AWS IAM Identity Center: User Guide
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# Table of Contents

What is IAM Identity Center? ................................................................. 1
IAM Identity Center features ........................................................................ 1
IAM Identity Center rename ......................................................................... 2
Legacy namespaces remain the same .......................................................... 2
Getting started ......................................................................................... 4
Prerequisites and considerations ............................................................... 4
  Are you new to AWS? ............................................................................. 4
  Prerequisites and considerations for specific environments .................... 4
Step 1: Enable IAM Identity Center .......................................................... 6
  Signing in when you're new to AWS ....................................................... 6
  Signing in when you're already using AWS ........................................... 6
  Enabling IAM Identity Center ............................................................. 7
Step 2: Confirm or change your identity source .......................................... 7
  Connect Active Directory or another IdP and specify a user .................... 8
  Use the default directory and create an IAM Identity Center user .......... 9
Step 3: Create an administrative permission set ........................................ 10
Step 4: Set up AWS account access for an administrative user .................. 11
Step 5: Sign in to the AWS access portal ................................................ 12
Step 6: Create a permission set that applies least-privilege permissions ....... 13
Step 7: Set up AWS account access for additional users (optional) .......... 14
Step 8: Set up access to your applications (optional) .................................. 15

Key concepts ......................................................................................... 16
Users, groups, and provisioning ............................................................... 16
  User name and email address uniqueness ............................................. 16
  Groups .............................................................................................. 16
  User and group provisioning ............................................................... 16
Identity Center enabled applications ....................................................... 17
  Considerations for sharing identity information in AWS accounts ......... 17
  Allow Identity Center enabled applications in AWS accounts .............. 18
SAML federation ..................................................................................... 18
User authentications ............................................................................... 18
  Authentication sessions ....................................................................... 18
OAuth 2.0 ............................................................................................ 19
  Supported grants ............................................................................... 20
  Access scopes .................................................................................. 20
Permission sets ...................................................................................... 21
  Predefined permissions ..................................................................... 21
  Custom permissions .......................................................................... 22
Workforce identities ............................................................................... 24
Use cases .............................................................................................. 24
  Enable single sign-on access to your AWS applications ....................... 24
  Enable single sign-on access to your Amazon EC2 Windows instances ... 25
Manage your identity source ................................................................. 25
  Considerations for changing your identity source ............................... 26
  Change your identity source .............................................................. 28
  Manage sign-in and attribute use for all identity source types ............... 29
Manage identities in IAM Identity Center ................................................. 33
  Connect to a Microsoft AD directory ................................................. 39
  Connect to an external identity provider .......................................... 51
Using the AWS access portal ................................................................. 86
  Accepting the invitation to join IAM Identity Center ......................... 87
  Signing up in the AWS access portal ............................................... 87
  Signing in to the AWS access portal ............................................... 88
  Resetting your user password ......................................................... 89
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS CLI and AWS SDK access</td>
<td>89</td>
</tr>
<tr>
<td>Bookmarking an IAM role</td>
<td>93</td>
</tr>
<tr>
<td>Registering a device for MFA</td>
<td>93</td>
</tr>
<tr>
<td>Customizing the AWS access portal URL</td>
<td>94</td>
</tr>
<tr>
<td>Multi-factor authentication</td>
<td>94</td>
</tr>
<tr>
<td>Available MFA types</td>
<td>95</td>
</tr>
<tr>
<td>Configure MFA</td>
<td>97</td>
</tr>
<tr>
<td>Manage MFA</td>
<td>101</td>
</tr>
<tr>
<td>Multi-account permissions</td>
<td>104</td>
</tr>
<tr>
<td>AWS account types</td>
<td>104</td>
</tr>
<tr>
<td>Assigning AWS account access</td>
<td>105</td>
</tr>
<tr>
<td>End-user experience</td>
<td>105</td>
</tr>
<tr>
<td>Enforcing and limiting access</td>
<td>106</td>
</tr>
<tr>
<td>Delegating and enforcing access</td>
<td>106</td>
</tr>
<tr>
<td>Limiting access to the identity store from member accounts</td>
<td>106</td>
</tr>
<tr>
<td>Delegated administration</td>
<td>107</td>
</tr>
<tr>
<td>Best practices</td>
<td>107</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>108</td>
</tr>
<tr>
<td>Register a member account</td>
<td>108</td>
</tr>
<tr>
<td>Deregister a member account</td>
<td>109</td>
</tr>
<tr>
<td>View which member account has been registered as the delegated administrator</td>
<td>109</td>
</tr>
<tr>
<td>Temporary elevated access</td>
<td>110</td>
</tr>
<tr>
<td>Validated AWS Security Partners for temporary elevated access</td>
<td>110</td>
</tr>
<tr>
<td>Temporary elevated access capabilities assessed for AWS partner validation</td>
<td>111</td>
</tr>
<tr>
<td>Single sign-on access to AWS accounts</td>
<td>111</td>
</tr>
<tr>
<td>Assign user access to AWS accounts</td>
<td>111</td>
</tr>
<tr>
<td>Remove user and group access</td>
<td>113</td>
</tr>
<tr>
<td>Delegate who can assign single sign-on access to users and groups in the management account</td>
<td>113</td>
</tr>
<tr>
<td>Create and manage permission sets</td>
<td>114</td>
</tr>
<tr>
<td>Create a permission set</td>
<td>114</td>
</tr>
<tr>
<td>Delegate permission set administration</td>
<td>116</td>
</tr>
<tr>
<td>Use IAM policies</td>
<td>116</td>
</tr>
<tr>
<td>Configure permission set properties</td>
<td>117</td>
</tr>
<tr>
<td>Referencing permission sets in resource policies, Amazon EKS, and AWS KMS</td>
<td>119</td>
</tr>
<tr>
<td>Delete permission sets</td>
<td>121</td>
</tr>
<tr>
<td>Attribute-based access control</td>
<td>122</td>
</tr>
<tr>
<td>Benefits</td>
<td>122</td>
</tr>
<tr>
<td>Checklist: Configuring ABAC in AWS using IAM Identity Center</td>
<td>123</td>
</tr>
<tr>
<td>Attributes for access control</td>
<td>124</td>
</tr>
<tr>
<td>IAM identity provider</td>
<td>128</td>
</tr>
<tr>
<td>Repair the IAM identity provider</td>
<td>129</td>
</tr>
<tr>
<td>Service-linked roles</td>
<td>129</td>
</tr>
<tr>
<td>Application assignments</td>
<td>130</td>
</tr>
<tr>
<td>Identity Center enabled applications</td>
<td>130</td>
</tr>
<tr>
<td>Constraining Identity Center enabled application use in AWS accounts</td>
<td>131</td>
</tr>
<tr>
<td>Add and configure an Identity Center enabled application</td>
<td>131</td>
</tr>
<tr>
<td>Remove an Identity Center enabled application</td>
<td>131</td>
</tr>
<tr>
<td>Cloud applications</td>
<td>132</td>
</tr>
<tr>
<td>Supported applications</td>
<td>132</td>
</tr>
<tr>
<td>Add and configure a cloud application</td>
<td>134</td>
</tr>
<tr>
<td>Custom SAML 2.0 applications</td>
<td>135</td>
</tr>
<tr>
<td>Add and configure a custom SAML 2.0 application</td>
<td>135</td>
</tr>
<tr>
<td>Manage certificates</td>
<td>136</td>
</tr>
<tr>
<td>Considerations before rotating a certificate</td>
<td>136</td>
</tr>
<tr>
<td>Rotate an IAM Identity Center certificate</td>
<td>136</td>
</tr>
<tr>
<td>Certificate expiration status indicators</td>
<td>138</td>
</tr>
<tr>
<td>Application properties</td>
<td>138</td>
</tr>
</tbody>
</table>
Additional quotas .................................................................................................................. 202
Troubleshooting .................................................................................................................. 204
  Issues regarding contents of SAML assertions created by IAM Identity Center .......... 204
  Specific users fail to synchronize into IAM Identity Center from an external SCIM provider .................................................... 204
  Users can't sign in when their user name is in UPN format ............................................ 205
  I get a 'Cannot perform the operation on the protected role' error when modifying an IAM role .................................................. 205
  Directory users cannot reset their password .................................................................. 206
  My user is referenced in a permission set but can't access the assigned accounts or applications .................................................. 206
  I cannot get my cloud application configured correctly .................................................. 206
  Error 'An unexpected error has occurred' when a user tries to sign in using an external identity provider .................................................. 207
  Error 'Attributes for access control failed to enable' ...................................................... 207
  I get a 'Browser not supported' message when I attempt to register a device for MFA ...................................................................................... 208
  Active Directory "Domain Users" group does not properly sync into IAM Identity Center .................................................. 208
  Invalid MFA credentials error ................................................................................. 208
  I get a 'An unexpected error has occurred' message when I attempt to register or sign in using an authenticator app ...................................................................................... 208
  My users are not receiving emails from IAM Identity Center ........................................ 209
  Error: You can't delete/modify/remove/assign access to permission sets provisioned in the management account .................................................. 209
Document history ............................................................................................................. 210
AWS Glossary ..................................................................................................................... 213
What is IAM Identity Center?

With AWS IAM Identity Center, you can manage sign-in security for your workforce identities, also known as workforce users. IAM Identity Center provides one place where you can create or connect workforce users and centrally manage their access across all their AWS accounts and applications. You can use multi-account permissions to assign your workforce users access to AWS accounts. You can use application assignments to assign your users access to IAM Identity Center enabled applications, cloud applications, and customer Security Assertion Markup Language (SAML 2.0) applications.

Note
Although the service name AWS Single Sign-On has been retired, the term single sign-on is still used throughout this guide to describe the authentication scheme that allows users to sign in one time to access multiple applications and websites.

IAM Identity Center features

IAM Identity Center includes the following core features:

Workforce identities

Human users who are members of your organization are also known as workforce identities or workforce users. You can create workforce users and groups in IAM Identity Center, or connect and synchronize to an existing set of users and groups in your own identity source for use across all your AWS accounts and applications. Supported identity sources include Microsoft Active Directory Domain Services, and external identity providers such as Okta Universal Directory or Microsoft Azure AD.

Application assignments for SAML applications

With application assignments, you can grant your workforce users in IAM Identity Center single sign-on access to SAML 2.0 applications, such as Salesforce and Microsoft 365. Your users can access these applications in a single place, without the need for you to set up separate federation.

Identity Center enabled applications

AWS applications and services, such as Amazon Managed Grafana, Amazon Monitron, and Amazon SageMaker Studio Notebooks, discover and connect to IAM Identity Center automatically to receive sign-in and user directory services. This provides users with a consistent single sign-on experience to these applications with no additional configuration of the applications. Because the applications share a common view of users, groups, and group membership, users also have a consistent experience when sharing application resources with others.

Multi-account permissions

With multi-account permissions you can plan for and centrally implement IAM permissions across multiple AWS accounts at one time without needing to configure each of your accounts manually. You can create fine-grained permissions based on common job functions or define custom permissions that meet your security needs. You can then assign those permissions to workforce users to control their access over specific accounts.

AWS access portal

The AWS access portal provides your workforce users with one-click access to all their assigned AWS accounts and cloud applications through a simple web portal.
IAM Identity Center rename

On July 26, 2022, AWS Single Sign-On was renamed to AWS IAM Identity Center. For existing customers, the following table is meant to describe some of the more common term changes that have been updated throughout this guide as a result of the rename.

<table>
<thead>
<tr>
<th>Legacy term</th>
<th>Current term</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS SSO user or SSO user</td>
<td>workforce user or user</td>
</tr>
<tr>
<td>AWS SSO user portal or user portal</td>
<td>AWS access portal</td>
</tr>
<tr>
<td>AWS SSO-integrated applications</td>
<td>Identity Center enabled applications</td>
</tr>
<tr>
<td>AWS SSO directory</td>
<td>Identity Center directory</td>
</tr>
<tr>
<td>AWS SSO store or AWS SSO identity store</td>
<td>identity store used by IAM Identity Center</td>
</tr>
</tbody>
</table>

The following table describes the applicable user, developer and API reference guide name changes that also took place as a result of this rename.

<table>
<thead>
<tr>
<th>Legacy guide</th>
<th>Current guide</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS Single Sign-On API Reference Guide</td>
<td>IAM Identity Center API Reference</td>
</tr>
<tr>
<td>AWS Single Sign-On Identity Store API Reference Guide</td>
<td>Identity Store API Reference</td>
</tr>
<tr>
<td>AWS Single Sign-On OIDC API Reference Guide</td>
<td>IAM Identity Center OIDC API Reference</td>
</tr>
</tbody>
</table>

Legacy namespaces remain the same

The sso and identitystore API namespaces along with the following related namespaces remain unchanged for backward compatibility purposes.

- CLI commands
  - `aws configure sso`
  - `identitystore`
  - `sso`
  - `sso-admin`
  - `sso-oidc`
  - Managed policies containing AWSSSO and AWSIdentitySync prefixes
  - Service endpoints containing sso and identitystore
  - AWS CloudFormation resources containing AWS::SSO prefixes
• **Service-linked role** containing AWSServiceRoleForSSO
• Console URLs containing sso and singlesignon
• Documentation URLs containing singlesignon
Getting started

The topics in this section will help you get started with IAM Identity Center.

Topics
- Prerequisites and considerations (p. 4)
- Step 1: Enable IAM Identity Center (p. 6)
- Step 2: Confirm your identity source (p. 7)
- Step 3: Create an administrative permission set (p. 10)
- Step 4: Set up AWS account access for an IAM Identity Center administrative user (p. 11)
- Step 5: Sign in to the AWS access portal with your IAM Identity Center administrative user credentials (p. 12)
- Step 6: Create a permission set that applies least-privilege permissions (p. 13)
- Step 7: Set up AWS account access for additional users (optional) (p. 14)
- Step 8: Set up single sign-on access to your applications (optional) (p. 15)

Prerequisites and considerations

The following topics provide information about prerequisites and other considerations for setting up IAM Identity Center.

Topics
- Are you new to AWS? (p. 4)
- Prerequisites and considerations for specific environments (p. 4)

Are you new to AWS?

If you don’t have an AWS account, sign up for one. After you create an AWS account, proceed to Step 1: Enable IAM Identity Center (p. 6).

Prerequisites and considerations for specific environments

The following topics provide guidance for setting up IAM Identity Center for specific environments. Review the guidance that applies to your environment before you proceed to Step 1: Enable IAM Identity Center (p. 6).

Topics
- Active Directory or an external IdP (p. 5)
- AWS Organizations (p. 5)
- IAM roles (p. 5)
- Next-generation firewalls and secure web gateways (p. 6)
Prerequisites and considerations for specific environments

Active Directory or an external IdP

If you're already managing users and groups in Active Directory or an external IdP, we recommend that you consider connecting this identity source when you enable IAM Identity Center and choose your identity source. Doing this before you create any users and groups in the default Identity Center directory will help you avoid the additional configuration that is required if you change your identity source later.

If you want to use Active Directory as your identity source, your configuration must meet the following prerequisites:

- If you're using AWS Managed Microsoft AD, you must enable IAM Identity Center in the same AWS Region where your AWS Managed Microsoft AD directory is set up. IAM Identity Center stores the assignment data in the same Region as the directory. To administer IAM Identity Center, you might need to switch to the Region where IAM Identity Center is configured. Also, note that the AWS access portal uses the same access URL as your directory.
- Use an Active Directory residing in the management account:
  You must have an existing AD Connector or AWS Managed Microsoft AD directory set up in AWS Directory Service, and it must reside within your AWS Organizations management account. You can connect only one AD Connector directory or one directory in AWS Managed Microsoft AD at a time. If you need to support multiple domains or forests, use AWS Managed Microsoft AD. For more information, see:
  - Connect a directory in AWS Managed Microsoft AD to IAM Identity Center (p. 39)
  - Connect a self-managed directory in Active Directory to IAM Identity Center (p. 40)
- Use an Active Directory residing in the delegated admin account:
  If you plan to enable IAM Identity Center delegated admin and use Active Directory as your IAM Identity Center identity source, you can use an existing AD Connector or AWS Managed Microsoft AD directory set up in AWS Directory residing in the delegated admin account.
  If you decide to change IAM Identity Center identity source from any other source to Active Directory, or change it from Active Directory to any other source, the directory must reside in (be owned by) the IAM Identity Center delegated administrator member account if one exists; otherwise, it must be in the management account.

AWS Organizations

Your AWS account must be managed by AWS Organizations. If you haven't set up an organization, you don't have to. When you enable IAM Identity Center, you will choose whether to have AWS create an organization for you.

If you've already set up AWS Organizations, make sure that all features are enabled. For more information, see Enabling All Features in Your Organization in the AWS Organizations User Guide.

To enable IAM Identity Center, you must sign in to the AWS Management Console by using the credentials of your AWS Organizations management account. You can't enable IAM Identity Center while signed in with credentials from an AWS Organizations member account. For more information, see Creating and Managing an AWS Organization in the AWS Organizations User Guide.

IAM roles

If you've already configured IAM roles in your AWS account, we recommend that you check whether your account is approaching the quota for IAM roles. For more information, see IAM object quotas.

If you're nearing the quota, consider requesting a quota increase. Otherwise, you might experience problems with IAM Identity Center when you provision permission sets to accounts that have exceeded...
The following topics provide information about how to sign into the AWS Management Console and enable IAM Identity Center.

**Topics**
- Signing in when you're new to AWS (p. 6)
- Signing in when you're already using AWS (p. 6)
- Enabling IAM Identity Center (p. 7)

**Step 1: Enable IAM Identity Center**

If you filter access to specific AWS domains or URL endpoints by using a web content filtering solution such as NGFWs or SWGs, you must add the following domains or URL endpoints to your web-content filtering solution allow-lists. Doing so enables IAM Identity Center to function correctly.

**Specific DNS domains**
- *.awsapps.com (http://awsapps.com/)
- *.signin.aws

**Specific URL endpoints**
- https://[yourdirectory].awsapps.com/start
- https://[yourdirectory].awsapps.com/login
- https://[yourregion].signin.aws/platform/login

**Next-generation firewalls and secure web gateways**

If you filter access to specific AWS domains or URL endpoints by using a web content filtering solution such as NGFWs or SWGs, you must add the following domains or URL endpoints to your web-content filtering solution allow-lists. Doing so enables IAM Identity Center to function correctly.

**Specific DNS domains**
- *.awsapps.com (http://awsapps.com/)
- *.signin.aws

**Specific URL endpoints**
- https://[yourdirectory].awsapps.com/start
- https://[yourdirectory].awsapps.com/login
- https://[yourregion].signin.aws/platform/login

**Signing in when you're new to AWS**

When you create an AWS account, you begin with one sign-in identity that has complete access to all AWS services and resources in the account. This identity is called the AWS account root user and is accessed by signing in with the email address and password that you used to create the account. We strongly recommend that you don't use the root user for your everyday tasks. Safeguard your root user credentials and use them to perform the tasks that only the root user can perform. For the complete list of tasks that require you to sign in as the root user, see Tasks that require root user credentials in the IAM User Guide.

**Note**

To enhance the security of your root user credentials, make sure that multi-factor authentication (MFA) is activated for your root user before you proceed. For more information, see Activate MFA on the AWS account root user in the AWS Account Management Reference Guide.

**Signing in when you're already using AWS**

If you're already using AWS and you're enabling IAM Identity Center to access AWS production accounts, sign in to the AWS Management Console using your AWS Identity and Access Management (IAM) credentials with administrative permissions.
Enabling IAM Identity Center

Complete the following steps to sign in to the AWS Management Console and enable IAM Identity Center.

To sign in and enable IAM Identity Center

1. Do either of the following to sign in to the AWS Management Console.
   - **New to AWS (root user)** – Sign in as the account owner by choosing Root user and entering your AWS account email address. On the next page, enter your password.
   - **Already using AWS (IAM credentials)** – Sign in using your IAM credentials with administrative permissions.

2. Open the IAM Identity Center console.

3. Under Enable IAM Identity Center, choose Enable.

4. IAM Identity Center requires AWS Organizations. If you haven't set up an organization, you must choose whether to have AWS create one for you. Choose Create AWS organization to complete this process.

   AWS Organizations automatically sends a verification email to the address that is associated with your management account. There might be a delay before you receive the verification email. Verify your email address within 24 hours.

   **Note**
   If you are using a multi-account environment, we recommend that you configure delegated administration. With delegated administration, you can limit the number of people who require access to the management account in AWS Organizations. For more information, see Delegated administration (p. 107).

Step 2: Confirm your identity source

Your identity source in IAM Identity Center defines where your users and groups are managed. You can choose one of the following as your identity source:

- **Identity Center directory (default identity source)** – When you enable IAM Identity Center for the first time, it is automatically configured with an Identity Center directory as your default identity source. This is where you create your users and groups, and assign their level of access to your AWS accounts and applications.
- **Active Directory** – Choose this option if you want to continue managing users in either your AWS Managed Microsoft AD directory using AWS Directory Service or your self-managed directory in Active Directory (AD).
- **External identity provider** – Choose this option if you want to manage users in an external identity provider (IdP) such as Okta or Azure Active Directory.

After you enable IAM Identity Center, you must choose your identity source. The identity source that you choose determines where IAM Identity Center searches for users and groups that need single sign-on access. After you choose your identity source, you’ll create or specify a user and assign them administrative permissions to your AWS account.

**Important**
If you’re already managing users and groups in Active Directory or an external identity provider (IdP), we recommend that you consider connecting this identity source when you enable IAM
Identity Center and choose your identity source. This should be done before you create any users and groups in the default Identity Center directory and make any assignments. If you're already managing users and groups in one identity source in IAM Identity Center, changing to a different identity source might remove all user and group assignments that you configured in IAM Identity Center. If this occurs, all users, including the administrative user in IAM Identity Center, will lose single sign-on access to their AWS accounts and applications. For more information, see Considerations for changing your identity source (p. 26).

Topics
- Connect Active Directory or an external IdP and specify a user (p. 8)
- Use the default directory and create an IAM Identity Center user (p. 9)

**Connect Active Directory or an external IdP and specify a user**

If you're already using Active Directory or an external identity provider (IdP), the following topics will help you connect your directory to IAM Identity Center.

You can connect an AWS Managed Microsoft AD directory, a self-managed directory in Active Directory, or an external IdP with IAM Identity Center. If you plan to connect an AWS Managed Microsoft AD directory or a self-managed directory in Active Directory, make sure that your Active Directory configuration meets the prerequisites in Active Directory or an external IdP (p. 5).

**Note**
As a security best practice, we strongly recommend that you enable multi-factor authentication. If you plan to connect an AWS Managed Microsoft AD directory or a self-managed directory in Active Directory and you're not using RADIUS MFA with AWS Directory Service, enable MFA in IAM Identity Center. If you plan to use an external identity provider, note that the external IdP, not IAM Identity Center, manages MFA settings. MFA in IAM Identity Center is not supported for use by external IdPs. For more information, see Prompt users for MFA (p. 98).

**AWS Managed Microsoft AD**
1. Review the guidance in Connect to a Microsoft AD directory (p. 39).
2. Follow the steps in Connect a directory in AWS Managed Microsoft AD to IAM Identity Center (p. 39).
3. Configure Active Directory to synchronize the user to whom you want to grant administrative permissions into IAM Identity Center. For more information, see Synchronize an administrative user into IAM Identity Center (p. 9).

**Self-managed directory in Active Directory**
1. Review the guidance in Connect to a Microsoft AD directory (p. 39).
2. Follow the steps in Connect a self-managed directory in Active Directory to IAM Identity Center (p. 40).
3. Configure Active Directory to synchronize the user to whom you want to grant administrative permissions into IAM Identity Center. For more information, see Synchronize an administrative user into IAM Identity Center (p. 9).

**External IdP**
1. Review the guidance in Connect to an external identity provider (p. 51).
2. Follow the steps in How to connect to an external identity provider (p. 52).
3. Configure your IdP to provision users into IAM Identity Center.

   Note
   Before you set up automatic, group-based provisioning of all your workforce identities from your IdP into IAM Identity Center, we recommend that you sync the one user to whom you want to grant administrative permissions into IAM Identity Center.

Synchronize an administrative user into IAM Identity Center

After you connect your directory to IAM Identity Center, you can specify a user to whom you want to grant administrative permissions, and then synchronize that user from your directory into IAM Identity Center.

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, choose Actions, and then choose Manage Sync.
4. On the Manage Sync page, choose the Users tab, and then choose Add users and groups.
5. On the Users tab, under User, enter the exact user name and choose Add.
6. Under Added Users and Groups, do the following:
   a. Confirm that the user to whom you want to grant administrative permissions is specified.
   b. Select the check box to the left of the user name.
   c. Choose Submit.
7. In the Manage sync page, the user that you specified displays in the Users in sync scope list.
8. In the navigation pane, choose Users.
9. On the Users page, it might take some time for the user that you specified to appear in the list. Choose the refresh icon to update the list of users.

Next step: Create an administrative permission set

At this point, your user doesn't have access to the management account. You will set up administrative access to this account by creating an administrative permission set and assigning the user to that permission set. For more information, see Step 3: Create an administrative permission set (p. 10).

Use the default directory and create an IAM Identity Center user

When you enable IAM Identity Center for the first time, it is automatically configured with an Identity Center directory as your default identity source. Complete the following steps to create an IAM Identity Center user.

1. Do either of the following to sign in to the AWS Management Console.
   a. **New to AWS (root user)** – Sign in as the account owner by choosing Root user and entering your AWS account email address. On the next page, enter your password.
   b. **Already using AWS (IAM credentials)** – Sign in using your IAM credentials with administrative permissions.
2. Open the IAM Identity Center console.
3. Follow the steps in Add users (p. 33) to create a user.

When you specify the user details, you can either send an email with the password setup instructions (this is the default option) or generate a one-time password. If you send an email, make sure that you specify an email address that you can access.

4. After you add the user, return to this procedure. If you kept the default option to send an email with the password setup instructions, do the following:

   a. You’ll receive an email with the subject Invitation to join AWS Single Sign-On. Open the email and choose Accept invitation.

   b. On the New user sign up page, enter and confirm a password, and then choose Set new password.

   Note
   Make sure to save your password. You’ll need it later to sign into the AWS access portal using your administrative credentials (p. 12).

Next step: Create an administrative permission set

At this point, your user doesn't have access to the management account. You will set up administrative access to this account by creating an administrative permission set and assigning the user to that permission set. For more information, see Step 3: Create an administrative permission set (p. 10).

---

Step 3: Create an administrative permission set

Permission sets are stored in IAM Identity Center and define the level of access that users and groups have to an AWS account. Perform the following steps to create a permission set that grants administrative permissions.

1. Do either of the following to sign in to the AWS Management Console.

   • **New to AWS (root user)** – Sign in as the account owner by choosing Root user and entering your AWS account email address. On the next page, enter your password. For more information, see Signing in when you're new to AWS (p. 6).

   • **Already using AWS (IAM credentials)** – Sign in using your IAM credentials with administrative permissions.

2. Open the IAM Identity Center console.

3. In the IAM Identity Center navigation pane, under Multi-account permissions, choose Permission sets.

4. Choose Create permission set.

5. 1. On the **Select permission set type** page, in the **Permission set type** section, choose Predefined permission set.

2. In the **Policy for predefined permission set** section, choose AdministratorAccess and choose Next.

   The default settings grant full access to AWS services and resources using the AdministratorAccess predefined permission set. The predefined AdministratorAccess permission set uses the AdministratorAccess AWS managed policy.

6. On the **Specify permission set details** page, keep the default settings and choose Next. The default setting limits your session to one hour.

7. On the **Review and create** page, confirm the following:
1. For **Step 1: Select permission set type**, the AWS managed policy is **AdministratorAccess**.
2. For **Step 2: Define permission set details**, the permission set name is **AdministratorAccess**.
3. Choose **Create**.

## Step 4: Set up AWS account access for an IAM Identity Center administrative user

To set up AWS account access for an IAM Identity Center administrative user, you must assign the user to the **AdministratorAccess** permission set.

1. Do either of the following to sign in to the AWS Management Console.
   - **New to AWS (root user)** – Sign in as the account owner by choosing **Root user** and entering your AWS account email address. On the next page, enter your password.
     
     For more information, see [Signing in when you're new to AWS](p. 6).
   - **Already using AWS (IAM credentials)** – Sign in using your IAM credentials with administrative permissions.
2. Open the **IAM Identity Center console**.
3. In the navigation pane, under **Multi-account permissions**, choose **AWS accounts**.
4. On the **AWS accounts** page, a tree view list of your organization displays. Select the check box next to the AWS account to which you want to assign administrative access. If you have multiple accounts in your organization, select the check box next to the management account.
5. Choose **Assign users or groups**.
6. For **Step 1: Select users and groups**, on the **Assign users and groups to "AWS account name"** page, do the following:
   1. On the **Users** tab, select the user to whom you want to grant administrative permissions.
      To filter the results, start typing the name of the user that you want in the search box.
   2. After you confirm that the correct user is selected, choose **Next**.
7. For **Step 2: Select permission sets**, on the **Assign permission sets to "AWS account name"** page, under **Permission sets**, select the **AdministratorAccess** permission set.
8. Choose **Next**.
9. For **Step 3: Review and Submit**, on the **Review and submit assignments to "AWS account name"** page, do the following:
   1. Review the selected user and permission set.
   2. After you confirm that the correct user is assigned to the **AdministratorAccess** permission set, choose **Submit**.

   **Important**
   The user assignment process might take a few minutes to complete. Leave this page open until the process successfully completes.
10. If either of the following applies, follow the steps in [Prompt users for MFA](p. 98) to enable MFA for IAM Identity Center:
   - You're using the default Identity Center directory as your identity source.
   - You're using an AWS Managed Microsoft AD directory or a self-managed directory in Active Directory as your identity source and you're not using RADIUS MFA with AWS Directory Service.
Note
If you're using an external identity provider, note that the external IdP, not IAM Identity Center, manages MFA settings. MFA in IAM Identity Center is not supported for use by external IdPs.

When you set up account access for the administrative user, IAM Identity Center creates a corresponding IAM role. This role, which is controlled by IAM Identity Center, is created in the relevant AWS account, and the policies specified in the permission set are attached to the role.

Step 5: Sign in to the AWS access portal with your IAM Identity Center administrative user credentials

The AWS access portal provides IAM Identity Center users with single sign-on access to all their assigned AWS accounts and cloud applications through a web portal.

Complete the following steps to confirm that you can sign in to the AWS access portal by using the credentials of the IAM Identity Center administrative user, and that you can access the AWS account.

Sign in to the AWS access portal

1. Do either of the following to sign in to the AWS Management Console.
   - **New to AWS (root user)** – Sign in as the account owner by choosing Root user and entering your AWS account email address. On the next page, enter your password. For more information, see Signing in when you're new to AWS (p. 6).
   - **Already using AWS (IAM credentials)** – Sign in with your IAM credentials and select an admin role.

2. Open the IAM Identity Center console.

3. In the navigation pane, choose Dashboard.

4. On the Dashboard page, under Settings summary, choose the AWS access portal URL.

5. Sign in by using either of the following:
   - If you're using Active Directory or an external identity provider (IdP) as your identity source, sign in by using the credentials of the Active Directory or IdP user that you assigned to the AdministratorAccess permission set in IAM Identity Center.
   - If you're using the default Identity Center directory as your identity source, sign in by using the user name that you specified when you created the user and the new password that you specified for the user. For more information, see Use the default directory and create an IAM Identity Center user (p. 9).

After you've signed in to the AWS access portal, if you're presented with the AWS account icon, follow the procedure in the Legacy AWS access portal tab.

Access your AWS account in the AWS access portal

AWS access portal

1. In the AWS accounts section, locate your AWS account and expand it to show the available roles. The name of the permission set to which the user is assigned displays as an available role in the AWS access portal. Because you assigned this user to the AdministratorAccess permission
Step 6: Create a permission set that applies least-privilege permissions

With IAM Identity Center, you can assign multiple permission sets to the same user. To follow the best practice of applying least-privilege permissions, after you create your administrative user, create a more restrictive permission set and assign it to the same user. That way, you can access your AWS account with only the permissions that you require, rather than administrative permissions.

For example, if you're a developer, after you create your administrative user in IAM Identity Center, you can create a new permission set that grants PowerUserAccess permissions, and then assign that permission set to the same user. Unlike the administrative permission set, which uses AdministratorAccess permissions, the PowerUserAccess permission set doesn't allow management of users and groups. When you sign into the AWS access portal to access your AWS account, you can choose PowerUserAccess rather than the AdministratorAccess to perform development tasks in the account.
To create a permission set, follow the steps in Create a permission set (p. 114). Keep the following considerations in mind:

- **To get started quickly with creating a more restrictive permission set, use a predefined permission set rather than a custom permission set.**

  With a predefined permission set, which uses predefined permissions (p. 21), you choose a single AWS managed policy from a list of available policies. Each policy grants a specific level of access to AWS services and resources or permissions for a common job function. For information about each of these policies, see AWS managed policies for job functions.

- **You can configure the session duration for a permission set to control the length of time that a user is signed into an AWS account.**

  When users federate into their AWS account and use the AWS Management Console or the AWS Command Line Interface (AWS CLI), IAM Identity Center uses the session duration setting on the permission set to control the duration of the session. By default, the value for **Session duration**, which determines the length of time that a user can be signed into an AWS account before AWS signs the user out of the session, is set to one hour. You can specify a maximum value of 12 hours. For more information, see Set session duration (p. 117).

- **You can also configure the AWS access portal session duration to control the length of time that a workforce user is signed into the portal.**

  By default, the value for **Maximum session duration**, which determines the length of time that a workforce user can be signed in to the AWS access portal before they must re-authenticate, is eight hours. You can specify a maximum value of 90 days. For more information, see Configure the duration of your users' AWS access portal sessions (p. 29).

- **When you sign into the AWS access portal, choose the role that provides least-privilege permissions.**

  Each permission set that you create and assign to your user displays as an available role in the AWS access portal. When you sign in to the portal as that user, choose the role that corresponds to the most restrictive permission set that you can use to perform tasks in the account, rather than AdministratorAccess.

- **You can add other users to IAM Identity Center and assign existing or new permission sets to those users.**

  For information, see the next topic, Step 7: Set up AWS account access for additional users (optional) (p. 14).

---

**Step 7: Set up AWS account access for additional users (optional)**

Now that you’ve created an administrative user in IAM Identity Center and assigned an additional permission set that you can use to perform tasks with least-privileged permissions, you can add other users. You can add users by doing any of the following:

- **Creating your users in IAM Identity Center. This is the quickest way to get started with IAM Identity Center. (p. 33)**

- **Synchronizing your users from Active Directory (p. 44)**

- **Synchronizing your users from your external identity provider (IdP) (p. 51)**
Step 8: Set up single sign-on access to your applications (optional)

With IAM Identity Center, you can use AWS applications that are integrated with IAM Identity Center, cloud applications for which AWS provides preintegration, and custom SAML 2.0 applications. The configuration steps for setting up single sign-on access to applications vary based on the application type.

- Add and configure an Identity Center enabled application (p. 131)
- Add and configure a cloud application (p. 134)
- Add and configure a custom SAML 2.0 application (p. 135)

For more information about supported application types, see Application assignments (p. 130).

After you follow the guidance in the relevant topics, your users can access your applications from within their AWS access portal based on the permissions that you assigned.
Key concepts

You'll get more out of AWS IAM Identity Center if you become familiar with key concepts relating to SAML federation, user authentication, and IAM permissions.

Topics
- Users, groups, and provisioning (p. 16)
- Identity Center enabled applications (p. 17)
- SAML federation (p. 18)
- User authentications (p. 18)
- OAuth 2.0 (p. 19)
- Permission sets (p. 21)

Users, groups, and provisioning

IAM Identity Center manages access to all your AWS Organizations accounts, Identity Center enabled applications, and other business applications that support the Security Assertion Markup Language (SAML) 2.0 standard.

User name and email address uniqueness

When working in IAM Identity Center, users must be uniquely identifiable. IAM Identity Center implements a user name that is the primary identifier for your users. Although most people set the user name equal to a user’s email address, IAM Identity Center and the SAML standard do not require this. However, a large percentage of SAML-based applications use an email address as the unique identifier for users. They obtain this from assertions that a SAML identity provider sends during authentication. Such applications depend upon the uniqueness of email addresses for each user. As such, IAM Identity Center allows you to specify something other than an email address for user sign-in. IAM Identity Center requires that all user names and email addresses for your users are non-NULL and unique.

Groups

Groups are a logical combination of users that you define. You can create groups and add users to the groups. IAM Identity Center does not support adding a group to a group (nested groups). Groups are useful when assigning access to AWS accounts and applications. Rather than assign each user individually, you give permissions to a group. Later, as you add or remove users from a group, the user dynamically gets or loses access to accounts and applications that you assigned to the group.

User and group provisioning

You can create users and groups directly in IAM Identity Center, or work with users and groups you have in Active Directory or another external identity provider. Before IAM Identity Center can be used to assign users and groups access permissions in an AWS account, IAM Identity Center must first be aware of the users and groups. Similarly, Identity Center enabled applications can work with users and groups...
Identity Center enabled applications

IAM Identity Center provides support for integration by other AWS applications and services. These applications can use IAM Identity Center to perform authentication and can access information about users and groups. For example, a user might sign into an application that generates performance dashboards for resources that the user controls. The user might then share the dashboard by looking up a group in IAM Identity Center.

To enable this capability, IAM Identity Center provides an identity store which contains user and group attributes, excluding sign-in credentials.

You can use either of the following methods to keep the users and groups in your IAM Identity Center identity store updated:

- Use the IAM Identity Center identity store as your main identity source. If you choose this method, you manage your users and groups from within the IAM Identity Center console or AWS CLI.
- Set up provisioning (synchronization) of users and groups coming from either of the following identity sources to your IAM Identity Center identity store:
  - **Active Directory** - For more information, see Connect to a Microsoft AD directory (p. 39).
  - **External identity provider** - For more information, see Connect to an external identity provider (p. 51).

If you choose this provisioning method, you continue managing your users and groups from within your identity source and those changes would get synced to the IAM Identity Center identity store.

Regardless of which identity source you choose, IAM Identity Center has the ability to share the user and group information with Identity Center enabled applications. This capability makes it possible to connect an identity source to IAM Identity Center once and then share identity information with multiple applications in the AWS Cloud. This eliminates the need to set up federation and identity provisioning with each application independently. This sharing feature also makes it easy to give users in your workforce access to many applications in different AWS accounts.

Considerations for sharing identity information in AWS accounts

The attributes contained in IAM Identity Center are the basic attributes commonly used across applications. These attributes include information such as first and last name, phone number, email address, address, and preferred language. You might want to consider which applications and which accounts can use this personally identifiable information.

To control access to this information, you have two options. First, you can choose to enable access in only the AWS Organizations management account or in all AWS Organizations accounts. Second, you can use service control policies (SCPs) to control which applications can access the information in which AWS Organizations accounts. For example, if you enable access in the AWS Organizations management account only, then applications in member accounts have no access to the information. However, if you enable access in all accounts, you can use SCPs to disallow access by all applications except those you want to permit.
Allow Identity Center enabled applications in AWS accounts

When you enable IAM Identity Center for the first time, AWS allows use of Identity Center enabled applications automatically in all AWS Organizations accounts. To constrain applications, you must implement SCPs.

If you enabled IAM Identity Center prior to November 25, 2019, IAM Identity Center disables the use of Identity Center enabled applications in all AWS Organizations accounts. To use Identity Center enabled applications, you must enable them in the management account and optionally enable them in member accounts. If you enable them in the management account only, you can enable them in member accounts in the future. To enable these applications, use the **Enable access** option in the IAM Identity Center **Settings** page in the Identity Center enabled applications section.

SAML federation

IAM Identity Center supports identity federation with SAML (Security Assertion Markup Language) 2.0. SAML 2.0 is an industry standard used for securely exchanging SAML assertions that pass information about a user between a SAML authority (called an identity provider or IdP), and a SAML consumer (called a service provider or SP). IAM Identity Center uses this information to provide federated single sign-on access for those users who are authorized to use applications within the AWS access portal.

IAM Identity Center adds SAML IdP capabilities to either your AWS Managed Microsoft AD or your IAM Identity Center identity store. Users can then single sign-on into services that support SAML, including the AWS Management Console and third-party applications such as Microsoft 365, SAP Concur, and Salesforce.

User authentications

A user signs in to the AWS access portal using their user name. When they do, IAM Identity Center redirects the request to the IAM Identity Center authentication service based on the directory associated with the user email address. Once authenticated, users have single sign-on access to any of the AWS accounts and third-party software-as-a-service (SaaS) applications that show up in the portal without additional sign-in prompts. This means that users no longer need to keep track of multiple account credentials for the various assigned AWS applications that they use on a daily basis.

Authentication sessions

There are two types of authentication sessions maintained by IAM Identity Center: one to represent the users’ sign in to IAM Identity Center, and another to represent the users’ access to IAM Identity Center enabled applications, such as Amazon SageMaker Studio or Amazon Managed Grafana. Each time a user signs in to IAM Identity Center, a sign in session is created for the duration configured in Identity Center, which can be up to 90 days. For more information, see Manage IAM Identity Center integrated application sessions (p. 29). Each time the user accesses an Identity Center enabled application, the IAM Identity Center sign in session is used to obtain an IAM Identity Center application session for that application. IAM Identity Center application sessions have a refreshable 1-hour lifetime – that is, IAM Identity Center application sessions are automatically refreshed every hour as long as the IAM Identity Center sign in session from which they were obtained is still valid. When the user uses IAM Identity Center to access the AWS Management Console or CLI, the IAM Identity Center sign in session is used to obtain an IAM session, as specified in the corresponding IAM Identity Center permission set (more
specifically, IAM Identity Center assumes an IAM role, which IAM Identity Center manages, in the target account).

When you disable or delete a user in IAM Identity Center, that user will immediately be prevented from signing in to create new IAM Identity Center sign in sessions. IAM Identity Center sign in sessions are cached for one hour, which means that when you disable or delete a user while they have an active IAM Identity Center sign in session, their existing IAM Identity Center sign in session will continue for up to an hour, depending on when the sign in session was last refreshed. During this time, the user can initiate new IAM Identity Center application and IAM role sessions.

After the IAM Identity Center sign in session expires, the user can no longer initiate new IAM Identity Center application or IAM role sessions. However, IAM Identity Center application sessions can also be cached for up to an hour, such that the user may retain access to an Identity Center enabled application for up to an hour after the IAM Identity Center sign in session has expired. Any existing IAM role sessions will continue based on the duration configured in the IAM Identity Center permission set (admin-configurable, up to 12 hours).

The table below summarizes these behaviors:

<table>
<thead>
<tr>
<th>User experience / system behavior</th>
<th>Time after user is disabled / deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>User can no longer sign in to IAM Identity Center; user cannot obtain a new IAM Identity Center sign in session</td>
<td>None (effective immediately)</td>
</tr>
<tr>
<td>User can no longer start new application or IAM role sessions via IAM Identity Center</td>
<td>Up to 1 hour</td>
</tr>
<tr>
<td>User can no longer access any Identity Center enabled applications (all app sessions are terminated)</td>
<td>Up to 2 hours (up to 1 hour for IAM Identity Center sign in session expiry, plus up to 1 hour for IAM Identity Center app session expiry)</td>
</tr>
<tr>
<td>User can no longer access any AWS accounts through IAM Identity Center</td>
<td>Up to 13 hours (up to 1 hour for IAM Identity Center sign in session expiry, plus up to 12 hours for administrator-configured IAM role session expiry per the IAM Identity Center session duration settings for the permission set)</td>
</tr>
</tbody>
</table>

For more information about sessions, see [Set session duration](#).
Supported grants

OAuth 2.0 framework specification provides different grant types to support variety of clients as well as a specification on creating a custom grant type. A grant type refers to the way an application gets an access token. IAM Identity Center currently supports the following grant types.

Device authorization grant

IAM Identity Center currently supports portions of the OAuth 2.0 device authorization grant (RFC 8628). The OIDC service allows applications to register as an OAuth client and use the device authorization grant flow to generate an access token for accessing IAM Identity Center protected APIs. To use this grant flow, an application must first register a public client with the IAM Identity Center OIDC service. Once registered, the OIDC service provides the application with a client ID and a client secret, which you can use to generate tokens using the device authorization grant.

When the application needs to access a protected resource in the future, it sends a request to the OIDC service to initiate device authorization. This request returns a verification URL and a device code. The IAM Identity Center authenticated user needs to use this device code and explicitly grant the application access to the requested resources. Once the user has granted access, the application can exchange the device code for an access token and a refresh token.

Access scopes

A scope defines the specific permissions or access rights that an OAuth client requests from a user or an authorization server to perform certain actions or access particular resources on behalf of the user. Scopes are a way for a resource server to group permissions related to actions and resources, and they specify the coarse grained operations that clients can request.

OIDC service clients use scope values as defined in section 3.3 of OAuth 2.0 (RFC6749) to specify what access privileges are being requested for an access token. Scopes associated with an access token determine what resources will be available when they are used to access protected resources such as IAM Identity Center integrated service APIs.

Access scopes supported by the IAM Identity Center OIDC service when registering a public client

<table>
<thead>
<tr>
<th>Scope</th>
<th>Description</th>
<th>Regions supported</th>
<th>Services supported by</th>
</tr>
</thead>
<tbody>
<tr>
<td>sso:account:access</td>
<td>Access IAM Identity Center managed accounts and permission sets.</td>
<td>All Regions supported by IAM Identity Center</td>
<td>IAM Identity Center</td>
</tr>
<tr>
<td>codewhisperer:compliance</td>
<td>Amazon CodeWhisperer to detect security vulnerabilities by analyzing your code.</td>
<td>US East (N. Virginia) (us-east-1) only</td>
<td>AWS Builder ID</td>
</tr>
<tr>
<td>codewhisperer:analysis</td>
<td>Amazon CodeWhisperer to generate suggestions, in code, based on both existing code and natural language comments in your IDE.</td>
<td>US East (N. Virginia) only</td>
<td>AWS Builder ID</td>
</tr>
<tr>
<td>codecatalyst:read_write</td>
<td>Read and write to your Amazon CodeCatalyst resources, allowing access to all your existing resources.</td>
<td>US East (N. Virginia) only</td>
<td>AWS Builder ID</td>
</tr>
</tbody>
</table>
Permission sets

A permission set is a template that you create and maintain that defines a collection of one or more IAM policies. Permission sets simplify the assignment of AWS account access for users and groups in your organization. For example, you can create a Database Admin permission set that includes policies for administering AWS RDS, DynamoDB, and Aurora services, and use that single permission set to grant access to a list of target AWS accounts within your AWS Organization for your database administrators.

IAM Identity Center assigns access to a user or group in one or more AWS accounts with permission sets. When you assign a permission set, IAM Identity Center creates corresponding IAM Identity Center-controlled IAM roles in each account, and attaches the policies specified in the permission set to those roles. IAM Identity Center manages the role, and allows the authorized users you've defined to assume the role, by using the IAM Identity Center User Portal or AWS CLI. As you modify the permission set, IAM Identity Center ensures that the corresponding IAM policies and roles are updated accordingly.

You can add AWS managed policies, customer managed policies, inline policies, and AWS managed policies for job functions to your permission sets. You can also assign an AWS managed policy or a customer managed policy as a permissions boundary.

To create a permission set, see Create and manage permission sets (p. 114).

Topics
- Predefined permissions (p. 21)
- Custom permissions (p. 22)

Predefined permissions

You can create a predefined permission set with AWS managed policies.

When you create a permission set with predefined permissions, you choose one policy from a list of AWS managed policies. Within the available policies, you can choose from Common permission policies and Job function policies.

Common permission policies

Choose from a list of AWS managed policies that make it possible to access resources in your entire AWS account. You can add one of the following policies:
- AdministratorAccess
- PowerUserAccess
- ReadOnlyAccess
- ViewOnlyAccess

Job function policies

Choose from a list of AWS managed policies that make it possible to access resources in your AWS account that might be relevant to a job within your organization. You can add one of the following policies:
- Billing
- DataScientist
- DatabaseAdministrator
- NetworkAdministrator
- SecurityAudit
- SupportUser
- SystemAdministrator
For detailed descriptions of the available common permission policies and job function policies, see AWS managed policies for job functions in the AWS Identity and Access Management user guide.

For instructions on how to create a permission set, see Create and manage permission sets (p. 114).

Custom permissions

When you create a permission set with Custom permissions, you can combine any of the AWS managed and customer managed policies that you have in AWS Identity and Access Management (IAM) with inline policies, and a permissions boundary that sets the maximum possible permissions that any other policy can grant to users of your permission set.

For instructions on how to create a permission set, see Create and manage permission sets (p. 114).

Policy types that you can attach to your permission set

Topics

- Inline policies (p. 22)
- AWS managed policies (p. 22)
- Customer managed policies (p. 23)
- Permissions boundaries (p. 23)

Inline policies

You can attach an inline policy to a permission set. An inline policy is a block of text formatted as an IAM policy that you add directly to your permission set. You can paste in a policy, or generate a new one with the policy creation tool in the IAM Identity Center console when you create a new permission set. You can also create IAM policies with the AWS Policy Generator.

When you deploy a permission set with an inline policy, IAM Identity Center creates an IAM policy in the AWS accounts where you assign your permission set. IAM Identity Center creates the policy when you assign the permission set to the account. The policy is then attached to the IAM role in your AWS account that your user assumes.

When you create an inline policy and assign your permission set, IAM Identity Center configures the policies in your AWS accounts for you. When you build your permission set with Customer managed policies (p. 23), you must create the policies in your AWS accounts yourself before you assign the permission set.

AWS managed policies

You can attach AWS managed policies to your permission set. AWS managed policies are IAM policies that AWS maintains. In contrast, Customer managed policies (p. 23) are IAM policies in your account that you create and maintain. AWS managed policies address common least privilege use cases in your AWS account. You can assign an AWS managed policy as permissions for the role that IAM Identity Center creates, or as a permissions boundary.

AWS maintains AWS managed policies for job functions that assign job-specific access permissions to your AWS resources. You can add one job-function policy when you choose to use Predefined permissions with your permission set. When you choose Custom permissions, you can add more than one job-function policy.

Your AWS account also contains a large number of AWS managed IAM policies for specific AWS services and combinations of AWS services. When you create a permission set with Custom permissions, you can choose from many additional AWS managed policies to assign to your permission set.
AWS populates every AWS account with AWS managed policies. To deploy a permission set with AWS managed policies, you don't need to first create a policy in your AWS accounts. When you build your permission set with Customer managed policies (p. 23), you must create the policies in your AWS accounts yourself before you assign the permission set.

For more information about AWS managed policies, see AWS managed policies in the IAM User Guide.

**Customer managed policies**

You can attach customer managed policies to your permission set. Customer managed policies are IAM policies in your account that you create and maintain. In contrast, AWS managed policies (p. 22) are IAM policies in your account that AWS maintains. You can assign an customer managed policy as permissions for the role that IAM Identity Center creates, or as a permissions boundary.

When you create a permission set with a customer managed policy, you must create an IAM policy with the same name and path in each AWS account where IAM Identity Center assigns your permission set. If you are specifying a custom path, make sure to specify the same path in each AWS account. For more information, see Friendly names and paths in the IAM User Guide. IAM Identity Center attaches the IAM policy to the IAM role that it creates in your AWS account. As a best practice, apply the same permissions to the policy in each account where you assign the permission set. For more information, see Use IAM policies in permission sets (p. 116).

For more information, see Customer managed policies in the IAM User Guide.

**Permissions boundaries**

You can attach a permissions boundary to your permission set. A permissions boundary is an AWS managed or customer managed IAM policy that sets the maximum permissions that an identity-based policy can grant to an IAM principal. When you apply a permissions boundary, your Inline policies (p. 22), Customer managed policies (p. 23), and AWS managed policies (p. 22) can't grant any permissions that exceed the permissions that your permissions boundary grants. A permissions boundary doesn't grant any permissions, but instead makes it so that IAM ignores all permissions beyond the boundary.

When you create a permission set with a customer managed policy as a permissions boundary, you must create an IAM policy with the same name in each AWS account where IAM Identity Center assigns your permission set. IAM Identity Center attaches the IAM policy as a permissions boundary to the IAM role that it creates in your AWS account.

For more information, see Permissions boundaries for IAM entities in the IAM User Guide.
Workforce identities

AWS Identity and Access Management (IAM) helps you securely manage identities and access to AWS services and resources. As an IAM service, AWS IAM Identity Center is where you create, or connect, your workforce identities in AWS once and manage access centrally to your multiple AWS accounts and applications.

For IAM Identity Center customers, there is no change to how you centrally manage access to multiple AWS accounts or applications. For new customers to IAM Identity Center, you can flexibly configure IAM Identity Center to run alongside or replace single AWS account access management using IAM.

Topics
- Use cases (p. 24)
- Manage your identity source (p. 25)
- Using the AWS access portal (p. 86)
- Multi-factor authentication for Identity Center users (p. 94)

Use cases

Following are use cases that show how you can use IAM Identity Center to meet different business needs.

Topics
- Enable single sign-on access to your AWS applications (Application admin role) (p. 24)
- Enable single sign-on access to your Amazon EC2 Windows instances (p. 25)

Enable single sign-on access to your AWS applications (Application admin role)

This use case provides guidance if you’re an application administrator who manages Identity Center enabled applications (p. 130) such as Amazon SageMaker or AWS IoT SiteWise, and you must provide single sign-on access to your users.

Before you get started, consider the following:

- Do you want to create a test or production environment in a separate organization in AWS Organizations?
- Is IAM Identity Center already enabled in your organization? Do you have permissions to enable IAM Identity Center in the management account of AWS Organizations?

Review the following guidance to determine next steps based on your business needs.

Configure my AWS application in a standalone AWS account

If you must provide single sign-on access to an AWS application and know that your IT department does not yet use IAM Identity Center, you might need to create a standalone AWS account to get started. By default, when you create your own AWS account, you’ll have the permissions that you require to create and manage your own AWS organization. To enable IAM Identity Center, you must have AWS account root user permissions.
IAM Identity Center and AWS Organizations can be enabled automatically during setup for some AWS applications (for example, Amazon Managed Grafana). If your AWS application doesn't provide the option to enable these services, you must set up AWS Organizations and IAM Identity Center before you can provide single sign-on access to your application.

IAM Identity Center isn't configured in my organization

In your role as an application administrator, you might not be able to enable IAM Identity Center, depending on your permissions. IAM Identity Center requires specific permissions in the AWS Organizations management account. In this case, contact the appropriate administrator to get IAM Identity Center enabled in the Organizations management account.

If you do have sufficient permissions to enable IAM Identity Center, do this first, then proceed with the application setup. For more information, see Getting started (p. 4).

IAM Identity Center is currently configured in my organization

In this scenario, you can continue to deploy your AWS application without taking any further action.

Note
If your organization enabled IAM Identity Center in the management account before November 25th, 2019, you must also enable Identity Center enabled applications in the management account and optionally in the member accounts. If you enable them in the management account only, you can enable them in member accounts later. To enable these applications, choose Enable access in the IAM Identity Center console’s Settings page in the Identity Center enabled applications section. For more information, see Identity Center enabled applications (p. 17).

Enable single sign-on access to your Amazon EC2 Windows instances

You can enable single sign-on access to your Amazon EC2 Windows instances if you’re an application administrator who manages users in the Identity Center directory (the default identity source for IAM Identity Center) or a supported external identity provider (IdP), and you must provide IAM Identity Center access to your Amazon EC2 Windows desktops from the AWS Fleet Manager console.

With this configuration, you can securely access your Amazon EC2 Windows instances with existing corporate credentials. You don’t need to share administrator credentials, access credentials multiple times, or configure remote access client software. You can centrally grant and revoke access to your Amazon EC2 Windows instances at scale across multiple AWS accounts. For example, if you remove an employee from your IAM Identity Center integrated identity source, they automatically lose access to all AWS resources, including Amazon EC2 Windows instances.

For more information, see How to enable secure seamless single sign-on to Amazon EC2 Windows instances with IAM Identity Center.

For a demonstration of how to configure IAM Identity Center to enable this capability, see Enabling Single Sign-on to Amazon EC2 Windows with IAM Identity Center.

Manage your identity source

Your identity source in IAM Identity Center defines where your users and groups are managed. After you configure your identity source, you can look up users or groups to grant them single sign-on access to AWS accounts, cloud applications, or both.

You can have only one identity source per organization in AWS Organizations. You can choose one of the following as your identity source:
Considerations for changing your identity source

Although you can change your identity source at any time, we recommend that you consider how this change might affect your current deployment.

If you’re already managing users and groups in one identity source, changing to a different identity source might remove all user and group assignments that you configured in IAM Identity Center. If this occurs, all users, including the administrative user in IAM Identity Center, will lose single sign-on access to their AWS accounts and applications.

Before you change the identity source for IAM Identity Center, review the following considerations before you proceed. If you want to proceed with changing your identity source, see Change your identity source (p. 28) for more information.

Changing between IAM Identity Center and Active Directory

If you’re already managing users and groups in Active Directory, we recommend that you consider connecting your directory when you enable IAM Identity Center and choose your identity source. Do this before you create any users and groups in the default Identity Center directory and make any assignments.

If you’re already managing users and groups in the default Identity Center directory, consider the following:

- **Assignments removed and users and groups deleted** – Changing your identity source to Active Directory deletes your users and groups from the Identity Center directory. This change also removes your assignments. In this case, after you change to Active Directory, you must synchronize your users and groups from Active Directory into the Identity Center directory, and then reapply their assignments.

  If you choose to not use Active Directory, you must create your users and groups in the Identity Center directory, and then make assignments.
• **Assignments aren’t deleted when identities are deleted** – When identities are deleted in the Identity Center directory, corresponding assignments also get deleted in IAM Identity Center. However in Active Directory, when identities are deleted (either in Active Directory or the synced identities), corresponding assignments are not deleted.

• **No outbound synchronization for APIs** – If you use Active Directory as your identity source, we recommend that you use the Create, Update, and Delete APIs with caution. IAM Identity Center doesn’t support outbound synchronization, so your identity source doesn’t automatically update with the changes that you make to users or groups using these APIs.

• **Access portal URL will change** – Changing your identity source between IAM Identity Center and Active Directory also changes the URL for the AWS access portal.

For information about how IAM Identity Center provisions users and groups, see [Connect to a Microsoft AD directory (p. 39)](#).

**Changing from IAM Identity Center to an external IdP**

If you change your identity source from IAM Identity Center to an external identity provider (IdP), consider the following:

• **User names and groups must match** – your existing assignments will work only if the user names and groups in the external IdP match those in IAM Identity Center. User names and groups that don’t match are unusable.

  If there are user names in the Identity Center directory that also exist in the new external IdP directory, we recommend validating those users and permissions.

• **No outbound synchronization for APIs** – IAM Identity Center doesn’t support outbound synchronization, so your external IdP won’t automatically update with changes to users and groups that you make in IAM Identity Center. Therefore, we don’t recommend that you use APIs in this situation.

For information about how IAM Identity Center provisions users and groups, see [Connect to an external identity provider (p. 51)](#).

**Changing from an external IdP to IAM Identity Center**

If you change your identity source from an external identity provider (IdP) to IAM Identity Center, consider the following:

• IAM Identity Center preserves all your assignments.

• **Force password reset** – Users who had passwords in IAM Identity Center can continue signing in with their old passwords. For users who were in the external IdP and weren’t in IAM Identity Center, an administrator must force a password reset.

For information about how IAM Identity Center provisions users and groups, see [Manage identities in IAM Identity Center (p. 33)](#).

**Changing from one external IdP to another external IdP**

If you’re already using an external IdP as your identity source for IAM Identity Center and you change to a different external IdP, consider the following:

• **Assignments and memberships work with correct assertions** – IAM Identity Center preserves all of your assignments. The user assignments, group assignments, and group memberships will continue to work as long as the new IdP sends the correct assertions (for example, SAML nameIDs).
These assertions must match the user names in IAM Identity Center when your users authenticate through the new external IdP.

- **SCIM provisioning** – If you are using SCIM for provisioning into IAM Identity Center, we recommend that you review the IdP-specific information in this guide and the documentation provided by the IdP to ensure that the new provider will match users and groups correctly when SCIM is enabled.

For information about how IAM Identity Center provisions users and groups, see [Connect to an external identity provider](p. 51).

### Changing between Active Directory and an external IdP

If you change your identity source from an external IdP to Active Directory, or from Active Directory to an external IdP, consider the following:

- **Users, groups, and assignments are deleted** – All users, groups, and assignments are deleted from IAM Identity Center. No user or group information is affected in either the external IdP or Active Directory.

- **Provisioning users** – If you change to an external IdP, you must configure IAM Identity Center to provision your users. Alternatively, you must manually provision the users and groups for the external IdP before you can configure assignments.

- **Create assignments and groups** – If you change to Active Directory, you must create assignments with the users and groups that are in your directory in Active Directory.

For information about how IAM Identity Center provisions users and groups, see [Connect to a Microsoft AD directory](p. 39).

### Change your identity source

The following procedure describes how to change from a directory that IAM Identity Center provides (the default Identity Center directory) to Active Directory or an external identity provider, or the other way around. Before you proceed, review the information in [Considerations for changing your identity source](p. 26). Depending on your current deployment, this change might remove any user and group assignments that you configured in IAM Identity Center. If this occurs, all users, including the administrative user in IAM Identity Center, will lose single sign-on access to their AWS accounts and applications.

**To change your identity source**

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab. Choose Actions, and then choose Change identity source.
4. Under Choose identity source, select the source that you want to change to, and then choose Next.

   **Important**
   Changing your identity source to or from Active Directory deletes users and groups from the Identity Center directory. This change also removes any assignments that you configured in IAM Identity Center.

   If you are switching to an external identity provider, we recommend that you follow the steps in [How to connect to an external identity provider](p. 52).
5. After you read the disclaimer and are ready to proceed, type **ACCEPT**.
6. Choose **Change identity source**. If you are changing your identity source to Active Directory, proceed to the next step.
7. Changing your identity source to Active Directory takes you to the **Settings** page. On the **Settings** page, do either of the following:
   - Choose **Start guided setup**. For information about how to complete the guided setup process, see [Guided setup](p. 47).
   - In the **Identity source** section, choose **Actions**, and then choose **Manage sync** to configure your **sync scope**, the list of users and groups to sync.

**Manage sign-in and attribute use for all identity source types**

IAM Identity Center provides the following set of features that enables admins to control AWS access portal use, to set session durations for users in the AWS access portal and your applications, and to use attributes for access control. These features work with an Identity Center directory or external identity provider as your identity source.

**Note**
If you're using Active Directory as an identity source for IAM Identity Center, session management isn't supported.

**Topics**
- Manage IAM Identity Center integrated application sessions (p. 29)
- Configure the duration of your users' AWS access portal sessions (p. 29)
- Manage AWS access portal sessions (p. 31)
- Supported user and group attributes (p. 32)

**Manage IAM Identity Center integrated application sessions**

You can customize the session duration for the AWS access portal to define how often users are required to re-authenticate. You can also terminate AWS access portal sessions. The AWS access portal session duration changes the duration of IAM Identity Center integrated application sessions, and AWS access portal session termination also affects these applications. IAM Identity Center integrated applications poll the AWS access portal sessions and terminate when they detect that the AWS access portal session has ended.

For more information about how to configure the length of AWS access portal sessions, see [Configure the duration of your users' AWS access portal sessions](p. 29). For more information about how to manage and delete user sessions, see [Manage AWS access portal sessions](p. 31).

**Note**
Modifying the AWS access portal session duration and terminating AWS access portal sessions have no effect on the AWS Management Console session duration that you define in your permission sets.

**Configure the duration of your users' AWS access portal sessions**

By default, the duration of a AWS access portal session, which is the maximum length of time that a user can be signed into the AWS access portal without re-authenticating into the portal, is 8 hours. You can specify a different duration, from a minimum of 15 minutes to a maximum of 90 days.
The following topics provide information about configuring the duration of your users' AWS access portal sessions.

Topics
- Prerequisites and considerations (p. 30)
- How to configure the session duration (p. 31)

Prerequisites and considerations

Following are the prerequisites and considerations for configuring the duration of your users' AWS access portal sessions.

External identity providers

If you're using an external identity provider (IdP) as an identity source for IAM Identity Center, the duration of an AWS access portal session is the lesser of the duration that you set in your IdP or IAM Identity Center. For example, if your IdP session duration is 24 hours and you set an 18-hour session duration in IAM Identity Center, your users must re-authenticate in the AWS access portal after 18 hours. If you set a 72-hour session duration in IAM Identity Center and your IdP has a session duration of 18 hours, your users must re-authenticate after 18 hours.

Note
If you're using Active Directory as an identity source for IAM Identity Center, session management isn't supported.

AWS CLI and SDK sessions

If you're using the AWS Command Line Interface, AWS Software Development Kits (SDKs), or other AWS development tools to access AWS services programmatically, the following prerequisites must be met for AWS access portal session duration settings to be applied.

- You must configure the AWS access portal session duration (p. 31) in the IAM Identity Center console.
- You must define a profile for single sign-on settings in your shared AWS config file. This profile is used to connect to the AWS access portal. We recommend that you use the SSO token provider configuration. With this configuration, your AWS SDK or tool can automatically retrieve refreshed authentication tokens. For more information, see SSO token provider configuration in the AWS SDK and Tools Reference Guide.
- Users must run a version of the AWS CLI or an SDK that supports session management.

Minimum versions of the AWS CLI that support session management

Following are the minimum versions of the AWS CLI that support session management.

- AWS CLI V2 2.9 or later
- AWS CLI V1 1.27.10 or later

For information about how to install or update the latest AWS CLI version, see Installing or updating the latest version of the AWS CLI.

If your users are running the AWS CLI, if you refresh your permission set just before the IAM Identity Center session is set to expire and the session duration is set to 20 hours while the permission set duration is set to 12 hours, the AWS CLI session runs for the maximum of 20 hours plus 12 hours for a total of 32 hours. For more information about the IAM Identity Center CLI, see AWS CLI Command Reference.
Minimum versions of SDKs that support IAM Identity Center session management

Following are the minimum versions of the SDKs that support IAM Identity Center session management.

<table>
<thead>
<tr>
<th>SDK</th>
<th>Minimum version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Python</td>
<td>1.26.10</td>
</tr>
<tr>
<td>PHP</td>
<td>3.245.0</td>
</tr>
<tr>
<td>Ruby</td>
<td>aws-sdk-core 3.167.0</td>
</tr>
<tr>
<td>Java V2</td>
<td>AWS SDK for Java v2 (2.18.13)</td>
</tr>
<tr>
<td>Go V2</td>
<td>Whole SDK: release-2022-11-11 and specific Go modules: credentials/v1.13.0, config/v1.18.0</td>
</tr>
<tr>
<td>JS V2</td>
<td>2.1253.0</td>
</tr>
<tr>
<td>JS V3</td>
<td>v3.210.0</td>
</tr>
<tr>
<td>C++</td>
<td>1.9.372</td>
</tr>
<tr>
<td>.NET</td>
<td>v3.7.400.0</td>
</tr>
</tbody>
</table>

How to configure the session duration

Use the following procedure to configure the duration of your users' AWS access portal sessions.

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Authentication tab.
5. In the Configure session settings dialog box, choose the maximum session duration in minutes, hours, and days for your users by selecting the drop down arrow. Choose a the length for the session, and then choose Save. You return to the Settings page.

Manage AWS access portal sessions

Use the following procedure to manage sessions for a user in your IAM Identity Center store.

To manage an AWS access portal session

1. Open the IAM Identity Center console.
2. Choose Users.
3. On the Users page, choose the username of the user whose sessions you want to manage. This takes you to a page with the user's information.
4. On the user's page, choose the Active sessions tab. The number in parentheses next to Active sessions indicates the number of current active sessions for this user.
5. Select the check boxes beside the sessions that you want to delete, and then choose Delete session. A dialog box appears that confirms you're deleting active sessions for this user. Read the information in the dialog box, and if you want to continue, choose Delete session.
Note
Deleting a session ends the AWS access portal session, but it does not affect the user's active AWS Management Console sessions that they created by choosing a permission set from the AWS access portal. Those sessions will continue until the permission set session duration elapses or the user signs out of the session. This also does not affect any active SAML application sessions. Those sessions continue until the user signs out of the application or the application ends its session with the user. For IAM Identity Center integrated applications such as Amazon SageMaker Studio or Amazon Monitron, those sessions end the next time the application checks to see if the AWS access portal session is still active for up to 2 hours, or if the user signs out of the application.

Note
When you delete a session, any running AWS CLI sessions are also revoked. Revoking these sessions does not happen immediately and can take up to an hour.

6. You return to the user's page. A green flash bar appears to indicate that the selected sessions were successfully deleted.

Supported user and group attributes

Attributes are pieces of information that help you define and identify individual user or group objects, such as name, email, or members. IAM Identity Center supports most commonly used attributes regardless if they are entered manually during user creation or when automatically provisioned using a synchronization engine such as defined in the System for Cross-Domain Identity Management (SCIM) specification. For more information about this specification, see https://tools.ietf.org/html/rfc7642. For more information about manual and automatic provisioning, see Provisioning when users come from an external IdP (p. 51).

Because IAM Identity Center supports SCIM for automatic provisioning use cases, the Identity Center directory supports all of the same user and group attributes that are listed in the SCIM specification, with a few exceptions. The following sections describe which attributes are not supported by IAM Identity Center.

User objects

All attributes from the SCIM user schema (https://tools.ietf.org/html/rfc7643#section-8.3) are supported in the IAM Identity Center identity store, except for the following:

• password
• ims
• photos
• entitlements
• x509Certificates

All sub-attributes for users are supported, except for the following:

• 'display' sub-attribute of any multi-valued attribute (For example, emails or phoneNumbers)
• 'version' sub-attribute of 'meta' attribute

Group objects

All attributes from the SCIM group schema (https://tools.ietf.org/html/rfc7643#section-8.4) are supported.

All sub-attributes for groups are supported, except for the following:
Manage identities in IAM Identity Center

IAM Identity Center provides the following capabilities for your users and groups:

- Create your users and groups.
- Add your users as members to the groups.
- Assign the groups with the desired level of access to your AWS accounts and applications.

To manage users and groups in the IAM Identity Center store, AWS supports the API operations listed in [Identity Center Actions](https://aws.amazon.com/identity-center/actions/).

Provisioning when users are in IAM Identity Center

When you create users and groups directly in IAM Identity Center, provisioning is automatic. These identities are immediately available for use in making assignments and for use by Identity Center enabled applications. For more information, see [User and group provisioning](https://aws.amazon.com/identity-center/user-provisioning/).

Changing your identity source

If you prefer to manage users in AWS Managed Microsoft AD, you can stop using your Identity Center directory at any time and instead connect IAM Identity Center to your directory in Microsoft AD by using AWS Directory Service. For more information, see considerations for [Changing between IAM Identity Center and Active Directory](https://aws.amazon.com/identity-center/active-directory/).

If you prefer to manage users in an external identity provider (IdP), you can connect IAM Identity Center to your IdP and enable automatic provisioning. For more information, see considerations for [Changing from IAM Identity Center to an external IdP](https://aws.amazon.com/identity-center/external-idp/).

Topics

- [Add users](#)
- [Add groups](#)
- [Add users to groups](#)
- [Delete groups in IAM Identity Center](#)
- [Delete users in IAM Identity Center](#)
- [Disable user access in IAM Identity Center](#)
- [Edit user properties](#)
- [Reset the IAM Identity Center user password for an end user](#)
- [Send email OTP for users created from API](#)
- [Password requirements when managing identities in IAM Identity Center](#)

Add users

Users and groups that you create in your Identity Center directory are available in IAM Identity Center only. Use the following procedure to add users to your Identity Center directory using the IAM Identity Center console. Alternatively, you can call the AWS API operation [CreateUser](https://docs.aws.amazon.com/IAM/latest/APIReference/API_CreateUser.html) to add users.

To add a user

1. Open the [IAM Identity Center console](https://aws.amazon.com/identity-center/).
2. Choose **Users**.
3. Choose **Add user** and provide the following required information:
   a. **Username** – This user name is required to sign in to the AWS access portal and can't be changed later. It must be between 1 and 100 characters.
   b. **Password** – You can either send an email with the password setup instructions (this is the default option) or generate a one-time password. If you are creating an administrative user and you choose to send an email, make sure that you specify an email address that you can access.
      i. **Send an email to this user with password setup instructions.** – This option automatically sends the user an email addressed from Amazon Web Services, with the subject line ***Invitation to join AWS Single Sign-On***. The email invites the user on behalf of your company to access the IAM Identity Center AWS access portal.
         **Note**
         In certain Regions, IAM Identity Center sends emails to users using Amazon Simple Email Service from another AWS Region. For information about how emails are sent, see [Cross-Region calls](p. 198).
         All emails sent by the IAM Identity Center service will come from either the address no-reply@signin.aws or no-reply@login.awsapps. We recommend that you configure your email system so that it accepts emails from these sender email addresses and does not handle them as junk or spam.
      ii. **Generate a one-time password that you can share with this user.** – This option provides you with the AWS access portal URL and password details that you can manually send to the user from your email address.
   c. **Email address** – The email address must be unique.
   d. **Confirm email address**
   e. **First name** – You must enter a name here for automatic provisioning to work. For more information, see [Automatic provisioning](p. 53).
   f. **Last name** – You must enter a name here for automatic provisioning to work.
   g. **Display name**
      **Note**
      (Optional) If applicable, you can specify values for additional attributes such as the user's **Microsoft 365 immutable ID** to help provide the user with single sign-on access to certain business applications.
4. Choose **Next**.
5. If applicable, select one or more groups to which you want to add the user, and choose **Next**.
6. Review the information that you specified for **Step 1: Specify user details** and **Step 2: Add user to groups - optional**. Choose **Edit** by either step to make any changes. After you confirm that the correct information is specified for both steps, choose **Add user**.

   **Note**
   If you are adding your first administrative user in IAM Identity Center by following the steps to [create a user](p. 9), return to that procedure and follow the steps to complete the process.

### Add groups

Use the following procedure to add groups to your Identity Center directory using the IAM Identity Center console. Alternatively, you can call the AWS API operation **CreateGroup** to add groups.

#### To add a group
1. Open the **IAM Identity Center console**.
2. Choose Groups.
3. Choose Create group.
4. Enter a Group name and Description - optional. The description should provide details on what permissions have been or will be assigned to the group. Under Add users to group - optional, locate the users you want to add as members. Then select the check box next to each of them.
5. Choose Create group.

After you add this group to your Identity Center directory, you can assign single sign-on access to this group. For more information, see Assign user access to AWS accounts (p. 111).

Add users to groups

Use the following procedure to add members of a group that you previously created in your Identity Center directory using the IAM Identity Center console. Alternatively, you can call the AWS API operation CreateGroupMembership to add a user as a member of a group.

To add a user as a member of a group

1. Open the IAM Identity Center console.
2. Choose Groups.
3. Choose the group name that you want to update.
4. On the group details page, under Users in this group, choose Add users to group.
5. On the Add users to group page, under Other users, locate the users you want to add as members. Then, select the check box next to each of them.
6. Choose Add users.

Delete groups in IAM Identity Center

When you delete a group in your IAM Identity Center directory, it removes access to AWS accounts and cloud applications for all users who are members of this group. After a group is deleted it cannot be undone. Use the following procedure to delete a group in your Identity Center directory using the IAM Identity Center console.

To delete a group in IAM Identity Center

Important
The instructions on this page apply to AWS IAM Identity Center. They do not apply to AWS Identity and Access Management (IAM). IAM Identity Center users, groups, and user credentials are different from IAM users, groups, and IAM user credentials. If you are looking for instructions on deleting groups in IAM, see Deleting an IAM user group in the AWS Identity and Access Management User Guide.

1. Open the IAM Identity Center console.
2. Choose Groups.
3. There are two ways you can delete a group:
   - On the Groups page, you can select multiple groups for deletion. Select the group name that you want to delete and choose Delete group.
   - Choose the group name that you want to delete. On the group details page, choose Delete group.
4. You might be asked to confirm your intent to delete the group.
   - If you delete multiple groups at once, confirm your intent by typing Delete in the Delete group dialog box.
If you delete a single group that contains users, confirm your intent by typing the name of the group you want to delete in the **Delete group** dialog box.

5. Choose **Delete group**. If you selected multiple groups for deletion, choose **Delete # groups**.

### Delete users in IAM Identity Center

When you delete a user in your IAM Identity Center directory, it removes their access to AWS accounts and cloud applications. After a user is deleted it cannot be undone. Use the following procedure to delete a user in your Identity Center directory using the IAM Identity Center console.

**Note**

When you disable user access or delete a user in IAM Identity Center, that user will immediately be prevented from signing in to the AWS access portal and will not be able to create new sign in sessions. For more information, see [Authentication sessions](#) (p. 18).

**To delete a user in IAM Identity Center**

1. Open the [IAM Identity Center console](#).
2. Choose **Users**.
3. There are two ways you can delete a user:
   - On the **Users** page, you can select multiple users for deletion. Select the username that you want to delete and choose **Delete users**.
   - Choose the username that you want to delete. On the user details page, choose **Delete user**.
4. If you delete multiple users at once, confirm your intent by typing **Delete** in the **Delete user** dialog box.
5. Choose **Delete user**. If you selected multiple users for deletion, choose **Delete # users**.

### Disable user access in IAM Identity Center

When you disable user access in your IAM Identity Center directory, you cannot edit their user details, reset their password, add the user to a group, or view their group membership. Use the following procedure to disable user access in your Identity Center directory using the IAM Identity Center console.

**Note**

When you disable user access or delete a user in IAM Identity Center, that user will immediately be prevented from signing in to the AWS access portal and will not be able to create new sign in sessions. For more information, see [Authentication sessions](#) (p. 18).

**To disable user access in IAM Identity Center**

1. Open the [IAM Identity Center console](#).

   **Important**

   The instructions on this page apply to AWS IAM Identity Center. They do not apply to AWS Identity and Access Management (IAM). IAM Identity Center users, groups, and user credentials are different from IAM users, groups, and IAM user credentials. If you are looking for instructions on deleting users in IAM, see [Deleting an IAM user](#) in the AWS Identity and Access Management User Guide.
2. Choose Users.
3. Select the username of the user whose access you want to disable.
4. In the General information section, choose Disable user access.
5. In the Disable user access dialog box, choose Disable user access.

Edit user properties

Use the following procedure to edit the properties of a user in your Identity Center directory using the IAM Identity Center console. Alternatively, you can call the AWS API operation UpdateUser to update user properties.

To edit user properties in IAM Identity Center

1. Open the IAM Identity Center console.
2. Choose Users.
3. Choose the user that you want to edit.
4. On the user Profile page, next to Profile details, choose Edit.
5. On the Edit profile details page, update the properties as needed. Then, choose Save changes.

Note
(Optional) You can modify additional attributes such as Employee number and Office 365 Immutable ID to help map the user's identity in IAM Identity Center with certain business applications that users need to use.

Note
The Email address attribute is an editable field and the value you provide must be unique.

Reset the IAM Identity Center user password for an end user

This procedure is for administrators who need to reset the password for a user in your IAM Identity Center directory. You'll use the IAM Identity Center console to reset passwords.

Considerations for identity providers and user types

- Microsoft Active Directory or external provider – If you're connecting IAM Identity Center to Microsoft Active Directory or an external provider, user password resets must be done from within Active Directory or the external provider. This means that passwords for those users can't be reset from the IAM Identity Center console.
- Users in the IAM Identity Center directory – If you're an IAM Identity Center user, you can reset your own IAM Identity Center password, see Resetting your IAM Identity Center user password (p. 89).

To reset a password for an IAM Identity Center end user

Important
The instructions on this page apply to AWS IAM Identity Center. They do not apply to AWS Identity and Access Management (IAM). IAM Identity Center users, groups, and user credentials are different from IAM users, groups, and IAM user credentials. If you are looking for instructions on changing passwords for IAM users, see Managing passwords for IAM users in the AWS Identity and Access Management User Guide.

1. Open the IAM Identity Center console.
2. Choose Users.
3. Select the username of the user whose password you want to reset.
4. On the user details page, choose **Reset password**.
5. In the **Reset password** dialog box, select one of the following choices, and then choose **Reset password**:

   a. **Send an email to the user with instructions to reset the password** – This option automatically sends the user an email addressed from Amazon Web Services that walks them through how to reset their password.

      **Warning**
      As a security best practice, verify that the email address for this user is correct prior to selecting this option. If this password reset email were to be sent to an incorrect or misconfigured email address, a malicious recipient could use it to gain unauthorized access to your AWS environment.

   b. **Generate a one-time password and share the password with the user** – This option provides you with the password details that you can manually send to the user from your email address.

**Send email OTP for users created from API**

When you create users with the **CreateUser** API operation, they do not have passwords. You can change this by electing to send users an email one-time password (OTP) when they're created with the API. Users receive the email OTP when they first attempt to sign in. After receiving the email OTP, when a user signs in, they must set a new password. If you don't enable this setting, then you must generate and share OTP with the users that you create using the **CreateUser** API.

**To send email OTP to users created with the CreateUser API**

1. Open the **IAM Identity Center console**.
2. Choose **Settings**.
3. On the **Settings** page, choose the **Authentication** tab.
4. In the **Standard authentication** section, choose **Configure**.
5. A dialog box appears. Check the box next to **Send email OTP**. Then, choose **Save**. The status updates from **Disabled** to **Enabled**.

**Password requirements when managing identities in IAM Identity Center**

**Note**

These requirements apply only to users created in the Identity Center directory. If you have configured an identity source other than IAM Identity Center for authentication, such as Active Directory or an external identity provider, the password policies for your users are defined and enforced in those systems, not in IAM Identity Center.

When you use IAM Identity Center as your identity source, users must adhere to the following password requirements to set or change their password:

- Passwords are case-sensitive.
- Passwords must be between 8 and 64 characters in length.
- Passwords must contain at least one character from each of the following four categories:
  - Lowercase letters (a-z)
  - Uppercase letters (A-Z)
  - Numbers (0-9)
• Non-alphanumeric characters (~@#$%^&*_-+=`|(){}[]:;"'<>,.?/)  
• The last three passwords cannot be reused.  
• Passwords that are publicly known through a data set leaked from a third party cannot be used.

**Connect to a Microsoft AD directory**

With AWS IAM Identity Center, you can connect a self-managed directory in Active Directory (AD) or a directory in AWS Managed Microsoft AD by using AWS Directory Service. This Microsoft AD directory defines the pool of identities that administrators can pull from when using the IAM Identity Center console to assign single sign-on access. After connecting your corporate directory to IAM Identity Center, you can then grant your AD users or groups access to AWS accounts, cloud applications, or both.

AWS Directory Service helps you to set up and run a standalone AWS Managed Microsoft AD directory hosted in the AWS Cloud. You can also use AWS Directory Service to connect your AWS resources with an existing self-managed AD. To configure AWS Directory Service to work with your self-managed AD, you must first set up trust relationships to extend authentication to the cloud.

IAM Identity Center uses the connection provided by AWS Directory Service to perform pass-through authentication to the source AD instance. When you use AWS Managed Microsoft AD as your identity source, IAM Identity Center can work with users from AWS Managed Microsoft AD or from any domain connected through an AD trust. If you want to locate your users in four or more domains, users must use the `DOMAIN\username` syntax as their user name when performing sign-ins to IAM Identity Center.

**Notes**

• As a prerequisite step, make sure your AD Connector or directory in AWS Managed Microsoft AD in AWS Directory Service resides within your AWS Organizations management account. For more information, see [Active Directory or an external IdP (p. 5)](https://docs.aws.amazon.com/IAM/latest/UserGuide/id-directory-sso-connect-ad.html).

• IAM Identity Center does not support SAMBA 4-based Simple AD as a connected directory.

**Provisioning when users come from Active Directory**

IAM Identity Center uses the connection provided by the AWS Directory Service to synchronize user, group, and membership information from your source directory in Active Directory to the IAM Identity Center identity store. No password information is synchronized to IAM Identity Center, since user authentication takes place directly from the source directory in Active Directory. This identity data is used by IAM Identity Center enabled applications to facilitate in-app lookup, authorization, and collaboration scenarios without passing LDAP activity back to the source directory in Active Directory.

For more information above provisioning, see [User and group provisioning (p. 16)](https://docs.aws.amazon.com/IAM/latest/UserGuide/id-directory-sso-connect-ad.html).

**Topics**

- [Connect a directory in AWS Managed Microsoft AD to IAM Identity Center (p. 39)](https://docs.aws.amazon.com/IAM/latest/UserGuide/id-directory-sso-connect-ad.html)
- [Provision users and groups from Active Directory (p. 44)](https://docs.aws.amazon.com/IAM/latest/UserGuide/id-directory-sso-connect-ad.html)

**Connect a directory in AWS Managed Microsoft AD to IAM Identity Center**

Use the following procedure to connect a directory in AWS Managed Microsoft AD that is managed by AWS Directory Service to IAM Identity Center.
To connect AWS Managed Microsoft AD to IAM Identity Center

1. Open the [IAM Identity Center console](https://aws.amazon.com/iam).
   
   **Note**
   Make sure that the IAM Identity Center console is using one of the Regions where your AWS Managed Microsoft AD directory is located before you move to the next step.

2. Choose **Settings**.
3. On the **Settings** page, choose the **Identity source** tab, and then choose **Actions > Change identity source**.
4. Under **Choose identity source**, select **Active Directory**, and then choose **Next**.
5. Under **Connect active directory**, choose a directory in AWS Managed Microsoft AD from the list, and then choose **Next**.
6. Under **Confirm change**, review the information and when ready type **ACCEPT**, and then choose **Change identity source**.

   **Important**
   To specify a user in Active Directory as an administrative user in IAM Identity Center, you must first synchronize the user to whom you want to grant administrative permissions from Active Directory into IAM Identity Center. To do so, follow the steps in [Synchronize an administrative user into IAM Identity Center](#).

Connect a self-managed directory in Active Directory to IAM Identity Center

Users in your self-managed directory in Active Directory (AD) can also have single sign-on access to AWS accounts and cloud applications in the AWS access portal. To configure single sign-on access for these users, you can do either of the following:

- **Create a two-way trust relationship** – When two-way trust relationships are created between AWS Managed Microsoft AD and a self-managed directory in AD, users in your self-managed directory in AD can sign in with their corporate credentials to various AWS services and business applications. One-way trusts do not work with IAM Identity Center.

  AWS IAM Identity Center requires a two-way trust so that it has permissions to read user and group information from your domain to synchronize user and group metadata. IAM Identity Center uses this metadata when assigning access to permission sets or applications. User and group metadata is also used by applications for collaboration, like when you share a dashboard with another user or group. The trust from AWS Directory Service for Microsoft Active Directory to your domain permits IAM Identity Center to trust your domain for authentication. The trust in the opposite direction grants AWS permissions to read user and group metadata.

  For more information about setting up a two-way trust, see [When to Create a Trust Relationship](#) in the [AWS Directory Service Administration Guide](#).

- **Create an AD Connector** – AD Connector is a directory gateway that can redirect directory requests to your self-managed AD without caching any information in the cloud. For more information, see [Connect to a Directory](#) in the [AWS Directory Service Administration Guide](#).

  **Note**
  If you are connecting IAM Identity Center to an AD Connector directory, any future user password resets must be done from within AD. This means that users will not be able to reset their passwords from the AWS access portal.
  If you use AD Connector to connect your Active Directory Domain Service to IAM Identity Center, IAM Identity Center only has access to the users and groups of the single domain to which AD Connector attaches. If you need to support multiple domains or forests, use AWS Directory Service for Microsoft Active Directory.
Note
IAM Identity Center does not work with SAMBA4-based Simple AD directories.

 Attribute mappings for AWS Managed Microsoft AD directory

Attribute mappings are used to map attribute types that exist in IAM Identity Center with like attributes in an AWS Managed Microsoft AD directory. IAM Identity Center retrieves user attributes from your Microsoft AD directory and maps them to IAM Identity Center user attributes. These IAM Identity Center user attribute mappings are also used for generating SAML assertions for your cloud applications. Each cloud application determines the list of SAML attributes it needs for successful single sign-on.

IAM Identity Center prefills a set of attributes for you under the Attribute mappings tab found on your application’s configuration page. IAM Identity Center uses these user attributes to populate SAML assertions (as SAML attributes) that are sent to the cloud application. These user attributes are in turn retrieved from your Microsoft AD directory. For more information, see Map attributes in your application to IAM Identity Center attributes (p. 141).

IAM Identity Center also manages a set of attributes for you under the Attribute mappings section of your directory configuration page. For more information, see Map attributes in IAM Identity Center to attributes in your AWS Managed Microsoft AD directory (p. 44).

Supported directory attributes

The following table lists all AWS Managed Microsoft AD directory attributes that are supported and that can be mapped to user attributes in IAM Identity Center.

<table>
<thead>
<tr>
<th>Supported attributes in your Microsoft AD directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>${dir:email}</td>
</tr>
<tr>
<td>${dir:displayname}</td>
</tr>
<tr>
<td>${dir:distinguishedName}</td>
</tr>
<tr>
<td>${dir:firstname}</td>
</tr>
<tr>
<td>${dir:guid}</td>
</tr>
<tr>
<td>${dir:initials}</td>
</tr>
<tr>
<td>${dir:lastname}</td>
</tr>
<tr>
<td>${dir:proxyAddresses}</td>
</tr>
<tr>
<td>${dir:proxyAddresses:smtp}</td>
</tr>
<tr>
<td>${dir:proxyAddresses:SMTP}</td>
</tr>
<tr>
<td>${dir:windowsUpn}</td>
</tr>
</tbody>
</table>

You can specify any combination of supported Microsoft AD directory attributes to map to a single mutable attribute in IAM Identity Center. For example, you can choose the subject attribute under the User attribute in IAM Identity Center column. Then map it to either ${dir:displayname} or ${dir:lastname}${dir:firstname} or any single supported attribute or any arbitrary combination of supported attributes. For a list of the default mappings for user attributes in IAM Identity Center, see Default mappings (p. 43).
Note
Certain IAM Identity Center attributes can't be modified because they are immutable and mapped by default to specific Microsoft AD directory attributes.

If you use the ListUsers or ListGroups API actions or the list-users and list-groups AWS CLI commands to assign users and groups access to AWS accounts and to applications, you must specify the value for AttributeValue as an FQDN. This value must be in the following format: user@example.com. In the following example, AttributeValue is set to janedoe@example.com.

```
aws identitystore list-users --identity-store-id d-12345a678b --filters AttributePath=UserName,AttributeValue=janedoe@example.com
```

**Supported IAM Identity Center attributes**

The following table lists all IAM Identity Center attributes that are supported and that can be mapped to user attributes in your AWS Managed Microsoft AD directory. After you set up your application attribute mappings, you can use these same IAM Identity Center attributes to map to actual attributes used by that application.

<table>
<thead>
<tr>
<th>Supported attributes in IAM Identity Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>${user:AD_GUID}</td>
</tr>
<tr>
<td>${user:email}</td>
</tr>
<tr>
<td>${user:familyName}</td>
</tr>
<tr>
<td>${user:givenName}</td>
</tr>
<tr>
<td>${user:middleName}</td>
</tr>
<tr>
<td>${user:name}</td>
</tr>
<tr>
<td>${user:preferredUsername}</td>
</tr>
<tr>
<td>${user:subject}</td>
</tr>
</tbody>
</table>

**Supported external identity provider attributes**

The following table lists all external identity provider (IdP) attributes that are supported and that can be mapped to attributes you can use when configuring Attributes for access control (p. 124) in IAM Identity Center. When using SAML assertions, you can use whichever attributes your IdP supports.

<table>
<thead>
<tr>
<th>Supported attributes in your IdP</th>
</tr>
</thead>
<tbody>
<tr>
<td>${path:userName}</td>
</tr>
<tr>
<td>${path:name.familyName}</td>
</tr>
<tr>
<td>${path:name.givenName}</td>
</tr>
<tr>
<td>${path:displayName}</td>
</tr>
<tr>
<td>${path:nickName}</td>
</tr>
<tr>
<td>${path:emails[primary eq true].value}</td>
</tr>
</tbody>
</table>
Supported attributes in your IdP

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>${path:addresses[type eq &quot;work&quot;].streetAddress}</td>
<td></td>
</tr>
<tr>
<td>${path:addresses[type eq &quot;work&quot;].locality}</td>
<td></td>
</tr>
<tr>
<td>${path:addresses[type eq &quot;work&quot;].region}</td>
<td></td>
</tr>
<tr>
<td>${path:addresses[type eq &quot;work&quot;].postalCode}</td>
<td></td>
</tr>
<tr>
<td>${path:addresses[type eq &quot;work&quot;].country}</td>
<td></td>
</tr>
<tr>
<td>${path:addresses[type eq &quot;work&quot;].formatted}</td>
<td></td>
</tr>
<tr>
<td>${path:phoneNumbers[type eq &quot;work&quot;].value}</td>
<td></td>
</tr>
<tr>
<td>${path:userType}</td>
<td></td>
</tr>
<tr>
<td>${path:title}</td>
<td></td>
</tr>
<tr>
<td>${path:locale}</td>
<td></td>
</tr>
<tr>
<td>${path:timezone}</td>
<td></td>
</tr>
<tr>
<td>${path:enterprise.employeeNumber}</td>
<td></td>
</tr>
<tr>
<td>${path:enterprise.costCenter}</td>
<td></td>
</tr>
<tr>
<td>${path:enterprise.organization}</td>
<td></td>
</tr>
<tr>
<td>${path:enterprise.division}</td>
<td></td>
</tr>
<tr>
<td>${path:enterprise.department}</td>
<td></td>
</tr>
<tr>
<td>${path:enterprise.manager.value}</td>
<td></td>
</tr>
</tbody>
</table>

Default mappings

The following table lists the default mappings for user attributes in IAM Identity Center to the user attributes in your AWS Managed Microsoft AD directory. IAM Identity Center only supports the list of attributes in the **User attribute in IAM Identity Center** column.

**Note**

If you don't have any assignments for your users and groups in IAM Identity Center when you enable configurable AD sync, the default mappings in the following table are used. For information about how to customize these mappings, see [Configure attribute mappings for your sync](p. 49).

<table>
<thead>
<tr>
<th>User attribute in IAM Identity Center</th>
<th>Maps to this attribute in your Microsoft AD directory</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD_GUID</td>
<td>${dir:guid}</td>
</tr>
<tr>
<td>email *</td>
<td>${dir:windowsUpn}</td>
</tr>
<tr>
<td>familyName</td>
<td>${dir:lastname}</td>
</tr>
<tr>
<td>givenName</td>
<td>${dir:firstname}</td>
</tr>
<tr>
<td>middleName</td>
<td>${dir:initials}</td>
</tr>
</tbody>
</table>
Connect to a Microsoft AD directory

**User attribute in IAM Identity Center** | **Maps to this attribute in your Microsoft AD directory**
--- | ---
name | ${dir:displayname}
preferredUsername | ${dir:displayname}
subject | ${dir:windowsUpn}

* The email attribute in IAM Identity Center must be unique within the directory. Otherwise, the JIT login process could fail.

You can change the default mappings or add more attributes to the SAML assertion based on your requirements. For example, assume that your cloud application requires the users email in the User.Email SAML attribute. In addition, assume that email addresses are stored in the windowsUpn attribute in your Microsoft AD directory. To achieve this mapping, you must make changes in the following two places in the IAM Identity Center console:

1. On the Directory page, under the Attribute mappings section, you would need to map the user attribute email to the ${dir:windowsUpn} attribute (in the Maps to this attribute in your directory column).
2. On the Applications page, choose the application from the table. Choose the Attribute mappings tab. Then map the User.Email attribute to the ${user:email} attribute (in the Maps to this string value or user attribute in IAM Identity Center column).

Note that you must supply each directory attribute in the form ${dir:AttributeName}. For example, the firstname attribute in your Microsoft AD directory becomes ${dir:firstname}. It is important that every directory attribute have an actual value assigned. Attributes missing a value after ${dir: will cause user sign-in issues.

Map attributes in IAM Identity Center to attributes in your AWS Managed Microsoft AD directory

You can use the following procedure to specify how your user attributes in IAM Identity Center should map to corresponding attributes in your Microsoft AD directory.

**To map attributes in IAM Identity Center to attributes in your directory**

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Attributes for access control tab, and then choose Manage Attributes.
4. On the Manage attribute for access control page, find the attribute in IAM Identity Center that you want to map and then type a value in the text box. For example, you might want to map the IAM Identity Center user attribute email to the Microsoft AD directory attribute ${dir:windowsUpn}.
5. Choose Save changes.

**Provision users and groups from Active Directory**

IAM Identity Center provides the following two ways to provision users and groups from Active Directory.

- IAM Identity Center configurable Active Directory (AD) sync (recommended) (p. 45) — With this sync method, you can do the following:
IAM Identity Center configurable AD sync

IAM Identity Center configurable Active Directory (AD) sync enables you to explicitly configure the identities in Microsoft Active Directory that are automatically synchronized into IAM Identity Center and control the synchronization process.

The following topics provide information to enable you to configure and administer configurable AD sync.

Topics

- Prerequisites and considerations (p. 45)
- How configurable AD sync works (p. 46)
- Configure and manage your sync scope (p. 47)

Prerequisites and considerations

Before you use configurable AD sync, be aware of the following prerequisites and considerations:

- Specifying users and groups in Active Directory to sync

Before you can use IAM Identity Center to assign new users and groups access to AWS accounts and to applications [Identity Center enabled applications, cloud applications, or custom Security Assertion Markup Language (SAML 2.0) applications], you must specify the users and groups in Active Directory to sync, and then sync them into IAM Identity Center.

- AD sync – When you make assignments for new users and groups by using the IAM Identity Center console or related assignment API actions, IAM Identity Center searches the domain controller directly for the specified users or groups, completes the assignment, and then periodically syncs the user or group metadata into IAM Identity Center.

- Configurable AD sync – IAM Identity Center doesn’t search your domain controller directly for users and groups. Instead, you must first specify the list of users and groups to sync. You can configure this list, also known as the sync scope, in one of the following ways, depending on whether you have users and groups that are already synced into IAM Identity Center, or you have new users and groups that you are syncing for the first time by using configurable AD sync.

- Existing users and groups: If you have users and groups that are already synced into IAM Identity Center, the sync scope in configurable AD sync is prepopulated with a list of those users and groups. To assign new users or groups, you must specifically add them to the sync scope. For more information, see Add users and groups to your sync scope (p. 48).

- New users and groups: If you want to assign new users and groups access to AWS accounts and to applications, you must specify which users and groups to add to the sync scope in configurable AD sync before you can use IAM Identity Center to make the assignment. For more information, see Add users and groups to your sync scope (p. 48).
• Making assignments to nested groups in Active Directory

Using configurable AD sync to make assignments to a group in Active Directory that contains other groups (nested groups) might increase the scope of users who have access to AWS accounts or to applications.

• AD sync – When you make assignments to a group in Active Directory that contains other groups (nested groups), only the direct members of the group can access the account. For example, if you assign access to Group A, and Group B is a member of Group A, only the direct members of Group A can access the account. No members of Group B inherit the access.

• Configurable AD sync – When you make assignments to a group in Active Directory that contains nested groups, the assignment applies to all users, including those in nested groups. For example, if you assign access to Group A, and Group B is a member of Group A, members of Group B also inherit this access.

• Updating automated workflows

If you have automated workflows that use the IAM Identity Center identity store API actions and IAM Identity Center assignment API actions to assign new users and groups access to accounts and to applications, and to sync them into IAM Identity Center, you must adjust those workflows by April 15, 2022 so that they function as expected with configurable AD sync. Configurable AD sync changes the order in which user and group assignment and provisioning occur, and the way in which queries are performed.

• AD sync – The process of assignments occurs first. You assign users and groups access to AWS accounts and to applications. After the users and groups are assigned access, they are automatically provisioned (synced into IAM Identity Center). If you have an automated workflow, this means that when you add a new user to Active Directory, your automated workflow can query Active Directory for the user by using the identity store ListUser API action, and then assign the user access by using the IAM Identity Center assignment API actions. Because the user has an assignment, that user is automatically provisioned into IAM Identity Center.

• Configurable AD sync – Provisioning occurs first, and it is not automatically performed. Instead, you must first explicitly add users and groups to the identity store by adding them to your sync scope. For information about the recommended steps for automating your sync configuration for configurable AD sync, see Automate your sync configuration for configurable AD sync (p. 50).

How configurable AD sync works

IAM Identity Center refreshes the AD-based identity data in the identity store by using the following process.

Creation

After you connect your self-managed directory in Active Directory or your AWS Managed Microsoft AD directory that is managed by AWS Directory Service to IAM Identity Center, you can explicitly configure the Active Directory users and groups that you want to sync into the IAM Identity Center identity store. The identities that you choose will be synchronized every three hours or so into the IAM Identity Center identity store. Depending on the size of your directory, the sync process might take longer.

Groups that are members of other groups (called nested groups or child groups) are also written to the identity store. The nested groups are flattened, that is, users in the nested groups are added to the parent group in the IAM Identity Center identity store. This allows you to use the parent group for authorization. Any access that you assign to the parent group applies to all users in the parent group and the users in nested (child) groups.

You can only assign access to new users or groups after they are synchronized into the IAM Identity Center identity store.
Update

The identity data in the IAM Identity Center identity store stays fresh by periodically reading data from the source directory in Active Directory. Identity data changed in AD usually appears in the AWS identity store within four hours, but might take longer based on the amount of data being synchronized.

User and group objects that are in the sync scope and their memberships are created or updated in IAM Identity Center to map to the corresponding objects in the source directory in Active Directory. For user attributes, only the subset of attributes listed in the Attributes for access control section of the IAM Identity Center console are updated in IAM Identity Center.

You can also update the subset of users and groups that you synchronize into the IAM Identity Center identity store. You can choose to add new users or groups to this subset, or remove them. Any identities that you add are synchronized at the next scheduled sync. Identities that you remove from the subset will stop being updated in the IAM Identity Center identity store. Any user who isn’t synchronized for more than 28 days will be disabled in the IAM Identity Center identity store. The corresponding user objects will be automatically disabled in the IAM Identity Center identity store during the next sync cycle, unless they are part of another group that is still part of the sync scope.

Deletion

Users and groups are deleted from the IAM Identity Center identity store when the corresponding user or group objects are deleted from the source directory in Active Directory. Alternatively, you can explicitly delete user objects from the IAM Identity Center identity store by using the IAM Identity Center console. If you use the IAM Identity Center console, you must also remove the users from the sync scope to ensure that they aren't re-synced back into IAM Identity Center during the next sync cycle.

You can also pause and restart synchronization at any time. If you pause synchronization for more than 28 days, all your users will be disabled.

Configure and manage your sync scope

You can configure your sync scope in either of the following ways:

- Guided setup: If you are synchronizing your users and groups from Active Directory into IAM Identity Center for the first time, follow the steps in Guided setup (p. 47) to configure your sync scope. After you complete the guided setup, you can modify your sync scope at any time by following the other procedures in this section.
- If you already have users and groups that are synchronized into IAM Identity Center or you don’t want to follow the guided setup, choose Manage sync. Skip the guided setup procedure and follow the other procedures in this section as required to configure and manage your sync scope.

Procedures

- Guided setup (p. 47)
- Add users and groups to your sync scope (p. 48)
- Remove users and groups from your sync scope (p. 48)
- Pause and resume your sync (p. 49)
- Configure attribute mappings for your sync (p. 49)
- Automate your sync configuration for configurable AD sync (p. 50)

Guided setup

1. Open the IAM Identity Center console.

   Note
   Make sure that the IAM Identity Center console is using one of the AWS Regions where your AWS Managed Microsoft AD directory is located before you move to the next step.
2. Choose Settings.
3. At the top of the page, in the notification message, choose Start guided setup.
4. In Step 1 – optional: Configure attribute mappings, review the default user and group attribute mappings. If no changes are required, choose Next. If changes are required, make the changes, and then choose Save changes.
5. In Step 2 – optional: Configure sync scope, choose the Users tab. Then, enter the exact username of the user that you want to add to your sync scope and choose Add. Next, choose the Groups tab. Enter the exact group name of the group that you want to add to your sync scope and choose Add. Then, choose Next. If you want to add users and groups to your sync scope later, make no changes and choose Next.
6. In Step 3: Review and save configuration, confirm your Attribute mappings in Step 1: Attribute mappings and your Users and groups in Step 2: Sync scope. Choose Save configuration. This takes you to the Manage Sync page.

Add users and groups to your sync scope

To add users
1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, choose Actions, and then choose Manage Sync.
4. On the Manage Sync page, choose the Users tab, and then choose Add users and groups.
5. On the Users tab, under User, enter the exact user name and choose Add.
6. Under Added Users and Groups, review the user that you want to add.
7. Choose Submit.
8. In the navigation pane, choose Users.
9. On the Users page, it might take some time for the user that you specified to appear in the list. Choose the refresh icon to update the list of users.

To add groups
1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, choose Actions, and then choose Manage Sync.
4. On the Manage Sync page, choose the Groups tab, and then choose Add users and groups.
5. Choose the Groups tab. Under Group, enter the exact group name and choose Add.
6. Under Added Users and Groups, review the group that you want to add.
7. Choose Submit.
8. In the navigation pane, choose Groups.
9. On the Groups page, it might take some time for the group that you specified to appear in the list. Choose the refresh icon to update the list of groups.

Remove users and groups from your sync scope

For more information about what happens when you remove users and groups from your sync scope, see How configurable AD sync works (p. 46).
To remove users

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, choose Actions, and then choose Manage Sync.
4. Choose the Users tab.
5. Under Users in sync scope, select the check box beside the user that you want to delete. To delete all users, select the check box beside Username.
6. Choose Remove.

To remove groups

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, choose Actions, and then choose Manage Sync.
4. Choose the Groups tab.
5. Under Groups in sync scope, select the check box beside the user that you want to delete. To delete all groups, select the check box beside Group name.
6. Choose Remove.

Pause and resume your sync

Pausing your sync pauses all future sync cycles and prevents any changes that you make to users and groups in Active Directory from being reflected in IAM Identity Center. After you resume the sync, the sync cycle picks up these changes from the next scheduled sync.

To pause your sync

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, choose Actions, and then choose Manage Sync.
4. Under Manage Sync, choose Pause sync.

To resume your sync

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, choose Actions, and then choose Manage Sync.
4. Under Manage Sync, choose Resume sync.

Note
If you see Pause sync instead of Resume sync, the sync from Active Directory to IAM Identity Center has already resumed.

Configure attribute mappings for your sync

For more information about available attributes, see Attribute mappings for AWS Managed Microsoft AD directory (p. 41).
To configure attribute mappings in IAM Identity Center to your directory

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, choose Actions, and then choose Manage Sync.
4. Under Manage Sync, choose View attribute mapping.
5. Under Active Directory user attributes, configure IAM Identity Center identity store attributes and Active Directory user attributes. For example, you might want to map the IAM Identity Center identity store attribute email to the Active Directory user directory attribute ${objectguid}.
   
   Note
   Under Group attributes, IAM Identity Center identity store attributes and Active Directory group attributes can’t be changed.
6. Choose Save changes. This returns you to the Manage Sync page.

Automate your sync configuration for configurable AD sync

To ensure that your automated workflow works as expected with configurable AD sync, we recommend that you perform the following steps to automate your sync configuration.

To automate your sync configuration for configurable AD sync

1. In Active Directory, create a parent sync group to contain all users and groups that you want to sync into IAM Identity Center. For example, you can name the group IAMIdentityCenterAllUsersAndGroups.
2. In IAM Identity Center, add the parent sync group to your configurable sync list. IAM Identity Center will synchronize all users, groups, sub-groups, and members of all groups contained within the parent sync group.
3. Use the Active Directory user and group management API actions provided by Microsoft to add or remove users and groups from the parent sync group.

IAM Identity Center AD sync

You can use IAM Identity Center to assign Active Directory users and groups access to AWS accounts and applications with IAM Identity Center AD sync. Applications include Identity Center enabled applications, cloud applications, and custom Security Assertion Markup Language (SAML 2.0) applications. All identities with assignments are automatically synced into IAM Identity Center.

How IAM Identity Center AD sync works

IAM Identity Center refreshes the AD-based identity data in the identity store using the following process.

Creation

When you assign users or groups to AWS accounts or applications by using the AWS console or the assignment API calls, information about the users, groups, and membership is periodically synchronized into the IAM Identity Center identity store. Users or groups that are added to IAM Identity Center assignments usually appear in the AWS identity store within two hours. Depending on the amount of data being synchronized, this process might take longer. Only users and groups that are directly assigned access, or are members of a group that is assigned access, are synchronized.

Groups that are members of other groups (called nested groups) are also written to the identity store. The nested groups are “flattened,” that is, users in the nested groups are added to the parent group in the IAM Identity Center identity store. This allows you to use only the parent group for authorization.
If a user accesses IAM Identity Center before their user object has been synchronized for the first time, that user’s identity store object is created on demand using just-in-time (JIT) provisioning. Users created by JIT provisioning are not synchronized unless they have directly assigned or group-based IAM Identity Center entitlements. Group memberships for JIT-provisioned users are unavailable until after synchronization.

For instructions on how to assign users access to AWS accounts, see Single sign-on access to AWS accounts (p. 111).

**Update**

The identity data in the IAM Identity Center identity store stays fresh by periodically reading data from the source directory in Active Directory. Identity data that is changed in Active Directory will usually appear in the AWS identity store within four hours. Depending on the amount of data being synchronized, this process might take longer.

User and group objects and their memberships are created or updated in IAM Identity Center to map to the corresponding objects in the source directory in Active Directory. For user attributes, only the subset of attributes listed in the Manage attributes for access control section of the IAM Identity Center console is updated in IAM Identity Center. In addition, user attributes are updated with each user authentication event.

**Deletion**

Users and groups are deleted from the IAM Identity Center identity store when the corresponding user or group objects are deleted from the source directory in Active Directory.

**Connect to an external identity provider**

If you’re using a self-managed directory in Active Directory or an AWS Managed Microsoft AD, see Connect to a Microsoft AD directory (p. 39). For other external identity providers (IdPs), you can use AWS IAM Identity Center to authenticate identities from the IdPs through the Security Assertion Markup Language (SAML) 2.0 standard. This enables your users to sign in to the AWS access portal with their corporate credentials. They can then navigate to their assigned accounts, roles, and applications hosted in external IdPs.

For example, you can connect an external IdP such as Okta or Azure Active Directory (AD), to IAM Identity Center. Your users can then sign in to the AWS access portal with their existing Okta or Azure credentials. In addition, you can assign access permissions centrally for your users across all the accounts and applications in your AWS organization. In addition, developers can simply sign in to the AWS Command Line Interface (AWS CLI) using their existing credentials, and benefit from automatic short-term credential generation and rotation.

The SAML protocol does not provide a way to query the IdP to learn about users and groups. Therefore, you must make IAM Identity Center aware of those users and groups by provisioning them into IAM Identity Center.

**Provisioning when users come from an external IdP**

When using an external IdP, you must provision all users and groups into IAM Identity Center before you can make any assignments to AWS accounts or applications. In this case, you can: You can configure Automatic provisioning (p. 53), or you can configure Manual provisioning (p. 56) of your users and groups. Regardless of how you provision users, IAM Identity Center redirects the AWS Management Console, command line interface, and application authentication to your external IdP. IAM Identity Center then grants access to those resources based on policies you create in IAM Identity Center. For more information about provisioning, see User and group provisioning (p. 16).
How to connect to an external identity provider

Use the following procedure to connect to an external identity provider from the IAM Identity Center console.

To connect to an external identity provider

1. Open the IAM Identity Center console.
2. Choose Settings.
3. On the Settings page, choose the Identity source tab, and then choose Actions > Change identity source.
4. Under Choose identity source, select External identity provider, and then choose Next.
5. Under Configure external identity provider, do the following:
   a. Under Service provider metadata, choose Download metadata file to download the metadata file and save it on your system. The IAM Identity Center SAML metadata file is required by your external identity provider.
   b. Under Identity provider metadata, choose Choose file, and locate the metadata file that you downloaded from your external identity provider. Then upload the file. This metadata file contains the necessary public x509 certificate used to trust messages that are sent from the IdP.
   c. Choose Next.

Important
Changing your source to or from Active Directory removes all existing user and group assignments. You must manually reapply assignments after you have successfully changed your source.

6. After you read the disclaimer and are ready to proceed, enter ACCEPT.
7. Choose Change identity source.

Topics
- SCIM profile and SAML 2.0 implementation (p. 52)
- Supported identity providers (p. 58)
- Other identity providers (p. 85)

SCIM profile and SAML 2.0 implementation

Both SCIM and SAML are important considerations for configuring IAM Identity Center.

SAML 2.0 implementation

IAM Identity Center supports identity federation with SAML (Security Assertion Markup Language) 2.0. This allows IAM Identity Center to authenticate identities from external identity providers (IdPs). SAML 2.0 is an open standard used for securely exchanging SAML assertions. SAML 2.0 passes information about a user between a SAML authority (called an identity provider or IdP), and a SAML consumer (called a service provider or SP). The IAM Identity Center service uses this information to provide federated single sign-on. Single sign-on allows users to access AWS accounts and configured applications based on their existing identity provider credentials.

IAM Identity Center adds SAML IdP capabilities to your IAM Identity Center store, AWS Managed Microsoft AD, or to an external identity provider. Users can then single sign-on into services that support SAML, including the AWS Management Console and third-party applications such as Microsoft 365, Concur, and Salesforce.
The SAML protocol however does not provide a way to query the IdP to learn about users and groups. Therefore, you must make IAM Identity Center aware of those users and groups by provisioning them into IAM Identity Center.

### SCIM profile

IAM Identity Center provides support for the System for Cross-domain Identity Management (SCIM) v2.0 standard. SCIM keeps your IAM Identity Center identities in sync with identities from your IdP. This includes any provisioning, updates, and deprovisioning of users between your IdP and IAM Identity Center.

For more information about how to implement SCIM, see Automatic provisioning (p. 53). For additional details about IAM Identity Center's SCIM implementation, see the IAM Identity Center SCIM Implementation Developer Guide.

**Topics**
- Automatic provisioning (p. 53)
- Manual provisioning (p. 56)
- Manage SAML 2.0 certificates (p. 56)

###Automatic provisioning

IAM Identity Center supports automatic provisioning (synchronization) of user and group information from your identity provider (IdP) into IAM Identity Center using the System for Cross-domain Identity Management (SCIM) v2.0 protocol. When you configure SCIM synchronization, you create a mapping of your identity provider (IdP) user attributes to the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and your IdP. You configure this connection in your IdP using your SCIM endpoint for IAM Identity Center and a bearer token that you create in IAM Identity Center.

**Topics**
- Considerations for using automatic provisioning (p. 53)
- How to monitor access token expiry (p. 54)
- How to enable automatic provisioning (p. 54)
- How to disable automatic provisioning (p. 55)
- How to generate a new access token (p. 55)
- How to delete an access token (p. 55)
- How to rotate an access token (p. 56)

### Considerations for using automatic provisioning

Before you begin deploying SCIM, we recommend that you first review the following important considerations about how it works with IAM Identity Center. For additional provisioning considerations applicable to your IdP, see Supported identity providers (p. 58).

- If you are provisioning a primary email address, this attribute value must be unique for each user. In some IdPs, the primary email address might not be a real email address. For example, it might be a Universal Principal Name (UPN) that only looks like an email. These IdPs may have a secondary or “other” email address that contains the user’s real email address. You must configure SCIM in your IdP to map the non-Null unique email address to the IAM Identity Center primary email address attribute. And you must map the users non-Null unique sign-in identifier to the IAM Identity Center user name attribute. Check to see whether your IdP has a single value that is both the sign-in identifier and the user’s email name. If so, you can map that IdP field to both the IAM Identity Center primary email and the IAM Identity Center user name.
• For SCIM synchronization to work, every user must have a **First name**, **Last name**, **Username** and **Display name** value specified. If any of these values are missing from a user, that user will not be provisioned.

• If you need to use third-party applications, you will first need to map the outbound SAML subject attribute to the user name attribute. If the third-party application needs a routable email address, you must provide the email attribute to your IdP.

• SCIM provisioning and update intervals are controlled by your identity provider. Changes to users and groups in your identity provider are only reflected in IAM Identity Center after your identity provider sends those changes to IAM Identity Center. Check with your identity provider for details on the frequency of user and group updates.

• Currently, multivalue attributes (such as multiple emails or phone numbers for a given user) are not provisioned with SCIM. Attempts to synchronize multivalue attributes into IAM Identity Center with SCIM will fail. To avoid failures, ensure that only a single value is passed for each attribute. If you have users with multivalue attributes, remove or modify the duplicate attribute mappings in SCIM at your IdP for the connection to IAM Identity Center.

• Verify that the **externalId** SCIM mapping at your IdP corresponds to a value that is unique, always present, and least likely to change for your users. For example, your IdP might provide a guaranteed **objectId** or other identifier that’s not affected by changes to user attributes like name and email. If so, you can map that value to the SCIM **externalId** field. This ensures that your users won’t lose AWS entitlements, assignments, or permissions if you need to change their name or email.

• Users who have not yet been assigned to an application or AWS account cannot be provisioned into IAM Identity Center. To synchronize users and groups, make sure that they are assigned to the application or other setup that represents your IdP’s connection to IAM Identity Center.

For more information about IAM Identity Center's SCIM implementation, see the **IAM Identity Center SCIM Implementation Developer Guide**.

**How to monitor access token expiry**

SCIM access tokens are generated with a validity of one year. When your SCIM access token is set to expire in 90 days or less, AWS sends you reminders in the IAM Identity Center console and over the AWS Health Dashboard to help you rotate the token. By rotating the SCIM access token before it expires, you continually secure automatic provisioning of user and group information. If the SCIM access token expires, the synchronization of user and group information from your identity provider into IAM Identity Center stops, so automatic provisioning can no longer make updates or create and delete information. Disruption to automatic provisioning may impose increased security risks and impact access to your services.

The Identity Center console reminders persist until you rotate the SCIM access token and delete any unused or expired access tokens. The AWS Health Dashboard events are renewed weekly between 90 to 60 days, twice per week from 60 to 30 days, three times per week from 30 to 15 days, and daily from 15 days until the SCIM access tokens expires.

**How to enable automatic provisioning**

Use the following procedure to enable automatic provisioning of users and groups from your IdP to IAM Identity Center using the SCIM protocol.

**Note**
Before you begin this procedure, we recommend that you first review provisioning considerations that are applicable to your IdP. For more information, see **Supported identity providers (p. 58)**.

**To enable automatic provisioning in IAM Identity Center**

1. After you have completed the prerequisites, open the [IAM Identity Center console](https://console.aws.amazon.com/iam/).

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54
Connect to an external identity provider

2. Choose **Settings** in the left navigation pane.

3. On the **Settings** page, locate the **Automatic provisioning** information box, and then choose **Enable**. This immediately enables automatic provisioning in IAM Identity Center and displays the necessary SCIM endpoint and access token information.

4. In the **Inbound automatic provisioning** dialog box, copy each of the values for the following options. You will need to paste these in later when you configure provisioning in your IdP.
   a. **SCIM endpoint**
   b. **Access token**

5. Choose **Close**.

After you complete this procedure, you must configure automatic provisioning in your IdP. For more information, see [Supported identity providers](p. 58).

**How to disable automatic provisioning**

Use the following procedure to disable automatic provisioning in the IAM Identity Center console.

**Important**

You must delete the access token before you start this procedure. For more information, see [How to delete an access token](p. 55).

**To disable automatic provisioning in the IAM Identity Center console**

1. In the IAM Identity Center console, choose **Settings** in the left navigation pane.

2. On the **Settings** page, choose the **Identity source** tab, and then choose **Actions > Manage provisioning**.

3. On the **Automatic provisioning** page, choose **Disable**.

4. In the **Disable automatic provisioning** dialog box, review the information, type **DISABLE**, and then choose **Disable automatic provisioning**.

**How to generate a new access token**

Use the following procedure to generate a new access token in the IAM Identity Center console.

**Note**

This procedure requires that you have previously enabled automatic provisioning. For more information, see [How to enable automatic provisioning](p. 54).

**To generate a new access token**

1. In the IAM Identity Center console, choose **Settings** in the left navigation pane.

2. On the **Settings** page, choose the **Identity source** tab, and then choose **Actions > Manage provisioning**.

3. On the **Automatic provisioning** page, under **Access tokens**, choose **Generate token**.

4. In the **Generate new access token** dialog box, copy the new access token and save it in a safe place.

5. Choose **Close**.

**How to delete an access token**

Use the following procedure to delete an existing access token in the IAM Identity Center console.

**To delete an existing access token**

1. In the IAM Identity Center console, choose **Settings** in the left navigation pane.
2. On the Settings page, choose the Identity source tab, and then choose Actions > Manage provisioning.
3. On the Automatic provisioning page, under Access tokens, select the access token you want to delete, and then choose Delete.
4. In the Delete access token dialog box, review the information, type DELETE, and then choose Delete access token.

How to rotate an access token

An IAM Identity Center directory supports up to two access tokens at a time. To generate an additional access token prior to any rotation, delete any expired or unused access tokens.

If your SCIM access token is close to expiring, you can use the following procedure to rotate an existing access token in the IAM Identity Center console.

To rotate an access token

1. In the IAM Identity Center console, choose Settings in the left navigation pane.
2. On the Settings page, choose the Identity source tab, and then choose Actions > Manage provisioning.
3. On the Automatic provisioning page, under Access tokens, make a note of the token ID of the token you want to rotate.
4. Follow the steps in How to generate a new access token (p. 55) to create a new token. If you have already created the maximum number of SCIM access tokens, you will first need to delete one of the existing tokens.
5. Go to your identity provider's website and configure the new access token for SCIM provisioning, and then test connectivity to IAM Identity Center using the new SCIM access token. Once you’ve confirmed that provisioning is working successfully using the new token, continue to the next step in this procedure.
6. Follow the steps in How to delete an access token (p. 55) to delete the old access token you noted earlier. You can also use the token’s creation date as a hint for which token to remove.

Manual provisioning

Some IdPs do not have System for Cross-domain Identity Management (SCIM) support or have an incompatible SCIM implementation. In those cases, you can manually provision users through the IAM Identity Center console. When you add users to IAM Identity Center, ensure that you set the user name to be identical to the user name that you have in your IdP. At a minimum, you must have a unique email address and user name. For more information, see User name and email address uniqueness (p. 16).

You must also manage all groups manually in IAM Identity Center. To do this, you create the groups and add them using the IAM Identity Center console. These groups do not need to match what exists in your IdP. For more information, see Groups (p. 16).

Manage SAML 2.0 certificates

IAM Identity Center uses certificates to set up a SAML trust relationship between IAM Identity Center and your external identity provider (IdP). When you add an external IdP in IAM Identity Center, you must also obtain at least one public SAML 2.0 X.509 certificate from the external IdP. That certificate is usually installed automatically during the IdP SAML metadata exchange during trust creation.

As an IAM Identity Center administrator, you’ll occasionally need to replace older IdP certificates with newer ones. For example, you might need to replace an IdP certificate when the expiration date on the certificate approaches. The process of replacing an older certificate with a newer one is referred to as certificate rotation.
Rotate a SAML 2.0 certificate

You may need to import certificates periodically in order to rotate invalid or expired certificates issued by your identity provider. This helps to prevent authentication disruption or downtime. All imported certificates are automatically active. Certificates should only be deleted after ensuring that they are no longer in use with the associated identity provider.

You should also consider that some IdPs might not support multiple certificates. In this case, the act of rotating certificates with these IdPs might mean a temporary service disruption for your users. Service is restored when the trust with that IdP has been successfully reestablished. Plan this operation carefully during off peak hours if possible.

**Note**
As a security best practice, upon any signs of compromise or mishandling of an existing SAML certificate, you should immediately remove and rotate the certificate.

Rotating an IAM Identity Center certificate is a multistep process that involves the following:

- Obtaining a new certificate from the IdP
- Importing the new certificate into IAM Identity Center
- Activating the new certificate in the IdP
- Deleting the older certificate

Use all of the following procedures to complete the certificate rotation process while avoiding any authentication downtime.

**Step 1: Obtain a new certificate from the IdP**

Go to the IdP website and download their SAML 2.0 certificate. Make sure that the certificate file is downloaded in PEM encoded format. Most providers allow you to create multiple SAML 2.0 certificates in the IdP. It is likely that these will be marked as disabled or inactive.

**Step 2: Import the new certificate into IAM Identity Center**

Use the following procedure to import the new certificate using the IAM Identity Center console.

1. In the IAM Identity Center console, choose Settings.
2. On the Settings page, choose the Identity source tab, and then choose Actions > Manage authentication.
3. On the Manage SAML 2.0 certificates page, choose Import certificate.
4. On the Import SAML 2.0 certificate dialog, choose Choose file, navigate to your certificate file and select it, and then choose Import certificate.

At this point, IAM Identity Center will trust all incoming SAML messages signed from both of the certificates that you have imported.

**Step 3: Activate the new certificate in the IdP**

Go back to the IdP website and mark the new certificate that you created earlier as primary or active. At this point all SAML messages signed by the IdP should be using the new certificate.

**Step 4: Delete the old certificate**
Use the following procedure to complete the certificate rotation process for your IdP. There must always be at least one valid certificate listed, and it cannot be removed.

**Note**
Make sure that your identity provider is no longer signing SAML responses with this certificate before deleting it.

1. On the Manage SAML 2.0 certificates page, choose the certificate that you want to delete. Choose **Delete**.
2. In the Delete SAML 2.0 certificate dialog box, type **DELETE** to confirm, and then choose **Delete**.
3. Return to the IdP’s website and perform the necessary steps to remove the older inactive certificate.

**Certificate expiration status indicators**

While on the Manage SAML 2.0 certificates page, you might notice colored status indicator icons. These icons appear in the Expires on column next to each certificate in the list. The following describes the criteria that IAM Identity Center uses to determine which icon is displayed for each certificate.

- **Red** – Indicates that a certificate is currently expired.
- **Yellow** – Indicates that a certificate will expire in 90 days or less.
- **Green** – Indicates that a certificate is currently valid and will remain valid for at least 90 more days.

**To check the current status of a certificate**

1. In the IAM Identity Center console, choose **Settings**.
2. On the Settings page, choose the Identity source tab, and then choose Actions > Manage authentication.
3. On the Manage SAML 2.0 authentication page, under Manage SAML 2.0 certificates, review the status of the certificates in the list as indicated in the Expires on column.

**Supported identity providers**

The following external identity providers have been tested with the IAM Identity Center SCIM implementation.

**Topics**

- Azure AD (p. 58)
- CyberArk (p. 62)
- Google Workspace (p. 65)
- JumpCloud (p. 68)
- Okta (p. 70)
- OneLogin (p. 75)
- Ping Identity (p. 78)

**Azure AD**

IAM Identity Center supports automatic provisioning (synchronization) of user and group information from Azure Active Directory (Azure AD) into IAM Identity Center using the System for Cross-domain Identity Management (SCIM) v2.0 protocol. You configure this connection in Azure AD using your SCIM endpoint for IAM Identity Center and a bearer token that is created automatically by IAM Identity Center. When you configure SCIM synchronization, you create a mapping of your user attributes in Azure AD to
the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and your IDP.

The following steps walk you through how to enable automatic provisioning of users and groups from Azure AD to IAM Identity Center using the IAM Identity Center app in the Azure AD Application Gallery and the SCIM protocol.

**Note**
Before you begin deploying SCIM, we recommend that you first review Considerations for using automatic provisioning (p. 53), and then continue reviewing Prerequisites (p. 59) and Additional considerations (p. 59) in the next sections.

**Prerequisites**

You will need the following before you can get started:

- An Azure AD tenant. For more information, see Quickstart: Set up a tenant on Microsoft's website.
- An IAM Identity Center-enabled account (AWS IAM Identity Center). For more information, see Enable IAM Identity Center.
- A SAML connection from your Azure AD account to IAM Identity Center, as described in Tutorial: Azure Active Directory single sign-on (SSO) integration with IAM Identity Center on Microsoft's website.

**Important**
Make sure that all users in Azure AD have filled out **First name**, **Last name**, and **Display name** values in their user properties. Otherwise, automatic provisioning won't work with Azure AD.

**Additional considerations**

The following are additional considerations for automatic provisioning of user and group information from Azure AD into IAM Identity Center using the SCIM v2 protocol.

**Attributes for access control**

Attributes for access control are used in permission policies that determine who in your identity source can access your AWS resources. If an attribute is removed from a user in Azure AD, that attribute will not be removed from the corresponding user in IAM Identity Center. This is a known limitation in Azure AD. If an attribute is changed to a different (non-empty) value on a user, that change will be synchronized to IAM Identity Center.

**Nested Groups**

The Azure AD user provisioning service can't read or provision users in nested groups. Only users that are immediate members of an explicitly assigned group can be read and provisioned. Azure AD doesn't recursively unpack the group memberships of indirectly assigned users or groups (users or groups that are members of a group that is directly assigned). For more information, see Assignment-based scoping in the Microsoft documentation for Azure AD.

**Dynamic Groups**

The Azure AD user provisioning service can read and provision users in dynamic groups. See below for an example showing the users and groups structure while using dynamic groups and how they are displayed in IAM Identity Center. These users and groups were provisioned from Azure AD into IAM Identity Center via SCIM.

For example, if Azure AD structure for dynamic groups is as follows:

1. Group A with members ua1, ua2
2. Group B with members ub1
3. Group C with members uc1
4. Group K with a rule to include members of Group A, B, C
5. Group L with a rule to include members Group B and C

After the user and group information is provisioned from Azure AD into IAM Identity Center through SCIM, the structure will be as follows:

1. Group A with members ua1, ua2
2. Group B with members ub1
3. Group C with members uc1
4. Group K with members ua1, ua2, ub1, uc1
5. Group L with members ub1, uc1

When you configure automatic provisioning using dynamic groups, keep the following considerations in mind.

- A dynamic group can include a nested group. However, Azure AD provisioning service doesn’t flatten the nested group. For example, if you have the following Azure AD structure for dynamic groups:
  - Group A is a parent of group B.
  - Group A has ua1 as a member.
  - Group B has ub1 as a member.

  The dynamic group that includes Group A will only include the direct members of group A (that is, ua1). It won’t recursively include members of group B.

- Dynamic groups can’t contain other dynamic groups. For more information, see Preview limitations in the Microsoft documentation for Azure AD.

**Step 1: Set up IAM Identity Center and configure automatic provisioning**

To get started, you'll need to first follow the instructions in Tutorial: Configure IAM Identity Center for automatic user provisioning. These instructions walk you through the following:

- Enable IAM Identity Center.
- Install the IAM Identity Center app from the Azure AD Application Gallery.
- Configure automatic provisioning (SCIM) within the Azure portal.

**Step 2: (Optional) Configure attribute-based access control**

Now that you have configured Azure AD to work with IAM Identity Center, you can optionally choose to configure attribute-based access control (ABAC). ABAC is an authorization strategy that defines permissions based on attributes.

With Azure AD, you have two different ways to configure ABAC for use with IAM Identity Center. Choose either of the following methods.

**Method 1: Configure ABAC using Azure AD**

This method can be used when you need to define which attributes in Azure AD can be used by IAM Identity Center to manage access to your AWS resources. Once defined, Azure AD sends these attributes to IAM Identity Center through SAML assertions. You will then need to Create a permission set (p. 114) in IAM Identity Center to manage access based on the attributes you passed from Azure AD.
Before you begin this procedure, you first need to enable the Attributes for access control (p. 124) feature. For more information about how to do this, see Enable and configure attributes for access control (p. 126).

To configure user attributes in Azure AD for access control in IAM Identity Center

1. While signed into the Azure portal, navigate to Azure Active Directory, Enterprise applications. Search for the name of the application that you created previously to form your SAML connection. Then choose the application.
2. Choose Single sign-on.
3. In the User Attributes & Claims section, choose Edit.
4. On the User Attributes & Claims page, do the following:
   a. Choose Add new claim
   b. For Name, enter AccessControl:AttributeName. Replace AttributeName with the name of the attribute you are expecting in IAM Identity Center. For example, AccessControl:Department.
   c. For Namespace, enter https://aws.amazon.com/SAML/Attributes.
   d. For Source, choose Attribute.
   e. For Source attribute, use the drop-down list to choose the Azure AD user attributes. For example, user.department.
5. Repeat the previous step for each attribute you need to send to IAM Identity Center in the SAML assertion.
6. Choose Save.

Method 2: Configure ABAC using IAM Identity Center

With this method, you use the Attributes for access control (p. 124) feature in IAM Identity Center to pass an Attribute element with the Name attribute set to https://aws.amazon.com/SAML/Attributes/AccessControl:{TagKey}. You can use this element to pass attributes as session tags in the SAML assertion. For more information about session tags, see Passing session tags in AWS STS in the IAM User Guide.

To pass attributes as session tags, include the AttributeValue element that specifies the value of the tag. For example, to pass the tag key-value pair CostCenter = blue, use the following attribute:

```xml
<saml:AttributeStatement>
  <saml:Attribute Name="https://aws.amazon.com/SAML/Attributes/AccessControl:CostCenter">
    <saml:AttributeValue>blue</saml:AttributeValue>
  </saml:Attribute>
</saml:AttributeStatement>
```

If you need to add multiple attributes, include a separate Attribute element for each tag.

Troubleshooting

The following can help you troubleshoot some common issues you might encounter while setting up automatic provisioning with Azure AD.

Azure AD users are not synchronizing to IAM Identity Center

This might be due to a syntax issue that IAM Identity Center has flagged when a new user is being added to IAM Identity Center. You can confirm this by checking the Azure audit logs for failed events, such as an 'Export'. The Status Reason for this event will state:
You can also check AWS CloudTrail for the failed event. This can be done by searching in the Event History console of CloudTrail using the following filter:

```
"eventName":"CreateUser"
```

The error in the CloudTrail event will state the following:

```
"errorCode": "ValidationException",
"errorMessage": "Currently list attributes only allow single item"
```

Ultimately, this exception means that one of the values passed from Azure contained more values than anticipated. The solution here is to review the attributes of the user in Azure AD, ensuring that none contain duplicate values. One common example of duplicate values is having multiple values present for contact numbers such as mobile, work, and fax. Although separate values, they are all passed to IAM Identity Center under the single parent attribute phoneNumbers.

CyberArk

IAM Identity Center supports automatic provisioning (synchronization) of user information from CyberArk Directory Platform into IAM Identity Center. This provisioning uses the System for Cross-domain Identity Management (SCIM) v2.0 protocol. You configure this connection in CyberArk using your IAM Identity Center SCIM endpoint and access token. When you configure SCIM synchronization, you create a mapping of your user attributes in CyberArk to the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and CyberArk.

This guide is based on CyberArk as of August 2021. Steps for newer versions may vary. This guide contains a few notes regarding configuration of user authentication through SAML.

Note

Before you begin deploying SCIM, we recommend that you first review the Considerations for using automatic provisioning (p. 53). Then continue reviewing additional considerations in the next section.

Topics

- Prerequisites (p. 62)
- SCIM considerations (p. 63)
- Step 1: Enable provisioning in IAM Identity Center (p. 63)
- Step 2: Configure provisioning in CyberArk (p. 63)
- (Optional) Step 3: Configure user attributes in CyberArk for access control (ABAC) in IAM Identity Center (p. 64)
- (Optional) Passing attributes for access control (p. 64)

Prerequisites

You will need the following before you can get started:

- CyberArk subscription or free trial. To sign up for a free trial visit CyberArk.
- An IAM Identity Center enabled account (free). For more information, see Enable IAM Identity Center.
- A SAML connection from your CyberArk account to IAM Identity Center, as described in CyberArk documentation for IAM Identity Center.
- Associate the IAM Identity Center connector with the roles, users and organizations you want to allow access to AWS accounts.
SCIM considerations

The following are considerations when using CyberArk federation for IAM Identity Center:

- Only roles mapped in the application Provisioning section will be synchronized to IAM Identity Center.
- The provisioning script is supported only in its default state, once changed the SCIM provisioning might fail.
  - Only one phone number attribute can be synchronized and the default is “work phone”.
- If the role mapping in CyberArk IAM Identity Center application is changed, the below behavior is expected:
  - If the role names are changed - no changes to the group names in IAM Identity Center.
  - If the group names are changed - new groups will be created in IAM Identity Center, old groups will remain but will have no members.
- User synchronization and de-provisioning behavior can be set up from the CyberArk IAM Identity Center application, make sure you set up the right behavior for your organization. These are the options you have:
  - Overwrite (or not) users in Identity Center directory with the same principal name.
  - De-provision users from IAM Identity Center when the user is removed from the CyberArk role.
  - De-provision user behavior - disable or delete.

Step 1: Enable provisioning in IAM Identity Center

In this first step, you use the IAM Identity Center console to enable automatic provisioning.

To enable automatic provisioning in IAM Identity Center

1. After you have completed the prerequisites, open the IAM Identity Center console.
2. Choose Settings in the left navigation pane.
3. On the Settings page, locate the Automatic provisioning information box, and then choose Enable. This immediately enables automatic provisioning in IAM Identity Center and displays the necessary SCIM endpoint and access token information.
4. In the Inbound automatic provisioning dialog box, copy each of the values for the following options. You will need to paste these in later when you configure provisioning in your IdP.
   a. SCIM endpoint
   b. Access token
5. Choose Close.

Now that you have set up provisioning in the IAM Identity Center console, you need to complete the remaining tasks using the CyberArk IAM Identity Center application. These steps are described in the following procedure.

Step 2: Configure provisioning in CyberArk

Use the following procedure in the CyberArk IAM Identity Center application to enable provisioning with IAM Identity Center. This procedure assumes that you have already added the CyberArk IAM Identity Center application to your CyberArk admin console under Web Apps. If you have not yet done so, refer to the Prerequisites (p. 62), and then complete this procedure to configure SCIM provisioning.

To configure provisioning in CyberArk

1. Open the CyberArk IAM Identity Center application that you added as part of configuring SAML for CyberArk (Apps > Web App). See Prerequisites (p. 62).
2. Choose the IAM Identity Center application and go to the Provisioning section.
3. Check the box for **Enable provisioning for this application** and choose **Live Mode**.

4. In the previous procedure, you copied the **SCIM endpoint** value from IAM Identity Center. Paste that value into the **SCIM Service URL** field, in the CyberArk IAM Identity Center application set the **Authorization Type** to be **Authorization Header**. Make sure that you remove the trailing forward slash at the end of the URL.

5. Set the **Header Type** to **Bearer Token**.

6. From the previous procedure you copied the **Access token** value in IAM Identity Center. Paste that value into the **Bearer Token** field in the CyberArk IAM Identity Center application.

7. Click **Verify** to test and apply the configuration.

8. Under the **Sync Options**, choose the right behavior for which you want the outbound provisioning from CyberArk to work. You can choose to overwrite (or not) existing IAM Identity Center users with similar principal name, and the de-provisioning behavior.

9. Under **Role Mapping** set up the mapping from CyberArk roles, under the **Name** field to the IAM Identity Center group, under the **Destination Group**.

10. Click **Save** at the bottom once you are done.

11. To verify that users have been successfully synchronized to IAM Identity Center, return to the IAM Identity Center console and choose **Users**. Synchronized users from CyberArk will appear on the **Users** page. These users can now be assigned to accounts and can connect within IAM Identity Center.

**(Optional) Step 3: Configure user attributes in CyberArk for access control (ABAC) in IAM Identity Center**

This is an optional procedure for CyberArk should you choose to configure attributes for IAM Identity Center to manage access to your AWS resources. The attributes that you define in CyberArk are passed in a SAML assertion to IAM Identity Center. You then create a permission set in IAM Identity Center to manage access based on the attributes you passed from CyberArk.

Before you begin this procedure, you must first enable the **Attributes for access control** feature. For more information about how to do this, see [Enable and configure attributes for access control](#).

To configure user attributes in CyberArk for access control in IAM Identity Center

1. Open the CyberArk IAM Identity Center application that you installed as part of configuring SAML for CyberArk (**Apps > Web Apps**).

2. Go to the **SAML Response** option.

3. Under Attributes, add the relevant attributes to the table following the below logic:

   a. **Attribute Name** is the original attribute name from CyberArk.

   b. **Attribute Value** is the attribute name sent in the SAML assertion to IAM Identity Center.

4. Choose **Save**.

**(Optional) Passing attributes for access control**

You can optionally use the **Attributes for access control** feature in IAM Identity Center to pass an Attribute element with the Name attribute set to `https://aws.amazon.com/SAML/Attributes/AccessControl:{TagKey}`. This element allows you to pass attributes as session tags in the SAML assertion. For more information about session tags, see [Passing session tags in AWS STS](#) in the IAM User Guide.

To pass attributes as session tags, include the AttributeValue element that specifies the value of the tag. For example, to pass the tag key-value pair `CostCenter = blue`, use the following attribute.
Connect to an external identity provider

<saml:AttributeStatement>
<saml:Attribute Name="https://aws.amazon.com/SAML/Attributes/AccessControl:CostCenter">
<saml:AttributeValue>blue</saml:AttributeValue>
</saml:Attribute>
</saml:AttributeStatement>

If you need to add multiple attributes, include a separate Attribute element for each tag.

**Google Workspace**

IAM Identity Center supports automatic provisioning (synchronization) of user information from Google Workspace into IAM Identity Center using the System for Cross-domain Identity Management (SCIM) v2.0 protocol. You configure this connection in Google Workspace using your SCIM endpoint for IAM Identity Center and a bearer token that is created automatically by IAM Identity Center. When you configure SCIM synchronization, you create a mapping of your user attributes in Google Workspace to the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and Google Workspace. SCIM automatic synchronization from Google Workspace is currently limited to users provisioning.

The following steps walk you through how to enable automatic provisioning of users from Google Workspace to IAM Identity Center using the SCIM protocol.

**About group provisioning**

SCIM automatic provisioning of Google Workspace groups isn't available. You can create groups manually as follows:

- Identity Store AWS CLI `create-group` operation
- CreateGroup API

You can't create groups manually in the AWS Management Console.

**Note**
Before you configure SCIM, we recommend that you first review Considerations for using automatic provisioning (p. 53), and then continue reviewing Prerequisites (p. 65) and SCIM considerations (p. 65) in the next sections.

**Prerequisites**

You will need the following before you can get started:

- Google Workspace subscription or free trial. To sign up for a free trial visit Google Workspace on Google's website.
- An IAM Identity Center-enabled account (free). For more information, see Enable IAM Identity Center.
- A SAML connection from your Google Workspace account to IAM Identity Center, as described in Configure Amazon Web Services (AWS) auto-provisioning on Google's website.
- Associate the IAM Identity Center connector with the roles, users, and organizations you want to allow access to AWS accounts.

**SCIM considerations**

Considerations when using Google Workspace federation for IAM Identity Center:

- Only one phone number attribute can be synchronized and the default is "work phone".
- Users in Google Workspace directory must have first and last names configured to be synchronized to IAM Identity Center using SCIM.
• Attributes are still synchronized if the user is disabled in IAM Identity Center, but still active in Google Workspace.
• If there is an existing user in Identity Center directory with the same user name and email, the user will be overwritten and synchronized using SCIM from Google Workspace.

Step 1: Enable provisioning in IAM Identity Center

In this first step, you use the IAM Identity Center console to enable automatic provisioning.

To enable automatic provisioning in IAM Identity Center

1. After you have completed the prerequisites, open the IAM Identity Center console.
2. Choose Settings in the left navigation pane.
3. On the Settings page, locate the Automatic provisioning information box, and then choose Enable. This immediately enables automatic provisioning in IAM Identity Center and displays the necessary SCIM endpoint and access token information.
4. In the Inbound automatic provisioning dialog box, copy each of the values for the following options. You will need to paste these in later when you configure provisioning in your IdP.
   a. SCIM endpoint
   b. Access token
5. Choose Close.

Now that you've set up provisioning in the IAM Identity Center console, complete the remaining tasks using the Google Workspace Auto provisioning IAM Identity Center connector. These steps are described in the following procedure.

Step 2: Configure provisioning in Google Workspace

1. Sign in to your Google Admin console using an administrator account and then navigate to Apps > Web and mobile apps.
2. Choose the Amazon Web Services application.
3. In the Auto provisioning section, choose Configure auto provisioning.
4. In the previous procedure, you copied the Access token value in IAM Identity Center. Paste that value into the API key field in Google and choose Continue. Also, in the previous procedure, you copied the SCIM endpoint value in IAM Identity Center. Paste that value into the endpoint URL field. Make sure that you remove the trailing forward slash at the end of the URL and choose Continue.
5. Verify that all mandatory IAM Identity Center attributes (those marked with *) are mapped to Google Cloud Directory attributes. If not, choose the down arrow and map to the appropriate attribute.
6. Choose Continue.
7. Set the amount of time before deprovisioning begins to: within 24 hours or after one, seven, or 21 days. Choose at least one of these options:
   • When an app is turned off for the user, delete their account after [number of days].
   • When a user is suspended on Google, delete their account after [number of days].
   • When a user is deleted from Google, delete their account after [number of days].

   Tip
   Always set more time before hard deleting a user's account than for suspending a user's account.
9. In the **Auto-provisioning** section, choose the activation slider.

   **Note**
   The activation slider is disabled if IAM Identity Center isn't turned on for users. Choose **User access** and turn the app on to enable the slider.

10. In the confirmation dialog box, choose **Turn on**.

11. To verify that users are successfully synchronized to IAM Identity Center, return to the IAM Identity Center console and choose **Users**. Synchronized users from Google display on the **Users** page. You can now assign accounts to these users in **IAM Identity Center**.

(Optional) Step 3. Configure user attributes in Google Workspace for access control in IAM Identity Center

This is an optional procedure for Google Workspace if you want to configure attributes for IAM Identity Center to manage access to your AWS resources. The attributes that you define in Google are passed in a SAML assertion to IAM Identity Center. You then create a permission set in IAM Identity Center to manage access based on the attributes you passed from Google.

Before you begin this procedure, first enable the **Attributes for access control** feature. See [Enable and configure attributes for access control](p. 126).

**To configure user attributes in Google Workspace for access control in IAM Identity Center**

1. Open the Google Workspace IAM Identity Center connector that you installed as part of configuring SAML for Google by navigating to **User Authentication > IAM Identity Center**.
2. Choose the IAM Identity Center connector. Then, choose the second tab for IAM Identity Center.
3. In the **User Attribute Mapping**, choose **Add new attribute**, and then complete the following steps for each attribute you’ll add access control for in IAM Identity Center.
   a. In the **Service Provide Attribute Name** field, enter `https://aws.amazon.com/SAML/Attributes/AccessControl:`Attribute\Name. Replace `Attribute\Name` with the name of the attribute you're expecting in IAM Identity Center. For example, `https://aws.amazon.com/SAML/Attributes/AccessControl:Email`.
   b. In the **Google Workspace Attribute Name** field, choose user attributes from your Google Workspace directory. For example, `Email (Work)`.
4. Choose **Save**.

(Optional) Passing attributes for access control

You can optionally use the **Attributes for access control** (p. 124) feature in IAM Identity Center to pass an Attribute element with the Name attribute set to `https://aws.amazon.com/SAML/Attributes/AccessControl:{TagKey}`. This element allows you to pass attributes as session tags in the SAML assertion. For more information about session tags, see [Passing session tags in AWS STS](in the IAM User Guide).

To pass attributes as session tags, include the `AttributeValue` element that specifies the value of the tag. For example, to pass the tag key-value pair `CostCenter = blue`, use the following attribute.

```xml
<saml:AttributeStatement>
  <saml:Attribute Name="https://aws.amazon.com/SAML/Attributes/AccessControl:CostCenter">
    <saml:AttributeValue>blue</saml:AttributeValue>
  </saml:Attribute>
</saml:AttributeStatement>
```

If you need to add multiple attributes, include a separate `Attribute` element for each tag.
JumpCloud

IAM Identity Center supports automatic provisioning (synchronization) of user information from JumpCloud Directory Platform into IAM Identity Center. This provisioning uses the System for Cross-domain Identity Management (SCIM) v2.0 protocol. You configure this connection in JumpCloud using your IAM Identity Center SCIM endpoint and access token. When you configure SCIM synchronization, you create a mapping of your user attributes in JumpCloud to the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and JumpCloud.

This guide is based on JumpCloud as of June 2021. Steps for newer versions may vary. This guide contains a few notes regarding configuration of user authentication through SAML.

The following steps walk you through how to enable automatic provisioning of users and groups from JumpCloud to IAM Identity Center using the SCIM protocol.

**Note**
Before you begin deploying SCIM, we recommend that you first review the Considerations for using automatic provisioning (p. 53). Then continue reviewing additional considerations in the next section.

**Topics**
- Prerequisites (p. 68)
- SCIM considerations (p. 68)
- Step 1: Enable provisioning in IAM Identity Center (p. 69)
- Step 2: Configure provisioning in JumpCloud (p. 69)
- (Optional) Step 3: Configure user attributes in JumpCloud for access control in IAM Identity Center (p. 70)
- (Optional) Passing attributes for access control (p. 70)

**Prerequisites**

You will need the following before you can get started:

- JumpCloud subscription or free trial. To sign up for a free trial visit JumpCloud.
- An IAM Identity Center enabled account (free). For more information, see Enable IAM Identity Center.
- A SAML connection from your JumpCloud account to IAM Identity Center, as described in JumpCloud documentation for IAM Identity Center.
- Associate the IAM Identity Center connector with the groups you want to allow access to AWS accounts.

**SCIM considerations**

The following are considerations when using JumpCloud federation for IAM Identity Center.

- Only groups associated with the AWS Single Sign-On connector in JumpCloud will be synchronized with SCIM.
- Only one phone number attribute can be synchronized and the default is “work phone.”
- Users in JumpCloud directory must have first and last names configured to be synchronized to IAM Identity Center with SCIM.
- Attributes are still synchronized if the user is disabled in IAM Identity Center but still activate in JumpCloud.
- You can choose to enable SCIM sync for only user information by unchecking the “Enable management of User Groups and Group membership” in the connector.
• If there is an existing user in Identity Center directory with the same username and email, the user will be overwritten and synchronized with SCIM from JumpCloud.

Step 1: Enable provisioning in IAM Identity Center

In this first step, you use the IAM Identity Center console to enable automatic provisioning.

**To enable automatic provisioning in IAM Identity Center**

1. After you have completed the prerequisites, open the IAM Identity Center console.
2. Choose **Settings** in the left navigation pane.
3. On the **Settings** page, locate the **Automatic provisioning** information box, and then choose **Enable**. This immediately enables automatic provisioning in IAM Identity Center and displays the necessary SCIM endpoint and access token information.
4. In the **Inbound automatic provisioning** dialog box, copy each of the values for the following options. You will need to paste these in later when you configure provisioning in your IdP.
   a. SCIM endpoint
   b. Access token
5. Choose **Close**.

Now that you have set up provisioning in the IAM Identity Center console, you need to complete the remaining tasks using the JumpCloud IAM Identity Center connector. These steps are described in the following procedure.

Step 2: Configure provisioning in JumpCloud

Use the following procedure in the JumpCloud IAM Identity Center connector to enable provisioning with IAM Identity Center. This procedure assumes that you have already added the JumpCloud IAM Identity Center connector to your JumpCloud admin portal and groups. If you have not yet done so, refer to Prerequisites (p. 68), and then complete this procedure to configure SCIM provisioning.

**To configure provisioning in JumpCloud**

1. Open the JumpCloud IAM Identity Center connector that you installed as part of configuring SAML for JumpCloud (User Authentication > IAM Identity Center). See Prerequisites (p. 68).
2. Choose the IAM Identity Center connector, and then choose the third tab **Identity Management**.
3. Check the box for **Enable management of User Groups and Group membership in this application** if you want groups to SCIM sync.
4. Click on **Configure**.
5. In the previous procedure, you copied the SCIM endpoint value in IAM Identity Center. Paste that value into the **Base URL** field in the JumpCloud IAM Identity Center connector. Make sure that you remove the trailing forward slash at the end of the URL.
6. From the previous procedure you copied the Access token value in IAM Identity Center. Paste that value into the **Token Key** field in the JumpCloud IAM Identity Center connector.
7. Click **Activate** to apply the configuration.
8. Make sure you have a green indicator next to **Single Sign-On activated**.
9. Move to the fourth tab **User Groups** and check the groups you want to be provisioned with SCIM.
10. Click **Save** at the bottom once you are done.
11. To verify that users have been successfully synchronized to IAM Identity Center, return to the IAM Identity Center console and choose **Users**. Synchronized users from JumpCloud appear on the **Users** page. These users can now be assigned to accounts within IAM Identity Center.
(Optional) Step 3: Configure user attributes in JumpCloud for access control in IAM Identity Center

This is an optional procedure for JumpCloud should you choose to configure attributes for IAM Identity Center to manage access to your AWS resources. The attributes that you define in JumpCloud are passed in a SAML assertion to IAM Identity Center. You then create a permission set in IAM Identity Center to manage access based on the attributes you passed from JumpCloud.

Before you begin this procedure, you must first enable the Attributes for access control feature. For more information about how to do this, see Enable and configure attributes for access control.

To configure user attributes in JumpCloud for access control in IAM Identity Center

1. Open the JumpCloud IAM Identity Center connector that you installed as part of configuring SAML for JumpCloud (User Authentication > IAM Identity Center).
2. Choose the IAM Identity Center connector. Then, choose the second tab IAM Identity Center.
3. At the bottom of this tab you have User Attribute Mapping, choose Add new attribute, and then do the following: You must perform these steps for each attribute you will add for use in IAM Identity Center for access control.
   a. In the Service Provider Attribute Name field, enter https://aws.amazon.com/SAML/Attributes/AccessControl:AttributeName. Replace AttributeName with the name of the attribute you are expecting in IAM Identity Center. For example, https://aws.amazon.com/SAML/Attributes/AccessControl:Email.
   b. In the JumpCloud Attribute Name field, choose user attributes from your JumpCloud directory. For example, Email (Work).
4. Choose Save.

(Optional) Passing attributes for access control

You can optionally use the Attributes for access control (p. 124) feature in IAM Identity Center to pass an Attribute element with the Name attribute set to https://aws.amazon.com/SAML/Attributes/AccessControl:{TagKey}. This element allows you to pass attributes as session tags in the SAML assertion. For more information about session tags, see Passing session tags in AWS STS in the IAM User Guide.

To pass attributes as session tags, include the AttributeValue element that specifies the value of the tag. For example, to pass the tag key-value pair CostCenter = blue, use the following attribute.

```xml
<saml:AttributeStatement>
  <saml:Attribute Name="https://aws.amazon.com/SAML/Attributes/AccessControl:CostCenter">
    <saml:AttributeValue>blue</saml:AttributeValue>
  </saml:Attribute>
</saml:AttributeStatement>
```

If you need to add multiple attributes, include a separate Attribute element for each tag.

**Okta**

IAM Identity Center supports automatic provisioning (synchronization) of user and group information from Okta into IAM Identity Center using the System for Cross-domain Identity Management (SCIM) v2.0 protocol. To configure this connection in Okta, you use your SCIM endpoint for IAM Identity Center and a bearer token that is created automatically by IAM Identity Center. When you configure SCIM synchronization, you create a mapping of your user attributes in Okta to the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and your IdP.
Okta supports the following provisioning features when connected to IAM Identity Center through SCIM:

- **Create users** – Users assigned to the IAM Identity Center application in Okta are provisioned in IAM Identity Center.
- **Update user attributes** – Attribute changes for users who are assigned to the IAM Identity Center application in Okta are updated in IAM Identity Center.
- **Deactivate users** – Users who are unassigned from the IAM Identity Center application in Okta are disabled in IAM Identity Center.
- **Group push** – Groups (and their members) in Okta are synchronized to IAM Identity Center.

The following steps walk you through how to enable automatic provisioning of users and groups from Okta to IAM Identity Center using the SCIM protocol.

**Note**
Before you begin deploying SCIM, we recommend that you first review the Considerations for using automatic provisioning (p. 53). Then continue reviewing additional considerations in the next section.

**Topics**
- Additional considerations (p. 71)
- Prerequisites (p. 71)
- Step 1: Enable provisioning in IAM Identity Center (p. 72)
- Step 2: Configure provisioning in Okta (p. 72)
- Step 3: Assign access for users and groups in Okta (p. 72)
- (Optional) Step 4: Configure user attributes in Okta for access control in IAM Identity Center (p. 73)
- (Optional) Passing attributes for access control (p. 74)
- Troubleshooting (p. 74)

**Additional considerations**

The following are important considerations about Okta that can affect how you implement provisioning with IAM Identity Center.

- Using the same Okta group for both assignments and group push is not currently supported. To maintain consistent group memberships between Okta and IAM Identity Center, you need to create a separate group and configure it to push groups to IAM Identity Center.
- If you update a user’s address you must have streetAddress, city, state, zipCode and the countryCode value specified. If any of these values are not specified for the Okta user at the time of synchronization, the user or changes to the user will not be provisioned.
- Entitlements and role attributes are not supported and cannot be synced to IAM Identity Center.

**Prerequisites**

You will need the following before you can get started:

- An Okta account (free trial) with Okta’s IAM Identity Center application installed. Note also that for paid Okta products, you might need to confirm that your Okta license supports “lifecycle management” or similar capabilities that enable outbound provisioning. These features might be necessary to configure SCIM from Okta to IAM Identity Center.
- A SAML connection from your Okta account to IAM Identity Center, as described in How to Configure SAML 2.0 for IAM Identity Center.
• An IAM Identity Center-enabled account (free). For more information, see Enable IAM Identity Center.

**Step 1: Enable provisioning in IAM Identity Center**

In this first step, you use the IAM Identity Center console to enable automatic provisioning.

**To enable automatic provisioning in IAM Identity Center**

1. After you have completed the prerequisites, open the IAM Identity Center console.
2. Choose Settings in the left navigation pane.
3. On the Settings page, locate the Automatic provisioning information box, and then choose Enable. This immediately enables automatic provisioning in IAM Identity Center and displays the necessary SCIM endpoint and access token information.
4. In the Inbound automatic provisioning dialog box, copy each of the values for the following options. You will need to paste these in later when you configure provisioning in your IdP.
   a. SCIM endpoint
   b. Access token
5. Choose Close.

You have set up provisioning in the IAM Identity Center console. Now you need to do the remaining tasks using the Okta user interface as described in the following procedures.

**Step 2: Configure provisioning in Okta**

Use the following procedure in the Okta admin portal to enable integration between IAM Identity Center and the IAM Identity Center app.

**To configure provisioning in Okta**

1. In a separate browser window, log in to the Okta admin portal and navigate to the IAM Identity Center app.
2. On the IAM Identity Center app page, choose the Provisioning tab, and then choose Integration.
3. Choose Configure API Integration, and then select the check box next to Enable API integration to enable provisioning.
4. In the previous procedure you copied the SCIM endpoint value in IAM Identity Center. Paste that value into the Base URL field in Okta. Make sure that you remove the trailing forward slash at the end of the URL. Also, in the previous procedure you copied the Access token value in IAM Identity Center. Paste that value into the API Token field in Okta.
5. Choose Test API Credentials to verify the credentials entered are valid.
6. Choose Save.
7. Under Settings, choose To App, choose Edit, and then select the Enable check box for each of the Provisioning Features you want to enable.
8. Choose Save.

By default, no users or groups are assigned to your Okta IAM Identity Center app. Therefore you must complete the next procedure to begin synchronizing users and groups to IAM Identity Center.

**Step 3: Assign access for users and groups in Okta**

Use the following procedures in Okta to assign access to your users and groups. Okta users who belong to groups that you assign here are synchronized automatically to IAM Identity Center. To minimize administrative overhead in both Okta and IAM Identity Center, we recommend that you assign and push groups instead of individual users.
After you complete this step and the first synchronization with SCIM is completed, the users and groups that you have assigned appear in IAM Identity Center. Those users are able to access the AWS access portal using their Okta credentials.

**To assign access for users in Okta**

1. In the IAM Identity Center app page, choose the Assignments tab.
2. In the Assignments page, choose Assign, and then choose Assign to People.
3. Choose the Okta user or users whom you want to assign access to the IAM Identity Center app. Choose Assign, choose Save and Go Back, and then choose Done. This starts the process of provisioning the user or users into IAM Identity Center.

**To assign access for groups in Okta**

1. On the IAM Identity Center app page, choose the Assignments tab.
2. In the Assignments page, choose Assign, and then choose Assign to Groups.
3. Choose the Okta group or groups that you want to assign access to the IAM Identity Center app. Choose Assign, choose Save and Go Back, and then choose Done. This starts the process of provisioning the users in the group into IAM Identity Center.
4. Choose the Push Groups tab. Choose the Okta group or groups that you chose in the previous step.
   
   **Note**
   These chosen groups must be different from those assigned to the application. To maintain consistent group memberships between Okta and IAM Identity Center, you need to create a separate group and configure it to push groups to IAM Identity Center.

   Then choose Save. The group status changes to Active after the group and its members have successfully been pushed to IAM Identity Center.

To grant your Okta users access to AWS accounts and cloud applications, complete the following applicable procedures from the IAM Identity Center console:

- To grant access to AWS accounts, see [Assign user access to AWS accounts](p. 111).
- To grant access to cloud applications, see [Assign user access to applications in the IAM Identity Center console](p. 140).

(Optional) Step 4: Configure user attributes in Okta for access control in IAM Identity Center

This is an optional procedure for Okta if you choose to configure attributes you will use in IAM Identity Center to manage access to your AWS resources. The attributes you define in Okta are passed in a SAML assertion to IAM Identity Center, you will then create a permission set in IAM Identity Center to manage access based on the attributes you passed from Okta.

Before you begin this procedure, you first need to enable the Attributes for access control feature. For more information about how to do this, see [Enable and configure attributes for access control](p. 126).

**To configure user attributes in Okta for access control in IAM Identity Center**

1. In a separate browser window, log in to the Okta admin portal and navigate to the IAM Identity Center app.
2. On the IAM Identity Center app page, choose the Sign On tab, and then choose Edit.
3. In the SAML section, expand Attributes (Optional).
4. In the Attribute Statements (optional) section, do the following for each attribute where you will use IAM Identity Center for access control:
Connect to an external identity provider

1. In the Name field, enter https://aws.amazon.com/SAML/Attributes/AccessControl:AttributeName, and replace AttributeName with the name of the attribute you are expecting in IAM Identity Center. For example, https://aws.amazon.com/SAML/Attributes/AccessControl:Department.

2. In the Name Format field, choose URI reference.

3. In the Value field, enter user.AttributeName, replace AttributeName with the Okta default user profile variable name. For example, user.department. To find your Okta default user profile variable name, see View the Okta default user profile on the Okta website.

5. (Optional) Choose Preview SAML, to review a sample SAML assertion that includes the new attributes.

6. Choose Save.

(Optional) Passing attributes for access control

You can optionally use the Attributes for access control (p. 124) feature in IAM Identity Center to pass an Attribute element with the Name attribute set to https://aws.amazon.com/SAML/Attributes/AccessControl:{TagKey}. This element allows you to pass attributes as session tags in the SAML assertion. For more information about session tags, see Passing session tags in AWS STS in the IAM User Guide.

To pass attributes as session tags, include the AttributeValue element that specifies the value of the tag. For example, to pass the tag key-value pair CostCenter = blue, use the following attribute.

```
<saml:AttributeStatement>
  <saml:Attribute Name="https://aws.amazon.com/SAML/Attributes/AccessControl:CostCenter">
    <saml:AttributeValue>blue</saml:AttributeValue>
  </saml:Attribute>
</saml:AttributeStatement>
```

If you need to add multiple attributes, include a separate Attribute element for each tag.

Troubleshooting

The following can help you troubleshoot some common issues you might encounter while setting up automatic provisioning with Okta.

Base URL: Does not match required pattern

The SCIM endpoint URL that you pasted into Base URL likely contains a trailing forward slash (/). Remove the forward slash from the SCIM endpoint URL before pasting into Base URL. For example, https://scim.us-east-2.amazonaws.com/xxxxxxxx-xxxx-xxxx-xxxxx-xxxx/scim/v2.

Error during synchronization

After you have started synchronization, you might see the following error:

```
Automatic profile push of <user> to app IAM Identity Center failed: Error while trying to push profile update for <user>@Corp.Example.com: Bad Request. Errors reported by remote server: Request is unparsable, syntactically incorrect, or violates schema.
```

For SCIM synchronization to work:

- Every user must have a First name, Last name, Username, and Display name value specified. If any of these values are missing from a user, that user will not be provisioned.
- Usernames should be mapped to attributes that are unique within your directory in Okta.
The following special characters must not be used in attributes that are synchronized with SCIM: <>; : %

If you update a user's address you must have streetAddress, city, state, zipCode and the countryCode value specified. If any of these values are not specified for the Okta user at the time of synchronization, the user or changes to the user will not be provisioned.

OneLogin

IAM Identity Center supports automatic provisioning (synchronization) of user and group information from OneLogin into IAM Identity Center using the System for Cross-domain Identity Management (SCIM) v2.0 protocol. You configure this connection in OneLogin, using your SCIM endpoint for IAM Identity Center and a bearer token that is created automatically by IAM Identity Center. When you configure SCIM synchronization, you create a mapping of your user attributes in OneLogin to the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and OneLogin.

The following steps walk you through how to enable automatic provisioning of users and groups from OneLogin to IAM Identity Center using the SCIM protocol.

**Note**
Before you begin deploying SCIM, we recommend that you first review the Considerations for using automatic provisioning (p. 53).

**Topics**
- Prerequisites (p. 75)
- Step 1: Enable provisioning in IAM Identity Center (p. 75)
- Step 2: Configure provisioning in OneLogin (p. 76)
- (Optional) Step 3: Configure user attributes in OneLogin for access control in IAM Identity Center (p. 76)
- (Optional) Passing attributes for access control (p. 77)
- Troubleshooting (p. 77)

**Prerequisites**

You will need the following before you can get started:

- A OneLogin account. If you do not have an existing account, you may be able to obtain a free trial or developer account from the OneLogin website.
- An IAM Identity Center-enabled account (free). For more information, see Enable IAM Identity Center.
- A SAML connection from your OneLogin account to IAM Identity Center. For more information, see Enabling Single Sign-On Between OneLogin and AWS on the AWS Partner Network Blog.

**Step 1: Enable provisioning in IAM Identity Center**

In this first step, you use the IAM Identity Center console to enable automatic provisioning.

**To enable automatic provisioning in IAM Identity Center**

1. After you have completed the prerequisites, open the IAM Identity Center console.
2. Choose Settings in the left navigation pane.
3. On the Settings page, locate the Automatic provisioning information box, and then choose Enable. This immediately enables automatic provisioning in IAM Identity Center and displays the necessary SCIM endpoint and access token information.
4. In the **Inbound automatic provisioning** dialog box, copy each of the values for the following options. You will need to paste these in later when you configure provisioning in your IdP.
   
   a. SCIM endpoint  
   b. Access token  

5. Choose **Close**.

You have now set up provisioning in the IAM Identity Center console. Now you need to do the remaining tasks using the OneLogin admin console as described in the following procedure.

**Step 2: Configure provisioning in OneLogin**

Use the following procedure in the OneLogin admin console to enable integration between IAM Identity Center and the IAM Identity Center app. This procedure assumes you have already configured the AWS Single Sign-On application in OneLogin for SAML authentication. If you have not yet created this SAML connection, please do so before proceeding and then return here to complete the SCIM provisioning process. For more information about configuring SAML with OneLogin, see [Enabling Single Sign-On Between OneLogin and AWS](https://aws.amazon.com/partner-network/blogs/aws-enabling-single-sign-on-between-onevlogin-and-aws/) on the AWS Partner Network Blog.

**To configure provisioning in OneLogin**

1. Sign in to OneLogin, and then navigate to **Applications > Applications**.

2. On the **Applications** page, search for the application you created previously to form your SAML connection with IAM Identity Center. Choose it and then choose **Configuration** from the left navigation bar.

3. In the previous procedure, you copied the **SCIM endpoint** value in IAM Identity Center. Paste that value into the **SCIM Base URL** field in OneLogin. Make sure that you remove the trailing forward slash at the end of the URL. Also, in the previous procedure you copied the **Access token** value in IAM Identity Center. Paste that value into the **SCIM Bearer Token** field in OneLogin.

4. Next to **API Connection**, click **Enable**, and then click **Save** to complete the configuration.

5. In the left navigation bar, choose **Provisioning**.

6. Select the check boxes for **Enable provisioning**, **Create user**, **Delete user**, and **Update user**, and then choose **Save**.

7. In the left navigation bar, choose **Users**.

8. Click **More Actions** and choose **Sync logins**. You should receive the message **Synchronizing users with AWS Single Sign-On**.

9. Click **More Actions** again, and then choose **Reapply entitlement mappings**. You should receive the message **Mappings are being reapplied**.

10. At this point, the provisioning process should begin. To confirm this, navigate to **Activity > Events**, and monitor the progress. Successful provisioning events, as well as errors, should appear in the event stream.

11. To verify that your users and groups have all been successfully synchronized to IAM Identity Center, return to the IAM Identity Center console and choose **Users**. Your synchronized users from OneLogin appear on the **Users** page. You can also view your synchronized groups on the **Groups** page.

12. To synchronize user changes automatically to IAM Identity Center, navigate to the **Provisioning** page, locate the **Require admin approval before this action is performed** section, de-select **Create User**, **Delete User**, and/or **Update User**, and click **Save**.

(Optional) **Step 3: Configure user attributes in OneLogin for access control in IAM Identity Center**

This is an optional procedure for OneLogin if you choose to configure attributes you will use in IAM Identity Center to manage access to your AWS resources. The attributes that you define in OneLogin are passed in a SAML assertion to IAM Identity Center. You will then create a permission set in IAM Identity Center to manage access based on the attributes you passed from OneLogin.
To configure user attributes in OneLogin for access control in IAM Identity Center

1. Sign in to OneLogin, and then navigate to Applications > Applications.
2. On the Applications page, search for the application you created previously to form your SAML connection with IAM Identity Center. Choose it and then choose Parameters from the left navigation bar.
3. In the Required Parameters section, do the following for each attribute you want to use in IAM Identity Center:
   a. Choose +.
   b. In Field name, enter https://aws.amazon.com/SAML/Attributes/AccessControl:AttributeName, and replace AttributeName with the name of the attribute you are expecting in IAM Identity Center. For example, https://aws.amazon.com/SAML/Attributes/AccessControl:Department.
   c. Under Flags, check the box next to Include in SAML assertion, and choose Save.
   d. In the Value field, use the drop-down list to choose the OneLogin user attributes. For example, Department.
4. Choose Save.

(Optional) Passing attributes for access control

You can optionally use the Attributes for access control feature in IAM Identity Center to pass an Attribute element with the Name attribute set to https://aws.amazon.com/SAML/Attributes/AccessControl:{TagKey}. This element allows you to pass attributes as session tags in the SAML assertion. For more information about session tags, see Passing session tags in AWS STS in the IAM User Guide.

To pass attributes as session tags, include the AttributeValue element that specifies the value of the tag. For example, to pass the tag key-value pair CostCenter = blue, use the following attribute.

```
<saml:AttributeStatement>
  <saml:Attribute Name="https://aws.amazon.com/SAML/Attributes/AccessControl:CostCenter">
    <saml:AttributeValue>blue</saml:AttributeValue>
  </saml:Attribute>
</saml:AttributeStatement>
```

If you need to add multiple attributes, include a separate Attribute element for each tag.

Troubleshooting

The following can help you troubleshoot some common issues you might encounter while setting up automatic provisioning with OneLogin.

Groups are not provisioned to IAM Identity Center

By default, groups may not be provisioned from OneLogin to IAM Identity Center. Ensure that you’ve enabled group provisioning for your IAM Identity Center application in OneLogin. To do this, sign in to the OneLogin admin console, and check to make sure that the Include in User Provisioning option is selected under the properties of the IAM Identity Center application (IAM Identity Center application > Parameters > Groups). For more details on how to create groups in OneLogin, including how to synchronize OneLogin roles as groups in SCIM, please see the OneLogin website.
Nothing is synchronized from OneLogin to IAM Identity Center, despite all settings being correct

In addition to the note above regarding admin approval, you will need to Reapply entitlement mappings for many configuration changes to take effect. This can be found in Applications > IAM Identity Center application > More Actions. You can see details and logs for most actions in OneLogin, including synchronization events, under Activity > Events.

I’ve deleted or disabled a group in OneLogin, but it still appears in IAM Identity Center

OneLogin currently does not support the SCIM DELETE operation for groups, which means that the group continues to exist in IAM Identity Center. You must therefore remove the group from IAM Identity Center directly to ensure that any corresponding permissions in IAM Identity Center for that group are removed.

I deleted a group in IAM Identity Center without first deleting it from OneLogin and now I’m having user/group sync issues

To remedy this situation, first ensure that you do not have any redundant group provisioning rules or configurations in OneLogin. For example, a group directly assigned to an application along with a rule that publishes to the same group. Next, delete any undesirable groups in IAM Identity Center. Finally, in OneLogin, Refresh the entitlements (IAM Identity Center App > Provisioning > Entitlements), and then Reapply entitlement mappings (IAM Identity Center App > More Actions). To avoid this issue in the future, first make the change to stop provisioning the group in OneLogin, then delete the group from IAM Identity Center.

Ping Identity

The following Ping Identity products have been tested with IAM Identity Center.

Topics
- PingFederate (p. 78)
- PingOne (p. 82)

PingFederate

IAM Identity Center supports automatic provisioning (synchronization) of user and group information from the PingFederate product by Ping Identity (hereafter “Ping”) into IAM Identity Center. This provisioning uses the System for Cross-domain Identity Management (SCIM) v2.0 protocol. You configure this connection in PingFederate using your IAM Identity Center SCIM endpoint and access token. When you configure SCIM synchronization, you create a mapping of your user attributes in PingFederate to the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and PingFederate.

This guide is based on PingFederate version 10.2. Steps for other versions may vary. Contact Ping for more information about how to configure provisioning to IAM Identity Center for other versions of PingFederate.

The following steps walk you through how to enable automatic provisioning of users and groups from PingFederate to IAM Identity Center using the SCIM protocol.

Note
Before you begin deploying SCIM, we recommend that you first review the Considerations for using automatic provisioning (p. 53). Then continue reviewing additional considerations in the next section.

Topics
- Prerequisites (p. 79)
- Additional considerations (p. 79)
- Step 1: Enable provisioning in IAM Identity Center (p. 79)
• **Step 2: Configure provisioning in PingFederate (p. 80)**
• (Optional) **Step 3: Configure user attributes in PingFederate for access control in IAM Identity Center (p. 81)**
• (Optional) **Passing attributes for access control (p. 82)**

**Prerequisites**

You will need the following before you can get started:

• A working PingFederate server. If you do not have an existing PingFederate server, you might be able to obtain a free trial or developer account from the Ping Identity website. The trial includes licenses and software downloads and associated documentation.

• A copy of the PingFederate IAM Identity Center Connector software installed on your PingFederate server. For more information about how to obtain this software, see IAM Identity Center Connector on the Ping Identity website.

• An IAM Identity Center-enabled account (**free**). For more information, see Enable IAM Identity Center.

• A SAML connection from your PingFederate instance to IAM Identity Center. For instructions on how to configure this connection, see the PingFederate documentation. In summary, the recommended path is to use the IAM Identity Center Connector to configure "Browser SSO" in PingFederate, using the "download" and "import" metadata features on both ends to exchange SAML metadata between PingFederate and IAM Identity Center.

**Additional considerations**

The following are important considerations about PingFederate that can affect how you implement provisioning with IAM Identity Center.

• If an attribute (such as a phone number) is removed from a user in the data store configured in PingFederate, that attribute will not be removed from the corresponding user in IAM Identity Center. This is a known limitation in PingFederate's provisioner implementation. If an attribute is changed to a different (non-empty) value on a user, that change will be synchronized to IAM Identity Center.

**Step 1: Enable provisioning in IAM Identity Center**

In this first step, you use the IAM Identity Center console to enable automatic provisioning.

**To enable automatic provisioning in IAM Identity Center**

1. After you have completed the prerequisites, open the [IAM Identity Center console](https://aws.amazon.com/identity-center).  
2. Choose **Settings** in the left navigation pane.  
3. On the **Settings** page, locate the **Automatic provisioning** information box, and then choose **Enable**. This immediately enables automatic provisioning in IAM Identity Center and displays the necessary SCIM endpoint and access token information.  
4. In the **Inbound automatic provisioning** dialog box, copy each of the values for the following options. You will need to paste these in later when you configure provisioning in your IdP.  
   a. **SCIM endpoint**  
   b. **Access token**  
5. Choose **Close**.

Now that you have set up provisioning in the IAM Identity Center console, you must complete the remaining tasks using the PingFederate administrative console. The steps are described in the following procedure.
Step 2: Configure provisioning in PingFederate

Use the following procedure in the PingFederate administrative console to enable integration between IAM Identity Center and the IAM Identity Center Connector. This procedure assumes that you have already installed the IAM Identity Center Connector software. If you have not yet done so, refer to Prerequisites (p. 79), and then complete this procedure to configure SCIM provisioning.

Important
If your PingFederate server has not been previously configured for outbound SCIM provisioning, you may need to make a configuration file change to enable provisioning. For more information, see Ping documentation. In summary, you must modify the pf.provisioner.mode setting in the pingfederate-<version>/pingfederate/bin/run.properties file to a value other than OFF (which is the default), and restart the server if currently running. For example, you may choose to use STANDALONE if you don’t currently have a high-availability configuration with PingFederate.

To configure provisioning in PingFederate

1. Sign on to the PingFederate administrative console.
2. Select Applications from the top of the page, then click SP Connections.
3. Locate the application you created previously to form your SAML connection with IAM Identity Center, and click on the connection name.
4. Select Connection Type from the dark navigation headings near the top of the page. You should see Browser SSO already selected from your previous configuration of SAML. If not, you must complete those steps first before you can continue.
5. Select the Outbound Provisioning check box, choose IAM Identity Center Cloud Connector as the type, and click Save. If IAM Identity Center Cloud Connector does not appear as an option, ensure that you have installed the IAM Identity Center Connector and have restarted your PingFederate server.
6. Click Next repeatedly until you arrive on the Outbound Provisioning page, and then click the Configure Provisioning button.
7. In the previous procedure, you copied the SCIM endpoint value in IAM Identity Center. Paste that value into the SCIM URL field in the PingFederate console. Make sure that you remove the trailing forward slash at the end of the URL. Also, in the previous procedure you copied the Access token value in IAM Identity Center. Paste that value into the Access Token field in the PingFederate console. Click Save.
8. On the Channel Configuration (Configure Channels) page, click Create.
9. Enter a Channel Name for this new provisioning channel (such as AWSIAMIdentityCenterchannel), and click Next.
10. On the Source page, choose the Active Data Store you want to use for your connection to IAM Identity Center, and click Next.

Note
If you have not yet configured a data source, you must do so now. See the Ping product documentation for information on how to choose and configure a data source in PingFederate.

11. On the Source Settings page, confirm all values are correct for your installation, then click Next.
12. On the Source Location page, enter settings appropriate to your data source, and then click Next. For example, if using Active Directory as an LDAP directory:
   a. Enter the Base DN of your AD forest (such as DC=myforest,DC=mydomain,DC=com).
   b. In Users > Group DN, specify a single group that contains all of the users that you want to provision to IAM Identity Center. If no such single group exists, create that group in AD, return to this setting, and then enter the corresponding DN.
c. Specify whether to search subgroups (**Nested Search**), and any required LDAP **Filter**.

d. In **Groups > Group DN**, specify a single group that contains all of the groups that you want to
provision to IAM Identity Center. In many cases, this may be the same DN as you specified in the
**Users** section. Enter **Nested Search** and **Filter** values as required.

13. On the **Attribute Mapping** page, ensure the following, and then click **Next**:

a. The **userName** field must be mapped to an **Attribute** that is formatted as an email
(user@domain.com). It must also match the value that the user will use to log in to Ping. This
value in turn is populated in the SAML nameId claim during federated authentication and used
for matching to the user in IAM Identity Center. For example, when using Active Directory, you
may choose to specify the UserPrincipalName as the **userName**.

b. Other fields suffixed with a * must be mapped to attributes that are non-null for your users.

14. On the **Activation & Summary** page, set the **Channel Status** to **Active** to cause the synchronization
start immediately after the configuration is saved.

15. Confirm that all configuration values on the page are correct, and click **Done**.

16. On the **Manage Channels** page, click **Save**.

17. At this point, provisioning starts. To confirm activity, you can view the **provisioner.log** file, located
by default in the pingfederate-<version>/pingfederate/log directory on your PingFederate server.

18. To verify that users and groups have been successfully synchronized to IAM Identity Center, return to
the IAM Identity Center Console and choose **Users**. Synchronized users from PingFederate appear on
the **Users** page. You can also view synchronized groups on the **Groups** page.

(Optional) Step 3: Configure user attributes in PingFederate for access control in IAM Identity
Center

This is an optional procedure for PingFederate if you choose to configure attributes you will use in IAM
Identity Center to manage access to your AWS resources. The attributes that you define in PingFederate
are passed in a SAML assertion to IAM Identity Center. You will then create a permission set in IAM
Identity Center to manage access based on the attributes you passed from PingFederate.

Before you begin this procedure, you must first enable the **Attributes for access control** feature. For more information about how to do this, see **Enable and configure attributes for access
control**.

**To configure user attributes in PingFederate for access control in IAM Identity Center**

1. Sign on to the PingFederate administrative console.
2. Choose **Applications** from the top of the page, then click **SP Connections**.
3. Locate the application you created previously to form your SAML connection with IAM Identity
Center, and click on the connection name.
4. Choose **Browser SSO** from the dark navigation headings near the top of the page. Then click on
**Configure Browser SSO**.
5. On the **Configure Browser SSO** page, choose **Assertion Creation**, and then click on **Configure
Assertion Creation**.
6. On the **Configure Assertion Creation** page, choose **Attribute Contract**.
7. On the **Attribute Contract** page, under **Extend the Contract** section, add a new attribute by
performing the following steps:

   a. In the text box, enter https://aws.amazon.com/SAML/Attributes/
AccessControl:AttributeName, replace **AttributeName** with the name of the attribute
you are expecting in IAM Identity Center. For example, https://aws.amazon.com/SAML/
Attributes/AccessControl:Department.
For **Attribute Name Format**, choose `urn:oasis:names:tc:SAML:2.0:attrname-format:uri`.

Choose **Add**, and then choose **Next**.

8. On the **Authentication Source Mapping** page, choose the Adapter Instance configured with your application.

9. On the **Attribute Contract Fulfillment** page, choose the **Source** (data store) and **Value** (data store attribute) for the **Attribute Contract** `https://aws.amazon.com/SAML/Attributes/AccessControl:Department`.

   **Note**
   If you have not yet configured a data source, you will need to do so now. See the Ping product documentation for information on how to choose and configure a data source in PingFederate.

10. Click **Next** repeatedly until you arrive on the **Activation & Summary** page, and then click **Save**.

### (Optional) Passing attributes for access control

You can optionally use the **Attributes for access control** (p. 124) feature in IAM Identity Center to pass an Attribute element with the **Name** attribute set to `https://aws.amazon.com/SAML/Attributes/AccessControl:{TagKey}`. This element allows you to pass attributes as session tags in the SAML assertion. For more information about session tags, see [Passing session tags in AWS STS](#) in the IAM User Guide.

To pass attributes as session tags, include the `AttributeValue` element that specifies the value of the tag. For example, to pass the tag key-value pair `CostCenter = blue`, use the following attribute.

```xml
<saml:AttributeStatement>
  <saml:Attribute Name="https://aws.amazon.com/SAML/Attributes/AccessControl:CostCenter">
    <saml:AttributeValue>blue</saml:AttributeValue>
  </saml:Attribute>
</saml:AttributeStatement>
```

If you need to add multiple attributes, include a separate `Attribute` element for each tag.

### PingOne

IAM Identity Center supports automatic provisioning (synchronization) of user information from the PingOne product by Ping Identity (hereafter “Ping”) into IAM Identity Center. This provisioning uses the System for Cross-domain Identity Management (SCIM) v2.0 protocol. You configure this connection in PingOne using your IAM Identity Center SCIM endpoint and access token. When you configure SCIM synchronization, you create a mapping of your user attributes in PingOne to the named attributes in IAM Identity Center. This causes the expected attributes to match between IAM Identity Center and PingOne.

This guide is based on PingOne as of October 2020. Steps for newer versions may vary. Contact Ping for more information about how to configure provisioning to IAM Identity Center for other versions of PingOne. This guide also contains a few notes regarding configuration of user authentication through SAML.

The following steps walk you through how to enable automatic provisioning of users from PingOne to IAM Identity Center using the SCIM protocol.

**Note**
Before you begin deploying SCIM, we recommend that you first review the [Considerations for using automatic provisioning](#) (p. 53). Then continue reviewing additional considerations in the next section.

### Topics
Prerequisites

You will need the following before you can get started:

- A PingOne subscription or free trial, with both federated authentication and provisioning capabilities. For more information about how to obtain a free trial, see the Ping Identity website.
- An IAM Identity Center-enabled account (free). For more information, see Enable IAM Identity Center.
- The PingOne IAM Identity Center application added to your PingOne admin portal. You can obtain the PingOne IAM Identity Center application from the PingOne Application Catalog. For general information, see Add an application from the Application Catalog on the Ping Identity website.
- A SAML connection from your PingOne instance to IAM Identity Center. After the PingOne IAM Identity Center application has been added to your PingOne admin portal, you must use it to configure a SAML connection from your PingOne instance to IAM Identity Center. Use the “download” and “import” metadata feature on both ends to exchange SAML metadata between PingOne and IAM Identity Center. For instructions on how to configure this connection, see the PingOne documentation.

Additional considerations

The following are important considerations about PingOne that can affect how you implement provisioning with IAM Identity Center.

- As of October 2020, PingOne does not support provisioning of groups through SCIM. Contact Ping for the latest information on group provisioning for PingOne.
- Users may continue to be provisioned from PingOne after disabling provisioning in the PingOne admin portal. If you need to terminate provisioning immediately, delete the relevant SCIM bearer token, and/or disable Automatic provisioning (p. 53) in IAM Identity Center.
- If an attribute for a user is removed from the data store configured in PingOne, that attribute will not be removed from the corresponding user in IAM Identity Center. This is a known limitation in PingOne’s provisioner implementation. If an attribute is modified, the change will be synchronized to IAM Identity Center.
- The following are important notes regarding your SAML configuration in PingOne:
  - IAM Identity Center supports only emailaddress as a NameId format. This means you need to choose a user attribute that is unique within your directory in PingOne, non-null, and formatted as an email/UPN (for example, user@domain.com) for your SAML_SUBJECT mapping in PingOne. Email (Work) is a reasonable value to use for test configurations with the PingOne built-in directory.
  - Users in PingOne with an email address containing a + character may be unable to sign in to IAM Identity Center, with errors such as 'SAML_215' or 'Invalid input'. To fix this, in PingOne, choose the Advanced option for the SAML_SUBJECT mapping in Attribute Mappings. Then set Name ID Format to send to SP: to urn:oasis:names:tc:SAML:1.1:nameid-format:emailAddress in the drop-down menu.

Step 1: Enable provisioning in IAM Identity Center

In this first step, you use the IAM Identity Center console to enable automatic provisioning.
To enable automatic provisioning in IAM Identity Center

1. After you have completed the prerequisites, open the IAM Identity Center console.
2. Choose Settings in the left navigation pane.
3. On the Settings page, locate the Automatic provisioning information box, and then choose Enable. This immediately enables automatic provisioning in IAM Identity Center and displays the necessary SCIM endpoint and access token information.
4. In the Inbound automatic provisioning dialog box, copy each of the values for the following options. You will need to paste these in later when you configure provisioning in your IdP.
   a. SCIM endpoint
   b. Access token
5. Choose Close.

Now that you have set up provisioning in the IAM Identity Center console, you need to complete the remaining tasks using the PingOne IAM Identity Center application. These steps are described in the following procedure.

Step 2: Configure provisioning in PingOne

Use the following procedure in the PingOne IAM Identity Center application to enable provisioning with IAM Identity Center. This procedure assumes that you have already added the PingOne IAM Identity Center application to your PingOne admin portal. If you have not yet done so, refer to Prerequisites (p. 83), and then complete this procedure to configure SCIM provisioning.

To configure provisioning in PingOne

1. Open the PingOne IAM Identity Center application that you installed as part of configuring SAML for PingOne (Applications > My Applications). See Prerequisites (p. 83).
2. Scroll to the bottom of the page. Under User Provisioning, choose the complete link to navigate to the user provisioning configuration of your connection.
3. On the Provisioning Instructions page, choose Continue to Next Step.
4. In the previous procedure, you copied the SCIM endpoint value in IAM Identity Center. Paste that value into the SCIM URL field in the PingOne IAM Identity Center application. Make sure that you remove the trailing forward slash at the end of the URL. Also, in the previous procedure you copied the Access token value in IAM Identity Center. Paste that value into the ACCESS_TOKEN field in the PingOne IAM Identity Center application.
5. For REMOVE_ACTION, choose either Disabled or Deleted (see the description text on the page for more details).
6. On the Attribute Mapping page, choose a value to use for the SAML_SUBJECT (NameId) assertion, following guidance from Additional considerations (p. 83) earlier on this page. Then choose Continue to Next Step.
7. On the PingOne App Customization - IAM Identity Center page, make any desired customization changes (optional), and click Continue to Next Step.
8. On the Group Access page, choose the groups containing the users you would like to enable for provisioning and single sign-on to IAM Identity Center. Choose Continue to Next Step.
9. Scroll to the bottom of the page, and choose Finish to start provisioning.
10. To verify that users have been successfully synchronized to IAM Identity Center, return to the IAM Identity Center console and choose Users. Synchronized users from PingOne will appear on the Users page. These users can now be assigned to accounts and applications within IAM Identity Center.

Remember that PingOne does not support provisioning of groups or group memberships through SCIM. Contact Ping for more information.
(Optional) Step 3: Configure user attributes in PingOne for access control in IAM Identity Center

This is an optional procedure for PingOne if you choose to configure attributes for IAM Identity Center to manage access to your AWS resources. The attributes that you define in PingOne is passed in a SAML assertion to IAM Identity Center. You then create a permission set in IAM Identity Center to manage access based on the attributes you passed from PingOne.

Before you begin this procedure, you must first enable the Attributes for access control (p. 124) feature. For more information about how to do this, see Enable and configure attributes for access control (p. 126).

To configure user attributes in PingOne for access control in IAM Identity Center

1. Open the PingOne IAM Identity Center application that you installed as part of configuring SAML for PingOne (Applications > My Applications).
2. Choose Edit, and then choose Continue to Next Step until you get to the Attribute Mappings page.
3. On the Attribute Mappings page, choose Add new attribute, and then do the following. You must perform these steps for each attribute you will add for use in IAM Identity Center for access control.
   a. In the Application Attribute field, enter https://aws.amazon.com/SAML/Attributes/AccessControl:AttributeName. Replace AttributeName with the name of the attribute you are expecting in IAM Identity Center. For example, https://aws.amazon.com/SAML/Attributes/AccessControl:Email.
   b. In the Identity Bridge Attribute or Literal Value field, choose user attributes from your PingOne directory. For example, Email (Work).
4. Choose Next a few times, and then choose Finish.

(Optional) Passing attributes for access control

You can optionally use the Attributes for access control (p. 124) feature in IAM Identity Center to pass an Attribute element with the Name attribute set to https://aws.amazon.com/SAML/Attributes/AccessControl: {TagKey}. This element allows you to pass attributes as session tags in the SAML assertion. For more information about session tags, see Passing session tags in AWS STS in the IAM User Guide.

To pass attributes as session tags, include the AttributeValue element that specifies the value of the tag. For example, to pass the tag key-value pair CostCenter = blue, use the following attribute.

```xml
<saml:AttributeStatement>
  <saml:Attribute Name="https://aws.amazon.com/SAML/Attributes/AccessControl:CostCenter">
    <saml:AttributeValue>blue</saml:AttributeValue>
  </saml:Attribute>
</saml:AttributeStatement>
```

If you need to add multiple attributes, include a separate Attribute element for each tag.

Other identity providers

IAM Identity Center implements the following standards-based protocols for identity federation:

- SAML 2.0 for user authentication
- SCIM for provisioning

Any identity provider (IdP) that implements these standard protocols is expected to interoperate successfully with IAM Identity Center, with the following special considerations:
• **SAML**
  - IAM Identity Center requires a SAML nameID format of email address (that is, urn:oasis:names:tc:SAML:1.1:nameid-format:emailAddress).
  - The metadata file cannot be over 75000 characters.
  - The metadata must contain an entityId, X509 certificate, and SingleSignOnService as part of the sign-in URL.
  - An encryption key is not supported.

• **SCIM**

IdPs that do not conform to the standards and considerations mentioned above are not supported. Please contact your IdP for questions or clarifications regarding the conformance of their products to these standards and considerations.

If you have any issues connecting your IdP to IAM Identity Center, we recommend that you check:

• AWS CloudTrail logs by filtering on the event name **ExternalIdPDirectoryLogin**
• IdP-specific logs and/or debug logs
• **Troubleshooting IAM Identity Center issues (p. 204)**

**Note**

Some IdPs, including the list of Supported identity providers (p. 58), offer a simplified configuration experience for IAM Identity Center in the form of an “application” or “connector” built specifically for IAM Identity Center. If your IdP provides this option, we recommend that you use it, being careful to choose the item that’s built specifically for IAM Identity Center. Other items called “AWS”, “AWS federation”, or similar generic “AWS” names may use other federation approaches and/or endpoints, and may not work as expected with IAM Identity Center.

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**Using the AWS access portal**

The AWS access portal provides you (end users) with single sign-on access to all your AWS accounts and most commonly-used cloud applications such as Office 365, Concur, Salesforce, and many more. You can quickly launch multiple applications simply by choosing the AWS account or application icon in the portal. The presence of icons in your AWS access portal means that an administrator from your company has granted you access to those AWS accounts or applications. It also means that you can access all these accounts or applications from the AWS access portal without additional sign-in prompts.

Contact your administrator to request additional access in the following situations:

• You don't see an AWS account or application that you need to access.
• The access that you have to a given account or application is not what you expected.
Accepting the invitation to join IAM Identity Center

If this is your first time signing into the AWS access portal, check your email for instructions on how to activate your account.

To activate your account

1. Depending on the email you received from your company, choose one of the following methods to activate your account so that you can start using the AWS access portal.
   a. If you received an email with the subject Invitation to join AWS Single Sign-On, open it and choose Accept invitation. On the New user sign up page, enter and confirm a password, and then choose Set new password. You’ll use that password each time you sign in to the portal.
   b. If you were sent an email from your company's IT support or IT administrator, follow the instructions they provided to activate your account.
2. After you activate your account by providing a new password, the AWS access portal signs you in automatically. If this doesn’t occur, you can manually sign in to the AWS access portal by using the instructions provided in the next section.

Signing up in the AWS access portal

When you sign up for an AWS account, you create a personal or business account. This helps us determine what information we need to collect during sign-up.

To sign up for AWS

1. Under Root user email address, enter your email address. For information about security best practices, see Getting Started: Follow Security Best Practices as You Configure Your AWS Resources.
2. AWS account name auto-fills with your email domain.
3. Choose Verify email address. We then send a verification code to your email address.

   Note
   Email from the IAM Identity Center service comes from the address no-reply@signin.aws. We recommend that you configure your mail system so that it accepts email from this address and does not treat it as junk or spam.
   You might receive a different email from us if there is a problem creating your account. Review this email and follow its instructions to correct the problem.
4. Under Verification code, enter the code that you received. Then choose Verify.
5. Under Root user password, enter a password containing 8-20 characters, numbers, and both uppercase and lowercase letters. Under Confirm root user password, enter your password again. Choose Continue.
6. Under **How do you plan to use AWS?**, choose **Business - for your work, school, or organization** or **Personal - for your own projects**, based on your account needs.

7. Under **Contact information**, provide the required information. Choose the **I have read and agree to the terms of the AWS Customer Agreement** check box. Then choose **Continue**.

8. Under **Billing information**, provide the required information. Choose **Verify**.

9. Under **Identity Verification**, choose either **Phone call** or **SMS** and enter your phone number.
   a. If you selected **Phone call**, you receive a verification code on your screen and a phone call. Enter this code on the phone's keypad.
   b. If you selected **SMS**, you receive a text with a verification code. Enter this code in the field provided.

10. Under **Select a support plan**, choose the support plan that best meets your personal or business needs. Choose **Complete sign up**. You're taken to a page that confirms we are activating your account. Choose **Let's go!**

### Signing in to the AWS access portal

By this time, you should have been provided a specific sign-in URL to the AWS access portal by an administrator. Once you have this URL, you can proceed with signing in to the portal. For more information, see [Sign in to the AWS access portal](#).

**Note**

After you sign in, your AWS access portal session is valid for 8 hours.

### Trusted devices

When you choose the option **This is a trusted device** from the sign-in page, IAM Identity Center considers all future sign-ins from that device as authorized. This means that IAM Identity Center won't present an option to enter in an MFA code as long as you're using that trusted device. However, there are some exceptions, including signing in from a new browser or when your device has been issued an unknown IP address.

### Sign in tips for the AWS access portal

Here are some tips to help you manage your AWS access portal experience.

- Occasionally, you might need to sign out and sign back in to the AWS access portal. This might be necessary to access new applications that your administrator recently assigned to you. This is not required, however, because all new applications are refreshed every hour.
- When you sign in to the AWS access portal, you can open any of the applications listed in the portal by choosing the application's icon. After you are done using the application, you can either close the application or sign out of the AWS access portal. Closing the application signs you out of that application only. Any other applications that you have opened from the AWS access portal remain open and running.
- Before you can sign in as a different user, you must first sign out of the AWS access portal. Signing out from the portal completely removes your credentials from the browser session.
- Once you sign in to the AWS access portal, you can switch to a role. Switching roles temporarily sets aside your original user permissions and instead gives you the permissions assigned to the role. For more information, see [Switching to a role (console)](#).

### Signing out of the AWS access portal

When you sign out from the portal, your credentials are completely removed from the browser session. For more information, see [Sign out of the AWS access portal](#) in the AWS Sign-In guide.
To sign out of the AWS access portal

- In the AWS access portal, choose **Sign out** from the navigation bar.

**Note**

If you want to sign in as a different user, you must first sign out of the AWS access portal.

### Resetting your IAM Identity Center user password

The AWS access portal provides IAM Identity Center users with single sign-on access to all their assigned AWS accounts and cloud applications through a web portal. The AWS access portal is different from the **AWS Management Console**, which is a collection of service consoles for managing AWS resources.

Use this procedure to reset your IAM Identity Center user password for the AWS access portal. Learn more about **User types** in the **AWS Sign-In User Guide**.

#### To reset your password to the AWS access portal

1. Open a web browser and go to the sign-in page for your AWS access portal.

   If you don't have your AWS access portal URL, check your email. You should have been emailed an invitation to join AWS IAM Identity Center that includes a specific sign-in URL to the AWS access portal. Alternatively, your administrator might have directly provided you with a one-time password and the AWS access portal URL. If you can't locate this information, ask your administrator to send it to you.

   For more information about signing into the AWS access portal, see **Sign in to the AWS access portal** in the **AWS Sign-In User Guide**.

2. Enter your **Username**, and then choose **Next**.

3. Under **Password**, choose **Forgot password**.

   Verify your **Username** and enter the characters for the provided image to confirm that you're not a robot. Then choose **Next**. You might need to disable ad blocker software if you can't enter characters.

4. A message appears to confirm that a reset password email was sent. Choose **Continue**.

5. You'll receive an email from no-reply@signin.aws with the subject **Password reset requested**. In your email, choose **Reset password**.

6. On the **Reset password** page, verify your **Username**, specify a new password for the AWS access portal, and then choose **Set new password**.

7. You'll receive an email from no-reply@signin.aws with the subject line **Password updated**.

   **Note**

   An administrator can reset your password by either sending an email to you with instructions for resetting your password or generating a one-time password and sharing it with you. If you're an administrator, see **Reset the IAM Identity Center user password for an end user** (p. 37).

### Getting IAM Identity Center user credentials for the AWS CLI or AWS SDKs

You can access AWS services programmatically by using the AWS Command Line Interface or AWS Software Development Kits (SDKs) with user credentials from IAM Identity Center. This topic describes how to get temporary credentials for a user in IAM Identity Center.
The AWS access portal provides IAM Identity Center users with single-sign on access to their AWS accounts and cloud applications. After you sign in to the AWS access portal as an IAM Identity Center user, you can get temporary credentials. You can then use the credentials, also referred to as IAM Identity Center user credentials, in the AWS CLI or AWS SDKs to access resources in an AWS account.

If you’re using the AWS CLI to access AWS services programmatically, you can use the procedures in this topic to initiate access to the AWS CLI. For information about the AWS CLI, see the **AWS Command Line Interface User Guide**.

If you’re using the AWS SDKs to access AWS services programmatically, following the procedures in this topic also directly establishes authentication for the AWS SDKs. For information about the AWS SDKs, see the **AWS SDKs and Tools Reference Guide**.

**Note**

Users in IAM Identity Center are different than IAM users. IAM users are granted long-term credentials to AWS resources. Users in IAM Identity Center are granted temporary credentials. We recommend that you use temporary credentials as a security best practice for accessing your AWS accounts because these credentials are generated every time you sign in.

**Prerequisites**

To get temporary credentials for your IAM Identity Center user, you'll need the following:

- **An IAM Identity Center user** – You’ll sign in to the AWS access portal as this user. You or your administrator might create this user. For information about how to enable IAM Identity Center and create an IAM Identity Center user, see **Getting started (p. 4)**.

- **User access to an AWS account** – To grant an IAM Identity Center user permission to retrieve their temporary credentials, you or an administrator must assign the IAM Identity Center user to a **permission set (p. 21)**. Permission sets are stored in IAM Identity Center and define the level of access that an IAM Identity Center user has to an AWS account. If your administrator created the IAM Identity Center user for you, ask them to add this access for you. For more information, see **Assign user access to AWS accounts (p. 111)**.

- **AWS CLI installed** – To use the temporary credentials, you must install the AWS CLI. For instructions, see **Installing or updating the latest version of the AWS CLI** in the **AWS CLI User Guide**.

**Considerations**

Before you complete the steps to get temporary credentials for your IAM Identity Center user, keep the following considerations in mind:

- **IAM Identity Center creates IAM roles** – When you assign a user in IAM Identity Center to a permission set, IAM Identity Center creates a corresponding IAM role from the permission set. IAM roles created by permission sets differ from IAM roles created in AWS Identity and Access Management in the following ways:
  - IAM Identity Center owns and secures the roles that are created by permission sets. Only IAM Identity Center can modify these roles.
  - Only users in IAM Identity Center can assume the roles that correspond to their assigned permission sets. You can't assign permission set access to IAM users, IAM federated users, or service accounts.
  - You can't modify a role trust policy on these roles to allow access to **principals** outside of IAM Identity Center.

  For information about how to get temporary credentials for a role that you create in IAM, see **Using temporary security credentials with the AWS CLI** in the **AWS Identity and Access Management User Guide**.

- **You can set the session duration for permission sets** – After you sign in to the AWS access portal, the permission set to which your IAM Identity Center user is assigned appears as an available role.
IAM Identity Center creates a separate session for this role. This session can be from one to 12 hours, depending on the session duration configured for the permission set. The default session duration is one hour. For more information, see Set session duration (p. 117).

Getting and refreshing temporary credentials

You can get and refresh temporary credentials for your IAM Identity Center user automatically or manually.

Topics
- Automatic credential refresh (recommended) (p. 91)
- Manual credential refresh (p. 92)

Automatic credential refresh (recommended)

Automatic credential refresh uses the Open ID Connect (OIDC) Device Code Authorization standard. With this method, you initiate access directly by using the `aws configure sso` command in the AWS CLI. You can use this command to automatically access any role that is associated with any permission set that you're assigned to for any AWS account.

To access the role created for your IAM Identity Center user, run the `aws configure sso` command, and then authorize the AWS CLI from a browser window. As long as you have an active AWS access portal session, the AWS CLI automatically retrieves temporary credentials and refreshes the credentials automatically.

For more information, see Configure your profile with the `aws configure sso wizard` in the AWS Command Line Interface User Guide.

To get temporary credentials that automatically refresh

1. Sign in to the AWS access portal by using the specific sign-in URL provided by your administrator. If you created the IAM Identity Center user, AWS sent an email invitation that includes your sign-in URL. For more information, see Sign in to the AWS access portal in the AWS Sign-In User Guide.

2. In the AWS accounts section or by choosing the AWS account icon, locate the AWS account from which you want to retrieve credentials. When you choose the account, the account name, account ID, and email address associated with the account appear.

   **Note**
   If you don't see any AWS accounts listed, it's likely that you've not yet been assigned to a permission set for that account. In this case, contact your administrator and ask them to add this access for you. For more information, see Assign user access to AWS accounts (p. 111).

3. Below the name of the account, the permission set to which your IAM Identity Center user is assigned appears as an available role. For example, if your IAM Identity Center user is assigned to the `PowerUserAccess` permission set for the account, the role appears in the AWS access portal as `PowerUserAccess`.

4. Depending on your option next to the role name, either choose the credentials key icon or choose Command line or programmatic access.

5. In the Get credentials dialog box, choose either macOS and Linux, Windows, or PowerShell, depending on the operating system on which you installed the AWS CLI.

6. Under AWS IAM Identity Center credentials (Recommended), your SSO Start URL and SSO Region are displayed. These values are required to configure both an IAM Identity Center enabled profile and sso-session to your AWS CLI. To complete this configuration, follow the instructions in...
Configure your profile with the `aws configure sso wizard` in the *AWS Command Line Interface User Guide*.

Continue using the AWS CLI as necessary for your AWS account until the credentials have expired.

**Manual credential refresh**

You can use the manual credential refresh method to get temporary credentials for a role that is associated with a specific permission set in a specific AWS account. To do so, you copy and paste the required commands for the temporary credentials. With this method, you must refresh the temporary credentials manually.

You can run AWS CLI commands until your temporary credentials expire.

**To get credentials that you manually refresh**

1. Sign in to the AWS access portal by using the specific sign-in URL provided by your administrator. If you created the IAM Identity Center user, AWS sent an email invitation that includes your sign-in URL. For more information, see *Sign in to the AWS access portal* in the *AWS Sign-In User Guide*.

2. In the AWS account section or by choosing the AWS account icon, locate the AWS account from which you want to retrieve access credentials and expand it to show the IAM role name (for example Administrator). Depending on your option next to the IAM role name, either choose the credentials key icon or choose *Command line or programmatic access*.

   **Note**
   If you don't see any AWS accounts listed, it's likely that you've not yet been assigned to a permission set for that account. In this case, contact your administrator and ask them to add this access for you. For more information, see *Assign user access to AWS accounts* (p. 111).

3. In the *Get credentials* dialog box, choose MacOS and Linux, Windows, or PowerShell, depending on the operating system on which you installed the AWS CLI.

4. Choose any of the following options:

   • **Option 1: Set AWS environment variables**
   
   Choose this option to override all credential settings, including any settings in the credentials files and config files. For more information, see *Environment variables to configure the AWS CLI* in the *AWS CLI User Guide*.

   To use this option, copy the commands to your clipboard, paste the commands into your AWS CLI terminal window, and then press Enter to set the required environment variables.

   • **Option 2: Manually add a profile to your AWS credentials file**
   
   Choose this option to run commands with different sets of credentials.

   To use this option, copy the commands to your clipboard, and then paste the commands into your shared AWS credentials file to set up a new named profile. For more information, see *Shared config and credentials files* in the *AWS SDKs and Tools Reference Guide*. To use this credential, specify the `--profile` option in your AWS CLI command. This affects all environments that use the same credential file.

   • **Option 3: Use individual values in your AWS service client**
   
   Choose this option to access AWS resources from an AWS service client. For more information, see *Tools to Build on AWS*.

   To use this option, copy the values to your clipboard, paste the values into your code, and assign them to the appropriate variables for your SDK. For more information, see the documentation for your specific SDK API.
Bookmarking an IAM role

For quicker access to frequently-used IAM roles from the AWS access portal, you can create a bookmark for a given role associated with a specific AWS account.

To bookmark an IAM role for a specific AWS account

1. While signed into the AWS access portal, in the AWS accounts section or by choosing the AWS account icon, locate the AWS account you want to bookmark and expand it to choose the IAM role name (for example Administrator Access).
2. Depending on your option, either right-click the IAM role name (for example Administrator) or Management console, copy the link address, and then use that URL to create your bookmark.

Registering a device for MFA

Use the following procedure within the AWS access portal to register your new device for multi-factor authentication (MFA).

**Note**
We recommend that you first download the appropriate Authenticator app onto your device before starting the steps in this procedure. For a list of apps that you can use for MFA devices, see Virtual authenticator apps (p. 96).

To register your device for use with MFA

1. Sign in to your AWS access portal. For more information, see Signing in to the AWS access portal (p. 88).
2. Near the top-right of the page, choose MFA devices.
3. On the Multi-factor authentication (MFA) devices page, choose Register device.
   **Note**
   If the Register MFA device option is grayed out, contact your administrator for assistance with registering your device.
4. On the Register MFA device page, select one of the following MFA device types, and follow the instructions:
   - Authenticator app
     1. On the Set up the authenticator app page, you might notice configuration information for the new MFA device, including a QR code graphic. The graphic is a representation of the secret key that is available for manual entry on devices that do not support QR codes.
     2. Using the physical MFA device, do the following:
       a. Open a compatible MFA authenticator app. For a list of tested apps that you can use with MFA devices, see Virtual authenticator apps (p. 96). If the MFA app supports multiple accounts (multiple MFA devices), choose the option to create a new account (a new MFA device).
       b. Determine whether the MFA app supports QR codes, and then do one of the following on the Set up the authenticator app page:
          i. Choose Show QR code, and then use the app to scan the QR code. For example, you might choose the camera icon or choose an option similar to Scan code. Then use the device's camera to scan the code.
          ii. Choose show secret key, and then enter that secret key into your MFA app.
        **Important**
        When you configure an MFA device for IAM Identity Center, we recommend that you save a copy of the QR code or secret key in a secure place. This can help if
you lose the phone or have to reinstall the MFA authenticator app. If either of
those things happen, you can quickly reconfigure the app to use the same MFA
configuration.

3. On the Set up the authenticator app page, under Authenticator code, enter the one-time
password that currently appears on the physical MFA device.

**Important**
Submit your request immediately after generating the code. If you generate the code
and then wait too long to submit the request, the MFA device is successfully associated
with your user, but the MFA device is out of sync. This happens because time-based
one-time passwords (TOTP) expire after a short period of time. If this happens, you can
csync the device again.

4. Choose Assign MFA. The MFA device can now start generating one-time passwords and is now
ready for use with AWS.

- **Security key** or **Built-in authenticator**
  1. On the Register your user's security key page, follow the instructions provided by your
     browser or platform.

    **Note**
The experience will vary based on the browser or platform. After your device is
successfully registered, you can associate a friendly display name with your newly
enrolled device. To to change the name, choose **Rename**, enter the new name, and
then choose **Save**.

---

### Customizing the AWS access portal URL

By default, you can access the AWS access portal by using a URL that follows this
format: `d-xxxxxxxxxx.awsapps.com/start`. You can customize the URL as follows:
`your_subdomain.awsapps.com/start`. If you change the AWS access portal, you can't edit it later.

**To customize your URL**

1. Sign in to your AWS access portal. For more information, see [How to sign in to the AWS access
   portal](#).
2. In the IAM Identity Center console, choose **Dashboard** in the navigation pane and locate the
   **Settings summary**.
3. Choose the **Customize** button for AWS access portal.
4. Enter your desired domain name and choose **Save**.

You can now sign in to the AWS Console through your AWS access portal with your customized
awsapps.com/start URL.

---

### Multi-factor authentication for Identity Center users

Multi-factor authentication (MFA) provides a simple and secure way to add an extra layer of protection
on top of the default authentication mechanism of user name and password.

When administrators enable MFA, users must sign in to the AWS access portal with two factors:
Available MFA types

- Their user name and password. This is the first factor and is something users know.
- Either a code, security key, or biometrics. This is the second factor and is something users have (possession) or are (biometric). The second factor might be either an authentication code generated from their mobile device, a security key connected to their computer, or user's biometric scan.

Together, these multiple factors provide increased security by preventing unauthorized access to your AWS resources unless a valid MFA challenge has been successfully completed.

Each user can register up to two virtual authenticator apps, which are one-time password authenticator applications installed on your mobile device or tablet, and six FIDO authenticators, which include built-in authenticators and security keys, for a total of eight MFA devices. Learn more about Available MFA types for IAM Identity Center (p. 95).

Important
As a security best practice, we strongly recommend that you enable MFA.

Topics
- Available MFA types for IAM Identity Center (p. 95)
- Configure MFA (p. 97)
- Manage MFA devices in IAM Identity Center (p. 101)

Available MFA types for IAM Identity Center

Multi-factor authentication (MFA) is a simple and effective mechanism to enhance the security of your users. A user’s first factor — their password — is a secret that they memorize, also known as a knowledge factor. Other factors can be possession factors (something you have, such as a security key) or inherence factors (something you are, such as a biometric scan). We strongly recommend that you configure MFA to add an additional layer of security to your account.

IAM Identity Center MFA supports the following device types. All MFA types are supported for both browser-based console access as well as using the AWS CLI v2 with IAM Identity Center.

- FIDO2 authenticators (p. 95), including built-in authenticators and security keys
- Virtual authenticator apps (p. 96)
- Your own RADIUS MFA (p. 97) implementation connected through AWS Managed Microsoft AD

A user can have up to eight MFA devices, which include up to two virtual authenticator apps and six FIDO authenticators, registered to one account. You can also configure MFA enablement settings to require MFA each time your users sign in or to enable trusted devices that don’t require MFA at every sign-in. For more information about how to configure MFA types for your users, see Choose MFA types (p. 99) and Configure MFA device enforcement (p. 100).

FIDO2 authenticators

FIDO2 is a standard that includes CTAP2 and WebAuthn and is based on public key cryptography. FIDO credentials are phishing-resistant because they are unique to the website that the credentials were created such as AWS.

AWS supports the two most common form factors for FIDO authenticators: built-in authenticators and security keys. See below for more information about the most common types of FIDO authenticators.

Topics
- Built-in authenticators (p. 96)
Available MFA types

- **Security keys (p. 96)**
- **Password managers, passkey providers, and other FIDO authenticators (p. 96)**

**Built-in authenticators**

Many modern computers and mobile phones have built-in authenticators, such as TouchID on Macbook or a Windows Hello-compatible camera. If your device has a FIDO-compatible built-in authenticator, you can use your fingerprint, face, or device pin as a second factor.

**Security keys**

Security keys are FIDO-compatible external hardware authenticators that you can purchase and connect to your device through USB, BLE, or NFC. When you’re prompted for MFA, you simply complete a gesture with the key’s sensor. Some examples of security keys include YubiKeys and Feitian keys, and the most common security keys create device-bound FIDO credentials. For a list of all FIDO-certified security keys, see [FIDO Certified Products](#).

**Password managers, passkey providers, and other FIDO authenticators**

Multiple third party providers support FIDO authentication in mobile applications, as features in password managers, smart cards with a FIDO mode, and other form factors. These FIDO-compatible devices can work with IAM Identity Center, but we recommend that you test a FIDO authenticator yourself before enabling this option for MFA.

**Note**

Some FIDO authenticators can create discoverable FIDO credentials known as passkeys. Passkeys may be bound to the device that creates them, or they may be syncable and backed up to a cloud. For example, you can register a passkey using Apple Touch ID on a supported Macbook, and then log in to a site from a Windows laptop using Google Chrome with your passkey in iCloud by following the on-screen prompts at sign-in. For more information about which devices support syncable passkeys and current passkey interoperability between operating systems and browsers, see [Device Support](#) at [passkeys.dev](#), a resource maintained by the FIDO Alliance And World Wide Web Consortium (W3C).

**Virtual authenticator apps**

Authenticator apps are essentially one-time password (OTP)–based third party-authenticators. You can use an authenticator application installed on your mobile device or tablet as an authorized MFA device. The third-party authenticator application must be compliant with RFC 6238, which is a standards-based time-based one-time password (TOTP) algorithm capable of generating six-digit authentication codes.

When prompted for MFA, users must enter a valid code from their authenticator app within the input box presented. Each MFA device assigned to a user must be unique. Two authenticator apps can be registered for any given user.

**Tested authenticator apps**

Any TOTP-compliant application will work with IAM Identity Center MFA. The following table lists well-known third-party authenticator apps to choose from.

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Tested authenticator app</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android</td>
<td>Authy, Duo Mobile, Microsoft Authenticator, Google Authenticator</td>
</tr>
</tbody>
</table>
Operating system | Tested authenticator app
---|---
iOS | Authy, Duo Mobile, Microsoft Authenticator, Google Authenticator

**RADIUS MFA**

Remote Authentication Dial-In User Service (RADIUS) is an industry-standard client-server protocol that provides authentication, authorization, and accounting management so users can connect to network services. AWS Directory Service includes a RADIUS client that connects to the RADIUS server upon which you have implemented your MFA solution. For more information, see [Enable Multi-Factor Authentication for AWS Managed Microsoft AD](#).

You can use either RADIUS MFA or MFA in IAM Identity Center for user sign-ins to the user portal, but not both. MFA in IAM Identity Center is an alternative to RADIUS MFA in cases where you want AWS native two-factor authentication for access to the portal.

When you enable MFA in IAM Identity Center, your users need an MFA device to sign in to the AWS access portal. If you had previously used RADIUS MFA, enabling MFA in IAM Identity Center effectively overrides RADIUS MFA for users who sign in to the AWS access portal. However, RADIUS MFA continues to challenge users when they sign in to all other applications that work with AWS Directory Service, such as Amazon WorkDocs.

If your MFA is **Disabled** on the IAM Identity Center console and you have configured RADIUS MFA with AWS Directory Service, RADIUS MFA governs AWS access portal sign-in. This means that IAM Identity Center falls back to RADIUS MFA configuration if MFA is disabled.

**Configure MFA**

The following topics provide instructions for configuring MFA devices in IAM Identity Center.

**Topics**
- Considerations before enabling MFA in IAM Identity Center (p. 97)
- Enable MFA in IAM Identity Center (p. 98)
- Choose MFA types (p. 99)
- Configure MFA device enforcement (p. 100)
- Allow users to register their own MFA devices (p. 101)

**Considerations before enabling MFA in IAM Identity Center**

Before you enable MFA, consider the following:

- Users are encouraged to register multiple backup authenticators for all enabled MFA types. This practice can prevent loss of access in case of a broken or misplaced MFA device.
- Don't choose the **Require Them to Provide a One-Time Password Sent by Email** option if your users must sign in to the AWS access portal to access their email. For example, your users might use Microsoft 365 in the AWS access portal to read their email. In this case, users won't be able to retrieve the verification code and would be unable to sign in to the AWS access portal. For more information, see [Configure MFA device enforcement (p. 100)](#).
- If you’re already using RADIUS MFA that you configured with AWS Directory Service, you don’t need to enable MFA within IAM Identity Center. MFA in IAM Identity Center is an alternative to RADIUS MFA for Microsoft Active Directory users of IAM Identity Center. For more information, see [RADIUS MFA](#).
You can use MFA capabilities in IAM Identity Center when your identity source is configured with IAM Identity Center's identity store, AWS Managed Microsoft AD, or AD Connector. MFA in IAM Identity Center is currently not supported for external identity providers.

Enable MFA in IAM Identity Center

You can enable secure access to the AWS access portal, IAM Identity Center integrated apps, and the AWS CLI by enabling multi-factor authentication (MFA).

**Topics**
- Prompt users for MFA (p. 98)
- Disable MFA for your IAM Identity Center directory (p. 99)

**Prompt users for MFA**

Use the following steps to enable MFA in the IAM Identity Center console. Before you begin, we recommend that you understand the [Available MFA types for IAM Identity Center](p. 95).

**Note**

If you're using an external IdP, the Multi-factor authentication section won't be available. Your external IdP manages MFA settings, rather than IAM Identity Center managing them.

**To enable MFA**

1. Open the IAM Identity Center console.
2. In the left navigation pane, choose Settings.
3. On the Settings page, choose the Authentication tab.
4. In the Multi-factor authentication section, choose Configure.
5. On the Configure multi-factor authentication page, under Prompt users for MFA, choose one of the following authentication modes based on the level of security that your business needs:
   - **Only when their sign-in context changes (context-aware)**
     - In this mode (the default), IAM Identity Center provides users the option to trust their device during sign-in. After a user indicates that they want to trust a device, IAM Identity Center prompts the user for MFA once and analyzes the sign-in context (such as device, browser, and location) for the user’s subsequent sign-ins. For subsequent sign-ins, IAM Identity Center determines if the user is signing in with a previously trusted context. If the user’s sign-in context changes, IAM Identity Center prompts the user for MFA in addition to their email address and password credentials.
     - This mode provides ease of use for users who frequently sign in from their workplace, so they don’t need to complete MFA on every sign-in. They are only prompted for MFA if their sign-in context changes.
   - **Every time they sign in (always-on)**
     - In this mode, IAM Identity Center requires that users with a registered MFA device will be prompted every time they sign in. You should use this mode if you have organizational or compliance policies that require your users to complete MFA every time they sign in to the AWS access portal. For example, PCI DSS strongly recommends MFA during every sign-in to access applications that support high-risk payment transactions.
   - **Never (disabled)**
     - While in this mode, all users will sign in with their standard user name and password only. Choosing this option disables IAM Identity Center MFA.
Note
If you are already using RADIUS MFA with AWS Directory Service, and want to continue using it as your default MFA type, then you can leave the authentication mode as disabled to bypass MFA capabilities in IAM Identity Center. Changing from Disabled mode to Context-aware or Always-on mode will override the existing RADIUS MFA settings. For more information, see RADIUS MFA (p. 97).

6. Choose Save changes.

Related Topics
- Choose MFA types (p. 99)
- Configure MFA device enforcement (p. 100)
- Allow users to register their own MFA devices (p. 101)

Disable MFA for your IAM Identity Center directory

When you disable multi-factor authentication (MFA) for your IAM Identity Center directory, it allows users to sign in with their standard user name and password only. While MFA is disabled for your Identity Center directory for users, you can't manage MFA devices in their user details, and Identity Center directory users can't manage MFA devices from the AWS access portal.

To disable MFA for your IAM Identity Center directory

Important
The instructions in this section apply to AWS IAM Identity Center. They do not apply to AWS Identity and Access Management (IAM). IAM Identity Center users, groups, and user credentials are different from IAM users, groups, and IAM user credentials. If you are looking for instructions on deactivating MFA for IAM users, see Deactivating MFA devices in the AWS Identity and Access Management User Guide.

1. Open the IAM Identity Center console.
2. In the left navigation pane, choose Settings.
3. On the Settings page, choose the Authentication tab.
4. In the Multi-factor authentication section, choose Configure.
5. On the Configure multi-factor authentication page, in the Prompt users for MFA section, choose the Never (disabled) radio button.
6. Choose Save changes.

Choose MFA types

Use the following procedure to choose the device types your users can authenticate with when prompted for MFA in the AWS access portal.

To configure MFA types for your users

1. Open the IAM Identity Center console.
2. In the left navigation pane, choose Settings.
3. On the Settings page, choose the Authentication tab.
4. In the Multi-factor authentication section, choose Configure.
5. On the Configure multi-factor authentication page, under Users can authenticate with these MFA types choose one of the following MFA types based on your business needs. For more information, see Available MFA types for IAM Identity Center (p. 95).
Configure MFA device enforcement

Use the following procedure to determine whether your users must have a registered MFA device when signing in to the AWS access portal.

To configure MFA device enforcement for your users

1. Open the IAM Identity Center console.
2. In the left navigation pane, choose Settings.
3. On the Settings page, choose the Authentication tab.
4. In the Multi-factor authentication section, choose Configure.
5. On the Configure multi-factor authentication page, under If a user does not yet have a registered MFA device choose one of the following choices based on your business needs:

• Require them to register an MFA device at sign in

Use this option when you want to require users who do not yet have a registered MFA device, to self-enroll a device during sign-in following a successful password authentication. This allows you to secure your organization’s AWS environments with MFA without having to individually enroll and distribute authentication devices to your users. During self-enrollment, your users can register any device from the available Available MFA types for IAM Identity Center (p. 95) you’ve previously enabled. After completing registration, users have the option to give their newly enrolled MFA device a friendly name, after which IAM Identity Center redirects the user to their original destination. If the user’s device is lost or stolen, you can simply remove that device from their account, and IAM Identity Center will require them to self-enroll a new device during their next sign-in.

• Require them to provide a one-time password sent by email to sign in

Use this option when you want to have verification codes sent to users by email. Because email is not bound to a specific device, this option does not meet the bar for industry-standard multi-factor authentication. But it does improve security over having a password alone. Email verification will only be requested if a user has not registered an MFA device. If the Context-aware authentication method has been enabled, the user will have the opportunity to mark the device on which they receive the email as trusted. Afterward they will not be required to verify an email code on future logins from that device, browser, and IP address combination.

Note
If you are using Active Directory as your IAM Identity Center enabled identity source, the email address will always be based on the Active Directory ema11 attribute. Custom Active Directory attribute mappings will not override this behavior.

• Block their sign-in

Use the Block Their Sign-In option when you want to enforce MFA use by every user before they can sign in to AWS.

Important
If your authentication method is set to Context-aware a user might select the This is a trusted device check box on the sign-in page. In that case, that user will not be prompted for MFA even if you have the Block their sign in setting enabled. If you want these users to be prompted, change your authentication method to Always On.

• Allow them to sign in
The default setting when you first configure IAM Identity Center MFA. Use this option to indicate that MFA devices are not required in order for your users to sign in to the AWS access portal. Users who chose to register MFA devices will still be prompted for MFA.

6. Choose **Save changes**.

## Allow users to register their own MFA devices

Use the following procedure to allow your users to self-register their own MFA devices.

### To allow users to register their own MFA devices

1. Open the IAM Identity Center console.
2. In the left navigation pane, choose **Settings**.
3. On the **Settings** page, choose the **Authentication** tab.
4. In the **Multi-factor authentication** section, choose **Configure**.
5. On the **Configure multi-factor authentication** page, under **Who can manage MFA devices**, choose **Users can add and manage their own MFA devices**.
6. Choose **Save changes**.

### Note

After you set up self-registration for your users, you might want to send them a link to the procedure **Registering a device for MFA** (p. 93). This topic provides instructions on how to set up their own MFA devices.

## Manage MFA devices in IAM Identity Center

The following topics provide instructions for managing MFA devices in IAM Identity Center.

### Topics

- [Register an MFA device](#)
- [Manage a user's MFA device](#)

## Register an MFA device

Use the following procedure to set up a new MFA device for access by a specific user in the IAM Identity Center console. You must have physical access to the user's MFA device in order to register it. For example, if you configure MFA for a user who will use an MFA device running on a smartphone, you'll need physical access to the smartphone to complete the registration process. Alternatively, you can allow users to configure and manage their own MFA devices. For more information, see **Allow users to register their own MFA devices** (p. 101).

### To register an MFA device

1. Open the IAM Identity Center console.
2. In the left navigation pane, choose **Users**. Choose a user in the list. Don't select the checkbox next to the user for this step.
3. On the user details page, choose the **MFA devices** tab, and then choose **Register MFA device**.
4. On the **Register MFA device** page, select one of the following MFA device types, and follow the instructions:
   - **Authenticator app**
1. On the **Set up the authenticator app** page, IAM Identity Center displays configuration information for the new MFA device, including a QR code graphic. The graphic is a representation of the secret key that is available for manual entry on devices that do not support QR codes.

2. Using the physical MFA device, do the following:
   a. Open a compatible MFA authenticator app. For a list of tested apps that you can use with MFA devices, see *Virtual authenticator apps* (p. 96). If the MFA app supports multiple accounts (multiple MFA devices), choose the option to create a new account (a new MFA device).
   b. Determine whether the MFA app supports QR codes, and then do one of the following on the **Set up the authenticator app** page:
      i. Choose **Show QR code**, and then use the app to scan the QR code. For example, you might choose the camera icon or choose an option similar to **Scan code**. Then use the device's camera to scan the code.
      ii. Choose **show secret key**, and then type that secret key into your MFA app.

     **Important**
     When you configure an MFA device for IAM Identity Center, we recommend that you save a copy of the QR code or secret key in a secure place. This can help if the assigned user loses the phone or has to reinstall the MFA authenticator app. If either of those things happen, you can quickly reconfigure the app to use the same MFA configuration. This avoids the need to create a new MFA device in IAM Identity Center for the user.

3. On the **Set up the authenticator app** page, under **Authenticator code**, type the one-time password that currently appears on the physical MFA device.

   **Important**
   Submit your request immediately after generating the code. If you generate the code and then wait too long to submit the request, the MFA device is successfully associated with the user. But the MFA device is out of sync. This happens because time-based one-time passwords (TOTP) expire after a short period of time. If this happens, you can resync the device.

4. Choose **Assign MFA**. The MFA device can now start generating one-time passwords and is now ready for use with AWS.

- **Security key**
  1. On the **Register your user's security key** page, follow the instructions given to you by your browser or platform.

     **Note**
     The experience here varies based on the different operating systems and browsers, so please follow the instructions displayed by your browser or platform. After your user's device has been successfully registered, you will be given the option to associate a friendly display name to your user's newly enrolled device. If you want to change this, choose **Rename**, enter the new name, and then choose **Save**. If you have enabled the option to allow users to manage their own devices, the user will see this friendly name in the AWS access portal.

### Manage a user's MFA device

Use the following procedures when you need to rename or delete a user's MFA device.

**To rename an MFA device**

1. Open the **IAM Identity Center console**.
2. In the left navigation pane, choose Users. Choose the user in the list. Don't select the checkbox next to the user for this step.
3. On the user details page, choose the MFA devices tab, select the device, and then choose Rename.
4. When prompted, enter the new name and then choose Rename.

To delete an MFA device

1. Open the IAM Identity Center console.
2. In the left navigation pane, choose Users. Choose the user in the list.
3. On the user details page, choose the MFA devices tab, select the device, and then choose Delete.
4. To confirm, type DELETE, and then choose Delete.
Multi-account permissions

AWS IAM Identity Center is integrated with AWS Organizations, which enables you to centrally manage permissions across multiple AWS accounts without configuring each of your accounts manually. You can define permissions and assign these permissions to workforce users to control their access to specific AWS accounts.

AWS account types

There are two types of AWS accounts in AWS Organizations:

- **Management account** - The AWS account that is used to create the organization.
- **Member accounts** - The rest of the AWS accounts that belong to an organization.

For more information about AWS account types, see [AWS Organizations Terminology and Concepts](https://docs.aws.amazon.com/organizations/latest/userguide/terminology.html) in the [AWS Organizations User Guide](https://docs.aws.amazon.com/organizations/latest/userguide/).

You can also choose to register a member account as a *delegated administrator* for IAM Identity Center. Users in this account can perform most IAM Identity Center administrative tasks. For more information, see [Delegated administration](https://docs.aws.amazon.com/identity-center/latest/UserGuide/delegated-administration.html).

For each task and account type, the following table indicates whether the IAM Identity Center administrative task can be performed by users in the account.

<table>
<thead>
<tr>
<th>IAM Identity Center administrative tasks</th>
<th>Member account</th>
<th>Delegated administrator account</th>
<th>Management account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read users or groups (reading the group itself and the group’s membership)</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
</tr>
<tr>
<td>Add, edit, or delete users or groups</td>
<td>☒ No</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
</tr>
<tr>
<td>Enable or disable user access</td>
<td>☒ No</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
</tr>
<tr>
<td>Enable, disable, or manage incoming attributes</td>
<td>☒ No</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
</tr>
<tr>
<td>Change or manage identity sources</td>
<td>☒ No</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
</tr>
<tr>
<td>Create, edit, or delete applications</td>
<td>☒ No</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
</tr>
<tr>
<td>Configure MFA</td>
<td>☒ No</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
</tr>
<tr>
<td>Manage permission sets not provisioned in the management account</td>
<td>☒ No</td>
<td>☑ Yes</td>
<td>☑ Yes</td>
</tr>
</tbody>
</table>
Assigning AWS account access

You can use permission sets to simplify how you assign users and groups in your organization access to AWS accounts. Permission sets are stored in IAM Identity Center and define the level of access that users and groups have to an AWS account. You can create a single permission set and assign it to multiple AWS accounts within your organization. You can also assign multiple permission sets to the same user.

For more information about permission sets, see Create and manage permission sets (p. 114).

Note
You can also assign your users single sign-on access to applications. For information, see Application assignments (p. 130).

End-user experience

The AWS access portal provides IAM Identity Center users with single sign-on access to all their assigned AWS accounts and applications through a web portal. The AWS access portal is different from the AWS Management Console, which is a collection of service consoles for managing AWS resources.

When you create a permission set, the name that you specify for the permission set appears in the AWS access portal as an available role. Users sign in to the AWS access portal, choose an AWS account, and then choose the role. After they choose the role, they can access AWS services by using the AWS Management Console or retrieve temporary credentials to access AWS services programmatically.

To open the AWS Management Console or retrieve temporary credentials to access AWS programmatically, users complete the following steps:

1. Users open a browser window and use the sign-in URL that you provide to navigate to the AWS access portal.
2. Using their directory credentials, they sign in to the AWS access portal.
3. After authentication, on the AWS access portal page, they choose the AWS account icon to expand the list of AWS accounts to which they have access.
4. Users then choose the AWS account that they want to use.
5. Below the name of the AWS account, any permission sets to which users are assigned appear as available roles. For example, if you assigned user john_stiles to the PowerUser permission set, the role will appear in the AWS access portal as PowerUser/john_stiles. Users who are assigned multiple permission sets choose which role to use.
6. In addition to the role, the AWS access portal displays links that enable users to open the AWS Management Console or retrieve temporary credentials for command line or programmatic access.

For step-by-step guidance that you can provide to your workforce users, see Using the AWS access portal (p. 86) and Getting IAM Identity Center user credentials for the AWS CLI or AWS SDKs (p. 89).

Enforcing and limiting access

When you enable IAM Identity Center, IAM Identity Center creates a service-linked role. You can also use service control policies (SCPs).

Delegating and enforcing access

A service-linked role is a type of IAM role that is linked directly to an AWS service. After you enable IAM Identity Center, IAM Identity Center can create a service-linked role in each AWS account in your organization. This role provides predefined permissions that allow IAM Identity Center to delegate and enforce which users have single sign-on access to specific AWS accounts in your organization in AWS Organizations. You need to assign one or more users with access to an account, to use this role. For more information, see Service-linked roles (p. 129) and Using service-linked roles for IAM Identity Center (p. 168).

Limiting access to the identity store from member accounts

For the identity store service used by IAM Identity Center, users who have access to a member account can use API actions that require Read permissions. Member accounts have access to Read actions on both the sso-directory and identitystore namespaces. For more information, see Actions, resources, and condition keys for AWS IAM Identity Center directory and Actions, resources, and condition keys for AWS Identity Store in the Service Authorization Reference.

To prevent users in member accounts from using API operations in the identity store, you can attach a service control policy (SCP). An SCP is a type of organization policy that you can use to manage permissions in your organization. The following example SCP prevents users in member accounts from accessing any API operation in the identity store.

```json
{
    "Sid": "ExplicitlyBlockIdentityStoreAccess",
    "Effect": "Deny",
    "Action": ["identitystore:*", "sso-directory:*"],
    "Resource": "*"
}
```

Note

Limiting member accounts' access might impair functionality in IAM Identity Center enabled applications.

For more information, see Service control policies (SCPs) in the AWS Organizations User Guide.
Delegated administration

Delegated administration provides a convenient way for assigned users in a registered member account to perform most IAM Identity Center administrative tasks. When you enable IAM Identity Center, your IAM Identity Center instance is created in the management account in AWS Organizations by default. This was originally designed this way so that IAM Identity Center can provision, de-provision, and update roles across all your organization's member accounts. Even though your IAM Identity Center instance must always reside in the management account, you can choose to delegate administration of IAM Identity Center to a member account in AWS Organizations, thereby extending the ability to manage IAM Identity Center from outside the management account.

Enabling delegated administration provides the following benefits:

- Minimizes the number of people who require access to the management account to help mitigate security concerns
- Allows select administrators to assign users and groups to applications and to your organization's member accounts

For more information about how IAM Identity Center works with AWS Organizations, see Multi-account permissions (p. 104). For additional information and to review an example company scenario showing how to configure delegated administration, see Getting started with IAM Identity Center delegated administration in the AWS Security Blog.

Topics

- Best practices (p. 107)
- Prerequisites (p. 108)
- Register a member account (p. 108)
- Deregister a member account (p. 109)
- View which member account has been registered as the delegated administrator (p. 109)

Best practices

Here are some best practices to consider before you configure delegated administration.

- **Grant least privilege to the management account** – Knowing that the management account is a highly privileged account and to adhere to the principal of least privilege, we highly recommend that you restrict access to the management account to as few people as possible. The delegated administrator feature is intended to minimize the number of people who require access to the management account.

- **Create permission sets for use only in the management account** – This makes it easier to administer permission sets tailored just for users accessing your management account and helps to differentiate them from permission sets managed by your delegated administrator account.

- **Consider your Active Directory location** – If you plan on using Active Directory as your IAM Identity Center identity source, locate the directory in the member account where you have enabled the IAM Identity Center delegated administrator feature. If you decide to change the IAM Identity Center identity source from any other source to Active Directory, or change it from Active Directory to any other source, the directory must reside in (be owned by) the IAM Identity Center delegated administrator member account if one exists; otherwise, it must be in the management account.

- **Create user assignments only in the management account** – The delegated administrator can't alter permission sets provisioned in the management account. However, delegated administrators can add, edit, and delete groups and group assignments.
Prerequisites

Before you can register an account as a delegated administrator you must first have the following environment deployed:

- AWS Organizations must be enabled and configured with at least one member account in addition to your default management account.
- If your identity source is set to Active Directory, the IAM Identity Center configurable AD sync feature must be enabled.

**Note**

If your IAM Identity Center configuration was enabled prior to November 2019 and you have not yet enabled access to other accounts in AWS Organizations, you might see an info alert in the console to enable access to IAM Identity Center for a member account in your organization. To provide a registered delegated administrator access to your users and groups and to setup entitlements you have to Allow Identity Center enabled applications in AWS accounts. If your IAM Identity Center configuration was enabled after November 2019, there is nothing more for you to do because access to accounts in your organization were automatically enabled by AWS.

Register a member account

To configure delegated administration, you must first register a member account in your organization as a delegated administrator. Users in that member account who have sufficient permissions will have administrative access to IAM Identity Center. After a member account is successfully registered for delegated administration, it's referred to as the delegated administrator account. To learn more about tasks that the delegated administrator account can perform, see AWS account types.

IAM Identity Center supports registering only one member account as a delegated administrator at a time. You can only register a member account while signed in with credentials from the management account.

Use the following procedure to grant administrative access to IAM Identity Center by registering a specific member account in your AWS organization as a delegated administrator.

**Important**

This operation delegates IAM Identity Center administrative access to admin users in this member account. All users who have sufficient permissions to this delegated administrator account can perform all IAM Identity Center administrative tasks from the account, except for:

- Enabling IAM Identity Center
- Deleting IAM Identity Center configurations
- Managing permission sets provisioned in the management account
- Registering or deregistering other member accounts as delegated administrators
- Enabling or disabling user access in the management account

The delegated administrator can edit group membership.

**To register a member account**

1. Sign in to the AWS Management Console using the credentials of your management account in AWS Organizations. Management account credentials are required to run the RegisterDelegatedAdministrator API.
2. Select the Region where IAM Identity Center is enabled, and then open the IAM Identity Center console.
3. Choose Settings, and then select the Management tab.
4. In the Delegated administrator section, choose Register account.
5. On the Register delegated administrator page, select the AWS account you want to register, and then choose Register account.

Deregister a member account

You can only deregister a member account while signed in with credentials from the management account.

Use the following procedure to remove administrative access from IAM Identity Center by deregistering a member account in your AWS organization that had previously been designated as a delegated administrator.

**Important**

When you deregister an account, you effectively remove the ability for all admin users to manage IAM Identity Center from that account. As a result, they can no longer administer IAM Identity Center identities, access management, authentication, or application access from this account. This operation will not affect any permissions or assignments configured in IAM Identity Center and therefore will have no impact on your end users as they will continue to have access to their apps and AWS accounts from within the AWS access portal.

**To deregister a member account**

1. Sign in to the AWS Management Console using the credentials of your management account in AWS Organizations. Management account credentials are required to run the DeregisterDelegatedAdministrator API.
2. Select the Region where IAM Identity Center is enabled, and then open the IAM Identity Center console.
3. Choose Settings, and then select the Management tab.
4. In the Delegated administrator section, choose Deregister account.
5. In the Deregister account dialog box, review the security implications, and then enter the name of the member account to confirm that you understand.
6. Choose Deregister account.

View which member account has been registered as the delegated administrator

Use the following procedure to find which member account in your AWS Organizations has been configured as the delegated administrator for IAM Identity Center.

**To view your registered member account**

1. Open the IAM Identity Center console.
2. Choose Settings.
3. In the Details section, locate the registered account name under Delegated administrator. You can also locate this information by selecting the Management tab, and viewing it under the Delegated administrator section.
Temporary elevated access

All access to your AWS account involves some level of privilege. Sensitive operations, such as changing configuration on a high-value resource, for example, a production environment, require special treatment due to scope and potential impact. Temporary elevated access (also known as just-in-time access) is a way to request, approve, and track the use of a permission to perform a specific task during a specified time. Temporary elevated access supplements other forms of access control, such as permission sets and multi-factor authentication.

AWS IAM Identity Center provides you with options for temporary elevated access management in different business and technical environments:

- **Vendor-managed and supported solutions** – AWS has validated the IAM Identity Center integrations of select partner offerings (p. 110) and has assessed their capabilities against a common set of customer requirements (p. 111). Choose the solution that best aligns with your scenario and follow the provider’s guidance to enable the capability with IAM Identity Center.

- **Self-managed and self-supported** – a starting point for customers who are interested in temporary elevated access to AWS only and are willing to deploy, tailor, and maintain the capability by themselves. For more information, see Temporary elevated access management (TEAM).

Validated AWS Security Partners for temporary elevated access

AWS Security Partners use different approaches to address a common set of temporary elevated access requirements (p. 111). We encourage you to review each partner solution carefully and discuss with its provider before choosing the one that best fits your needs and preferences, including your business, the architecture of your cloud environment, and your budget.

**Note**
For disaster recovery, we recommend you set up emergency access to the AWS Management Console before a disruption occurs.

AWS Identity has validated the capabilities and integration with IAM Identity Center of the following just-in-time offerings by AWS Security Partners:

- **CyberArk Secure Cloud Access** – part of the CyberArk Identity Security Platform, provisions on-demand elevated access to AWS and multi-cloud environments, and can be used to achieve zero standing privileges by just-in-time provisioning of regular and expected access. Approvals are addressed via integration with either ITSM or ChatOps tooling. All sessions can be recorded for audit and compliance.

- **Ermetic** – the Ermetic platform includes provisioning of just-in-time privileged access for administrative operations in AWS and multi-cloud environments. Session logs from all cloud environments, including AWS CloudTrail access logs, are available in a single interface for analysis and audit. The capability integrates with enterprise and developer tools such as Slack and MS Teams.

- **Okta Access Requests** – part of Okta Identity Governance, enables you to configure a just-in-time access request workflow using Okta as an IAM Identity Center external identity provider (IdP) and your IAM Identity Center permission sets.

This partner list will be updated as partner solutions become available.
Temporary elevated access capabilities assessed for AWS partner validation

AWS Identity has validated that the temporary elevated access capabilities offered by CyberArk Secure Cloud Access, Ermetic, and Okta Access Requests address the following common customer requirements:

- User can request access to a permission set for a user-specified time period, specifying the AWS account, permission set, time period, and reason.
- User can receive approval status for their request.
- User can’t invoke a session with a given scope, unless there is an approved request with the same scope and they invoke the session during the approved time period.
- There is a way to specify who can approve requests.
- Approver can’t approve their own requests.
- Approver has list of pending, approved, and rejected requests and can export it for auditors.
- Approver can approve and reject pending requests.
- Approver can add a note explaining their decision.
- Approver can revoke an approved request, preventing future use of the elevated access.

**Note**
If the user is signed in with the elevated access at the time of revocation, their session remains active for up to one hour after the approval is revoked. For information about authentication sessions, see User authentications (p. 18).

- User actions and approvals are available for audit.

Single sign-on access to AWS accounts

You can assign users in your connected directory permissions to the management account or member accounts in your AWS Organizations organization based on common job functions. Or you can use custom permissions to meet your specific security requirements. For example, you can grant database administrators broad permissions to Amazon RDS in development accounts but limit their permissions in production accounts. IAM Identity Center configures all the necessary user permissions in your AWS accounts automatically.

**Note**
You might need to grant users or groups permissions to operate in the AWS Organizations management account. Because it is a highly privileged account, additional security restrictions require you to have the IAMFullAccess policy or equivalent permissions before you can set this up. These additional security restrictions are not required for any of the member accounts in your AWS organization.

Assign user access to AWS accounts

Use the following procedure to assign single sign-on access to users and groups in your connected directory and use permission sets to determine their level of access.

**Note**
To simplify administration of access permissions, we recommended that you assign access directly to groups rather than to individual users. With groups you can grant or deny permissions to groups of users rather than having to apply those permissions to each individual. If a user moves to a different organization, you simply move that user to a different group and they automatically receive the permissions that are needed for the new organization.
To assign user or group access to AWS accounts

1. Open the IAM Identity Center console.

   Note
   Make sure that the IAM Identity Center console is using the Region where your AWS Managed Microsoft AD directory is located before you move to the next step.

2. In the navigation pane, under Multi-account permissions, choose AWS accounts.

3. On the AWS accounts page, a tree view list of your organization appears. Select the check box next to one or more AWS accounts to which you want to assign single sign-on access.

   Note
   You can select up to 10 AWS accounts at a time per permission set when you assign single sign-on access to users and groups. To assign more than 10 AWS accounts to the same set of users and groups, repeat this procedure as required for the additional accounts. When prompted, select the same users, groups, and permission set.

4. Choose Assign users or groups.

5. For Step 1: Select users and groups, on the Assign users and groups to "AWS-account-name" page, do the following:

   1. On the Users tab, select one or more users to whom to grant single sign-on access.

      To filter the results, start typing the name of the user that you want in the search box.

   2. On the Groups tab, select one or more groups to which to grant single sign-on access.

      To filter the results, start typing the name of the group that you want in the search box.

   3. To display the users and groups that you selected, choose the sideways triangle next to Selected users and groups.

   4. After you confirm that the correct users and groups are selected, choose Next.

6. For Step 2: Select permission sets, on the Assign permission sets to "AWS-account-name" page, do the following:

   1. Select one or more permission sets. If required, you can create and select new permission sets.

      • To select one or more existing permission sets, under Permission sets, select the permission sets that you want to apply to the users and groups that you selected in the previous step.

      • To create one or more new permission sets, choose Create permission set, and follow the steps in Create a permission set (p. 114). After you create the permission sets that you want to apply, in the IAM Identity Center console, return to AWS accounts and follow the instructions until you reach Step 2: Select permission sets. When you reach this step, select the new permission sets that you created, and proceed to the next step in this procedure.

   2. After you confirm that the correct permission sets are selected, choose Next.

7. For Step 3: Review and Submit, on the Review and submit assignments to "AWS-account-name" page, do the following:

   1. Review the selected users, groups, and permission sets.

   2. After you confirm that the correct users, groups, and permission sets are selected, choose Submit.

       Important
       The user and group assignment process might take a few minutes to complete. Leave this page open until the process successfully completes.

       Note
       You might need to grant users or groups permissions to operate in the AWS Organizations management account. Because it is a highly privileged account, additional security restrictions require you to have the IAMFullAccess policy or equivalent.
permissions before you can set this up. These additional security restrictions are not required for any of the member accounts in your AWS organization.

## Remove user and group access

Use this procedure to remove single sign-on access to an AWS account for one or more users and groups in your connected directory.

### To remove user and group access to an AWS account

1. Open the IAM Identity Center console.
2. In the navigation pane, under Multi-account permissions, choose AWS accounts.
3. On the AWS accounts page, a tree view list of your organization appears. Select the name of the AWS account that contains the users and groups for whom you want to remove single sign-on access.
4. On the Overview page for the AWS account, under Assigned users and groups, select the name of one or more users or groups, and choose Remove access.
5. In the Remove access dialog box, confirm that the names of the users or groups are correct, and choose Remove access.

## Delegate who can assign single sign-on access to users and groups in the management account

Assigning single sign-on access to the management account using the IAM Identity Center console is a privileged action. By default, only an AWS account root user or a user who has the AWSSSOMasterAccountAdministrator and IAMFullAccess AWS managed policies attached, can assign single sign-on access to the management account. The AWSSSOMasterAccountAdministrator and IAMFullAccess policies manage single sign-on access to the management account within an AWS Organizations organization.

Use the following steps to delegate permissions to manage single sign-on access to users and groups in your directory.

### To grant permissions to manage single sign-on access to users and groups in your directory

1. Sign in to the IAM Identity Center console as a root user of the management account or with another user who has administrator permissions to the management account.
2. Follow the steps in Create a permission set (p. 114) to create a permission set, and then do the following:
   1. On the Create new permission set page, select the Create a custom permission set check box, and then choose Next: Details.
   2. On the Create new permission set page, specify a name for the custom permission set and optionally, a description. If required, modify the session duration and specify a relay state URL.
      
      **Note**
      
      For the relay state URL, you must specify a URL that is in the AWS Management Console.
      For example: https://console.aws.amazon.com/ec2/
      For more information, see Set relay state (p. 118).

   3. Under What policies do you want to include in your permission set?, select the Attach AWS managed policies check box.
Create and manage permission sets

Permission sets define the level of access that users and groups have to an AWS account. Permission sets are stored in IAM Identity Center and can be provisioned to one or more AWS accounts. You can assign more than one permission set to a user. For more information about permission sets and how they are used in IAM Identity Center, see Permission sets (p. 21).

Topics
• Create a permission set (p. 114)
• Delegate permission set administration (p. 116)
• Use IAM policies in permission sets (p. 116)
• Configure permission set properties (p. 117)
• Referencing permission sets in resource policies, Amazon EKS, and AWS KMS (p. 119)

Create a permission set

Use this procedure to create a predefined permission set that uses a single AWS managed policy, or a custom permission set that uses up to 10 AWS managed or customer managed policies and an inline policy. You can request an adjustment to the maximum number of 10 policies in the Service Quotas console for IAM.

You can create a permission set in the IAM Identity Center console.

To create a permission set
1. Open the IAM Identity Center console.
2. Under Multi-account permissions, choose Permission sets.
3. Choose Create permission set.
4. On the Select permission set type page, under Permission set type, select a permission set type.
5. Choose one or more policies that you want to use for the permission set, based on the permission set type:
   • Predefined permission set
     1. Choose Next.
     2. Under Predefined policy, select one of the IAM Job function policies or Common permission policies in the list, and then choose Next. For more information, see AWS managed policies
for job functions and AWS managed policies in the AWS Identity and Access Management User Guide.

3. At the Review and create screen, review the selections you made, and then choose Create.

- Custom permission set
  1. Choose Next.
  2. On the Specify policies page, choose the types of IAM policies that you want to apply to your new permission set. By default, you can add any combination of up to 10 AWS managed policies and Customer managed policies to your permission set. This quota is set by IAM. To raise it, request an increase to the IAM quota Managed policies attached to an IAM role in the Service Quotas console in each AWS account where you want to assign the permission set.

- Expand AWS managed policies to add policies from IAM that AWS builds and maintains. For more information, see AWS managed policies (p. 22).
  a. Search for and choose AWS managed policies that you want to apply to your users in the permission set.
  b. If you want to add another type of policy, choose its container and make your selection. Choose Next when you've chosen all the policies that you want to apply.

- Expand Customer managed policies to add policies from IAM that you build and maintain. For more information, see Customer managed policies (p. 23).
  a. Choose Attach policies and enter the name of a policy that you want to add to your permission set. In each account where you want to assign the permission set, create a policy with the name you entered. As a best practice, assign the same permissions to the policy in each account.
  b. Choose Attach more to add another policy.
  c. If you want to add another type of policy, choose its container and make your selection. Choose Next when you've chosen all the policies that you want to apply.

- Expand Custom inline policy to add custom JSON-formatted policy text. Inline policies don't correspond to existing IAM resources. To create an inline policy, enter custom policy language in the provided form. IAM Identity Center adds the policy to the IAM resources that it creates in your member accounts. For more information, see Inline policies (p. 22).
  a. Choose Design to use an interactive editor to choose permissions that you want to include in your inline policy. Choose Code to paste in preformatted policy JSON.
  b. If you want to add another type of policy, choose its container and make your selection. Choose Next when you've chosen all the policies that you want to apply.

- Expand Permissions boundary to add an AWS managed or customer managed IAM policy as the maximum permissions that your other policies in the permission set can assign. For more information, see Permissions boundaries (p. 23).
  a. Choose Use a permissions boundary to control the maximum permissions.
  b. Choose AWS managed policy to set a policy from IAM that AWS builds and maintains as your permissions boundary. Choose Customer managed policies to set a policy from IAM that you build and maintain as your permissions boundary.
  c. If you want to add another type of policy, choose its container and make your selection. Choose Next when you've chosen all the policies that you want to apply.

6. On the Specify permission set details page, do the following:

1. Under Permission set name, type a name to identify this permission set in IAM Identity Center. The name that you specify for this permission set appears in the AWS access portal as an available role. Users sign into the AWS access portal, choose an AWS account, and then choose the role.

2. (Optional) You can also type a description. The description appears in the IAM Identity Center console only, not the AWS access portal.

3. (Optional) Specify the value for Session duration. This value determines the length of time that a user can be logged on before the console logs them out of their session. For more information, see Set session duration (p. 117).
Delegate permission set administration

IAM Identity Center enables you to delegate management of permission sets and assignments in accounts by creating IAM policies that reference the Amazon Resource Names (ARNs) of IAM Identity Center resources. For example, you can create policies that enable different administrators to manage assignments in specified accounts for permission sets with specific tags.

You can use either of the following methods to create these types of policies.

- (Recommended) Create permission sets in IAM Identity Center, each with a different policy, and assign the permission sets to different users or groups. This enables you to manage administrative permissions for users who sign in using your chosen IAM Identity Center identity source.
- Create custom policies in IAM, and then attach them to IAM roles that your administrators assume. For information about roles, see IAM roles to get their assigned IAM Identity Center administrative permissions.

**Important**
IAM Identity Center resource ARNs are case sensitive.

The following shows the proper case for referencing the IAM Identity Center permission set and account resource types.

<table>
<thead>
<tr>
<th>Resource Types</th>
<th>ARN</th>
<th>Context Keys</th>
</tr>
</thead>
<tbody>
<tr>
<td>PermissionSet</td>
<td>arn:${Partition}:sso::permissionSet/${InstanceId}/${PermissionSetId}</td>
<td>aws:ResourceTag/${TagKey}</td>
</tr>
<tr>
<td>Account</td>
<td>arn:${Partition}:sso::account/${AccountId}</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Use IAM policies in permission sets

In Create a permission set (p. 114), you learned how to add policies, including customer managed policies and permissions boundaries, to a permission set. When you add customer managed policies and
permissions to a permission set, IAM Identity Center doesn't create a policy in any AWS accounts. You must instead create those policies in advance in each account where you want to assign your permission set, and match them to the name and path specifications of your permission set. When you assign a permission set to an AWS account in your organization, IAM Identity Center creates an AWS Identity and Access Management (IAM) role and attaches your IAM policies to that role.

Note
Before you assign your permission set with IAM policies, you must prepare your member account. The name of an IAM policy in your member account must be a case-sensitive match to name of the policy in your management account. IAM Identity Center fails to assign the permission set if the policy doesn't exist in your member account.

The permissions that the policy grants don't have to be an exact match between accounts.

To assign an IAM policy to a permission set
1. Create an IAM policy in each of the AWS accounts where you want to assign the permission set.
2. Assign permissions to the IAM policy. You can assign different permissions in different accounts. For a consistent experience, configure and maintain identical permissions in each policy. You can use automation resources like AWS CloudFormation StackSets to create copies of an IAM policy with the same name and permissions in each member account. For more information about CloudFormation StackSets, see Working with AWS CloudFormation StackSets in the AWS CloudFormation User guide.
3. Create a permission set in your management account and add your IAM policy under Customer managed policies or Permissions boundary. For more details about how to create a permission set, See Create a permission set (p. 114).
4. Add any inline policies, AWS managed policies, or additional IAM policies that you have prepared.
5. Create and assign your permission set.

Configure permission set properties

In IAM Identity Center you can customize the user experience by configuring the following permission set properties.

Topics
- Set session duration (p. 117)
- Set relay state (p. 118)

Set session duration

For each permission set, you can specify a session duration to control the length of time that a user can be signed in to an AWS account. When the specified duration elapses, AWS signs the user out of the session.

When you create a new permission set, the session duration is set to 1 hour (in seconds) by default. The minimum session duration is 1 hour, and can be set to a maximum of 12 hours. IAM Identity Center automatically creates IAM roles in each assigned account for each permission set, and configures these roles with a maximum session duration of 12 hours.

When users federate into their AWS account console or when the AWS Command Line Interface (AWS CLI) is used, IAM Identity Center uses the session duration setting on the permission set to control the duration of the session. By default, IAM roles generated by IAM Identity Center for permission sets can only be assumed by IAM Identity Center users, which ensures that the session duration specified in the IAM Identity Center permission set is enforced.

Important
As a security best practice, we recommend that you do not set the session duration length longer than is needed to perform the role.
After you create a permission set, you can update it to apply a new session duration. Use the following procedure to modify the session duration length for a permission set.

**To set the session duration**

1. Open the IAM Identity Center console.
2. Under Multi-account permissions, choose Permission sets.
3. Choose the name of the permission set for which you want to change the session duration.
4. On the details page for the permission set, to the right of the General settings section heading, choose Edit.
5. On the Edit general permission set settings page, choose a new value for Session duration.
6. If the permission set is provisioned in any AWS accounts, the names of the accounts appear under AWS accounts to reprovision automatically. After the session duration value for the permission set is updated, all AWS accounts that use the permission set are reprovisioned. This means that the new value for this setting is applied to all AWS accounts that use the permission set.
7. Choose Save changes.
8. At the top of the AWS accounts page, a notification appears.
   - If the permission set is provisioned in one or more AWS accounts, the notification confirms that the AWS accounts were reprovisioned successfully, and the updated permission set was applied to the accounts.
   - If the permission set isn't provisioned in an AWS account, the notification confirms that the settings for the permission set were updated.

**Set relay state**

By default, when a user signs into the AWS access portal, chooses an account, and then chooses the role that AWS creates from the assigned permission set, IAM Identity Center redirects the user’s browser to the AWS Management Console. You can change this behavior by setting the relay state to a different console URL. Setting the relay state enables you to provide the user with quick access to the console that is most appropriate for their role. For example, you can set the relay state to the Amazon EC2 console URL (https://console.aws.amazon.com/ec2/) to redirect the user to that console when they choose the Amazon EC2 administrator role. During the redirection to the default URL or relay state URL, IAM Identity Center routes the user’s browser to the console endpoint in the last AWS Region used by the user. For example, if a user ended their last console session in the Europe (Stockholm) Region (eu-north-1), the user is redirected to the Amazon EC2 console in that Region.

To configure IAM Identity Center to redirect the user to a console in a specific AWS Region, include the Region specification as part of the URL. For example, to redirect the user to the Amazon EC2 console in the US East (Ohio) Region (us-east-2), specify the URL for the Amazon EC2 console in that Region (https://us-east-2.console.aws.amazon.com/ec2/). If you enabled IAM Identity Center in the US West (Oregon) Region (us-west-2) Region and you want to direct the user to that Region, specify https://us-west-2.console.aws.amazon.com.

Use the following procedure to configure the relay state URL for a permission set.

**To configure the relay state**

1. Open the IAM Identity Center console.
2. Under **Multi-account permissions**, choose **Permission sets**.

3. Choose the name of the permission set for which you want to set the new relay state URL.

4. On the details page for the permission set, to the right of the **General settings** section heading, choose **Edit**.

5. On the **Edit general permission set settings** page, under **Relay state**, type a console URL for any of the AWS services. For example:

   ```
   https://console.aws.amazon.com/ec2/
   ```

   **Note**
   The relay state URL must be within the AWS Management Console.

6. If the permission set is provisioned in any AWS accounts, the names of the accounts appear under **AWS accounts to reprovision automatically**. After the relay state URL for the permission set is updated, all AWS accounts that use the permission set are reprovisioned. This means that the new value for this setting is applied to all AWS accounts that use the permission set.

7. Choose **Save changes**.

8. At the top of the **AWS Organization** page, a notification appears.

   - If the permission set is provisioned in one or more AWS accounts, the notification confirms that the AWS accounts were reprovisioned successfully, and the updated permission set was applied to the accounts.
   - If the permission set isn't provisioned in an AWS account, the notification confirms that the settings for the permission set were updated.

   **Note**
   You can automate this process by using the AWS API, an AWS SDK, or the AWS Command Line Interface (AWS CLI). For more information, see:

   - The **CreatePermissionSet** or **UpdatePermissionSet** actions in the [IAM Identity Center API Reference](#).
   - The **create-permission-set** or **update-permission-set** commands in the [sso-admin](#) section of the [AWS CLI Command Reference](#).

---

### Referencing permission sets in resource policies, Amazon EKS, and AWS KMS

When you assign a permission set to an AWS account, IAM Identity Center creates a role with a name that begins with `AWSReservedSSO_`

The complete name and Amazon Resource Name (ARN) for the role use the following format:

<table>
<thead>
<tr>
<th>Name</th>
<th>ARN</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>AWSReservedSSO_permission-set-name_unique-suffix</code></td>
<td><code>arn:aws:iam::aws-account-ID:role/aws-reserved/sso.amazonaws.com/aws-region/AWSReservedSSO_permission-set-name_unique-suffix</code></td>
</tr>
</tbody>
</table>

For example, if you create a permission set that grants AWS account access to database administrators, a corresponding role is created with the following name and ARN:
Referencing permission sets in resource policies, Amazon EKS, and AWS KMS

<table>
<thead>
<tr>
<th>Name</th>
<th>ARN</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWSReservedSSO_DatabaseAdministrator_1234567890abcdef</td>
<td>arn:aws:iam::111122223333:role/aws-reserved/sso.amazonaws.com/eu-west-2/AWSReservedSSO_DatabaseAdministrator_1234567890abcdef</td>
</tr>
</tbody>
</table>

If you delete all assignments to this permission set in the AWS account, the corresponding role that IAM Identity Center created is also deleted. If you make a new assignment to the same permission set later, IAM Identity Center creates a new role for the permission set. The name and ARN of the new role include a different, unique suffix. In this example, the unique suffix is `abcdef0123456789`.

<table>
<thead>
<tr>
<th>Name</th>
<th>ARN</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWSReservedSSO_DatabaseAdministrator_abcdef0123456789</td>
<td>arn:aws:iam::111122223333:role/aws-reserved/sso.amazonaws.com/eu-west-2/AWSReservedSSO_DatabaseAdministrator_abcde0123456789</td>
</tr>
</tbody>
</table>

The suffix change in the new name and ARN for the role will cause any policies that reference the original name and ARN to be out-of-date, which disrupts access for individuals who use the corresponding permission set. For example, a change in the ARN for the role will disrupt access for users of the permission set if the original ARN is referenced in the following configurations:

- In the `aws-auth` ConfigMap file for Amazon Elastic Kubernetes Service (Amazon EKS)
- In a resource-based policy for an AWS Key Management Service (AWS KMS) key. This policy is also referred to as a key policy.

Although you can update resource-based policies for most AWS services to reference a new ARN for a role that corresponds to a permission set, you must have a backup role that you create in IAM for Amazon EKS and AWS KMS if the ARN changes. For Amazon EKS, the backup IAM role must exist in the `aws-auth` ConfigMap. For AWS KMS, it must exist in your key policies. If you don't have a backup IAM role in either case, you must contact AWS Support.

**Recommendations to avoid access disruptions**

To avoid access disruptions due to changes in the ARN for a role that corresponds to a permission set, we recommend that you do the following.

- **Maintain at least one permission set assignment.**
  Maintain this assignment in the AWS accounts that contain the roles that you reference in the `aws-auth` ConfigMap for Amazon EKS, key policies in AWS KMS, or resource-based policies for other AWS services.

  For example, if you create an EKSAccess permission set and reference the corresponding role ARN from AWS account `111122223333`, then permanently assign an administrative group to the permission set in that account. Because the assignment is permanent, IAM Identity Center won't delete the corresponding role, which eliminates the renaming risk. The administrative group will always have access without the risk of privilege escalation.

- **For Amazon EKS and AWS KMS: Include a role created in IAM.**
  If you reference role ARNs for permission sets in an `aws-auth` ConfigMap for Amazon EKS cluster or in key policies for AWS KMS keys, we recommend that you also include at least one role that you create in IAM. The role must allow you to access the Amazon EKS cluster or manage the AWS KMS key policy. The permission set must be able to assume this role. That way, if the role ARN for a permission
set changes, you can update the reference to the ARN in the `aws-auth` ConfigMap or AWS KMS key policy. The next section provides an example of how you can create a trust policy for a role that is created in IAM. The role can be assumed only by an `AdministratorAccess` permission set.

**Custom trust policy example**

Following is an example of a custom trust policy that provides an `AdministratorAccess` permission set with access to a role that is created in IAM. The key elements of this policy include:

- The Principal element of this trust policy specifies an AWS account principal. In this policy, principals in the AWS account 111122223333 with `sts:AssumeRole` permissions can assume the role that is created in IAM.
- The Condition element of this trust policy specifies additional requirements for principals that can assume the role created in IAM. In this policy, the permission set with the following role ARN can assume the role.

```json
arn:aws:iam::111122223333:role/aws-reserved/sso.amazonaws.com/eu-west-2/AWSReservedSSO_AdministratorAccess_*
```

**Note**
The Condition element includes the ArnLike condition operator and uses a wildcard at the end of the permission set role ARN, rather than a unique suffix. This means that the policy will allow the permission set to assume the role created in IAM even if the role ARN for the permission set changes.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "AWS": "arn:aws:iam::111122223333:root"
      },
      "Action": "sts:AssumeRole",
      "Condition": {
        "ArnLike": {
          "aws:PrincipalArn": "arn:aws:iam::111122223333:role/aws-reserved/sso.amazonaws.com/eu-west-2/AWSReservedSSO_AdministratorAccess_*"
        }
      }
    }
  ]
}
```

Including a role that you create in IAM in such a policy will provide you with emergency access to your Amazon EKS clusters, AWS KMS keys, or other AWS resources if a permission set or all assignments to the permission set are accidentally deleted and re-created.

**Delete permission sets**

Before you can delete a permission set from IAM Identity Center, you must remove it from all AWS accounts that use the permission set.

**To remove a permission set from an AWS account**

1. Open the [IAM Identity Center console](https://aws.amazon.com).
2. Under Multi-account permissions, choose AWS accounts.
3. On the AWS accounts page, a tree view list of your organization appears. Select the name of the AWS account from which you want to remove the permission set.
4. On the Overview page for the AWS account, choose the Permission sets tab.
5. Select the check box next to the permission set that you want to remove, and then choose Remove.
6. In the Remove permission set dialog box, confirm that the correct permission set is selected, type Delete to confirm removal, and then choose Remove access.

Use the following procedure to delete one or more permission sets so that they can no longer be used by any AWS account in the organization.

Note
All users and groups that have been assigned this permission set, regardless of what AWS account is using it, will no longer be able to sign in.

To delete a permission set from an AWS account
1. Open the IAM Identity Center console.
2. Under Multi-account permissions, choose Permission sets.
3. Select the permission set that you want to delete, and then choose Delete.
4. In the Delete permission set dialog box, type the name of the permission set to confirm deletion, and then choose Delete. The name is case-sensitive.

**Attribute-based access control**

Attribute-based access control (ABAC) is an authorization strategy that defines permissions based on attributes. You can use IAM Identity Center to manage access to your AWS resources across multiple AWS accounts using user attributes that come from any IAM Identity Center identity source. In AWS, these attributes are called tags. Using user attributes as tags in AWS helps you simplify the process of creating fine-grained permissions in AWS and ensures that your workforce gets access only to the AWS resources with matching tags.

For example, you can assign developers Bob and Sally, who are from two different teams, to the same permission set in IAM Identity Center and then select the team name attribute for access control. When Bob and Sally sign in to their AWS accounts, IAM Identity Center sends their team name attribute in the AWS session so Bob and Sally can access AWS project resources only if their team name attribute matches the team name tag on the project resource. If Bob moves to Sally's team in the future, you can modify his access by simply updating his team name attribute in the corporate directory. When Bob signs in next time, he will automatically get access to the project resources of his new team without requiring any permissions updates in AWS.

This approach also helps in reducing the number of distinct permissions you need to create and manage in IAM Identity Center as users associated with the same permission sets can now have unique permissions based on their attributes. You can use these user attributes in IAM Identity Center permission sets and resource-based policies to implement ABAC to AWS resources and simplify permissions management at scale.

**Benefits**

The following are additional benefits of using ABAC in IAM Identity Center.

- **ABAC requires fewer permission sets** – Because you don't have to create different policies for different job functions, you create fewer permission sets. This reduces your permissions management complexity.
• Using ABAC, teams can change and grow quickly – Permissions for new resources are automatically granted based on attributes when resources are appropriately tagged upon creation.

• Use employee attributes from your corporate directory with ABAC – You can use existing employee attributes from any identity source configured in IAM Identity Center to make access control decisions in AWS.

• Track who is accessing resources – Security administrators can easily determine the identity of a session by reviewing the user attributes in AWS CloudTrail to track user activity in AWS.

For information about how to configure ABAC using the IAM Identity Center console, see Attributes for access control (p. 124). For information about how to enable and configure ABAC using the IAM Identity Center APIs, see CreateInstanceAccessControlAttributeConfiguration in the IAM Identity Center API Reference Guide.

Topics
• Checklist: Configuring ABAC in AWS using IAM Identity Center (p. 123)
• Attributes for access control (p. 124)

Checklist: Configuring ABAC in AWS using IAM Identity Center

This checklist includes the configuration tasks that are necessary to prepare your AWS resources and to set up IAM Identity Center for ABAC access. Complete the tasks in this checklist in order. When a reference link takes you to a topic, return back to this topic so that you can proceed with the remaining tasks in this checklist.

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review how to add tags to all your AWS resources. To implement ABAC in IAM Identity Center, you'll first need to add tags to all your AWS resources that you want to implement ABAC for.</td>
<td>• Tagging AWS resources</td>
</tr>
<tr>
<td>2</td>
<td>Review how to configure your identity source in IAM Identity Center with the associated user identities and attributes in your identity store. IAM Identity Center lets you use user attributes from any supported IAM Identity Center identity source for ABAC in AWS.</td>
<td>• Manage your identity source (p. 25)</td>
</tr>
<tr>
<td>3</td>
<td>Based on the following criteria, determine which attributes you want to use for making access control decisions in AWS and send them to IAM Identity Center.</td>
<td>• Getting started (p. 125)</td>
</tr>
<tr>
<td></td>
<td>• If you are using an external identity provider (IdP), decide whether you want to use attributes passed from the IdP or select attributes from within IAM Identity Center.</td>
<td>• Choosing attributes when using an external identity provider as your identity source (p. 125)</td>
</tr>
<tr>
<td></td>
<td>• If you choose to have your IdP send attributes, configure your IdP to transmit the attributes in SAML assertions. See the Optional sections in the procedure for your specific IdP.</td>
<td>• Supported identity providers (p. 58)</td>
</tr>
<tr>
<td></td>
<td>• If you use an IdP as your identity source and choose to select attributes in IAM Identity Center, investigate how</td>
<td>• Automatic provisioning (p. 53)</td>
</tr>
</tbody>
</table>
### Attributes for access control

**Attributes for access control** is the name of the page in the IAM Identity Center console where you select user attributes that you want to use in policies to control access to resources. You can assign users to workloads in AWS based on existing attributes in the users' identity source.

For example, suppose you want to assign access to S3 buckets based on department names. While on the **Attributes for access control** page, you select the **Department** user attribute for use with attribute-based access control (ABAC). In the IAM Identity Center permission set, you then write a policy that grants users access only when the **Department** attribute matches the department tag that you assigned to your S3 buckets. IAM Identity Center passes the user's department attribute to the account being accessed. The attribute is then used to determine access based on the policy. For more information about ABAC, see [Attribute-based access control](#).

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>to configure SCIM so that the attribute values come from your IdP. If you cannot use SCIM with your IdP, add the users and their attributes using the IAM Identity Center console <strong>User</strong> page.</td>
<td>• <a href="#">Supported external identity provider attributes</a> (p. 42)</td>
</tr>
<tr>
<td></td>
<td>• If you use Active Directory or IAM Identity Center as your identity source, or you use an IdP and choose to select attributes in IAM Identity Center, review the available attributes that you can configure. Then jump immediately to step 4 to start configuring your ABAC attributes using the IAM Identity Center console.</td>
<td>• <a href="#">Choosing attributes when using IAM Identity Center as your identity source</a> (p. 125) • <a href="#">Choosing attributes when using AWS Managed Microsoft AD as your identity source</a> (p. 125) • Default mappings (p. 43)</td>
</tr>
<tr>
<td>4</td>
<td>Select the attributes to use for ABAC using the <strong>Attributes for access control</strong> page in the IAM Identity Center console. From this page you can select attributes for access control from the identity source that you configured in step 2. After your identities and their attributes are in IAM Identity Center, you must create key-value pairs (mappings) which will be passed to your AWS accounts for use in access control decisions.</td>
<td>• <a href="#">Enable and configure attributes for access control</a> (p. 126)</td>
</tr>
<tr>
<td>5</td>
<td>Create custom permissions policies within your permission set and use access control attributes to create ABAC rules so that users can only access resources with matching tags. User attributes that you configured in step 4 are used as tags in AWS for access control decisions. You can refer to the access control attributes in the permissions policy using the <code>aws:PrincipalTag/key</code> condition.</td>
<td>• <a href="#">Create permission policies for ABAC in IAM Identity Center</a> (p. 128)</td>
</tr>
<tr>
<td>6</td>
<td>In your various AWS accounts, assign users to permissions sets you created in step 5. Doing so ensures that when they federate into their accounts and access AWS resources, they only get access based on matching tags.</td>
<td>• <a href="#">Assign user access to AWS accounts</a> (p. 111)</td>
</tr>
</tbody>
</table>

After you complete these steps, users who federate into an AWS account using single sign-on will get access to their AWS resources based on matching attributes.
Getting started

How you get started configuring attributes for access control depends on which identity source you are using. Regardless of the identity source you choose, after you have selected your attributes you need to create or edit permission set policies. These policies must grant user identities access to AWS resources.

Choosing attributes when using IAM Identity Center as your identity source

When you configure IAM Identity Center as the identity source, you first add users and configure their attributes. Next, navigate to the Attributes for access control page and select the attributes you want to use in policies. Finally, navigate to the AWS accounts page to create or edit permission sets to use the attributes for ABAC.

Choosing attributes when using AWS Managed Microsoft AD as your identity source

When you configure IAM Identity Center with AWS Managed Microsoft AD as your identity source, you first map a set of attributes from Active Directory to user attributes in IAM Identity Center. Next, navigate to the Attributes for access control page. Then choose which attributes to use in your ABAC configuration based on the existing set of SSO attributes mapped from Active Directory. Finally, author ABAC rules using the access control attributes in permission sets to grant user identities access to AWS resources. For a list of the default mappings for user attributes in IAM Identity Center to the user attributes in your AWS Managed Microsoft AD directory, see Default mappings (p. 43).

Choosing attributes when using an external identity provider as your identity source

When you configure IAM Identity Center with an external identity provider (IdP) as your identity source, there are two ways to use attributes for ABAC.

- You can configure your IdP to send the attributes through SAML assertions. In this case, IAM Identity Center passes the attribute name and value from the IdP through for policy evaluation.

  Note

  Attributes in SAML assertions will not be visible to you on the Attributes for access control page. You will have to know these attributes in advance and add them to access control rules when you author policies. If you decide to trust your external IdPs for attributes, then these attributes will always be passed when users federate into AWS accounts. In scenarios where the same attributes are coming to IAM Identity Center through SAML and SCIM, the SAML attributes value take precedence in access control decisions.

- You can configure which attributes you use from the Attributes for access control page in the IAM Identity Center console. The attributes values that you choose here replace the values for any matching attributes that come from an IdP through an assertion. Depending on whether you are using SCIM, consider the following:

  - If using SCIM, the IdP automatically synchronizes the attribute values into IAM Identity Center. Additional attributes that are required for access control might not be present in the list of SCIM attributes. In that case, consider collaborating with the IT admin in your IdP to send such attributes to IAM Identity Center via SAML assertions using the required https://aws.amazon.com/SAML/Attributes/AccessControl: prefix. For information about how to configure user attributes for access control in your IdP to send through SAML assertions, see Supported identity providers (p. 58).

  - If you are not using SCIM, you must manually add the users and set their attributes just as if you were using IAM Identity Center as an identity source. Next, navigate to the Attributes for access control page and choose the attributes you want to use in policies.

For a complete list of supported attributes for user attributes in IAM Identity Center to the user attributes in your external IdPs, see Supported external identity provider attributes (p. 42).
To get started with ABAC in IAM Identity Center, see the following topics.

Topics
- Enable and configure attributes for access control (p. 126)
- Create permission policies for ABAC in IAM Identity Center (p. 128)

Enable and configure attributes for access control

To use ABAC in all cases, you must first enable ABAC using the IAM Identity Center console or the IAM Identity Center API. If you choose to use IAM Identity Center to select attributes, you use the Attributes for access control page in the IAM Identity Center console or the IAM Identity Center API. If you use an external identity provider (IdP) as an identity source and choose to send attributes through the SAML assertions, you configure your IdP to pass the attributes. If a SAML assertion passes any of these attributes, IAM Identity Center will replace the attribute value with the value from the IAM Identity Center identity store. Only attributes configured in IAM Identity Center will be sent over for making access control decisions when users federate into their accounts.

Note
- You cannot view attributes configured and sent by an external IdP from the Attributes for access control page in the IAM Identity Center console. If you are passing access control attributes in the SAML assertions from your external IdP, then those attributes are directly sent to the AWS account when users federate in. The attributes won’t be available in IAM Identity Center for mapping.

Enable attributes for access control

Use the following procedure to enable the attributes for access (ABAC) control feature using the IAM Identity Center console.

Note
- If you have existing permission sets and you plan to enable ABAC in your IAM Identity Center instance, additional security restrictions require you to first have the iam:UpdateAssumeRolePolicy policy. These additional security restrictions are not required if you do not have any permission sets created in your account.

To enable Attributes for access control
1. Open the IAM Identity Center console.
2. Choose Settings
3. On the Settings page, locate the Attributes for access control information box, and then choose Enable. Continue to the next procedure to configure it.

Select your attributes

Use the following procedure to set up attributes for your ABAC configuration.

To select your attributes using the IAM Identity Center console
1. Open the IAM Identity Center console.
2. Choose Settings
3. On the Settings page, choose the Attributes for access control tab, and then choose Manage attributes.
4. On the Attributes for access control page, choose Add attribute and enter the Key and Value details. This is where you will be mapping the attribute coming from your identity source to an attribute that IAM Identity Center passes as a session tag.
Key represents the name you are giving to the attribute for use in policies. This can be any arbitrary name, but you need to specify that exact name in the policies you author for access control. For example, let’s say that you are using Okta (an external IdP) as your identity source and need to pass your organization’s cost center data along as session tags. In Key, you would enter a similarly matched name like `CostCenter` as your key name. It’s important to note that whichever name you choose here, it must also be named exactly the same in your `aws:PrincipalTag` condition key (p. 128) (that is, "ec2:ResourceTag/CostCenter": "${aws:PrincipalTag/CostCenter}").

**Note**

Use a single-value attribute for your key, for example, `Manager`. IAM Identity Center doesn’t support multi-value attributes for ABAC, for example, `Manager, IT Systems`.

Value represents the content of the attribute coming from your configured identity source. Here you can enter any value from the appropriate identity source table listed in Attribute mappings for AWS Managed Microsoft AD directory (p. 41). For example, using the context provided in the above mentioned example, you would review the list of supported IdP attributes and determine that the closest match of a supported attribute would be `${path:enterprise.costCenter}` and you would then enter it in the Value field. See the screenshot provided above for reference. Note, that you can’t use external IdP attribute values outside of this list for ABAC unless you use the option of passing attributes through the SAML assertion.

5. Choose Save changes.

Now that you have configured mapping your access control attributes, you need to complete the ABAC configuration process. To do this, create your ABAC rules and add them to your permission sets and/or resource-based policies. This is required so that you can grant user identities access to AWS resources. For more information, see Create permission policies for ABAC in IAM Identity Center (p. 128).

### Disable attributes for access control

Use the following procedure to disable the ABAC feature and delete all of the attribute mappings that have been configured.

**To disable Attributes for access control**

1. Open the IAM Identity Center console.
2. Choose Settings
3. On the Settings page, choose the Attributes for access control tab, and then choose Disable.
4. In the Disable attributes for access control dialog, review the information and when ready enter DELETE, and then choose Confirm.

**Important**

This step deletes all attributes that have been configured. Once deleted, any attributes that are received from an identity source and any custom attributes you have previously configured will not be passed.

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127
Create permission policies for ABAC in IAM Identity Center

You can create permissions policies that determine who can access your AWS resources based on the configured attribute value. When you enable ABAC and specify attributes, IAM Identity Center passes the attribute value of the authenticated user into IAM for use in policy evaluation.

**aws:PrincipalTag condition key**

You can use access control attributes in your permission sets using the `aws:PrincipalTag` condition key for creating access control rules. For example, in the following trust policy you can tag all the resources in your organization with their respective cost centers. You can also use a single permission set that grants developers access to their cost center resources. Now, whenever developers federate into the account using single sign-on and their cost center attribute, they only get access to the resources in their respective cost centers. As the team adds more developers and resources to their project, you only have to tag resources with the correct cost center. Then you pass cost center information in the AWS session when developers federate into AWS accounts. As a result, as the organization adds new resources and developers to the cost center, developers can manage resources aligned to their cost centers without needing any permission updates.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": ["ec2:DescribeInstances"],
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": ["ec2:StartInstances", "ec2:StopInstances"],
            "Resource": "*",
            "Condition": {
                "StringEquals": {
                    "ec2:ResourceTag/CostCenter": "${aws:PrincipalTag/CostCenter}"
                }
            }
        }
    ]
}
```

For more information, see [aws:PrincipalTag](#) and [EC2: Start or stop instances based on matching principal and resource tags](#) in the IAM User Guide.

If policies contain invalid attributes in their conditions, then the policy condition will fail and access will be denied. For more information, see [Error 'An unexpected error has occurred' when a user tries to sign in using an external identity provider](#) (p. 207).

**IAM identity provider**

When you add single sign-on access to an AWS account, IAM Identity Center creates an IAM identity provider in each AWS account. An IAM identity provider helps keep your AWS account secure because you don't have to distribute or embed long-term security credentials, such as access keys, in your application.
Repair the IAM identity provider

If you accidentally delete or modify your identity provider, you must manually reapply your user and group assignments. Reapplying your user and group assignments recreates the identity provider. For more information, see:

- Multi-account permissions (p. 104)
- Application assignments (p. 130)

Service-linked roles

Service-linked roles are predefined IAM permissions that allow IAM Identity Center to delegate and enforce which users have single sign-on access to specific AWS accounts in your organization in AWS Organizations. The service enables this functionality by provisioning a service-linked role in every AWS account within its organization. The service then allows other AWS services like IAM Identity Center to leverage those roles to perform service-related tasks. For more information, see AWS Organizations and service-linked roles.

When you enable IAM Identity Center, IAM Identity Center creates a service-linked role in all accounts within the organization in AWS Organizations. IAM Identity Center also creates the same service-linked role in every account that is subsequently added to your organization. This role allows IAM Identity Center to access each account's resources on your behalf. For more information, see Multi-account permissions (p. 104).

Service-linked roles that are created in each AWS account are named AWSServiceRoleForSSO. For more information, see Using service-linked roles for IAM Identity Center (p. 168).
Application assignments

With AWS IAM Identity Center, you can easily control who can have single sign-on access to your cloud applications. Users get one-click access to these applications after they use their directory credentials to sign in to their AWS access portal.

IAM Identity Center securely communicates with these applications through a trusted relationship between IAM Identity Center and the application’s service provider. This trust is created when you add the application from the IAM Identity Center console and configure it with the appropriate metadata for both IAM Identity Center and the service provider.

After the application has been successfully added to the IAM Identity Center console, you can manage which users or groups need permissions to the application. By default, when you add an application, no users are assigned to the application. In other words, newly added applications in the IAM Identity Center console are inaccessible until you assign users to them. IAM Identity Center supports the following applications types:

- Identity Center enabled applications
- Cloud applications
- Custom Security Assertion Markup Language (SAML 2.0) applications

You can also grant your employees access to the AWS Management Console for a given AWS account in your organization. For more information on how to do this, see Multi-account permissions (p. 104).

The following sections explain how to configure user access to your AWS applications and third-party software as a service (SaaS) applications. You can also configure any custom applications that support identity federation with SAML 2.0.

Topics

- Identity Center enabled applications (p. 130)
- Cloud applications (p. 132)
- Custom SAML 2.0 applications (p. 135)
- Manage IAM Identity Center certificates (p. 136)
- Application properties in the IAM Identity Center console (p. 138)
- Assign user access to applications in the IAM Identity Center console (p. 140)
- Remove user access in the IAM Identity Center console (p. 141)
- Map attributes in your application to IAM Identity Center attributes (p. 141)

Identity Center enabled applications

With Identity Center enabled applications, AWS enterprise applications such as Amazon SageMaker or AWS IoT SiteWise, can exist in a child account in your organization but still use your IAM Identity Center identities. This provides your application end users with an easy sign-in experience and allows for delegation of administrator of your applications to operators in a child account. Learn more about Identity Center enabled applications (p. 17).
Constraining Identity Center enabled application use in AWS accounts

If you want to constrain which of your AWS Organizations accounts that an Identity Center enabled application can be used, you can do so using service control policies (SCPs). You can use SCPs to block access to the IAM Identity Center user and group information and to prevent the application from being started except in designated accounts.

Add and configure an Identity Center enabled application

To use Identity Center enabled applications, you must first enable IAM Identity Center to allow them access. For more information, see Identity Center enabled applications (p. 17).

After they are enabled, Identity Center enabled applications can access user and group information directly from IAM Identity Center. As a result, you won’t have to manage access in both IAM Identity Center and then again inside the application. Instead, IAM Identity Center delegates application access to the application administrator. To add users to Identity Center enabled applications, use the console of the application where you created the application.

To add and configure your application

1. Open the IAM Identity Center console.
2. Choose Applications.
3. Choose Add application.
4. Under Applications, search for an application, and select the application from the list. Choose Next.
5. Under Configure application, the Display name and Description pre-populates with the application you chose. You can edit these. Under IAM Identity Center metadata, download or copy any certificate you might need. Under Application properties, optionally fill out the fields. Under Application metadata, fill out all the fields. Then, choose Submit. You’re taken to the details page of the application that you just added.

Remove an Identity Center enabled application

To remove an Identity Center enabled application, you can remove the application from the IAM Identity Center console. This action is irreversible and you might not be able to recover data from the application.

Warning
Removing an application deletes all user permissions to this application, disconnects the application from IAM Identity Center, and renders the application inaccessible.

To remove an AWS application

1. Open the IAM Identity Center console.
2. Choose Applications.
3. On the Applications page, under Configured applications, choose the application that you want to remove.
4. With the application selected, choose Actions and in the dropdown, choose Remove.
5. A Remove application dialog box appears. Follow the prompt to type and confirm the application that you want to remove. Choose Remove application.
Cloud applications

You can use the IAM Identity Center application configuration wizard to include built-in SAML integrations to many popular cloud applications. Examples include Salesforce, Box, and Office 365. For a complete list of applications that you can add from the wizard, see Supported applications (p. 132).

Most cloud applications come with detailed instructions on how to set up the trust between IAM Identity Center and the application’s service provider. You can find these instructions on the cloud applications configuration page during the setup process and after the application has been set up. After the application has been configured, you can assign access to the groups or users that require it.

Supported applications

IAM Identity Center has built-in support for the following commonly used cloud applications.

Note
AWS Support engineers can assist customers who have Business and Enterprise support plans with some integration tasks that involve third-party software. For a current list of supported platforms and applications, see Third-Party Software Support on the AWS Support Features page.

<table>
<thead>
<tr>
<th>10000ft</th>
<th>Cybozu Mailwise</th>
<th>Heap</th>
<th>Pivotal Tracker</th>
<th>Squadcast</th>
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### Supported applications

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<thead>
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<th>TeamSupport</th>
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### Add and configure a cloud application

Use this procedure when you need to set up a SAML trust relationship between IAM Identity Center and your cloud application's service provider. Before you begin this procedure, make sure you have the service provider's metadata exchange file so that you can more efficiently set up the trust. If you do not have this file, you can still use this procedure to configure it manually.

**To add and configure a cloud application**

1. Open the [IAM Identity Center console](#).
2. Choose Applications.
3. Choose Add application.
4. Under Applications, search for an application, and select the application from the list. Choose Next.
5. Under Configure application, the Display name and Description pre-populates with the application you chose. You can edit these.

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<tr>
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<th>Sentry.io</th>
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<td>PipeDrive</td>
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134
6. Under **IAM Identity Center metadata**, do the following:
   a. Under **IAM Identity Center SAML metadata file**, choose **Download** to download the identity provider metadata.
   b. Under **IAM Identity Center certificate**, choose **Download certificate** to download the identity provider certificate.

   **Note**
   You will need these files later when you set up the cloud application from the service provider's website. Follow the instructions from that provider.

7. (Optional) Under **Application properties**, you can specify additional properties for the **Application start URL**, **Relay state**, and **Session duration**. For more information, see **Application properties in the IAM Identity Center console** (p. 138).

8. Under **Application metadata**, do one of the following:
   a. Choose **Upload application SAML metadata file**. Then, select **Choose file** to find and select the metadata file.
   b. If you do not have a metadata file, choose **Manually type your metadata values**, and then provide the **Application ACS URL** and **Application SAML audience** values.

9. Choose **Submit**. You're taken to the details page of the application that you just added.

---

**Custom SAML 2.0 applications**

You can use the IAM Identity Center application configuration wizard to add support for applications that allow identity federation using Security Assertion Markup Language (SAML) 2.0. In the console, you set these up by choosing **Custom SAML 2.0 application** from the application selector. Most of the steps for configuring a custom SAML application are the same as configuring a cloud application.

However, you also need to provide additional SAML attribute mappings for a custom SAML application. These mappings tell IAM Identity Center how to populate the SAML assertion correctly for your application. You can provide this additional SAML attribute mapping when you set up the application for the first time. You can also provide SAML attribute mappings on the application detail page that is accessible from the IAM Identity Center console.

**Add and configure a custom SAML 2.0 application**

Use this procedure when you need to set up a SAML trust relationship between IAM Identity Center and your custom application's service provider. Before you begin this procedure, make sure that you have the service provider's certificate and metadata exchange files so that you can finish setting up the trust.

**To add and configure a custom SAML application**

1. Open the **IAM Identity Center console**.
2. Choose **Applications**.
3. Choose **Add application**.
4. On the **Select an application** page, choose **Add custom SAML 2.0 application**. Then, choose **Next**.
5. On the **Configure application** page, under **Configure application**, enter a **Display name** for the application, such as **MyApp**. Then, enter a **Description**.
6. Under **IAM Identity Center metadata**, do the following:
   a. Under **IAM Identity Center SAML metadata file**, choose **Download** to download the identity provider metadata.
b. Under **IAM Identity Center certificate**, choose **Download certificate** to download the identity provider certificate.

**Note**
You will need these files later when you set up the custom application from the service provider's website.

7. (Optional) Under **Application properties**, you can specify additional properties for the **Application start URL**, **Relay State**, and **Session Duration**. For more information, see Application properties in the IAM Identity Center console (p. 138).

8. Under **Application metadata**, choose **Manually type your metadata values**. Then, provide the **Application ACS URL** and **Application SAML audience** values.

9. Choose **Submit**. You're taken to the details page of the application that you just added.

### Manage IAM Identity Center certificates

IAM Identity Center uses certificates to set up a SAML trust relationship between IAM Identity Center and your cloud application's service provider. When you add an application in IAM Identity Center, an IAM Identity Center certificate is automatically created for use with that application during the setup process. By default, this autogenerated IAM Identity Center certificate is valid for a period of five years.

As an IAM Identity Center administrator, you'll occasionally need to replace older certificates with newer ones for a given application. For example, you might need to replace a certificate when the expiration date on the certificate approaches. The process of replacing an older certificate with a newer one is referred to as **certificate rotation**.

**Topics**
- Considerations before rotating a certificate (p. 136)
- Rotate an IAM Identity Center certificate (p. 136)
- Certificate expiration status indicators (p. 138)

### Considerations before rotating a certificate

Before you start the process of rotating a certificate in IAM Identity Center, consider the following:

- The certification rotation process requires that you reestablish the trust between IAM Identity Center and the service provider. To reestablish the trust, use the procedures provided in Rotate an IAM Identity Center certificate (p. 136).
- Updating the certificate with the service provider may cause a temporary service disruption for your users until the trust has been successfully reestablished. Plan this operation carefully during off peak hours if possible.

### Rotate an IAM Identity Center certificate

Rotating an IAM Identity Center certificate is a multistep process that involves the following:

- Generating a new certificate
- Adding the new certificate to the service provider's website
- Setting the new certificate to active
- Deleting the inactive certificate
Use all of the following procedures in the following order to complete the certificate rotation process for a given application.

**Step 1: Generate a new certificate.**

New IAM Identity Center certificates that you generate can be configured to use the following properties:

- **Validity period** – Specifies the time allotted (in months) before a new IAM Identity Center certificate expires.
- **Key size** – Determines the number of bits that a key must use with its cryptographic algorithm. You can set this value to either 1024-bit RSA or 2048-bit RSA. For general information about how key sizes work in cryptography, see [Key size](#).
- **Algorithm** – Specifies the algorithm that IAM Identity Center uses when signing the SAML assertion/response. You can set this value to either SHA-1 or SHA-256. AWS recommends using SHA-256 when possible, unless your service provider requires SHA-1. For general information about how cryptography algorithms work, see [Public-key cryptography](#).

1. Open the IAM Identity Center console.
2. Choose Applications.
3. In the list of applications, choose the application that you want to generate a new certificate for.
4. On the application details page, choose the Configuration tab. Under IAM Identity Center metadata, choose Manage certificate. If you do not have a Configuration tab or the configuration setting is not available, you do not need to rotate the certificate for this application.
5. On the IAM Identity Center certificate page, choose Generate new certificate.
6. In the Generate new IAM Identity Center certificate dialog box, specify the appropriate values for Validity period, Algorithm, and Key size. Then choose Generate.

**Step 2: Update the service provider's website.**

Use the following procedure to reestablish the trust with the application's service provider.

**Important**

When you upload the new certificate to the service provider, your users might not be able to get authenticated. To correct this situation, set the new certificate as active as described in the next step.

1. In the IAM Identity Center console, choose the application that you just generated a new certificate for.
2. On the application details page, choose Edit configuration.
3. Choose View instructions, and then follow the instructions for your specific application service provider's website to add the newly generated certificate.

**Step 3: Set the new certificate to active.**

An application can have up to two certificates assigned to it. Whichever certificate is set as active, IAM Identity Center will use it to sign all SAML assertions.

1. Open the IAM Identity Center console.
2. Choose Applications.
3. In the list of applications, choose your application.
4. On the application details page, choose the Configuration tab. Under IAM Identity Center metadata, choose Manage certificate.
5. On the IAM Identity Center certificate page, select the certificate you want to set to active, choose Actions, and then choose Set as active.
6. In the **Set the selected certificate as active** dialog, confirm that you understand that setting a certificate to active may require you to re-establish the trust, and then choose **Make active**.

### Step 4: Delete the old certificate.

Use the following procedure to complete the certificate rotation process for your application. You can only delete a certificate that is in an **Inactive** state.

1. Open the [IAM Identity Center console](#).
2. Choose **Applications**.
3. In the list of applications, choose your application.
4. On the application details page, select the **Configuration** tab. Under **IAM Identity Center metadata**, choose **Manage certificate**.
5. On the [IAM Identity Center certificate](#) page, select the certificate you want to delete. Choose **Actions** and then choose **Delete**.
6. In the **Delete certificate** dialog box, choose **Delete**.

### Certificate expiration status indicators

While on the **Applications** page in the properties of an application, you may notice colored status indicator icons. These icons appear in the **Expires on** column next to each certificate in the list. The following describes the criteria that IAM Identity Center uses to determine which icon is displayed for each certificate.

- **Red** – Indicates that a certificate is currently expired.
- **Yellow** – Indicates that a certificate will expire in 90 days or less.
- **Green** – Indicates that a certificate is currently valid and will remain valid for at least 90 more days.

#### To check the current status of a certificate

1. Open the [IAM Identity Center console](#).
2. Choose **Applications**.
3. In the list of applications, review the status of the certificates in the list as indicated in the **Expires on** column.

### Application properties in the IAM Identity Center console

In IAM Identity Center you can customize the user experience by configuring the application start URL, relay state, and session duration.

#### Application start URL

You use an application start URL to start the federation process with your application. The typical use is for an application that supports only service provider (SP)-initiated binding.

The following steps and diagram illustrate the application start URL authentication workflow when a user chooses an application in the AWS access portal:
1. The user’s browser redirects the authentication request using the value for the application start URL (in this case https://example.com).
2. The application sends an HTML POST with a SAMLRequest to IAM Identity Center.
3. IAM Identity Center then sends an HTML POST with a SAMLResponse back to the application.

Relay state

During the federation authentication process, the relay state redirects users within the application. For SAML 2.0, this value is passed, unmodified, to the application. After the application properties are configured, IAM Identity Center sends the relay state value along with a SAML response to the application.

Session duration

Session duration is the length of time that the application user sessions are valid for. For SAML 2.0, this is used to set the NotOnOrAfter date of the SAML assertion’s elements; saml2:SubjectConfirmationData and saml2:Conditions.

Session duration can be interpreted by applications in any of the following ways:
Assign user access to applications in the IAM Identity Center console

You can assign users single sign-on access to cloud applications or custom SAML 2.0 applications.

Considerations for group assignments:

- **Assign access directly to groups.** To help simplify administration of access permissions, we recommend that you assign access directly to groups rather than to individual users. With groups you can grant or deny permissions to groups of users, instead of applying those permissions to each individual. If a user moves to a different organization, you simply move that user to a different group. The user then automatically receives the permissions that are needed for the new organization.

- **Nested groups aren't supported.** When assigning user access to applications, IAM Identity Center doesn't support users being added to nested groups. If a user is added to a nested group, they might receive a “You do not have any applications” message during sign-in. Assignments must be made against the immediate group for which the user is a member.

To assign user or group access to applications

**Important**

To add users to Identity Center enabled applications, use the console of the application where you created the application.

1. Open the IAM Identity Center console.

   **Note**

   If you manage users in AWS Managed Microsoft AD, make sure that the IAM Identity Center console is using the Region where your AWS Managed Microsoft AD directory is located before taking the next step.

2. Choose Applications.

3. In the list of applications, choose the application name to which you want to assign access.

4. On the application details page, in the Assigned users section, choose Assign users.

5. In the Assign users dialog box, enter a user or group name. You can also search users and groups. You can specify multiple users or groups by selecting the applicable accounts as they appear in search results.

6. Choose Assign users.
Remove user access in the IAM Identity Center console

Use this procedure to remove user access to cloud applications or custom SAML 2.0 applications.

**To remove user access from an application**

1. Open the [IAM Identity Center console](#).
2. Choose **Applications**.
3. In the list of applications, choose the application from which you want to remove user access.
4. On the application details page, in the **Assigned users** section, select the user or group that you want to remove and then choose the **Remove access** button.
5. In the **Remove access** dialog box, verify the user or group name. Then choose **Remove access**.

Map attributes in your application to IAM Identity Center attributes

Some service providers require custom SAML assertions to pass additional data about your user sign-ins. In that case, use the following procedure to specify how your applications user attributes should map to corresponding attributes in IAM Identity Center.

**To map application attributes to attributes in IAM Identity Center**

1. Open the [IAM Identity Center console](#).
2. Choose **Applications**.
3. In the list of applications, choose the application where you want to map attributes.
4. On the application details page, choose the **Attribute mappings** tab.
5. Choose **Add new attribute mapping**
6. In the first text box, enter the application attribute.
7. In the second text box, enter the attribute in IAM Identity Center that you want to map to the application attribute. For example, you might want to map the application attribute `Username` to the IAM Identity Center user attribute `email`. To see the list of allowed user attributes in IAM Identity Center, see the table in [Attribute mappings for AWS Managed Microsoft AD directory](p. 41).
8. In the third column of the table, choose the appropriate format for the attribute from the menu.
9. Choose **Save changes**.
Resiliency design and Regional behavior

The IAM Identity Center service is fully managed and uses highly available and durable AWS services, such as Amazon S3 and Amazon EC2. To ensure availability in the event of an availability zone disruption, IAM Identity Center operates across multiple availability zones.

You enable IAM Identity Center in your AWS Organizations management account. This is required so that IAM Identity Center can provision, de-provision, and update roles across all your AWS accounts. When you enable IAM Identity Center, it is deployed to the AWS Region that is currently selected. If you want to deploy to a specific AWS Region, change the region selection before enabling IAM Identity Center.

**Note**
IAM Identity Center controls access to its permission sets and applications from its primary Region only. We recommend that you consider the risks associated with access control when IAM Identity Center operates in a single Region.

Although IAM Identity Center determines access from the Region in which you enable the service, AWS accounts are global. This means that after users sign in to IAM Identity Center, they can operate in any Region when they access AWS accounts through IAM Identity Center. Most Identity Center enabled applications such as Amazon SageMaker, however, must be installed in the same Region as IAM Identity Center for users to authenticate and assign access to these applications. For information about Regional constraints when using an application with IAM Identity Center, see the documentation for the application.

You can also use IAM Identity Center to authenticate and authorize access to SAML-based applications that are reachable through a public URL, regardless of the platform or cloud on which the application is built.

Set up emergency access to the AWS Management Console

IAM Identity Center is built from highly available AWS infrastructure and uses an Availability Zone architecture to eliminate single points of failure. For an extra layer of protection in the unlikely event of an IAM Identity Center or AWS Region disruption, we recommend that you set up a configuration that you can use to provide temporary access to the AWS Management Console.

**Contents**
- **Overview** (p. 142)
- **Summary of emergency access configuration** (p. 143)
- **How to design your critical operations roles** (p. 143)
- **How to plan your access model** (p. 144)
- **How to design emergency role, account, and group mapping** (p. 144)
- **How to create your emergency access configuration** (p. 145)
- **Emergency preparation tasks** (p. 146)
- **Emergency failover process** (p. 146)
Overview

AWS enables you to:

- Connect your third-party IdP to IAM Identity Center.
- Connect your third-party IdP to individual AWS accounts by using SAML 2.0-based federation.

If you use IAM Identity Center, you can use these capabilities to create the emergency access configuration described in the following sections. This configuration enables you to use IAM Identity Center as the mechanism for AWS account access. If IAM Identity Center is disrupted, your emergency operations users can sign in to the AWS Management Console through direct federation, by using the same credentials that they use to access their accounts. This configuration works when IAM Identity Center is unavailable, but the IAM data plane and your external identity provider (IdP) are available.

**Important**

We recommend that you deploy this configuration before a disruption occurs because you can't create the configuration if your access to create the required IAM roles is also disrupted. Also, test this configuration periodically to ensure that your team understands what to do if IAM Identity Center is disrupted.

Summary of emergency access configuration

To configure emergency access, you must complete the following tasks:

1. Create an emergency operations account in your organization in AWS Organizations.
2. Connect your IdP to the emergency operations account by using SAML 2.0-based federation.
3. In the emergency operations account, create a role for third-party identity provider federation. Also, create an emergency operations role in each of your workload accounts, with your required permissions.
4. Delegate access to your workload accounts for the IAM role that you created in the emergency operations account. To authorize access to your emergency operations account, create an emergency operations group in your IdP, with no members.
5. Enable the emergency operations group in your IdP to use the emergency operations role by creating a rule in your IdP that enables SAML 2.0 federated access to the AWS Management Console.

During normal operations, no one has access to the emergency operations account because the emergency operations group in your IdP has no members. In the event of an IAM Identity Center disruption, use your IdP to add trusted users to the emergency operations group in your IdP. These users can then sign in to your IdP, navigate to the AWS Management Console, and assume the emergency operations role in the emergency operations account. From there, these users can switch roles to the emergency access role in your workload accounts where they need to perform operations work.

How to design your critical operations roles

With this design, you configure a single AWS account in which you federate through IAM, so that users can assume critical operations roles. The critical operations roles have a trust policy that enables users to assume a corresponding role in your workload accounts. The roles in the workload accounts provide the permissions that users require to perform essential work.

The following diagram provides a design overview.
How to plan your access model

Before you configure emergency access, create a plan for how the access model will work. Use the following process to create this plan.

1. Identify the AWS accounts where emergency operator access is essential during a disruption to IAM Identity Center. For example, your production accounts are probably essential, but your development and test accounts might not be.
2. For that collection of accounts, identify the specific critical roles that you need in your accounts. Across these accounts, be consistent in defining what the roles can do. This simplifies work in your emergency access account where you create cross-account roles. We recommend that you start with two distinct roles in these accounts: Read Only (RO) and Operations (Ops). If required, you can create more roles and map these roles to a more distinct group of emergency access users in your setup.
3. Identify and create emergency access groups in your IdP. The group members are the users to whom you are delegating access to emergency access roles.
4. Define which roles these groups can assume in the emergency access account. To do this, define rules in your IdP that generate claims that list which roles the group can access. These groups can then assume your Read Only or Operations roles in emergency access account. From those roles, they can assume corresponding roles in your workload accounts.

How to design emergency role, account, and group mapping

The following diagram shows how to map your emergency access groups to roles in your emergency access account. The diagram also shows the cross-account role trust relationships that enable emergency
access account roles to access corresponding roles in your workload accounts. We recommend that your emergency plan design use these mappings as a starting point.

How to create your emergency access configuration

Use the following mapping table to create your emergency access configuration. This table reflects a plan that includes two roles in the workload accounts: Read Only (RO) and Operations (Ops), with corresponding trust policies and permissions policies. The trust policies enable the emergency access account roles to access the individual workload account roles. The individual workload account roles also have permissions policies for what the role can do in the account. The permissions policies can be AWS managed policies or customer managed policies.

<table>
<thead>
<tr>
<th>Account</th>
<th>Roles to create</th>
<th>Trust policy</th>
<th>Permissions policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency access account</td>
<td>EmergencyAccess_Role1_RO: aws:iam::aws:policy/ReadOnlyAccess</td>
<td>EmergencyAccess_Role1_Ops</td>
<td>AssumeRole for role resource in account</td>
</tr>
</tbody>
</table>
In this mapping plan, the emergency access account contains two read-only roles and two operations roles. These roles trust your IdP to authenticate and authorize your selected groups to access the roles by passing the names of the roles in assertions. There are corresponding read-only and operations roles in workload Account 1 and Account 2. For workload Account 1, the EmergencyAccess_R0 role trusts the EmergencyAccess_Role1_RO role that resides in the emergency access account. The table specifies similar trust patterns between the workload account read-only and operations roles and the corresponding emergency access roles.

**Emergency preparation tasks**

To prepare your emergency access configuration, we recommend that you perform the following tasks before an emergency occurs.

1. Set up a direct IAM federation application in your IdP. For more information, see [One-time setup of a direct IAM federation application](p. 147).
2. Create an IdP connection in the emergency access account that can be accessed during the event.
3. Create emergency access roles in the emergency access accounts as described in the mapping table above.
4. Create temporary operations roles with trust and permission policies in each of the workload accounts.
5. Create temporary operations groups in your IdP. The group names will depend on the names of the temporary operations roles.
6. Test direct IAM federation.
7. Disable the IdP federation application in your IdP to prevent regular usage.

**Emergency failover process**

When an IAM Identity Center instance isn't available and you determine that you must provide emergency access to the AWS Management Console, we recommend the following failover process.

1. The IdP administrator enables the direct IAM federation application in your IdP.
2. Users request access to the temporary operations group through your existing mechanism, such as an email request, Slack channel, or other form of communication.
3. Users that you add to your emergency access groups sign in to the IdP, select the emergency access account, and, users choose a role to use in the emergency access account. From these roles, they can assume roles in corresponding workload accounts that have cross-account trust with the emergency account role.

**Return to normal operations**

Check the [AWS Health Dashboard](https://aws.amazon.com) to confirm when the health of the IAM Identity Center service is restored. To return to normal operations, perform the following steps.

1. After the status icon for the IAM Identity Center service indicates that the service is healthy, sign in to IAM Identity Center.
2. If you can sign in to IAM Identity Center successfully, communicate to emergency access users that IAM Identity Center is available. Instruct these users to sign out and use the AWS access portal to sign back in to IAM Identity Center.
3. After all emergency access users sign out, in the IdP, disable the IdP federation application. We recommend that you perform this task after working hours.
4. Remove all users from the emergency access group in the IdP.
Your emergency access role infrastructure remains in place as a backup access plan, but it is now disabled.

**One-time setup of a direct IAM federation application in**

1. Sign in to your Okta account as a user with administrative permissions.
2. In the Okta Admin Console, under **Applications**, choose **Applications**.
3. Choose **Browse App Catalog**. Search for and choose **AWS Account Federation**. Then choose **Add integration**.
4. Set up direct IAM federation with AWS by following the steps in [How to Configure SAML 2.0 for AWS Account Federation](#).
5. On the **Sign-On Options** tab, select SAML 2.0 and enter **Group Filter** and **Role Value Pattern** settings. The name of the group for the user directory depends on the filter that you configure.

   ![Group Filter and Role Value Pattern](image)

   In the figure above, the role variable is for the emergency operations role in your emergency access account. For example, if you create the `EmergencyAccess_Role1_RO` role (as described in the mapping table) in AWS account 123456789012, and if your group filter setting is configured as shown in the figure above, your group name should be `aws#EmergencyAccess_Role1_RO#123456789012`.

6. In your directory (for example, your directory in Active Directory), create the emergency access group and specify a name for the directory (for example, `aws#EmergencyAccess_Role1_RO#123456789012`). Assign your users to this group by using your existing provisioning mechanism.

7. In the emergency access account, configure a custom trust policy that provides the permissions required for the emergency access role to be assumed during a disruption. Following is an example statement for a custom trust policy that is attached to the `EmergencyAccess_Role1_RO` role. For an illustration, see the emergency account in the diagram under [How to design emergency role, account, and group mapping](#) (p. 144).

   ```json
   { 
   "Version": "2012-10-17",
   "Statement": [
   {
   "Effect":"Allow",
   "Principal":{
   "Federated":"arn:aws:iam::123456789012:saml-provider/Okta"
   },
   "Action":[
   "sts:AssumeRoleWithSAML",
   "sts:SetSourceIdentity",
   "sts:TagSession"
   ],
   "Condition":{
   "StringEquals":{
   "SAML:aud":"https://signin.aws.amazon.com/saml"
   }
   }
   }
   }
   ```
8. The following is an example statement for a **permissions policy** that is attached to the EmergencyAccess_Role1_R0 role. For an illustration, see the emergency account in the diagram under [How to design emergency role, account, and group mapping](p. 144).

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": "sts:AssumeRole",
            "Resource": [
                "arn:aws:iam::<account 1>:role/EmergencyAccess_R0",
                "arn:aws:iam::<account 2>:role/EmergencyAccess_R0"
            ]
        }
    ]
}
```

9. On the workload accounts, configure a custom trust policy. Following is an example statement for a **trust policy** that is attached to the EmergencyAccess_RO role. In this example, account 123456789012 is the emergency access account. For an illustration, see workload account in the diagram under [How to design emergency role, account, and group mapping](p. 144).

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Principal": {
                "AWS": "arn:aws:iam::123456789012:root"
            },
            "Action": "sts:AssumeRole"
        }
    ]
}
```

**Note**
Most IdPs enable you to keep an application integration deactivated until required. We recommend that you keep the direct IAM federation application deactivated in your IdP until required for emergency access.
Security in AWS IAM Identity Center

Cloud security at AWS is the highest priority. As an AWS customer, you benefit from a data center and network architecture that is built to meet the requirements of the most security-sensitive organizations.

Security is a shared responsibility between AWS and you. The shared responsibility model describes this as security of the cloud and security in the cloud:

- **Security of the cloud** – AWS is responsible for protecting the infrastructure that runs AWS services in the AWS Cloud. AWS also provides you with services that you can use securely. Third-party auditors regularly test and verify the effectiveness of our security as part of the AWS compliance programs. To learn about the compliance programs that apply to AWS IAM Identity Center, see AWS Services in Scope by Compliance Program.
- **Security in the cloud** – Your responsibility is determined by the AWS service that you use. You are also responsible for other factors including the sensitivity of your data, your company’s requirements, and applicable laws and regulations.

This documentation helps you understand how to apply the shared responsibility model when using IAM Identity Center. The following topics show you how to configure IAM Identity Center to meet your security and compliance objectives. You also learn how to use other AWS services that help you to monitor and secure your IAM Identity Center resources.

**Topics**

- [Identity and access management for IAM Identity Center](#) (p. 149)
- IAM Identity Center console and API authorization (p. 173)
- [Logging and monitoring in IAM Identity Center](#) (p. 174)
- [Compliance validation for IAM Identity Center](#) (p. 190)
- Resilience in IAM Identity Center (p. 192)
- Infrastructure security in IAM Identity Center (p. 193)

Identity and access management for IAM Identity Center

Access to IAM Identity Center requires credentials that AWS can use to authenticate your requests. Those credentials must have permissions to access AWS resources, such as an IAM Identity Center enabled application.

Authentication to the AWS access portal is controlled by the directory that you have connected to IAM Identity Center. However, authorization to the AWS accounts that are available to users from within the AWS access portal is determined by two factors:

1. Who has been assigned access to those AWS accounts in the IAM Identity Center console. For more information, see [Single sign-on access to AWS accounts](#) (p. 111).
2. What level of permissions have been granted to the users in the IAM Identity Center console to allow them the appropriate access to those AWS accounts. For more information, see [Create and manage permission sets](#) (p. 114).

The following sections explain how you as an administrator can control access to the IAM Identity Center console or can delegate administrative access for day-to-day tasks from the IAM Identity Center console.
Authentication

Learn how to access AWS using IAM identities.

Access control

You can have valid credentials to authenticate your requests, but unless you have permissions, you can't create or access IAM Identity Center resources. For example, you must have permissions to create an IAM Identity Center connected directory.

The following sections describe how to manage permissions for IAM Identity Center. We recommend that you read the overview first.

- Overview of managing access permissions to your IAM Identity Center resources (p. 150)
- Identity-based policy examples for IAM Identity Center (p. 152)
- Using service-linked roles for IAM Identity Center (p. 168)

Overview of managing access permissions to your IAM Identity Center resources

Every AWS resource is owned by an AWS account, and permissions to create or access the resources are governed by permissions policies. To provide access, an account administrator can add permissions to IAM identities (that is, users, groups, and roles). Some services (such as AWS Lambda) also support adding permissions to resources.

**Note**

An account administrator (or administrator user) is a user with administrator privileges. For more information, see IAM best practices in the IAM User Guide.

Topics

- IAM Identity Center resources and operations (p. 150)
- Understanding resource ownership (p. 150)
- Managing access to resources (p. 151)
- Specifying policy elements: actions, effects, resources, and principals (p. 152)
- Specifying conditions in a policy (p. 152)

IAM Identity Center resources and operations

In IAM Identity Center, the primary resources are application instances, profiles, and permission sets.

Understanding resource ownership

A resource owner is the AWS account that created a resource. That is, the resource owner is the AWS account of the principal entity (the account, a user, or an IAM role) that authenticates the request that creates the resource. The following examples illustrate how this works:
• If the AWS account root user creates an IAM Identity Center resource, such as an application instance or permission set, your AWS account is the owner of that resource.
• If you create a user in your AWS account and grant that user permissions to create IAM Identity Center resources, the user can then create IAM Identity Center resources. However, your AWS account, to which the user belongs, owns the resources.
• If you create an IAM role in your AWS account with permissions to create IAM Identity Center resources, anyone who can assume the role can create IAM Identity Center resources. Your AWS account, to which the role belongs, owns the IAM Identity Center resources.

Managing access to resources

A permissions policy describes who has access to what. The following section explains the available options for creating permissions policies.

Note
This section discusses using IAM in the context of IAM Identity Center. It doesn't provide detailed information about the IAM service. For complete IAM documentation, see What is IAM? in the IAM User Guide. For information about IAM policy syntax and descriptions, see AWS IAM policy reference in the IAM User Guide.

Policies that are attached to an IAM identity are referred to as identity-based policies (IAM policies). Policies that are attached to a resource are referred to as resource-based policies. IAM Identity Center supports only identity-based policies (IAM policies).

Topics
• Identity-based policies (IAM policies) (p. 151)
• Resource-based policies (p. 152)

Identity-based policies (IAM policies)

You can add permissions to IAM identities. For example, you can do the following:

• **Attach a permissions policy to a user or a group in your AWS account** – An account administrator can use a permissions policy that is associated with a particular user to grant permissions for that user to add an IAM Identity Center resource, such as a new application.
• **Attach a permissions policy to a role (grant cross-account permissions)** – You can attach an identity-based permissions policy to an IAM role to grant cross-account permissions.

For more information about using IAM to delegate permissions, see Access management in the IAM User Guide.

The following permissions policy grants permissions to a user to run all of the actions that begin with List. These actions show information about an IAM Identity Center resource, such as an application instance or permissions set. Note that the wildcard character (*) in the Resource element indicates that the actions are allowed for all IAM Identity Center resources that are owned by the account.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": "sso:List*",
      "Resource": "*"
    }
  ]
}
```
For more information about using identity-based policies with IAM Identity Center, see Identity-based policy examples for IAM Identity Center (p. 152). For more information about users, groups, roles, and permissions, see Identities (users, groups, and roles) in the IAM User Guide.

Resource-based policies

Other services, such as Amazon S3, also support resource-based permissions policies. For example, you can attach a policy to an S3 bucket to manage access permissions to that bucket. IAM Identity Center doesn't support resource-based policies.

Specifying policy elements: actions, effects, resources, and principals

For each IAM Identity Center resource (see IAM Identity Center resources and operations (p. 150)), the service defines a set of API operations. To grant permissions for these API operations, IAM Identity Center defines a set of actions that you can specify in a policy. Note that performing an API operation can require permissions for more than one action.

The following are the basic policy elements:

- **Resource** – In a policy, you use an Amazon Resource Name (ARN) to identify the resource to which the policy applies.
- **Action** – You use action keywords to identify resource operations that you want to allow or deny. For example, the sso:DescribePermissionsPolicies permission allows the user permissions to perform the IAM Identity Center DescribePermissionsPolicies operation.
- **Effect** – You specify the effect when the user requests the specific action—this can be either allow or deny. If you don't explicitly grant access to (allow) a resource, access is implicitly denied. You can also explicitly deny access to a resource, which you might do to make sure that a user cannot access it, even if a different policy grants access.
- **Principal** – In identity-based policies (IAM policies), the user that the policy is attached to is the implicit principal. For resource-based policies, you specify the user, account, service, or other entity that you want to receive permissions (applies to resource-based policies only). IAM Identity Center doesn't support resource-based policies.

To learn more about IAM policy syntax and descriptions, see AWS IAM policy reference in the IAM User Guide.

Specifying conditions in a policy

When you grant permissions, you can use the access policy language to specify the conditions that are required for a policy to take effect. For example, you might want a policy to be applied only after a specific date. For more information about specifying conditions in a policy language, see Condition in the IAM User Guide.

To express conditions, you use predefined condition keys. There are no condition keys specific to IAM Identity Center. However, there are AWS condition keys that you can use as appropriate. For a complete list of AWS keys, see Available global condition keys in the IAM User Guide.

Identity-based policy examples for IAM Identity Center

This topic provides examples of IAM policies that you can create to grant users and roles permissions to administer IAM Identity Center.
Important
We recommend that you first review the introductory topics that explain the basic concepts and options available for you to manage access to your IAM Identity Center resources. For more information, see Overview of managing access permissions to your IAM Identity Center resources (p. 150).

The sections in this topic cover the following:

- Custom policy examples (p. 153)
- Permissions required to use the IAM Identity Center console (p. 157)

Custom policy examples

This section provides examples of common use cases that require a custom IAM policy. These example policies are identity-based policies, which do not specify the Principal element. This is because with an identity-based policy, you don't specify the principal who gets the permission. Instead, you attach the policy to the principal. When you attach an identity-based permission policy to an IAM role, the principal identified in the role's trust policy gets the permissions. You can create identity-based policies in IAM and attach them to users, groups, and/or roles. You can also apply these policies to IAM Identity Center users when you create a permission set in IAM Identity Center.

Note
Use these examples when you create policies for your environment and make sure to test for both positive ("access granted") and negative ("access denied") test cases before you deploy these policies in your production environment. For more information about testing IAM policies, see Testing IAM policies with the IAM policy simulator in the IAM User Guide.

Topics

- Example 1: Allow a user to view IAM Identity Center (p. 153)
- Example 2: Allow a user to manage permissions to AWS accounts in IAM Identity Center (p. 154)
- Example 3: Allow a user to manage applications in IAM Identity Center (p. 155)
- Example 4: Allow a user to manage users and groups in your Identity Center directory (p. 156)

Example 1: Allow a user to view IAM Identity Center

The following permissions policy grants read-only permissions to a user so they can view all the settings and directory information configured in IAM Identity Center.

Note
This policy is provided for example purposes only. In a production environment, we recommend that you use the ViewOnlyAccess AWS managed policy for IAM Identity Center.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "VisualEditor0",
            "Effect": "Allow",
            "Action": [
                "ds:DescribeDirectories",
                "ds:DescribeTrusts",
                "iam:ListPolicies",
                "organizations:DescribeOrganization",
                "organizations:DescribeAccount",
                "organizations:ListParents",
                "organizations:ListChildren",
                "organizations:ListAccounts",
                "organizations:ListRoots"
            ]
        }
    ]
}
```
Example 2: Allow a user to manage permissions to AWS accounts in IAM Identity Center

The following permissions policy grants permissions to allow a user to create, manage, and deploy permission sets for your AWS accounts.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": ["sso:AttachManagedPolicyToPermissionSet", "sso:CreateAccountAssignment", "sso:CreatePermissionSet", "sso:DeleteAccountAssignment", "sso:DeleteInlinePolicyFromPermissionSet", "sso:DeletePermissionSet", "sso:DetachManagedPolicyFromPermissionSet", "sso:ProvisionPermissionSet", "sso:PutInlinePolicyToPermissionSet", "sso:UpdatePermissionSet"],
            "Resource": "*"
        },
        {
            "Sid": "IAMListPermissions",
            "Effect": "Allow",
            "Action": ["iam:ListRoles", "iam:ListPolicies"],
            "Resource": "*"
        },
        {
            "Sid": "AccessToSSOProvisionedRoles",
            "Effect": "Allow",
```
```
Identity-based policies (IAM policies)

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "iam:PutRolePolicy",
        "iam:UpdateRole",
        "iam:UpdateRoleDescription"
      ],
      "Resource": "arn:aws:iam::*:role/aws-reserved/sso.amazonaws.com/*"
    },
    {
      "Effect": "Allow",
      "Action": [
        "iam:GetSAMLProvider"
      ],
      "Resource": "arn:aws:iam::*:saml-provider/AWSSSO_*_DO_NOT_DELETE"
    }
  ]
}
```

**Note**

The additional permissions listed under the "Sid": "IAMListPermissions", and "Sid": "AccessToSSOProvisionedRoles" sections are required only to enable the user to create assignments in the AWS Organizations management account. In certain cases, you may also need to add iam:UpdateSAMLProvider to these sections.

**Example 3: Allow a user to manage applications in IAM Identity Center**

The following permissions policy grants permissions to allow a user to view and configure applications in IAM Identity Center, including pre-integrated SaaS applications from within the IAM Identity Center catalog.

**Note**

The sso:AssociateProfile operation used in the following policy example is required for management of user and group assignments to applications. It also allows a user to assign users and groups to AWS accounts by using existing permission sets. If a user must manage AWS account access within IAM Identity Center, and requires permissions necessary to manage permission sets, see **Example 2: Allow a user to manage permissions to AWS accounts in IAM Identity Center** (p. 154).

As of October 2020, many of these operations are available only through the AWS console. This example policy includes "read" actions such as list, get, and search, which are relevant to the error-free operation of the console for this case.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "sso:AssociateProfile",
        "sso:CreateApplicationInstance",
        "sso:ImportApplicationInstanceServiceProviderMetadata",
        "sso:DeleteApplicationInstance",
        "sso:DeleteProfile",
        "sso:DisassociateProfile",
        "sso:GetApplicationTemplate",
        "sso:UpdateApplicationInstanceServiceProviderConfiguration",
        "sso:UpdateApplicationInstanceDisplayData",
        "sso:DeleteManagedApplicationInstance",
        "sso:UpdateApplicationInstanceStatus",
        "sso:GetManagedApplicationInstance",
        "sso:UpdateManagedApplicationInstanceStatus",
        "sso:CreateManagedApplicationInstance",
        "sso:UpdateApplicationInstanceSecurityConfiguration",
        "sso:UpdateApplicationInstanceResponseConfiguration",
        "sso:GetApplicationInstance"
      ],
      "Resource": "arn:aws:sso:*:sso.amazonaws.com/*"
    }
  ]
}
```
Example 4: Allow a user to manage users and groups in your Identity Center directory

The following permissions policy grants permissions to allow a user to create, view, modify, and delete users and groups in IAM Identity Center.

In some cases, direct modifications to users and groups in IAM Identity Center are restricted. For example, when Active Directory, or an external identity provider with Automatic Provisioning enabled, is selected as the identity source.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "sso-directory:ListGroupsForUser",
                "sso-directory:DisableUser",
                "sso-directory:EnableUser",
                "sso-directory:SearchGroups",
                "sso-directory:DeleteGroup",
                "sso-directory:AddMemberToGroup",
                "sso-directory:DescribeDirectory",
                "sso-directory:UpdateUser",
                "sso-directory:ListMembersInGroup",
                "sso-directory:CreateUser",
                "sso-directory:DescribeGroups",
                "sso-directory:SearchGroups",
                "sso-directory:ListDirectoryAssociations",
                "sso-directory:RemoveMemberFromGroup",
                "sso-directory:DeleteUser",
                "sso-directory:DescribeUsers",
                "sso-directory:ListUpdateGroup",
                "sso-directory:CreateGroup"
            ],
            "Resource": "*"
        }
    ]
}
```
Permissions required to use the IAM Identity Center console

For a user to work with the IAM Identity Center console without errors, additional permissions are required. If an IAM policy has been created that is more restrictive than the minimum required permissions, the console won't function as intended for users with that policy. The following example lists the set of permissions that might be needed to ensure error-free operation within the IAM Identity Center console.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "sso:DescribeAccountAssignmentCreationStatus",
        "sso:DescribeAccountAssignmentDeletionStatus",
        "sso:DescribePermissionSet",
        "sso:DescribePermissionSetProvisioningStatus",
        "sso:DescribePermissionsPolicies",
        "sso:DescribeRegisteredRegions",
        "sso:GetApplicationInstance",
        "sso:GetApplicationTemplate",
        "sso:GetInlinePolicyForPermissionSet",
        "sso:GetManagedApplicationInstance",
        "sso:GetMfaDeviceManagementForDirectory",
        "sso:GetPermissionSet",
        "sso:GetPermissionsPolicy",
        "sso:GetProfile",
        "sso:GetSharedSsoConfiguration",
        "sso:GetSsoConfiguration",
        "sso:GetSSOStatus",
        "sso:GetTrust",
        "sso:ListAccountAssignmentCreationStatus",
        "sso:ListAccountAssignmentDeletionStatus",
        "sso:ListAccountAssignments",
        "sso:ListAccountsForProvisionedPermissionSet",
        "sso:ListApplicationInstanceCertificates",
        "sso:ListApplicationInstances",
        "sso:ListApplications",
        "sso:ListApplicationTemplates",
        "sso:ListDirectoryAssociations",
        "sso:ListInstances",
        "sso:ListManagedPoliciesInPermissionSet",
        "sso:ListPermissionSetProvisioningStatus",
        "sso:ListPermissionSets",
        "sso:ListPermissionSetsProvisionedToAccount",
        "sso:ListProfileAssociations",
        "sso:ListProfiles",
        "sso:ListTagsForResource",
        "sso-directory:DescribeDirectory",
        "sso-directory:DescribeGroups",
        "sso-directory:DescribeUsers",
        "sso-directory:ListGroupsForUser",
        "sso-directory:ListMembersInGroup",
        "sso-directory:SearchGroups",
        "sso-directory:SearchUsers"
      ],
      "Resource": "*"
    }
  ]
}
```
AWS managed policies for IAM Identity Center

To create IAM customer managed policies that provide your team with only the permissions they need takes time and expertise. To get started quickly, you can use AWS managed policies. These policies cover common use cases and are available in your AWS account. For more information about AWS managed policies, see AWS managed policies in the IAM User Guide.

AWS services maintain and update AWS managed policies. You can't change the permissions in AWS managed policies. Services occasionally add additional permissions to an AWS managed policy to support new features. This type of update affects all identities (users, groups, and roles) where the policy is attached. Services are most likely to update an AWS managed policy when a new feature is launched or when new operations become available. Services do not remove permissions from an AWS managed policy, so policy updates won't break your existing permissions.

Additionally, AWS supports managed policies for job functions that span multiple services. For example, the ReadOnlyAccess AWS managed policy provides read-only access to all AWS services and resources. When a service launches a new feature, AWS adds read-only permissions for new operations and resources. For a list and descriptions of job function policies, see AWS managed policies for job functions in the IAM User Guide.

New actions that allow you to list and delete user sessions are available under the new namespace identitystore-auth. Any additional permissions for actions in this namespace will be updated on this page. When creating your custom IAM policies, avoid using * after identitystore-auth because this applies to all actions that exist in the namespace today or in the future.

AWS managed policy: AWSSSOMasterAccountAdministrator

The AWSSSOMasterAccountAdministrator policy provides required administrative actions to principals. The policy is intended for principals who perform the job role of an AWS IAM Identity Center administrator. Over time the list of actions provided will be updated to match the existing functionality of IAM Identity Center and the actions that are required as an administrator.

You can attach the AWSSSOMasterAccountAdministrator policy to your IAM identities. When you attach the AWSSSOMasterAccountAdministrator policy to an identity, you grant administrative AWS IAM Identity Center permissions. Principals with this policy can access IAM Identity Center within the AWS Organizations management account and all member accounts. This principal can fully manage all IAM Identity Center operations, including the ability to create an IAM Identity Center instance, users, permission sets, and assignments. The principal can also instantiate those assignments throughout the AWS organization member accounts and establish connections between AWS Directory Service managed directories and IAM Identity Center. As new administrative features are released, the account administrator will be granted these permissions automatically.

Permissions groupings

This policy is grouped into statements based on the set of permissions provided.

- AWSSSOMasterAccountAdministrator – Allows IAM Identity Center to pass the service role named AWSServiceRoleforSSO to IAM Identity Center so that it can later assume the role and perform actions on their behalf. This is necessary when the person or application attempts to enable IAM Identity Center. For more information, see Multi-account permissions (p. 104).
- AWSSSOMemberAccountAdministrator – Allows IAM Identity Center to perform account administrator actions in a multi-account AWS environment. For more information, see AWS managed policy: AWSSSOMemberAccountAdministrator (p. 160).
- AWSSSOManageDelegatedAdministrator – Allows IAM Identity Center to register and deregister a delegated administrator for your organization.
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AWSSSOC CreateSLR",
            "Effect": "Allow",
            "Action": "iam: CreateServiceLinkedRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/sso.amazonaws.com/AWSServiceRoleForSSO",
            "Condition": {
                "StringLike": {
                    "iam: AWSServiceName": "sso.amazonaws.com"
                }
            }
        },
        {
            "Sid": "AWSSSOMasterAccount Administrator",
            "Effect": "Allow",
            "Action": "iam: PassRole",
            "Resource": "arn:aws:iam::*:role/aws-service-role/sso.amazonaws.com/AWSServiceRoleForSSO",
            "Condition": {
                "StringLike": {
                    "iam: PassedToService": "sso.amazonaws.com"
                }
            }
        },
        {
            "Sid": "AWSSSOMemberAccount Administrator",
            "Effect": "Allow",
            "Action": [
                "ds: DescribeTrusts",
                "ds: UnauthorizeApplication",
                "ds: DescribeDirectories",
                "ds: AuthorizeApplication",
                "iam: ListPolicies",
                "organizations: EnableAWSServiceAccess",
                "organizations: ListRoots",
                "organizations: ListAccounts",
                "organizations: ListOrganizationalUnitsForParent",
                "organizations: ListAccountsForParent",
                "organizations: DescribeOrganization",
                "organizations: ListChildren",
                "organizations: DescribeAccount",
                "organizations: ListParents",
                "organizations: ListDelegatedAdministrators",
                "sso: *",
                "sso-directory: *",
                "identitystore: *",
                "identitystore-auth: *",
                "ds: CreateAlias",
                "access-analyzer: ValidatePolicy"
            ],
            "Resource": "*"
        },
        {
            "Sid": "AWSSSOManage DelegatedAdministrator",
            "Effect": "Allow",
            "Action": [
                "organizations: RegisterDelegatedAdministrator",
                "organizations: DeregisterDelegatedAdministrator"
            ],
            "Resource": "*",
            "Condition": {
                "StringEquals": {
                    "organizations: RegisterDelegatedAdministrator": "true",
                    "organizations: DeregisterDelegatedAdministrator": "true"
                }
            }
        }
    ]
}
Additional information about this policy

When IAM Identity Center is enabled for the first time, the IAM Identity Center service creates a service linked role in the AWS Organizations management account (formerly master account) so that IAM Identity Center can manage the resources in your account. The actions required are `iam:CreateServiceLinkedRole` and `iam:PassRole`, which are shown in the following snippets.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "AWSSSOCreateSLR",
      "Effect": "Allow",
      "Action": "iam:CreateServiceLinkedRole",
      "Resource": "arn:aws:iam::*:role/aws-service-role/sso.amazonaws.com/AWSServiceRoleForSSO",
      "Condition": {
        "StringLike": {
          "iam: AWSServiceName": "sso.amazonaws.com"
        }
      }
    },
    {
      "Sid": "AWSSSOMasterAccountAdministrator",
      "Effect": "Allow",
      "Action": "iam:PassRole",
      "Resource": "arn:aws:iam::*:role/aws-service-role/sso.amazonaws.com/AWSServiceRoleForSSO",
      "Condition": {
        "StringLike": {
          "iam:PassedToService": "sso.amazonaws.com"
        }
      }
    }
  ]
}
```

AWS managed policy: AWSSSOMemberAccountAdministrator

The AWSSSOMemberAccountAdministrator policy provides required administrative actions to principals. The policy is intended for principals who perform the job role of an IAM Identity Center administrator. Over time the list of actions provided will be updated to match the existing functionality of IAM Identity Center and the actions that are required as an administrator.

You can attach the AWSSSOMemberAccountAdministrator policy to your IAM identities. When you attach the AWSSSOMemberAccountAdministrator policy to an identity, you grant administrative AWS IAM Identity Center permissions. Principals with this policy can access IAM Identity Center within the AWS Organizations management account and all member accounts. This principal can fully manage all IAM Identity Center operations, including the ability to create users, permission sets, and assignments. The principal can also instantiate those assignments throughout the AWS organization member accounts and establish connections between AWS Directory Service managed directories and IAM Identity Center. As new administrative features are released, the account administrator is granted these permissions automatically.
Additional information about this policy

IAM Identity Center administrators manage users, groups, and passwords in their Identity Center directory store (sso-directory). The account admin role includes permissions for the following actions:

- "sso:*"
- "sso-directory:*"

IAM Identity Center administrators need limited permissions to the following AWS Directory Service actions to perform daily tasks.

- "ds:DescribeTrusts"
- "ds:UnauthorizeApplication"
These permissions allow IAM Identity Center administrators to identify existing directories and manage applications so that they can be configured for use with IAM Identity Center. For more information about each of these actions, see AWS Directory Service API permissions: Actions, resources, and conditions reference.

IAM Identity Center uses IAM policies to grant permissions to IAM Identity Center users. IAM Identity Center administrators create permission sets and attach polices to them. The IAM Identity Center administrator must have the permissions to list the existing policies so that they can choose which policies to use with the permission set they are creating or updating. To set secure and functional permissions, the IAM Identity Center administrator must have permissions to run the IAM Access Analyzer policy validation.

IAM Identity Center administrators need limited access to the following AWS Organizations actions to perform daily tasks:

- "organizations:EnableAWSServiceAccess"
- "organizations:ListRoots"
- "organizations:ListAccounts"
- "organizations:ListOrganizationalUnitsForParent"
- "organizations:ListAccountsForParent"
- "organizations:DescribeOrganization"
- "organizations:ListChildren"
- "organizations:DescribeAccount"
- "organizations:ListParents"
- "organizations:ListDelegatedAdministrators"
- "organizations:RegisterDelegatedAdministrator"
- "organizations:DeregisterDelegatedAdministrator"

These permissions allow IAM Identity Center administrators the ability to work with organization resources (accounts) for basic IAM Identity Center administrative tasks such as the following:

- Identifying the management account that belongs to the organization
- Identifying the member accounts that belong to the organization
- Enabling AWS service access for accounts
- Setting up and managing a delegated administrator

For more information about using a delegated administrator with IAM Identity Center, see Delegated administration (p. 107). For more information about how these permissions are used with AWS Organizations, see Using AWS Organizations with other AWS services.

**AWS managed policy: AWSSSODirectoryAdministrator**

You can attach the AWSSSODirectoryAdministrator policy to your IAM identities.
This policy grants administrative permissions over IAM Identity Center users and groups. Principals with this policy attached can make any updates to IAM Identity Center users and groups. The content of this policy statement is shown in the following snippet.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AWSSSOReadOnly",
            "Effect": "Allow",
            "Action": [
                "ds:DescribeDirectories",
                "ds:DescribeTrusts",
                "iam:ListPolicies",
                "organizations:DescribeOrganization",
                "organizations:DescribeAccount",
                "organizations:ListParents",
                "organizations:ListChildren",
                "organizations:ListAccounts",
                "organizations:ListRoots",
                "organizations:ListAccountsForParent",
                "organizations:ListOrganizationalUnitsForParent",
                "organizations:ListDelegatedAdministrators",
                "sso:Describe*",
                "sso:Get*",
                "sso:List*",
                "sso:Search*",
                "sso-directory:DescribeDirectory",
                "access-analyzer:ValidatePolicy"
            ],
            "Resource": "*"
        }
    ]
}
```

**AWS managed policy: AWSSSOSOReadOnly**

You can attach the AWSSSOReadOnly policy to your IAM identities.

This policy grants read-only permissions that allow users to view information in IAM Identity Center. Principals with this policy attached cannot view the IAM Identity Center users or groups directly. Principals with this policy attached cannot make any updates in IAM Identity Center. For example, principals with these permissions can view IAM Identity Center settings, but cannot change any of the setting values. The content of this policy statement is shown in the following snippet.

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AWSSSOReadOnly",
            "Effect": "Allow",
            "Action": [
                "sso-directory:*",
                "identitystore:*",
                "identitystore-auth:*",
                "sso:ListDirectoryAssociations"
            ],
            "Resource": "*"
        }
    ]
}
```
AWS managed policy: AWSSSODirectoryReadOnly

You can attach the AWSSSODirectoryReadOnly policy to your IAM identities.

This policy grants read-only permissions that allow users to view users and groups in IAM Identity Center. Principals with this policy attached cannot view IAM Identity Center assignments, permission sets, applications, or settings. Principals with this policy attached can't make any updates in IAM Identity Center. For example, principals with these permissions can view IAM Identity Center users, but they can't change any user attributes or assign MFA devices. The content of this policy statement is shown in the following snippet.

```json
{
"Version": "2012-10-17",
"Statement": [
{
"Sid": "AWSSSODirectoryReadOnly",
"Effect": "Allow",
"Action": [
"sso-directory:Search*",
"sso-directory:Describe*",
"sso-directory:List*",
"sso-directory:Get*",
"identitystore:Describe*",
"identitystore:List*",
"identitystore-auth:ListSessions",
"identitystore-auth:BatchGetSession"
],
"Resource": "*"
}
]
}
```

AWS managed policy: AWSIdentitySyncFullAccess

You can attach the AWSIdentitySyncFullAccess policy to your IAM identities.

Principals with this policy attached have full access permissions to create and delete sync profiles, associate or update a sync profile with a sync target, create, list and delete sync filters, and start or stop synchronization.

Permission details

This policy includes the following permissions when accessing Active Directory.

- ds:AuthorizeApplication – Allows identity-sync to grant access to the application during the sync profile creation process.
- ds:UnauthorizedApplication – Allows identity-sync to remove access to the application during the sync profile deletion process.

The content of this policy statement is shown in the following snippet.

```json
{
"Version": "2012-10-17",
"Statement": [
{
"Effect": "Allow",
"Action": [
"ds:AuthorizeApplication",
"ds:UnauthorizedApplication"

```
AWS managed policies

AWS Identity Center User Guide

AWS Identity Center User Guide

AWS managed policies

AWS managed policy: AWSIdentitySyncReadOnlyAccess

You can attach the AWSIdentitySyncReadOnlyAccess policy to your IAM identities.

This policy grants read-only permissions that allow users to view information about the identity synchronization profile, filters, and target settings. Principals with this policy attached can't make any updates to synchronization settings. For example, principals with these permissions can view identity synchronization settings, but can't change any of the profile or filter values. The content of this policy statement is shown in the following snippet.

```json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "identity-sync:GetSyncProfile",
        "identity-sync:ListSyncFilters",
        "identity-sync:GetSyncTarget",
      ],
      "Resource": "*
    }
  ]
}
```

AWS managed policy: AWSSSOServiceRolePolicy

You can't attach the AWSSSOServiceRolePolicy policy to your IAM identities.

This policy is attached to a service-linked role that allows IAM Identity Center to delegate and enforce which users have single sign-on access to specific AWS accounts in AWS Organizations. When you enable IAM, a service-linked role is created in all of the AWS accounts within your organization. IAM Identity Center also creates the same service-linked role in every account that is subsequently added to your organization. This role allows IAM Identity Center to access each account's resources on your behalf. Service-linked roles that are created in each AWS account are named AWSServiceRoleForSSO. For more information, see Using service-linked roles for IAM Identity Center (p. 168).
IAM Identity Center updates to AWS managed policies

The following table describes the updates to AWS managed policies for IAM Identity Center since this service began tracking these changes. For automatic alerts about changes to this page, subscribe to the RSS feed on the IAM Identity Center Document history page.

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWSSSODirectoryReadOnly (p. 164)</td>
<td>This policy now includes the new namespace identitystore-auth with new permissions to allow users to list and get sessions.</td>
<td>February 21, 2023</td>
</tr>
<tr>
<td>AWSSSOServiceRolePolicy (p. 165)</td>
<td>This policy now allows the UpdateSAMLProvider action to be taken on the management account.</td>
<td>October 20, 2022</td>
</tr>
<tr>
<td>AWSSSOMasterAccountAdministrator (p. 158)</td>
<td>This policy now includes the new namespace identitystore-auth with new permissions to allow the admin to list and delete sessions for a user.</td>
<td>October 20, 2022</td>
</tr>
<tr>
<td>AWSSSOMemberAccountAdministrator (p. 160)</td>
<td>This policy now includes the new namespace identitystore-auth with new permissions to allow the admin to list and delete sessions for a user.</td>
<td>October 20, 2022</td>
</tr>
<tr>
<td>AWSSSODirectoryAdministrator (p. 162)</td>
<td>This policy now includes the new namespace identitystore-auth with new permissions to allow the admin to list and delete sessions for a user.</td>
<td>October 20, 2022</td>
</tr>
<tr>
<td>AWSSSOMasterAccountAdministrator</td>
<td>This policy now includes new permissions to call ListDelegatedAdministrators in AWS Organizations. This policy also now includes a subset of permissions AWSSSOManageDelegatedAdministrator that includes permissions to call RegisterDelegatedAdministrator and DeregisterDelegatedAdministrator.</td>
<td>August 16, 2022</td>
</tr>
<tr>
<td>AWSSSOMemberAccountAdministrator</td>
<td>This policy now includes new permissions to call ListDelegatedAdministrators in AWS Organizations. This policy also now includes a subset of permissions AWSSSOManageDelegatedAdministrator that includes permissions to call</td>
<td>August 16, 2022</td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>AWS IAM Identity Center User Guide</td>
<td>AWS managed policies</td>
<td></td>
</tr>
<tr>
<td>Change</td>
<td>Description</td>
<td>Date</td>
</tr>
<tr>
<td>RegisterDelegatedAdministrator and DeregisterDelegatedAdministrator</td>
<td>This policy now includes new permissions to call ListDelegatedAdministrators in AWS Organizations.</td>
<td></td>
</tr>
<tr>
<td>AWSSSOREadOnly (p. 163)</td>
<td>This policy now includes new permissions to call ListDelegatedAdministrators in AWS Organizations.</td>
<td>August 11, 2022</td>
</tr>
<tr>
<td>AWSSSOServiceRolePolicy (p. 165)</td>
<td>This policy now includes new permissions to call DeleteRolePermissionsBoundary and PutRolePermissionsBoundary.</td>
<td>July 14, 2022</td>
</tr>
<tr>
<td>AWSSSOServiceRolePolicy (p. 165)</td>
<td>This policy now includes new permissions that allow calls to ListAWSServiceAccessForOrganization and ListDelegatedAdministrators in AWS Organizations.</td>
<td>May 11, 2022</td>
</tr>
<tr>
<td>AWSSOMasterAccountAdministrator</td>
<td>Add IAM Access Analyzer permissions that allow a principal to use the policy checks for validation.</td>
<td>April 28, 2022</td>
</tr>
<tr>
<td>AWSSOMemberAccountAdministrator</td>
<td>This policy now allows all IAM Identity Center Identity Store service actions. For information about the actions available in the IAM Identity Center Identity Store service, see the IAM Identity Center Identity Store API Reference.</td>
<td>March 29, 2022</td>
</tr>
<tr>
<td>AWSSSOREadOnly (p. 163)</td>
<td>This policy now allows all IAM Identity Center Identity Store service actions. For information about the actions available in the IAM Identity Center Identity Store service, see the IAM Identity Center Identity Store API Reference.</td>
<td>March 29, 2022</td>
</tr>
<tr>
<td>AWSSSMemberAccountAdministrator</td>
<td>This policy now allows all IAM Identity Center Identity Store service actions. For information about the actions available in the IAM Identity Center Identity Store service, see the IAM Identity Center Identity Store API Reference.</td>
<td>March 29, 2022</td>
</tr>
<tr>
<td>AWSSSODirectoryAdministrator (p. 162)</td>
<td>This policy now allows all IAM Identity Center Identity Store service actions.</td>
<td>March 29, 2022</td>
</tr>
<tr>
<td>AWSSSODirectoryReadOnly (p. 164)</td>
<td>This policy now grants access to the IAM Identity Center Identity Store service read actions. This access is required to retrieve user and group information from the IAM Identity Center Identity Store service.</td>
<td>March 29, 2022</td>
</tr>
<tr>
<td>AWSIdentitySyncFullAccess (p. 164)</td>
<td>This policy allows full access to identity-sync permissions.</td>
<td>March 3, 2022</td>
</tr>
</tbody>
</table>
Using service-linked roles for IAM Identity Center

AWS IAM Identity Center uses AWS Identity and Access Management (IAM) service-linked roles. A service-linked role is a unique type of IAM role that is linked directly to IAM Identity Center. It is predefined by IAM Identity Center and includes all the permissions that the service requires to call other AWS services on your behalf. For more information, see Service-linked roles (p. 129).

A service-linked role makes setting up IAM Identity Center easier because you don't have to manually add the necessary permissions. IAM Identity Center defines the permissions of its service-linked role, and unless defined otherwise, only IAM Identity Center can assume its role. The defined permissions include the trust policy and the permissions policy, and that permissions policy cannot be attached to any other IAM entity.

For information about other services that support service-linked roles, see AWS Services That Work with IAM and look for the services that have Yes in the Service-Linked Role column. Choose a Yes with a link to view the service-linked role documentation for that service.

Service-linked role permissions for IAM Identity Center

IAM Identity Center uses the service-linked role named AWSServiceRoleForSSO to grant IAM Identity Center permissions to manage AWS resources, including IAM roles, policies, and SAML IdP on your behalf.

The AWSServiceRoleForSSO service-linked role trusts the following services to assume the role:

- IAM Identity Center

The AWSServiceRoleForSSO service-linked role permissions policy allows IAM Identity Center to complete the following on roles on the path “/aws-reserved/sso.amazonaws.com/” and with the name prefix “AWSReservedSSO_”:

- iam:AttachRolePolicy
- iam:CreateRole
- iam:DeleteRole
- iam:DeleteRolePermissionsBoundary
- iam:DeleteRolePolicy
- iam:DetachRolePolicy
- iam:GetRole
- iam:ListRolePolicies

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWSIdentitySyncReadOnlyAccess</td>
<td>This policy grants read-only permissions that allow a principal to view identity-sync settings.</td>
<td>March 3, 2022</td>
</tr>
<tr>
<td>AWSSSOReadOnly (p. 163)</td>
<td>This policy grants read-only permissions that allow a principal to view IAM Identity Center configuration settings.</td>
<td>August 4, 2021</td>
</tr>
<tr>
<td>IAM Identity Center started tracking changes</td>
<td>IAM Identity Center started tracking changes for AWS managed policies.</td>
<td>August 4, 2021</td>
</tr>
</tbody>
</table>
Using service-linked roles

- `iam:PutRolePolicy`
- `iam:PutRolePermissionsBoundary`
- `iam:ListAttachedRolePolicies`

The AWSServiceRoleForSSO service-linked role permissions policy allows IAM Identity Center to complete the following on SAML providers with name prefix as “AWSSSO_”:

- `iam:CreateSAMLProvider`
- `iam:GetSAMLProvider`
- `iam:UpdateSAMLProvider`
- `iam:DeleteSAMLProvider`

The AWSServiceRoleForSSO service-linked role permissions policy allows IAM Identity Center to complete the following on all organizations:

- `organizations:DescribeAccount`
- `organizations:DescribeOrganization`
- `organizations:ListAccounts`
- `organizations:ListAWSServiceAccessForOrganization`
- `organizations:ListDelegatedAdministrators`

The AWSServiceRoleForSSO service-linked role permissions policy allows IAM Identity Center to complete the following on all IAM roles (*):

- `iam:listRoles`

The AWSServiceRoleForSSO service-linked role permissions policy allows IAM Identity Center to complete the following on “arn:aws:iam::*:role/aws-service-role/sso.amazonaws.com/AWSServiceRoleForSSO”:

- `iam:GetServiceLinkedRoleDeletionStatus`
- `iam:DeleteServiceLinkedRole`

The role permissions policy allows IAM Identity Center to complete the following actions on resources:

```json
{
  "Version":"2012-10-17",
  "Statement":[
    {
      "Sid":"IAMRoleProvisioningActions",
      "Effect":"Allow",
      "Resource": ["arn:aws:iam::*:role/aws-reserved/sso.amazonaws.com/*"]
    }
  ]
}
```
"Condition":{
   "StringNotEquals":{
   "aws:PrincipalOrgMasterAccountId": "${aws:PrincipalAccount}" 
   }
},
{
   "Sid":"IAMRoleReadActions",
   "Effect":"Allow",
   "Action":[
   "iam:GetRole",
   "iam:ListRoles"
   ],
   "Resource": ["*"]
},
{
   "Sid":"IAMRoleCleanupActions",
   "Effect":"Allow",
   "Action":[
   "iam:DeleteRole",
   "iam:DeleteRolePolicy",
   "iam:DetachRolePolicy",
   "iam:ListRolePolicies",
   "iam:ListAttachedRolePolicies"
   ],
   "Resource": ["arn:aws:iam::*:role/aws-reserved/sso.amazonaws.com/*"]
},
{
   "Sid":"IAMSLRCleanupActions",
   "Effect":"Allow",
   "Action":[
   "iam:DeleteServiceLinkedRole",
   "iam:GetServiceLinkedRoleDeletionStatus",
   "iam:DeleteRole",
   "iam:GetRole"
   ],
   "Resource": ["arn:aws:iam::*:role/aws-service-role/sso.amazonaws.com/AWSServiceRoleForSSO"]
},
{
   "Sid": "IAMSAMLProviderCreationAction",
   "Effect": "Allow",
   "Action": [ "iam:CreateSAMLProvider"
   ],
   "Resource": [ "arn:aws:iam::*:saml-provider/AWSSSO_*" ],
   "Condition": { "StringNotEquals": { "aws:PrincipalOrgMasterAccountId": "${aws:PrincipalAccount}" } } }
},
{
   "Sid": "IAMSAMLProviderUpdateAction",
   "Effect": "Allow",
   "Action": [ "iam:UpdateSAMLProvider"
   ],
   "Resource": [ "arn:aws:iam::*:saml-provider/AWSSSO_*" ]
}
"arn:aws:iam::*:saml-provider/AWSSSO_*"
],
{
"Sid":"IAMSAMLProviderCleanupActions",
"Effect":"Allow",
"Action":
[  
"iam:DeleteSAMLProvider",
"iam:GetSAMLProvider"
],
"Resource":
[  
"arn:aws:iam::*:saml-provider/AWSSSO_*"
]
},
{
"Effect":"Allow",
"Action":
[  
"organizations:DescribeAccount",
"organizations:DescribeOrganization",
"organizations:ListAccounts",
"organizations:ListAWSServiceAccessForOrganization",
"organizations:ListDelegatedAdministrators"
],
"Resource":
[  
"*
]
},
{
"Sid":"AllowUnauthAppForDirectory",
"Effect":"Allow",
"Action":
[  
"ds:UnauthorizeApplication"
],
"Resource":
[  
"*
]
},
{
"Sid":"AllowDescribeForDirectory",
"Effect":"Allow",
"Action":
[  
"ds:DescribeDirectories",
"ds:DescribeTrusts"
],
"Resource":
[  
"*
]
},
{
"Sid":"AllowDescribeAndListOperationsOnIdentitySource",
"Effect":"Allow",
"Action":
[  
"identitystore:DescribeUser",
"identitystore:DescribeGroup",
"identitystore:ListGroup",
"identitystore:ListUsers"
],
"Resource":
[  
"*
]
}
You must configure permissions to allow an IAM entity (such as a user, group, or role) to create, edit, or delete a service-linked role. For more information, see Service-linked role permissions in the IAM User Guide.

Creating a service-linked role for IAM Identity Center

You don't need to manually create a service-linked role. Once enabled, IAM Identity Center creates a service-linked role in all accounts within the organization in AWS Organizations. IAM Identity Center also creates the same service-linked role in every account that is subsequently added to your organization. This role allows IAM Identity Center to access each account's resources on your behalf.

Notes

- If you're signed in to the AWS Organizations management account, it uses your currently signed-in role and not the service-linked role. This prevents the escalation of privileges.
- When IAM Identity Center performs any IAM operations in the AWS Organizations management account, all operations happen using the credentials of the IAM principal. This enables the logs in CloudTrail to provide visibility of who made all privilege changes in the management account.

Important

If you were using the IAM Identity Center service before December 7, 2017, when it began supporting service-linked roles, then IAM Identity Center created the AWSServiceRoleForSSO role in your account. To learn more, see A New Role Appeared in My IAM Account.

If you delete this service-link role and then need to create it again, you can use the same process to recreate the role in your account.

Editing a service-linked role for IAM Identity Center

IAM Identity Center does not allow you to edit the AWSServiceRoleForSSO service-linked role. After you create a service-linked role, you cannot change the name of the role because various entities might reference the role. However, you can edit the description of the role using IAM. For more information, see Editing a service-linked role in the IAM User Guide.

Deleting a service-linked role for IAM Identity Center

You don't need to manually delete the AWSServiceRoleForSSO role. When an AWS account is removed from an AWS organization, IAM Identity Center automatically cleans up the resources and deletes the service-linked role from that AWS account.

You can also use the IAM console, the IAM CLI, or the IAM API to manually delete the service-linked role. To do this, you must first manually clean up the resources for your service-linked role and then you can manually delete it.

Note

If the IAM Identity Center service is using the role when you try to delete the resources, then the deletion might fail. If that happens, wait for a few minutes and try the operation again.

To delete IAM Identity Center resources used by the AWSServiceRoleForSSO

1. Remove user and group access (p. 113) for all users and groups that have access to the AWS account.
2. Delete permission sets (p. 121) that you have associated with the AWS account.

To manually delete the service-linked role using IAM
Use the IAM console, the IAM CLI, or the IAM API to delete the AWSServiceRoleForSSO service-linked role. For more information, see [Deleting a Service-Linked Role](#) in the IAM User Guide.

### IAM Identity Center console and API authorization

Existing IAM Identity Center console APIs support dual authorization. If you have existing IAM Identity Center instances that were created prior to October 15th 2020, you can use the following table to determine which API operations now map to newer API operations that were released after that date.

IAM Identity Center instances created before October 15th 2020 honor both old and new API actions as long as there is no explicit deny on any of the actions. Instances created after October 15th 2020 use the **newer API actions** for authorization in the IAM Identity Center console.

<table>
<thead>
<tr>
<th>Operation name</th>
<th>API actions used before October 15th, 2020</th>
<th>API actions used after October 15th, 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>AssociateProfile</td>
<td>AssociateProfile</td>
<td>CreateAccountAssignment</td>
</tr>
<tr>
<td>AttachManagedPolicy</td>
<td>PutPermissionsPolicy</td>
<td>AttachManagedPolicyToPermissionSet</td>
</tr>
<tr>
<td>CreatePermissionSet</td>
<td>CreatePermissionSet</td>
<td>CreatePermissionSet</td>
</tr>
<tr>
<td>DeleteApplicationInstanceForAWSAccount</td>
<td>DeleteApplicationInstance</td>
<td>DeleteTrust</td>
</tr>
<tr>
<td>DeleteApplicationProfileForAwsAccount</td>
<td>DeleteProfile</td>
<td>DeleteAccountAssignment</td>
</tr>
<tr>
<td>DeletePermissionsPolicy</td>
<td>DeletePermissionsPolicy</td>
<td>DeleteInlinePolicyFromPermissionSet</td>
</tr>
<tr>
<td>DeletePermissionSet</td>
<td>DeletePermissionSet</td>
<td>DeletePermissionSet</td>
</tr>
<tr>
<td>DescribePermissionsPolicies</td>
<td>DescribePermissionsPolicies</td>
<td>ListManagedPoliciesInPermissionSet</td>
</tr>
<tr>
<td>DetachManagedPolicy</td>
<td>DeletePermissionsPolicy</td>
<td>DetachManagedPolicyFromPermissionSet</td>
</tr>
<tr>
<td>DisassociateProfile</td>
<td>DisassociateProfile</td>
<td>DeleteAccountAssignment</td>
</tr>
<tr>
<td>GetApplicationInstanceForAWSAccount</td>
<td>GetApplicationInstance</td>
<td>ListAccountAssignments</td>
</tr>
<tr>
<td>GetAWSAccountProfileStatus</td>
<td>GetProfile</td>
<td>ListPermissionSetsProvisionedToAccount</td>
</tr>
<tr>
<td>GetPermissionSet</td>
<td>GetPermissionSet</td>
<td>DescribePermissionSet</td>
</tr>
<tr>
<td>GetPermissionsPolicy</td>
<td>GetPermissionsPolicy</td>
<td>GetInlinePolicyForPermissionSet</td>
</tr>
<tr>
<td>ListAccountsWithProvisionedPermissionSets</td>
<td>ListProfiles</td>
<td>GetProfile</td>
</tr>
<tr>
<td>ListAWSAccountProfiles</td>
<td>ListProfiles</td>
<td>GetProfile</td>
</tr>
<tr>
<td>ListPermissionSets</td>
<td>ListPermissionSets</td>
<td>ListPermissionSets</td>
</tr>
<tr>
<td>ListProfileAssociations</td>
<td>ListProfileAssociations</td>
<td>ListAccountAssignments</td>
</tr>
<tr>
<td>ProvisionApplicationInstanceForAWSAccount</td>
<td>CreateApplicationInstance</td>
<td>CreateApplicationInstance</td>
</tr>
<tr>
<td>ProvisionApplicationProfileForAWSAccount</td>
<td>CreateProfile</td>
<td>UpdateProfile</td>
</tr>
</tbody>
</table>
Logging and monitoring in IAM Identity Center

As a best practice, you should monitor your organization to ensure that changes are logged. This helps you to ensure that any unexpected change can be investigated and unwanted changes can be rolled back. AWS IAM Identity Center currently supports two AWS services that help you monitor your organization and the activity that happens within it.

**Topics**
- Logging IAM Identity Center API calls with AWS CloudTrail (p. 174)
- Amazon CloudWatch Events (p. 190)

### Logging IAM Identity Center API calls with AWS CloudTrail

AWS IAM Identity Center is integrated with AWS CloudTrail, a service that provides a record of actions taken by a user, role, or an AWS service in IAM Identity Center. CloudTrail captures API calls for IAM Identity Center as events. The calls captured include calls from the IAM Identity Center console and code calls to the IAM Identity Center API operations. If you create a trail, you can enable continuous delivery of CloudTrail events to an Amazon S3 bucket, including events for IAM Identity Center. If you don’t configure a trail, you can still view the most recent events in the CloudTrail console in Event history. Using the information collected by CloudTrail, you can determine the request that was made to IAM Identity Center, the IP address from which the request was made, who made the request, when it was made, and additional details.

To learn more about CloudTrail, see the AWS CloudTrail User Guide.

**Topics**
- IAM Identity Center information in CloudTrail (p. 174)
- Understanding IAM Identity Center log file entries (p. 178)
- Understanding IAM Identity Center sign-in events (p. 180)

### IAM Identity Center information in CloudTrail

CloudTrail is enabled on your AWS account when you create the account. When activity occurs in IAM Identity Center, that activity is recorded in a CloudTrail event along with other AWS service events in Event history. You can view, search, and download recent events in your AWS account. For more information, see Viewing events with CloudTrail event history.

For an ongoing record of events in your AWS account, including events for IAM Identity Center, create a trail. A trail enables CloudTrail to deliver log files to an Amazon S3 bucket. By default, when you create

<table>
<thead>
<tr>
<th>Operation name</th>
<th>API actions used before October 15th, 2020</th>
<th>API actions used after October 15th, 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProvisionSAMLProvider</td>
<td>GetTrust</td>
<td>CreateTrust</td>
</tr>
<tr>
<td>PutPermissionsPolicy</td>
<td>PutPermissionsPolicy</td>
<td>PutInlinePolicyToPermissionSet</td>
</tr>
<tr>
<td>UpdatePermissionSet</td>
<td>UpdatePermissionSet</td>
<td>UpdatePermissionSet</td>
</tr>
</tbody>
</table>
a trail in the console, the trail applies to all AWS Regions. The trail logs events from all Regions in the AWS partition and delivers the log files to the Amazon S3 bucket that you specify. Additionally, you can configure other AWS services to further analyze and act upon the event data collected in CloudTrail logs. For more information, see the following:

- [Overview for creating a trail](#)
- [CloudTrail supported services and integrations](#)
- [Configuring Amazon SNS notifications for CloudTrail](#)
- [Receiving CloudTrail log files from multiple Regions](#) and [Receiving CloudTrail log files from multiple accounts](#)

When CloudTrail logging is enabled in your AWS account, API calls made to IAM Identity Center actions are tracked in log files. IAM Identity Center records are written together with other AWS service records in a log file. CloudTrail determines when to create and write to a new file based on a time period and file size.

The following IAM Identity Center CloudTrail operations are supported:

<table>
<thead>
<tr>
<th>Console API operations</th>
<th>Public API operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>AssociateDirectory</td>
<td>AttachManagedPolicyToPermissionSet</td>
</tr>
<tr>
<td>AssociateProfile</td>
<td>CreateAccountAssignment</td>
</tr>
<tr>
<td>BatchDeleteSession</td>
<td>CreateInstanceIdAttributeConfiguration</td>
</tr>
<tr>
<td>BatchGetSession</td>
<td>CreatePermissionSet</td>
</tr>
<tr>
<td>CreateApplicationInstance</td>
<td>DeleteAccountAssignment</td>
</tr>
<tr>
<td>CreateApplicationInstanceCertificate</td>
<td>DeleteInlinePolicyFromPermissionSet</td>
</tr>
<tr>
<td>CreatePermissionSet</td>
<td>DeleteInstanceIdAttributeConfiguration</td>
</tr>
<tr>
<td>CreateProfile</td>
<td>DeletePermissionSet</td>
</tr>
<tr>
<td>DeleteApplicationInstance</td>
<td>DescribeAccountAssignmentCreationStatus</td>
</tr>
<tr>
<td>DeleteApplicationInstanceCertificate</td>
<td>DescribeAccountAssignmentDeletionStatus</td>
</tr>
<tr>
<td>DeletePermissionsPolicy</td>
<td>DescribeInstanceIdAttributeConfiguration</td>
</tr>
<tr>
<td>DeletePermissionSet</td>
<td>DescribePermissionSet</td>
</tr>
<tr>
<td>DeleteProfile</td>
<td>DescribePermissionSetProvisioningStatus</td>
</tr>
<tr>
<td>DescribePermissionsPolicies</td>
<td>DetachManagedPolicyFromPermissionSet</td>
</tr>
<tr>
<td>DisassociateDirectory</td>
<td>GetInlinePolicyForPermissionSet</td>
</tr>
<tr>
<td>DisassociateProfile</td>
<td>ListAccountAssignmentCreationStatus</td>
</tr>
<tr>
<td>GetApplicationInstance</td>
<td>ListAccountAssignmentDeletionStatus</td>
</tr>
<tr>
<td>GetApplicationTemplate</td>
<td>ListAccountAssignments</td>
</tr>
<tr>
<td>GetMfaDeviceManagementForDirectory</td>
<td>ListAccountsForProvisionedPermissionSet</td>
</tr>
<tr>
<td>GetPermissionSet</td>
<td>ListInstances</td>
</tr>
</tbody>
</table>

---

175
### Console API operations

<table>
<thead>
<tr>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GetSSOStatus</td>
</tr>
<tr>
<td>ImportApplicationInstanceServiceProvider</td>
</tr>
<tr>
<td>ListApplicationInstances</td>
</tr>
<tr>
<td>ListApplicationInstanceCertificates</td>
</tr>
<tr>
<td>ListApplicationTemplates</td>
</tr>
<tr>
<td>ListDirectoryAssociations</td>
</tr>
<tr>
<td>ListPermissionSets</td>
</tr>
<tr>
<td>ListPermissionSetsProvisionedToAccount</td>
</tr>
<tr>
<td>ListPermissions</td>
</tr>
<tr>
<td>ListProfileAssociations</td>
</tr>
<tr>
<td>ListProfiles</td>
</tr>
<tr>
<td>ListSessions</td>
</tr>
<tr>
<td>PutMfaDeviceManagementForDirectory</td>
</tr>
<tr>
<td>PutPermissionsPolicy</td>
</tr>
<tr>
<td>StartSSO</td>
</tr>
<tr>
<td>UpdateApplicationInstanceActiveCertificate</td>
</tr>
<tr>
<td>UpdateApplicationInstanceDisplayData</td>
</tr>
<tr>
<td>UpdateApplicationInstanceServiceProviderConfiguration</td>
</tr>
<tr>
<td>UpdateApplicationInstanceStatus</td>
</tr>
<tr>
<td>UpdateApplicationInstanceResponseConfiguration</td>
</tr>
<tr>
<td>UpdateApplicationInstanceResponseSchemaConfiguration</td>
</tr>
<tr>
<td>UpdateApplicationInstanceSecurityConfiguration</td>
</tr>
<tr>
<td>UpdateDirectoryAssociation</td>
</tr>
<tr>
<td>UpdateProfile</td>
</tr>
</tbody>
</table>

### Public API operations

<table>
<thead>
<tr>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ListManagedPoliciesInPermissionSet</td>
</tr>
<tr>
<td>ListPermissionSets</td>
</tr>
<tr>
<td>ListPermissionSetsProvisionedToAccount</td>
</tr>
<tr>
<td>ListTagsForResource</td>
</tr>
<tr>
<td>ProvisionPermissionSet</td>
</tr>
<tr>
<td>PutInlinePolicyToPermissionSet</td>
</tr>
<tr>
<td>TagResource</td>
</tr>
<tr>
<td>UntagResource</td>
</tr>
<tr>
<td>UpdateInstanceAccessControlAttributeConfiguration</td>
</tr>
<tr>
<td>UpdatePermissionSet</td>
</tr>
</tbody>
</table>

For more information about IAM Identity Center's public API operations, see the IAM Identity Center API Reference Guide.

The following IAM Identity Center identity store CloudTrail operations are supported:

- AddMemberToGroup
- CompleteVirtualMfaDeviceRegistration
- CompleteWebAuthnDeviceRegistration
- CreateAlias
- CreateExternalIdPConfigurationForDirectory
- CreateGroup
- CreateUser
- DeleteExternalIdPConfigurationForDirectory
• DeleteGroup
• DeleteMfaDeviceForUser
• DeleteUser
• DescribeDirectory
• DescribeGroups
• DescribeUsers
• DisableExternalIdPConfigurationForDirectory
• DisableUser
• EnableExternalIdPConfigurationForDirectory
• EnableUser
• GetAWSSPCConfigurationForDirectory
• ListExternalIdPConfigurationsForDirectory
• ListGroupsForUser
• ListMembersInGroup
• ListMfaDevicesForUser
• PutMfaDeviceManagementForDirectory
• RemoveMemberFromGroup
• SearchGroups
• SearchUsers
• StartVirtualMfaDeviceRegistration
• StartWebAuthnDeviceRegistration
• UpdateExternalIdPConfigurationForDirectory
• UpdateGroup
• UpdateMfaDeviceForUser
• UpdatePassword
• UpdateUser
• VerifyEmail

The following IAM Identity Center OIDC CloudTrail actions are supported:

• CreateToken
• RegisterClient
• StartDeviceAuthorization

The following IAM Identity Center Portal CloudTrail actions are supported:

• Authenticate
• Federate
• ListApplications
• ListProfilesForApplication
• ListAccounts
• ListAccountRoles
• GetRoleCredentials
• Logout
Every event or log entry contains information about who generated the request. The identity information helps you determine the following:

- Whether the request was made with root user or AWS Identity and Access Management (IAM) user credentials.
- Whether the request was made with temporary security credentials for a role or federated user.
- Whether the request was made by another AWS service.

For more information, see the CloudTrail `userIdentity` element.

Understanding IAM Identity Center log file entries

A trail is a configuration that enables delivery of events as log files to an Amazon S3 bucket that you specify. CloudTrail log files contain one or more log entries. An event represents a single request from any source and includes information about the requested action, the date and time of the action, request parameters, and so on. CloudTrail log files aren't an ordered stack trace of the public API calls, so they don't appear in any specific order.

The following example shows a CloudTrail log entry for an administrator (samadams@example.com) that took place in the IAM Identity Center console:

```
{
  "Records": [
    {
      "eventVersion": "1.05",
      "userIdentity": {
        "type": "IAMUser",
        "principalId": "AIDAIAIENLMexample",
        "arn": "arn:aws:iam::08966example:user/samadams",
        "accountId": "08966example",
        "accessKeyId": "AKIAIIJM2K4example",
        "userName": "samadams"
      },
      "eventTime": "2017-11-29T22:39:43Z",
      "eventSource": "sso.amazonaws.com",
      "eventName": "DescribePermissionsPolicies",
      "awsRegion": "us-east-1",
      "sourceIPAddress": "203.0.113.0",
      "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/62.0.3202.94 Safari/537.36",
      "requestParameters": {
        "permissionSetId": "ps-79a0d4e74b95ed05"
      },
      "responseElements": null,
      "requestID": "319ac6a1-d556-11e7-a34f-69a331068015",
      "eventID": "a93a952b-13dd-4ae5-a156-35d6220b071",
      "readOnly": true,
      "resources": [],
      "eventType": "AwsApiCall",
      "recipientAccountId": "08966example"
    }
  ]
}
```

The following example shows a CloudTrail log entry for an end-user (bobsmith@example.com) action that took place in the AWS access portal:

```
{
```

178
The following example shows a CloudTrail log entry for an end-user (bobsmith@example.com) action that took place in IAM Identity Center OIDC:

```
{
    "eventVersion": "1.05",
    "userIdentity": {
        "type": "Unknown",
        "principalId": "example.com//S-1-5-21-1122334455-3652759393-4233131409-1126",
        "accountId": "08966example",
        "userName": "bobsmith@example.com"
    },
    "eventTime": "2020-06-16T01:31:15Z",
    "eventSource": "sso.amazonaws.com",
    "eventName": "CreateToken",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "203.0.113.0",
    "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_6) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/62.0.3202.94 Safari/537.36",
    "requestParameters": {
        "clientId": "clientid1234example",
        "clientSecret": "HIDDEN_DUE_TO_SECURITY_REASONS",
        "grantType": "urn:ietf:params:oauth:grant-type:device_code",
        "deviceCode": "devicecode1234example"
    },
    "responseElements": {
        "accessToken": "HIDDEN_DUE_TO_SECURITY_REASONS",
        "tokenType": "Bearer",
        "expiresIn": 28800,
        "refreshToken": "HIDDEN_DUE_TO_SECURITY_REASONS",
        "idToken": "HIDDEN_DUE_TO_SECURITY_REASONS"
    },
    "eventID": "09a6e1a9-50e5-45c0-9f08-e6ef5089b262",
    "readOnly": false,
    "resources": [
        {
            "accountId": "08966example",
            "type": "IdentityStoreId",
            "ARN": "d-1234example"
        }
    ]
}
```
Understanding IAM Identity Center sign-in events

AWS CloudTrail logs successful and unsuccessful sign-in events for all AWS IAM Identity Center identity sources. Native SSO and Active Directory (AD Connector and AWS Managed Microsoft AD) sourced identities will include additional sign-in events that are captured each time a user is prompted to solve a specific credential challenge or factor, as well as the status of that particular credential verification request. Only after a user has completed all required credential challenges will the user be signed in, which will result in a UserAuthentication event being logged.

The following table captures each of the IAM Identity Center sign-in CloudTrail event names, their purpose, and applicability to different identity sources.

<table>
<thead>
<tr>
<th>Event name</th>
<th>Event purpose</th>
<th>Identity source applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>CredentialChallenge</td>
<td>Used to notify that IAM Identity Center has requested the user to solve a specific credential challenge and specifies the CredentialType that was required (For example, PASSWORD or TOTP).</td>
<td>Native IAM Identity Center users, AD Connector, and AWS Managed Microsoft AD</td>
</tr>
<tr>
<td>CredentialVerification</td>
<td>Used to notify that the user has attempted to solve a specific CredentialChallenge request and specifies whether that credential succeeded or failed.</td>
<td>Native IAM Identity Center users, AD Connector, and AWS Managed Microsoft AD</td>
</tr>
<tr>
<td>UserAuthentication</td>
<td>Used to notify that all authentication requirements the user was challenged with have been successfully completed and that the user was successfully signed in. <strong>Users failing to successfully complete the required credential challenges will result in no UserAuthentication event being logged.</strong></td>
<td>All identity sources</td>
</tr>
</tbody>
</table>

The following table captures additional useful event data fields contained within specific sign-in CloudTrail events.

<table>
<thead>
<tr>
<th>Event name</th>
<th>Event purpose</th>
<th>Sign-in event applicability</th>
<th>Example values</th>
</tr>
</thead>
<tbody>
<tr>
<td>AuthWorkflowID</td>
<td>Used to correlate all events emitted across an entire sign-in</td>
<td></td>
<td>CredentialChallenge, &quot;AuthWorkflowID&quot;: &quot;0de74b32-8362-4a01-a524-de21df59fd83&quot;</td>
</tr>
<tr>
<td>Event name</td>
<td>Event purpose</td>
<td>Sign-in event applicability</td>
<td>Example values</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CredentialType</td>
<td>Used to specify the credential or factor that was challenged.</td>
<td>CredentialChallenge,</td>
<td>CredentialType: &quot;PASSWORD&quot; or &quot;CredentialType&quot;: &quot;PASSWORD,TOTP&quot; (possible</td>
</tr>
<tr>
<td></td>
<td>UserAuthentication events will include all of the CredentialType values that</td>
<td>CredentialVerification,</td>
<td>values include: PASSWORD, TOTP, WEBAUTHN, EXTERNAL_IDP, RESYNC_TOTP)</td>
</tr>
<tr>
<td></td>
<td>were successfully verified across the user's sign-in sequence.</td>
<td>UserAuthentication</td>
<td></td>
</tr>
<tr>
<td>DeviceEnrollmentRequired</td>
<td>Used to specify that the user was required to register an MFA device</td>
<td>&quot;DeviceEnrollmentRequired&quot;:</td>
<td>&quot;true&quot;</td>
</tr>
<tr>
<td></td>
<td>during sign-in, and that the user successfully completed that request.</td>
<td>UserAuthentication</td>
<td></td>
</tr>
<tr>
<td>LoginTo</td>
<td>Used to specify the redirect location following a successful sign-in sequence.</td>
<td>UserAuthentication</td>
<td>&quot;LoginTo&quot;: &quot;<a href="https://mydirectory.awsapps.com/start/">https://mydirectory.awsapps.com/start/</a>.....&quot;</td>
</tr>
</tbody>
</table>

Example events for IAM Identity Center sign-in scenarios

The following examples show the expected sequence of CloudTrail events for different sign-in scenarios.

**Topics**

- Successful sign-in when authenticating with only a password (p. 181)
- Successful sign-in when authenticating with an external identity provider (p. 183)
- Successful sign-in when authenticating with a password and a TOTP authenticator app (p. 184)
- Successful sign-in when authenticating with a password and forced MFA registration is required (p. 187)
- Failed sign-in when authenticating with only a password (p. 189)

**Successful sign-in when authenticating with only a password**

The following sequence of events captures an example of a successful password only sign-in.

**CredentialChallenge (Password)**

```json
{
    "eventVersion":"1.08",
    "userIdentity":{
        "type":"Unknown",
        "principalId":"111122223333",
        "arn":"
        "accountId":"111122223333",
```
Successful CredentialVerification (Password)

```json
{
  "eventVersion":"1.08",
  "userIdentity":{
    "type":"Unknown",
    "principalId":"111122223333",
    "arn":"
    "accountId":"111122223333",
    "accessKeyId":"
    "userName":"user1"
  },
  "eventTime":"2020-12-07T20:34:09Z",
  "eventSource":"signin.amazonaws.com",
  "eventName":"CredentialVerification",
  "awsRegion":"us-east-1",
  "sourceIPAddress":"203.0.113.0",
  "userAgent":"Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
  "requestParameters":null,
  "responseElements":null,
  "additionalEventData":{
    "AuthWorkflowID":"9de74b32-8362-4a01-a524-de21df59fd83",
    "CredentialType":"PASSWORD"
  },
  "requestID":"f3cf52ad-fd3d-4889-8c15-f18d1a7c7393",
  "eventID":"c49640f6-0c8a-43d3-a6e0-900e3bb188d4",
  "readOnly":false,
  "eventType":"AwsServiceEvent",
  "managementEvent":true,
  "eventCategory":"Management",
  "recipientAccountId":"111122223333",
  "serviceEventDetails":{
    "CredentialVerification":"Success"
  }
}
```
Successful User Authentication (Password Only)

```
{
  "eventVersion": "1.08",
  "userIdentity": {
    "type": "Unknown",
    "principalId": "111122223333",
    "arn": "",
    "accountId": "111122223333",
    "accessKeyId": "",
    "userName": "user1"
  },
  "eventTime": "2020-12-07T20:34:09Z",
  "eventSource": "signin.amazonaws.com",
  "eventName": "UserAuthentication",
  "awsRegion": "us-east-1",
  "sourceIPAddress": "203.0.113.0",
  "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
  "requestParameters": null,
  "responseElements": null,
  "additionalEventData": {
    "AuthWorkflowID": "9de74b32-8362-4a5d-8e2d-85f9f838",
    "LoginTo": "https://d-1234567890.awsapps.com/start/?state=QVlBQmVGMHFiS0wzWlp1SFgrR25BRnFobU5nQUlnQUlBQk5FWHsaVFVHeGhvbVZUZEdGMFpQWmhjbUZ0QFUNpYpYVYxM0pwYBshl+C0cA6x7z7J6LsWfLD1fOvxioZ3w5z8Vg961C80f_iWd1x-zv__ApSH7mcUIs&wdc_csrf_token=AsrAzW1jK4GPYYrR4252z78DxEsDY9x81q1tVRSnno5pUjxSVp7Tqzi0LiBLBw5xEjOmQk2Xeast-1",
    "CredentialType": "PASSWORD"
  },
  "requestID": "f3cf52ad-fd3d-4889-8c15-f18d1a7c3793",
  "eventID": "e959a95a-2b33-478d-906c-4fe3058a9f1",
  "readOnly": false,
  "eventType": "AwsServiceEvent",
  "managementEvent": true,
  "eventCategory": "Management",
  "recipientAccountId": "111122223333",
  "serviceEventDetails": {
    "UserAuthentication": "Success"
  }
}
```

Successful sign-in when authenticating with an external identity provider

The following sequence of events captures an example of a successful sign-in when authenticated through the SAML protocol using an external identity provider.

Successful User Authentication (External Identity Provider)

```
{
  "eventVersion": "1.08",
  "userIdentity": {
    "type": "Unknown",
    "principalId": "111122223333",
    "arn": "",
    "accountId": "111122223333",
    "accessKeyId": "",
    "userName": "user1"
  },
  "eventTime": "2020-12-07T20:34:09Z",
  "eventSource": "signin.amazonaws.com",
  "eventName": "UserAuthentication",
  "awsRegion": "us-east-1",
  "sourceIPAddress": "203.0.113.0",
```
Successful sign-in when authenticating with a password and a TOTP authenticator app

The following sequence of events captures an example where multi-factor authentication was required during sign-in and the user successfully signed in using a password and a TOTP authenticator app.

**CredentialChallenge (Password)**

```json
{
  "eventVersion": "1.08",
  "userIdentity": {
    "type": "Unknown",
    "principalId": "111122223333",
    "arn": "",
    "accountId": "111122223333",
    "accessKeyId": "",
    "userName": "user1"
  },
  "eventTime": "2020-12-08T20:40:13Z",
  "eventSource": "signin.amazonaws.com",
  "eventName": "CredentialChallenge",
  "awsRegion": "us-east-1",
  "sourceIPAddress": "203.0.113.0",
  "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
  "requestParameters": null,
  "responseElements": null,
  "additionalEventData": {
    "AuthWorkflowID": "9de7ab32-8362-4a01-a524-de21df59fd83",
    "LoginTo": "https://d-1234567890.awsapps.com/start/?state=QVlBQmVGMHFiS0wzWlp1SFgrR25BRnF0bU5nQUlnQUJBQk5FWVhSaFVHeGhibVZU2EdGMFpWQmhjbUZ0QUSvVpYSmxaM0pwY8Sh3LcS0BA6fzT73MGLsfLWdf0vxiO2K5wte9461C30f_iWdlx-vz_GpSHF7mcUIs&wde_csrf_token=srAzW1jK4GPYYoR452zuZ380xEnDI9x81q1tVRSnnoSpUjISvP7tqzi0LiBLBUsxEj0mQK2Yeast-1",
    "CredentialType": "EXTERNAL_IDP"
  },
  "requestID": "f3cf52ad-fd3d-4889-8c15-f18d1a7c7393",
  "eventID": "e959a95a-2b33-478d-906c-4fe305e8a9f1",
  "readOnly": false,
  "eventType": "AwsServiceEvent",
  "managementEvent": true,
  "eventCategory": "Management",
  "recipientAccountID": "111122223333",
  "serviceEventDetails": {
    "UserAuthentication": "Success"
  }
}
```
Successful CredentialVerification (Password)

```
{
    "eventVersion": "1.08",
    "userIdentity": {
        "type": "Unknown",
        "principalId": "111122223333",
        "arn": "",
        "accountId": "111122223333",
        "accessKeyId": "",
        "userName": "user1"
    },
    "eventTime": "2020-12-08T20:40:20Z",
    "eventSource": "signin.amazonaws.com",
    "eventName": "CredentialVerification",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "203.0.113.0",
    "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
    "requestParameters": null,
    "responseElements": null,
    "additionalEventData": {
        "AuthWorkflowID": "303486b5-fce1-4d59-ba1d-eb3acb790729",
        "CredentialType": "PASSWORD"
    },
    "requestID": "92c4ac90-0d9b-452d-95d5-728487612f5e",
    "eventID": "4533fd49-6669-4d0b-b272-a0b2139309a8",
    "readOnly": false,
    "eventType": "AwsServiceEvent",
    "managementEvent": true,
    "eventCategory": "Management",
    "recipientAccountId": "111122223333",
    "serviceEventDetails": {
        "CredentialVerification": "Success"
    }
}
```

CredentialChallenge (TOTP)

```
{
    "eventVersion": "1.08",
    "userIdentity": {
        "type": "Unknown",
        "principalId": "111122223333",
        "arn": "",
        "accountId": "111122223333",
        "accessKeyId": "",
        "userName": "user1"
    },
    "eventTime": "2020-12-08T20:40:20Z",
    "eventSource": "signin.amazonaws.com",
    "eventName": "CredentialChallenge",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "203.0.113.0",
    "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
    "requestParameters": null,
    "responseElements": null,
    "additionalEventData": {
        "AuthWorkflowID": "303486b5-fce1-4d59-ba1d-eb3acb790729"
    }
}
```
Successful CredentialVerification (TOTP)

{
   "eventVersion": "1.08",
   "userIdentity": {
      "type": "Unknown",
      "principalId": "111122223333",
      "arn": "",
      "accountId": "111122223333",
      "accessKeyId": "",
      "userName": "user1"
   },
   "eventTime": "2020-12-08T20:40:27Z",
   "eventSource": "signin.amazonaws.com",
   "eventName": "CredentialVerification",
   "awsRegion": "us-east-1",
   "sourceIPAddress": "203.0.113.0",
   "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
   "requestParameters": null,
   "responseElements": null,
   "additionalEventData": {
      "AuthWorkflowID": "303486b5-fce1-4d59-ba1d-eb3acb790729",
      "CredentialType": "TOTP"
   },
   "requestID": "c40a691f-eeb1-4352-b286-5e909f6f318",
   "eventType": "AwsServiceEvent",
   "managementEvent": true,
   "eventCategory": "Management",
   "recipientAccountId": "111122223333",
   "serviceEventDetails": {
      "CredentialChallenge": "Success"
   },
   "requestID": "92c4ac90-0d9b-452d-95d5-728487612f5e",
   "eventID": "29202f08-f240-40cc-b789-c0cea8a27847",
   "readOnly": false,
   "eventType": "AwsServiceEvent",
   "managementEvent": true,
   "eventCategory": "Management",
   "recipientAccountId": "111122223333",
   "serviceEventDetails": {
      "CredentialType": "TOTP"
   }
}

Successful UserAuthentication (Password + TOTP)

{
   "eventVersion": "1.08",
   "userIdentity": {
      "type": "Unknown",
      "principalId": "111122223333",
      "arn": "",
      "accountId": "111122223333",
      "accessKeyId": "",
      "userName": "user1"
   },
   "eventTime": "2020-12-08T20:40:27Z",
   "eventSource": "signin.amazonaws.com",
   "eventName": "CredentialVerification",
   "awsRegion": "us-east-1",
   "sourceIPAddress": "203.0.113.0",
   "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
   "requestParameters": null,
   "responseElements": null,
   "additionalEventData": {
      "AuthWorkflowID": "303486b5-fce1-4d59-ba1d-eb3acb790729",
      "CredentialType": "TOTP"
   },
   "requestID": "c40a691f-eeb1-4352-b286-5e909f6f318",
   "eventType": "AwsServiceEvent",
   "managementEvent": true,
   "eventCategory": "Management",
   "recipientAccountId": "111122223333",
   "serviceEventDetails": {
      "CredentialVerification": "Success"
   },
   "requestID": "92c4ac90-0d9b-452d-95d5-728487612f5e",
   "eventID": "29202f08-f240-40cc-b789-c0cea8a27847",
   "readOnly": false,
   "eventType": "AwsServiceEvent",
   "managementEvent": true,
   "eventCategory": "Management",
   "recipientAccountId": "111122223333",
   "serviceEventDetails": {
      "CredentialType": "TOTP"
   }
}
Successful sign-in when authenticating with a password and forced MFA registration is required

The following sequence of events captures an example of a successful password sign in, but the user was required and successfully completed registering an MFA device before completing their sign-in.

**CredentialChallenge (Password)**

```json
{
   "eventVersion": "1.08",
   "userIdentity": {
      "type": "Unknown",
      "principalId": "111122223333",
      "arn": "",
      "accountId": "111122223333",
      "accessKeyId": "",
      "userName": "user1"
   },
   "eventTime": "2020-12-09T01:24:02Z",
   "eventSource": "signin.amazonaws.com",
   "eventName": "CredentialChallenge",
   "awsRegion": "us-east-1",
   "sourceIPAddress": "203.0.113.0",
   "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
   "requestParameters": null,
   "responseElements": null,
   "additionalEventData": {
      "AuthWorkflowId": "76d8a26d-ad9c-41a4-90c3-d607cdd7155c",
      "CredentialType": "PASSWORD"
   },
   "requestID": "321f4b13-42b5-4005-a0f7-826cad26d159",
   "eventID": "8c707b0f-e45a-4a9c-bee2-ff686b83d2f1b"
}
```
Successful CredentialVerification (Password)

```json
{
  "eventVersion": "1.08",
  "userIdentity": {
    "type": "Unknown",
    "principalId": "111122223333",
    "arn": "",
    "accountId": "111122223333",
    "accessKeyId": "",
    "userName": "user1"
  },
  "eventTime": "2020-12-09T01:24:09Z",
  "eventSource": "signin.amazonaws.com",
  "eventName": "CredentialVerification",
  "awsRegion": "us-east-1",
  "sourceIPAddress": "203.0.113.0",
  "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
  "requestParameters": null,
  "responseElements": null,
  "additionalEventData": {
    "AuthWorkflowID": "76d8a26d-ad9c-41a4-90c3-d607cdd7155c",
    "CredentialType": "PASSWORD"
  },
  "requestID": "12b57efa-0a92-4479-91a3-5b6641817c21",
  "readOnly": false,
  "eventType": "AwsServiceEvent",
  "managementEvent": true,
  "eventCategory": "Management",
  "recipientAccountID": "111122223333",
  "serviceEventDetails": {
    "CredentialChallenge": "Success"
  }
}
```

Successful UserAuthentication (Password + MFA Registration Required)

```json
{
  "eventVersion": "1.08",
  "userIdentity": {
    "type": "Unknown",
    "principalId": "111122223333",
    "arn": "",
    "accountId": "111122223333",
    "accessKeyId": "",
    "userName": "user1"
  },
  "eventTime": "2020-12-09T01:24:14Z",
  "eventSource": "signin.amazonaws.com",
  "eventName": "UserAuthentication",
  "awsRegion": "us-east-1",
  "sourceIPAddress": "203.0.113.0",
  "requestParameters": null,
  "responseElements": null,
  "additionalEventData": {
    "AuthWorkflowID": "76d8a26d-ad9c-41a4-90c3-d607cdd7155c",
    "CredentialType": "PASSWORD"
  },
  "requestID": "12b57efa-0a92-4479-91a3-5b6641817c21",
  "readOnly": false,
  "eventType": "AwsServiceEvent",
  "managementEvent": true,
  "eventCategory": "Management",
  "recipientAccountID": "111122223333",
  "serviceEventDetails": {
    "CredentialVerification": "Success"
  },
  "credentialType": "PASSWORD"
}
```
Failed sign-in when authenticating with only a password

The following sequence of events captures an example of a failed password only sign-in.

CredentialChallenge (Password)

```json
{
    "eventVersion": "1.08",
    "userIdentity": {
        "type": "Unknown",
        "principalId": "111122223333",
        "arn": "",
        "accountId": "111122223333",
        "accessKeyId": "",
        "userName": "user1"
    },
    "eventTime": "2020-12-08T18:56:15Z",
    "eventSource": "signin.amazonaws.com",
    "eventName": "CredentialChallenge",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "203.0.113.0",
    "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
    "requestParameters": null,
    "responseElements": null,
    "additionalEventData": {
        "AuthWorkflowID": "adbf67c4-8188-4e2b-8527-fe539e328fa7",
        "CredentialType": "PASSWORD"
    },
    "requestID": "f54848ea-b1aa-402f-bf0d-a54561a2ffcc",
    "eventID": "d96f1d6c-4a0b-9a45-6a2b66078c78",
    "readOnly": false,
    "eventType": "AwsServiceEvent",
    "managementEvent": true,
    "eventCategory": "Management",
    "recipientAccountId": "111122223333",
    "serviceEventDetails": {
        "UserAuthentication": "Success"
    }
}
```
Failed CredentialVerification (Password)

```
{
    "eventVersion": "1.08",
    "userIdentity": {
        "type": "Unknown",
        "principalId": "111122223333",
        "arn": "",
        "accountId": "111122223333",
        "accessKeyId": "",
        "userName": "user1"
    },
    "eventTime": "2020-12-08T18:56:21Z",
    "eventName": "CredentialVerification",
    "awsRegion": "us-east-1",
    "sourceIPAddress": "203.0.113.0",
    "userAgent": "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_15_7) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/87.0.4280.66 Safari/537.36",
    "requestParameters": null,
    "responseElements": null,
    "additionalEventData": {
        "AuthWorkflowID": "adbfb7c4-8188-4e2b-8527-fe39e328fa7",
        "CredentialType": "PASSWORD"
    },
    "requestID": "04528c82-a678-4a1f-a56d-ea2c6445a72a",
    "eventType": "AwsServiceEvent",
    "managementEvent": true,
    "recipientCategory": "Management",
    "recipientAccountId": "111122223333",
    "serviceEventDetails": {
        "CredentialVerification": "Failure"
    }
}
```

Amazon CloudWatch Events

IAM Identity Center can work with CloudWatch Events to raise events when administrator-specified actions occur in an organization. For example, because of the sensitivity of such actions, most administrators would want to be warned every time someone creates a new account in the organization or when an administrator of a member account attempts to leave the organization. You can configure CloudWatch Events rules that look for these actions and then send the generated events to administrator-defined targets. Targets can be an Amazon SNS topic that emails or text messages its subscribers. You could also create an AWS Lambda function that logs the details of the action for your later review.

To learn more about CloudWatch Events, including how to configure and enable it, see the Amazon CloudWatch Events User Guide.

Compliance validation for IAM Identity Center

Third-party auditors assess the security and compliance of AWS services such as AWS IAM Identity Center as part of multiple AWS compliance programs.
To learn whether an AWS service is within the scope of specific compliance programs, see AWS services in Scope by Compliance Program and choose the compliance program that you are interested in. For general information, see AWS Compliance Programs.

You can download third-party audit reports using AWS Artifact. For more information, see Downloading Reports in AWS Artifact.

Your compliance responsibility when using AWS services is determined by the sensitivity of your data, your company's compliance objectives, and applicable laws and regulations. AWS provides the following resources to help with compliance:

- **Security and Compliance Quick Start Guides** – These deployment guides discuss architectural considerations and provide steps for deploying baseline environments on AWS that are security and compliance focused.
- **Architecting for HIPAA Security and Compliance on Amazon Web Services** – This whitepaper describes how companies can use AWS to create HIPAA-eligible applications.
  
  **Note**
  Not all AWS services are HIPAA eligible. For more information, see the HIPAA Eligible Services Reference.
- **AWS Compliance Resources** – This collection of workbooks and guides might apply to your industry and location.
- **Evaluating Resources with Rules** in the AWS Config Developer Guide – The AWS Config service assesses how well your resource configurations comply with internal practices, industry guidelines, and regulations.
- **AWS Security Hub** – This AWS service provides a comprehensive view of your security state within AWS. Security Hub uses security controls to evaluate your AWS resources and to check your compliance against security industry standards and best practices. For a list of supported services and controls, see Security Hub controls reference.
- **AWS Audit Manager** – This AWS service helps you continuously audit your AWS usage to simplify how you manage risk and compliance with regulations and industry standards.

### Supported compliance standards

IAM Identity Center has undergone auditing for the following standards and is eligible for use as part of solutions for which you need to obtain compliance certification.

AWS has expanded its Health Insurance Portability and Accountability Act (HIPAA) compliance program to include IAM Identity Center as a HIPAA eligible service.

AWS offers a HIPAA-focused whitepaper for customers who want to learn more about how they can use AWS services to process and store health information. For more information, see HIPAA compliance.
Resilience in IAM Identity Center

The AWS global infrastructure is built around AWS Regions and Availability Zones. AWS Regions provide multiple physically separated and isolated Availability Zones, which are connected with low-latency, high-throughput, and highly redundant networking. With Availability Zones, you can design and operate...
applications and databases that automatically fail over between Availability Zones without interruption. Availability Zones are more highly available, fault tolerant, and scalable than traditional single or multiple data center infrastructures.

For more information about AWS Regions and Availability Zones, see [AWS global infrastructure](https://aws.amazon.com/global-infrastructure/).

To learn more about AWS IAM Identity Center resiliency, see [Resiliency design and Regional behavior](https://docs.aws.amazon.com/IAM/latest/UserGuide/id嵬保護環境-_errors.html#嵬保護環境-_errors-1).

**Infrastructure security in IAM Identity Center**

As a managed service, AWS IAM Identity Center is protected by the AWS global network security procedures that are described in [Best Practices for Security, Identity, & Compliance](https://aws.amazon.com/security/best-practices/).

You use AWS published API calls to access IAM Identity Center through the network. Clients must support Transport Layer Security (TLS) 1.0 or later. We recommend TLS 1.2 or later. Clients must also support cipher suites with perfect forward secrecy (PFS) such as Ephemeral Diffie-Hellman (DHE) or Elliptic Curve Ephemeral Diffie-Hellman (ECDHE). Most modern systems such as Java 7 and later support these modes.

Additionally, requests must be signed by using an access key ID and a secret access key that is associated with an IAM principal. Or you can use the [AWS Security Token Service](https://docs.aws.amazon.com/AmazonSTS/latest/APIReference/) (AWS STS) to generate temporary security credentials to sign requests.
Tagging AWS IAM Identity Center resources

A tag is a custom attribute label that you add to an AWS resource to make it easier to identify, organize, and search for resources. Each tag has two parts:

- A tag key (for example, CostCenter, Environment, or Project). Tag keys can be up to 128 characters in length and are case sensitive.
- A tag value (for example, 111122223333 or Production). Tag values can be up to 256 characters in length, and like tag keys, are case sensitive. You can set the value of a tag to an empty string, but you can't set the value of a tag to null. Omitting the tag value is the same as using an empty string.

Tags help you identify and organize your AWS resources. Many AWS services support tagging, so you can assign the same tag to resources from different services to indicate that the resources are related. For example, you can assign the same tag to a specific permission set in your IAM Identity Center instance. For more information about tagging strategies, see Tagging AWS Resources in the AWS General Reference Guide and Tagging Best Practices.

In addition to identifying, organizing, and tracking your AWS resources with tags, you can use tags in IAM policies to help control who can view and interact with your resources. To learn more about using tags to control access, see Controlling access to AWS resources using tags in the IAM User Guide. For example, you can allow a user to update an IAM Identity Center permission set, but only if the IAM Identity Center permission set has an owner tag with a value of that user's name.

Currently, you can apply tags to permission sets only. You can't apply tags to the corresponding roles that IAM Identity Center creates in AWS accounts. You can use the IAM Identity Center console, AWS CLI or the IAM Identity Center APIs to add, edit, or delete tags for a permission set.

The following sections provide more information about tags for IAM Identity Center.

Tag restrictions

The following basic restrictions apply to tags on IAM Identity Center resources:

- The maximum number of tags that you can assign to a resource is 50.
- The maximum key length is 128 Unicode characters.
- The maximum value length is 256 Unicode characters.
- Valid characters for a tag key and value are:
  - a-z, A-Z, 0-9, space, and the following characters: _ . : / = + - and @
  - Keys and values are case sensitive.
  - Don't use aws: as a prefix for keys; it's reserved for AWS use

Manage tags by using the IAM Identity Center console

You can use the IAM Identity Center console to add, edit, and remove tags that are associated with your permission sets.
To manage tags for an IAM Identity Center console

1. Open the IAM Identity Center console.
2. Choose Permission sets.
3. Choose the name of the permission set that has the tags you want to manage.
4. On the Permissions tab, under Tags, do one of the following, and then proceed to the next step:
   a. If tags are already assigned for this permission set, choose Edit tags.
   b. If no tags are assigned to this permission set, choose Add tags.
5. For each new tag, type the values in the Key and Value (optional) columns. When you are finished, choose Save changes.

To remove a tag, choose the X in the Remove column next to the tag that you want to remove.

AWS CLI examples

The AWS CLI provides commands that you can use to manage the tags that you assign to your permission set.

Assigning tags

Use the following commands to assign tags to your permission set.

Example tag-resource Command for a permission set

Assign tags to a permission set by using tag-resource within the sso set of commands:

```
$ aws sso-admin tag-resource \
  --instance-arn sso-instance-arn \
  --resource-arn sso-resource-arn \
  --tags Stage=Test
```

This command includes the following parameters:

- **instance-arn** – The Amazon Resource Name (ARN) of the IAM Identity Center instance under which the operation will run.
- **resource-arn** – The ARN of the resource with the tags to be listed.
- **tags** – The key-value pairs of the tags.

To assign multiple tags at once, specify them in a comma-separated list:

```
$ aws sso-admin tag-resource \
  --instance-arn sso-instance-arn \
  --resource-arn sso-resource-arn \
  --tags Stage=Test,CostCenter=80452,Owner=SysEng
```

Viewing tags

Use the following commands to view the tags that you have assigned to your permission set.
Removing tags

Use the following commands to remove tags from a permission set.

**Example untag-resource Command for a permission set**

Remove tags from a permission set by using `untag-resource` within the `sso` set of commands:

```
$ aws sso-admin untag-resource --instance-arn sso-instance-arn \\
  > --resource-arn sso-resource-arn \\
  > --tag-keys Stage CostCenter Owner
```

For the `--tag-keys` parameter, specify one or more tag keys, and do not include the tag values.

**Applying tags when you create a permission set**

Use the following commands to assign tags at the moment you create a permission set.

**Example create-permission-set Command with tags**

When you create a permission set by using the `create-permission-set` command, you can specify tags with the `--tags` parameter:

```
$ aws sso-admin create-permission-set \\
  > --instance-arn sso-instance-arn \\
  > --name permission-set-name \\
  > --tags Stage=Test,CostCenter=80432,Owner=SysEng
```

**Manage tags using the IAM Identity Center API**

You can use the following actions in the IAM Identity Center API to manage the tags for your permission set.

**API actions for IAM Identity Center instance tags**

Use the following API actions to assign, view, and remove tags for a permission set.

- `TagResource`
- `ListTagsForResource`
- `UntagResource`
- `CreatePermissionSet`
Integrating AWS CLI with IAM Identity Center

AWS Command Line Interface (CLI) version 2 integration with IAM Identity Center simplifies the sign-in process. Developers can sign in directly to the AWS CLI using the same Active Directory or IAM Identity Center credentials that they normally use to sign in to IAM Identity Center, and access their assigned accounts and roles. For example, after an administrator configures IAM Identity Center to use Active Directory for authentication, a developer can sign into the AWS CLI directly using their Active Directory credentials.

AWS CLI integration with IAM Identity Center offers the following benefits:

- Enterprises can enable their developers to sign in using credentials from IAM Identity Center or Active Directory by connecting IAM Identity Center to their Active Directory using AWS Directory Service.
- Developers can sign in from the CLI for faster access.
- Developers can list and switch between accounts and roles to which they have assigned access.
- Developers can generate and save named role profiles in their CLI configuration automatically and reference them in the CLI to run commands in desired accounts and roles.
- The CLI manages short-term credentials automatically so developers can start in and stay in the CLI securely without interruption, and run long running scripts.

How to integrate AWS CLI with IAM Identity Center

To use the AWS CLI integration with IAM Identity Center, you need to download, install, and configure AWS Command Line Interface version 2. For detailed steps on how to download and integrate the AWS CLI with IAM Identity Center, see Configuring the AWS CLI to use IAM Identity Center in the AWS Command Line Interface User Guide.
AWS IAM Identity Center Region availability

IAM Identity Center is available in several commonly used AWS Regions. This availability makes it easier for you to configure user access to multiple AWS accounts and business applications. When your users sign in to the AWS access portal, they can select the AWS account to which they have permissions, and then access the AWS Management Console. For a full list of the AWS Regions that IAM Identity Center supports, see IAM Identity Center endpoints and quotas.

IAM Identity Center Region data

When you first enable IAM Identity Center, all the data that you configure in IAM Identity Center is stored in the Region where you configured it. This data includes directory configurations, permission sets, application instances, and user assignments to AWS account applications. If you are using the IAM Identity Center identity store, all users and groups that you create in IAM Identity Center are also stored in the same Region. We recommend that you install IAM Identity Center in a Region that you intend to keep available for users, not a Region that you might need to disable.

AWS Organizations supports only one AWS Region at a time. To enable IAM Identity Center in a different Region, you must first delete your current IAM Identity Center configuration. Switching to a different Region also changes the URL for the AWS access portal, and you must reconfigure all permission sets and assignments.

Cross-Region calls

IAM Identity Center uses Amazon Simple Email Service (Amazon SES) to send emails to end users when they attempt to sign-in with one-time password (OTP) as a second authentication factor. These emails are also sent for certain identity and credential management events, such as when the user is invited to set up an initial password, to verify an email address, and reset their password. Amazon SES is available in a subset of AWS Regions that IAM Identity Center supports.

IAM Identity Center calls Amazon SES local endpoints when Amazon SES is available locally in an AWS Region. When Amazon SES isn’t available locally, IAM Identity Center calls Amazon SES endpoints in a different AWS Region, as indicated in the following table.

Amazon SES Region codes are listed in the following table.

<table>
<thead>
<tr>
<th>IAM Identity Center Region code</th>
<th>IAM Identity Center Region name</th>
<th>Amazon SES Region code</th>
<th>Amazon SES Region name</th>
</tr>
</thead>
<tbody>
<tr>
<td>eu-central-2</td>
<td>Europe (Zurich)</td>
<td>eu-central-1</td>
<td>Europe (Frankfurt)</td>
</tr>
<tr>
<td>ap-east-1</td>
<td>Asia Pacific (Hong Kong)</td>
<td>ap-northeast-2</td>
<td>Asia Pacific (Seoul)</td>
</tr>
<tr>
<td>us-gov-east-1</td>
<td>AWS GovCloud (US-East)</td>
<td>us-gov-west-1</td>
<td>AWS GovCloud (US-West)</td>
</tr>
</tbody>
</table>
In these cross-Region calls, IAM Identity Center might send the following user attributes:

- Email address
- First name
- Last name
- Account in AWS Organizations
- AWS access portal URL
- Username
- Directory ID
- User ID

Managing IAM Identity Center in AWS Regions that must be manually enabled

Most AWS Regions are enabled for operations in all AWS services by default. Those Regions are automatically activated for use with IAM Identity Center. The following AWS Regions must be manually enabled:

- Africa (Cape Town)
- Asia Pacific (Hong Kong)
- Asia Pacific (Jakarta)
- Europe (Milan) Region
- Europe (Zurich)
- Israel (Tel Aviv)
- Middle East (Bahrain)

When you enable IAM Identity Center for a management account in a manually enabled AWS Region, the following IAM Identity Center metadata for any member accounts is stored in the Region.

- Account ID
- Account name
- Account email
- Amazon Resource Names (ARNs) of the IAM roles that IAM Identity Center creates in the member account

If you disable a Region in which IAM Identity Center is installed, IAM Identity Center is also disabled. After IAM Identity Center is disabled in a Region, users in that Region won't have single sign-on access to AWS accounts and applications. AWS retains the data in your IAM Identity Center configuration for at least 10 days. If you re-enable IAM Identity Center within this time frame, your IAM Identity Center configuration data will still be available in the Region.

To re-enable IAM Identity Center in Regions that must be manually enabled, you must re-enable the Region. Because IAM Identity Center must reprocess all paused events again, re-enabling IAM Identity Center might take some time.

Note
IAM Identity Center can manage access only to the AWS accounts that are enabled for use in a Region. To manage access across all accounts in your organization, enable IAM Identity Center in the management account in a Region that is automatically activated for use with IAM Identity Center.
Delete your IAM Identity Center configuration

When an IAM Identity Center configuration is deleted, all the data in that configuration is deleted and can't be recovered. The following table describes what data is deleted based on the directory type that is currently configured in IAM Identity Center.

<table>
<thead>
<tr>
<th>What data gets deleted</th>
<th>Connected directory</th>
<th>IAM Identity Center identity store</th>
</tr>
</thead>
<tbody>
<tr>
<td>All permission sets you have configured for AWS accounts</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>All applications you have configured in IAM Identity Center</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>All user assignments you have configured for AWS accounts</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>All users and groups in the directory or store</td>
<td>N/A</td>
<td>✔️</td>
</tr>
</tbody>
</table>

Use the following procedure when you need to delete your current IAM Identity Center configuration.

**To delete your IAM Identity Center configuration**

1. Open the IAM Identity Center console.
2. In the left navigation pane, choose Settings.
3. On the Settings page, choose the Management tab.
4. In the Delete IAM Identity Center configuration section, choose Delete.
5. In the Delete IAM Identity Center configuration dialog, select each of the check boxes to acknowledge you understand that your data that will be deleted. Type your IAM Identity Center instance in the text box, and then choose Confirm.
AWS IAM Identity Center quotas

The following tables describe quotas within IAM Identity Center. Quota increase requests must come from a management or delegated administrator account. To increase a quota, see Requesting a quota increase.

Note
We recommend using the AWS CLI and APIs if you have more than 50,000 users, 10,000 groups, or 500 permission sets. For more information about the CLI, see Integrating AWS CLI with IAM Identity Center (p. 197). For more information about APIs, see Welcome to the IAM Identity Center API Reference.

Application quotas

<table>
<thead>
<tr>
<th>Resource</th>
<th>Default quota</th>
<th>Can be increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>File size of service provider SAML certificates (in PEM format)</td>
<td>2 KB</td>
<td>No</td>
</tr>
<tr>
<td>File size limit of the IdP certificate uploaded to SSO</td>
<td>2500 (UTF-8) characters</td>
<td>No</td>
</tr>
</tbody>
</table>

AWS account quotas

<table>
<thead>
<tr>
<th>Resource</th>
<th>Default quota</th>
<th>Can be increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of permission sets allowed in IAM Identity Center</td>
<td>2000</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of provisioned permission sets allowed per AWS account</td>
<td>250</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of inline policies per permission set</td>
<td>1</td>
<td>No</td>
</tr>
<tr>
<td>Number of AWS managed and customer managed policies per permission set</td>
<td>20¹</td>
<td>No</td>
</tr>
<tr>
<td>Maximum size of inline policy per permission set</td>
<td>32,768 bytes.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Maximum size of non-whitespace characters in the inline policy per permission set is 10,240 bytes.</td>
<td></td>
</tr>
<tr>
<td>Number of IAM roles (permission sets) in the AWS account that can be updated at a time</td>
<td>1</td>
<td>No</td>
</tr>
</tbody>
</table>
AWS IAM Identity Center User Guide

Active Directory quotas

AWS Identity and Access Management (IAM) sets a quota of 10 managed policies per role. To take advantage of this quota, request an increase to the IAM quota *Managed policies attached to an IAM role* in the Service Quotas console for each AWS account where you want to deploy the permission set.

**Note**

Permission sets (p. 21) are provisioned in AWS accounts as IAM roles, or use existing IAM roles in AWS accounts, and therefore follow IAM quotas. For more information about quotas that are associated with IAM roles, see [IAM and STS quotas](#).

Active Directory quotas

<table>
<thead>
<tr>
<th>Resource</th>
<th>Default quota</th>
<th>Can be increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of connected directories that you can have at a time</td>
<td>1</td>
<td>No</td>
</tr>
</tbody>
</table>

IAM Identity Center identity store quotas

<table>
<thead>
<tr>
<th>Resource</th>
<th>Default quota</th>
<th>Can be increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of users supported in IAM Identity Center</td>
<td>100000</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of groups supported in IAM Identity Center</td>
<td>100000</td>
<td>No</td>
</tr>
<tr>
<td>Number of unique groups that can be used to evaluate the permissions for a user</td>
<td>1000</td>
<td>No</td>
</tr>
</tbody>
</table>

IAM Identity Center throttle limits

<table>
<thead>
<tr>
<th>Resource</th>
<th>Default quota</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAM Identity Center APIs</td>
<td>IAM Identity Center APIs have a collective throttle maximum of 20 transactions per second (TPS). The CreateAccountAssignment has a maximum rate of 10 outstanding async calls. These quotas cannot be changed.</td>
</tr>
</tbody>
</table>

Additional quotas

<table>
<thead>
<tr>
<th>Resource</th>
<th>Default quota</th>
<th>Can be increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of AWS accounts or applications that can be configured *</td>
<td>3000</td>
<td>Yes</td>
</tr>
</tbody>
</table>

---

1AWS Identity and Access Management (IAM) sets a quota of 10 managed policies per role. To take advantage of this quota, request an increase to the IAM quota *Managed policies attached to an IAM role* in the Service Quotas console for each AWS account where you want to deploy the permission set.

**Note**

Permission sets (p. 21) are provisioned in AWS accounts as IAM roles, or use existing IAM roles in AWS accounts, and therefore follow IAM quotas. For more information about quotas that are associated with IAM roles, see [IAM and STS quotas](#).
* Up to 3000 AWS accounts or applications (total combined) are supported. For example, you might configure 2750 accounts and 250 applications, resulting in a total of 3000 accounts and applications.
Troubleshooting IAM Identity Center issues

The following can help you troubleshoot some common issues you might encounter while setting up or using the IAM Identity Center console.

Issues regarding contents of SAML assertions created by IAM Identity Center

IAM Identity Center provides a web-based debug experience for the SAML assertions created and sent by IAM Identity Center, including attributes within these assertions, when accessing AWS accounts and SAML applications from the AWS access portal. To see the details of a SAML assertion that IAM Identity Center generates, use the following steps.

1. Sign in to the AWS access portal.
2. While you are signed into the portal, hold the Shift key down, choose the application tile, and then release the Shift key.
3. Examine the information on the page titled You are now in administrator mode. To keep this information for future reference, choose Copy XML, and paste the contents elsewhere.
4. Choose Send to <application> to continue. This option sends the assertion to the service provider.

**Note**

Some browser configurations and operating systems may not support this procedure. This procedure has been tested on Windows 10 using Firefox, Chrome, and Edge browsers.

Specific users fail to synchronize into IAM Identity Center from an external SCIM provider

If SCIM synchronization succeeds for a subset of users configured in your IdP for provisioning into IAM Identity Center but fails for others, you might see an error similar to 'Request is unparsable, syntactically incorrect, or violates schema' from your identity provider. You may also see detailed provisioning failure messages in AWS CloudTrail.

This issue often indicates that the user in your IdP is configured in a way that IAM Identity Center does not support. Full details of the IAM Identity Center SCIM implementation, including the specifications of required, optional, and forbidden parameters and operations for user objects, can be found in the [IAM Identity Center SCIM Implementation Developer Guide](#). The SCIM Developer Guide should be considered authoritative for information around SCIM requirements. However, the following are a couple of common reasons for this error:

1. The user object in the IdP lacks a first (given) name, a last (family) name, and/or a display name.
   - **Solution:** Add a first (given), last (family), and display name for the user object. In addition, ensure that the SCIM provisioning mappings for user objects at your IdP are configured to send nonempty values for all of these attributes.
2. More than one value for a single attribute is being sent for the user (also known as “multi-value attributes”). For example, the user may have both a work and a home phone number specified in the IdP, or multiple emails or physical addresses, and your IdP is configured to try to synchronize multiple or all values for that attribute.

   • **Solution options:**
     i. Update your SCIM provisioning mappings for user objects at your IdP to send only a single value for a given attribute. For example, configure a mapping that sends only the work phone number for each user.
     ii. If the additional attributes can safely be removed from the user object at the IdP, you can remove the additional values, leaving either one or zero values set for that attribute for the user.
     iii. If the attribute is not needed for any actions in AWS, remove the mapping for that attribute from the SCIM provisioning mappings for user objects at your IdP.

3. Your IdP is trying to match users in the target (IAM Identity Center, in this case) based on multiple attributes. Since user names are guaranteed unique within a given IAM Identity Center instance, you only need to specify **username** as the attribute used for matching.

   • **Solution:** Ensure that your SCIM configuration in your IdP is using only a single attribute for matching with users in IAM Identity Center. For example, mapping `username` or `userPrincipalName` in the IdP to the `userName` attribute in SCIM for provisioning to IAM Identity Center will be correct and sufficient for most implementations.

---

**Users can’t sign in when their user name is in UPN format**

Users might not be able to sign in to the AWS access portal based on the format they use to enter in their user name on the sign in page. For the most part, users can sign in to the user portal using either their plain user name, their down-level logon name (DOMAIN\UserName) or their UPN logon name (UserName@Corp.Example.com). The exception to this is when IAM Identity Center is using a connected directory that has been enabled with MFA and the verification mode has been set to either **Context-aware** or **Always-on**. In this scenario, users must sign in with their down-level logon name (DOMAIN\UserName). For more information, see [Multi-factor authentication for Identity Center users](#). For general information about user name formats used to sign in to Active Directory, see [User Name Formats](#) on the Microsoft documentation website.

---

**I get a ‘Cannot perform the operation on the protected role' error when modifying an IAM role**

When reviewing IAM Roles in an account, you may notice role names beginning with ‘AWSReservedSSO_‘. These are the roles which the IAM Identity Center service has created in the account, and they came from assigning a permission set to the account. Attempting to modify these roles from within the IAM console will result in the following error:

> 'Cannot perform the operation on the protected role 'AWSReservedSSO_RoleName_Here' - this role is only modifiable by AWS'

These roles can only be modified from the IAM Identity Center Administrator console, which is in the management account of AWS Organizations. Once modified, you can then push the changes down to the AWS accounts that it is assigned to.
Directory users cannot reset their password

When a directory user resets their password using the Forgotten Password option during sign-in of the AWS access portal, their new password must adhere to the default password policy as described in Password requirements when managing identities in IAM Identity Center (p. 38).

If a user enters a password that adheres to the policy and then receives the error We couldn't update your password, check to see if AWS CloudTrail recorded the failure. This can be done by searching in the Event History console of CloudTrail using the following filter:

"UpdatePassword"

If the message states the following, then you may need to contact support:

"errorCode": "InternalFailure",
"errorMessage": "An unknown error occurred"

Another possible cause of this issue is in the naming convention that was applied to the user name value. Naming conventions must follow specific patterns such as 'surname.givenName'. However, some user names can be quite long, or contain special characters, and this can cause characters to be dropped in the API call, thereby resulting in an error. You may want to attempt a password reset with a test user in the same manner to verify if this is the case.

If the issue persists, contact the AWS Support Center.

My user is referenced in a permission set but can't access the assigned accounts or applications

This issue can occur if you're using System for Cross-domain Identity Management (SCIM) for Automatic Provisioning with an external identity provider. Specifically, when a user, or the group the user was a member of, is deleted then re-created using the same user name (for users) or name (for groups) in the identity provider, a new unique internal identifier is created for the new user or group in IAM Identity Center. However, IAM Identity Center still has a reference to the old identifier in its permission database, such that the name of the user or group still appears in the UI, but access fails. This is because the underlying user or group ID to which the UI refers no longer exists.

To restore AWS account access in this case, you can remove access for the old user or group from the AWS account(s) where it was originally assigned, and then reassign access back to the user or group. This updates the permission set with the correct identifier for the new user or group. Similarly, to restore application access, you can remove access for the user or group from the assigned users list for that application, then add the user or group back again.

You can also check to see if AWS CloudTrail recorded the failure by searching your CloudTrail logs for SCIM synchronization events that reference the name of the user or group in question.

I cannot get my cloud application configured correctly

Each service provider of a preintegrated cloud application in IAM Identity Center has its own detailed instruction manual. You can access the manual from the Configuration tab for that application in the IAM Identity Center console.
Error 'An unexpected error has occurred' when a user tries to sign in using an external identity provider

This error may occur for multiple reasons, but one common reason is a mis-match between the user information carried in the SAML request, and the information for the user in IAM Identity Center.

In order for an IAM Identity Center user to sign in successfully when using an external IdP as the identity source, the following must be true:

- The SAML nameID format (configured at your identity provider) must be ‘email’
- The nameID value must be a properly (RFC2822)-formatted string (user@domain.com)
- The nameID value must exactly match the user name of an existing user in IAM Identity Center (it doesn't matter if the email address in IAM Identity Center matches or not – the inbound match is based on username)
- The IAM Identity Center implementation of SAML 2.0 federation supports only 1 assertion in the SAML response between the identity provider and IAM Identity Center. It does not support encrypted SAML assertions.
- The following statements apply if Attributes for access control (p. 124) is enabled in your IAM Identity Center account:
  - The number of attributes mapped in the SAML request must be 50 or less.
  - The SAML request must not contain multi-valued attributes.
  - The SAML request must not contain multiple attributes with the same name.
  - The attribute must not contain structured XML as the value.
  - The Name format must be a SAML specified format, not generic format.

Note
IAM Identity Center does not perform “just in time” creation of users or groups for new users or groups via SAML federation. This means that the user must be pre-created in IAM Identity Center, either manually or via automatic provisioning, in order to sign in to IAM Identity Center.

This error can also occur when the Assertion Consumer Service (ACS) endpoint configured in your identity provider does not match the ACS URL provided by your IAM Identity Center instance. Ensure that these two values match exactly.

Additionally, you can troubleshoot external identity provider sign-in failures further by going to AWS CloudTrail and filtering on the event name ExternalIdPDirectoryLogin.

Error 'Attributes for access control failed to enable'

This error may occur if the user enabling ABAC does not have the iam:UpdateAssumeRolePolicy permissions required to enable Attributes for access control (p. 124).
I get a 'Browser not supported' message when I attempt to register a device for MFA

WebAuthn is currently supported in Google Chrome, Mozilla Firefox, Microsoft Edge and Apple Safari web browsers, as well as Windows 10 and Android platforms. Some components of WebAuthn support may be varied, such as platform authenticator support across macOS and iOS browsers. If users attempt to register WebAuthn devices on an unsupported browser or platform, they will see certain options greyed out that are not supported, or they will receive an error that all supported methods are not supported. In these cases, please refer to FIDO2: Web Authentication (WebAuthn) for more information about browser/platform support. For more information about WebAuthn in IAM Identity Center, see FIDO2 authenticators (p. 95).

Active Directory “Domain Users” group does not properly sync into IAM Identity Center

The Active Directory Domain Users group is the default “primary group” for AD user objects. Active Directory primary groups and their memberships cannot be read by IAM Identity Center. When assigning access to IAM Identity Center resources or applications, use groups other than the Domain Users group (or other groups assigned as primary groups) to have group membership properly reflected in the IAM Identity Center identity store.

Invalid MFA credentials error

This error can occur when a user attempts to sign in to IAM Identity Center using an account from an external identity provider (for example, Okta or Azure AD) before their account is fully provisioned to IAM Identity Center using the SCIM protocol. After the user account is provisioned to IAM Identity Center, this issue should be resolved. Confirm that the account has been provisioned to IAM Identity Center. If not, check the provisioning logs in the external identity provider.

I get a 'An unexpected error has occurred' message when I attempt to register or sign in using an authenticator app

Time-based one-time password (TOTP) systems, such as those used by IAM Identity Center in combination with code-based authenticator apps, rely on time synchronization between the client and the server. Ensure that the device where your authenticator app is installed is correctly synchronized to a reliable time source, or manually set the time on your device to match a reliable source, such as NIST (https://www.time.gov/) or other local/regional equivalents.
My users are not receiving emails from IAM Identity Center

All emails sent by the IAM Identity Center service will come from either the address no-reply@signin.aws or no-reply@login.awsapps.com. Your mail system must be configured so that it accepts emails from these sender email addresses and does not handle them as junk or spam.

Error: You can't delete/modify/remove/assign access to permission sets provisioned in the management account

This message indicates that the Delegated administration (p. 107) feature has been enabled and that the operation you previously attempted can only be successfully performed by someone who has management account privileges in AWS Organizations. To resolve this issue, sign in as a user who has these privileges and try performing the task again or assign this task to someone who has the correct permissions. For more information, see Register a member account (p. 108).
# Document history

The following table describes important additions to the AWS IAM Identity Center documentation. We also update the documentation frequently to address the feedback that you send us.

- **Latest major documentation update:** September 23, 2022

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enhanced guidance for getting started with IAM Identity Center</strong></td>
<td>Added new content for getting started with IAM Identity Center and creating an administrative user</td>
<td>September 23, 2022</td>
</tr>
<tr>
<td><strong>Updated users and groups in the Identity Center API Reference</strong></td>
<td>This update includes references to the new Create, Update and Delete APIs in the Identity Center API Reference Guide.</td>
<td>August 31, 2022</td>
</tr>
<tr>
<td><strong>AWS Single Sign-On (AWS SSO) renamed to AWS IAM Identity Center</strong></td>
<td>AWS introduces AWS IAM Identity Center. IAM Identity Center expands the capabilities of AWS Identity and Access Management (IAM) to help you centrally manage account and access to cloud applications for your workforce users. IAM Identity Center features include application assignments, multi-account permissions, and an AWS access portal.</td>
<td>July 26, 2022</td>
</tr>
<tr>
<td><strong>Support for permissions boundaries and customer managed policies in permission sets</strong></td>
<td>Added content for using AWS managed and customer managed AWS Identity and Access Management (IAM) policies with permission sets.</td>
<td>July 14, 2022</td>
</tr>
<tr>
<td><strong>Support for manually enabled AWS Regions</strong></td>
<td>Added content for using IAM Identity Center in manually enabled Regions.</td>
<td>June 15, 2022</td>
</tr>
<tr>
<td><strong>Updates for AWS managed policies</strong></td>
<td>Updated permissions for the AWSSSOServiceRolePolicy AWS managed policy.</td>
<td>May 11, 2022</td>
</tr>
<tr>
<td><strong>Support for delegated administration</strong></td>
<td>Added content for the delegated administration feature.</td>
<td>May 11, 2022</td>
</tr>
<tr>
<td><strong>Updates for AWS managed policies</strong></td>
<td>Updated permissions for the AWSSSOMasterAccountAdministrator, AWSSSOMemberAccountAdministrator, and AWSSSOReadOnly AWS managed policies.</td>
<td>April 28, 2022</td>
</tr>
<tr>
<td>Feature Area</td>
<td>Description</td>
<td>Date</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Support for configurable AD sync</td>
<td>Added content for the configurable AD sync feature.</td>
<td>April 14, 2022</td>
</tr>
<tr>
<td>New AWS managed policy topic</td>
<td>Added details for the AWSSSOAdministratorsAdministrator AWS managed policy.</td>
<td>August 4, 2021</td>
</tr>
<tr>
<td>Updates for quotas</td>
<td>Adjustments to quota tables.</td>
<td>December 21, 2020</td>
</tr>
<tr>
<td>New example policies</td>
<td>Added new customer managed policy examples and updates to the permissions required section.</td>
<td>December 21, 2020</td>
</tr>
<tr>
<td>Support for attribute-based access control (ABAC)</td>
<td>Added content for ABAC feature.</td>
<td>November 24, 2020</td>
</tr>
<tr>
<td>Support for MFA forced enrollment</td>
<td>Updates to require users to enroll an MFA device at sign-in.</td>
<td>November 23, 2020</td>
</tr>
<tr>
<td>Support for WebAuthn</td>
<td>Added content for new WebAuthn feature.</td>
<td>November 20, 2020</td>
</tr>
<tr>
<td>Support for Ping Identity</td>
<td>Added content to integrate with Ping Identity products as a supported external identity provider.</td>
<td>October 26, 2020</td>
</tr>
<tr>
<td>Support for OneLogin</td>
<td>Added content to integrate with OneLogin as a supported external identity provider.</td>
<td>July 31, 2020</td>
</tr>
<tr>
<td>Support for Okta</td>
<td>Added content to integrate with Okta as a supported external identity provider.</td>
<td>May 28, 2020</td>
</tr>
<tr>
<td>Support for external identity providers</td>
<td>Changed references from directory to identity source, added content to support external identity providers.</td>
<td>November 26, 2019</td>
</tr>
<tr>
<td>New MFA settings</td>
<td>Removed two-step verification topic and added new MFA topic in its place.</td>
<td>October 24, 2019</td>
</tr>
<tr>
<td>New setting to add two-step verification</td>
<td>Added content on how to enable two-step verification for users.</td>
<td>January 16, 2019</td>
</tr>
<tr>
<td>Support for session duration on AWS accounts</td>
<td>Added content on how to set the session duration for an AWS account.</td>
<td>October 30, 2018</td>
</tr>
<tr>
<td>New option to use Identity Center directory</td>
<td>Added content for choosing either Identity Center directory or connecting to an existing directory in Active Directory.</td>
<td>October 17, 2018</td>
</tr>
<tr>
<td>Support for relay state and session duration on applications</td>
<td>Added content about relay state and session duration for cloud applications.</td>
<td>October 10, 2018</td>
</tr>
<tr>
<td>Additional support for new cloud applications</td>
<td>Added 4me, BambooHR, Bonusly, Citrix ShareFile, ClickTime, Convo, Deputy, Deskpro, Dome9, DruvaInSync, Egnyte, Engagedly, Expensify, Freshdesk, IdeaScale, Igloo, Jitbit, Kudos, LiquidFiles, Lucidchart, PurelyHR, Samanage, ScreenSteps, Sli.do, SmartSheet, Syncplicity, TalentLMS, Trello, UserVoice, Zoho, OpsGenie, DigiCert, WeekDone, ProdPad, and UserEcho to the application catalog.</td>
<td>August 3, 2018</td>
</tr>
<tr>
<td>Support for multi-account access to management accounts</td>
<td>Added content about how to delegate multi-account access to users in a management account.</td>
<td>July 9, 2018</td>
</tr>
<tr>
<td>Support for new cloud applications</td>
<td>Added DocuSign, Keeper Security, and SugarCRM to the application catalog.</td>
<td>March 16, 2018</td>
</tr>
<tr>
<td>Get temporary credentials for CLI access</td>
<td>Added information about how to get temporary credentials to run AWS CLI commands.</td>
<td>February 22, 2018</td>
</tr>
<tr>
<td>New guide</td>
<td>This is the first release of the IAM Identity Center User Guide.</td>
<td>December 7, 2017</td>
</tr>
</tbody>
</table>
AWS Glossary

For the latest AWS terminology, see the AWS glossary in the AWS Glossary Reference.