Data Center Modernization Webinar

Charles Apdua
ASEAN Data Center vSales Specialist
What Makes Up the SP DC Architecture?

<table>
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<tr>
<th>Category</th>
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<td>Servers</td>
<td>Physical Hosts and Virtual Workloads</td>
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<tr>
<td>Storage</td>
<td>Array Based as well as locally attached</td>
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<tr>
<td>Network</td>
<td>Data Center Switching – Layer II/Layer III and FC SAN + Security</td>
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<tr>
<td>Software</td>
<td>Control, automation, analytics, security and visibility</td>
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![Diagram](image-url)
What is Enabling SP DC Architecture?

- **Virtualization**: Services are being virtualized to optimize OPEX/CAPEX
- **Disaggregation**: Distributed datacenter architecture for better speed and latency
- **Automation**: Centralized automation and orchestration for operations
There is Nothing
"CENTER-ED"
About Data Anymore
There is Nothing "CENTER-ED" About Data Anymore

Enterprise DC
This is where we began, and it’s here to stay

Public Cloud
A new operating model and growth of cloud native apps

Private Cloud

IoT Edge
Significant amounts of data are being generated remotely which need to be analyzed, processed, and consumed.

5G Telco Edge
New apps are creating new BW demands

Enterprise Edge
Data processing needs to be closer to the sources of demand

Colo
The DC Needs to go Anywhere the Data is
Living on the edge
The Intersection of Data and Applications

IT organizations are challenged with securing, monitoring and reliably transporting the dispersed data.
DC Switching
Using DC to Transform the SP

Legacy migration to modern DC future

- Legacy gear being de-commissioned
- Moving away from hardened single purpose appliances

- Modern DC hardware and software infrastructure
- Transformed to a multi-purpose cloud
- Built for automation
Nov 2013: Cisco Announces ACI
ACI has grown up
The DC network before
Classic modular switching

Supervisors (1 or 2)
Fabric Modules (3-5)
Linecards (Copper, Fiber, 1/10G)

Single chassis (e.g. Nexus 7000)

Up to 18 RUs Scale-up

The DC network now
ACI

APICs (1, 3 or more)
SPINE (1 to 6)

Zero-touch L2 VXLAN No STP

LEAVES (1 to 200 or more*)

Scale as you need

Single VXLAN Network**
Evolution from Nexus 5000 and Nexus 7000

* > 200 Leaves with MultiPod/Multi-Site
** Other topologies available (e.g. 3-tier, etc.)
**Without ACI**

- **Chaotic IT Operations**
- **Slower**
  - Configurations are not standardized and changes not automated (Inconsistencies/errors/delays)
- **Less Efficient**
  - Tribal knowledge, multiple configuration templates, ad-hoc CLI changes, needle-in-a-haystack troubleshooting

**With ACI**

- **Simpler**
- **Efficient**
  - Automate repeated tasks and predicative change impact analysis
- **Faster**
  - Software defined networking for multi-cloud environments
Without ACI

- New Application: Slower, IT administrators work in silos. Weeks.
- App Requirements: Less Efficient, no shared deployment model. Resulting in spreadsheets, checklists, scripts, emails, with individual physical and logical network configurations for each app.

With ACI

- Many New Applications: Simpler, IT administrators work at the application level. Hours.
- App Policy: Efficient, shared model for deployment and continuous changes through policy automation.

Faster: IT administrators work at the application level.

Efficient: Shared model for deployment and continuous changes through policy automation.
Application Centric Infrastructure
The Network Made Simple

Zero Touch Auto Provisioning
With Policy Driven Automation

Any Hypervisor, Any Workload
Physical, Virtual, Containers

Single Central Management
With Integrated Overlay And Full Visibility
ACI Anywhere

Automation with Consistent Policy

Virtual ACI

WAN

ACI On-Premises

WAN

Cloud ACI

WAN

Edge / Remote DC

Regional/Central Location

Public or Private Cloud

Security Everywhere

Analytics Everywhere

Policy Everywhere

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ACI Anywhere: **Multi Pod**
Single APIC Cluster Extends Network Virtualization, Policy, Services to Multiple PODs

Multicast on IPN needed & Jumbo Frames (<=1550) || <= 50 ms RTT Required
Up to 12 Pods, distributed gateway || Single central management (APIC)
Automated L2 DCI VXLAN extension
ACI Anywhere: **Remote Leaf**
Connect On-premises To Remote Offices With Nexus 9000 Switches

- **Zero Touch Auto Discovery**
  of Remote Leaf

- **<= 300 ms** RTT Required
  Up to 20 Remote Locations

- **Single** central management
  Automated L2 VXLAN extension
ACI Anywhere: **Multi Site Orchestrator**
Seamlessly Connect Multiple Data Centers At Scale

Multi-Site Orchestrator

Data Center 1 (ACI Site 1)

Data Center 2 (ACI Site 2)

Nexus 9000 (DC Network)

Nexus 9000 (DC Network)

Network

Network

IP Network

VXLAN L2 Extension

Local Router

Nexus 9000 (Remote Leaf Network)

No Multicast/No Jumbo Frames
Phased Changes (Zones)

<= 1s RTT Required (MSO → APIC)
Up to 12 Sites, distributed gateway

Single central management (MSO)
Automated L2 DCI VXLAN extension
ACI Anywhere: ACI Virtual Edge
Decoupled From Hypervisor Kernel APIs

Data Center 1 (ACI Site 1)

Data Center 2 (ACI Site 2)

ACI Virtual Edge

Policy Consistency Across Multiple Hypervisors

Enable Migration From Legacy To ACI

Maintain Existing Operational Models

Multi-Site Orchestrator

IP Network

VXLAN L2 Extension

Local Router

Nexus 9000

(Remote Leaf Network)
ACI Anywhere: **ACI Virtual Pod**
Extend ACI To Bare-metal Clouds, Remote Data Centers, and Legacy Infrastructure

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**Virtual Spine/Leaf Functionality w/AVE integration**

Up to 64 AVEs per vPod

Single central management
Automated L2 VXLAN extension

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ACI Anywhere: Public Cloud Extensions
Seamlessly Connect Multiple Data Centers

Discovery & Visibility
Policy Translation
CSR-1Kv/Direct-Connect integration
Single Point Of Orchestration
Operational Consistency

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ACI Anywhere

- Consistent Network and Policy across clouds
- Seamless Workload Migration
- Single Point of Orchestration
- Secure Automated Connectivity
1. NSX-v (vSphere)
2. NSX-T (KVM, Containers..)
3. Overlay in Software (troubleshooting)
4. Bare Metal workload Policy mgmt.?
5. Underlay Network Automation?

Applications
- Multi Cloud Workload Protection
- Model based Cloud Agnostic Blueprint
- APL
- APL
- APL
- Azure
- AWS
- Hypervisor-VMware
- Hypervisor-KVM

Virtual Services and Security
Overlay

Application Data Networking
- Network Assurance
- Intent based – Logical Networks
- Overlay Networking (Self Programmable)
- Underlay Networking (Self Programmable)
- Switching Hardware
Applications

Tetration
Cloud Center

APL
APL
APL
Azure
AWS

Multi Cloud Workload Protection
Model based Cloud Agnostic Blueprint

Hypervisor-VMware
Hypervisor-KVM

Virtual Services and Security

ACI

Network Assurance
Intent based – Logical Networks

Overlay Networking (Self Programmable)
Underlay Networking (Self Programmable)

Switching Hardware

Cloud Scale ASIC

Next-Gen DC

CNAE

ACI

ACI

ACI

ACI
What Is Hyperconvergence?

Traditional Approach – Converged

HCI is an Appliance that incorporates Server – Storage – Network And layers on SDS Software

HyperConverged

NO LEGACY STORAGE CONTRACTS

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HyperFlex Product Overview

**Enterprise workloads, Validated solutions**
- Citrix VDI deployment (XenDesktop and XenApp)
- Microsoft SQL, Exchange, SharePoint etc.
- Oracle & other mission critical apps
- Backup vendor integrations

**Integrated Management**
- Manage workloads from familiar vCenter, SCVMM, and Kubernetes
- Leverage HX Connect UI (HTML5) for HX management
- Automate HX operations using HX REST API
- Extend workloads to Google Cloud Platform

**Vendor-agnostic Virtualization**
- VMware vSphere 6.X
- Windows Server 2016 Datacenter
- Cisco Container Platform

**Complete Hyperconvergence**
- Fully integrated network, compute, storage, and virtualization
- Highly scalable, resilient, scale-out file protocol
- Fully distributed data system, No data locality
The New HyperFlex Edge

The Power of Cloud-Managed Computing

- Lights out, multi-site parallel deployment
- Rapid cluster profile creation and full stack upgrades
- Flexible scalability and investment protection
- Connected TAC Support

Ultra-light 2-node HyperFlex Edge

Customer Leveraging Existing Branch Network

Cloud Witness Service

Three-node cluster quorum without physical 3rd node!
HyperFlex Data Protection
In-built 1-Click Disaster Recovery

Test Recovery
- DR Readiness
- Customize DR Test parameters

Planned Migration
- Move VMs across Data Centers / Clusters
- Re-Protect after Migration

Unplanned Failover
- Recovery VMs after Disaster
- Re-Protect after Recovery

Long Distance Replication
HyperFlex Stretch Cluster
Cloud Scale Data Platform

Power Mission Critical Apps with

- Disaster Avoidance
- Maximum Uptime
- Zero RPO
- Automated DR

HX Data Platform

Site-A <-> Site-B

Synchronous Replication

DB | APP

SSD SSD SSD

DB | APP

SSD SSD SSD

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# HyperFlex Product Differentiation

Architected to Optimize Across Hardware, Software, Networking and Management.
Integrated Solution with Single Point of Support

<table>
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<tr>
<th>High Performance &amp; Scalable Data Platform</th>
<th>Enterprise Class Data Services &amp; Storage Optimization</th>
<th>Seamless integration of Converged &amp; Hyperconverged</th>
<th>Independent Scaling of Compute &amp; Capacity</th>
</tr>
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<tbody>
<tr>
<td>#1 Performing HCI platform</td>
<td>Integrated Dedup &amp; Compression w/ no performance penalty</td>
<td>Investment protection of existing storage and compute investment</td>
<td>Cost optimization through Compute-only node support</td>
</tr>
<tr>
<td>Consistent, Low latency performance</td>
<td></td>
<td></td>
<td>Cloud based centralized management</td>
</tr>
<tr>
<td>3X Lower TCO, 3X Higher VM Density, 64 node scale, linear scale out performance</td>
<td></td>
<td></td>
<td>Monitoring, Telemetry, Analytics, Policy, Orchestration, Proactive TAC, HX Cluster management</td>
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<tr>
<th>Deployment Automation &amp; Simplicity</th>
<th>Integrated High Performance Network Fabric</th>
<th>Data Protection, High Availability &amp; Resiliency</th>
<th>Cloud based centralized management</th>
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<tr>
<th>Broad Range Of Supported Workloads</th>
<th>ROBO (Branch, IOT)</th>
<th>VSI (app/web)</th>
<th>VDI (Citrix, Horizon)</th>
<th>Collaboration (UC, HCS)</th>
<th>Databases (Oracle, SQL)</th>
<th>Mission Critical &amp; ERP (SAP)</th>
<th>Analytics (Splunk)</th>
<th>Cloud-Native Apps (Docker, Kubernetes)</th>
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Cost optimization through Compute-only node support
Integrated High Performance Network Fabric
Native replication, backup/DR, Stretch Cluster, Availability Zones, Fault tolerant HA architecture
Monitoring, Telemetry, Analytics, Policy, Orchestration, Proactive TAC, HX Cluster management
Centralized Cloud-Based Management of the Future

- Telemetry and Analytics
- Policy Based Orchestration
- Secure and Compliant
- API Driven, DevOps Enabled
- Connected TAC

Cisco Intersight

Next Generation Management

Remotely Deploy & Manage

1. HyperFlex with Intersight
   - Ship to sites
   - Connect to Intersight
   - Deploy & manage remotely

2. Conventional Infrastructure
   - Ship from Factory
   - Integrate and Configure
   - Stage
   - Ship People and Infra to Sites
   - IT Deploy On-Site

Compatibility (HCL) Check

Recommendations Engine
Cisco HyperFlex Multicloud Services

Application Visibility Engine

Cisco AppDynamics

Workload Placement
Performance
Application Monitoring
Application Modelling
Instrumentation
Hybrid Cloud Management

Cisco CloudCenter

Cisco HyperFlex

Deployment Engine

Multicloud Infrastructure
Primary HyperFlex Use Cases

- **Virtual Desktop Infrastructure**
  - Low upfront costs
  - Consistent performance
  - Predictable scaling

- **Server Virtualization**
  - Reduce operational complexity
  - Adaptive scaling
  - Always-on resiliency

- **Test and Development**
  - Agile provisioning
  - Frequent iterations
  - Instant cloning and snapshots

- **ROBO & Edge**
  - Simple deployment
  - Centralized management
  - No "fly-and-fix" missions

- **Databases & ERP**
  - Consistent, low-latency
  - High IOPS
  - All-flash nodes

- **Containers**
  - Simple & seamless customer experience
  - Enterprise grade container storage
  - Cloud native development on prem
One Architecture for Operational Simplicity

Unified Computing System

UCS Management  Intersight  IMC Supervisor

UCS Mini  Fourth Gen. UCS

Mainstream Computing

Converged Infrastructure

Hyperconverged Infrastructure

HyperFlex Systems

UCS C240  UCS C3000

Software-Defined Storage

Scale Out

EDGE  CORE DATA CENTER  CLOUD
Tetration Analytics
Actionable Insights across Applications, Security and Infrastructure

Application Intelligence: AppDynamics | CWOM

Security Intelligence: Stealthwatch

Infrastructure Intelligence: Tetration

Cross-Domain ITOA

Visibility
Baselining
Correlation
Prediction
Automation

Real-Time, Best in Class Visibility
Faster Anomaly Detection
Code to Customer Insights
Prescriptive Guidance
Self Healing, Self Learning

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Policy Discovery – What talks to what and how
Use Cases for Tetration

**Workload Discovery**
- Discover workload dependencies while making applications "hybrid cloud ready"
  - “ADM”

**Network Insights**
- Gain performance insights per application in real time with historical references
  - “NPMD”

**Workload Protection**
- Secure workloads with portable policies across any cloud, any floor tile, any OS
  - “CWP”

Network and Operations Buying Centers

Security Buying Center
## Cisco Tetration: Deployment options

### Hardware options
- **Cisco Tetration platform** (large form factor)
  - Suitable for deployments of more than 5000 workloads
  - Built-in redundancy
  - Scales to up to 25,000 workloads
  - Includes:
    - 36 Cisco UCS® C220
    - 3 Cisco Nexus® 9300
- **Cisco Tetration-M** (small form factor)
  - Suitable for deployments of less than 5,000 workloads
  - Includes:
    - 6 Cisco UCS C220
    - 2 Cisco Nexus 9300

### Software/Service Option
- **Cisco Tetration SW Only**
  - Software deployed on VMW
  - Suitable for deployments of less than 1000 workloads
  - Generic HW requirements
- **Cisco Tetration as a Service**
  - Software deployed on Cisco Cloud
  - 100% Cisco managed, up to 25,000 workloads
  - No VPN required

### Public cloud
- **Cisco Tetration Cloud Deployment**
  - Software deployed in public cloud
  - Suitable for deployments of less than 1000 workloads
  - Public cloud instance owned by customer
Cisco Tetration software-as-a-service option

Cisco Tetration™ SaaS

- Software-as-a-service model: No need to purchase, install and manage hardware or software
- Fully managed and operated by Cisco
- Suitable for commercial customers and SaaS-first/SaaS-only customers
- Flexible pricing model; lower barrier to entry
- Quick turn up
- Scales to up to 25,000 workloads

Software subscription license based on number of workloads; available in 1-, 3- and 5-year terms

Real-time Data Sync