

Cisco Intelligent Automation for Cloud

Introduction

Enterprise IT leaders are under increasing pressures to deliver services to the business more quickly and inexpensively than ever before, to evolve their data centers to highly efficient private cloud architectures, and to provide users with self-service access to IT offerings with fast, automated delivery. To deliver this, IT operations teams need to:

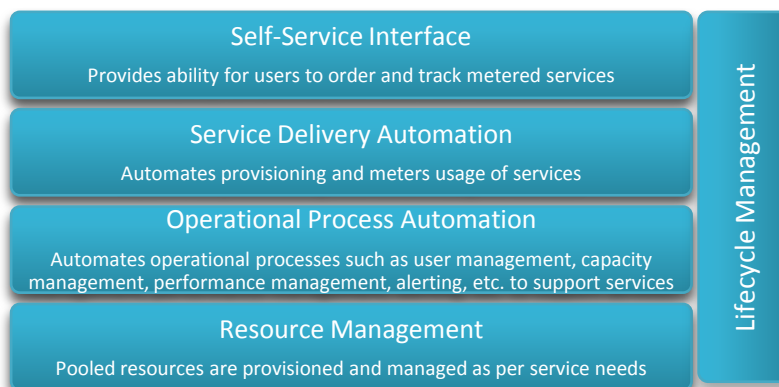
- Create a catalog of standardized service offerings with the capability to provide a self-service portal for users, implement policy-based controls, and manage the service lifecycle.
- Automate various aspects of their operations, including service and infrastructure provisioning, service change management, metering and billing/chargeback, and resource management across various aspects of their infrastructure, including compute, virtualization, network, storage, and applications.

Cisco® Intelligent Automation for Cloud combines these capabilities to provide a single platform with which enterprises can build their private clouds.

Solution Overview

Cisco Intelligent Automation for Cloud is an advanced automation and orchestration software stack for private cloud computing and data center automation. It stands at the core of a heterogeneous technology private cloud and works with both virtual and physical infrastructure across the compute, network, storage, and application domains. Cisco Intelligent Automation for Cloud provides automation across the various elements of Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) clouds depicted in Figure 1.

Figure 1. Elements of Private Cloud Computing



A web-based **self-service interface** enables end users to view service options based on their role, organization, and other access controls. They can order services, provide configuration information through dynamic forms, and track and manage their services and usage on an ongoing basis. The catalog also enables IT to associate costs with various services, which can be integrated with

billing and financial services for chargeback if desired. The order process can also manage policies such as the lease period, so that services that are no longer needed can be expired and the associated resources pulled back into the pool.

After the order has been placed and approved, the order is decomposed into its various elements such as resources to be provisioned (compute, virtualization, network, and storage), configuration updates to be made, software to be provisioned, and supporting services to be set up (firewalls, load balancing, and disaster recovery). The **service delivery automation** layer orchestrates the provisioning and configuration steps across all the elements. It also sends service information back to the web-based portal as well as any systems management tools, such as ticketing systems and configuration management database (CMDBs) that need to be updated.

The **operational process automation** layer uses automation to assist and coordinate the ongoing operational and support tasks for cloud management, including user management, performance management, alerting, service-level management, capacity planning, maintenance checks and procedures, and audit/compliance reporting.

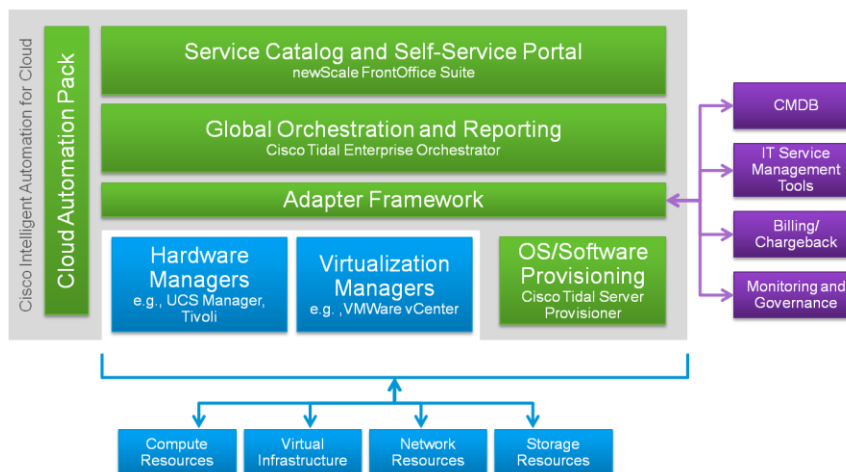
The **resource management** layer interacts with the resource pool to provision, manage, deprovision, configure, and otherwise interact with the individual resources to complete resource-level operations. Our approach is to orchestrate requests to the resource management “controllers” to provision, deprovision, and change resources. Through this approach, Intelligent Automation for Cloud orchestrates resource-level operations across compute resources (Cisco Unified Computing System™ or other hardware), hypervisors (VMware, Xen, Hyper-V), storage resources (for example, EMC and NetApp), and network resources (for example, Cisco Nexus® family).

Lifecycle management involves creation and management of a service model, service definitions, and the underlying automation design for provisioning and managing each service. It also provides the ability to track all aspects of individual services running on the private cloud, including the project and business information captured during the initial order as well as data about the various elements that were provisioned to enable the service from initiation to retirement.

Solution Components

Figure 2 shows the components of the Cisco Intelligent Automation for Cloud solution.

Figure 2. Cisco Intelligent Automation for Cloud System Components



Cisco Intelligent Automation for Cloud components include:

- An integrated framework of core solution elements, including:
 - **newScale Service Catalog and Self-Service Portal:** A comprehensive service catalog with capabilities for service design and lifecycle management, a web-based self-service portal for users to order and manage services, and built-in policy enforcement and tracking. (See Figure 3.)

Figure 3. newScale's Self-Service Portal Enables Non-Technical Users to Order and Configure Services

newScale RequestCenter: MyServices - Order Service - Windows Internet Explorer

http://newScale01/RequestCenter/MyServices/shavigate.do?query=orderForm&id=0&superid_for_...

Select this service to request a new virtual database server. Standard virtual machine configurations for small, medium or large servers running Windows, Linux or Unix operating systems are available. Both SQL Server and Oracle database software are offered.

Virtual server configurations offer the fastest time-to-provision with low ongoing operating costs.

Add & Review Order **Submit Order** **Reset**

Requestor Information

First Name: Robert

Last Name: Customer

Email Address: meisenst@disco.com

Home Organizational Unit: Product Management

Project Confirmation

Is this request part of a funded project? ☐ No ☐ Yes

Package Information

Package: Bronze Please select a server package

Operating System: Windows Please select desired Operating System

Server Size: Small Please select the server size (Default is Small)

Server Type: DB SQL Please select the Database Server Application Type

Network Information

Network Name: DEV2 Please select a network deployment location

Virtual Machine Information

Virtual Machine Template: Windows DB SQL Server

Virtual Machine Start Date: 11/01/2010 05:35 AM

Virtual Machine End Date: 11/30/2010 05:35 AM

VM Friendly Name: SQLDev1104

Guest Operating System: Windows

Guest OS Description: Windows 2008 64 bit

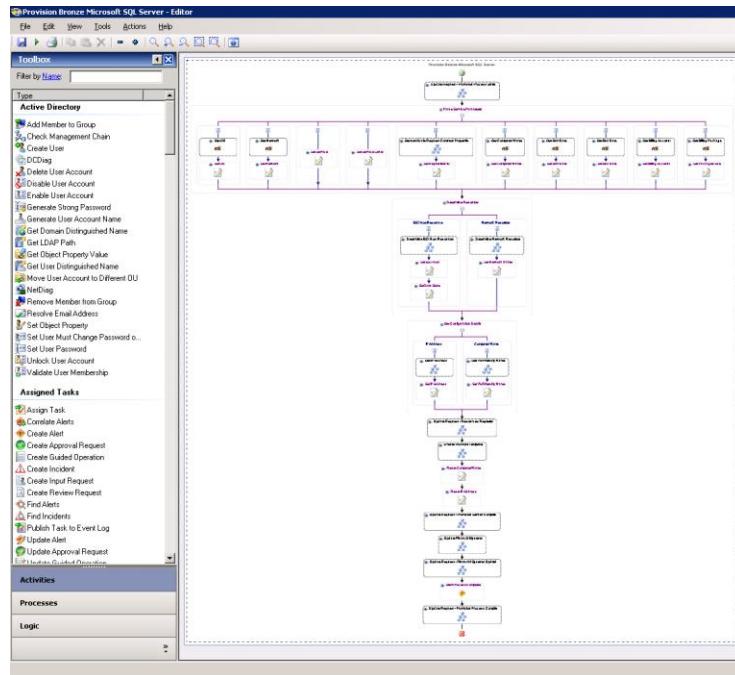
CPU Number: 2

Memory: 2

Hard Disk 1: 50

- **Cisco Tidal Enterprise Orchestrator:** A global orchestration engine for automation of order-to-delivery, service management, and assurance instantiation. This automation core includes a process orchestration engine, an interactive automation design studio, and a reporting and analytics module. (See Figure 4.)

Figure 4. Cisco Tidal Enterprise Orchestrator Automates Process Execution through Workflows



- **Cisco Tidal Enterprise Orchestrator Adapters:** A set of adapters that integrate existing infrastructure elements and IT service management tools with the Cisco Tidal Enterprise Orchestrator to provide smooth, precise orchestration of automated processes. Predefined adapters include Cisco UCS Manager adapter, VMware adapter, Remyd adapter, web services adapter, terminal adapter (for connection to heterogeneous network, storage, and server resources), Microsoft SCOM adapter, and many more.
- **Cisco Tidal Server Provisioner:** This software provisioning and imaging component provides OS (Windows, Linux), hypervisor (ESX), and application provisioning: remote, unattended, native installation on virtual and physical servers. (See Figure 5.)

Figure 5. Cisco Tidal Server Provisioner Provisions Operating Systems and Application Software on Bare Metal

Cisco Tidal Server Provisioner™

Main Menu

MAC-Independent Provisioning

MAC-Specific Provisioning

MAC-Specific Imaging

Help

Logout

MAC-Specific Provisioning Roles

Add MAC-Specific Role

Nickname	Host Name	IP Address	MAC Address	Role Template	Provisioning	Edit/Delete/Clone
UCSDev4	UCSDev4	192.168.0.204	00:11:09:2e:b4:05	Red Hat Enterprise Linux 5.5 x86_64	Next Boot	
UCSQ42	UCSQ42	192.168.0.212	00:11:09:62:9c:49	Windows Server 2008 R2 Standard	Live Ubuntu	
UCSQ45	UCSQ45	192.168.0.215	00:11:09:62:b7:15	Ubuntu 10.04 LTS x86_64 Server	Ignore	
UCSQ46	UCSQ46	192.168.0.216	00:15:c5:5e:ba:b6	ESX 4.1.0	Next Boot	

Add MAC-Specific Role

- Click on the "Add MAC-Specific Role" button to create a Role (operating system and/or applications, network and other parameters) to be installed onto a physical system or virtual machine based on its MAC address.
- Click on button to see profile details and to edit the Role.
- To delete a Role, click on button.
- Click on button to clone the Role then modify it for another system.

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- **Cloud Automation Pack:** A set of preconfigured workflows for common private cloud computing tasks, including VMware task automation, Cisco UCS Manager task

automation, Cisco Tidal Server Provisioner task automation, and automation of core and common activities that span multiple domains.

Cisco Intelligent Automation for Cloud is built to integrate easily with any data center device and solution in the ecosystem, using either the out-of-box connectivity or customization. Its core engine, Cisco Tidal Enterprise Orchestrator, is open and interoperable and has rich integration capabilities that support interfaces from CLI, web services (SOAP and REST), script support such as PERL, Powershell, SNMP integration, and so on, allowing any data center system (including public clouds) to enter the fabric of automation.

Benefits

Dramatically Reduces Provisioning Time for New Services

New services can be ordered by users through a self-service portal, with dynamic forms for gathering information on the orders, thereby eliminating the need for back-and-forth information gathering between the user and IT. After an order is submitted, cross-domain orchestration provisions and configures the various elements of the order and updates various associated systems. The end-to-end provisioning time for new services is reduced from weeks to minutes. This enables end users to acquire infrastructure resources in a self-service mode without the attendant risks of going to the public cloud.

Implements Best Practices and Enforces Policies

Automated and guided workflows promote the consistent implementation of best practice and policy-compliant processes. Approval steps can easily be built into the workflows, and detailed reporting and audit trails are generated. Consistent, automated implementation of best practices improves service levels, reduces the risk of errors, and improves consistency of data in the CMDB. Because services are ordered for a specific period of time and provide visibility into associated costs, infrastructure sprawl is brought under control.

Maximizes Asset Utilization

Because systems can be rapidly repurposed (reprovisioned or reimaged), idle systems are a thing of the past. As soon as a customer (internal or external) no longer requires a system, it can be put back into the available pool, repurposed, and put to near-immediate use, maximizing the utilization of capital equipment.

Promotes the Reuse of IT Intellectual Capital

Domain experts with deep industry or institutional knowledge of system deployment and IT task automation can create automation workflows and system provisioning role templates that are readily reusable within the data center or the enterprise, using the expertise across the entire organization.

Creates an Adaptable Cloud

Cisco Intelligent Automation for Cloud is designed to support an evolving set of cloud services. As enterprises add and modify cloud services to the service catalog, they can easily add and adapt the underlying automation through an easy-to-use interactive automation design studio. By using prepackaged automation packs and through reuse of existing pieces of automation, the time required to bring new services to life can be substantially reduced.

Uses Existing Infrastructure Resources

Cisco Intelligent Automation for Cloud is designed to work with both physical and virtual resources and can use both types to create a private cloud. It also works in heterogeneous environments and integrates with resources from different vendors as well as system management tools from different vendors.

Improves Employee Productivity and Promotes Business-IT Alignment

Because Cisco Intelligent Automation for Cloud automates many manual processes, it dramatically improves productivity of the IT staff and frees them up to focus on new projects. This helps IT to be more responsive to business initiatives and improves business-IT alignment.

Primary Functions

Cisco Intelligent Automation for Cloud supports a wide spectrum of cloud management activities, from setup and design, ongoing service delivery, and system operations, to management control points, reporting, and analytics.

Self-Service Interface

Ordering services: End users can browse and search a web-based catalog of service options and request services through a simple self-service ordering process.

Managing services: End-users can track order status, modify and manage completed orders; as well as view usage and consumption/costs for all their services.

Service Delivery Automation

Infrastructure orchestration: Automated processes decompose service requests to their components and orchestrate the provisioning and configuration of the underlying resources, as well as OS and software within the purview of the private cloud.

Billing and chargeback: Automated consumption tracking and integration into metering, chargeback, and billing systems.

Integration with CMDB and other systems management tools: Automated processes keep CMDB and other systems management tools updated as service changes are made. This integration can also use information from these tools as sources of data when appropriate.

Operational Process Automation

User and system administration: Control user identity, roles, and entitlements, keeping cloud tenants securely isolated from each other.

Alert and incident management: Detect and manage system incidents, send alerts, and open support tickets.

Automation control center: A single point to view and control automated processes across the private cloud.

Reporting: Built-in ROI and auditing models. The advanced reporting function allows all processes, results, and audit to be tracked and reported.

Compliance: Tracks all activities and creates detailed audit trails that can be used for compliance reporting.

Resource Management

Integration with resource managers: Integrates with resource managers such as Cisco UCS Manager and VMware vCenter for provisioning of individual resource components.

Capacity management: Automated capacity utilization checks, alerts, and trending reports enable proactive capacity management.

Maintenance and replacement of units: Automates process to evacuate resource for maintenance and replacement as required.

Usage and quota management: Automated monitoring and metering of usage per tenant account.

Lifecycle Management

Service definition: Define new services using predefined templates or on a custom basis. Service definitions include design descriptions, selection parameters, pricing options, as well as the business and technical processing flows, all using a GUI interface.

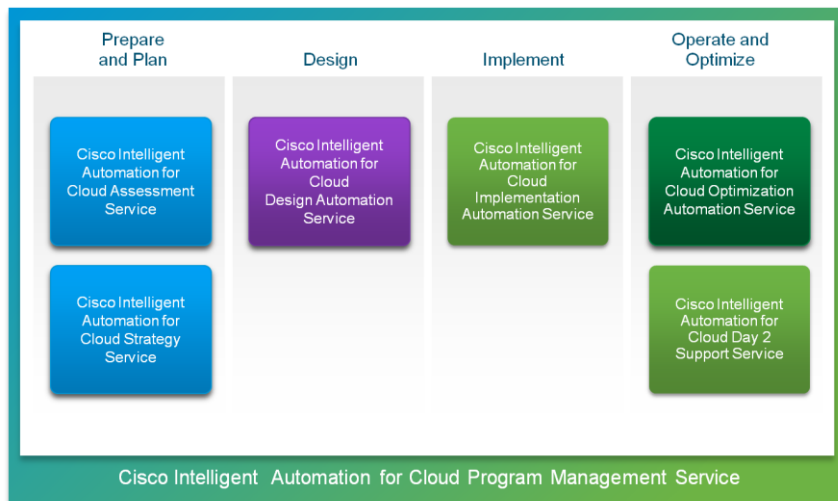
Automation design: Set up workflows to automate all steps of the service lifecycle: service provisioning, decommissioning, modification, and upgrades. Workflows are set up using a GUI interface.

Both service definitions and automation designs can be modified easily through the service lifecycle.

Deployment

Cisco Intelligent Automation for Cloud is deployed either as a comprehensive solution that packages a services engagement covering preparation and planning, design, implementation, and optimization of cloud service offerings and delivery, and creation of the corresponding workflows along with the software or as a standard software product with basic implementation services. (See Figure 6.)

Figure 6. Cisco Intelligent Automation for Cloud Services





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