AWS Cloud WAN User Guide

AWS Network Manager

AWS Network Manager: AWS Cloud WAN User Guide

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What is AWS Cloud WAN?

AWS Cloud WAN is a managed wide-area networking (WAN) service that you can use to build, manage, and monitor a unified global network that connects resources running across your cloud and on-premises environments. It provides a central dashboard from which you can connect on-premises branch offices, data centers, and Amazon Virtual Private Clouds (VPCs) across the AWS global network. You can use simple network policies to centrally configure and automate network management and security tasks, and get a complete view of your global network. For key concepts and terms about global and core networks, see the section called “Global and core network key concepts”.

> **Note**
>
> AWS Cloud WAN is designed to work with a core network. You can create a core network at the time you create your global network, or you can create one later on. If you want to create a global network without using a core network, use AWS Global Networks for Transit Gateways. For more information, see the *AWS Global Networks for Transit Gateways User Guide*.

There are a number of ways you can work with AWS Cloud WAN to create and maintain your core network, policies, segments, and attachments:

- **AWS Management console**

  The AWS Management console provides a web interface for you to create your global and core networks, policy versions, segments, and attachments. For more information on using the console to create and maintain your global and core networks, see Getting started.

- **AWS Command Line Interface (AWS CLI)**

  Provides command-line support for a broad set of AWS services using the command line. For more information see the Amazon EC2 command line reference, which includes AWS Transit Gateway and Amazon VPC and the *AWS Global Networks for Transit Gateways API Reference*.

- **AWS SDKs**

Provides language-specific API operations and takes care of a number of connection details, such as calculating signatures, handling request retries, and handling errors. For more information, see the *AWS Global Networks for Transit Gateways API Reference*.

- **Query API**

  Provides low-level API actions using HTTPS requests. Using the Query API is the most direct way to access Amazon VPC, but it requires that your application handle low-level details such as generating the hash to sign the request, and handling errors. For more information, see the *Amazon EC2 API Reference.*

Global and core network key concepts

The following are the key concepts for AWS Cloud WAN:

- **Global network**

  A single, private network that acts as the high-level container for your network objects. A global network can contain both AWS Transit Gateways and other AWS Cloud WAN core networks. These can be seen in the Network Manager console.

- **Core network**

  The part of your global network managed by AWS. This includes Regional connection points and attachments, such as VPNs, VPCs, and Transit Gateway Connects. Your core network operates in the Regions that are defined in your core network policy document.

- **Core network policy**

  A core network policy document is a single document applied to your core network that captures your intent and deploys it for you. The core network policy is a declarative language that defines segments, AWS Region routing, and how attachments should map to segments. With a core network policy, you can describe your intent for access control and traffic routing, and AWS Cloud WAN handles the configuration details. Some examples of advanced architectures that you can create with policy include creating a segment for shared services (for example, service directories or authentication services), providing internet access through a firewall for a segment, automatically assigning VPCs to segments based on tags, and defining which AWS Regions a segment is available in.

Over time you might find that you want to make adjustments or additions to your core network policy. With a policy, you can make any changes or additions to your core network and apply those changes through an updated JSON policy. You can do this using either the visual editor on the console, or through an included JSON editor. You can maintain multiple versions of a policy, although only one policy can be in effect. At any time, you can update your core network to use a new policy or revert to a previous version.

- **Attachments**

  Attachments are any connections or resources that you want to add to your core network. Supported attachments include VPCs, VPNs, Transit Gateway route table attachments, and Connect attachments.

- **Core Network Edge**

  The Regional connection point managed by AWS in each Region, as defined in the core network policy. Every attachment connects to a Core Network Edge. Under the hood, this is an AWS Transit Gateway, and it inherits many of the same properties.

  In your core network policy document, you define the AWS Region where you want connectivity. At any time, you can add or remove AWS Regions using the policy document. For each AWS Region that you define in the policy document, AWS Cloud WAN then creates a Core Network Edge router in the specified Region. All Core Network Edges in your core network create full-mesh peering with each other to form a highly resilient network. Traffic across the AWS global network uses redundant connections and multiple paths.

- **Network segments**

  Segments are dedicated routing domains, which means that by default, only attachments within the same segment can communicate. You can define segment actions that share routes across segments in the core network policy. In a traditional network, a segment is similar to a globally consistent Virtual Routing and Forwarding (VRF) table, or a Layer 3 IP VPN over an MPLS network.

  AWS Cloud WAN supports built-in segmentation, which means that you can more easily manage network isolation across your AWS and on-premises locations. Using network segments, you can divide your global network into separate isolated networks. For example, you might want to isolate traffic between different parts of your business, such as between retail sites or IT networks.

You can create a segment and define whether resources that ask for access require approval. You can also define explicit route filters to be applied before those routes can be attached to a segment. Each attachment connects to one segment. Each segment will create a dedicated routing domain. You can create multiple network segments within your global network. Resources connected to the same segment can only communicate within the segment. Optionally, resources in the same segment can be isolated from each other, with access only to shared services. With segments, AWS maintains a consistent configuration across AWS Regions for you, instead of you needing to synchronize configuration across every device in your network.

- **Segment actions and attachment policies**

  Segment actions define how routing works between segments. After you create a segment, you can choose to map attachments to the segments either by explicitly mapping a resource to a segment (for example, `"VpcId: "vpc-2f09a348`) or by creating and using attachment policies. Instead of manually associating a segment to each attachment, attachments are tagged. Those tags are then associated with the applicable segment. When attachments are mapped to segments, you can choose how routes are shared between segments. For example, you might want to share access to a VPN across multiple segments, or allow access between two types of branch offices. You can also choose to configure centralized internet routing for a segment, or route traffic between segments through a firewall.

- **Core network owner** and **Attachment owner**

  When creating a core network within a global network, the user that creates the core network automatically becomes the owner of the core network. A core network owner has full control and visibility over all parts of the AWS Cloud WAN network. The core network owner can then share a core network across accounts or across an organization using AWS Resource Access Manager. For more information, see the section called “Share a core network”. The account to which the core network is shared becomes an attachment owner. An attachment owner has permission only to create connections, attachments, or tags, but no permission for any core network tasks. A core network owner can also be an attachment owner.

  A core network owner can:

  - Create, update, restore, delete, or share a Cloud WAN network.
  - Create, update, download, run, delete, or restore core network policy versions.
  - Create, update, or delete core network attachments.
  - Accept or reject core network attachments.

- Create, update, or remove attachment tags.
- Visualize network topology and policy change sets.
- Track network events, routes, and performance.
- Create sites, links, devices, and other transit gateway associations.

An attachment owner can:

- Create, update, or delete VPC attachments.
- Add, update, or remove attachment tags.

- **Peering**

  You can interconnect your core network edge and transit gateway in the same AWS Region using a peering connection. You can create one or more route table attachments over a peering connection to peer a transit gateway route table through a Cloud WAN network segment, allowing you to deploy end-to-end network segmentation across your transit gateway and Cloud WAN-based networks.

Home Region

The home Region is the AWS Region where data related to your use of your AWS Cloud WAN core network is aggregated and stored. Cloud WAN aggregates and stores this information in the home Region to provide you with a central dashboard with visualized insights into your global network. Currently, Cloud WAN only supports US West (Oregon) as the home Region.

> **⚠ Important**
>
> - Cloud WAN aggregates and stores Regional usage data associated with the core network edges specified in your core network policy from the AWS Regions you're using to the US West (Oregon) Region.
> - When it has been established, you can't change the home Region.

AWS aggregates and stores this Regional usage data from the AWS Regions that you are using to US West (Oregon), using Amazon Simple Queue Service (SQS) and Amazon Simple Storage Service (S3). This data includes but is not limited to:

- Topology data for registered transit gateways
- Event data for transit gateways and VPNs
- Transit gateway IDs for registering transit gateways into a global network
- (Optional) Location data related to your device and site registrations
- (Optional) Provider and link data related to your link registrations
- (Optional) IP address and CIDR ranges used in Cloud WAN and transit gateway Connect peers

All movement and data aggregation occurs over a secure and encrypted channel and stored with encryption at rest. We use a third-party, Mapbox, to create maps of your global network. We send the resource identifiers collected during device and site registrations to Mapbox to generate those maps.

Region availability

AWS Cloud WAN is available in the following AWS Regions:

AWS Region	Description
us-east-1	US East (N. Virginia)
us-east-2	US East (Ohio)
us-west-1	US West (N. California)
us-west-2	US West (Oregon)
af-south-1	Africa (Cape Town)
ap-northeast-1	Asia Pacific (Tokyo)
ap-northeast-2	Asia Pacific (Seoul)
ap-northeast-3	Asia Pacific (Osaka)
ap-south-1	Asia Pacific (Mumbai)
ap-southeast-1	Asia Pacific (Singapore)

AWS Region	Description
ap-southeast-2	Asia Pacific (Sydney)
ap-southeast-3	Asia Pacific (Jakarta)
ca-central-1	Canada (Central)
eu-central-1	Europe (Frankfurt)
eu-north-1	Europe (Stockholm)
eu-west-1	Europe (Ireland)
eu-west-2	Europe (London)
eu-west-3	Europe (Paris)
eu-south-1	Europe (Milan)
me-south-1	Middle East (Bahrain)

Getting started with AWS Cloud WAN

To get started with AWS Cloud WAN, you first create your global network. Your global network contains all of your network resources, such as core networks, sites, devices, and attachments. During the creation process, you can choose to create your core network and core network policy simultaneously. Or you can choose to create the core network, and then create a policy at a later time. Creating a core network and policy creates the structure of your core network and implements it. Until you finish creating your core network and core network policy, you won't be able to do anything in your global network. After the structure is implemented, you can then add attachments, devices, or sites, and you can register existing transit gateways.

Prerequisites

There are no prerequisites for setting up AWS Cloud WAN. However, some features are not available to you unless you set them up in advance. These features are described in the following table:

Prerequisite	Description
Events and metrics	Before viewing events on the Events dashboard, you must complete a one-time setup that registers your events with CloudWatch Logs Insights. Until you register your events, you'll be unable to view any of your events on the dashboard. See the section called “Onboard CloudWatch Logs Insights” for the steps to register your events.
Transit gateways	A transit gateway must first be created on the Amazon Virtual Private Cloud console at console.aws.amazon.com/vpc/home. Transit gateways that you have created in Amazon VPC can then be registered in AWS Cloud WAN to be part of your AWS Cloud WAN global network.

Steps to create your global and core network

The following high-level steps provide links to the required and optional procedures for setting up the structure of your AWS Cloud WAN global and core network.

Step 1: the section called “Create a global network”.

Step 2: the section called “Create a core network and core network policy”.

Step 3: the section called “Create an attachment”.

Step 4: (Optional) the section called “Create a core network policy version”.

Step 5: (Optional) the section called “Register a transit gateway”.

Step 6: (Optional) the section called “Add a device”.

Step 7: (Optional) the section called “Create a site”.

After getting your AWS Cloud WAN network set up, you can work with and modify any aspect of the network. Steps for working with your global and core network can be found in *Work with AWS Cloud WAN*. For example, you can:

- Add new segments and implement an updated policy version.
- Add, edit, or remove attachments, devices, and sites.
- Add new resource tags to further help identify your network resources.
- View logical and topological trees of your global and core networks.

You can also view visualizations of your global and core networks as topological trees and logical diagrams, and you can monitor and track events. See *Visualize and monitor global and core networks* for the ways you can visualize and monitor your global and core networks.

Create a global network

The first step in setting up AWS Cloud WAN is to create a global network. A global network is a single, private network that acts as the high-level container for your network objects. A Global Network can contain both an AWS Transit Gateway and other Cloud WAN core networks. These

will appear in the AWS Network Manager console. After you create a global network, you can then create a core network at the same time. You can also choose to create a core network later on.

> **Note**
>
> If you're only creating and managing a global network without a core network, use AWS Global Networks for Transit Gateways. For more information, see the *AWS Global Networks for Transit Gateways User Guide*.

You can either create a global network using the AWS console or through the command line or API.

To create a global network using the AWS console

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. Choose **Create global network**.
4. Enter a **Name** and **Description** for your global network.
5. (Optional) In **Additional settings**, add **Key** and **Value** tags that further help identify an Network Manager resource. To add multiple tags, choose **Add tag** for each tag that you want to add.
6. (Optional) Do one of the following:

   - Keep the **Add core network in your global network** check box selected, and then choose **Next** to set up your core network and policies. For detailed instructions, see the section called “Create a core network while creating a global network”.
   - Set up your core network later on.

     1. Clear the **Add core network in your global network** check box, and then choose **Next** to review your global network details.
     2. Choose **Edit** for any detail that you want to change, and then choose **Create global network**.

        The **Global networks** page appears with a confirmation box that your global network was created successfully. Later, when you're ready to add your core network, see the section called “Create a core network after creating a global network”.

To create a global network using the command line or API

- create-global-network

Next step: the section called “Create a core network and core network policy”.

Create a core network and core network policy

After you've created your global network, you can create a core network within your global network. When you create your core network, you also create the core network policy that deploys your network structure as it sets up the permissions. When the core network has been created, you can then create attachments within the network, and set up transit gateways and devices. At any time, you can also modify your policy and deploy a new version to better suit your business needs. For steps to create a new version of a policy, see the section called “Create a core network policy version”.

> **Note**
>
> You can only have one core network for each of your global networks.

Create a core network while creating a global network

To create a core network while creating a global network

Prerequisite: the section called “Create a global network”.

1. Create the core network. See the section called “Create a global network”.
2. On the **Create core network** page, under **Core network general settings**, enter a **Name** and **Description** to identify the core network.
3. (Optional) Choose **Additional settings** to add one or more **Key** and **Value** tags to help identify this network resource.
4. (Optional) Under **Core network policy settings**, set the beginning and ending **ASN range** (Autonomous System Number). Format the range as **xxxxx - xxxxx**.

   ASN is the Border Gateway Protocol (BGP) for the new core network. Valid ranges are **64512** – **65334** and **4200000000** – **4294967294**. The **ASN range** is left-closed and right-open. This

means that the leftmost number is included in the range but the rightmost number is not. For example, if you choose an ASN range of **`64900-64903`**, the actual available ASN range is **`64900`** through **`64902`**. **`64903`** is not included.

> **Important**
>
> While the **ASN range** is optional, we recommend that you define a range in your initial core network policy. Once created, that ASN range is locked into that policy and can't be changed. If you connect the core network to any network using BGP, define the ASN range in the initial policy in order to prevent ASN overlap.

5. Choose the **Edge locations**. These are the Regions where your edges are located. You can have more than one edge location, but you must choose at least one. You can select multiple edge locations from the dropdown list.
6. Enter a **Name** to identify the segment. The name can include up to 100 alphanumeric characters. Blank spaces and hyphens are not allowed. For example, if this core network is going to be used for development work, you can name the segment **`development`**.
7. Choose **Next** to review the global network details. Choose **Edit** to make any changes.
8. Choose **Create global network**.

   Your global network is created. The core network policy starts creating and deploying your core network.

> **Important**
>
> A core network is not deployed instantaneously after creation. It can sometimes take several minutes or longer to complete, depending on the number of edge locations. While the core network is being created, you can't create any attachments within your core network or create policy versions. To view the status of the deployment, in the navigation pane, choose **Policy versions**. While the policy is being implemented, the **Change set state** is **Executing**. After the policy is implemented, the **Alias** is **LIVE**, and the **Change set state** changes to **Execution succeeded**.

9. After your policy is LIVE and the core network has been created, you can begin to add attachments to your core network. See the section called “Create an attachment”.

Create a core network after creating a global network

Follow these steps to create a core network after creating a global network. You can only have one core network per global network. If the global network you choose to create a core network for already has an associated core network, you'll be unable to create a new one without first deleting the existing core network.

To create a core network after creating a global network

1. Access the AWS Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global networks**.
3. On the **Global networks** page, if you have multiple global networks, choose the global link that doesn't already have a **Core network**.

   > **Note**
   >
   > You can only have one core network for each global network.

4. Under **Core network** in the navigation pane, choose **Create core network**.

   The page displays a message that a core network is not enabled.
5. Choose **Create core network**.
6. On the **Create core network** page, enter an optional **Name** and **Description** for the core network. The name can include up to 100 alphanumeric characters.
7. (Optional) Under **Additional settings**, add one or more **Key** and **Value** tags to help identify this core network.
8. Choose the **Edge locations**. These are the Regions where your edges are located. You can have more than one edge location, but you must choose at least one. You can select multiple edge locations from the dropdown list.
9. Enter a **Segment name** and **Segment description** to identify the segment. The name can include up to 100 alphanumeric characters. Blank spaces and hyphens are not allowed. For example, if this core network is going to be used for development work, you can name the segment **`development`**.
10. Choose **Create core network**.

11. Your global network is created, and the core network policy starts creating and deploying your core network.

> **Important**
>
> A core network is not deployed instantaneously after creation. It can sometimes take several minutes or longer to complete, depending on the number of edge locations. While the core network is being created, you can't create any attachments within your core network or create policy versions. To view the status of the deployment, in the navigation pane, choose **Policy versions**. While the policy is being implemented, the **Change set state** is **Executing**. After the policy is implemented, the **Alias** is **LIVE**, and the **Change set state** changes to **Execution succeeded**.

12. After your policy is LIVE and the core network has been created, you can begin to add attachments to your core network. See the section called “Create an attachment”.

To view policy deployment status

1. While the policy is deploying, the **Core network** page displays a message that no live core network can be found. To see the status of the policy deployment, continue with the following step.
2. The **Policy versions** page displays the current status of the deployment. To view the current status of the deployment, choose the **Progress** details status bar. The Events section of the page shows the following:

   - **Type** — What's being deployed for the policy. For example, this might be a core network or a segment.
   - **Action** — The action being taken for the Type. This can be **Add**,
   - **State** — The current state of the deployment.
   - **Edge locations** — Any locations for the policy type.
   - **Identifier** — The identifier path for the policy type.
   - **Start time** — The timestamp when deployment of the policy type started.
   - **End time** — The timestamp when deployment of the policy type finished.

3. After your policy is LIVE and the core network has been created, you can begin to add attachments to your core network. See the section called “Create an attachment”.

Next step: the section called "Create an attachment".

Create an attachment

When you attach a VPC to a core network edge, you must specify one subnet from each Availability Zone to be used by the core network edge to route traffic. Specifying one subnet from an Availability Zone enables traffic to reach resources in every subnet in that Availability Zone. Limits mentioned on the Transit Gateway attachment to VPC page of the *Transit Gateway User Guide* applies also to core network VPC attachments. You can only add attachments after your core network is deployed and the core network policy is in place.

You can work with core network attachments using the Amazon VPC Console or the command line or API.

Attachment states can be one of the following. Attachment states appear on the Attachments page of the AWS Cloud WAN console.

- **Creating** — Creation of an attachment is in process.
- **Deleting** — Deletion of an attachment is in process.
- **Pending network update** — Waiting for the connection of attachments to the core network.
- **Pending tag acceptance** — Waiting for the core network owner to review the tag change for an attachment.
- **Pending attachment acceptance** — Waiting for the core network owner to accept or reject an attachment.
- **Rejected** — The core network owner rejected the attachment.
- **Available** — The attachment is fully functional.
- **Failed** — The attachment failed to attach to the core network. For example, this might be due to an input error or a service linked role issue.

The following are the supported core network attachment types. You can create an attachment using either the Network Manager console or through the command line/API.

- Connect
- Connect peer
- Transit gateway route table
- VPC

- VPN

Next step: (Optional) the section called “Create a core network policy version”.

Add a Connect attachment

You can create a transit gateway Connect attachment to establish a connection between a core network edge and third-party virtual appliances (such as SD-WAN appliances) running in Amazon VPC. A Connect attachment supports both the Generic Routing Encapsulation (GRE) tunnel protocol and Tunnel-less connect protocol for high performance, and the Border Gateway Protocol (BGP) for dynamic routing. After you create a Connect attachment, you can create one or more GRE or Tunnel-less Connect tunnels (also referred to as Transit Gateway Connect peers) on the Connect attachment to connect the core network edge and the third-party appliance. You establish two BGP sessions over the tunnel to exchange routing information. The two BGP sessions are for redundancy. A Connect attachment uses an existing VPC attachment as the underlying transport mechanism. This is referred to as the transport attachment.

The Core Network Edge identifies matched GRE packets from the third-party appliance as traffic from the Connect attachment. It treats any other packets, including GRE packets with incorrect source or destination information, as traffic from the transport attachment.

You can create a Connect attachment through either the AWS Network Manager console or using the CLI/SDK.

> **Note**
>
> A Connect attachment must be created in the same AWS account that owns the core network.

Tunnel-less Connect

AWS Cloud WAN supports Tunnel-less Connect for VPC Connect attachments. Tunnel-less Connect provides a simpler way to build a global SD-WAN using AWS. Third-party SD-WAN appliances can peer with Cloud WAN using Border Gateway Protocol (BGP) without needing to deploy IPsec or GRE-based tunnels between the appliance and Cloud WAN. This allows you to deploy a Cloud WAN core network across multiple AWS Regions and to connect one or more of your third-party SD-WAN appliances to core network edges in each Region. Because Tunnel-less Connect has no

tunneling overhead, it provides better performance and peak bandwidth on TLC attachments. IPSec provides 1.25G, allowing you to combine up to eight tunnels while providing up to the entire VPC attachment bandwidth. GRE supports only 5G, which means you'd need to deploy specialized techniques, such as ECMP (Equal Cost Multi-pathing), for scaling bandwidth across tunnels.

You can use the console or API to specify the Tunnel-less Connect protocol.

In order to use Tunnel-less Connect, note the following:

- Your SD-WAN appliance must support BGP. The appliance must be deployed in a VPC and use a Connect attachment enabled for the tunnel-less operation in order to connect your SD-WAN appliance to a core network edge.
- Attachment policy tags or resource names are used to associate the Tunnel-less Connect attachment to the SD-WAN segment.
- Both Connect (GRE) and Connect (Tunnel-less) attachments can co-exist in the same VPC. There is a maximum of single Connect (Tunnel-less) attachment per VPC.
- Tunnel-less Connect and any underlying transport VPC attachments must be associated to the same core network segment.
- Inside CIDR blocks cannot be used when creating a Tunnel-less Connect peer

Routing

Tunnel-less Connect uses BGP for dynamic routing. Therefore, any third-party SD-WAN appliance you want to use for Tunnel-less Connect must support BGP. SD-WAN appliances peer with a core network using the Connect attachment functioning in a tunnel-less manner. It uses native BGP to dynamically exchange routing and reachability information between SD-WAN appliance in the VPC and the core network edge. We recommend using a different autonomous number (ASN) on your SD-WAN appliance from the one configured on the core network edge.

Tunnel-less Connect also supports also supports Multiprotocol extension for BGP (MP- BGP) in order to support both IPv4/IPv6 address families.

You'll need to configure the following in the VPC route table used for Tunnel-less Connect:

- The core network edge BGP IP address. This is necessary to bring up the BGP session between the core network edge and the SD-WAN appliance.
- If your third-party appliance is in a different subnet from the VPC attachment, you'll need to add all destination prefixes.

For more information about route tables, see Configure route tables in the *Amazon VPC User Guide*.

Third-party appliance limitations

An AWS Cloud WAN tunnel-less attachment peer (third-party appliance) can be located in the same subnet as the VPC attachment (transport attachment) subnet or a different subnet. The following limitations apply if your third-party appliance is located either in the same subnet as the Cloud WAN VPC attachment or in different subnets.

For third-party appliances in the same subnet as the Cloud WAN VPC attachment:

- When the third-party appliance is in the same subnet as the VPC attachment, routes are dynamically exchanged using BGP with the core network edge. For the dataplane to function correctly, no VPC route table modifications are required except for adding the core network BGP addresses to establish BGP peering.
- The BGP IPv4 prefixes advertised by the core network edge to your third-party appliance will have the core network attachment's Elastic Network Interface's (ENI) IPv4 address as the next-hop address, which differs from the core network BGP address peering.
- The BGP IPv6 prefixes advertised by the core network edge to your third-party appliance will use the EUI-64 Address of the core network attachment's ENI as the next-hop.

For third-party appliances in a different subnets from the Cloud WAN VPC attachment:

- If the third-party appliance is in a different subnet from the VPC attachment, you can still establish dynamic route exchange the core network edge using BGP. However, in addition to adding the core network BGP addresses for peering, you must modify the VPC route table for the dataplane to function correctly. This includes adding the prefixes received from the core network edge BGP peer into the route table. You can create a summary route that encompasses the longest prefixes advertised by the core network edge.
- The BGP IPv4 prefixes advertised by the core network edge to your third-party appliance will have the core network BGP address as the next-hop.
- The BGP IPv6 prefixes advertised by the core network edge to your third-party appliance will use IPv4-mapped IPv6 addresses of the core network BGP address as the next-hop.

It's recommended that you place your third-party appliance in the same subnet as the Cloud WAN VPC attachment for more seamless integration with Tunnel-less connect.

Add a Connect attachment using the console

The following steps add a Connect attachment using the console.

To add a Connect attachment using the console

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link for the core network you want to add an attachment to.
4. In the navigation pane under he name of the global network, choose **Attachments**.
5. Choose **Create attachment**.
6. Enter a **Name** identifying the attachment.
7. From the **Edge location** dropdown list, choose the location where the attachment is located.
8. Choose **Connect**.
9. From the **Connect attachment** section, choose the Connect protocol. This will be either:
   - **GRE**
   - **Tunnel-less (No encapsulation)**
10. Choose the **Transport Attachment ID** that will be used for the Connect attachment.
11. (Optional) In the **Tags** section, add **Key** and **Value** tags to further help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
12. Choose **Create attachment**.

Add a Connect attachment using the command line or API

Use the command line or API to create an AWS Cloud WAN Connect attachment. When using the `CreateConnectAttachment` API pass the following:`"Protocol" : "NO_ENCAP"`.

To create a Connect attachment using the command line or API

- Use `create-connect-attachment`. See create-connect-attachment.

If you're creating a Tunnel-less Connect attachment, you must then use the following command line or API to create the Connect peer:

- `create-connect-peer`. See create-connect-peer.

Add a Connect peer

You can create a either a GRE Connect peer or a Tunnel-less Connect peer for an existing Connect attachment using either the AWS Cloud WAN console or the command line/API.

Add a GRE Connect peer using the console

The following steps add a GRE Connect peer using the console.

To add a Connect peer using the console

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Choose an attachment with a resource type of **Connect**.

   The **Details** tab displays the **Connect protocol**. Make sure to choose a Connect attachment where the Connect protocol is **GRE**.
6. Choose the **Connect peers** tab.
7. Choose **Create Connect peer**.
8. Enter a **Name** to identify the Connect peer.
9. (Optional) For the **Core network GRE address**, enter the GRE outer IP address for the core network edge. By default, the first available address from the Inside CIDR block is used.
10. For the **Peer GRE address**, enter the GRE outer IP address for the Core Network Edge. By default, the first available address from the Inside CIDR block is used.
11. For **BGP Inside CIDR blocks IPv4**, enter the range of inside IPv4 addresses used for BGP peering. Use a `/29` CIDR block from the `169.254.0.0/16` range.
12. (Optional) For **BGP Inside CIDR blocks IPv6**, enter the range of inside IPv6 addresses used for BGP peering. Use a `/125` CIDR block from the `fd00::/8` range.

13. For **Peer ASN**, specify the Border Gateway Protocol (BGP) Autonomous System Number (ASN) for the appliance. You can use an existing ASN that's assigned to your network. If you do not have one, you can use any ASN in the 1-4294967294 range.

    The default is the same ASN as the core network edge. If you configure the **Peer ASN** to be different than the core network edge ASN (eBGP), you must configure ebgp-multihop with a time-to-live (TTL) value of 2.
14. (Optional) In the **Tags** section, add **Key** and **Value** pairs to further help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
15. Choose **Create Connect peer**.

Add a Tunnel-less Connect peer using the console

The following steps add a Tunnel-less Connect peer using the console.

To add a Tunnel-less Connect peer using the console

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Choose an attachment with a resource type of **Connect**.

   The **Details** tab displays the **Connect protocol**. Make sure to choose a Connect attachment where the Connect protocol is **NO_ENCAP**.
6. Choose the **Connect peers** tab.
7. Choose **Create Connect peer**.
8. Enter a **Name** to identify the Tunnel-less Connect peer.
9. For the **Peer BGP address**, enter the appliance's IPv4 address.

> **Note**
>
> BGP peering primarily uses IPv4 addresses, but it does support IPv6 addres exchange through MP-BGP. To establsih BGP sessions for IPv6 Unicast, you must have IPv4 Unicast addressing.

10. For the **Peer ASN**, specify the BGP ASN for the appliance.

    You can use an existing ASN that's assigned to your network. If you do not have one, you can use any ASN in the `1-4294967294` range. The default is the same ASN as the core network edge. If you configure the **Peer ASN** to be different from the core network edge ASN (eBGP), you must configure ebgp-multihop with a time-to-live (TTL) value of 2.

11. For **Subnet**, choose the subnet of the appliance.

> **Note**
>
> We recommend you run your appliance in the same subnet as your transport VPC attachment.

12. (Optional) In the **Tags** section, add **Key** and **Value** pairs to further help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
13. Choose **Create Connect peer**.

Add a Connect peer using the command line or API

Use the command line or API to create an AWS Cloud WAN Connect peer.

To create a Connect peer using the command line or API

- Use `create-connect-peer`. See create-connect-peer.

Add a transit gateway route table attachment

Add a transit gateway route table attachment to your AWS Cloud WAN core network. You can create a transit gateway route table attachment using either the console or the command line/API. Before creating the attachment you must first have created your transit gateway route table.

For more information about creating transit gateway route tables, see Routing in the *AWS Transit Gateway User Guide*.

Add a transit gateway route table attachment using the console

The following steps add a transit gateway route table attachment using the console.

To add a transit gateway route table attachment using the console

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link for the core network you want to add an attachment to.
4. In the navigation pane under he name of the global network, choose **Attachments**.
5. Choose **Create attachment**.
6. Enter a **Name** identifying the attachment.
7. From the **Edge location** dropdown list, choose the location where the attachment is located.
8. From the **Attachment type** dropdown list, choose **Transit gateway route table**.
9. In the **Transit gateway route table attachment** section, choose the **Transit gateway peering** that will be used for the route table attachment. For information on creating a peering, see the section called “Create a peering”.
10. From the **Transit gateway route table** dropdown list, choose the route table that you want to be used for the peering. For information on creating a transit gateway route table, see Transit gateway route tables in the *AWS Transit Gateway Guide*.
11. (Optional) In the **Tags** section, add **Key** and **Value** tags to help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
12. Choose **Create attachment**.

Add a transit gateway route table attachment using the command line or API

Use the command line or API to create an AWS Cloud WAN transit gateway route table attachment.

To create a transit gateway route table attachment using the command line or API

- Use `create-transit-gateway-route-table-attachment`. See create-transit-gateway-route-table-attachment.

Add a VPC attachment

When you attach a VPC to a core network edge in AWS Cloud WAN, you must specify one subnet from each Availability Zone to be used by the core network edge to route traffic. Specifying one subnet from an Availability Zone enables traffic to reach resources in every subnet in that Availability Zone. For more information about limits to core network VPC attachments, see Transit Gateway attachment to a VPC in the *Transit Gateway User Guide*.

> **Important**
>
> You cannot select a subnet from a Local Zone while creating a Cloud WAN VPC attachment. Doing so will result in an error. For more information about Local Zones, see the *AWS Local Zones User Guide*.

Appliance mode

If you plan to configure a stateful network appliance in your VPC, you can enable appliance mode support for the VPC attachment in which the appliance is located when you create an attachment. This ensures that Cloud WAN uses the same Availability Zone for that VPC attachment for the lifetime of the flow of traffic between a source and destination. It also allows Cloud WAN to send traffic to any Availability Zone in the VPC as long as there is a subnet association in that zone. While appliance mode is only supported on VPC attachments, the network flow can enter the core network from any other Cloud WAN attachment type, including VPC, VPN, and Connect attachments. Cloud WAN appliance mode also works for network flows that have sources and destinations across different AWS Regions in your core network. Network flows can potentially be rebalanced across different Availability Zones if you don't initially enable appliance mode but later edit the attachment configuration to enable it.

You can enable or disable appliance mode using either the console or the command line/API.

Note

- When you create a VPC attachment you can't create a core network VPC attachment that uses only IPv6 subnets. A core network VPC attachment must also support IPv4 addresses.
- Appliance mode is only supported for VPC attachments.

Add a VPC attachment using the console

The following steps add a VPC attachment using the console.

To add a VPC attachment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link for the core network you want to add an attachment to.
4. In the navigation pane under he name of the global network, choose **Attachments**.
5. Choose **Create attachment**.
6. Enter a **Name** identifying the attachment.
7. From the **Edge location** dropdown list, choose the location where the attachment is located.
8. Choose **VPC**.
9. In the VPC attachment section, choose **Appliance mode support** appliance mode is supported.
10. Choose **IPv6 support** if the attachment supports IPv6.
11. From the **VPC IP** dropdown list, choose the VPC ID to attach to the core network.
12. After choosing the VPC ID, you're prompted to choose the **Availability Zone** and **Subnet Id** in which to create the core network VPC attachment. The Availability Zones that are listed are those edge locations that you chose when you created your core network. You must choose at least one Availability Zone and subnet ID.
13. (Optional) In the **Tags** section, add **Key** and **Value** pairs to further help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
14. Choose **Create attachment**.

Add a VPC attachment using the command line or API

Use the command line or API to create an AWS Cloud WAN VPC attachment

To create a VPC attachment using the command line or API

- Use `create-vpc-attachment`. See create-vpc-attachment.

To enable appliance mode, add `--options ApplianceModeSupport=true` to the command.

Shared subnets

A VPC owner can create VPC attachments in a shared VPC subnet. Participants cannot. The Cloud WAN or core network owner must first share their core network with the VPC owner via AWS RAM for the VPC owner to be able to create VPC attachments.

For more information, see Share your VPC with other accounts in the *Amazon VPC User Guide*.

Troubleshoot VPC attachment creation

The following information might help you troubleshoot an issue where a VPC attachment shows a `Failed` state upon creation.

Problem

A VPC attachment shows a `Failed` state after creating the attachment.

Cause

One or more of the following issues might be the cause for the failed attachment.

1. One or both of the following required services-linked roles don't exist in your account:
   - **AWSServiceRoleForVPCTransitGateway**
   - **AWSServiceRoleForNetworkManager**
2. VPC or subnet IDs might not be valid or are not available.

Solution

Depending on the cause, try the following:

1. Add the missing service-linked roles:

- If the **AWSServiceRoleForVPCTransitGateway** service-linked role doesn't exist in your account, run the following to create it:

  ```
  aws iam create-service-linked-role --aws-service-name
  transitgateway.amazonaws.com
  ```

- If the **AWSServiceRoleForNetworkManager** service-linked role doesn't exist in your account, run the following to create it:

  ```
  aws iam create-service-linked-role --aws-service-name
  networkmanager.aws.internal
  ```

  For more information about these service-linked roles, see ???.

2. Verify that any VPC or subnet IDs used for the attachment are valid and are available.

Add a Site-to-Site VPN attachment

To attach a Site-to-Site VPN connection to your core network edge, you must first create a Site-to-Site VPN connection with **Target Gateway Type** set to **Not Associated**. See Creating an AWS Cloud WAN Site-to-Site VPN attachment in the *AWS Site-to-Site VPN User Guide*.

You can create a Site-to-Site VPN attachment using either the Network Manager console or using the command line/API.

> **Note**
>
> - Your Site-to-Site VPN must be attached to a core network before you can start configuring a customer gateway. AWS doesn't provision these endpoints until the Site-to-Site VPN is attached to the core network.
> - A Site-to-Site VPN attachment must be created in the same AWS account that owns the core network.

Add a Site-to-Site VPN attachment using the console

To attach a Site-to-Site VPN connection to your core network edge, you must first create a Site-to-Site VPN connection with **Target Gateway Type** set to **Not Associated**. See Creating an AWS Cloud WAN Site-to-Site VPN attachment in the *AWS Site-to-Site VPN User Guide*.

The following steps add a Site-to-Site VPN attachment using the console

To add a Site-to-Site VPN attachment using the console

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link for the core network you want to add an attachment to.
4. In the navigation pane under he name of the global network, choose **Attachments**.
5. Choose **Create attachment**.
6. Enter a **Name** identifying the attachment.
7. From the **Edge location** dropdown list, choose the location where the attachment is located.
8. Choose **VPN**.
9. From the **VPN attachment** section, choose the VPN ID to be used for the VPN attachment.
10. (Optional) In the **Tags** section, add **Key** and **Value** pairs to further help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
11. Choose **Create attachment**.

Add a Site-to-Site VPN attachment using the command line or API

Use the command line or API to create an AWS Cloud WAN Site-to-Site VPN attachment.

To create a Site-to-Site VPN attachment using the command line or API

- Use `create-site-to-site-vpn-attachment`. See create-site-to-site-vpn-attachment.

Register a transit gateway

Prerequisite: A transit gateway must first be created on the Amazon Virtual Private Cloud console at console.aws.amazon.com/vpc/home. For the steps to create a transit gateway, see Working with transit gateways in the *Amazon VPC Transit Gateways Guide*

Transit gateways that you've created in Amazon VPC can be registered in AWS Cloud WAN to be part of your AWS Cloud WAN global network.

To register a transit gateway in AWS Cloud WAN

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Choose **Transit gateways**.
5. For **Select Transit Gateway**, choose the transit gateway that you want to register.
6. Choose **Register Transit Gateway**.

Next step: (Optional) the section called “Create a site”.

Create a site

A site represents the physical location of your network, using location information. Sites are used in dashboard visualizations.

To create a site

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Sites**.
5. Choose **Create site**.
6. For **Name** and **Description**, enter a name and description for the site.
7. For **Address**, enter the physical address of the site, for example, New York, NY 10004.
8. For **Latitude**, enter the latitude coordinates for the site (for example, `40.7128`).
9. For **Longitude**, enter the longitude coordinates for the site (for example, `-74.0060`).
10. (Optional) Under **Additional settings**, add one or more **Key** and **Value** tags to help identify this site.
11. Choose **Create site**.

Next step: (Optional) the section called “Add a device”.

Add a device

Devices represent a physical or virtual appliance.

When you've created a device, you have options for further refining it. For more information on working with devices in AWS Cloud WAN, see Working with devices.

To add a device

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose **Create Device**.
6. For Name and Description, enter a name and description for the device.
7. For **Model**, enter the device model number.
8. For **Serial number**, enter the serial number for the device.
9. For **Type**, enter the device type.
10. For **Vendor**, enter the name of the vendor, for example, **`Cisco`**.
11. For **Location type**, specify whether the device is located in a remote location (**On-premises, Data center/ Other Cloud Provider**) or in the **AWS Cloud**.

    If you choose **AWS Cloud**, specify the location of the device within AWS:

    - For the **Zone**, specify the name of an **Availability Zone**,**Local Zone**, **Wavelength Zone**, or an **Outpost**.
    - For the **Subnet**, specify the Amazon Resource Name (ARN) of the subnet (for example, `arn:aws:ec2:useast-1:111111111111:subnet/subnet-abcd1234`).
12. For **Address**, enter the physical location of the site (for example **`New York, NY 10004`**).
13. For **Latitude**, enter the latitude coordinates for the site (for example, **`40.7128`**).
14. For **Longitude**, enter the longitude coordinates for the site (for example, **`-74.0060`**).

Work with AWS Cloud WAN

With your global and core networks in place, you can modify and change different aspects of your global network and core networks.

Topics

Global and core networks

A core network owner can maintain all aspects of global and core networks, including viewing, deleting, and updating networks.

Global networks

View, edit, or delete any of your current global networks.

Topics

View and edit global network information

To view details about a global network

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Choose the **Details** tab.
5. On the **Details** page you can edit the following:
   - (Optional) To edit the description of your global network, in the **Details** section, choose **Edit**. In the **Description** field, enter a new description for your global network, and then choose **Edit global network**.
   - (Optional) To edit, add, or delete tags, in the **Tags** section, choose **Edit tags**.
     - To edit any current tag, change the **Key** or **Value** text as needed.
     - To add additional **Key** and **Value** tags, choose **Add tag** for each tag that you want to add.
     - To remove any existing tag, choose **Remove tag**.

Delete a global network

When you delete a global network, the deletion cannot be undone. Before you delete a global network, you must first delete any core networks that are associated with it. For more information on deleting core networks, see the section called “Delete a core network”.

To delete a global network

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Choose the **Details** tab.
5. On the **Details** page, choose **Delete**, and then confirm that you are deleting the global network.

Core networks

View, edit, or delete core networks.

Topics

View or edit core network information

To view or edit details about a core network

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. Choose the **Details** tab.
6. On the **Details** page, you can edit the following:
   - (Optional) To edit the description of your core network, in the **Details** section, choose **Edit**. In the **Description** field, enter a new description for your core network, and then choose **Edit core network**.
   - (Optional) To edit, add, or delete tags, in the **Tags** section, choose **Edit tags**.
     - To edit any current tag, change the **Key** or **Value** text as needed.
     - To add additional **Key** and **Value** tags, choose **Add tag** for each tag you want to add.
     - To remove any existing tag, choose **Remove tag**.

Delete a core network

When you delete a core network, the deletion cannot be undone. After you have deleted all core networks that are associated with a global network, you can then delete a global network. For more information on deleting global networks, see the section called “Delete a global network”.

To delete a core network

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. Choose the **Details** tab.
6. On the **Details** page, choose **Delete**, and then confirm that you are deleting the core network.

Create a core network policy version

You can create a core network policy version at any time from the console, using visual editor mode or JSON mode. When you create a policy version, you can configure settings that determine how your network works. When you create a new policy version, a change set of the proposed core network changes is added. You can then review the changes and deploy the new core network and core network policy when you're ready.

When you create a new policy version, the policy version ID increments from the previous LIVE version. For example, if the current policy version ID is 1, and you create a new version of that policy, the new version is numbered 2. The latest version is displayed on the Policy versions screen with a **LATEST** status, indicating that the new policy is ready to deploy.

Change set states can be any of the following:

- **Ready to execute** — A policy version change set and a new policy version have been created. This policy version was verified with no issues and is in a state where it can be deployed as the new LIVE policy. You can have multiple policy versions in this state, but you can only have one LIVE policy. When deployed, the policy change set state changes to **Execution succeeded**. For the steps to deploy a policy change set state, see the section called “Deploy a policy version”.
- **Execution succeeded** — The policy version was deployed as the new LIVE policy.
- **Out of date** — If you have multiple policy version change sets, any policy version that's older than the current LIVE policy is set to out-of-date, indicating that it's older than the LIVE policy. You can restore an out-of-date policy. For instructions, see the section called “Restore an out-of-date policy version”.

- **Failed generation** — An error prevented the policy from generating. Choose the Failed generation link to see details about the failure.
- **Pending generation** — A policy version was created and is waiting to be generated. When the version has been generated, the change set state changes to **Ready to execute**. If policy generation failed, this state changes to **Failed generation**.

You can create a core network policy version using either the AWS Cloud WAN console or by creating a JSON file.

- the section called “Create a policy version using the AWS Cloud WAN console”
- the section called “Create a policy version using the JSON editor”

Create a policy version using the AWS Cloud WAN console

Use the AWS Cloud WAN console to create a core network policy version following these tasks:

1. Configure the network settings.
2. Create network policy segments within your core network.
3. Create segment sharing and segment route actions.
4. Create policy attachments.

Network configuration

You can use the **Network configuration** page to configure the Border Gateway Protocol (BGP) Autonomous System Number (ASN) for your core network. The valid ranges are **64512 - 65534** and **4200000000 - 4294967294**. You can also configure the Inside CIDR blocks that are used for BGP peering on Connect peers. For more information on Transit Gateway Connect attachment and Connect peers, see the Transit Gateway Connect documentation. Using the network configuration, you can also configure the edge locations where you want the Core Network Edges to be available. At any time, you can add or remove edge locations through the network configuration.

To configure the network settings

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity** choose **Cloud WAN**.

3. On the **Global networks** page, choose the global network ID that for the core network you want to create a policy version for, and then choose **Core network**.
4. In the navigation pane, choose **Policy versions**.
5. Choose **Create policy version**.
6. In **Choose policy view mode**, choose **Visual editor**.
7. The **Network configuration** displays general settings for the policy.
8. In **General settings,** choose **Edit**.
    1. The **Version** can't be changed for a policy version.
    2. Choose **VPN ECMP support** if the core network should forward traffic over multiple-cost routes using VPN.
    3. Choose **Edit general settings**.
9. In the **ASN ranges** section, do the following:
    1. Choose **Create**.
    2. For **ASN range**, enter the ASN range for the policy version. For example, enter **`64512-65334`**.

        > **Note**
        >
        > The **ASN range** is left-closed and right-open. This means that the leftmost number is included in the range but the rightmost number is not. For example, if you choose an ASN range of **`64900-64903`**, the actual available ASN range is **`64900`** through **`64902`**. **`64903`** is not included.

    3. Choose **Create ASN range**.
10. In the **Inside CIDR blocks** section, do the following:
    1. Choose **Create**.
    2. For **CIDR**, enter the CIDR block that you want to use for BGP peering on Connect peers.
    3. Choose **Create inside CIDR block**.
11. In the **Edge locations** section, do the following:
    1. Choose **Create**.

2. From the **Location** dropdown list, choose the **Region** where you want the Core Network Edge router to be created. You can choose only one Region.
3. For **ASN**, enter the ASN number for the Region.

> **Note**
>
> You can't change the ASN of a Core Network Edge. Any transit gateway with the same ASN can't be peered to that Core Network Edge. For example, if you have a Core Network Edge with an ASN of **64512**, you can't peer any transit gateway that also has an ASN of **64512**.

4. For **Inside CIDR block**, enter the CIDR block that you want to use for BGP peering on Connect peers. You can enter multiple CIDR blocks by choosing **Add** for each block that you want to add. Choose **Remove** for any block that you don't want.

> **Note**
>
> You can't leave any blank destination CIDR blocks. Choose **Remove** to delete any empty blocks.

5. Choose **Create edge locations**.

12. Next, add your **Segments**. For detailed instructions, see the section called “Segments”.

Segments

You can use a network segment to divide your global network into separate isolated networks. On the segments page, you create a segment, and then define the attachment communication mapping. Each segment creates a dedicated routing domain. You can create multiple network segments within your global network. Resources that are connected to the same segment can only communicate within the segment. Optionally, you can also set resources in the same segment to be isolated from each other, with access only to shared services. With segments, AWS maintains a consistent configuration across AWS Regions for you, meaning that you don't need to synchronize configuration across every device in your network.

To configure a segment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity** choose **Cloud WAN**.
3. On the **Global networks** page, choose the global network ID that for the core network you want to create a policy version for, and then choose **Core network**.
4. In the navigation pane, choose **Policy versions**.
5. Choose **Create policy version**.
6. Choose **Segments**.
7. In the **Segments** section, Choose **Create**.
8. Enter the **Segment name** and **Segment description** to identify the segment.
9. From the **Edge locations** dropdown list, choose one or more segments to create.
10. Choose **Require acceptance** if you require approval for attachments to be mapped to this segment.
11. Choose **Isolated attachments** if you need this segment isolated. Attachments in isolated segments can't communicate with other segments, and attachments in other segments can't communicate with the isolated segment.
12. For **Segment filter**, choose if you want to **Allow all** shared routes from other segments, **Allow selected** routes, or **Deny selected** routes.
13. Choose **Create policy**.

Segment actions

Segment actions allow you to optionally share your segments or create routes.

Segment sharing

Create a shared segment between two segments.

Segment sharing is bidirectional by default. When you create a segment share between two segments, routes from both segments are automatically advertised to each other. For example, you might share a segment named `test` with another segment named `dev`. Routes from `test` are advertised to `dev`, and vice versa. To make routes in shared segments unidirectional, create a deny list filter to share routes from one segment to the other, but not vice versa. Using the previous

example, you could make a deny list filter that prevents routes from `test` being advertised to `dev`. For more information on creating the deny list for a segment, see the section called “Segments”.

To create a shared segment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity** choose **Cloud WAN**.
3. On the **Global networks** page, choose the global network ID that for the core network you want to create a policy version for, and then choose **Core network**.
4. In the navigation pane, choose **Policy versions**.
5. Choose **Create policy version**.
6. Choose **Segment actions**.
7. (Optional) In the **Sharing** section, choose **Create**, and then do the following:
    1. From the **Segment** dropdown list, choose the core network segment that you want to share.
    2. For the **Segment filter**, choose whether you want to allow all shared routes from other segments, to allow only selected routes, or to deny selected routes. The default is **Allow all**.
    3. Choose **Create sharing**.

Segment routes

Create a segment route for a policy version.

To create a segment route

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity** choose **Cloud WAN**.
3. On the **Global networks** page, choose the global network ID that for the core network you want to create a policy version for, and then choose **Core network**.
4. In the navigation pane, choose **Policy versions**.
5. Choose **Create policy version**.
6. (Optional) In the **Routes** section, choose **Create**, and then do the following:
    1. From the **Segment** dropdown list, choose the core network segment that you want to share.

2. For **Destination CIDR Block**, enter a static route. You can enter multiple CIDR blocks by choosing **Add** for each block that you want to add. Choose **Remove** for any blocks that you don't want.

   > **Note**
   >
   > You can't leave any blank destination CIDR blocks. Choose **Remove** to delete any empty blocks.

3. Choose **Blackhole** if you want to "black hole" the route. If you make this choice, you can't add any attachments to the route.
4. From the **Attachments** list, choose any attachments that you want to include in this route.
5. Choose **Create segment route**.

7. (Optional) Add **Attachment policies**. For more information, see the section called “Attachment policies”.
8. Choose **Create route**.

Attachment policies

Attachment policies control how your attachments map to your segments.

To create an attachment policy

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity** choose **Cloud WAN**.
3. On the **Global networks** page, choose the global network ID that for the core network you want to create a policy version for, and then choose **Core network**.
4. In the navigation pane, choose **Policy versions**.
5. Choose **Create policy version**.
6. (Optional) Choose **Attachment policies**.
7. Choose **Create**.
8. For the **Rule number**, enter the rule number to apply to this attachment. Rule numbers determine the order in which rules are run.
9. Enter an optional **Description** to identify the attachment policy.

10. In the **Action** section, choose how you want to associate the attachment to the segment. Choose one of the following:

    - **Segment name** — associates the attachment by the segment name. After choosing this option, the segment to attach to from the **Attach to segment** dropdown list.
    - **Attachment tag value** — associates the attachment by the tag's value in a key-value pair. Enter the tag value in the **Attachment tag** value field.

11. Choose one of the following:

    - **Inherit segments acceptance value** if the attachment inherits the acceptance setting from a segment when a segment was created. This can't be changed.
    - **Requires attachment acceptance** if you require approval for attachments to be mapped to this segment.
    - If no acceptance option is chosen, attachments are automatically mapped to the segment.

    > **Note**
    >
    > If `require-attachment-acceptance` is `false` for a segment, it's still possible for attachments to be added to or removed from a segment automatically when their tags change. If this behavior is not desired, set `require-attachment-acceptance` to `true`.

12. (Optional) For **Condition logic**, further refine how the attachment is associated with the segment:

    - Choose **OR** — if you want to associate the attachment with the segment by either the **Segment name/Attachment tag value**, *or* by the chosen conditions.
    - Choose **AND** — if you want to associate the attachment with the segment by either the **Segment name/Attachment tag value** *and* by the chosen conditions.

    If no acceptance option is chosen, attachments are automatically mapped to the segment.

13. In **Conditions**, set the condition logic by doing the following:

    1. From the **Type** dropdown list, choose one of the following condition types:
        - **Resource Id** — Set an **OR** or **AND** condition that uses a Resource ID.

- **Attachment type** — Set an **OR** or **AND** condition that matches a specific attachment type.
- **Account** — Set an **OR** or **AND** condition that matches an account.
- **Tag name** — Set an **OR** or **AND** condition that matches a specific tag name.
- **Tag value** — Set an **OR** or **AND** condition that matches a specific tag value.

2. From the **Operator** dropdown list, choose the operator. The operator determines the relationship of the Type.
   - **Equals** — Filters results that match the passed **Condition value**.
   - **Not equals** — Filters results that do not match the passed **Condition value**. This option is not used for **Attachment type**.
   - **Begins with** — Filters results that start with the passed **Condition value**. This option is not used for **Attachment type**.
   - **Contains** — Filters results that match a substring within a string. This option is not used for **Attachment type**.
   - **Any** — Filters results that match any field. This option is not used for **Attachment type**.
3. In the **Condition values** field, enter the value that corresponds to the **Type** and **Operator**. This option is not used for **Attachment type**.
4. Choose **Add** to include additional conditions or choose **Remove** to delete any conditions.

14. Choose **Create attachment policy**.
15. Choose **Create policy**.

Example attachment policy

The following shows a JSON containing three attachment policies for a core network.

- There are three segments, `DevelopmentSegment`, `TestingSegment`, and `ProductionSegment`, which were first created on the **Segments** tab of the **Create policy** page. When these segments were created, `DevelopmentSegment` was set to automatically accept attachments, while `TestingSegment` and `ProductionSegment` were required to accept attachments. `ProductionSegment` was also limited to `us-east-1` only and only `TestingSegment` is allowed to advertise to this segment.
- Rule numbers are manually assigned to each attachment policy for rule processing. Rules are then processed in numerical order according to the number assigned to them. In this example, the following rule numbers are used: `100` for `DevelopmentSegment`, `200` for

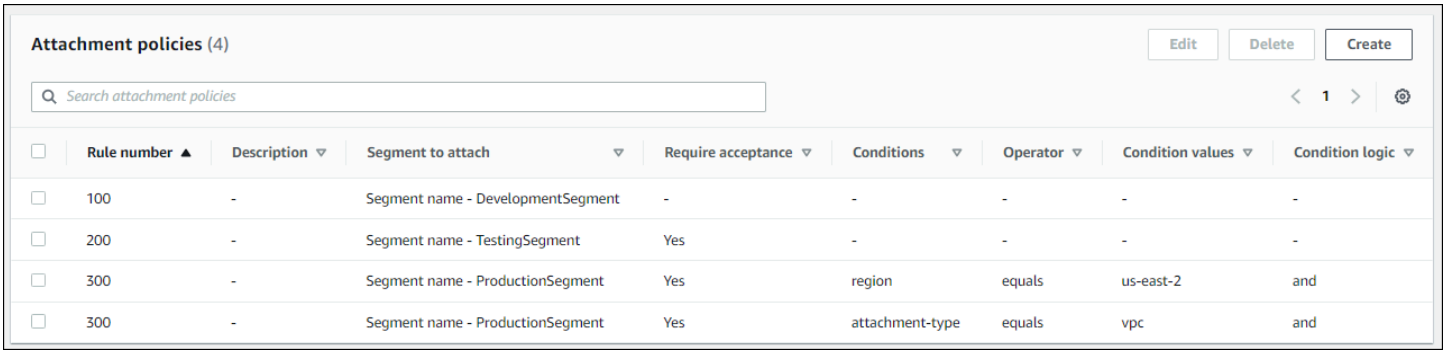
`TestingSegment`, and `300` for `ProductionSegment`. This indicates that rule `100` will be run first, followed by rule `200` and then rule `300`. Once an attachment matches a rule, no further rules are processed for that attachment. Rule `300` for `ProductionSegment` additionally indicates that the policy will only accept `vpc` attachments and only if the request comes from `us-east-2`.

For more information on the parameters used in the JSON file, see the section called "Core network policy parameters".

```
{
  "version": "2021.12",
  "core-network-configuration": {
    "vpn-ecmp-support": true
  },
  "segments": [
    {
      "name": "DevelopmentSegment",
      "require-attachment-acceptance": false
    },
    {
      "name": "TestingSegment",
      "require-attachment-acceptance": true
    },
    {
      "name": "ProductionSegment",
      "edge-locations": [
        "us-east-1"
      ],
      "require-attachment-acceptance": true,
      "isolate-attachments": true,
      "allow-filter": [
        "TestingSegment"
      ]
    }
  ],
  "attachment-policies": [
    {
      "rule-number": 100,
      "condition-logic": "or",
      "conditions": [],
      "action": {
        "association-method": "constant",
```

```
        "segment": "DevelopmentSegment"
      }
    },
    {
      "rule-number": 200,
      "condition-logic": "or",
      "conditions": [],
      "action": {
        "association-method": "constant",
        "segment": "TestingSegment",
        "require-acceptance": true
      }
    },
    {
      "rule-number": 300,
      "condition-logic": "and",
      "conditions": [
        {
          "type": "region",
          "operator": "equals",
          "value": "us-east-2"
        },
        {
          "type": "attachment-type",
          "operator": "equals",
          "value": "vpc"
        }
      ],
      "action": {
        "association-method": "constant",
        "segment": "ProductionSegment",
        "require-acceptance": true
      }
    }
  ]
}
```

Using the **Visual editor**, the same policies display as follows:



Note that if an attachment policy uses the **and** condition, each condition appears on a separate row of the editor. In this example, since rule number 300 uses **region** and **attachment-type** conditions, each of those conditions appear on separate rows.

Create a policy version using the JSON editor

You can create a core network policy version by using the AWS Cloud WAN JSON editor. In the JSON editor, you add the parameters of your core network and policies. For a description of the required and optional parameters in the JSON file, see the section called “Core network policy parameters”.

> **Note**
>
> Familiarity with creating JSON files is required.

To create a policy version using a JSON editor

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity** choose **Cloud WAN**.
3. On the **Global networks** page, choose the global network ID that for the core network you want to create a policy version for, and then choose **Core network**.
4. In the navigation pane, choose **Policy versions**.
5. Choose **Create policy version**.
6. In **Choose policy view mode**, choose **JSON**.
7. In the JSON editor, create your new policy. You can create a new policy version using a blank form, or copy and modify the contents of a policy version that you've downloaded.

- For the required and optional parameters in your JSON policy, see the section called "Core network policy parameters".
- For the steps to download a previous policy version, see the section called "Download a policy"

8. Choose **Create policy**.

   A new policy version is generated.

   The **Change set state** on the **Policy version** page displays **Pending generation** while the new policy generates. The state changes when the policy either generates successfully or fails to generate.

Next step: Optional: the section called "Register a transit gateway".

Core network policies

You can update, delete, or restore an out-of-date AWS Cloud WAN policy. You can also download a policy as a JSON file, and then edit the JSON file to create a new policy version. For examples of JSON policies, see the section called "Core network policy examples".

When you make an update to a policy version, it creates a new change set for that new policy version. When a change set has been created, you can then implement it as your new core network policy.

Topics

Update a policy version

Before deploying a new policy version, review the proposed change set.

To access a core network policy change set

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**, and then choose **Policy versions**.
5. Under **Policy version ID**, choose the policy version that you want to edit, and then choose **Edit**.
6. Change any information on the **Network configuration**, **Segments**, **Segment actions**, or **Attachment policies** tabs. For more information about creating policy versions, see the section called “Create a core network policy version”.
7. Choose **Create policy**. This creates a new version of the policy. The policy version is incremented by one from the last version.

   The **Change set state** of the new version is set to **Pending generation** on the Policy versions page, and the alias is set to **LATEST**, indicating that this is the most recent version of the policy. When a policy version has been generated, the **Change set state** changes to **Ready to execute**. You can then implement the new policy version as your **LIVE** policy. See the section called “Deploy a policy version”.

View a policy change set

View proposed changes to a policy before deploying those changes to become the new live policy.

A policy version is never implemented automatically. After creating a version of a policy, you can implement the policy version as your new **LIVE** policy.

To view a core policy version change set

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.

4. In the navigation pane, choose **Core network**, and then choose **Policy versions**.
5. In the **Policy versions section**, choose the check box that you want to see policy changes for.
6. Choose **View or apply change set**. This creates a new version of the policy. The policy version is incremented by one from the last policy version.
7. The **Change set** page displays the **Type** of change being affected, for example, a core network segment, and the **Action** that's associated with that type, for example, adding a new segment.
8. In **New Values** and **Previous values**, choose **Details** to view the change in a JSON format.
9. In the **Compare** column, choose **Compare** to view a line-by-line comparison of the current live policy with the proposed policy change.

Compare policy change set versions

Compare two policy versions against each other using the console. The comparison returns line-by-line changes between the two policies in JSON format with changes highlighted.

To compare policy versions

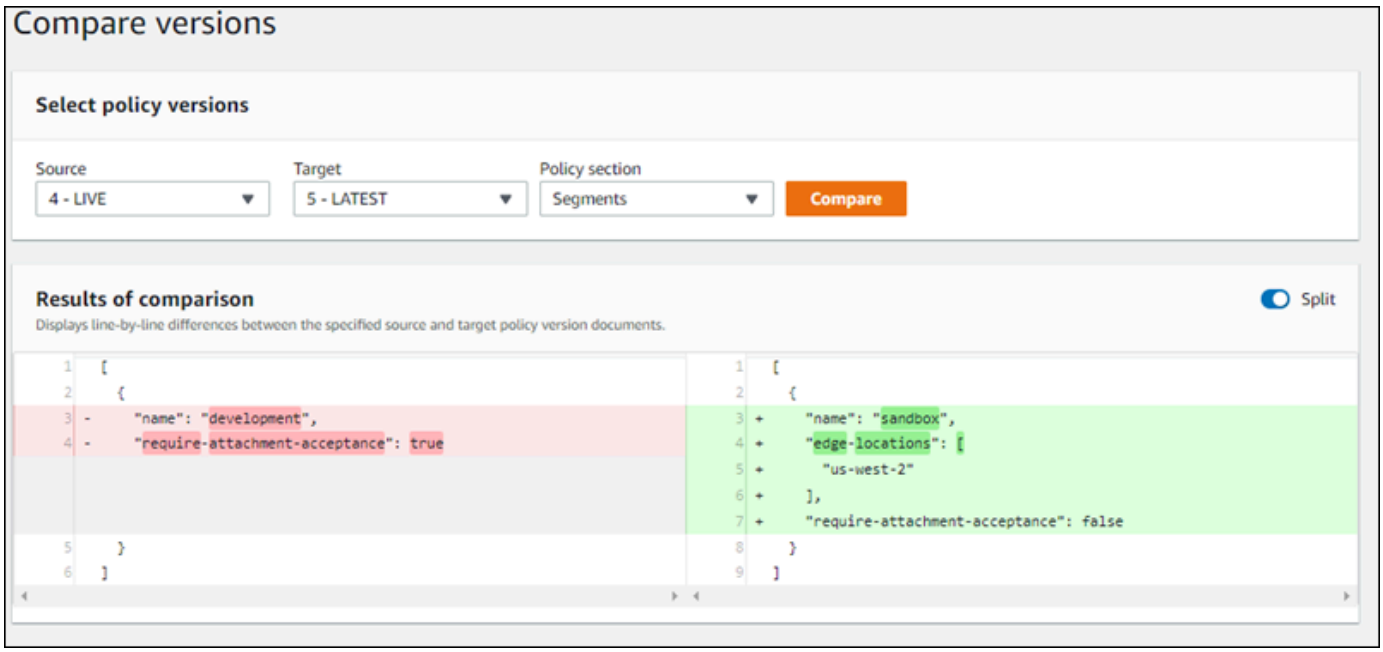
1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**, and then choose **Policy versions**.
5. Under **Policy version ID**, choose the policy version that you want to compare against another policy.
6. Choose **View or apply change set**.
7. On the Change set page, choose **Compare with LIVE**.
8. From the **Source** and **Target** dropdown lists, choose the policy versions that you want to compare.
9. (Optional) From the **Policy section** dropdown list, choose a specific policy section to compare. Options are:

   - **All** — Compares all policy changes between the two policies. This is the default view.
   - **Network configuration** — Compares Border Gateway Protocol (BGP), Autonomous System Number (ASN), and core network edge locations.

- **Segments** — Compares segment additions, deletions, or modifications.
- **Segment actions** — Compares segment sharing and filtering.
- **Attachment policies** — Compare how attachments map to segments.

10. Choose **Compare**.

    The **Results of comparison** section displays the changes between the two policies. In the following example, the **Segments** of a current LIVE **Source** policy are compared against the segment changes to an undeployed **Target** policy. The comparison shows that a new segment, **sandbox**, will be added when deploying the **Target** policy version.



11. By default, the changes for each policy display in separate policy windows. To see the results of the comparison line-by-line in a single window, turn the **Split** toggle off.

Deploy a policy version

A policy version is never deployed automatically. After creating a version of a policy, you can deploy the policy version as your new **LIVE** policy.

To implement a core policy version

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.

3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**, and then choose **Policy versions**.
5. On the **Policy versions** page, choose the policy that you want to deploy.
6. Choose **View or apply change set**.
7. (Optional) Do either of the following:
   - To review the proposed changes to the policy, choose **Details** in the **New values** column.
   - To review the values of the original policy, choose **Details** in the **Previous values** column.
8. Choose **Apply change set** to deploy the policy to become the new LIVE policy.
9. On the Policy versions page, the status of the policy deployment is **Executing policy**.
10. To view the deployment details and progress, choose the policy link. The **Policy version - X** page appears.
    - The **Policy details** page displays information about the policy that you're deploying.
    - The **JSON** page displays policy information as a JSON file.
    - The **Execution progress** page displays the status of the policy deployment. You can view all events related to the deployment or you can view specific events. For example, you might want to view the deployment status of core network edges.
11. When finished, the **Alias** changes to **LIVE/LATEST** and the **Change set state** changes to **Execution succeeded**. The **Change set state** of any previous policies that were in a **Ready to execute** change set state change to **Out of date**. This indicates that those policies are now considered older than the current LIVE policy.

Restore an out-of-date policy version

An out-of-date policy can be restored as a new version of a policy.

To restore an out-of-date policy version

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**, and then choose **Policy versions**.

5. Under **Policy version ID**, choose the out-of-date policy version that you want to restore, and then choose **Restore**.

   The **Policy version ID** is incremented by one from the last version listed on the **Policy versions** page, and the **Change set state** displays as **Pending generation.**

   When generated, the **Change set state** changes to **Ready to execute**, and the **Alias** changes to **LATEST**. If any previous policies were in the **Ready to execute** change set state, those change to **Out of date**. This indicates that those policies are now considered older than the **LATEST**.

Delete a policy version

Any policy except your current LIVE policy can be deleted.

To delete a core policy version

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**, and then choose **Policy versions**.
5. Under **Policy version ID**, choose the policy version that you want to delete, and then choose **Delete**.
6. Confirm that you want to delete the policy version, and then choose **Delete** again.

   Deleted policy versions are removed from the **Policy versions** page.

Download a policy

Download any policy version or your current LIVE policy as a JSON file.

To download a core policy

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.

4. In the navigation pane, choose **Core network**, and then choose **Policy versions**.
5. Under **Policy version ID**, choose the policy version that you want to download, and then choose **Download**.

   The policy downloads to your system as a JSON file. You can make changes to this JSON file as needed. You can create a new policy version using the contents of this file by pasting them into the Cloud WAN JSON editor. For the steps to create a policy using the JSON editor, see the section called “Create a policy version using the JSON editor”.

Core network policy parameters

The following sections describe the parameters that you use to create a core network policy version using JSON. Your JSON file contains two sections that describe the policy network settings and segments. You can then add two optional sections for defining segment actions and attachment policies.

For example JSON policies, see the section called “Core network policy examples”.

Topics

`core-network-configuration`

The core network configuration section defines the Regions where a core network should operate.

For AWS Regions that are defined in the policy, the core network creates a Core Network Edge where you can connect attachments. After it's created, each Core Network Edge is peered with every other defined Region and is configured with consistent segment and routing across all Regions. Regions can't be removed until the associated attachments are deleted. `core-network-configuration` is required.

Parameters

The following parameters are used in `core-network-configuration`:

- `asn-ranges` — The Autonomous System Numbers (ASNs) to assign to Core Network Edges. By default, the core network automatically assigns an ASN for each Core Network Edge, but you can optionally define the ASN in the `edge-locations` for each Region. The ASN uses an array of integer ranges only from `64512` to `65534` and `4200000000` to `4294967294`. No other ASN ranges can be used.

  For example, you might have the following:

  ```
  "asn-ranges": [
                  "64512-65534",
                  "4200000000-4294967294"
                  ],
  ```

- `inside-cidr-blocks` — (Optional) The Classless Inter-Domain Routing (CIDR) block range used to create tunnels for AWS Transit Gateway Connect. The format is standard AWS CIDR range (for example, `10.0.1.0/24`). You can optionally define the inside CIDR in the Core Network Edges section per Region. The minimum is a `/24` for IPv4 or `/64` for IPv6. You can provide multiple `/24` subnets or a larger CIDR range. If you define a larger CIDR range, new Core Network Edges will be automatically assigned `/24` and `/64` subnets from the larger CIDR. an Inside CIDR block is required for attaching Connect attachments to a Core Network Edge.
- `vpn-ecmp-support` — (Optional) Indicate whether the core network forwards traffic over multiple equal-cost routes using VPN. The value can either be `true` or `false`. The default is `true`.
- `edge-locations` — An array of AWS Region locations where you're creating Core Network Edges. The array is composed of the following parameters:
  - `location` — An AWS Region code, such as `us-east-1`.
  - `asn` — (Optional) The ASN of the Core Network Edge in an AWS Region. By default, the ASN will be a single integer automatically assigned from `asn-ranges`.

> **Note**
>
> You can't change the ASN of a Core Network Edge. Any transit gateway with the same ASN can't be peered to that Core Network Edge. For example, if you have a Core Network Edge with an ASN of **64512**, you can't peer any transit gateway that also has an ASN of **64512**.

- `inside-cidr-blocks` — (Optional) The local CIDR blocks for this Core Network Edge for AWS Transit Gateway Connect attachments. By default, this CIDR block will be one or more optional IPv4 and IPv6 CIDR prefixes auto-assigned from `inside-cidr-blocks`.

`segments`

The segments section defines the different segments in the network. Here you can provide descriptions, change defaults, and provide explicit regional, operational, and route filters. The names defined for each segment are used in the segment-actions and attachment-policies section. Each segment is created and operates as a completely separate routing domain. By default, attachments can only communicate with other attachments in the same segment. `segments` is a required section.

Parameters

The following parameters are used in `segments`:

- `segments` — At least one segment must be defined and composed of the following parameters:
  - `name` — The name of the segment. The `name` is a string used in other parts of the policy document, as well as in the console for metrics and other reference points. Valid characters are a–z, A–Z, and 0–9.

    > **Note**
    >
    > There is no ARN or ID for a segment.

  - `description` — (Optional) A user-defined string describing the segment.
  - `edge-locations` — (Optional) Allows you to define a more restrictive set of Regions for a segment. The edge location must be a subset of the locations that are defined for `edge-locations` in the core-network-configuration. These locations use the AWS Region code. For example, you might want to use `us-east-1` as an edge location.
  - `isolate-attachments` — (Optional) This Boolean setting determines whether attachments on the same segment can communicate with each other. The default value is `false`. When set to `true`, the only routes available will either be shared routes through the share actions, which are attachments in other segments, or static routes. For example, you might have a segment dedicated to `development` that should never allow VPCs to talk to each other, even if they're on the same segment. In this example, you would set the parameter to `true`.

> **Note**
>
> Routes coming from a route table attachment are not affected by the `isolate-attachments` parameter. You are responsible for managing routes propagating from their attached route tables. Routes flowing into the route table attachment from other attachments within the segment follow the standard `isolate-attachments` behavior

- `require-attachment-acceptance` — (Optional) This Boolean setting determines whether attachment requests are automatically approved or require acceptance. The default is `true`, indicating that attachment requests require acceptance. For example, you might use this setting to allow a `sandbox` segment to allow any attachment request so that a core network or attachment administrator does not need to review and approve attachment requests. In this example, `require-attachment-acceptance` is set to `true`.

  > **Note**
  >
  > If `require-attachment-acceptance` is `false` for a segment, it's still possible for attachments to be added to or removed from a segment automatically when their tags change. If this behavior is not desired, set `require-attachment-acceptance` to `true`.

- `deny-filter` — (Optional) An array of segments that disallows routes from the segments listed in the array. It is applied only after routes have been shared in `segment-actions`. If a segment is listed in the `deny-filter`, attachments between the two segments will never have routes shared across them. For example, you might have a financial `payment` segment that should never share routes with a `development` segment, regardless of how many other share statements are created. Adding the `payments` segment to the `deny-filter` parameter prevents any shared routes from being created with other segments.
- `allow-filter` (optional) — An array of segments that explicitly allows only routes from the segments that are listed in the array. Use the `allow-filter` setting if a segment has a well-defined group of other segments that connectivity should be restricted to. It is applied after routes have been shared in `segment-actions`. If a segment is listed in `allow-filter`, attachments between the two segments will have routes if they are also shared in the `segment-actions` area. For example, you might have a segment named `video-producer`

that should only ever share routes with a `video-distributor` segment, no matter how many other share statements are created.

> **Note**
>
> You can use either `allow-filter` or `deny-filter`, but you can't use both of them simultaneously. These are optional fields used to more explicitly control segment sharing. These parameters are not required in order to receive or send routes between segments.

`segment-actions`

`segment-actions` define how routing works between segments. By default, attachments can only communicate with other attachments in the same segment. You can use `segment-actions` to:

- `share` attachments across segments. Use the `share` action so that attachments from two different segments can reach each other. For example, if you've set a segment to `isolate-attachments`, the segment can't reach anything unless it has a `share` relationship with other segments. The `share` statement creates routes between attachments in the provided segments. If you're creating a share between one segment and an array of segments, the segment to share allows attachments from the segments in the array. However, sharing does not occur between the segments within the array. For example, if a segment named `shared-service` is defined as a segment with a `share-with` array of segments named `prod` and `prod2`, the network policy will allow the attachments in both `prod` and `prod2` to reach `shared-service`. But the network policy will not allow sharing of attachments between `prod` and `prod2`.
- `create-route` to define a static route in a segment.

> **Note**
>
> Sharing routes occurs between segments. All attachments connected to the same segment will share a similar routing behavior globally. If some attachments differ from other attachments in the same segment, those attachments should be within their own segments. This is intentional to prevent a proliferation of segments where one segment equals one attachment.

`segment-actions` is an optional section.

Parameters

The following parameters are used in `segment-actions`:

- `action` — The action to take for the chosen segment. The `action` must be either `share` or `create-route`. The following parameters are described for these actions.
- `share` parameters. If the action to take is share, the following parameters are required. `share` is the default action behavior.
  - `segment` — The name of the segment created in the `segments` section to share.
  - `mode` — `attachment-route` is the only supported value. This mode places the attachment and return routes in each of the `share-with` segments. For example, if there are static routes or routes shared from other segments, those will not be shared through the `attachment-route` mode.
  - `share-with` — An array of segments that will have reachability with the segment defined. The core network will create mutual advertisements between these `share-with` segments and the defined segment attachments.

    For example, if you create a `share` between a segment named `shared-services` and share-with “A” and “B”, this allows the attachments from “A” and “B” to reach “Shared services”. “A” and “B” cannot reach each other, and any static routes or routes propagated from other segments are not shared among these segments.

    Use "*" as a wild card to reference all segments instead of explicitly calling out segments individually.
  - `except` — Explicitly exclude segments, encapsulated within a `share-with` block. For example,

```
{
      "action": "share",
      "mode": "attachment-route",
      "segment": "segment",
      "share-with": {
        "except": [
          "dev",
          "prod"
        ]
      }
```

```
    }
```

- `create-route` parameters. If the action is `create-route`, the following are the required and optional parameters.
  - `segment` — The name of the segment created in the `segments` section, which must be a static route. If you need to duplicate the static route in multiple segments, use multiple `create-route` statements.
  - `destination-cidr-blocks` — The static route to create. A segment should have the same routing behavior for a certain destination. This means if one Region has a route to a destination, other Regions should also have that route, but with potentially different paths. You can define the IPv4 and IPv6 CIDR notation for each AWS Region. For example, `10.1.0.0/16` or `2001:db8::/56`. This is an array of CIDR notation strings.
  - `destinations` — Defines the list of attachments to send the traffic to, with up to one `attachment-id` per Region. Because a segment is a global object, you should design your routing so that every AWS Region has an attachment in the destinations list. Regions that do not have attachments in this list will receive a propagated version of this route through cross-Region peering connections, and will use the static route of another Region. If multiple attachments are defined for a single Region, a single attachment will be chosen at random (deterministically random). This is the same case for multiple attachments that are defined across multiple remote Regions. Instead of an array of attachments, you can also provide a `blackhole`, which drops all traffic to the `destination-cidr-blocks`.

    Note
    - AWS Cloud WAN does not propagate blackhole routes.
  - `description` — (Optional) A user-defined description to help further identify this route.

`attachment-policies`

In a core network, all attachments use the `attachment-policies` section to map an attachment to a segment. Instead of manually associating a segment to each attachment, attachments use tags. The tags are then used to associate the attachment to the specified segment. A core network supports the following types of attachments:

- Transit Gateway Connect — `connect`
- VPC — `vpc`

- VPN — `site-to-site-vpn`
- Transit Gateway route table — `transit-gateway-route-table`

For example, to attach a VPC to a core network, either the VPC owner or the core network owner would create a core network attachment in the core network using either the AWS Cloud WAN console or the Network Manager `create-attachment` command line or API. The attachment itself will have tags analyzed by the attachment policy, and not the tags associated with the VPC resource. A tag on the attachment such as `“environment” : “development”` would then map to a `development` segment. Attachment policy rules can also use available metadata from within the conditions, such as `account ID`, `type` of attachment, the `resource ID` (for example, `vpc-id`), or the AWS Region.

Rules are assigned numbers for processing, and are processed in order by number, from lowest to highest. When a match is made, the action is taken and no further rules are processed. A single attachment can only be associated to a single segment. If no rules are matched (for example, there might be a misspelled tag value), the attachment won't be associated to a segment.

When an attachment matches a rule, the attachment attaches to the segment defined `segment`. Each attachment can either be associated without acceptance or require a separate action to approve the attachment association. By default, every segment requires all attachments to be accepted. The acceptance requirement can be turned off with `“require-attachment-acceptance” : false` in the `segment` definition. When `require-acceptance` is `false`, any attachment that maps to the segment is automatically added. For example, a developer `sandbox` segment might want to allow any attachment with the correct tag to be added to the network. With the `attachment-policies`, you can add additional controls on a per-rule basis. For example, if attachments from the `us-east-2` Region require acceptance but other Regions do not, you can set the `“require-acceptance” : true` setting on a rule that is specific to `us-east-2` .

You can apply multiple conditions using either `and` or `or` logic to create a single rule. For example, you can state that if the account is `111122223333` and includes the tag `“stage” : “development”` it should map to a specified segment. If you don't want to use tags to map attachments, you could use the `resource-id` to manually map each incoming connection to a segment. However, this approach requires changing the policy document every time new attachments are added and can reduce the operability of your current LIVE policy.

`attachment-policies` is an optional section.

Parameters

The following parameters are used in `attachment-policies`:

- `rule-number` — An integer from 1 to 65535 indicating the rule's order number. Rules are processed in order from the lowest numbered rule to the highest. Rules stop processing when a rule is matched. It's important to make sure that you number your rules in the exact order that you want them processed.
- `description` — (Optional) A user-defined description that further helps identify the rule.
- `condition-logic` — Evaluates a condition on either `and` or `or`. This is a mandatory parameter only if you have more than one condition. The conditions themselves are unordered, so the `condition-logic` applies to all of the conditions for a rule, which also means nested conditions of `and` or `or` are not supported. Use `and` if you want to the rule to match on all of the conditions, or use `or` if you want the rule to match on one of the conditions.
- `conditions` — An array composed of one of the four following types:

  1. `type` where the `value` is `any` — This matches any request. For example, you could use any if you're only using one segment that everything should map to. Or, you could use this as a fallback segment if you want all attachments that don't match a rule to map to a known segment.
  2. `type` where

     - `value` = `resource-id` | `account-id` | `region` | `attachment-type`
     - `operator` = `equals` | `not-equals` | `contains` | `begins-with`

     This type is the `value` compared against the `operator`. For example, you might use the `condition type` in the following way:

     - where the `resource-id` uses the resource associated with the attachment (for example, `vpc-1234567890123456`)
     - where the `account-id` uses the account ID of the requesting attachment (for example, `111122223333`)
     - where the `Region` uses the Region code for the requesting attachment (for example, `us-east-1`), and
     - where the `attachment-type` uses `vpc`, `site-to-site-vpn`, `connect`, or `transit-gateway-route-table` strings

3. `type` where the `value` is `tag-exists` — A string that matches against any of the keys defined on the attachment. Use this type when the value of the tag is not important, or if there is only a key without a value.
4. `type` where the `value` is `tag-value` — Evaluates the following key value parameters:
   - `key` — A string that matches against any of the keys defined on the attachment. It must be an exact match of the key.
   - `operator` — The operation to perform against the key value. Must be one of `equals` | `not-equals` | `contains` | `begins-with`.
   - `value` — The value of the key to be evaluated for the operator.

   In this example,

   ```
   “type” : “tag-value”,

   “key” : “project”,

   “operator” : “begins-with”,

   “value” : “sta”
   ```

   Any condition where the value of `project` begins with `sta` is matched against the condition. This would return `staging`, `stage`, etc.

- `description` — A user-defined description to help further identify the attachment policy.
- `action` — The action to take when a condition is true.
  - `association-method` — Defines how a segment is mapped. Values can be `constant` or `tag`. `constant` statically defines the segment to associate the attachment to. `tag` uses the value of a tag to dynamically try to map to a segment.
  - `segment` — The name of the segment to share as defined in the `segments` section. This is used only when the `association-method` is constant.
  - `tag-value-of-key` — Maps the attachment to the value of a known key. This is used with the `association-method` is `tag`. For example a tag of `“stage” : “test”`, will map to a segment named `test`. The value must exactly match the name of a segment. This allows you to have many segments, but use only a single rule without having to define multiple nearly identical conditions. This prevents creating many similar conditions that all use the same keys to map to segments.

- `require-acceptance` — Determines if this mapping should override the segment value for `require-attachment-acceptance`. You can only set this to `true`, indicating that this setting applies only to segments that have `require-attachment-acceptance` set to `false`. If the segment already has the default `require-attachment-acceptance`, you can set this to inherit segment's acceptance value.

Core network policy examples

This section provides example JSON AWS Cloud WAN policies. You can modify any of these examples for your own use. For a description of the required and optional parameters in the JSON file, see the section called "Core network policy parameters".

Topics

Example: One segment, one AWS Region

This policy sets up one network in `us-east-1` with the name **`my-network`**. Any attachment is automatically added to the network without requiring approval.

```
{
    "version": "2021.12",
    "core-network-configuration": {
        "asn-ranges": ["64512-65534"],
        "edge-locations": [
            {"location": "us-east-1"}
        ]
    },
    "segments": [
        {
            "name": "mynetwork",
```

```
            "require-attachment-acceptance": false
        }
    ],
    "attachment-policies": [
    {
        "rule-number": 100,
        "condition-logic": "and",
        "conditions": [{ "type": "any" }],
        "action": {
            "association-method": "constant",
            "segment": "mynetwork"
            }
        }
    ]
}
```

Example: Two segments and multiple AWS Regions

This policy sets up two networks, `Secured` and `Non-Secured`, across three AWS Regions. Attachments with the tag `"Network" : "Secured"` map to `"Secured"`, while attachments with the tag `"Network" : "Non-Secured"` map to `"Non-Secured"`. All attachments require acceptance. Attachments can only talk within their segment but not across segments.

```
{
    "version": "2021.12",
    "core-network-configuration": {
        "asn-ranges": ["64512-65534"],
        "edge-locations": [
            {"location": "us-east-1"},
            {"location": "us-east-2"},
            {"location": "eu-west-1"}
        ]
    },
    "segments": [
        {"name": "secured"},
        {"name": "nonSecured"}
    ],
    "attachment-policies": [
        {
            "rule-number": 100,
            "conditions": [{
                "type": "tag-value",
                "key": "Network",
```

```
                "value": "Secured",
                "operator": "equals"
            }],
            "action": {
            "association-method": "constant",
            "segment": "secured"
            }
        },
        {
            "rule-number": 200,
            "conditions": [{
                "type": "tag-value",
                "key": "Network",
                "value": "Non-Secured",
                "operator": "equals"
        }],
        "action": {
            "association-method": "constant",
            "segment": "non-secured"
            }
        }
    ]
}
```

Example: Edge consolidation with isolated VPCs

This policy creates two segments, `development` and `hybrid`. If an attachment comes from a VPC, it will be mapped automatically to the development segment. VPCs that are attached to the development segment cannot talk to each other, and can talk only to the VPN. The development segment has a default route that points to the two attachments (one for each Region) and routes all traffic back on-premises.

```
{
    "version": "2021.12",
    "core-network-configuration": {
        "asn-ranges": ["64512-65534"],
        "edge-locations": [
            {"location": "us-east-1"},
            {"location": "eu-west-1"}
        ]
    },
    "segments": [
        {
```

```
            "name": "development",
            "isolate-attachments": true,
            "require-attachment-acceptance": false
        },
        {"name": "hybrid"}
    ],
    "segment-actions": [
        {
            "action": "share",
            "mode": "attachment-route",
            "segment": "development",
            "share-with": ["hybrid"]
        },
        {
            "action": "create-route",
            "destination-cidr-blocks": ["0.0.0.0/0"],
            "segment": "development",
            "destinations": ["attachment-12355678901234567",
 "attachment-23456789012345678"]
        }
    ],
    "attachment-policies": [
        {
            "rule-number": 10,
            "conditions": [
                {
                    "type": "attachment-type",
                    "operator": "equals",
                    "value": "vpc"
                }
            ],
            "action": {
                "association-method": "constant",
                "segment": "development"
            }
        },
        {
            "rule-number": 20,
            "conditions": [{
                "type": "attachment-type",
                "operator": "equals",
                "value": "vpn"
            }],
            "action": {
```

```
                "association-method": "constant",
                "segment": "hybrid"
            }
        }
    ]
}
```

Example: Three-stage development environment using both tag values and manual shared services mapping

This policy creates a common software development lifecycle policy. It includes three development stages: development, testing, and production. VPCs in any one of these segments can't talk to each other because `isolate-attachments` is set to true. These VPC attachments are tagged with their stage, which directly maps to the name of the segment that they should belong to. If developers use the Development or Testing stages, the VPC is automatically mapped without approval, but Production requires approval. There is an additional `sharedservices` segment, which includes both a VPC and a site-to-site VPN. These attachments don't use tags, but are instead mapped by their explicit resource-ID. The `sharedservices` segment is shared with the isolated development environments so that they can reach on-premises through VPN and can also reach the shared services VPC.

```
{
    "version": "2021.12",
    "core-network-configuration": {
        "asn-ranges": ["64512-65534"],
        "edge-locations": [
            {"location": "us-east-1"},
            {"location": "us-west-2"}
        ]
    },
    "segments": [
        {
            "name": "development",
            "isolate-attachments": true,
            "require-attachment-acceptance": false
        },
        {
            "name": "testing",
            "isolate-attachments": true,
            "require-attachment-acceptance": false
        },
```

```
        {
            "name": "production",
            "isolate-attachments": true,
            "require-attachment-acceptance": true
        },
        {"name": "sharedServices"}
    ],
    "segment-actions": [
        {
            "action": "share",
            "mode": "attachment-route",
            "segment": "sharedservices",
            "share-with": "*"
        }
    ],
    "attachment-policies": [
        {
            "rule-number": 1000,
            "conditions": [{
                "type": "tag-exists",
                "key": "Stage"
            }],
            "action": {
                "association-method": "tag",
                "tag-value-of-key": "Stage"
            }
        },
        {
            "rule-number": 1500,
            "conditions": [{
                "type": "resource-id",
                "operator": "equals",
                "value": "vpc-1234567890123456"
            }],
            "action": {
                "association-method": "constant",
                "segment": "sharedservices"
            }
        },
        {
            "rule-number": 1600,
            "conditions": [{
                "type": "resource-id",
                "operator": "equals",
```

```
                "value": "vpn-1234567890123456"
            }],
            "action": {
                "association-method": "constant",
                "segment": "sharedservices"
            }
        }
    ]
}
```

Example: Distributed WAN without VPCs

This network policy creates a network across four Regions for a global wide area network (WAN). This WAN has no connectivity to AWS workloads, and is using the AWS network only as transport between sites and for internet access for sales offices. The IoT network is still under security scrutiny, so attachments within the IoT segment cannot reach each other. However, in this example, SD-WAN has been deployed to the engineering sites and parts of the IoT network. Engineering needs direct access to the IoT network, which is currently a mixture of VPN and SD-WAN. In some cases, the SD-WAN network takes a direct route between sites. When crossing the engineering and IoT segments, it uses the AWS backbone as transport. Because the SD-WAN solution uses Transit Gateway Connect, there is a general pool assigned for Core Network Edge IP address pools. To reduce effort, the administrators allowed the `Assign-to` tag to define which segment the new attachments should be mapped to, but all attachments need to be approved (using the default value for `require-attachment-acceptance`).

```
{
    "version": "2021.12",
    "core-network-configuration": {
        "asn-ranges": ["64512-65534"],
        "inside-cidr-blocks": ["100.65.0.0/16"],
        "edge-locations": [
            {"location": "eu-central-1"},
            {"location": "us-west-2"},
            {"location": "us-east-1"},
            {"location": "eu-west-1"}
        ]
    },
    "segments": [
        {"name": "sales"},
        {"name": "testing"},
        {
```

```
        "name": "iot",
        "isolate-attachments": true
        },
        {"name": "internet"},
        {"name": "engineering"}
    ],
    "segment-actions": [
        {
        "action": "share",
        "mode": "attachment-route",
        "segment": "internet",
        "share-with": ["sales"]
        },
        {
        "action": "share",
        "mode": "attachment-route",
        "segment": "iot",
        "share-with": ["engineering"]
        },
        {
            "action": "create-route",
            "destination-cidr-blocks": ["0.0.0.0/0"],
            "segment": "sales",
            "destinations": [
                "attachment-12355678901234567",
                "attachment-23456789012345678",
                "attachment-35567890123456790",
                "attachment-4567890123456789a"
            ]
        }
    ],
    "attachment-policies": [
        {
            "rule-number": 1000,
            "conditions": [
                {
                "type": "tag-exists",
                "key": "Assign-to"
                }
            ],
            "action": {
                "association-method": "tag",
                "tag-value-of-key": "Assign-to"
            }
```

```
        }
    ]
}
```

Example: Insert firewalls between on-premises and VPCs

In this policy, the goal is to send all traffic from on-premises to AWS through a firewall. The customer has a VPC with a firewall (AWS Network Firewall, Gateway Load Balancer, or EC2/ Marketplace offering) already configured in the VPC. The firewall is responsible for inspecting traffic from on-premises to AWS, and from AWS VPCs in the internalApps segment to the internet.

Similar to Example: Edge consolidation, the VPC and VPNs are mapped to segments based on the attachment type. The one exception is the firewall VPC, which needs its own specific segment so that it can be shared separately with the other segments. In order to force the traffic coming in from the VPN to a firewall, static routes are configured that point to the firewall. In this case, the AWS VPCs in the internalApps segment are using the `172.16.0.0/16` CIDR space. All other private (RFC1918) space is advertised from the VPN connection. In this case, the policy uses the share and static-route options to define how each of the three segments receive the correct routes to send traffic through a middle box.

```
{
    "version": "2021.12",
    "core-network-configuration": {
        "asn-ranges": ["64512-65534"],
        "edge-locations": [
            { "location": "us-east-1"},
            { "location": "us-west-2"}
        ]
    },
    "segments": [
        { "name": "internalApps"},
        { "name": "firewall"},
        { "name": "onPremises"}
    ],
    "segment-actions": [
        {
            "action": "create-route",
            "destination-cidr-blocks": ["0.0.0.0/0"],
            "segment": "internalApps",
            "destinations": ["attachment-deadbeef901234567","attachment-
eeeeee00000000000"],
```

```
            "description": "Send all internet headed on-premises through the firewall"
        },
        {
            "action": "create-route",
            "destination-cidr-blocks": ["0.0.0.0/0"],
            "segment": "onPremises",
            "destinations": [ "attachment-deadbeef901234567", "attachment-
eeeeee00000000000"],
            "description": "Send all traffic received from the VPN through the
 firewall"
            },
        {
            "action": "share",
            "mode": "attachment-route",
            "segment": "firewall",
            "share-with": ["internalAapps", "onPremises"]
        }
    ],
    "attachment-policies": [
        {
            "rule-number": 500,
            "description": "We'll do our specific policies before we do attachment
 types.",
            "conditions": [{
                "type": "tag-value",
                "key": "core-network",
                "operator": "equals",
                "value": "firewall"
            }],
            "action": {
                "association-method": "constant",
                "segment": "firewall"
            }
        },
        {
            "rule-number": 1000,
            "description": "Let's assume all VPCs are internal apps",
            "conditions": [{
                "type": "attachment-type",
                "operator": "equals",
                "value": "vpc"
            }],
            "action": {
                "association-method": "constant",
```

```
                "segment": "internalApps"
            }
        },
        {
            "rule-number": 1500,
            "description": "Let's also assume all VPNs are from on-premises",
            "conditions": [{
                "type": "attachment-type",
                "operator": "equals",
                "value": "site-to-site-vpn"
            }],
            "action": {
                "association-method": "constant",
                "segment": "onPremises"
            }
        }
    ]
}
```

Attachments

You can modify or delete any of your core network attachments on the **Attachments** page by using either the AWS Cloud WAN console or the command line or API.

Viewing and editing attachments

This section describes viewing and editing your core network attachments either by using the console, or by using the command line or API.

> **Note**
>
> You can only view transit gateway route table attachments or modify tags.

Topics

- Connect attachments
- Connect peer attachments
- VPC attachments
- Site-to-Site VPN attachments

- Transit gateway route table attachments
- View and edit attachments using the command line or API

Connect attachments

To view and edit a Connect peer attachment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for an attachment where the **Resource Type** is **Connect**. Details about the attachment are displayed, as well as any Connect peers and tags that are associated with the attachment. You can add new Connect peers and add, remove, or edit tags.
   - To add a new Connect peer attachment, see the section called “Add a Connect peer”.
   - To add or edit attachment Tags, choose the **Tags** tab. The current list of tags associated with this attachment are displayed. Choose **Edit tags** to modify or delete current tags, and to add new tags.
6. Choose **Edit**.
7. On the **Edit attachment** page, you can edit the subnet configuration and the tags.
8. If you made any changes, choose **Edit attachment** to save the changes. The **Attachments** page displays along with a confirmation that the attachment was modified successfully.

Connect peer attachments

To view and edit a Connect peer attachment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.

5. Select the check box for an attachment where the **Resource Type** is **Connect**. Details about the attachment are displayed in the lower part of the page. In this section, you can also edit the attachment Tags by choosing the **Tags** tab.
6. Choose **Edit**.
7. On the **Edit attachment** page, you can edit the subnet configuration and the tags.
8. If you made any changes, choose **Edit attachment** to save the changes. The **Attachments** page displays along with a confirmation that the attachment was modified successfully.

VPC attachments

To view and edit a VPC attachment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for an attachment where the **Resource Type** is **VPC**. Details about the attachment are displayed in the lower part of the page. In this section, you can also edit the attachment Tags by choosing the **Tags** tab.
6. Choose **Edit**.
7. On the **Edit attachment** page, do any of the following:
   - Enable or disable appliance mode support.
   - Enable or disable IPv6 support.
   - Add or remove subnets IDs.
   - Add or remove tags.
8. If you made any changes, choose **Edit attachment** to save the changes. The **Attachments** page displays along with a confirmation that the attachment was modified successfully.

Site-to-Site VPN attachments

To view and edit a Site-to-Site VPN attachment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for an attachment where the **Resource Type** is **VPN**. Details about the attachment are displayed in the lower part of the page. You can add, remove, or edit the current attachment tags by choosing the **Tags** tab.
6. Choose **Edit**.
7. On the **Edit attachment** page, you can edit the subnet configuration and the tags.
8. If you made any changes, choose **Edit attachment** to save your changes. The **Attachments** page displays along with a confirmation that the attachment was modified successfully.

Transit gateway route table attachments

You can only view transit gateway route table attachments or modify tags.

To view a transit gateway route table attachment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for an attachment where the **Resource Type** is **Transit gateway route table**. Details about the attachment are displayed in the lower part of the page. In this section, you can also edit the attachment Tags by choosing the **Tags** tab.
6. In the details section, choose the **Tags** tab.
7. Choose **Add/Update** tags.
8. In the **Tags** section, add **Key** and **Value** tags to help identify this transit gateway route table. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.

9. When finished, choose **Edit attachment**.
10. If you made any changes, choose **Edit attachment** to save the changes. The **Attachments** page displays along with a confirmation that the attachment was modified successfully.

View and edit attachments using the command line or API

Use the command line or API to view and edit any of your core network attachments.

To view or edit a core network attachment using the command line or API

- For a Connect attachment, see get-connect-attachment.
- For a Connect peer attachment, see get-connect-peer.
- For a VPC attachment, see get-vpc-attachment.
- For a Site-to-Site VPN attachment, see get-site-to-site-vpn-attachment.
- For a transit gateway route table attachment, see get-transit-gateway-route-table-attachment.

  You can only view transit gateway route table attachments.

Attachment acceptance

When you create an attachment and associate it to a segment that requires an acceptance from the core network owner, the newly created attachment goes into a **Pending attachment acceptance** state. The core network owner has to review the attachment and choose to accept or reject the request.

To accept or reject an attachment using the console

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for the specific attachment that is in the **Pending attachment acceptance** state. Details about the attachment are displayed in the lower part of the page.
6. Choose **Accept** or **Reject**.

7. If you chose **Accept**, the attachment goes into a **Creating (Accept)** state. If you chose **Reject**, the attachment goes into a **Rejected (Reject)** state.

Delete attachments

You can delete any attachment from your core network. Deleted attachments can't be recovered. This section including the steps to delete an attachment using the AWS Cloud WAN console or by using the command line or API.

To delete an attachment using the console

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for the attachment that you want to delete.
6. Choose **Delete**.
7. Confirm that you want to delete the attachment by choosing **Delete** again.

   The attachment is removed from the **Attachments** page.

Use the command line or API to delete any of your core network attachments.

To delete a core network attachment using the command line or API

- For a Connect, transit gateway route table, VPC, or Site-to-Site VPN attachment, see delete-attachment.
- For a Connect peer attachment, see delete-transit-gateway-connect-peer.

AWS Cloud WAN peerings and routing

AWS Cloud WAN peering connections allow you to interconnect your core network edge with an AWS Transit Gateway in the same Region. Peering connections between Cloud WAN and transit gateways support dynamic routing with automatic exchange of routes using BGP. You can use route table attachments on the peering connection to selectively exchange routes between a specific

transit gateway route table and a Cloud WAN network segment for end-to-end segmentation and network isolation.

The peering connection supports policy-based routing to implement segment isolation across peering connections. Using this capability, routes are selectively propagated between a route table in transit gateway and a core network segment. You first need to create the peering connection and associate a policy table to the transit gateway peering attachment. A policy table contains rules for matching network traffic by a specific route table or segment, and then maps traffic that matches the rule to a target route table for determining routing behavior.

When you create a peering connection, you can either create a new policy table or use an existing policy table for association with the peering attachment. As you create your route table attachments, the policy table is populated automatically with the policy rules that match network traffic by a segment or routing domain, and then maps the traffic that matches the rule to a target route table. For more information about transit gateway peering, see Transit gateway peering attachments in the *AWS Transit Gateway Guide*.

Topics

Route evaluation

Limits apply when creating a transit gateway peering connection between your transit gateways in AWS Cloud WAN.

Cloud WAN evaluates routes in the following order:

1. The most specific route for the destination
2. For routes with the same destination IP address, but different targets, the following route priority is used:
   a. Static routes
   b. VPC-propagated routes in the same Region.

c. For dynamic routes received at the core network with an *unequal* AS path length and/or MED BGP attributes, Cloud WAN evaluates them in the following order:

   i. AS path length

   ii. MED

d. For dynamic routes received at the core network with *equal* AS path length and MED BGP attributes, Cloud WAN evaluates them in the following order:

   i. Cloud WAN Connect-propagates routes in the same Region.

   ii. Site-to-Site VPN-propagated routes in the same Region.

   iii. Routes propagated from other sources, such as transit gateway peering (which also includes AWS Direct Connect gateway-propagated routes) and core network edges in other remote Regions over the AWS global infrastructure. If identical routes are received from two or more sources, a single attachment will be chosen in a deterministically random manner.

Limitations

Limits apply when creating a transit gateway peering connection between your transit gateways in AWS Cloud WAN.

The following limitations apply when creating a peering:

- A transit gateway used for peering must be in the same Region as the core network.
- The Autonomous System Number (ASN) of a transit gateway and the core network must be different.
- A transit gateway connection to Cloud WAN only supports dynamically propagated routes. An error is returned if you try to add a static route.

Create a peering

Create a transit gateway peering.

Important

Before creating a peering, make sure that the account you use to create the peering has the following permissions:

- `ec2:CreateTransitGatewayPolicyTable`
- `ec2:AcceptTransitGatewayPeering`
- `ec2:AssociateTransitGatewayPolicyTable`

To create a peering

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Peerings**.
5. Choose **Create peering**.
6. (Optional) Enter a **name** identifying the peering.
7. From the **Edge location** dropdown list, choose the edge location where the peering is located.
8. From the **Transit gateway** dropdown list, choose a transit gateway to be used for the peering.

> **Note**
>
> The core ASN and the transit gateway ASN must be unique. ASNs must be unique for peerings to succeed.

9. Choose one of the following **Associate policy table** options:

   - **New** — Creates a new policy routing table.
   - **Existing** — Allows you to associate this peering with an existing policy table. If you choose this option, you'll be prompted to choose an existing **Transit gateway policy table** to associate with the peering. For information on creating a transit gateway policy table, see Transit Gateway policy tables in the *AWS Transit Gateway Guide*.

10. (Optional) If the transit gateway is not registered in your global network, choose **Register the specific transit gateway to the global network** to simultaneously register the transit gateway to the global network. If your transit gateway is already registered, this option does not display.
11. (Optional) In the **Tags** section, add **Key** and **Value** tags to help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.

12. Choose **Create peering**.

    The **Create peering progress** displays the current status of the peering deployment. When deployment is complete, the **State** of the peering on the **Peerings** page displays **Available**. You can then use this peering to create a transit gateway route table attachment. See the section called “Add a transit gateway route table attachment”

View peering details

View information about a transit gateway used for peering.

To view peering details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Peerings**.
5. Choose the **Peering ID** of the peer that you want to view details for.
6. In the **Details** section, choose the **Resource ID** link.

   The **Transit gateways** page appears in a new window. Depending on your permissions, you can add or modify your transit gateways or transit gateway route tables. For more information on working with transit gateways, see the *AWS Transit Gateway Guide*.

Delete a peering

Delete a transit gateway peering.

To delete a peering

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Peerings**.

5. Choose the **Peering ID** of the peer that you want to delete.
6. Choose **Delete**.
7. In the confirmation box, choose **Delete**.

   The **Peering** page displays a confirmation that you deleted the transit gateway peering.

Edit peering tags

Edit the tags that are associated with transit gateway peering.

To edit peering tags

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Peerings**.
5. Choose the **Peering ID** of the peer that you want to add or modify tags for.
6. In the **Peering name** section, choose the **Tags** tab.
7. Choose **Edit tags**.
8. Do any of the following:

   - To add a new tag, choose **Add tag**, and then add a new **Key** and **Value**.
   - To remove an existing tag, choose **Remove tag** for the tag that you want to delete.
   - To edit an existing tag, change the **Key** or **Value** text as needed.
9. Choose **Edit tags**.

Share a core network

You can use AWS Resource Access Manager to share a core network across accounts or across your organization. By default, AWS Identity and Access Management (IAM) users do not have permission to create or modify AWS RAM resources. To allow users to create or modify resources and perform tasks, you must create IAM policies that grant permission to use specific resources and API actions. You then attach those policies to the users or groups that require those permissions.

Only the network owner can perform the following operations:

- Create a resource share.
- Create a core network.
- Update a resource share.
- View a resource share.
- View the resources shared by your account, across all resource shares.
- View the principals with whom you're sharing your resources, across all resource shares. Viewing these principals provides you with the information to determine who has access to your shared resources.
- Delete a resource share.

You can perform the following operations on resources that are shared with you:

- Accept or reject a resource share invitation.
- View a resource share.
- View the shared resources that you can access.
- View a list of all of the principals that are sharing resources with you.
- Run the `list-core-networks` API to view information about the core networks you own. See list-core-networks.
- Run the APIs that create, view, and delete VPC attachments:

> **Note**
>
> A shared core network supports only VPC and transit gateway route table attachments.

  - Create a VPC attachment: create-vpc-attachment
  - Get a VPC attachment: get-vpc-attachment
  - Delete a VPC attachment: delete-vpc-attachment
- Leave a resource share.

When a core network is shared with an account, the account that accepts the shared core network can't make any changes to it, but it can create VPC attachments to the shared network.

> **Important**
>
> You must share your global resource from the N. Virginia (us-east-1) Region so that all other Regions can see the global resource.

To share a core network

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Sharing** tab.
7. To create a resource share, choose **Share core network**.
8. In the **Resource sharing** field, choose an existing resource share.
9. For the **Available resource share**, choose the resource that you want to share, and then choose **Create resource share**.
10. If there are no resources available to share, you'll need to create a new resource share:
    1. Choose **Create resource share**. See Create a resource share in the *AWS RAM User Guide*.
    2. After creating the resource share in AWS RAM, return to the **Sharing** page of your core network.
    3. Choose the **Refresh** icon. The page updates to show the new resource share that you created.
    4. Choose the newly added resource.
11. Choose **Share core network**.

On the **Sharing** page, you can stop sharing any core network resource.

To stop sharing a core network share

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.

2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Sharing** tab.
7. To create a resource share, choose **Share core network**.
8. In the **Resource sharing** field, choose an existing shared resource.
9. Choose **Stop sharing**.

Shared attachments and peerings

You can share attachments and peerings on any of your shared core networks. For more information on sharing core networks, see the section called “Share a core network”.

Topics

Shared attachments

When a core network owner shares their core network with your account, you are then able to create new VPC or transit gateway route table attachments for the shared core network. You can also view the current attachments, and delete an attachment from the shared core network.

> **Important**
>
> A shared core network currently supports only VPC and transit gateway route table attachments.

Topics

- Delete shared attachments

Create a shared VPC attachment

To create a shared VPC attachment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, under **Shared by me**, choose **Attachments**.
5. Choose **Create attachment**.
6. Enter a **name** to identify the attachment.
7. From the **Core network** dropdown list, choose the core network that is shared with you and that is where you want to create the VPC attachment.
8. From the **Edge location** dropdown list, choose the location where the attachment is located.
9. From the **Attachment type** dropdown list, choose **VPC**.
10. In the **VPC attachment** section, choose **IPv6 support** if you want to enable IPv6 for the attachment.
11. Choose the **VPC ID**. You're then prompted to choose the **Availability Zone** and **Subnet Id** in which to create the core network VPC attachment. The Availability Zones that are listed are those edge locations that you chose when you created your core network. You must choose at least one Availability Zone and subnet ID.
12. (Optional) In the **Tags** section, add **Key** and **Value** pairs to help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
13. Choose **Create attachment**.
14. The **Attachment** page displays the following information about your shared attachments:

    - **Attachment ID**
    - **Name**
    - **Edge location**
    - **Resource Type**
    - **Resource ID**

- **State**
- **Core network**
- **Core network status**

15. Choose **Create attachment** to create a new shared VPC attachment. See the section called "Create an attachment".

Create a shared transit gateway route table attachment

To create a shared transit gateway attachment

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, under **Shared by me**, choose **Attachments**.
5. Choose **Create attachment**.
6. Enter a **`name`** to identify the attachment.
7. From the **Core network** dropdown list, choose the core network that is shared with you and that is where you want to create the VPC attachment.
8. From the **Edge location** dropdown list, choose the location where the attachment is located.
9. In the **VPC attachment** section, choose **IPv6 support** if the attachment supports IPv6.
10. From the **Attachment type** dropdown list, choose **Transit gateway route table**.
11. From the **Transit gateway peering** dropdown list in the **Transit gateway route table attachment** section, choose an existing peering to share.
12. (Optional) In the **Tags** section, add **Key** and **Value** pairs to help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
13. Choose **Create attachment**.
14. The **Attachment** page displays the following information about your shared attachments:

    - **Attachment ID**
    - **Name**
    - **Edge location**
    - **Resource Type**

- **Resource ID**
- **State**
- **Core network**
- **Core network status**

15. Choose **Create attachment** to create the new shared VPC or transit gateway attachment. See the section called “Create an attachment”.

View shared attachments

View details about your shared VPC and transit gateway attachments.

To view shared attachments

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, under **Shared by me**, choose **Attachments**.
5. The **Attachment** page displays the following information about your shared attachments:

   - **Attachment ID**
   - **Name**
   - **Edge location**
   - **Resource Type**
   - **Resource ID**
   - **State**
   - **Core network**
   - **Core network status**

6. Select the check box for the specific attachment that you want to view. Details about the attachment are displayed on the lower part of the page.
7. (Optional) You can edit some of the attachment information:

   1. Choose the attachment, and then choose **Edit**.
   2. On the **Edit attachment** page, you can edit the subnet configuration and the tags.

3. If you made any changes to update the attachment, choose **Edit attachment**. The **Attachments** page displays a confirmation that the attachment was modified successfully.

Delete shared attachments

You can delete your shared VPC and transit gateway attachments.

To delete attachments from a shared core network

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, under **Shared by me**, choose **Attachments**.
5. Select the check box for the specific attachment that you want to delete, and then choose **Delete**.
6. Confirm that you want to delete the attachment by choosing **Delete** again. The attachment is removed from the **Attachments** page.

Shared peerings

When a core network owner shares their core network with your account, you are then able to create new peerings for the shared core network, delete existing peerings, or manage the tags associated with a peering.

Create a shared peering

When a core network owner shares their core network with your account, you are then able to create new peering attachments for the shared core network, view the current attachments, and delete an attachment from the shared core network.

> **Important**
>
> Before creating a peering, make sure that the account you use to create the peering has the following permissions:
>
> - `ec2:CreateTransitGatewayPolicyTable`

- `ec2:AcceptTransitGatewayPeering`
- `ec2:AssociateTransitGatewayPolicyTable`

To create a shared peering

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, under **Shared by me**, choose **Peerings**.
5. Choose **Create peering**.
6. Enter a **name** to identify the attachment.
7. From the **Core network** dropdown list, choose the core network that is shared with you and that is where you want to create the peering.
8. From the **Edge location** dropdown list, choose the location where the attachment is located.
9. In the **Transit gateway** section, choose the transit gateway used for the peering.
10. Choose one of the following **Associate policy table** options:
    - **New** — Creates a new policy routing table.
    - **Existing** — Allows you to associate this peering with an existing policy route table. If you choose this option, choose an existing **Transit gateway policy table** from the dropdown list to associate with the peering.
11. (Optional) In the **Tags** section, add **Key** and **Value** pairs to help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
12. Choose **Create peering**.

Delete a shared peering

Delete a transit gateway peering.

To delete a shared peering

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.

2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, under **Shared by me**, choose **Peerings**.
5. Choose the **Peering ID** of the peer that you want to delete.
6. Choose **Delete**.
7. In the confirmation box, choose **Delete**.

   The **Peering** page displays a confirmation that you deleted the transit gateway peering.

Edit shared peering tags

Edit the tags associated with a shared transit gateway peering.

To edit shared peering tags

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, under **Shared by me**, choose **Peerings**.
5. Choose the **Peering ID** of the peer that you want to add or modify tags for.
6. In the **Peering name** section, choose the **Tags** tab.
7. Choose **Edit tags**.
8. Do any of the following:

   - To add a new tag, choose **Add tag**, then add a new **Key** and **Value**.
   - To remove an existing tag, choose **Remove tag** for the tag that you want to delete.
   - To edit an existing tag, change the **Key** or **Value** text as needed.
9. Choose **Edit tags**.

Tag core resources

A tag is a metadata label that either you or AWS assigns to an AWS resource. Each tag consists of a key and a value. For tags that you assign, you define the key and the value. For example, you might define the key as `purpose` and the value as `test` for one resource.

Tags help you do the following:

- 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.
- Control access to your AWS resources. For more information on controlling access to resources, see Controlling access to AWS resources using tags in the *AWS Identity and Access Management User Guide*.

Supported resources

The following core network resources support tagging:

- Core network
- Core network attachments
- Connect peer

For tagging support resources in Network Manager, see Tag your Network Manager resources in the *Network Manager User Guide*.

Add or remove tags

Tags have an important role in AWS Cloud WAN. In a core network, all attachments use the attachment policy to map an attachment to a segment. Instead of manually associating a segment to each attachment, you can add tags to attachments. You can then use the tags to associate the attachments to the desired segment as defined in the attachment policies. For example, a tag on an attachment that's labeled `“segment”:“development”` would map to a `“development”` segment.

To add or update attachment tags

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.

2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for the specific attachment that you want to view or update. Details about the attachment are displayed in the lower part of the page. Choose the **Tags** tab.
6. Choose **Add/Update tags**.
7. Remove or add tags as needed.

   - To remove a tag, choose **Remove tag**, choose **Remove tag** for the tag you want to delete, and then choose **Edit tags**.
   - To add a tag, choose **Add tags**, and then choose **Add tag** to add a new key-value pair. Or edit the **Value** of any existing tag. Choose **Edit tags** when finished.

   If the change that you made to the tags requires a tag acceptance from the core network owner, you will see the new proposed tags in the **Proposed Tags** tab.

To remove a tag

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for the specific attachment that you want to remove. Details about the attachment are displayed in the lower part of the page. Choose the **Tags** tab.
6. Choose **Remove tag**.
7. Choose **Edit tags** to save your changes.
8. If the removal of the tag requires acceptance from the core network owner, you will see the new proposed tags in the **Proposed Tags** tab.

Tag acceptance

When you add, update, or remove tags, and the result is a segment change that requires an acceptance from the core network owner, the attachment goes into a **Pending tag acceptance**

state. The core network owner has to review segment changes for the attachment, and either accept or reject the request.

To accept or reject an attachment tag

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. Under **Core network** in the navigation pane, choose **Attachments**.
5. Select the check box for the specific attachment that's in a **Pending tag acceptance** state. Details about the attachment are displayed on the lower part of the page.
6. Choose **Accept or Reject**, and then choose **Accept or Reject** again to confirm and save your changes.

Sites and links

Use the AWS Cloud WAN console to manage the sites and links in your core network.

Topics

Sites

Use the AWS Cloud WAN console to manage the physical locations of your core network.

View details about a site

View details about a core network site using the AWS Cloud WAN console.

To access details about a site

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.

3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Sites**.
5. Choose the link that you want to see site details for.
6. The **General details** page provides information about the site.
7. Choose the **Devices** tab. This page displays information about the devices that are connected to the site. If you don't see a device listed, you'll need to add it. For more information on adding devices, see the section called “Add a device”.
8. Choose the **Links** tab. This page displays the links that represent a connection from a device. If you don't see a link listed, you'll need to create the link. For the steps to create a link, see the section called “Add a link”.
9. Choose the **VPNs** tab. This page displays site-related VPN information.
10. Choose the **Monitoring** tab. This page displays **Data In** and **Data Out** information for your links.
11. From the dropdown list, choose the link that you want to view information for.
12. (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

    Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

    > **Note**
    >
    > The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

Update or delete a site

Update or delete a core network site using the AWS Cloud WAN console.

To update a site

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.

2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Sites**.
5. Choose the site that you want to update, and then choose**Edit**.
6. On the **Edit site** page, you can make changes to the following information:

> **Note**
>
> You can't change the site **Name**.

   - **Description**
   - **Address**
   - **Latitude**
   - **Longitude**
   - **Tags**
7. Choose **Edit site**.

To delete a site

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Sites**.
5. Choose the site that you want to want to delete, and then choose **Delete**.
6. Confirm that you want to delete the site by choosing **Delete** again.

Links

Links represent an internet connection from a device. A link is created for a specific site, and therefore you must create a site before you create a link. For the steps to create a site, see the section called “Create a site”.

Add a link

Add a link to a device.

To add a link

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Sites**.
5. Choose the link **ID** of the site that you want to add a link to, and then choose the **Links** tab.

> **Note**
>
> Choose the link. Do not select the check box.

6. On the **Links** page, choose **Create link**.
7. For **Name** and **Description**, enter a name and description for the link.
8. For **Upload speed (Mbps)**, enter the upload speed in Mbps.
9. For **Download speed (Mbps)**, enter the download speed in Mbps.
10. (Optional) For **Provider**, enter the name of the service provider.
11. (Optional) For **Type**, enter the type of link, for example, **`broadband`**.
12. (Optional) Under **Additional settings**, add one or more **Key** and **Value Tags** to help identify this link.
13. Choose **Create link**.

Update or delete a link

Update or delete current links.

To update a link

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.

3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Sites**.
5. Choose the **Links** tab.
6. On the **Links** page, select the check box for the link that you want to update, and then choose **Edit**.
7. Modify any of the link settings as needed, including adding, editing, or removing tags.
8. Choose **Edit link**.

To delete a link

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Sites**.
5. Choose the **Links** tab.
6. On the **Links** page, select the check box for the link that you want to delete, and then choose **Delete**.
7. Confirm that you want to delete the link by choosing **Delete** again.

Devices

Update or delete devices using the AWS Cloud WAN console.

Update or delete a device

Update or delete a device using the AWS Cloud WAN console.

To update a device

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.

5. Select the check box of the device that you want to update, and then choose **Edit**.
6. Choose **Edit device**.
7. Add or update any of the following device information:

   - **Description**
   - **Model**
   - **Serial number**
   - **Type**
   - **Vendor**
   - **Location type**
   - **Latitude**
   - **Longitude**
   - **Tags**
8. Choose **Edit device**.

To delete a device

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Select the check box of the device that you want to want to delete, and then choose **Delete**.
6. Confirm that you want to delete the device by choosing **Delete** again.

View details about a device

View details of a device using the AWS Cloud WAN console.

To access details about a device

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.

3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the link that you want to see device details for.
6. Choose any of the following tabs to see more details:

   - **the section called "Overview"**
   - **the section called "Links"**
   - **the section called "On-premises associations"**
   - **the section called "Connect peer associations"**
   - **the section called "Connections"**
   - **the section called "VPNs"**
   - **the section called "Monitoring"**

Overview

The **Overview** page provides general details about the device. On this page you can associate or disassociate sites from the device, delete a device, or add, edit, or remove tags.

To associate a device with a site

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. On the **Overview** page, choose **Associate site**.
6. From the **Site Association** dropdown list, choose the site where the device is located.
7. Choose **Edit site association**.

   The **Overview** page displays the site association in the **General details** section.

Remove the association of a device and a site.

To disassociate a site from a device

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. In the General details section of the Overview page, choose **Disassociate site**.

> **Note**
>
> There is no confirmation to delete the association.

Links

Associate a device with a link.

To associate a device with a link

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the device link that you want to create an association for.
6. Choose the **Links** tab.
7. Choose **Associate link**.
8. Choose the link that you want to associate with the site, and then choose **Create link**. If you do not see the link that you want, you'll need to create it. See the section called “Add a link”

Remove the association of a device and a link.

To disassociate a device from a link

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the **Links** tab.
6. Choose the device link that you want to remove the association from.
7. Choose **Disassociate**.

On-premises associations

Create an on-premises association.

To create an on-premises association

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the **On-premises associations** tab.
6. Choose **Associate**.
7. Choose the **Customer gateway**.
8. (Optional) Choose the **Link** for the connection from the device.
9. Choose **Create on-premises association**.

To disassociate an on-premises association

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.

3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the **On-premises association** tab.
6. Choose the device link that you want to remove the association from.
7. Choose **Disassociate**.

Connect peer associations

Create a Connect peer association.

To create a Connect peer association

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the **Connect peer** tab.
6. Choose **Associate**.
7. Choose the **Connect peer**.
8. (Optional) Choose the **Link** for the connection from the device.
9. Choose **Create Connect peer association**.

To disassociate a Connect peer association

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the **Connect peer** tab.
6. Choose the device link that you want to remove the association from.

7. Choose **Disassociate**.

Connections

Create a device connection.

To create a device connection

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the **Connections** tab.
6. Choose **Create connection**.
7. For **Name** and **Description**, enter a name and description for the connection.
8. (Optional) For **Link**, choose a link to associate with the first device in the connection.
9. For **Connected device**, choose the ID of the second device in the connection.
10. (Optional) For **Connected link**, choose a link to associate with the second device in the connection.
11. (Optional) In the **Tags** section, add **Key** and **Value** pairs to further help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
12. Choose **Create connection**.

To delete a device connection

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the **On-premises association** tab.
6. Choose the device that you want to delete the connection for.
7. Choose **Delete**.

VPNs

The VPNs page displays a list of your VPN connections for a device.

To access device VPN connections

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the device that you want to view the VPN connections for.
6. Choose **VPNs**.

Monitoring

Monitor device events on the AWS Cloud WAN Monitoring page.

To access monitoring information

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Devices**.
5. Choose the **Monitoring** tab.
6. The **Monitoring** page displays data for the following:

   - **Data In**
   - **Data Out**
   - **Tunnel down count Average**

   (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

> **Note**
>
> The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

Visualize and monitor global and core networks

The AWS Cloud WAN console uses dashboard visualizations to help you view and monitor all aspects of your global and core networks. Some of the dashboards include:

- World maps that pinpoint where your network resources are located, including edge locations, devices, and attachments.
- Monitoring data that uses CloudWatch Events to track 15-months' worth of statistics, giving you a better perspective on how your networks are performing.
- Event tracking that streams real-time events to an events dashboard.
- Topological and logical diagrams of your global and core networks.

There are separate dashboards for your global networks and for your core networks.

Topics

Visualize AWS Cloud WAN global networks

The AWS Cloud WAN console provides a dashboard where you can visualize and monitor your global network. It includes information about the resources in your global network, their geographic locations, the network topology, and the logical network associations.

Topics

Overview

On the AWS Cloud WAN console **Overview** page, you can view the following information:

- Your global network resource inventory, which includes any core networks and transit gateway networks.
- The location of core network edges and transit gateways within your global network, displayed as icons on global map. Connections are shown between resources.

Use the following legend to understand the icons on your global network map:

Description
Edge locations The total number of edge locations in your global network. The number is shown in the **Inventory** section and as an icon on the map for each edge location in your global network.
Transit gateways The total number of transit gateways in your global network. The number is shown in the **Inventory** section and as an icon on the map for each transit gateway in your global network.
Devices The total number of devices in your global network. The number is shown in the **Inventory** section and as an icon on the map for each device in your global network.
Sites The total number of sites in your global network. The number is shown in the **Inventory** section and as an icon on the map for each site in your global network.

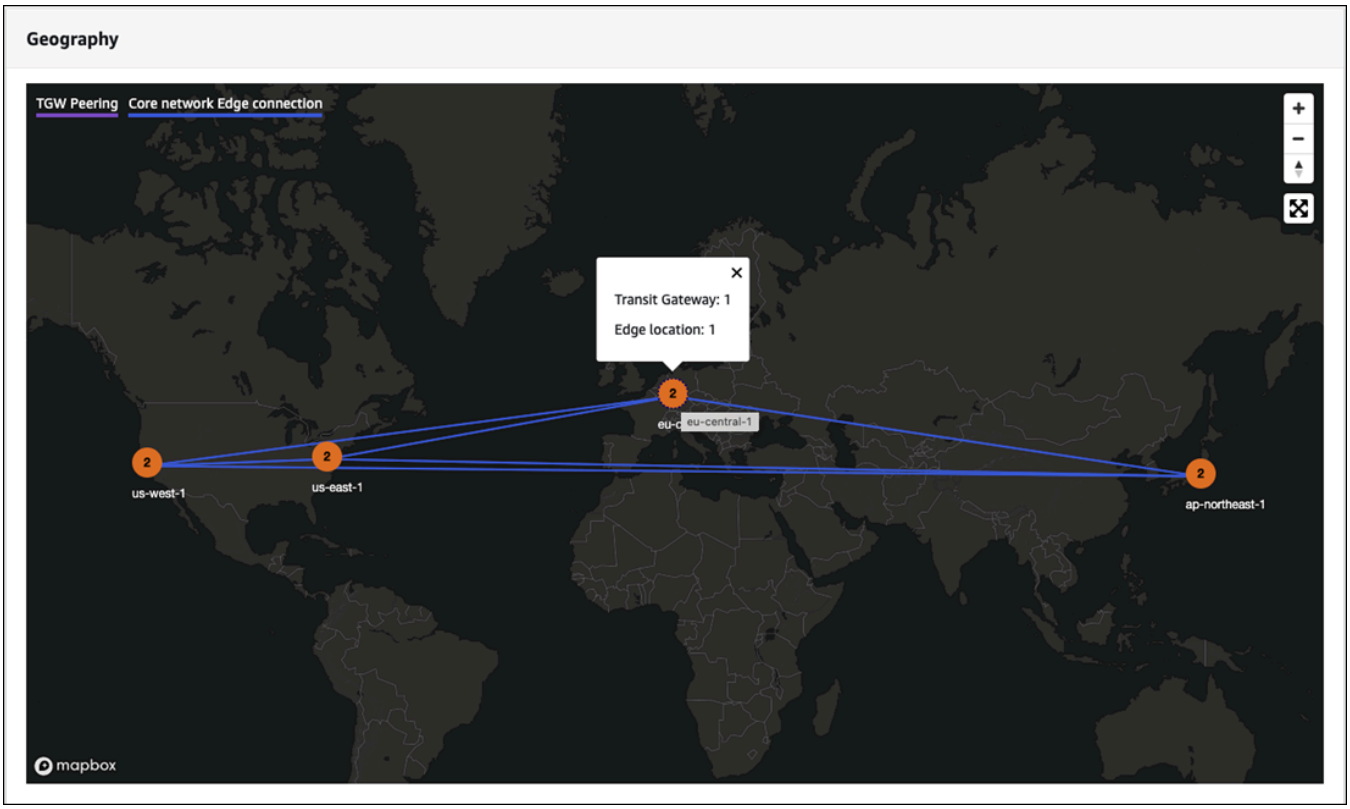
To access your global network resource inventory list

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Dashboard**.

5. The **Overview** page opens by default. This page shows information about the network resources in your global network:

   - The **Inventory** section shows the number of **Edge locations** in your global network, the number of **Transit gateways**, the number of **Devices**, and the number of **Sites**.

     In the following example, you'll see that there are four Regions, **us-west-2**, **us-east-**1, **eu-central-1**, and **ap-northeast-1**. Some Regions are represented by a number (for example, **eu-central-1** is represented by the number 2,). This indicates that there are two network resources associated with that region. Choosing 2 opens a displays what those network resources are: one transit gateway and one edge location.



6. The**Details** page shows the add **Key** and **Value** pairs to further help identify this resource. You can add multiple tags by choosing **Add tag**, or remove any tag by choosing **Remove tag**.
7. Choose **Create attachment**.

Details

The **Details** page provides information about your global network resources. You can view information about your global network, as well as edit the Description, or add and remove tags.

To access global network details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Dashboard**.
5. Choose the **Details** tab.

   The **Details** page shows the following information:

   - **Name** — The name that you gave to the global network when you created it.
   - **State** — The current state of the network. Possible states are **Pending**, **Available**, **Deleting**, and **Updating**.
   - **Global network ARN** — The unique Amazon Resource Number (ARN) of the global network.
   - **AWS account** — The AWS account that's associated with the global network.
   - **Description** — The description given to the global network when it was created.
   - **Tags** — The key-value tags associated with the global network when it was created.
6. (Optional) Change the global network **Description**. Choose **Edit** in the **Details** section, and then in the **Description - *optional*** field, replace the current description with a new description. Then choose **Edit global network** to save your change.
7. (Optional) Edit, remove or add tags. In the **Tags** section, choose **Edit tags** and do any of the following. When finished, choose **Edit global network** to return to the **Details** page.

   1. Choose **Add tag** to add a new tag. Add **Key** and **Value** pairs to help identify this resource. You can add multiple tags.
   2. Choose **Remove tag** to delete any tag. You are not prompted to confirm the deletion.
   3. To edit an existing tag, enter the new **Key** or **Value** into the applicable field.

Topology graph

On the **Topology graph** page, you can view a topology diagram of your global network that includes core network and transit gateway networks. It includes information about AWS Regions, core network edges, transit gateways, segments, VPCs, VPNs, and Connect attachments. Icons represent specific resource types, and lines represent connections between resources. The line

colors represent the state of the connection between AWS and the on-premises resources. You can filter the topology view to show specific segments and exclude AWS Regions and labels from being shown.

Use the following legend to understand the icons on your topology graph:

Description
Core network edge The core network edges in your global network.
Transit Gateway The transit gateways in your global network.
VPC The VPC attachments in your global network.
Connect The Connect attachments in your global network.
Segment The segments in your global network.
Devices The devices in your global network.
Region The Regions in your global network.

To access the topology graph for a global network

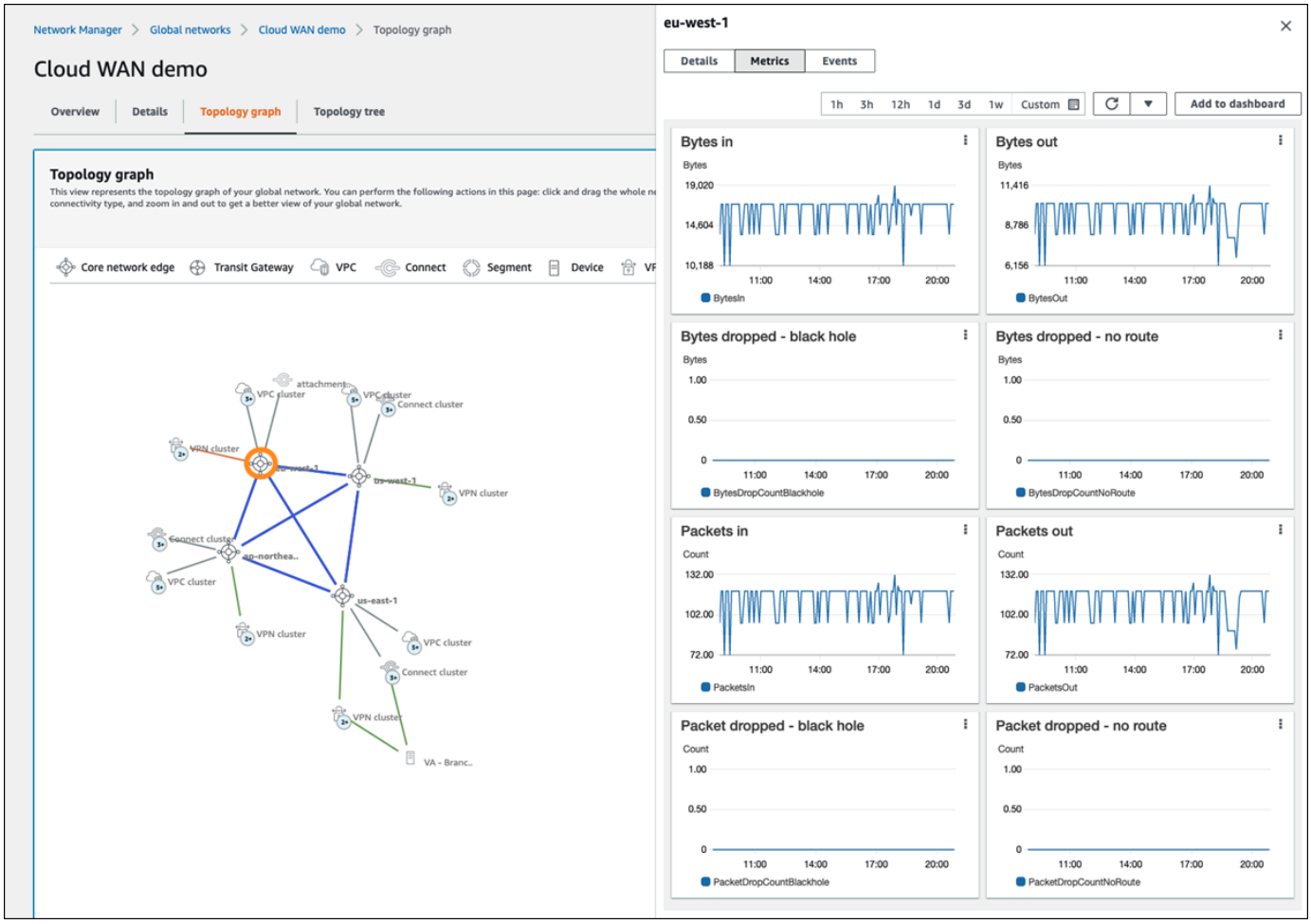
1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.

3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Dashboard**.
5. Choose the **Topology graph** tab.

   A topological representation of your global network is displayed. Connect lines are created between your resources.
6. (Optional) Filter the information that is displayed in the topology by making choices for any combination of the following:

   - **Label** — Turns resource labels on or off.
   - **Region** — Turns the display of a Region on or off.
   - **Segment** — Turns the display Segments on or off.
   - **Cluster** — Turns the display of clusters on or off.
7. On the **Topology graph**, choose any of your network resources to view details about that resource. A panel opens on the right-hand side of the graph.

   The following example shows the Metrics for the **eu-west-1** edge location.



Depending on the resource chosen, the following information is available in the panel:

- **Core network edge** — **Details**, **Metrics**, and **Events**. See *Events and metrics* for more information about the types of events that can be tracked.
- **Transit Gateway** — **Transit Gateway details**.
- **VPC**, **Connect**, and **VPC** — **Attachment details**.
- **Segment** — **Segment details**.
- **Device** — **Device details**.
- **Region** — **Region details**.

Topology tree

The **Topology tree** page shows a logical diagram of your global network. Here you can view the network tree for your global network, which includes core network and transit gateway networks.

By default, the page displays all resources in your global network and the logical relationships between them. You can filter the network tree to show specific on-premises resource types only. For example, the preceding image shows sites and devices, and excludes customer gateways. You can choose any of the nodes to view information about the specific resource that it represents. The line colors represent the state of the relationships between AWS and any on-premises resources.

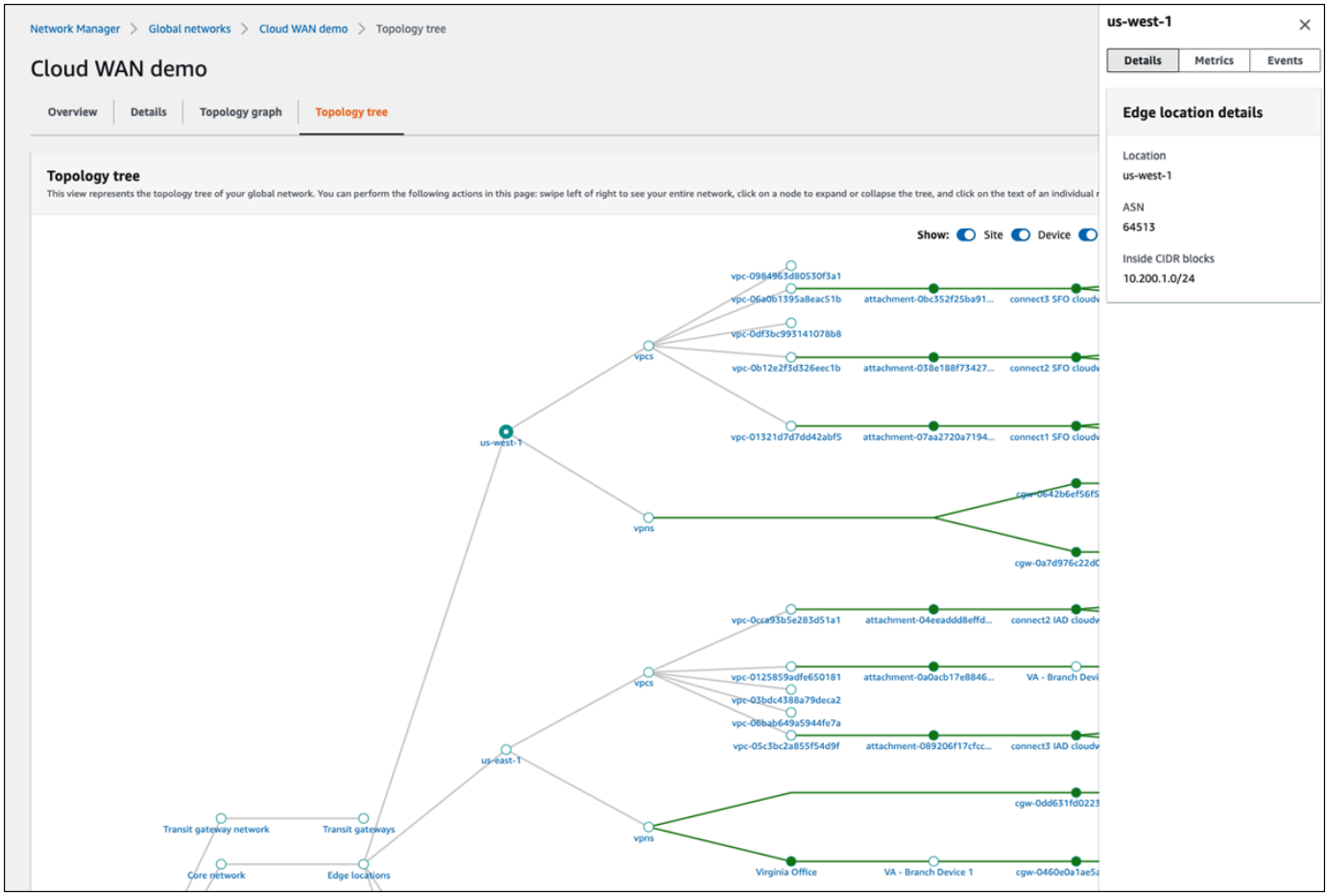
To access the topology tree for a global network

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Dashboard**.
5. Choose the **Topology tree** tab.

   A logical representation of your global network is displayed, along with the details of your global network configuration.
6. (Optional) Filter the information that is displayed in the topology tree by making choices for any combination of the following:

   - **Site** — Turns the display of sites on or off.
   - **Device** — Turns the display of devices on or off.
   - **Customer gateway** — Turns the display of customer gateways on or off.
7. In the **Topology tree**, choose any of your network resources to view details about that resource. A panel opens on the right-hand side of the graph.

   The following example shows the **Details** for the **us-west-1** edge location.



Depending on the resource chosen, the following information is available in the panel:

- **Edge locations** — **Details**, **Metrics**, and **Events**. See *Events and metrics* for more information about the types of events that can be tracked.
- **VPC**, **Connect**, and **VPC** attachments — **Attachment details**.
- **Transit Gateways** — **Transit Gateway details**.
- **Device** — **Device details**.
- **Sites** — **Site details**.

Visualize AWS Cloud WAN core networks

The AWS Cloud WAN console provides a dashboard where you can visualize and monitor your global network. It includes information about the resources in your global network, their geographic locations, the network topology, and the logical network associations.

Topics

Overview

On the AWS Cloud WAN console **Overview** page, you can view the following information:

- Your core network resource inventory.
- The location of core network edges and transit gateways within your global network, displayed as icons on a map. Connections are shown between resources.
- Throughput information between core network edges.
- The number of core network attachments per edge, shown as a stacked column chart. You can filter this chart to display specific attachment types.

Use the following legend to understand the icons on your core network map:

Description
Edge locations The total number of edge locations in your core network. The number is shown in the **Inventory** section and as an icon on the map for each edge location in your core network.
Segments The total number of segments in your core network. The number is shown in the **Inventory** section and as an icon on the map for each section in your core network.

Description
Devices The total number of devices in your core network. The number is shown in the **Inventory** section and as an icon on the map for each device in your core network.
Sites The total number of sites in your core network. The number is shown in the **Inventory** section and as an icon on the map for each site in your core network.

To view the core network map

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. The **Inventory** section shows information about your core network: the number of **Edge locations** in your core network, the number of **Segments**, the number of **Devices**, and the number of **Sites**.
7. The **Geography** section displays a world map with the locations of your resources.
8. The **Throughput** section shows throughput information between the core network edges.

    - (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

      Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

> **Note**
>
> The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

9. The **Attachment** section displays information about each attachment for each core network edge location. Choose the **Filter by attachment type** dropdown list. By default all attachment types are chosen. Clear the check box for any attachment type that you don't want to include in the graph. You can filter by any combination of:

   - **VPN**
   - **VPC**
   - **Connect**

Details

The **Details** page provides information about your core network resources.

To view your core network details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Details** tab.

   The **Details** page shows the following information:

   - **Name** — The name that you gave to the core network when you created it.
   - **State** — The current state of the core network. Possible states are **Pending**, **Available**, **Deleting**, and **Updating**.
   - **Core network ARN** — The unique Amazon Resource Number (ARN) of the core network.
   - **AWS account** — The AWS account that's associated with the core network.

- **Description** — The description given to the core network when it was created.
- **Tags** — The key-value tags that were associated with the core network when it was created.

7. (Optional) Change the core network **Description**. Choose **Edit** in the **Core network details** section, and then in the **Description** field, replace the current description with a new description. Then choose **Edit core network** to save your change.
8. (Optional) Edit, remove or add Tags. In the **Tags** section choose **Edit tags** and do any of the following. When finished, choose **Edit core network** to return to the **Details** tab.

    1. Choose **Add tag** to add a new tag. Add **Key** and **Value** pairs to help identify this resource. You can add multiple tags.
    2. Choose **Remove tag** to delete any tag. You are not prompted to confirm the deletion.
    3. To edit an existing tag, enter the new **Key** or **Value** into the applicable field.

Sharing

On the **Sharing** page, you can view your currently shared network resources. You can also use AWS Resource Access Manager (RAM) to share a core network across accounts or across your organization in AWS organizations.

To view shared network resources

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Sharing** tab.

    The **Resource sharing** page displays a list of the resources that you're currently sharing.
7. If you want to share a network resource. See the section called “Share a core network” for the steps to share a network resource.

Topology graph

On the **Topology graph** page, you can view a topology diagram of your core network that includes core network and transit gateway networks. It includes information about AWS Regions, core network edges, segments, VPCs, VPNs, and Connect attachments. Icons represent specific resource type and lines represent connections between resources. The line colors represent the state of the connection between AWS and the on-premises resources. You can filter the topology view to show specific segment, and exclude AWS Regions and labels that are shown.

Use the following legend to understand the icons on your core network topology graph:

Description
Core network edge The core network edges in your network.
VPC The VPC attachments in your core network.
Connect The Connect attachments in your core network.
Segment The segments in your core network.
Devices The devices in your core network.
VPN The VPN attachments in your core network.

To view the core network topology graph

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Topology graph** tab.

   A topological representation of your global network is displayed. Connect lines are created between your resources.
7. (Optional) Filter the information that is displayed in the topology by making choices for any combination of the following:

   - **Label** — Turns resource labels on or off.
   - **Segment** — Turns the display segments on or off.
   - **Cluster** — Turns the display of a Cluster on or off.
8. On the graph, choose any of your network resources to view details about that resource. A panel opens on the right-hand side of the graph.

   In this example, the `development` segment is chosen in the graph. The panel displays **Details** about the segment. Choose the **Routes** tab to view the segment routes.

   Depending on the resource chosen, the following information is available in the panel:

   - **Core network edge** — **Details**, **Metrics**, and **Events**. See *Events and metrics* for more information about the types of metrics and events that can be tracked.
   - **VPC**, **Connect**, and **VPN** — **Details** and **Events**.

- **Segment** — **Details** and **Routes**.
- **Device** — Device **Details**.

Topology tree

The **Topology tree** page shows a logical diagram of your core network. Here you can view the network tree for your core network. By default, the page displays all resources in your core network and the logical relationships between them. You can filter the network tree to show specific on-premises resource types only. For example, the preceding image shows sites and devices, and excludes customer gateways. You can choose any of the nodes to view information about the specific resource it represents. The line colors represent the state of the relationships between AWS and the on-premises resources.

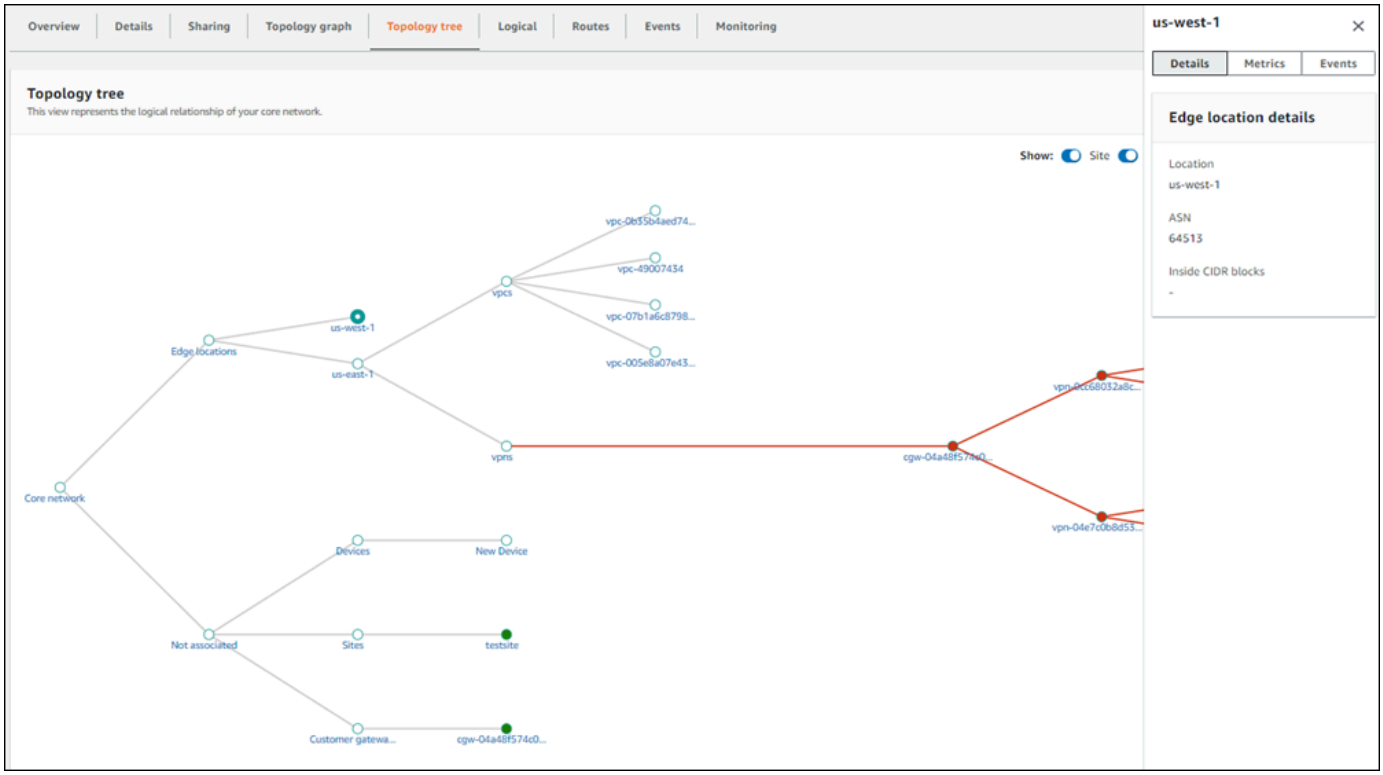
To view the topology tree

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Topology tree** tab.

   A logical representation of your global network is displayed, along with the details of your global network configuration.
7. (Optional) Filter the information that is displayed in the topology by making choices for any combination of the following:

   - **Site** — Turns the display of sites on or off.
   - **Device** — Turns the display of devices on or off.
   - **Customer gateway** — Turns the display of customer gateways on or off.
8. On the tree, choose the label of any of your network resources to view details about that resource. A panel opens on the right-hand side of the tree.

In this example, an edge location, **us-west-1**, is chosen in the tree. The panel displays **Edge location details**. Choose any of the tabs in the panel to view more information about that edge location.



Depending on the resource chosen, the following information is available in the panel:

- **Attachments** — Attachment **Details** and **Events**. See *Events and metrics* for more information about the types of events that can be tracked.
- **Devices** — **Device details**.
- **Sites** — **Site details**.
- **Not associated** — There is no information to return.

Logical

The **Logical** page shows a logical representation of the segments in your core network. You can filter by a specific source or destination segment, or by a source or destination attachment. You can view the network tree for your global network, which includes core network and transit gateway networks. By default, the page displays all resources in your global network and the logical relationships between them. You can filter the network tree to show specific on-premises resource

types only. For example, the preceding image shows sites and devices, and excludes customer gateways. You can choose any of the nodes to view information about the specific resource that it represents. The line colors represent the state of the relationships between AWS and any on-premises resources.

Use the following legend to understand the icons on your core network logical graph:

Description
VPC The VPC attachments in your core network.
Connect The Connect attachments in your core network.
Segment The segments in your core network.
VPN The VPN attachments in your core network.

To access the logical diagram for a core network

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Logical** tab.

   By default, all segments and all attachments are displayed in the logical representation.
7. (Optional) Do any of the following:

- From the **Source segment** dropdown list, choose a segment from the core network.
- From the **Source attachment** dropdown list, choose an attachment from the source segment.
- From the **Destination segment** dropdown list, choose a destination segment from the core network.
- From the **Destination attachment** dropdown list, choose an attachment from the destination segment.

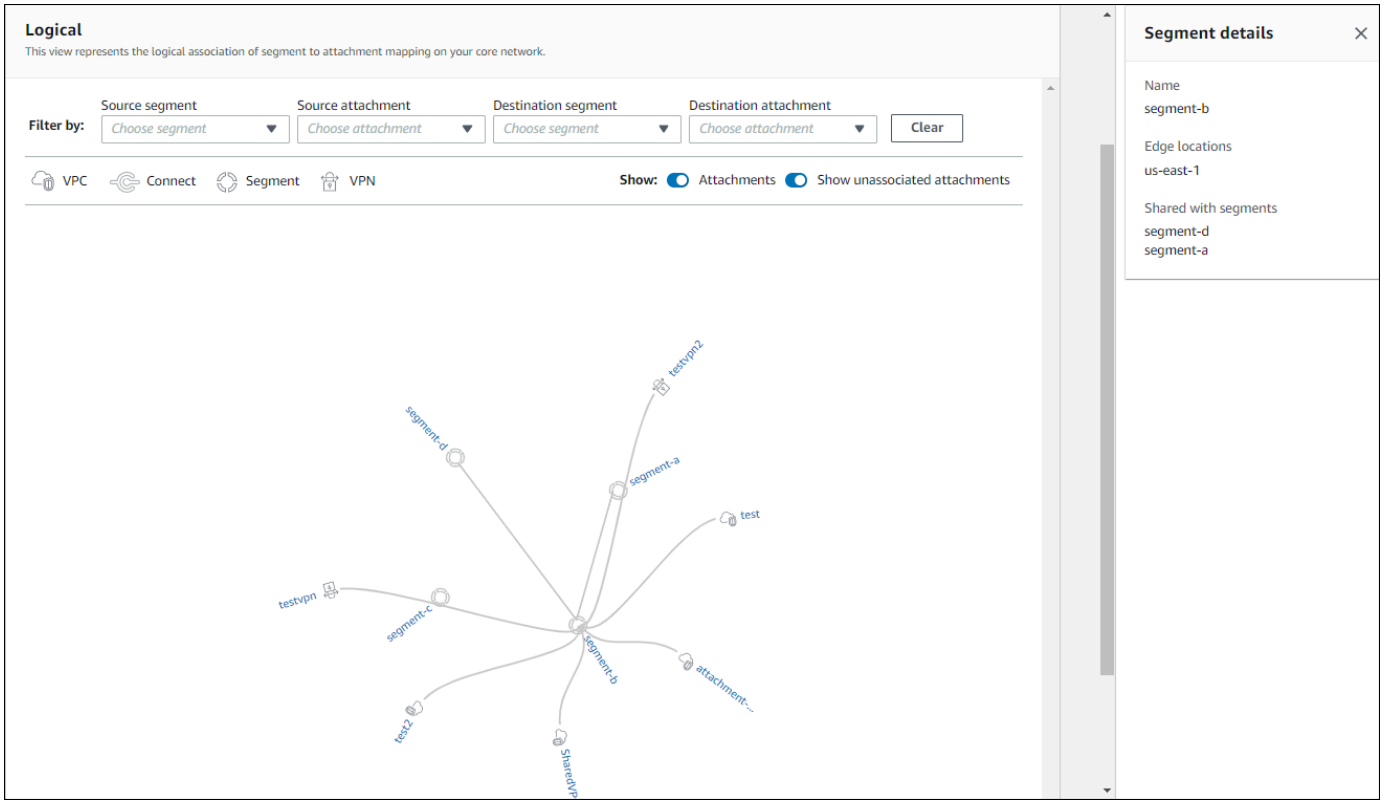
The logical graph updates based on your choices. Choose **Clear** to reset the page.

8. (Optional) Filter the information that is displayed in the topology by making choices for any combination of the following:

   - **Attachments** — Turns the display of attachments on or off.
   - **Show unassociated attachments** — Turns the display of unassociated attachments on or off.

9. On the graph, choose any of your network resources to view details about that resource. A panel opens on the right-hand side of the graph.

   In this example, a segment, **segment-b**, is chosen in the graph. The panel displays **Segment details**.



Depending on the resource chosen, the following information is available in the panel:

- **VPC**, **Connect**, and **VPN** — **Details** and **Events**. See *Events and metrics* for more information about the types of events that can be tracked.
- **Segment** — **Segment details** and **Routes**.

Routes

On the **Routes** page, you can search for and view core network routes. On this page, you can refine results to show routes for specific segments and edge locations.

To access core network routes

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.

6. Choose the **Routes** tab.
7. In the **Routes filter** section, do the following:
   - From the **Segment** dropdown list, choose a core network segment to filter on.
   - From the **Edge location** dropdown list, choose a core network edge location to filter on.
8. The **Routes** table updates to display the routes for the chosen segment and edge location and includes the following:
   - **CIDR** — All CIDRs used by this route.
   - **Destinations** — All destination addresses.
   - **Route types** — The type of route. This will be either **PROPAGATED** or **STATIC**.
   - **Route state** — The current state of a route. This will be either **ACTIVE** or **BLACKHOLE**.

Events

You can monitor your core network using CloudWatch Events, which delivers a near-real-time stream of system events that describe changes in your resources. Using simple rules that you can quickly set up, you can match events and route them to one or more target functions or streams. For more information about CloudWatch Events, see the *Amazon CloudWatch Events User Guide*.

Prerequisites: Before monitoring CloudWatch Events you must first onboard CloudWatch Logs Insights. This is a one-time process that needs to be completed at the account level. After this is set up for your core network, you'll be able to see event updates on this page. For more information on AWS Cloud WAN events, see *Events and metrics*.

To access core network events

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Events** tab.

The **Events** section updates with the CloudWatch events that occurred during the selected time frame.

7. (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

   Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

   > **Note**
   >
   > The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

8. In the following example, the **Events** section shows two events occurring within a custom 15-month time frame:

   - A change set was executed successfully for a core network policy update.
   - An edge location was added to the core network.

For a full list of tracked events, see the section called “Monitor with CloudWatch Events”.

Monitoring

You can monitor your core network by using Amazon CloudWatch, which collects raw data and processes it into readable, near-real-time metrics. These statistics are kept for 15 months, so that you can access historical information and gain a better perspective on how your network is

performing. You can also set alarms that watch for certain thresholds, and send notifications or take actions when those thresholds are met. For more information, see the *Amazon CloudWatch Events User Guide*.

On the monitoring page you can view usage metrics for your core network, filtering by specific edge locations.

To access core network monitoring details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Monitoring** tab.
7. From the **Core network edge** dropdown list, choose the core network edge that you want to monitor.
8. (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

   Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

   > **Note**
   >
   > The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

9. The page updates the following monitors:

   - **Bytes in**
   - **Bytes out**
   - **Bytes dropped – black hole**
   - **Bytes dropped – no route**

- **Packets in**
- **Packets out**
- **Packets dropped – black hole**
- **Packets dropped – no route**

Visualize and monitor transit gateways

The AWS Cloud WAN console uses dashboard visualizations to help you view and monitor all aspects of your transit gateways and transit gateway networks. Some of the dashboards include:

- World maps that pinpoint where your transit gateway resources, such as VPNs, VPCs, sites, and devices are located.
- Monitoring data that uses CloudWatch Events to track 15-months' worth of statistics, giving you a better perspective on how your transit gateways are performing.
- Event tracking that streams transit gateway real-time events to an events dashboard.
- Topological and logical diagrams of your transit gateways.

There are separate dashboards for your transit gateway networks and for individual transit gateways.

Topics

Transit gateway networks

View dashboard information about transit gateways that are registered in AWS Cloud WAN.

Topics

Overview

The **Overview** page displays details about your transit gateways, their VPN, their Connect peer status, and any network events affecting your transit gateways.

To access transit gateway details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Transit Gateway network**.
5. The **Overview** page opens by default, showing information about your transit gateways.
6. On the **Overview** page, you can view the following information:

   - Your transit gateway **Inventory**:

Description
Transit gateways The total number of registered transit gateways in. Choose the link to open the **Transit gateways** page to view more information about your transit gateways.
Sites The total number of sites that are associated with your transit gateways. Choose the link to open the **Sites** page to view more information about your transit gateway sites.
Devices The total number of devices that are associated with your transit gateways. Choose the link to open the **Devices** page to view more information about your transit gateway devices.

   - **Transit gateways VPN status**:
     - **ID** — The ID of the transit gateway. Choose the link to open details about the transit gateway.

- **Name** — The name of the transit gateway.
- **Region** — The Region where the transit gateway is located.
- **Down VPN** — The percentage of your total transit gateway VPNs that are down.
- **Impaired VPN** —The percentage of your total transit gateways VPNs that are impaired.
- **Up VPN** — The percentage of your total transit gateway VPNs that are up.

- **Transit gateways connect peer status**:
  - **ID** — The ID of the transit gateway.
  - **Name** — The name of the transit gateway.
  - **Region** — The Region where the transit peer is located.
  - **Down Connect peer** — The percentage of your total transit gateway Connect peers that are down.
  - **Impaired Connect peer** — The percentage of your total transit gateway Connect peers that are impaired.
  - **Up VPN** — The percentage of your total transit gateway Connect peers that are up.
- The **Network events summary** displays CloudWatch Events and the number of core network attachments per edge, shown as a stacked column chart.

  (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

  Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

  > **Note**
  >
  > The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

Geography

The **Geography** page displays a world map showing the locations of your transit gateways.

To access transit gateway details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Transit Gateway network**.
5. The **Overview** page opens by default, showing information about your transit gateways.
6. Choose the **Geography** tab.

   A world map displays, showing you the locations of the following:

   - **AWS TGWs** and **VPCs**.
   - The **Connectivity** of **VPNs**, **Direct Connects**, and **Connect peers**.
   - **On-premises Sites** and **Devices**.
   - **Not associated Sites** and **Devices**.

Topology tree

The **Topology tree** page shows a logical diagram of your transit gateways.

To access the topology tree for a transit gateway

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Transit Gateway network**.
5. The **Overview** page opens by default, showing information about your transit gateways.
6. Choose the **Topology tree** tab.
7. By default, the **Topology tree** page displays all **Sites**, **Devices**, and **Customer Gateways** of your transit gateway and the logical relationships between them. You can filter the network tree to show specific resource types to view information about the specific resource represented. The line colors represent the state of the relationships between AWS and the on-premises resources.

Events

Track your transit gateway events by using CloudWatch Events, which delivers a near-real-time stream of system events that describe changes in your resources. Using simple rules that you can quickly set up, you can match events and route them to one or more target functions or streams. For more information about CloudWatch Events, see the *Amazon CloudWatch Events User Guide*.

To track transit gateway events

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Transit Gateway network**.
5. The **Overview** page opens by default, showing information about your transit gateways.
6. Choose the **Events** tab.

   The **Events** section updates with the CloudWatch transit events that occurred during the time frame.

   (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

   Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

   > **Note**
   >
   > The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

Monitoring

You can monitor your transit gateways using Amazon CloudWatch, which collects raw data and processes it into readable, near-real-time metrics. These statistics are kept for 15 months, so

that you can access historical information and gain a better perspective on how your network is performing. You can also set alarms that watch for certain thresholds, and send notifications or take actions when those thresholds are met. For more information, see the *Amazon CloudWatch Events User Guide*.

On the monitoring page you can view usage metrics for your transit gateways, filtering by specific transit gateways.

To access transit monitoring details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Transit Gateway network**.
5. The **Overview** page opens by default, showing information about your transit gateways.
6. Choose the **Monitoring** tab.
7. Choose a transit gateway that you want to monitor.
8. (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

   Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

   > **Note**
   >
   > The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

9. The page updates the following transit gateway monitors:

   - **Bytes in**
   - **Bytes out**
   - **Bytes dropped – black hole**
   - **Bytes dropped – no route**

- **Packets in**
- **Packets out**
- **Packets dropped – black hole**
- **Packets dropped – no route**

10. (Optional) Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

> **Note**
>
> The **Add to dashboard** option works only if your registered transit gateway is in the US West (Oregon) Region.

Route analyzer

The Route Analyzer analyzes the routing path between a specified source and destination.

> **Note**
>
> Route Analyzer checks the routes on Transit Gateway route tables only.

To analyze route information

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Transit Gateway network**.
5. The **Overview** page opens by default, showing information about your transit gateways.
6. Choose the **Route Analyzer** tab.
7. In the **Source** section, do the following:

   - Choose the source **Transit Gateway** for the route that you want to analyze.

- Choose the source **Transit Gateway attachment** for the route.
- Enter either the IPv4 or IPv6 **IP address**.
- Clear the **Include return path in results** check box if you don't want to include a return path.
- Indicate whether this is a **Middlebox appliance**. For more information on middlebox configurations, see Route analysis with a middlebox configuration .

8. In the Destination section, do the following:

- Choose the destination **Transit Gateway**.
- Choose the destination **Transit Gateway attachment** for the route.
- Enter either the IPv4 or IPv6 **IP address**.

9. Choose **Run route analysis**.
10. The Results of route analysis return the **Source** and **Destination** transit gateways and the current **Status**. An error message is returned if no information is found in the transit gateway route table. For more information on route tables, see Transit gateway route tables.

Transit gateways

View dashboard information about transit gateways that are registered in AWS Cloud WAN.

Topics

Overview

The **Overview** page displays details about your transit gateways, their VPN, their Connect peer status, and any network events affecting the transit gateway.

To view transit gateway details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link.
4. In the navigation pane, choose **Transit Gateways**.
5. On the **Transit gateways** page, choose the **ID** link that you want to view the dashboard for.
6. The **Overview** page opens by default.
7. On the **Overview** page, you can view the following sections:

   - The **Transit Gateway** details section displays the transit gateway **ID**, **Name**, **Region**, and **State**. Choose a different transit gateway to view those details.
   - The **Attachments** section shows the number of each resource attached to the transit gateway. The following legend describes the attachments:

Description
VPC The total number of VPCs attached to your transit gateway.
VPN The total number of VPNs attached to your transit gateway.
Direct Connect Gateways The total number of Direct Connect Gateways attached to your transit gateway.
Connect The total number of Connect attachments on your transit gateway.
Transit Gateway The total number of transit gateways.

   - The **VPNs** section displays the VPN **ID**, **Device**, **Link**, **VPN status**, and **Tunnel status**.

- The **Connect peers** section displays the Connect peer **ID**, **Device**, **Link**, **Status**, and **BGP status**.
- The **Network events summary** displays CloudWatch Events and the number of core network attachments per edge, shown as a stacked column chart.

  (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

  Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

  > **Note**
  >
  > The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

Topology tree

The **Topology tree** page shows a logical diagram of each AWS Transit Gateway.

To access the topology tree for a transit gateway

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link.
4. In the navigation pane, choose **Transit Gateways**.
5. On the **Transit gateways** page, choose the **ID** link that you want to view the dashboard for.
6. The **Overview** page opens by default.
7. Choose the **Topology tree** tab.
8. By default, the **Topology tree** page displays the **Sites**, **Devices**, and **Customer Gateways** of the chosen transit gateway and the logical relationships between them. You can filter the

network tree to show specific resources types to view information about the specific resource represented. The line colors represent the state of the relationships between AWS and the on-premises resources.

Events

Track your transit gateway **Events** using CloudWatch Events, which delivers a near-real-time stream of system events that describe changes in your resources. Using simple rules that you can quickly set up, you can match events and route them to one or more target functions or streams. For more information about CloudWatch Events, see the *Amazon CloudWatch Events User Guide.*.

To track transit gateway events

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link.
4. In the navigation pane, choose **Transit Gateways**.
5. On the **Transit gateways** page, choose the **ID** link that you want to view the dashboard for.
6. The **Overview** page opens by default.
7. Choose the **Events** tab.

   The **Events** section updates with the CloudWatch transit events that occurred during the time frame for the chosen transit gateway.

   (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

   Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

> **Note**
>
> The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

Monitoring

On the **Monitor** page, monitor your transit gateways using Amazon CloudWatch, which collects raw data and processes it into readable, near-real-time metrics. These statistics are kept for 15 months, so that you can access historical information and gain a better perspective on how your network is performing. You can also set alarms that watch for certain thresholds, and send notifications or take actions when those thresholds are met. For more information, see the *Amazon CloudWatch Events User Guide*.

On the monitoring page, you can view usage metrics for your transit gateways, filtering by specific transit gateways.

To access transit monitoring details

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link.
4. In the navigation pane, choose **Transit Gateways**.
5. On the **Transit gateways** page, choose the **ID** link that you want to view the dashboard for.
6. The **Overview** page opens by default.
7. Choose the **Monitoring** tab.
8. Monitoring statistics display for the chosen transit gateway. Choose a different transit gateway to see those monitoring statistics.
9. (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

> **Note**
>
> The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

10. The page updates the following transit gateway monitors:

    - **Bytes in**
    - **Bytes out**
    - **Bytes dropped – black hole**
    - **Bytes dropped – no route**
    - **Packets in**
    - **Packets out**
    - **Packets dropped – black hole**
    - **Packets dropped – no route**

11. (Optional) Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

> **Note**
>
> The **Add to dashboard** option works only if your registered transit gateway is in the US West (Oregon) Region.

On-premises associations

The **On-premises** page displays information about your on-premises devices for this transit gateway. On this page you can associate or disassociate any of your devices..

To access transit gateway on-premises associations

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link.
4. In the navigation pane, choose **Transit Gateways**.
5. On the **Transit gateways** page, choose the **ID** link that you want to view the dashboard for.
6. The **Overview** page opens by default.
7. Choose the **On-premises associations** tab.
8. The **Transit Gateway** on-premises association page displays the **Customer gateway**, **Device**, **Link**, and **State** of the transit gateway.

To associate a device

1. Choose the **Customer gateway** that you want to associate a device with.
2. Choose **Associate**.
3. On the **Edit on-premises association** page, choose the **Device** and optional **Link** for the association.
4. Choose **Edit on-premises association**.

To disassociate an on-premises device

1. Choose the **Customer gateway** that you want to disassociate.
2. Choose **Disassociate**.

Connect peer

The Connect peer page displays information about your associated Connect peers for this transit gateway. On this page you can disassociate any of your devices.

To access on-premises associations

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.

2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link.
4. In the navigation pane, choose **Transit Gateways**.
5. On the **Transit gateways** page, choose the **ID** link that you want to view the dashboard for.
6. The **Overview** page opens by default.
7. Choose the **Connect peer associations** tab.
8. The **Connect peer associations** page displays the **Connect peer**, **Device**, **Link**, and **State** of the transit gateway.

To disassociate a Connect peer device

1. Choose the **Connect peer** that you want to disassociate.
2. Choose **Disassociate**.

Tags

The **Tags** page displays the tags that are associated with the transit gateway. You can edit any of your transit gateway tags.

> **Note**
>
> Editing transit gateway tags is done through the Amazon Virtual Private Cloud console at console.aws.amazon.com/vpc/home.

To view transit gateway tags

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network link.
4. In the navigation pane, choose **Transit Gateways**.
5. On the **Transit gateways** page, choose the **ID** link that you want to view the dashboard for.
6. The **Overview** page opens by default.

7. Choose the **Tags** tab.
8. A list of the transit gateway key-value tags is displayed.
9. To add, edit, or delete any tags, choose **Edit tags** to open the Amazon Virtual Private Cloud console at console.aws.amazon.com/vpc/home. See Add or edit tags for a transit gateway in the *AWS Transit Gateway User Guide* for the steps to add or edit transit gateway tags.

Authentication and access for AWS Cloud WAN

AWS Cloud WAN uses service-linked roles for the permissions that it requires to call other AWS services on your behalf. For more information on the Network Manager service-lined role, see service-linked role in the *Transit Gateway User Guide*.

Identity and access management for AWS Cloud WAN

AWS Identity and Access Management (IAM) is an AWS service that helps an administrator securely control access to AWS resources. IAM administrators control who can be authenticated (signed in) and authorized (have permissions) to use AWS Cloud WAN resources. IAM is an AWS service that you can use with no additional charge. You can use features of IAM to allow other users, services, and applications to use your AWS resources fully or in a limited way, without sharing your security credentials.

By default, IAM users don't have permission to create, view, or modify AWS resources. To allow an IAM user to access resources, such as a global network, and perform tasks, you must:

- Create an IAM policy that grants the user permission to use the specific resources and API actions they need
- Attach the policy to the IAM user or to the group to which the user belongs

When you attach a policy to a user or group of users, it allows or denies the user permissions to perform the specified tasks on the specified resources.

Important

If you grant access to a global network you grant access to all AWS service data associated with the core network edges across all AWS Regions. For more information, see Identity and access management for AWS Network Manager in the *Transit Gateway User Guide*.

Condition keys

The `Condition` element (or Condition block) lets you specify conditions in which a statement is in effect. The Condition element is optional. You can build conditional expressions that use

condition operators, such as equals or less than, to match the condition in the policy with values in the request. For more information, see IAM JSON policy elements: Condition operators in the *AWS Identity and Access Management User Guide*.

If you specify multiple `Condition` elements in a statement, or multiple keys in a single `Condition` element, AWS evaluates them using a logical `AND` operation. If you specify multiple values for a single condition key, AWS evaluates the condition using a logical `OR` operation. All of the conditions must be met before the statement's permissions are granted.

You can also use placeholder variables when you specify conditions. For example, you can grant an IAM user permission to access a resource only if it is tagged with their IAM user name.

You can attach tags to AWS Cloud WAN resources or pass tags in a request to Cloud WAN. To control access based on tags, you provide tag information in the condition element of a policy using the `aws:ResourceTag/key-name`, `aws:RequestTag/key-name`, or `aws:TagKeys` condition keys. See IAM JSON policy elements: Condition in the *AWS Identity and Access Management User Guide* for more information.

To see all AWS global condition keys, see AWS global condition context keys in the *AWS Identity and Access Management User Guide*.

AWS Cloud WAN supports the following condition keys:

- `networkmanager:vpcArn` — Filters access by which VPC can be used to create or update an attachment.
- `networkmanager:subnetArns` — Filters access by which VPC subnets can be added or removed from a VPC attachment.
- `networkmanager:vpnConnectionArn` — Filters access by which site-to-site VPN can be used to create or update an attachment.

For more information see the following:

- For information on supported condition keys, see Identity and access management in the *Transit Gateway User Guide*.
- For example policies to manage, see Example policies to manage in the *Transit Gateway User Guide*.

Tag core network resources

A tag is a metadata label that either you or AWS assigns to an AWS resource. Each tag consists of a key and a value. For tags that you assign, you define the key and the value. For example, you might define the key as `purpose` and the value as `test` for one resource. Tags help you do the following:

- 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.
- Control access to your AWS resources. For more information, see Controlling access to AWS resources using tags in the *AWS Identify and Access Management User Guide*.

Supported resources

The following core network resources support tagging:

- Core network
- Core network attachments
- Connect peer

For tagging supported resources, see Tag your Network Manager resources in the *Transit Gateway User Guide*.

AWS managed policies for AWS Cloud WAN

To add permissions to users, groups, and roles, it is easier to use AWS managed policies than to write policies yourself. It takes time and expertise to create IAM customer managed policies that provide your team with only the permissions they need. To get started quickly, you can use our 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*.

AWS managed policy: AWSNetworkManagerCloudWANServiceRolePolicy

You can attach the `AWSNetworkManagerCloudWANServiceRolePolicy` policy to your IAM identities. This policy allows AWS Network Manager to access resources associated with Cloud WAN. For more information, see the section called "Service-linked roles".

AWS managed policy: AWSNetworkManagerServiceRolePolicy

This policy is attached to the service-linked role named `AWSServiceRoleForNetworkManager` to allow AWS Cloud WAN to call API actions on your behalf when you work with global networks. For more information, see the section called "Service-linked roles".

Cloud WAN updates to AWS managed policies

View details about updates to AWS managed policies for AWS Cloud WAN since this service began tracking these changes in July 2022.

Change	Description	Date
the section called "`AWSServiceRoleForNetworkManagerCloudWAN`". New policy.	New policy added to AWS Cloud WAN.	July 12, 2022
the section called "`AWSServiceRoleForNetworkManager`". New policy.	New policy added to AWS Cloud WAN.	July 12, 2022

AWS Cloud WAN service-linked roles

AWS Cloud WAN uses the following service-linked roles for the permissions that it requires to call other AWS services on your behalf:

- AWSServiceRoleForNetworkManagerCloudWAN
- AWSServiceRoleForVPCTransitGateway
- AWSServiceRoleForNetworkManager

AWSServiceRoleForNetworkManagerCloudWAN

AWS Cloud WAN uses the service-linked role named AWSServiceRoleForNetworkManagerCloudWAN to create and announce transit gateway route tables, and then propagates transit gateway routes to those tables.

The AWSServiceRoleForNetworkManagerCloudWAN service-linked role trusts the following service to assume the role:

- networkmanager.amazonaws.com

The following AWSNetworkManagerCloudWANServiceRolePolicy policy is attached to the role.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "ec2:CreateTransitGatewayRouteTableAnnouncement",
                "ec2:DeleteTransitGatewayRouteTableAnnouncement",
                "ec2:EnableTransitGatewayRouteTablePropagation",
                "ec2:DisableTransitGatewayRouteTablePropagation"
            ],
            "Resource": "*"
        }
    ]
}
```

AWSServiceRoleForVPCTransitGateway

Amazon VPC uses the service-linked role named **AWSServiceRoleForVPCTransitGateway** to call the following actions on your behalf when you work with a transit gateway:

- `ec2:CreateNetworkInterface`
- `ec2:DescribeNetworkInterface`
- `ec2:ModifyNetworkInterfaceAttribute`
- `ec2:DeleteNetworkInterface`
- `ec2:CreateNetworkInterfacePermission`
- `ec2:AssignIpv6Addresses`
- `ec2:UnAssignIpv6Addresses`

AWSServiceRoleForVPCTransitGateway trusts the `transitgateway.amazonaws.com` service to assume the role.

AWSServiceRoleForNetworkManager

AWS Cloud WAN uses the service-linked role named `AWSServiceRoleForNetworkManager` to call actions on your behalf when you work with global networks.

The `AWSServiceRoleForNetworkManager` service-linked role trusts the following service to assume the role:

- `networkmanager.amazonaws.com`

The following `AWSNetworkManagerServiceRolePolicy` policy is attached to the role.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "directconnect:DescribeDirectConnectGateways",
                "directconnect:DescribeConnections",
                "directconnect:DescribeDirectConnectGatewayAttachments",
```

```
                "directconnect:DescribeLocations",
                "directconnect:DescribeVirtualInterfaces",
                "ec2:DescribeCustomerGateways",
                "ec2:DescribeTransitGatewayAttachments",
                "ec2:DescribeTransitGatewayRouteTables",
                "ec2:DescribeTransitGateways",
                "ec2:DescribeVpnConnections",
                "ec2:DescribeVpcs",
                "ec2:GetTransitGatewayRouteTableAssociations",
                "ec2:GetTransitGatewayRouteTablePropagations",
                "ec2:SearchTransitGatewayRoutes",
                "ec2:DescribeTransitGatewayPeeringAttachments",
                "ec2:DescribeTransitGatewayConnects",
                "ec2:DescribeTransitGatewayConnectPeers",
                "ec2:DescribeRegions",
                "organizations:DescribeAccount",
                "organizations:DescribeOrganization",
                "organizations:ListAccounts",
                "organizations:ListAWSServiceAccessForOrganization",
                "organizations:ListDelegatedAdministrators",
                "ec2:DescribeTransitGatewayRouteTableAnnouncements",
                "ec2:DescribeTransitGatewayPolicyTables",
                "ec2:GetTransitGatewayPolicyTableAssociations",
                "ec2:GetTransitGatewayPolicyTableEntries"
            ],
            "Resource": "*"
        }
    ]
}
```

AWS Cloud WAN uses the service-linked role named `AWSServiceRoleForNetworkManagerCloudWAN` to create and announce transit gateway routing tables, and then propagates transit gateway routes to those tables.

The `AWSServiceRoleForNetworkManager` service-linked role trusts the following service to assume the role:

- `networkmanager.amazonaws.com`

The following `AWSNetworkManagerCloudWANServiceRolePolicy` policy is attached to the role.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "ec2:CreateTransitGatewayRouteTableAnnouncement",
                "ec2:DeleteTransitGatewayRouteTableAnnouncement",
                "ec2:EnableTransitGatewayRouteTablePropagation",
                "ec2:DisableTransitGatewayRouteTablePropagation"
            ],
            "Resource": "*"
        }
    ]
}
```

Create the service-linked role

You don't need to manually create the `AWSServiceRoleForNetworkManager` or `AWSServiceRoleForVPCTransitGateway` roles.

- Network Manager creates the `AWSServiceRoleForNetworkManager` role when you create your first global network.
- Amazon VPC creates the `AWSServiceRoleForVPCTransitGateway` role when you attach a VPC to a transit gateway in your account.

For Network Manager to create a service-linked role on your behalf, you must have the required permissions. For more information, see Service-Linked Role Permissions in the *IAM User Guide*.

Edit the service-linked role

You can edit the `AWSServiceRoleForNetworkManager` or `AWSServiceRoleForVPCTransitGateway` descriptions using IAM. For more information, see Editing a Service-Linked Role in the *IAM User Guide*.

Delete the service-linked role

If you no longer need to use Network Manager, we recommend that you delete the `AWSServiceRoleForNetworkManager` or `AWSServiceRoleForVPCTransitGateway` roles.

You can delete these service-linked roles only after you delete your global network. For information about deleting your global network, see Delete a global network.

You can use the IAM console, the IAM CLI, or the IAM API to delete service-linked roles. For more information, see Deleting a Service-Linked Role in the *IAM User Guide*.

After you delete `AWSServiceRoleForNetworkManager`< Network Manager will create the role again when you create a new global network. After you delete `AWSServiceRoleForVPCTransitGateway` Amazon VPC will create that role again when you attach a VPC to a transit gateway in your account.

Supported Regions for Network Manager service-linked roles

Network Manager supports the service-linked roles in all of AWS Regions where the service is available. For more information, see AWS endpoints in the *AWS General Reference*.

AWS Cloud WAN Events and metrics

AWS provides the following monitoring tools to watch the resources in your global network, report when something is wrong, and take automatic actions when appropriate.

- *Amazon CloudWatch* monitors your AWS resources and the applications that you run on AWS in real time. You can collect and track metrics, create customized dashboards, and set alarms that notify you or take actions when a specified metric reaches a threshold that you specify. For more information, see the Amazon CloudWatch User Guide.
- *Amazon CloudWatch Events* delivers a near-real-time stream of system events that describe changes in AWS resources. CloudWatch Events enables automated event-driven computing, as you can write rules that watch for certain events and then trigger automated actions in other AWS services when these events happen. For more information, see the Amazon CloudWatch Events User Guide.

You must first onboard CloudWatch Logs Insights before you can view Events on the AWS Cloud WAN dashboards. See the section called “Onboard CloudWatch Logs Insights” for the onboarding steps.

Topics

Onboard CloudWatch Logs Insights

Before viewing events on the Events dashboard, you must complete a one-time setup that registers your events with CloudWatch Logs Insights. Until you register your events, you'll be unable to view any of your events on the dashboard.

To onboard CloudWatch Logs Insights

Before you begin, verify that an AWS Identity and Access Management (IAM) principal (user) in your account has the appropriate permissions to onboard to CloudWatch Logs Insights. Ensure that the IAM policy contains the following permissions.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "events:PutTargets",
                "events:DescribeRule",
                "logs:PutResourcePolicy",
                "logs:DescribeLogGroups",
                "logs:DescribeResourcePolicies",
                "events:PutRule",
                "logs:CreateLogGroup"
            ],
            "Resource": "*"
        }
    ]
}
```

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core network**.
5. The **Overview** page opens by default.
6. Choose the **Events** tab.
7. Choose **Onboard to CloudWatch Logs Insights**.
8. When you onboard to CloudWatch Logs Insights, the following occurs:

   - A CloudWatch Events rule with the name `DON_NOT_DELETE_networkmanager_rule` is created in the US West (Oregon) Region.
   - A CloudWatch Logs group with the name `/aws/events/networkmanagerloggroup` is created in the US West (Oregon) Region.
   - A CloudWatch Events rule is configured with the CloudWatch Logs group as a target.
   - A CloudWatch resource policy named `DO_NOT_DELETE_networkmanager_TrustEventsToStoreLogEvents` is created in the US West (Oregon) Region.

To view this policy, run the following AWS CLI command:

```
aws logs describe-resource-policies --region us-west-2
```

Monitor with CloudWatch Events

You can monitor your core network using Amazon CloudWatch Events, which delivers a near-real-time stream of system events that describe changes in your resources. You set up simple rules, which then can match events and route them to one or more target functions or streams. For more information, see the *Amazon CloudWatch Events User Guide*.

The following events can be sent to CloudWatch Events:

- the section called “Topology changes”
- the section called “Route changes”
- the section called “Status updates”
- the section called “Policy updates”
- the section called “Segment update events”

Topology changes

Topology change events occur when there are changes to your core network resources. These changes include the following:

- An edge location was added to the core network.
- An edge location was deleted from a core network.
- A Site-to-Site VPN attachment was created for a core network.
- A Site-to-Site VPN attachment was deleted from a core network.
- A VPC attachment was created for a core network.
- A VPC attachment was deleted from a core network.
- A VPN attachment was created for a core network.
- A VPN attachment was deleted from a core network.
- A Connect attachment was created for a core network.

- A Connect attachment was deleted from a core network.
- A Connect peer attachment was created for a core network.
- A Connect peer attachment was deleted from a core network.

The following example shows a topology update event where a core network VPC attachment was deleted.

```
{
  "version": "0",
  "id": "13143a7e-806e-a904-300b-ef874c56eaac",
  "detail-type": "Network Manager Topology Change",
  "source": "aws.networkmanager",
  "account": "166889823465",
  "time": "2021-09-02T12:00:38Z",
  "region": "us-west-2",
  "resources": [
    "arn:aws:networkmanager::166889823465:global-network/global-
network-0de3af1d5c665d6d8",
    "arn:aws:networkmanager::166889823465:core-network/core-network-03ad314394f3f014d"

  ],
  "detail": {
    "changeType": "VPC-ATTACHMENT-DELETED",
    "changeDescription": "A VPC attachment has been deleted from a Core Network.",
    "edgeLocation": "us-east-2",
    "attachmentArn": "arn:aws:networkmanager::166889823465:attachment/
attachment-092077875ecbe596b",
    "vpcArn": "arn:aws:ec2:us-east-2:212869205455:vpc/vpc-049a3a24f48fcc47d",
    "coreNetworkArn": "arn:aws:networkmanager::166889823465:core-network/core-
network-03ad314394f3f014d"
  }
}
```

Route changes

Routing events occur when there are changes to your core network routes. These changes include the following:

- Routes in one or more segments have been installed.
- Routes in one or more segments have been uninstalled.

The following example shows a routing update event where a route was installed in one or more segments.


```
{
   "version": "0",
   "id": "13143a7e-806e-a904-300b-ef874c56eaac",
   "detail-type": "Network Manager Routing Update",
   "source": "aws.networkmanager",
   "account": "166889823465",
   "time": "2021-09-02T12:00:38Z",
   "region": "us-west-2",
   "resources": [
     "arn:aws:networkmanager::166889823465:global-network/global-
network-0de3af1d5c665d6d8",
     "arn:aws:networkmanager::166889823465:core-network/core-
network-092077875ecbe596b"
   ],
   "detail": {
     "changeType": "SEGMENT-ROUTES-INSTALLED",
     "changeDescription": "Routes in one or more Segments have been installed.",
     "region": "us-east-2",
     "segments": [
       "development"
     ],
     "sequenceNumber": 1630585228195,
     "routes": [
       {
         "destinationCidrBlock": "169.254.137.220/30",
         "attachments": [
           {
             "attachmentId": "attachment-06d30d085574773ee",
             "attachmentType": "vpn",
             "vpnOutsideIpAddress": "3.138.83.40"
           }
         ],
         "routeType": "route_propagated",
         "routeState": "active",
         "propagatedRouteFamily": "bgp",
         "bgpAttributes": {
           "med": "0",
           "asPath": [ "AS_SEQ: [65001]" ]
         }
       }
```

```
    ],
    "coreNetworkArn": "arn:aws:networkmanager::166889823465:core-network/core-
network-03ad314394f3f"
   }
 }
}
```

Status updates

Routing events occur when there are changes to your core network status. These changes include the following:

- IPsec for a VPN connection has gone down.
- IPsec for a VPN connection has come back up.
- BGP for a VPN connection has gone down.
- BGP for a VPN connection has come back up.
- BGP for a Connect peer connection has gone down.
- BGP for a Connect peer connection has come back up.

The following example shows a status update event where IPsec for a VPN connection has come up.

```
{
   "version": "0",
   "id": "13143a7e-806e-a904-300b-ef874c56eaac",
   "detail-type": "Network Manager Status Update",
   "source": "aws.networkmanager",
   "account": "166889823465",
   "time": "2021-09-02T12:00:38Z",
   "region": "us-west-2",
   "resources": [
     "arn:aws:networkmanager::166889823465:global-network/global-
network-0de3af1d5c665d6d8",
     "arn:aws:networkmanager::166889823465:core-network/core-
network-092077875ecbe596b"
   ],
   "detail": {
     "changeType": "VPN-CONNECTION-IPSEC-UP",
     "changeDescription": "IPsec for a VPN connection has come up.",
     "region": "us-west-2",
```

```
     "attachmentArn": "arn:aws:networkmanager::166889823465:attachment/
attachment-092077875ecbe596b",
     "outsideIpAddress": "35.161.41.136",
     "coreNetworkArn": "arn:aws:networkmanager::166889823465:core-network/core-
network-03ad314394f3f014d"
   }
 }
```

Policy updates

Routing events occur when there are changes to your core network policies. These changes include the following:

- A change set is ready to run for a core network policy.
- A change set was run successfully for a core network policy.

The following example shows a policy update event where a change set was run successfully.

```
{
   "version": "0",
   "id": "13143a7e-806e-a904-300b-ef874c56eaac",
   "detail-type": "Network Manager Policy Update",
   "source": "aws.networkmanager",
   "account": "166889823465",
   "time": "2021-09-02T12:00:38Z",
   "region": "us-west-2",
   "resources": [
     "arn:aws:networkmanager::166889823465:global-network/global-
network-0de3af1d5c665d6d8",
     "arn:aws:networkmanager::166889823465:core-network/core-
network-092077875ecbe596b"
   ],
   "detail": {
     "changeType": "CHANGE-SET-EXECUTED",
     "changeDescription": "A change-set has been sucessfully executed for a Core
 Network policy.",
     "policyVersionId":"1",
     "coreNetworkArn": "arn:aws:networkmanager::166889823465:core-network/core-
network-03ad314394f3f014d"
   }
 }
```

Segment update events

Routing events occur when there are changes to your core network segments. These changes include the following:

- An attachment was associated with a segment.
- An attachment was mapped to a different segment.
- An attachment was disassociated from a segment.

The following example shows a segment update event where an attachment was mapped to a different segment.


```
{
   "version": "0",
   "id": "13143a7e-806e-a904-300b-ef874c56eaac",
   "detail-type": "Network Manager Segment Update",
   "source": "aws.networkmanager",
   "account": "166889823465",
   "time": "2021-09-02T12:00:38Z",
   "region": "us-west-2",
   "resources": [
     "arn:aws:networkmanager::166889823465:global-network/global-
network-0de3af1d5c665d6d8",
     "arn:aws:networkmanager::166889823465:core-network/core-
network-092077875ecbe596b"
   ],
   "detail": {
     "changeType": "ATTACHMENT-ASSOCIATION-MODIFIED",
     "changeDescription": "An attachment has been mapped to a different Segment.",
     "attachmentArn": "arn:aws:networkmanager::166889823465:attachment/
attachment-092077875ecbe596b",
     "previousSegmentName": "development",
     "segmentName": "production",
     "edgeLocation": "us-west-2",
     "coreNetworkArn": "arn:aws:networkmanager::166889823465:core-network/core-
network-03ad314394f3f014d"
   }
 }
```

Monitor with CloudWatch metrics

You can monitor your core network and core network attachments using Amazon CloudWatch under the AWS/NetworkManager namespace, which collects raw data and processes it into readable, near-real-time metrics. These statistics are kept for 15 months, so that you can access historical information and gain a better perspective on how your network is performing. You can also set alarms that watch for certain thresholds, and send notifications or take actions when those thresholds are met. For more information, see the *Amazon CloudWatch User Guide*.

> **Note**
>
> CloudWatch metrics in the AWS/NetworkManager namespace are available only in the following Regions:
>
> - US West (Oregon) for all Regions except AWS GovCloud (US)
> - AWS GovCloud (US-West) for AWS GovCloud (US-West) and AWS GovCloud (US-East)

You can view usage metrics for any of your core network edge locations.

View usage metrics for an edge location

View usage metrics for a specific core network edge.

To access usage metrics for a core network edge location

1. Access the Network Manager console at https://console.aws.amazon.com/networkmanager/home/.
2. Under **Connectivity**, choose **Global Networks**.
3. On the **Global networks** page, choose the global network ID.
4. In the navigation pane, choose **Core networks**, and then choose the **Monitoring** tab.
5. On the **Core network** page, choose the **Show metrics** dropdown list, and then choose **Usage**.
6. From the **Core network edge** dropdown list, choose the edge location that you want to see metrics for.
7. (Optional) Metrics and events use the default time set up in the CloudWatch Events event. To set a custom time frame, choose **Custom** and then choose a **Relative** or **Absolute** time, and then choose if you want to see that date range in **UTC** or the edge location's **Local time zone**.

Choose **Add to dashboard** to add this metric to your CloudWatch dashboard. For more information about using CloudWatch dashboards, see Using Amazon CloudWatch Dashboards in the *Amazon CloudWatch User Guide*.

> **Note**
>
> The **Add to dashboard** option only works if your registered transit gateway is in the US West (Oregon) Region.

8. The Metrics page displays the following usage metrics for the specified edge location during the chosen time frame.

- **Bytes in**
- **Bytes out**
- **Bytes dropped - black hole**
- **Bytes dropped - no route**
- **Packets in**
- **Packets out**

Quotas

Your AWS account has the quotas shown in the following table for AWS Cloud WAN.

The Service Quotas console also provides information about AWS Cloud WAN quotas. You can use the Service Quotas console to view default quotas and request quota increases for adjustable quotas. For more information, see Requesting a quota increase in the *Service Quotas User Guide*.

General

The following AWS Cloud WAN general quotas apply.

Quota	Default	Adjustable
Global networks per AWS account	5	Yes
Core networks per global network	1	No
Edges per Region per core network	1	No
Segments per core network	40	No
Retention duration (in seconds) for core network policies with out-of-date change sets	7776000	Yes
Number of policy versions per core network	10,000	Yes
Size of a core network policy	1 MB	No
Number of policy versions	10000	Yes
Number of attachments per core network	5000	Yes

Quota	Default	Adjustable
Number of core network Connect attachments	No limit, up to 5000 maximum attachments per core network	No
Number of core network attachments per VPC	5	No
Number of Connect peers per Connect attachment	4	No
Number of Connect peers per Tunnel-less Connect attachment	4	No
Number of devices per global network	200	Yes
Number of sites per global network	200	Yes
Number of links per global network	200	Yes
Number of connections per global network	500	Yes
Number of transit gateway peers	50	Yes
Number of transit gateway routing tables	No limit	

Bandwidth

Your AWS account has the following bandwidth quotas for AWS Cloud WAN.

You can use equal-cost multipath routing (ECMP) to get higher VPN bandwidth by aggregating multiple VPN tunnels. To use ECMP, the VPN connection must be configured for dynamic routing. ECMP is not supported on VPN connections that use static routing.

You can create up to four Connect peers per Connect attachment (up to 20 Gbps in total bandwidth per Connect attachment). You can use ECMP to get higher bandwidth by scaling horizontally across multiple Connect peers of the same Connect attachment or across multiple Connect attachments. Core network cannot use ECMP between the BGP peerings of the same Connect peer.

Quota	Default	Adjustable
Bandwidth per VPC attachment per Availability Zone	Up to 100 Gbps	Contact your Solutions Architect (SA) or Technical Account Manager (TAM) for further assistance.
Packets per second per transit gateway VPC attachment per Availability Zone	Up to 7,500,000	Contact your Solutions Architect (SA) or Technical Account Manager (TAM) for further assistance.
Maximum bandwidth per VPN tunnel	Up to 1.25 Gbps	No
Maximum bandwidth per Connect peer (GRE tunnel) per Connect attachment	Up to 5 Gbps	No
Maximum bandwidth per Connect peer (Tunnel-less) per Connect attachment	Up to 100 Gbps per availability zone	Contact your Solutions Architect (SA) or Technical Account Manager (TAM) for further assistance.

Routing

Your AWS account has the following routing quotas for AWS Cloud WAN.

Quota	Default	Adjustable
Routes per core network, across all segments	10,000	No
Routes advertised over VPN to core network	1,000	No
Routes advertised from core network over VPN	5,000	No
Routes advertised over Connect peer to core network	1,000	No
Routes advertised from core network over Connect peer	5,000	No
Maximum of Tunnel-less Connect routes	5,000 outbound 1,000 inbound	No

Maximum transmission unit (MTU)

Your AWS account has the following MTU quotas for AWS Cloud WAN:

- The MTU of a network connection is the size, in bytes, of the largest permissible packet that can be passed over the connection. The larger the MTU of a connection, the more data that can be passed in a single packet. A Cloud WAN core network supports an MTU of 8500 bytes for traffic between VPCs, including Tunnel-less Connect VPC attachments. Traffic over VPN connections can have an MTU of 1500 bytes.
- Packets with a size larger than 8500 bytes that arrive at the core network are dropped.
- The core network does not generate the FRAG_NEEDED for ICMPv4 packet, or the Packet Too Big (PTB) for ICMPv6 packet. Therefore, the Path MTU Discovery (PMTUD) is not supported.
- The core network enforces Maximum Segment Size (MSS) clamping for all packets. For more information, see RFC879.

Document history for AWS Cloud WAN

The following table describes the releases for AWS Cloud WAN.

Change	Description	Date
Added a new available Region.	ap-southeast-3 Asia Pacific (Jakarta) Region is now an available Region for AWS Cloud WAN.	March 26, 2024
Support added for appliance mode.	VPC attachments now support appliance mode in AWS Cloud WAN.	December 14, 2022
Official launch date	The official launch of AWS Cloud WAN.	July 12, 2022