

Oracle VM 3: Planning the Site Guard Deployment for Oracle VM Centric DR

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Introduction

Site Guard is used to orchestrate transitions of Oracle VM guests between DR sites and comes prepackaged with Oracle Enterprise Manager. What does it take to design and implement a complete Oracle VM Centric disaster recovery solution using Site Guard? This document will help you understand what it takes to integrate Enterprise Manager and Site Guard with Oracle VM.

This white paper is not an installation and configuration guide, but rather a planning guide that explains concepts and best practices. This document explains the role of Oracle Enterprise Manager Cloud Control and Site Guard to help understand how it is integrated with Oracle VM to achieve disaster recovery. It also articulates some concepts that you will need to consider when planning this aspect of our solution for Oracle VM Centric DR using Site Guard.

This paper is written specifically for Oracle VM disaster recovery using Site Guard to orchestrate the transition of application workloads between disaster recovery sites. The process articulated in this technical white paper should not be used for any other purpose, nor should it be used to solve any other problem or design limitation of the Oracle VM product.

Overview

Site Guard is the engine behind Oracle VM disaster recovery and comes bundled with the standard release of Enterprise Manager. You do not need to install Site Guard or do anything to enable the product beyond licensing it for use with your Oracle and non-Oracle applications; it's always included with every copy of Enterprise Manager and ready to use for disaster recovery with or without Oracle VM.

Site Guard has been included with Enterprise Manager for a number of years and is normally used to orchestrate disaster recovery using the HA and DR capabilities already built into Oracle applications that follow our Maximum Availability Architecture blueprint (MAA). What is different about Site Guard beginning with release 12.1.0.5 of Enterprise Manager is that the product now comes with highly specialized automation written specifically to manage switchovers and failovers of Oracle VM Guests from one DR site to another.

Customers wanted the ability to automatically stop Oracle VM virtual machines running at one site, transition the storage and storage repositories containing the virtual machines to another site and then start the virtual machines again. We have written and bundled these capabilities into Enterprise Manager allowing you to create, manage and trigger switchovers and failovers of Oracle VM Guests using Site Guard Operation Plans.

Site Guard Operation Plans

Site Guard allows you to create operation plans for different types of activities such as switchovers, switchbacks, failover and failbacks as well as other types of operations. The screen shot in Figure 1 below shows an example of Site Guard operation plans. Operation plans have many options for executing tasks at various stages of a site transition and can be named anything you like; you should devise descriptive names that are meaningful for your environment.

The screenshot shows the Oracle Enterprise Manager Cloud Control 12c interface. The main heading is 'Site Guard Operations'. Below this, there are tabs for 'Operation Plans' and 'Operation Activities'. A descriptive paragraph explains that an operation plan is a list of steps to be executed for a Site Guard operation. Below the text are several action buttons: 'Create', 'Create Like', 'Edit', 'Delete', 'Execute Operation', 'Run Prechecks', 'Schedule Health Checks', and 'Stop Health Checks'.

Plan Name	Operation Type	Primary System	Standby System
Start-A	Start	SiteA	
Failback-to-A	Fallover	SiteB	SiteA
Failover-to-B	Fallover	SiteA	SiteB
Stop-A	Stop	SiteA	
Switchback-fom-B-to-A	Switchover	SiteB	SiteA
Switchover-from-A-to-B	Switchover	SiteA	SiteB

Below the table, the 'Operation Plan - Switchover-from-A-to-B' is expanded, showing a 'Target Name' field and two sections: 'Custom Precheck Scripts' and 'Post Scripts'. The 'Custom Precheck Scripts' section contains a command: `/home/oracle/bin/python /home/oracle/siteguard_ovm/v8/siteguard_ovm_control.py --action stop_precheck --force --uri https://ovm4m1.us.oracle.com:7002/ovm/core/wsapi/rest --repo 'SiteA ca-c`. The 'Post Scripts' section contains a command: `/home/oracle/bin/python /home/oracle/siteguard_ovm/v8/siteguard_ovm_control.py --action stop --force --uri https://ovm4m1.us.oracle.com:7002/ovm/core/wsapi/rest --repo 'SiteA Prod BAM ca-c`.

Figure 1: Example of Site Guard operation plans

The operation plans are what make this solution so flexible. But the flexibility of the operation plans is highly dependent upon the way you organize your virtual machines into discrete storage repositories. If all your Oracle VM



guests reside in a single storage repository, then you can only have a single operation plan which is why we suggest you organize your virtual machines into distinct business systems or groups of virtual machines with similar DR requirements.

We explain best practices for organizing your virtual machines into discrete storage repositories in our storage planning guide. Our white paper **SN21305: Implementing Oracle VM Centric DR using Site Guard** contains a list of all the other best practice white papers we've written to help you plan a robust, scalable DR solution using Site Guard.

Managing Oracle VM is optional

Using Enterprise Manager to manage the Oracle VM environments at each DR site is optional. Oracle VM Centric DR using Site Guard will function whether the Oracle VM environment is managed by Enterprise Manager or not. You must deploy an EM agent to each Oracle VM management server at each DR site since the Site Guard scripts are driven by the EM agent. However, there is no requirement that you manage Oracle VM using Enterprise Manager even though an agent is installed on each Oracle VM management server.

Deploying Enterprise Manager agents

EM agents will be deployed to various components of the DR solution.

- » Deploy EM agent to each Oracle VM Manager across all DR sites [required]
 - » The EM agent controls the Site Guard DR scripts for Oracle VM DR [required]
 - » The EM agent can monitor and manage the entire Oracle VM environment at each site [optional and beyond scope of solution]
- » Deploy EM agent to each Oracle VM server to monitor server health [optional and beyond scope of solution]
- » Deploy EM agent to each Oracle VM guest operating system to manage Oracle and non-Oracle applications [optional and beyond scope of solution]

The role of EM agent on Oracle VM Managers

You must deploy an EM agent to the Oracle VM management server at each DR site. Deploying the EM agent copies the Site Guard scripts to each Oracle VM Manager automatically. You do not need to deploy EM agents to any other component of your DR infrastructure to enable Site Guard to orchestrate switchovers or failovers.

Optionally, you may use the EM agent to manage and monitor your Oracle VM environment including Oracle VM servers, guests, pool file systems, storage repositories, networking and server status. The EM agent will allow you to completely manage all aspects of the Oracle VM environment from Enterprise Manager Cloud Control.

The role of EM agent on Oracle VM servers

Deploying agents to the Oracle VM servers allows your data center operations staff to monitor the health of the hardware and operating system. EM agents on the physical Oracle VM servers is optional and absolutely nothing to do with managing or monitoring Oracle VM guests, pool file system or storage repositories – the agent is strictly used to monitor the hardware.

The role of EM agent on Oracle VM guests

Deploying agents to manage Oracle and non-Oracle databases and applications running on the Oracle VM guest operating systems is entirely dependent on your requirements for managing databases and applications. As long as you deploy EM agents to Oracle VM guests, Site Guard can be used to further automate switchovers and failovers



at the application level. But deploying EM agents to the virtual machines is beyond the scope of our white papers which are entirely focused on planning, implementing and validating the Oracle VM DR infrastructure.

Planning the Enterprise Manager Deployment

Enterprise Manager (EM) can be deployed using four different architectures with successively higher levels of availability. Enterprise Manager uses the term “level” to describe the different deployment architectures. The Oracle VM infrastructure is deployed exactly the same no matter which deployment architecture you choose for Enterprise Manager so the way you deploy Enterprise Manager is up to you and your unique requirements. Please refer to [MAA best practices for Enterprise Manager](#) which explains deploying EM 12c Cloud Control in much greater detail.

We recommend that you install and configure Enterprise Manager using the level 4 deployment architecture. This white paper presents a high level overview of the four different deployment architectures to help make a decision about the level of availability needed to meet the goals of your DR solution. Actual steps for installing and configuring Enterprise Manager Cloud Control are beyond the scope or purpose of this document.

Please refer to **High Availability Solutions** found in the latest [Advanced Installation and Configuration Guide for Enterprise Manager](#); the chapter articulates specific steps needed to install and configure EM for your chosen level of availability. [MAA Best Practices for Enterprise Manager](#) on Oracle Technology Network is also an invaluable resource for more information about deploying more sophisticated implementations of Enterprise Manager Cloud Control.

Use level 1 for a basic deployment at a single site

This is just a basic install of a single Enterprise Manager at a single site. This is an easy to deploy solution and adequate for a proof of concept project, but should not be used for a production deployment of Oracle VM Centric DR using Site Guard. This has no protection from an outage other than recovering from a valid backup. Once you lose EM, you lose the ability to perform Oracle VM switchovers or failovers until you have first rebuilt or recovered your Enterprise Manager.

For proof of concept projects Enterprise Manager can be installed at either DR site alongside the Oracle VM Managers. If you decide to risk using this deployment architecture in production, then Enterprise Manager should be deployed to a third site (see Figure 2, item B). An EM agent is deployed to the Oracle VM Managers at each site making them act as Site Guard script servers (see Figure 2, item A).

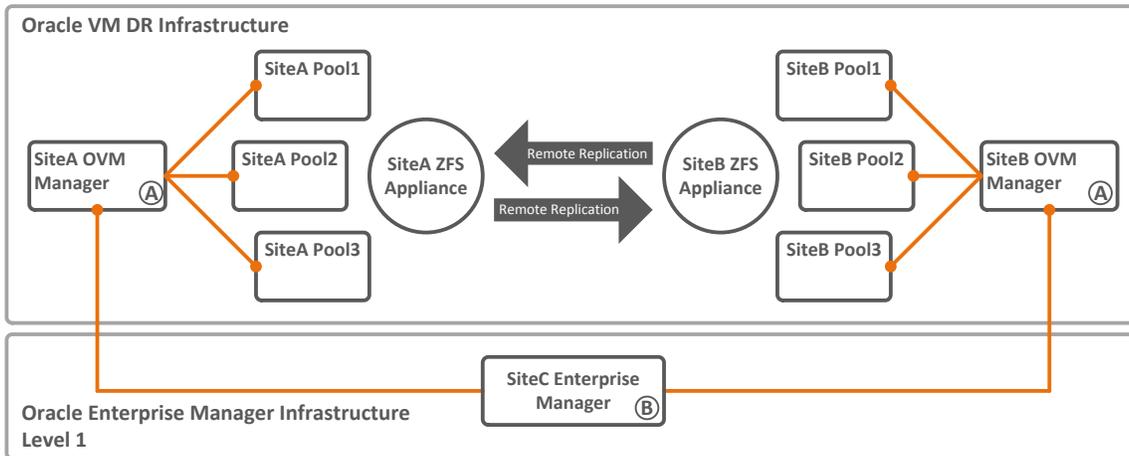


Figure 2: Level 1 deployment is not fault tolerant at all

Use level 2 for an active/standby deployment at a single site

This is also a single site deployment architecture, but includes an active Enterprise Manager (Figure 3, item B) with a second server running a standby Enterprise Manager (Figure 3, item C). This is a traditional high availability solution that will incur a short outage while control is passed to the standby Enterprise Manager.

Enterprise Manager can be installed at either DR site alongside the Oracle VM Managers for proof of concept projects. This can be used for Oracle VM Centric DR using Site Guard in a production environment if it is deployed to a third, independent site.

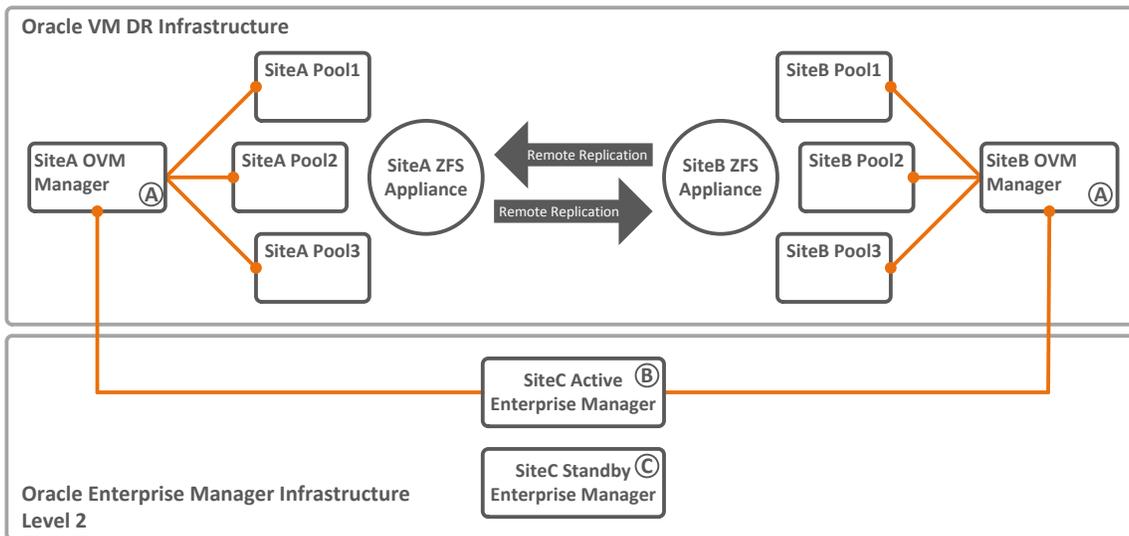


Figure 3: Level 2 deployment at a single site using active/standby configuration

Use level 3 for an active/active deployment at a single site

This is also a single site deployment architecture, but includes two active Enterprise Managers on two different servers (Figure 4, item B & C). This is a continuous availability solution that does not incur any outage if either of

the Enterprise Managers fails. This solution includes a load balancer along with Data Guard to keep both instances in sync and actively processing workloads.

Enterprise Manager can be installed at either DR site alongside the Oracle VM Managers for proof of concept projects. This can be used for Oracle VM Centric DR using Site Guard in a production environment if it is deployed to a third, independent site.

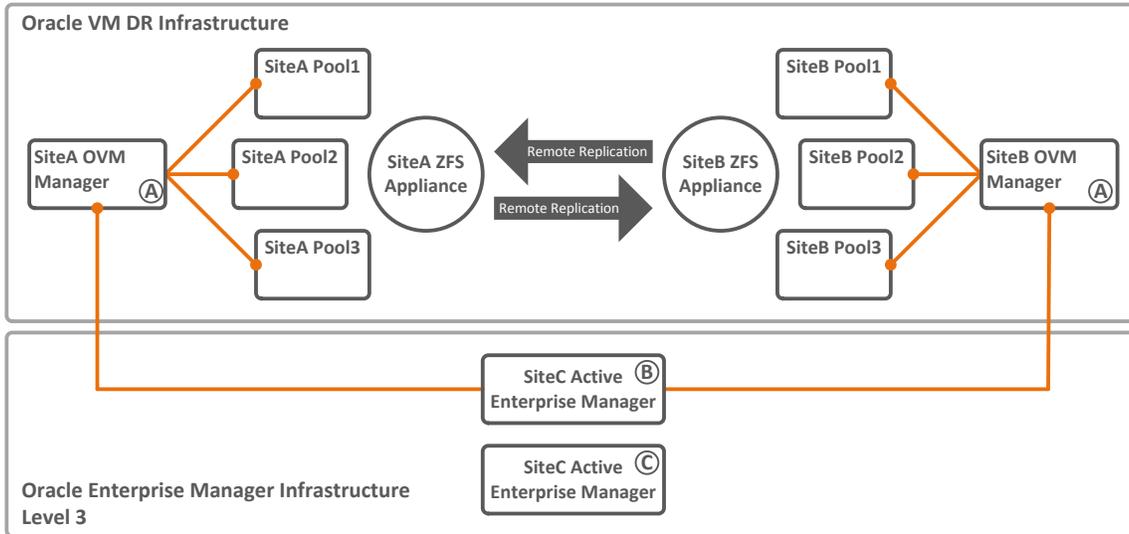


Figure 4: Level 3 deployment at a single site using active/active configuration

Use level 4 for a disaster tolerant deployment across multiple sites

This is a multi-site deployment architecture that includes two active Enterprise Managers at SiteA (Figure 5, item B & C) and two standby Enterprise Managers at SiteB (Figure 5, item D & E). This is a continuous availability solution that does not incur any outage if either of the Enterprise Managers fails at SiteA (Figure 5, item B & C). The workload is distributed between the two active instances of Enterprise Manager by a load balancer along with Data Guard to keep both instances in sync and actively processing workloads.

The data from SiteA is replicated to SiteB (Figure 5, item 1) where two Enterprise Managers are running in standby (Figure 5, item D & E). If SiteA fails, then the SiteB Enterprise Managers can be switched over to active/active using steps articulated in the Enterprise Manager Cloud Control Installation and Configuration Guide. The failover from SiteA to SiteB will incur an outage while the SiteB Enterprise Managers are changed to an active/active state.

Unlike the previous three levels, this deployment architecture does not require a third site for production Oracle VM Centric DR using Site Guard. This is Oracle's recommended deployment architecture for Enterprise Manager Cloud Control in a production environment for Oracle VM Centric DR using Site Guard.

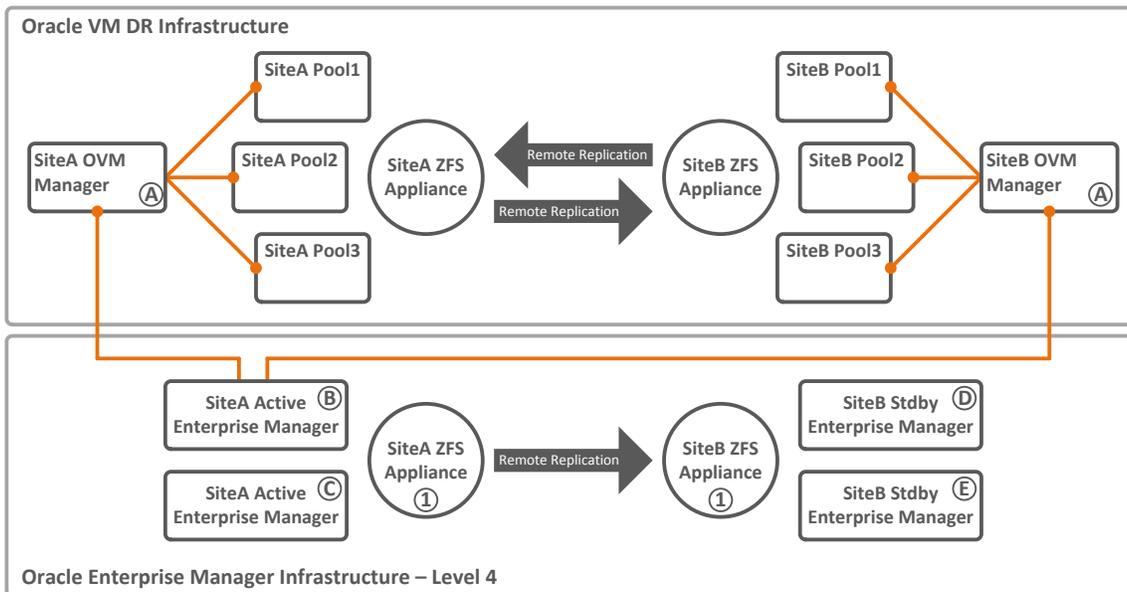


Figure 5: Level 4 has highest degree of availability across multiple sites



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