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Installing Oracle WebCenter Sites 12.2.1.3 on Oracle Java Cloud Service

Setup, configure Oracle WebCenter Sites products on JCS

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Overview

Enterprises are increasingly looking to reduce IT complexity and investments. Further, rapidly scaling the infrastructure to meet spikes in demand is a challenge. Hosted services are gaining in popularity as a solution to address these concerns. Oracle provides standards-based, enterprise grade and highly flexible solution to host applications on the cloud—Oracle Java Cloud Service (JCS) and Oracle Infrastructure as a Service (IaaS). This greatly enhances the business value to enterprises as they can focus on building their business solution and leave the infrastructure management to Oracle.

This document provides guided instructions to install and configure Oracle WebCenter Sites 12c R2 (12.2.1.3.0) on JCS in accordance with a recommended architecture that scales based on your business needs.

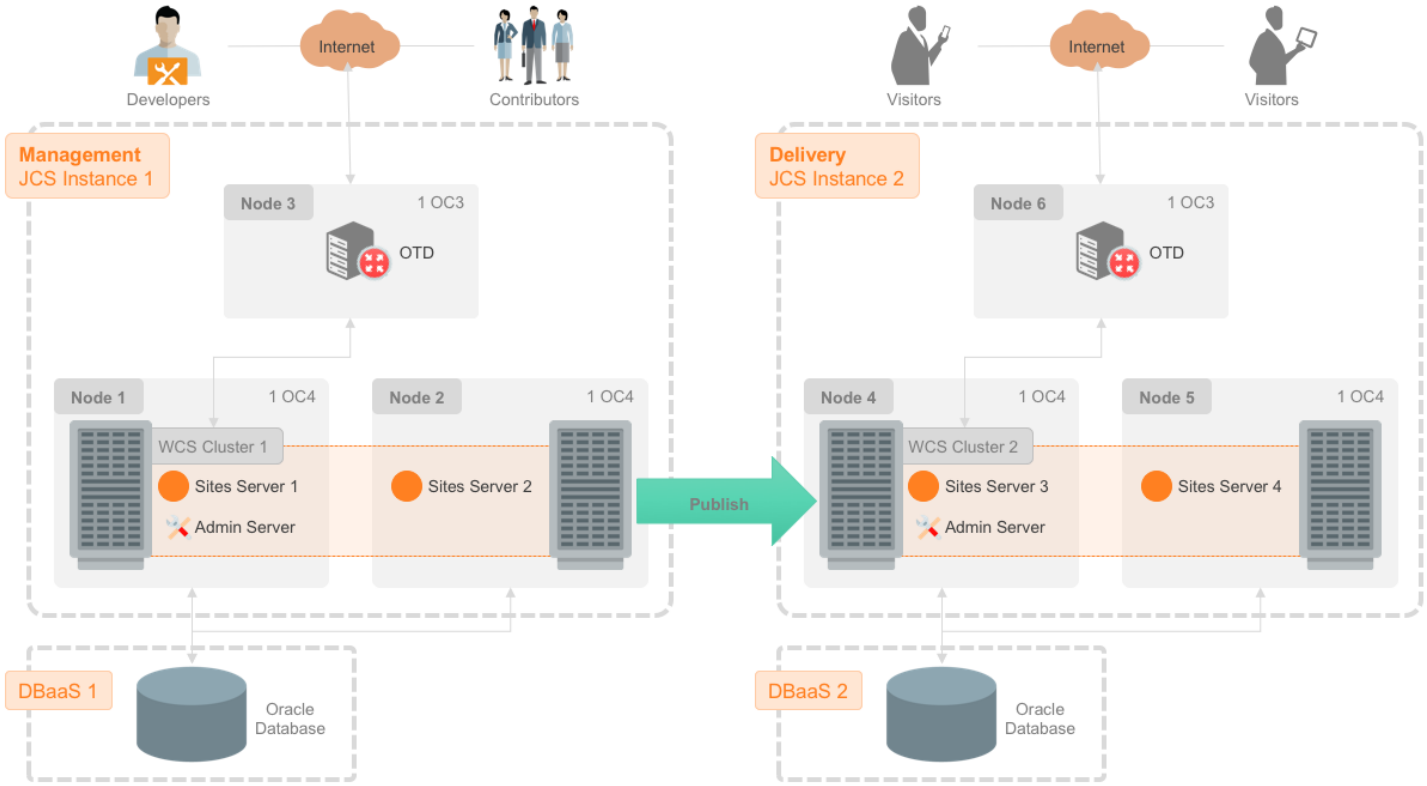
At a high level, the following are the steps to install and configure Oracle WebCenter Sites (WCS) on JCS—

- **Create Service Instances.** Create instances of virtual machine, database, and storage from your service dashboard. These instances will be used to install, run, and backup WCS.
- **Pre-installation Steps.** Perform a series of tasks to get remote access to JCS, prepare for the installation.
- **Install Oracle WebCenter Sites.** Download WCS 12c R2 binaries from Oracle Software Delivery Cloud and install on JCS.

» **Configure Oracle WebCenter Sites.** Extend the Oracle Weblogic Server (WLS) domain to add WCS application, configure various WCS products.

Recommended Architecture

Consider installing WCS environments (such as management/UAT/delivery) on separate instances of JCS. This will provide the right level of isolation between the environments. Create as many VMs as you want WCS severs in the cluster. The cluster has one WLS Admin Server. WCS server and its components should use different instances of database residing on Oracle Database Cloud Service. OTD provides the load balancing capabilities.



1. Create Service Instances

In order to create a Java Service and install WCS, ensure that you have additional services in your plan—

» **Oracle Database Cloud Service (DbCS).** Choose database version 12.1.0.2, Enterprise Edition. Note the database connection details from the dashboard. This will be handy when you run Repository Creation Utility (RCU).

» **Oracle Storage Cloud Service (StCS).** (Optional) Storage service is used to store backup of the database instances running on DbCS and WLS-WCS running on JCS.

Prior to creating the cloud instances, you need to create a public key that will be used to connect to the cloud instance.

Create a SSH Key Pair

Follow the instructions in Creating SSH Keys for Use with Oracle Cloud Services to create a SSH key pair. The key pair will be used later while creating a JCS instance.

Create Storage Cloud Service Containers

Containers are used to store backups of Database Cloud Service instances and Java Cloud Service instances. You can choose to have a single container for all the Cloud Service instances, or create a separate container for each Cloud Service instance (recommended).

The following container information is required when creating DbCS instances and JCS instances—

- The name of the container
- The user name and password of a user with read/write access to the container

For information about creating a container, see Creating Containers in Using Oracle Storage Cloud Service.

Create a Database Cloud Service Instance

You can create a new database instance by click the 'Create Service' on the DbCS service console. Ensure that it has the following minimum configuration—

- Service level: Oracle Database Cloud Service
- Database release: Oracle Database 12c Release 1 (12.1.0.2)
- Edition: Enterprise Editor (or higher based on your requirement)
- On the Service Details screen: use the SSH key file you created in the earlier step. Enter the rest of the details as appropriate to your installation. Note all the database details; you will use it when you run RCU while installing WCS.

While DbCS instance can be shared between WCS Management and Delivery instances, we recommend you to use separate database instances between them.

For more information about creating a database instance, see Creating a Database Deployment.

Create a JCS Instance

You can create a new database instance by click the 'Create Service' on the DbCS service console. Ensure that it has the following minimum configuration—

- Service level: Oracle Database Cloud Service
- WLS release: 12c (12.2.1.3.0)
- Edition: Enterprise Editor or Enterprise Edition with Coherence
- On the Service Details screen:
    - Use the SSH key file you created in the earlier step. Enter the rest of the details as appropriate to your installation.
    - If you want to create a multi-node cluster, select the appropriate *Cluster Size*. This option is recommended for Delivery instance.
    - Choose 'Yes' against the *Provision Load Balancer* option. This option is recommended for Delivery instance.
    - Set up the backup and recovery configuration as appropriate.

We recommend you to create separate JCS instances for WCS Management and Delivery. For information about creating a JCS instance, see Creating an Oracle Java Cloud Service Instance.

You're all set to start configuring the instances in preparation of WCS installation.

2. Pre-installation Steps

You need to complete a few tasks to prepare the ground to install WCS. Here are the steps in brief—

» **Enable SSH connection**. SSH connection must be enabled on all the virtual machines (VMs) where the managed servers are run.

» **Enable VNC connection**. VNC connection should be enabled on all the VMs where the managed servers are run.

» **Download WCS Installer**. Download WCS installer from Oracle Software Delivery Cloud.

Enable SSH connection

By default, external SSH connections are enabled only to the admin server VM in JCS instance (where the WebLogic Administration Server runs). Enable SSH access to all VMs where the managed servers will run by adding an access rule in Oracle Cloud Compute dashboard. This access will be handy to perform routine maintenance tasks on your servers.

To enable SSH connection, navigate to the Oracle Cloud Compute dashboard by clicking the *hamburger* menu at the top-left of the services page and then *Compute*. On the dashboard—

1. Click *Network* tab
2. Click *Security Rules* on the menu that appears on the left
3. Click *Create Security Rule* to launch a dialog
4. Enter a name (ex. <JCS_instance_name>_p2ms_ssh)
5. Select `ssh` from the *Security Application* dropdown menu
6. For *Source*, select *Security IP List*, and select `public-internet`
7. For *Destination*, select *Security List*, and select `<JCS_instance_name>/wls/ora_ms`
8. For *Description*, enter any descriptive text as appropriate.
9. Click *Create*

Enable VNC connection

VNC is recommended for running WCS & RCU GUI installer on a JCS VM. A security application and an access rule will need to be created for external connections to be made on VNC ports.

Navigate to the Oracle Cloud Compute dashboard by clicking the *hamburger* menu at the top-left of the services page and then *Compute*. On the dashboard —

1. Click *Network* tab
2. Click *Security Applications* on menu that appears on the left
3. Create *Security Application*
   a. Click *Create Security Application*
   b. Enter a name (ex. vnc)
   c. Select `TCP` for *Port Type*
   d. For *Port Range Start*, enter `5900`.
   e. For *Port Range End*, enter `59NN` where NN is the number of VNC connections you expect to have on a given VM (ex. 5928 to enable 28 VNC connections).
   f. Enter a description.

g. Click *Create*.

4. Click *Security Rules* on menu that appears on the left
5. Create Security Rule—
   a. Click *Create Security Rule*
   b. Enter a name (ex. <JCS_instance_name>_p2ms_vnc)
   c. Select the security application created in step 3.
   d. For *Source*, select *Security IP List*, and select *public-internet*
   e. For *Destination*, select *Security List*, and select `<JCS_instance_name>/wls/ora_ms`
   f. For *Description*, enter any descriptive text as appropriate.
   g. Click *Create*

Start a VNC Server

In order to proceed with the next steps, you need to start a VNC session to access the JCS VM.

1. Connect to the instance with an SSH client as opc user.
2. Switch to `oracle` user
   ```
   sudo su - oracle
   ```
3. Run VNC server
   ```
   vncserver
   ```
   At the prompt, enter a password that will be used when connection to the server.
   Note the display the VNC server used to start. (ex. <hostname>:<X Display number>)
4. Set the `DISPLAY` variable (ex. `localhost:10.0`).
   ```
   export DISPLAY=<hostname>:<X Display number>
   ```
5. You can connect to the VNC sever with a VNC client on your machine
   ```
   <public IP of VM>:<display number>
   ```

Download WebCenter Sites Installer

The last step in this section is to download the WCS 12.2.1.3.0 installer file from Oracle Software Delivery Cloud or Oracle Technology Network (OTN). Access your JCS VM over VNC, open Oracle Software Delivery Cloud/OTN website with a web browser to download the installer files.

Provide full read access to everybody on the system as you will be installing WCS as '`oracle`' user. You can do this by opening a console, navigating to folder where the binary file was downloaded and use the `chmod` command on the folder.

Important: *For information about JCS patching, backup, and restore with WCS deployed on it, refer Doc ID 2411269.1 and Doc ID 2411270.1.*

It is currently not certified to upgrade JCS with WCS deployed on it.

All the groundwork to install WCS is complete. You can proceed to install WCS.

3. Install Oracle WebCenter Sites

You can install WCS with either the GUI installer or silent installer. This guide covers the GUI installer. You must repeat the installation on all the VMs where you want WCS to run.

The following paths required for Sites installation and configuration are configured on JCS instance VMs.

JDK: /u01/jdk

- Middleware Home: /u01/app/oracle/middleware
- OraInventory Home: /u01/app/oraInventory
- Domain Home: /u01/data/domains/<JCS_instance_name>_domain

Install WebCenter Sites Software

1. Connect to the VM over VNC and start a console
2. Switch over to oracle user and navigate to the folder where you downloaded WCS installer
3. Start WCS Installer by following the instructions in Installing the Oracle WebCenter Sites Software

Important: *You must turn on auto-update by choosing "Search My Oracle Support for Updates" and provide your MOS credentials. This allows the installer to install the very latest JCS patches to the environment before installing WebCenter Sites.*

Run Repository Creation Utility

The WebCenter Sites schemas need to be created using the RCU.

Ensure that you have the instance details of the database you created earlier. This information will be used during this step. This can be found on the service console for the instance in DbCS dashboard. Specifically—

- Host, Port, Service Name, Username, Password, Schema Prefix

For information on running the RCU, see Creating the Database Schemas.

Oracle WebCenter Sites is now installed. You can now proceed to configure the WLS domain to deploy WLS application and the WCS components. If you started any managed servers, you must shut those down before proceeding with this step.

4. Configure Oracle WebCenter Sites

In the next steps, you will configure the following components—

1. Weblogic and Infrastructure
    - WLS Domain
    - Coherence Cluster
    - Oracle Traffic Director (OTD)
2. WebCenter Sites & Components
    - WebCenter Sites
    - Satellite Server
    - Visitor Service
    - Site Capture

The default domain of a JCS instance has an admin server, and one managed server per node. You must reconfigure it to support various WCS applications using the Configuration Wizard on the admin server VM.

1. Access the Admin server VM over VNC

2. Start a console and change user to oracle
3. Run the domain configuration tool by following instructions in Configuring the WebCenter Sites Domain
4. On the Configuration Type screen, select Update an existing domain. Select the domain from the dropdown.
5. On the Database Configuration type screen, use the same information that you used while running the RCU.
6. On the Advanced Configuration screen, select Managed Servers, Clusters and Coherence, and Deployments and Services.
7. Use the following configuration on the Managed Servers screen. Increment the server name for each additional server, ex., `satellite_server1`, `satellite_server2` etc.—

TABLE 1. WEBCENTER SITES COMPONENTS' CONFIGURATION

Component	Name	Listen Port	Server Groups	Listen Address	SSL Listen Port
Sites Cluster	Wcsites_server1	8001	WCSITES-MGD-SVR	All local addresses	Optional
Satellite Server	satellite_server1	8002	SATELLITE-MGD-SVR		
Visitor Service Cluster	visitorservices_server1	8003	VS-MGD-SVR		
Site Capture Cluster	sitecapture_server1	8004	SITECAPTURE-MGD-SVR		

8. On the Clusters screen, the Sites, Visitor Services, and Site Capture applications will each require a cluster be created if the application is clustered. The Frontend Host is the public `ip`, `http` (80), and `https` (443) ports of the provisioned OTD server.
9. On the Assign Servers to Clusters screen, assign all managed servers for the Sites application to one cluster, all managed servers for the Visitor Services application to another cluster, and all managed servers for the Site Capture application to another cluster.
10. On the Assign Servers to Machines screen, assign all managed servers to the machines representing the VM it will be running on.
11. On the Deployments Targeting screen, ensure the `wsm-pm` application is targeting the cluster for the Sites application.
12. On the Services Targeting screen, ensure the `mds-owsm` JDBC resource is targeting the cluster for the Sites application.
13. Open setDomainEnv.sh and update the class path as below:
```
export CLASSPATH=/u01/app/oracle/middleware/oracle_common/modules/com.oracle.cie.config-external_8.5.1.0.jar:$CLASSPATH
```

Coherence Cluster Configuration (Optional)

Some managed servers may be configured to belong to the wrong coherence cluster. You may need to modify this configuration in the domain configuration.

1. Open `<domain_home>/conf/config.xml` in a text editor.
2. Remove the following lines:
```
<coherence-cluster-system-resource>DataGridConfig</coherence-cluster-system-resource>
```
3. Search for the following tag:
```
<name>defaultCoherenceCluster</name>
```
In the following `<target>` tag, add all clusters and standalone servers that are in the domain.

4. Search for the following tag:
   `<name>DataGridConfig</name>`
   In the following `<target>` tag, remove all clusters and standalone servers.
5. Save the file.

Configure OTD

You need to configure OTD load-balance clustered and act as a frontend to all the Sites applications.

1. Open the Oracle Enterprise Manager for OTD and log in as `weblogic` user:
   `https://<public_ip_otd_VM>:8989/em`
2. Click the WebLogic Domain dropdown, select Administration, and select OTD Configurations.
3. Click opc-config.
4. Click the Traffic Director Configuration dropdown, select Administration, and Server Pools.
5. Create server pools such that Sites, Visitor Services, and Satellite Server each have a pool containing all servers to be load balanced. Use the internal host names of the VMs and the ports of the managed servers specified during domain configuration (Table 1. WebCenter Sites components' configuration). A pool for Site Capture will be created in a separate OTD configuration.
6. Click the Traffic Director Configuration dropdown, select Administration, and select Virtual Servers.
7. Click opc-config > *Routes* tab.
   - Create a route each for the Visitor Services and Satellite Server context roots; click *Create*—
   - Enter a Name `<application_context_root>`
   - Click *Edit Expression* > *Create*
   - In the Value field, enter `/<application_context_root>/,` and click *OK*
   - Select the origin server pool containing the servers running the application the route is for and click *OK*
   - Click *Restart Instances*

If you install Site Capture, you need complete the following additional steps:

8. Click *WebLogic Domain* dropdown > Administration > OTD Configurations, and click Create
9. Enter a name for the configuration, a unique port (ex. 8181), and click Next.
10. For each node of the Site Capture cluster, click Add Server and enter the internal host and port of the Sites Capture managed server.
11. Select the existing machine and click Create Configuration.
12. Select the newly created configuration and click Start Instances.

Enable Secure Communication between OTD and Managed Servers

Navigate to the Oracle Cloud Compute dashboard:

1. Click *Network* tab and then *Security Applications* on the left menu
2. Creating a Security Application

> *Note: You can choose to create a single security application (recommended) that spans the ports of all Sites applications (Sites, SatelliteServer, Visitor Services, Site Capture), or create a security application for each. If creating a security application for each, security rules for each application will also have to be created.*

- Click Create Security Application
- Enter a name (ex. <application name> or sites_apps)

- Select TCP for Port Type.
- Enter the starting port range and the end port range for the application or applications.
- Enter a description and click Create.

3. Click *Security Rules* on the left menu
4. Create *Security Rules*

Note: Create a security rule for each of the security applications created in step 2.

- Click *Create Security Rule*
- Enter a name ex. `<JCS_instance_name>_otd2ms_<security_application_name>`
- Select the security application created in step 2. This rule will associate with your selection.
- For Source, select Security List, and select `<JCS_instance_name>/lb/ora_otd`
- For *Destination*, select *Security List* > `<JCS_instance_name>/wls/ora_ms`
- For *Description*, enter "Enable OTD communication with WebCenter Sites VMs"
- Click *Create*

Enable Publishing from Management to Delivery

Publishing sites from one environment to another (ex. Management to Production) requires a security rule to allow communication from the source server to the destination.

Navigate to the Oracle Cloud Compute dashboard:

1. Click *Network* tab
2. Click *Security Rules* on the left menu
3. Click *Create Security Rule*
4. Enter a name ex. `Man2ProdPub_ms2ms_sites`
5. Select the security application representing the WebCenter Sites port (ex. 8001) from the *Security Application* dropdown menu
6. For *Source*, select *Security List*, and then <Source_JCS_instance_name>/wls/ora_ms
   This is the where the publishing source is located.
7. For *Destination*, select *Security List*, and then <Destination_JCS_instance_name>/wls/ora_ms
   This is where the publishing destination is located.
8. For *Description*, enter "Enable WebCenter Publish from Management to Delivery".
9. Click *Create*

WebCenter Sites Configuration

Configure WebCenter Sites on the primary node, referring Configuring WebCenter Sites. You should take special note of the following—

1. Use the OTD external IP and port for Sites and CAS connection information.
2. After configuring WebCenter Sites on the primary node you need configure it to use unicast instead of multicast as the latter isn't available on JCS. Use the private host name of the managed server VM in both the cases—
   - Convert cs-cache.xml, cas-cache.xml, ss-cache.xml, and linked-cache.xml to use unicast. Use the private host name of the managed server VMs.
     Knowledge Base Article: incache point-to-point configuration (Doc ID 1451708.1)

» Convert jbossTicketCacheReplicationConfig.xml to use unicast.
Knowledge Base Article: How to set up CAS ticket replication using TCP/unicast instead of UDP/multicast? (Doc ID 1549877.1)

3. If you do not use NIO (not recommended), the shared directory will be mounted as an NFS share.
4. Complete cluster configuration steps, ignoring multicast configuration steps, in Setting Up a Cluster
   Any changes to the CLASSPATH and Java properties should be affected on all nodes.

Satellite Server Configuration

For configuration of Satellite Server, refer Configuring Satellite Server

Visitor Services Configuration

Configure Visitor Services on the primary node, by referring Configuring Visitor Services. You should take special note of the following—

1. After configuring Visitor Services on the primary node, convert visitors-cache.xml to use unicast instead of multicast. Use the private host name of the managed server VMs.
   Knowledge Base Article: incache point-to-point configuration (Doc ID 1451708.1)
2. Cluster JMS by creating a vsjms directory that will become an NFS share and following the steps in the Clustering JMS section of the below article.
   Knowledge Base Article: How to Cluster WebCenter Sites Visitor Services 12c? (Doc ID 2120761.1)

Site Capture Configuration

Configure Site Capture on the primary node, by referring Configuring Site Capture. You should take special note of the following—

1. After configuring Site Capture on the primary node, copy cas-cache.xml and linked-cache.xml from <domain_home>/wcsites/wcsites/config to <domain_home>/wcsites/sitecapture/config
2. The crawler directory specified during configuration will become an NFS share.
3. The <domain_home>/sitecapture/config directory will become an NFS share. Create a directory for each node under this directory, move the linked-cache.xml and cas-cache.xml for each node under its respective directory. Add this node directory to the CLASSPATH of the respective node.

Configure NIO for Shared File System HIGHLY RECOMMENDED

Configure WebCenter Sites to store its shared file system using Java NIO instead of disk-based file system. This eliminates the need for a network file share in a clustered environment and allows file locking to be handled by a Coherence cache. Configure NIO by referring Moving the Shared File System to a Database.

Create NFS Shares

Out of the box, WebCenter Sites defaults to a disk-based shared file system (local or network). If you decide to use disk-based shared file system, follow these steps.

Note: It is recommended to use NIO for WebCenter Sites shared file system. This helps configure highly available deployments.`

After configuring all Sites applications on the primary node, create an NFS shared folders for WebCenter Sites, Visitor Services JMS, and Site Capture.

1. Open /etc/exports in a text editor.

2. Add a line for the Sites NFS share
   ex. <domain_home>/wcsites/wcsites/Shared *(rw,async,no_root_squash,no_subtree_check)
3. Add a line for Visitor Services JMS
   ex. <domain_home>/wcsites/visitorservices/vsjms *(rw,async,no_root_squash,no_subtree_check)
4. Add a line for Site Capture crawler
   ex. <domain_home>/wcsites/sitecapture/crawler *(rw,async,no_root_squash,no_subtree_check)
5. Add a line for Site Capture config
   ex. <domain_home>/wcsites/sitecapture/config *(rw,async,no_root_squash,no_subtree_check)
6. Run exportfs to add new directories
   exportfs -a
7. Make sure rpcbind is started
   /etc/init.d/rpcbind start
8. Make sure nfs is started
   /etc/init.d/nfs start

Important: After the domain has been copied to a secondary node, delete files from the above paths and mount the necessary NFS shares on each node using the mount command:

mount -t nfs <internal_ip_primary_VM>:<full path of share> <full or relative path of share>

Configure Secondary Nodes

After the primary node is configured, you must configure a secondary node by following these steps—

Note: The managed servers for the secondary node should have been configured during domain configuration.

1. Shutdown all the servers and node managers on the primary node and copy the domain to an archive file (.zip file, for ex).
2. Copy the domain to the secondary node.
3. Delete the domain directory on the secondary node and copy the domain archive on the secondary node.
4. Optional; these step is applicable only if you use disk-based shared file system—
   - Delete files from the paths that you will be mounting an NFS share.
   - Run the mount command for any NFS paths:
     mount -t nfs <internal_ip_primary_VM>:<full path of share on source> <full or relative path of share on local system>
5. Modify all the configuration files that require adjustments to support the host transfer, for ex. host name—
   - Node manager file
     <domain_home>/nodemanager/nodemanager.properties
   - Sites files
     cs-cache.xml
     cas-cache.xml
     linked-cache.xml
     ss-cache.xml
     jbossTicketCacheConfig.xml
     host.properties
   - Visitor Services files
     visitors-cache.xml
   - Site Capture files
     cas-cache.xml
     linked-cache.xml

This concludes the install and configuration of WCS on JCS. The next step is to ensure that the instance functions correctly.

5. Verifying WebCenter Sites Install

Open WebCenter Sites on your browser, create a site, to verify that it's working well.

Conclusion

In order to nimbly adapt to the rapidly changing operating model of your business, it is important that you have highly flexible IT infrastructure. Oracle Cloud provides various ways to achieve it. Using the instructions in this document, you can deliver world class, lightning fast websites with Oracle WebCenter Sites from the cloud while you put your in-house IT infrastructure for alternative uses. Additionally, you benefit from the services that come as part of Oracle Java Cloud platform such as assisted upgrade, security, scale, and ease of maintenance.

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