



# Cisco and NetApp

Delivering value to the SAP Market

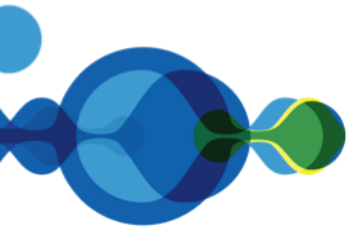
Ralf Klahr

Erik Lillestolen

October 14, 2015

# Building SAP Infrastructure on the Flexpod Foundation

- Introduction
- SAP HANA Appliance on modified Flexpod
- SAP HANA TDI Implementation on Flexpod, with HA DT/Biz continuity
- SAP HANA with Cisco ACI
- Use Case: SAP HANA and Big Data
- Call to Action



# FlexPod Business Continues to Accelerate



**6300+** FlexPod Customers



**1100+** Partners



**\$5.6 Billion** Revenue



More than **100**  
**Countries**

# UCS-based FlexPod Expanded Portfolio

## FlexPod Express



Entry level  
UCS, Nexus, FAS

For smaller, less dynamic  
requirements & VAR velocity

Target: Primarily MSB

## FlexPod Data Center



UCS, Nexus, FAS

Massively scalable shared virtual  
data center infrastructure

Target: Enterprise /  
Service Provider

## FlexPod Select



UCS, E-Series, FAS

Dedicated app infrastructure

Target: Specialized environments  
within enterprises



# FlexPod Next Generation Capabilities

All Flash FlexPod

Policy-Based Application Architectures with Cisco ACI (Microsoft, SAP, Oracle)

Support for any Cloud Strategy

Lifecycle Management

Unified ROBO/Edge Solutions

Data Center Automation with OpenStack, ACI, FastTrack, UCS Director

Full Stack Design and Configuration Tools

Single SKU Frameworks

Factory Integration

Post Implementation Validation Tools

Automated Provisioning

Pre-Rack Half and Full Racks



## Optimized applications Start with FlexPod

Reduce deployment time and improved performance for SAP, Microsoft and Oracle applications

Run applications 20x faster with All Flash FAS while leveraging Cisco UCS and over 100 world record benchmarks

Achieve software-defined, policy-based automated deployment of enterprise apps with Cisco Application-Centric Infrastructure

## Hybrid cloud Starts with FlexPod

Embrace the benefits of private and hybrid cloud with confidence

Control how you manage, secure and move data across cloud resources

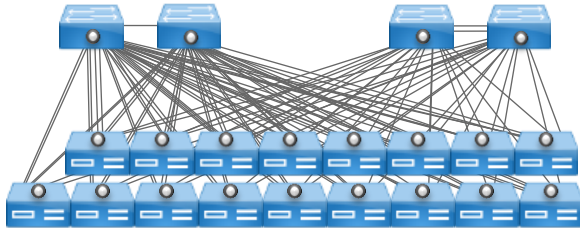


## Simplified IT Starts with FlexPod

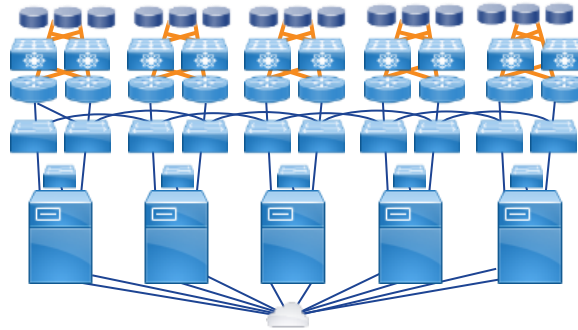
Make simplicity a competitive advantage

# SAP HANA Appliance

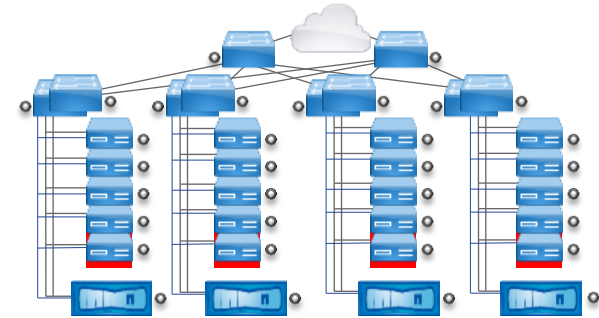
# What's Wrong with Traditional Approaches?



- Too many nodes and switches
- Complicated management
- Higher risk of failure in HA situation



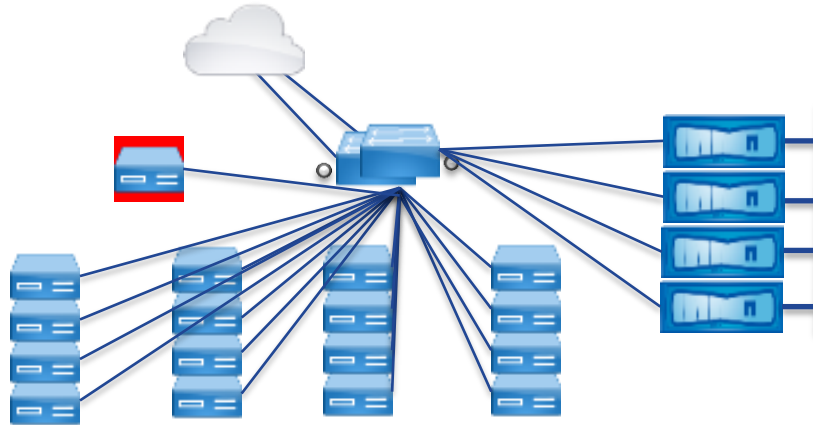
- Latency introduced by daisy chaining or additional network layers



- Another networking layer required to scale beyond 6 TB (4x1.5TB)
- Complex standby node configuration

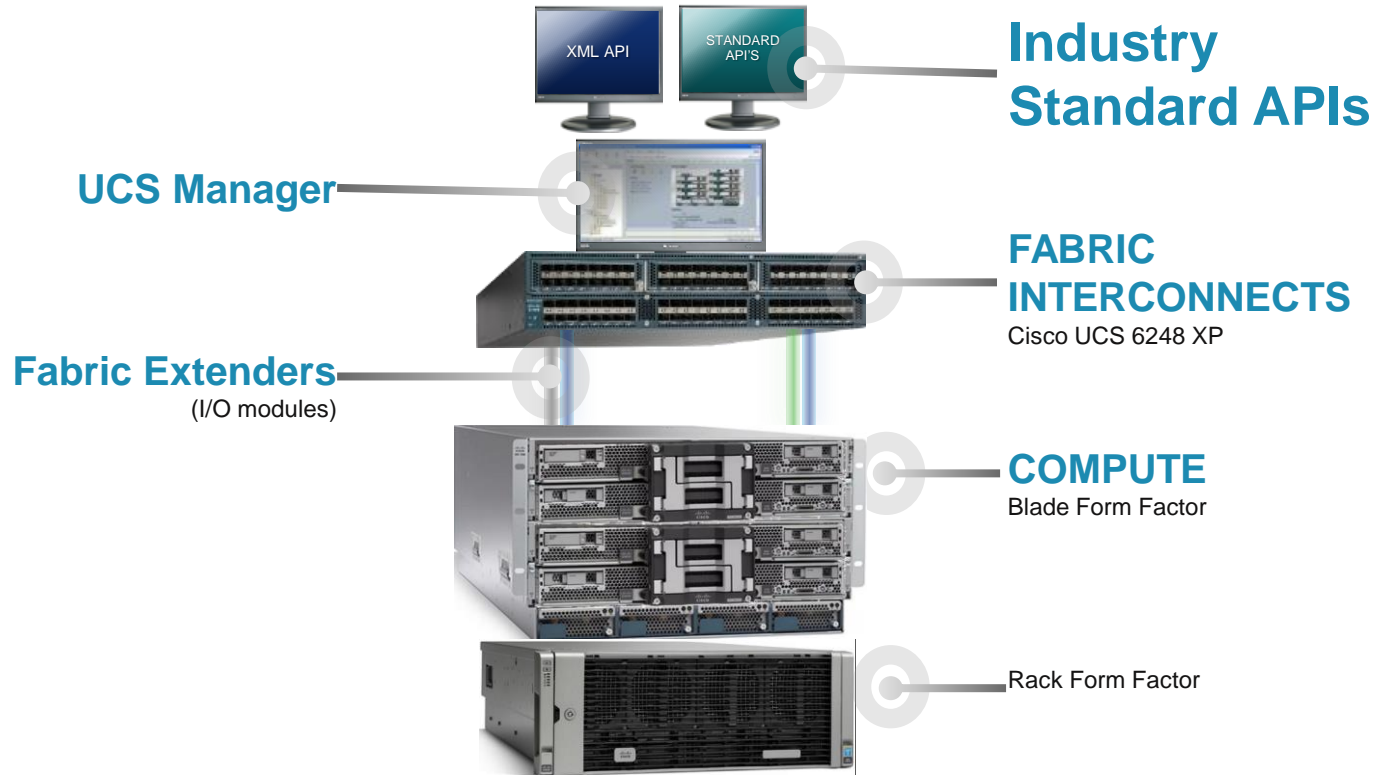


# Cisco NetApp FlexPod Approach



- Simple scaling up to 32 nodes = 48TB
- Simple standby node configuration
- Simple network design
- No additional networking layer necessary

# Cisco UCS Architecture



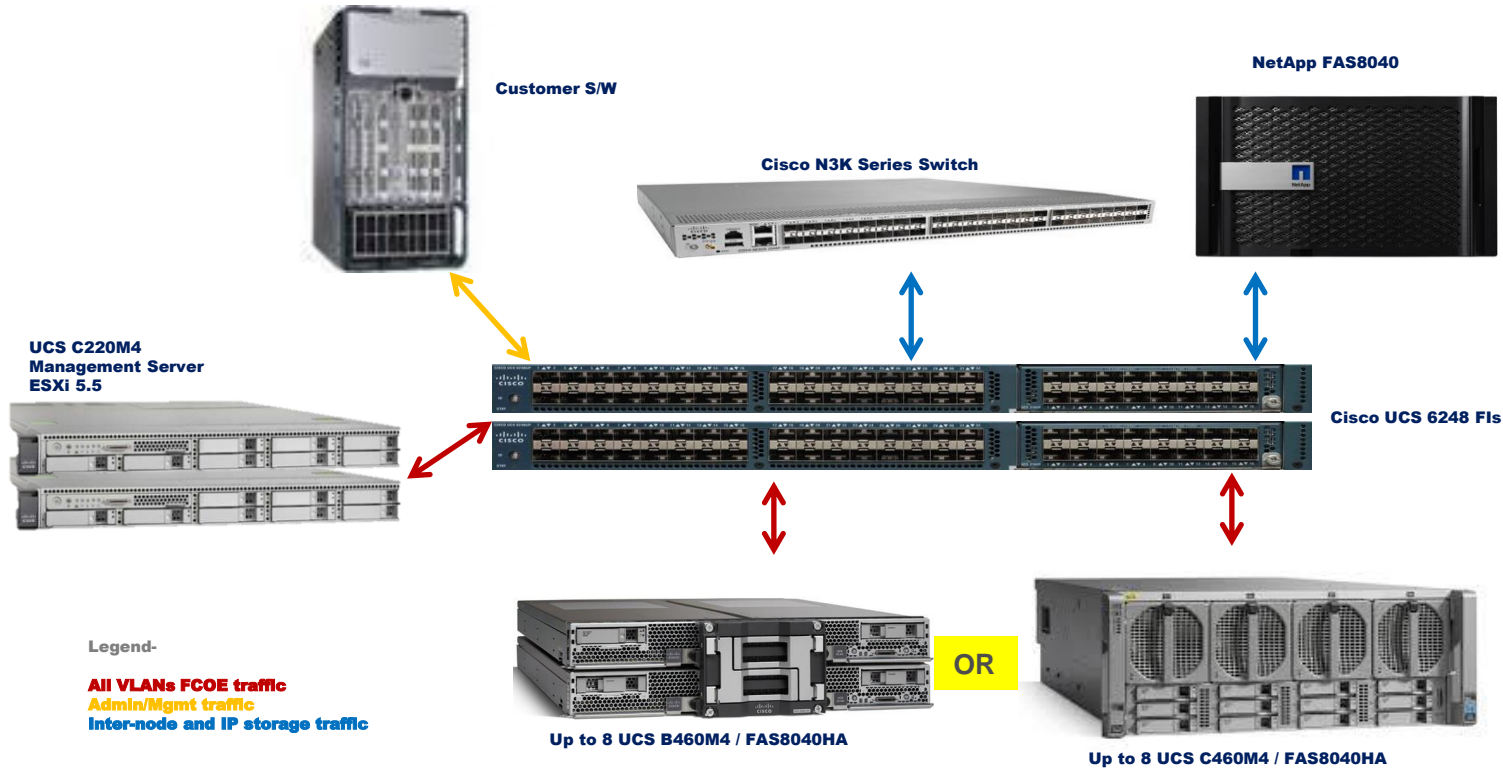
# Powerful and Flexible Storage Foundation

## NetApp FAS8040

- Simplicity
- Scalability (plug-and-play storage)
- Multiprotocol, multipurpose support
- Advanced efficiency, management, and protection software
- High availability (non-stop operations)
- Disaster recovery support



# 4 Socket Nodes - Scale-Out concept with UCS



# Cisco and NetApp: Scale-Out for SAP HANA

- Bare Minimum Components
  - Cisco UCS (6248 FI, 5108 Chassis and B460M4 blades)
  - NetApp FAS8040 with 3x DS2246
  - One Cisco Nexus 3524 or Nexus 5548 or Nexus 9304
  - 2 Management Server for PXE Boot
- Scalability from 1+1 min. up to 32+1 blade by blade
- Build-In High-Availability
- SAP HANA DT with SAP HANA Replication Service



# Solution Components



## Cisco Network Fabric

1 Cisco Nexus 3524 Switch  
For Failover capabilities only

C220 Management Server ESX

## Cisco UCS Platform

2 Cisco UCS 62xxUP Fabric Interconnects  
2 Cisco UCS 5108 Blade Server Chassis  
4-16+N Cisco UCS B460 M4 Servers plus  
Cisco Virtual Interface Cards

## NetApp FAS Series Storage

1-2 NetApp FAS8040 Storage Systems

# Cisco and NetApp: Build to Scale

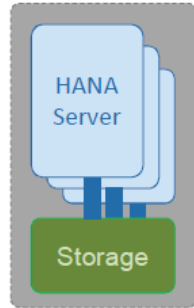
- Simplify switching and networking layers
- Streamline management
- Add compute capacity, node by node
- Add storage capacity or scale throughput
- Scale to 40+ nodes and 160+ TB (with 8-to-1 compression)
- Best in class ratio compute to storage
  - 8 nodes to one storage unit**



# SAP HANA TDI



# SAP HANA Appliance vs. Tailored Data Center Integration



## Fast Implementation

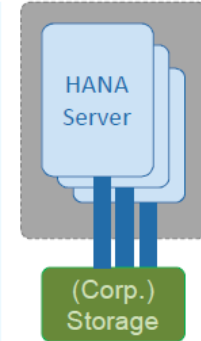
- Solution validation done by SAP and Partner
- Preconfigured hardware set-up
- Defined performance & KPIs out of the box
- Preinstalled software

Support fully provided by SAP

## More Flexibility & Responsibility

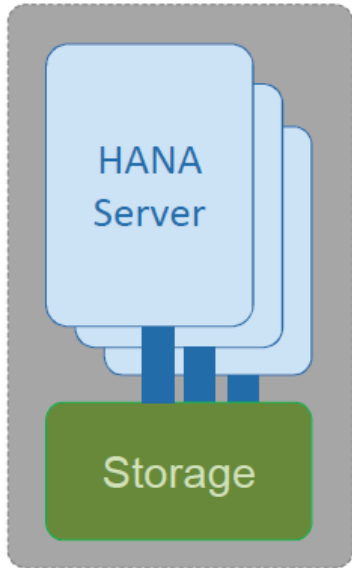
- Additional efforts through verification test
- Preferred combinations of server and storage possible
- Installation and validation needs to be done by customer
- HANA installation certification necessary
- Customer ensures support for all stack components

Save IT budget and existing investments



# SAP HANA Tailored Data Center Integration - Storage

- **SAP HANA tailored data center integration is an additional option to the existing appliance model**



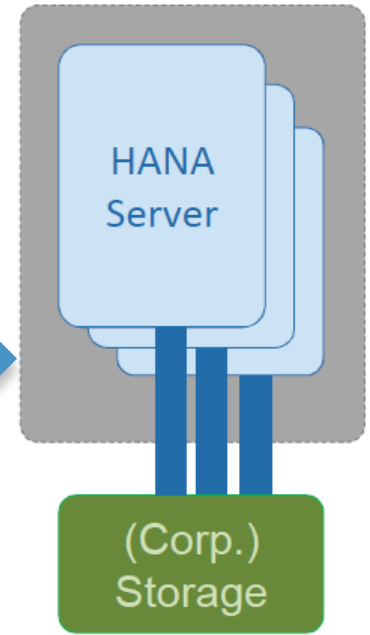
Source SAP AG

- Well defined packages of Server, Network and Storage
- Established IT operation processes have to be adapted slightly
- Well defined HW and performance KPIs
- End-2-End Solution Support

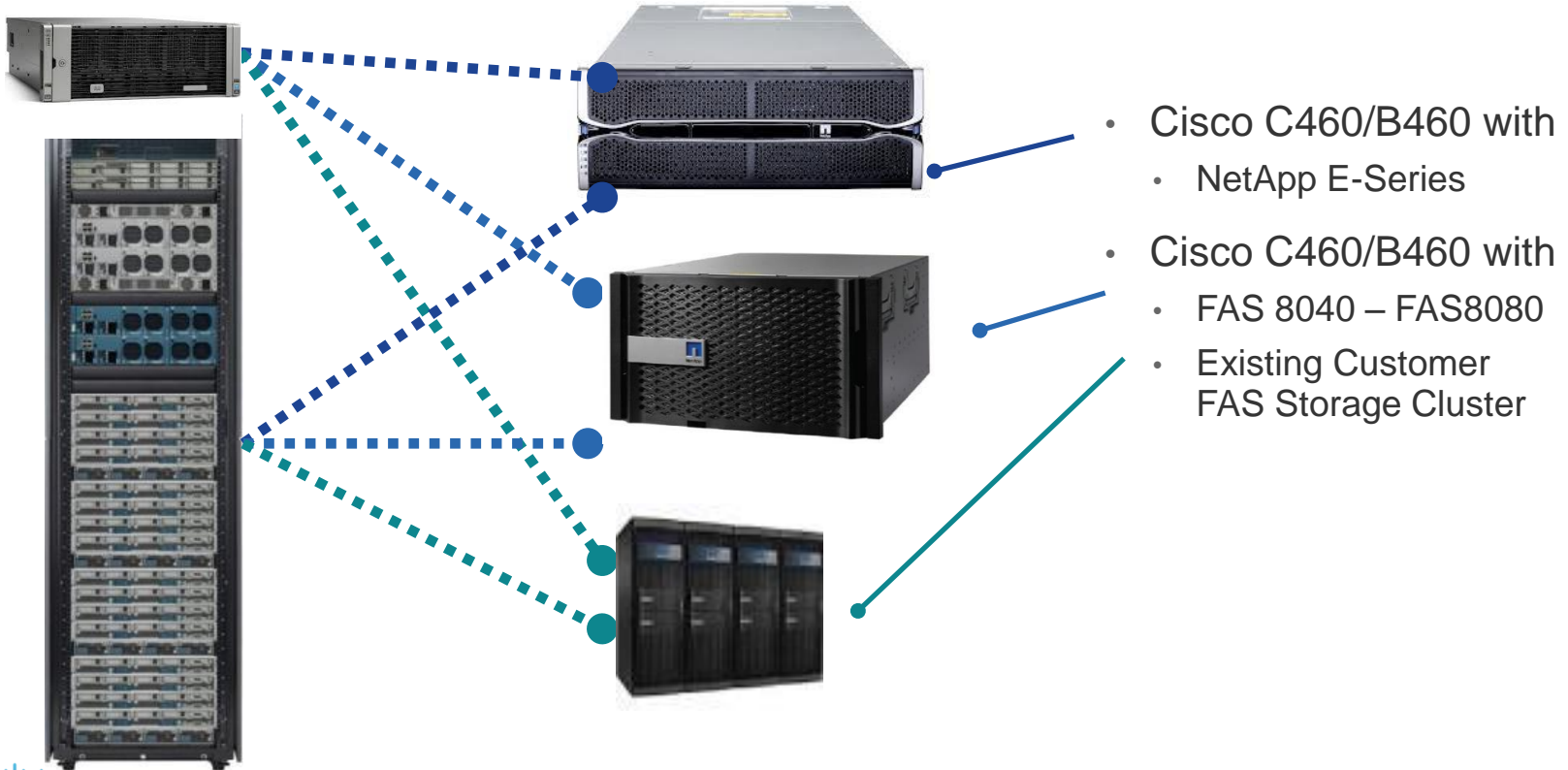
← „Appliance“ Model

Tailored Datacenter Integration →

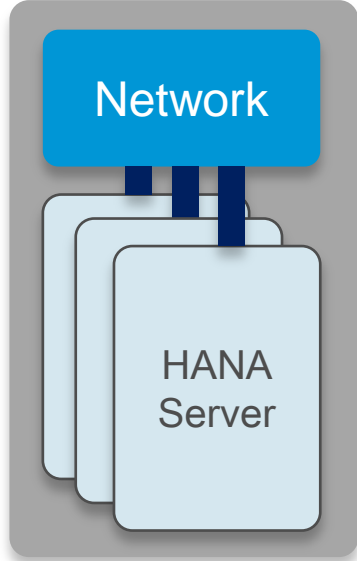
- Reduce hardware and operation cost at installed base
- Mitigate risk and optimize time to value by taking more responsibility
- Break-Fix Support only from the hardware vendor
- Gain additional flexibility in hardware vendor selection \*



# Potential Cisco–NetApp Options for TDI Storage



# SAP HANA Tailored Data Center Integration - Network

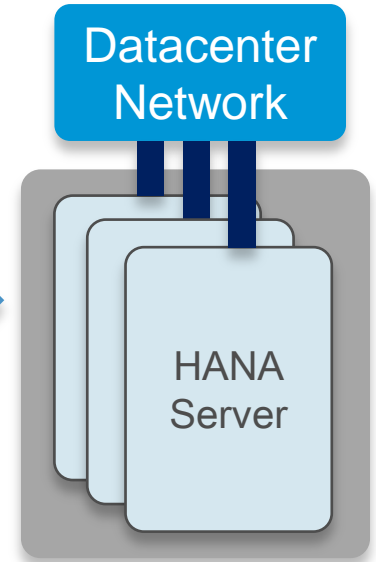


Source SAP AG

- Well defined packages of Server, Network and Storage
- Established IT operation processes have to be adapted slightly
- Well defined HW and performance KPIs
- End-2-End Solution Support
- Dedicated Network Switches per HANA SID



- Re-Use the Data Center Network for SAP HANA
- Mitigate risk and optimize time to value by taking more responsibility
- Break-Fix Support from the hardware vendor
- Gain additional flexibility in hardware vendor selection \*

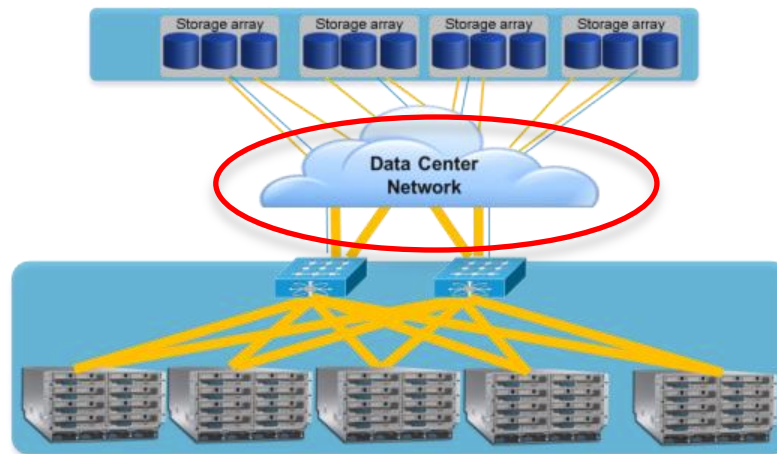


# Network requirements for SAP HANA TDI

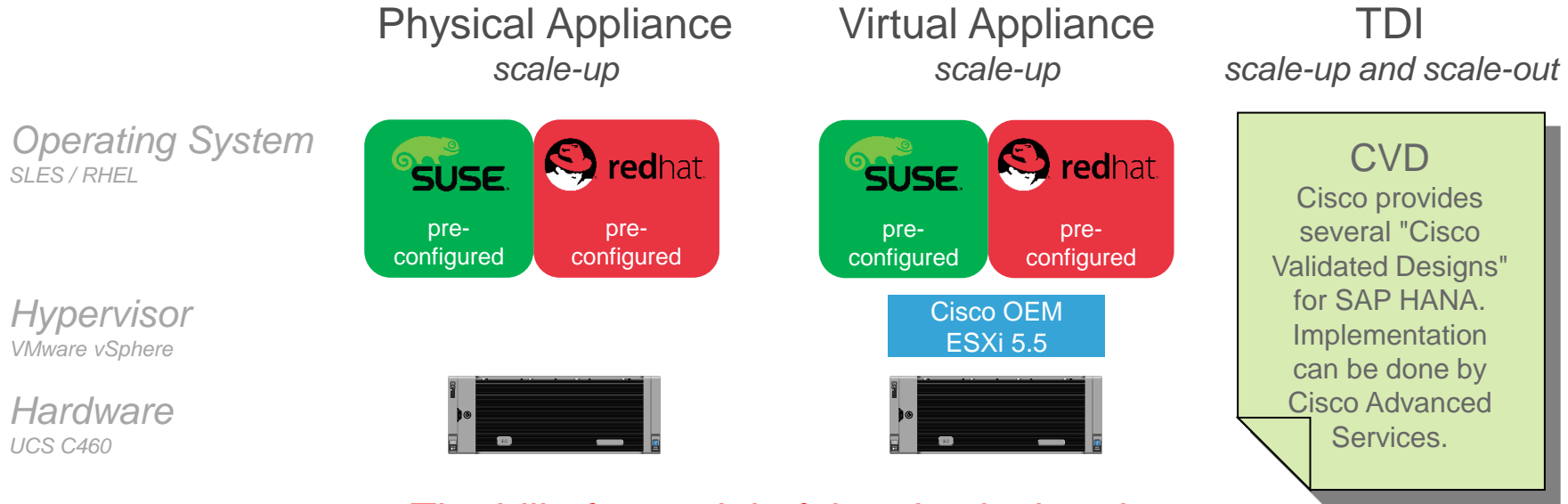
- HANA Node to HANA Node communication – 10 GbE or better, redundant
- HANA Node to Storage communication – 10 GbE or 8 Gb FC or better, redundant
- HANA Node to Application or User communication – 1 GbE or better, redundant

Optional Networks, can be on a shared 1 GbE / 10 GbE interface

- Management Network
- Backup Network
- others



# How does Cisco offer Virtual HANA?



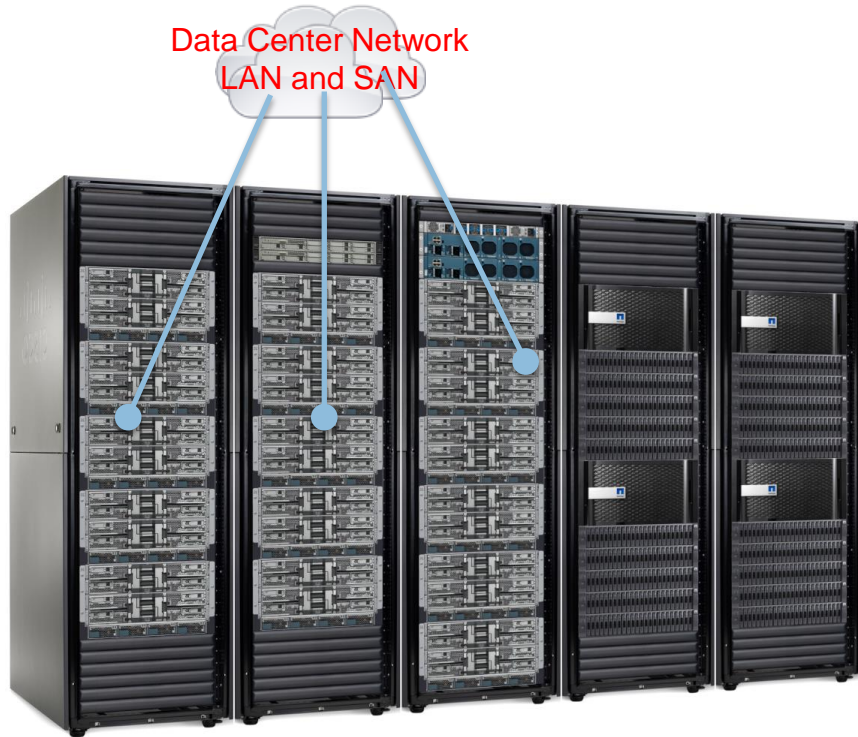
The bill of material of the physical and virtual appliance is identical!

# SAP HANA TDI – Use Case #1



- Support for multiple SAP HANA production systems within one UCS
- Support for SAP HANA and other Applications in the same UCS
  - Sample: Run the SAP Application Server together with SAP HANA
- Cisco will provide Solution Support
  - All components are same as listed on the PAM

# SAP HANA TDI – Use Case #2



- Remove the Network components from the Solution
- Use existing 10 GbE Network devices shared with other applications
- Cisco will provide Solution Support if: \*
  - The used network components are from Cisco



# SAP HANA TDI – Use Case #3

## Shared Infrastructure to run all Applications



# NetApp Technical Report 4290



NetApp

Technical Report

## SAP HANA on NetApp FAS Systems with NFS Configuration Guide

Nils Bauer and Marco Schön, NetApp  
March 2015 | TR-4290

### Abstract

The NetApp® FAS system product family has been certified for use with SAP® HANA in tailored data center integration (TDI) projects. The certified enterprise storage platform is characterized by the NetApp Data ONTAP® storage operating system. The FAS product family is supported on either NetApp Data ONTAP® operating in 7-Mode or clustered Data ONTAP.

<http://www.netapp.com/us/media/tr-4290.pdf>

Storage configuration requirements and recommendations for integrating FAS Systems with NFS into an SAP HANA TDI environment

# SAP HANA with Cisco ACI

# ACI: Translates Application Needs to Network

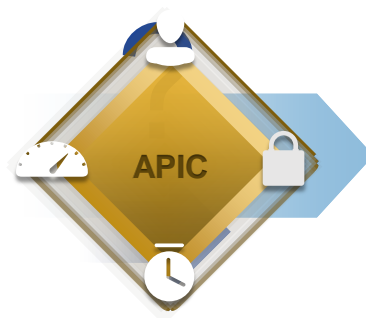
## APPLICATION LANGUAGE



## NETWORK LANGUAGE



- Application Tier Policy and Dependencies
- Security Requirements
- Service Level Agreement
- Application Performance
- Compliance
- Geo Dependencies



- VLAN
- IP Address
- Subnets
- Firewalls
- Quality of Service
- Load Balancer
- Access Lists

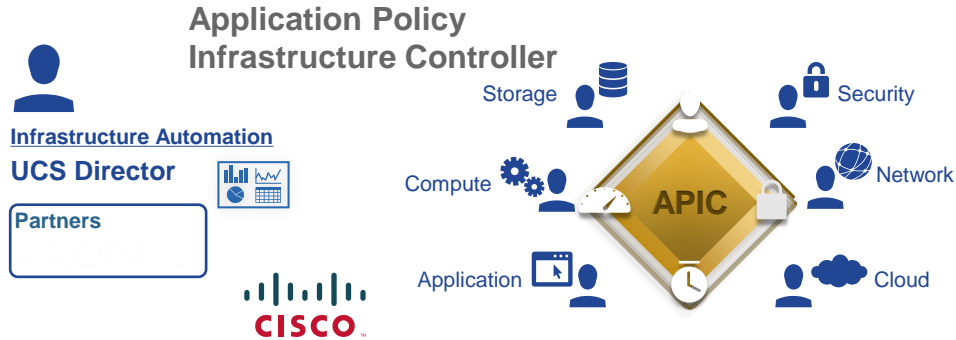
# Common Application Network Profile

## Any Application Anywhere – Physical and Virtual



# Application Centric Converged Infrastructure

ACI ready application environment on Flexpod systems



- Policy Based Programming
- Advanced Secure Multi-Tenancy
- Broad Visibility and Dynamic Responsiveness to Real-Time Events

## FlexPod Systems



- Hypervisor
- Compute
- Network
- Storage

- Reduced Time to Deployment
- Simplified Operations
- Reduced Risk

# FlexPod Ref Architecture for SAP Solutions

## BUSINESS CHALLENGES

- Provide an end-to-end implementation of SAP HANA utilizing the capabilities of the unified infrastructure for Cloud solutions
- Provides architecture for SAP HANA solution efficiently virtualizing various compute option from Cisco UCS servers for varied customer use cases
- Provide a reliable, flexible and scalable reference design

## TECHNICAL HIGHLIGHTS

Implementation of mixed HANA use case. Scale-Up with BareMetal and Virtualization Option, Scale-Out for BareMetal and Suites on HANA

Scalable architecture with new Cisco Nexus 9000 series switches in standalone mode

Scalable Unified storage for iSCSI and NFS traffic. NetApp FAS 8000 Series

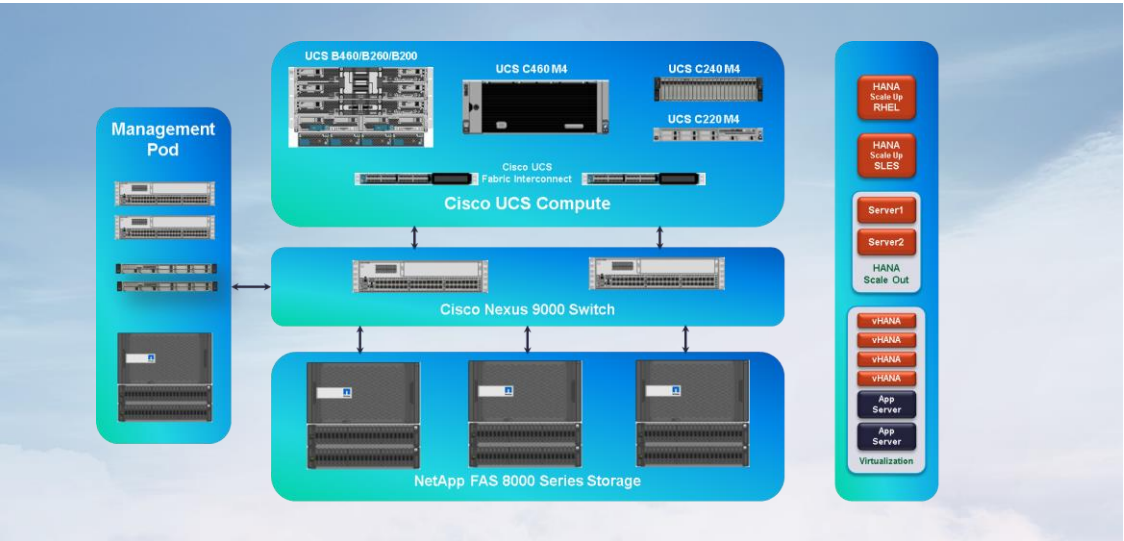
Supports multiple OS RedHat Enterprise Linux 6.6, SUSE Linux Enterprise Server 11 SP3 & 12



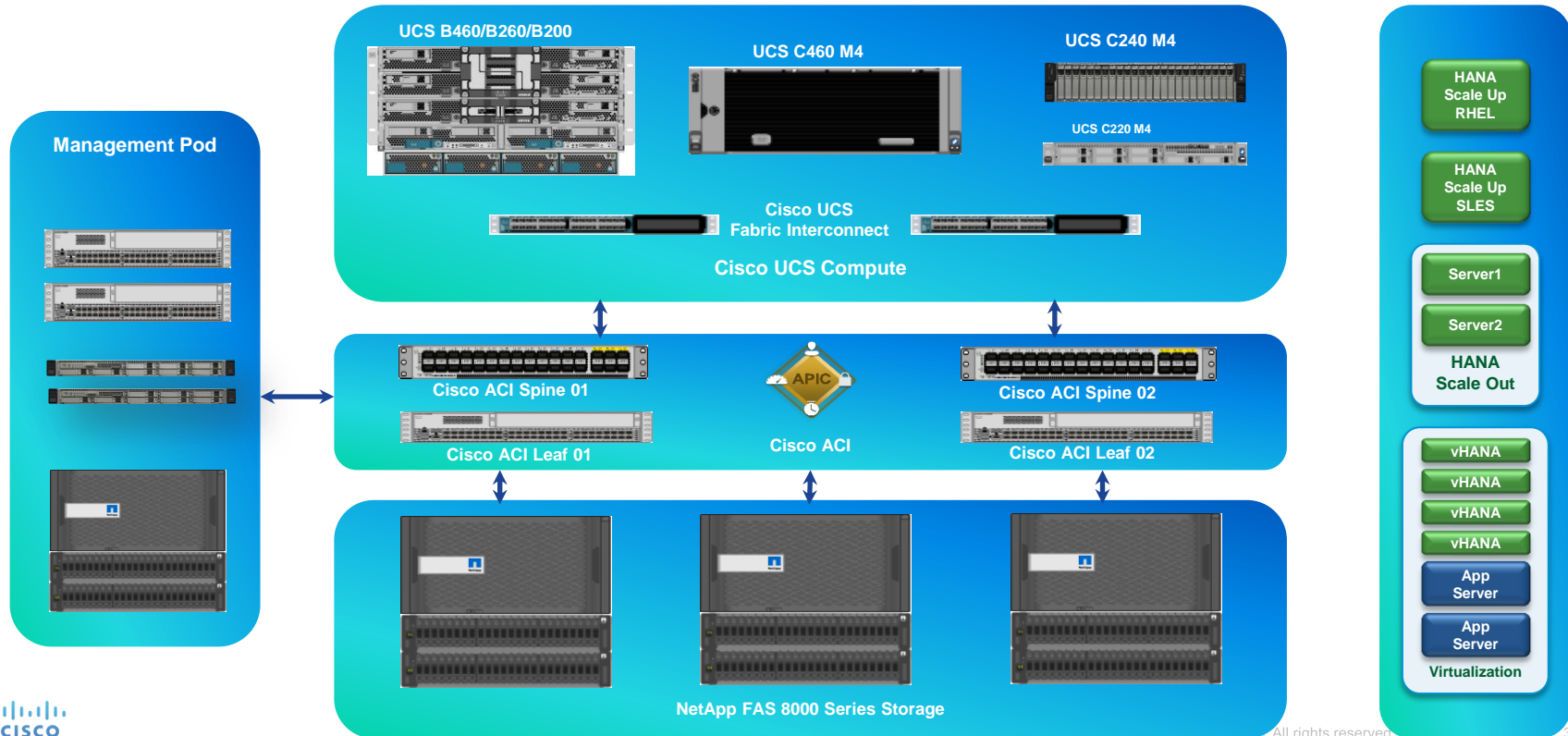
## SUMMARY

- Integration of Compute, Network and Storage solution.
- Rapid provisioning of SAP HANA using UCS Service Profile, Storage clone using NetApp Flexclone
- Scalable NetApp storage using cluster Data Ontap, using dedicated cluster switch
- Integration of vSphere 5.5 for virtualized HANA support
- Multiple HANA instances on shared infrastructure, and application server connecting to HANA DB

## ARCHITECTURE



# SAP HANA with Cisco ACI Architecture





# Application policy simplifies workload mobility and visibility

## Tenant

Health Score



Systems Telemetry



Latency



Isolation



## Application



Health Score

Systems Telemetry



Latency



Isolation



SAP HANA TDI

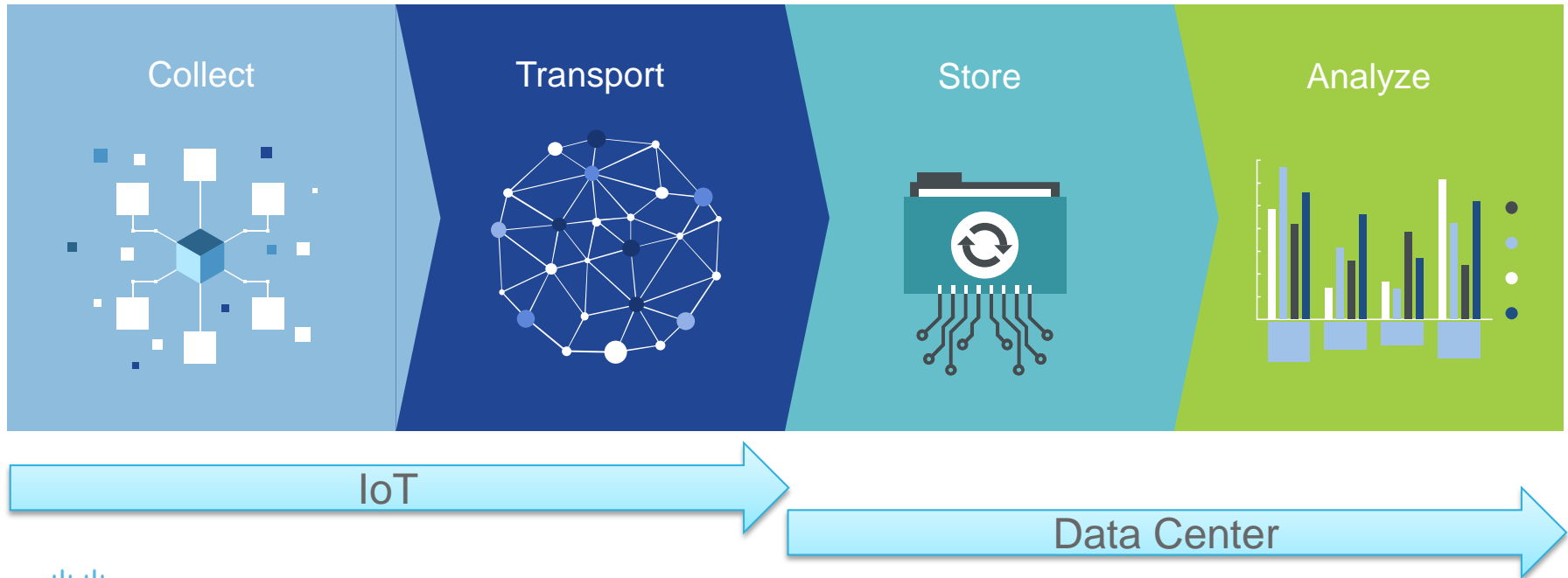
Cisco ACI

Flexpod

Big Data Use Case

# Big Data and SAP

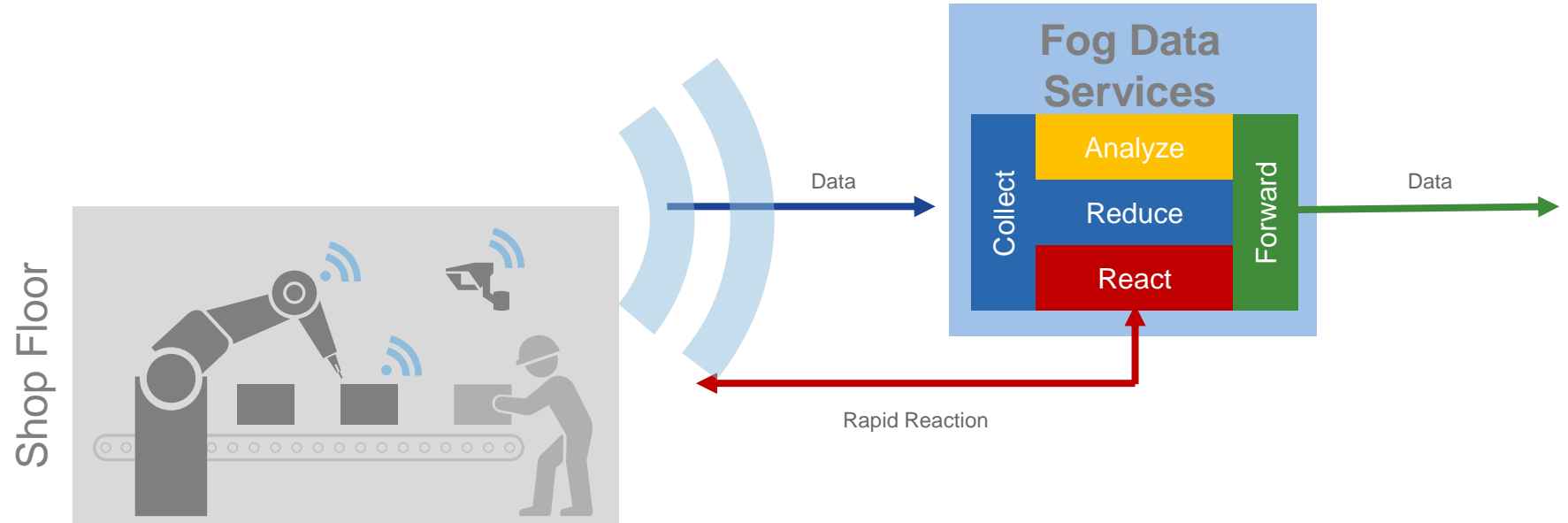
How to collect, transport, store, and analyze the data?



# Big Data and SAP

## Collect

### Rapid Reaction with Fog Data Services



# Big Data and SAP

## Transport

Secure and Reliable with Cisco Technology



Cisco Industrial Ethernet Switching /  
Routing / Wireless / Firewalling

- High Redundancy
- High Resiliency
- Fast Convergence



Cisco Catalyst Switching / Routing /  
Wireless / Firewalling

LAN / WAN



Datacenter

Cisco Nexus Technologies



Shop Floor

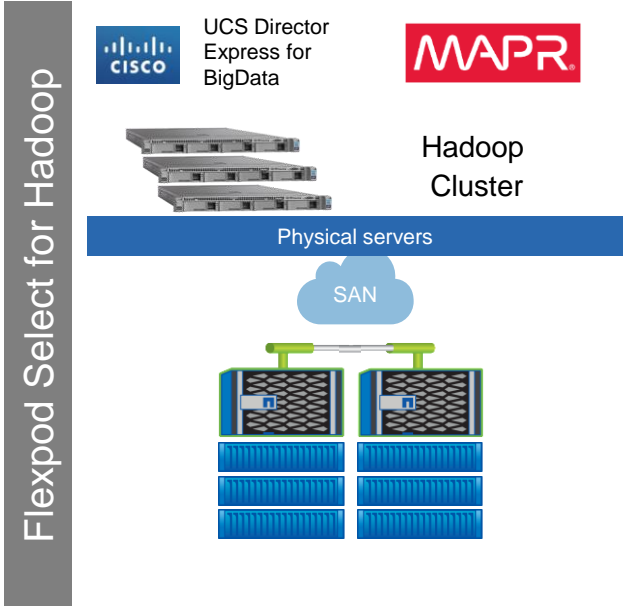
Secure and Reliable Data Transport



# Big Data and SAP

## Store

Use BI and Analytics Software



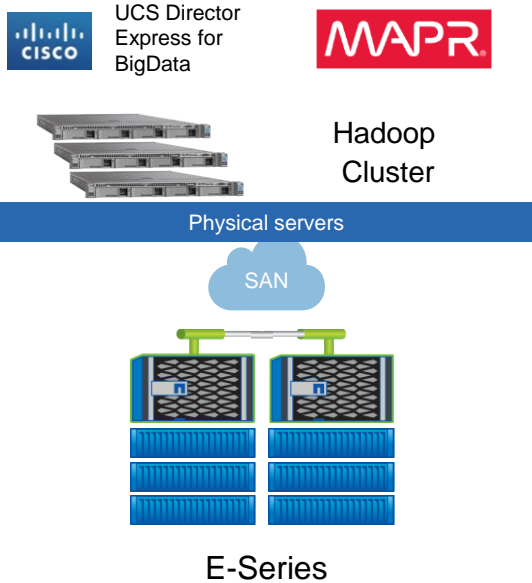
# Big Data and SAP

## Analyze

### Integration with SAP HANA



Flexpod Select for Hadoop

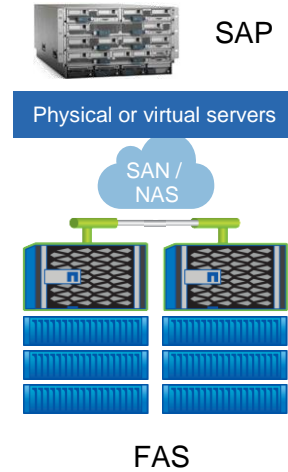


- SAP Mobile Device
- SAP Landscape Virtualization Management
- HANA Studio
- SAP Lumira
- NetApp SSC for SAP LVM
- NetApp Snap Manager / Creator

Smart Data Access

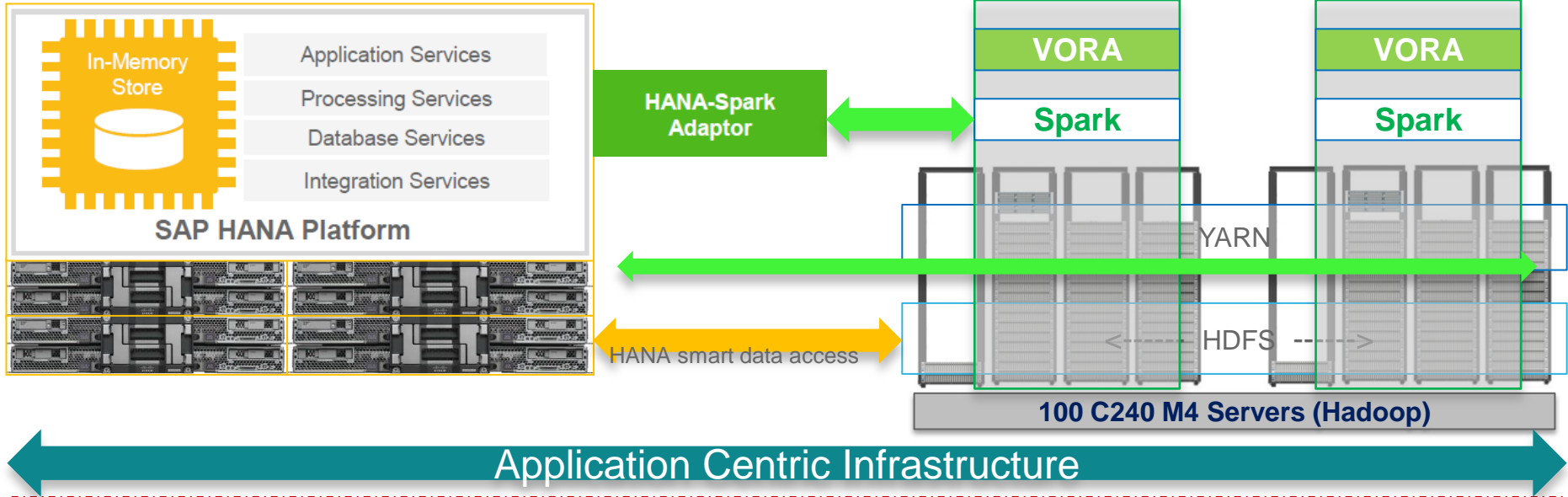


Hadoop Connector



Flexpod Data Center

# HANA VORA - SPARK architecture



## Benefits:

- Open Development Interface and Mashup APIs: facilitate better data science by providing ability to merge/co-relate corporate data with Hadoop/Spark, Spark R/ML data easily.
- Compiled queries for efficient data analysis and distributed application performance
- HANA-Spark adaptor delivers enhanced performance and distributed data processing.
- Simplify Big Data Ownership: Take advantage of multiple data processing engines for deriving new insights from business and contextual data across Hadoop and HANA tiers.



# SAP HANA and Hadoop

Controllers

SAP HANA  
SAP Application



Spine Layer

Layer

Hadoop Cluster

# Call to Action

# Cisco at NetApp Insight Las Vegas Highlights

	Monday, Oct. 12	Tuesday, Oct. 13	Wednesday, Oct. 14	Thursday, Oct. 15
<b>Cisco Booth with Meeting Room</b>	5:30 – 7:30 pm	10:00 am – 3:30 pm	10:00 am – 3:30 pm	10:00 am – 2:00 pm
<b>Briefing Center</b>	Cisco Meeting Room: M10			
<b>Keynote</b>	Cisco Keynote Speaker 4:15 pm			
<b>Boot Camps</b>	3223 <b>Building Private and Hybrid Cloud with Cisco ONE Enterprise Cloud Suite:</b> Monday at 8:45 am – 10:45 am 3124 <b>FlexPod Portfolio:</b> Monday at 1:30 pm – 3:45 pm			
<b>Breakout Sessions</b>	3125 <b>New FlexPod Solutions:</b> Tuesday at 2:15 pm – 3:15 pm 3126 <b>FlexPod &amp; ACI Overview &amp; Use Cases:</b> Wednesday at 10:30 am – 11:30 am 3027 <b>FlexPod with SAP HANA and SAP Applications,</b> Wednesday at 2:15 pm – 3:15 pm			
<b>Co-Presenting Sessions</b>	2204 <b>FlexPod Configuration Best Practices for VDIA for All Flash FAS</b> 2197 <b>FlexPod® Solutions with UCS Mini &amp; FAS25xx for Small Data Centers &amp; ROBO</b> 2194 <b>FlexPod with Cisco ACI Deep Dive</b>			
<b>Meet the Engineer</b>		<b>FlexPod Powerhouse</b> 12:00 pm – 1:00 pm	<b>NetApp with Cisco Cloud Architecture for Microsoft Cloud Platform</b> 12:00 pm – 1:00 pm	<b>FlexPod Management</b> 11:00 am – 12:00 pm



**CISCO**

*TOMORROW starts here.*