Oracle E-Business Suite Deployment on Oracle Cloud Infrastructure (OCI)

White Paper | May 2018 | Version 2.0

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Purpose of this Whitepaper

Oracle E-Business Suite can provide a strategic advantage to your business with the most comprehensive suite of integrated, global business applications that enable organizations to make better decisions, reduce costs, and increase performance. Until now, most Oracle E-Business Suite users have chosen to run it in their own data centers.

The purpose of this document is to provide an understanding of how Oracle E-Business Suite can be deployed in the Oracle Cloud Infrastructure (OCI) environment, and enable you to combine the traditional benefits of the application with the agility, availability, and cost-effectiveness of a modern cloud platform.

Scope & Assumptions

The contents of this white paper assumes that you have a basic understanding of the Oracle E-Business Suite architecture and OCI environment and components.

By following this document, you will gain knowledge of available implementation methods for various Oracle E-Business Suite configurations, and the OCI Oracle E-Business Suite architecture for initial development and test as well as production deployment. This includes all the necessary compute instances, storage, security, networking and connectivity.

This is an overview document, that is not intended to provide a production deployment reference architecture. This paper is a high-level reference guide for deploying Oracle E-Business Suite by either moving an environment from on-premises, “lift and shift”, to the cloud or creating a new environment on Oracle Cloud Infrastructure. This document outlines some of the best practices, and should not be viewed as a full reference guide for E-Business Suite.

There are a number of products and topics that are beyond the scope of this document. While not all topics are listed, Identity Access Management (IAM) and VPN/IPSec are examples of additional components used for typical Oracle E-Business Suite deployments in OCI which are not covered in this paper.

Readers of this document should first:

- Be familiar with the fundamentals of Oracle Cloud Infrastructure
  - Getting Started Guide
- Have a basic understanding of Oracle Cloud Infrastructure Compute
  - Oracle Compute Service
- Have a basic understanding of Oracle Cloud Infrastructure Database
  - Database as a Service
- Have a basic understanding of Oracle Cloud Infrastructure Networking
  - Oracle Cloud Networking
  - Network Load Balancing
- Have a basic understanding of Oracle Cloud Infrastructure Storage Services
  - Block Storage
  - Object Storage
- Have a basic understanding of Oracle Cloud Infrastructure Identity Access Management (OIAM)
  - Identity Access Management
- Have a basic understanding of VPN IPSec tunnel functionality

  VPN IPSec Tunnels Security

Oracle E-Business Suite on Oracle Cloud Infrastructure

You can think of running Oracle E-Business Suite on Oracle Cloud for Infrastructure as running exactly the same Oracle E-Business Suite that you run on premises in your data center today — the same applications you may have customized — on a combination of Oracle's Infrastructure as a Service (IaaS) and Platform as a Service (PaaS).

Oracle E-Business Suite deployment on Oracle Cloud Infrastructure choices include the following:

Infrastructure as a Service: Oracle Cloud Infrastructure is a set of complementary cloud services that enable you to build and run a wide range of applications and services in a highly-available hosted environment. Oracle Cloud Infrastructure offers high-performance compute capabilities and storage capacity in a flexible overlay virtual network that is securely accessible from your on-premises network. OCI provides highly scalable, competitively priced compute capacity that you can use to host your Oracle E-Business Suite application tier and, optionally, your database tier.

Infrastructure as a Service + Platform as a Service: Oracle Cloud Platform is a comprehensive, standards-based, fully integrated combination of Oracle and open source technologies you can use to build, deploy, migrate, and manage a variety of different application workloads in the cloud at a significantly lower operational cost. The OCI DB System or OCI Exadata DB System can be used to run your database tier, enabling you to provision your chosen database configuration quickly and easily.

Later in this paper, we provide some guidelines you can use to navigate these choices.

Deployment Choices for Oracle E-Business Suite on Oracle Cloud Infrastructure

When you subscribe to Oracle's Infrastructure as a Service (IaaS), you have access to all the compute, storage, and network services associated with it. If you find that PaaS is required for your deployment, you can also subscribe to Oracle DB System or Oracle Exadata DB System and take advantage of the specific features and capabilities of these offerings. There are several methods of deploying Oracle E-Business Suite on OCI.

1. **Deploy the application and the database tiers to Compute VMs.** With this deployment, the application and database tiers are deployed on distinct sets of Compute VMs. You may optionally deploy multiple application tiers on distinct compute VMs that are load balanced using Load Balancer as a Service (LBaaS).
2. **Deploy the application tier to Compute VMs and the database tier to PaaS**. Just like in the previous scenario, the application tier is deployed on a Compute VM, or you can deploy multiple application tiers on distinct Compute VMs that are load balanced using LBaaS. The database may be deployed to a Database Cloud Service (DBCS) Single Instance VM, to a DB System Single Instance on Bare Metal, or to an Exadata DB System. When you choose Exadata DB Systems, RAC is deployed by default. Oracle offers automated provisioning capabilities that can be used to deploy a Demo (Vision) Oracle E-Business Suite instance.

Oracle also offers automation to perform a migration of your on-premises Oracle E-Business Suite instance to OCI. The migration from on-premises to Oracle Cloud is commonly referred to as Lift and Shift. With the Lift and Shift automation you have the ability to define your deployment architecture. You will also define your Virtual Cloud Network including subnets, routing tables, security lists and load balancers. The Oracle E-Business Suite instance running on OCI can be used for non-production (test or development) and—when you are ready—for production.

For the latest information and requirements regarding supported deployments and automations refer to Getting Started with Oracle E-Business Suite on Oracle Cloud (Doc ID 2066260.1)

Oracle E-Business Suite supports the following platforms, storage, networking and versions on the Oracle Cloud Infrastructure:

- Oracle E-Business Suite Release 12.2.3 and higher and Oracle E-Business Suite Release 12.1.3
- Oracle E-Business Suite Application Tier
    - Operating system versions:
        - Oracle Linux (6.x, 7.x)
    - Application Technology Stack
        - Oracle E-Business Suite 12.2.3 and higher: Fusion Middleware 11g including Oracle HTTP Server (OHS) and WebLogic Server (WLS) and Oracle Developer 10g (Forms and Reports)
        - Oracle E-Business Suite 12.1.3: Fusion Middleware 10g including OHS and Oracle Containers for Java (OC4J) and Oracle Developer 10g (Forms and Reports)
    - OCI Deployment Options
        - Compute VM
            - Single node
            - Multiple nodes with Load Balancer as a Service (LBaaS)
- Oracle E-Business Database Tier
    - Operating system versions:
        - Oracle Linux (6.x, 7.x)
    - Database versions: Oracle Database 11.2.0.4 and 12.1.0.2
    - OCI Deployment Options
        - Compute (VM)
            - Single node with Database Enterprise Edition
        - Database Cloud Service (DBCS)
            - Single Instance (VM) with Enterprise Edition (EE), High Performance (EE-HP) or Extreme Performance (EE-EP)
        - DB Systems
            - Single Instance (Bare Metal) with Enterprise Edition (EE), High Performance (EE-HP) or Extreme Performance (EE-EP)
        - Exadata DB System
            - Real Application Clusters (RAC) and many additional advanced features

- Available storage options for Oracle E-Business Suite on OCI
    - Database storage uses high-performance local or network NVMe block storage
    - Object storage is used as the target for database backups
    - A separate NFS server or File Storage Service (FSS) may be used for the Oracle E-Business Suite shared application tier file system
- Network architecture with multiple configurations are available in support of the Oracle E-Business Suite environment
    - Custom network definition
        - Configure both Application and DB servers with your own subnet ip ranges (CIDR)
        - LBaaS will have Public IP for external connectivity
    - Load Balancer
        - LBaaS external Public IPs
        - LBaaS supports both Public and Private load balancing
    - Hybrid Story for migration, connectivity and integration with on-premises
        - VPN Connectivity
        - VPN IPSec Tunneling

        - MPLS / Fast Connect
- Security and compliance recommendations
    - The use of OCI Security Lists and Security Rules are recommended for Oracle E-Business Suite. With the use of Security Lists and Security communication of the protocols and ports are limited to allow only the traffic that is needed for the application to function properly. When using the automated Lift and Shift, a number of Security Lists (SL) are created that are dependent on your initial network entries. Lift and Shift creates multiple Security Lists as these are dependent on which tier or component that is deployed. For example, during the deployment you may create Security Lists for the application tier, database tier and load balancer. The configuration process is repeated for the Routing tables as well.
    - OCI meets a number of compliance specifications
        - General: SOC1, SOC2, ISO 27001/2
        - Specific: PCI, HIPAA, NIST 800-53

Oracle E-Business Suite Deployment Examples

Oracle E-Business Suite has a flexible three-tier logical architecture that provides many deployment options including the use of multiple nodes for high availability. You may also optionally configure your environment for disaster recovery. Selecting your deployment architecture is based on a number of factors including but not limited to: performance, user concurrency, and operational requirements. Business requirements, such as availability and disaster recovery have to be taken into consideration. Each has a consideration into the design and application of the cloud architecture.

Multiple Oracle E-Business Suite Nodes on Oracle Cloud Infrastructure Compute

This option allows you to provision one or more Oracle E-Business Suite application tier nodes, plus a separate node for the database tier, on Oracle Cloud Infrastructure Compute. You can scale out the application tier adding additional nodes as needed. The flexibility of this option makes it ideal for supporting production workloads, as well as development, testing and training environments for all types of Oracle E-Business Suite installation:

- New Vision (demo) installations of Oracle E-Business Suite 12.2
- Lift and Shift of on-premises Release 12.2 or 12.1.3 environments to Oracle Cloud Infrastructure Compute

  Note: The automated Lift and Shift of Oracle E-Business Suite Releases 12.2 or 12.1.3 provides an expedited method for moving from on-premises to Oracle Cloud Infrastructure with reduced risk and shorter a time period for project completion.

The following diagram is an example of a multi-node Oracle E-Business Suite deployment on OCI Compute with the primary environment in Availability Domain 1 and the secondary environment for high availability deployed in Availability Domain 2. Note that the primary environment and secondary environment are active-passive – meaning only the primary site is active for online users and transactions.

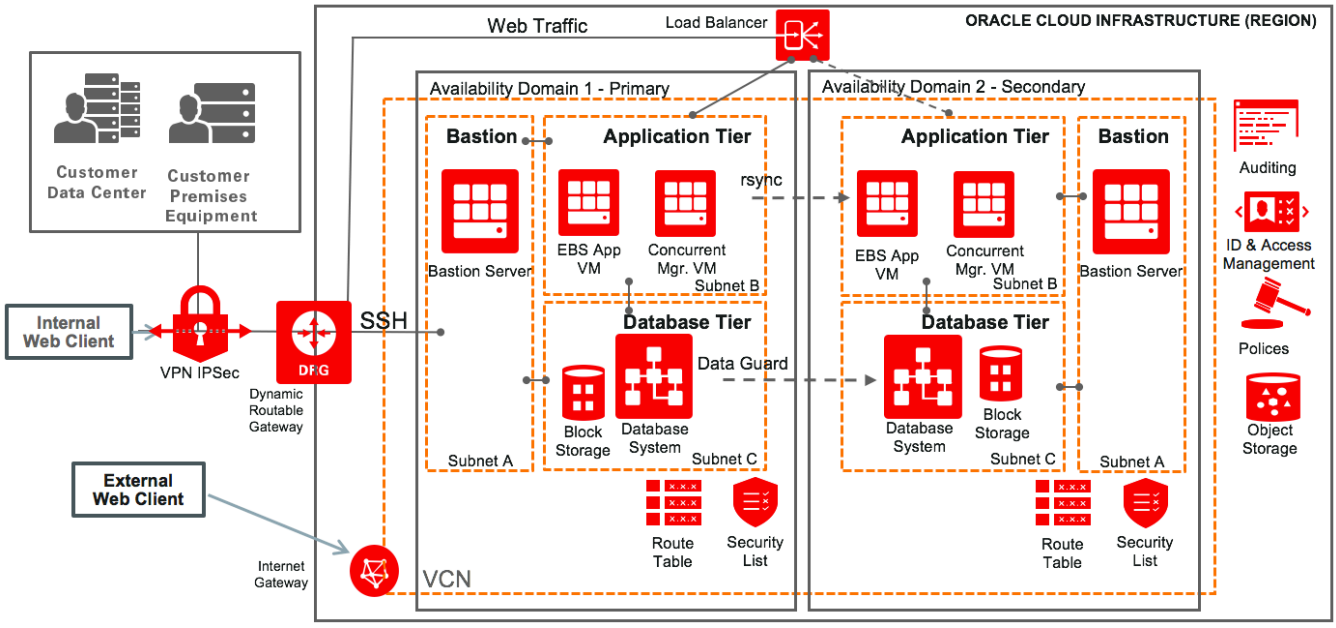

DIAGRAM 1 – MULTIPLE NODE DEPLOYMENT WITH HIGH AVAILABILITY

Oracle E-Business Suite Application on Oracle Cloud Infrastructure with Disaster Recovery Architecture

This option is a variant of the *multiple node* architecture. It is comprised of the same components, however, the database is deployed to Oracle's *Platform as a Service* (PaaS). You may subscribe to DBCS (Single Instance), DB Systems (Single Instance) or Exadata DB System for the Oracle E-Business Suite database. You may provision a multi–node Oracle E-Business Suite environment or perform a Lift and Shift of an existing on-premises Oracle E-Business Suite Release 12.2 or 12.1.3 Environment. The use of the Lift and Shift automation provides an expedited capacity for migration with reduced risk and shorter a time period for project completion.

The following diagram is an example of a multi-node Oracle E-Business Suite installation on OCI for the application tier with PaaS services for the database tier. The primary environment is deployed to Availability Domain 1 in Region 1, a secondary site for high availability is deployed to Availability Domain 2 in Region 1 and a disaster recovery environment is deployed in Availability Domain 1 in Region 2. Note that the primary environment and secondary environment as well as the disaster recovery environment are all active-passive – meaning only the primary site is active for online users and transactions.

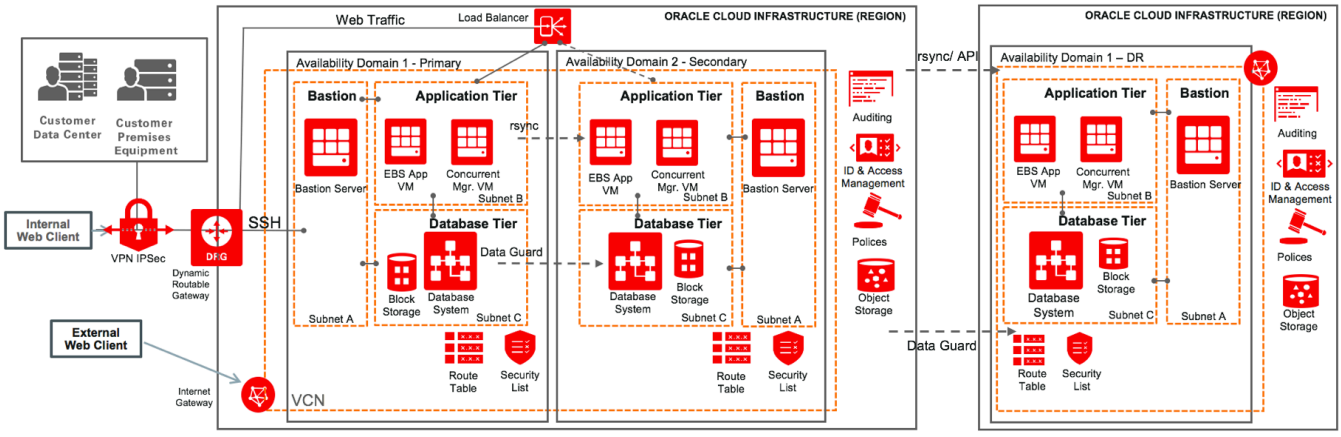

DIAGRAM 2 – MULTIPLE NODE DEPLOYMENT WITH HIGH AVAILABILITY AND DISASTER RECOVERY

Conclusion:

Many enterprises rely on Oracle Database and software like Oracle E-Business Suite to power their business. Automations provided by Oracle make it easier to move these workloads to Oracle cloud.

Oracle has a public cloud Infrastructure-as-a-Service offering – Oracle Cloud Infrastructure – and decades of experience provisioning and running Oracle products. Our hardware choices, staff expertise, and long-honed IT processes are all best-of-breed for managing Oracle workloads, and make Oracle Cloud Infrastructure the best place to host applications like E-Business Suite.

Migrating your existing Oracle applications such as Oracle E-Business Suite to Oracle Cloud Infrastructure helps you:

- Manage solutions and applications – not infrastructure.
- Focus on your core business, not on IT

Oracle E-Business Suite on Oracle Cloud Infrastructure is a scalable, reliable, high performance solution. A number of architecture configurations are available to match your current on-premises design. With the Oracle E-Business Suite Lift and Shift capability, moving from on-premises, operational risk has been reduced with improved success on all migrations. OCI is also very cost-effective for rapid deployment and removal of test and QA environments.

Additional information regarding Oracle E-Business Suite on Oracle Cloud Infrastructure is available here:

- Oracle E-Business Suite on Oracle Cloud – Quick References
- Oracle Applications On Oracle Cloud Learning Library
- Oracle E-Business on Oracle Cloud Blog
- Getting started with Oracle E-Business Suite on Oracle Cloud (My Oracle Support Knowledge Document 2066260.1)

Appendix: Key Components of Oracle Cloud Infrastructure (OCI)

Oracle Cloud Identifier (OCID)

Oracle Cloud Identifier (OCID) is a unique name assigned to every resource you provision on OCI. This is an auto-generated long string used by Support Engineers to identify your cloud resource when working with any Support Tickets. The customer can't choose a preferred value for OCID and can't modify it for the life of cloud resource. The customer will also use OCIDs when working with REST APIs or SDKs.

Cloud Resource

Cloud resource refers to anything you provision on the cloud platform. In OCI terms, it can be a VCN, Compute, User, Compartment, DBaaS, LBaaS or any other service component on the platform.

On-Premises

On-Premises is a widely-used term in Cloud Technologies and it refers to your traditional data-center environment. It includes any co-location, dedicated floor space, dedicated data-center building or even a desktop running under your desk.

Compute Service

Oracle Cloud Infrastructure Compute lets you provision and manage compute hosts, known as instances. You can launch instances as needed to meet your compute and application requirements. After you launch an instance, you can access it securely from your computer, restart it, attach and detach volumes, and terminate it when you're done with it. Any changes made to the instance's local drives are lost when you terminate it. Any saved changes to volumes attached to the instance are retained.

Oracle Cloud Infrastructure offers both Bare Metal and Virtual Machine instances:

Bare Metal - A bare metal compute instance gives you dedicated physical server access for highest performance and strong isolation.

Virtual Machine - A Virtual Machine (VM) is an independent computing environment that runs on top of physical bare metal hardware. The virtualization makes it possible to run multiple VMs that are isolated from each other. VMs are ideal for running applications that do not require the performance and resources (CPU, memory, network bandwidth, storage) of an entire physical machine.

An Oracle Cloud Infrastructure VM compute instance runs on the same hardware as a Bare Metal instance, leveraging the same cloud-optimized hardware, firmware, software stack, and networking infrastructure.

Virtual Cloud Network (VCN)

Virtual Cloud Network (VCN) also known as Cloud Network is a software-defined network that you set up on OCI. You can think of VCN as an extension of your on-premises network to the cloud, with firewall rules and specific types of communication gateways. A VCN covers a single, contiguous CIDR (range of IP Addresses) block of your choice. VCN is a regional resource, it means it covers all the Availability Domains (ADs) within a region.

Oracle OCI VCN supports a CIDR range of /16 to /30 and you can't change the CIDR of a VCN after it's created. The VCN's CIDR must not overlap with your on-premises network so work with your on-premises Network Administrator to get an available range of IP addresses (CIDR) that can be used with your VCN.

Subnet

A subnet is a subdivision of cloud network (VCN). Subnet is an AD (Availability Domain) specific resource and you must have one subnet per AD in a region. A subnet consists of a contiguous range of IP Addresses that do not overlap with other Subnets within the same VCN. You build a subnet by specifying the CIDR (range of IP Address), Availability Domain (AD) and a user-friendly name for the Subnet. Subnets contain virtual network interface cards (VNIC), which attach to instances. You can designate a subnet as private when you create it, which means VNICs in the subnet can't have public IP address.

A subnet is associated with Security Lists, Route tables and DHCP options to control what traffic is allowed to flow in which direction (DRG or IG for public/private traffic). You can't change Security Lists/Route Table attachment once a subnet is built, however you can change the rules of Security Lists and Route Tables.

Virtual Network Interface Card (VNIC)

A Virtual Network Interface card (VNIC) resides in a Subnet and gets attached to an instance to enable connections to the Subnet's VCN. Each instance has a default primary VNIC that is created during instance launch and can't be removed. You can add Secondary VNICs to an existing instance (in the same AD as the primary AD) if needed.

Dynamic Routing Gateway (DRG)

Dynamic Routing Gateway (DRG) is a virtual router that provides a path for private traffic between OCI cloud network (VCN) and on-premises (data-center) network. DRG is a standalone resource on OCI and is designed to give you full flexibility to attach/detach to different VCN as per the business needs. A DRG is required for both VPN IPSec Tunnels and Fast Connect virtual circuits. A network administrator might think of the DRG as the VPN headend on their OCI Services.

Internet Gateway (IG)

Internet Gateway (IG) is an optional virtual router that you can add to an VCN for internet connectivity. It provides internet access to your VCN and is controlled by the Route Tables and Security List configuration on the Subnet Level. In addition to IG, you must have the following to access the internet from the compute instance:

a) Routing rule in Route Table that points to the IG

b) Appropriate port open in the Security List, e.g. Port 80/443 must be opened for Web Server Traffic.

NOTE: Having an Internet Gateway alone DOES NOT expose your subnet to the internet unless you satisfy both conditions above.

Security Lists

Security Lists are a virtual firewall for your VCN on OCI infrastructure. Each security list consists of ingress and egress rules that specify the destination (CIDR) and type of traffic (Protocol and port) allowed in and out of instances within a subnet. A Security List is attached to a subnet and you can change the traffic type/destination dynamically. For example, a rule in Security Lists with source CIDR 10.100.200.0/24 with destination port 22 of TCP protocol will allow all ingress traffic from IP addresses (10.100.200.0/24) on to OCI instances on port 22 for ssh connection.

Route Table

Route Tables are virtual route tables where you configure private and public traffic using DRG or IG. The route table rules provide mapping for the traffic from subnets via gateways to a destination outside VCN, e. g., private traffic flows using DRG and public traffic flows using IG. You can build multiple route tables within a VCN or use the default route table.

A route table must be assigned to a subnet within a VCN, so a default route table is used when you create a subnet without specifying a route table. You can have one dedicated route table per subnet to keep it easy for subnet management. You can't change a subnet to use another route table once a subnet is created, however, you can change the route table rules at any time.

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EBS Deployment on Oracle Cloud Infrastructure
May 2018
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