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# HyperFlex Day 2 Operations

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@IOCisco
BRKDCN-2594

# Cisco Webex App

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## How

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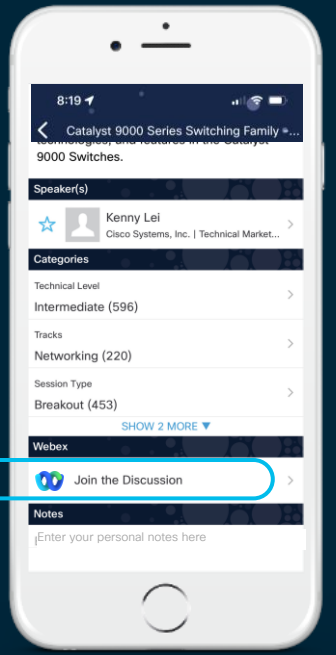


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# Agenda

- Introduction
- Operational Best Practices
- Benefits of Intersight for HX Operations
- Upgrade Considerations
- Expansion Considerations


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# Introduction

# Operational Best Practices

# Storage Best Practices and Tidbits

# HX Storage Calculations

- Capacity = Raw – (conversion overhead) – (RF overhead) – (metadata overhead)
- Used Space = Total physical space used *after* deduplication and compression
- Storage optimization = (1 - (1-%dedupe savings) * (1 - %Compression savings))

- There is often a delta between the cluster usage and the datastore usage. This is due to the metadata overhead and garbage that has not been collected they the HX cleaner process.

| | | |
|---|---|---|
| No. of HyperFlex Nodes | | 3 |
| No. of Disk Drives per Node | | 8 |
| Disk Drive Size (GB) | | 960 |
| **Total Physical Resources** | | 23.0 TB (21.0 TiB) |
| *Controller VM & Metadata Reserves* | *8%* | *-1.8 TB (-1.7 TiB)* |
| *Replication Factor* | *RF3* | *7.1 TB (6.4 TiB)* |
| **Total Usable** | | 7.1 TB (6.4 TiB) |
| *Best Practice Threshold* | *20.0%* | *-1.4 TB (-1.3 TiB)* |
| *Storage Efficiency Savings Multiplier* | *1.39* | *7.9 TB (7.2 TiB)* |
| **Best Practice Resources** | | 7.9 TB (7.2 TiB) |

Capacity Management Whitepaper: https://www.cisco.com/c/en/us/products/collateral/hyperconverged-infrastructure/hyperflex-hx-series/white-paper-c11-744026.html
HyperFlex Sizer: http://cs.co/hxsizer


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# Storage Best Practices and Tidbits

- Replication Factor (RF) is the number of data copies written across the nodes
- Available Replication Factor are 2, 3 and 2+2 for Stretch Clusters
- Replication Factor of 3 and clusters with 5 or more nodes provides the best resiliency for Standard Clusters.
- Copies of data will be written to different nodes across the cluster
- Deduplication is always on and occurs at the cluster level
- Compression occurs at the Write Log level before being written to the capacity drives

Capacity Management Whitepaper: https://www.cisco.com/c/en/us/products/collateral/hyperconverged-infrastructure/hyperflex-hx-series/white-paper-c11-744026.html


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# Storage Best Practices and Tidbits

- Datastores, less is more!
  - Each HX datastore adds 180 seconds to ESXi boot time
- Storage utilization should remain under 76%*
- Upgrades may be prevented if usage is at or above 76%
- Performance impacts may be observed when utilization is above 80%*
- Cluster may go read only when utilization is above 90%*

*Storage Industry Best Standards

Capacity Management Whitepaper: https://www.cisco.com/c/en/us/products/collateral/hyperconverged-infrastructure/hyperflex-hx-series/white-paper-c11-744026.html


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# Storage Best Practices and Tidbits

- The HX cleaner process reclaims freed space and performs garbage collection
- Plan and perform periodic space cleanup on VMs (sdelete or dd). This will allow the HX Cleaner process to identify and reclaim deleted space within VMs.
- Cleaner policy-defined conditions:
  - Number of flushes since the last cleaner run
  - Amount of data written since the last cleaner run
  - Amount of data deleted since the last cleaner run
  - Storage cluster space usage
- Cleaner runs on two priority levels:
  - Normal priority – The cleaner generates minimum I/O
  - High priority – The cleaner I/O is increased. This kicks in when the capacity thresholds are near to 76 percent

Capacity Management Whitepaper: https://www.cisco.com/c/en/us/products/collateral/hyperconverged-infrastructure/hyperflex-hx-series/white-paper-c11-744026.html


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# Data Protection

# Data Protection – Factors to consider

- Consider ability to retain multiple recovery points
- Business requirements for Recovery Point Objective
- Business requirements for Recovery Time Objective
- Consider ability to retain multiple copies of important data at Remote/DR site and/or Cloud
- VM Level backups vs Application-level backups


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# RPO / RTO

- Recovery Point Objective (RPO)
  - It is the maximum allowable data loss following a large-scale disaster. An RPO defines:
    - The point in time to which the system must be recovered after an outage
    - The amount of data loss an organization can endure
    - Different applications/businesses that may have different recovery objectives
- Recovery Time Objective (RTO)
  - It is the time available to recover a disrupted service. An RTO defines:
    - How long it takes to recover services after the disaster
    - The amount of downtime an organization can endure


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# Data Protection Options

- HX Native Replication
- Third party data protection partners:

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# Notifications

# Notifications

- Configure Notification Settings in HX Connect to Receive Notifications for Alarms via Email
- Emails can be used by third party monitoring tools
- Events are reported into vCenter. Monitoring tools for vCenter can consume those events and trigger notifications or actions
- Enabling Auto Support sends periodic information over HTTPS for proactive support and product improvement.


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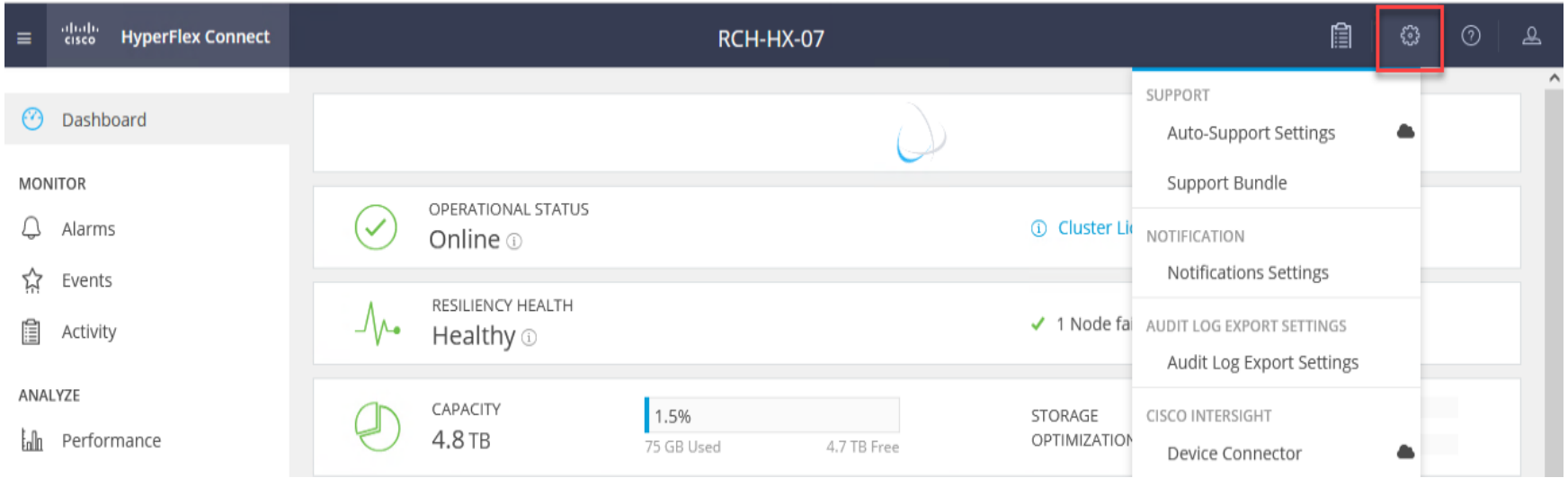
# HX Connect – Where to configure notifications





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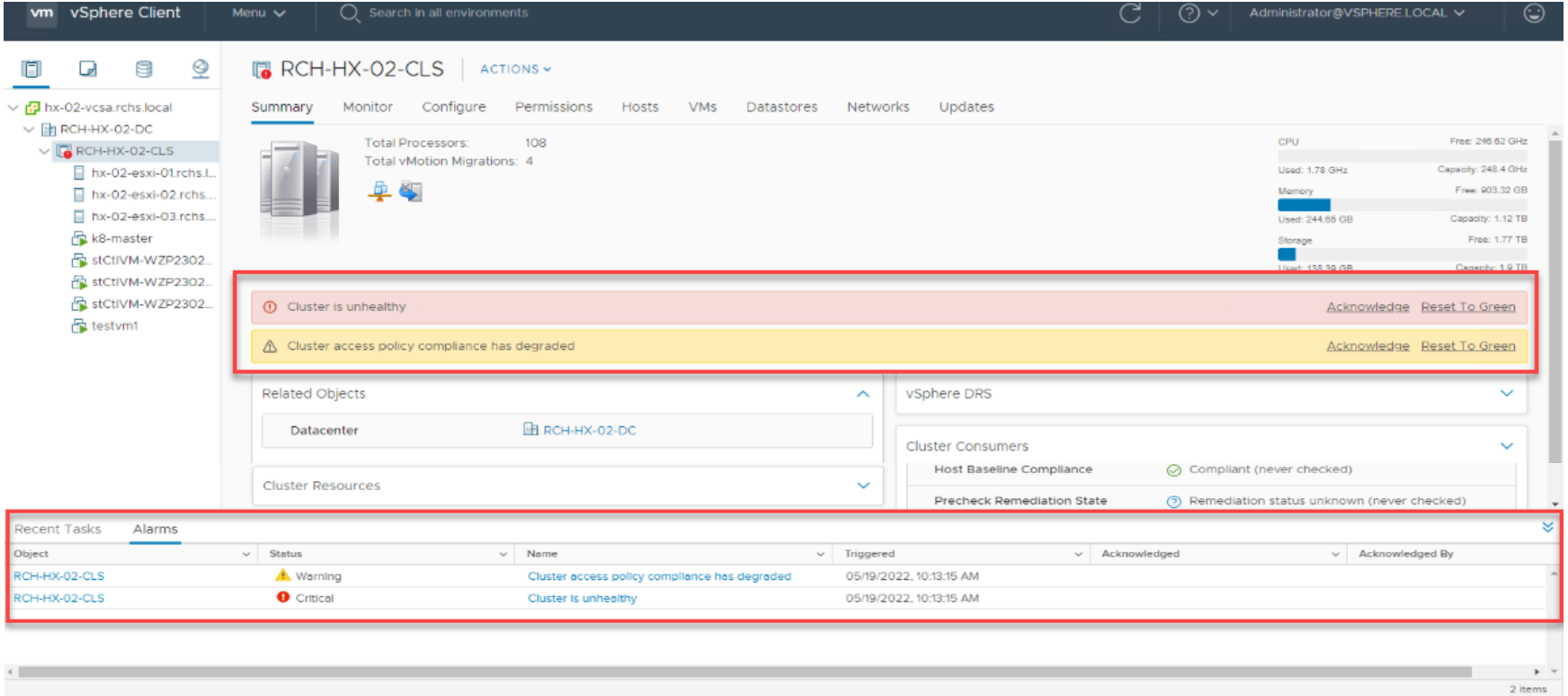
# HX Alarms in vCenter



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# Benefits of Intersight for HX Operations

# Benefits of Intersight for HX Operations

- Multi-cluster dashboards
- Storage capacity utilization projection
- Ability to open cases for your HX clusters
- TAC can collect support bundles for connected clusters
- Proactive RMAs of drives, DIMMs and fans.
- Alerts for security advisories, field notices and End of Life advisories
- N:1 Replication

- HX Connect Cross Launch
- Manage Datastores
- HX Health Check
- Upgrades
- Expansions
- Enable and configure Software Encryption
- Create Notification Rules
- Create Webhooks


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# Multi-Cluster Dashboard

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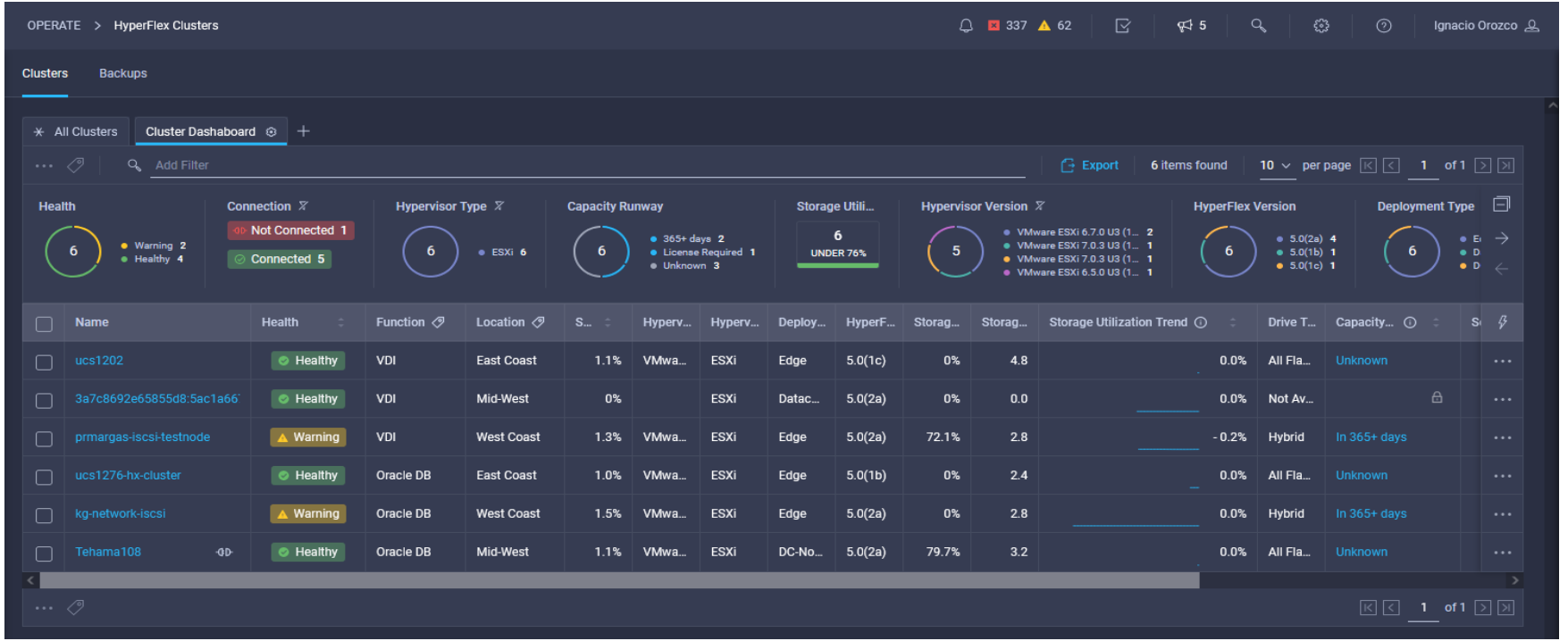



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# Storage Capacity Runway

## *Forecasting, Trending, and Recommendations*

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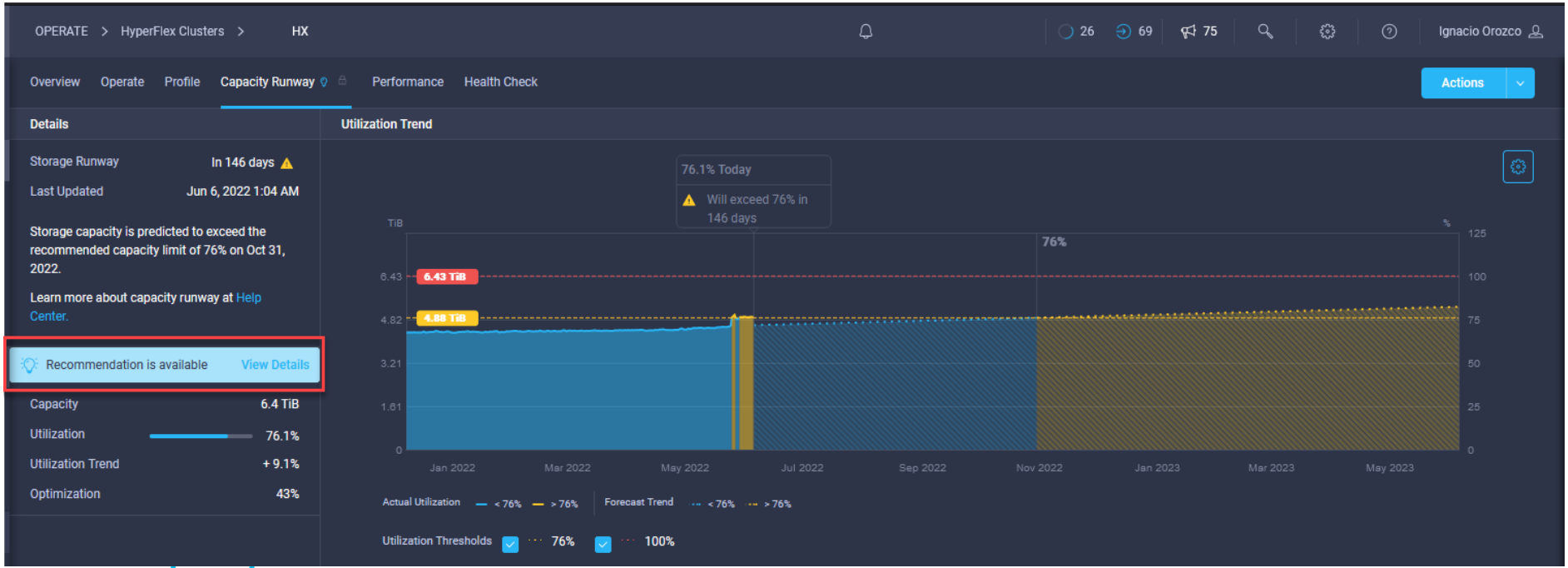
- Predict the storage capacity runway up to 18 months in advance
- Periodic reminders as you get closer to maximum capacity
- Insights on the last 6 months historical trends
- Forecast available 2 weeks after cluster installation



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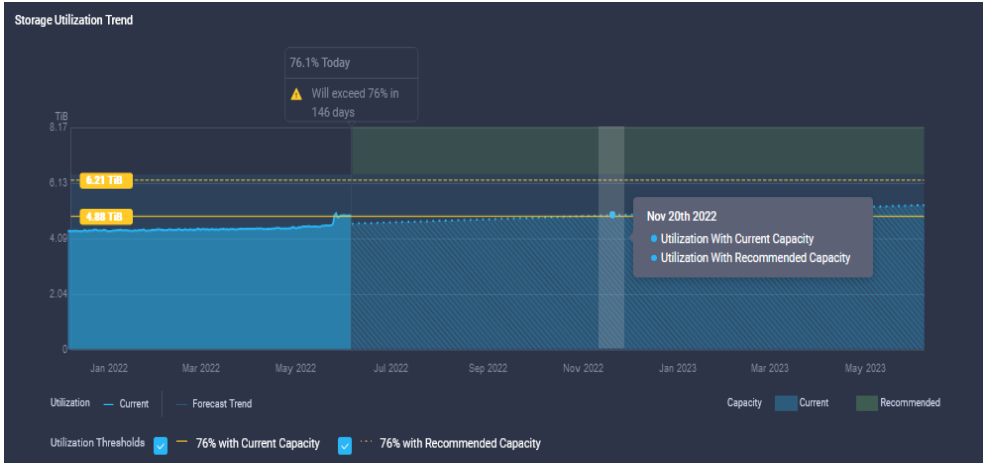
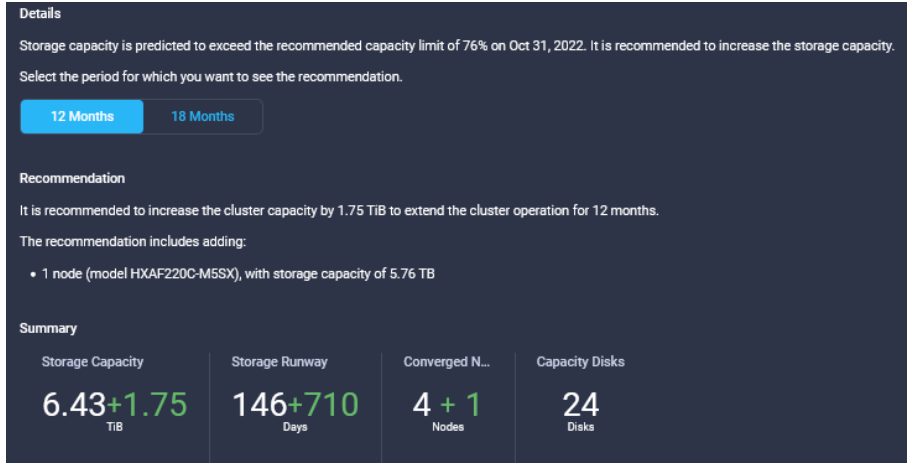
# Storage Capacity Runway
## *Forecasting, Trending, and Recommendations*

Available in CISCO INTERSIGHT

- Recommendation to extend capacity runway to 12 or 18 months
- Get recommendations on number of disks and nodes to add
- View the storage capacity trend before and after additional capacity
- Disk slot info on where to add the disks




https://intersight.com/help/appliance/resources/hyperflex_cluster_capacity_planning



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# Advisories

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https://intersight.com/help/saas/features/cisco_intersight/settings#advisories


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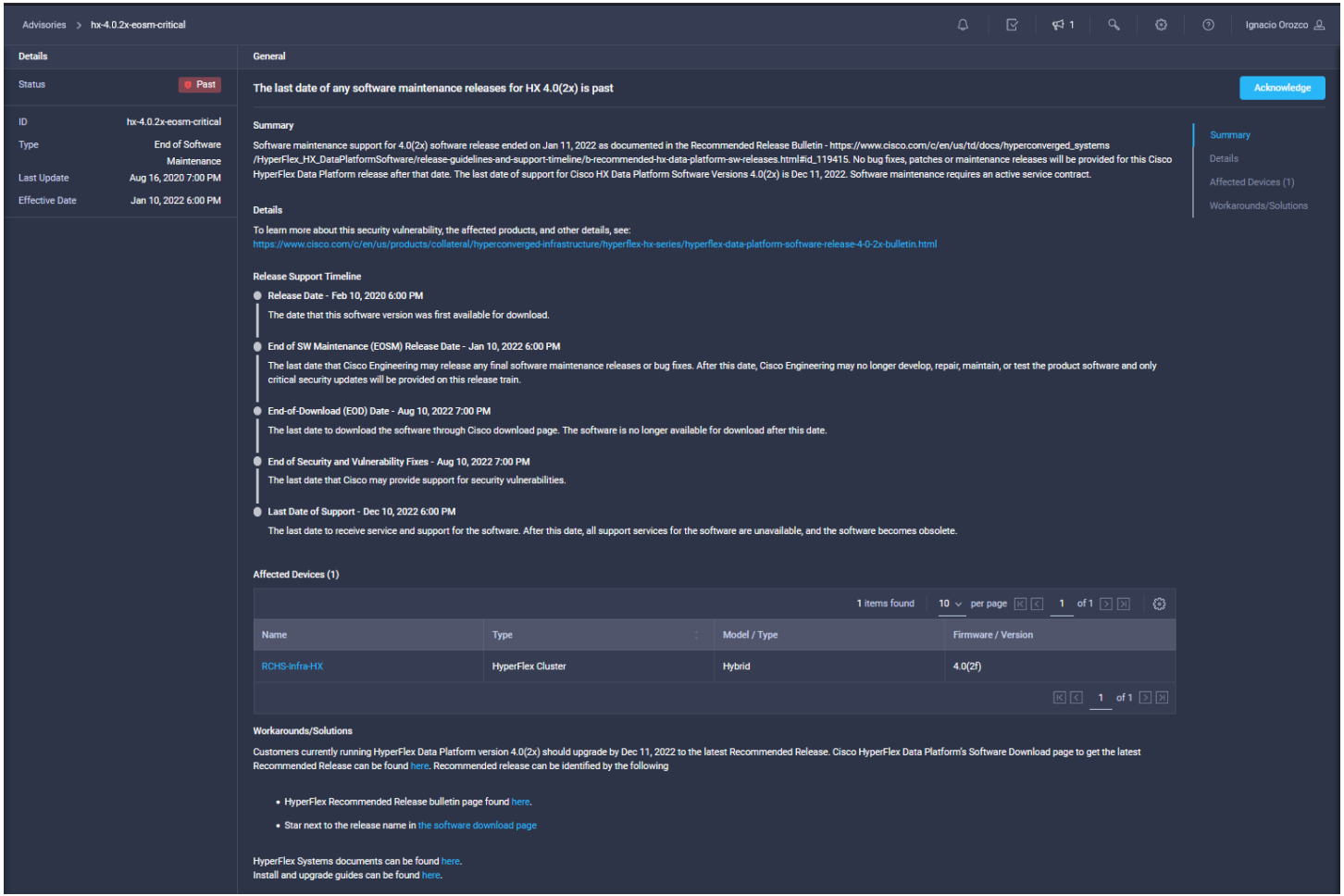



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# Viewing and Managing Alarms

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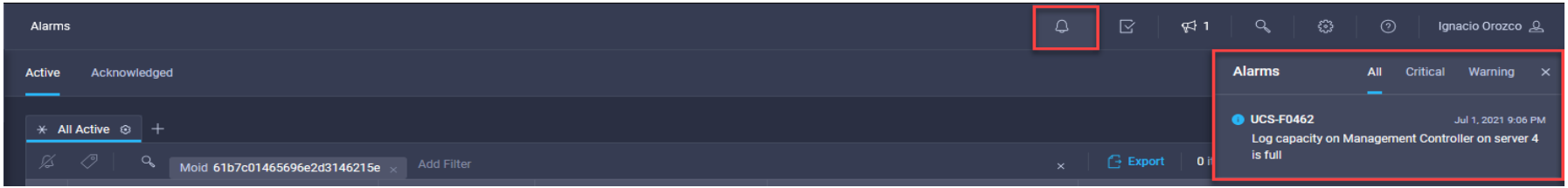


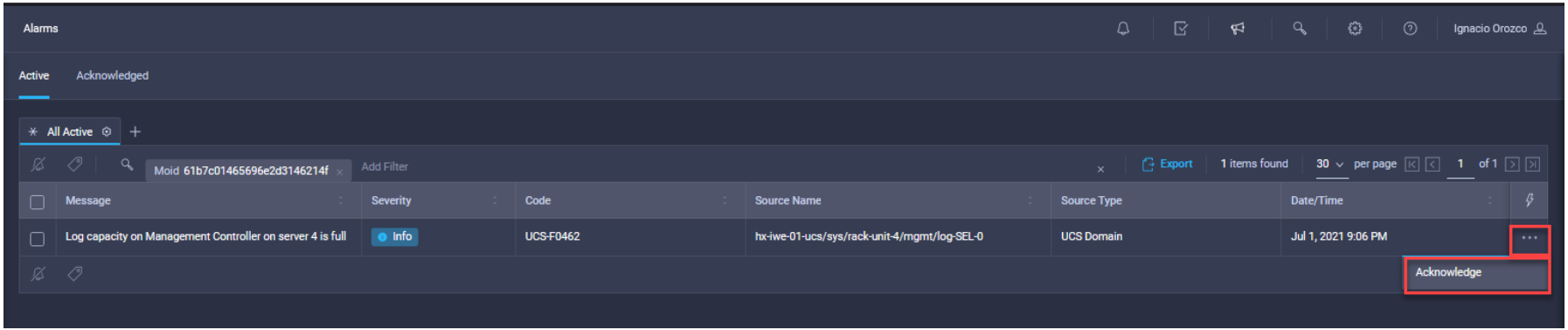


https://intersight.com/help/appliance/features/cisco_intersight/monitor#alarms


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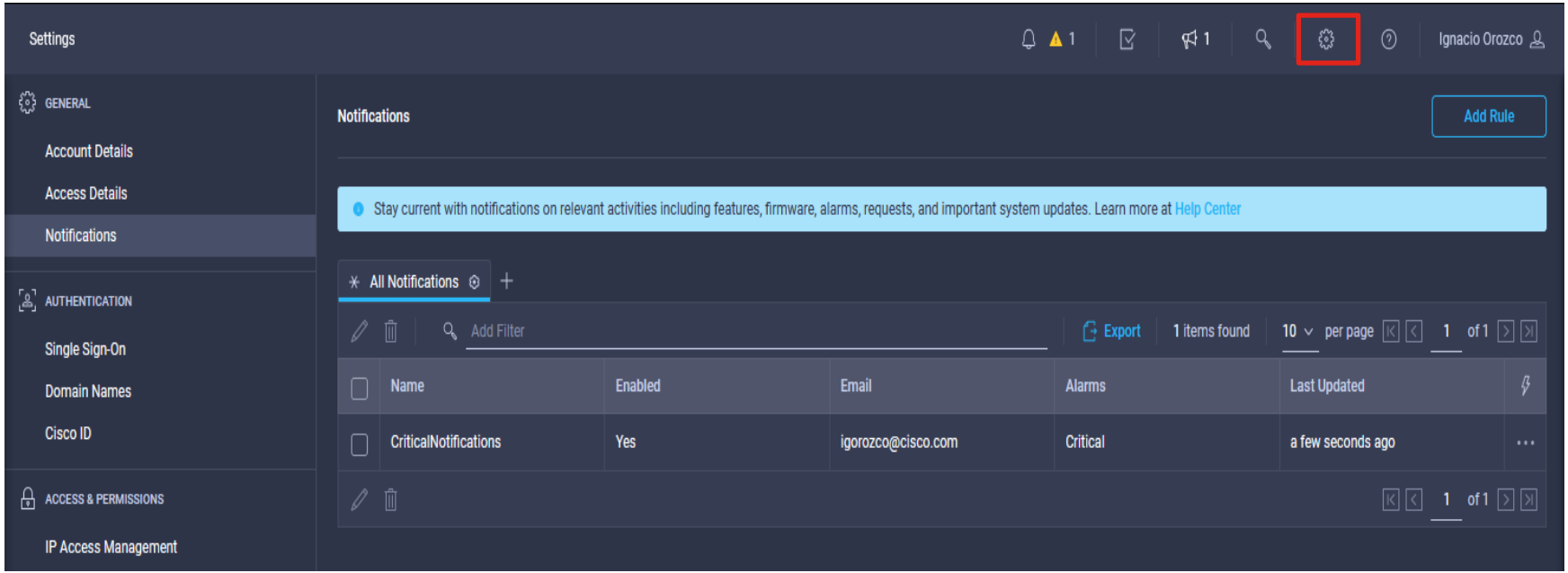
# Notification Rules

Available in CISCO INTERSIGHT

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# Notification Rules

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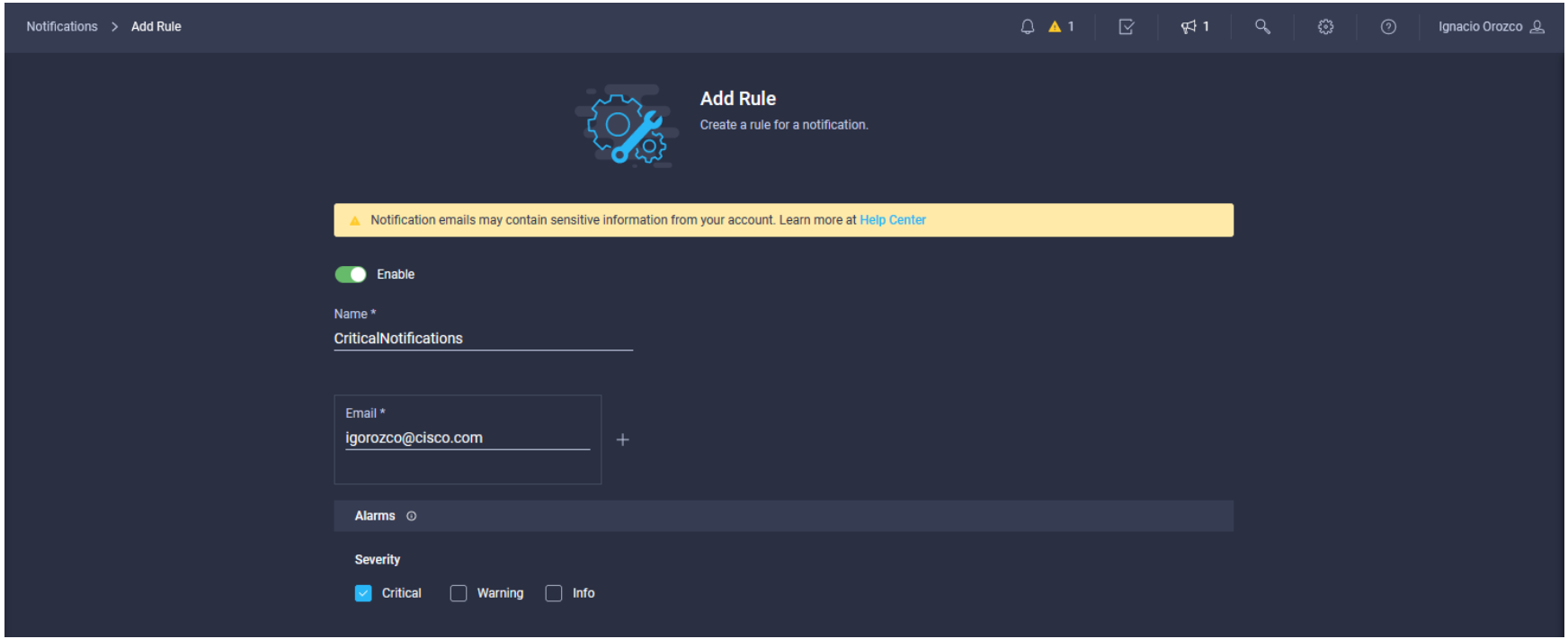


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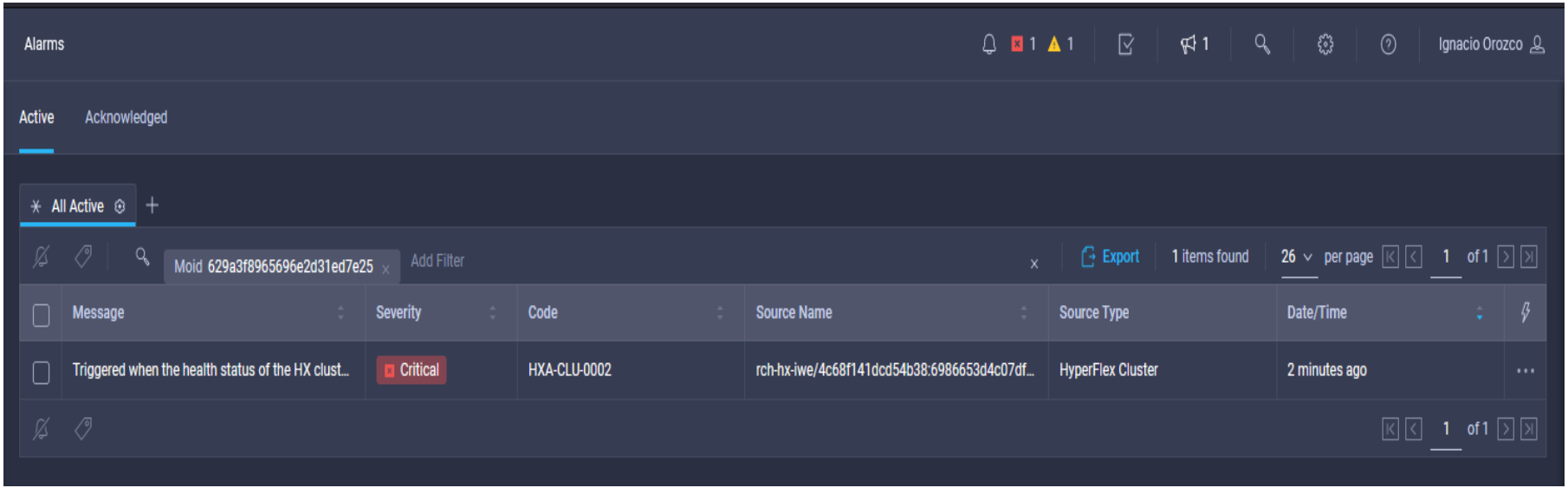


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# Open a TAC case from Intersight

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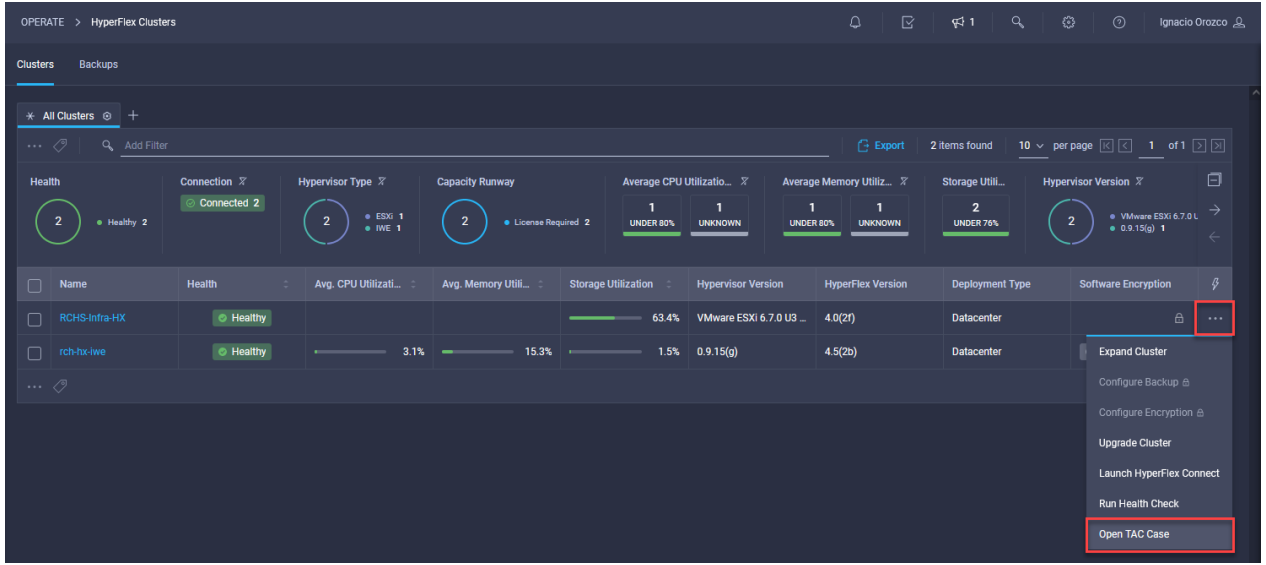
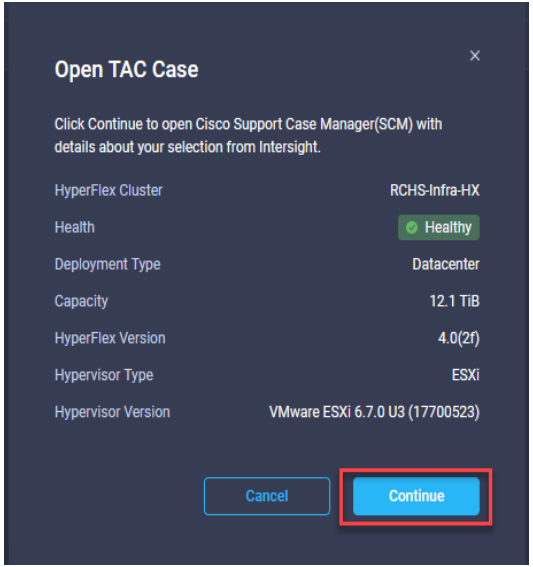
- Opening case from Intersight ensures correct Serial Number or Managed Object is tied to the Service Request for TAC log collection




https://intersight.com/help/saas/features/cisco_intersight/settings#integration_with_cisco_tac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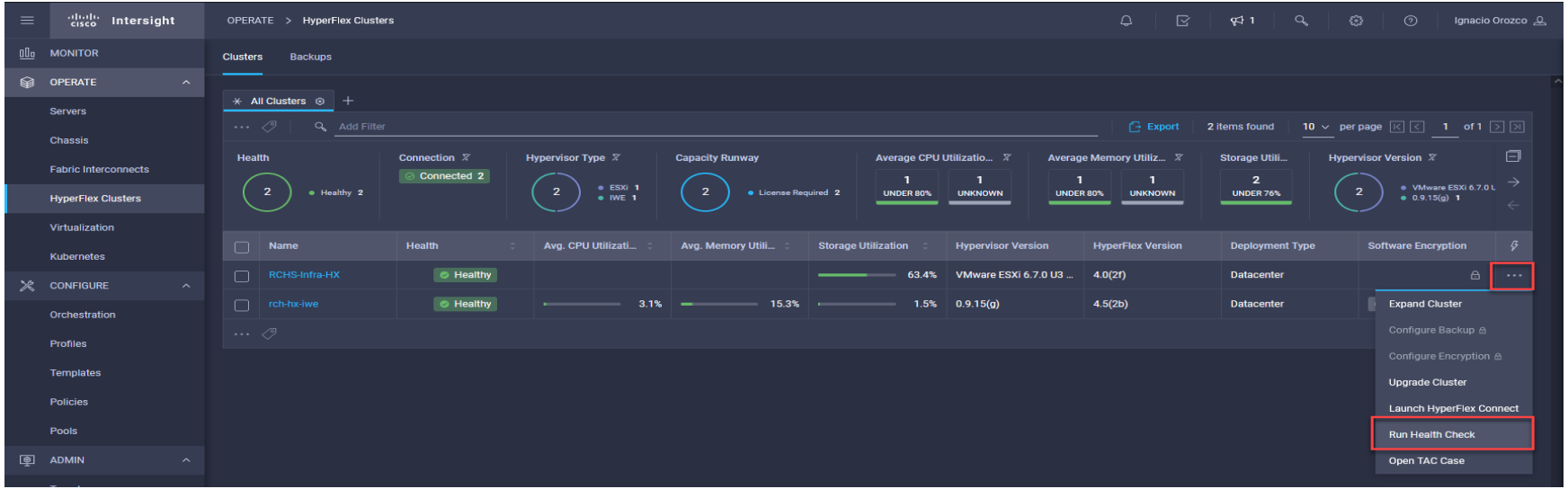
# HyperFlex Health Check

Available in CISCO INTERSIGHT

- Run comprehensive health checks across the entire stack. Pick and choose specific tests to run
- Automatic updates for newer checks are added when we detect new issues in the field
- Detailed troubleshooting info along with next steps
- Results viewable across multiple HX clusters in a health dashboard in Intersight
- Ability to run the health check across older HX versions




https://intersight.com/help/saas/resources/hyperflex_cluster_health_check



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# HyperFlex Health Check

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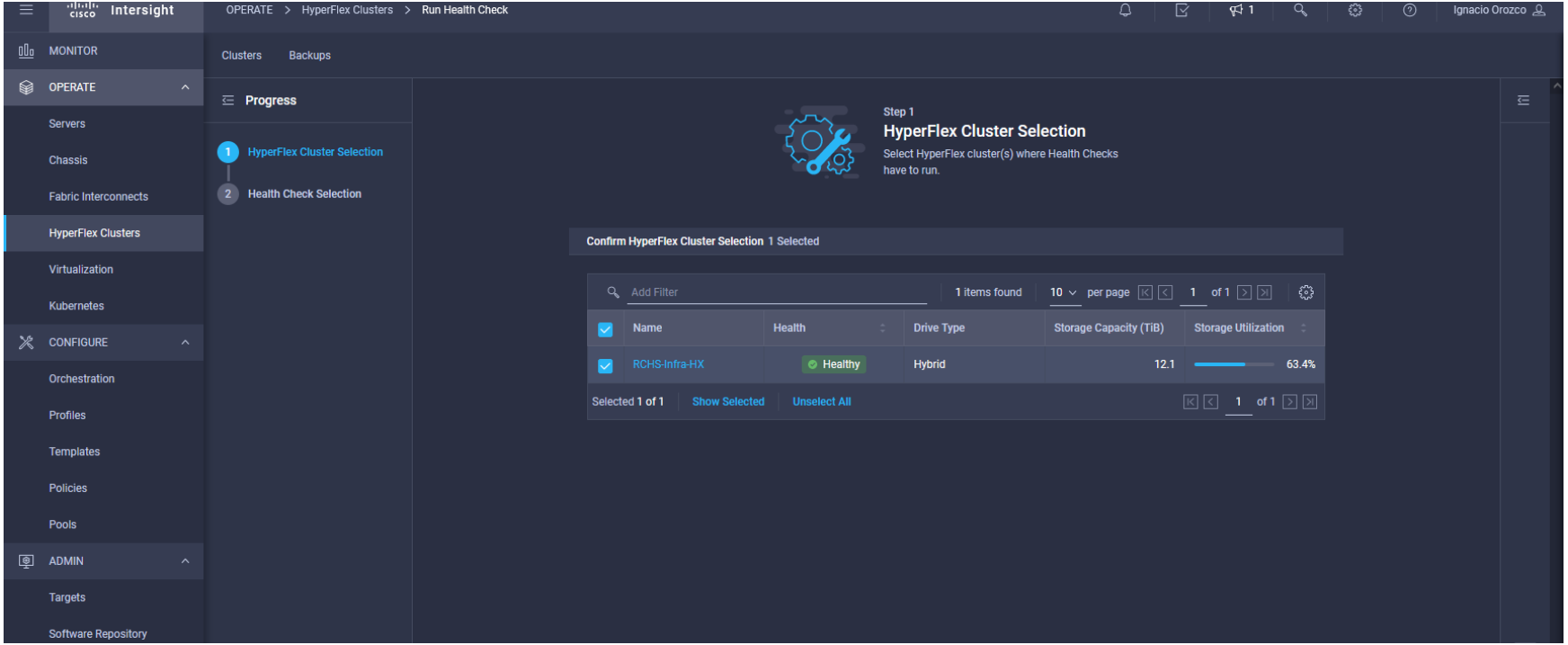


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# HyperFlex Health Check

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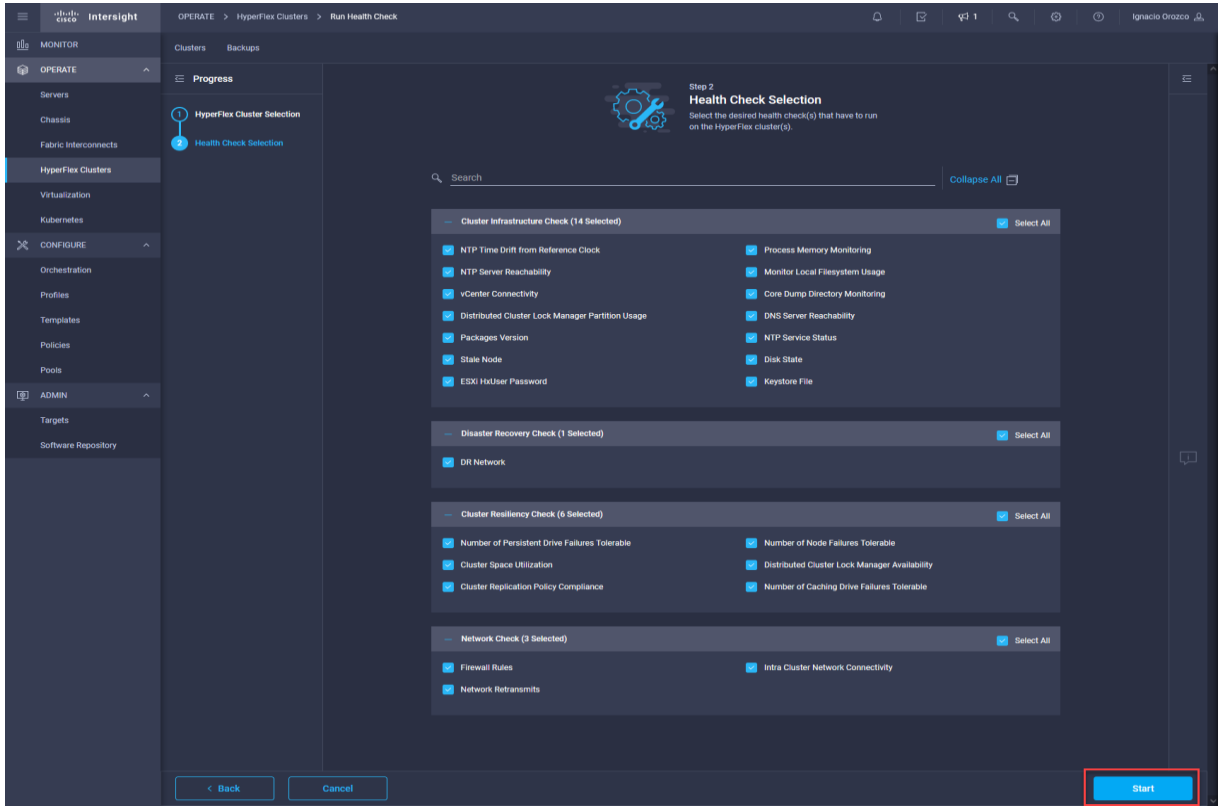


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# HyperFlex Health Check

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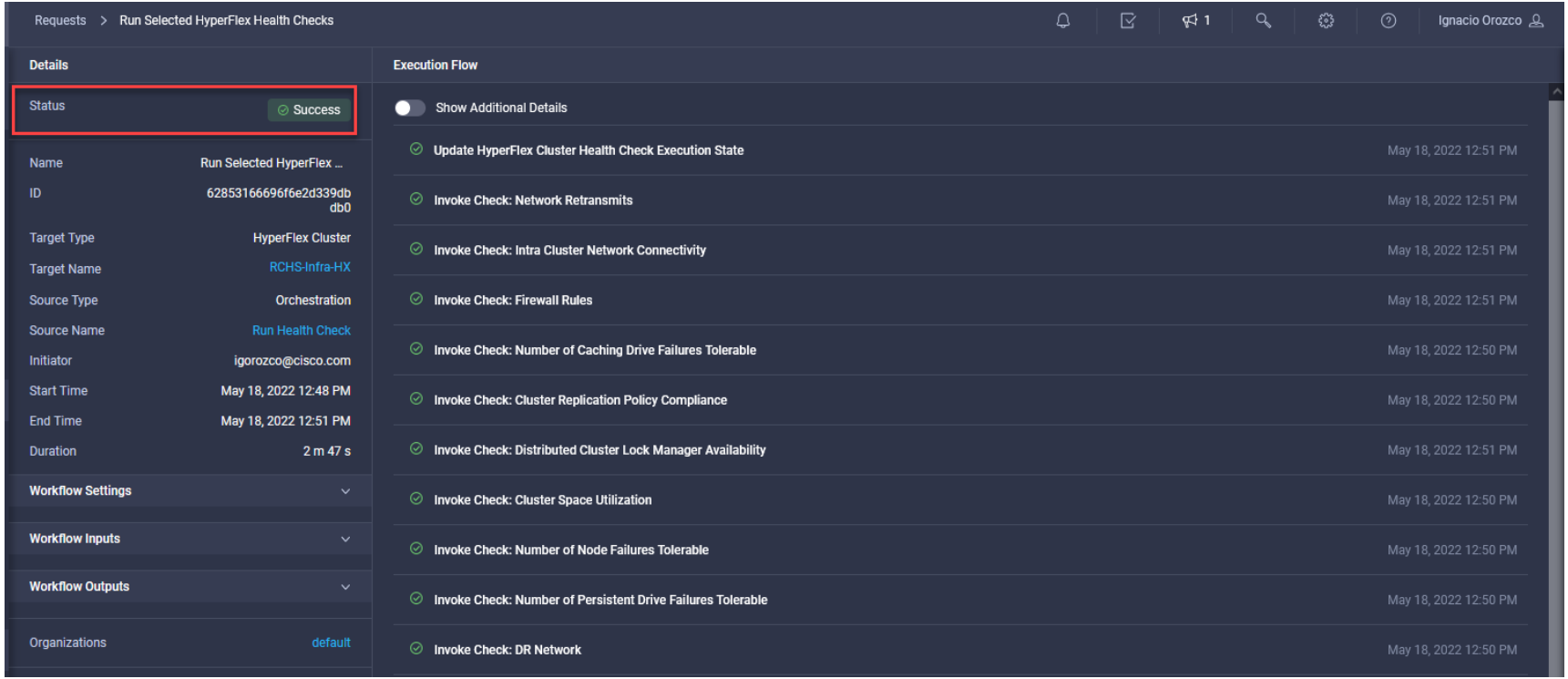


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# Manage Datastores

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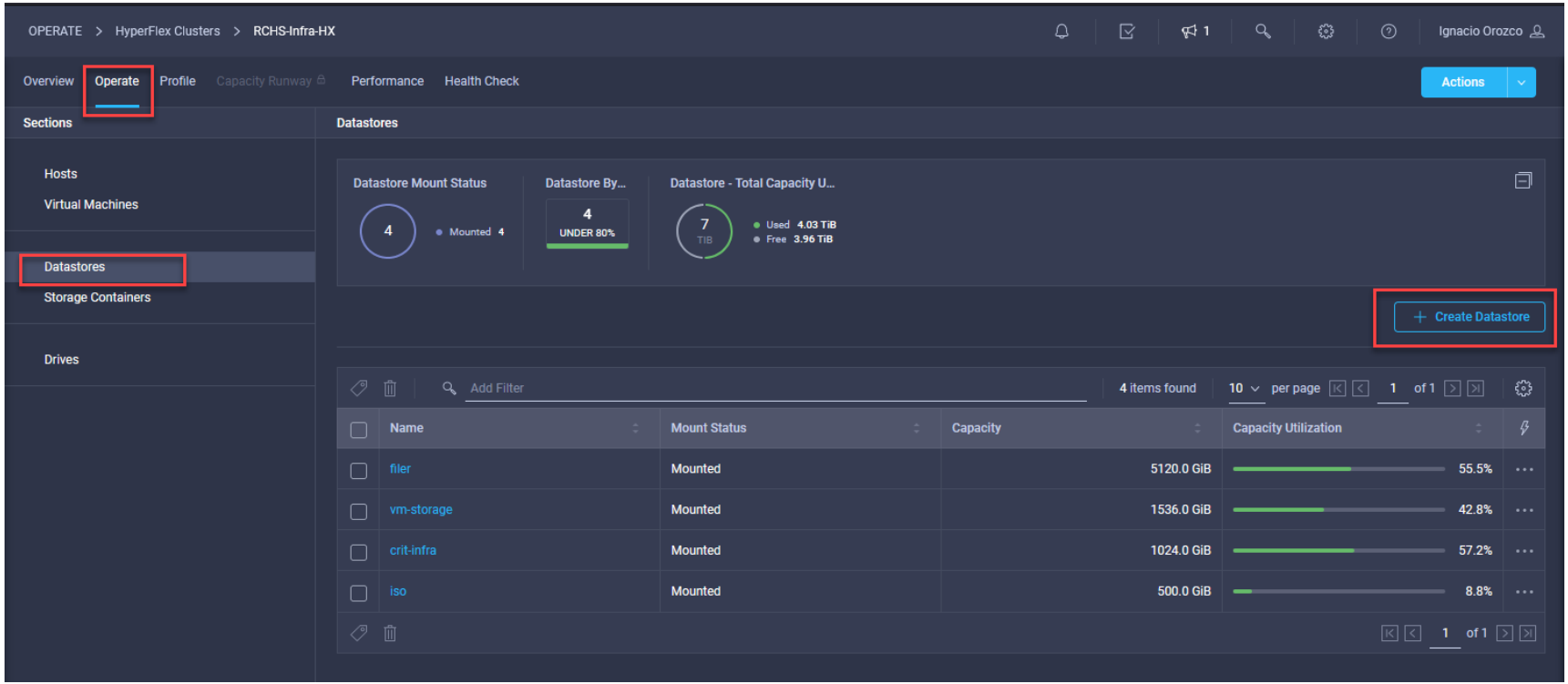


https://intersight.com/help/saas/resources/cisco_hyperflex_systems_administration_guide#manage_datastores


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# Create Datastore

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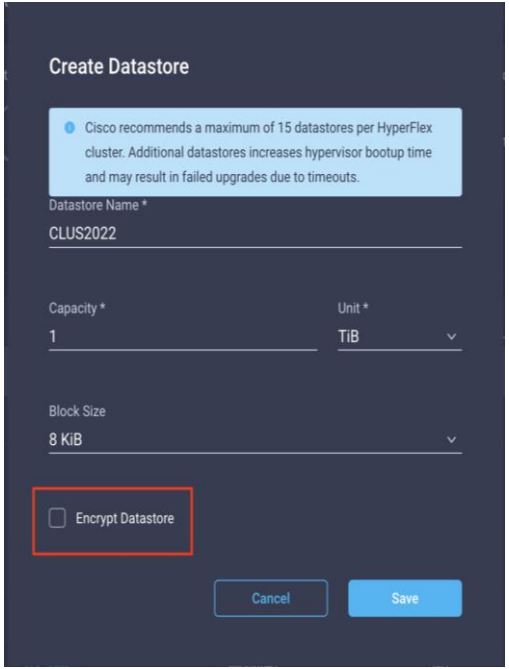


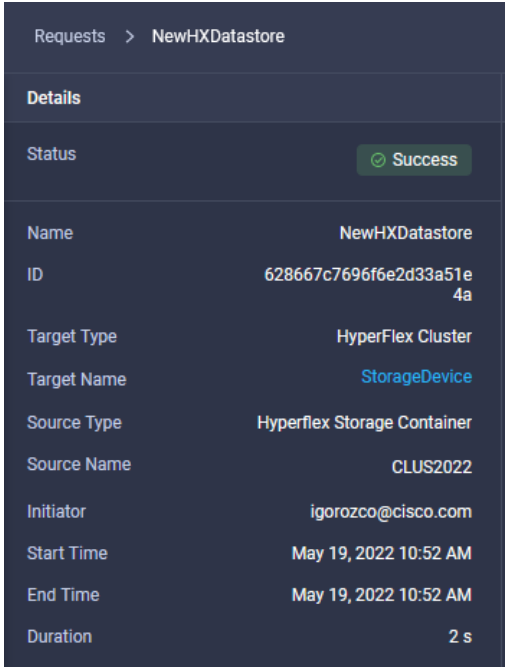


If you have software encryption enabled, you can configure encryption on new datastores.
https://intersight.com/help/appliance/resources/hyperflex_software_encryption


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# Datastore – Edit, Delete, Unmount

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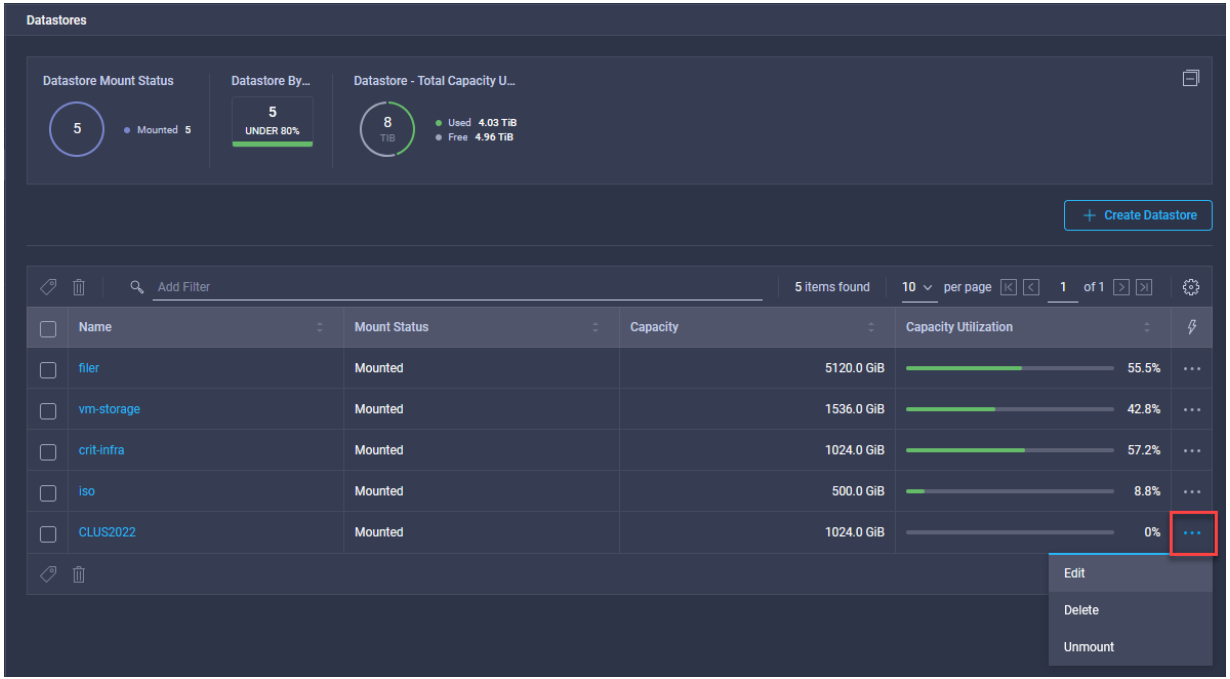


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# HX Cluster Upgrade

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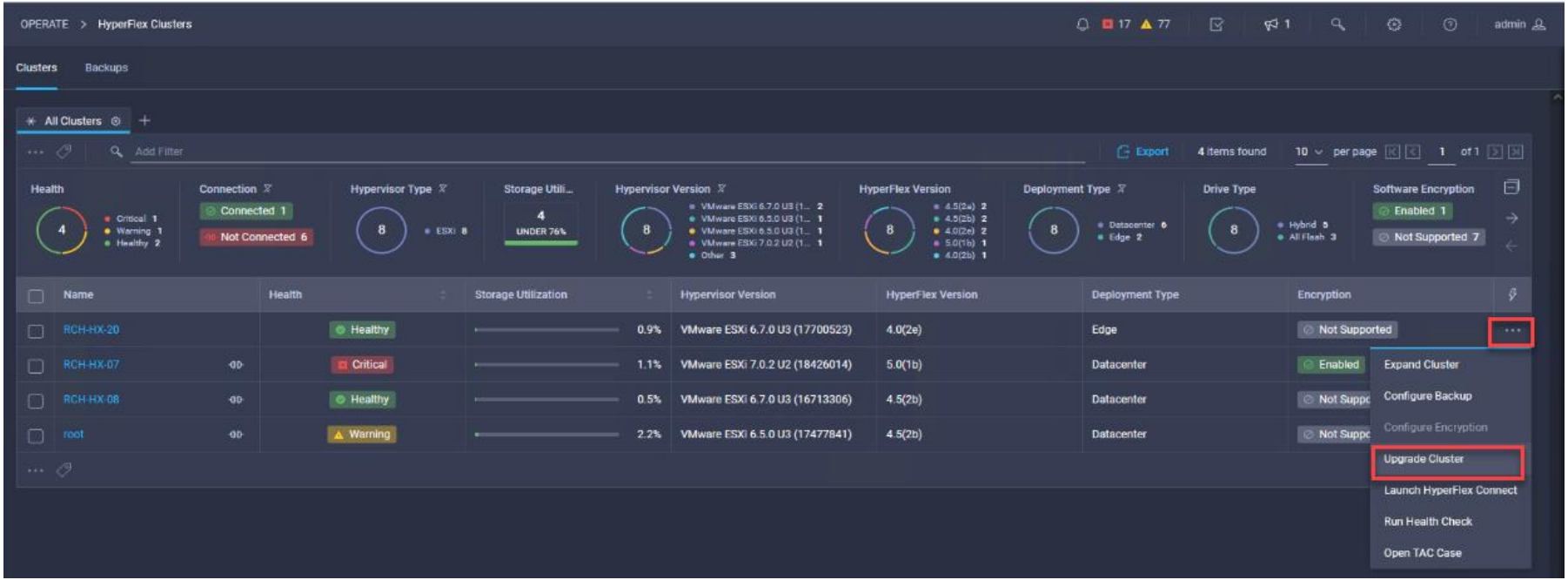


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# HX Cluster Upgrade – Basic Mode

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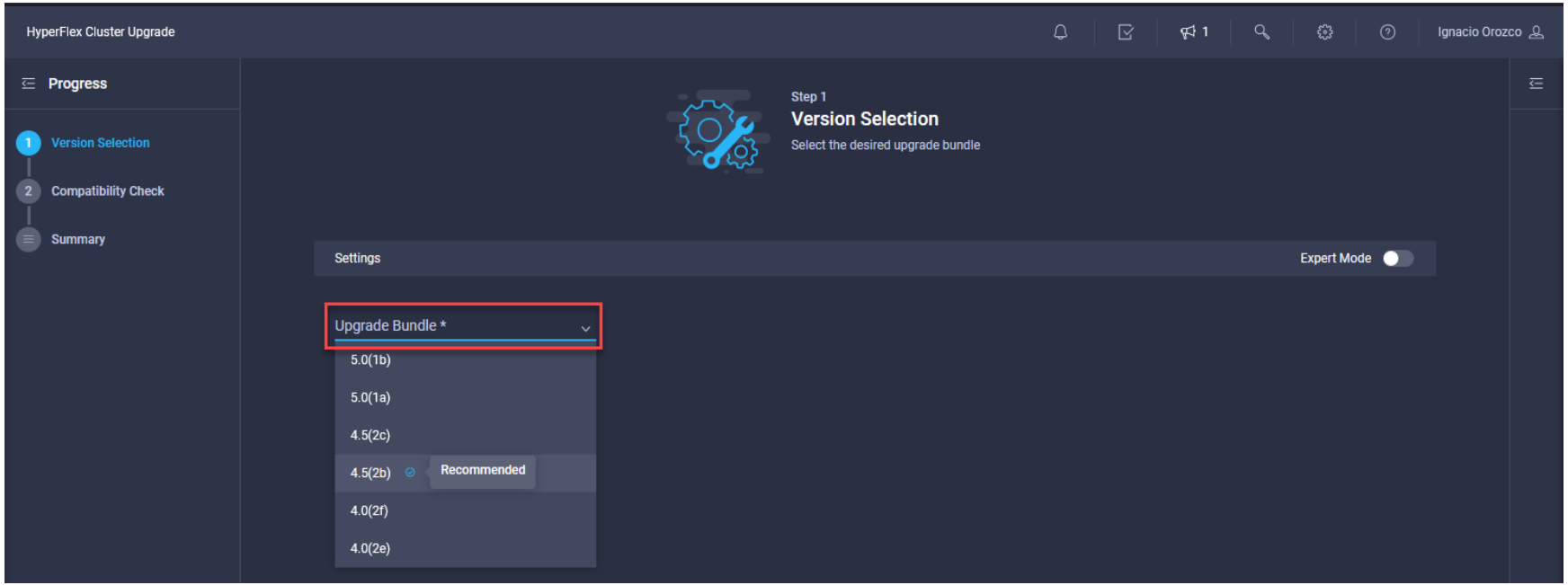


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# HX Cluster Upgrade – Basic Mode

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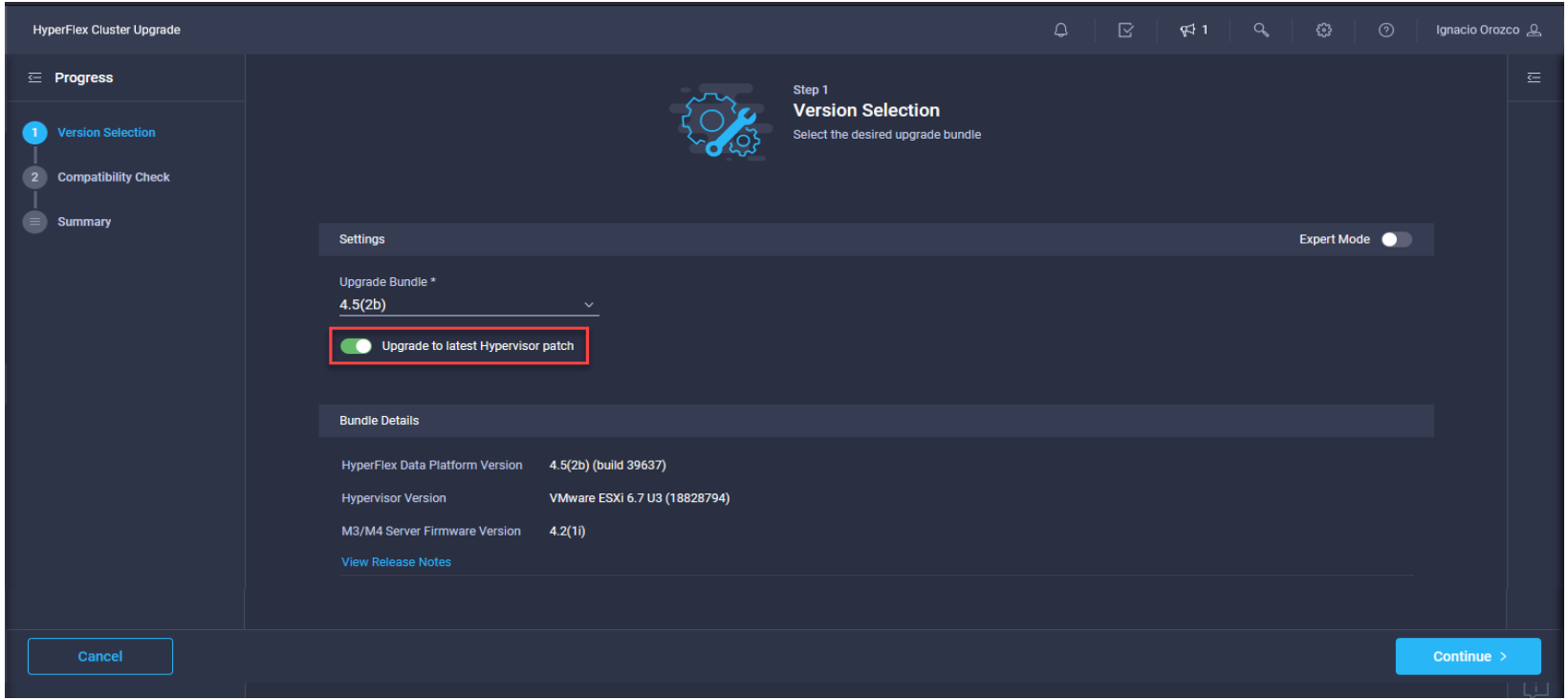


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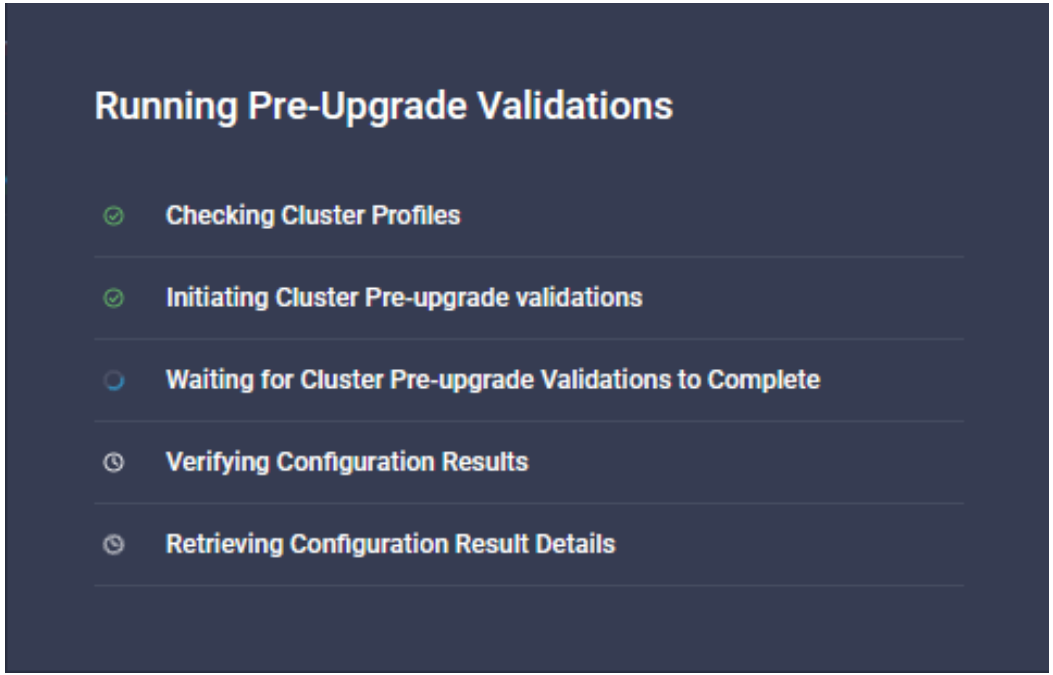


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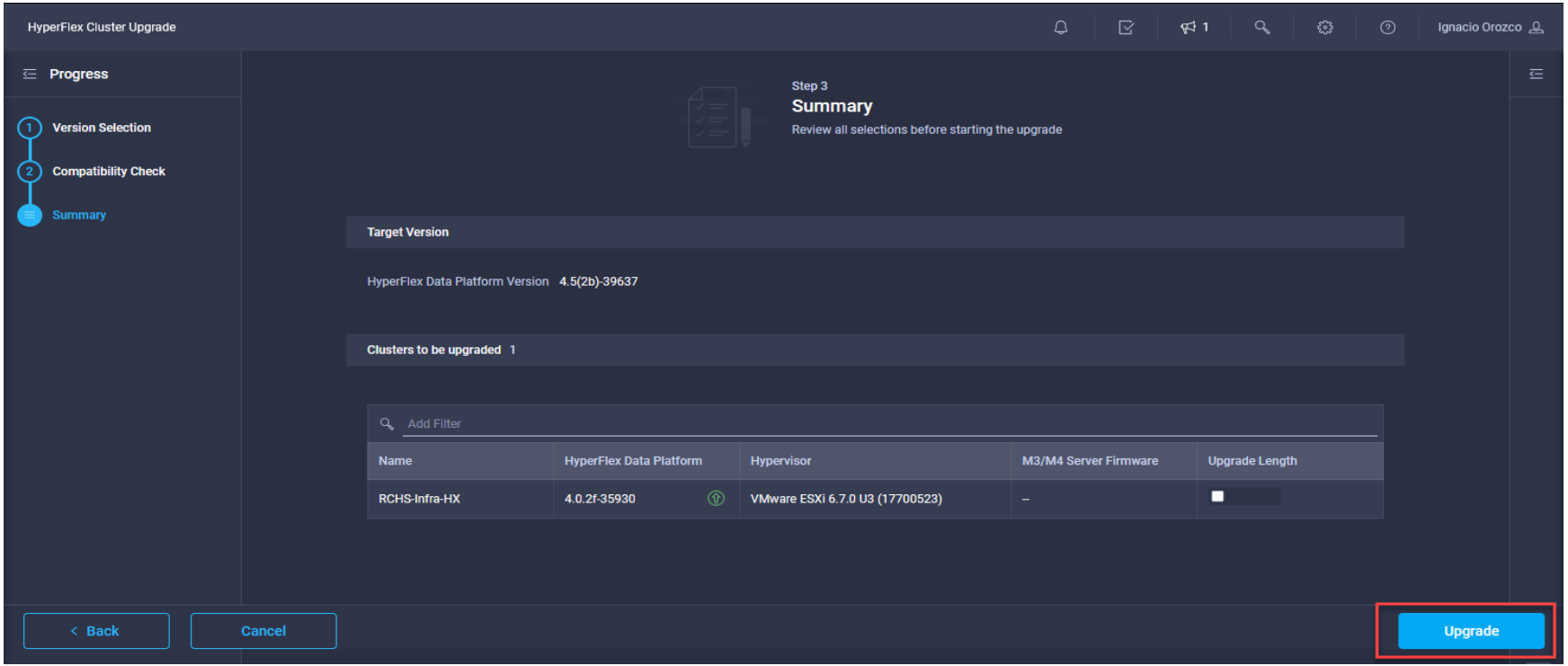


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# HX Cluster Upgrade – Expert Mode

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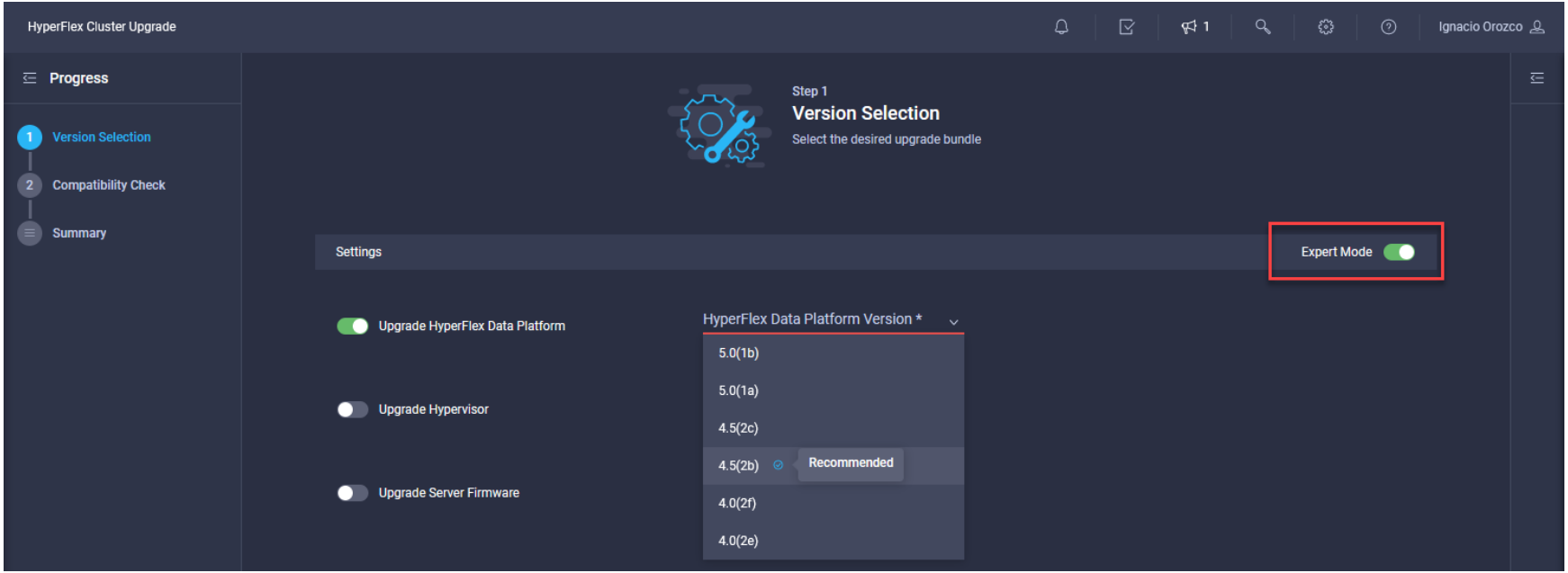


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# HyperFlex Licensing Requirements

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- HyperFlex Data Platform License is required
- License required to receive support
- You must have both an Intersight license and a HXDP license to access these HyperFlex features and functionality in Intersight

| HyperFlex Licensing Requirements | | | | | | | |
|---|---|---|---|---|---|---|---|
| **HyperFlex Features** | **Intersight License** | | | **HyperFlex Data Platform License** | | | |
| | **Essentials** | **Advantage** | **Premier** | **Edge Advantage** | **Edge Premier** | **Datacenter Advantage** | **Datacenter Premier** |
| HyperFlex Cluster Upgrade (VMware ESXi, HyperFlex Data Platform and HyperFlex server firmware) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| N:1 Replication for HyperFlex Clusters | ✓ | ✓ | ✓ | | ✓ | | ✓ |
| HyperFlex Cluster Capacity Runway | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| HyperFlex Software Encryption | ✓ | ✓ | ✓ | | ✓ | | ✓ |
| HyperFlex Cluster Expansion | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| HyperFlex Cluster Health Check | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Licensing Information:
https://intersight.com/help/saas/getting_started/licensing_requirements#cisco_hyperflex_licensing
https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/HX-Ordering-and-Licensing-Guide/b_Cisco_HyperFlex_Systems_Ordering_and_Licensing_Guide.html


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# Upgrade Considerations

# Factors for upgrading HyperFlex

Feature(s)

Long-lived release

Bug driven

For more information:
https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/release-guidelines-and-support-timeline/b-release-bulletin-hyperflex.html


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# HyperFlex Release Model

## Feature Release

Contains new feature(s)

May contain bug fixes

Example Release: 4.5(**1**a)

## Long-lived Release/Maintenance Release

Contains bug fixes

Serviceability improvements

Example Release: 4.5(**2**a)

For more information:
https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/release-guidelines-and-support-timeline/b-release-bulletin-hyperflex.html


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# HyperFlex Feature Release Milestones

- End of SW Maintenance (EOSM) Release Date
  - 6 months from the release date
- End of Security and Vulnerability Fixes
  - 6 months from the release date
- Last Date of Support
  - 9 months from the release date

For more information:
https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/release-guidelines-and-support-timeline/b-release-bulletin-hyperflex.html


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# HyperFlex Long-lived Release Milestones

- End of SW Maintenance (EOSM) Release Date
  - Minimum of 18 months from the release date
- End of Security and Vulnerability Fixes
  - 27 months from the release date
- Last Date of Support
  - 30 months from the release date

For more information:
https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/release-guidelines-and-support-timeline/b-release-bulletin-hyperflex.html


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# Perform the Following Pre-upgrade Checks

- Storage Data Network failover test
- Run Hypercheck script or HX Health Checks from Intersight and correct any identified issues
- Review and follow Cisco Documentation

Hypercheck : Hyperflex Health & Pre-Upgrade Check Tool:
https://www.cisco.com/c/en/us/support/docs/hyperconverged-infrastructure/hyperflex-hx-data-platform/214101-hypercheck-hyperflex-health-pre-upgr.html


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# Do I need to also upgrade UCS?

# Qualified UCS Firmware Releases

- Review the Software Requirements and Recommendations guide for qualified UCS firmware releases
- If your current UCS firmware release is on the qualified releases list for the HXDP version, UCS firmware upgrade is not required.
- The highest listed version is recommended*
- Review the HyperFlex Software Requirements and Recommendations for qualified UCS firmware releases (see link below)

Cisco HyperFlex Software Requirements and Recommendations:
https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/release-guidelines-and-support-timeline/b-recommended-hx-data-platform-sw-releases/m-recommended-releases.html


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# vSphere ESXi Upgrade Guidance

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# vSphere ESXi

- Use the offline upgrade bundle posted on CCO under HyperFlex or version listed on the Intersight HX Upgrade wizard.
- VUM is not recommended
- Additional patches can be applied if they are within the qualified ESXi Update release (U2, U3)
  - Example: If you are on ESXi 7.0 Update 2d, you can apply patch release ESXi 7.0 Update 2e.
- Always review documentation for any exceptions

ESXi and HXDP Compatibility Guidelines: https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/b_ESXi_HXDP_Compatibiltiy_Guidelines.html


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# Expansion Considerations

# Expansion Considerations

- Ensure drives in new node are compatible with existing nodes in cluster
- Ensure cluster is running minimum HXDP version for the drives
- New nodes must have the same number of drives as existing nodes
- When expanding clusters with Logical Availability Zones (LAZ), add nodes equally across the zones. If cluster has 4 zones, add 4 nodes, one per zone
- For stretch clusters, add nodes to each site so that each side has the same number of nodes
- Run Hypercheck script or HX Health Check from Intersight to ensure cluster is in good state.

Cisco HyperFlex Drive Compatibility Guide:https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/hyperflex-drive-compatibility/b-hx-drive-compatibility-guide.html
Cluster Expansion Guidelines: https://www.cisco.com/c/en/us/td/docs/hyperconverged_systems/HyperFlex_HX_DataPlatformSoftware/AdminGuide/4-5/b-hxdp-admin-guide-4-5/m_expand_the_cisco_hx_cluster.pdf


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# Thank you

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