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- HP AlphaServer DS15 Overview
- HP AlphaServer ES47/ES80/GS1280 Overview
- EV7 Processor and CPU Module
  - EV7 Processor
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Der neue HP AlphaServer DS15

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DS10 / DS15 Product Comparison

	DS10	DS15
Processor	• 1 x 617MHz EV67	• 1 x **1GHz EV68CB**
Dimensions	• 5.1 x 17.6 x 19 inches • 13 x 45 x 48 cm	• 5.1 x 17.6 x 19.65 inches • 13 x 45 x 48 cm
SPECint2000	• 364 – EV67/600	• **592**
SPECfp2000	• 411 – EV67/600	• **813**
Cache	• 2MB LW 205MHz	• 2MB **DDR 250MHz**
Memory	• 2GB Maximum • 77MHz – 1.2GB/sec.	• **4GB** Maximum • **125MHz – 2GB/sec.**
I/O	• 4 PCI slots • 64-bit/33MHz • Embedded IDE internal • External SCSI needs PCI card • 2 Embedded 10/100	• 4 PCI slots @ 64-bit/33MHz **or** 2 slots @ 64-bit/**66MHz** • Embedded IDE for **CD only** • **Embedded dual U3 SCSI** • Embedded dual Ethernet
Ports	• 2 Ethernet (10/100) • Keyboard, mouse • 2 Comm ports • Parallel port	• 2 Ethernet (10/100) • Keyboard, mouse • 2 Comm ports • **No** Parallel port • **1 External SCSI port**
Storage	• Internal storage cage or front access cage	• **4** bays max. with front access card cage • CD-ROM
O/S Min. Rev.	• Tru64 UNIX V4.0f • OVMS V7.1-2	• Tru64 UNIX V5.1A/5.1B via NHD7 • OVMS V7.3-1
Enclosure	• 3U – Top Gun blue	• 3U – Carbon Black

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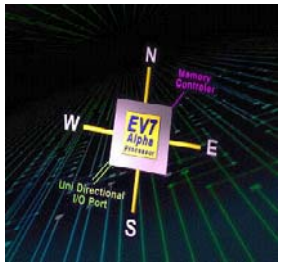
EV7 — the system is the silicon

Integrated Memory Controller
- Direct Rambus
- High data capacity per pin
- 12 GB/s read or write bandwidth
- 2048 open pages
- Directory based cache coherence
- ECC SECDED single error correction, double error detect,
- Optional RAID in memory

Integrated Mesh Interface
- Direct processor-to-processor interconnect
- 4 links 24.6 GB/s per processor (1.150 GHz)
  - Hop Latency: <40ns
  - Worst Latency <400ns
- ECC SECDED, per hop
- Out-of-order network with adaptive routing
- Asynchronous clocking between processors
- 3 GB/s I/O interface per processor



Integrated L2 Cache
- 1.75 MB
- 7-way set associative
- 20 GB/s total read/write
- 9.6 ns load to use latency

6

"Switch-less" mesh architecture

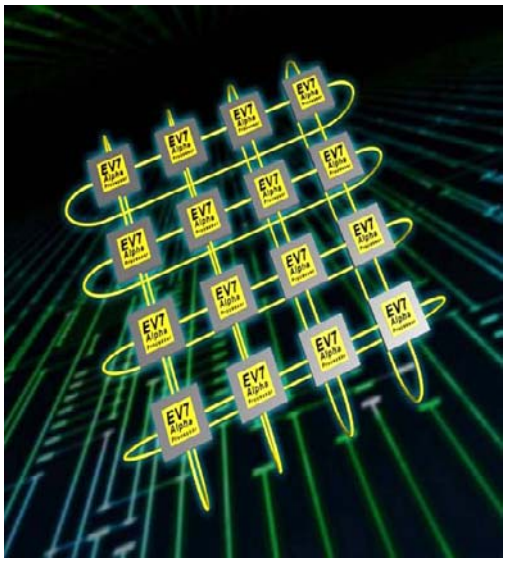
Improving application performance

- Incredible memory and I/O bandwidth based on a high performance microprocessor
- Robust NUMA architecture
- No intermediate logic to cause delays

Improving system reliability

- Fewer components
- Electrical isolation between partitions
- More granular system partitions (2 CPUs)

Improving scalability for all classes of applications



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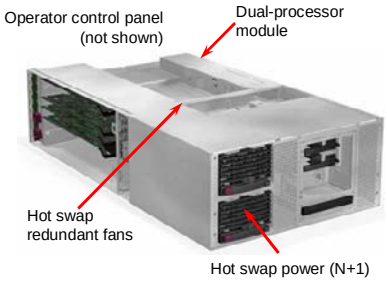
2P building block drawer

- Same enclosure for ES47 and ES80
- One dual CPU module
- 8 GB/CPU memory capacity (design limit 32 GB/CPU)
- Three PCI-X/PCI buses
  - Five slots (two hot-plug slots)
  - One AGP 4X slot
- I/O port for external I/O expansion
- Integrated server management module
- Two hot swap SCSI disk drives
- Hot swap redundant fans
- N+1 hot swap power
- 4U height



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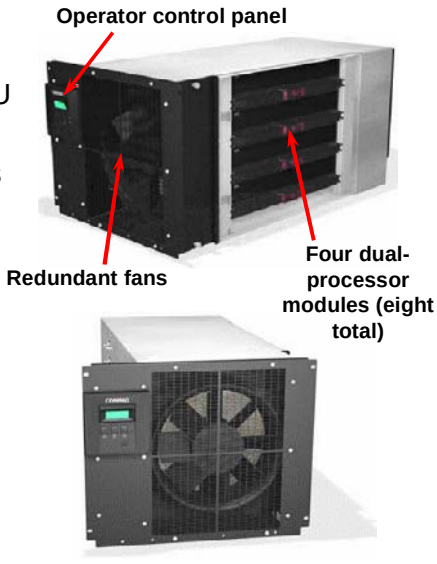
8P building block drawer

- Supports up to four dual CPU building block modules
- 16 GB maximum memory per CPU (4 GB at FRS)
- Up to eight I/O expansion drawers can be supported per 8P drawer
- Four 8P building block drawers fit into a standard 2M rack
- Integrated server management module
- N+1 cooling
- N+1 48 V power supplies power the 8P drawer



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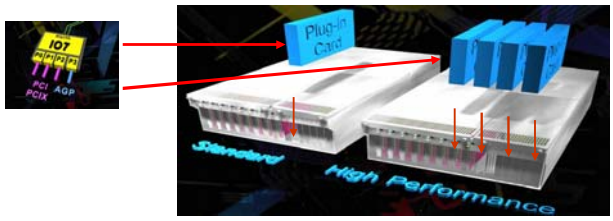
External I/O expansion drawers



Standard I/O building block drawer

- Single I/O riser module
- Optimized for PCI slot connectivity
- **Three** PCI-X buses / 11 slots
  - Six PCI-X 66 MHz
  - Two PCI-X 133 MHz
  - Three non hot-plug PCI
- One AGP 4X bus slot for graphics

High performance I/O building block drawer

- Up to 4 I/O riser modules
- Optimized for bandwidth and density
- **Eight** PCI-X buses (133 MHz) / eight slots (Single slot per bus design maximizes bandwidth)
- Attachment to four processors, up to four separate partitions

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HP AlphaServer ES47 systems

Workgroup

Configuration flexibility
- 2 - 4 1 GHz processors
- Up to 32 GB memory
- 6 - 36 I/O slots
- Tru64 UNIX v5.1B, OpenVMS v7.3-1, v7.3-2 and Linux

Reliability enhancements
- Redundant components
- Optional “RAID” memory
- Family-wide RAS features

Flexibility & manageability
- “Cluster worthy” partitions
- Embedded server management

Complementary product to HP AlphaServer DS25 and ES45 systems

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HP AlphaServer ES80 system

Departmental

Configuration flexibility
- 2 - 8 1 GHz processors
- Up to 64 GB memory
- 6 - 72 I/O slots
- Tru64 UNIX v5.1B, OpenVMS v7.3-1, v7.3-2 and Linux

Reliability enhancements
- Redundant components
- Optional “RAID” memory
- Family-wide RAS features

Flexibility & manageability
- “Cluster worthy” partitions
- Embedded server management

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HP AlphaServer GS1280 system

Enterprise

Configuration flexibility
- 2 - 64 1.15 GHz processors
- Up to 512 GB memory
- 12 - 768 I/O slots
- Tru64 UNIX v5.1B, OpenVMS v7.3-1 and OpenVMS v7.3-2

Reliability enhancements
- Redundant components
- Optional “RAID” memory
- Family-wide RAS features

Flexibility & manageability
- “Cluster worthy” partitions
- Embedded server management

Replacement offering for AlphaServer GS80, GS160 and GS320 systems

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Der EV7z
Ab August 2004

New

EV7: 1,0 GHz bei ES47,ES80
1,15 GHz bei GS1280

EV7z: 1,15 GHz bei ES47, ES80 (ca. 15% Performance Steigerung)

1,30 GHz bei GS1280 (ca. 13% Performance Steigerung neue Memory Module erforderlich!)

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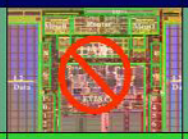
EV7z ab August 2004

System	EV7 Speed	Jan 2003 to July 2004	August 2004	Mixing CPU Speeds
GS1280	1.3 GHz		☑	Different CPU speeds can co-exist in one system, but must be separated into hard partitions where all the CPUs have the same speed.
	1.15 GHz	☑	☑	
ES47/80	1.15 GHz		☑	Different CPU speeds can co-exist in one system, but must be separated into hard partitions where all the CPUs have the same speed.
	1.0 GHz	☑	☑	

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EV7z und neue Memory Module

		Jan 2003 July 2004	August 2004	
		RDRAM Memory, max speed specification		
		800 MHz	1066 MHz	800 MHz
EV7 CPU Speed	1.3 GHz		☑	Works, but support not planned because memory must be run at a lower bus speed, cutting system performance gain from ~13% to~11%
	1.15 GHz	☑	Would operate below the speed spec for the part	☑
	1.0 GHz	☑	Would operate below the speed spec for the part	☑

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Beispiel: Upgrade AlphaServer ES80

Starting with ES80 and 6 processors, 1.0GHz

Two solutions are feasible:

A)
Swap for 6 Processors 1.15GHz
@ $37,000 US per dual CPU board
15% more capacity for $111,000

B)
Add 2 Processors 1.0 GHz + 4GB RAM
@ $55,750 US for CPU & memory
33% more capacity for $55,750

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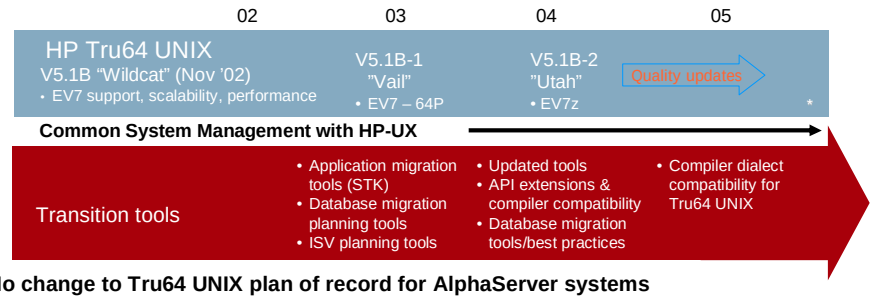
Tru64 UNIX operating system roadmap



No change to Tru64 UNIX plan of record for AlphaServer systems

- Continued enhancement, full support for EV7 and EV7z systems including 32P and 64P shipments
- Sales at least until 2006, with support at least until 2011

Tru64 UNIX

- Customer support extensions, including Tru64 UNIX v5.1B with enhancements, through 2011
- Storage offerings extended to maximize investment protection

Services and business practices

- Tools now available to assist ISVs and customers in transition to HP-UX
- Free** Tru64 UNIX license trade-ins in transition to HP-UX or OpenVMS

* Sales thru at least 2006, support thru at least 2011
** For those with active Rights to New Version software support

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Transition Tru64 Unix → HP/UX

Zwei Eigenschaften von Tru64 Unix werden auf HP/UX portiert:

*** ADVFS (Advanced File System)**
*** TruCluster Software**

<u>Wichtigste</u> Frage zur beabsichtigten Kundenmigration:

Benutzt Ihre Applikation ADVFS oder TruCluster?

Wenn **ja** → **2 Jahre warten**
Wenn **nein** → **Porting Guide übergeben**

Getting started porting Tru64 applications to HP-UX 11i
http://h30097.www3.hp.com/transition/apps/downloads/t64_hpux_wp.pdf

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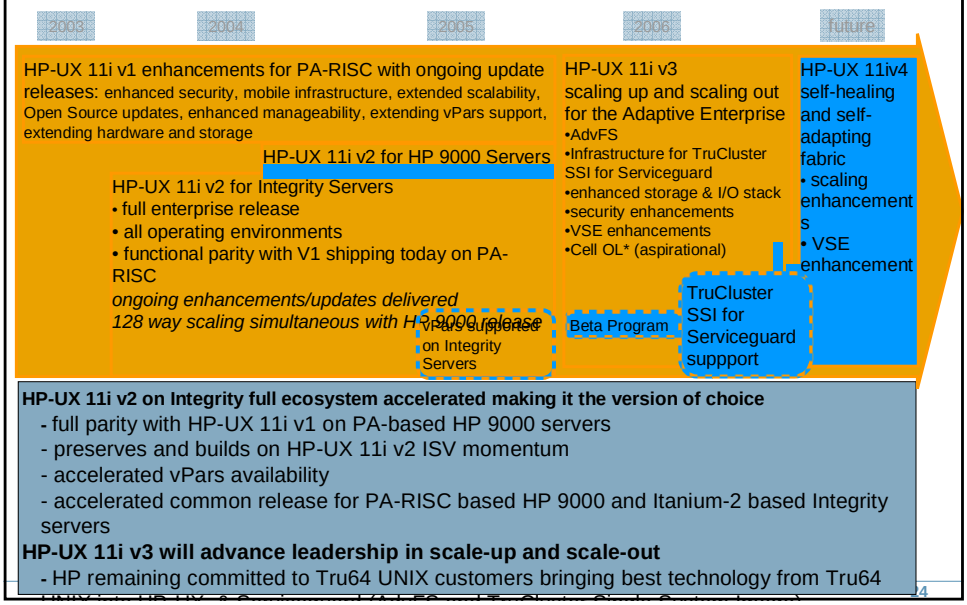
HP-UX 11i Roadmap: The UNIX Foundation of the Adaptive Enterprise



Alpha Server custom application migration suite Tru64 UNIX Application Transition Tools

Transition of Tru64 UNIX applications onto HP-UX on HP Integrity servers

Migrated Tru64 UNIX applications become **native** HP-UX applications

Appscan – a planning tool

Software Transition Kit (STK) – a porting tool, including:

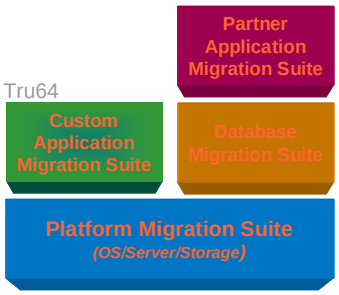
- UNIX APIs, development tools and commands
- Migration Assistant:
  - Helps developers identify and resolve compatibility issues between HP-UX and Tru64 UNIX
- Developer's documentation

Migration environment – a deployment tool

- Software compatibility layer on HP-UX for select Tru64
- Documented porting tips and recommendations

Delivered in stages

- Awareness (now)
- Plan (1-3 years prior to transition)
- Design (1 year to six months prior to transition
- Implement (two months prior to transition)
- Manage (ongoing after transition)



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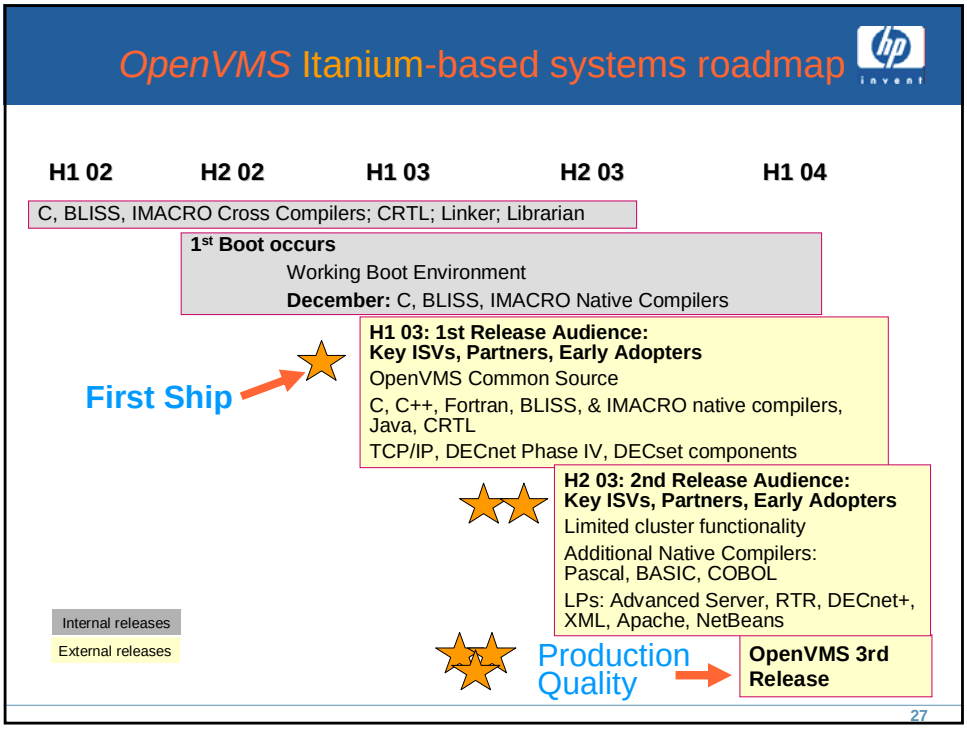
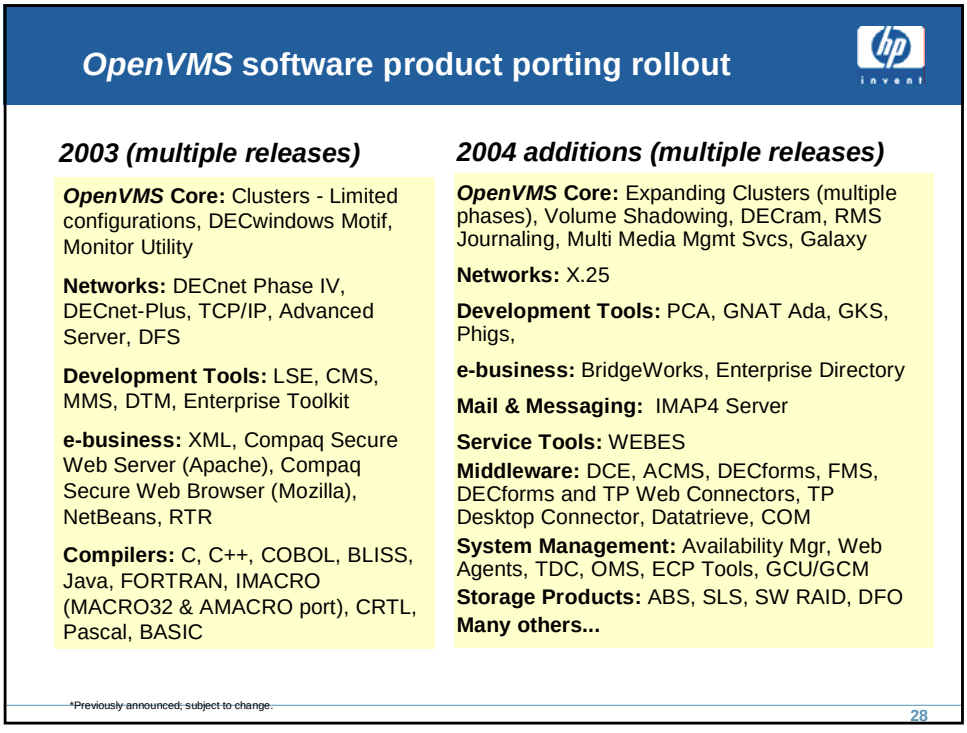

OpenVMS Itanium-based systems roadmap
H1 02
H2 02
H1 03
H2 03
H1 04
C, BLISS, IMACRO Cross Compilers; CRTL; Linker; Librarian
1st Boot occurs
Working Boot Environment
December: C, BLISS, IMACRO Native Compilers
First Ship
H1 03: 1st Release Audience:
Key ISVs, Partners, Early Adopters
OpenVMS Common Source
C, C++, Fortran, BLISS, & IMACRO native compilers, Java, CRTL
TCP/IP, DECnet Phase IV, DECset components
H2 03: 2nd Release Audience:
Key ISVs, Partners, Early Adopters
Limited cluster functionality
Additional Native Compilers:
Pascal, BASIC, COBOL
LPs: Advanced Server, RTR, DECnet+, XML, Apache, NetBeans
Internal releases
External releases
Production Quality
OpenVMS 3rd Release
27


OpenVMS software product porting rollout
2003 (multiple releases)
OpenVMS Core: Clusters - Limited configurations, DECwindows Motif, Monitor Utility
Networks: DECnet Phase IV, DECnet-Plus, TCP/IP, Advanced Server, DFS
Development Tools: LSE, CMS, MMS, DTM, Enterprise Toolkit
e-business: XML, Compaq Secure Web Server (Apache), Compaq Secure Web Browser (Mozilla), NetBeans, RTR
Compilers: C, C++, COBOL, BLISS, Java, FORTRAN, IMACRO (MACRO32 & AMACRO port), CRTL, Pascal, BASIC
2004 additions (multiple releases)
OpenVMS Core: Expanding Clusters (multiple phases), Volume Shadowing, DECram, RMS Journaling, Multi Media Mgmt Svcs, Galaxy
Networks: X.25
Development Tools: PCA, GNAT Ada, GKS, Phigs,
e-business: BridgeWorks, Enterprise Directory
Mail & Messaging: IMAP4 Server
Service Tools: WEBES
Middleware: DCE, ACMS, DECforms, FMS, DECforms and TP Web Connectors, TP Desktop Connector, Datatrieve, COM
System Management: Availability Mgr, Web Agents, TDC, OMS, ECP Tools, GCU/GCM
Storage Products: ABS, SLS, SW RAID, DFO
Many others...
*Previously announced; subject to change.
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HP OpenVMS Operating System Roadmap

2003 2004 2005 2006

OpenVMS Alpha V7.3-2 (Opal)
Minor Release
FRS: Q403
- Ongoing EV7 platform support
- Performance Enhancements
- Unix Portability Standards
- Availability enhancements
- DECwindows XllR6 support

OpenVMS V8.2 (Topaz)
Major Feature Release
Platforms: Alpha, VAX & I64
FRS: 2004
- Performance
- Security
- Storage
- Standards
- Alpha Compatibility with OpenVMS Clusters for Integrity Servers

OpenVMS V8.x
New Feature Release
Platforms: Alpha and I64
FRS: 2005
- Performance
- Security
- Storage
- Standards

OpenVMS I64 V8
Initial Release (V8.0): H103
Update Release (V8.1): H203

COE 42P4 on OpenVMS V8.2

HW Update to V7.3-1
V7.3-1 plus HW remedial kit
FRS: Available Now
- EV7 New System Support

OpenVMS releases

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hp OpenVMS *"Security by design"*

Then

- Security built in to the O/S no add on security.
- First commercial "C2" O/S VAX/VMS V4 (1988)
- Certificate "C2" & "B1" in 1993.
- Security encompasses the entire cluster and certified! (1998 RAMP)

Now

- Supporting new Industry Standards
  - •OpenSSL
  - •Kerberos
  - •CDSA
- Ready for new evaluations and standards
  - •DII COE
  - •ITSEC
  - •HIPAA

Future

- •Enterprise wide security external authentication for:
  - LDAP
  - Kerberos
  - User defined
- eBusiness security

DEFCON 9 Winner
July 2001
Cool and Unhackable

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Open Source Tools CD

- Open Source Tools CD
- Ships with OpenVMS V7.3-1
- Includes GNV
- Other contents:
  - Stunnel
  - BASH shell
  - VMSTAR
  - ZIP
  - SSL 0.9.6b Sources
  - CDRECORD
  - OpenVMS Migration Software

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Software Cross Platform Trade-in Policy

From: Tru64 UNIX Alpha to HP-UX on either PA-RISC or Integrity servers

From: OpenVMS VAX or Alpha to OpenVMS I64 on Integrity servers , or to HP-UX on PA-RISC or Integrity

Support Customer	• **Licenses on support* are traded-in for new licenses at no charge** • **Commitment to continue support* on new licenses for one (1) year**
Non-Support Customer	• **Licenses not on support* are traded-in for new license purchase at 40% of new license price** • **Commitment to support* on new licenses for one (1) year, pre-paid**

Trade-in applies to 'equivalent product' or operating environment licenses

Parallel usage of licenses on both platforms is allowed during transition, consistent with the parallel usage for the hardware

* Support = Service contract with Right to New Version (RTNV)

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Informationen zur Migration

From Tru64 Unix to HP-UX questions and answers
http://h30097.www3.hp.com/transition/faqs.html

Getting started porting Tru64 applications to HP-UX 11i
http://h30097.www3.hp.com/transition/apps/downloads/t64_hpux_wp.pdf

Software transition HP software transition kit
http://devrsrc1.external.hp.com/STKT/cgi-bin/pfnew.cgi?in=/SKTK/srctransitions.html

Tools HP software transition kit
http://devrsrc1.external.hp.com/STKT/cgi-bin/pfnew.cgi?in=/SKTK/tools.html

Transitioning your Tru64 UNIX applications to HP-UX
http://h30097.www3.hp.com/transition/apps/index.html?jumpid=/go/tru64appmigration

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invent

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ADVFS Advanced File System

- **Reboot in seconds –**
  no matter how large FS is
- **Flexible configuration –**
  volumes may be single disk partition, entire disk, or a volume
- **Mirroring –**
  supports Logical Storage Manager SW
- **Reconfigure online –**
  no interruption
- **Easy-to-use menus, icons**
- **Data remain online –**
  while files are added, removed or defragmented
- **Assign frequently used files to high-performance volumes**

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TruCluster Features

- **Verbindung der Vorteile von SMP und distributed computing**
- **Single system Management für das gesamte Cluster**
- **Clusterweite Namensgebung für Files und Directories (inkl. root, /usr und /var files)**
- **Eine Internet Adresse für das gesamte Cluster**
- **Wahlweise grafische, Web-basierte oder command line Schnittstelle**
- **Load Balancing daemon**
- **Rolling upgrade**
- **X/Open und POSIX semantics**
- **CAA (Cluster Application Availability)**
- **Connection Manager monitors cluster members**

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The new EV7 AlphaServer Systems

2P AlphaServer ES47 tower
2 - 4P AlphaServer ES47 rack
2 - 8P AlphaServer ES80 system
2 - 64P AlphaServer GS1280 system

family-wide capabilities

- integrated server management
- scalable I/O
- hard partitioning & Galaxy soft partitions for OVMS
- enterprise RAS
  - **RAID memory**
  - **Redundant power supplies and fans**
  - **Hot-plug disks, power supplies, fans, and platform management modules**
  - **Dual power feeds**
  - **ECC protected cache, memory, and inter-processor links, and I/O links**
  - **Fully isolated hard partitions**
  - **Pre-failure warning on hard drives, processors, and memory**
- AGP graphics
- capacity on demand
- hp Tru64 UNIX, OpenVMS and Linux support

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