d i g i t a l

Internet UNIX Energized ASE
AlphaServer 4x00

DIGITAL HiTest Notes

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Digital Equipment Corporation
Maynard, Massachusetts

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Preface

This document provides an overview of DIGITAL HiTest Suites and detailed technical information about interoperability test results for the Internet UNIX Energized ASE AlphaServer 4x00 HiTest Suite.

Audience

Primary users of this document are DIGITAL and Partners sales representatives and technical support personnel. Secondary audiences include product managers, customers, and the personnel responsible for installing, setting up, and operating a DIGITAL HiTest Suite.

Road Map

This document contains the following chapters:

1. Introduction – Provides a brief summary of the benefits of DIGITAL HiTest Suites and an overview of the Suite covered in this document.

2. Configuration Data – Includes tables of configuration data about the hardware and software components that define the Template, and special configuration rules if any.

3. System Installation and Setup – Presents useful information for installing and setting up this DIGITAL HiTest Suite.

4. Interoperability Tests and Results – Describes how the tests were set up (including database organization), what data and programs were placed on what disks, and how the tests were run.

5. System Limits and Characterization Data – Summarizes any system limitations or characterization data that were identified during testing.

6. Problems and Resolutions – Discusses any problems and resolutions that were discovered during testing.

Appendix A: Detailed Hardware Configuration – Contains more detailed information about the hardware and software components listed in the Configuration Data chapter.

Feedback and Ordering Information

What our readers think of this or any other DIGITAL documentation is important to us. If you have any comments, we would appreciate hearing from you. Send your comments to: *reader-comments@digital.com*.

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Copies of this and other DIGITAL documents can be ordered by calling 1-800-DIGITAL.

1
Introduction

DIGITAL HiTest Suite and Its Advantages

DIGITAL HiTest Suites are guidelines for configuring a set of prequalified computer systems. A HiTest Suite often contains all the hardware and software needed for a complete customer solution. DIGITAL HiTest Suites can be used as a basis for configuring systems that satisfy a wide set of customer requirements. Typically, Suites target specific markets such as Data Warehousing or Internet Servers.

DIGITAL Product Management and Engineering select the components and design the configurations in each HiTest Suite to ensure high system reliability, application performance, and upgradability. A Suite's hardware and software components have been successfully tested for interoperability.

A HiTest Suite specifies allowed ranges of hardware and software components, as well as each component's part number, description, and revision information. These specifications are listed in the *DIGITAL HiTest Template*.

The components in a HiTest Suite are organized into two groups, the *DIGITAL HiTest Foundation* and the *DIGITAL HiTest AppSet*. The HiTest Foundation includes the hardware, operating system, middleware, and database software. The HiTest Foundation can be used as a base on which any customer-desired application can be installed. The HiTest AppSet includes the software specific to one class of customer solutions.

Configuring a DIGITAL HiTest Suite is straightforward. Select components from the HiTest Template to configure a DIGITAL HiTest System. Any system configured as specified in the DIGITAL HiTest Template can be called a DIGITAL HiTest System.

The HiTest Suite is documented in the *DIGITAL HiTest Notes*. The HiTest Notes list the HiTest Foundation and HiTest AppSet components. HiTest Notes also describe the testing of the Suite and include configuration details, installation instructions, tuning parameters, problems encountered and their solutions, and system diagrams.

Some components listed in the HiTest Foundation or AppSet may be optional. If the minimum quantity is zero (0), then the component is optional. If the minimum quantity is one or more, then you must order at least the minimum quantity.

The maximum quantities represent the largest group of components that were tested for interoperability with all the other components in the Suite. Although it may be possible to place more than the specified maximum quantity of a component on a DIGITAL system, extensive interoperability testing was not done at that level and such a system would not be considered a DIGITAL HiTest System.

You can select any combination of components with quantities ranging from the minimum to the maximum specified. Occasionally, special configuration rules give further guidance or restrict configurations. These rules appear in the Configuration Data chapter of the HiTest Notes.

A customer can include the Suite-specified hardware and software they need and then layer on additional software. Other types of hardware, called *add-on hardware*, can also be added to a DIGITAL HiTest System. The add-on hardware is specified in the Configuration Data chapter of the HiTest Notes, and in the HiTest Systems Web Pages, available through the following URLs:

```
http://cosmo.tay.dec.com             (Intranet)
http://www.partner.digital.com:9003  (Internet)
```

Even though the customer may install application software that is not specified in the Suite, the customer and DIGITAL still experience the advantages of knowing that all of the Suite-based hardware and software interoperates correctly. Of course, the full benefit of configuring a system from a HiTest Suite is obtained when the system includes only specified HiTest Foundation and AppSet components.

Overview of This DIGITAL HiTest Suite

The Internet UNIX Energized AlphaServer HiTest Suite consists of the following software components:

- Internet AlphaServer

    – Internet AlphaServer

    – BMC Patrol

    – AdvFS

    – DIGITAL UNIX

- Internet AlphaServer TruCluster Available Server

    – Internet AlphaServer

    – BMC Patrol

    – TruCluster Available Server

    – LSM

    – AdvFS

    – DIGITAL UNIX

This Suite will meet the internet server needs of medium to high-end UNIX users. The TruCluster Available Server configuration allows for the clustering of two 4x00 Internet Energized Plus systems. It is based on a Template configuration which configures two 4100 system drawers into one RETMA cabinet, and contains all the DIGITAL UNIX Operating System and Internet Software and BMC management software that the Internet Energized Plus Systems contain, as well as the clustering hardware.

The clustered configurations are easy to order and easy to configure. They provide cost-effective solutions for high availability. Clusters enable failover of a service from one node to another automatically and transparently.

Users obtain full benefit of all the hardware during normal operation, but have all services still available if one node goes down for maintenance or a transient problem occurs.

2
Configuration Data

This chapter describes the tested DIGITAL HiTest Configuration Suite including the hardware, software, and firmware components, and their revision levels. Special configuration rules are explained if required.

Hardware and Software Components

Table 2-1 and Table 2-2 identify the range of hardware and software components that can be configured using the Internet UNIX Energized AlphaServer 4000/4100 HiTest Suite or the Internet UNIX TruCluster Available Server AlphaServer 4000/4100 HiTest Suite. This range includes both the AlphaServer 4000 and the AlphaServer 4100. Each CPU drawer can have one or two CPUs, and 512 MB to 2 GB of memory. A wide selection of other options can be configured, including storage and network adapters.

The HiTest Template (Tables 2-1 and 2-2) consists of three categories:

- **AppSet Software** − Includes software specific to one class of customer solutions, in this case Internet Servers.

- **Foundation Hardware** − Includes the base system, storage, and other hardware options.

- **Foundation Software** − Includes the operating system, middleware, and database software.

When ordering an item from a HiTest Template, select a quantity that is within the minimum/maximum range for the item. If the minimum quantity is zero (0), then the component is optional. If the minimum quantity is one or more, then order at least the minimum quantity, but not more than the maximum quantity. The maximum quantity represents the greatest number of components that were tested for interoperability with all the other components in the Suite.

For more details on the HiTest Suite hardware configuration, see Appendix A.

Table 2-1: Internet UNIX Energized AlphaServer 4000/4100 HiTest Template

Line Item	Description	Part Number	Tested Range	
			Min	**Max**
	Internet Energized *HiTest AppSet* **DIGITAL UNIX AlphaServer 4000/4100 *HiTest Foundation***			
	For documentation and updates: http://cosmo.tay.dec.com *and* http://www.partner.digital.com:9003 *For a hardcopy of this Suite's HiTest Notes, order* EK-HASUA-HN.			
	AppSet Software			
1	**Internet AlphaServer V3.2**	**AG-QF6MG-BE**	1	1
2	**Internet AlphaServer V3.2 License**	Included with item 1	1	1
3	**BMC Operating System Knowledge Module (UNIX)**	QB-5KLAA-WC	1	1
4	**BMC Operating System Knowledge Module License**	Included with item 3	1	1
	Foundation Hardware			
5	*Select just one base system:* **AS4100 5/466 Drawer UNIX 512 MB** **AS4100 5/466 Drawer UNIX 1 GB** **AS4100 5/466 Drawer UNIX 2 GB** **AS4000 5/466 Drawer UNIX 512 MB** **AS4000 5/466 Drawer UNIX 1 GB** **AS4000 5/466 Drawer UNIX 2 GB** *Hardware includes*: • 5/466 MHz CPU with 4-MB cache • Memory • S3 Trio64 PCI 1 MB Graphics Adapter • DE500-AA 10/100 Mbit Fast Ethernet • KZPDA-AA FWSE SCSI and cable • RRD46-AB SCSI 12X CD-ROM drive • RX23L-AB 1.44 MB Floppy drive • LK47W-A2 PS/2 style keyboard • Three-button PS/2 compatible mouse *Software includes*: • DIGITAL UNIX • ServerWorks • BMC Patrol Agent	**DA-51JAB-EB** **DA-51JAB-FB** **DA-51JAB-GB** **DA-53JEB-EA** **DA-53JEB-FA** **DA-53JEB-GA**	1	1
6	**Cabinet Enclosure** *Hardware includes*: • 4.3 GB Wide Disk (RZ29B-VW) • 19-in cabinet with StorageWorks Shelf and mounting kit. Cabinet supports up to seven more StorageWorks shelves.	**H9A10-ED**	1	1
7	**466 MHz CPU DIGITAL UNIX SMP UPG**	**KN304-DB**	0	1
8	*Provides redundancy (N+1) for up to two CPUs.* **450 Watt Power Supply**	**H7291-AA**	0	1

	Internet Energized *HiTest AppSet* DIGITAL UNIX AlphaServer 4000/4100 *HiTest Foundation*			
	For documentation and updates: http://cosmo.tay.dec.com *and* http://www.partner.digital.com:9003 *For a hardcopy of this Suite's HiTest Notes, order* EK-HASUA-HN.			
Line Item	**Description**	**Part Number**	**Tested Range**	
			Min	**Max**
	NOTE: *This HiTest Template supports a memory range from 512 MB to 2 GB. When selecting memory options; stay within the Template's 2 GB maximum. The AlphaServer 4100 System Drawer supports three additional memory options. The AlphaServer 4000 System Drawer supports one additional memory option. The largest memory option should be placed in Memory Slot 0, the next largest in Slot 1, and so on.*			
9	**128 MB Memory Option**	**MS320-CA**	0	2
10	**512 MB Memory Option**	**MS330-EA**	0	1
11	**1 GB Memory Option**	**MS330-FA**	0	1
12	*The maximum number is reduced by one for TLZ09 or by three for TLZ9L and TLZ7L tape drives.* **4.3 GB 7200 RPM 16-bit Wide SCSI Disks**	**RZ29B-VW**	2	41
13	**8 GB DAT Tape Drive**	**TLZ09-VA**	0	2†
14	**8 GB 4mm DAT 93 MB/min (compressed) 5.25-inch Tape Drive**	**TLZ9L-VA**	0	1†
15	**32/96 GB 4mm 1.5 GB/hr 5.25-inch SCSI Tape Loader**	**TLZ7L-VA**	0	1†
16	*Each shelf holds seven RZ29B-VW disks.* **Cabinet StorageWorks Shelf**	**BA36R-RA**	0	6
17	*Order one kit when three or more StorageWorks shelves are used.* **Cabinet Power kit for additional shelves**	**CK-H9A10-EB/ CK-H9A10-EC‡**	0	1
18	**PCI one-port FWD SCSI controller**	**KZPSA-BB**	0	4
19	*Order one for each KZPSA-BB ordered* **2 meter 16-bit SCSI cable (internal)**	**BN21K-02**	0	4
20	*Quantity limited to three with HSZ present* **StorageWorks shelf signal converter**	**DWZZB-VW**	0	4
21	**StorageWorks Array Controller with 32-MB cache**	**HSZ50-AJ**	0	1
	Order the following items when an HSZ50-AJ is ordered:			
22	**Rackmount StorageWorks controller shelf**	**BA35R-MR/ BA350-MB‡**	0	1
23	**IEC to IEC power cord, gray**	**BN30B-02**	0	1
24	**SCSI Y cable, 68-pin**	**BN21W-0B**	0	1
25	**SCSI Tri-link connector**	**H885-AA**	0	1
26	**SCSI Differential terminator**	**H879-AA**	0	1
27	*Order one cable for each StorageWorks shelf that will be attached to the HSZ40 controller.* **Cable for Connection HSZ to Shelf**	**BN21N-02**	0	6

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†Only one tape drive is needed per system. If ordering an autoloader, reduce the number of single drives accordingly (tape drives may occupy more than one slot in a BA350).

‡ Where two part numbers or variants are separated by a "/", the first number applies to the Americas and Asia Pacific and the second number applies to Europe.

Internet Energized *HiTest AppSet*				
DIGITAL UNIX AlphaServer 4000/4100 *HiTest Foundation*				
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Line Item	**Description**	**Part Number**	**Tested Range**	
			Min	**Max**
28	**PCI to FDDI Adapter, single attachment station (SAS), multimode fiber (MMF), and SC connector**	**DEFPA-AB**	0	1
29	**Cable for PCI to FDDI Adapter**	**BN34B-10**	2	2
30	*Select one high-resolution color monitor:* **15-in Flat-square with 0.28 dot pitch** **17-in Trinitron aperture grille, 0.26mm** **21-in Diamondtron aperture grille, 0.30mm**	**VRC15-WA** **SN-VRCX7-WA** **VRC21-WA**	1	1
Foundation Software				
NOTE: *Order the exact versions and revisions of the software shown below. Paper documentation can be ordered separately.*				
--	**DIGITAL UNIX V4.0B and ServerWorks**	Included with item 5	1	1
31	**ServerWorks**	Included with Item 5	1	1
32	**StorageWorks Platform kit (DIGITAL UNIX)** (includes: HSDF and StorageWorks Command Console)	**QB-5JCAB-SA**	1	1
33	**DIGITAL UNIX V4.0B CD-ROM Media** (includes licenses for items 6 and 7)	**AG-QTM9C-BE**	1	1
34	**StorageWorks PLUS** includes: • Networker Save and Restore for DIGITAL UNIX • LSM • AdvFS	**QB-5RYAQ-AA**	1	1

Table 2-2: Internet Energized TruCluster Available Server 4000/4100 HiTest Template

Internet Energized TruCluster Available Server *HiTest AppSet* DIGITAL UNIX AlphaServer 4000/4100 *HiTest Foundation*				
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Line Item	**Description**	**Part Number**	**Tested Range**	
			Min	**Max**
AppSet Software				
1	**Internet AlphaServer V3.2**	**AG-QF6MG-BE**	2	2
2	**Internet AlphaServer V3.2 License**	Included with item 1	2	2
3	**BMC Operating System Knowledge Module (UNIX)**	QB-5KLAA-WC	2	2
4	**BMC Operating System Knowledge Module License**	Included with item 3	2	2
Foundation Hardware				
5	*Select two base systems. HiTest recommends identical systems:* **AS4100 5/466 Drawer UNIX 512 MB** **AS4100 5/466 Drawer UNIX 1 GB** **AS4100 5/466 Drawer UNIX 2 GB** **AS4000 5/466 Drawer UNIX 512 MB** **AS4000 5/466 Drawer UNIX 1 GB** **AS4000 5/466 Drawer UNIX 2 GB** *Hardware includes*: • 5/466-MHz CPU with 4-MB cache • Memory • S3 Trio64 PCI 1 MB Graphics Adapter • DE500-AA 10/100 Mbit Fast Ethernet • KZPDA-AA FWSE SCSI and cable • RRD46-AB SCSI 12X CD-ROM drive • RX23L-AB 1.44 MB Floppy drive • LK47W-A2 PS/2 style keyboard • Three-button PS/2 compatible mouse *Software includes*: • DIGITAL UNIX • ServerWorks • BMC Patrol Agent	**DA-51JAB-EB** **DA-51JAB-FB** **DA-51JAB-GB** **DA-53JEB-EA** **DA-53JEB-FA** **DA-53JEB-GA**	2	2
6	**Cabinet Enclosure** *Hardware includes*: • 4.3 GB Wide Disk (RZ29B-VW) • 19-in cabinet with StorageWorks Shelf and mounting kit. Cabinet supports up to seven more StorageWorks shelves.	**H9A10-ED**	1	1
7	**466 MHz CPU DIGITAL UNIX SMP UPG**	**KN304-DB**	0	2
8	*Provides redundancy (N+1) for up to two CPUs.* **450 Watt Power Supply**	**H7291-AA**	0	2

Line Item	Description	Part Number	Tested Range	
			Min	Max
	NOTE: *This HiTest Template supports a memory range from 512 MB to 2 GB per system. When selecting memory options, stay within the Template's 2 GB maximum.* *The AlphaServer 4100 System Drawer supports three additional memory options.* *The AlphaServer 4000 System Drawer supports one additional memory option.* *The largest memory option should be placed in Memory Slot 0, the next largest in Slot 1 and so on.*			
9	**128 MB Memory Option**	**MS320-CA**	0	4
10	**512 MB Memory Option**	**MS330-EA**	0	2
11	**1 GB Memory Option**	**MS330-FA**	0	2
12	*Order when more than 5 additional StorageWorks shelves are ordered.* **StorageWorks Cabinet**	**SW500-AC**	1	1
13	*Each shelf holds seven RZ29B-VW disks.* **Rackmount StorageWorks Shelf**	**BA36R-RA**	2	14
14	*The maximum number is reduced by one for TLZ09 or by three for TLZ9L and TLZ7L tape drives.* **4.3 GB 7200 RPM 16-bit Wide SCSI Disks**	**RZ29B-VW**	6	81
15	*Order one kit when three or more StorageWorks shelves are used.* **Cabinet Power kit for additional shelves**	**CK-H9A10-EB/ CK-H9A10-EC§**	1	1
16	**PCI one-port FWD SCSI controller**	**KZPSA-BB**	1	4
17	*Order one for each KZPSA-BB ordered.* **2 meter 16-bit SCSI cable (internal)**	**BN21K-02**	1	4
18	*Quantity limited to 3 with HSZ present.* *This quantity can be increased to four if there is no HSZ52-AJ present.* **StorageWorks shelf signal converter**	**DWZZB-VW**	1	4
19	**StorageWorks Array Controller with 32-MB cache**	**HSZ52-AJ**	0	2
	Order the following items when an HSZ52-AJ is ordered:			
20	**Rackmount StorageWorks controller shelf**	**BA35R-MR/ BA350-MB§**	0	2
21	**IEC to IEC power cord, gray**	**BN30B-02**	0	2
22	**SCSI Y cable, 68-pin**	**BN21W-0B**	1	8
23	**SCSI Tri-link connector**	**H885-AA**	0	6
24	**SCSI Differential terminator**	**H879-AA**	0	8
25	*Order one cable for each StorageWorks shelf that will be attached to the HSZ5X controller.* **Cable for Connection HSZ to Shelf**	**BN21N-02**	2	8
26	**PCI to FDDI Adapter, single attachment station (SAS), multimode fiber (MMF), and SC connector**	**DEFPA-AB**	0	2
27	**Cable for PCI to FDDI Adapter**	**BN34B-10**	0	2

Internet Energized TruCluster Available Server *HiTest AppSet*
DIGITAL UNIX AlphaServer 4000/4100 *HiTest Foundation*

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§ Where two part numbers or variants are separated by a "/", the first number applies to the Americas and Asia Pacific and the second number applies to Europe.

Internet Energized TruCluster Available Server *HiTest AppSet*
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Line Item	Description	Part Number	Tested Range Min	Max
28	*Only one drive is needed per system. If ordering an autoloader, reduce the number of single drives accordingly. Similarly each cluster only needs one autoloader.* **8 GB DAT Tape Drive**	**TLZ09-VA**	0	2
29	**8 GB 4mm DAT 93 MB/min (compressed) 5.25-inch Tape Drive**	**TLZ9L-VA**	0	1
30	**32/96 GB 4mm 1.5 GB/hr 5.25-inch SCSI Tape Loader**	**TLZ7L-VA**	0	1
31	*Select one high-resolution color monitor:* **15-in Flat-square with 0.28 dot pitch** **17-in Trinitron aperture grille, 0.26mm** **21-in Diamondtron aperture grille, 0.30mm**	**VRC15-WA** **SN-VRCX7-WA** **VRC21-WA**	1	2
Foundation Software				
NOTE: *Order the exact versions and revisions of the software shown below. Paper documentation can be ordered separately.*				
--	**DIGITAL UNIX V4.0B and ServerWorks**	Included with Item 3		
32	**ServerWORKS**	Included with item 3		
33	**StorageWorks Platform kit (DIGITAL UNIX)** (includes: HSDF and StorageWorks Command Console)	**QB-5JCAB-SA**	0	2
34	**Advance File System V4.02 license**	**QI-0EGAx-AA**	2	2
35	**StorageWorks PLUS** includes: • Networker Save and Restore for DIGITAL UNIX • LSM • AdvFS	**QB-5RYAQ-AA**	0	2
36	*For additional information on TruCluster available servers, refer to the appropriate price book.* **TruCluster Available Server License and documentation**	**QB-05SA-AA**	2	2

Table 2-3 lists the revision levels of the components that were tested.

Table 2-3: Component Firmware Revision Levels

Hardware Component	Hardware Revision	Firmware Revision	Software Revision
SRM Console	n/a	V3.0-10	n/a
4.3 GB disk (RZ29B-VW)	n/a	0014	n/a
4.3 GB disk (RZ29B-VA)	n/a	0014	n/a
HSZ50	n/a	V5.0	n/a
DECchip 21040-AA	A03/2.4	n/a	n/a
DEC PCI FDDI	n/a	2.46	n/a
PALcode	n/a	n/a	V1.21-12
KZPSA	n/a	P01-A10	n/a
DEFPA	01/0	n/a	n/a
AlphaBIOS	n/a	5.24-0	n/a
KZPDA	A01	n/a	n/a
Graphics board (S3)	-2	n/a	n/a

Special Configuration Rules

Special Configuration rules for the Internet UNIX Energized AlphaServer 4x00 are as follows:

- It is possible to order too many memory options. A HiTest System for this template should have between 512 MB and 2 GB total memory.

- For TruCluster Available Server:

  - Make sure that each node has a unique SCSI host ID for all of the controllers attached to shared devices. For example, set one node's SCSI host ID to 6 and the other node's SCSI host ID to 7.

  - Make sure that each system in the TruCluster Available Server has the same SCSI devices in the same configuration. This is most easily accomplished by having identical option cards in the same slot for each system.

- Remove the internal terminating resistors from all shared SCSI controllers. These will be replaced by the Y-cable and external terminator (BN21W-0B / H879-AA).

The SW500 cabinet is not necessary for smaller configurations. There is a maximum of 6 storage shelves in the systems cabinet with two system drawers. For configurations with more than 36 disks, order the additional cabinet with enough shelves to accommodate the additional disks.

_____ **NOTE** _____

A fully populated SW500 can go beyond the limits of this template depending on the configuration of the system cabinet. The distribution of the individual disks between the system cabinet and SW500 is flexible.

_____

3

System Installation and Setup

This chapter presents information that is useful when installing and setting up a DIGITAL HiTest System configured from this DIGITAL HiTest Suite. System preparation includes installation of the hardware, operating system, and applications.

Hardware Installation

The hardware is installed and interconnected as shown in Appendix A.

Disk Storage Configuration

The HSZ50 Array Controller operating software (HSOF) is used to configure the HSZ52-AJ controllers and disks. The controllers are configured as mirrored and striped sets consisting of three RZ29B-VW or VAs each. The HSZ52-AJ is comprised of two HSZ50-AJs in a BA35-MR shelf. This is shown in Appendix A.

Install DIGITAL UNIX using the instructions provided with the software media. Take all defaults with these exceptions:

- Use AdvFS for all file systems (instead of UFS).

- Ensure that there is sufficient free space in /usr to accommodate the news history and log files. (See Chapter 6.)

- Ensure that there is sufficient free space in /root to accommodate rolling upgrades.

Operating System

The DIGITAL UNIX operating system is installed with all kernel options. All DIGITAL UNIX subsets and the TruCluster software are installed for TruCluster Available Server operation.

Swap Space

Set the swap mode to *lazy*.

Create one swap space for each system in the minimum configuration:

- Primary on rz8b

Create two swap spaces for each system in the maximum configuration:

- Primary on rz10c

- Secondary on rz11c

UNIX Kernel Parameters (/etc/sysconfigtab)

Table 3-1 lists the parameter settings used for the UNIX kernel. The settings are based on a 2 GB memory configuration.

Table 3-1: Kernel Parameters

Parameter	Value
num_netconfig	2
max_netdevs	24
netdev_0	tu0
netdev_1	fta0
ifconfig_0	xxx.xxx.xxx.xxx netmask 255.0.0.0
ifconfig_1	xxx.xxx.xxx.xxx netmask 255.0.0.0
new-wire-method	1
proc:	
max-proc-per-user	1024
max-threads-per-user	1024

Applications

This section describes the various application installation procedures.

Procedure for Internet UNIX AlphaServer

Perform the following software installations:

1. Load all pertinent licenses.

2. Label the disks using disklabel.

3. Add proc:max-proc-per-user 1024 to /etc/sysconfigtab and rebuild the kernel.

4. Install Internet AlphaServer (IAS). Since the system only has one CD drive, you will need to copy the IAS CD onto the system, and install from that copy. The following commands are the workaround for the IAS Installation listed in Chapter 6.

```
# mount -r /dev/rz5c /mnt # mount the IAS CD
# mkdir /var/tmp/ias
# cd /mnt
# tar cf - . | (cd /var/tmp/ias ; tar xf - )
# umount /mnt
# /var/tmp/ias_install.sh
```

When the installation script asks if you want to use the Netscape Browser to perform the installation, type N (no).

5. Use a Web browser to connect to TCP port 8081 on the system. Set the ftp, telnet, rlogin, rexec, and rsh services to be accessible to all your clients. Mail is accessible to everyone by default.

6. Add user accounts.

7. Create local newsgroups.

Procedure for UNIX TruCluster Available Server

Perform the following software installations:

1. Load all pertinent licenses.

2. Add `proc:max-proc-per-user 1024` to /etc/sysconfigtab and rebuild the kernel on both systems.

3. Label the disks using disklabel.

4. Install TruCluster Available Server software.

5. Install IAS. Since the system only has one CD drive, you will need to copy the IAS CD onto the system, and install from that copy. The following commands are the workaround for the IAS Installation described in Chapter 6.

```
# mount -r /dev/rz5c /mnt # mount the IAS CD
# mkdir /var/tmp/ias
# cd /mnt
# tar cf - . | (cd /var/tmp/ias ; tar xf - )
# umount /mnt
# /var/tmp/ias_install.sh
```

When the installation script asks if you want to use the Nestscape Browser to perform the installation, type N (no).

6. Configure TruCluster Available Server by creating a new disk service (with an IP address) to be used by IAS. An IP address must be assigned to this service to work properly. Modify the start and stop scripts to start and stop services cleanly.

Procedure for IAS Conversion to Available Server

Perform the following conversion procedure:

1. Configure IAS and TruCluster Available Server by running the `ase_config.sh` script on both systems. The script asks if you want to add several `stop` and `start` commands to the TruCluster service's Start and Stop Action Scripts. After adding the `/sbin/init.d/innd stop` line, add a `sleep 2` line immediately after it. The sleep command must be executed **after** the `innd stop`. Otherwise, TruCluster Available Server Problem 2 could occur. See Chapter 6.

2. Use a Web browser to connect to TCP port 8081 on the newly created disk service. Set the ftp, telnet, rlogin, rexec, and rsh services to be accessible to your clients. Mail is accessible to everyone by default.

3. Add user accounts.

4. Create local newsgroups.

5. Execute the commands listed in Chapter 6, IAS section, problem 2 (IAS does not assign the correct permissions to some log files.)

6. If a large number of new articles are expected (over 64,000) then perform the following actions immediately after installation. This prevents IAS Problem 1 in Chapter 6:

   a) Relocate the INND/News service to one member of the cluster.

   b) Delete all other members from the cluster.

  c) Go to single user mode.

  d) Back up the domain containing the news spool files.

  e) Delete the domain.

  f) Recreate the domain.
      `mkfdmn -x 2048 -p 57600 /dev/`*`rzx DOMAIN-NAME`*

  g) Restore data to the domain that was located in step d.

  h) Exit single user mode.

  i) Add the numbers that are deleted in step b.

Procedure for AdvFS

Install AdvFS via setld. Choose all subsets.

Procedure for LSM

Install LSM via setld. Choose all subsets.

Procedure for BMC

Install BMC as follows:

1. Create a directory `/data/web/public/cgi-bin.`

2. Link to the Web Browser's icon directory. For example,

    ```
    ln -s /data/web/public/cgi-bin   /usr/internet/apache/port-
    80/icons
    ```

3. Follow the instructions provided by BMC *except* where it says to run
    `./install.sh` substitute `./usr/users/patrol/PATROL3.1/patrol-`
    `watch/OSF1-alpha-V4/install.sh.`

4

Interoperability Tests and Results

This chapter describes how the tests were set up (including database organization), what data and programs were placed on what disks, and how the tests were run.

This chapter describes the test environment, including:

- Test Environment
- Test Tools
- Test Configuration
- Test Process and Results

Overview of Results

Interoperability testing was performed successfully on the Internet UNIX Energized AlphaServer 4x00 HiTest Suite. The tests verified that the IAS processes functioned as expected.

Test Environment

Figure 4-1 shows the Internet UNIX Energized AlphaServer 4x00 test environment. Figure 4-2 shows the Internet UNIX Energized TruCluster Available Server AlphaServer 4x00 test environment.

Figure 4-1: Internet UNIX Energized AlphaServer 4x00 Test Environment

ML014038
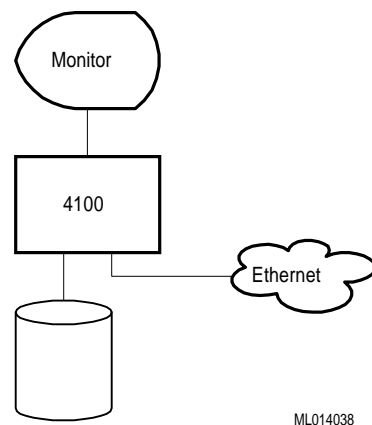
Figure 4-2: Internet UNIX Energized TruCluster AlphaServer 4x00 Test Environment

ML014037
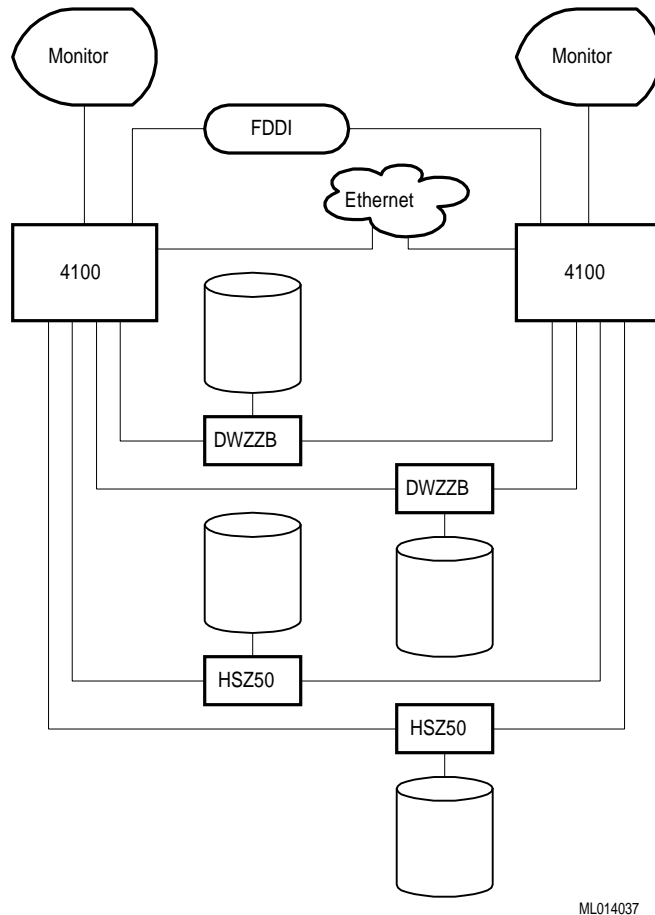
Test Tools

The following tools were used for interoperability testing:

- **WebTest**

  The WebTest consists of two parts: WebServer, which creates Web pages on the server system; and WebClient, which reads those Web pages.

  The WebServer process creates verifiable pages.

  The WebClient process repeatedly reads and verifies all the pages created by WebServer. This test exercises at the protocol and is browser independent.

- **NNTP**

  The NNTP (News) test consists of two parts: nntpPost and nntpRead. Both parts use the NNTP protocol as specified in RFC977. All tests are executed on load generation systems and affect data stored on the server system.

  The nntpPost process creates verifiable news articles and sends them to the server. The message sizes and content vary according to a random distribution.

  The nntpRead process reads and verifies the news articles.

- **MailTest**

  The MailTest consists of two parts: MailSender, which uses the SMTP protocol; and MailReceiver, which uses the POP3 protocol. The messages are sent to multiple accounts.

  The MailSender process creates verifiable mail messages and sends them to the server. The message sizes and content vary according to a random distribution.

  The MailReceiver process reads and verifies the mail messages.

Test Configuration

The test load was generated via 12 AlphaServer 600's running from an automated harness running on an additional AlphaServer 600. Network connections were Fast Ethernet (100baseT) for all systems with an additional FDDI connection for the maximum configurations.

Minimum Configuration

The minimum configuration includes all software listed in the templates except LSM and TruCluster Available Server. Hardware was comprised of an AlphaServer 4100 with a single 466 MHz processor and 512 MB of RAM. A single KZPSA-BB controller augmented the included KZPDA-AA SCSI controller for the disks. External communication was via a DE500-AA Fast Ethernet adapter. Tape storage was provided by a single TLZ09-VA.

Maximum Configuration

The maximum configuration includes all software listed in the templates. Hardware tested consisted of a pair of AlphaServer 4100's each with two 466 MHz processors and 2 GB of memory. Two HSZ52-AJ's were connected to six BA-36R-RA shelves with six RZ29B-Vx disks in each via two KZPSA-BB's in each system. Two additional shelves were connected directly to two of the four KZPSA-BB's via DWZZB-VW's in each. System storage (non-shared) was connected via a KZPDA and consisted of a single BA36R-RA with four RZ29B-VW disks. Tape storage was a TLZ9L-VA cartridge loader. Network connectivity was provided by a Fast Ethernet (DE500-AA) and FDDI (DEFPA-AB) adapter.

Test Process and Results

Interoperability testing was performed successfully on the Internet UNIX Energized ASE AlphaServer 4x00 HiTest Suite.

The tests were configured for load testing in the maximum configuration, and for throughput in the minimum configuration. The average test duration was 18 hours. The test load was generated as follows:

- Several user accounts were created using a Web browser with the IAS server management pages. These accounts were used by MailTest and WebClient. The FTP test was started on each client; writing and reading files to 10 accounts.

- The WebServer was started on the server. On the minimum configuration 1000 public pages, 5 user accounts with 1000 pages each, and 1000 cgi-bin pages were created. The maximum configuration had 1,000,000 public pages, 10 user accounts with 10,000 pages each and 1000 cgi-bin pages.

- The WebClient was started on load generation systems. It continuously read the pages created by WebServer. There was a 0 to 5 second gap between Web requests on each of the 12 load generators to properly represent a system under load.

- The News tests were started with the server tool posting articles to different groups at a rate of between 1 and 60 per second. Five groups were posted with articles in the minimum configuration and 10 groups were posted with articles in the maximum configuration. The maximum test had 40 readers on 5 clients and the minimum test had 5 readers on 5 clients.

- One MailSend test was started on each client system. Mail messages were continuously and evenly distributed between the accounts (10 for the maximum configuration, 5 for the minimum configuration) on the server.

- The MailRcvr test was started on the client systems (5 each for the maximum configuration, 1 each for the minimum configuration). It was to completely read, verify, and delete all mail messages for each account. (See Chapter 6.)

- On the TruCluster Available Server-based tests, one disk was shared in the minimum configuration. The maximum configuration had a shared AdvFS domain with two RZ29s and two LSM volumes. The two LSM volumes had a total of four RZ29s that were striped and mirrored. No HSZ RAID features were used.

5

System Limits and Characterization Data

This chapter describes any system limits that may have been determined as a result of the testing, along with information about the system characterization during testing.

During an average of 18 hours of testing, the system had the following performance characteristics:

- **Web test** − Connected directly to the Web server without a browser, processed over a million pages at a rate of 10 pages per second. There was a total of 5 GB transferred. The clients were able to receive at an average of 36 KB per second. Due to the overhead in performing verification, this is not representative of the maximum throughput of the Web server. The network was at 60% of capacity with a 5% collision rate.

- **Mail testing** − Occurred in two steps: sending and receiving messages. The sender achieved a throughput of about 1000 messages per second. The receivers achieved an average throughput of 7 messages per second with a total of over 500 MB being transferred.

- **NNTP testing** − Occurred in two steps: posting and reading articles. The posting occurred at an average of 0.2 articles per second with over 1.5 GB being posted. The reading occurred at an average of 5 articles per second.

6
Problems and Resolutions

This chapter describes any problems that may have been encountered during the testing along with any required actions or resolutions.

The following problems were identified during testing:

Operating System

1. Problem   Various IAS services stop working when using AdvFS.

Resolution   This could be because the file system has run out of metadata extents. Try recreating the domain with:

```
mkfdmn special domain -x 2048 -p 57600
```

Note that this problem is applicable only on large file systems with large numbers of news articles.

2. Problem   Multiple, simultaneous ftp connects to the same user cause ftpd to crash. `/var/adm/messages` has a message indicating that the ftp server is failing (looping) and the service is terminated.

Resolution   It is recommended that you use only one FTP session, per user, at any given time. This reflects normal usage.

IAS Installation

1. Problem   With one CD drive, IAS and Netscape cannot be installed.

Resolution   Copy the IAS CD to disk, unmount it, and run `ias_install.sh` from the disk.

2. Problem   Using a Web browser for installation results in an infinite loop that fills the disk (/tmp) with error messages.

Resolution   Do not use the Browser for installation.

3. Problem   The installation procedure does not properly handle disks without a disk label.

Resolution   Prior to IAS installation, run disklabel to install a label on each disk.

4. Problem   The installation procedure terminates if an LSM volume is chosen for a spool device.

Resolution   Do not use an LSM volume for spool area. Use an AdvFS or UFS device.

TruCluster Available Server

1. Problem   Setting a secondary network interface does not work.

Resolution   None.

2. Problem   User accounts and other IAS services do not appear to relocate.

Resolution   This appears to happen on "fast" systems, such as the AlphaServer 4x00. Place `sleep 2` after the `/sbin/init.d/innd stop` line in the services's Stop script.

3. Problem   TruCluster Available Server appears to hang.

Resolution   If the kernel is rebuilt with `proc:max-proc-per-user` as specified in Chapter 3, then this should not happen.

4. Problem   Starting TruCluster Available Server causes all static routes to disappear.

Resolution   None.

5. Problem   The disk service fails to go off line or relocate cleanly from `asemgr`.

Resolution   Make sure that all services running under IAS are shutdown. To do this, modify the start and stop scripts respectively. This starts and stops these services when these scripts are executed.

IAS

1. Problem   The Mail pop daemon may corrupt mail spool files for individual accounts. This occurs only when the spool file is both written and read simultaneously.

Resolution   None.

2. Problem   IAS does not assign the correct permissions to some log files.

Resolution   Execute the following commands after IAS installation:

```
cd /newslib/log
touch news.crit news.err news.notice
chown news news.crit news.err news.notice
```

3. Problem   Large news groups fill the `/usr` partition with log files.

    Resolution   Ensure that there is at least 2 GB of available disk space on `/usr`. The amount required will vary with news traffic.

4. Problem   News posting connections are dropped when `innd` is restarted.

    Resolution   This is expected behavior; restart the news reader.

BMC Patrol

1. Problem   Incomplete installation instructions for installation of BMC product.

    Resolution   Use the additional installation steps outlined in Chapter 3.

A
Detailed Hardware Configuration

This appendix describes the minimum and maximum hardware configuration for the following:

- System Diagram
- AlphaServer 4x00 Configurations, including:
  - System motherboard
  - PCI backplanes (slot usage)
- Configuration Cabling
- Disk Architecture

System Diagram

Figure A-1 shows a diagram of the entire HiTest Suite.

Figure A-1: System Diagram
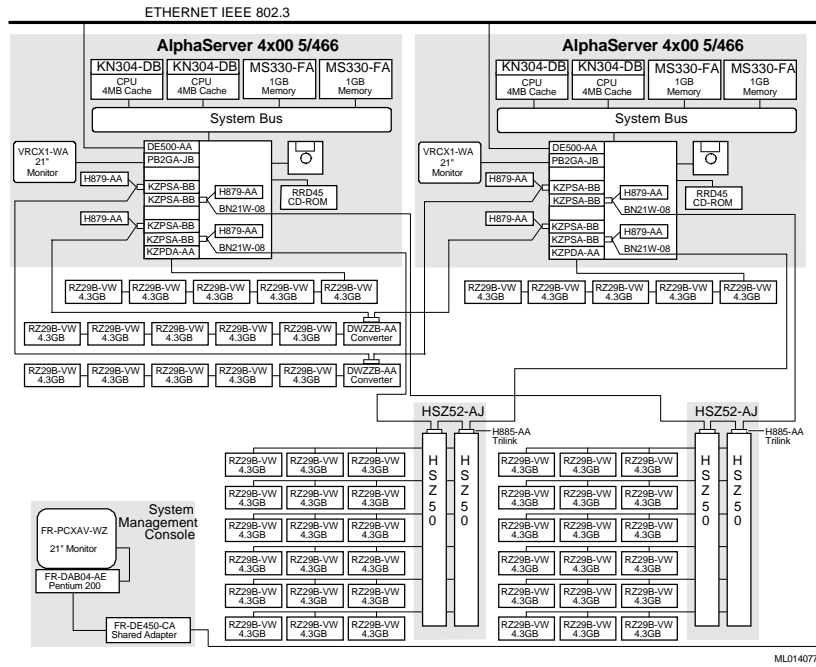
AlphaServer 4x00 PCI Slot Usage

The following information describes the minimum and maximum hardware configuration for the PCI motherboard.

Compare the slots in Figure A-2 to the slots listed in Table A-1.

Figure A-2: AlphaServer 4x00 PCI Motherboard
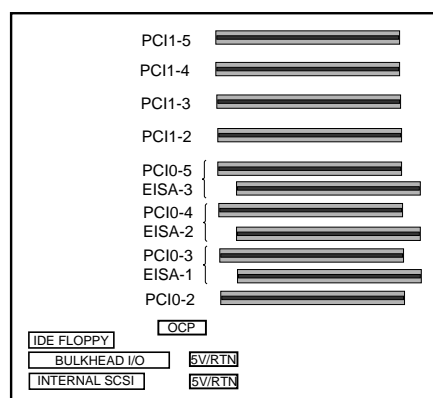
PK-0615-96

Table A-1: AlphaServer 4x00 Usage (Minimum and Maximum Configurations)

Slot	Minimum Configuration Options	Maximum Configuration Options	Description
PCI1-5	KZPSA-BB	KZPSA-BB	PCI FWSE SCSI Controller
PCI1-4	open	KZPSA-BB	PCI FWSE SCSI Controller
PCI1-3	KZPDA-AA	KZPDA-AA	PCI to SCSI adapter
PCI1-2	DE500-AA	DE500-AA	Ethernet adapter
PCI0-5	open	KZPSA-BB	PCI FWSE SCSI Controller
EISA-3	open	open	
PCI0-4	open	KZPSA-BB	PCI FWSE SCSI Controller
EISA-2	open	open	
PCI0-3	open	open	
EISA-1	open	DEFPA-AB	FDDI adapter
PCI0-2	PB2GA-JB	PB2GA-JB	PCI-based S3 Trio Video card

AlphaServer 4x00 Motherboard

The following information describes the minimum and maximum hardware configuration for the AlphaServer 4100 system motherboard. The configuration is similar for the AlphaServer 4000.

Compare the slots in Figure A-3 to the slots listed in Table A-2 and Table A-3.

Figure A-3: AlphaServer 4x00 System Motherboard
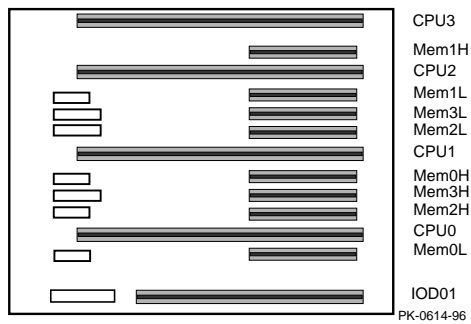
Table A-2: AlphaServer 4x00 System Motherboard (Minimum Configuration)

Slot	Part Number	Description
CPU3	open	
Mem1H	open	
CPU2	open	
Mem1L	open	
Mem3L	open	
Mem2L	open	
CPU1	open	
Mem0H	MS330-EA	board 2 of 2
Mem3H	open	
Mem2H	open	
CPU0	KN304-DB	466 MHz CPU 4 MB cache
Mem0L	MS330-EA	board 1 of 2
IOD01		

Table A-3: AlphaServer 4x00 System Motherboard (Maximum Configuration)

Slot	Part Number	Description
CPU3	open	
Mem1H	MS330-FA	board 2 of 2
CPU2	open	
Mem1L	MS330-FA	board 1 of 2
Mem3L	open	
Mem2L	open	
CPU1	KN304-DB	466 MHz CPU 4 MB cache
Mem0H	MS330-FA	board 2 of 2
Mem3H	open	
Mem2H	open	
CPU0	KN304-DB	466 MHz CPU 4 MB cache
Mem0L	MS330-FA	board 1 of 2
IOD01		

Configuration Cabling

Table A-4 lists the major cables in the HiTest Template. Use this table with Figure A-1.

Table A-4: Configuration Cabling

Part Number	Qty	Description	From	To
BN21W-0B	8	SCSI Y cable	KZPSA-BB	Shared SCSI buses
BN21K-03	4	Shared SCSI buses	SCSI Y-cable	SCSI Y-cable
BN21K-10	4	Shared SCSI buses	SCSI Y-cable	HSZ52
BN21L-0B	2	Shared SCSI buses	HSZ52	HSZ52
BN21N-02	12	8/16-bit SCSI buses	HSZ52	StorageWorks shelves

Disk Architecture

Table A-5 lists the architecture of the disk subsystem for this HiTest System.

Table A-5: Disk Architecture

SCSI Bus	Logical Unit (LUN)	RAID Level	Member Drives
SCSI1	rz24	5	3 each 4.3 GB
	rz25	5	3 each 4.3 GB
	rz26	5	3 each 4.3 GB
	rz27	5	3 each 4.3 GB
	rze25	5	3 each 4.3 GB
	rze27	5	3 each 4.3 GB
SCSI2	rz40	5	3 each 4.3 GB
	rz41	5	3 each 4.3 GB
	rz42	5	3 each 4.3 GB
	rz43	5	3 each 4.3 GB
	rzc40	5	3 each 4.3 GB
	rzc41	5	3 each 4.3 GB
SCSI3	rz34	0	4.3 GB
	rz35	0	4.3 GB
SCSI4	rz17	0	4.3 GB
	rz18	0	4.3 GB