LET’S BUILD TOMORROW TODAY
The Rise of the Intercloud

How Service Providers Can Leverage the Platform for the Internet of Everything

Tom Williams, Director, Cloud Business Development
Azhar Sayeed, Sr. Director of Solutions Engineering
Agenda

• Introduction
• IoE and the Cloud Platform
• Cisco/Microsoft Partnership
• Cisco Cloud Architecture for the Microsoft Cloud Platform - Technical Architecture
• Key Service Provider Benefits
IoT Is Here Now – And Growing!

The New Essential Infrastructure

Rapid Adoption rate of digital infrastructure:
5X faster than electricity and telephony

World Population

Timeline

2010  2015  2020

0  10  20  30  40  50

Billions of Devices

Inflection point

12.5  25

6.8  7.2  7.6

6.8  7.2  7.6

50 Billion
Smart Objects

6.8  7.2  7.6
Enablers/Drivers of IoT
More Innovation and Change than at Any Other Point in Our Lifetime

Technology Transitions
- BYOD
- Cloud
- New Breed of Apps
- Sensors & Devices
- Big Data Analytics

Network as the Platform

Business Transitions
- Growth & Innovation
- New Business Models
- Experience Expectations
- Globalization
- Security & Privacy
What Will it Take?  
Operational Technology Network Transformation

From Basic Connectivity... …to a Critical Part of the Enterprise Infrastructure

From Proprietary Standards… …to Open Standards

From Disparate IT and OT Networks… …to Converged, Secure and Collaborative Operations
## Internet of Things: What If, We Deliver a 1% Improvement?

<table>
<thead>
<tr>
<th>Industry</th>
<th>Segment</th>
<th>Type of Savings</th>
<th>Estimated Value Over 15 Years (Billion Nominal USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation</td>
<td>Commercial</td>
<td>1% Fuel Savings</td>
<td>$30B</td>
</tr>
<tr>
<td>Power</td>
<td>Gas-fired Generation</td>
<td>1% Fuel Savings</td>
<td>$66B</td>
</tr>
<tr>
<td>Healthcare</td>
<td>System-wide</td>
<td>1% Reduction in System Inefficiency</td>
<td>$63B</td>
</tr>
<tr>
<td>Rail</td>
<td>Freight</td>
<td>1% Reduction in System Inefficiency</td>
<td>$27B</td>
</tr>
<tr>
<td>Oil &amp; Gas</td>
<td>Exploration &amp; Development</td>
<td>1% Reduction in Capital Expenditures</td>
<td>$90B</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$276B</strong></td>
</tr>
</tbody>
</table>

### Value for Transportation: $57 Billion in Aviation and Rail alone

Source: “Industrial Internet: Pushing the Boundaries of Minds and Machines,” GE, November 26, 2012
Cisco Internet of Things Portfolio

- Manufacturing
- Mining
- Energy-Utity
- Oil & Gas
- Transportation
- Cities
- Defense
- SP / M2M

Plant-wide Ethernet, Intelligent Transportation, Smart Cities, S&C Refinery, Smart Connected Vehicle, Smart Grid

**Plant Switching**
- IE 2000
- IE 3000
- CGS 1000
- CGS 2500

**Plant Routing**
- CGR 2000

**Field Network**
- CGR 1000
- 1552 Rugged Wireless
- 819H M2M ISR Gateway Router

**Embedded Networks**
- 5915, 5940 ESR
- 5921 S/W only ESR
- ESS 2020

**Physical Security**
- Video Surveillance Manager and IP Cameras
- IPICS
- Physical Access Manager

**Network Management and IoT Security**

**Fog Computing**

**Data Center / Virtualization**
Applications in IoT space vary with the vertical

**Enterprise Scale Products/Technologies**
- Best-in-class ruggedized products
- Legacy applications that are mission critical and rely on network availability
- Architected to meet the vertical needs
- Examples: Oil and Gas, Mining, Energy-Utility, Manufacturing, transportation

**Web Scale**
- Applications that new and designed from the ground up
- Resilient to failures and designed to take advantage of Web architectures
- Examples: Smart Parking, Smart Lighting, Traffic Management, Public Safety
Introducing Cisco Cloud Architecture for the Microsoft Cloud Platform
Customers Are Demanding Solutions that Are…

<table>
<thead>
<tr>
<th>Deployed on Demand</th>
<th>New services and enterprise applications provided at Dev-Ops speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workload Tuned</td>
<td>Environments optimized through an application-centric approach</td>
</tr>
<tr>
<td>Cloud Connected</td>
<td>Hybrid Cloud solutions seamlessly enabled for end-customers</td>
</tr>
</tbody>
</table>
Intercloud Must Support Both “Scale Up” and “Scale Out”
Scale up for 90% of today business, scale out to expand

**Scale Up: Infrastructure designed for resiliency**
- Stateful architecture with infrastructure failure resulting in loss of critical data
- Application completely reliant on the infrastructure for resiliency

**Scale Out: Designed for rapid scale**
- Stateless architecture with infrastructure failures not resulting in any loss of data
- Needs software defined networking and storage
- Infrastructure not resilient
- Application centric with application managing it’s resiliency

**Relative Market Size**

- Traditional Enterprise Workloads
  - Stateful architecture with infrastructure failure resulting in loss of critical data
  - Application completely reliant on the infrastructure for resiliency

- Cloud Native Workloads
  - Stateless architecture with infrastructure failures not resulting in any loss of data
  - Needs software defined networking and storage
  - Infrastructure not resilient
  - Application centric with application managing it’s resiliency
“James Staten, Cloud Analyst from Forrester says that it will be 5 years before the majority of "systems of engagement", are cloud native, and 7-10 before the majority of "systems of record are cloud native".
Cisco and Microsoft Are Working Together to…

- Deep level of engagement
- Shared long-term vision
- Alignment around customer success
…Deliver an Integrated Cloud Solution for Service Providers – Taking Advantage of IoE

<table>
<thead>
<tr>
<th>Comprehensive Cloud Platform</th>
<th>Increased Profit Potential</th>
<th>Faster Time to Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Joint product engineering</td>
<td>• Offer new differentiated services</td>
<td>• Lifecycle approach to policy management</td>
</tr>
<tr>
<td>• Joint solution engineering</td>
<td>• Lower TCO and OpEx</td>
<td>• Enable cloud opportunities</td>
</tr>
<tr>
<td>• Cisco® Architected Designs / Solutions</td>
<td>• Operational simplicity and control</td>
<td>• Go-to-market partnership</td>
</tr>
</tbody>
</table>
Beyond SDN – Software Defined Data Center

From VMDC…

• Data Center Fabric using Nexus 7000, Nexus 5000, Nexus 2000
• NOT SDN Capable, STATIC connection policies
• Programmable connections per by tools OUTSIDE the Fabric
• 10G / 40G Capable

To CCA…

• Data Center Fabric using Nexus 9000, ACI/APIC
• SDN Capable, Programmable features built into Fabric including Security
• STATELESS Policy Model (APIC), fabric automation built-in
• Repeatable Deployment Model using Network/Service Profiles
• 10G / 40G AND 100G Capable
• Lower Cost per Port Switching

External tools to stitch a specific container

SDN Application Network Profiles, Stateless, repeatable, secure, faster to deploy
Lifecycle Approach to Policy Management by Integration of the Cisco Application Policy Infrastructure Controller (APIC) Directly into Windows Azure Pack (WAP)
Cisco and Microsoft Cloud Solution

Completely altering the service provider hybrid cloud delivery experience through a preprogrammed SDN platform that ties infrastructure, applications and services together.
Cisco Cloud Architecture for Microsoft Cloud Platform

**Enterprise Customers**

- **WAN Gateways**
  - Cisco Edge Gateways
    - Virtual CSR or Physical ASR-9K, ASR-1K

- **Data Center Switching**
  - Nexus
    - Nexus-9K or Standalone

- **Integrated Compute/Storage**
  - Microsoft Hypervisor
    - Cisco Compute: UCS, FlexPod, vBlock, Colusa 2

**Services**
- IaaS
- PaaS
- SaaS
- DRaaS

**Applications**
- SQL-aas
- Exchange
- SharePoint
- DeskTop

**Microsoft Hypervisor Providers**
- Azure Public Cloud / Cisco Intercloud

**MPLS (incl. MS ExpressRoute)**

**Value Added Services**
- DRaaS, BaaS

**Application Catalogue**
- SQL, Exchange, SharePoint, DeskTop

**Cisco Automated Catalogues**
- Azure Resource Providers (Cisco Products, Tenant Models)
- Application Catalogue (SQL, Exchange, SharePoint, DeskTop)
- Value Added Services (DRaaS, BaaS)
Start with an “Application Driven” Policy Model
Cisco and Microsoft Integration Effort

Applications

Storage
Security
Network
Compute
Apps
Azure Pack

Application Network Profiles

Firewall
ADC
WEB
APP
APP
APP
DB

Microsoft Azure Pack

Nexus 9K
Nexus 2K
Microsoft
Compute
Cisco
L4-L7 Services
Citrix
Sourcefire
EMC
NetApp
Multi DC WAN and Cloud
Integrated WAN Edge

Application Policies Automated across Infrastructure
CCA – Network Automation Manager
Building a Secure Cisco Network Container with Windows Azure Pack (WAP)

Cisco Network PLAN
Example in WAP

**Network Pattern 1**
- Customer
- WAN Gateway Services
- Tenant Perimeter Services
- Application Zone

**ADD-ONS to a Cisco Network PLAN**

**+ WAN Gateway Services**
- WAN Gateway Services

**+ Load Balancing Service**
- Load Balancing Service

**+ Another L2 Segment**
- Another L2 Segment

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Customer

WAN Gateway Services

Tenant Perimeter Services

Application Zone

MPLS L3 VPN

Site-to-Site VPN

MPLS L3 VPN

Site-to-Site VPN

MPLS L3 VPN

Site-to-Site VPN

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CCA – Network Automation Manager
Building a Secure Cisco Network Container with Windows Azure Pack (WAP)

Cisco Network PLAN Example in WAP

Network Pattern 1
- Customer
- WAN Gateway Services
- Tenant Perimeter Services
- Application Zone

+ WAN Gateway, + Load Balancing Service
- MPLS L3 VPN
- Site-to-Site VPN
- Tenant Perimeter Services
- WAN Gateway Services
- Application Zone

ADD-ONS to a Cisco Network PLAN

+ Secure Application Zone
- MPLS Express Route
- Site-to-Site VPN
- Tenant Perimeter Services
- WAN Gateway Services
- Application Zone

+ Backup Zone
- DMZ
- Application Zone 2
- WEB
- APP
- Cloud Storage as a Service
- Value-Added Service Zone

Tenant Perimeter Services

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Building a Cisco Network Container with Add-on Services Controlled thru Window Azure Pack PLANS and ADD-ONS Service Models

Cisco Network PLAN Example

- MPLS L3 VPN
- Site-to-Site VPN
- Remote Access VPN
- WAN Gateway Services
- Zone 1
- Zone 2
- Zone 3
- DMZ Zone
- X as a Service
- Value-Added Service Zone
- Tenant Perimeter Services
Windows Azure Pack
Service Management Portal

Cisco Network PLAN

Network patterns are offered as PLANS, and managed by the SP Admin
Windows Azure Pack
Service Management Portal

Network **PLAN ADD-ONS**

**ADD-ONS** provide optional features to network **PLANS**, and are managed by the admin.

- + WAN Gateway Services
  - MPLS L3 VPN
  - Site-to-Site VPN
- Tenant Perimeter Services
- Application Zone

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Cisco Network **PLANS**

Network patterns are offered as **PLANS**, and managed by the SP admin.

- **Network Pattern 1**
  - Customer
  - WAN Gateway Services
  - Tenant Perimeter Services
  - Application Zone

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Cloud Resource Providers Automate Cloud Offers
Rapid Onboarding of Tenants and Applications onto the Cisco Cloud Infrastructure

Cloud Management Components

- Windows Azure Pack
- Microsoft System Center
- Power tools for Compute/Storage
- Resource Providers for Network and Services
- Windows Server 2012 R2 with Hyper-V
- UCS Manager
- Nexus
- Security & Services
- WAN Gateways
- Cisco Network Resource Provider
- Cisco Power Tools for UCS
- Compute
- Storage
- Hypervisor
- Application
- Cisco Live!

Cisco Cloud Infrastructure

- Data Center PE
- Cisco ASR 9004
- Cisco ASR 1000
- Cisco CSR
- Data Center Network
- ACI with Nexus 9000 and APIC
  - Nexus 9508 with 9736PQ
  - Nexus 9300PQ
  - Nexus 95128TX
- Services
  - ASA 5586-X
  - ASA
  - NetScaler
- Virtual Access
  - Microsoft Virtual Switch
- Compute
  - UCS 6250 Fabric Interconnect with UCS B Series Blade Servers
  - UCS C-Series Rack Servers
  - Cisco Nexus 2232 FEX
  - Cisco Nexus 2248 FEX
- Storage
  - NetApp FAS
  - EMC VMAX, VNX or any other
- Management
  - Microsoft Cloud OS Network
  - Windows Azure Pack
  - UCSM and APIC
  - Resource Providers

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CCA for IoE – The Best Choice

- IoE needs both scale-up and scale-out cloud
- IoE has mission-critical legacy applications that need highly available zones for cloud based operations
- IoE needs common cloud platform that can drive multiple services as each service in itself may not be business effective
- CCA for MCP can provide the perfect platform for both scale up and scale out
- CCA well suited for Enterprise mission-critical applications that require offloading of common applications to SP private cloud
- CCA also well suited for a hybrid cloud model with on-premise, off-premise, scale up and scale out
Cisco Cloud Architecture with Microsoft for IoE

<table>
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<th>Description</th>
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<tbody>
<tr>
<td>More Profitable Services</td>
<td>IaaS / SaaS / PaaS Platform jointly engineered to facilitate rapid adoption of application services</td>
</tr>
<tr>
<td>Dramatically Lower TCO</td>
<td>Deep technical integration between Cisco and MSFT stacks to automate delivery of Cloud services and common IT tasks</td>
</tr>
<tr>
<td>Reduce Risk and TTM</td>
<td>Reduce risk and speed deployment through Cisco and MSFT validated profiles, designs and consulting services</td>
</tr>
<tr>
<td>Increase Demand</td>
<td>Leverage both Cisco and MSFT GTM programs to address Scale-Up services in market transition to as-a-service ICT</td>
</tr>
<tr>
<td>Simplified Support</td>
<td>Cisco and MSFT solution provide a simplified support model versus complex multi-vendor support model</td>
</tr>
<tr>
<td>Investment Protection</td>
<td>ACI oriented lifecycle approach to system development, improvement, support and service delivery</td>
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TOMORROW starts here.