Data Center Anywhere in Cloud
Native and Hybrid Cloud

CKN Session

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Technical Solutions Architect
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Data Center Anywhere in Cloud Native and Hybrid Cloud

Applications are no longer local to the data center. Modern apps are deployed at the edge, in the cloud, and connected to online services. New DevOps-style deployment methods using Kubernetes have increased the pace of application development. In this session, we will explore:

- Kubernetes as a service and cloud connectivity
- how to ease the operational pain of these infrastructures and keep costs under control
- evolution of management platforms that are increasingly cloud-native and analytics powered
Multi-Cloud Challenges and Opportunities

**On-Prem Cloud**
“Good Multicloud starts at home”

**Benefits**
- Security, Performance, Flexibility, Country Regulation Compliance

**Challenges**
- Scalability, Operational Cost, Agility

**Public Cloud**
“Take control”

**Benefits**
- On-demand scalable, Agile, Feature Rich

**Challenges**
- Cost, Security, Performance

**Application Experience**
“Follow business needs”

**Benefits**
- App is the Business, Agile

**Challenges**
- Cost, Security, Performance
On-Prem Cloud
“Good Multicloud starts at home”

**Benefits**
- Security
- Performance
- Flexibility

**Challenges**
- Scalability
- Operational Cost
- Agility

Edge Cloud
“Data Center Everywhere”

**Challenges**
- DCI Connectivity
- Visibility into Existing Transport
- Operational Cost
Intent
“What you want it to do”
Simplified Infrastructure with centralized API control points

Analytics
“What Could Happen”
Smart Events, Advisories, Anomalies

Automation
“Avoid It”
Automate Actions with Trustworthy Outcomes
Simplified Network Deployment
Any Workload. Any Location. Any Cloud. Any Hypervisor

Automation with Consistent Policy

Remote Leaf/Edge DC
MPLS/SR SD-WAN
ACI On-Premises
Cloud ACI

Campus
WAN

Edge / Remote DC Regional/Central Location Public or Private Cloud

Security Everywhere Analytics Everywhere Policy Everywhere

Data Center CKN Session: Cisco Application Centric Infrastructure (ACI) for Next Generation Telco Cloud
Introducing The HyperFlex Application Platform

Cloud Managed
Intersight SaaS based management of infra and containers across edge and core datacenters

Kubernetes cloud
Enables IT to deliver K8s-as-a-service to developers

Turnkey
Integrated platform for production grade cloud native applications

Economic
Independent from the underlying hypervisor

Future proof
Single platform for current and future apps
Cloud-Based Systems Management as-a-Service

Centralized Management
  Global Policies

Intuitive experience

Enhanced Support

Proactive Guidance

Secure and Extensible

SaaS or Connected Appliance

Comprehensive Automation
  Single Pane of Glass

SaaS Simplicity

Actionable Intelligence

Cisco Intersight
This ... used to be a thing of the past
VM Performance Assurance

- Navigate multiple tradeoffs
- Operate in real time
- Self-managing

- Initial Workload Placement
- Increase Resources
- Decrease Resources
- Move Workload
- Retire Resources

Performance

- CPU
  - Thread Utilization
  - Core Utilization
  - Ready Queue/Wait Time

- Network
  - Latency
  - Relationships
  - Bandwidth
  - Geography

- Storage
  - IOPS
  - Capacity
  - Throughput
  - Compression

Cost

- $/instance/hour
- $/instance/minute
- Reserved Instances
- ...

Compliance

- Licensing
- Data sovereignty
- Business constraints
- Affinity/anti-affinity
- ...

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Kubernetes Takes Care of Itself .... Until

... “Failed Scheduling No nodes are available that match all of the following predicates: Insufficient CPU”

- Noisy Neighbor
- CPU starvation due to node CPU congestion
- Resource Fragmentation
Kubernetes Performance Assurance

1. SIZING: How should you size containers?

2. PLACEMENT: When do you need to reschedule (move) pods? To which nodes?

3. SCALING: When do you need to scale out (or back) the cluster? By how much?
Micro-segmentation is a security technique that enables fine-grained security policies to be assigned to data center applications, down to the workload level. ...
In uSegmentation *every endpoint can become an enforcement point.*
Yet ... the most common uSegmentation example

Web-App-DB ;(-)
The reality - Telemetry vs. ADM
uSegmentation Is an *Operational Problem* not a technology problem

Q: When do you delete rules on your N/S Firewall today?
A: When it is full...

An anonymous customer
Public Cloud

“Take control”

Benefits
On-demand scalable, Agile, Feature Rich

Challenges
Cost, Security, Performance
Public Cloud Challenge #1
Controlling Public Cloud spend without breaking the app.
Automated Performance/Cost Optimization

85 Pending Actions

- Move VM to Storage
- Move VM to Storage
- Move VM to Storage
- Move VM to Storage
- Scale Database Server
- Scale Virtual Machine
- Scale Virtual Machine
- Scale Virtual Machine

Scale-up if workload demand increases to maintain application health.

Top Accounts

<table>
<thead>
<tr>
<th>Name</th>
<th>Workloads</th>
<th>Est. Cost</th>
<th>Potential Savings/ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>57479618044</td>
<td>18</td>
<td>N/A</td>
<td>$546 /mo 41 ACTIONS</td>
</tr>
<tr>
<td>70400740775</td>
<td>14</td>
<td>N/A</td>
<td>$52 /mo 32 ACTIONS</td>
</tr>
<tr>
<td>041986056854</td>
<td>1</td>
<td>N/A</td>
<td>$4.87 /mo 3 ACTIONS</td>
</tr>
<tr>
<td>049740227601</td>
<td>3</td>
<td>N/A</td>
<td>$0 /mo NO ACTIONS</td>
</tr>
</tbody>
</table>

Scale-down based on historical data if workload demand permits it. CWOM will not size-down beyond the peaks the application experiences.
Reserved Instances vs. On-Demand Instances

**On Demand Instances**

With On-Demand instances, you pay for compute capacity by the hour or the second depending on which instances you run. No longer-term commitments or upfront payments are needed. You can increase or decrease your compute capacity depending on the demands of your application and only pay the specified per hourly rates for the instance you use.

**Reserved Instances**

Reserved instances are often paid upfront and they have a term commitment which is one or three years. Reserved Instances provide you with a significant discount (up to 75%) compared to On-Demand instance pricing.
Assess Current Infrastructure
What would happen if we move to AWS

Cloud Cost Comparison

<table>
<thead>
<tr>
<th>Without CWOM</th>
<th>With CWOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation Plan</td>
<td>Consumption Plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>On-Demand Pricing</th>
<th>On-Demand Pricing</th>
<th>On-Demand + RI Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under-sized VMs</td>
<td>182 out of 1419</td>
<td>0 out of 1419</td>
</tr>
<tr>
<td>Oversized VMs</td>
<td>1056 out of 1419</td>
<td>0 out of 1419</td>
</tr>
<tr>
<td>Average VM Cost</td>
<td>$249AMD</td>
<td>$223AMD</td>
</tr>
<tr>
<td>Existing Cloud Cost</td>
<td>$16,434AMD</td>
<td>$14,340AMD</td>
</tr>
<tr>
<td>Added Cloud Cost</td>
<td>$335,462AMD</td>
<td>$362,260AMD</td>
</tr>
<tr>
<td>Total Monthly</td>
<td>$352,897AMD</td>
<td>$316,540AMD</td>
</tr>
<tr>
<td>Total Yearly</td>
<td>$4,234,759YR</td>
<td>$3,798,479YR</td>
</tr>
</tbody>
</table>

- $436,280
In cost avoidance using CWOM’s consumption based approach & On-Demand Pricing

- $761,085
In cost avoidance using CWOM & Reserved Instance Pricing
Public Cloud Challenge #2
Moving to multi-cloud without compromising on security.
Repsol Case-Study

1. Risk Moving Applications across to the cloud due to unknown dependencies
3. Increase Visibility Into Traffic Flows and Application Performance Across Data Centers

10x Faster Secure Application Migration
Application Experience

“Follow business needs”

Benefits
App is the Business, Agile

Challenges
Cost, Security, Performance
Is it the “code” or the “node”

The war room experience: it is impacting the business!!! Is it the network, is it the storage, is it the hypervisor, is something wrong with the code.
Application Performance Management
End-to-end visibility and actions for business transactions

<table>
<thead>
<tr>
<th>Tag</th>
<th>Follow</th>
<th>Learn</th>
<th>Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument every user transaction</td>
<td>Follow through complex systems</td>
<td>Baseline behavior and performance</td>
<td>Collect application and business data</td>
</tr>
</tbody>
</table>

Business Transaction: **Book A Flight**  
Response Time: **2.1s**

Java Heap Usage: **76%**  
/<SearchFlight>/: **32ms**  
From: LON  
To: LAS  
Out: Thursday 10th

Network Errors: **1.3%**  
/<GetCustLevel>/: **12ms**  
Platinum Customer  
Lives: CA, USA  
Using: Chrome

CPU Usage: **36%**  
/<GetPrice>/: **56ms**  
Class: Business  
Price: $3,269  
Special Meals: No

Database Time: **156ms**  
/<WPProcess>/: **340ms**  
Payment: Mastercard  
Merchant: WorldPay  
Confirmed: True
Enable Developers to Use APM
DIRECTV Scores Technology Touchdown with Debut of New APM

**CHALLENGES:**

- The performance of more than 100 internal and customer-facing applications was key to maintaining the satisfaction of DIRECTV’s customers, but developers had not adopted an existing APM solution.
- The complex environment behind DIRECTV’s entertainment service included 6,000 physical and virtual servers running a mix of Windows, Linux, and HP-UX, as well as applications built using Java, .NET, PHP, and Node.js.

**SOLUTION:**

- AppDynamics provided significant visibility and insight during a test at the start of football season when the website and infrastructure were required to carry unusually heavy loads.
- Rolled out AppDynamics to key development teams.

**RESULTS:**

- Faster resolution of performance issues.
- Faster code deployments.
- Improved cooperation between the development and testing teams.

*REGION: United States (AMER)*
Application-Aware Infrastructure
Integration with Cisco AppDynamics Application Performance Management (APM)

Results
✔ Assure application performance
✔ On-premises re-sizing automation: up to 20% utilization increase
✔ Cloud compute resizing automation: 30%+ cost savings

With CWOM, application performance metrics drive better decisions through the infrastructure.
Expanded Intersight capabilities with Intersight Workload Optimizer

Single Interface / Single API

Intersight Workload Optimizer (Application Resource Management)

Integration with AppD for even deeper app insights

Coming Soon

AppDynamics (Application Performance Mgt)
Can I prove it works to the business stakeholders
Correlate Business and Performance

- Focus Efforts on Business Impacting Issues
- Justify Investments with Business Metrics
- Compare Different IT Deployments

Real-time Business Health
Correlated Business and Performance KPIs
IT & Business Alignment
One more thing.....
CloudCenter Suite
Multicloud management platform securely design, deploy, and optimize anywhere

End to End Lifecycle
One Integrated Platform
New and Existing Applications

Data Center
Private Cloud
Public Cloud
Container as Service
To recap ....
Want to know more?

- **Deploy IT**
  - Application Experience
    - "Follow business needs"
    - Accelerate Deployments
  - Public Cloud
    - "Take control"
    - Move to the cloud efficiently.
  - On-Prem Cloud
    - "Good Multicloud starts at home"
    - Optimize Opex and Capex

- **Secure IT**
  - Tetration Analytics (Enforcement)
- **Make IT Perform**
  - App Dynamics
- **Optimize IT**
  - Cisco Workload Optimization Manager (CWOM)
- **Agile Infra**
  - Intent-Based Data Center Anywhere (HX-AP, Cloud-ACI, MSO, Intersight)

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Want To See More?

EASY: Experience Application Securely anywhere