Transform Your Network Infrastructure for Multicloud

Joseph Yap
ASEAN DC Switching Sales Lead, Cisco Systems
Jan 2019
Digital **transformation** driving innovation

<table>
<thead>
<tr>
<th>Apps</th>
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</table>

None of these are possible without an efficient underlying infrastructure.

- Artificial Intelligence
- Internet of Things
- Autonomous Systems
- Digitized Security
- Consumption Models
Digital transformation driving innovation

None of these are possible without an efficient underlying infrastructure

- Multicloud
- Security
- Cost and Complexity
- Simplicity & Agility
- Scalable
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

Source: Cisco Global Cloud Index, Feb-18
Strategic Cloud Imperatives

IT must adapt faster than ever before

65%

1. Modernizing IT infrastructure
2. Automating & optimizing business operations
3. Automating & optimizing IT operations
4. Transforming customer interactions
5. Transforming employee interactions

Sources: Q2 & Q3, Cisco IT Talent Survey, phone-to-web survey of 600 business and IT executives in the US and Europe (UK, Germany, France, Switzerland); fielded October 2017

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Intent-Based Networking is the future

Simpler
Capture intent, translate to policy, and check integrity

Secure
Automated network and/or policy configurations on any cloud

Correct and optimized
Continuous verification, insights and visibility plus corrective actions
The Autonomous Network

**Sensors**
Lasers, radars and cameras detect objects in all directions

**Interior**
Designed for riding, not for driving

**Electric batteries**
To power the vehicle

**Rounded shape**
Maximizes sensor field of view

**Computer**
Designed specifically for self-driving

**Back-up systems**
For steering, braking, computing and more

**Assurance**

**Automation**

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Cisco ACI

- Simpler & better networking for your business
- Any DC network: Any Size, Anywhere, Any form
- Based on Nexus 9000 covering any bandwidth (100Mbps – 400Gbps)
IT administrators work in silos.

There is no shared architectural model.

Without ACI

New Application

Application Requirements

Weeks

Efficient

Shared model for policy automation.

Faster

IT admins work at the application level.

Hours

With ACI

New Application

Application Policy

Simpler
ACI / N9k - Strong Adoption in the Marketplace

30,000+
Nexus 9K Customers Globally

5,800+
ACI Customers

65+
Ecosystem Partners

$3B
Business Run Rate

ECOSYSTEM PARTNERS

NetQoS, AVI Network, CFEngine, Splunk, radware, Check Point, CloudStack, Turbonomic, Microsoft, redhat, IBM, Nutanix, NetScout, MAPR, A10 Networks, Fortinet, Cloudera, puppet, One Convergence, VCE, NetApp, Symantec, BMC, ScienceLogic, EMC², Emulex, Sourcefire, Canonical, Datto, DATOS

KillerIT, Vmware, Zenoss, Apprenda, ServiceNow, N3N, AlgoSec, Tufin, Panduit

Infoblox, VERITAS, VMWARE, CITY, 2013 INTEROP AWARD, NewsWire, Excellence in SDN, SDN Zone, 2013 MEDARIZ 1H, AlgoSec, Tufin, Panduit
The platform is proven at scale in Global Financial Customers
Bank Central Asia accelerates service innovation with application-centric, software-defined infrastructure

Size: 25,000 employees  |  Industry: Financial services  |  Location: Jakarta, Indonesia

Bank Central Asia (BCA) is one of the leading private banks in Indonesia, offering business transactions, credit loans, and financial solutions for more than 16 million corporate, commercial, and individual customers. BCA services are delivered through 1,213 branches, 17,207 ATMs, more than 400,000 electronic data capture (EDC) machines, and 24-hour Internet and mobile banking.

**Challenges**
- Accelerate service innovation
- Increase operational agility and responsiveness
- Protect sensitive client and financial data
- Maintain high availability

**Solutions**
- Application-centric, software-defined networking
- Centralized, automated infrastructure management

**More Information**
- Visit: cisco.com/go/ac

**Results**
- Faster infrastructure deployments and changes
- Better data segmentation and security
- Easier IT monitoring and troubleshooting

**Products**
- Cisco® Application Centric Infrastructure (Cisco ACI™)
- Cisco Application Policy Infrastructure Controller (Cisco APIC)
<table>
<thead>
<tr>
<th>BCA Task</th>
<th>Before Cisco ACI</th>
<th>After Cisco ACI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server connectivity</td>
<td>Configuration on each switch or router</td>
<td>Configuration through centralized management console (Cisco APIC)</td>
</tr>
<tr>
<td>Virtual Machine (VM) connectivity</td>
<td>5 manual processes</td>
<td>3 manual processes</td>
</tr>
<tr>
<td>New VM server for existing application</td>
<td>10 to 20 minutes</td>
<td>10 seconds</td>
</tr>
<tr>
<td>Endpoint physical port tracing</td>
<td>5 to 10 minutes</td>
<td>30 seconds</td>
</tr>
<tr>
<td>Capacity measuring</td>
<td>10 to 30 minutes</td>
<td>20 seconds</td>
</tr>
<tr>
<td>Network configuration</td>
<td>Manual</td>
<td>XML/JSON scripting through API</td>
</tr>
</tbody>
</table>

“Moving from traditional networking to application-centric networking has made us all faster and more efficient.”

Lily Wongso
Data Center Network Manager, BCA
Five year cumulative benefits – IDC ROI spotlight

Symantec

441% ROI

$145M in business benefits
11 month payback
87% faster application development cycle
83% more efficient network operations
40x improvement in bandwidth

Pulsant

513% ROI

$7.8M in discounted business benefits
6.4 month payback
85% reduction in staff time for provisioning
75% reduction in staff time for hybrid deployment
0 unplanned downtime since deployment

Integra

368% ROI

$3.73M in discounted business benefits
9 month payback
90% less staff time to provision hosted svcs.
29% more efficient network operations
Supports growth of new cloud-based hosted pbx svc.
ACI with ACI Anywhere
Any Workload, Any Location, Any Cloud

Remote PoD
Multi-Pod / Multi-Site
Hybrid Cloud Extension

Remote Location
On Premise
Public Cloud

Security Everywhere
Analytics Everywhere
Policy Everywhere

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ACI MultiPod

Single APIC Cluster Extends Network Virtualization, Policy, Services to Multiple PODs

- Active-Active Datacenters
- Virtual Metro Clusters
- Stretch VRF, EPG, BD Across PoDs with VXLAN
- Up to 50ms Latency
ACI Multisite
Extends Network Virtualization, Policy, Services to Multiple Fabrics

Geographically Dispersed
Active/Active Data Centers
For Disaster Recovery

Active/Standby Data Centers
For Disaster Recovery

Stretch VRF, EPG, BD
Across Sites with VXLAN

Up to 500ms to 1 sec Latency
ACI Multi-Site

Multi-Site Orchestrator

- Consistent Policy across sites
- Single Point of Orchestration
- Fault Isolation
- Scale

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Policy Consistency | Single Point Of Orchestration | Availability Fault Isolation | Scale
ACI Remote Leaf

Zero Touch Auto Discovery of Remote Leaf

<= 300 ms RTT, 100M+ BW
Up to 20 Remote Locations

Single central management
Automated L2 VXLAN extension
ACI Virtual Edge

Maintain Existing Operational Models
Simple Transition/Migration AVS => AVE
Policy Consistency Across Multiple Hypervisors
AVS/AVE Feature Parity

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Cisco ACI Virtual Pod
Extend ACI to Bare Metal Clouds and Remote Data Centers

On-premises ACI Data Center

Bare Metal Clouds
(IBM, OVH, etc.)

Remote Data Centers

Co-location Facilities
(Equinix, CoreSite etc.)

Brownfield Deployments

IP Network

Logical connection to Spine
(BGP-EVPN)

Policy extension from On-premise DC

Virtual Pod

ACI Virtual Edge

Hypervisor

Remote location
ACI vPod Use Cases

- Bare Metal Cloud
- Brownfield
- Co-location/Remote DC

ACI Main Data Center

Data Center A

Data Center B

Data Center C
ACI Extensions to AWS

ACI Policy Mapped To AWS Cloud Native Constructs
## ACI Security Certifications

<table>
<thead>
<tr>
<th>Certification</th>
<th>ACI</th>
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<tbody>
<tr>
<td>PCI</td>
<td>Certified</td>
</tr>
<tr>
<td>UC APL</td>
<td>Certified</td>
</tr>
<tr>
<td>FIPS</td>
<td>Certified</td>
</tr>
<tr>
<td>Common Criteria</td>
<td>Certified</td>
</tr>
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**Vulnerability Scanners**
- Nessus, Fuzzing, etc...
- Port Scan, AppScan

Certified (Ran every release)
MultiCloud Needs ACI More Than Ever

ACI policies that follow the workloads anywhere

Remote Leaf, or Virtual PoD

ACI / Multi-Site
ACI Mini Fabric

Multi-cloud Extensions

Remote Location

On Premise

Public Cloud

Security Everywhere

Analytics Everywhere

App Deployment Anywhere
Tetration Analytics Platform
Intent-Based Network for Data Center

Intent “Should”

Policy & Automation

ACI

Tetration Analytics

Cisco Network Assurance Engine (CNAE)

Assurance “Can”

Guarantees Compliance Consistency

ADM Policy Forensics

Analytics “Has”

Traffic Analysis “Lots of Data”
Main features

- Software sensors that support bare-metal, virtual machines and containers
- Other telemetry collection option includes Nexus 9000 series hardware, ERSPAN and Netflow sensors

- Visibility into every packet, every flow within the datacenter
- Information about users accessing application, user groups and location
- Long term retention for telemetry and forensics
Cisco Tetration Platform

Security use cases

Advanced security
- Process security
- Software inventory baseline

Segmentation
- Whitelist policy
- Application segmentation
- Policy compliance

Insights
- Visibility and forensics
- Process inventory
- Application insight
Intent-Based Network for Data Center

- **Intent “Should”**
  - Policy & Automation

- **Assurance “Can”**
  - Configuration Analysis
  - “Very Large State-Space”

- **Guarantees Compliance Consistency**

- **Analytics “Has”**
  - ADM Policy Forensics

- **Cisco Network Assurance Engine (CNAE)**

- **Tetration Analytics**

- **Continuous Verification & Validation**
Assurance in Other Industries

- **Chip Design**: Functional and Physical Design Verification, Lint, Timing Analysis
- **Software Verification**: Semantic Checks, Dynamic Testing, Memory Profiling
- **Mars Rover**: Mars Rover (B) Still Operational After 14 yrs with Formal Verification

Formal Methods Assure Intent
Cisco Network Assurance Engine

Data Collection
Captures all non-packet data: intent, policy, state across data center network

Comprehensive Network Modeling
Mathematically accurate models spanning underlay, overlay and virtualization layers

Intelligent Analysis
5000+ domain knowledge-based error scenarios built-in, codified remediation steps
What Makes Cisco Network Assurance Engine Unique

- **Codified Cisco Domain Knowledge**
  - 5000+ built-in failure scenarios

- **Deep Policy Controller Integration**
  - Assures controller policy and configurations

- **Most Comprehensive Analysis**
  - Capture and analyze switch configs + hardware
What are the Benefits?

- Predict the impact of changes
- Proactively verify network-wide behavior
- Assure network security policy and compliance
What are we Delivering?
The Autonomous Vehicle

**Sensors**
Lasers, radars and cameras detect objects in all directions

**Interior**
Designed for riding, not for driving

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To power the vehicle

**Rounded shape**
Maximizes sensor field of view

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Intent-Based Networking for the Data Center and the MultiCloud

Automation
- Intent
- Policy & Automation
- Application Centric Infrastructure (ACI)

Assurance
- Network Assurance Engine
- Compliance
- Consistency
- Configuration Analysis

Analytics
- ADM Monitoring Forensics
- Tetrion Analytics
- Traffic Analysis "Lots of Data"

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