



Vergleich:
Tru64 UNIX und HP-UX

DECUS Symposium
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Agenda

- „UNIX is UNIX“
- functionally equivalent features
- differentiators
- roadmaps (HP-UX and Tru64)





“UNIX® is UNIX”

Tru64 UNIX® and HP-UX share a common core of basic programming, user and admin **interfaces** around UNIX traditions and standards

- common history in UNIX traditions and development
- UNIX standardization efforts define a core of APIs and functionality that both O/Ss adhere to
- examples:
 - user/group accounts
 - shells
 - file and directory commands
 - rooted tree and basic file system directory layout
 - process/job control including cron and at
 - system ASCII message and error logs
 - system startup, run-levels and shutdown
 - basic IP network Interface and services configuration
 - kernel building

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Agenda

- „UNIX is UNIX“
- **functionally equivalent features**
- differentiators
- roadmaps (HP-UX and Tru64)



functionally equivalent enterprise features



Tru64 UNIX® and HP-UX share a common set of “functional equivalent” features to meet enterprise computing needs

- journal file systems
- volume management, HP-UX with LVM
- hardware management
- centralized management with GUI capability
- graphical, automated and cloned installations
- basic SMP CPU resource management
- using multiple NICs for a single network interfaces
- event management systems

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file systems



	Tru64 UNIX® V5.1B	HP-UX 11iv2
storage model	AdvFS	JFS (VxFS)
journals	multi-volume meta-data optional – user file data, Atomic Data Logging	single volume meta-data
allocation abstraction	extents	extents
Recovery	automatic on mount	external tool <code>fsck</code> , run in <code>bcheckrc</code>
on-line resize	<code>addvol</code> , <code>rmvol</code> , or <code>mount -o expand</code>	(<i>volume mgr cmds</i>), <code>fsadm</code>
read-only file system copies	clones (<code>clonefset</code> , <code>mount</code>)	snapshots (<code>mount -F vxfs -o snapof=...</code>)
on-line defragmentation	<code>defragment</code> , <code>vfast</code>	<code>fsadm</code>

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system administration framework

consistent management

- command line (CLI), Character, X11/Motif, and web-based management tools (Java)
- common single system and cluster management
- Java-based Management Station
- management from a PC

HP-UX 11iv2

- system administration manager (SAM)
- service control manager
- OpenView

Tru64 UNIX® V5.1B

- Sysman
- Insight Manager

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Tru64 UNIX® Sysman


SysMan Menu on opsone.zk3.dec.com
Tru64 UNIX system management tasks:

```
+-----+
|>+ Accounts
| + Hardware
| + Mail
| + Monitoring and Tuning
| + Networking
| + Printing
| + Security
| + Software
| + Storage
| + Support and Services
| + TruCluster Specific
| + General Tasks
|
+-----+

Select          Find...          Help On Item
===== <CTRL-G> FOR KEYBOARD HELP =====
Exit           Options...         Help
```

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HP-UX SAM

```

=====
System Administration Manager (carly.zk3.dec.com) (1)
File View Options Actions                                     Help
Press CTRL-K for keyboard help.

SAM Areas
-----
Source Area
-----
SAM      Accounts for Users and Groups ->
SAM      Auditing and Security          ->
SAM      Backup and Recovery            ->
SAM      Disks and File Systems         ->
SAM      Kernel Configuration          ->
SAM      Networking and Communications ->
SAM      Performance Monitors          ->
SAM      Peripheral Devices             ->
SAM      Printers and Plotters          ->
SAM      Process Management             ->
Other    Resource Management           ->
SAM      Routine Tasks                  ->
SAM      Run SAM on Remote Systems      ->
SD-UX    Software Management           ->
    
```

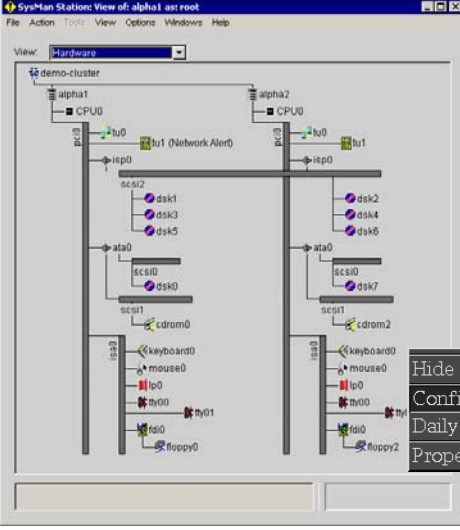
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Tru64 UNIX SysMan Station


SysMan Station View of: alpha1 as root


View: Hardware





SysMan Station View of: alpha1 as root


View: Status_Monitor



Applications


Cluster


Filesystems


Network


Storage


System

29 Jan 16:52 2002
Up: 1.1% 1 user, load 0.0

Hide

Configuration

Daily Administration

Properties

- DNS(Bind) Configuration
- LAT Configuration
- Network Adapter Configuration

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installation

HP-UX has o/s environments

- distribution has 5 "meta" subset groupings based on platform role to simplify pricing, distribution, installation and configuration
- commercial operating environments
 - 11i Mission Critical Operating Environment
 - 11i Enterprise Operating Environment
 - 11i Operating Environment
- technical operating environments
 - 11i Minimal Technical Environment
 - 11i Technical Computing Operating Environment (TCOE)

Tru64 UNIX® - no equivalent, pick and choose from one distribution

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event systems

Tru64 UNIX® v5.1B
event management system
(EVM)
framework to define, post, wait for
and log "events"

logging emphasis – notifying and
logging when a change is reported

integrated into and highly used in
base system as well as clustering

Integrated with UNIX ASCII and
binary logs

works cluster wide

programming and scripting APIs,
graphical monitoring tool (sysman)

HP-UX 11iv2
event monitoring service (EMS)
framework to define, post, wait for and
log "events"

polling emphasis – detecting when
something changes

heavily used in clustering, made
available on stand-alone, less part of
core os infrastructure

works cluster wide

programming API, graphical
monitoring tool (SAM)

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differentiating value-add features




In some areas, Tru64 UNIX® and HP-UX have relative competitive advantages through differentiating features

Tru64 UNIX

- TruCluster Single System Image (SSI) Clustering
- built-in multi-pathing storage, device location independent naming

HP-UX

- integrated resource/workload management
- broad range of clustering and disaster tolerant solutions
- RAS – OLAR, resiliency functions, partitioning (soft and hard)
- built-in Security Functions

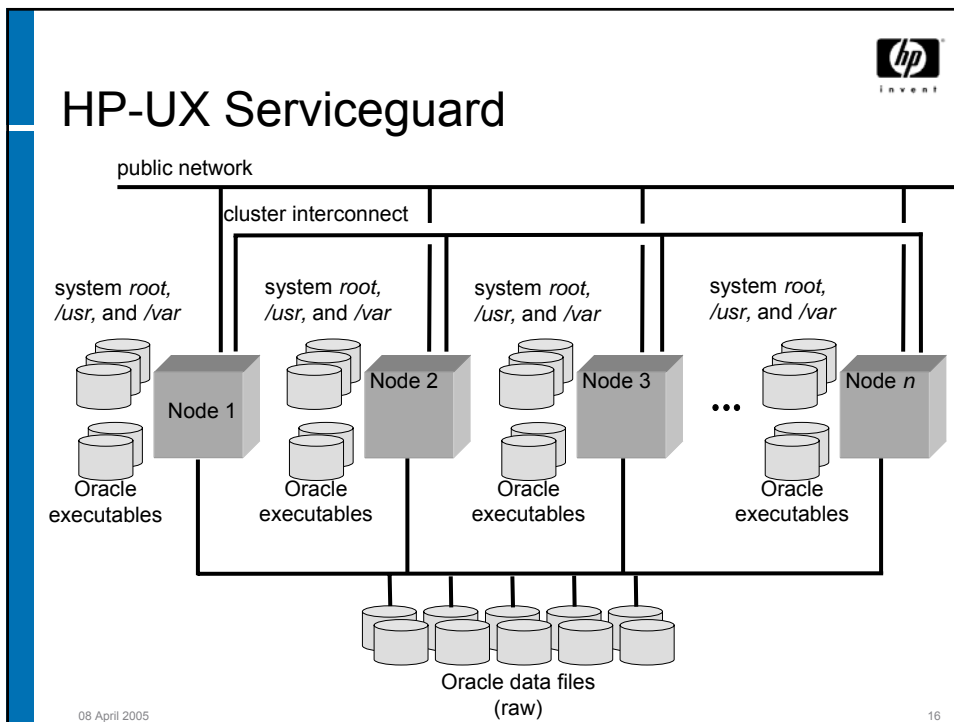


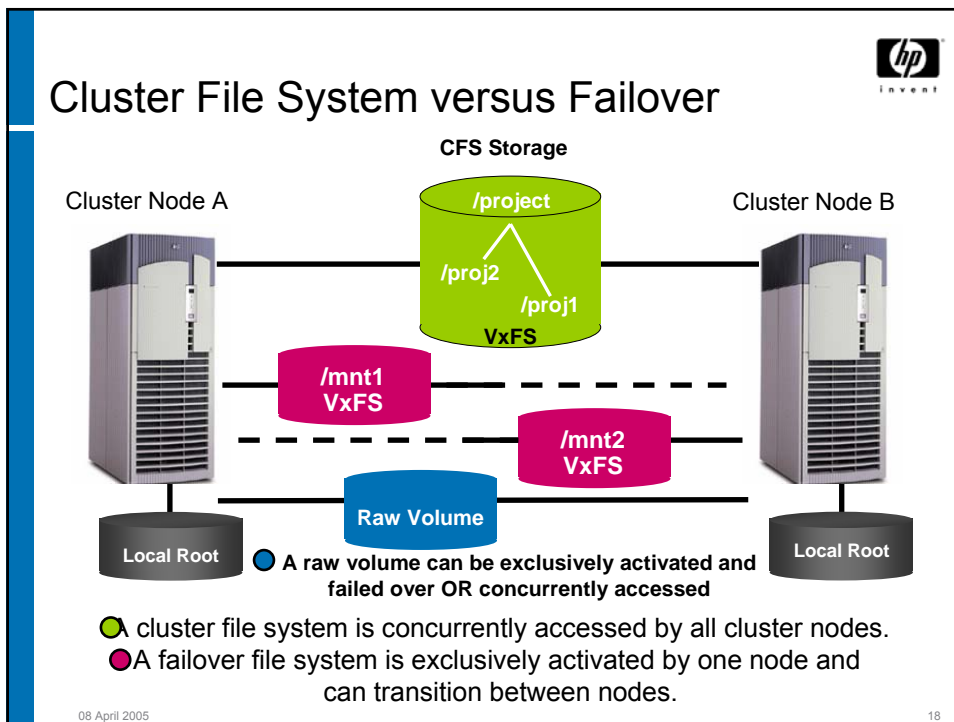
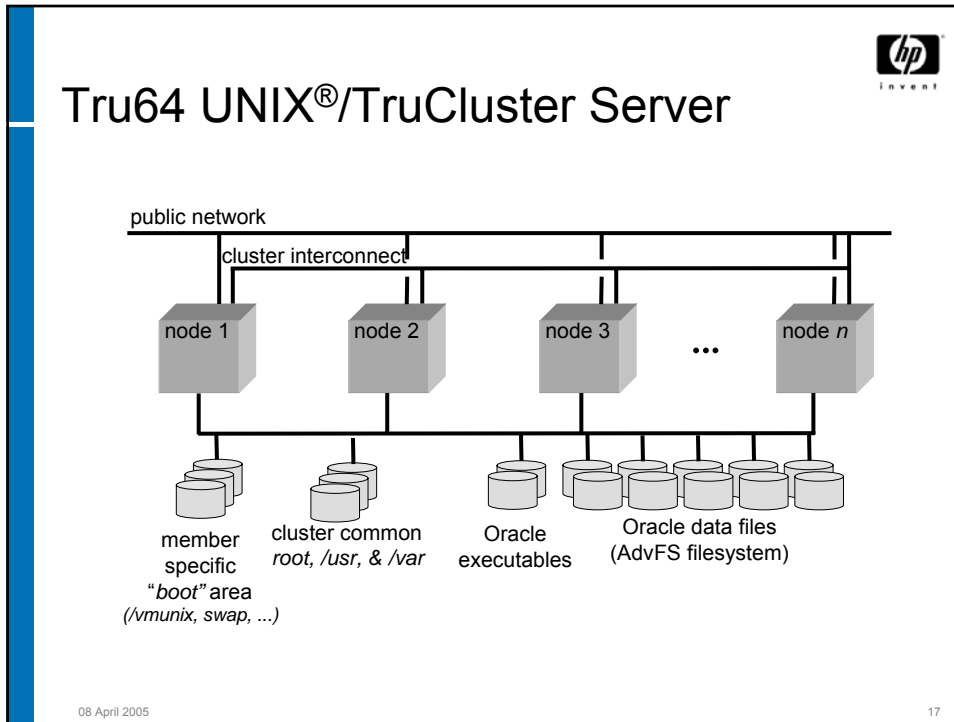
Cluster


Tru64 UNIX® V5.1B HP-UX 11iv2

<p>failover clustering</p>	<p>was Available Server Environment (ASE)</p>	<p>Serviceguard</p>
<p>failover clustering with hooks for parallel applications (OPS/RAC) on raw devices</p>	<p>was ASE Production Server (PS)</p>	<p>Serviceguard Extension for Oracle9i® Real Application Clusters (SG eRAC)</p>
<p>single image cluster for failover or parallel applications</p>	<p>TruCluster Server</p>	
<p>single cluster wide rooted-tree filesystem</p>		

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disaster tolerance

<p>Tru64 UNIX® V5.1B DT</p> <ul style="list-style-type: none"> • TruCluster Server based with either: <ul style="list-style-type: none"> – hardware based mirroring using StorageWorks data replication manager (DRM) – Oracle Standby Database (called DataGuard in Oracle9i) • Custom systems (CS) integrates solution as DT Campus 	<p>HP-UX 11iv2 DT</p> <ul style="list-style-type: none"> • Serviceguard based with either: <ul style="list-style-type: none"> – hardware support in HP XP disk arrays or EMC Symmetrix disk arrays – software based MirrorDisk/UX – Oracle Standby Database (called DataGuard in Oracle9i) • Standard Products <ul style="list-style-type: none"> – Extended Serviceguard clusters (a.k.a. Campus Clusters) – MetroCluster – ContinentalClusters
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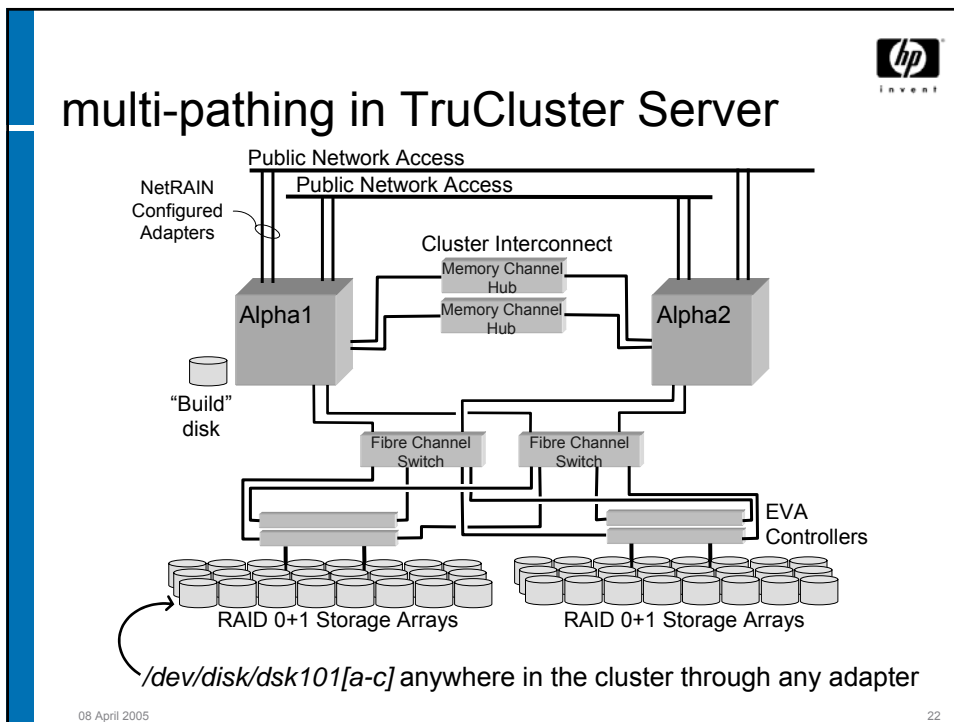
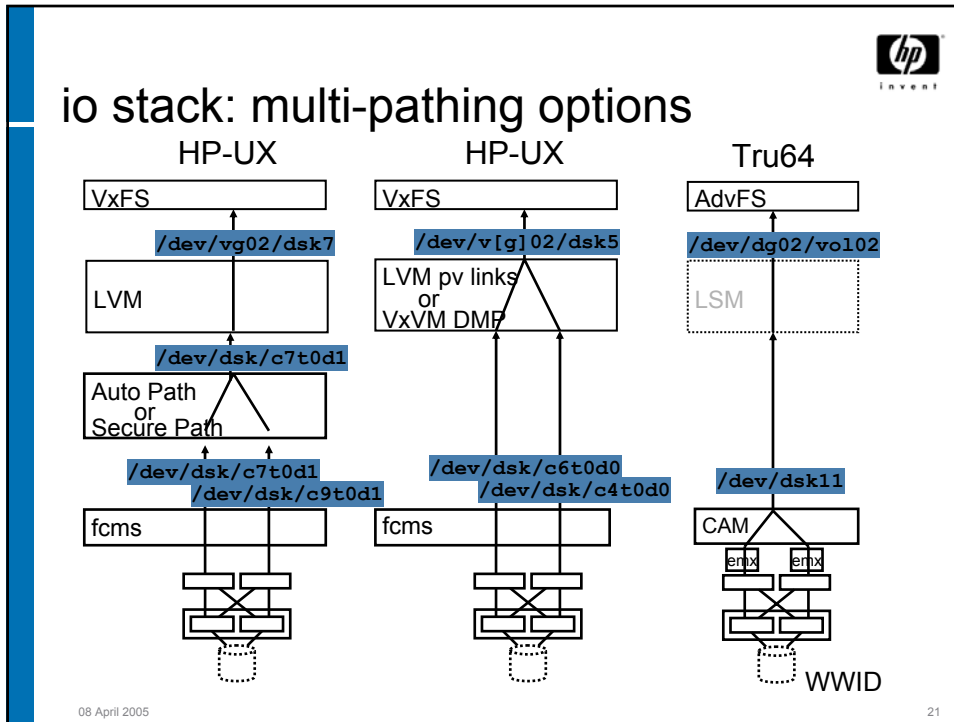
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Storage

	Tru64 UNIX® V5.1B	HP-UX 11iv2
device naming	physical location independent	physical location dependent
multi-pathing	built-in to single system and cluster, auto-configured and automatically used on all storage	manually configured add-on using either: volume manager (LVM pvlins, VxVM DMP) RAIDArray Driver (AutoPath, SecurePath)
journal file system	AdvFS (owned and developed by Compaq)	VxFS (Third party from Veritas Software)
volume manager	LSM - licensed port of Veritas VxVM	LVM of IBM/OSF heritage VxVM (third party from Veritas)

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resource management - frameworks

Tru64 UNIX® V5.1B	HP-UX 11iv2
<ul style="list-style-type: none">•class scheduler<ul style="list-style-type: none">– maximum– cpu only	<ul style="list-style-type: none">• Process Resource Manager (PRM)<ul style="list-style-type: none">– minimum and or maximum share– cpu, diskio, memory• Workload Manager (WLM)<ul style="list-style-type: none">– extension to PRM– prioritized service level objectives– resource adjustment to meet application objectives– adjusts to admin specified schedule,application input,..

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Tru64 UNIX® roadmap




V5.1B with its enhancements, sales until 2006, with support at least until 2011

Shipping V5.1B-2 2004	V5.1B-3 2005	V5.1B-4 2006 New version added
<ul style="list-style-type: none"> • EV7z AlphaServers • Improved storage management • Storage options • Resiliency enhancements • HP-UX 11i compatibility tools • Application updates 	<ul style="list-style-type: none"> • Storage options • Resiliency enhancements • ISV support • HP-UX 11i compatibility tools • Application updates 	<ul style="list-style-type: none"> • Storage Options • Resiliency enhancements • ISV support • Application updates

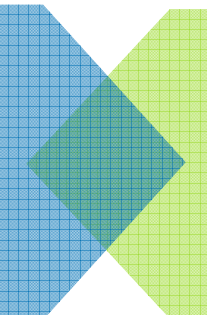
Maintain binary compatibility, Continue focus on quality, stability and security

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HP-UX 11i roadmap strengthened




Aligning virtualization and clustering plans to deliver more value sooner and to extend UNIX® leadership

<h3 style="text-align: center;">HP-UX 11i</h3> <ul style="list-style-type: none"> • Robust enterprise UNIX® • Proven foundation for Adaptive Enterprise • Leader in UNIX clusters • Continuous innovation 		<h3 style="text-align: center;">Virtualization</h3> <ul style="list-style-type: none"> • HP leads in virtualization with Virtual Server Environment • Mission critical HA and virtualization integrated • Leading automated workload management tools
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HP-UX 11i – Proven Foundation for the Adaptive Enterprise



2004 | 2005 | 2006+

HP-UX 11i v4 – Self-healing/adapting
- Automation and mgmt. integration

HP-UX 11i v3 – Unlimited Expansion
- Leadership performance with multi-threading.....
- Extended virtual view and partition mgmt
- Enhanced storage & I/O stack – SAN agility
- Increased Reliability, Availability & Serviceability

HP-UX 11i v2: Your Enterprise UNIX!

Integrated Virtualization – scale out & scale up

- Integrated Serviceguard with VERITAS cluster file system
- Single virtual view management
- Sub-CPU partitions – Integrity Virtual Machines
- Extending disaster tolerant solutions

- Security Containment
- Secure resource partitions
- vPars support on Integrity

Runs on HP 9000 & Integrity Servers

- Performance improvement, 128-way scaling
- Serviceguard extension Fast Fallover
- Global Workload Manager

Industry Standard - Integrity Servers



- Full enterprise release

ISV portfolio growing

HP-UX 11i v1 enhancements for HP 9000 Servers

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Questions ?





where to find more information

- Tru64 UNIX® doc set on-line
http://www.tru64unix.compaq.com/docs/pub_page/doc_list.html
- HP 11i doc set on-line
<http://docs.hp.com/hpux/11i/index.html>

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Backup Slides:

manipulating files and file systems




	Tru64 UNIX® V5.1B	HP-UX 11iv2
user file and dir commands	ls, cd, find, ...	ls, cd, find, ...
mounting / unmounting file systems	mount, umount	mount, umount
boot time mounted file systems	/etc/fstab /sbin/bcheckrc	/etc/fstab /sbin/bcheckrc
list mounted file systems	df	df, bdf



users, groups and shells

	Tru64 UNIX® V5.1B	HP-UX 11iv2
user and group files	/etc/passwd /etc/group	/etc/passwd /etc/group
default user account definition	/usr/skel	/etc/skel
command-line utilities to add a user	adduser, useradd	useradd
system-wide shell startup file	/etc/profile	/etc/profile
shell information	/etc/shells, man sh	man 1 sh
bourne shell	[/usr]/bin/sh	(removed with 11i 1.5)
korn shell	[/usr]/bin/ksh	/usr/bin/ksh
POSIX shell	[/usr]/bin/posix/sh	/usr/bin/sh
C shell	[/usr]/bin/csh	/usr/bin/csh

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file system directory hierarchy

	Tru64 UNIX® V5.1B	HP-UX 11iv2
	/	/
device special files	/dev, /devices	/dev
configuration files	/etc	/etc
diskless file sharing		/export
default user home dirs	/home, /usr/users	/home
	/lost+found	/lost+found
temporary mount	/mnt	/mnt
remote NFS mount		/net
optional software	/opt, /usr/opt, /var/opt	/opt, /var/opt
system binaries	/sbin	/sbin
kernel and kernel builds	/vmunix, /subsys, /sys	/stand/vmunix /stand
	/tmp	/tmp
	/usr	/usr
libraries	/usr/lib, /usr/shlib	/lib
	/var	/var
cluster member specific files	/cluster	/etc/cmcluster

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basic processes and jobs

	Tru64 UNIX® V5.1B	HP-UX 11iv2
process control	<code>ps, kill, nice, renice</code>	<code>ps (ps UNIX95), kill, nice, renice</code>
cron, at, batch	<code>/usr/sbin/cron</code>	<code>/usr/sbin/cron</code>
	<code>/var/adm/cron</code>	<code>/var/adm/cron</code>
	<code>/var/spool/cron/crontab</code>	<code>/var/spool/cron/crontab</code>
	<code>/var/adm/cron/log</code>	<code>/var/adm/cron/log</code>
	<code>/var/spool/cron/atjobs</code>	<code>/var/spool/cron/atjobs</code>

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system logs

	Tru64 UNIX® V5.1B	HP-UX 11iv2
ASCII Logs	<code>/etc/syslog.conf</code>	<code>/etc/syslog.conf</code>
	<code>syslogd</code>	<code>syslogd</code>
	<code>/var/adm/syslog.dated / XXX/ [kern daemon,].log</code>	<code>/var/adm/syslog/syslog.log</code>
BINARY logs	<code>/etc/binlog.conf</code>	<code>/etc/nettlgen.conf</code>
	<code>binlogd</code>	<code>kl</code>
	<code>/var/adm/binary.errlog</code>	<code>/var/adm/kl.KLOGXXg</code>

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startup and shutdown

	Tru64 UNIX® V5.1B	HP-UX 11iv2
startup	<pre>init /etc/inittab (initdefault 3) /sbin/rc[2 3] /sbin/rc[0 2 3].d /etc/rc.config</pre>	<pre>init /etc/inittab (initdefault 3) /sbin/rc /sbin/rc[0 2 3 4].d /etc/rc.config.d/XX</pre>
shutdown	shutdown, reboot	shutdown, reboot

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network interfaces and services

	Tru64 UNIX® V5.1B	HP-UX 11iv2
interface names	lnX, eeX	lanX
interface settings	/etc/rc.config	/etc/rc.config.d/ hpetherconf /etc/rc.config.d/ netconf
show configured interfaces	ifconfig -a	lanscan ifconfig <i>interface</i>
network services daemon	/usr/sbin/inetd	/usr/sbin/inetd
network services daemon config file	/etc/inetd.conf	/etc/inetd.conf
network services config file	/etc/services	/etc/services
failover between physical NICs	NetRAIN	LAN Monitor
aggregation	Link Aggregation (LAG)	Auto Port Aggregation (APA)

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kernel builds and configuration

	Tru64 UNIX® V5.1B	HP-UX 11iv2
location of kernel	<code>/vmunix</code>	<code>/stand/vmunix</code>
kernel build area	<code>/sys/HOST</code>	<code>/stand/build</code>
build definition file	<code>/sys/conf/HOST</code>	<code>/stand/system</code>
tools	<code>doconfig</code>	<code>kweb, Configure, sysdef, system_prep, mk_kernel</code>
dynamic interfaces	<code>sysconfig, /etc/sysconfigtab</code>	<code>Kmsystem, kmtune</code>

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