HP OpenVMS Cluster support on HP Integrity Servers

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Executive summary

HP OpenVMS Cluster software provides a highly integrated OpenVMS computing environment distributed over multiple HP Integrity server, AlphaServer, or VAX systems; or a mix of AlphaServer systems and VAX systems or AlphaServer and Integrity server systems. This white paper provides updated information about HP OpenVMS Cluster software running on HP Integrity servers powered by industry-standard Intel® Itanium® 2 technology.

Development history

OpenVMS Cluster system support was introduced in the second evaluation release of OpenVMS on HP Integrity servers (version E8.1). With the first production-quality release of OpenVMS on HP Integrity servers (v8.2), most OpenVMS Cluster features were available although configurations were limited to a maximum of 8 Integrity server systems. And if OpenVMS AlphaServer systems were in the same cluster, 16 systems were supported with a maximum of 8 Integrity servers.

Current capabilities

Starting with OpenVMS v8.2-1, 96 systems are supported in a single-architecture cluster or a mixed-architecture cluster of AlphaServer and Integrity server systems.

With few exceptions, OpenVMS Cluster software provides the same features on OpenVMS on HP Integrity servers as it currently offers on OpenVMS AlphaServer systems. Key OpenVMS Cluster features include:

- Fully shared, multiple-node read/write disk access
- Clusterwide file system
- Clusterwide batch/print queue subsystem
- Distributed lock manager
- Votes/quorum-based membership management
- Shared system disk
- Single security domain
- Single system-management domain
- Rich, clusterwide API
- Mixed-architecture clusters
- Support for rolling upgrades
- Support for multiple interconnects
- Support for 96 nodes
- Failover and load balancing
- Cluster network alias
- Disk and tape servers
- Disaster-tolerant capabilities with support for distances up to 500 miles (800 kilometers) using Disaster-Tolerant Cluster Services (DTCS)

Figure 1 shows an OpenVMS Cluster system to which two OpenVMS on HP Integrity servers have been added. A LAN interconnect is used for cluster communications for all systems in the cluster. In this configuration, both OpenVMS on AlphaServer and OpenVMS on HP Integrity servers can access the same Fibre Channel storage at the same time.

The Integrity server systems, directly connected to Fibre Channel disks, can be served data from the CI disks. In an OpenVMS mixed-architecture cluster, whether AlphaServer and VAX systems or AlphaServer and Integrity server systems, each architecture requires a minimum of one system disk. Please note that the inclusion of VAX systems in a mixed-architecture cluster containing Integrity servers is allowed only for the purposes of development and migration. It is not a supported configuration. If a problem arises because of the presence of the VAX system, the user may be advised to modify the configuration to one of the previously mentioned supported pairs.

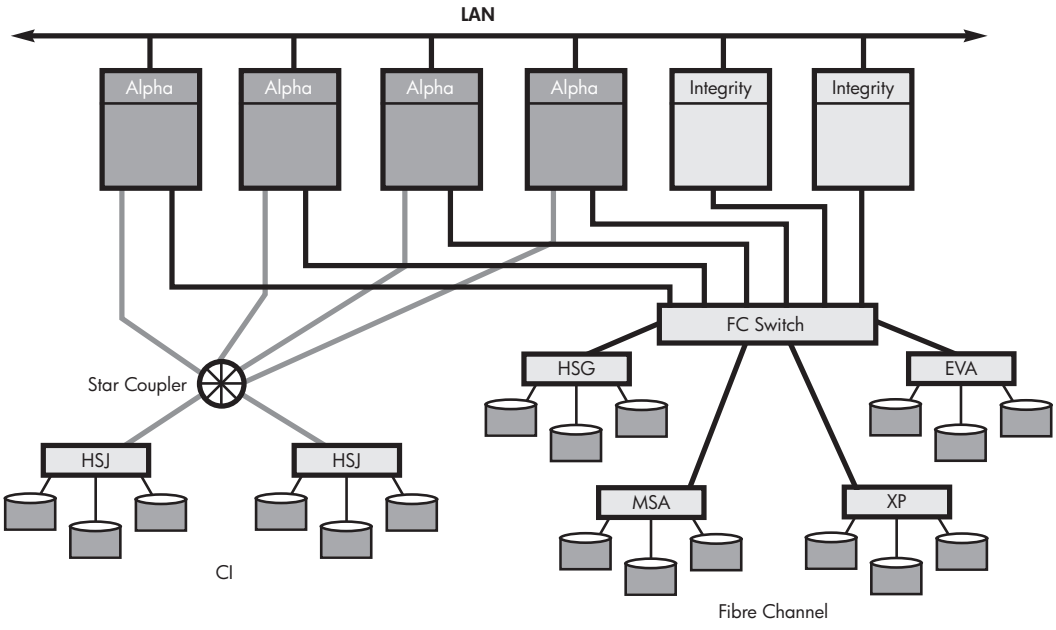

Figure 1. OpenVMS Cluster system on AlphaServer systems and HP Integrity servers

Same code base for both architectures

Support for OpenVMS on Integrity servers is built into the OpenVMS development stream on a continuous basis. The same OpenVMS code base produces OpenVMS on AlphaServer systems and OpenVMS on HP Integrity servers. This development process ensures feature-for-feature compatibility between the two platforms.

Features that were not ported

OpenVMS Cluster software supports three proprietary interconnects that were not ported to Integrity server systems:

- DSSI (DIGITAL Systems Storage Interconnect)
- CI (Cluster Interconnect)
- Memory Channel

Although DSSI and CI storage cannot be directly connected to OpenVMS on HP Integrity servers, data stored on CI and DSSI disks (connected to AlphaServer systems) can be served to OpenVMS on HP Integrity servers in the same cluster. In the configuration shown in Figure 1, data stored on the CI disks can be served to the Integrity server systems.

No other significant differences exist.

Multihost shared storage

Industry-standard Fibre Channel storage, on which storage area networks (SANs) are based, is supported on Integrity server systems. Fibre Channel storage is also supported on OpenVMS AlphaServer systems and can be served to OpenVMS VAX systems.

Multihost shared storage on a SCSI interconnect, commonly known as SCSI clusters, is supported in a limited 2-node Integrity server configuration starting with OpenVMS v8.2-1.

Timetable

The following table shows the phased release plan for OpenVMS on HP Integrity servers, the half-year target dates, and the OpenVMS Cluster support that was planned and delivered for each phase (except for v8.3, which is currently in development).

OpenVMS for Integrity servers release	**Planned release date**	**Planned OpenVMS Cluster support**
First evaluation release (vE8.0) (key ISVs)	H1CY03	Standalone system
Second evaluation release (vE8.1) (key ISVs, partners, and early adopters)	H2CY03	Small clusters of AlphaServer and Integrity server systems (potentially 4 to 8 nodes), with limited cluster functionality: • No served storage (shared SAN storage on Fibre Channel) • No network (satellite) booting (every system has its own system disk or uses a shared FC interconnect system disk) • Intra-cluster communication (ICC) services • Clusterwide logicals • Most clusterwide APIs This cluster functionality enabled testing of most cluster-aware applications (for example, applications that use ICC services)
First production quality release (v8.2)	H2CY04	Fully operational OpenVMS Cluster systems, except for network booting, consisting of both AlphaServer and Integrity server systems that may be limited to configurations of 8 to 16 nodes. Interconnects supported for cluster (SCS) communications are Gigabit Ethernet and Fast Ethernet. Interconnects supported for storage are Fibre Channel and SCSI – Fibre Channel as a multihost, shared storage interconnect, and SCSI as direct attached (not multihost).
v8.2-1	H2CY05	• Larger configurations (up to 96 nodes) • Limited 2-node, shared SCSI storage cluster configurations.
v8.3	TBD	Network booting, also known as satellite booting

Summary

With OpenVMS v8.2-1, all common OpenVMS Cluster capabilities are supported on AlphaServer and Integrity server systems. Applications on any system are able to access data directly from storage systems connected to a specific system. Any cluster members that are not directly connected to a particular storage type can continue to use data-serving technologies to obtain data in a clusterwide fashion. While some subtle interconnect and application differences may exist between AlphaServer and HP Integrity server systems (as was true when AlphaServer systems were added to a VAX environment), the design of the OpenVMS Cluster architecture facilitates the integration of OpenVMS on HP Integrity servers into an existing OpenVMS Cluster environment.

For more information

For a comprehensive description of the OpenVMS Cluster software, see its Software Product Description (SPD) at http://h18000.www1.hp.com/info/SP2978/SP2978PF.PDF

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