Cisco HyperFlex Systems

Tommi Keskitalo
DC & Cloud Sales
What Customers are Telling Us

**Moving at the Speed of Business**

Consumption of infrastructure adds time, cost and inefficiency

**Operationalizing Speed and Simplicity**

Proliferation of solutions creating silos that complicates operations

**CFOs Expect a Cloud Economics On-Premise**

Expectation of pay-as-you-go economics with scaling on-demand
The Promise of Hyperconverged Systems

**Agile**

**Deploy at Cloud Speed**
Instantly Provision, Clone or Snapshot Applications

**Efficient**

**Flexible Deployment**
Variety of Configurations to Handle Diversified Set of Workloads

**Adaptable**

**Scale-As-You-Grow**
Add Resources Non-Disruptively and Scale Performance Linearly in Small Increments
Hyperconvergence

First Gen HCI

Simplicity  Fast Time to Market
Hyperconvergence

Gaps

- New management silos
- Inefficient scaling and data optimization
- Limited app performance and workload support

First Gen HCI

Simplicity

Fast Time to Market
IT is Looking for a Better Answer

Next Gen HCI

Gaps

New management silos
Inefficient scaling and data optimization
Limited app performance and workload support

First Gen HCI

Simplicity
Fast Time to Market

Agile

Simplicity
Integration with Existing Data Center

Efficient

Easy Scaling
Resource Efficiency

Adaptable

Existing Apps
Next Gen

First Gen HCI

Simplicity

Fast Time to Market

Gaps

New management silos
Inefficient scaling and data optimization
Limited app performance and workload support
Cisco HyperFlex Systems
HX-Series
Introducing Cisco HyperFlex Systems

**Complete Hyperconvergence**
Software Defined Compute, Storage & Network

**Next Generation Data Management**
Always-on Optimization and Flexible Scaling

**Future Ready Architecture**
Built for Todays Workloads and Emerging Applications
# HyperFlex Key Customer Benefits

<table>
<thead>
<tr>
<th>Agile</th>
<th>Efficient</th>
<th>Adaptable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complete Hyperconvergence</strong></td>
<td><strong>Built on the UCS Platform</strong></td>
<td><strong>Scale-As-You-Grow</strong></td>
</tr>
<tr>
<td>All 3 Layers of Network, Compute and Storage Intelligently Integrated Into a Single Solution for &lt;60 Minute Deployment</td>
<td>Unified Management Using Existing Skillsets in the Organization</td>
<td>Add Resources Non-disruptively and Scale Performance Linearly in Small Increments</td>
</tr>
<tr>
<td><strong>Intuitive Management</strong></td>
<td><strong>Flexible Deployment</strong></td>
<td><strong>Adaptive Scaling</strong></td>
</tr>
<tr>
<td>Eliminate Infrastructure Silos and Use Existing Management Tools to Manage and Automate Operations</td>
<td>Variety of Configurations to Handle Diversified Set of Workloads</td>
<td>Scale Compute or Capacity to Match Application Needs</td>
</tr>
<tr>
<td><strong>Cloud Speed</strong></td>
<td><strong>Always-on Data Optimization</strong></td>
<td><strong>Non-Stop Infrastructure</strong></td>
</tr>
<tr>
<td>Instantly Provision, Clone or Snapshot Applications</td>
<td>Inline Dedupe and Compression Ensuring Hyper-Efficient Resource Utilization</td>
<td>Self-Healing Fabric Based Hyperconvergence with Cloud Monitoring</td>
</tr>
</tbody>
</table>

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Cisco HyperFlex Configurations

**HX220c Nodes**
- Smallest Footprint 3–8 Node Cluster (VDI, ROBO)
- Per-Node:
  - 1x480 GB Cache SSD
  - 6x1.2TB HDDs
  - SD Card/120GB SSD (Boot/Housekeeping)

**HX240c Nodes**
- Capacity-heavy 3–8 Node Cluster (VSI: IT/Biz Apps, Test/Dev)
- Per-Node:
  - 1x1.6TB Cache SSD
  - up to 23x1.2TB HDDs
  - SD Card/120GB Back SSD (Boot/Housekeeping)

**HX240c + B200 M4 for HF Hybrid Nodes**
- Compute-heavy Hybrid (Compute Bound Apps/VDI)
- 3-8 Node HX240c Cluster
- Up to 4 Blades
  - SD Card or SAN (Boot)
Powered by UCS Platform
Cisco UCS: Platform for All Architectures

Single Infrastructure Management Model

UCS Management

UCS Director

Enterprise Cloud Suite

HyperFlex Systems

UCS Mini

Fourth Generation UCS

Mainstream Computing

Converged Infrastructure

Hyperconverged Infrastructure

Scale Out

UCS M-Series Modular Servers

UCS C3160

Enterprise Cloud Suite

VM

VM

VM

Mainstream Computing

Converged Infrastructure

Hyperconverged Infrastructure

Scale Out

Edge

Core Data Center

Cloud
Cisco HX Data Platform Overview
HX Data Platform Overview

**Enterprise Grade**
- Robust Data Integrity
- Continuous Availability
- Proactive Auto-support
- VM-level Snapshots for Instant Backups

**Maximum Simplicity**
- Fast Installation and Configuration
- 100% vCenter-based Management
- Rapid Cloning for VM Provisioning

**Economical Scaling**
- Inline De-duplication and Inline Compression
- Scale Out Just-in Time
- Scale Compute and Storage Independently
- Annual Subscription Pricing

Hyperconverged Data Platform That Allows Companies to Leverage Compute Servers for Storing and Managing Their Data without Compromising on Features or Performance
Real Innovation

Independent Scaling of Compute and Capacity

Dynamic Data Distribution

Continuous Data Optimization

Integrated Management and Data Services
Hyperconverged Scale Out and Distributed File System

Start With as Few as Three Nodes
Hyperconverged Data Platform Installs in Minutes
Add Servers, One or More at a Time
Linearly Scale Compute, Storage Performance, and Capacity
Distribute and Rebalance Data Across Servers Automatically
Retire Older Servers
Software Modules Inside a Server

Controller VM Has Direct Access to Drives

VAAI Plugin Offloads Snapshots and Clone Operations

IO Visor Module Presents NFS to ESX and Stripes IO
Building on the Right Foundation
Cisco HX Data Platform

Unique Architecture

Built From the Ground Up for Hyperconvergence

Distributed Log-Structured File System Designed for Scale-out, Distributed Storage

Advanced Data Services (Snapshots, Clones) and Data Optimization (Inline Dedupe, Compression) Without Trade-offs

Better Flash Endurance and Disk Performance

Computing, Storage, Networking, and Hypervisor Integration

Eliminates Management Silos
Flexible, Extensible Infrastructure

Future Ready Architecture

API-Enabled Data Platform Supports Multiple Storage Formats
- Multiple Hyper-visors
- Containers
- Additional VM environments

Cisco HyperFlex: HX Data Platform
Data Services and Storage Optimization
Independent Scaling of Compute and Capacity

HX Data Platform

Scale Capacity Within Nodes

Add Nodes

Scale Compute

Non-HyperFlex Hosts Can Connect to Storage with IOVisor
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

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

HX Data Platform

HyperFlex
…and Efficient Capacity and Network Utilization

Balanced Space Utilization

No Data Migration on VM Migration
Less Stress on Network
High Resiliency, Fast Recovery

Platform Can Sustain Simultaneous 2 Node Failure Without Data Loss; Replication Factor Is Tunable

If a Node Fails, the Evacuated VMs Re-attach With No Data Movement Required

Replacement Node Automatically Configured Via UCS Service Profile
HX Data Platform Automatically Re-Distributes Data to Node
Non-Disruptive Operations

- Stripe blocks of a file across servers
- Replicate one or two additional copies to other servers
- Handle entire server or disk failures
- Restore back to original number of copies
- Rebalance VMs and data post replacement
- Rolling software upgrades
# Data Protection and High Availability

<table>
<thead>
<tr>
<th>Replication Factor = 3</th>
<th>Replication Factor = 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default Is Replication Factor = 3</td>
<td>Set at Cluster Creation Time</td>
</tr>
<tr>
<td>Every Block Is Written to 3 Different Nodes in the Cluster</td>
<td>Every Block Is Written to Min of 2 Different Nodes in the Cluster</td>
</tr>
<tr>
<td>Higher Availability to Survive Multi-Point Failures; Higher Device Protection</td>
<td>Can Survive a Single Node/Device Failure</td>
</tr>
<tr>
<td>Trades usable capacity for increased cluster resiliency</td>
<td>Usable Capacity is 50% of Raw Disk Capacity</td>
</tr>
<tr>
<td>Access Policy Is Strict (Default); Can Be Modified Via CLI</td>
<td>Access Policy Is Lenient</td>
</tr>
</tbody>
</table>

![Diagram showing data protection and replication](image)
Continuous Data Optimization

Log-Structured File System Yields More Efficient Data Optimization

Inline Deduplication
- 20–30% space savings

Inline Compression
- 30–50% space savings

No Special Hardware
No Performance Impact
Integrated Management and Data Services

- UCS Manager familiar to 50,000 customers WW
- Server and network deployment settings in pre-configured Service Profiles
- Instant provisioning, cloning and snapshotting of virtual machines from within vCenter
- No separate console, no learning curve
- UCS Manager vCenter Plug-in
- Manage UCS Service Profiles
- Update Server Firmware
- KVM launch of console
Fast and Flexible Native Snapshots

- Pointer-based snapshots
  - Space-efficient
  - Fast creations and deletions
- Fine-grained or coarse-grained
  - VM-level or VM folder-level
- VAAI-integrated
  - Quiesced and crash-consistent
- Use vCenter Snapshot Manager
- Policy-based
  - Schedules, retention period

All This Functionality Enabled with the HX Data Platform FileSystem
Native VM Clones for Rapid Provisioning

- Pointer-Based Writeable Snapshots (Instantaneous Clones)
- VAAI integrated
- VM-level granularity

- Batch creation GUI
  - Apply unique names
  - Use customization spec to apply IP
  - Powerful tool to rapidly setup a large set of VMs using just VC (without scripting or View composer); Up to 256 clones in parallel per job
  - Golden/Base VM can be a template, powered on or powered off
Use Cases
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

**Large Remote Branch Office**
- Simple deployment
- Centralized management
- No “fly-and-fix” missions
HyperFlex Summary

- **Log Structured Layout**: Flash endurance, compression friendly, faster rebuilds
- **Data Distribution**: Scale performance and capacity independently, eliminate hotspots
- **Data Virtualization**: Flash performance, low cost capacity
- **Data Services**: Fast, efficient snapshots and clones
- **Integrated Management**: Reduced management complexity

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Thank you.
Simplified Scaling

Creating Virtual Pools of Shared Resources

Application View

Physical View

HX Data Platform

HyperFlex
Configurations/Bundles
Hyperconvergence Meets Unified Computing
HyperFlex HX-Series

HCI Built on Cisco UCS

2 different UCS models
HX240c M4, HX220c M4

- Integrated Compute
  - Proven Performance
  - Enterprise Reliability
  - Blades and Rack Mount

- Centralized Management
  - Complete HW Abstraction
  - Policy and Profile Driven
  - Optimized for Scale

- Unified Fabric
  - Low Latency
  - Physical and Virtual
  - Data and Management

- Optimized for Virtualization
  - Comprehensive Hypervisor Integration
  - Native I/O Virtualization
  - Hypervisor Switching in HW

- Scale without Complexity
  - Maintains Single Point of Management
  - Self-integrating
  - Fewer Components
HyperFlex Components

Cisco HyperFlex Systems

Simple
- Pre-Engineered with Delivery and Support Services

Adaptable
- Mix and match servers and blades

Agile
- On-demand provisioning and scaling

Efficient
- Optimized solution with familiar management and operations

HX Appliance

- Compute and Storage on servers
- Fabric-based platform
- Centralized UCS management

HX Data Platform Software

- Enterprise grade data services
- Flexible on-demand scaling
- Simplified vCenter management
Cisco HX SmartPlay

Cisco HX-Series SmartPlay Bundles

<table>
<thead>
<tr>
<th>New Installs Require Pair of FI as Part of the PO</th>
<th># of HyperFlex Storage Nodes per Cluster Min 3–Max 8</th>
<th>All Nodes Must Have Same Configuration in a Cluster</th>
<th>3 Categories of Bundles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers with Existing VMW Licenses Don’t Need to Order Additional Licenses</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Nodes + FI Bundles**
  - Nodes Only: for existing cluster expansion
  - HDD Packs: Expanding an existing node storage capacity

- **Nodes Only**: for existing cluster expansion

- **Expanding an existing node storage capacity**
SmartPlay Select HX-Series Configurations

Cisco SmartPlay Select HX-Series Bundles

*Nodes: Min 3; Max 8 with 2 Fi's; *Al-carte Node Options available

<table>
<thead>
<tr>
<th></th>
<th>Entry Bundles</th>
<th>Value Bundles</th>
<th>Performance Bundles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HX220c</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>2 x E5-2630 v3</td>
<td>2 x E5-2660 v3</td>
<td>2 x E5-2690 v3</td>
</tr>
<tr>
<td>Memory</td>
<td>256GB (8 x 32GB DDR4)</td>
<td>256GB (8 x 32GB DDR4)</td>
<td>512GB (16 x 32GB DDR4)</td>
</tr>
<tr>
<td>Network</td>
<td>1 x 10Gb SFP+</td>
<td>1 x 10Gb SFP+</td>
<td>1 x 10Gb SFP+</td>
</tr>
<tr>
<td>Boot Device</td>
<td>2 x 64GB SD Cards</td>
<td>2 x 64GB SD Cards</td>
<td>2 x 64GB SD Cards</td>
</tr>
<tr>
<td>VMware License (Optional)</td>
<td>Follow CTO Rules</td>
<td>Follow CTO Rules</td>
<td>Follow CTO Rules</td>
</tr>
<tr>
<td>HyperFlex Data Platform SW</td>
<td>1 year and 3 Year Options</td>
<td>1 year and 3 Year options</td>
<td>1 year and 3 Year options</td>
</tr>
<tr>
<td>FI</td>
<td>6248 and 6296 Options</td>
<td>6248 and 6296 Options</td>
<td>6248 and 6296 Options</td>
</tr>
<tr>
<td><strong>HX240c</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>2 x E5-2630 v3</td>
<td>2 x E5-2660 v3</td>
<td>2 x E5-2690 v3</td>
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<tr>
<td>Memory</td>
<td>256GB (8 x 32GB DDR4)</td>
<td>256GB (8 x 32GB DDR4)</td>
<td>512GB (16 x 32GB DDR4)</td>
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<tr>
<td>Network</td>
<td>2 x 10Gb SFP+</td>
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<tr>
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<td>VMware License (Optional)</td>
<td>Follow CTO Rules</td>
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<td>Follow CTO Rules</td>
</tr>
<tr>
<td>HX Data Platform Software</td>
<td>1 year and 3 Year Options</td>
<td>1 year and 3 Year options available</td>
<td>1 year and 3 Year options available</td>
</tr>
<tr>
<td>FI</td>
<td>6248 and 6296 Options</td>
<td>6248 and 6296 Options</td>
<td>6248 and 6296 Options</td>
</tr>
</tbody>
</table>
# Configure to Order

## Cisco HX-Series

<table>
<thead>
<tr>
<th>New Installs Require Pair of FL as Part of the PO; Recommended Configuration</th>
<th># of HyperFlex Storage Nodes per Cluster Min 3–Max 8</th>
<th>All Nodes Must Have Same Configuration in a Cluster</th>
<th>Ordering Tool Requires Configuration for One Node Only</th>
<th>Customers with Existing VMW Licenses Don’t Need to Order Additional Licenses</th>
</tr>
</thead>
</table>

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# Cisco HyperFlex HX220c Configuration

## Cisco HyperFlex C220 HX220C-M4S Base System

<table>
<thead>
<tr>
<th>Description</th>
<th>Mfg’s PN</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Memory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16GB or 32GB DDR4-2133-MHz RDIMM/PC4-17000/dual rank/1.2v</td>
<td>128GB–768GB</td>
<td>Min 16</td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible Processor Choices: E5-2698, E5-2697, E5-2695, E5-2690, E5-2680, E5-2670, E5-2667, E5-2660, E5-2658, E5-2650, E5-2640, E5-2630</td>
<td>Varies</td>
<td>2</td>
</tr>
<tr>
<td><strong>Drive Controller</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cisco 12Gbps Modular SAS HBA</td>
<td>UCSC-SAS12GHBA</td>
<td>1</td>
</tr>
<tr>
<td><strong>SSD1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>120 GB 2.5 Inch Enterprise Value 6G SATA SSD</td>
<td>UCS-SD120GBKS4-EV</td>
<td>1</td>
</tr>
<tr>
<td><strong>SSD2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>480GB 2.5 Inch Enterprise Performance 6G SATA SSD (3X endurance)</td>
<td>UCS-SD480G12S3-EP</td>
<td>1</td>
</tr>
<tr>
<td><strong>HDD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2 TB SAS 12Gbps 10K rpm SFF HDD</td>
<td>UCS-HD12TB10K12G</td>
<td>6</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cisco UCS VIC1227 VIC MLOM—Dual Port 10Gb SFP+</td>
<td>UCSC-MLOM-CSC-02</td>
<td>1</td>
</tr>
<tr>
<td><strong>Boot Device</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64GB SD Card for UCS servers</td>
<td>UCS-SD-64G-S</td>
<td>2</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cisco HX Data Engine 1 or 3yr SW Subscription</td>
<td>HXDE-001-xYR</td>
<td>1</td>
</tr>
<tr>
<td><strong>Optional VMware License</strong></td>
<td>Factory Installed—VMware vSphere6 Enterprise SW and License</td>
<td>2</td>
</tr>
</tbody>
</table>

**Hardware**
- **Memory Configurable**
  - 8x16GB → 24x32GB
- **CPU Configurable**
  - 2socket, 8 core, 2.2GHz min
  - Up to E5-2698D

**Software**
- **Storage Controller**
  - Reserves 48GB RAM
  - Reserves 8 vCPU, 10.800GHz CPU
- **VAAI VIB**
- **IO Visor VIB**
## Cisco HyperFlex HX240c Configuration

### Cisco HyperFlex C240 HX240C-M4SX Base System

<table>
<thead>
<tr>
<th>Description</th>
<th>Mfg’s PN</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Memory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16GB or 32GB DDR4-2133-MHz</td>
<td>256GB–768GB</td>
<td></td>
</tr>
<tr>
<td>RDIMM/PC4-17000/dual rank/1.2v</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processor</td>
<td>Flexible Processor Choices: E5-2698, E5-2697, E5-2695, E5-2690, E5-2680, E5-2670, E5-2667, E5-2660, E5-2658, E5-2650, E5-2640, E5-2630</td>
<td>Varies</td>
</tr>
<tr>
<td>Drive Controller</td>
<td>Cisco 12Gbps Modular SAS HBA</td>
<td>1</td>
</tr>
<tr>
<td>SSD</td>
<td>1.6 TB 2.5” Enterprise Performance 6G SATA SSD (3X endurance)</td>
<td>1</td>
</tr>
<tr>
<td>HDD</td>
<td>1.2 TB SAS 12Gbps 10K rpm SFF HDD</td>
<td>6–23</td>
</tr>
<tr>
<td>Network</td>
<td>Cisco UCS VIC1227 VIC MLOM—Dual Port 10Gb SFP+</td>
<td>1</td>
</tr>
<tr>
<td>Boot Device</td>
<td>64GB SD Card for UCS servers</td>
<td>2</td>
</tr>
<tr>
<td>120 GB 2.5 inch Enterprise Value 6G SATA SSD</td>
<td>UCSC-SD64G-S</td>
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<tr>
<td>(Internal)</td>
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<tr>
<td>Right PCI Riser Bd (Riser 1) 2onbd SATA bootdrvs+</td>
<td>UCSC-SD120GBKS4-EB</td>
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<tr>
<td>2PCI slots</td>
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</tr>
<tr>
<td>Software</td>
<td>Cisco HX Data Engine 1 or 3yr SW Subscription</td>
<td>1</td>
</tr>
<tr>
<td>Optional VMware License</td>
<td>Factory Installed—VMware vSphere6 Enterprise SW and License</td>
<td>2</td>
</tr>
</tbody>
</table>

### Hardware
- **Memory Configurable**
  - 16x16GB → 24x32GB
- **CPU Configurable**
  - 2socket, 8 core, 2.2GHz min
  - Up to 2698D
- **HDD Storage Qty Configurable**

### Software
- **Storage Controller**
  - Reserves 72GB RAM
  - Reserves 8 vCPU, 10.800GHz CPU
- **VAAI VIB**
- **IO Visor VIB**
# Product Specification

<table>
<thead>
<tr>
<th>Category</th>
<th>Item</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardware Configuration</strong></td>
<td>HX220c and HX240c Based Servers as Specified in BOM</td>
<td>Blade Boot From SD card</td>
</tr>
<tr>
<td></td>
<td>B200 M4 Blades as Compute-Nodes (New or Existing)</td>
<td>Blade Boot From SAN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M4 Blades only</td>
</tr>
<tr>
<td>Hypervisor Compatibility</td>
<td>VMware ESX 5.5** and 6.0</td>
<td>ESX 5.5U3 Patch 1</td>
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<tr>
<td></td>
<td></td>
<td>ESX 6.0U1 Patch 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**HX220c Has ESX Upgrade Complexity</td>
</tr>
<tr>
<td>Software</td>
<td>HX Data Platform v1.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UCSM 2.2(6f)–El Cap MR5 Patch for Stryker</td>
<td></td>
</tr>
<tr>
<td>Scalability</td>
<td>Converged Nodes per Cluster: Min 3–Max 8 per Cluster</td>
<td>Up to 4 Clusters per VC</td>
</tr>
<tr>
<td></td>
<td>Compute Nodes: Min 1–Max 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td># of Compute Nodes &lt; # of Converged Nodes</td>
<td></td>
</tr>
</tbody>
</table>
# Cisco HyperFlex B200c Configuration

## Cisco HyperFlex C240 HX240C-M4SX Base System

<table>
<thead>
<tr>
<th>Description</th>
<th>Mfg’s PN</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blade Server</strong></td>
<td>UCS B200 M4 w/o CPU, Mem, Drive Bays, HDD, Mezz (UPG)</td>
<td>UCSB-B200-M4-U</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>16GB or 32GB DDR4-2133-MHz RDIMM/PC4-17000/Dual Rank/1.2v</td>
<td>UCS-MR-1X162RU-A</td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>Intel E5-2600v3; Any Processor Speed</td>
<td>Varies</td>
</tr>
<tr>
<td><strong>Drive Controller</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>SSD1</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>SSD2</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>HDD</strong></td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td>Cisco UCS VIC 1340 Modular LOM for Blade Servers</td>
<td>UCSB-MLOM-40G-03</td>
</tr>
<tr>
<td><strong>Boot Device</strong></td>
<td>64GB SD Card for UCS Servers</td>
<td>UCS-SD-64G-S</td>
</tr>
</tbody>
</table>

- **Controller** (for compatibility)
- Reserves 512MB RAM
- Reserves 1024MHz
- For compatibility with Maintenance Mode
- VAAI VIB
- IO Visor VIB