Delivering Automated Continuous Availability for HP CloudSystem

FalconStor High Availability (HA) Architecture Facilitates Greater Resiliency, Automated Provisioning, and Storage Consolidation

Technical White Paper
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Introduction

As enterprises and service providers advance into new private, public, and hybrid cloud territories, continuous service availability has become a best practice and “must have” to deliver maximum confidence and consistency for business end users. More aggressive service level agreements (SLA) are required to meet the demands in highly concentrated automated cloud service delivery platforms, increasing the need and demand for full redundancy of resources and multi-site high availability (HA) platforms.

To achieve greater resiliency, enterprise and service provider cloud adopters need a combination of automated provisioning, automated and immediate failover, and storage consolidation. Seamlessly managing the storage infrastructure in different stages of its lifecycles requires a field replaceable unit strategy that must be part of the always-available and resilient cloud service equation.

FalconStor is a member of the HP AllianceOne Partner program and provides qualified solutions for the HP CloudSystem Ready program. The FalconStor™ Network Storage Server (NSS) Gateway solution and HP CloudSystem integrate to deliver automated continuous availability of HP CloudSystem Services deployments. This paper describes the multiple extensions and capabilities that make this combined solution the superior choice to enable continuous cloud service availability.

FalconStor NSS Gateway

The FalconStor NSS Gateway is a scalable, highly available storage virtualization platform that bridges storage platforms found in private, public, and hybrid cloud environments, providing advanced protection. FalconStor NSS Gateway technology enables enterprise and service providers to build upon their current infrastructure using new and existing resources, allowing them to accelerate cloud service technology adoption while yielding maximum return-on-their storage platform investments. FalconStor NSS enables multi-site continuous availability at any point of the storage environment lifecycle by incorporating automated provisioning and stretch HA mirroring technology between data centers.

HP CloudSystem

As a part of the HP Converged Infrastructure portfolio, HP CloudSystem is built on a common architecture to deliver one of the industry’s most complete, integrated, and open cloud platforms. HP CloudSystem enables enterprises and service providers to effortlessly build and manage services across private, public, and hybrid cloud environments, ultimately reducing complexity and fostering business growth.

HP CloudSystem Matrix is the entry-level solution of the CloudSystem portfolio which is ideal for Infrastructure-as-a-Service (IaaS) for private and hybrid cloud environments. The solution includes a self-service portal for quick auto-provisioning, along with built-in lifecycle management to optimize infrastructure, manage the resource pools, and help ensure uptime. HP CloudSystem Matrix provides cloud-bursting capabilities to a variety of public cloud providers including HP Cloud Services.

HP Converged Infrastructure portfolio also includes HP CloudSystem Service Provider and HP CloudSystem Enterprise for more advanced provisioning integration of which each includes HP CloudSystem Matrix.

HP Storage Provisioning Manager (SPM) is a software tool that manages storage provisioning within the HP Matrix Operating Environment (Matrix OE) which is the core management software for HP CloudSystem Matrix. With SPM, HP CloudSystem Matrix has significantly advanced the automation of IT processes for storage, including enhancements for setting policies for storage resources, specifying storage requirements, and automatically generating and fulfilling storage requests.
Overview and Benefits

FalconStor NSS Gateway with HP CloudSystem Matrix

Flexible Storage Consolidation and Continuous Availability for HP CloudSystem

To achieve true continuous availability and protect the end-user from partial or full data center outages due to unexpected environmental site conditions or planned storage platform refreshes, the best practice has fast become site-to-site data center mirroring. All platform layers from compute to storage must be able to support two physical data centers as if they were one. The storage platform layer must also support site-to-site storage synchronous mirroring over a dark fiber link or fiber extenders. Site-to-site storage mirroring of this type is known by many names and is technically a high availability (HA) stretch cluster architecture leveraging synchronous mirroring between two storage arrays located in different sites. Typical distances are around 25 kilometers over dark fiber without Fibre Channel (FC) extenders; however, some deployments go as far as 100 kilometers or more.

The FalconStor NSS solution provides intelligent storage virtualization and advanced storage services to enable HA site mirroring between data centers without the need for identical storage arrays (make/model/firmware/options), providing greater flexibility for storage system lifecycle planning strategies.

Automated Storage Catalog Management and On-Demand Storage Service Provisioning

Now that continuous availability is possible between storage arrays, the next goal is to take advantage of HP CloudSystem’s ability to keep its storage resources accurately inventoried and up to date. In the absence of storage array integration with HP CloudSystem Matrix SPM, import and provisioning of storage can be done manually – however, that would defeat the point of a self-service platform. Cloud service-focused storage administrators would drown under the workload of connecting and disconnecting storage volumes from tens, if not hundreds of requests per day, week, or month.

The FalconStor NSS storage virtualization provisioning solution includes the FalconStor® NSS Storage Provisioning Manager Adapter (SPM Adapter) for HP CloudSystem. This adapter allows any storage array managed by FalconStor NSS to be automatically recognized, imported, and provisioned by HP CloudSystem without the need for identically configured storage arrays. The FalconStor NSS SPM Adapter enables full integration with HP SPM’s ability to perform on-demand storage provisioning to requested services. FalconStor NSS advanced storage management features enable HP Matrix Operating Environment (OE) and SPM to automatically match up the right type and class of storage with the right workloads.

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Overview and Benefits

Diagram 1: FalconStor NSS integration with HP CloudSystem Matrix Operating Environment

FalconStor NSS SPM Adapter Features and Benefits

FalconStor NSS Gateway software is certified to run on HP C-class blade servers and storage fabric, ensuring a more efficient and quick integration with HP CloudSystem Matrix. Automated storage management is accomplished through the FalconStor NSS Gateway SPM Adapter for HP CloudSystem Matrix SPM. Features of the FalconStor NSS SPM Adapter include:

- On-demand provisioning of storage volumes and presentation to hosts
- NPIV storage fabric port virtualization support for faster presentation to hosts
- Automatic import and adjustment of Storage Pool Entries
- Manual entry and adjustments of Storage Pool Entries
- Management signature support ensure HP CloudSystem Recovery of Matrix OE and SPM integration
- Cluster support for SPM Adapter redundancy
- Included in HP CloudSystem Ready Program
- Any FalconStor-certified storage array (FC only at this time)

The integration between FalconStor NSS Gateway and HP CloudSystem provides significant business value to enterprise and service providers:

- Reduces initial capital expenditure and time to deploy by leveraging existing HP storage arrays with newer HP storage arrays
- Facilitates seamless and flexible storage array migration supporting a field replaceable unit break/fix/upgrade strategy during storage platform lifecycle events
- Expands HP CloudSystem Choices by integrating third-party storage arrays with HP SPM
- Meets aggressive CloudSystem SLA requirements for continuous availability where entire site-to-site mirror protection is required
- Reduces recovery window to near-zero

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Requirements

- Two (2) FalconStor NSS Gateways with FC connectivity
- Two (2) FC arrays (existing or a combination of existing and new)
- FalconStor NSS SPM Adapter installed on each HP Matrix OE/Insight node
- Fiber link between two sites (each type will have different deployment requirements):
  - DWDM (dark fiber)
  - Direct Fiber link (campus fiber)
  - SAN extension technology

Best Practices

- Follow all FalconStor-published Best Practice guides for this solution. Contact FalconStor Support for final configuration review prior to going into production for target latency at or below 0.15 ms for a 25 kilometer distances using DMDW dark fiber links. Longer distances are supported.
- Survey all storage to ensure storage response time does not expand overall latency beyond failure limits.
- Test failover and failback between sites to ensure the recovery windows is within the limits of applications.
- Ensure that FalconStor NSS cluster quorum disks are mirrored between two sites.
- Implement power control over WAN instead of site-connected SAN.
- Ensure adequate bandwidth for SAN traffic between sites. Consider redundant SAN fabric between sites for maximum resilience.
- Obtain the true distance of the extended SAN link (A-to-B distance), as FC and circuit providers often have longer distances.
- Ask the fiber link provider to measure the latency for the main circuit and potential standby circuits.
- Follow best practices of applications server for VLAN stretch clusters, storage fabric stretch clusters, geo clusters, or metro area storage clusters.
Diagram 2: Example of site-to-site HA configuration
Conclusion

Together, FalconStor and HP help you get to the cloud. FalconStor NSS Gateway combined with HP CloudSystem provides a powerful solution to bring your legacy system forward, transform virtual assets into fully automated hybrid cloud environments, and enable an agile set of service delivery capabilities across all IT domains. No matter where you begin, HP and FalconStor provide you with a clear path to the cloud, a path that makes the most of your existing infrastructure while protecting your previous technology investment. By using the FalconStor NSS SPM Adapter and HP CloudSystem, you can build a continuously available and fully managed storage platform.

If you have already invested in HP Converged Infrastructure technology such as HP BladeSystem, you can easily add CloudSystem Matrix software or use the HP CloudSystem Matrix Conversion Service to expand your current architecture into a private, public, or hybrid cloud environment.

If you have already invested in FalconStor storage virtualization technology such as the FalconStor NSS Gateway, you can easily add the FalconStor NSS SPM Adapter for HP CloudSystem to expand your current architecture into a cloud environment while leveraging existing storage to reduce administrative complexity and overhead.

More Information

- About FalconStor NSS – www.falconstor.com/nss
- About FalconStor Technology Alliances – www.falconstor.com/partners/partnerships/technology-alliances
- About solution availability – support.falconstor.com
- Contact FalconStor – HPCloudSystem@falconstor.com