Cisco Delivers a Highly Available Platform using OpenShift by Red Hat

Michael White
Cisco Domain Architect for App and Web Services

Srinivas Kotaru
Cisco Lead Engineer for Lightweight Application Environment

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Agenda

- Who We Are
- Business Opportunities & Challenges We Set Out to Address
- Our Journey
- Enabling High Availability via Multi-Data Center Deployment
- Looking Forward and Lessons Learned
Who We Are
Who We Are

Global IT Company

“Changing the Way We Work, Live, Play, and Learn”

Broad portfolio of integrated products and solutions

Q2FY15 Quarterly Revenue $11.9 Billion

Over 70,000 employees
Who We Are

Information Technology

Global Infrastructure Services

IaaS: Compute, Network & Storage
PaaS: Apps, DBs & Integration

Application and Web Services

Line of Business IT
Engineering IT
Infrastructure
Data Centers

Domain Architect
15+ years at Cisco
micwhite@cisco.com

Tech Lead
8+ years at Cisco
skotaru@cisco.com

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Cisco IT App and Web Platforms Support

- 5,000+ Developers
- 30,000+ Java Virtual Machine Instances
- 2000+ Applications: From custom apps to packaged ERP
- All deployments and environments (Dev, Stage, LT, Prod, DR)
- Over $30B+ dollars worth of transactions annually
- 24/7 Global Availability
Lightweight Application Environment (LAE)

- Next Generation Platform as a Service Offering
- Built on Red Hat OpenShift
- Three years into our Journey
- One year + of Production Operations and Evolution
Opportunities and Challenges
# IT Transformations @ Cisco

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<tr>
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<tbody>
<tr>
<td>Focus</td>
<td>Transforms the fundamental processes of running IT</td>
<td>Transforms the data center environment and the services within it</td>
<td>Transforms the fundamental process of delivering services</td>
<td>Transforms the environment and the experience of our interactions</td>
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| Outcomes | • Efficiency  
• Effectiveness  
• Accountability | • Growth  
• Transformation  
• Resiliency | • Iterative Change  
• Speed  
• Quality  
• Programmable | • Connect Everything  
• Innovate Everywhere  
• Benefit Everyone |
Application Centric Cloud for Fast IT

- Stationary Applications
- Waterfall / Agile Development
- Dedicated Platforms
- Traditional Network
- Mobile Workload
- Continuous Delivery
- Lightweight App. Containers
- API Enabled Standard IaaS
- Application Centric Infra. (ACI)
- Order Mgmt
- Pricing
- XaaS
- SDaaS
- PaaS
- IaaS
- LAE
- ACI Fabric
- Distributed Services
- Cloud Scale
- DevOps
- Open source
- Quality Releases
- Adaptive Scaling
- Feature Rich
- Scalability
- APIS
- Intercloud
- Policy Control
- Unified Infrastructure

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## Key Capabilities and Benefits of LAE

<table>
<thead>
<tr>
<th>Developer Experience</th>
<th>Flexible Infrastructure</th>
<th>Future Proof</th>
<th>Cost Optimization</th>
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<tbody>
<tr>
<td>Continuous Delivery Alignment</td>
<td>Adaptive infrastructure. Dynamic scaling of applications based on workload.</td>
<td>Cloud-Native Platform</td>
<td>Open source technology Saves License $$</td>
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<tr>
<td>Complete ALM Experience</td>
<td>True container multi-tenant isolation.</td>
<td>Additional Technology enabled rapidly</td>
<td>High Density Server Utilization</td>
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<td>Rich Set of Open Source Technology Choices</td>
<td>Custom lifecycles to meet agile development requirements</td>
<td>New capabilities introduced in LAE only (e.g. A/B stack for NZDT)</td>
<td>Dynamically scale vs. Over provision for peaks</td>
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<td>Easily Integrates with Enterprise Services</td>
<td>Vanity URLs</td>
<td>Aligned with ACI and OpenStack Roadmaps</td>
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<td>API Driven, Multiple Client Interfaces for Managing the Applications</td>
<td>Alignment with cloud tenant model.</td>
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- **Developer Experience**: Continuous Delivery Alignment, Complete ALM Experience, Rich Set of Open Source Technology Choices, Easily Integrates with Enterprise Services, API Driven, Multiple Client Interfaces for Managing the Applications
- **Future Proof**: Cloud-Native Platform. Additional Technology enabled rapidly. New capabilities introduced in LAE only (e.g. A/B stack for NZDT). Aligned with ACI and OpenStack Roadmaps.
- **Cost Optimization**: Open source technology Saves License $$. High Density Server Utilization. Dynamically scale vs. Over provision for peaks.
LAE Conceptual View

Self Service Ordering, Automated Provisioning, Integration

Custom Routing: DMZ, Multi-DC, Vanity URLs

Core Runtime Platform

Continuous Delivery and Ongoing Operations
Our LAE Journey
Cisco LAE Platform Evolution

**POC and Evaluation**
- **Mid-2013**
  - OpenShift 1.0
  - Framework evaluation
  - Architecture alignment

**Express Release**
- **Aug 2013**
  - OpenShift 1.2
  - Free to use
  - Low SLA
  - 2 Nodes

**General Availability**
- **Jan 2014**
  - OpenShift 2.0
  - Integrated
  - P2 SLA
  - 14 Nodes

**High Availability**
- **Sept 2014**
  - OpenShift 2.1
  - Multi-DC & DR
  - P1 SLA
  - 60 Nodes

**Current**
- **June 2015**
  - OpenShift 2.2
  - Blue-Green
  - RDAC
  - 144 Nodes ++
Since We Spoke at Summit Last Year

- Active/Active Multi-DC capability introduced
- Active/passive DR site was added
- Two Platform-wide Upgrades
  - 2.0. → 2.1 → 2.2
- CI/CD Integration
- Capacity Expansion: From 14 to 144 Nodes and growing
- New Services Released
  - SSL Certificate as Service
  - Alias/CNAME as Service
  - Blue-Green Deployment (a.k.a Near Zero Down Time)
  - App Dynamics Cartridge for Monitoring
  - Restricted Database Access Control
Enabling High Availability
Importance of High Availability

- Resiliency & DR
- Standard & Expected
- Adoption & Migration

Customizations
- Programmable Request Routing
- Deployment of code to Multiple Apps

Version 2.1 Features
- Availability Zones and Regions
- Multiple Head Gears per App
Single Points of Failure in Original Design

myapp.cisco.com

Reverse Proxy (HAProxy)
Current HA Design

myapp.cisco.com

Cisco Global Site Selector (GSS)

Reverse Proxy (HAProxy)

Production Data Centers

Disaster Recovery Site (DR)

Zone 1 (DC 1)

Zone 2 (DC 2)

Zone 3 (DC 3)

us-tx region

us-east region
Additional Capabilities

- Leveraging the custom, intelligent routing layer and the deployment capabilities used for HA we are also offering:
  - Near Zero Downtime Deployments
  - A – B Testing
  - Multi-version Support
Video Demo (3:19)
Looking Forward & Lessons Learned
Looking Forward

- Continued Adoption and Scaling Out
- Deployment on OpenStack and Cisco ACI Network Fabric
- OpenShift Enterprise 3.0
  - Deterministic Definition of State
  - No Sized based districts
  - Add New Technology via Docker Images
  - Micro-Service patterns vs. Add-on Cartridges
  - Persistent Storage
  - Administrator API
# Lessons Learned

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Implementation</th>
<th>Adoption</th>
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| - OpenShift is Extensible…  
- Align with your corporate standards  
- Fit in with your architectural patterns  
- Integrate with enterprise services  
- Red Hat is a good partner to work with…  
- Features we’ve requested have made it into the product  
- Responsive Support Team  
- You can run Production apps on OpenShift Enterprise | - Upgrades can be challenging…  
- This may be particular to Cisco based on choices we’ve made  
- We detached from channel subscriptions  
- All at once vs by district or DC  
- Requires partnership between PaaS team and Compute, Storage & Networking | - Culture and Mindset Shift  
- Need to balance developer flexibility and enterprise control  
- Green-field and Brown-field require different strategies  
- Align with other major initiatives and form a cohesive story |
Thank You!
LEARN. NETWORK.
EXPERIENCE OPEN SOURCE.