Oracle® Database

Administering Oracle Blockchain Platform

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A Accessibility Features and Tips for Oracle Blockchain Platform

Preface

Administering Oracle Blockchain Platform explains how to provision and maintain Oracle Blockchain Platform instances.

Topics:

- Audience
- Documentation Accessibility
- Related Documents
- Conventions

Audience

This guide is intended for service administrators responsible for provisioning and maintaining Oracle Blockchain Platform .

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc`.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` or visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` if you are hearing impaired.

Related Documents

For more information, see these Oracle resources:

- *Using Oracle Blockchain Platform*

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.

Convention	Meaning
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1
A Service Administrator's Roadmap to Oracle Blockchain Platform

Topics

- Oracle Blockchain Platform Enterprise Edition Overview
- Security, Authentication, and Authorization

Oracle Blockchain Platform Enterprise Edition Overview

Oracle Blockchain Platform gives you a pre-assembled platform for building and running smart contracts and maintaining a tamper-proof distributed ledger.

Oracle Blockchain Platform is a network consisting of validating nodes (peers) that update the ledger and respond to queries by executing smart contract code—the business logic that runs on the blockchain. External applications invoke transactions or run queries through client SDKs or REST API calls, which prompts selected peers to run the smart contracts. Multiple peers endorse (digitally sign) the results, which are then verified and sent to the ordering service. After consensus is reached on the transaction order, transaction results are grouped into cryptographically secured, tamper-proof data blocks and sent to peer nodes to be validated and appended to the ledger. Platform administrators can use the Blockchain Platform Manager to create and manage platform instances, while network administrators can use the Oracle Blockchain Platform console to configure the blockchain and monitor its operation.

Oracle Blockchain Platform Enterprise Edition provides an independently-installable version of Oracle Blockchain Platform built on Docker containers and delivered as a pre-built VM image for multiple virtualization options. The VM is delivered in an Open Virtualization Appliance (ova) format and can be imported and started using VMWare ESXi, Oracle VirtualBox, and Oracle Linux Virtualization Manager. Once the VM is running, the Blockchain Platform Manager is used for configuration, provisioning, and patching multiple Blockchain Platform instances, which can be deployed over multiple VMs to distribute the Docker containers running Oracle Blockchain Platform nodes. Similarly to the cloud PaaS, this edition is fully pre-assembled and can create new complete blockchain instances in minutes.

In addition to flexible virtualization options, the enterprise edition enables dynamic scalability to handle the evolving workloads by increasing the resources in the current VMs or scaling out to more VMs to run the additional nodes (e.g., peers, orderers.) Additional VMs and nodes can be deployed in other datacenters across a WAN for disaster recovery (DR.) Unlike typical applications, Oracle Blockchain Platform's distributed ledger and the distributed metadata database handle data replication out-of-the-box.

Feature parity with the cloud version ensures that customers can deploy chaincode and use the same chaincode APIs and extensive REST APIs across both versions. Oracle innovations in using Berkeley DB for world state with SQL-based queries, built-in transaction synchronization to off-chain rich history database, intuitive and comprehensive console with powerful operations and monitoring tools, and all the other unique enterprise-grade features are shared across the cloud and on-premise versions.

Security, Authentication, and Authorization

Introduction to Oracle Blockchain Platform Enterprise Edition Security

Oracle Blockchain Platform Enterprise Edition deals with security on several levels. At the top level is the security related to the Oracle Blockchain Platform virtual machines (VMs). Next is the security associated with the control plane that is used to manage the life cycle on Oracle Blockchain Platform instances. Control plane (the Blockchain Platform Manager) users are able to create, scale out, scale in, patch, and other life cycle operations. For each instance there are users authorized for managing, monitoring, and administering an instance. Finally there are users of the instance that access an instance either via the Fabric SDK or the Oracle Blockchain Platform REST Proxy.

All user information including their roles and passwords are stored in your authentication server. A default LDAP server is provided as part of the VM and is only intended for development purposes. It is expected that you will connect to your corporate authentication server in production.

Managing Security

Creating Oracle Blockchain Platform VMs

Oracle Blockchain Platform uses a cluster of VMs based upon the VM image provided. The first step that needs to be taken in configuring Oracle Blockchain Platform VMs is to import them into whatever hypervisor is being used. Supported hypervisors include:

- Oracle VirtualBox – Primarily intended for development and testing
- Oracle Linux Virtualization Manager
- VMWare Workstation
- VMWare ESXi

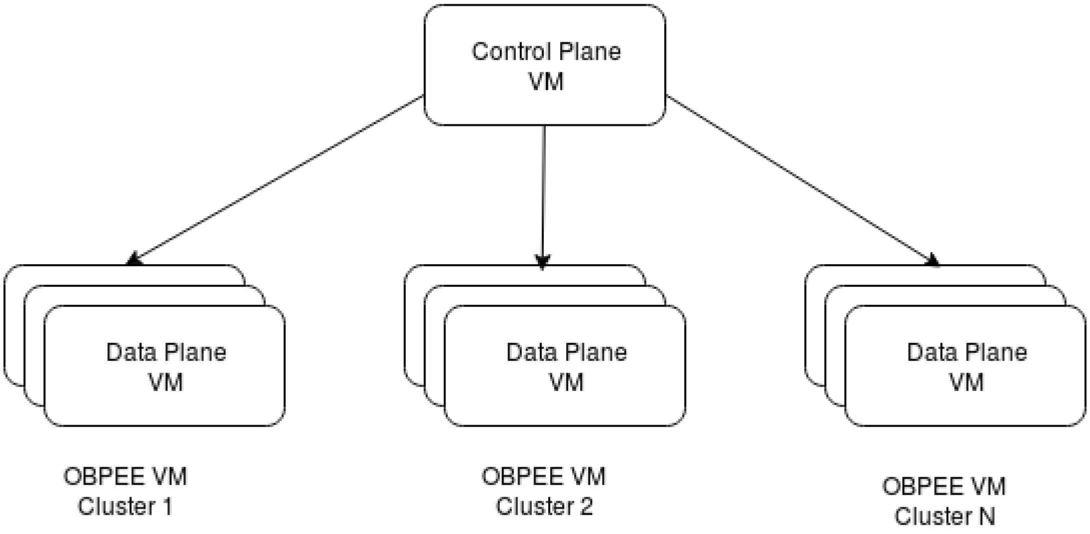
Securing Data at Rest

At the time of importing the OVA file or sometime later users may want to enable disk encryption in their hypervisor to protect data at rest. This may also require that the VM be encrypted, which would also be handled by hypervisor settings.

Control Plane VM and Data Plane Clusters

A particular VM instance should be reserved for the Oracle Blockchain Platform control plane. This VM will run the provisioning server that is used to control the life cycle operations of Oracle Blockchain Platform instances within a specific Oracle Blockchain Platform platform. It is possible to deploy multiple Oracle Blockchain Platform platforms, each with its own control plane VM and clusters of data plane VMs. Each cluster of data plane VMs only supports a single Oracle Blockchain Platform instance.

Figure 1-1 Oracle Blockchain Platform



Data plane clusters are automatically added to the Docker swarm used to allow containers to communicate with each other.

Securing the VM Network

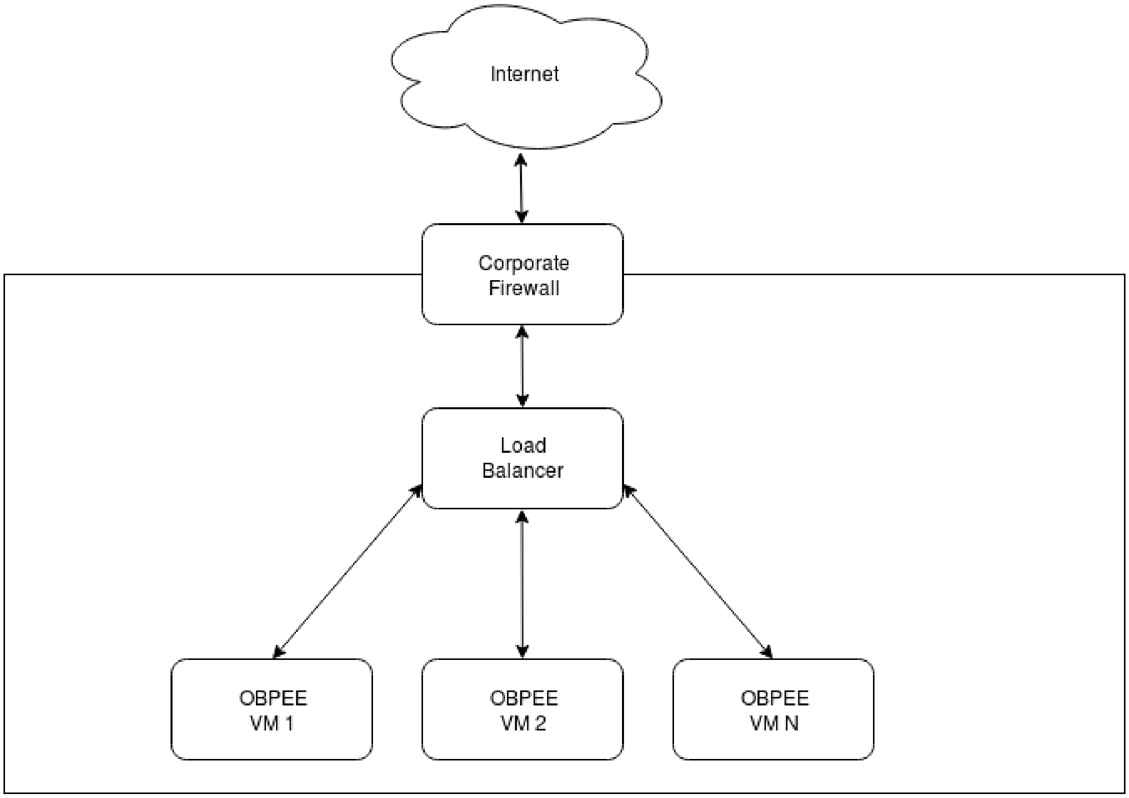
You'll initially log in with user ID `oracle`, and change your password as described in Add Users to Your LDAP Server Using a Script. After logging in, configure the firewall (firewalld) on the VM to protect ports that shouldn't be exposed outside the cluster. Whitelists should be used to only allow access to and from the other VMs in the cluster, and to grant access from any external load balancers that may be used.

The only network ports data plane VMs need to have accessible outside their cluster is for access to:

- Data plane console server
- Fabric-CA
- Ordering Service Nodes
- Peers

These ports should all be in the 10000-10200 range. No other ports should be accessible from outside the data plane cluster. These ports will automatically be exposed outside the VM at provisioning time.

Figure 1-2 Firewall, load balancer, and instance relationship



Normal Cluster Members

The VMs in a cluster need to be able to communicate with each other via Docker swarm. See the section below on which ports need to be accessible to other VMs in the cluster.

CRC Cluster Members

In production deployments, it is highly recommended that the chaincode runtime containers be placed in their own VM. Unless your chaincode needs to access external services, the VM should be configured to only be able to communicate with the other members of the cluster.

SSH Configuration

As delivered from Oracle, the VM appliance is configured with a default user of `oracle` and a default password of `Welcome1`. The password must be changed upon first login. In order to manage the VM, SSH is allowed with password-based authentication. This should be changed to public key based authentication for user `oracle`. No other users are required or should be configured.

VM Network Configuration

The Oracle Blockchain Platform VMs come configured and ready to run. The following ports are open on the VM. Most of these ports should not be exposed to the Internet or other unsecured hosts and access should be blocked by firewall rules on the VMs.

Internet Accessibility

Some ports may need to be accessible outside the corporate network. In particular, to have other Oracle Blockchain Platform or Fabric instances running outside the corporate network connect to an instance inside the corporate network, certain ports associated with the ordering service and peers will need to be accessible.

Corporate Network Accessibility

It is recommended that console UI ports associated with the provisioning console and instance console be restricted to at most access from inside the corporate network. Ideally they would be restricted to even a subset of that, only machines used for network management and operations.

Port Accessibility Guide

Port	Use or purpose	Internet accessible	Corporate network accessible	Accessible by other VMs in OBPEE cluster
22	SSH	N	N[1]	N
389	Local LDAP server for development purposes	N	N	Y
443	Docker Registry	N	N	Y
636	Local LDAP server for development purposes	N	N	Y
2375	Docker Daemon	N	N	Y
2377	Docker Swarm	N	N	Y
7070	Control plane UI and REST (http)–Application connector	N	Y[2]	N
7443	Control plane UI and REST (https)–Application connector	N	Y[3]	N
7946	Docker Swarm	N	N	Y
8080	Component manager	N	N	Y
10000-10200	Ports assigned to the load balancer for the various instance containers such as peer, orderer, etc.	Y	Y[4]	Y

[1] SSH is only required if the VM console isn’t accessible

[2] UI ports should be only accessible by machines needed for provisioning and configuring instances

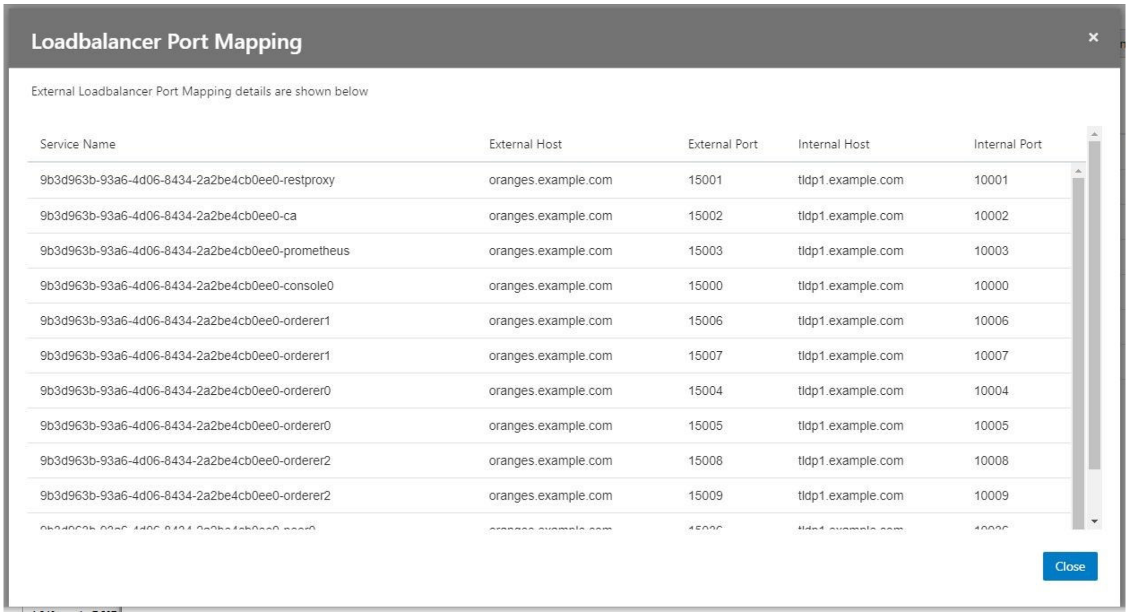
[3] UI ports should be only accessible by machines needed for provisioning and configuring instances

[4] See the section on load balancer configuration

Load Balancer Configuration

If using an external load balancer, it will need to be configured to perform TLS termination and pass the ports as listed in the provisioning console to the appropriate VM host and port. Below is an example of the necessary port mappings as reported by the provisioning console:

Figure 1-3   Load Balancer Port Mapping



External Loadbalancer Port Mapping details are shown below

Service Name	External Host	External Port	Internal Host	Internal Port
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-restproxy	oranges.example.com	15001	tldp1.example.com	10001
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-ca	oranges.example.com	15002	tldp1.example.com	10002
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-prometheus	oranges.example.com	15003	tldp1.example.com	10003
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-console0	oranges.example.com	15000	tldp1.example.com	10000
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-orderer1	oranges.example.com	15006	tldp1.example.com	10006
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-orderer1	oranges.example.com	15007	tldp1.example.com	10007
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-orderer0	oranges.example.com	15004	tldp1.example.com	10004
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-orderer0	oranges.example.com	15005	tldp1.example.com	10005
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-orderer2	oranges.example.com	15008	tldp1.example.com	10008
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-orderer2	oranges.example.com	15009	tldp1.example.com	10009
9b3d963b-93a6-4d06-8434-2a2be4cb0ee0-peer0	oranges.example.com	15036	tldp1.example.com	10036

See Postrequisites When Using an External Load Balancer.

Configuring Authentication and Authorization

Authentication in Oracle Blockchain Platform is performed using an authentication server. Users must have an account in the authentication server in order to be able to use the service.

Users associated with certain authentication groups are granted specific privileges as defined in User Groups and Roles.

Workflow for Administering Oracle Blockchain Platform

To start using Oracle Blockchain Platform, refer to the following tasks as a guide.

Task	Description	More Information
Prepare your hardware	Read through the suggested architectural designs and decide which is appropriate for your configuration. Ensure your hardware meets the required prerequisites.	Supported Topologies Prerequisites
Deploy Oracle Blockchain Platform Enterprise Edition	Deploy the Oracle Blockchain Platform Enterprise Edition virtual machine. Access Blockchain Platform Manager	Deploy Your Virtual Machine Log on to Oracle Blockchain Platform for the First Time
Add and manage users and roles	A rudamentary LDAP server is provided with Oracle Blockchain Platform Enterprise Edition, however you'll need to use a third-party tool to add users and roles.	Configure an Authentication Server User Groups and Roles

Task	Description	More Information
Provision a service instance	Use the Create Instance wizard in Blockchain Platform Manager to create a service instance.	Provision an Instance using the Blockchain Platform Manager
Configure your blockchain network	Once your instance is created, you can use the Blockchain Platform Console to configure the network.	What's the Console?

After you’ve created your instance and any required users, you can begin to use Oracle Blockchain Platform as described in *Using Oracle Blockchain Platform*

2

Design Your Oracle Blockchain Platform Configuration

Topics

- Prerequisites
- Supported Topologies

Prerequisites

Hardware

The host machine for a single Oracle Blockchain Platform VM should meet the following minimum requirements:

- 16 GB memory
- 500 GB available storage
- 4 CPUs

Virtual Machine Hosting Software

The following hypervisors are supported:

- Oracle VirtualBox v5.x or v6.0 or later
- Oracle Linux Virtualization Manager v4.2.8.2-1.0.8.el7 or later
- VMWare Workstation
- VMWare ESXi v6.7 or later

Additionally:

- VMs must be DNS-resolvable
- Date and time on the VMs and the client hosts for running a browser for Blockchain Platform Console and Blockchain Platform Manager must be synchronized.
- If your hypervisor is running on Microsoft Windows, you should disable Hyper-V. Hyper-V is a Windows-native hypervisor and may cause interoperability issues when another hypervisor is installed with it. For more information, see the Microsoft support article: Virtualization applications do not work together with Hyper-V

Load Balancer

A lightweight load balancer is provided with Oracle Blockchain Platform for prototyping and development needs. It is not recommended for production use as it runs as part of the blockchain cluster.

An external load balancer capable of supporting TCP pass-through (and not just HTTP path mapping) can be provided, such as a dedicated NGINX 1.9.3+ server or F5.

Authentication Servers

An LDAP server is provided for prototyping and development purposes, as managing blockchain instances and the blockchain network itself requires an identity management system.

This server isn't recommended for production use. We recommended you configure one of the following authentication servers for production:

- OpenLDAP 2.4.44 or later
- Oracle Internet Directory 12.2.1.4.0 or later
- Oracle Unified Directory 12.2.1.4.0 or later
- Microsoft Active Directory Windows Server 2016 or later with a single domain

Web Browsers

All administrative tools included with Oracle Blockchain Platform can be accessed through these browsers:

- Mozilla Firefox
- Microsoft Edge
- Google Chrome
- Apple Safari

Supported Topologies

In addition to creating a topology in which both the founder and participant are on Oracle Blockchain Platform Enterprise Edition, the following interoperability scenarios are supported:

- Oracle Blockchain Platform Enterprise Edition Founder, Oracle Blockchain Platform Cloud Participant
- Oracle Blockchain Platform Enterprise Edition Founder, Hyperledger Fabric Participant
- Oracle Blockchain Platform Cloud Founder, Oracle Blockchain Platform Enterprise Edition participant
- Hyperledger Fabric founder, Oracle Blockchain Platform Enterprise Edition participant

3 Install Your Oracle Blockchain Platform Instance

Topics

Deploy Your Virtual Machine

Load Oracle Blockchain Platform Enterprise Edition on your Virtual Machine Hosting Software

1. Download the blockchain package; it consists of an OVA image called `obpee_19_3_4.ova`.
2. Import the VM into your virtual machine hosting software. For example on Oracle VirtualBox, complete the following steps. For information about using VMWare ESXi, see Load Oracle Blockchain Platform Enterprise Edition on VMWare ESXi.
   a. Select **File** then **Import Appliance**, and browse to the directory where the OVA has been extracted.
   b. On the **Appliance settings** page, you may check **Reinitialize the MAC address of all network cards** if you plan on running more than 1 VM in your setup. You can create multiple VMs by either importing the appliance multiple times, or cloning the VM immediately after it's imported. Click **Import**.
3. After a few minutes, the VM will be displayed in the list of machines in VirtualBox Manager. Right-click on the VM and select **Settings**:
   a. Under **System** on the **Motherboard** tab, select **Hardware Clock in UTC Time** to ensure the guest VM and the host's clocks are consistent in terms of timezones.
   b. Under **Network** on the **Adapter** tab connected to the network you want the VM to be on, ensure **Enable Network Adapter** is selected, and select **Bridged Adapter**.

The VM is now ready to be used.

Load Oracle Blockchain Platform Enterprise Edition on VMWare ESXi

1. In the VMWare ESXi navigator, select the **Virtual Machines** page, and then click **Create / Register VM**.
2. Under **Select creation type**, select **Deploy a virtual machine from an OVF or OVA file** and then click **Next**.
3. Enter a name for the virtual machine and select the blockchain package (OVA file) that you downloaded and then click **Next**.
4. Accept the default values and click **Next** for the remaining pages.

5. Click **Finish**, and then wait for the VM to be provisioned.
6. Once the VM is running, open a console to the VM and log in using the default user name `oracle` and the default password `Welcome1`. You'll be prompted to change the password. After you change the password, log in again using the new password.
7. To enable DHCP to obtain an IP address, use the `sudo` command to change to the root account and then complete the following steps:
   1. Copy the file `/etc/sysconfig/network-scripts/ifcfg-enp0s3` to a new file in the same directory called `ifcfg-ens160`.
   2. Edit the `ifcfg-ens160` file to change the adapter name from `enp0s3` to `ens160`.
   3. Power off the VM.
   4. Change the network adapter type from **E1000** to **VMXNET 3**.
8. Power on the VM.

The VM is now ready to be used.

Expand the Available Space for the Ledger

Because the ledger and logs for Oracle Blockchain Platform are persistent, you need to expand the root volume to ensure you don't run out of space.

1. Add a hard disk for the SCSI controller. In VirtualBox click **Settings** then select **Storage**. Add a new hard disk. The recommended file type is VHD (Virtual Hard Disk); select either fixed or extensible mode.
2. Create the logical volume partition: `sudo fdisk -c -u /dev/sdb`
   Enter the following subcommands sequentially:

   ```
   n Create new partition Press
   p Choose primary partition use p
   1 Choose 1 for the primary partition
   after this press return key twice for max allocation
   t Change the type
   8e Change the partition type to Linux LVM
   p Print the partition
   w write the changes
   ```

3. Create the new physical volume: `sudo pvcreate /dev/sdb1`
4. Restart the system.
5. Verify the physical volume:

   ```
   sudo pvs
   PV VG Fmt Attr PSize PFree
   /dev/sda2 vg00 lvm2 a-- 96.66g <25.41g
   /dev/sdb1 lvm2 ¿ <200.00g <200.00g
   ```

6. Add `/dev/sdb1` to `vg00` to extend the size to get more space for expanding the logical volume: `sudo vgextend vg00 /dev/sdb1`

7. Check the size of the volume group:

   ```
   sudo vgs
   VG #PV #LV #SN Attr VSize VFree
   vg00 2 5 0 wz-n <296.66g 225.40g
   ```

   In this example, 225.4 GB are free.

8. After extending, resize the file system: `sudo resize2fs /dev/vg00/root\`
9. Check the logical volume:

   ```
   /dev/vg00/root
   df -h
   /dev/mapper/vg00-root 194G 18G 169G 10% /
   ```

Start Oracle Blockchain Platform

Once your network and sytem settings are configured, start the VM by selecting it and clicking **Start**. It should start within a minute.

Once the VM has started, hit the `Enter` key to get a login prompt.

Update Your Docker Root CA Certificate

The Docker root CA certificates included with Oracle Blockchain Platform Enterprise Edition must be updated on each of the Oracle Blockchain Platform Enterprise Edition virtual machines.

To update your certificates:

1. On one of your Oracle Blockchain Platform Enterprise Edition VMs, create a folder `/u01/renewCerts/docker-certs`.
2. Go to this folder and run the following commands to generate new certificates:

   ```
   openssl genrsa -aes256 -passout pass:example -out rootCA.key 4096
   openssl req -x509 -new -nodes -key rootCA.key -sha256 -days 3650 -out
   rootCA.crt -subj "/C=US/ST=CA/L=RedwoodShores/O=Oracle/OU=/CN=oracle.com" -
   passin pass:example
   ```

   The above commands will generate:

   - `rootCA.crt`
   - `rootCA.key`

   in `/u01/renewCerts/docker-certs`. These files will be used to update all VMs of all your Blockchain Platform instances.

3. Check the ownership of the two files. It should be set as `root:root`. If not, change the ownership.
4. Copy the `rootCA.crt` and `rootCA.key` files generated in step 2 to all the Oracle Blockchain Platform Enterprise Edition VMs of all instances, in a folder under `/u01`.

   For consistency, you can create a folder path `/u01/renewCerts/docker-certs` on each of the VMs and copy the files to this folder.

5. For each of the Oracle Blockchain Platform Enterprise Edition VMs of all instances do the following:
   a. Backup the existing root CA certificate files to `/u01/renewCerts/`:

      ```
      cp /etc/docker/ssl/rootCA.crt /u01/renewCerts/rootCA-orig.crt
      cp /etc/docker/ssl/rootCA.key /u01/renewCerts/rootCA-orig.key
      ```

   b. Copy the newly generated `rootCA.crt` and `rootCA.key` to `/etc/docker/ssl`.
   c. Verify that the files `rootCA.crt` and `rootCA.key` in`/etc/docker/ssl` are the new files.
   d. Restart the VM.

      > **Note:**
      >
      > The same `rootCA.crt` and `rootCA.key` files generated in step 2 must be copied to each Oracle Blockchain Platform Enterprise Edition VM.

Log on to Oracle Blockchain Platform for the First Time

After you've deployed and started Oracle Blockchain Platform Enterprise Edition on your VM hosting software, you can log on to Blockchain Platform Manager to create an instance.

You can directly log on to the Platform Manager by using the URL:

```
https://<hostname of your VM>:7443/console/index.html
```

The initial user name is `obpadmin` and the password is `welcome1`. This user is only meant for performing initial configuration and does not have instance creation privileges.

In order to use the internal LDAP server, the `admin` password must first be changed. Blockchain Platform Manager will not allow you to use an internal LDAP configuration with the default password.

Set the Blockchain Platform Manager Name

On the **Configuration** page **Platform Settings** tab of Blockchain Platform Manager, you can set a name for the Platform Manager.

> **Note:**
>
> Once the name for the Platform Manager has been set, any users added to the LDAP server will be associated with this name. If you change the name after adding users, those users will lose access to Blockchain Platform Manager and any Oracle Blockchain Platform instances.

Set the Notification and Console Idle Timeouts

On the **Configuration** page **Platform Settings** tab of Blockchain Platform Manager, you can set the timeouts for notifications and the console.

- **Console Idle Timeout**: in minutes, how long the console can be idle before it logs out the current user.
- **Notification Timeout**: in seconds, how long notifications will remain visible on the browser. Select `-1` if you want notifications to remain visible until you close them.

4
User Management

Topics

Configure an Authentication Server

An LDAP server is included with Oracle Blockchain Platform Enterprise Edition or you can integrate your own authentication server.

Currently the following external authentication servers are supported:

- OpenLDAP 2.4.44 or later
- Oracle Internet Directory 12.2.1.4.0 or later
- Oracle Unified Directory 12.2.1.4.0 or later
- Microsoft Active Directory Windows Server 2016 or later with a single domain

Each instance within a Blockchain Platform Manager uses the same authentication server. You can create multiple Blockchain Platform Manager instances, and each one can use a different authentication server or share an authentication server.

Lifecycle of Identity Resources within Oracle Blockchain Platform

When you provision an instance through Blockchain Platform Manager, it deploys the embedded LDAP server (if you're not providing your own), and creates the LDAP groups `OBP_<platform-name>_<instance-name>_xxxx`.

When you delete an instance, Blockchain Platform Manager removes all the LDAP assets such as the LDAP groups from an LDAP server you have provided.

- Configure the Built-In LDAP Server
- Configure an External OpenLDAP, Oracle Unified Directory, or Oracle Internet Directory LDAP Server
- Configure an External Microsoft Active Directory Authentication Server

Configure the Built-In LDAP Server

The built-in LDAP server has a default configuration already set up when you log in. You can use it for testing, or modify the configuration to meet your needs.

1. Open the **Configuration** tab.
2. Click **Add New**.
3. Enter the configuration information for the LDAP server:
   a. Configuration Name:

    Name must contain only ASCII alphanumerics and underscores.

  b. Authentication Server Type:

    Select **OpenLDAP/OID**.

  c. Host:

    Enter the fully-qualified host name of the directory server.

  d. Port:

    Enter the port number of the directory server.

  e. TLS Enabled:

    Setting this to True means you will connect to the directory server using a user name and password via SSL.

  f. Connect Timeout:

    In milliseconds.

  g. Base DN:

    Enter the base distinguished name of the directory you want to connect to. It should be in the form: `ou=organizationunit,dc=mycompany,dc=com`

  h. Root CA Certificate for Auth Server:

    If you're using a third-party TLS certificate or self-signed certificate, upload it in a .crt file.

  i. Bind User DN:

    The distinguished name of your administrative user account.

  j. Bind User Password:

    The password for the account.

  k. UserName Attribute:

    This is the filter used when searching to convert a login user name to a distinguished name.

  l. User Class Name:

    The attribute value to a user object in the directory.

  m. GroupName Attribute:

    This is the filter used when searching to convert a group name to a distinguished name.

  n. Group Membership Attribute:

    The membership attribute name of the group.

  o. Group Class Name:

    The ObjectClass attribute value for a group object in the directory.

4. Click **Test Configuration** to ensure your settings work. The test results show if the configuration was successful.

5. Click **Save**. Your configuration is now available to be used by any instances you provision.

Once you've selected your LDAP configuration by selecting it in the **Active LDAP Configuration** field, you need to log out of Blockchain Platform Manager with your administrative ID, and log in with a user ID that exists in the LDAP server as described in Add

Users to Your LDAP Server Using a Script or Add Users to Your LDAP Server Using Blockchain Platform Manager.

Once you've successfully logged into Blockchain Platform Manager with this user ID and provisioned an instance, you may want to disable the default user ID (obpadmin) for security reasons. This can be done from the **Configuration** page **Platform Settings** tab.

Add Users to Your LDAP Server Using a Script

Once you've configured your LDAP server in Blockchain Platform Manager, you need to add users to the LDAP server to create an instance.

The following steps describe how to add the initial user to the built-in LDAP server using a provided script:

1. Log into the VM instance as a Unix user. The initial user name and password are oracle and Welcome1. You'll be prompted to change the password immediately.
2. Change directories to /u01/blockchain/ldap/environment and run the adduser.sh script:
   a. `cd /u01/blockchain/ldap/environment/`
   b. `./adduser.sh` *`user_name platform_name`*

      where platform_name is the Platform Manager Name set on the **Configuration** page **Platform Settings** tab of Blockchain Platform Manager.
   c. You will be prompted to enter a password for the new user, as well as a password for the administrator who will authenticate user and group addition requests.
   d. The script will add a new user to the group OBP_<platform name>_CP_ADMIN which will have administrative access to Blockchain Platform Manager in order to create and modify instances.

Ensure that you've logged out of Blockchain Platform Manager, and then log in using this user ID and password. You can now provision a Oracle Blockchain Platform instance.

Once you've successfully logged into Blockchain Platform Manager with this user ID and provisioned an instance, you may want to disable the default user ID (obpadmin) for security reasons. This can be done from the **Configuration** page **Platform Settings** tab.

Add Users to Your LDAP Server Using Blockchain Platform Manager

Once you've configured your LDAP server in Blockchain Platform Manager, you need to add users to the LDAP server, and then log back into Blockchain Platform Manager with one of these users to create an instance.

Once you've create your LDAP configuration, you need to add your initial user to the LDAP server. On the **Authentication Server Configuration** page of Blockchain Platform Manager, click **Add User**. Once you've entered the user name and password, this user will be added to the LDAP server as an administrative user. You can now log out of Blockchain Platform Manager with your administrative ID, and log in with this user ID to create an instance.

Ensure that you've logged out of Blockchain Platform Manager, and then log in using this user ID and password. You can now provision a Oracle Blockchain Platform instance.

Once you've successfully logged into Blockchain Platform Manager with this user ID and provisioned an instance, you may want to disable the default user ID (obpadmin) for security reasons. This can be done from the **Configuration** page **Platform Settings** tab.

Configure an External OpenLDAP, Oracle Unified Directory, or Oracle Internet Directory LDAP Server

If you don't want to use the LDAP server provided with the product, you must have installed your ownOpenLDAP, Oracle Unified Directory, or Oracle Internet Directory server 12.2.1.4.0 or later before completing this configuration step.

- An external LDAP server should be installed for any production environment. It should be protected by TLS certificates - self-signed certificates should be used for internal testing only. If you are using self-signed certificates, complete these steps before configuring the LDAP server through Blockchain Platform Manager:
  1. Generate a root CA key/certificate pair.
  2. Generate a server key/certificate pair signed using the root CA pair.
- When configuring the server in Blockchain Platform Manager you will need to upload the root CA certificate.

1. Open the **Configuration** tab.
2. Click **Add New**.
3. Enter the configuration information for the LDAP server:
   a. Configuration Name:

      Name must contain only ASCII alphanumerics and underscores.

   b. Authentication Server Type:

      Select **OpenLDAP/OID**.

   c. Host:

      Enter the fully-qualified host name of the directory server.

   d. Port:

      Enter the port number of the directory server.

   e. TLS Enabled:

      Setting this to True means you will connect to the directory server using a user name and password via SSL.

   f. Connect Timeout:

      In milliseconds.

   g. Base DN:

      Enter the base distinguished name of the directory you want to connect to. It should be in the form: `ou=organizationunit,dc=mycompany,dc=com`

   h. Root CA Certificate for Auth Server:

      If you're using a third-party TLS certificate or self-signed certificate, upload it in a .crt file.

   i. Bind User DN:

      The distinguished name of your administrative user account.

   j. Bind User Password:

      The password for the account.

k. UserName Attribute:

   This is the filter used when searching to convert a login user name to a distinguished name.

l. User Class Name:

   The attribute value to a user object in the directory.

m. GroupName Attribute:

   This is the filter used when searching to convert a group name to a distinguished name.

n. Group Membership Attribute:

   The membership attribute name of the group.

o. Group Class Name:

   The ObjectClass attribute value for a group object in the directory.

4. Click **Test Configuration** to ensure your settings work. The test results show if the configuration was successful.
5. Click **Save**. Your configuration is now available to be used by any instances you provision.

After you've selected your LDAP configuration by selecting it in the **Authentication Servers** field, you need to log out of Blockchain Platform Manager with your administrative ID, and log in with a user ID that exists in the LDAP server as described in Add Users to an External LDAP Server.

Add Users to an External LDAP Server

Once you've configured your LDAP server in Blockchain Platform Manager, you need to add users to the LDAP server to create an instance.

The following steps describe how to add the initial user to your separately-installed LDAP server:

1. Create your administrative user if one doesn't already exist.
2. Create the `OBP_<platform name>_CP_ADMIN` group if it doesn't exist.
3. Add the user as a member of the `OBP_<platform name>_CP_ADMIN` group.

Ensure that you've logged out of Blockchain Platform Manager, and then log in using this user ID and password. You can now provision a Oracle Blockchain Platform instance.

Once you've successfully logged into Blockchain Platform Manager with this user ID and provisioned an instance, you may want to disable the default user ID (`obpadmin`) for security reasons. This can be done from the **Configuration** page **Platform Settings** tab.

Configure an External Microsoft Active Directory Authentication Server

If you don't want to use the LDAP server provided with the product, you must have installed your own Microsoft Active Directory Windows Server 2016 or later with a single domain before completing this configuration step.

- An external authentication server should be installed for any production environment. It should be protected by CA certificates - self-signed certificates should be used for internal testing only. If you are using self-signed certificates, complete these steps before configuring the authentication server through Blockchain Platform Manager:

  1. Generate a root CA key/certificate pair.

    2. Generate a server key/certificate pair signed using the root CA pair.

       When configuring the server in Blockchain Platform Manager you will need to upload the root CA certificate.

- All necessary user groups should be created in Microsoft Active Directory before configuring it as the authentication server for Blockchain Platform. During the configuration process you will map these groups to pre-existing Blockchain Platform groups in order to control user access and capabilities. For a complete list of Blockchain Platform groups and their roles see: User Groups and Roles.

1. Open the **Configuration** tab.
2. Click **Add New**.
3. Enter the configuration information for the authentication server:

   a. Configuration Name:

      Name must contain only ASCII alphanumerics and underscores.

   b. Authentication Server Type:

      Select **Active Directory**.

   c. Primary Domain Controller:

      Enter the domain controller for the Active Directory server.

   d. Backup Domain Controller:

      Optional: Enter the backup domain controllers for the Active Directory server. You can add a maximum of two. If Blockchain Platform Manager is unable to connect to the first backup it will attempt to connect to the second one automatically.

   e. Port:

      Enter the port number of the directory server.

   f. TLS Enabled:

      Setting this to True means you will connect to the directory server using a user name and password via SSL.

   g. Base DN:

      Enter the base distinguished name of the directory you want to connect to. It should be in the form: `ou=organizationunit,dc=mycompany,dc=com`

   h. Root CA Certificate for Auth Server:

      Upload the root CA certificate for the authorization server in a .crt file.

   i. User name:

      Enter the user name of your user account. Any user account with read-capability is sufficient.

   j. Password:

      The password for the account.

   k. UserName Attribute:

      This is the filter used when searching to convert a login user name to a distinguished name.

   l. User Class Name:

      The attribute value to a user object in the directory.

m. GroupName Attribute:

   This is the filter used when searching to convert a group name to a distinguished name.

n. Group Membership Attribute:

   The membership attribute name of the group.

o. Group Class Name:

   The ObjectClass attribute value for a group object in the directory.

4. Map your Active Directory group names to the Blockchain Platform groups that control user access and function:

   a. Blockchain Platform Manager Users

   b. CA Administrators

   c. REST Proxy Client Users

   d. Blockchain Instance Admins

   e. Blockchain Instance Users

   All groups must be created in Microsoft Active Directory before you configure it as your authentication server. See User Groups and Roles for a detailed description of each group.

5. Click **Test Configuration** to ensure your settings work. The test results show if the configuration was successful.

6. Click **Save**. Your configuration is now available to be used by any instances you provision.

After you've selected your authentication server configuration by selecting it in the **Authentication Servers** field, you need to log out of Blockchain Platform Manager with your administrative ID, and log in with a user ID that exists in Active Directory with membership in the `Blockchain Platform Manager Users` group.

User Groups and Roles

This overview describes the groups and roles that are relevant to Oracle Blockchain Platform. Anyone who uses or administers Oracle Blockchain Platform must be added to the authentication server and granted the correct group.

Groups

Below are the group roles that are available for Oracle Blockchain Platform.

User Role	LDAP Group Name in LDAP/Oracle Internet Directory/ Oracle Unified Directory	Microsoft Active Directory Group Name	Description
Application	OBP_<platform-name>_<instance-name>	Not applicable	Security identifier for an individual instance.

User Role	LDAP Group Name in LDAP/Oracle Internet Directory/ Oracle Unified Directory	Microsoft Active Directory Group Name	Description
Control Plane management	OBP_<platform-name>_CP_ADMIN	Blockchain Platform Manager Users	User can provision a new Oracle Blockchain Platform instance, configure existing instances, set the LDAP configuration, and perform life cycle operations on Oracle Blockchain Platform instances. A user must be a member of this group to be able to log in to the Blockchain Platform Manager or create an instance.
CA Administrator	OBP_<platform-name>_<instance-name>_CA_ADMIN	CA Administrators	The CA Admin group is the bootstrap and overall administrator for the Oracle Blockchain Platform application. Users must be part of this group to create an instance.
Instance Administrator	OBP_<platform-name>_<instance-name>_ADMIN	Blockchain Instance Admins	Users in this group can manage instances via the console UI or REST. Users must be part of this group to create an instance. See the table in Access Control List for Console Function by User Roles for a complete list of console functions available for this user role.
Instance User	OBP_<platform-name>_<instance-name>_USER	Blockchain Instance Users	Users in this group can view instance via console UI or REST See the table in Access Control List for Console Function by User Roles for a complete list of console functions available for this user role.
REST Proxy Client	OBP_<platform-name>_<instance-name>_REST	Rest Proxy Client Users	Users in this group can call REST proxy to execute transactions using the default enrollment.
Custom REST Client	OBP_<platform-name>_<instance-name>_REST_<custom-enrollment>	<Rest Proxy Client Users group name>_<custom enrolment name>	Users in this group can call REST proxy to execute transactions using a custom enrollment.

Access Control List for Console Function by User Roles

The following table lists which console features are available to the Instance Administrator and Instance User roles.

Feature	Instance Administrator	Instance User
Dashboard	Yes	Yes
Network: list orgs	Yes	Yes
Network: add orgs	Yes	No
Network: Ordering service setting	Yes	No
Network: Export certificates	Yes	No
Network: Export orderer settings	Yes	Yes
Node: list	Yes	Yes
Node: start/stop/restart	Yes	No
Node: view attributes	Yes	Yes
Node: edit attributes	Yes	No
Node: view metrics	Yes	Yes
Node: Export/Import Peers	Yes	No
Peer Node: list channels	Yes	Yes
Peer Node: join channel	Yes	No
Peer Node: list chaincode	Yes	Yes
Channel: list	Yes	Yes
Channel: create	Yes	No
Channel: add org to channel	Yes	No
Channel: Update ordering service settings	Yes	No
Channel: view/query ledger	Yes	Yes
Channel: list instantiated chaincode	Yes	Yes
Channel: list joined peers	Yes	Yes
Channel: set anchor peer	Yes	No
Channel: upgrade chaincode	Yes	No
Chaincode: list	Yes	Yes
Chaincode: install	Yes	No
Chaincode: instantiate	Yes	No
Sample chaincode: install	Yes	No
Sample chaincode: instantiate	Yes	No
Sample chaincode: invoke	Yes	Yes
CRL	Yes	No

5

Provision an Instance

Topics

Before You Create an Oracle Blockchain Platform Instance

Before you provision Oracle Blockchain Platform, decide if a developer or enterprise instance meets your needs.

Deciding Which Provisioning Shape to Use

When provisioning an instance, you choose between two configurations. Migration between these options isn't supported currently.

Configuration	Features
Developer Recommended use for this starter shape is development and evaluation.	• Default configuration is a single platform VM running all other blockchain functions such as peers, orderers, CAs, console, REST proxy and an internal load balancer, and 1 chaincode runtime container VM for running chaincode. You can optionally choose to run the chaincode on a seperate VM. • 2 Fabric-CA nodes • 3-node single VM Kafka/Zookeeper cluster (Founder only) • Up to 14 Peer nodes • Dynamically managed chaincode execution containers • Console service for operations web user interface • REST proxy service for RESTful API • LDAP server integration for authentication and role management • Load balancer

Configuration	Features
Enterprise Highly available instance configuration, suitable for small-to-medium production deployments of Founder and Participant instances with performance requirements in tens of transactions per second (TPS) single digit TPS rate.	• Default configuration is 3 platform VMs running all other blockchain functions such as peers, orderers, CAs, console, REST proxy and an internal load balancer • 1 chaincode runtime container VM for running chaincode • 2 Fabric-CA nodes • 3-VM Kafka/Zookeeper cluster (Founder only) for high availability. You can optionally choose to reuse other VMs for these. • Up to 14 Peer nodes spread across separate virtual machines • Dynamically managed chaincode execution containers in an isolated virtual machine • Console service for operations web user interface replicated across separate virtual machines for high availability • REST proxy service for RESTful API • LDAP server integration for authentication and role management • Load balancer

Provision an Instance using the Blockchain Platform Manager

To create a blockchain founder or participant instance in Blockchain Platform Manager, use the Create New Instance wizard.

There are two types of Oracle Blockchain Platform instances you can provision:

- **Founder organization**: a complete blockchain environment, including a new network to which participants can join later on.
- **Participant instance**: if there is already a founder organization you want to join, you can create a participant instance if your credentials provide you with access to the network.

1. In Blockchain Platform Manager, open the Instances page.
2. Select **Create Instance**.
3. Complete the following fields:

Section	Field	Description
General	**Instance Name**	Enter a name for your Oracle Blockchain Platform instance. The service instance name: • Must contain one or more characters. • Must not exceed 15 characters. • Must start with an ASCII letter: `a` to `z`. • Must contain only ASCII lower-case letters or numbers. • Must not contain a hyphen. • Must not contain any other special characters. • Must be unique within the identity domain.
	Description	Optional. Enter a short description of the Oracle Blockchain Platform instance.
	Role	Select **Founder** to create a complete blockchain environment. This instance becomes the founder organization and you can onboard new participants in the network later. Select **Participant** to create an instance that will join an existing blockchain network created elsewhere before this instance can be used.

Section	Field	Description
	Configuration	Select a provisioning shape which meets the needs of your deployment: • **Developer** • **Enterprise**
	Peers	Specify the number of peer nodes to be initially created in this service instance. You can create between 1 and 14 peer nodes. You can create additional peer nodes in the Oracle Blockchain Platform console at a later time.
Cluster Configuration	**Platform Host**	Add the fully qualified host name of the VM hosting Oracle Blockchain Platform. For Developer instances you need to provide one VM. For Enterprise instances you need to provide three VMs to create a high-availability cluster.
	Chaincodes Host	Add the fully qualified host name of the VM hosting the chaincodes.
	Zookeeper/Kafka Host	Add the fully qualified names of the VMs hosting the Zookeeper/Kafka orderer cluster (the platform hosts). Developer instances will have 1 VM, Enterprise will have 3 VMs to create a high-availability cluster. If you're using the same host as the platform you can select the checkbox instead of re-entering the host information.
Additional Configuration	**Use External Load Balancer**	Select if you want to use an external load balancer instead of the one provided by Oracle Blockchain Platform Enterprise Edition. Enter the fully qualified domain name and port of the load balancer. Upload the TLS root CA certificate. The TLS root CA certificate must be named `rootCA.zip` and contain a single file named `tls-ca.pem`
	Enable TLS for Default Load Balancer	If you want to use the load balancer provided by Oracle Blockchain Platform Enterprise Edition, select this option.
	Third Party CA Archive	Optional. Oracle Blockchain Platform includes a certificate authority (CA), which is used to create self-signed certificates for all blockchain nodes in your instance If you want to use certificates from your own certificate authority and use the Oracle Blockchain Platform certificate authority as an intermediary CA, you can upload your CA archive. The certificate you upload will be used to sign the intermediary certificates for Oracle Blockchain Platform nodes, thus including them under your root CA chain. The archive is a zip file which contains the following files: • CA chain - named `xxxca-chain.pem`. The entire CA file sequence from the signing CA to the top-level CA should be present. • key - named `xxxca-key.pem`. The key should be a 256-bit elliptic curve key. The `prime256v1` curve is recommended. The key should be an unencrypted private key in PKCS #8 format. • certificate - named `xxxca-cert.pem`. Must be in Base64 format. Must include the Subject Key Identifier extension. where `xxx` is an identifier of your choice. The archive must be less than 2MB.

4. Verify that the details are correct, and click **Confirm**.

Once your instance has been created and is listed in the Instances list, you can launch the service console from the menu next to the instance name. Use the console to configure your network as described in *Using Oracle Blockchain Platform*.

Provision an Instance Using REST APIs

You can provision an Oracle Blockchain Platform instance using a REST API.

The following example shows how to create an Oracle Blockchain Platform instance using REST API:

```
curl -X POST \
-u <username>:<password> \
http://localhost:7070/api/v1/blockchainPlatforms/instances \
-H "Content-Type: multipart/form-data; boundary=----
WebKitFormBoundary7MA4YWxkTrZu0gW' \
-F 'payload={
"name": "obpinstance1",
"desc": "test instance",
"platformRole": "founder",
"configuration": "Developer",
"peer": 4,
"cluster": {
"platformHosts": [
"10.182.73.23",
"10.182.73.20"
],
"crcHosts": [
"10.182.73.23",
"10.182.73.20"
]
},
"additionalConfiguration": {
"instanceFQDN": "domain.host.com"
}
}'
```

- **`name`**
  - Must contain one or more characters.
  - Must not exceed 15 characters.
  - Must start with an ASCII letter: `a` to `z`.
  - Must contain only ASCII lower-case letters or numbers.
  - Must not contain a hyphen.
  - Must not contain any other special characters.
  - Must be unique within the identity domain.
- **`desc`**
  - Optional: Enter a description of the instance
- **`platformRole`**
  - Must be set to `developer` or `founder`
- **`configuration`**
  - **`Developer`**: A 1 Kafka orderer and 3 OCPU total in 1 VM
  - **`Enterprise`**: A 3 node Kafka cluster and 3 X VM
- **`peer`**
  - Specify the number of peer nodes that will be initially created in this service instance.

  - 1 to 14 peer nodes can be created.
- **`cluster`**
  - Enter the information for your cluster:
    - **`platformHosts`**: the VMs hosting your platform cluster
    - **`crcHosts`**: the VMs hosting the Kafka/Zookeeper cluster
- **`instanceFQDN`**
  - The fully qualified domain name of your external load balancer. This is used exclusively for external load balancers - if you're not using an external load balancer, you don't need to specify this parameter.

Postrequisites When Using an External Load Balancer

When provisioning your instance, if you are using an external load balancer you must have selected this during the provisioning steps and uploaded the TLS root CA certificate as described in Provision an Instance using the Blockchain Platform Manager or Provision an Instance Using REST APIs.

Once this is done you can configure your load balancer. The blockchain instance will be listening on a variety of ports which will need mapped to external ports. The ports used will vary depending on the configuration; namely the amount of peers.

1. Obtain the complete list of ports needing mapping for your instance. Open the Instance Details page for your instance on Blockchain Platform Manager, then click **LBR Port Map**. Record the ports listed.
2. In your load balancer, do a mapping as shown in the Nginx syntax example below, where `my.blockchain.example.com` is the FQDN of the blockchain instance (internal side):

```
...stream {
    upstream port1 {
    server my.blockchain.example.com:10001;
  }
  server {
        listen *:10003 ssl;
        ssl_certificate /etc/nginx/server.pem; # use your own
certificate/key
        ssl_certificate_key /etc/nginx/serverkey.pem;
        proxy_pass port1;
  }
...
```

3. Repeat for every port listed in the port map.

> **Note:**
>
> If at some point in the future you scale out your instance by adding new peers, remember to map those new peers using the steps above.

High Availability

To achieve high availability in an Enterprise-shaped instance with distinct VMs, you can configure the external load balancer to add a list of all platform VMs in the cluster (the Kafka and ZooKeeper VMs are already highly available) as an upstream (backend) list.

For example, with a cluster of VMs with hostnames

- `a.example.com`
- `b.example.com`
- `c.example.com`

the configuration snippet becomes:

```
...
stream {
upstream rest_proxy_backend_servers
{
    server a.example.com:10001;
    server b.example.com:10001;
    server c.example.com:10001;
}
server
{
    listen *:10003 ssl;
    ssl_certificate /etc/nginx/server.pem; # use your own certificate/key
    ssl_certificate_key /etc/nginx/serverkey.pem;
    proxy_pass rest_proxy_backend_servers;
}
...
stream {
upstream peer0_backend_servers
{
    server a.example.com:10036;
    server b.example.com:10036;
    server c.example.com:10036;
}
server {
    listen *:10036 ssl;
    ssl_certificate /etc/nginx/server.pem; # use your own certificate/key
    ssl_certificate_key /etc/nginx/serverkey.pem;
    proxy_pass peer0_backend_servers;
}
...
```

Each externally available port in the instance cluster is published on each VM and routes to the proper service automatically (console, membership/CA, orderers, peers, REST proxy).

Ensure that all ports listed via the **LBR Port Map** button are routed in this way.

After provisioning a 3 VM cluster, run the following commands on the swarm manager (which should be the first machine in the cluster), where the control plane and component manager run:

```
$ docker node ls
```

This will return the list of nodes in the cluster. For example:

```
 [oracle@dhcp-10-144-63-180 ~]$ docker node ls
ID                           HOSTNAME
STATUS   AVAILABILITY  MANAGER STATUS  ENGINE VERSION
fz1ksoxysyorz754x0hswnird    dhcp-10-144-62-149.usdhcp.oraclecorp.com
Ready    Active                        18.09.1-ol
rayhna7vdiup5p7tkmxxepyex *  dhcp-10-144-63-180.usdhcp.oraclecorp.com
Ready    Active        Leader          18.09.1-ol
```

For each node that has no manager status, promote the nodes using a command similar to the following example:

```
$ docker node promote dhcp-10-144-62-149.usdhcp.oraclecorp.com
```

Ensure that a minimum of three nodes are promoted in this manner.

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Manage Oracle Blockchain Platform

Once you've provisioned your instance, you can manage it in Blockchain Platform Manager.

Topics

View Instance Details

Clicking on your instance name in Blockchain Platform Manager opens the **Instances** tab displaying details about the instance.

The **Instance Details** page lists information such as the location of the logs and ledger, as well as the health of the instance. You can also see all the VMs and their status.

The **Patching** page lists all the patches that have been applied to the instance, as well as any available patches that haven't been applied.

You can manage the instance from the **Actions** menu, or launch the Oracle Blockchain Platform Service Console to manage your blockchain network.

Open the **Configuration** tab to access the LDAP and platform configuration tabs. You can update your LDAP or platform configuration if needed. You may want to disable the default user (`obpadmin`) once you've created your user in LDAP and successfully logged in with that user ID.

View Instance Activity

The Activity pages shows the status of operations that have been performed on your instances.

To see the activity of an instance, select your instance name and on the **Instances** page click **Activity**.

This tab lists any operations that have been performed on your instance such as starting, stopping, and updating, as well as whether or not it was successful, the time of the operation, and the user ID who initiated the operation.

You can see and filter the activity of all instances managed by Blockchain Platform Manager on the **Activities** page. The **Activities** page can be used to see the history of operations performed on any instances, including deleted instances. These activities can be filtered by different search criteria such as instance name, operation types, and date range.

Start or Stop an Instance

You can start or stop an instance in the Blockchain Platform Manager.

To start or stop an instance:

1. In Blockchain Platform Manager, find your instance and select the menu beside it.
2. Select **Start** or **Stop**. You'll be prompted to confirm your selection.

Delete an Instance

You can delete your instance in Blockchain Platform Manager.

To delete your instance:

1. Open Blockchain Platform Manager and find your instance.
2. From the menu beside your instance, select **Terminate**.
3. You'll be prompted to confirm you action. Click **Confirm**.

Scale an Instance In or Out

You can scale an instance in or out in Blockchain Platform Manager.

Scale Out

You can scale out your instance by creating new VMs, replicas, or peers:

1. In Blockchain Platform Manager open the menu beside your instance name and click **Scale Out**.
2. You can scale out using any of these methods:
   - **New VMs**: adds a new VM to the cluster with the specified role of platform host, chaincode host, or ZooKeeper/Kafka host.
   - **New Replicas**: adds additional nodes; REST proxy or CA.
   - **New Peers**: adds one additional peer at a time.

Scale In

You can scale in your instance by deleting peers.

Before scaling in an instance, you should transfer all this peer's responsibilities to other running peers, and then remove all the responsibilities this peer has.

- Check all other peers' gossip bootstrap address lists, remove the peer address, and add another running peer's address if needed. After peer configuration change, restart the peer.
- Check all channels' anchor peer lists, remove the peer from the anchor peer lists, and add another running peer to the anchor peer list if needed.
- If a channel or chaincode is only joined or instantiated in this peer, you should consider using another running peer to join the same channel and instantiate the same chaincode.

1. In Blockchain Platform Manager open the menu beside your instance name and click **Scale In**.
2. Enter the hostname or IP address of the peer you want to delete. To delete more than one peer, click Add Peer and enter the information for the additional peer.

Patch an Instance

You can patch Blockchain Platform Manager and your instance from within Blockchain Platform Manager.

Register a Patch

1. Download any desired patches from support.oracle.com.
2. Open the **Patches** tab.
3. Click **Register Patch** and select the patch you've downloaded.

Patching Blockchain Platform Manager

When a Blockchain Platform Manager patch is available, you must apply it before patching your instance. Otherwise when you are trying to do the data plane patching a warning message will be shown to remind you patch the control plane first.

1. When a Blockchain Platform Manager patch is available, an **Upgrade** button will be shown in the **About** dialog which you can open from the **User** menu in the top-right corner.
2. The Blockchain Platform Manager patching process will reboot Blockchain Platform Manager automatically. After the reboot, you need to clean up cached images and files in the browser, then log in to the Blockchain Platform Manager again.

Any existing instances must be patched as described in Patching an Instance.

Patching an Instance

You must have patched Blockchain Platform Manager before you patch you instance.

A patch package includes:

- A metadata file
- One or more scripts to be run during patching
- Docker images for different components

Blockchain Platform Manager extracts the patch package, pushes the component docker images to the docker registry, and stores the metadata file and scripts in local database.

The patch package is a rolling patch; a newer patch is always a superset of an older patch within the same release.

1. Open the **Patches** page. Select the registered patch you want to apply and click **Apply**. Select all the instances you want to apply the patch to, click **Next** and then **Submit**.
2. Patching is an asynchronous operation. In the instance's Activity pane, click **Refresh** to check the operation's status periodically and wait until the status changes to `Successful`.

To Roll Back a Patch

In Blockchain Platform Manager:

1. On the Instances tab, select your instance to open the Instance Details page and select the **Patches** tab.
2. Select the patch to be rolled back, and click **Rollback**.

Post-Patching Steps

After you patch your instance, the Blockchain Platform Manager UI may not be updated. Clear your browser cache and reload the Blockchain Platform Manager to see the updated pages.

For information on how to configure logging for a patched instance, see Migrated Instance Logs

Back Up an Instance

You can use a rolling backup procedure to back up instances of Oracle Blockchain Platform Enterprise Edition.

The following steps describe how to back up an instance by using Oracle VM VirtualBox or a similar virtualization tool that can export and import the contents of VMs. Typically, you back up and restore an instance during a maintenance window, when the load on the system is low. Do not run any administrative actions in the service console until the backup procedure is complete.
The following procedure assumes that you will use Oracle VM VirtualBox to import the VM image to the same host system. If you plan to restore the VM image to a different host system, additional steps might be needed, which are not covered in this topic.

For a typical high availability scenario, to back up instances in a live environment without affecting normal operations, your configuration must meet the following requirements:

- The instance uses the Enterprise configuration, and includes at least three Oracle Blockchain Platform host VMs, three Kakfa host VMs and three chaincode host VMs. Separate from these hosts, Blockchain Platform Manager must be installed on a separate host VM.
- The instance has a sufficient number of peers and orderer service instances, based on the sizing and usage. Typically, you need at least two peers and one orderer per platform host.
- All of the platform hosts, Kafka hosts, and chaincode hosts are located on different computers, and at least one host of each type is in a different region.
- The instance uses an external load balancer which is configured to route requests to the active service instances when other service instances are stopped. The external load balancer must be running on a separate VM and must be available during the entire backup process. If an external load balancer is not available, then there will be downtime when the first platform host is stopped for backup.
- The applications used by the instance are configured to retry failed transactions. If a platform host or chaincode host is not available, intermittent failures can occur when running transactions using the REST proxy or SDK. If a transaction fails, the application must attempt the transaction again on a different platform host or chaincode host until the transaction succeeds.
- The authentication server is external to the instance and configured to be highly available. The authentication server is not backed up as part of this procedure.

1. Back up the chaincode hosts, one at a time.
   a. Stop one chaincode host, and ensure that all other chaincode hosts are still running.
   b. Export the VM contents of the stopped host. In Oracle VM VirtualBox, select **File** and then select **Export Appliance**. For **Format**, select **Open Virtualization Format 1.0**. If

you plan to restore the backup to the same system, specify the **MAC Address Policy** to retain network adapter MAC addresses.

   c. Start the chaincode host.

   d. Repeat the previous steps for all other chaincode hosts.

2. Back up the Kafka hosts, one at a time.

   a. Stop one Kafka host, and ensure that all other Kafka hosts are still running.

   b. Export the VM contents of the stopped host. In Oracle VM VirtualBox, select **File** and then select **Export Appliance**. For **Format**, select **Open Virtualization Format 1.0**. If you plan to restore the backup to the same system, specify the **MAC Address Policy** to retain network adapter MAC addresses.

   c. Start the Kafka host.

   d. Use the `docker ps` command to verify that Kafka and Zookeeper containers are running normally in the VM.

   e. Repeat the previous steps for all other Kafka hosts.

3. On the **Nodes** tab of the service console, click the **More Actions** icon to determine which peer and orderer nodes are running on each platform host. Record this information to use in the following steps to back up the platform hosts, one at a time.

   a. Use the service console or REST API to stop the peer and orderer nodes on the first platform host.

   b. Stop the platform host, and ensure that all other platform hosts are still running.

   c. Export the VM contents of the stopped host. In Oracle VM VirtualBox, select **File** and then select **Export Appliance**. For **Format**, select **Open Virtualization Format 1.0**. If you plan to restore the backup to the same system, specify the **MAC Address Policy** to retain network adapter MAC addresses.

   d. Start the platform host.

   e. Start the peer and orderer nodes that were running on the platform host.

   f. Verify that the peer and orderer nodes are running normally.

   g. Repeat the previous steps for all other platform hosts.

4. Back up the Blockchain Platform Manager.

   a. Stop the Blockchain Platform Manager host.

   b. Export the VM contents of the stopped host. In Oracle VM VirtualBox, select **File** and then select **Export Appliance**.

   c. Start the Blockchain Platform Manager host.

- When a chaincode host is stopped, an error similar to the following text might be returned.

```
{
"returnCode": "Failure",
"error": "Transaction processing for endorser [<Host FQDN>:15036]:
Chaincode status Code: (500) UNKNOWN. Description: failed to execute
transaction
f04fa964c4eae9387d2f97887a3558118412b0c6b76a33d75f17572c37c20918: error
sending: timeout expired while executing transaction",
"result": null
}
```

- When a chaincode host is restarting, an error similar to the following text might be returned.

  ```
  {
  "returnCode": "Failure",
  "error": "Transaction processing for endorser [<Host FQDN>:15039]:
  Chaincode status Code: (500) UNKNOWN. Description: failed to execute
  transaction
  7dbb9966b40ecb07b811dc2e6a23cea899e791f4eeb80d5e1b15daa10350aa6a: [channel
  mychan2] could not launch chaincode obcs-example02:v0: error starting
  container: error starting container: Post https://<HOST FQDN>:2376/
  containers/create?name=dev-6aae07b4-779c-4752-bcb9-4df010503168-peer3-obcs-
  example02-v0: dial tcp <IP Address>:2376: connect: no route to host",
  "result": null
  }
  ```

- Additionally, transient timeout errors can occur, similar to the two following examples.

  ```
  {
  "returnCode": "Failure",
  "error": "Transaction processing for endorser [<External LBR FQDN>:15041]:
  Chaincode status Code: (500) UNKNOWN. Description: failed to execute
  transaction
  7fb7f989a88ac3b068052ccd3f9acce555c6319d0cfe975fcfdd6a84b32fe421: error
  sending: timeout expired while executing transaction",
  "result": null
  }
  ```

  ```
  {
  "returnCode": "Failure",
  "error": "Failed to get endorsing peers: Discovery status Code: (11)
  UNKNOWN. Description: error getting endorsers: no endorsement combination
  can be satisfied",
  "result": null
  }
  ```

Restore an Instance

After you complete the backup procedure, you can restore an instance that is not working correctly or is unusable.

The following steps describe how to restore an instance by using Oracle VM VirtualBox or a similar virtualization tool that can export and import the contents of VMs. When you restore an instance from backup, the instance must be completely stopped.

1. Use Oracle VM VirtualBox to stop all of the platform hosts, chaincode hosts, and Kafka hosts that are used by the instance.
2. Rename all of the VMs to ensure that there is no name collision when you import the VM contents that you exported during the backup process.

   For example, add the suffix `_backup` to all of the VM names.
3. One at a time, import (but do not start) each of the VM images that you created during the backup procedure for all of the platform hosts, chaincode hosts, and Kafka hosts.

4. Start each platform host and verify that all the platform hosts are running normally. Use the `ping` command with the fully-qualified domain name of each host to very that all platform hosts are accessible to each other on the network.

   By default, the first platform host is the Docker swarm leader. Start the first platform host before any other platform hosts.

5. Start each chaincode host and verify that all the chaincode hosts are running normally. Use the `ping` command with the fully-qualified domain name of each host to very that all chaincode hosts and all platform hosts are accessible to each other on the network.

6. Start each Kakfa host and verify that all the Kafka hosts are running normally. Use the `ping` command with the fully-qualified domain name of each host to very that all Kafka hosts are accessible to each other on the network.

7. From one of the platform hosts, verify that all hosts are active and accessible by running the `docker node ls` command. All hosts in the network must show `Ready` status and `Active` availability. You might need to wait a few minutes for network configuration to complete for all hosts to be active and ready.

8. Log in to the Oracle Blockchain Platform console for the instance. On the **Nodes** tab, start all of the orderer nodes and then all the peer nodes. Verify that all the orderer nodes and peer nodes are running normally. If there are any failures, check the logs for the details. Typically, all the peer and orderer nodes start normally and the instance is then available to use.

9. If you need to restore the Blockchain Platform Manager host, stop the current host and rename it, then import the image backup and restart the host.

7

Monitor and Troubleshoot Your Instance

Topics

- Logging

Logging

v19.3.2 Instance Logs

After Oracle Blockchain Platform has started successfully, a container log will be written to `/u01/obp-logs` when its size reaches 10MB.You can check the current logs in the docker containers using docker commands.

Upon failure of provisioning, in most cases you would want to use a docker command to check the container status and logs, such as `docker ps`, `docker inspect`, `docker service ls`, and `docker service ps`. Logs will not be found under `/u01/obp-logs` because either the container creation failed in the middle of the docker daemon preparing the container, control has not been transferred to `ENTRYPOINT` command, or the container has exited due to error condition before the log reached 10MB.

v19.3.3 New Instance Logs

When an instance is created in Oracle Blockchain Platform Enterprise Edition v19.3.3 or later, all service logs are output to your local VM syslog; the default is `/var/log/messages`. To configure the logging, as root go to `/u01/blockchain/tools`. The `config-syslog.sh` script is used to:

- define the syslog server
- define the server log location if you don't want to use `/var/log/messages`
- define the log rotation cycle

```
$ ./config-syslog.sh -h
Syslog config: main entry
Usage: ./config-syslog.sh -s logserveraddr [-d logserverdir] [-f
syslogfacility] [-r logrotateday]
```

- `logserveraddr` is the remote rsyslog server address. Its value should be the output of *`<platformhost.com>`*
- `logserverdir` is the log output directory on logserver. Default is `/u01/obp-logs`.
- `syslogfacility` is the syslog facility value. Default is `local6`.
- `logrotateday(numeric)` is the log rotation days before expired data could be removed. Default is `7`.

Example:

```
./config-syslog.sh -s syslog.server.example.com -d /u01/obp-logs -r 10
```

v19.3.3 Migrated Instance Logs

Because log collection was introduced in v19.3.3, instances created in 19.3.2 and patched to 19.3.3 are still using docker container logs; the default location is `/var/lib/docker/containers/<CID>/<CID>-json.log`

If you want to configure log collection, as root go to `/u01/blockchain/tools` and run `config-patch.sh`. This script is used to:

- define the syslog server
- define the server log location if you don't want to use `/var/log/messages`
- define the log rotation cycle

```
$ ./config-patch.sh -h Patch config: main entry  Usage:
    ./config-patch.sh -s logserveraddr [-d logserverdir] [-f syslogfacility]
[-r logrotateday]
```

- `logserveraddr` is the remote rsyslog server address. Its value should be the output of *`<platformhost.com>`*
- `logserverdir` is the log output directory on logserver. Default is `/u01/obp-logs`.
- `syslogfacility` is the syslog facility value. Default is `local6`.
- `logrotateday(numeric)` is the log rotation days before expired data could be removed. Default is `7`.

Example:

```
./config-patch.sh -s syslog.server.example.com -d /u01/obp-logs -r 10
```

Blockchain Platform Manager Logs

The following logs are available in `/u01/blockchain/cp/logs/`:

- **access.log**: This log provides Blockchain Platform Manager access information for audit purposes. This log shows access information for all the REST resources (APIs) that have been accessed by a user while performing various activities. The user information is available only for the activities that are performed using the Blockchain Platform Manager Console.

Default location: /var/log/messages

But they can run script sudo /u01/blockchain/tools/config-syslog.sh -s `hostname` and instance log are output to default file /u01/obp-logs/obp.log

Set the Log Level for Component Manager

To set the log level for Component Manager:

1. Log in to your virtual machine

2. Open `/home/oracle/startcm.sh` in an editor.
3. Add the following line next to the line starting with `docker run`:

   ```
   -e "BCS_LOG_LEVEL=DEBUG" \
   ```

   where the supported log levels are `ERROR`, `WARNING`, `INFO`, and `DEBUG`.
4. Restart the component manager:

   ```
   sudo systemctl restart compmanager.service
   ```

For component manager on the VM, you can use the environment variable `BCS_LOG_LEVEL` to set the log level.

Set the Log Level for the Instance Service

To set the log level for the node manager:

1. Find your node manager service name:

   ```
   docker service ls
   ```

2. Use the following Docker command:

   ```
   docker service update --env-add BCS_LOG_LEVEL=DEBUG <NM_service_name>
   ```

   where the supported log levels are `ERROR`, `WARNING`, `INFO`, and `DEBUG`.

For node manager on the VM, you can use the environment variable `BCS_LOG_LEVEL` to set the log level.

A

Accessibility Features and Tips for Oracle Blockchain Platform

This topic describes accessibility features and information for Oracle Blockchain Platform.

Table A-1 Keyboard Shortcuts for Blockchain Platform Manager

Task	Keyboard Shortcut
Create an Oracle Blockchain Platform instance.	Alt+Shift+C
Terminate an Oracle Blockchain Platform instance	Alt+Shift+T
Navigate to the Patch page	Alt+Shift+P
Refresh the Instance Summary page	Alt+Shift+R