

Making the transition from HP OpenVMS VAX to HP OpenVMS on Integrity servers



Table of contents

- Introduction**3
- OpenVMS features and benefits**3
 - High availability3
 - OpenVMS Clusters4
 - Security4
 - Interoperability and UNIX portability4
 - Storage4
 - Current and future functionality4
- Inside HP Integrity servers**5
 - Integrity price/performance5
 - OpenVMS on Integrity servers – a competitive TCO5
 - Server consolidation, headroom, and scalability5
- Business practices**6
 - HP License Trade-in and Transfer policy6
 - Utility pricing solutions6

Table of contents (continued)

Transition considerations	7
Application porting	7
Mixed-cluster support policies	10
Device support	10
Compilers	10
HP layered software products	11
Third-party layered software products	11
User interface	11
System management interface	12
Programming interfaces	12
Data	12
Databases	12
Network interfaces	12
Migration service and support	13
From end of life to a new beginning	13
Transition Consulting workshops	13
Migration delivery services	13
Hardware support	14
HP OpenVMS operating system services	14
Conclusion	15

Introduction

The first VAX/VMS systems were introduced in 1977. In the ensuing years, many major technical advances were made to this 32-bit product line. Even though the 64-bit AlphaServer system became the successor to the VAX product in 1992, customers have received many more years of VAX systems availability, service, and support – as well as continued enhancements to OpenVMS.

While some HP customers continue to draw value from their aged VAX systems, many are interested in moving to an industry-standard, lower-cost OpenVMS solution. Owners of existing VAX production systems are finding it increasingly difficult to obtain replacement components and are experiencing increased service costs. As a result, many VAX customers have already migrated to HP AlphaServer 64-bit systems. Others are planning to migrate directly to the new HP Integrity servers based on the Intel® Itanium® microprocessor, a move that HP encourages. VAX customers who migrate directly to HP Integrity servers will benefit both immediately and in the long term from 64-bit, standards-based computing.

This white paper, written for HP OpenVMS VAX customers, provides a background to support the decision to migrate to the Integrity server platform. It highlights the benefits of OpenVMS on Integrity servers and presents an overview of migration business practices in the areas of licensing and trade-ins. It discusses key technical considerations of the migration process and surveys HP services, support, and programs covering all aspects of migration.

Over the years, HP has gained substantial experience working with customers in migrating their VAX systems to 64-bit technology. Customers who have made the transition are finding that the benefits far outweigh the effort involved.

Note: This white paper is not a porting guide. A comprehensive OpenVMS VAX to HP Integrity servers porting guide will be available.

OpenVMS features and benefits

The OpenVMS operating system is a key reason why VAX systems are still in use. The original VMS operating system was introduced in 1977 on the VAX line of 32-bit servers. Ever since that first release, VMS (renamed OpenVMS in 1992) has evolved within a customer-centric environment composed of some of the most serious and experienced IT professionals in the world.

The development of OpenVMS has been a collaborative effort between knowledgeable and demanding customers and the OpenVMS engineering team. OpenVMS was ported to the Alpha 64-bit architecture in the early 1990s and is now fully ported to the Intel® Itanium® 64-bit microprocessor.

Let's review some of the strengths of the OpenVMS operating system and why VAX customers should be optimistic about migrating to HP OpenVMS on Integrity servers.

High availability

The technology behind business continuity needs to combine high availability and disaster tolerance. While high availability typically protects against local difficulties such as application failures or system-level problems, disaster tolerance protects against larger outages such as catastrophic data center failure due to natural disasters, fire, electrical failure, evacuation, or pervasive sabotage.

Because OpenVMS Clusters (see below) can provide full capabilities even when physically separated by up to 800 kilometers (500 miles), they are extremely well suited to disaster-tolerant environments. In addition to clusters, the OpenVMS host-based volume shadowing technology provides exceedingly efficient and reliable data-replication capabilities over virtually any distance.

For distances beyond 800 kilometers, OpenVMS is also one of the most reliable, efficient, and effective environments for ensuring business continuity because it can protect data virtually seamlessly and ensure maximum uptime. OpenVMS data protection capabilities have been qualified for distances as great as 90,000 kilometers (60,000 miles).

OpenVMS Clusters

HP OpenVMS has always been the gold standard for high availability. One of the most profound innovations for OpenVMS was the development of clusters. Clustering helps achieve the goal of 100% application uptime and allows for interruption-free maintenance and upgrades as well as the addition of new servers to the cluster. Qualified for up to 96 computer nodes and more than 3,000 processors, OpenVMS Clusters afford up to 100 percent application uptime and expand the multiprocessing capabilities of the computing environment.

A key enabler of HP OpenVMS effectiveness within the HP Adaptive Enterprise, OpenVMS Cluster software is an industry exemplar for technological adaptation to growth and change. These capabilities also make the total cost of ownership (TCO) for an OpenVMS application environment extremely attractive. (OpenVMS on Integrity TCO is discussed on page 5.)

Security

HP OpenVMS was one of the first commercial operating systems to achieve a US Department of Defense C2 security rating and all new releases continue to comply with these rigorous standards. It continues to evolve to meet ever-changing security needs with industry-standard technology enabling secure interoperation in heterogeneous environments. All security attributes are fully available and regularly enhanced on Integrity servers and in mixed clusters of Integrity servers and AlphaServer systems.

Interoperability and UNIX portability

OpenVMS v8.2 provides new and enhanced functionality in areas including interoperability, connectivity, configuration, and better tracing and diagnostic tools to identify and resolve network problems.

OpenVMS v8.2 also includes a number of products and features that enable application integration. Using these products and features, customers can modernize existing applications with GUI or Web-based front ends. They can also integrate them into larger, enterprise-wide solutions interoperating with applications in other operating environments.

Portability program

The goal of the OpenVMS UNIX Portability program is to provide a rich set of UNIX® and Linux® interfaces and tools within OpenVMS in a native, integrated fashion so that porting applications to OpenVMS will be like porting applications to any other UNIX “flavor.” This will allow developers to develop and support applications on OpenVMS just as they do on UNIX. OpenVMS offers a rich set of UNIX file name semantics that are, in general, enabled via logical name switches.

In addition, many leading ISVs already develop multi-operating-system applications and the HP UNIX portability capability enables them to develop and deploy software faster and at reduced costs.

Storage

HP OpenVMS supports storage and storage management technologies developed and delivered by HP and key third-party providers to meet the technical and business needs of environments ranging from the workgroup to the enterprise.

Data storage infrastructure

OpenVMS storage solutions include the hardware and associated software that provide the data storage infrastructure supporting customer applications. Storage solutions are provided by HP StorageWorks and are based on the Fibre Channel SAN solutions embraced by all HP operating systems. Typical solutions in this area are the MSA, EVA, and XP array families, and SCSI solutions such as Backplane RAID.

Enterprise backup solutions

OpenVMS has a robust array of data protection solutions, ranging from the single-system homogeneous environment to the largest DT-clustered heterogeneous enterprises. These solutions include the OpenVMS-provided BACKUP utility, HP-provided backup products, and some well-known third-party solutions.

Storage management solutions

HP OpenVMS solutions are based on tried-and-true storage management products that have been provided with OpenVMS for many years. They offer the support aspects for several data protection solutions provided by HP and some standalone products that help better manage application data.

Current and future functionality

OpenVMS v8.2 includes many changes that will provide immediate benefits in virtually every aspect of current operations. Yet OpenVMS v8.2 also includes infrastructure changes whose value will be measured in terms of future enhancements of performance and scalability. As HP Integrity servers continue to evolve, OpenVMS will be positioned to take full advantage of Integrity server enhancements.

Inside HP Integrity servers

HP Integrity servers are based on the latest Intel® Itanium® 2 microprocessors. This new generation of chip technology is widely regarded by industry analysts, vendors, and customers as the successor to RISC-based architectures and creates a strong future for customers and partners.

Having established a long-term roadmap to protect and enhance customer investments in applications, HP is committed to providing advanced, high-performance systems with the volume economics of an industry-standard technology. As of this white paper's publication, OpenVMS v8.2 has been qualified to run on all CPU-speed variants of the following industry-standard HP Integrity servers:

- HP Integrity rx1600-2 and rx1620-2 (up to two processors)
- HP Integrity rx2600-2 and rx2620-2 (up to two processors)
- HP Integrity rx4640 and rx4640-8 (up to eight processors)

By the end of 2005, OpenVMS will be qualified on the full line of HP Integrity servers.

Integrity price/performance

Integrity servers offer 64-bit power for demanding applications along with excellent price/performance. They are especially suited to SSL Web serving, and deliver significant performance advantages over both x86-based systems running Microsoft Windows® applications and RISC-based systems for Windows running database applications. They are also well suited for running many third-party business application suites currently offered on the Integrity server platform.

Detailed information on the Integrity server family can be found at <http://www.hp.com/products1/servers/integrity/index.html>

OpenVMS on Integrity servers – a competitive TCO

In a January 2005 report, Alinean Inc. compared the TCO of mid-range UNIX clusters to that of Integrity servers running OpenVMS v8.2. The report¹ found that the OpenVMS on Integrity platform delivered significant business as well as computing and technical benefits in comparison to competitive platforms. Its attractive price/performance ratio and cost savings derived from standardization contributed to a “competitive” TCO.

The report goes on to state that customers requiring clustered solutions should consider OpenVMS on Integrity servers because “OpenVMS clustering is superior to most of the clustered proprietary UNIX solutions from IBM and Sun. OpenVMS also provides lower TCO, higher availability and security risk avoidance, and greater business agility through the use of industry standard hardware.”

Comparing HP OpenVMS running on HP Integrity servers to proprietary UNIX solutions from IBM and Sun, the Alinean analysis found typical TCO savings of “59-84% for the OpenVMS configurations, with average savings of \$10.0 to \$35.9 million in cumulative five year savings.”

Server consolidation, headroom, and scalability

Consolidation presents an opportunity to introduce new software and hardware technologies to improve availability, management, security, and interoperability. HP consolidation solutions are founded on substantial technology, powerful and scalable systems, sophisticated system management software, clustering and high availability capabilities, and the latest hardware and software technologies. HP consolidation programs help organizations maintain focus on both the business issues and the processes that are essential to implementing a successful consolidation effort.

Because OpenVMS on Integrity servers has a multi-application capability, customers can consolidate servers and gain ample headroom to grow within the same footprint as application requirements increase.

OpenVMS scales up by adding processors to a single system, and it scales out using clusters. The unique technology used in OpenVMS provides good scaling for both large symmetric multiprocessing (SMP) systems and for clusters. These two options provide outstanding flexibility in terms of performance, capacity growth, and high availability.

HP Integrity server multi-operating-system capability

The Integrity server family supports HP OpenVMS, HP-UX, Linux, and Microsoft Windows operating systems either alone or in combination. This multi-operating-system capability overcomes many of the complexities and challenges associated with deploying and maintaining a heterogeneous operating environment.

¹Improving Availability and Lowering TCO with HP Integrity Servers and OpenVMS. Alinean Inc, January 2005

Any one of the four operating systems can run on Integrity servers with no hardware modification required.

On the midrange and high-end HP Integrity servers, hard partitioning enables any combination of the four operating systems to run on a server at the same time. It is impossible to read or write across a hard-partition boundary and there is no resource sharing between hard partitions. This means that one Integrity midrange or high-end system can support an isolated development environment and an isolated production environment at the same time. And it can support additional cells (hard partitions) with other production or development environments as well.

Integrity servers can also run an entire client/server environment – with each tier electrically isolated – in the same machine. For example, the database can run on OpenVMS while the application layer runs in Windows or HP-UNIX partitions and the Web server runs in a Linux partition.

With OpenVMS Cluster software, it is possible to cluster among partitions in one Integrity server, between Integrity servers, or between Integrity and AlphaServer systems, providing considerable investment protection. In addition, an OpenVMS Cluster can run on a cell-based server while other operating systems run on the same server at the same time via the use of hard partitions.

This flexible and adaptive HP multi-operating-system approach supports consolidation and growth while easing maintenance, management, and redeployment tasks.

Learn more about HP OpenVMS on Integrity servers at <http://h71000.www7.hp.com/openvms/integrity/index.html>

Business practices

HP License Trade-in and Transfer policy

The HP License Trade-in and Transfer policy supports migration from OpenVMS VAX to HP Integrity servers. The cross-platform trade-in policy is based on whether or not a customer's licensed product is under an HP support contract that includes rights to new versions for the software product licensed.

Customers with HP support

Licenses under HP support can be traded in at no charge for equivalent product license(s) on an Integrity server. The customer must commit to continue support for the new licenses for a minimum of one year.

Customers without HP support

Licenses not under current HP support agreements can be traded in for an equivalent license purchase at 40% of the new license price. The customer must commit to support on the new licenses for one year and the support must be pre-paid.

Equivalency

All license trade-ins apply to equivalent products or equivalent operating environment licenses. HP defines what product licenses are equivalent. Customers should work with their HP representative or business partner to determine valid trade-ins when mapping out a transition from VAX systems to HP Integrity servers.

Utility pricing solutions

Customers running OpenVMS on Integrity servers will gain full access to utility pricing solutions in the 2006 timeframe. Utility pricing solutions incorporate a portfolio of integrated products, services, and financing options that deliver IT resources when and where they are needed with payments based on usage levels. This can help reduce capital outlays, streamline IT staffing, enable high service levels, and respond to time-to-market demands.

HP Instant Capacity

HP Instant Capacity is designed for customers who want to scale their IT environments quickly to meet business growth without straining their capital budgets. Instant Capacity upgrades are easy to implement, easy to activate, and very easy to afford.

Temporary Instant Capacity enables customers to activate Instant Capacity processors for 30 CPU days. This program includes an OpenVMS temporary operating environment right-to-use license and temporary hardware and software support.

Detailed information on HP Instant Capacity is available at <http://h71028.www7.hp.com/enterprise/cache/4221-0-0-225-121.html>

Pay Per Use

Pay Per Use addresses widely varying capacity requirements by enabling payment for server capacity based upon actual usage. HP offers two different Pay Per Use programs:

1. Active CPU: Measures how many CPUs are activated. Customers determine when to activate additional capacity and when to deactivate.
2. Percent CPU: Measures the actual CPU utilization level and bills accordingly. All of the CPUs are active and available for processing the workload at all times.

To learn more about Pay Per Use programs, please see http://h10016.www1.hp.com/hpfinancialservices/pay_per_use.html

Transition considerations

The OpenVMS operating system on HP Integrity servers preserves compatibility with the OpenVMS VAX user, system management, and programming environments. For general users and system managers, OpenVMS on Integrity servers has the same interfaces as OpenVMS VAX. For programmers, the goal is to come as close as possible to a “recompile, relink, and run” model for transition. Many aspects of an application running on OpenVMS VAX systems remain unchanged on an HP Integrity server.

Application porting

Figure 1 provides a general overview of the methods for porting a VAX application to an Integrity server. Please note that the details and methods of porting are not covered here but will be available in a forthcoming VAX to Integrity server porting guide.

The process for converting VAX programs to run on an Integrity server includes the following stages:

1. Evaluate the code to be migrated:
 - Take inventory of the elements of the application and its environment
 - Identify any dependencies on other programs
 - Review code in each element to find potential obstacles to migration
 - Decide on the best method for moving each part of the application to the Integrity server
2. Write a migration plan
3. Set up the migration environment
4. Migrate the application
5. Debug and test the migrated application
6. Integrate the migrated software into a software system

Please see page 13 for an overview of comprehensive HP services and support for migration activities.

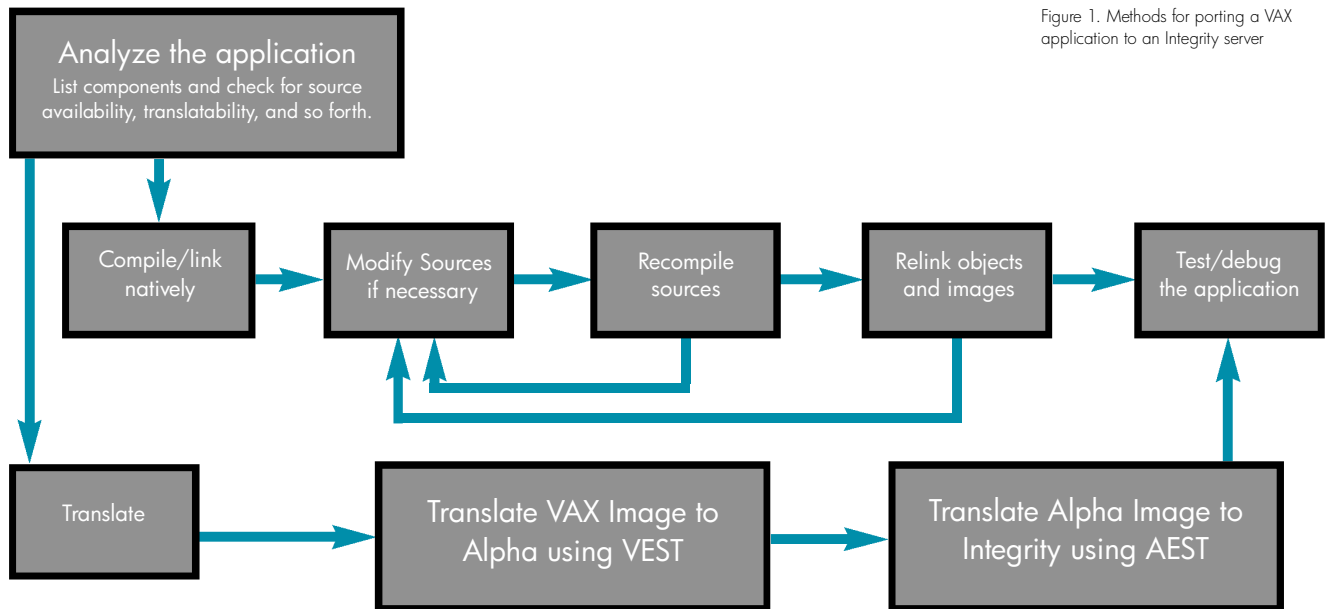


Figure 1. Methods for porting a VAX application to an Integrity server

Customers with application sources – recompile, relink, and run

In most cases, VAX customers with their application sources need not rewrite their applications. For many applications, moving from OpenVMS VAX to OpenVMS on Integrity servers is straightforward.

If an application runs only in user mode and is written in a standard high-level language, it can probably be recompiled with a native Integrity compiler and relinked to produce a version that runs successfully on an Integrity server. The work required to port those sources to Integrity servers is roughly equivalent to the work that would have been required to port them to AlphaServer systems.

To ease the porting process, it is important to upgrade all of the VAX-based code, compilers, and tools up to the most current versions prior to initiating any porting activity. Experience has shown that a significant number of problems – in some cases the vast majority – arise from older software versions and are completely eliminated with the latest revision levels.

The most effective way to convert a program from OpenVMS VAX to OpenVMS on Integrity servers is to recompile the source code using a native Integrity compiler (such as HP C, HP COBOL, or HP Fortran) and then use the OpenVMS linker to relink the resulting object files and any required shareable images. This method produces a native Integrity image that takes full advantage of the speed of the Integrity server.

Many applications, especially those that use only standard coding practices are written with portability in mind, and will port from OpenVMS VAX to OpenVMS on Integrity servers with little or no trouble. However, recompiling an application that depends on VAX-specific features that are incompatible with the Integrity architecture will require modifying the source code. Typical incompatibilities include use of the following:

- VAX MACRO assembly language to obtain high performance on a VAX system or to make use of features specific to the VAX architecture
- Privileged code
- Features specific to the VAX architecture
- 32- versus 64-bit issues
- Data structure layout/packing
- Floating-point standard

Customers without application sources

For customers who do not have their VAX application sources, HP provides two translators for translating images from VAX to AlphaServer systems and from AlphaServer systems to Integrity servers:

1. OpenVMS Migration Software for VAX to Alpha (OMSVA) (Previously known as DECmigrate)
2. HP OpenVMS Migration Software for HP Alpha to Integrity Servers (OMSAIS)

The translators will not translate all images. Code that can't be translated includes self-modifying code, user-written system services, and privileged instructions.

Despite differences between VAX and Integrity servers, most user-mode VAX images can run without error on an Integrity system by using the VAX Environment Software Translator (VEST). VEST is part of the OMSVA binary translator product.

32-bit applications will run perfectly well without conversion in the 64-bit OpenVMS for Integrity environment. HP Services stands ready to assist you in this endeavor. Once you have an AlphaServer-based image you then use the OMSAIS binary translator to convert the AlphaServer image to an Integrity-based OpenVMS image.

An AlphaServer system is only required to create an image that will be used with the binary translator. To avoid purchasing an AlphaServer system just for this purpose, customers can choose from these options:

1. Rent an AlphaServer system
2. Use an AlphaServer system deployed elsewhere in the organization
3. Engage HP Services to do this step

This process provides a higher degree of VAX compatibility than recompiling the sources, but since the translated image does not provide the same high performance as a recompiled image, translation is used primarily when recompilation is impossible or impractical. For example, translation is used in the following situations:

- When source files are not available
- In cases where there are compelling reasons why you may want to rebuild
- If there is a lack of technical resources to execute the port

A translated Integrity image runs under the Translated Image Environment (TIE) on an Integrity server. (TIE is a shareable image that is part of OpenVMS on Integrity servers.) Translation does not involve running a VAX image under emulation or interpretation (with certain limited exceptions). Instead, the new Integrity image contains Integrity instructions that perform operations identical to those performed by the instructions in the original VAX image.

The translated image does not benefit from the optimizing compilers that take full advantage of the Integrity architecture but a translated image should run at least as fast on an Integrity server as the original image runs on a VAX system.

You can mix migration methods among the individual images that comprise an application. An application can also be partially translated as one stage in a migration. This allows the application to run and to be tested on Integrity hardware before being completely recompiled.

For more information on OpenVMS Migration Software for VAX to Alpha (OMSVA), previously known as DECmigrate, refer to <http://h71000.www7.hp.com/openvms/products/omsva/omsva.html>

For more information on HP OpenVMS Migration Software for HP Alpha to Integrity Servers (OMSAIS) see <http://h71000.www7.hp.com/openvms/products/omsva/omsais.html>

Mixed-cluster support policies

OpenVMS supports mixed-architecture cluster pairs (VAX and Alpha clusters, and Alpha and Integrity server clusters) to allow maximum flexibility for user environments. These environments enable customers to allow coexistence of applications across multiple environments, as well as create an environment to allow migration from one hardware architecture to another.

A VAX system and an Integrity server in a mixed-architecture cluster (with or without AlphaServer systems included) is not a formally supported configuration for production environments. This type of configuration, however, can be used temporarily as an interim step for the purposes of development and migration, as applications are moved from VAX to either an Alpha or Integrity server platform. Should a problem arise while using this type of configuration, the customer will be advised to either revert back to their VAX-Alpha cluster environment or remove the VAX from the cluster that contains Integrity server systems.

VAX to Integrity with no AlphaServer systems

Customers who have only VAX systems in their environment and wish to migrate directly to Integrity servers will need to temporarily use the VAX/Integrity mixed cluster environment, or migrate their environment manually without the assistance of cluster capabilities.

Standalone VAX systems or systems in clusters had storage that was typically either shared cluster interconnect (CI) or direct-attached old-architecture SCSI. Neither of these storage environments is directly available on Integrity servers. As such, not only will the server and application have to change, the storage environment will need to change as well (either to direct-attached new-architecture SCSI or via a shared Fibre Channel SAN environment).

In this case, moving data from VAX to Integrity will require using MSCP serving or host-based Volume Shadowing from the VAX to Integrity nodes. A more manual method could involve using backup tapes to move the data or more primitive network-based file transfers.

VAX to Integrity with AlphaServer systems in an existing cluster

Customers who have a mixed-architecture VAX and AlphaServer system environment, and wish to add Integrity servers to replace their VAX systems, have different methods at their disposal for moving from VAX environments. From a storage perspective, customers typically either use CI-based shared storage between AlphaServer and VAX systems, or have the storage segregated by VAX-only and AlphaServer-only. On the VAX side, it would be the same as described in the previous section. On the AlphaServer side, the more common storage used is the shared Fibre Channel-based SAN environment.

This latter scenario eases the migration from VAX to HP Integrity servers because data can be moved from the VAX to AlphaServer system via either the CI infrastructure or existing data transfer technologies within a cluster (MSCP serving or Host-based volume shadowing). By using existing SAN-based storage on the AlphaServer system, data could then be directly used by the Integrity server system environment, and as such, create a new mixed-architecture AlphaServer and Integrity environment with common storage.

Device support

For some VAX customers, a lack of device support on AlphaServer systems and Integrity servers has prevented migration because controller cards for certain external devices had no comparable replacements. In this case, HP will help identify an alternative device or method to find a way around this hardware problem.

Compilers

Compiler differences can exist for two reasons:

1. Differences between earlier and current versions of compilers running on OpenVMS VAX
2. Differences between the versions running on the VAX and Integrity server

The OpenVMS on Integrity compilers are intended to be compatible with their OpenVMS VAX counterparts. This includes several qualifiers that contribute to compatibility:

- The languages conform to language standards and include support for most OpenVMS VAX language extensions
- The compilers produce output files with the same default file types as they do on OpenVMS VAX systems

Note that some features supported by the compilers on OpenVMS VAX systems may not be available on OpenVMS on Integrity servers.

For more information about the compiler differences for each language, refer to its documentation, especially the User's Guides and the Release Notes.

HP layered software products

The rollout of HP OpenVMS layered software for the Integrity platform began with OpenVMS v8.2 and will continue through early 2006. The Software Public Rollout for OpenVMS v8.2 lists current and future layered software products, order numbers, and approximate availability. This Integrity Rollout report is available on the OpenVMS Public Rollout webpage at <http://h71000.www7.hp.com/openvms/os/swroll/index.html>

Licensing

The layered software products continue to be licensed using the HP OpenVMS License Management Facility (LMF). A new license type, "Per-Processor License to Use," is used for most products. A Per-Processor License (PPL) is required for each active processor (CPU) on the server or hard partition. The familiar "Concurrent Use" license type is used for compilers.

Delivery

For new software orders, OpenVMS Integrity layered software products are included with the operating system. Delivery of updates is provided through Software Updates Services, purchased separately for each layered product.

Third-party layered software products

Many third-party applications now run on the OpenVMS on Integrity server platform. The current lists are available at http://h71000.www7.hp.com/solutions/matrix/i64partner_A.html

For additional information on a particular application, contact the application vendor.

User interface

DIGITAL Command Language (DCL)

The DIGITAL Command Language (DCL), the standard user interface to OpenVMS, remains essentially unchanged with OpenVMS on Integrity servers. All commands, qualifiers, and lexical functions available on OpenVMS VAX also work on OpenVMS on Integrity servers.

Command Procedures

Command procedures written for earlier versions of OpenVMS VAX should continue to work on Integrity systems without change. Certain command procedures, though, such as build procedures, must be changed to accommodate new compiler qualifiers and linker switches. Linker options files will also require modification, especially for shareable images. In addition, any command procedures that are conditionalized to run on VAX or AlphaServer systems may need to be changed to work on Integrity servers.

DECwindows

The window interface, DECwindows Motif, is unchanged.

DECforms

The DECforms interface is unchanged.

Editors

The two standard OpenVMS editors, EVE and EDT, are unchanged.

System management interface

The system management utilities are largely unchanged. One major exception is that device configuration functions, appearing in the System Generation utility (SYSGEN) on VAX systems, are provided in the System Management utility (SYSMAN) for OpenVMS on Integrity servers.

Beyond the system management utilities, HP OpenView provides a comprehensive suite of management tools, and is supported by leading management ISVs. Systems Insight Manager provides server management, including hardware status and fault monitoring, configuration data, and software version control. Several additional tools – including HP OpenView management products such as OpenVMS Management Station, Availability Manager, and Performance Data Collector – are available to further ease the OpenVMS-specific management tasks and increase productivity and agility.

Programming interfaces

In general, the system service and run-time library (RTL) calling interfaces remain unchanged. Argument definitions do not need to be changed. The few differences fall into two categories:

1. Some system services and RTL routines (such as the memory management system and exception-handling services) operate somewhat differently on VAX and Integrity systems
2. A few RTL routines are so closely tied to the VAX architecture that their presence on an Integrity system would not be meaningful

Data

The on-disk format for ODS-2 data files is the same on VAX and Integrity systems. However, ODS-1 files are not supported on OpenVMS on Integrity servers. Record Management Services (RMS) and file management interfaces are unchanged.

Integrity servers support only IEEE S_floating point and T_floating point data types in hardware arithmetic operations. D_floating point, G_floating point, and F_floating point data types are supported via enhancements made to the compilers. Please see the OpenVMS Floating Point white paper for details:
<http://h71000.www7.hp.com/openvms/whitepapers/>

Databases

The following database vendors/products will be available on OpenVMS Integrity servers including:

- InterSystems Cache
- CA Ingres
- Mimer
- MySQL
- Oracle 10g R2
- Oracle Rdb

Individual database vendors will supply details regarding Integrity server support.

Network interfaces

VAX and Integrity servers both support the following interfaces:

- Interconnects
 - Ethernet
 - X.25
- Protocols
 - DECnet (Phase IV in version 7.1; Phase V in the optional DECnet-Plus kit)
 - TCP/IP
 - OSI
 - LAD/LAST
 - LAT (Local Area Transport)
- Peripheral connections
 - SCSI
 - Ethernet

Migration service and support

From end of life to a new beginning

The official HP company policy has been to support each system type for at least five years from the date of the last new-product sale of that system type. Yet the actual business practice has been to support products as long as there is both a viable business requirement and sustainable capability.

That's why over half of the VAX hardware system types introduced are still being supported. Spare-parts availability is perhaps the most critical factor influencing the support timeline, especially for products no longer in production. It is inevitable that HP will have to end worldwide support on all VAX platforms eventually.

When a decision is made to end support for a particular hardware platform, that information is communicated to HP regional personnel and thence to the customer at least 18 to 24 months prior to the scheduled end-of-support date. That timeframe should prove more than adequate to migrate OpenVMS from VAX to Integrity servers. HP offers migration services to assist customers along the way.

Transition Consulting workshops

To help customers quantify their migration requirements upfront, HP offers Transition Consulting workshops. These customized planning and problem-solving sessions are tailored to customers' key business and IT requirements. Ranging from one to three days, the workshops assist customers in planning an IT environment transition. They provide directional consulting together with high-level roadmap information to update customers on the latest technologies and information on options, benefits, and risks.

Migration delivery services

The key to a successful migration is planning and a well-defined process that takes into account the impact of change and the alternatives available. HP Services has designed a focused, phased migration methodology that delivers the OpenVMS application environment to Integrity servers cost-effectively and at a pace that is appropriate to a customer's requirements.

Throughout the migration project, HP consultants work with customers to tune their applications for optimal performance and to transfer critical operational knowledge to their IT staff. HP Services has led more than one hundred software migration projects involving millions of lines of code. The maturity of the HP migration process is confirmed through a Capability Maturity Model (CMM) Level 5 certification from the Software Engineering Institute (SEI).

Additional information on HP porting and migration is available at: <http://h20219.www2.hp.com/services/cache/10300-0-0-225-121.aspx>

VAX to Integrity Migration workshop

HP Services initially engages with an organization to conduct a preliminary workshop based on a requirements survey. Workshop participants develop a high-level migration strategy in alignment with business priorities and an inventory of systems, applications, and databases.

Migration Assessment service

The Migration Assessment service assesses the VAX system and application environment to be migrated to the Integrity platform. The objectives of the migration are reviewed and a complete current state configuration is completed. The desired end state is determined, risks and constraints are identified, and several migration scenarios are developed.

Application Migration Detailed Analysis and Design service

The Application Migration Detailed Analysis and Design service does a detailed analysis of an in-house developed application. From that analysis, it creates a report of all VAX dependencies within all modules and recommends what modifications should be made to migrate the application to Integrity servers. Acceptance criteria are specified for performance and functionality.

System Migration Detailed Analysis and Design service

The System Migration Detailed Analysis and Design service performs a detailed analysis of the current system environment including hardware, software (HP and third-party, excluding in-house developed applications) and network components. The best tools and migration methods are determined and a project plan mapping the steps from the current to the future state is created.

Application Migration service

The Application Migration service helps move in-house developed applications from OpenVMS VAX platforms to Integrity servers. Each code module is either recompiled or translated depending on source code availability. VAX dependencies are removed beforehand. Finally the entire application is relinked and tested on the Integrity platform. The application is then deployed on the target system(s).

System Migration service

The System Migration service moves an OpenVMS system (single node or cluster) from the VAX platform to the Integrity platform. The customer's system availability and performance requirements are reviewed and acceptance testing methodology and criteria are determined.

Hardware support

From installation to product retirement, warranty upgrades to self-maintenance, proactive care to 24x7 problem resolution, customers rely on HP Services and authorized service partners for all hardware support needs.

HP Services delivers comprehensive support for enterprises of all sizes and environments of all types. HP Services capabilities include:

- Total lifecycle support for all HP hardware products and many third-party products from today's leading vendors
- A full range of proven preventive, diagnostic, remedial, and repair services
- A global service network of 16 strategically located Customer Support Centers delivering 7x24x365 problem-solving help by telephone, the Internet, and electronic service tools
- 65,000 service professionals at offices in 160 countries
- Leadership e-business lifecycle services, including 24x7 Mission Critical Support

- Support for a wide array of popular third-party peripherals

- Flexible purchase options to simplify service planning, acquisition, and budgeting

More information on HP hardware services is available at <http://h20219.www2.hp.com/services/cache/10657-0-0-225-121.html>

HP OpenVMS operating system services

HP Services and certified support partners ensure that customers benefit from all the performance, availability, and reliability the OpenVMS operating system is capable of delivering. HP remains committed to high levels of OpenVMS support and provides technical software support coverage for the currently shipping version and the immediate prior version. HP OpenVMS support offerings include:

- Business continuity and availability services
- Start-Up and implementation services
- Assessment services
- System management services
- Software product updates
- Software technical support
- Prior version support (on selected versions)

More information on HP OpenVMS operating system services is available at <http://h20219.www2.hp.com/services/cache/10647-0-0-225-121.aspx>

Conclusion

While some VAX customers continue to draw value from their systems, many are interested in moving to an industry-standard, lower-cost OpenVMS solution, a move that HP encourages. HP stands ready to provide as much assistance as required to ensure a successful migration to HP Integrity servers, including:

- Joint migration planning at the customer's own pace to minimize disruption and cost while adding business value through evolution
- Generous trade-in programs for transferring OpenVMS and OpenVMS layered products licenses from OpenVMS VAX to OpenVMS on Integrity servers
- A broad range of technical services to assist in porting code from VAX to Integrity servers

Many VAX customers have already migrated to HP AlphaServer 64-bit systems. Others are planning to migrate directly to the new HP Integrity servers with the Intel® Itanium® microprocessor. In any case, customers who have already made the transition to 64-bit computing are finding that the benefits of migration – lower TCO and better price/performance – far outweigh the effort involved.

For more information

To learn more about the OpenVMS operating system
visit www.hp.com/go/openvms

To learn more, visit www.hp.com.

© 2005 Hewlett-Packard Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Intel and Itanium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. UNIX is a registered trademark of The Open Group. The term "Linux" is a registered trademark of Linus Torvalds, the original author of the Linux kernel. Windows is a registered trademark of the Microsoft Corporation in the United States and other countries.

5983-2722EN 6/20/2005