AWS Whitepaper

Amdocs Digital Brand Experience Platform in AWS Cloud

Amdocs Digital Brand Experience Platform in AWS Cloud: AWS Whitepaper

Table of Contents

Abstract and introduction i
Introduction 1
BSS applications are mission-critical workloads 3
Amdocs BSS portfolio 5
Amdocs Digital Brand Experience Suite overview 6
Functional capabilities 7
Digital channels 7
Business process foundation 7
Customer management layer capabilities 8
Revenue management 8
Order management 10
Functional architecture 10
Integration layer capabilities 12
Application layer capabilities 13
Data management 13
Benefits of deploying Digital Brand Experience Suite on AWS 14
Digital Brand Experience Suite deployment architecture 15
Technical architecture 15
Common deployment architecture 15
High availability 18
Scalability 19
Security 19
Digital Brand Experience Suite SaaS model 20
Inbound services VPC (SaaS Offering) 21
Management VPC (SaaS offering) 22
AWS Well-Architected Framework 24
Operational excellence 24
Security 19
Reliability 25
Performance efficiency 25
Cost optimization 26
Conclusion 27
Contributors 28
Further reading 29

Document history **30**
Notices **31**
AWS Glossary **32**

Amdocs Digital Brand Experience Platform in AWS Cloud

Publication date: **November 18, 2021** (*Document history*)

Amdocs Digital Brand Experience Suite is a digital customer management and commerce platform designed to rapidly and securely monetize any product or service. Serving innovative communications operators, utilities, and other subscription-based service providers, Digital Brand Experience Suite's open platform has been available on-premises, but is now also available on the AWS Cloud. This whitepaper provides an architectural overview of how the Digital Brand Experience Suite business support systems (BSS) solution operates on the AWS Cloud. The document is written for executives, architects, and development teams that want to deploy a business support solution for their consumer or enterprise business on the AWS Cloud.

Introduction

Amdocs provides the Amdocs Digital Brand Experience Suite: a digital customer management, commerce, and monetization software as a service (SaaS) solution designed specifically for the needs of digital brands and other small service providers who need to provide digital experience to their customers while being agile, innovative, and with rapid time to market. The Amdocs solution helps these communications service providers (CSPs) to focus on their business by simplifying their business support through prebuilt packages of business and technical processes spanning the full customer lifecycle: care, commerce, ordering, and monetization. Provided as a service, the solution is ready to support simple models with minimal time to market, including integrations to key external partners and an extensive set of application programming interfaces (APIs). More complex business models can be configured in the system, and integrations within bespoke ecosystems are supported through the open API architecture.

The enterprise market in particular involves unique challenges that require an industry-proven solution. Service providers focusing on the enterprise and small- and medium-sized enterprise (SME) business segments can deliver a significant increase in revenue and market share. However, when trying to perform an enterprise business strategy, many operators find they lack the required capability to support the continuous demand for their corporate services. They find that their BSS platforms lack business flexibility and operational efficiency, and are not cost effective. Key challenges include: underperforming systems, the high cost of managing legacy operations, and maintaining regulatory compliance. Many companies need to adopt a pan-Regional architecture to onboard additional countries, Regions, customer verticals, and products. This situation demands

a significant change in both revenue and customer management systems, as well as in the IT environment.

This whitepaper provides an overview of the Amdocs Digital Brand Experience platform and a reference architecture for deploying Amdocs on AWS. This whitepaper also discusses the benefits of running the platform on AWS, and various use cases. By running Amdocs Digital Brand Experience on the AWS Cloud, and especially delivered as SaaS, the Amdocs platform can deliver significant required improvements to the operations and capabilities of customers in every industry, while enabling future growth and expansion to new domains. Customers can also benefit from the compliance and security credentials of the AWS Cloud instead of incurring an ongoing cost of audits related to storing customer data.

BSS applications are mission-critical workloads

BSS are the backbone of a service provider's customer-facing strategy. BSS encompasses the spectrum from marketing, shopping, ordering, charging, taxation, invoicing, payments collection, dunning, and ultimately financial reporting. There are four primary domains: product management, order management, revenue management, and customer management.

Product management

Product management supports the sellable entities, or catalog, of a provider. From conception to sale to revenue recognition, this is the toolset for managing services, products, pricing, discounts, and many other attributes of the product lifecycle.

Order management

Order management is an extension of the sales process and encompasses four areas: order decomposition, order orchestration, order fallout, and order status management. Ordering may be synchronous, where service is enabled in real-time. Or, the actual service delivery may take days, with complex installation processes. It is incumbent on the BSS to accurately and efficiently processing orders, avoiding fallouts, while providing status both to the service provider and the customer.

Revenue management

Revenue management focuses on the financial aspects of the business, both from the customer and service provider perspective. It includes pricing, charging, and discounting those feeds into the invoicing process and taxing. The invoice in turn feeds the accounts receivable processes—payment collection and dunning—and becomes the foundation for revenue recognition reporting (general ledger). Consumer billing for consumer, enterprise, and wholesale services, as well as prepaid and postpaid models, are supported in the system. Revenue management also includes fraud management and revenue assurance.

Customer management

The relationship of the service provider to their customers is of critical importance. From the initial contact through self-care and mobile applications, shopping online, and to customer care, it is important to provide the multi-channel exposure of a single customer view. Complex customer models are supported through robust mechanisms of customer groups. Enterprises are modeled

through a combination of accounts, hierarchies, groups, and organizations—providing support for real-world charging, billing, and reporting responsibilities.

Amdocs BSS portfolio

Amdocs is a software and services vendor with nearly 40 years of expertise specifically focused on the communications and media industry. It's a trusted partner to the world's leading communications and media companies, serving more than 350 service providers in more than 85 countries.

Amdocs' product lines encompass digital customer experience, monetization, network and service automation, and more, supporting more than 1.7 billion digital customer journeys every day.

Amdocs CES21 is a 5G native integrated BSS operations support system (OSS) suite. It is a cloud-native, open, and modular suite that supports many of the world's top CSPs on their digital and 5G journeys.

The Amdocs Digital Brand Experience Suite is a SaaS solution that's specifically built for the needs of digital brands and other small service providers. It is a pre-integrated suite with an extensive set of built-in processes and configuration templates to simplify commerce, care, ordering, and monetization, and empowering business users through "shift-left" to a truly digital experience for the BSS itself. As SaaS, it provides unparalleled time to market and scalability, while benefitting from Amdocs' robust operations and a "pay as you grow" business model.

Amdocs Digital Brand Experience Suite overview

Amdocs Digital Brand Experience Suite provides flexibility while implementing a high level of complexity. It enables customers to capitalize on digital era opportunities by growing customer's business with an open system that seamlessly interacts with ancillary applications.

It offers the freedom to address a diverse set of product and service markets, as well as a range of end-customer types. Encompassing a set of established and progressive BSS products, Amdocs Digital Brand Experience Suite represents proven functionality under a preconfigured, industry-standard integration layer.

Configurability, smart interoperability, and consistent experience

- Swift onboarding of the service provider onto the platform. With the SaaS solution, onboarding can be done immediately. Complex business models and dedicated instances of Digital Brand Experience Suite for larger service providers take slightly longer.
- Time-to-market for new products, services, and bundles occurs in minutes instead of months.
- Simple, table-driven configuration doesn't require coding. The data model is highly flexible without requiring software changes.
- Provides support for multiple lines of business. Within a single instance or tenant, Amdocs Digital Brand Experience Suite supports any number of lines of business (mobile, fixed-line, broadband, cable, finance, and utilities) and uses a flexible catalog to offer converged services to a sophisticated market.

Flexible deployment

- Multi-tenancy capabilities allow for a "define once, utilize many" strategy, as different tenants are hosted on a single hardware and software platform that is operated in one location. CSPs can deploy Amdocs Digital Brand Experience Suite on AWS as a service, or as a dedicated instance.

Support options

- Amdocs offers support for subscription, usage-based, and "billing as a service" models over multiple networks and protocols of any kind, and across borders. In addition, Amdocs supports any service, product, and payment method, as well as multiple currencies and languages.

Open and secure integration model

- More than 500 open-standard, partner-friendly, pre-integrated microservices use RESTful service methods.
- Security and compliance is provided by both AWS Cloud and the Digital Brand Experience Suite architecture.

Functional capabilities

The Digital Brand Experience Suite comes with the following capabilities:

Digital channels

- **Responsive with multi-modal web presentation layer** – Multimodal user interfaces provide users with different ways of interacting with applications. This has advantages both in providing interaction solutions with additional robustness in environments.
- **Bespoke native mobile application** – The goal of bespoke software or mobile apps is to create operational efficiency, reduce cost, improve retention and drive-up revenue.
- **Self-care** – Web interface enables customers to use the self-service capability.
- **Customer service representative (CSR) interfaces** – The customer service interface includes tools and information for supporting the system admin users, customers, and transactions.

Business process foundation

- **Identity management** – Authentication, roles, user management, and single sign-on.
- **Security, usage throttling, service-level agreements (SLAs)** – Authorization, metrics, and SLA enforcement around exposed northbound APIs.
- **Microservice based REST APIs** – API framework to deliver business services through a standardized REST API model.
- **Configurable service logic** – Orchestration of underlying APIs to deliver business-oriented functions, enhanced flexibility, and extensibility.
- **Data mapping** – Management of the Digital Brand Experience Suite data model and virtualization of external, third-party applications.
- **Commerce catalog** – Rules matching products and services to customers. Rules can be based on account segment, hierarchy, geography, equipment, serviceability, or any number of other

factors and defined business processes, serving both B2B and B2C customers. With optional intelligence capabilities, the rules can be extended to support marketing campaigns, such as Next Best Offer /Next Best Action (NBO/NBA).

- **Shopping cart** – Product browsing and search, cart item management (including product options and features), and pricing.
- **Quotation service** – A view into what a bill would look like for a given order, including prices, discounts, and taxation.
- **Messaging** – Asynchronous message queuing technology with persistence for internal event notification and synchronization and routing to the relevant professional (system administrator, CSR, and so on).

Customer management layer capabilities

- **Customer management** – Definition of customer profiles, customer interactions, and customer hierarchies, supporting simple to extremely complex B2B hierarchies and B2C scenarios.
- **Case management** – Customer interaction mechanism which can initiate actions in the system, and queue up issues for service provider personnel. Configurable rules determine actions and routing, for a particular case.
- **Inventory** – Manages serialized logical inventory for association to billing products. Inventory can be categorized by type or line, with corequisite rules defined in the catalog.
- **Resource management** – Manages dynamic lifecycle policy for all resources.

Revenue management

- **Billing rules** – Configurable management of rules related to the billing operation. This is the foundation for how charges are derived from a combination of price and customer service attributes.
- **Event and order fulfillment** – A workflow-driven process to provision and activate billing orders in the system. This involves instantiation of the relevant products to their respective customer databases.
- **Usage and file processing** – Integrity checks on the input event usage files before passing to rating.

- **Rating engine** – Offline and online rating engine including file-based offline rating, typically for prepaid and postpaid subscribers. The rating engine can use multiple factors related to the subscriber, account, and service to calculate the price for the usage.
  - **Offline rating engine** – File-based offline rating, typically for postpaid subscribers.
  - **Online rating engine** – Real-time rating and promotional calculations based on network events.
- **Rated usage management** – Persistence and indexing of billed, unbilled, non-billable usage, and usage details.
- **Bill preparer** – The billing processor (BIP) identifies accounts within a particular bill cycle, gathers data for bill processing, calculates billable charges, and generates processed information for bill formatting.
- **Bill-time discount** – Calculates bill-time discounts based on total usage for the period, total charges, and applicable discount tiers.
- **Bill-time taxation** – Calculates appropriate taxes given the geography, account information info and installed tax packages.
- **Invoice generator (IGEN)** – Combines the processed bill information from the BIP with invoice formats from the invoice designer to produce formatted bills. The IGEN supports conditional logic in the templates and multi-language presentation formats.
- **Accounts receivable (AR) balance management** – Applies bill charges to an account's AR balances. Thresholds defined against the balance may trigger notifications and/or lifecycle state changes.
- **Payments** – Requests for payment, payment history, and payment profiles.
- **Adjustments and refunds –** Allow for charges to be disputed, adjusted, or fully refunded. A manager approval mechanism, with workflow ensures that all adjustments have been reviewed and authorized.
- **Journal (general ledger) feeds** – Reporting function that maps all financially significant activities in the system to operator-defined general ledger codes. Journaling generates feed files on a regular basis with the charges, organized based on the specified codes and categories. These files are then imported into the operator's account systems.
- **Collections** – Driven process through which past-due bills launch various external notification and collection activities, ultimately leading to debt resolution or write-off. Interfaces are provided to restore account state upon successful collection action.
- **Recharge** – Balance allotments and related promotions launched by recharge actions.
- **Balance management** – Full lifecycle of cyclical authorization balances updated in real time.

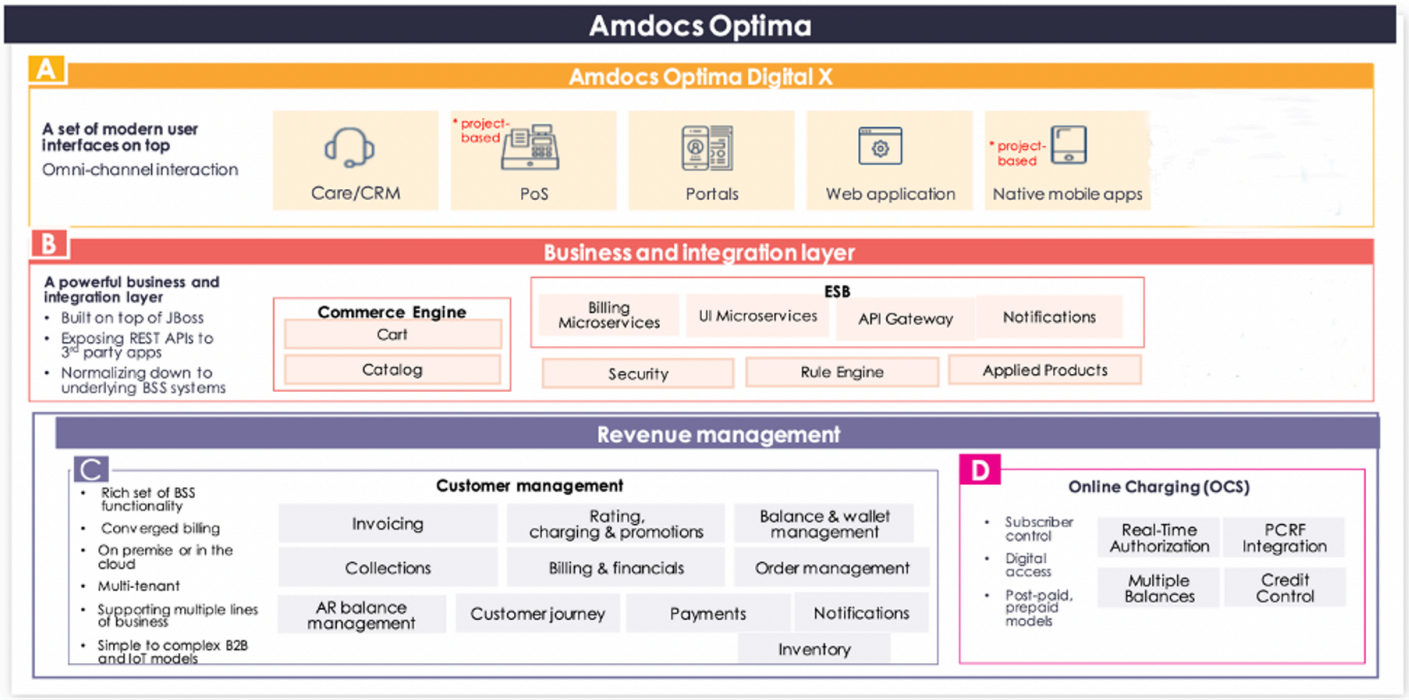
- **Online promotions** – Real-time bonus awards and discounts, applied immediately to balances.
- **Notifications** – Threshold-based external notifications (for example, invoked in response to a low balance).

Order management

- **Order management** – Processing of ordered services and their elements prior to order fulfillment. Typically initiated at the end of the shopping experience, this can include editing or cancelling pending orders, or forcing pending orders to immediately activate workflow-driven processes configured to meet business needs.
- **Order fulfillment** – A workflow-driven process to provision and activate orders in the system. Configurable milestones define the workflow model for each service, and may involve many steps a route to service activation on third-party systems.
- **Provisioning** – Runs the provisioning processes of all ordered services on various networks, including: Home Location Registers, unified communication platforms, electrical grids, media servers, Home Subscriber Servers, and others.
- **Network protocol integration** – Supports authentication, authorization, and accounting functionality for all types of online and offline charging, as well as major network protocols. Formats are provided for common event record types. Interfaces to online charging system (OCS) support all the protocols involved in voice and data charging, especially 5G.

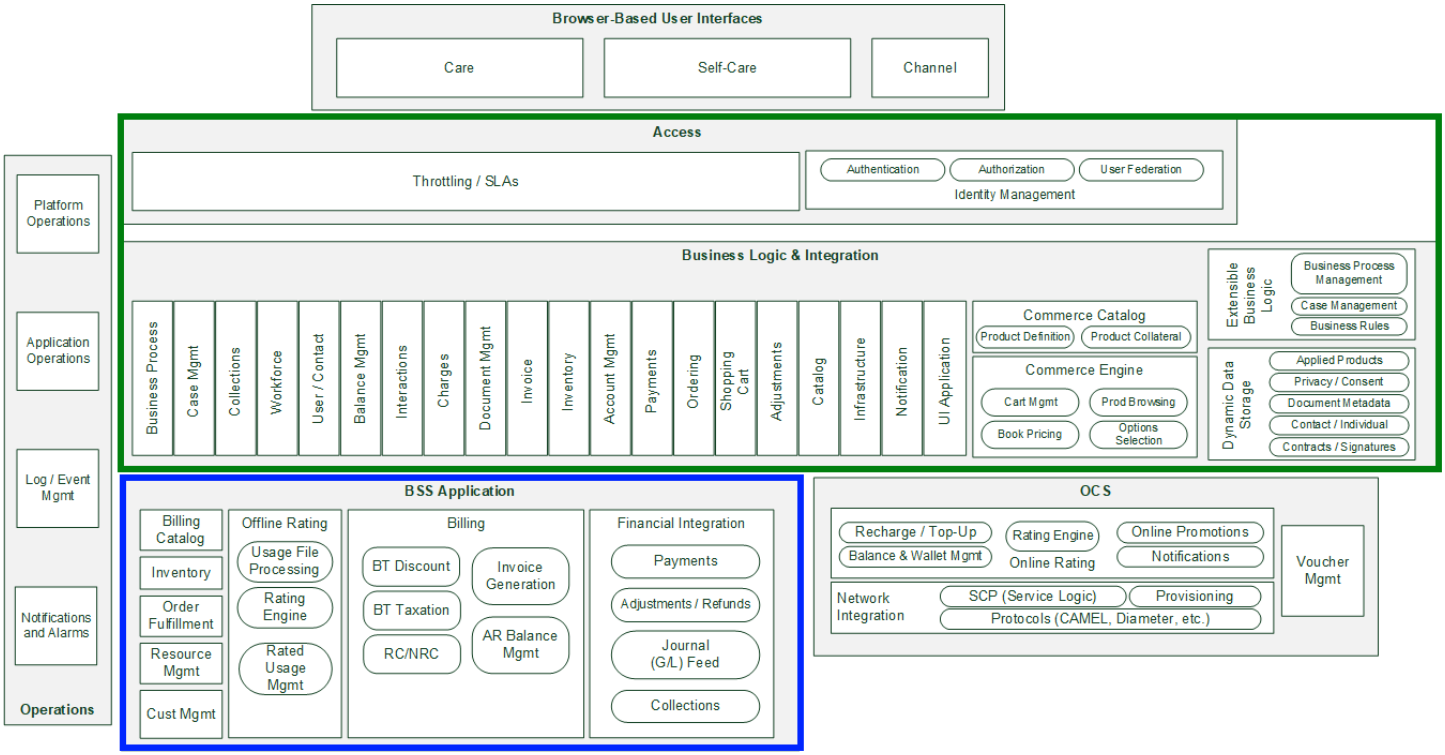
Functional architecture

Digital Brand Experience Suite architecture includes three layers: user experience, integration, and application. The following diagram illustrates the high-level architecture.



Digital Brand Experience Suite functional architecture

This whitepaper focuses primarily on the integration and application layers, because these features are deployed in AWS. While the UI applications are downloaded from AWS, the actual UI runtime occurs client-side. The APIs of the integration layer support the Digital Brand Experience Suite user interfaces (UIs), as well as other third-party client integrations. These APIs expose the capabilities of the application layer, as well as orchestrate the different applications to form higher-level business services. Integration layer capabilities are marked in the green box, and application layer capabilities are marked in the blue box. Additional detailed capabilities can be reviewed in the following diagram.



Digital Brand Experience Suite functional capabilities

Note that the OCS domain in the preceding diagram depicts a reference implementation; integration with an OCS (as well as the specific OCS used) is an optional aspect of the Digital Brand Experience Suite solution.

Integration layer capabilities

- **Throttling and SLAs** – Metrics and SLA reporting around the exposed northbound APIs.
- **Identity management** – Centralized authentication and authorization.
- **Business logic and integration** – Service-oriented APIs, and their supporting capabilities.
- **Commerce catalog** – Definition and management of products related to the shopping experience. Includes eligibility aspects, references to marketing collateral, bundling constructions, and so forth.
- **Commerce engine** – Technical APIs to manage shopping carts and catalog browsing.
- **Extensible business logic** – Business rules which extend the core logic of the APIs. This also includes business process management to model flow-based scenarios such as case handling and post-checkout approval.
- **Dynamic data storage** – Persistence for objects that are required for Digital Brand Experience Suite capabilities, but not part of the existing and native application models. This includes things

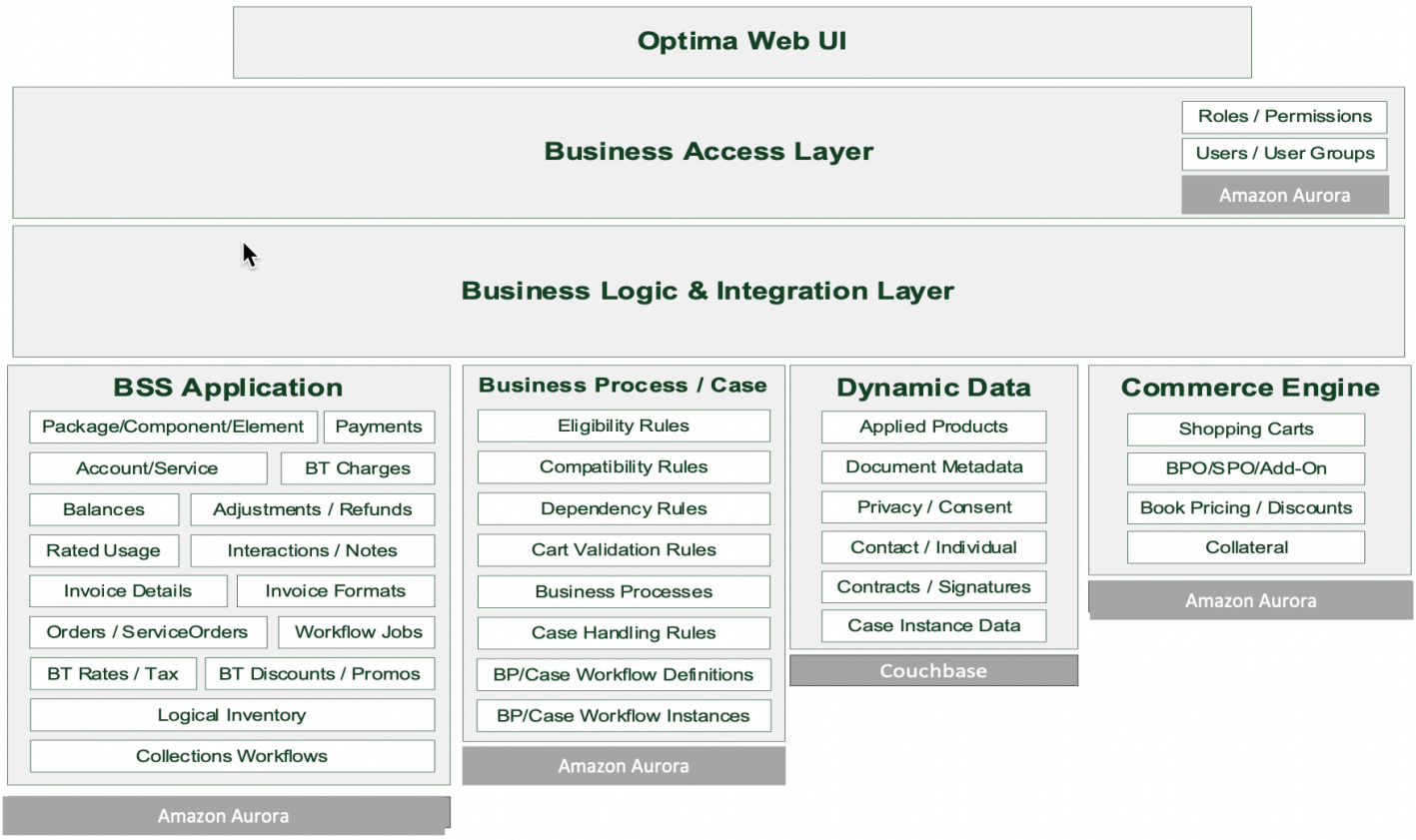
like consents, contacts, metadata for order-supporting documentation, and assigned and applied product instances.

Application layer capabilities

- **Billing catalog** – Definition and management of products related to the billing operation. Products and their elements include rate plans, discount plans, recurring and non-recurring charges, and associated configuration. Product lifecycle allows for advance sales windows, sunsetting, and so forth. For other billing application capabilities, refer to the Revenue management section of this document.

Data management

The following diagram shows the main entities managed by Digital Brand Experience Suite, with the functional domains which are primarily responsible for each.



Digital Brand Experience Suite functional domains

Benefits of deploying Digital Brand Experience Suite on AWS

With the increase of the subscriber base and high demands of 5G, cost reduction becomes an essential factor to build a successful business model. CSPs that are running Digital Brand Experience Suite on AWS will pay only for the resources they use. With the “pay as you go” model, customers also can spin up, experiment, and iterate BSS environments (testing, dev, and so forth), and pay based on consumption.

An on-premises environment usually provides a limited set of environments to work with—provisioning additional environments can take a long time or might not be possible. With AWS, CSPs can create virtually many new environments in minutes as required.

In addition, CSPs can create a logical separation between projects, environments, and loosely decoupled application, thereby enabling each of their teams to work independently with the resources they need. Teams can subsequently converge in a common integration environment when they are ready. At the conclusion of a project, customers can shut down the environment and cease payment.

Customers often over-size on-premises environments for the initial phases of a project, but subsequently cannot cope with growth in later phases. With AWS, customers can scale their compute resources up or down at any time. Customers pay only for the individual services they need, for as long as they use them. In addition, customers can change instance sizes in minutes through AWS Management Console, AWS API, or AWS Command Line Interface (AWS CLI).

Because of the exponential growth of data worldwide, and specifically in the telecom world, designing and deploying backup solutions has become more complicated. With AWS, customers have multiple options to set up a disaster recovery strategy depending on the recovery point objective (RPO) and recovery time objective (RTO) using the expansive AWS Global Cloud Infrastructure.

Amdocs Digital Brand Experience Suite platform offers rich product and service management capabilities which can be integrated with AWS Cloud Analytics services for use cases such as subscriber, customer, and usage analytics. Digital Brand Experience Suite capabilities can be also empowered by machine learning and artificial intelligence capabilities through AWS services.

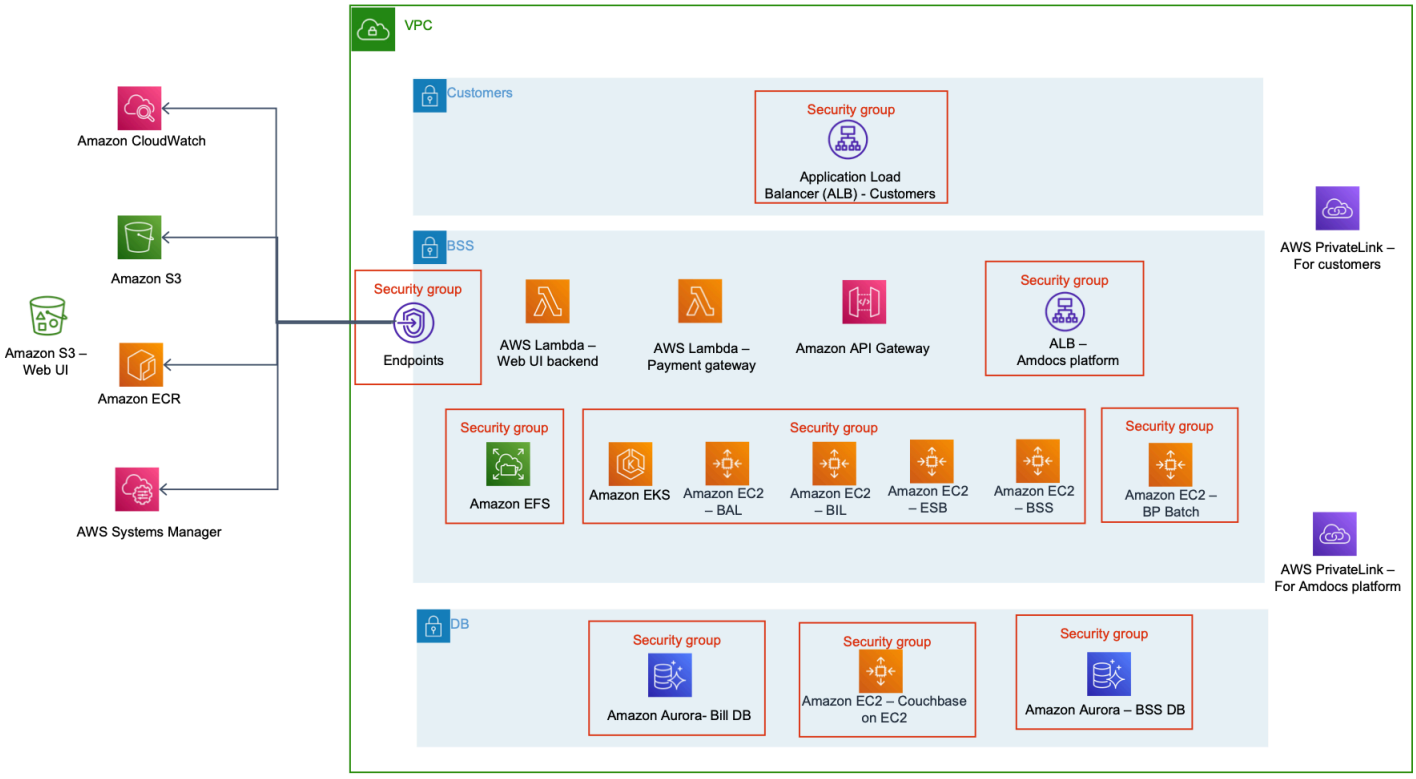
Digital Brand Experience Suite deployment architecture

Although there are multiple options for deploying the Digital Brand Experience Suite into an AWS environment, the diagrams in this section primarily focus on deploying into a multi-tenant SaaS architecture. Where possible, common aspects of the architecture for non-SaaS deployments will be highlighted.

Technical architecture

Common deployment architecture

The following diagram depicts the main resources deployed for the Digital Brand Experience Suite. The application is using the same AWS services, regardless of the nature of the cloud deployment (for example, SaaS vs. non-SaaS).



Digital Brand Experience Suite common cloud resources detail

The Digital Brand Experience Suite uses Amazon Virtual Private Cloud (VPC) that is divided into three subnets, which organize the access, compute, and storage resources needed for the Digital

Brand Experience Suite. All of these subnets are private—access is handled by a demilitarized zone (DMZ) such as the inbound services VPC of the SaaS offering.

Customers subnet

The customers subnet provides access and load balancing capabilities into the VPC. This is the entry point from the DMZ (for example, inbound services VPC through AWS PrivateLink for customers interface). As such, access here is focused on the services that the end users need for their Digital Brand Experience.

BSS subnet

The BSS subnet holds the primary computing resources. These comprise different Auto Scaling groups, managed by Amazon Elastic Kubernetes Service (Amazon EKS).

- **Business Access Layer (BAL) nodes** – Used for API access, path-based routing, metrics, and throttling to support the Digital Brand Experience Suite APIs. These capabilities are provided by the APIMAN package. These nodes support inherent SLAs, and enable customers to set throttling rules based on the number of requests per second for each method in APIs.
- **Enterprise Service Bus (ESB) nodes** – Implement the Digital Brand Experience Suite SaaS APIs which are organized into microservices based on functional areas (for example, account management, shopping cart, and invoicing). These APIs and their integration logic translate between the high-level, service-oriented requests received by the Digital Brand Experience Suite APIs, and the low-level technical APIs needed to fulfill the requests across the various Digital Brand Experience Suite resources.
- **Bill Processing (BP) batch nodes** – Run the billing applications, which perform bill calculation, invoice generation, collections, and journal processing. These applications are task-based, meaning that they are initiated on a schedule and on a particular set of input data. For example, bill processing for cycle 15 will run on the determined day (for example, the fifteenth day of the month) for the subset of accounts who have selected the fifteenth day as their bill cycle date. By using native auto scaling, BP batch nodes dynamically scale Amazon Elastic Compute Cloud (Amazon EC2) instances based on configurable parameters (such as, the number of customers, services, and products), and is one of the major benefits of running the application on AWS. With AWS Auto Scaling, BP batch applications always have the right resources at the right time.
- **BSS nodes** – Host the low-level service APIs which expose the billing capabilities to the Integration layer. For example, fetching the invoice details from processed bills, or inquiring about a particular collections' scenario.

- **Business Integration Layer (BIL) nodes** – Contain applications to support the middleware—the shopping cart application, Red Hat Decision Manager (RHDM) which is used to extend the BIL API business logic, and RedHat Process Automation Manager (RHPAM) which is used for case handling and post-cart processing (for example, credit review).

Using each of these different node groups highly depends on the traffic profiles of the specific operator; as a result, deploying these node groups into separate Auto Scaling groups allows for greater platform efficiency by scaling the specific node group accordingly.

AWS Fargate is used for BP batch, which comprises of scheduled and task-based applications like the billing processor and invoice generator. Rather than port these applications, Fargate is used to containerize them while maintaining their established technology stack.

An Amazon Elastic File System (Amazon EFS) instance is deployed within this subnet, that is used by the various processes of the billing application (for example, usage files which are shared between the different usage file rating processes).

As part of the overall migration of the Digital Brand Experience Suite solution to be more AWS native, several processes have already moved to use serverless computing resources. For example, the payment gateway and web UI backend are implemented through AWS Lambda functions for event-based handling. Serverless computing on AWS—such as AWS Lambda—includes automatic scaling, built-in high availability, and a pay-for-value billing model. AWS Lambda is an event-driven compute service that enables customer to run code in response to events from over 200 natively-integrated AWS and SaaS sources—all without managing any servers.

Internal Amdocs operations and support users access BSS subnet from the management VPC through PrivateLink for Amdocs interfaces. PrivateLink provides private connectivity between VPCs, AWS services, and customer's on-premises networks, without exposing their traffic to the public internet.

Database subnet

The database subnet holds the resources for the Digital Brand Experience Suite persistence layer (such as, multiple database technologies) that are used across the Digital Brand Experience Suite SaaS solution. The BIL database and BSS database use Amazon Aurora databases for commerce (shopping cart) and billing, respectively.

Database resources are only accessible from the BSS subnet. Not only does this secure the actual persisted data, but it decouples the storage technology from the external services and hides

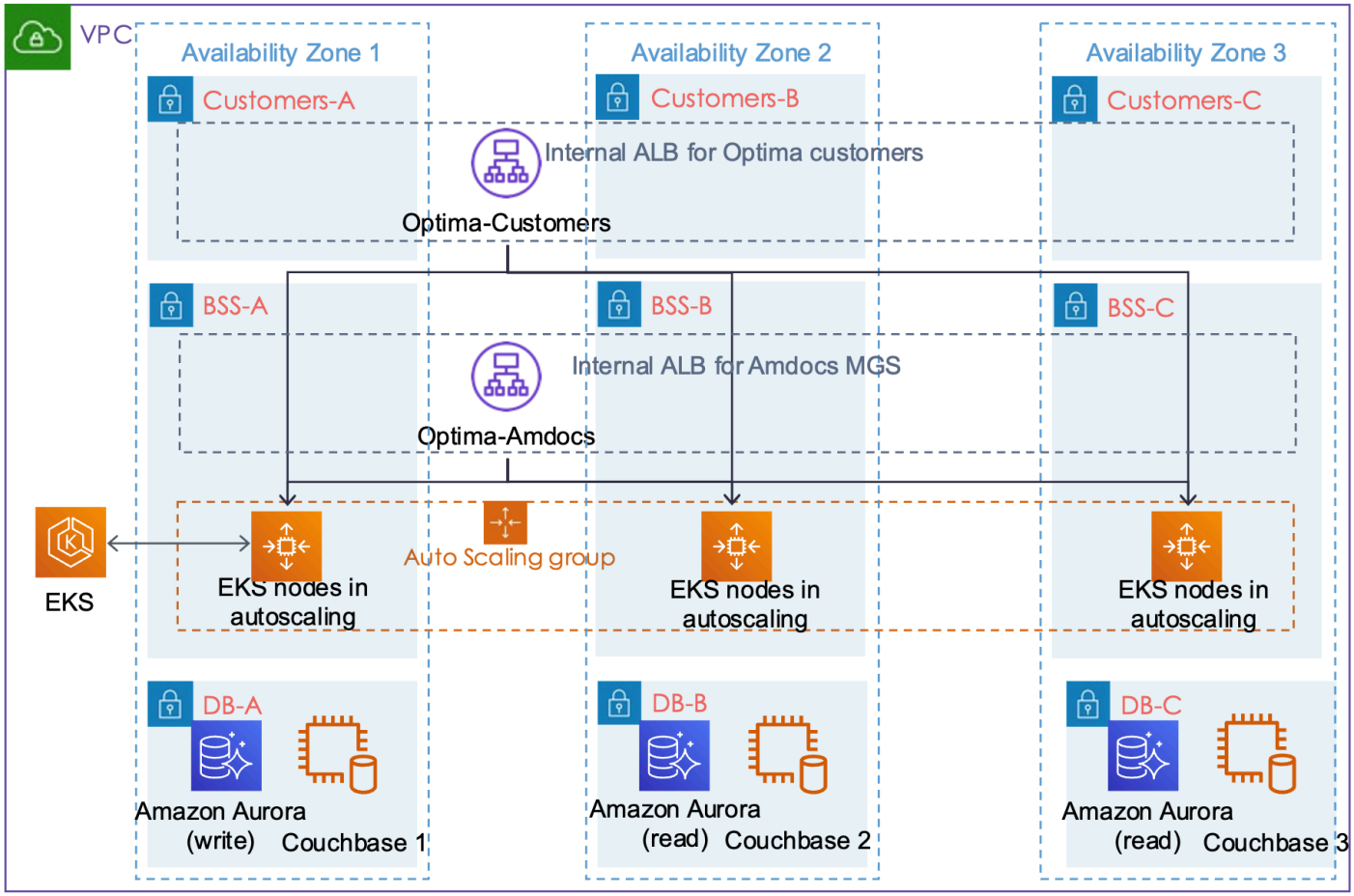
storage details like database schemas from the end users. This allows the solution to evolve over time, and introduce and update storage technology, while minimizing the impact on the rest of the solution and its users.

External services integration

Interface VPC endpoints are used to securely access various AWS services such as Amazon CloudWatch, Amazon Simple Storage Service (Amazon S3), Amazon Elastic Container Registry (Amazon ECR), and AWS Systems Manager. VPC endpoints allows communication between instances and database in customer VPCs and management services such as CloudWatch and Systems Manager without imposing availability risks and bandwidth constraints on network traffic.

High availability

The following diagram depicts how Digital Brand Experience Suite can be deployed in multiple Availability Zones (AZs) configuration to promote high availability.



Digital Brand Experience Suite high availability in AWS

Digital Brand Experience Suite architecture on AWS is highly available. The solution is built across a minimum of two Availability Zones. All Availability Zones in an AWS Region are interconnected with high-bandwidth, low-latency networking. Availability Zones are physically separated by a meaningful distance, although all are within 100 km (60 miles) of each other.

If one of the Availability Zones becomes unavailable, the application continues to stay available, because the architecture is highly available in all layers—databases utilizing multi-AZ set up as well as Kubernetes spreads the pods in a deployment across nodes and multiple Availability Zones—and impact of an Availability Zone failure is mitigated. Digital Brand Experience Suite architecture on AWS supports Cluster Autoscaling as well as Horizontal Pod Autoscaling, and it adjusts the size of Amazon EKS cluster by adding or removing worker nodes in multiple Availability Zones. In addition, application components are stateless, and based on containers with Elastic Load Balancing, with native awareness of failure boundaries like Availability Zones to keep your applications available across a Region, without requiring Global Server Load Balancing.

Scalability

The solution is fully scalable using Auto Scaling groups of various container types. This allows for more fine-grained scalability, as the various compute needs change over time. Auto Scaling groups can be configured with different scaling models, either scaling up or down based on events, system measurements, or a preset schedule.

Digital Brand Experience Suite architecture uses Amazon Aurora, a MySQL and PostgreSQL–compatible relational database built for the cloud. Amazon Aurora scales in many ways, including storage, instance, and read scaling. The application also uses Couchbase on Amazon EC2, setting up Couchbase in a way that makes it scalable.

Security

Access management

The access is following role-based access control through AWS Identity and Access Management (IAM). The solution has defined roles based on who needs access to what. As a best practice, customers could assign permissions at IAM group role level to access applications in the specific VPCs, and never grant privileges beyond the minimum required for a user or group to fulfill their job requirements. The list of roles and groups change with each project.

Secure data at rest

Data at rest will be encrypted on the storage volume level (using AWS built-in capabilities) as well as on the database level (on configurable PII fields).

Digital Brand Experience Suite architecture uses AWS Key Management Service (AWS KMS) to create and control the encryption keys, and makes it easy for customers to create and manage cryptographic keys, and control their use across a wide range of AWS services and applications. Encryption is applied by solution components and AWS services. Decryption is applied by each data consumer.

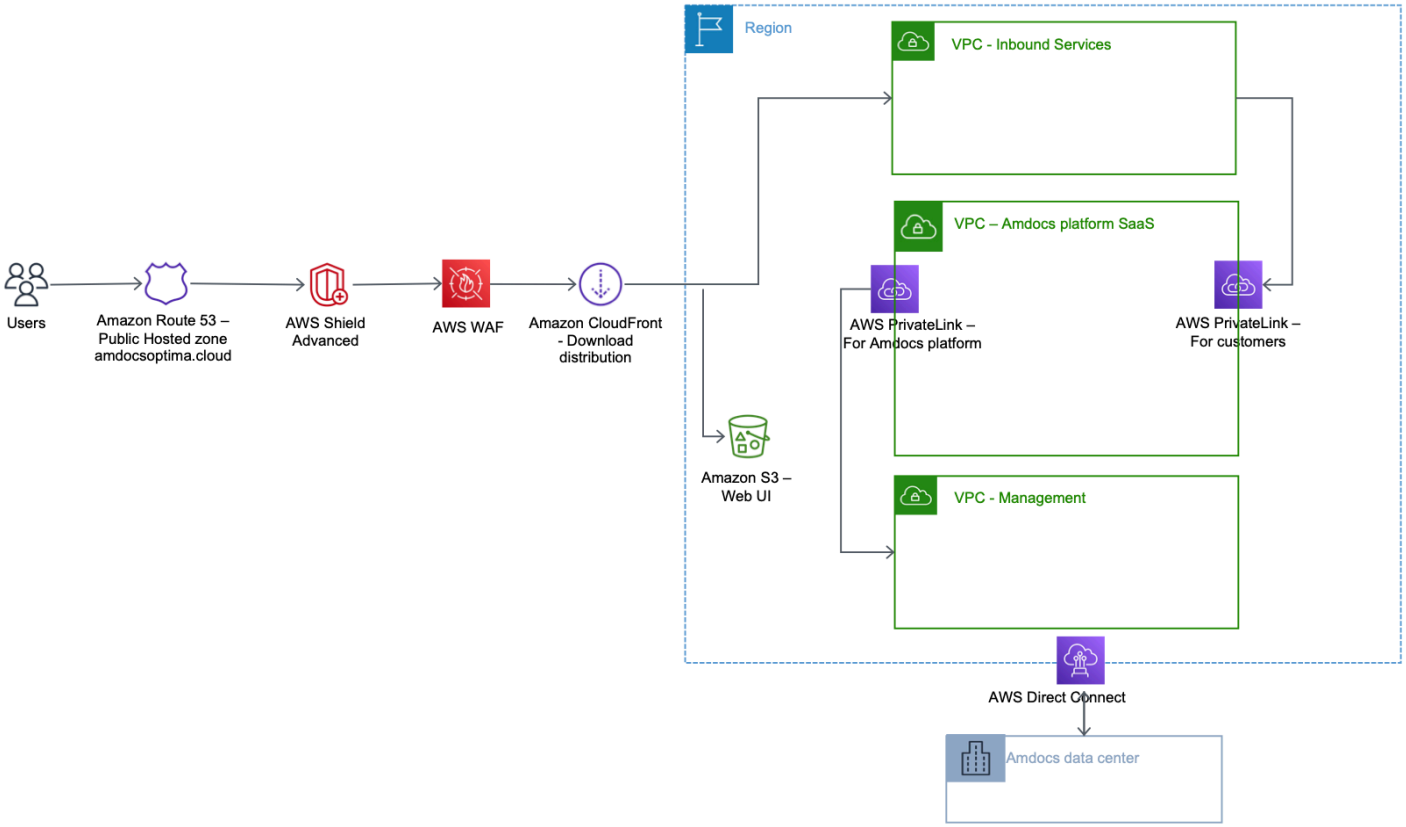
Secure data in transit

The web UIs access will be encrypted with SSL encryption (HTTPS). The solution API layer access will be encrypted with SSL encryption (HTTPS).

Additionally, the encryption keys will be stored in AWS KMS. The system credentials will be securely stored in AWS Secrets Manager. Automated clearing house and credit card data will be tokenized by purchaser's payment gateway system, and the solution stores the credit card token only.

Digital Brand Experience Suite SaaS model

The following diagram provides a high-level network layout view, identifying the three major VPCs configured.



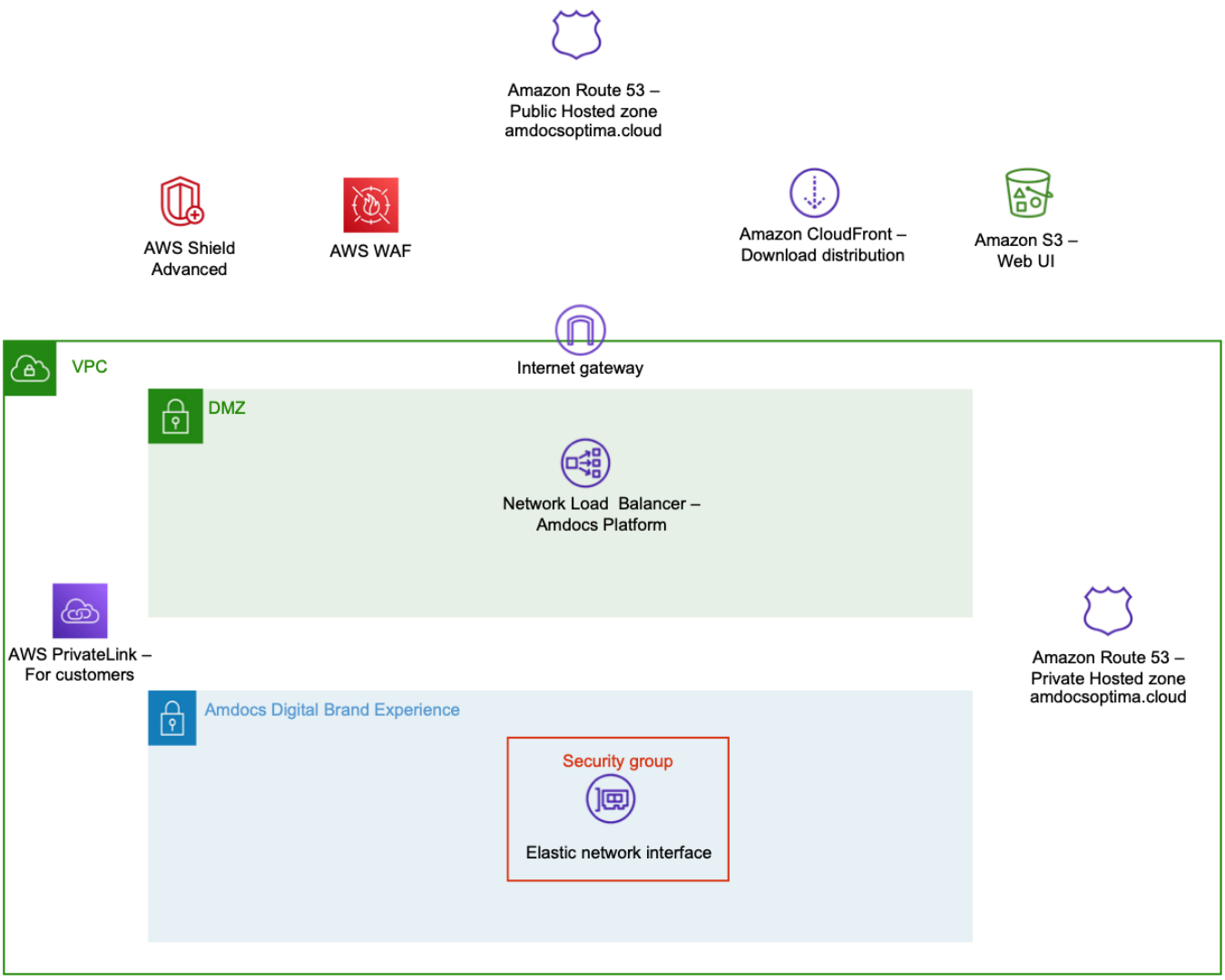
Digital Brand Experience Suite SaaS overall view

This diagram also addresses the two primary means of accessing the solution: end customer and user access by the inbound services VPC, and Amdocs operations access by the management VPC. Both methods can then access the common resources in the Digital Brand Experience Suite SaaS VPC. End customer and user access is secured by AWS Shield Advanced to provide managed distributed denial-of-service (DDoS) protection and AWS Web Application Firewall (AWS WAF) to protect their application from common web exploits.

In addition, Amazon CloudFront is deployed in front of the Amazon S3 buckets used to host the web UI application client for download. This improves initial application download performance by placing the application closer to the user. This layout is more tailored to SaaS offerings because it provides two main access channels: individual tenant and global operations. Non-SaaS cloud offerings employ a different network architecture.

Inbound services VPC (SaaS Offering)

The following diagram provides more detail on the inbound services VPC.

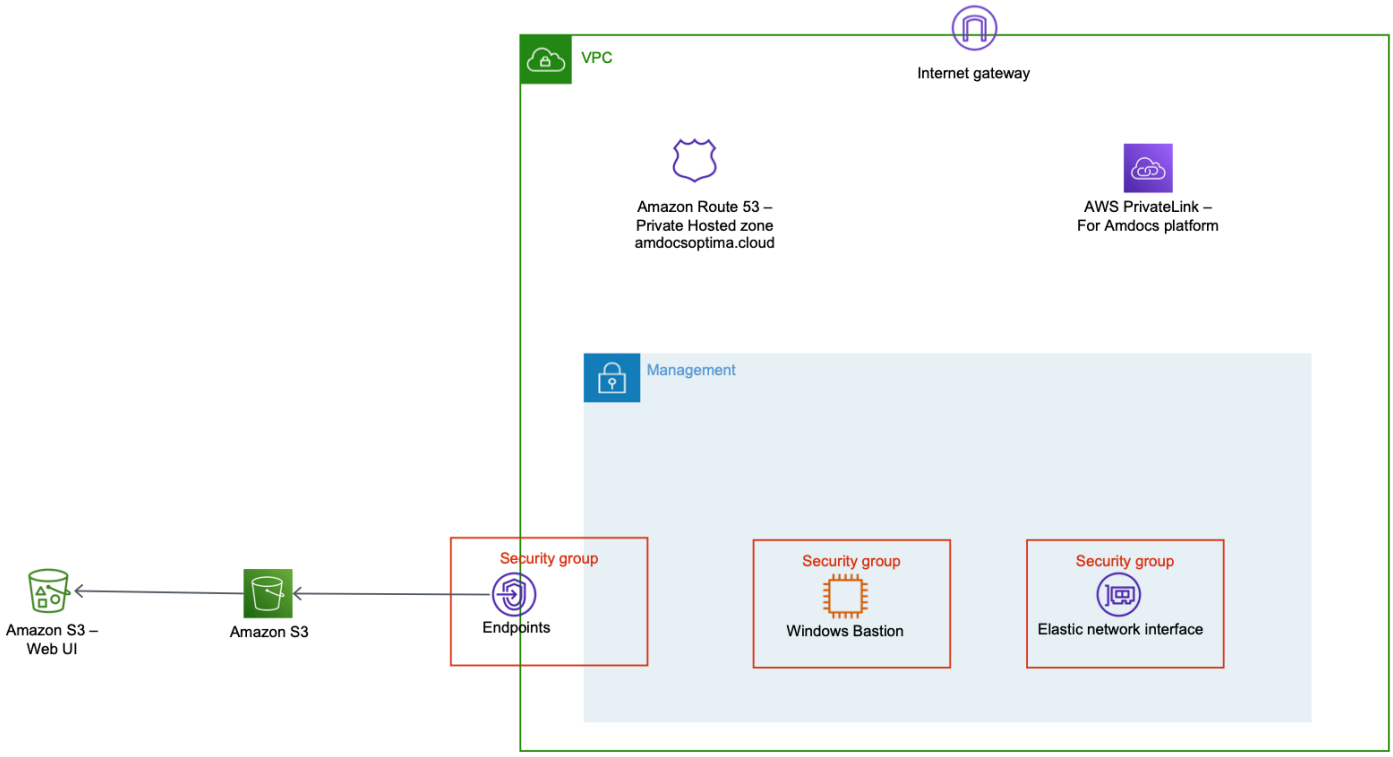


Digital Brand Experience Suite SaaS inbound services VPC detail

The public DMZ subnet is the approachable point for all users—it primarily provides authentication services, so that further secured services can be accessed. To protect the solution from malicious attacks such as DDoS, AWS WAF and AWS Shield are deployed.

Management VPC (SaaS offering)

The following diagram provides more detail on the management VPC.



Digital Brand Experience Suite SaaS management VPC detail

The resources within the private management subnet provide access to Digital Brand Experience Suite SaaS for the operations engineers. Microsoft Windows instances in Amazon EC2 as Bastion instance are running in the private management VPC. Operations engineers can use the Remote Desktop Protocol to administrate and access the compute resources inside the VPC remotely. PrivateLink is also used to connect services across accounts and VPCs without exposing the traffic to the public internet.

AWS Well-Architected Framework

The AWS Well-Architected Framework helps cloud architects build secure, high-performing, resilient, and efficient infrastructure for their applications and workloads. The AWS Well-Architected Framework is based on five pillars.

AWS Well-Architected provides a consistent approach for customers and partners to evaluate architectures, and implement designs that can scale over time. The AWS Well-Architected Framework helped Amdocs to adapt best practices and to achieve an optimized architecture of their Digital Brand Experience Suite on AWS.

The following is an overview of the five pillars of the AWS Well-Architected Framework, with reference to the Digital Brand Experience Suite architecture on AWS.

Pillars

- Operational excellence
- Security
- Reliability
- Performance efficiency
- Cost optimization

Operational excellence

This pillar focuses on the ability to run and monitor systems to deliver business value and continually improve supporting processes and procedures. Digital Brand Experience Suite architecture on AWS has the ability to support development and run workloads effectively. The application gains insights into the operations aspects by using CloudWatch to collect metrics, send alarms, monitor Amazon Aurora metrics, and use CloudWatch Container Insights from an Amazon EKS cluster. The application uses AWS Lambda to respond to operational events, automate changes, and continuously manage and improve processes to deliver a business value.

Customers can find prescriptive guidance on implementation in the *Operational Excellence Pillar* whitepaper.

Security

This pillar focuses on the ability to protect information, systems, and assets while delivering business value through risk assessments and mitigation strategies. Digital Brand Experience Suite architecture on AWS takes advantage of inherent prevention features such as:

- Amazon VPCs to logically isolate environments, per customer requirements.
- Subnets to logically isolate multiple layers in VPC and control the communication between them.
- Network access control lists and security groups to control incoming and outgoing traffic.

Digital Brand Experience Suite uses AWS KMS for security of data at rest, SSL encryption for data in transit as well as Secrets Manager for systems credential management, role-based access control through IAM for access management.

Customers can find prescriptive guidance on implementation in the *Security Pillar* whitepaper.

Reliability

This pillar focuses on the ability of a system to recover from infrastructure or service failures, to dynamically acquire computing resources to meet demand, and to mitigate disruptions such as misconfigurations or transient network issues. Digital Brand Experience Suite quickly recovers from database failure by using Amazon Aurora which spans across multiple Availability Zones in an AWS Region, and each Availability Zone contains a copy of the cluster volume data. This functionality means that database cluster can tolerate a failure of an Availability Zone without any loss of data. Digital Brand Experience Suite on AWS supports Cluster Autoscaling as well as Horizontal Pod Autoscaling handling scalability and reliability of application. Changes are made through automation using AWS CloudFormation.

The architecture of Digital Brand Experience Suite on AWS encompasses the ability to perform its intended function correctly and consistently when it's expected to. This includes the ability to operate and test the workload through its total lifecycle.

Customers can find prescriptive guidance on implementation in the *Reliability Pillar* whitepaper.

Performance efficiency

This pillar deals with the ability to use computing resources efficiently to meet system requirements, and to maintain that efficiency as demand changes and technologies evolve. The

architecture of Digital Brand Experience Suite on AWS ensures an efficient usage of the compute, storage, and database resources to meet system requirements, and to maintain them as demand changes and technologies evolve.

Customers can find prescriptive guidance on implementation in the Performance Efficiency Pillar whitepaper.

Cost optimization

This pillar deals with the ability to avoid or eliminate unneeded cost or suboptimal resources. Digital Brand Experience Suite on AWS uses Amazon Aurora PostgreSQL which considerable reduces database costs. Amazon Aurora PostgreSQL is three times faster than standard PostgreSQL databases. It provides the security, availability, and reliability of commercial databases at one-tenth the cost. Additionally, Digital Brand Experience Suite on AWS supports Cluster Autoscaling as well as Horizontal Pod Autoscaling, contributing to considerable cost reduction. The architecture of Digital Brand Experience Suite on AWS has the ability to run systems to deliver business value at the lowest price point.

Customers can find prescriptive guidance on implementation in the Cost Optimization Pillar whitepaper.

Conclusion

Amdocs Digital Brand Experience Suite is a pre-integrated, complete, digital customer management and commerce platform designed to rapidly and securely monetize any product or service. The richness of Amdocs Digital Brand Experience Suite's capabilities and flexibility—a strong BSS engine enabled by modern, digital, open-source components such as JBoss Fuse, REST APIs, React, Node.js, and other advanced technologies—enables customers to enjoy the superior performance of a well-proven solution.

Amdocs Digital Brand Experience Suite combines the effectiveness of a lean architecture and future readiness to provide customers the ability to step into the digital economy. By deploying Amdocs Digital Brand Experience Suite in the AWS Cloud, customers can increase deployment velocity, reduce infrastructure cost significantly, and integrate with IoT, analytics, and machine learning services. Customers can further use the compliance benefits of the AWS Cloud for sensitive customer data. AWS is the cost-effective, secure, scalable, high-performing, and flexible option for deploying Amdocs Digital Brand Experience Suite BSS.

Contributors

Contributors to this document include:

- David Sell, Lead Software Architect, Amdocs Digital Brand Experience, Amdocs
- Shahar Dumai, Head of marketing for Amdocs Digital Brand Experience, Amdocs
- Efrat Nir-Berger, Sr. Partner Solutions Architect OSS/BSS, Amazon Web Services
- Visu Sontam, Sr. Partner Solutions Architect OSS/BSS, Amazon Web Services
- Mounir Chennana, Solutions Architect, Amazon Web Services

Further reading

For additional information, see:

- *5G Network Evolution with AWS* whitepaper
- *Continuous Integration and Continuous Delivery for 5G Networks on AWS* whitepaper
- *Next-Generation Mobile Private Networks Powered by AWS* whitepaper
- *AWS Well-Architected Framework* whitepaper
- *Next-Generation OSS with AWS* whitepaper
- AWS Architecture Center
- AWS Well-Architected

Document history

To be notified about updates to this whitepaper, subscribe to the RSS feed.

Change	Description	Date
Whitepaper updated	Second publication.	November 18, 2021
Initial publication	Whitepaper first published.	February 1, 2018

Note

To subscribe to RSS updates, you must have an RSS plug-in enabled for the browser that you are using.

Notices

Customers are responsible for making their own independent assessment of the information in this document. This document: (a) is for informational purposes only, (b) represents current AWS product offerings and practices, which are subject to change without notice, and (c) does not create any commitments or assurances from AWS and its affiliates, suppliers or licensors. AWS products or services are provided “as is” without warranties, representations, or conditions of any kind, whether express or implied. The responsibilities and liabilities of AWS to its customers are controlled by AWS agreements, and this document is not part of, nor does it modify, any agreement between AWS and its customers.

AWS Glossary

For the latest AWS terminology, see the AWS glossary in the *AWS Glossary Reference*.