TOMORROW starts here.

SECURITY EVERYWHERE
Policy Architected Data Center

Defined by Applications. Driven by Policy. Delivered as a Service.

Marty Ma
Technical Solution Architect, Data Center and Cloud
Cisco Greater China xArchitecture Team
Data Center and Cloud – Top Challenges
Business Expectations in the Digital Era

Manage IT Change
- Cloud
- Mobile
- Social

Cloud Strategy
- Shadow IT Cloud
- DevOps
- Flat IT budgets
- Deliver IT-as-a-Service Consistently Across Public and Private Clouds

New Application Architectures
- Big Data / Analytics
- Cloud-Scale Apps

Security and Compliance
- Securing Data Within DC and Across Clouds

“Bi-Modal IT”

Hybrid Clouds

Data Insights

Pervasive Security
## What Is “Bi-Modal IT”?

<table>
<thead>
<tr>
<th>Trait</th>
<th>Mode 1 — Reliable</th>
<th>Mode 2 — Agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>Price for performance</td>
<td>Revenue, brand, customer experience</td>
</tr>
<tr>
<td>Objectives</td>
<td>Cost reduction</td>
<td>Flexibility and speed</td>
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<td></td>
<td>Cost predictability</td>
<td>Manage uncertainty</td>
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<td>Build to a specification</td>
<td>Validate, learn, pilot</td>
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<td></td>
<td>Reliable, secure, well-managed risks</td>
<td>Fail fast, fail frequently, fail small</td>
</tr>
<tr>
<td>Governance</td>
<td>Plan-driven, approval-based</td>
<td>Empirical, continuous, process-based</td>
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<tr>
<td>Culture</td>
<td>IT-centric, removed from customer</td>
<td>Business-centric, close to customer</td>
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<tr>
<td>Requirements</td>
<td>Predictable and known functionality</td>
<td>Requirements change frequently</td>
</tr>
<tr>
<td></td>
<td>Performance requirements are known</td>
<td>Requirements are uncertain</td>
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<td></td>
<td>Capacity needs can be predicted</td>
<td>Unpredictable capacity needs, scale to demand</td>
</tr>
<tr>
<td>Rate of Change</td>
<td>Stable, low-change, incremental change</td>
<td>Rapid and frequent</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Mature technology</td>
<td>Technology may be immature</td>
</tr>
<tr>
<td></td>
<td>Mature suppliers</td>
<td>Suppliers may be small or immature</td>
</tr>
<tr>
<td></td>
<td>Long-term deals</td>
<td>Short-term deals</td>
</tr>
<tr>
<td>Personality</td>
<td>Linear, step-by-step, slow but steady</td>
<td>Inquisitive, thrives on change</td>
</tr>
<tr>
<td>Cycle Times</td>
<td>Long (months)</td>
<td>Short (days, weeks)</td>
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Source: Gartner (March 2015)
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"Mode 1" Apps @ "Mode 2" DC Infra = Availability Challenge

"Mode 2" Apps @ "Mode 1" DC Infra = Resource optimization & Scale Challenge
We Are at the Beginning of a Major Shift

- Efficiency
- Virtualization
- Consolidation
- Automation
- Simplicity
- Agility
- Standardization
- Hybrid Cloud
- Distributed Cloud Data Center
- The IoE Era
- IaaS | PaaS | SaaS | XaaS
- Connected Experiences
- Adoption Curve
- IT as a Service
- The Next 5+ years

2000 2008 2015
Automation ≠ MicroManagement

**Challenges:**
- Manual processes
- Complex handoffs between teams and domains
- Static resource allocation

**Business Outcome:**
- Days/weeks/months to deploy IT services
- High operational cost
- Rigid silos
- Infrastructure inefficiency and under utilization
Would a Software Only Overlay Suffice?

**Advantage**

- **Increased Agility For Virtual Devices** – Faster configuration and provisioning of virtual devices

**Disadvantage**

- **Partial Solution** – Embedded support only for virtual devices
- **Operational Complexity** – Two networks
- **No Traffic Visibility** – Limited troubleshooting
- **Limited Scale** – Centralized gateways, sub-optimal traffic flow
Abstraction, the Real Objective of “SDN”
How to Avoid “Death by MicroManagement”?

“Simplicity is the ultimate sophistication.”
— Leonardo da Vinci
Infrastructure Layer with Domain Controllers

Summary Complexity

Domain Controller

Business Language

Network Language
Orchestrate the Abstraction, rather than Implementation
Automation via Policy

On-Demand Automated Delivery

Single Pane of Glass

End-to-End Infrastructure Automation and Lifecycle Management

Policy-Driven Provisioning

Secure Cloud Container

Network Compute VMs Storage

Domain Managers

OS and Virtual Machines

Virtualized and Bare-Metal

Compute

Compute and Hypervisor

Network

Network and Services

Storage

Tenant A Tenant B Tenant C

Bare Metal

Virtualized and Bare-Metal

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Policy – what do we mean?
A ‘MetaModel’ used to define IT Services

Use template to represent a service as a directed graph

XML/JSON based description for each components/capabilities in the template provide consistent view from application level all the way down to infrastructure orchestration
Policy – Empowers Cohesiveness as DC Infrastructure Evolves
Policy – Linking the Application Language to Infrastructure

Application Language

- Multi-Tier / DevOps
- Security & Compliance
- SLA
- Performance
- Compliance
- High-Availability

Decouple Application AND Policy from underlying infrastructure

Common Policy

App Network Profile

UCS Service Profile

Network Language

Compute Language

Security Language
Cisco ACI
The Most Complete Solution for Our Customers
Cisco ACI Complements, Enhances, and/or Replaces Any SDN Offering

<table>
<thead>
<tr>
<th>Bare Metal Applications</th>
<th>ORACLE</th>
<th>SAP</th>
<th>Hadoop</th>
<th>Microsoft Exchange</th>
<th>Business Objects</th>
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<td>Virtualized Applications</td>
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<td>Optional Software Overlay</td>
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Foundation:
Nexus or ACI
Pillars of ACI
Rapid Deployment of Application onto Open Networks with Scale, Security, and Full Visibility

Application Centric Infrastructure

ACI Fabric/Nexus 9000
Application Centric Policy
Open Ecosystem

Industry Leading Partnerships
Application Centric Infrastructure Fabric

Flat Hardware Accelerated Network
Full abstraction, de-coupled from VLANs and Dynamic Routing, low latency, built-in QoS

Flexible Insertion
Every device is one hop away, microsecond latency, no power or port availability constraints, ease of scaling

Unified Management and Visibility
ACI Controller manages all participating devices, change control and audit capabilities

Fabric Port Services
Hardware filtering and bridging; default gateway; seamless service insertion, “service farm” aggregation

Logical Endpoint Groups by Role
Heterogeneous clients, servers, external clouds; fabric controls communication
Application Centric Policy

1. Subject Matter Experts Define Policies
2. Policies Used To Create Application Network Profile Templates
3. Automated policy configuration across the infrastructure
4. Life cycle management for day 1, day 2 operations
ACI Vision: Scale, Security, and Full Visibility

Enabled by physical and virtual integration
Open Enables Choices and Investment Protection

Northbound Partners

Hyper-Agility
Security & Governance
Biz. Insights

DevOps
Systems Management
Orchestration Frameworks

Analytics
Enterprise Monitoring

Open Infra.
Security & Services
L4-L7 Services

Fabric Attached Devices

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Data Centers Built on Open Architectures

Open Source

- OPEN DAYLIGHT
- python
- OpFlex
- docker
- openstack
- Chef
- puppet

Open Standards

- IETF
- IEEE
- VXLAN
- NSH
- OpFlex

Open Interfaces

- RESTful APIs (XML)
- JSON

Open Ecosystem

- UCS
- ACI
- Inter-cloud
An Open Ecosystem Approach

What Started with UCS

Is Extending to the Network

And Intercloud!
ACI Delivers Secure Multi-Tenancy at Scale
Automated Protection to Cover the Attack Continuum

EMBEDDED IN ACI

POLICY DRIVEN
Physical & Virtual

CENTRALIZED AUTOMATION
Audit, Detect, Mitigate

INVESTMENT PROTECTION

FirePOWER Now Integrated with ACI
Validated for Deployment in PCI Compliant Networks
ACI Enables Segmentation Based on Business Needs

- **Basic DC Network Segmentation**
  - PRODUCTION POD
  - DMZ
  - SHARED SERVICES

- **Segment by Application Lifecycle**
  - DEV
  - TEST
  - PROD

- **Network centric Segmentation by VLAN**
  - VLAN 1
  - VLAN 2
  - VLAN 3

- **Per Application-tier / Service Level Micro-Segmentation**
  - WEB
  - APP
  - DB

Level of Segmentation/Isolation/Visibility
Cisco Policy Architected Data Center

Consistent Management, Automation and Policy

Unified Compute
Stateless Computing
Simplified Operations

Nexus Data Center Switching Application Centric Infrastructure
Stateless Networking
Business Agility

Integrated Solutions
Policy Driven Storage
Reduced Costs

Comprehensive Security
POLICY-Architected DATA CENTER

Bring Your Data Center Closer to IoE/IoT, Remote Branches with Distributed Analytics

Get Secure Workload Mobility with Any Cloud

Optimized for Bi-Modal IT
Automated | Simple | Secure

Network and Policy Drive the End-to-End Digital Experience