



An Oracle White Paper
January 2014

Oracle WebLogic Server on Oracle Database Appliance



Introduction

This white paper describes the architecture and highlights the value proposition of Oracle WebLogic Server on Oracle Database Appliance (ODA) virtual environment.

The Oracle Database Appliance (ODA) is an Oracle engineered system, consisting of hardware and software, designed to simplify the deployment, maintenance and support of high availability database and middle tier WebLogic solutions.

The latest version of ODA appliance – Oracle Database Appliance Manager v2.7 and v2.8 - enables customers to deploy this simplified and affordable database solution in either a physical or a virtual environment.

In the ODA physical environment, customers can continue to deploy a highly available Oracle Database on the physical hardware. For more information on this deployment, please refer to the Oracle Database Appliance White Paper.

In the ODA virtual environment, customers can deploy Oracle Database, Oracle WebLogic Server and consolidate their application and database tier within the ODA appliance to further lower their capital expenditure. This allows customers to have an entire enterprise application infrastructure deployed within a single appliance.

ODA virtual environment also offers customers a unique pay-as-you-grow software licensing capability to the provisioned Oracle Database and WebLogic Server within the ODA appliance. This allows customers to efficiently manage their software licensing costs while scaling their database and middle tier to fully utilize the processor cores available in the appliance.

The primary purpose of this engineered system and the ODA virtualized platform is to be:

- Simple
- Reliable
- Affordable

This is an ideal appliance for customers who value simplicity and who seek to avoid the complexity, costs, and risks in deploying a highly available database solution. In addition, with ODA virtualized platform, customers can provision a two, four or eight node WebLogic cluster along with a software load balancer to front-end these clusters in an extremely simple fashion without requiring special skills or HA expertise.

Simple to Implement, Manage, and Support

Simple to Implement

The hallmark of the Oracle Database Appliance is its simplicity: a single box, with servers, storage and networking — all engineered together as a complete system with no assembly or wiring required.

To deploy and use the Oracle Database Appliance, simply unpack it, plug in the power cord, plug in the network cables, and run the Oracle Appliance Manager installation to create a clustered, highly available database and WebLogic Server.

Simple to Manage and Maintain

Maintaining systems and keeping all the associated software elements current with the latest patches is often one of the most time consuming and error-prone tasks administrators are confronted with. The Oracle Database Appliance and its specially engineered software enables “one button” patching for all the elements of the software stack — firmware, operating system, clusterware, storage manager, and database software.

The appliance simplifies storage management by automatically detecting performance and availability issues and performing corrective actions. Disks can be replaced without administrative tasks, and should a storage device exhibit behavior that indicates it is beginning to fail and is impacting performance, the appliance will offline the disk and rebuild redundancy.

If hardware fails or is about to fail, the Automated Service Request capability (phone home) generates automatic requisitions for replacement components such as disks, power supplies, fans etc.

When a problem occurs, Oracle Database Appliance gathers and packages all the relevant logs to service the support request. Rather than requiring the DBA or System Administrator to manually search for and compile all the logs and system history when issuing a Support Request, the Oracle Appliance Manager automatically collects and then compiles the relevant logs and history, allowing issues to be processed, analyzed and fixed much more quickly.

ODA Virtualized Platform

Oracle empowers customers to decide on the Oracle Database Appliance provision model – ODA Physical or ODA Virtualized – to best suite their needs.

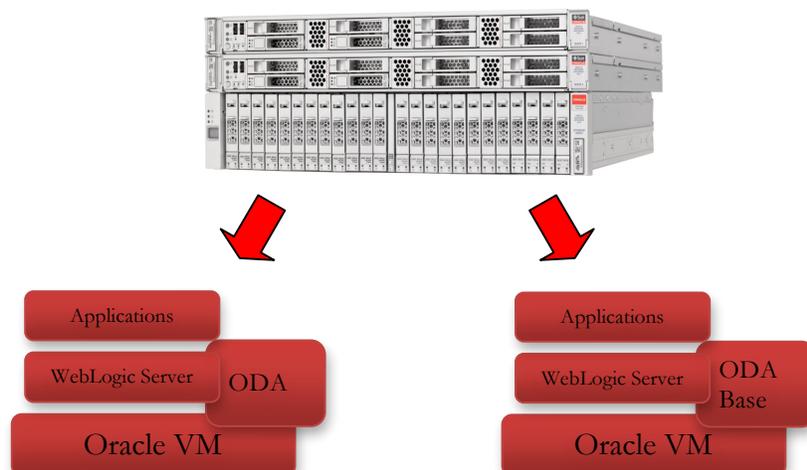
The ODA physical platform leverages the ODA Appliance Manager to deploy a highly scalable database within the physical hardware in few steps. In this environment, the Database is the only application deployed on this hardware and can be scaled to consume all the physical core and memory available within the hardware.

The ODA virtualized platform allows ODA customers to provision and manage multiple layered products and applications, such as Oracle WebLogic Cluster and Oracle Database Real Application Clusters in few simple steps and to efficiently utilize ODA hardware capabilities. In this environment,

Oracle VM technology allows an enterprise infrastructure such as Oracle WebLogic Server and an Oracle Database to run in isolation within the underlying ODA hardware.

ODA virtualized platform includes:

- *ODA Virtualized Image* - A specifically engineered Oracle VM server for ODA so as to better leverage ODA hardware capabilities.
 - *ODA Virtualized Image* delivers the core virtualization technology to allow multiple applications to be deployed and hosted on the same hardware.
- *ODA Base Domain* - A “privileged VM domain” within ODA virtualized image.
 - *ODA Base Domain* allows customers to deploy and scale Oracle database similar to ODA physical environment.
 - *ODA Base Domain* can utilize up to 9 TB of useable storage.
 - *ODA Appliance Manager* provisions Oracle Database within the *ODA Base Domain* so as to deliver native disk performance.
 - Database workload is tied to user determined physical cores within the ODA hardware to ensure reliable performance and isolation from other application workloads.
- *ODA Guest Domains* – Middle tier products such as WebLogic Server and Application specific VMs provisioned within ODA virtualized image.
 - *Oracle WebLogic Server* configuration for Oracle Database Appliance can provision one or more WebLogic servers within one cluster as *ODA guest domain*. There are options of supporting two, four or eight node clusters. Also, WebLogic Server workload is pinned to user licensed physical cores to ensure reliable performance and isolation from other application and database workloads.
- Applications and Database on ODA Virtualized platform



Customer can configure the ODA virtualized platform by following these steps:

- Download ODA virtualized image from My Oracle Support. Use this downloaded virtualized image file to re-image ODA.
- Download ODA Base Template from My Oracle Support and deploy ODA Base Template.
- Run the ODA Base configurator to create file system, Grid Infrastructure and provision Database with HA setup.
- Download Oracle WebLogic Server OVM images from My Oracle Support or eDelivery, with the option of Oracle WebLogic Server 11g (10.3.6) or 12c (12.1.1 and 12.1.2).
- Run the WebLogic Configuration for Oracle Database Appliance to provision WebLogic cluster with the choice of a two, four or eight node cluster; and configure WebLogic resources and services, such as data sources and JMS destinations.
- Configure any guest VMs and templates using ODA Appliance Manager Interface – available as part of ODA virtualized image.

Database Appliance Manager provides the ability to provision and administer Oracle VM such as WebLogic Cluster on the ODA hardware.

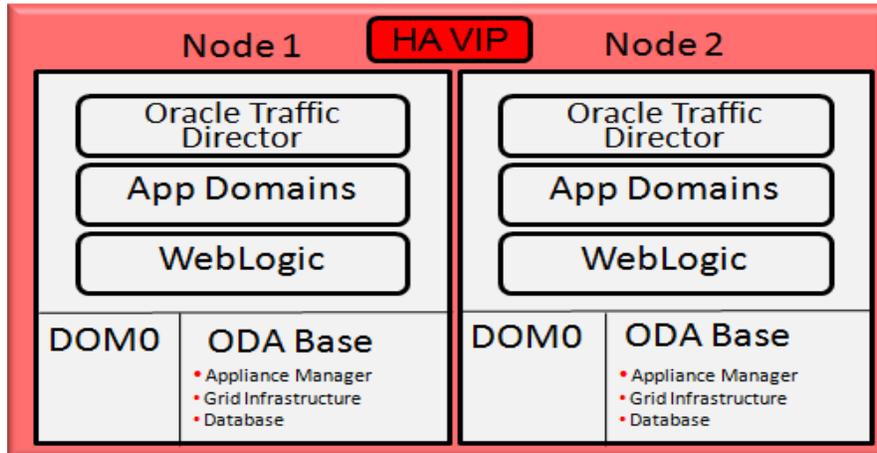
Oracle WebLogic Configuration for ODA

Oracle WebLogic Server is a customized Oracle VM designed to be deployed at user domains within ODA virtual so that customers can efficiently utilize the underlying ODA hardware.

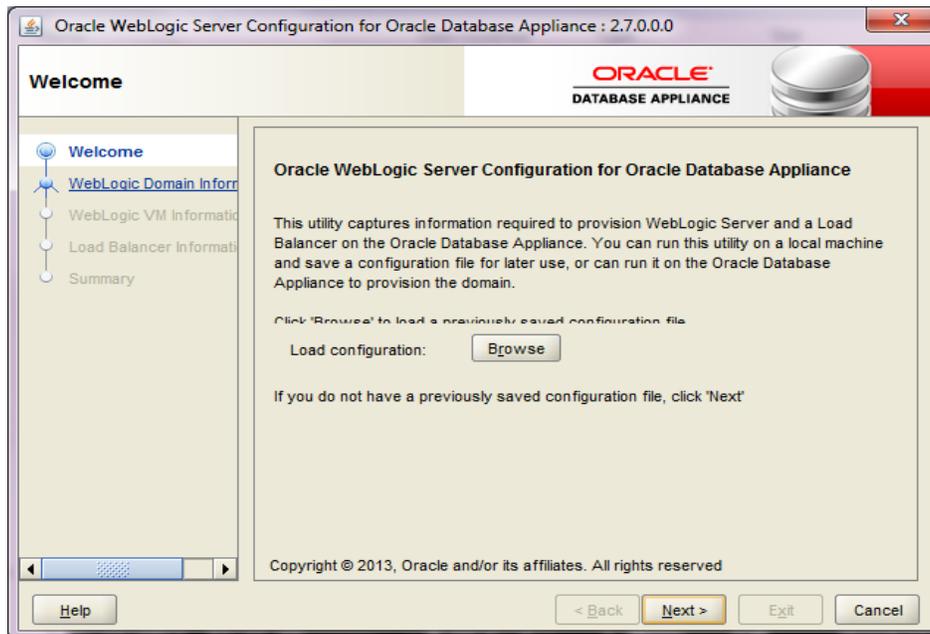
Oracle WebLogic cluster with the help of a WebLogic Configuration utility, similar to the Database configurator shipped within ODA virtual, allows customers to provision a WebLogic cluster and a highly available software load balancer, to front end these WebLogic clusters, in a few simple steps.

WebLogic Virtual Appliance software includes:

- Customized Oracle VM 3.1.1 templates - designed to leverage ODA virtual platform
- WebLogic Configuration for Oracle Database Appliance - provisions VMs and a WebLogic cluster in few simple steps
- WebLogic 10.3.6, 12.1.1 or 12.1.2 – Application Infrastructure
- Oracle Traffic Director 11.1.1.7 - With HA VIP for a single entry point for back-end applications

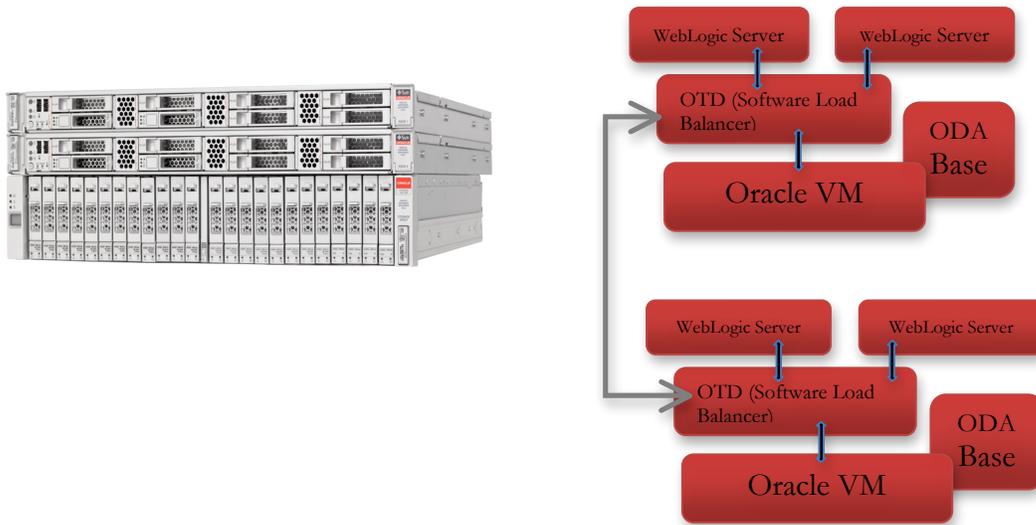


WebLogic Configuration for ODA allows customers to provision WebLogic clusters in a two, four or eight-node cluster environment and to configure database connectivity between the WebLogic cluster and the Oracle Database hosted within the ODA Base environment. The WebLogic configuration supports the option of connecting to Oracle Database with either Multi Data source, GridLink Data Source or generic Data Source depending upon the option of the database installation.



For example, in a four-node WebLogic cluster deployment, the figure below shows how different middle tier products and applications are provisioned within the ODA hardware.

Four-node WebLogic cluster with Database on ODA Virtualized platform:



WebLogic Configuration for ODA accepts user input for WebLogic version, network related information and the connectivity to be used between WebLogic server and Database application, and proceeds to provision multiple Oracle VMs within the ODA hardware.

WebLogic Configuration for ODA provisions each WebLogic managed server to run individually within the Oracle VM. Also, these WebLogic VMs are deployed separately among the two-compute nodes within the ODA hardware for high availability. For example, on a four-node WebLogic cluster, four separate Oracle WebLogic managed server VMs are provisioned with two VMs deployed to the first compute node and the other two VMs deployed to the second compute node.

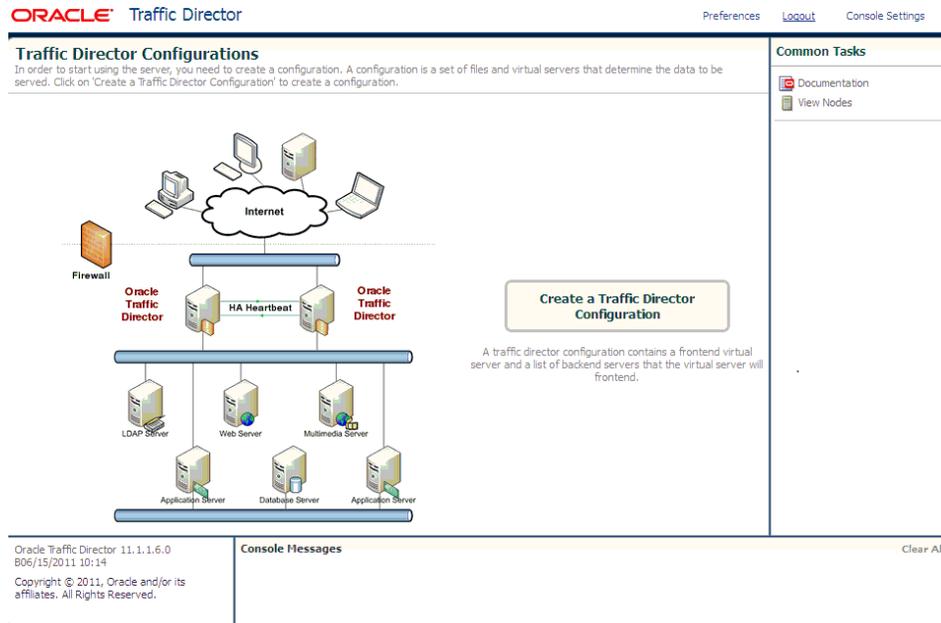
Each WebLogic managed server VM is configured with:

- 6 GB RAM and 2 Virtual CPU (vCPU)
- One Managed Server and Node Manager per virtual machine
- Java Heap of 3Gb is allocated for WebLogic managed server
- Start-on-boot service is enabled to allow VMs to be bounced with minimal administration

WebLogic Administration Server is provisioned as a separate VM and is responsible for managing the provisioned managed servers and the accompanying cluster within the WebLogic domain.

WebLogic Cluster is configured using 'Unicast'. The WebLogic provisioning process does not enable 'Whole Server' migration by default in this cluster environment. However, users can enable this feature as necessary post provisioning.

WebLogic Configuration for ODA also provisions Oracle Traffic Director (OTD) – a software load balancer with High Availability (HA) setup – as VMs hosted separately between the two compute nodes within the ODA hardware. This setup allows customers to leverage OTD to front-end two, four or eight-node WebLogic clusters and to access their entire back-end WebLogic managed servers through a single Virtual IP (VIP) address as shown below.



WebLogic Configuration for ODA configures OTD – load balancer VM – with:

- 4 GB RAM and 2 Virtual CPU (vCPU)
- One Administration Node and Load Balancer service per virtual machine
- Start-on-boot service enabled to allow VMs to be bounced with minimal administration
- Load Balancing service is defaulted to Round-Robin load distribution method
- Active-Passive HA setup. Active setup is an OTD VM running on physical compute node and is responsible for load balancing incoming requests; Passive will be the other OTD VM, and is designed to provide fail-over.

Similar to WebLogic, WebLogic Configuration for ODA configures OTD Administration Server to run as a separate VM and is deployed to one of the compute nodes.

Conclusion

Oracle WebLogic Server for ODA virtual environment allows customers to effectively utilize ODA hardware capabilities and to provision, in few simple steps, WebLogic cluster front-ended by a software load balancer. This configuration allows customers to consolidate their middle tier infrastructure, application and database tier within a single hardware appliance.

In nutshell, ODA Virtualized Platform along with WebLogic Configuration for ODA offers these benefits:

- Single server to deploy your database, WebLogic Server, Oracle Traffic Director and applications
- Reduce IT data center footprint in space and power consumption
- Auto configured virtualized platform infrastructure
- VM and template repository, networks, storage
- Integrated command line to manage Oracle Database Appliance and VMs/templates
- No need for additional hardware resources for OVM Server Manager
- Pay-as-you-grow pricing for Oracle database, WebLogic Server and applications



WebLogic Appliance for Oracle Database
Appliance January 2014

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