Overview of Oracle E-Business Suite on AWS

First Published May 2017

Updated September 10, 2021



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Abstract

<u>Oracle E-Business Suite</u> is a popular suite of integrated business applications for automating enterprise-wide processes like customer relationship management, financial management, and supply chain management. This is the first whitepaper in a series focused on Oracle E-Business Suite on Amazon Web Services (AWS). It provides an architectural overview for running Oracle E-Business Suite 12.2 on AWS.

The whitepaper series is intended for customers and partners who want to learn about the benefits and options for running Oracle E-Business Suite on AWS. Subsequent whitepapers in this series will discuss advanced topics and outline best practices for high availability, security, scalability, performance, migration, disaster recovery, and management of Oracle E-Business Suite systems on AWS.



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Introduction

Almost all large enterprises use enterprise resource planning (ERP) systems for managing and optimizing enterprise-wide business processes. Cloud adoption among enterprises is growing rapidly, with many adopting a cloud-first strategy for new projects and migrating their existing systems from on-premises to AWS. ERP systems such as Oracle E-Business Suite are mission critical for most enterprises and figure prominently in considerations for planning an enterprise cloud migration.

This whitepaper provides a brief overview of Oracle E-Business Suite and a reference architecture for deploying Oracle E-Business Suite on AWS. It also discusses the benefits of running Oracle E-Business suite on AWS, and various use cases.

AWS overview

AWS provides on-demand computing resources and services in the cloud, with pay-as-you-go pricing. As of the date of this publication, AWS serves over a million active customers in more than 190 countries, and is available in 25 <u>AWS Regions</u> worldwide. You can run a server on AWS and log in, configure, secure, and operate it just as you would operate a server in your own data center.

Using AWS resources for your compute needs is like purchasing electricity from a power company instead of running your own generator, and it provides many of the same benefits:

- The capacity you get exactly matches your needs archived.
- You pay only for what you use.
- Economies of scale result in lower costs.
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 The service is provided by a vendor who is experienced in running large-scale compute and network systems.



Amazon Web Services concepts

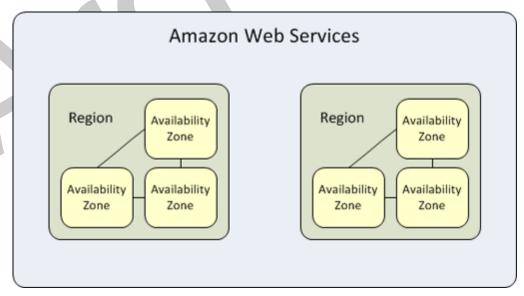
This section describes the AWS infrastructure and services that are part of the reference architecture for running Oracle E-Business Suite on AWS.

Regions and Availability Zones

Each <u>Region</u> is a separate geographic area isolated from the other Regions. Regions provide you the ability to place resources, such as Amazon Elastic Compute Cloud (Amazon EC2) instances, and data in multiple locations. Resources aren't replicated across Regions unless you do so specifically.

An AWS account provides multiple Regions so you can launch your application in locations that meet your requirements. For example, you might want to launch your application in Europe to be closer to your European customers, or to meet legal requirements.

Each Region has multiple, isolated locations known as Availability Zones. Each Availability Zone runs on its own physically distinct, independent infrastructure, and is engineered to be highly reliable. Common points of failure, such as generators and cooling equipment, are not shared across Availability Zones. Because Availability Zones are physically separate, even extremely uncommon disasters such as fires, tornados or flooding would only affect a single Availability Zone. Each Availability Zone is isolated, but the Availability Zones in a Region are connected through low-latency links. The following figure illustrates the relationship between Regions and Availability Zones.



Relationship between AWS Regions and Availability Zones



The following figure shows the Regions and the number of Availability Zones in each Region provided by an AWS account at the time of this publication. For the most current list of Regions and Availability Zones, see <u>Global Infrastructure</u>.

Note: You can't describe or access additional Regions from the AWS GovCloud (US) Region or China (Beijing) Region.



Map of AWS Regions and Availability Zones

Amazon Elastic Compute Cloud (Amazon EC2)

Amazon EC2 is a web service that provides resizable compute capacity in the cloud, billed by the hour or second (minimum of 60 seconds). You can run virtual machines (EC2 instances) ranging **This eversion has been a Ethiced**ry, to 448 vCPU and 6six TB memory. You have a choice of operating systems including Windows Server 2008/2012/2016/2019, Oracle Linux, Red Hat Enterprise Linux, and SUSE Linux.

Elastic Load Balancing version of this document, visit:

Elastic Load Balancing automatically distributes incoming application traffic across multiple Amazon EC2 instances, containers, and IP addresses, in one or more Availability Zones on AWS Cloud: It enables you to achieve greater levels of fault tolerance in your applications, searfilessly providing the required amount of oad balancing capacity needed to distribute application traffic. Elastic Load Balancing can be used for load balancing web server traffic.



Amazon Elastic Block Store (Amazon EBS)

Amazon EBS provides persistent block level storage volumes for use with EC2 instances in the AWS Cloud. Each Amazon EBS volume is automatically replicated within its Availability Zone to protect you from component failure, offering high availability and durability. EBS volumes offer the consistent and low-latency performance needed to run your workloads.

Amazon Machine Image (AMI)

An <u>Amazon Machine Image</u> (AMI) is simply a packaged-up environment that includes all the necessary bits to set up and boot your instance. Your AMIs are your unit of deployment. Amazon EC2 uses Amazon EBS and Amazon Simple Storage Service (Amazon S3) to provide reliable, scalable storage of your AMIs so they can boot when you need them.

Amazon Simple Storage Service (Amazon S3)

Amazon S3 provides developers and IT teams with secure, durable, highly scalable object storage. Amazon S3 is easy to use. It provides a simple web services interface you can use to store and retrieve any amount of data from anywhere on the web. With Amazon S3, you pay only for the storage you actually use. There is no minimum fee and no setup cost.

Amazon Route 53

Amazon Route 53 is a highly available and scalable cloud bornain Name System (DNS) web service. It is designed to give developers and businesses an extremely reliable and cost-effective way to route end users to internet applications by translating names like www.example.copointo the lattestic Versions of this document. visit:

Amazon Virtual Private Cloud (Amazon VPC)

Amazon VPC propher / Montes armisian a zorical prisolation of floor of the control over your virtual networking environment including selection of your own private IP address range, creation of subnets, and configuration of route tables and network gateways.



You can use multiple layers of security, including security groups and network access control lists, to help control access to EC2 instances in each subnet. Additionally, you can create a Hardware Virtual Private Network (VPN) connection between your corporate data center and your VPC and use the AWS Cloud as an extension of your corporate data center.

Amazon Elastic File System (Amazon EFS)

Amazon EFS is a file storage service for EC2 instances. Amazon EFS supports the NFS v4 protocol, so the applications and tools that you use today work seamlessly with Amazon EFS. Multiple EC2 instances can access an Amazon EFS file system at the same time, providing a common data source for workloads and applications running on more than one instance. With Amazon EFS, storage capacity is elastic, growing and shrinking automatically as you add and remove files, so your applications have the storage they need, when they need it.

AWS security and compliance

The AWS Cloud security infrastructure has been architected to be one of the most flexible and secure cloud computing environments available today. Security on AWS is very similar to security in your on-premises data center—but without the costs and complexities involved in protecting facilities and hardware. AWS provides a secure global infrastructure, plus a range of features that you can use to help secure your systems and data in the cloud. To learn more, see AWS Cloud Security.

AWS compliance enables customers to understand the robust controls in place at AWS to maintain security and talks were found to the controls of the customers with external certifying bodies and independent auditors to provide customers with extensive information regarding the policies, processes, and controls established and operated by AWS.

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To learn more, see AWS Compliance.

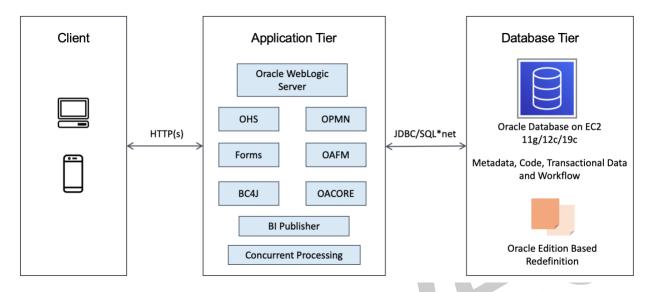
Oracle Http://diogsaws.anartm.com/Allytepapers/latest/overview-oracle-e-business-suite/overview-oracle-

This section covers the major companying of Quite http://iness Suite and its architecture on AWS. It is important to have a good understanding of Oracle E-Business Suite architecture and its major components to successfully deploy and configure it on AWS.



Oracle E-Business Suite components

Oracle E-Business Suite has a three-tier architecture consisting of client, application, and database (DB) tiers.



Oracle E-Business Suite three-tier architecture

The client tier contains the client user interface, which is provided through HTML or Java applets in a web browser for forms-based applications.

The application tier consists of Oracle Fusion Middleware (Oracle HTTP Server and Oracle WebLogic Server) and the concurrent processing server. The Fusion Middleware server has HTTP, Java, and Forms services that process the business logic and talk to the database tier. The Olacle Interest of the Oracle Web Logic Server (WLS), which hosts the business logic and other server-side components. The HTTP services, forms services, and concurrent processing server or of the installed on multiple application tier nodes and load balanced.

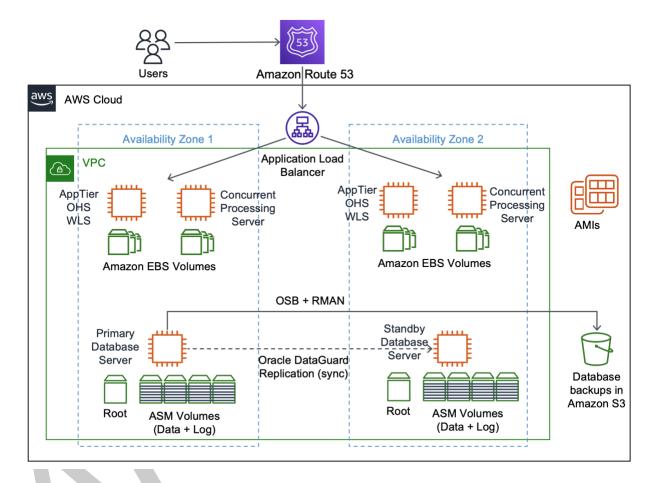
The database tier consists of an Oracle database that stores the data for Oracle E-Business Suite. This tier has the Oracle database run items and the Oracle database files that physically store the tables, indexes, and other database overview-oracle-e-business-suite/overview-oracle-

See the <u>Oracle E-Business Suite Dusiness Suite Dusiness Suite architecture components.</u>



Oracle E-Business Suite architecture on AWS

The following reference diagram illustrates how Oracle E-Business Suite can be deployed on AWS. The application and database tiers are deployed across multiple Availability Zones for high availability.



Sample Oracle E-Business Suite deployment on AWS For the latest version of this document, visit:

User requests from the client tier are routed using Amazon Route53 DNS to the Oracle E-Business Suite application servers deployed on EC2 instances through Application Load Balancer. The OHS and the Oracle WLS are deployed on each application tier instance. The https://exishawsquesta/om/appli/atioitepaphats/hatesta/ routes them to the Oracle West-Toracotacle-Willsi ness-tise itep/oprierte ileusiness adoptic and communicates with the Oracle detabasiness-suite.html

The various modules and functions within Oracle E-Business Suite share a common data model. There is only one Oracle database instance for multiple application tier nodes.



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Load balancing and high availability

Application Load Balancer is used to distribute incoming traffic across multiple application tier instances deployed across multiple Availability Zones. You can add and remove application tier instances from your load balancer as your needs change, without disrupting the overall flow of information. Application Load Balancer ensures that only healthy instances receive traffic by detecting unhealthy instances and rerouting traffic across the remaining healthy instances.

If an application tier instance fails, Application Load Balancer automatically reroutes the traffic to the remaining running application tier instances. In the unlikely event of an Availability Zone failure, user traffic is routed to the remaining application tier instances in the other Availability Zone.

Other third-party load balancers like the F5 BIG-IP are available on AWS Marketplace and can be used as well. See My Oracle Support document 1375686.1 for more details on using load balancers with Oracle E-Business Suite (sign in required).

The database tier is deployed on Oracle running on two EC2 instances in different Availability Zones. Oracle Data Guard replication (maximum protection or maximum availability mode) is configured between the primary database in one Availability Zone and a standby database in another Availability Zone. In case of failure of the primary database, the standby database is promoted as the primary and the application tier instances will connect to it.

For more details on deploying Oracle Database on AWS, see the <u>Oracle Database on</u> AWS Quick Start.

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Scalability

When using AWS, you can scale your application easily due to the elastic nature of the cloud. You can start the latest trensions of utlaisploation tent instances simply by changing the instance type to a larger instance type.

For example, you can start with an r5.large instance with two vCPUs and 16 GiB RAM and scale up https://avioconavios.andargeringtons/withtepayers/startes/solares/sola

You can scale out the application tier by adding and configuring more application tier instances when required. You can launch a new EC2 instance in a few minutes.



However, additional work is required to ensure that the AutoConfig files are correct and the new application tier instance is correctly configured and registered with the database.

Although it might be possible to automate scaling out the application tier using scripting, this requires an additional technical investment. A simpler alternative might be to use standby EC2 instances, as explained in the next section.

Standby EC2 instances

To meet extra capacity requirements, additional application tier instances of Oracle E-Business Suite can be pre-installed and configured on EC2 instances. These standby instances can be shut down until extra capacity is required. Charges are not incurred when EC2 instances are shut down—only EBS storage charges are incurred.

At the time of this publication, EBS General Purpose (gp2) volumes are priced at \$0.10 per GB per month in the US East (Ohio) Region. Therefore, for an EC2 instance with 120 GB hard disk drive (HDD) space the storage charge is only \$12 per month. These pre-installed standby instances provide you the flexibility to use these instances for meeting additional capacity needs as and when required. In this model, you need to ensure that any configuration changes/patching/maintenance activities are also applied to the standby node to avoid inconsistencies.

Storage options and backup

AWS offers a complete range of cloud storage services to support both application and archival compliance requirements. You can choose from object, file, block, and archival services. The following table lists some of the storage options and how they can be used when deploying Oracle E-Business Suite on AWS.

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Storage type	Storage characteristics	Oracle E-Business Suite use case	
Amazon EBShttpss://slees.awk.amazonh.com/whitepapers/latesti/g system gp2/gp3 volumes overtiewi-pra/olapa-dousiness-esuite/aven/ieave-binacite,-Oracle second (IOPS) @ by Stimess-suite.htmatabase archive logs			



Storage type	Storage characteristics	Oracle E-Business Suite use case
Amazon EBS – io1/io2/io2 Block Express volumes	SSD-based block storage with up to 64,000 IOPS per volume. Multiple volumes can be striped together for higher IOPS. By attaching io2 volumes to r5b instance types, you can achieve up to 256,000 IOPS per volume.	Storage for the database tier – ASM disks, Oracle data files, redo logs
Amazon EFS	Highly durable, NFSv4.1 compatible file system	PCP out and log files, media staging
Amazon S3	Object store with 99.999999999% durability	Backups, archives, media staging
Amazon Glacier	Extremely low-cost and highly durable storage for long-term backup and archival	Long-term backup and archival
Amazon EC2 instance storage	Ephemeral or temporary storage, data persists only for the lifetime of the instance	Swap, temporary files, reports cache, Web Server cache

The application and database servers use EBS volumes for persistent block storage. Amazon EBS has two types of solid-state drive (SSD)-backed volumes: provisioned IOPS SSD (io1, io2, io2 Block Express) for latency-sensitive database and application workloads, and general purpose SSD (gp2, gp3) that balances price and performance for a wide variety of transactional workloads, including development and test environments, and boot volumes.

General purpose SSD volumes provide good balance between price and performance and can be used for boot volumes, the Oracle E-Business Suite application tier file system, and logs. They are designed to offer single-digit millisecond latencies and deliver a consistent baseline performance of 3 LOPS/GR for gp2 and 3 000 LOPS regardless of volume size for gp3 to a maximum of 16 000 LOPS per volume.

Provisioned IOPS volumes are the highest sentified be storage option and should be used along with Oracle Automatic Storage Management (ASM) for storing the Oracle database data and log files. You can provision up to 64,000 IOPS per io1/io2 volume and 256,000 per io2 Block Express. These volumes are designed to achieve single-digit



millisecond latencies and to deliver the provisioned IOPS 99.9% for i01 and 99.999% of the time for io2 and io2 Block Express. You can use Oracle ASM to stripe the data across multiple EBS volumes for higher IOPS and to scale the database storage.

To maximize the performance of EBS volumes, use <u>EBS-optimized EC2 instances</u> and instances based on the AWS Nitro System.

EC2 instances have temporary SSD-based block storage called instance storage. Instance storage persists only for the lifetime of the instance and should not be used to store valuable, long-term data. Instance storage can be used as swap space and for storing temporary files like the report cache or web server cache. If you are using Oracle Linux as the operating system for the database server, you can use the instance storage for the Oracle Database Smart Flash Cache and improve the database performance.

Parallel Concurrent Processing (PCP) allows you to distribute concurrent managers across multiple nodes so that you can use the available capacity and provide failover. You can use a shared file system such as Amazon EFS for storing the log and out files while implementing PCP in Oracle E-Business Suite. However, this configuration may not be ideal for environments with an extremely large number of log and out files.

Oracle E-Business Suite Release 12.2 introduced a new environment variable, APPLLDM, to specify whether log and out files are stored in a single directory for all Oracle E-Business Suite products, or in one subdirectory per product. APPLLDM can be set to 'single' or 'product'. 'Product' will avoid highest concentration of log and out files in a single directory and may avoid performance issues.

Amazon S3 provides low to storing backups. You can use Oracle Recovery Manager (RMAN) to back up your database, then copy the data to Amazon S3.

Alternatively, you can use the tracle secure Backup (SS) Cloud Module to back up your database. The OSB Cloud Module is fully integrated with RMAN features and functionality, and the backups are sent directly to Amazon S3 for storage.

Benefits of Oracle Business Suite on AWS are brisiness suite on AWS are brisiness suite on AWS are brisiness suite on the bracle-

The following sections discuss sentential interest suite on AWS.



Agility and speed

Traditional deployment involves a long procurement process in which each stage is time-intensive and requires large capital outlay and multiple approvals. With AWS, you can provision new infrastructure and Oracle E-Business Suite environments in minutes, compared to waiting weeks or months to procure and deploy traditional infrastructure.

Lower total cost of ownership

In an on-premises environment, you typically pay hardware support costs, virtualization licensing and support, data center costs, and so on. You can eliminate or reduce all of these costs by moving to AWS. You benefit from the economies of scale and efficiencies provided by AWS, and pay only for the compute, storage, and other resources you use.

Cost savings for non-production environments

You can shut down your non-production environments when you are not using them and save costs. For example, if you are using a development environment for only 40 hours a week (eight hours a day, five days a week), you can shut down the environment when it's not in use. You pay only for 40 hours of Amazon EC2 compute charges instead of 168 hours (24 hours a day, seven days a week) for an on-premises environment running all the time; this can result in a saving of 75% for EC2 compute charges.

Replace capital expenditure (CapEx) with operating expenditure (OpEx) This version has been archived.

You can start an Oracle E-Business Suite implementation or project on AWS without any upfront cost or commitment for compute, storage, or network infrastructure.

Unlimited environments For the latest version of this document, visit:

In an on-premises environment, you usually have a limited set of environments to work with; provisioning additional environments takes a long time or might not be possible at all. You do not the inclusion with the limit of new environments in the least of the control of new environments in the least of the last of th

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You can have a different environment for each major project so that each team can work independently with the resources they need without interfering with other teams; the teams can then converge at a common integration environment when they are



ready. You can shut down these environments when the project finishes and stop paying for them.

Have Moore's Law work for you instead of against you

Moore's Law refers to the observation that the number of transistors on a microchip doubles every two years. In an on-premises environment, you end up owning hardware that depreciates in value every year. You are locked into the price and capacity of the hardware after it is acquired, plus you have ongoing hardware support costs. With AWS, you can switch your underlying instances to the faster, more powerful next-generation AWS instance types as they become available.

Right-size anytime

Customers often over-size environments for initial phases, and are then unable to cope with growth in later phases. With AWS, you can scale the usage up or down at any time. You pay only for the computing capacity you use, for the duration you use it. Instance sizes can be changed in minutes through the AWS Management Console or the AWS Application Programming Interface (API) or Command Line Interface (CLI). Assess the resource usage on current system and launch with appropriate size instances for the enterprise resource planning (ERP) environment to reduce the cost overhead.

Low-cost disaster recovery

You can build extremely low-cost standby disaster recovery environments for your existing deployments and incur costs only for the duration of the outage. CloudEndure Disaster Recovery for Oracle brings significant savings on disaster recovery total cost of Deen archived. ownership (TCO) compared to traditional disaster recovery solutions.

Ability to test application performance
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Although performance testing is recommended prior to any major change to an Oracle E-Business Suite environment, most customers only performance test their Oracle E-Business Suite application during the initial launch in the yet-to-be-deployed production hardware. Later releases ore usually meyes perform and iteates being to the expense and lack of environment/rewired acte ef thusing set to the control of the control of

With AWS, you can minimize the risk of discovering performance issues later in production. An AWS Cloud environment can be created easily and guickly just for the duration of the performance test and only used when needed. Again, you are charged only for the hours the environment is used.



No end of life for hardware or platform

All hardware platforms have end-of-life dates, at which point the hardware is no longer supported and you are forced to buy new hardware again. In the AWS Cloud, you can simply upgrade the platform instances to new AWS instance types in a single click at no cost for the upgrade.

Oracle E-Business Suite on AWS use cases

Oracle E-Business Suite customers are using AWS for a variety of use cases including the following environments:

- Migration of existing Oracle E-Business Suite production environments
- Implementation of new Oracle E-Business Suite production environments
- Implementing disaster recovery environments
- Running Oracle E-Business Suite development, test, demonstration, proof of concept (POC), and training environments
- Temporary environments for migrations and testing upgrades
- Temporary environments for performance testing

Conclusion

AWS can be an extremely cost-effective, secure, scalable, high-performing, and flexible option for deploying Oracle is being suited as This whiteharth with the same of the benefits and use cases for deploying Oracle E-Business Suite on AWS. If you are looking for migration specific guidance, see the Migrating Oracle E-Business Suite on AWS whitehaper. Subsequent whitehapers in this series will cover advanced topics and outline best practices for a law of the same specific guidance, see the Migrating Oracle E-Business Suite on AWS.

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Further reading

For additional information, see:

- AWS Whitepapers & Guides
- AWS Cloud Security
- AWS Compliance
- Oracle R12.2 Document
- <u>Using Load Balancers with Oracle EBS</u> (Sign in to Oracle required)
- Oracle Database on AWS
- AWS EBS-Optimized instances
- Oracle APPLLDM document (Sign in to Oracle required)

Document versions

Date	Description
September 10, 2021	Updated logos, new EBS storage and EC2 instance types, performance metrics
May 2017	First pu Thisoversion has been archived.

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