

# Planning for the integration of HP Integrity servers into the OpenVMS environment



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**Abstract:** Integrating Itanium® 2-based HP Integrity servers into your OpenVMS environment can be as straightforward as adding a new node to your OpenVMS cluster.

This means you can focus on the business decision of when to add Integrity servers instead of on the technical question of how you're going to do it. This white paper is designed to help you determine when is the best time for you to integrate HP Integrity servers into your OpenVMS environment. The answer differs from organization to organization. Each of the six sections of this paper addresses a key element of the decision-making and

implementation process that ultimately determines what course of action and timing is best for your business.

Sections one, two, and three summarize the evolution of the OpenVMS operating environment to the Integrity server platform, including several of the most vital technical and solution considerations. Section four addresses the new business practices and packaging that are part of the new OpenVMS model as it is implemented for the Integrity server environment. And section five outlines the key steps and triggers to consider as you plan the integration of HP Integrity servers into your OpenVMS environment.

# 1. From HP AlphaServer systems to HP Integrity servers

## Continuous high-quality evolution

The OpenVMS operating system has been in a state of continuous high-quality evolution since its 1977 introduction on the VAX line of 32-bit servers. OpenVMS was ported to the Alpha 64-bit architecture in the early 1990s. Now HP OpenVMS has undergone a full port to the Intel® Itanium® architecture and a production version will be available on HP Integrity servers during the latter half of 2004.

## Single-source-code approach

HP will use a single source code stream for OpenVMS on both HP Integrity and AlphaServer systems. This approach will allow for simultaneous release of new non-hardware-dependant features and functions on both AlphaServer systems and Integrity servers. As you plan the integration of Itanium®-based HP Integrity servers into your OpenVMS environment, you will be free to do so based on what your business needs — not on what the hardware will support.

With binary data-file compatibility, HP AlphaServer systems will run seamlessly with Itanium®-based HP servers. Most existing applications will run on HP Integrity servers by simply recompiling and relinking with minimal if any, source-code modification. HP's goal is to have all existing OpenVMS software partners port their applications to the HP Integrity platform. In fact, more than 280 Independent Software Vendors supporting over 600 applications have committed to porting their products to the new platform as of the publication date of this document. Additional

applications are being committed every week. For more information on partner directions and progress, see: [www.hp.com/products1/evolution/alpha\\_retaintrust/openvms/partners.html](http://www.hp.com/products1/evolution/alpha_retaintrust/openvms/partners.html).

## AlphaServer roadmap

Customers who prefer to remain on and grow their AlphaServer system environments can continue to take advantage of new versions of OpenVMS. Those who choose to deploy OpenVMS on HP Integrity servers can immediately exploit its capabilities on the industry-standard Itanium -based architecture.

HP plans to continue delivering AlphaServer systems until at least 2006 with ongoing support for at least 5 years after that. This means that our OpenVMS business partners and end users can continue OpenVMS application development efforts for current and future AlphaServer production-system environments while concurrently porting applications to the Itanium architecture.

## OpenVMS development

OpenVMS Evaluation Release Version 8.1 is a significant achievement. It contains much more functionality than originally planned. HP engineers are running mixed-architecture clusters of over a dozen AlphaServers and Itanium systems with TCP/IP and DECnet network stacks and four-way SMP system support. Customers who have seen the mixed-cluster demonstration are accelerating their Integrity server adoption plans.

Moreover, HP has met all its scheduled OpenVMS release dates and is on track to release OpenVMS Version 8.2 – a production quality release of OpenVMS for the HP Integrity server and AlphaServer platforms – in the second half of 2004. Now HP customers can look forward to leveraging this stable, secure, and highly available operating environment on an industry-standard architecture.

## 2. Fundamentals

The longevity and durability of the OpenVMS operating system rest on fundamental strengths in the areas of

- Security
- System management
- Storage management
- High Availability and Clustering

HP is enhancing these fundamentals in the newest versions of the operating system for HP Integrity and AlphaServer systems.

### Security

OpenVMS is secure by design. From the very first, security was incorporated into the base operating system. It was declared “cool and unhackable” at the DEFcon9 hacker convention and is extremely virus resistant. In addition, the infamous hacker, Kevin Mitnick could not hack his way in a single OpenVMS machine and testified in congress about that. Because OpenVMS functions as a single security domain encompassing everything from a single node or soft partition instance to an entire 96-node cluster it is fully secure. OpenVMS was one of the first commercial operating systems to achieve a US DOD C2 security rating and continues to pass that same test suite on each release of the operating system. It continues to evolve to meet the world’s changing security needs with industry-standard security technology enabling secure interoperation in heterogeneous environments. All security attributes will be fully available and regularly enhanced on Integrity servers and in mixed environments. The bottom line: OpenVMS for both AlphaServer and Integrity servers provides the highest levels of security and data protection.

Learn more about OpenVMS security capabilities at <http://h71000.www7.hp.com/openvms/security.html>

### System Management

Among the core strengths of OpenVMS are its built-in system management features and the variety of third-party applications available for added management functionality. That won’t change with OpenVMS on Integrity servers. The third-party agents will continue to function on the Integrity system. What’s more, HP is now building an agent for managing OpenVMS servers with HP OpenView Operations. OpenView on OpenVMS is designed to enable enterprise management of heterogeneous environments.

For more information on OpenVMS system management visit [http://h71000.www7.hp.com/openvms/system\\_management.html](http://h71000.www7.hp.com/openvms/system_management.html)

### Storage and Backup/Restore

The HP storage strategy revolves around a common SAN architecture and components – disks, tapes, infrastructure, and management products – supported

across OpenVMS, Tru64 UNIX® and HP-UX. OpenVMS supports all HP storage technologies. Whatever business decisions around storage you make, OpenVMS maps into it. Data protection and recovery, data availability, improved storage efficiency and performance, and investment protection are key focus areas for the transition to Itanium architecture-based OpenVMS systems.

### Backup Strategy

HP is providing OpenVMS users with a choice of data backup-and-restore solutions allowing maximum flexibility when implementing your data protection strategy.

Historically, the majority of OpenVMS customers demanded the “home grown” solution in an OpenVMS-only storage environment. They did not have to worry about sharing with any other environment. They developed knowledge of the file system and flexibility of single-file restorations. And some only trusted solutions built by the OpenVMS group.

Environmental changes, however, have created a new approach to backup. The enterprise now relies on FibreChannel Storage Area Networks (SANs) composed of heterogeneous storage environments. The backup engine must match the speed and capacity of the SAN technology.

HP understands that customers are looking for a common tool or methodology to manage their data within the data center. They want the ability to train staff with a single tool or concept rather than one for each environment. And they want the ability to manipulate the data for backup/restore on/from the host environment where the data is native.

HP will continue to support the existing tools that OpenVMS customers have relied upon for many years — BACKUP Utility and the SLS/ABS product family. At the same time, HP will introduce new solutions that integrate with the existing tools on both the Alpha and Itanium platforms for OpenVMS.

Learn more about OpenVMS storage products at [www.hp.com/go/storage](http://www.hp.com/go/storage) or <http://h71000.www7.hp.com/openvms/fibre/index.html>

### High Availability and Clustering

Clustering for both availability and performance was an OpenVMS innovation first released in May of 1982. OpenVMS clustering continues to be the gold standard in the industry because of its security, availability, versatility, ease of management, and profound disaster tolerance and business continuity attributes.

With more than 50,000 clusters – ranging from 2 to 96 nodes per cluster – installed and supported worldwide, HP support for OpenVMS clustering capabilities continues to improve with additional features being added at every release. With the advent of OpenVMS for Integrity servers, the power and functionality of OpenVMS Clusters is taken to a new level. Here is a quick update on OpenVMS cluster support plans.

Initial support for limited cluster functionality appeared in OpenVMS Version 8.0 evaluation release in a mixed-architecture configuration (AlphaServers and Integrity servers). OpenVMS for Integrity servers Version 8.1 evaluation release has OpenVMS Clusters support for two to four nodes with limited functionality in a mixed architecture configuration (AlphaServer and Integrity). Host to Host (SCS) Communications Cluster Interconnect will be supported on Gigabit Ethernet and 10/100 Ethernet. You can use different versions of OpenVMS Alpha on your AlphaServer systems in the mixed-architecture cluster.

OpenVMS Version 8.2 for Integrity servers will provide support for up to eight nodes with expanded cluster functionality. Mixed-architecture clusters for OpenVMS Version 8.2 for Integrity servers will be supported with OpenVMS

Version 8.2 for AlphaServer systems or Version 7.3-2 as Warranted configurations.

Mixed-architecture OpenVMS Clusters with up to 96 nodes and full cluster functionality will be available in the 2005 timeframe. In addition, SCS Cluster Interconnect will be supported over Fibre Channel.

There are no plans at this time to support OpenVMS VAX and OpenVMS for Integrity servers in a mixed-architecture cluster. OpenVMS VAX systems are allowed in mixed-architecture clusters only with OpenVMS Alpha systems.

Learn more about OpenVMS Clusters, high availability, and business continuity at <http://h71000.www7.hp.com/availability/index.html> and <http://h71000.www7.hp.com/openvms/products/clusters/index.html>

## 3. Solution environment

### E-business and integration infrastructure

For e-business and integration, HP is enriching the strengths of the OpenVMS operating system by providing an infrastructure that facilitates application, middleware, and data integration in a global, multi-platform environment.

Following is a list of supported tools, products, and technologies available from HP and our partners for e-business and integration for OpenVMS. When combined with our Service offerings, they are the building blocks for robust enterprise integration solutions

### Web servers and browsers

- Secure Web Server (Apache) including support for PHP, Perl, and Tomcat (JSP)
- Secure Web Browser (Mozilla)

### Web services

- Simple Object Access Protocol (SOAP) Toolkit
- XML Technology (parsers and style sheet processors)

### Legacy and data integration

- BridgeWorks
- Attunity Connect
- TP Connector suite

### Directory services

- Enterprise Directory (LDAP)

### Development tools

- Java SDK
- NetBeans
- 3GLs (C/C++, Fortran, Cobol, Basic, Pascal, Ada)

### Application servers

- BEA WebLogic Server
- Xology Concerto
- Tomcat

### Middleware

- HP ACMS
- HP COM for OpenVMS
- HP Reliable Transaction Router
- 2AB orb2 (CORBA ORB)
- 2AB iLock (ORB security)
- BEA MessageQ
- Ericom Host Publisher (terminal access)
- IBM WebSphere MQ (formerly IBM MQSeries)
- OCI TAO (open source CORBA ORB)
- SpiritSoft SpiritWave (JMS-messaging integration) and Jcache
- Tibco Rendezvous and SmartSockets (messaging)
- WRQ Verastream (terminal adapter and integration broker)

You can learn more about HP e-business solutions at [www.hp.com/go/openvms/ebusiness/](http://www.hp.com/go/openvms/ebusiness/)

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### **UNIX portability**

HP is in the process of providing a full set of UNIX interfaces and tools on OpenVMS in a native, integrated fashion. This will eliminate performance issues associated with a layered emulator solution while enhancing interoperability. The OpenVMS UNIX™ Portability (UP) Initiative is an effort to simplify porting of applications from UNIX systems to OpenVMS systems through C RTL, file system enhancements, and a port of the UNIX (BASH) shell called GNV. In upcoming releases, HP is investigating implementation of symbolic links, async I/O, locking semaphores, messaging, scheduling, file characteristics, and more.

Native OpenVMS behavior remains the default and UNIX functionality is turned on as desired. While the OpenVMS UNIX Portability Initiative eases the porting of UNIX applications to OpenVMS, it also facilitates the porting of many other types of applications to OpenVMS. Linux applications, Java applications, and most Open Source applications benefit from the UNIX Portability initiative.

For more on UNIX portability visit  
<http://h71000.www7.hp.com/portability/index.html>

### **Layered products**

Consistent with HP's strategy of evolving the OpenVMS environment so that HP Integrity servers will integrate into the OpenVMS AlphaServer environment, virtually all layered products are being ported, as well.

Current scheduling and information can be found at [www.hp.com/products1/evolution/alpha\\_retaintrust/openvms/openvms\\_move.html](http://www.hp.com/products1/evolution/alpha_retaintrust/openvms/openvms_move.html)

### **Applications**

HP made early versions of OpenVMS available to application providers so they could port as quickly as possible. With the release of production quality OpenVMS Version 8.2, a substantial number of key applications will have already been ported, qualified, and ready to go. HP has firm commitments and statements of endorsement (plans to port applications to OpenVMS on Integrity servers) from over 280 partners.

As this list continues to grow, check periodically for an up-to-date account of these partners at [www.hp.com/products1/evolution/alpha\\_retaintrust/openvms/partners.html](http://www.hp.com/products1/evolution/alpha_retaintrust/openvms/partners.html)

# 4. Business practices and packaging

With the release of OpenVMS Version 8.2 HP is simplifying the business practices and packaging for OpenVMS on Integrity servers. In addition to reducing complexity these new business practices can help lower the cost of OpenVMS environments, as well. Therefore, HP packaging and business practices feature

- Simplified license management with one license per operating environment
- Standardized software configurations to improve quality, certification, deployment, and support
- Attractive pricing through per-processor licensing
- Favorable trade-in program for investment protection.
- Straightforward installation of a very complete and sophisticated operating environment from a single DVD

## Operating Environment Packages

Beginning with OpenVMS Version 8.2 for Integrity servers, HP will provide a three-tier operating environment paradigm with Foundation, Enterprise, and Mission-Critical options. Note that the contents of the three Operating Environments are subject to change.

### Foundation Operating Environment (FOE) Base

The Foundation Operating Environment is an Internet-ready, economical feature set that includes

- OpenVMS Operating System
- OpenVMS Unlimited User Licensing
- TCP/IP Services for OpenVMS
- DECnet-Plus for OpenVMS End System
- DECwindows Motif for OpenVMS
- DECnet IV

### Integration Technologies

- BridgeWorks
- COM for OpenVMS
- Secure Web Server (SWS)
- Secure Web Browser (SWB)
- SDK for the Java(tm) Platform
- XML Technology
- NetBeans
- Simple Object Access Protocol (SOAP) Toolkit
- Kerberos

- Enterprise Directory
- CDSA
- SSL
- OpenSource Tools

### Enterprise Operating Environment (EOE)

The Enterprise Operating Environment is an augmented feature set that enhances the customer experience in areas of manageability, single-system availability, and performance. This package contains everything in the FOE plus:

- RMS journaling
- Volume Shadowing
- DECram

### OpenVMS for Integrity Servers System Management Tools

- OpenVMS Management Station
- The Data Collector - TDC
- Enterprise Capacity Planner (ECP) and Performance Analyzer
- Availability Manager
- HP Management Web Agents
- HP WBEM (Web-Based Enterprise Management) Services

### Mission Critical Operating Environment (MCOE)

The premium Mission Critical Operating Environment (MCOE) package delivers the ultimate customer experience in terms of multi-system availability and workload management. This package contains everything in the FOE and EOE plus:

- OpenVMS Clusters
- Reliable Transaction Router (RTR)

### Trade-in Policy

To support the transition to Integrity servers, HP has introduced a new Software License Trade-in and Transfer Policy. OpenVMS operating system and layered product licenses from Alpha servers may be traded-in for the equivalent operating environment or layered product licenses on an Integrity server. If the licenses are on a support contract that provides new version rights, the equivalent licenses are provided at no charge, provided a support contract is purchased for the new licenses. Licenses not on support may be traded-in at 60% credit with the purchase of one year of support for the new licenses. HP has defined product equivalency between the platforms. The new cross platform Trade-in and Transfer Policy can be accessed at: [http://licensing.hp.com/swl/view.slm;jsessionid=aaafd9rdUI7ZeT\\_lqEzQO?page=swl\\_policies](http://licensing.hp.com/swl/view.slm;jsessionid=aaafd9rdUI7ZeT_lqEzQO?page=swl_policies)

# 5. Moving forward

Planning and implementing the integration of HP Integrity servers into an OpenVMS environment is a multi-step process. It is similar to that which you might go through to plan an expansion or upgrade within the AlphaServer environment. It will generally be driven by the same criteria that you would use in planning the expansion or upgrade of your OpenVMS AlphaServer environment with one additional dimension — whether to integrate Integrity servers or AlphaServer systems.

As you step through the planning and implementation process it is important to keep in mind that, all things being equal, you can opt for either AlphaServer systems or Integrity servers for quite some time to come. HP support for the AlphaServer family extends well into the future. From a business perspective, though, it is prudent to explore the possibilities that exist with the industry-standard Itanium architecture with an incremental integration of Integrity servers.

## Start testing now

That incremental integration is made possible with OpenVMS Evaluation Release Version 8.1 for Integrity servers. Kits are available at a nominal charge. Start your testing on a low-end Integrity server in early 2004. Many application providers are making beta version of their products available for those who want to experiment and are thinking about porting to the new environment.

In the second half of 2004 you can actually begin to do some pilot projects. If you have a new project, kick it off on Integrity servers with the OpenVMS Version 8.2 production version. Then you can begin to deploy Integrity servers into Alpha production environments and continue capacity and evolution planning.

Our customers and business partners can also take advantage of a secure environment for testing applications on OpenVMS in our labs in Nashua, New Hampshire and other sites around the world. We have invested heavily in creating lab environments that allow us to help you evaluate software and new hardware technology on the latest versions of OpenVMS.

### Key steps and considerations

Following are the key steps and considerations when planning the integration of Integrity servers into your OpenVMS environment.

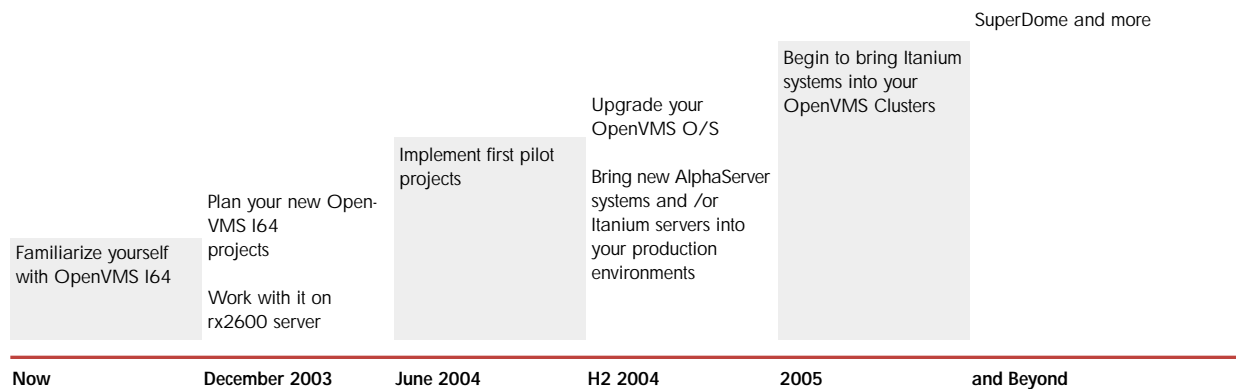
| 1. Capacity planning | Trigger                                    | Action  | Comments  |
|----------------------|--|---|---|
|                      | New projects                               | Consider requirements and timing  | If production deployment is planned for late in 2004 this is the ideal opportunity to begin.  |
|                      | Performance                                | Consider timing   | While we anticipate substantial performance improvements beginning in the next two years, we have focused on achieving a stable and complete O/S in the near term.  |
|                      | System expansion                           | Prepare to integrate new cluster nodes.<br>Consider application-porting status. | Beginning with Version 8.2 you will be able to integrate Integrity servers into your OpenVMS AlphaServer production cluster. Hundreds of applications are already being ported to be ready for Version 8.2.   |
|                      | Modified, updated, or new business process | Consider timing; part of operation being affected; complexity of process.       | A good time to add Integrity servers to the environment is when business processes are being modified. This provides for fewer steps. Just ensure that production implementation schedules are consistent with the timing for application and server qualification. |

|   |  |  |   |
|---|--|--|---|
| <b>2. Become familiar with Integrity servers and OpenVMS for Integrity servers</b>  | <b>Trigger</b>   | <b>Action</b>  | <b>Comments</b>   |
|   | Availability of OpenVMS Version 8.1 evaluation release                                       | Obtain a low-end Integrity server – the rx2600 is recommended – and the evaluation release OpenVMS Version 8.1 kit. Begin exploring this environment and porting applications. | <a href="http://www.hp.com/products1/evolution/alpha_retaintrust/openvms/integrity-ready.html">www.hp.com/products1/evolution/alpha_retaintrust/openvms/integrity-ready.html</a><br><br>This environment can be clustered homogeneously as well as heterogeneously with AlphaServer systems |
| <b>3. Determine triggers for when you feel OpenVMS on Integrity servers will be ready based on your capacity planning in #1</b> | <b>Trigger</b>   | <b>Action</b>  | <b>Comments</b>   |
|   | Performance  | Determine needs and timing of those needs  | As we continue to improve OpenVMS, we anticipate raw performance of Integrity servers to evolve at a rate at least equal to that of OpenVMS on AlphaServer systems.   |
|   | Application availability   | Consult website for the latest status  | <a href="http://www.hp.com/products1/evolution/alpha_retaintrust/openvms/partners.html">www.hp.com/products1/evolution/alpha_retaintrust/openvms/partners.html</a>  |
|   | Economic considerations  | Become familiar with pricing and business practices for OpenVMS on Integrity servers. Become familiar with pricing of Integrity servers.                                       |   |
|   | Technology considerations  | Become familiar with the Integrity server line   |   |
|   | Other  |  | Dependent on your specific environment  |
| <b>4. Chose a pilot project and proceed with it on Integrity servers</b>  | <b>Trigger</b>   | <b>Action</b>  | <b>Comments</b>   |
|   | New application  | Develop a pilot implementation based on the configurations with which you have become familiar in #2 above.  |   |
|   | New business process   |  |   |
|   | Expansion of a localized operation   |  |   |
|   |  |  |   |
| <b>5. Continue to upgrade your OpenVMS AlphaServer environment</b>  | <b>Trigger</b>   | <b>Action</b>  | <b>Comments</b>   |
|   | Required upgrades and expansions that cannot be met by Integrity in your planning time frame | Proceed as you normally would to meet the continuing growth requirements of your operation.  | Your investments in AlphaServer OpenVMS environments are fully protected because of the compatibility of OpenVMS Integrity environments with OpenVMS Alpha environments.  |
| <b>6. Implement the pilot project into production</b>   | <b>Trigger</b>   | <b>Action</b>  | <b>Comments</b>   |
|   | Pilot meets your qualification criteria  | Proceed as you normally would when a pilot project is successfully completed.  | Because releases of OpenVMS beginning with Version 8.2 (the first production-quality release for Integrity servers) will be on a common code stream your OpenVMS environment will continue to evolve in the consistent, seamless way with which you have become accustomed.                 |

## 7. Integrate Integrity servers into your AlphaServer Environment

| Trigger  | Action  | Comments   |
|--|---|--|
| Any requirement, such as those listed in #1 above, which requires you to plan and implement an upgrade or enhancement to your OpenVMS environment. | Proceed as you normally would but implement with Integrity servers. | <p>While AlphaServer systems will continue to meet many requirements for the near-term, especially those that are most rigorous, we fully anticipate that, over the next several years, OpenVMS will be qualified and perform to or beyond expectations on a broad range of Integrity servers from entry level through Superdome.</p> <p>Our roadmaps are published in our web site. These will help you match your future needs with the evolution of OpenVMS for Integrity servers. Figure 1 below presents a high-level overview of the general timeline for OpenVMS on Integrity integration.</p> <p><a href="http://h71000.www7.hp.com/openvms/strategy.html">http://h71000.www7.hp.com/openvms/strategy.html</a></p> |

**Fig 1.** OpenVMS I64 implementation general timeline



## 6. Starting from VAX

Migrating from a VAX to an OpenVMS Integrity server environment is a straightforward proposition.

### With the sources

Porting applications from VAX to Integrity server environments is similar to porting applications from VAX to AlphaServers. The key areas of difference are data alignment, H\_FLOAT data types, data granularity, page sizes, and exception handling. If you have the sources, HP recommends that you refer to the book "Migrating an Application from OpenVMS VAX to OpenVMS Alpha" (<http://h71000.www7.hp.com/doc/72final/6459/6459PRO.HTML>) and apply the recommendations found therein as you port your applications from VAX to Itanium servers. Although this document does not address porting to Integrity, much of what is required to port an application from VAX to Alpha will also apply when porting an application from VAX to Integrity.

Even though it is a two-step process to translate the images, it only has to be done once. Although HP does not plan an emulator for this scenario you can port (recompile and relink) the 32-bit application to run on OpenVMS for Integrity servers.

### Without the sources

If you do not have the sources you can use DECmigrate (<http://h71000.www7.hp.com/openvms/products/omsva/omsva.html>) to port to Alpha and then use the binary translator available from Software Resources International ([www.softresint.com/expe.htm](http://www.softresint.com/expe.htm)) to port to Integrity. An AlphaServer 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 you can choose from these options:

1. Rent an AlphaServer system.
2. If you have AlphaServer systems deployed elsewhere in your organization, use one of them.
3. Engage HP Services to do this step.

Please note that 32-bit applications will run perfectly well without conversion in the 64-bit OpenVMS for Integrity environment.

HP Services ([www.hp.com/go/services](http://www.hp.com/go/services)) stands ready to assist you in this endeavor.

### **Mixed architectures**

HP will support mixed-architecture clusters of AlphaServer systems and Integrity servers. Mixed VAX and Alpha environments will be supported as well. But, due to lack of demand, HP does not plan to support mixed VAX and Itanium environments at this time.

For information specific to OpenVMS for Integrity servers, please refer to [www.hp.com/products1/evolution/alpha\\_retaintrust/openvms/](http://www.hp.com/products1/evolution/alpha_retaintrust/openvms/)

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## Conclusion

HP OpenVMS for Integrity servers is expected to be ready for production-quality release in the second half of 2004. With two evaluation releases already deployed and with hundreds of applications already ported, the integration of Integrity servers into OpenVMS environments is expected to be just about as easy as adding new AlphaServer systems.

This white paper summarized the evolution of the OpenVMS operating environment to the Integrity server platform, including several of the most vital technical and solution considerations. It addressed the new business practices and packaging that will be part of the new OpenVMS model as it is implemented for the Integrity server environment. And it outlined the key steps and triggers to consider as you plan the integration of HP Integrity servers into your OpenVMS environment.

While every situation is, by definition, unique, we firmly believe that we have provided a path that is straightforward, evolutionary, and ensures maximum agility, return on your IT investment, and investment protection.

For additional information on any aspect of the OpenVMS operating system, please refer to [www.hp.com/go/openvms](http://www.hp.com/go/openvms)

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To learn more about HP's offering, visit [www.hp.com](http://www.hp.com).

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