



# Cisco HyperFlex 3.5

Modernize the present, simplify the future

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27.11.2018

# Agenda

- Industry Trends
- Cisco HyperFlex Overview
- HyperFlex 3.5 News
- Summary

A low-angle, upward-looking photograph of several modern skyscrapers with glass facades. The buildings are set against a bright blue sky with scattered white clouds. The perspective creates a sense of height and architectural grandeur. A semi-transparent cyan rectangular overlay is positioned in the lower half of the image, containing the text.

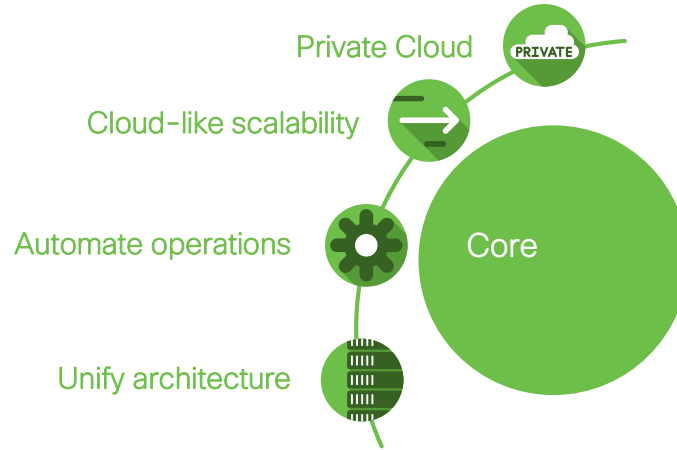
# *Industry Trends*

# What does the future look like?

#1 Initiative Is to Reduce Operations and Capital in the Core

Over the Last Two Years, IT Organizations Spent **70%** on “Run the Business” IT Spending

04/18 Gartner,  
Strategic roadmap for compute infrastructure



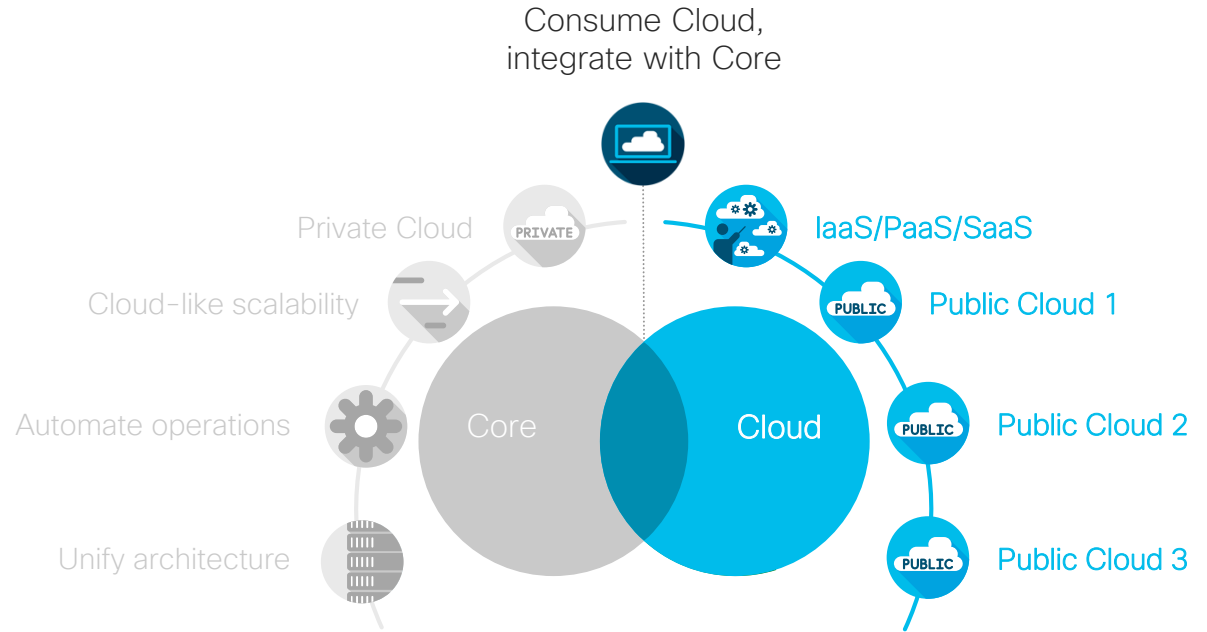
# What does the future look like?

By 2020, More Than 50% of Enterprises Will Run Mission-Critical, Containerized Cloud-Native Applications

04/18 Gartner,  
Strategic roadmap for compute infrastructure

By 2020, Over 90% of Enterprises Will Use Multiple Cloud Services and Platforms

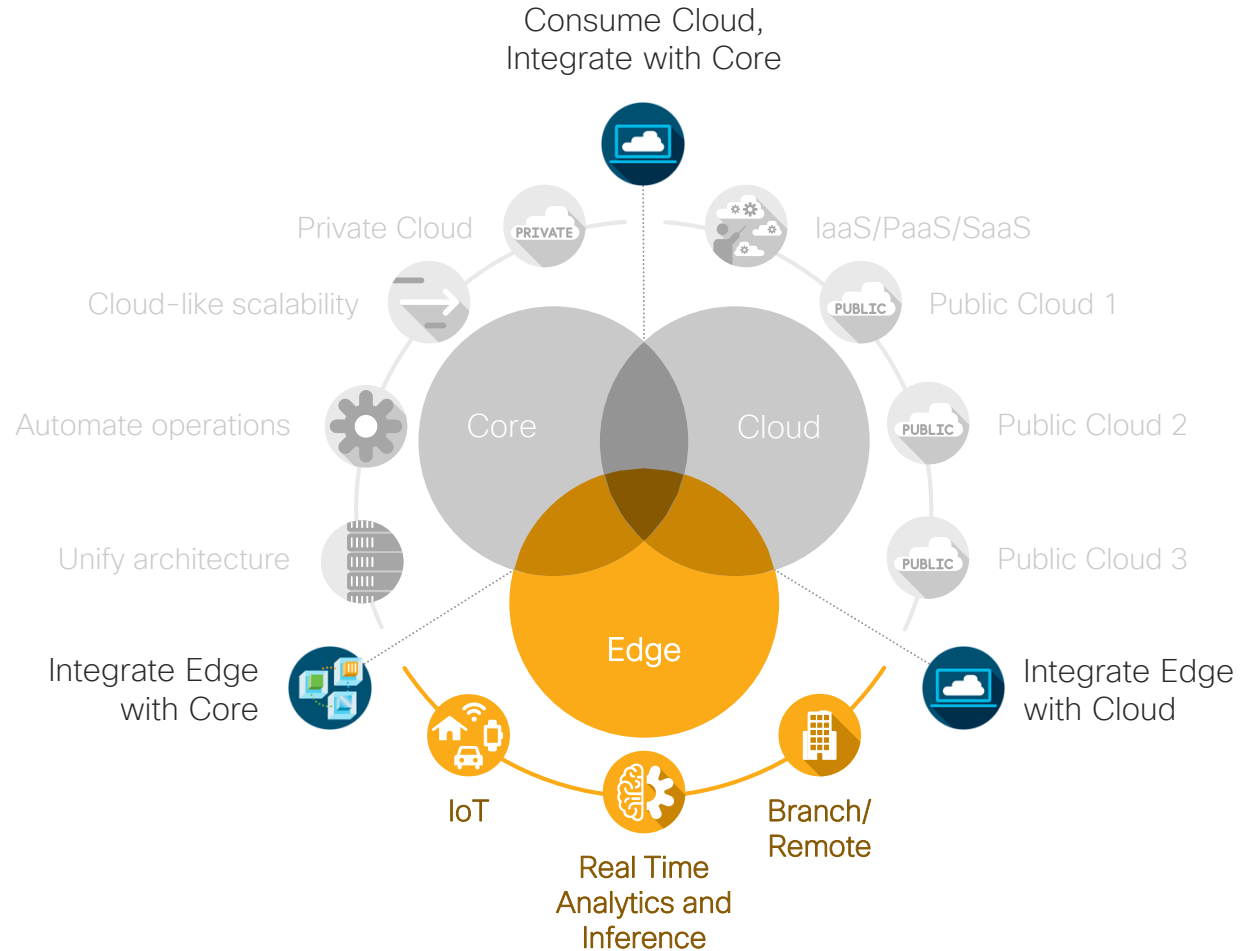
2018 IDC,  
IDC FutureScape:  
Worldwide IT Industry 2018 Predictions



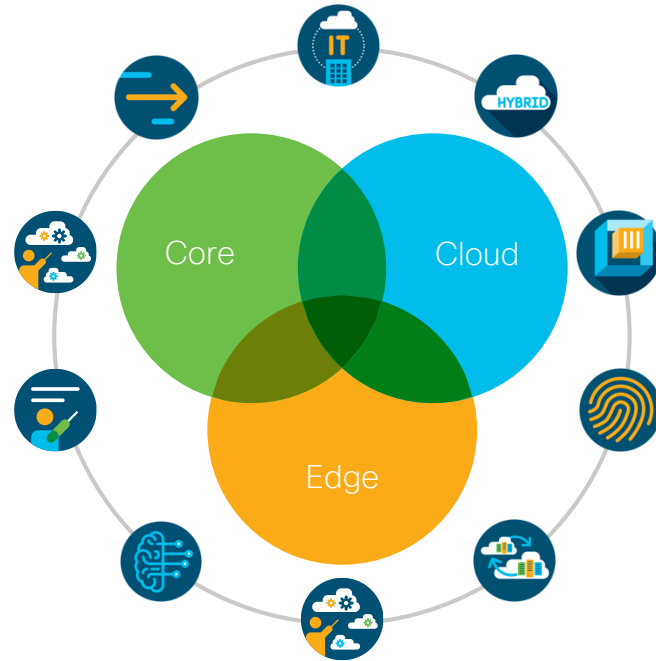
# What does the future look like?

By 2021, 40% of Large Enterprises Will be Integrating Edge Computing Principles Into Their IT Projects

11/15/17 Gartner,  
Predicts 2018: Servers



# The Future is the Distributed Datacenter







*Are you building  
for the future today?*

...or just keeping the lights on?



# Datacenter Modernization

## Your bridge to the Future

### Traditional Infrastructure

Highly Manual Core Operations  
Limited Time and Budget  
for Future Initiatives



### Modernized Hyperconverged Infrastructure

Streamlined and Modernized Core

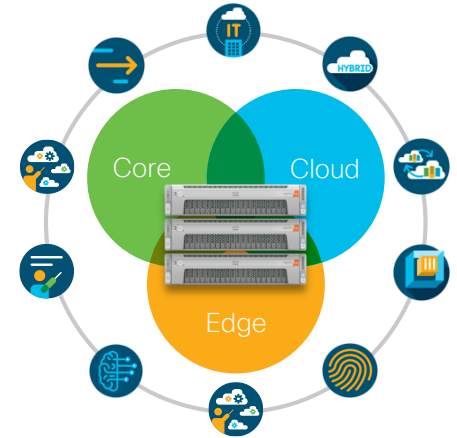


**75%** Management  
Time Savings<sup>3</sup>

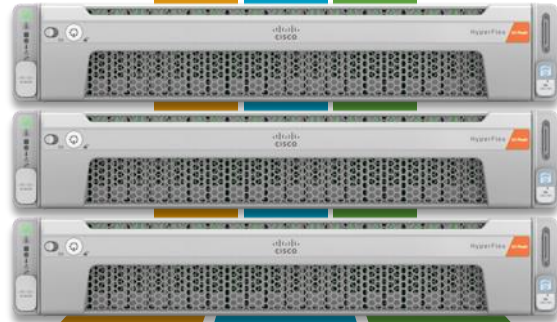
**90%** Downtime  
Reduction<sup>7</sup>

**80%** Savings vs. 3-tier  
Infrastructure<sup>1</sup>

### Optimized for the Distributed Datacenter

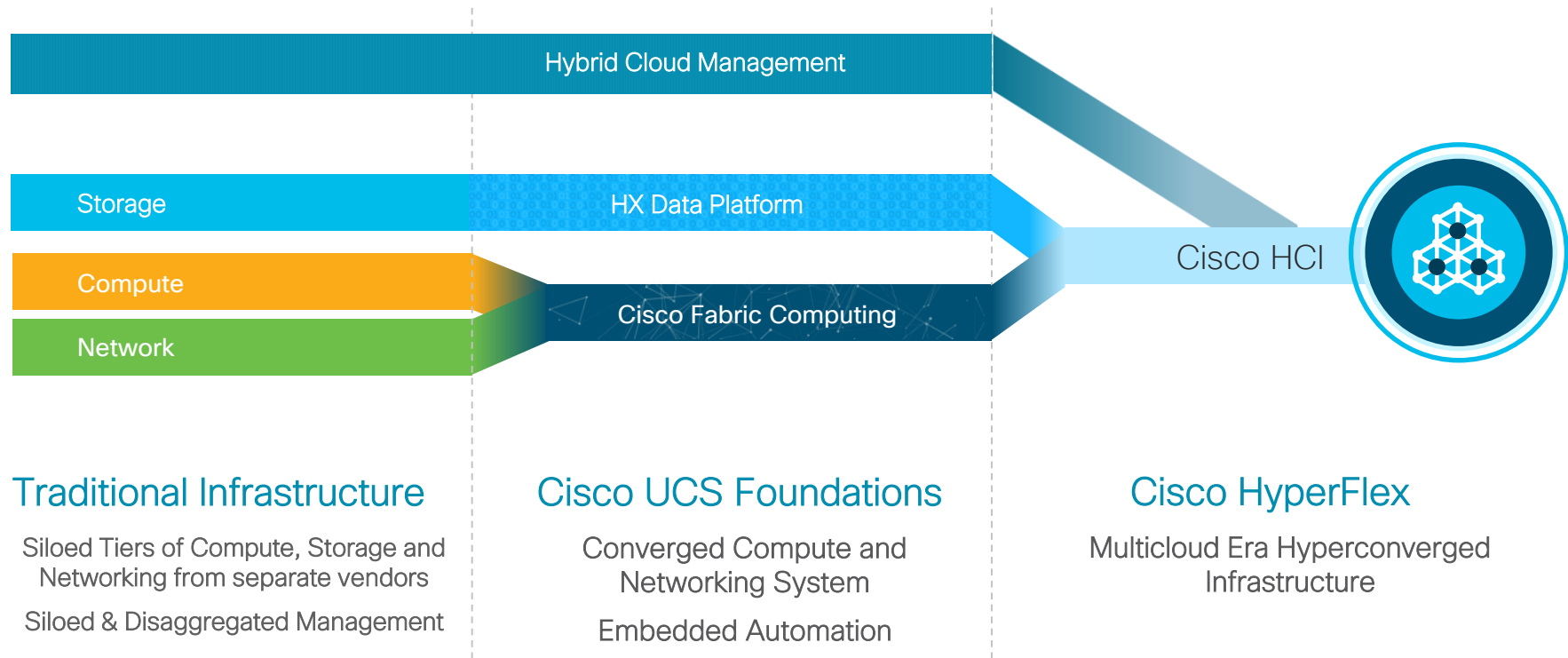


# Cisco HyperFlex Overview



# Complete Hyperconvergence

## Compute, Network, HCI Software Engineered Together



### Traditional Infrastructure

Siloed Tiers of Compute, Storage and Networking from separate vendors  
Siloed & Disaggregated Management

### Cisco UCS Foundations

Converged Compute and Networking System  
Embedded Automation

### Cisco HyperFlex

Multicloud Era Hyperconverged Infrastructure

# One Architecture for Operational Simplicity

## Unified Computing System

UCS Management

Intersight

IMC Supervisor



UCS Mini

Fourth Gen. UCS



Mainstream Computing



Converged Infrastructure



HyperFlex Systems

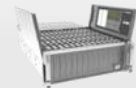


Hyperconverged Infrastructure



UCS C240

UCS C3000



Software-Defined Storage

Scale Out

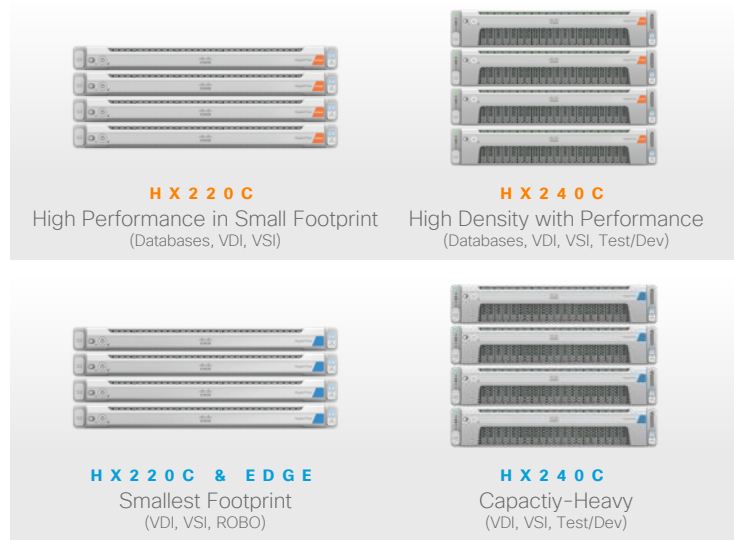
EDGE

CORE DATA CENTER

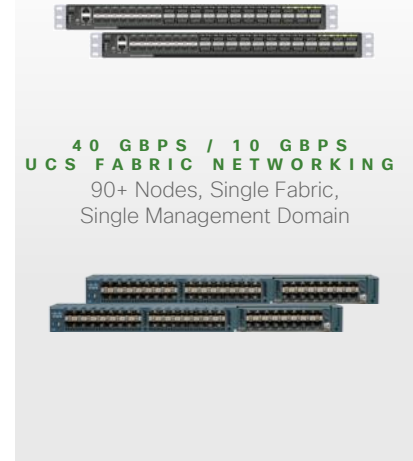
CLOUD

# HCI with Converged Fabric Networking

- 1 Network Integrated HCI
- 2 Policy Based Management
- 3 End-to-End HCI Automation



+

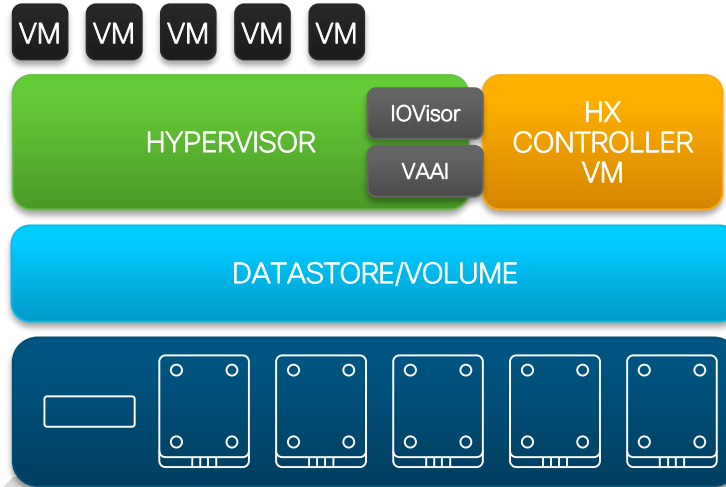


+

**HYBRID CLUSTER**  **ALL FLASH CLUSTER**

Available as **M4** or **M5** HX Nodes

# Inside HX Data Platform Node

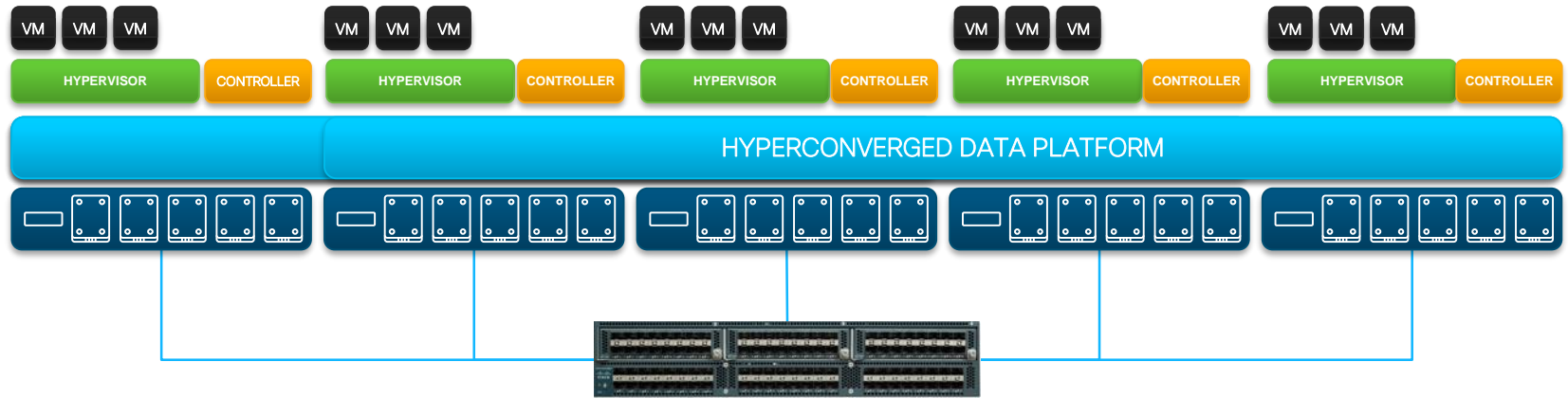


HX Controller VM  
Assumes Direct Access of  
Local Storage

IOvisor Module Presents  
Pooled Storage to HyperVisor  
and Stripes IO

Data Services are  
Offloaded  
to HX Data Platform

# Hyperconverged Scale Out and Distributed File System



Start with as Few  
as Three Nodes

Hyperconverged  
Data Platform  
Installs in Minutes

Network Fabric  
Policy Configures  
QoS Settings

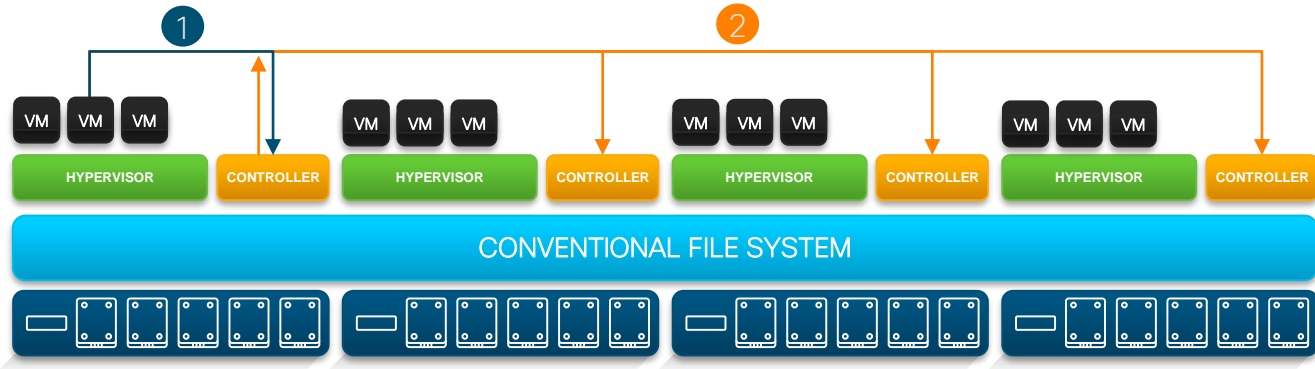
Add Servers,  
One or More at a  
Time

Distribute and  
Rebalance Data  
Across Servers  
Automatically

Retire Older  
Servers

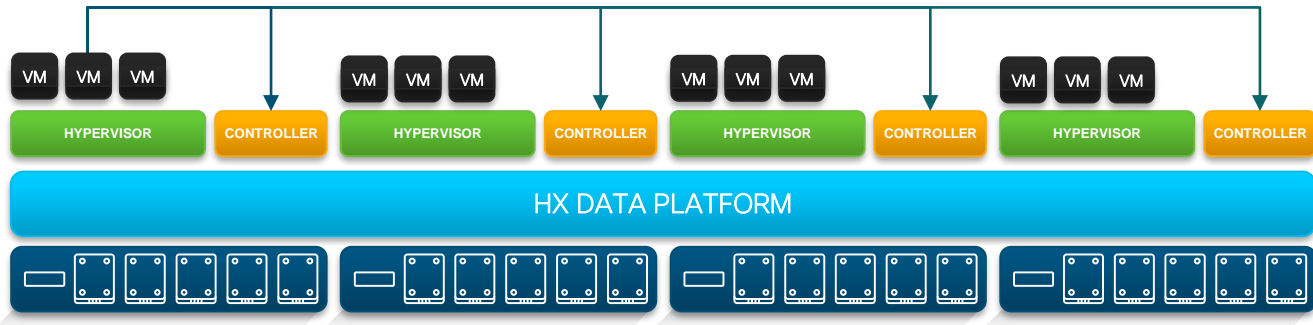


# Dynamic Data Distribution



Systems Built on Conventional File Systems Write Locally, Then Replicate, Creating Performance Hotspots

# Dynamic Data Distribution

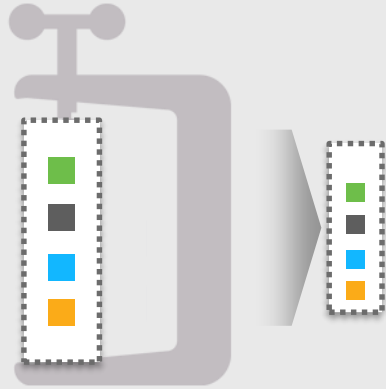


HX Data Platform Stripes Data Across All Nodes Simultaneously, Leveraging Cache Across all SSDs for Fast Writes

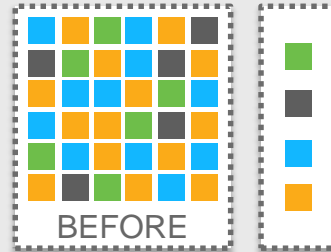
Balanced Space Utilization: No Data Migration Required Following a VM Migration

# Continuous Data Optimization

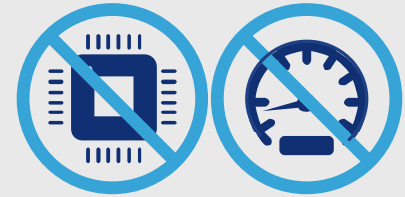
## Log-Structured File System Yields More Efficient Data Optimization



Inline Compression



Inline Deduplication



No Special Hardware  
No Performance Impact  
No Config lock-in  
No Additional License

30-50% space savings

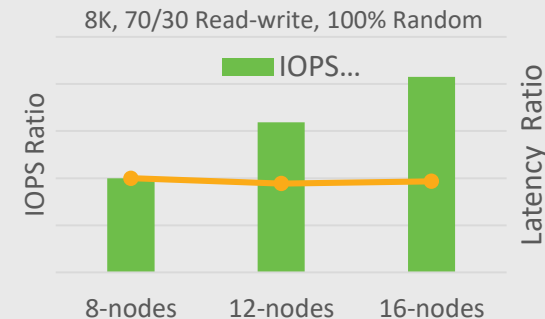
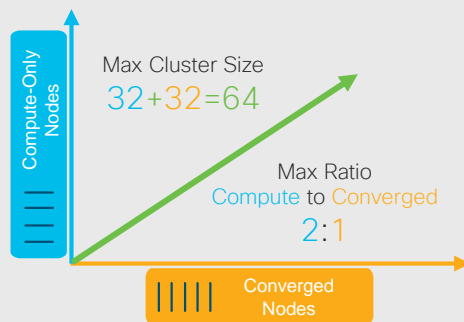
20-30% space savings

Lower Cost

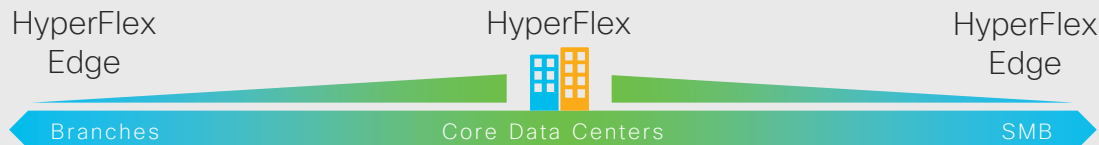


# Seamless Scalability

## Independent Scaling



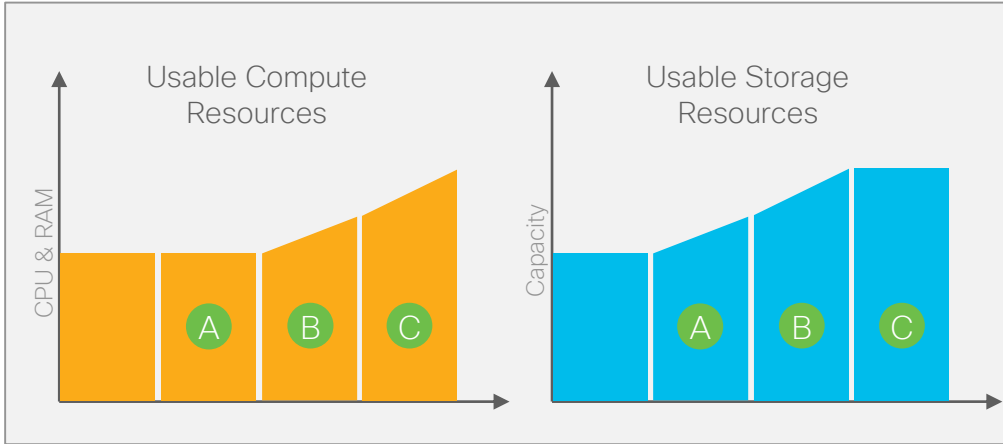
## Scale Up and Scale Down



## Scale Across Clouds

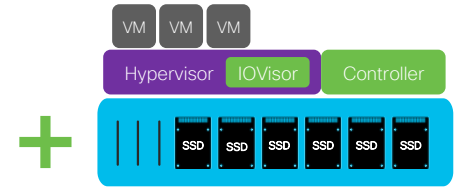
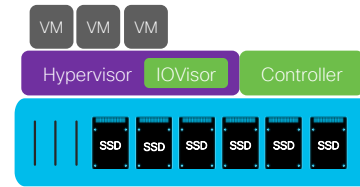
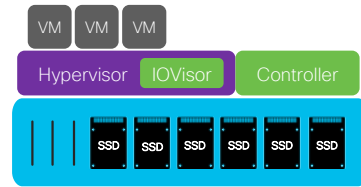
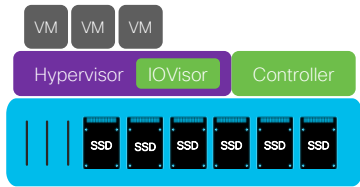
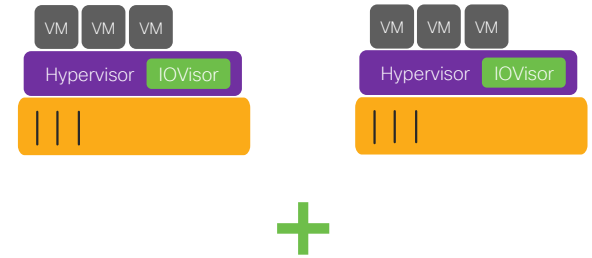


# Independent Scaling of Compute and Capacity



## C Add Compute-Only Nodes

Non-HyperFlex hosts can connect to storage with IOVisor



## A Scale Capacity Within Converged Nodes

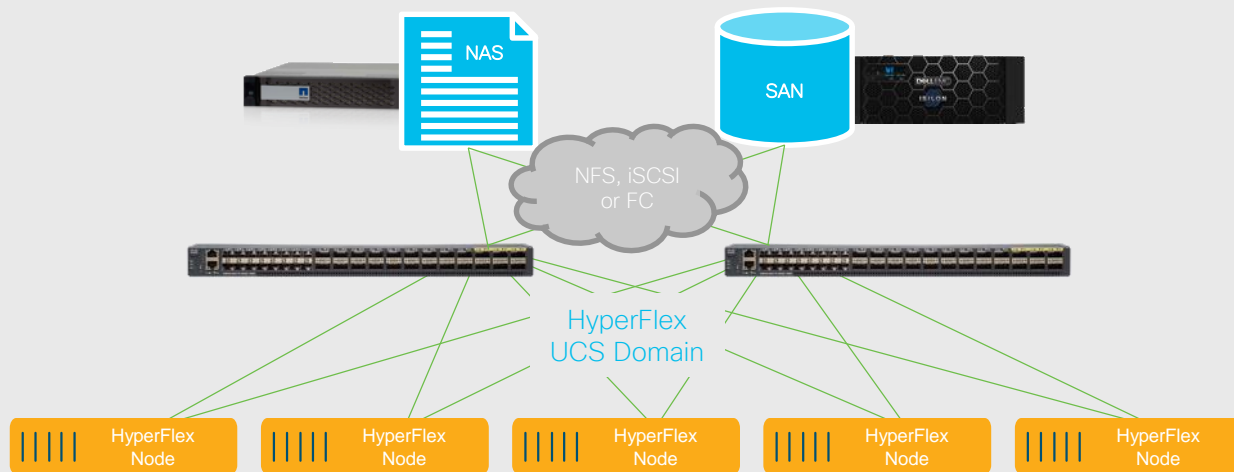
## B Add Converged Nodes



# Adaptive Infrastructure

## Support for External Storage

HyperFlex supports mounting external storage arrays via NFS, iSCSI, or FC

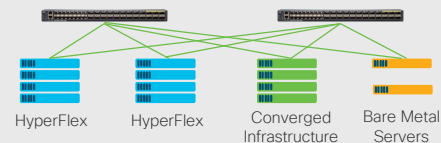


## Example Use-Cases

- VM migration and data transfer
- Co-existence with existing SAN environment/data
- Present RDM from SAN to VMs
- Use VMware storage vMotion for migrations over Ethernet
- Use for backup and other application support

## Use Existing Fabric Interconnects

- Leverage existing investment in UCS Fabric Interconnects
- Support multiple HyperFlex clusters, CI stacks, Bare Metal Servers, etc.



# HyperFlex Data Protection

## Built-In Replication for Business Continuity



### Reliable

- TCP based reliable transmission
- Protected from network corruptions
- Robust fault handling
- Crash consistent VM snapshots



### Performant

- Scale-out Replication streams
- Large IO transfers
- Network QoS
- Minimal impact on Primary IOs



### Optimized

- Incremental snapshots
- Compressed data on wire
- Intelligent pattern detection
- Different Primary and Target side configurations





# High Availability & Reliability

## Enterprise Class Filesystem

### Data Integrity & Reliability

- Block checksums protect against media errors
- Flash friendly layout helps maximize flash life
- Zero overhead, instantaneous snapshots for DP

### High Availability

- Fully-striped architecture helps with faster rebuilds
- Fine grained data-resync and rebalance
- Non-disruptive rolling upgrades

## Native Data Replication & DR



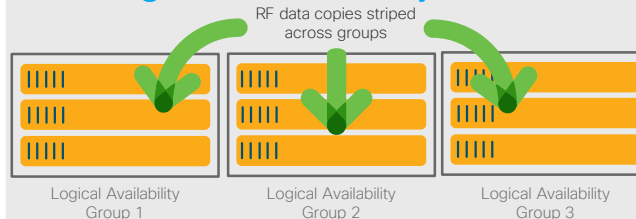
## 3<sup>rd</sup> Party Backup Integrations

COHESITY

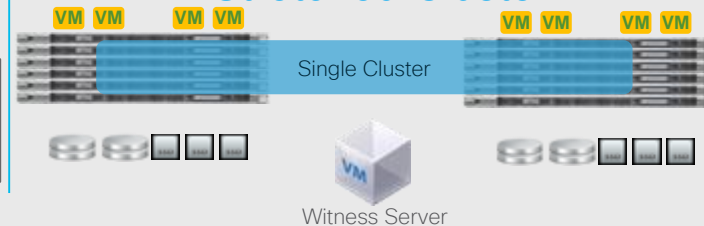
COMMAVAULT

VEEAM

## Logical Availability Zones



## Stretched Cluster





# Next Generation Management

## Centralized Cloud-Based Management of the Future

Telemetry and Analytics

Policy Based Orchestration

Secure and Compliant

API Driven, DevOps Enabled

Connected TAC

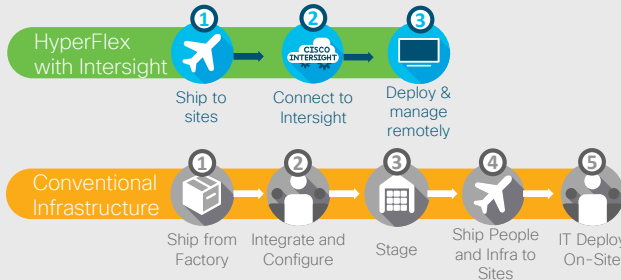
Cisco Intersight

SaaS Simplicity

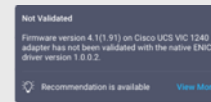
Actionable Intelligence



## Remotely Deploy & Manage



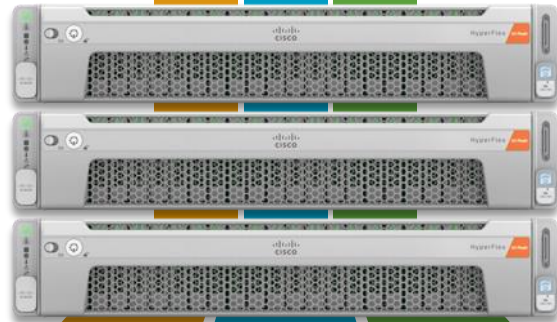
## Compatibility(HCL) Check



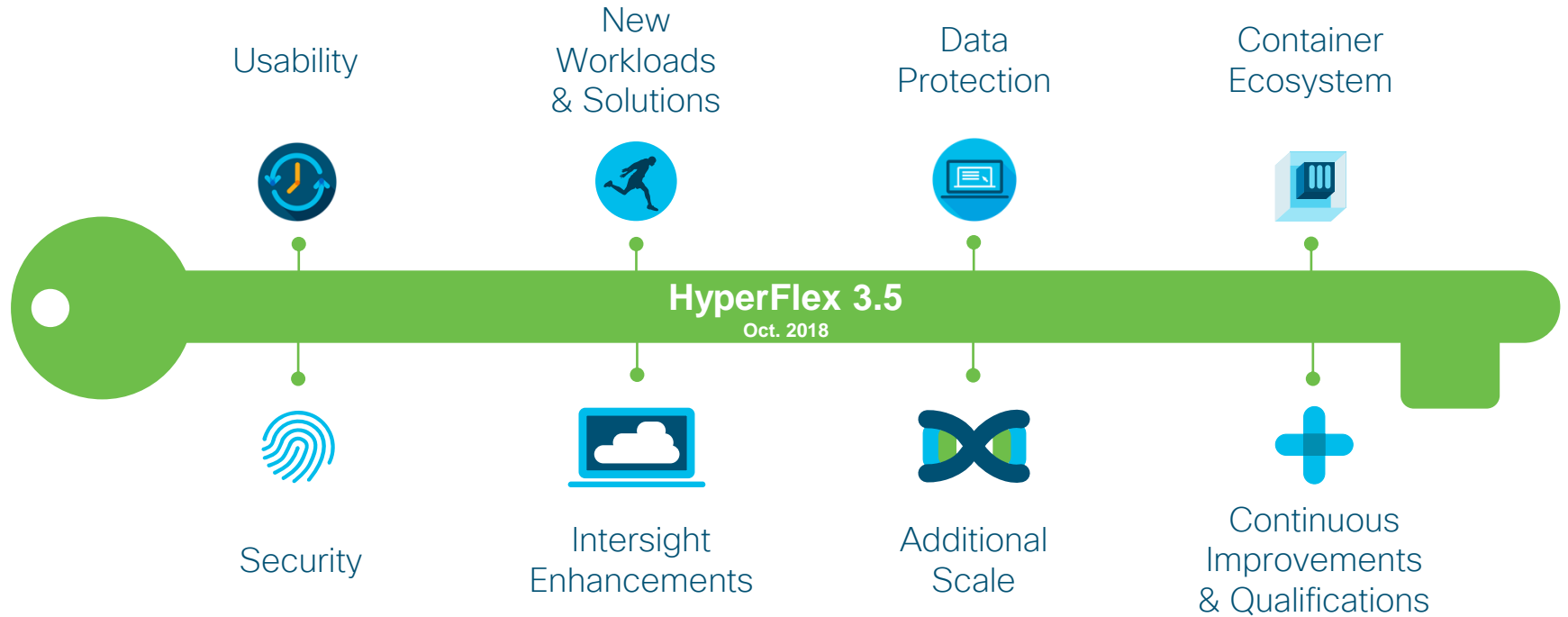
## Recommendations Engine



# HyperFlex 3.5 News

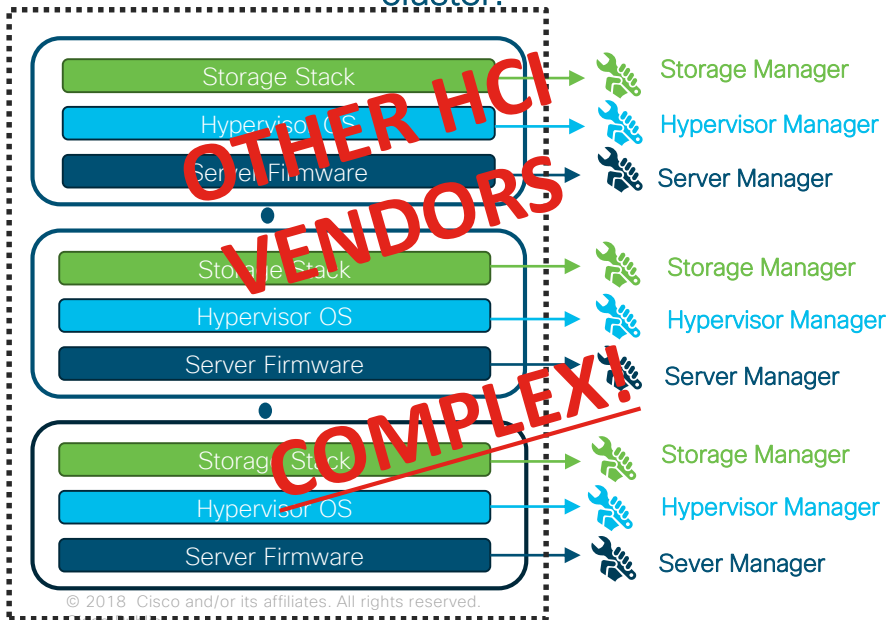


# HyperFlex 3.5: Key Themes



# One-Click Full Stack Hyperconverged Cluster Upgrades

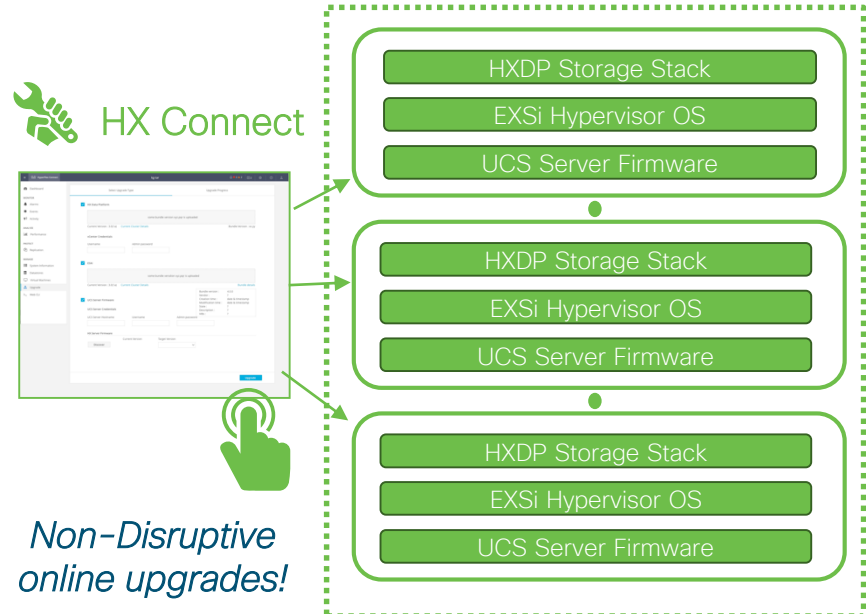
HCI vendors use different management tools to upgrade each portion of the HCI stack in a cluster.



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CISCO PUBLIC

HyperFlex

With Cisco HX 3.5, one-click, fully integrated stack upgrades are possible via HX Connect.\*



*Non-Disruptive  
online upgrades!*

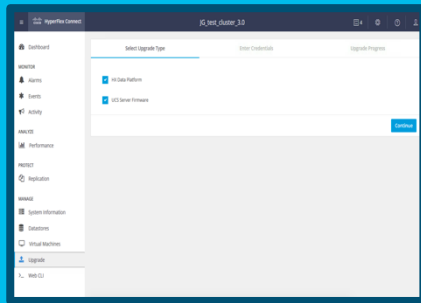
\*vCenter must be upgraded following VMware standard process  
\*EXSI today, Hyper-V in the future

# Hyperflex 3.0



## Upgrade Procedure

- 10 step manual controller VM bootstrap process



- Upgrade HX DP and Server Firmware\* from HX Connect UI.

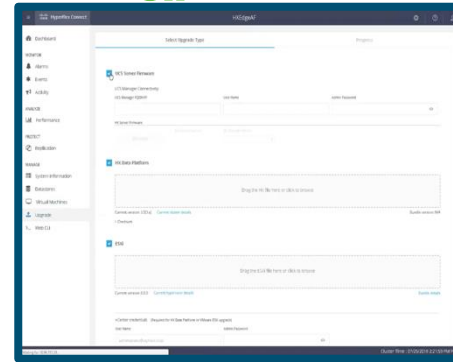
vmware vSphere Web Client



- Use a separate process to upgrade the vSphere ESXi hypervisor

# Hyperflex 3.5

## Simplified Upgrade with HX Connect UI!



1. Download upgrade packages and upload server firmware to USCM.
2. Login to HX Connect UI, select which parts of the HX stack to upgrade (HX DP, ESXi hypervisor, server firmware).
3. Drag and drop files to the UI.
4. Select upgrade.

## Hyperflex Connect drives auto-bootstrap and orchestrates the upgrade of each part of the stack.

**Note: Full stack upgrades are only available on UCSM managed HX clusters. Support for HX Edge is coming in a future Intersight release.**

# HyperFlex Data Protection Enhancements

Flexibility to meet business needs

RPO / RTO

> 24 hours

5mins - 24 hours

Zero

## Integration with 3rd Party Backup Vendors



Backup & DR to Cloud

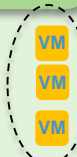


## In-built Snapshots, Replication & Disaster Recovery

High Performing VM Centric Periodic Snapshots



Highly optimized long distance Async Replication



Planned Migration, Disaster Recovery and Test Recovery

## Local High Availability and Stretched Clusters



Synchronous Replication



Local



Metro



WAN



Cloud



# HyperFlex Data Protection

## Built-In 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

# Modernizing SAP on HyperFlex

## SAP Datacenter

Databases



ORACLE

SAP Enterprise Apps



BW, BI



ERP



Security



Sales Data




Analytics Data




Consumer Data


SAP Data Hub




Data Pipelines




DB Engines




Metadata



Discovery



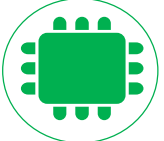
Connectivity



Kubernetes

HANA Interfaces

SAP HANA



Big Data Mgmt

Relational Time Series

Graph Documents

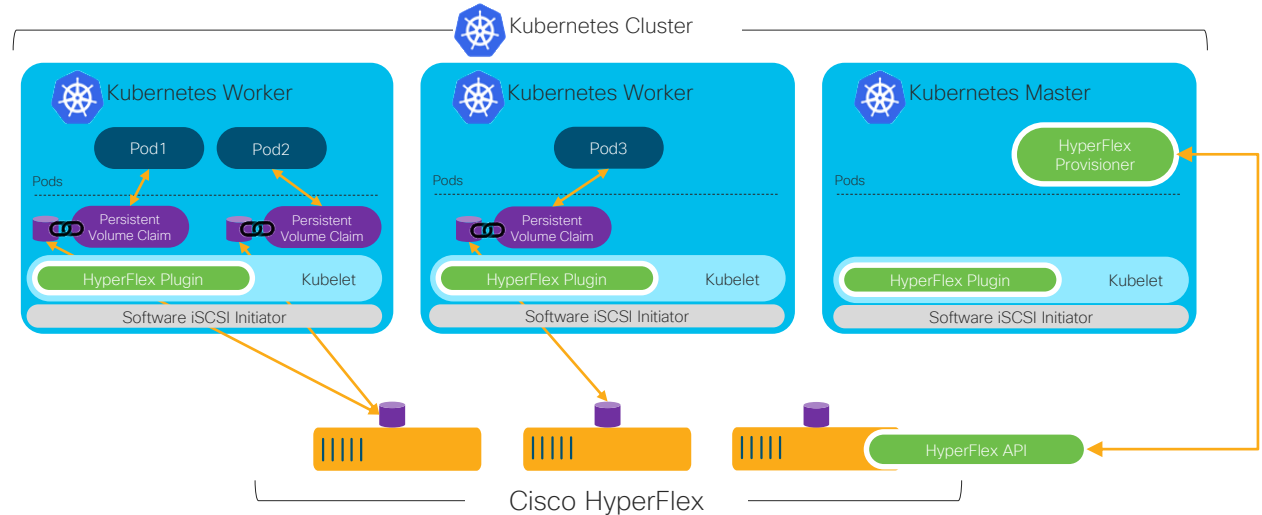
Cluster Orchestration Disk Persistence

✓ Certified  
SAP Certified  
vHANA on HX



# HyperFlex Storage Integration for Kubernetes

Dynamic on-demand provisioning of Kubernetes persistent volumes through HyperFlex



- 1 Developer requests a persistent volume through a persistent volume claim
- 2 Persistent volume claim request is sent to the **HyperFlex Provisioner** (pod running in Kubernetes) via the StorageClass parameters
- 3 **HyperFlex Provisioner** makes call to **HyperFlex API** to provision backend iSCSI LUN for request
- 4 Software iSCSI initiator on each Kubernetes node VM discovers new iSCSI block device from HyperFlex cluster
- 5 **HyperFlex Plugin** orchestrates the mounting of the new iSCSI block device and the creation of a Kubernetes persistent volume
- 6 Kubernetes binds the newly created persistent volume to the persistent volume claim

# HyperFlex Storage Integration for Kubernetes

- Expanding customer choice with HyperFlex Storage Integration for Kubernetes
- HyperFlex 3.5 release adds support for RedHat OpenShift Container Platform



RedHat  
OpenShift Container Platform



Cisco  
Container Platform

 **kubernetes**




 **HyperFlex**

# HyperFlex AI/ML Portfolio

UCSM and Intersight Managed

**Test & Dev and Model Training**


**C240**



2 x P100/V100


Available Today

**HyperFlex 240**



2 x V100 Per Node


Option of GPU Only Nodes



HyperFlex 3.5

**Deep Learning/ Training**


**C480**



6 x PCIe P100/ V100

Available Today

**C480 ML**





8x SXM2 V100 with NVLink

CY Q4' 18

**Inferencing**

**C 220  
C/HX 240**



2 x P4  
6 x P4

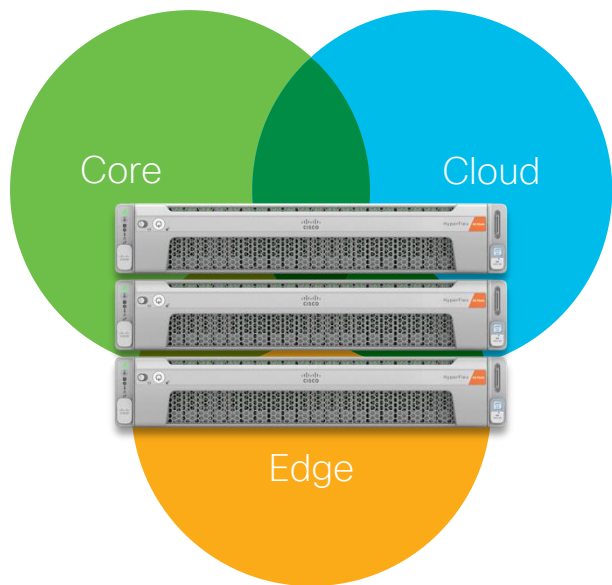
Available Today

Validated AI/ML SW For Turnkey (Working with Partners)



Better Together, Customer Choice, Cisco Validated Design with Eco-system

# Supporting your Application Ecosystem



## Enterprise Apps



## Hybrid/Multicloud



## Containers / Cloud Native Apps



## Intelligent Management (AI Ops)



## AI/ML Apps





# Bringing Cloud Management to Cisco HyperFlex and HyperFlex Edge

Sign In with Cisco ID

100% FREE

## Base

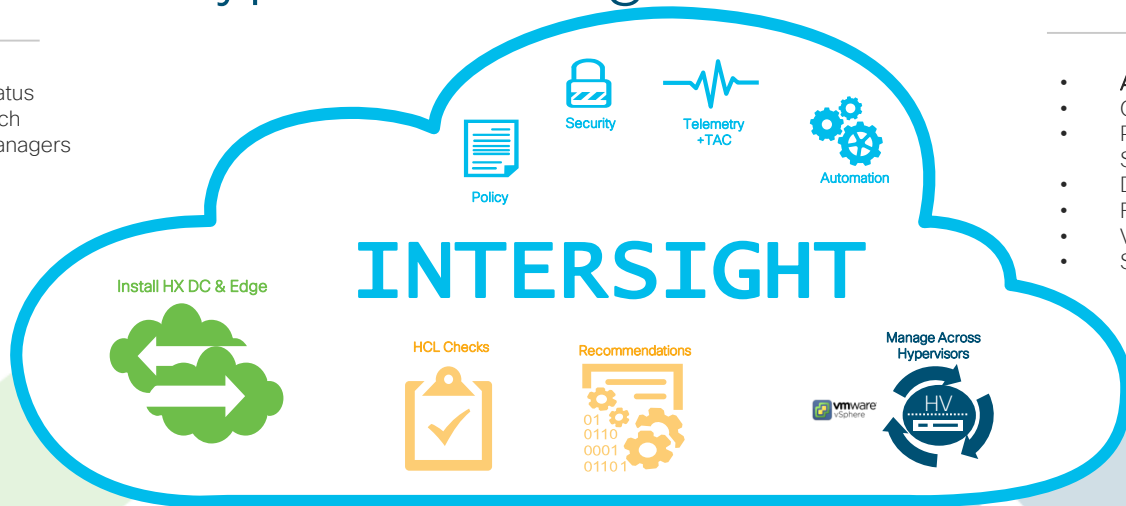
### Features

- Global inventory and health status
- Tagging and basic global search
- Context-launch of element managers
- Cisco HyperFlex installation
- User customizable dashboard

## Essentials

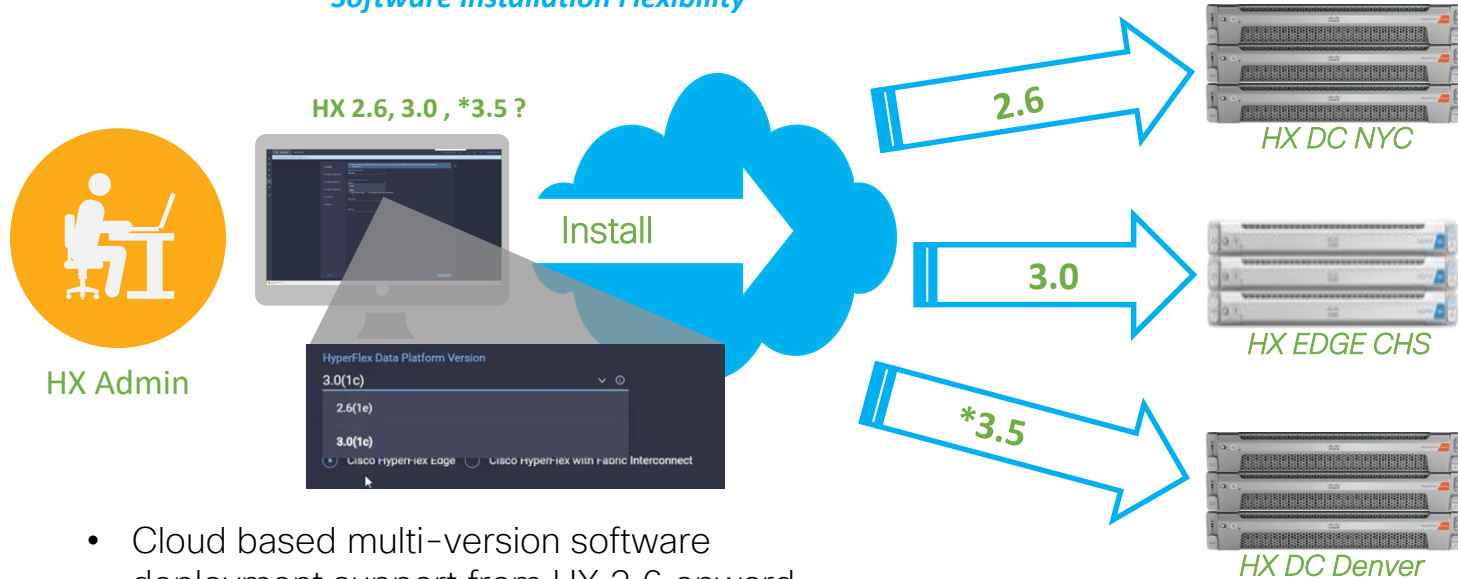
### Features

- **All functionality of Base**
- Cisco UCS C-Series management
- Policy-based configuration through Service Profiles
- Detailed inventory and server actions
- Firmware Management
- Virtual Keyboard-Video-Mouse (vKVM)
- Server HCL compliance check



# Hyperflex Multi-version Deployments from Intersight

## Software Installation Flexibility



- Cloud based multi-version software deployment support from HX 2.6 onward
- Deploy multiple clusters in parallel
- Clone Hyperflex cluster profiles

### Caveats:

- VMware hypervisor only
- Data center or edge deployments
- M4 and M5 nodes supported
- Stretched cluster is not supported



# Updated Scalability

## VMware

### SFF

Converged Nodes  
3-32



Compute-Only Nodes  
0-32

✓ Expansion Supported

**2:1**

Max ratio **Compute** to  
**Converged Nodes\***

Max Cluster Size

**64**

### LFF

Converged Nodes  
3-16



Compute-Only Nodes  
0-32

✓ Expansion Supported

**2:1**

Max ratio **Compute** to  
**Converged Nodes**

Max Cluster Size

**48**

! Hybrid Only

## HyperV

### SFF

Converged Nodes  
3-16



Compute-Only Nodes  
Coming in HX 3.5.2

✓ Expansion Supported

Max Cluster Size

**16**

### LFF

Converged Nodes  
3-8



Compute-Only Nodes  
Coming in HX 3.5.2

✓ Expansion Supported

Max Cluster Size

**8**

! Hybrid Only

## Stretched Cluster\*

### SFF

Converged Nodes  
2-8 / Site



Compute-Only Nodes  
0-8 / Site

✓ Expansion Supported\*\*

**1:1**

Max ratio **Compute** to  
**Converged Nodes**

Max Cluster Size (Both Sites)

**32**

### LFF

Converged Nodes  
2-8 / Site



Compute-Only Nodes  
0-8 / Site

✓ Expansion Supported\*\*

**1:1**

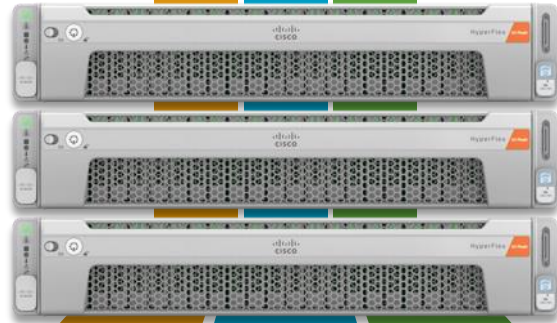
Max ratio **Compute** to  
**Converged Nodes**

Max Cluster Size (Both Sites)

**32**

! Hybrid Only

# Summary



# HyperFlex Platform Differentiation

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

High Performance &  
Scalable Data Platform

#1 Performing HCI  
platform

Consistent, Low latency  
performance

3X Lower TCO, 3X Higher VM  
Density, 64 node scale, linear scale  
out performance

Enterprise Class Data  
Services & Storage  
Optimization



Integrated Dedup & Compression  
w/ no performance penalty

Seamless integration of  
Converged & Hyperconverged



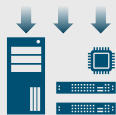
Investment protection of existing  
storage and compute investment

Independent Scaling of  
Compute & Capacity



Cost optimization through  
Compute-only node support

Deployment Automation &  
Simplicity



Out-of-the-box service profiles,  
install/upgrade automation,  
automated cluster scaling

Integrated High Performance  
Network Fabric



10G/40G VIC/Fabric  
Factory installed, integrated  
networking, fabric QoS

Data Protection, High  
Availability & Resiliency



Native replication, backup/DR,  
Stretch Cluster, Availability Zones,  
Fault tolerant HA architecture

Cloud based centralized  
management



Monitoring, Telemetry, Analytics,  
Policy, Orchestration, Proactive  
TAC, HX Cluster management

Broad Range  
Of Supported  
Workloads

ROBO  
(Branch, IOT)

VSI  
(app/web)

VDI  
(Citrix, Horizon)

Collaboration  
(UC, HCS)

Databases  
(Oracle, SQL)

Mission Critical & ERP  
(SAP)

Analytics  
(Splunk)

Cloud-Native Apps  
(Docker, Kubernetes)



# Enterprise Application Ready

## Enterprises Run Mission Critical Apps on HyperFlex



### #1 in Performance

HyperFlex vs.  
HCI Competition



Full ESG report:  
[cisco.com/go/hyperflex](http://cisco.com/go/hyperflex)

1

3x higher  
VM density

2

3x reduced  
read/write latency

3

7:1 reduction  
IOPS variability



3x better  
TCO

More workloads  
On Hyperconverged

Predictable  
End User Experience

### Enterprise Grade HCI

+35%

Clusters Running  
Databases(ASUP data)

25+%

Enterprise scale  
deployments

10+

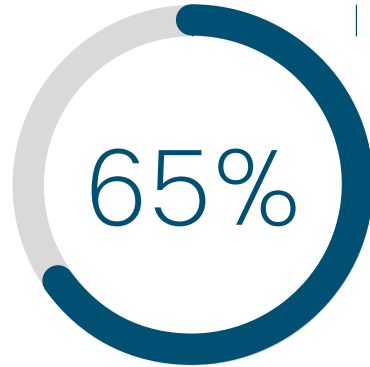
New CVDs/Solution  
Guides for DB Apps

# HyperFlex Value for Today and Tomorrow



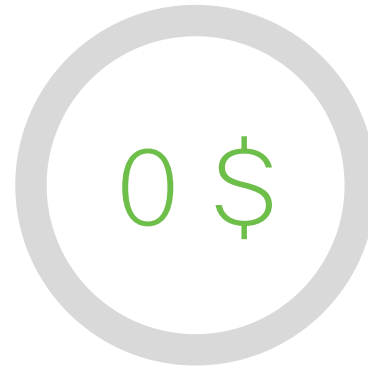
Faster Cluster  
Deployment Time

Including the network



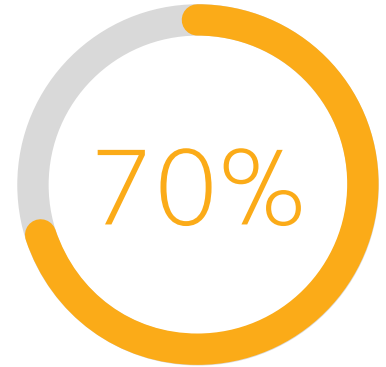
Lower TCO  
vs. SW Only HCI

Power More VM's with Less  
HCI Nodes & SW Licenses



Compute Scaling  
License Cost

HyperFlex UCS compute  
only nodes vs. SW Only HCI



Savings vs.  
Public Cloud

HyperFlex's  
Better than Cloud  
Economics

# HyperFlex Innovations

Driving Modernization Benefits

## Industry Leading HCI Innovations



**3000+** Customers Are Saying

**80%** Savings vs. 3-tier  
Infrastructure<sup>1</sup>

**75%** Management  
time savings<sup>3</sup>

**30%** More Performance for  
Mission Critical Apps<sup>5</sup>

**50%** Improvement in ERP  
Response Time<sup>6</sup>

**51%** Savings vs. Public Cloud  
Over 3 years<sup>2</sup>

**2x** Virtual desktop speed<sup>4</sup>

**90%** Downtime Reduction<sup>7</sup>

# Cisco HyperFlex

## Modernize the Present, Simplify your Future

