Automation for Cloud

Michael Doherty
Cloud Automation Technical Architect
EMEAR Data Center Team
Is Cloud Business Transformational...well..........yes!

LAST YEAR WE RECOGNIZED THAT OUR PROCESSES WERE FAR TOO COMPLEX

SO WE PUT THEM INTO THE CLOUD

LET THE CLOUDS MAKE YOUR LIFE EASIER
Agenda

Cloud Lessons Learned
Intelligent Automation for Cloud
Cisco Cloupia Unified Infrastructure Manager
Cloud Lessons Learned
The Journey to a ‘Cloud’

- Consolidate Assets
- Standardize Operations
- Virtualize the Environment
- Automate Self Service Delivery

Increased IT Operational Excellence (Agility, Efficiency and Simplicity)

Increased ‘Shared Services’ Platform Readiness (Physical - Virtual – Dynamic I.T.)
X as a Service

- SaaS
- PaaS
- IaaS

Public
Hybrid
Private

DaaS
CaaS
BaaS
NaaS
Considering we have the components why not…….. IT-as-a-Service Requires a New Management Approach

Self-Service Portal and Orchestration

Automation

Intelligence

Flexibility

IaaS  PaaS  SaaS  Desktop aaS  Telephony aaS  New Employee Onboarding  Employee LifeCycle Operations
Virtual Services Team

Virtual Services Teams:
- Unified Comms
- Networking
- Compute
- Storage
- Data Centers

Functional Teams:
- Architecture
- Design
- Implementation
- Services Delivery
So you would like to build a ‘Shared Services’ platform?

- Drive Standards
- Modular Service Components
- Publish and Market Services
- Simple to use / administrate
- Policies & Governance
- Drive Adoption & Consumption
- Track who owns what!
Technical Model: 10 domains

1. Facility: Power, Cooling, Space
2. Virtualization / Abstraction
3. Automation / Orchestration
4. Service Catalog
5. Store Front
6. Metering/Billing
7. Operations and Governance
8. Security and Compliance
9. OS / Middleware / Database
10. Applications / VXI
# A Classic Decision: Build vs. Buy

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Build (Open Source)</th>
<th>Buy (Commercial Product)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scope</strong> (What functionality is available in the typical solutions?)</td>
<td>Fair</td>
<td>Excellent</td>
</tr>
<tr>
<td><strong>Time</strong> (How much time is required to implement the solution?)</td>
<td>Fair</td>
<td>Excellent</td>
</tr>
<tr>
<td><strong>Cost</strong> (How much budget is available to procure/deploy the solution?)</td>
<td>Very Good</td>
<td>Fair to Good</td>
</tr>
<tr>
<td><strong>Support</strong> (How hard is it to proactively find skills or reactively solve issues?)</td>
<td>Fair</td>
<td>Very Good</td>
</tr>
</tbody>
</table>
Flexible or Focused Systems

Flexible ............ (IAC for example)

Open System

‘Under Construction’ by Design

Requires Services for initial Configuration and for major changes

Business people see the value as it gives differentiation potential

Offers IaaS by default, and a clear path to XaaS

Are appropriate when a customer: -

- Wants a full-fledged “cloud”
- Wants a more heterogeneous infrastructure
- Want to completely customize the look and feel
- Wants to add additional self-service options that are not included out-of-the-box
- Want’s to be able to integrate into existing Management Tools
Flexible or Focused Systems

Focused…….. (Cloupia for example)

**Pure Play** or Closed System

They have a **defined model** which is difficult to extend

Works ‘**Out of the Box**’

Customization required **code changes**

Are appropriate when a customer:

- Who thinks they want “cloud” but really just wants “IaaS”
- Overworked **server admins** who need to the ability to spin things up quick
- Helping admins simplify the task of managing a **converged infrastructure**
- Wants to avoid a **heavy services** engagement
Architectural Desires… API’s at Every Layer

Application Layer
- Each tenant is responsible for requesting and managing their own set of virtual resources
- May call other services through APIs

IaaS (Cloud stack) Layer
- Allocates virtualized resources to tenants through end-user portal and developer APIs
- Each tenant only sees their own resources

Resource Virtualization Layer
- Creates virtualized compute, storage and networking resources
- Manages resource creation, isolation, and non-interference

Physical Resource Layer
- Networking, Storage and Compute resources
- Management, monitoring, etc.

Example developer application
- Virtual Waas API
- Virtual Firewall API
- Virtual VPN API

Virtual Infrastructure

Network Virtualization:
- L2-LISP, vPath, OpenFlow, VLAN

UCS Manager – Network Containers – System Level API
- Hypervisor: KVM, Xen, ESX - Nexus 1000v + Open vSwitch
- Network Virtualization: L2-LISP, vPath, OpenFlow, VLAN

Infrastructure as a Service – Developer API
- Compute Service
- Storage Service
- User and System Admin
Evolution of the DC – Programmatic Infrastructure

**Distributed**
- Manual Provisioning
- Limited scaling
- Rack-wide VM mobility

**Fabric Based**
- Policy-based Provisioning
- Scale Physical & Virtual
- DC-wide/Cross-DC VM Mobility

**Application Driven**
- Service-centric Provisioning
- Flexible – Anywhere, Anytime
- Workload mobility across admin domains
True Clouds require……Multi-tenancy

Admin Roles & Privileges
- Cloud Admin
- Org Admin
- Tenant Admin

Orchestration

Network Path Isolation
- Single Network
  - Shared (no isolation)
- Multiple Networks
  - VLANs (L2 Isolation)
- Network Container (L3 Isolation)
Multi-tenancy with ‘Service Chains’
But don’t forget about Lifecycle Management

- Modify VDC
- Decommission VDC
- Add Network to VDC
- Remove Network from VDC
- Order a VM from Template
- Order a VM and Install an OS
- Order a Physical Server
Then consider the steps in a Service Assurance workflow
Intelligent Automation for Cloud – Starter Edition
Simple Compute-as-a-Service, self service, governance and foundation for the future

Develop and pursue vision
Evolve capability and expand service areas

Crawl
Walk
Run
Sprint
Intelligent Automation for Cloud
Cisco Intelligent Automation for Cloud

Self-Service Portal and Service Catalog
Cisco Cloud Portal

Orchestration and Automation
Cisco Process Orchestrator

Integration Framework

Policy-Based Compute
Cisco UCS Manager

Policy-Based Network
Network Containers

OS/Bare Metal Provisioning
Cisco Server Provisioner

Virtualization Mgmt
Storage Mgmt
Multi-Vendor Compute and Network Mgmt

Cloud Service Providers

LDAP/Active Directory
Email
Service Desk/CMDB
Monitoring
Image/Config Mgmt
Billing/Chargeback

Compute
Network
Storage
Features & Benefits

- Pre-Built Portal Content and Workflows to Accelerate Time to Cloud Deployment of Compute-as-a-Service on Cisco UCS to Improve Agility
- Self-Service Provisioning and Automation for both Virtual and Physical
- Control Over Resources and Consumption with Lifecycle Management
- Ability to Grow Deployment and Expand to New Use Cases with Upgrade Path
Cisco Intelligent Automation for Cloud

Secure, reliable foundation for private, public or hybrid clouds

- Scalable Clouds: From single virtual machines to large-scale virtual data centers
- CloudSync: Cloud infrastructure discovery and management systems connected
- Service Remediation: Quick identification of problem workflows and remediation actions
- Flexible Clouds: One Portal, One VDC and Multiple Cloud Platforms
**Key Concept: Compute POD**

**What is it?**
Point of Delivery, a unit of the data center
Examples: vBlock 300, FlexPod, VMDC Compute POD
One UCS domain
Local and shared network and storage
Local and shared domain managers

**Also:**
IAC registers POD by associating a set of domain managers
Scalability through multiple PODs

---

**Network Stack**

**POD 1**
- Access Switch
- UCS Manager
- UCS Chassis and Servers
- Cisco Server Provisioner
- NetApp DFM or EMC UIM
- NetApp/EMC/HDS

**POD 2**
- Access Switch
- UCS Manager
- UCS Chassis and Servers
- Cisco Server Provisioner
- NetApp DFM or EMC UIM
- NetApp/EMC/HDS

- Portal, Orchestrator, NSM and vCenter are one per system
Key Concept: Virtual Data Centers
Shared and Dedicated Deployment Environments

What are they?
- A pool of physical servers, VMs, virtual CPU, memory and storage
- Include one network zone & VLANs
- Each housed in a cluster within one POD
- May be placed in any POD
- Soft or hard reservation

Also:
- Created on-demand (unlike in vCloud)
- Can cohabitate PODs, but not span over POD over-subscription allowed

Shared Zones:
A special VDC shared across all cloud users. Created by the cloud administrator.

Virtual Data Center:
Dedicated to one organization’s users. Ordered by the org admin. The cloud admin selects the PODs to house in.

Shared Zone

Org A’s VDC “QA Lab”

Pod 1

Org A Users

Deploy servers

Pod 2

VDC “Web Site”

Network 1

Network 2

Network 3

VM VM VM VM

Physical Server

Physical Server

Physical Server
VDC Ordering Service in 3.1

Order by “Organization Admin” or “Cloud Portal Technical Admin”
Resource Capacity Dashboards

The chart below shows the resource usage of the VDC.
VDC Lifecycle Management
Actions for managing VDC – “My Virtual Data Centers” Portlet

- Modify VDC
- Decommission VDC
- Add Network to VDC
- Remove Network from VDC
- Order a Virtual Machine from Template
- Order a Physical Server
- Order a Virtual Machine and Install an OS
CloudSync & Connection Status Dashboards
Observe and Validate Connectivity

Select the platform element

Detail of the platform element

User can take Action here to validate connection

The results will be shown here
A Cloud Admin can remediate failed services caused by infrastructure problems.

Service Remediation

Requisition Summary

Remediation Actions

Error Details
- Error Code: 9006
- Error Description: Unable to customize OS. Customize virtual machine failed. Customization of the guest operating system 'centos4Guest' is not supported in this configuration. Microsoft Vista (TM) and Linux guestes with Logical Volume Manager are supported only for recent ESX host and VMware Tools versions. Refer to vCenter documentation for supported configurations.

Requisition Details
- Requisition ID: 1932
- Requisition Process: Automation Summary

Requisition Details
- Order Name: Order a Virtual Machine From Template
- Severity: Medium
- Co...
Third-Party Technology Partners

Service Catalog and Self-Service Portal
Cisco Cloud Portal

Cisco Process Orchestrator

App Config and Delivery
Puppet
Chef
CFEngine

Server
Cisco Server
Provision

Network
Network
Services
Manager

Virtualization
VMWare
Microsoft
Citrix

Storage
EMC NetApp
HDS

IPAM and DNS
Cisco Prime IPAM
Infoblox,

Showback / Chargeback
CloudCruser, Apptio

Service Assurance
Zenoss, Nimsoft

Billing
Metratech, Zuora, Aria, Astel

Mediation
Comptel, Nimsoft

Security and Compliance
nSolution, Hytrust

CMDB
BMC, CA, IBM, HP, Servicenow

Dashboard & Reporting
Apptio (or native portlets)

ITIL Workflow
BMC, CA, IBM, HP, Servicenow

Service Assurance
Zenoss, Nimsoft

Billing
Metratech, Zuora, Aria, Astel

Mediation
Comptel, Nimsoft

Security and Compliance
nSolution, Hytrust

CMDB
BMC, CA, IBM, HP, Servicenow

Dashboard & Reporting
Apptio (or native portlets)

ITIL Workflow
BMC, CA, IBM, HP, Servicenow
Portal Integration with Service Assurance Solutions

Example screen shots with these partners:
Zenoss
Nimsoft
Watch4Net
IAC Solution Accelerator Community

This is a community site where customers and partners can contribute or download Solution Accelerators

The URL is: http://cs.co/cloudcommunity
Cisco Cloupia
Transform DC Tasks from Manual to Self-Service Delivery

- What to offer?
- How to deliver?
- Who’s using what?

Automation delivers:
- Speed
- Consistency

I Need Stuff

Self-Service

What it offers delivers:
- How to deliver
- Who’s issuing what?
Cisco Cloupia Turnkey Solution - Demo

- Single, unified product built from the ground up
- Modular architecture
- Extensibility through APIs
- Deployed as an on-premise Virtual Appliance(s)

Provides:
- Policy-Driven
- Self-Service Infrastructure
- Lifecycle Management

Cloupia Provides Unified, Centralized Management of Physical and Virtualization Infrastructure in Private and Hybrid Clouds
Cisco Cloupia Infrastructure Management

Key-Summary

End-to-End Automation
- Unified policy-driven provisioning
- Model-based automation – no need for scripting
- Ongoing lifecycle management

Turn-Key Solution – Ready to Use in Hours
- Unified, integrated and out-of-the-box solution
- Seamless physical and Virtual resource pooling
- Hypervisor agnostic

Customers are increasingly buying compute, network, storage, and virtualization as a single, converged system.
Integrated Compute Stack Management
Cisco Cloupia
Validated Management Solution for FlexPod

Self-service Delivery

Secure Cloud Container
Policy Driven Provisioning

Unified model-based management
Delivering secure multi-tenancy
Cisco Cloupia with VSPEX

- Single-click provisioning
- Single management interface
  Physical and virtual infrastructure

- Model-based orchestration
- Converged infrastructure management
  Self-service portal
  Multi-tenant security
Cisco Cloupia with Vblock

**Single-Click Provisioning**

**Single Management Interface**
- Physical and Virtual Infrastructure

**Converged Infrastructure Management**
- Self-service portal
- Multi-tenant security
Cisco Cloupia with Vblock

Q4CY13
System 100

System 200
System 320

Q4CY13
System 720

Supported Today
Positioning: Cloupia and Intelligent Automation for Cloud
Positioning: Cisco Cloupia and IAC

End Users
IT Admins, Developers, Engineers, Architects, etc.

Technical Users
IT Operations, Infrastructure Admins, etc.

Customers may need one or both solutions based on their infrastructure, requirements and cloud maturity

Cloud Management
Cisco Intelligent Automation for Cloud

Cisco Cloupia
Infrastructure Management

Hybrid Cloud

Partner Ecosystem

Cloud Service Providers

Virtual

Physical

Microsoft

Red Hat

Citrix

VMware
Thank you.