Infrastructure Configuration and Management

Infrastructure Configuration and Management Overview

You can use Cisco UCS Director to configure, administer, manage, and monitor your infrastructure components. For example, out of the box, Cisco UCS Director can provision a VLAN on both a Cisco switch and the Cisco UCS servers with which the switch communicates, and it can also provision a LUN on a Netapp or EMC storage array and provision the vHBA on the Cisco UCS server to communicate with that LUN.

Some additional configuration and management tasks you can perform with Cisco UCS Director including the following:

- Create, clone, and deploy service profiles and templates for all Cisco UCS servers and compute applications.
- Monitor organizational usage, trends, and capacity across a converged infrastructure on a continuous basis. For example, you can view heat maps that show virtual machine (VM) utilization across all your data centers.
- Deploy and add capacity to converged infrastructures in a consistent, repeatable manner.
- Manage, monitor, and report on data center components, such as Cisco UCS domains or Cisco Nexus network devices.
- Configure, manage, and monitor all components of a converged infrastructure stack, such as FlexPod, Vblock, or VSPEX.

For more information about how to configure and manage the supported infrastructure components through Cisco UCS Director, see the Cisco UCS Director Management Guides for your physical and virtual compute, network, and storage resources.

Infrastructure Organization

Before you add any supported infrastructure to Cisco UCS Director, we recommend that you carefully consider how you want to organize your physical and virtual compute, network, and storage devices and resources. You can organize your infrastructure components into combinations of the following logical groupings:

- Accounts that represent the physical and virtual infrastructure components

- Pods that include one or more accounts

- Sites that include one or more pods

This hierarchy can reflect the physical organization and locations of your data center. However, you can also use the logical groupings in Cisco UCS Director to create an organization that maps to how the resources of your data center are used, the types of tenants that you support, or your customers.

Sites

A site is a logical grouping of one or more pods that represents a division of the resources in your data center. Sites are optional in Cisco UCS Director. However, if you choose to implement them, you can create sites that represent one or more of the following:

- A location within your data center. For example, if your data center is spread across multiple physical locations, you could create a site for each location, such as the U.S., India, and China.

- An internal customer who uses one or more tenants in a multi-tenant data center. For example, you could create a site for each of Finance, Sales, and Support.

- An external customer whose resources you want to segregate and keep separate from other customers.

You can view details of the sites on the **Converged** tab in Cisco UCS Director. For more information about how to create a site, see the Cisco UCS Director Administration Guide.

Pods

A pod is a logical grouping of physical and virtual components, including one or more physical or virtual accounts, such as a Cisco UCS Manager account for computing, a network account, or a cloud account. Each pod is a module of network, compute, storage, and application components that work together to deliver services for your data center and users. The pod is a repeatable pattern, and its components maximize the modularity, scalability, and manageability of data centers.

When you create a pod, consider what you want it to represent. For example, you can create a pod to represent the following:

- A single converged infrastructure stack, such as FlexPod, Vblock, or VSPEX

- A grouping of resources assigned to a specific customer or tenant

- The resources within a specific range of IP addresses

For systems that include Cisco UCS Central, we recommend that you create a pod for each Cisco UCS domain or domain group.

If needed, you can group pods into sites. However, a pod can only belong to one site.

You can view details of the pods and their components on the **Converged** tab in Cisco UCS Director. For information about how to create pods, see the Cisco UCS Director Administration Guide.

Accounts

Each account in Cisco UCS Director represents a physical or virtual infrastructure component. These accounts contain the information about the component that Cisco UCS Director requires to discover and manage the component, such as IP address, login name and password, port, and protocol.

For more information about the specific type of account you need to create, see the Cisco UCS Director Management Guides for your physical and virtual compute, network, and storage resources.

Note The following is a representative sample of the types of accounts that you can create in Cisco UCS Director. It is not an exhaustive list.

Virtual Accounts

A virtual account represents a supported hypervisor or cloud service. For example, you can create a virtual account for one or more of the following:

- VMware vSphere

- Microsoft Hyper-V

- RedHat KVM

- Rackspace Cloud

- Amazon Web Services EC2

Physical Accounts

A physical account represents a supported compute or storage device or domain. Physical accounts are identified by the element manager of the component, such as the following:

- UCSM account for Cisco UCS servers managed by Cisco UCS Manager

- HP OA account or HP iLO account for HP servers

- NetApp OnCommand account or NetApp ONTAP account for NetApp storage arrays

- EMC VNX account, EMC VNXe account, or EMC VMAX accounts for EMC storage arrays

Multi-Domain Manager Accounts

A multi-domain manager is a physical account that represents a software application that can manage more than one domain. Multi-domain manager accounts are identified by the software name, such as the following:

- Cisco UCS Central

- Cisco Prime Data Center Network Manager (DCNM)

- Cisco Prime Network Services Controller (PNSC)

- Cisco Application Policy Infrastructure Controller (APIC)

- EMC RecoverPoint

- EMC VPLEX

Rack Accounts

A rack account represents a supported rack server that is not managed by a physical account or a multi-domain manager account, such as a Cisco C-Series server or a Cisco E-Series server. There is only one type of rack account.

Managed Network Elements

A managed network element is a physical account that represents a supported network device, switch, firewall, or load balancer. Managed network elements are identified by the operating system or name of the network device, such as the following:

- Cisco Nexus OS

- Cisco IOS

- Cisco ASA

- F5 Load Balancer

- Brocade Fabric OS

- Brocade Network OS

Device Discovery

With Cisco UCS Director, you can perform device discovery manually or use the Device Discovery guided setup wizard. Some discovery steps are the same whether you do them manually or use the guided setup wizard. However, if you choose to use the wizard, you must use credential policies.

The protocol that Cisco UCS Director uses to communicate with the device and retrieve the inventory during discovery depends upon the type of device. For example, Cisco UCS Director uses XML to communicate with Cisco UCS Manager and CLI to communicate with Cisco Nexus devices.

During discovery and the retrieval of inventory, Cisco UCS Director creates at least one system task that polls the device at regular intervals and retrieves the inventory. The polling time for these system tasks is different for each device type. However, you can customize that interval to meet your data center's needs. For some devices, Cisco UCS Director creates additional system tasks to retrieve other information, such as faults and statistics.

Manual Device Discovery

The manual process discovers one infrastructure component at a time. You use the same basic procedure for all devices, whether the device is physical or virtual, or whether it's a compute, network, or storage device.

1　(Optional) You create a credential policy for the device.

2　You add a Cisco UCS Director account for the device to a pod, including the IP address, user name, password, and other relevant information.

3 Cisco UCS Director tests the connection to the device, using the credentials and other information that you provided in the account to authenticate.

4 If the connection test and authentication are successful, Cisco UCS Director does the following:

- Adds the device to its inventory and to the selected pod.

- Discovers the basic configuration and infrastructure elements associated with that device. For example, with a Cisco UCS Manager account, Cisco UCS Director discovers all infrastructure elements related to that account, including the chassis, servers, fabric interconnects, service profiles, and pools.

- Creates system tasks with default values for the device to poll for inventory and, if appropriate, other information at regular intervals.

This discovery process and inventory collection cycle takes several minutes to complete.

You need to repeat this manual process for all devices that you want Cisco UCS Director to manage.

Device Discovery through Guided Setup

With the Device Discovery guided setup wizard, you can perform discovery for all devices that you want to add to the same pod. You use the same basic procedure for all pods to which you want to add devices. You must create credential policies if you want to use the guided setup wizard.

1 You enter the following information in the **Policy** screen of the Device Discovery guided setup wizard:

- IP addresses for the devices that you want to discover (can be a range or a comma-separated list)

- Credential policies for the devices that you can choose or create

2 You choose a pod and start discovery on the **Discover and Assign** screen.

3 Cisco UCS Director tests the connection to all devices that can be accessed through the information added on the **Policy** screen.

4 If the connection test is successful, Cisco UCS Director does the following:

- Adds all the devices in the IP address list and range to its inventory.

- Discovers the basic configuration and infrastructure elements associated with all the devices. For example, with a Cisco UCS Manager account, Cisco UCS Director discovers all infrastructure elements related to that account, including the chassis, servers, fabric interconnects, service profiles, and pools.

- Creates system tasks with default values for the devices to poll for inventory and, if appropriate, other information at regular intervals.

This discovery process and inventory collection cycle takes several minutes to complete.

5 You choose the pod and the discovered devices that you want to add to it.

6 Cisco UCS Director adds all of the selected devices to the pod.

Credential Policies

Credential policies contain the login, port, and protocol information to log into a supported physical or virtual compute, network, or storage device or management application. Each credential policy represents a specific type of account. With a credential policy, when the password for a device login ID changes, you only need to change the password in the credential policies for those devices. You do not need to update the accounts for every individual device that Cisco UCS Director manages.

When to Use a Credential Policy

You can use the same credential policy for one or more of the same type of resources that share the same login user ID, password, port, and protocol. For example, you can use the same credential policy for one or more Cisco Nexus OS devices, NetApp ONTAP resources, Cisco UCS Manager domains, or VMware hypervisors.

When Not to Use a Credential Policy

You cannot use the same credential policy for different types of accounts. For example, you cannot use the same credential policy for a Cisco Nexus OS device and a Cisco UCS Manager domain, even if they share the same login user ID, password, port, and protocol.

Infrastructure Reporting

Cisco UCS Director provides a wide variety of reporting information out of the box. In addition, you can create custom report templates to build your own reports for the parameters that are relevant to your needs.

Additional information about reporting is available in the Cisco UCS Director Administration Guide and in the appropriate Cisco UCS Director Management Guides.

Reports

Cisco UCS Director can help you monitor virtual infrastructure and system resources. It displays a wide variety of reports that provide insight into how the system is performing

Following are the types of reports:

- Tabular reports for system information, including overview, host nodes, new VMs, and deleted VMs.

- Bar and pie graph comparisons, including VMs active versus inactive, and CPU provisioned versus capacity.

- Trend graphs about system resources, including CPU trends, memory trends, and VM additions and deletions.

- Other reports include Top 5 reports at the group, VDC, host node, and VM levels. The Top 5 reports focus on groups with the highest number of VMs, groups with the greatest CPU usage, VDCs with the highest number of VMs, and host nodes with the greatest CPU usage.

- Map reports, displaying the system resource information in the form of heat maps or color-coded maps.

Additional trend reports are available for certain accounts (for example: KVM accounts). Trend reports display data over a selected time frame.

CloudSense Analytics

CloudSense Analytics in Cisco UCS Director provide visibility into the infrastructure resources utilization, critical performance metrics across the IT infrastructure stack, and capacity in real time. CloudSense significantly improves capacity trending, forecasting, reporting, and planning of virtual and cloud infrastructures.

You can generate the following reports with CloudSense:

- Billing Report for a Customer
- EMC Storage Inventory Report
- NetApp Storage Inventory Report
- NetApp Storage Savings Per Group
- NetApp Storage Savings Report
- Network Impact Assessment Report
- Organizational Usage of Virtual Computing Infrastructure
- PNSC Account Summary Report
- Physical Infrastructure Inventory Report for a Group
- Storage Dedupe Status Report
- Storage Inventory Report For A Group
- Thin Provisioned Space Report
- UCS Data Center Inventory Report
- VM Activity Report by Group
- VMware Host Performance Summary
- Virtual Infrastructure and Assets Report

Note This is a complete list of reports available in the system. However, the number of reports available in the system for a user depends on the user role. By default, the **CloudSense** option is not visible to MSP administrators. The system administrator needs to enable this option for MSP administrators. Once this is done, then when an MSP administrator logs in, only reports relevant to customer organizations are displayed.

Report Builder for Custom Report Templates

Using the **Report Builder** option in Cisco UCS Director, you can create custom report templates to run reports on specific parameters. You can specify the context, the type of report to run, and the duration of the data samples for the report. You can also create multiple templates.

After you have created a report template, you can use it to generate a report in either PDF or HTML formats. You can view custom reports in Cisco UCS Director or you can email reports, either to yourself and to other users in your organization. You can review and archive these reports outside Cisco UCS Director.

In addition to creating a template, you can edit, clone, and delete custom report templates.

Note You cannot generate daily and hourly trend cost reports using the report builder. You can generate trend reports only for weekly and monthly duration. While generating trend reports for a month, the data is caculated from the first day of the month till the current date. For example, if you are generating a trend report on 5th March, this report includes data from March 1st, to March 5th.

Dashboard

In Cisco UCS Director, you can enable the **Dashboard** option in the user interface. On the **Dashboard** screen, you can add important, or frequently accessed report widgets. If you have enabled the **Dashboard** option, then this is the first window that you see when you log in to the user interface. After enabling the **Dashboard**, you can create additional dashboards, and delete them when you no longer need them.

Summary

The **Summary** screen allows you to manage system inventory. It gives you access to a wide array of tabular, graphical, and map reports, and also helps in managing inventory lifecycle actions.

Each report is displayed as a widget. Reports can be hidden through customization.

Inventory Management

You can monitor the system inventory using the **Dashboard**. The **Dashboard** displays the entire system level infrastructure information for administrative management.