Cisco UCS Director

Challenges

IT is being challenged to align quickly with business needs. People want data center resources to be as easy to obtain as online consumer items. But that’s not the reality today. So project managers - who now own more than 40 percent of project budgets - use outside providers, creating shadow IT.

What prevents IT departments from providing resources more quickly? In brief, they use too many manual procedures and still rely on siloed management. IT departments could deliver data center resources faster if they used automation.

A good starting point for automation is infrastructure delivery. Infrastructure includes a broad set of processes, so to achieve an effective solution you need an enterprise-level automation solution that:

- Covers heterogeneous resources
- Is easy to use
- Can automate complete processes, from ordering to delivery to tracking
- Can be extended to offer more automated services

Solution

Cisco UCS® Director is a software solution that lets you use automation to deliver and manage infrastructure as a service (IaaS). The solution lets you convert complex procedures and best practices into repeatable and reliable automated steps that reduce the pressure on IT and make life easier for anyone who requests data center resources on a regular basis.

It lets you:

- Deliver infrastructure resources within minutes, not days or weeks
- Use budgets for governable IT resources to eliminate shadow IT
- Go beyond standard infrastructure and deliver application-ready infrastructure
After it is installed, the solution does the following:

- Discovers and maps your environment
- Lets you visually create workflows that will set up your infrastructure resources in the ways that you specify
- Runs the workflows, preparing and delivering infrastructure resources to requestors

After it is in production, Cisco UCS Director gives your organization:

- Easy, automated provisioning and management of infrastructure resources
- Less data center complexity because it automates both Cisco® infrastructure and multivendor resources
- Greater IT agility and consistency

This solution places IT firmly at the helm, using automation to achieve more efficient business operations throughout the organization.

**Proven Automation**

Cisco UCS Director is proven to deliver efficiency and speed. Analysis reveals that Cisco UCS Director reduced the number of steps needed to provision six servers by 88.4 percent compared to manual provisioning\(^1\). The same study showed that Cisco UCS Director can reduce time-to-value for business by 12.9 percent. So if you use Cisco UCS Director to replace your manual management with automation across computing, network, storage, and virtualization layers, you deliver services quickly and make managing the environment easier - freeing IT to focus on advanced business solutions. The right automation helps in so many ways.

**How It Works**

You can think of Cisco UCS Director as an orchestra conductor coordinating and guiding all the automated steps so that they operate as fluid workflows that keep adjusting to the available resources and delivering services.

This solution provides easy-to-use automation, covers heterogeneous environments, maintains its awareness of your environments, and organizes your environments into a unified holistic view so you can see and control everything (Figure 1).

**Figure 1.** Cisco UCS Director Orchestrates Infrastructure across Multiple Data Centers

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Start Fast
The Cisco UCS Director installation wizards (Figure 2) make it easy to set up standard components of your infrastructure correctly and achieve consistent automation in your production environment. The wizards guide IT administrators through the steps required for:

- Initial system configuration
- FlexPod, vBlock® Systems, and EMC VSPEX pod configuration
- Device discovery
- Creation of a virtual data center
- Bare-metal agent setup

These wizards reduce complexity for IT by helping ensure that tasks are completed in the specific order required. If the steps were implemented manually, errors could occur, causing delays. Using these wizards, IT can help ensure consistency, avoid costs from rework that might be needed to fix errors, and deliver faster time-to-value.

Figure 2. Installation Wizards Provide Visual, Guided Setup
Unique Approach to Orchestration

Model-based orchestration is a fundamental differentiator that lets you implement consistent and reliable automation. To be effective, automation must keep track of many changing elements and adjust workflows to accommodate resources. Beginning at installation, the Cisco solution takes a model-based approach, which is the key to consistent automation. Cisco UCS Director discovers and maps your environment. Then it abstracts your hardware and software into programmable tasks. IT administrators can then use the built-in workflow designer to drag and drop those tasks to create complete workflows that control the automated provisioning or deprovisioning of data center resources. Later when users request resources, Cisco UCS Director runs those workflows to create and deliver those data center resources in minutes.

Cisco UCS Director lets you quickly create, edit, and get workflows into production because the process is not script based. Instead, the API code associated with each task is embedded behind each task icon. Therefore, after workflows are created, the solution’s model-based orchestration can prevalidate and release them into production so they can be used to deliver services.

Because of this model-based orchestration, you can create your workflows once and then use them as needed. In fact, the benefits of our model-based orchestration begin in the installation process. During installation, the solution creates an infrastructure map by conducting a discovery process that reveals the physical and logical relationships and connections of your infrastructure. Then it saves that information in a database.

That map is updated at intervals determined by your IT administrators, and the solution detects and reflects changes and movements within infrastructure that could impede workflow completion. When a change is detected, it is automatically transferred to the workflow designs to help ensure that your business processing continues to move forward.

A Deeper Look

Management Capabilities

Automation is only as good as it is easy to manage. Cisco UCS Director’s unified provisioning and infrastructure management reduces operating costs and your data center’s complexity with management capabilities that include:

- Abstraction of hardware and software elements into more than 1000 programmable tasks used to create automated workflows (Figures 3 and 4)
- Model-based orchestration that maintains the physical and logical relationships of your infrastructure with the capability to automatically detect and reflect infrastructure configuration changes
- Optimal resource use through the use of resource pools that span physical and virtual components and can be tailored to specific service levels: gold, silver, and bronze
- Resource pools that allow isolation of groups so that appropriate resources are available for specific teams, such as quality assurance (QA) and development (Figure 5)
  - Resource pools also prevent changes to one group from adversely affecting other groups
  - Resource pools allow real-time monitoring for dynamic load balancing, helping reduce capital costs
Figure 3. Workflow Designer Converts Tasks into Workflows

Figure 4. Sample of Programmable Tasks Provided with Cisco UCS Director

1. Select UCS Server
2. Create UCS Server Pool
3. Delete UCS Server Pool
4. Add Servers to UCS Server Pool
5. Delete Servers from UCS Server Pool
6. Associate UCS Service Profile Template
7. Reset UCS Server
8. Power On UCS Server
9. Power Off UCS Server
10. Create UCS Service Profile from Template
11. Create UCS Service Profile
12. Select UCS Service Profile
13. Modify UCS Service Profile Boot Policy
14. Delete UCS Service Profile
15. Associate UCS Service Profile
16. Disassociate UCS Server
17. Disassociate UCS Service Profile
18. Create UCS Boot Policy
19. Modify UCS Boot Policy LUN ID
20. Clone UCS Boot Policy
21. Modify UCS Boot Policy WWPN
22. Create VLAN Group
23. Delete UCS VLAN Group
24. Modify UCS VLAN/VLAN Group Org Permissions
25. Server Maintenance
26. Reallocate Server Slot
27. Add VLAN
28. Delete UCS Boot Policy
29. Delete UCS VLAN
30. Add VLAN to Service Profile
31. Delete VLAN from Service Profile
32. Add iSCSI vNIC to Service Profile
33. Delete iSCSI vNIC from Service Profile
34. Add vNIC to UCS Service Profile
35. Delete vNIC from Service Profile
36. Create Service Profile iSCSI Boot Policy
37. Modify Service Profile Boot Policy to Boot from iSCSI
38. Delete VLAN from Service Profile vNIC
39. Add VLAN to vNIC Template
40. Delete VLAN from vNIC Template
Application Acceleration

At some point, you likely will want to go further and offer infrastructure that is customized for specific applications. Provisioning the infrastructure for applications in traditional data centers requires manual setup and configuration to make it meet specific application requirements. These manual processes increase the time needed to get projects underway and to configure changes and move or reallocate resources as business needs evolve.

Cisco UCS Director accelerates application deployment with the capability to design, configure, and deploy application-aware infrastructure containers. Every container spans physical and virtual computing, network, storage, and hypervisor components and is provisioned according to each application’s unique requirements (Figures 6 and 7).

Figure 5. Administrator’s View of Resource Pools, Status, and Assignments

Figure 6. Administrator Dashboard of Available Infrastructure Containers
Cisco UCS Director allows IT to synchronize configuration and deployment of Cisco Application Centric Infrastructure (ACI) and Cisco Nexus® 1000V Switch network services with computing, storage, and virtualization components within a single entity. Working in tandem with Cisco Application Policy Infrastructure Controller (APIC) or Cisco Virtual Application Container Services (VACS), Cisco UCS Director binds together automated network services created by Cisco APIC or Cisco VACS with computing, storage, and virtualization resources into a single API. This API delivers infrastructure application containers on demand. The benefits of this feature include:

- Automated delivery of application-aware infrastructure that relieves IT staff of the need to manually provision and configure infrastructure resources
- Automation and synchronization of the lifecycle of application infrastructure components to help ensure optimal application performance
- Support for a diverse range of workloads that span development, test, and production environments

**Support for Multiple Hypervisors**
Cisco UCS Director supports VMware, Microsoft Hyper-V, and Red Hat Kernel-based Virtual Machine (KVM) hypervisors with task libraries for creating, manipulating, and editing virtual machines, hosts, and virtual networks. With broad OS guest support, the solution enables Microsoft Windows and Linux virtual machine cloning and allows IT to monitor host and virtual machine memory and resource use.

- **VMware enhancements**
  - Support for NetApp Virtual Storage Console for Clustered Data ONTAP accounts: when configured for efficiency cloning, this utility provides very fast cloning of virtual machines with NetApp storage efficiency
- **Microsoft Hyper-V enhancements**
  - Enhanced task library with robust features for Microsoft Hyper-V management of infrastructure
  - Support for all Microsoft System Center Virtual Machine Manager networking models
  - Support for Cisco Nexus 1000V
  - Support for Citrix network devices within a Microsoft System Center private cloud
Multivendor Solution

Your data center is composed of solutions from multiple vendors, so do not limit yourself to management solutions that manage only a specific hardware stack. The multivendor capabilities of Cisco UCS Director help you get the greatest value from an infrastructure management solution and reduce costs across your entire data center.

Enhancements to Cisco UCS Director’s multivendor solution include:

- Support for HP Onboard Administrator, providing bare-metal setup of HP blades; after the OS is installed, customers can use the Cisco UCS Director task library to manage this environment
- Support for VMware Virtual Remote Console, vMotion, and Site Recovery Manager (SRM)
- VCE Vision Intelligent Operations integration to synchronize inventory discovery and provisioning on vBlock converged infrastructure
- EMC Isilon scale-out network-attached storage (NAS) solutions

In addition, third-party hardware and solution vendors can use a publically available software development kit (SDK) to integrate their products directly into the Cisco UCS Director infrastructure platform.

Conclusion

Cisco UCS Director lets you establish automation at the core of IT. And you can use it with other Cisco solutions to extend automation further so you can convert many more offerings into automated services that can be ordered. The pace of business continues to get faster. With Cisco UCS Director infrastructure automation, you can increase the speed and efficiency of your IT services and better align IT with the needs of your business.

You can get started by simply replacing manual provisioning and deprovisioning tasks with automated workflows that let you deliver data center resources within minutes to your users. It can be that easy to pave the way for future automation.

For More Information