MultiCloud Deployment of Self Operating Applications Using Cisco CloudCenter and AppDynamics APM

Vinod Kataria, Technical Marketing Engineer
Cisco CloudCenter
Cisco Spark

Questions?
Use Cisco Spark to communicate with the speaker after the session

How
1. Find this session in the Cisco Live Mobile App
2. Click “Join the Discussion”
3. Install Spark or go directly to the space
4. Enter messages/questions in the space

Spark Room:
Mohit Vaswani – Technical Marketing Engineer

cs.co/ciscolivebot#BRKCLD-2280
Agenda

• Introduction – Multicloud and it’s requirements
• Challenges in Multicloud Application Management and Monitoring
• Cisco CloudCenter and its Architecture
• AppDynamics APM and its Architecture
• Building a Self Operating Application
• Additional Use Cases with CloudCenter and AppD
• Demo
• Q & A
It’s a Multicloud World

85% evaluating or using public cloud

87% taken steps towards a hybrid cloud strategy

94% plan to use multiple clouds

Among cloud users

Source: IDC CloudView, April, 2017, n=8,293 worldwide respondents, weighted by country, company size and industry
Multicloud Requirements

Networking  Security  Analytics  Management

Multicloud Software

Helping customers optimize their multicloud strategy
Introducing Cisco Multicloud Portfolio

Cloud Advisory

Cloud Connect

Cloud Consume

Cloud Protect
Cisco Multicloud — Offers

Cloud Advisory
Advisory Services
• Cloud Migration
• Cloud Connect
• Cloud Protect
• Cloud Consume

Cloud Connect
• vEdge and Umbrella
• CSR 1000v

Cloud Protect
• Umbrella
• AMP for Endpoints
• Meraki Systems Manager
• Cloudlock
• Tetration Cloud

Cloud Consume
• CloudCenter
• AppDynamics
Multiple Clouds – Multiple Interfaces
Multiple Clouds – Multiple Interfaces
Multiple Clouds – Multiple Interfaces
Multiple Clouds – Multiple Interfaces
Challenges in Multicloud Application Management

• Distributed and Complex Applications

• Multiple Environments like Private, Public Clouds, Datacenters

• Governance and Control

• Consistent User Experience

• Hybrid Applications
Challenges in Application Monitoring

- Am I paying too much for what I need? Performance vs Price?
- Am I using the Performance monitoring data to make decisions?
- Am I getting same or better performance in Public Cloud?
- Is App monitoring helping me in business goals?
- Will my App monitoring continue to work after I move to cloud?
Multicloud – Challenged to Winning

Challenging State

Winning State
Multiple Clouds – With CloudCenter

A datacenter is the primary container of inventory objects such as hosts and virtual machines. From the datacenter, you can add and organize inventory objects. Typically, you add hosts, folders, and clusters to a datacenter.

vCenter Server can contain multiple datacenters. Large companies might use multiple datacenters to represent organizational units in their enterprise.

Inventory objects can interact within datacenters, but interaction across datacenters is limited. For example, you can move a virtual machine with vMotion technology across hosts within a datacenter but not to a host in another datacenter.
Multiple Clouds – With CloudCenter

CloudCenter

Summary

Cloud Cost (last 30 days)

VMware: 2.8k
Amazon: 1.3k
CiscoUCSD: 191

Run Time (last 30 days)

Amazon: 60%
VMware: 39%
CiscoUCSD: 1%

Running VMs (updated hourly)

VMware: 35
Amazon: 29
CiscoUCSD: 1

My Plan Usage

Unlimited Subscription

Cloud Status

AWS_Cloud US East (Virginia)
AWS_Cloud US West (Oregon)
Honeynet

Cloud Agnostic

Manager

Application Profile

Cloud API-Specific

Orchestrator

Extendable

Secure

Scalable

API

Multi-tenant
CloudCenter - Approach Unique

**Script-Based**
- Infrastructure-centric
- Cloud-specific workflows and scripts
- Labor/services intensive

**Application Profile-Based**
- Application-centric
- Cloud agnostic
- Low TCO
CloudCenter, Clouds Safe and Managed

Tag-based Governance
Access-Control / Security Profiles
User, Cloud Acct. Mgmt, Cost Controls
Logging / Audit, Reporting
Data Encryption At-Rest, In-Motion
Key Mgmt & Vaulting
CloudCenter Uncomplicates the Cloud.

One Integrated Platform

“Day 2” Actions

New and Existing Applications
CloudCenter Uncomplicates the Cloud.

One Integrated Platform

“Day 2” Actions

New and Existing Applications

Data Center

Private Cloud

Public Cloud
AppDynamics: Application Performance Management

1 | Agent Deployment
Agents monitor end-to-end application performance and collect real-time metrics which are sent to a controller.

2 | Application Mapping
Visual Flow Maps are automatically created and updated dynamically across all digital environments. Business Transactions are automatically detected.

3 | Transaction Snapshots
Machine learning determines dynamic baselines. Snapshots are taken when performance deviates from baseline.

4 | Actionable Insights
AppDynamics Platform

Monitoring (Data Collection)

End-User  Application  Infrastructure

Native Mobile - iOS / Android  Web Applications  Synthetic Transactions
AppDynamics Platform

Monitoring (Data Collection)

End-User

Application

Infrastructure

Apache Web Server

Java, .NET, Node.js, Python, PHP

C/C++, Golang
AppDynamics Platform

Monitoring (Data Collection)

No code changes required
End-to-end dynamic discovery and map
Source line of code diagnostics
<2% overhead in production
AppDynamics Platform

Monitoring (Data Collection)

End-User → Application → Infrastructure

Cloud, PaaS, or On-premises
Infrastructure and Deep DB Monitoring
Log Ingestion
Highly extensible (APIs)
AppDynamics Platform

Monitoring (Data Collection)

End-User  Application  Infrastructure

Application and Business Performance

SaaS/On-Premise Flexibility  Performance, Metadata, Events  Real-time Analytics
CloudCenter and AppDynamics

- Seamless deployment and monitoring of applications across multicloud
- Identify performance trends to right-size IT resources and control cloud spend
- Identify application dependencies to prioritize migration candidates
- Analyze user, app and business performance before and after migration
CloudCenter and AppDynamics

Self Operating Applications

- Deploy AppDynamics Agent as part of Application Profile deployment
- Monitor the application using the AppD Controller
- Scale up or Scale Down the Application based on policies configured in AppD Controller
Building Self Operating Application - Steps

1. Model the application with AppD Agent Integration
2. Deploy the AppD enabled application using CloudCenter
3. AppD Controller starts monitoring the application **
4. Define policy/rules at AppD Controller
5. With increased load on application, the AppD Controller triggers scale out action for the tier **
6. CloudCenter receives the trigger and scales the application **
7. The increased load now gets distributed among scaled nodes **

** Tasks getting executed automatically without user intervention
Sample AppDynamics Agent Install Script

#Download the AppD Agent
wget http://appd-s3.s3.amazonaws.com/appd/php/appdynamics-php-agent-x64-linux-4.3.5.0.tar.bz2

#Extract the file
tar -xvjf appdynamics-php-agent-x64-linux-4.3.5.0.tar.bz2

#Install the agent
cd appdynamics-php-agent
sudo ./install.sh -a=customer1@XXXX-XXX-XXX appd-controller 443 $parentJobName $cliqrAppTierName $cliqrNodeHostname

#Restart web service
sudo service httpd restart
AppDynamics Agent Integration
AppDynamics Agent Integration

1. Cloud Level

```
AWS

Accounts
US East (Virginia)
Orchestrator: Running

Regions

US East (Virginia)

Cloud Settings
```
AppDynamics Agent Integration

1. Cloud Level

2. Application Tier Level
AppDynamics Agent Integration

1. Cloud Level
2. Application Tier Level
3. Service Level
AppDynamics Agent Integration

1. Cloud Level
2. Application Tier Level
3. Service Level
4. Deployment Level
Application Deployment

Deploy Application from CloudCenter

• AppD Agents gets installed with Application

• AppD Agent starts sending performance metrics to AppD Controller
Application Deployment

Deploy Application from CloudCenter

• AppD Agents gets installed with Application

• AppD Agent starts sending performance metrics to AppD Controller
AppDynamics Agent Integration - Example
AppDynamics Agent Integration - Example

1. Integration at Application Tier Level
AppDynamics Agent Integration - Example

1. Integration at Application Tier Level

2. Node Initialization Properties
Application Deployment

Deploy Application from CloudCenter

- AppD Agents gets installed with Application
- AppD Agent starts sending performance metrics to AppD Controller
Application Deployment

Deploy Application from CloudCenter

• AppD Agents gets installed with Application

• AppD Agent starts sending performance metrics to AppD Controller
AppD Controller Monitoring – Application Flowmap

Application Flowmap gets built in the AppD Controller
AppDynamics – Defining policies at AppD Controller

1. Define metrics to track for given application - health rule
2. Define Triggers/Events – rule violation limits
3. Define Actions to take on violations
4. Enable Policy for a given application
AppDynamics – Monitoring

Monitoring Criteria:

- Specific Application Transactions
- Specific Application Tier performance
- Overall Application performance
- Business metrics
- Response Time, CPU, Memory Load
Sunday Evening Show Use case

Problem Statement:

- You have a Sunday evening spike due to new show release
- It happens every Sunday evening, say 4pm to 7pm
- Application needs to be ready for the increased load

Solution:

- Defined Policy in AppDynamics to scale the application before the increase in load (say 10mins before the expected time)
- CloudCenter gets the trigger from AppDynamics and scales the application before the application experiences increased load
Scaling Application at CloudCenter

- AppDynamics detects rule violation – transactions, latency etc. turning status Application status to Red
- AppDynamics triggers an action linked to rule violation – API call, Custom script
- CloudCenter receives the action against deployment – Scales out the tier
- New Node starts handling traffic and starts reporting back to AppD controller
  - AppD Agent gets installed automatically on new node
  - Traffic distribution from Load Balancer starts automatically
- Application status becomes green
AppDynamics – Policies Example
AppDynamics – Policies Example

- Health Rule

![Health Rule](image-url)
AppDynamics – Policies Example

- Health Rule
- Action
AppDynamics – Policies Example

• Health Rule

• Action

• Policy
Application Scaling - Example
Application Scaling - Example

• Deployment Status changes to Scaling
Application Scaling - Example

- Deployment Status changes to Scaling
- Tier Job Status changes to JobScaling
Application Scaling - Example

- Deployment Status changes to Scaling
- Tier Job Status changes to JobScaling
CloudCenter with AppDynamics

Intelligent Application Orchestration

• Deploy - AppDynamics Agent seamlessly as part of CloudCenter Application Profile

• Monitor – Application ecosystem and identify emerging issues

• Optimize – Automate scale out to preserve performance and minimize cost
Comparison w/o and w/ CloudCenter + AppD

<table>
<thead>
<tr>
<th></th>
<th>Without CC/AppD</th>
<th>With CC/AppD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment of AppD Agents</td>
<td>Manual or OOB</td>
<td>Automated</td>
</tr>
<tr>
<td>Actions on Rule Violation Events</td>
<td>Manual or OOB</td>
<td>Automated</td>
</tr>
<tr>
<td>Monitoring of Actions</td>
<td>Manual or OOB</td>
<td>Automated</td>
</tr>
<tr>
<td>Scaling Out/In of Application</td>
<td>Manual or OOB</td>
<td>Automated</td>
</tr>
<tr>
<td>Self-Operating Application</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Admin Sleeps Well</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Brownfield Monitoring of VMs

- Discover brownfield VMs in CloudCenter
- Import VMs to CloudCenter Management and Install CloudCenter Agent
- Using Action Library install AppD Agents
Application Migration with CloudCenter and AppD

- Pre-Migration Performance Baseline
- Application Discovery
- Migrate
- Post-Migration Performance Baseline
- Compare Performance
Application Migration with CloudCenter and AppD

Pre-Migration Performance Baseline
Application Discovery
Cisco CloudCenter
Post-Migration Performance Baseline
Compare Performance
Migrate
Cloud Consume Use Cases - Summarized

Use cases

1. **Optimize Resources** - Scale applications based on end user performance and business metrics (e.g., conversion rate, page loading time) to align

2. **Apply governance and control** – of who deploys what and where, to ensure security and compliance while controlling resource usage and cloud costs.

3. **Optimize service quality** – by identifying and responding to emerging issues before they impact the business

4. **Seamless deploy and monitor** - with automated provisioning of fully configured application stacks with monitoring agents into any environment

5. **Optimize code** – by identifying code level performance issues

6. **Migrate with comparison** – identify services to migrate, and get accurate view of application technical and business metrics before and after move in order to prove migration success
Demo

Composite Application Deployment using CloudCenter and Monitoring using AppDynamics
Example Application Composite Architecture

Web Front End
SubApp1 with load balancer
SubApp2 with load balancer
Shared MySQL Database Instance
Example Application Composite Architecture

Web Front End
SubApp1 with load balancer
SubApp2 with load balancer
Shared MySQL Database Instance
F5 BIG-IP Integrate with Cisco Cloud Center
Create BIG-IP Service Catalog using Cloud Center External Services

Create F5 BIG-IP External Service from Cloud Center Admin Tab
F5 BIG-IP Integrate with Cisco Cloud Center
Create BIG-IP Service Catalog using Cloud Center External Services

Create F5 BIG-IP External Service from Cloud Center Admin Tab

F5 BIG-IP L4-L7 parameters now configurable in Cloud Center
F5 BIG-IP Integrate with Cisco Cloud Center
Create BIG-IP Service Catalog using Cloud Center External Services

Create F5 BIG-IP External Service from Cloud Center Admin Tab
F5 BIG-IP Integrate with Cisco Cloud Center
Create BIG-IP Service Catalog using Cloud Center External Services

Create F5 BIG-IP External Service from Cloud Center Admin Tab

Drag-and-drop F5 BIG-IP when creating Application Profile
Create F5 BIG-IP External Service from Cloud Center Admin Tab

Drag-and-drop F5 BIG-IP when creating Application Profile

F5 BIG-IP Integrate with Cisco Cloud Center
Create BIG-IP Service Catalog using Cloud Center External Services

Create F5 BIG-IP External Service from Cloud Center Admin Tab

To Learn more:
https://communities.cisco.com/docs/DOC-71952
More Learning….

• Cisco Communities - CloudCenter

• Documentation
  • CloudCenter
    https://docs.cloudcenter.cisco.com/
  • AppDynamics
    https://docs.appdynamics.com/
Related Sessions

• Hybrid Cloud Automation using Cisco CloudCenter API [DEVNET-1651]
• DevNet Workshop-Hands-on with CloudCenter and Jenkins [DEVNET-1769]
• Deploy a Hybrid, Multi-Cloud Container Environment in Less than an Hour [BRKCLD-2235]
• The Essentials of Application Performance Management in the Digital Enterprise [PSOAPP-4595]
• Inside Cisco IT: Automated end user services via Cisco Prime Service Catalog, Process Orchestrator and AppDynamics [BRKCOC-1309]
Cisco Spark

Questions?
Use Cisco Spark to communicate with the speaker after the session

How
1. Find this session in the Cisco Live Mobile App
2. Click “Join the Discussion”
3. Install Spark or go directly to the space
4. Enter messages/questions in the space

cs.co/ciscolivebot#BRKCLD-2280
• Please complete your Online Session Evaluations after each session

• Complete 4 Session Evaluations & the Overall Conference Evaluation (available from Thursday) to receive your Cisco Live T-shirt

• All surveys can be completed via the Cisco Live Mobile App or the Communication Stations

Don’t forget: Cisco Live sessions will be available for viewing on-demand after the event at www.ciscolive.com/global/on-demand-library/.
CloudCenter with AppDynamics

Intelligent Application Orchestration

Deploy - AppDynamics Agent seamlessly as part of CloudCenter Application Profile

Monitor – Application ecosystem and identify emerging issues

Optimize – Automate scale out to preserve performance and minimize cost
Continue Your Education

- Demos in the Cisco campus
- Walk-in Self-Paced Labs
- Tech Circle
- Meet the Engineer 1:1 meetings
- Related sessions
Thank you
You’re it