Communicator HP e3000 MPE/iX Express 2 Based on Release 6.5

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Acknowledgments

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1 Announcements

Introducing Express 2 Based on MPE/iX 6.5 Release

Customers looking for a solution that supports high system availability, reduced downtime, improved redundancy and increased dataset support for applications such as TurboIMAGE/iX, should order Express 2 release of MPE/IX 6.5. MPE/iX Release 6.5 Express 2 is expected to be available in late November 2000. It is a collection of improvements in “High Availability” features and database support. The MPE/iX 6.5 base release contains numerous performance and capacity enhancements that will allow for more growth in high-end enterprise environments and bundled tools for web deployment of the HP e3000.

MPE/iX Release 6.5 Express 2 features include the following

Performance and Capacity Improvements:

- Reduced planned or unplanned downtime – High Availability Cluster/iX provides increased uptime by moving the mission critical data from the unavailable system to a secondary system that is up and running.
- Protection against loss of server accesses to data.
- Support for N-way systems - High Availability Cluster/iX is not limited to 2-way topologies. It can manage N-way systems.
- Improved switch over from failed I/O path to active I/O path – High Availability FailOver/iX (HAFO) continually monitors SCSI reply messages for failed data path components and allows MPE to switch to another active I/O path connected to the same array.
- TurboIMAGE/iX Support for databases with dataset size greater than 80GB - This enhancement in TurboIMAGE/iX removes the current 80 GB limit on the size of a dataset so as to allow users to have really large datasets. Old and new format databases can co-exist in the same system.
- Increased TurboIMAGE Limits - Number of items limit raised to 1200, number of sets per database increased to 240, and number of paths for master supported up to 64. The new limits will not be applicable for old databases created under previous versions of TurboIMAGE/iX. However, these databases will continue to function with the old limits and applications will be compatible.
- Improved and user-friendly ALLBASE ANSI AS Clause - This enhancement builds support for AS clause in SELECT statements to help the user to give a more meaningful name to the column headings.

End of Support Dates for MPE/iX Release 5.5 and 6.0:

Support for the 5.5 release will end on December 31, 2000. Customers should plan to update to either MPE/iX 6.0 or MPE/iX 6.5 prior to this date. We would encourage most customers to update to the 6.5 release since that release contains many performance and capacity enhancements for high-end systems and bundled tools for using the HP e3000 with the Internet. Additionally, the 6.5 release will be supported longer than 6.0.

Support for the 6.0 release has been extended until April 30, 2002. Please be aware that support for the 9x7 servers (917-987) will also end at this same time.

In the future, Hewlett-Packard will continue to provide 18 months notice before terminating support of a given release as we have done for 5.5 and 6.0.

Welcome to Express 2 based on MPE/iX 6.5 release. This Express Communicator should be seen as a supplement to the MPE/iX 6.5 Communicator.

NOTE Correction: in the 6.5 Communicator there's a reference to an AIF enhancement for JOBQ functionality. This functionality has not yet been implemented.

Pages 40 and 55 of the Communicator 3000 MPE/iX Release 6.5 states that AIFFILEGPUT new item 5101, was added in release 6.5 to allow setting of EOF with largefiles. This is a documentation error.This new item 5101 should not be valid for the PUT function. The reason is that the existing item 5017, the 32-bit equivalent, does not allow modification of the EOF in the file label, and therefore the 64-bit item 5101 would also be invalid.

Obsolete Products Removed from Release 6.5

by Allan Hertling
CS R&D

Numerous products that have reached their “End of Support Life” were removed from the SUBSYS tape for the 6.5 release.

The following obsolete products have been removed.

Product Number	Product Description
B1710A	NWOffice (FULL)
B1711A	NWOffice (DESK)
B1712A	NWOffice (ACCESS)
B1713A	NWOffice (CORE)
B1714A	NWOffice (FULL)
B1715A	NWOffice (DESK)
B1716A	NWOffice (ACCESS)
B1716B	Access Server/XL
B1717A	NWO-AccessSQL
B1717B	NWO-AccessSQL
B1718A	Resource Sharing
B3160A	CCSY Access Server
B3162A	CCSY Access SQL
32560A	PSP (FULL)
32561A	PSP (DESK)
32562A	PSP (ACCESS)
32563A	PSP (CORE)
32571A	Cooperative Services/XL
32586A	Information Access
35460A	PC Backup/XL
36561A	HPSpell (AM)
36562A	HPSpell (DUAL)
36576A	HPSlate
36930A	DSG-V
50700A	LaserRX

This product removal from the SUBSYS tape will affect you if one or more of these products reside on your system.

During an FOS Update

If your system contained any of the above listed products, the associated library modules were removed from the system libraries.The product files will not be removed.

NOTE The products listed above are obsolete and no longer supported. There is no guarantee that they will continue to function correctly under Release 6.5 or future versions of the operating system.

Following an Install

None of the products listed above will reside on your system after you have completed an INSTALL using the Release 6.5 tapes. If any of the products listed above are required on the system, the product files will have to be retrieved from a previous system backup which contains the product files.

NOTE Once again, the products listed above are obsolete and no longer supported. There is no guarantee that they will continue to function correctly under Release 6.5 or future versions of the operating system.

Obtaining Software Security Patches for your HP Computer System

Hewlett-Packard would like to make you aware of a special free service provided for all customers of HP e3000 and HP 9000 computer systems. This service gives customers a direct route to Hewlett-Packard for obtaining information relating to the security of their Hewlett-Packard Computer System(s).

Hewlett-Packard issues information on the availability of Software security patches via Security Bulletins to subscribers of the HP Security Bulletin Digest e-mail service, a part of the HP Electronic Support Center. A Hewlett-Packard support contract is NOT required to subscribe to this service to obtain information or security patches. Any purchaser of an HP e3000 or HP 9000 Computer System can make use of the HP Security Bulletin services at no charge.

Customers may also obtain information and Security Bulletin services via the World Wide Web.

A security problem is a software defect that allows unauthorized personnel to gain access to a Computer System or to circumvent any of the mechanisms that protect the confidentiality, integrity or availability of the information stored on the system. When such problems in Hewlett-Packard software are brought to the attention of the company, their resolution is given a very high priority. This resolution is usually in the form of a Security Bulletin which may explain how to correct the problem or describe how to obtain a software security patch that will correct the problem.

Hewlett-Packard has introduced this service as the primary mechanism to alert subscribers to security problems and provide corrections. Hewlett-Packard will not analyze the relevance of any security patch to any individual customer site within the scope of the HP Security Bulletin service. The responsibility for obtaining and applying security patches resides with the customer.

The remainder of this letter outlines the various security related services offered by HP Electronic Support Center and the methods for subscribing to and retrieving information from it. It also outlines how you can inform Hewlett-Packard of potential security concerns you may have with your Hewlett-Packard Computer System.

HP Electronic Support Center Security-Related Services

HP Electronic Support Center offers subscribers the following benefits:

- Receive Security Bulletins automatically when they are published.
- Retrieve the archive list of bulletins issued prior to subscription.
- Download security patches if the subscriber configuration supports it.

Remember, an HP support contract is not required to subscribe to HP Security Bulletin services.

Subscribing to HP Electronic Support Center Security Bulletin Services

Once you have placed your name on the subscriber list for future Security Bulletins (see instructions below), you will receive them via e-mail on the day they are issued by HP.

As referenced below, you can also view a list of past Security Bulletins issued in the "HP Security Bulletins Archive."

Instructions

To subscribe to automatically receive future NEW HP Security Bulletins from the HP Electronic Support Center via electronic mail, do the following (instructions subject to change without notice):

1. Use your browser to access the HP Electronic Support Center web page at:

http://us-support.external.hp.com	US, Canada, Asia-Pacific, and Latin-America
http://europe-support.external.hp.com	Europe

2. Logon with your User ID and password (or register for one). Remember to save the User ID assigned to you, and your password.
3. Once you are on the HP Electronic Support Center home page, click on "Support Information Digests." On this page, you can subscribe to many different digest services, including the Security Bulletin Digests.

To review Security Bulletins that have already been released, click on "Search Technical Knowledge Base (Security Bulletins only)" on the HP Electronic Support Center home page. Near the bottom of the next page, click on "Browse the HP Security Bulletins Archive."

Once in the archive, click on "HP-UX Security Patch Matrix" to get a patch matrix of current HP-UX and BLS security patches. Updated daily, this matrix categorizes security patches by platform/OS release, and by Security Bulletin topic.

If You Discover a Security Problem

To report new security vulnerabilities, send e-mail to

security-alert@hp.com

Please encrypt any exploit information using the security-alert PGP key, available from your local key server, or by sending a message with a -subject- (not body) of 'get key' (no quotes) to security-alert@hp.com.

2 Overview—Express 2 based on MPE/iX Release 6.5 (C.65.02)

This *Communicator HP e3000* provides general and detailed information on the new and enhanced functionality for the MPE/iX 6.5 Release Expresss2 (C.65.02), as well as information on release strategy and installation prerequisites.

MPE/iX 6.5 Express 2 provides the following enhancements:

- QUERY/iX Enhancements Respond to User Requests
- Using the AS Clause in ALLBASE/SQL
- Apache 1.3.9 for MPE/iX
- AIFs for Large Files
- Java Serevlets for MPE/iX Versions 2
- Announcing High Availability FailOver for the SureStore E Disk Array XP256
- Announcing MPE/iX High Availability Cluster/iX
- MPE/iX Release 6.5 Supports >3.75 GBs of Memory
- New Limits in TurboIMAGE/iX
- Business BASIC and the TurboIMAGE Limits Increase
- Large Size Datasets in TurboIMAGE/iX

Communicator Summary

Following are brief descriptions of the articles and chapters.

Chapter 1 Announcements

Important announcements regarding availability of products and services are included in this chapter.

- Introducing Express 2 Based onMPE/iX 6.5 Release -- provides overview of enhancements.
- Obsoleted Products Removed from Release 6.5 -- lists the obsolete products that have been removed from the SUBSYS tape for the 6.5 release.
- Obtaining Software Security Patches for your HP Computer System -- Describes the process for obtaining security patches for HP systems.

Chapter 2, Overview--Communicator Summary

This chapter provides a summary of information contained in this manual. It also provides information about obtaining MPE patches from the HP Electronic Support Center.

Chapter 3, Technical Articles

This chapter provides technical articles about the following topics:

- QUERY/iX Enhancements Respond to User Requests
- Using the AS Clause in ALLBASE/SQL
- Apache 1.3.9 for MPE/iX.
- Java Serevlets for MPE/iX Versions 2.
- Announcing High Availability FailOver for the SureStore E Disk Array XP256.
- Announcing MPE/iX High Availability Cluster/iX

Chapter 4, Increases in Limits

This chapter provides technical articles about the following topics:

- MPE/iX Release 6.5 Supports >3.75 GBs of Memory. With the March 2000 shipment of MPE/iX Release 6.5, HP e3000 Servers now support greater than 3.75 GBs of main memory.
- New Limits in TurboIMAGE/iX. Customers have often expressed the need for increased capacity for some of the elements in TurboIMAGE/iX such as, number of items, number of datasets, number of paths, capacities etc. This article describes the limits in TurboIMAGE/iX that that have been increased.
- Business BASIC and the TurboIMAGE Limits Increase. The Business BASIC runtime library contains calls using some of the DBINFO modes affected by these changes.

- Large Size Datasets in TurboIMAGE/iX. This enhancement in TurboIMAGE/iX removes the current 80 GB limit on the size of a dataset so as to allow users to have really large datasets. Now the only limiting factor is the number of entries in a dataset, which can be up to 2**31 -1.

Chapter 5, How to Order

This chapter provides information on how to order MPE/iX subsystem products.

Chapter 6, Product Release History

This chapter adds product information for MPE/iX Release 6.5 and updates the termination dates in the Supported System Release Matrix table.

Chapter 7, Catalog of User Documentation

This chapter provides a list of updated or new manual listings:

- A listing of all new or updated manuals since the time of the MPE/iX 6.5 Release.

MPE/iX Patches on HP IT Resource Center

by Patch Support Team
Commercial Systems Division

MPE/iX patches for MPE/iX Release 5.5 and later, are available on the IT Resource Center (previously the HP Electronic Support Center) to all customers.

Features and Benefits

The new patch access and delivery system benefits all MPE/iX customers with:

- Improved overall communication between HP and customers.
- Provision of useful and timely information for patch justification and decision making.
- Reduced system downtime for known problems.
- Reduction of the turnaround time for patch availability and delivery.
- Close to 24*7 access time.
- Unification of the MPE/iX and HP-UX patch delivery process.

Electronic access to patch information and delivery of patches provide three basic services:

1. Access to patch information in an automated, timely and accurate manner.
2. Electronic downloading of patch information and binaries.
3. Proactive notification of new patches via email.

Access Method to the HP Electronic Support Center

To serve customers the IT Resource Center provides World Wide Web access for downloading patches.

Access to World Wide Web Server (www)

IT Resource Center is available through the World Wide Web.World Wide Web access is the easiest, fastest, and most popular method of browsing for patch information and downloading patches. It is more reliable, especially for large patches.

- **U.S. Web accessing address:**
  http://us-support.external.hp.com
- **European Web accessing address:**
  http://europe-support.external.hp.com

Electronic Digests

If you want to keep yourself up-to-date on the latest development of MPE/iX patches, you can sign up for the daily Security Bulletin and weekly mpeix_patch Bulletin. Once you have subscribed to these two bulletins, you will receive these digests on a periodic basis via electronic mail. HP IT Resource Center will inform you proactively about newly developed security and GR patches. For more information, refer to the instructions on the IT Resource Center website.

Patch Installation Tools

There are two tools available to install MPE/iX reactive patches, Patch/iX and AUTOPAT. HP recommends the use of Patch/iX for reactive patch installation. Patch/iX has many features and checks to ease and improve the installation process, including:

- A sophisticated patch qualification mechanism to ensure the integrity of your system.
- The ability to perform much of the patch installation process while your system is still up and available to users.
- An option to install a patch or set of patches using the HP Stage/iX Subsystem, which allows the application of a patch to be performed without tapes. For more information on Stage/iX, refer to the *System Software Maintenance Manua*l for your release. Patch/iX instructions are also available on the following website: *http://www.docs.hp.com/mpeix/*

You should use AUTOPAT only if you are familiar with its use, and have a good understanding of MPE/iX patch management.

Patch/iX Installation Document Retrieval

These are the steps for retrieving documents using Patch/iX.

1. Access the HP IT Resource Center WEB site (previously the Electronic Support Center) using the appropriate WEB address for your country.
2. Click on the link, "Individual Patches".
3. Enter: “ITRC User ID” and “password”.
4. Click on the link, "MPE/iX Patches".
5. Click on the link, "MPE Patch Installation Guide".
6. Click on the link, "Use Patch/iX or AUTOPAT to install the patch".
7. Click on the link, "Patch/iX Instructions".

Patch/iX Version Identification

To ensure you have the latest version of Patch/iX, on your system do the following:

1. `:HELLO MANAGER.SYS,INSTALL`
2. `:PATCHIX VERSION`
3. Compare this version number (for example, B.01.02) with the latest version available for your release on the HP IT Resource Center Patch/iX download page. If you are

running an earlier version than is available, you should download and install the newer one from the download page.

AUTOPAT Installation Document Retrieval

AUTOPATINST is the "DOCID" of the document with instructions to assist you in installing one or more patches needed by your MPE/iX system using the AUTOPAT installation tool.

1. Access the HP IT Resource Center WEB site (previously the Electronic Support Center) using the appropriate WEB address for your country.
2. In the Main Menu, Click on the link, "Search Technical Knowledge Base".
3. Enter: "ITRC User ID" and "password".
4. In the Technical Knowledge Base Home page from the pull down menu, Click on "Search By DOC ID" (do not Search by Keyword).
5. In the search field, enter "AUTOPATINST".
6. Click on the "SEARCH" button.

Create a CSLT Prior to Patch Installation

Before starting any patch application activity, you should always back up your system by creating a Custom System Load Tape and a full backup. This will allow you the flexibility of restoring your system to the previous environment. To create a CSLT, do the following:

1. Log on as MANAGER.SYS
2. :SYSGEN
3. >TAPE

Disclaimer

CAUTION Hewlett-Packard is not liable for errors occurring during data transmission through the Internet. HP assumes no responsibility for the use or reliability of its software on equipment that it has not furnished itself. Furthermore, for customers without a current support contract with HP, HP is not responsible for answering any questions in regard to the use of this patch delivery process.

3 Technical Articles

The following articles are about upgrades of various applications for MPE/iX 6.5

- QUERY/iX Enhancements Respond to User Requests
- Using the AS Clause in ALLBASE/SQL
- Apache 1.3.9 for MPE/iX
- Java Servlets for MPE/iX
- Announcing High Availability FailOver for the SureStore E Disk Array XP256
- Announcing MPE/iX High Availability Cluster/iX

QUERY/iX Enhancements Respond to User Requests

By James Overman
Enterprise Support Services Organization R&D

The newest release of QUERY/iX HP32216D.03.17 (and later) contains enhancements that were requested by customers through the SIGIMAGE User's Group. These are the support of the Expanded TurboIMAGE Limits and the Find-by-Record-Number option.

In addition, QUERY/iX has been changed to allow the runtime PARM=%777 option that invokes Business Basic Floating Decimal datatype on the Native Mode version of QUERY.

TurboIMAGE Expanded Limits

The support of the TurboIMAGE Limit Expansion allows for the increased number of datasets from 199 to 240, the increased number of data items from 1023 to 1200, and the increase in paths into a master dataset from 16 to 64. QUERY/iX will utilize the new limits on systems with the TurboIMAGE version HP30391C.09.00 and later. If the new DBUTIL option flag of OLDINFOLIMITS is enabled for a database, QUERY/iX will function normally as it uses the new DBCONTROL Mode 20 to inform TurboIMAGE that QUERY code supports the new expanded limits.

FIND by Record Number

The long requested Find-by-Record-Number enhancement has been implemented. This new format of the FIND command permits the retrieval of a specific record in a dataset. The form of the new feature is:

```
FIND [DATA BASE NAME:] DATA SET NAME.#RECORD NUMBER
```

The record number is preceded by a "#" and is the record offset into the dataset that is to be retrieved. The record number may be a decimal number (the default) or an octal value indicated by a "%" after the "#", or a hexadecimal value indicated by a "$".

For example, to read the fifteenth record in the dataset INVOICES, one could use any of the following commands:

```
FIND INVOICES.#15

FIND INVOICES.#%17

FIND INVOICES.#$f
```

After a record is retrieved, all of the usual QUERY commands may be used on the record. If the record number requested does not exist, QUERY will return a "NO ENTRY" or "DIRECTED END OF FILE" followed by "0 ENTRIES QUALIFIED."

Floating Decimal Option with Native Mode QUERY

The PARM=%777 option is now available with the Native Mode version of QUERY. It was previously only available with the Compatibility Mode version of QUERY.

The availability of this feature on Native Mode QUERY will allow the Compatibility Mode version of QUERY to be discontinued in a future release. With this change, Native Mode Query (QUERY.PUB.SYS and QUERYNM.PUB.SYS) now provides a superset of the Compatibility Mode QUERY. All use of QUERYCM should now be transferable to QUERY.PUB.SYS. Thus, QUERYCM.PUB.SYS may no longer be updated and will be replaced on a future release with a SYMLINK to QUERY.PUB.SYS.

Service Request Fixes

Two Service Requests were fixed in this release of QUERY/iX.

SR 1653-268235 Superdex Indexes were being reported twice on FORM commands.

SR 8606-108307 Find on Z-type items sometimes gave a Scratch File Read Error 0.

Using the AS Clause in ALLBASE/SQL

By Kumaran N.S.
Commercial Systems Division - Database

The AS Clause allows users to specify an alias name for the items in the Select Statement. The specified alias name will be returned as the column heading in the query result.

Syntax

-- Select Statement Level --

[BULK] QueryExpression [ORDER BY {ColumnID [ASC]} [,...]]

[{ [DESC]}]

-- Subquery Level --

(QueryExpression)

-- Query Expression Level --

{QueryBlock } [UNION [ALL] {QueryBlock }] [...]

{(QueryExpression)} [{(QueryExpression)}]

-- Query Block Level --

SELECT [ALL] SelectList [INTO HostVariableSpecification]

[DISTINCT]

FROM FromSpec [,...] [WHERE SearchCondition1] [GROUP BY GroupColumnList]

[HAVING SearchCondition2]

where SelectList =

{* }

{[Owner.]Table.* }

{CorrelationName.* } [,...]

{Expression AS Alias_name }

{[[Owner.]Table.]ColumnName AS Alias_name }

{CorrelationName.ColumnName AS Alias_name}

where Alias_name can be an identifier, a single-quoted string or a

double-quoted string

Example

SELECT PartNumber AS "Part Number" , AVG (UnitPrice) AS avg_price,

AVG (deliverydays) AS 'avg days' FROM PurchDB.SupplyPrice GROUP BY

partnumber;

If the alias name is specified as an identifier it should conform to the following rules which are the rules defined for "Basic Names" in ALLBASE/SQL.

- The name can be up to 20 characters in length.
- The name can be made of any combination of letters (a to z, A to Z), decimal digits (0 to 9), $, #, @, or underscore (_). The first character cannot be an underscore or a decimal digit.

When the alias name is specified as a single-quoted identifier or as a double-quoted identifier, it can contain spaces and special characters in addition to the characters allowed in the "Basic Names," as defined above, and the name can be up to 20 characters in length. The alias name cannot be only spaces and it should not be of zero length, i.e., it cannot be specified as '' or as "".

Constraints

- The alias name cannot be used in the other clauses of the query.
- AS Clause cannot be used in sub-queries because the sub-query result is not returned to the user and hence the alias name doesn't have any significance here.
- AS Clause cannot be used in the Select Statement of Create View, Type 2 Insert or Genplan because it doesn't have any significance here.

New Error Messages

1172	**Message**	`AS Clause cannot be used in sub-queries. (DBERR 1172)`
	Cause	This error occurs when AS Clause is specified in sub-queries.
	Action	Remove the AS Clause from the sub-query.
1173	**Message**	`AS Clause cannot be used in the Select Statement of Create View. (DBERR 1173)`
	Cause	AS Clause is specified in the Select Statement of Create View, Type 2 Insert or Genplan.
	Action	Remover AS Clause from Select Statement of Create View, etc.
1174	**Message**	`Expected something between the single quotes. (DBERR 1174)`
	Cause	The alias name is specified as a single-quoted identifier that doesn't contain any characters, i.e., the alias name is specified as ''
	Action	Insert at least one legal character between the qoutes.
1175	**Message**	`The alias name cannot be only spaces. (DBERR 1175)`

Cause	The alias name specified is either a single-quoted identifier or as a double-quoted identifier made of only spaces.
Action	Insert at least one legal character between the qoutes that is not a space.

Apache 1.3.9 for MPE/iX

By Barbara Dubbert
Commercial Systems Division

Apache 1.3.9 for MPE/iX is based on Apache 1.3.9 from the Apache Software Foundation. It is an upgrade to Apache 1.3.4 for MPE/iX with added enhancements such as DSO capability, an extended API (EAPI), and additional compiled-in modules.

Release Information

Apache 1.3.9 for MPE/iX is available as an individual patch for 6.0 or 6.5 from the HP Response Center. It is not part of the Express 2 release.

System Requirements and Patches

Apache 1.3.9 for MPE/iX requires the following:

- MPE/iX 6.0 or 6.5
- General Release Patch MPEKXU3F or supersedes (Release 6.0 only)

It is highly recommended that you also install the latest Network Services Transport patch (NSTxxxxx). The following patches fix a corruption problem when displaying large CGI output over a slow connection:

- NSTFDR1A or supersedes (Release 6.0)
- NSTFDR2A or supersedes (Release 6.5)

The following patches are optional. You may want to install one or more of these:

- MPELX36 - This fix makes it possible to shut down or restart Apache using the kill command as MANAGER.SYS. The kill command can be used without this fix if the user is logged on as WWW.APACHE (Release 6.0 only).
- MPELX37 - This fix addresses several problems in the TAR utility. Without this fix, files restored from the TAR tape will not have their permissions restored for an existing file on the target system. This could cause problems when updating from Apache versions earlier than 1.3.4 or where the file permissions or file ownership have been changed. (Release 6.0 and 6.5).
- MPELX44 - This fix provides the capability to use Dynamic Shared Objects (DSOs). It is necessary for running Java Servlets for MPE/iX or any user-designed DSOs (Release 6.0 and 6.5).
- MPELX51 - This fix makes it possible to shut down or restart Apache using the kill command as MGR.APACHE. The kill command can be used without this fix if the user is logged on as WWW.APACHE (Release 6.0 and 6.5).
- MPELXC6 - This fix needs to be installed if the following error message occurs and MPELX44 is already installed on your system . “An invalid pointer was detected by VIRTUAL SPACE MANAGEMENT.” This situation occurs when trying to load DSOs

with Procedure Exits enabled.

- PX1LXC8 - This patch changes the way `getenv()` operates. Currently `getenv()` returns the address of the value of an environment variable. This patch causes the value itself to be returned instead of the address. This change is needed for many customer applications.(Release 6.0 and 6.5).

Support

Apache 1.3.9 for MPE/iX is supported through the HP Response Center as part of MPE FOS support.

Product Description

Apache 1.3.9 for MPE/iX is an upgrade to base version Apache 1.3.9 and also includes major new features and functionality. These new features include:

- Dynamic Shared Object (DSO) capability
- Extended API (EAPI)
- Additional compiled-in modules
- General bug fixes and upgrades provided by the Apache Software Foundation as part of the Apache 1.3.9 base.
- File Creation Mask

Dynamic Shared Objects (DSOs)

DSOs are add-on modules that extend the functionality of Apache. These module are loaded at Apache startup (and at restart, i.e. kill -HUP) into Apache process space. These modules exist separately from the Apache binary and allow a user to add new functionality as they desire. This DSO feature keeps Apache memory usage low while still making new features available. It also gives flexibility in Apache installations. No recompilation of Apache is necessary to use DSOs. However, DSOs require a DSO-enabled Apache, such as Apache1.3.9.

HP currently provides a DSO for Java Servlets. This DSO can be installed to run with Apache 1.3.9 or HP Webwise Secure Web Server.

Users can also create their own DSOs. A DSO is an Apache module, similar to the modules that are compiled into the Apache binary. DSOs can be written in C or perl. To write a DSO in C, /APACHE/PUB/libexec/mod_example.c file is a useful template. Mod_example.c compiles into a working DSO by compiling it as a shared library, `mod_example.so`.

DSOs can also be created by using the bin/apxs utility ("Apache eXtenSion" tool). If creating a DSO using bin/apxs, the -g and -n options will create a module skeleton and corresponding Makefile. This is useful as the Makefile will contain all the necessary MPE compile options. Details on using bin/apxs are found on the apxs manual page on your server in /APACHE/PUB/manual/dso.html. Please note that apxs is a perl script and perl is not distributed with FOS. It is available as downloadable software from http://jazz.external.hp.com but is not supported by HP.

DSOs are configured in conf/httpd.conf by specifying the AddModule and LoadModule

directives:

```
AddModule mod_example.c
LoadModule example_module libexec/mod_example.so
```

The LoadModule directive takes two arguments. The first is the name of the module to load. This is the module's structure name from the source file (e.g. mod_example.c). The second argument is the path to the shared object file to load. The path can be relative to the server root (/APACHE/PUB) as shown here, or it can be an absolute path.

EAPI

Apache 1.3.9 is built with an extended set of Apache APIs. This means that Apache also expects these EAPIs to be built into any module it calls, including DSOs. This EAPI feature was included in Apache 1.3.9 so that the same DSOs could be used by both Apache and WebWise without the need to recompile.

When creating DSOs, you must compile with the -DEAPI option. This will include the necessary EAPI header files. These header files are part of the Apache 1.3.9 distribution and reside in /APACHE/PUB/include. The /APACHE/PUB/include directory also contains the README.EAPI file. The README.EAPI file describes the functionality that is available with EAPI such as more features in the mod_rewrite, mod_status, and mod_proxy modules.

DSOs created with the -g -n options of bin/apxs will have a Makefile generated with the -DEAPI option automatically included.

Additional Modules

The Apache 1.3.9 for MPE/iX contains all the modules in Apache 1.3.4 for MPE/iX as well as five additional modules. To view the complete set of modules, execute the Apache binary with the "-l" option:

```
shell/iX>/APACHE/PUB/HTTPD -l
```

The modules that are new to Apache 1.3.9 are:

- mod_proxy, for using the HP e3000 as a proxy server
- mod_rewrite, for large-scale translation of URLs to a new address
- mod_digest, a new browser authentication scheme (future browser feature)
- mod_vhost_alias, for easy use of large numbers of virtual hosts with similar configurations
- mod_so, makes DSOs loadable

mod_proxy - With this module, Apache can act as a proxy server, or intermediary, when clients make web server requests. Instead of a client making a direct request to a web server, the client makes a request to the proxy server. The proxy server then makes the actual request to the web server. The web server responds to the proxy server who then forwards the response back to the original client.

The proxy server can also cache documents and resources that pass through the proxy interface. If the proxy server has a copy of a requested document, it can return the copy immediately without contacting the web server.

mod_rewrite - Mod_rewrite is a very powerful module for translating requested URLs to new addreses on the fly. The URL manipulations can depend on various tests, for example server variables, environment variables, HTTP headers and time stamps. New translation rules can be added to existing ones. Because of this module's functionality and flexibility, it is complex to use. Extensive documentation on mod_rewrite is available from the official Apache web site, http://www.apache.org.

mod_digest - This module provides a method of authentication, called Digest Authentication. Although Digest Authentication is not currently used by web browsers on the market, it is available to use whenever web browsers adopt this type of authentication. Web browsers currently use Basic Authentication.

mod_vhost_alias - Mod_vhost_alias simplifies the use of large numbers of virtual hosts by replacing static virtual host configurations (<VirtualHost>) with dynamic configuration. With this feature, adding more virtual hosts does not require reconfiguring or restarting Apache. This feature can make Apache startup faster. It also uses less memory because the httpd.conf file is smaller.

mod_so - This module implements the Dynamic Shared Object (DSO) mechanism for loading executable code and modules into Apache at start-up or restart.

Apache 1.3.9 Base Features

An overview of the new Apache 1.3.9 base features is described in the online Apache newsletter, *Apacheweek*, at http://www.apacheweek.com/issues/99-08-20. These new features include the ability to better handle many virtual hosts, conformance to the latest draft for Digest Authentication, and the abiltiy to customize the name of a cookie.

File Creation Mask

A file creation mask, umask007, was added to the startup stream job, JHTTPD, for increased security. With this change, files created by Apache will prohibit access by anyone outside of the Apache account. Files in this category are log files, files created in the proxy directiory (when Apache is used as a proxy server) and any files created by CGI scripts.

Version Identification

This version of Apache has the product number A.01.00 which is viewable by running the Apache binary with the "-v" option

```
shell/iX> /Apache/PUB/HTTPD -v
Server version: Apache/1.3.9 (HP MPE/iX A.01.00)
Server built: Oct 23 2000 13:41:28
```

Product Installation

Apache 1.3.9 for MPE/iX is installed by following the installation instructions that come with the patch. The product will be installed in /APACHE/PUB and will overlay any previous versions of Apache installed in that location.

Product Configuration

The /APACHE/PUB/conf directory contains the Apache configuration files. After

installation, you need to create your own copies of these. The httpd.conf.sample file was derived from the httpd.conf.default file with modifications for Apache on MPE/iX.

Make sure you are logged on as MGR.APACHE before beginning configuration,

```
:HELLO MGR.APACHE
:xeq sh.hpbin.sys -L
shell/iX>cd /APACHE/PUB/conf
shell/iX>cp httpd.conf.sample httpd.conf
shell/iX>cp mime.types.default mime.types
shell/iX>cp magic.default magic
```

The access.conf.default file and the srm.conf.default file need not be copied. These files were used in earlier versions of Apache but their content is now included in the httpd.conf file. However, if these files exist, Apache will read and process them after processing the conf/httpd.conf file.

httpd.conf

Edit the httpd.conf file for your own server. You may also wish to change default values. For information about configuration directives, visit the online Apache documentation at http://www.apache.org/docs. Httpd.conf is a bytestream file. If you have Samba installed, you can edit httpd.conf on your PC.

Modify the following httpd.conf directives by replacing "yourserver.com" with your own server name:

- ServerAdmin MGR.APACHE@*yourserver.com*
- ServerName *yourserver.com*

JHTTPD Job Stream File

The startup job stream file, JHTTPD, is provided as a sample file to prevent overwriting JHTTPD on an existing installation. For new installations, copy the sample file then change the timezone variable, TZ, to your own timezone. Note that the file mask is now set in this file. JHTTPD is an MPE, fixed-record filetype which can be edited with any MPE text editor.

```
shell/iX>cd /APACHE/PUB
shell/iX>cp JHTTPD.sample JHTTPD
shell/iX>cat JHTTPD

!job jhttpd,www.apache,pub;outclass=,2
!setvar TZ 'PST8PDT'
!xeq sh.hpbin.sys “-c ‘umask 007;./HTTPD -f /APACHE/PUB/conf/httpd.conf‘”
!eoj
```

Updating from Earlier Versions

If you are updating from earlier versions of Apache, rename or remove the existing log files after stopping Apache. This way, Apache can create fresh log files with the correct ownership and permissions. Startup errors will also be easier to detect. Make sure to stop Apache before renaming or trying to remove these files. Apache will continue to hold log files open and write to them while it is running.

```
shell/iX>kill `cat /APACHE/PUB/logs/httpd.pid`
shell/iX>cd /APACHE/PUB/logs
shell/iX>mv error_log error_log134
shell/iX>mv access_log access_log134
```

Apache 1.3.9 runs as WWW.APACHE. If your previous version of Apache was running as a different user, you must change your documents (.html, .txt, etc.) to be readable by WWW.APACHE, your log files must be writeable by WWW.APACHE, and your CGI must be executable by WWW.APACHE. The *Apache Troubleshooting Guide*, http://jazz.external.hp.com/src/apache/troubleshoot.txt, has examples on how to set these permissions. File permissions will not be updated by the Apache 1.3.9 installation unless patch MPELX37 is installed.

If your current version of Apache is running successfully as WWW.APACHE, such as Apache 1.3.4, update to Apache 1.3.9 by following the installation and configuration instructions as given. File permissions should not be a problem.

Running Apache

Startup

Apache can be started from either the CI or the POSIX shell.

```
:stream jhttpd.pub.apache
```
or
```
shell/iX>callci stream JHTTPD.PUB.APACHE
```

Verifying Startup

Successful installation and startup of Apache 1.3.9 can be verified by

- Doing a :SHOWJOB to see if JHTTPD,WWW.APACHE is running
- Checking JHTTPD's output spoolfile
- Looking at the content of the error_log
- Accessing web pages

To check the content of the error_log,

```
shell/iX>cd /APACHE/PUB/logs
shell/iX>tail error_log
```

If the JHTTPD job is running, try accessing Apache's home page,

http://*yourserver.com*

If Apache does not start, try consulting the *Apache Troubleshooting Guide* for tips on debugging the problem.

Shutdown

Apache can be shut down by issuing an :ABORTJOB or `kill`. Using `kill` (which defaults to `kill` -TERM) is the preferred method since it uses Apache's internal routines to clean up open resources and shut down gracefully.

Apache can be restarted by issuing a `kill -HUP`. A restart will cause Apache to reread its configuration files without having to stop and restream the Apache job stream file. Restart is useful for making configuration changes without disrupting web users. After a restart, Apache continues running with the new configuration settings.

To use `kill` requires the use of one of the following:

- Log on as WWW.APACHE
- Log on as MANAGER.SYS with MPELX36 installed (patch needed for Release 6.0 only)
- Log on as MGR.APACHE with MPELX51 installed (patch needed for Release 6.0 and 6.5)

To shut down Apache:

```
:ABORTJOB JHTTPD,WWW.APACHE
```

or

```
shell/iX>kill `cat /APACHE/PUB/logs/httpd.pid`
```

or

```
:xeq sh.hpbin.sys "-c 'kill `cat /APACHE/PUB/logs/httpd.pid`'"
```

To restart Apache:

```
shell/iX>kill -HUP `cat /APACHE/PUB/logs/httpd.pid`
```

or

```
:xeq sh.hpbin.sys "-c 'kill -HUP `cat /APACHE/PUB/logs/httpd.pid`'"
```

Additional Resources

For general Apache information, the official Apache web site, http://www.apache.org, contains documentation on configuration and functionality, FAQs, a list of books, and much more.

Apacheweek, http://www.apacheweek.com, is a weekly digest of Apache activities, book reviews, and in-depth articles on Apache features.

After installing Apache, your manual directory contains a User's Guide, Reference Manual, and other information which pertains to the installed version of Apache: http://yourserver.com/manual.

For writing DSOs, a good reference is Writing Apache Modules with Perl and C, by Lincoln Stein and Doug MacEachern, published by O'Reilly & Associates, ISBN 1-56592-567-X.

For MPE-specific information on Apache, the following documents are available on HP's online document site, http://docs.hp.com

- *Configuring and Managing MPE/iX Internet Services* for Release 6.5, Chapter 9
- *Communicator 3000 MPE/iX Release 6.5*

Java Servlets for MPE/iX

By Barbara Dubbert
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Java Servlets for MPE/iX is add-on functionality to the Apache Web Servers for MPE/iX. With this new functionality, Java servlets can be compiled and run on the MPE platform. Java servlets are server-side Java code for creating dynamic web pages and developing web applications. Servlets are similar to java applets except they run on a server instead of in a browser

Java Servlets for MPE/iX runs with Apache 1.3.9 for MPE/iX and HP WebWise Secure Web Server for MPE/iX.

Servlets vs CGI

Servlets provide a powerful alternative to traditional CGI. Servlets can be used wherever CGI might normally be used yet they allow for session persistence and have faster startup times than traditional CGI . Servlets also have all the advantages of the Java language such as ease of development, platform independence, and a large set of available APIs.

Like CGI, servlets extend the functionality of a web server. For example, a servlet could be written to do any of the following:

- Process and/or store data from an HTML form
- Provide dynamic content (such as returning the results from a database query)
- Manage state information such as for an online shopping cart system

But servlets have several advantages over CGI:

- They do not run as a separate process and so do not incur the overhead of creating a new process for every request.
- Servlets stays in memory between requests and do not need to be loaded and started as a CGI program would.
- Servlets can run as a single instance answering all requests concurrently. With only one instance, memory is better utilized and servlets can easily manage persistent data.
- A servlet can run in its own zone (restricted area) for increased security.

Release Information

Java Servlets for MPE/iX is currently available as an individual patch from the HP Response Center. It is not part of the Express 2 release. Java Servlets can be installed on either MPE/iX Release 6.0 or 6.5 and run with either Apache 1.3.9 or WebWise Secure Web Server for MPE/iX. The HPRC can provide you with the correct patch version for your release and web server.

WebWise Secure Web Server is available for ordering. For information on obtaining WebWise, please visit the WebWise site on Jazz at http://jazz.external.hp.com/src/webwise/.

Apache 1.3.9 for MPE/iX is currently available as an individual patch from the HP Response Center. Please refer to the Apache 1.3.9 article in this Communicator for release and installation information about Apache 1.3.9.

Java Servlets do not work with Apache 1.3.4 since this version lacks the necessary DSO capability.

System Requirements

Java Servlets running on MPE/iX require the following software and patches:

- MPE/iX 6.0 or 6.5
- Apache 1.3.9 or WebWise Secure Web Server for MPE/iX
- MPELX44 for 6.0 or 6.5 (for DSO capability)
- MPELXC6 for 6.0 or 6.5 (for DSO when Procedure Exits (PEs) are enabled). If the following error message occurs and MPEXL44 is already installed on your system, you will also need to install this patch: “An invalid pointer was detected by VIRTUAL SPACE MANAGEMENT.”
- Current Java release: JDK 1.1.7B, SDK 1.2, or SDK 1.2.2

Any additional requirements for Apache 1.3.9 or WebWise Secure Web Server should be met before installing and running Java Servlets.

The following are estimates of disk space needs:

- 1 MB for product files (configuration files, class libraries, startup/shutdown files, example files)
- 2 MB documentation (API specifications)
- Additional space for log files
- Additional space for new servlets

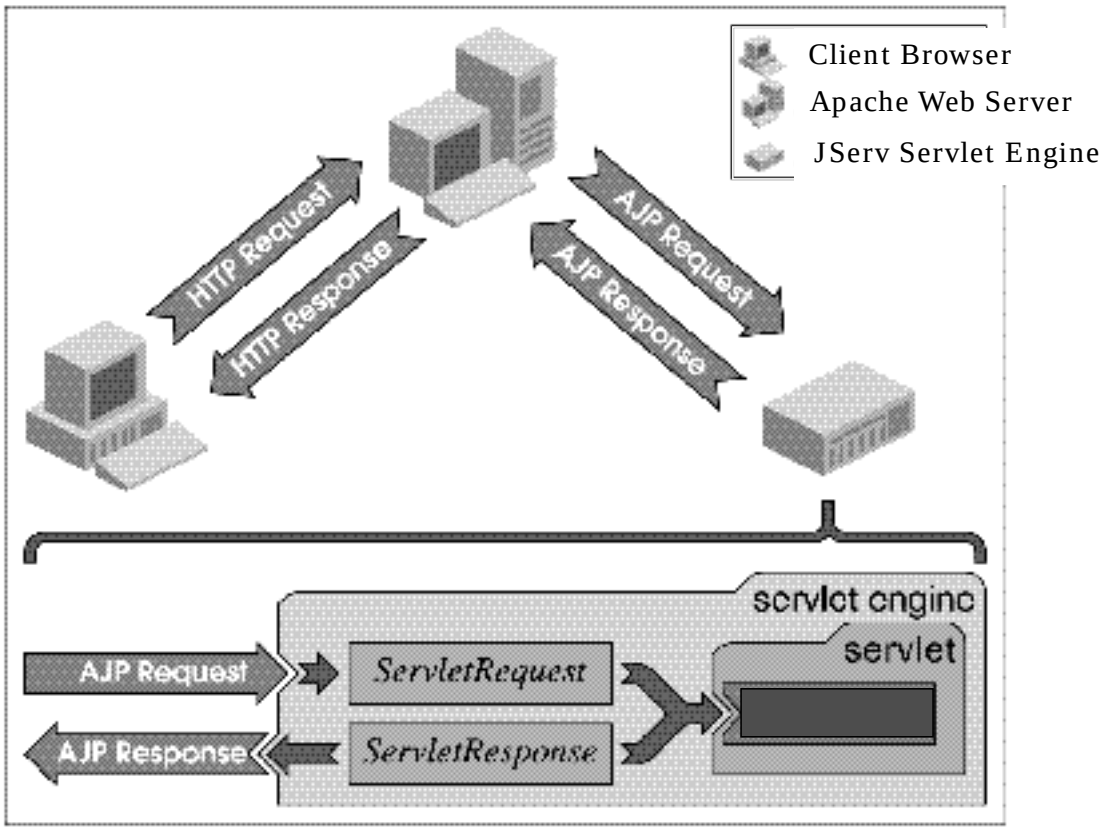
Technical Overview

The Java Servlets product on MPE/iX consists of an add-on module to Apache, called "mod_jserv," and a standalone Java application, referred to as the "servlet engine" or JServ. Mod_jserv is implemented as a Dynamic Shared Object (DSO) and the servlet engine runs on top of the MPE's Java Virtual Machine (JVM). Mod_jserv module and the servlet engine are open source software from the Java Apache Project, Apache JServ 1.1

The MPE implementation of Java servlets is referred to as a three-tiered model because it consists of three components. Some implementations of Java servlets are two-tiered with the servlet engine being part of the web server. The three tiers on MPE/iX are:

1. The web browser
2. The Apache web server with add-on module, mod_jserv.so
3. The servlet engine, JServ

Figure 3-1. Java Servlet model on HP e3000



Apache's mod_jserv and the servlet engine communicate through a special protocol, Apache JServ Protocol (AJP), which runs on top of TCP. The TCP connection is usually through the localhost, 127.0.0.1, but can also be via a remote host. For a remote host, the Apache Web Server and the servlet engine are on separate machines.

A servlet is a body of server-side Java code that is loaded into and runs inside the servlet engine. It receives and responds to requests from clients in a manner similar to CGI.

When making a request, the web browser acts as a client and sends its request to Apache using the HTTP protocol. Apache's mod_jserv translates this HTTP request into AJP and acts as the AJP client by sending the request over the network (local or remote) to the servlet engine. The servlet engine acts as the AJP server and listens on a specific port (8007 by default) for incoming requests. The servlet engine will process a request by executing the requested servlet. When the servlet has completed processing its request, the servlet engine responds back to Apache using AJP. Apache converts the AJP response to HTTP and sends it back to the client browser.

Major Components

Java Servlets for MPE/iX installs and runs under directory /APACHE/PUB for Apache or directory /APACHE/SECURE for WebWise Secure Web Server. Under one of these directories will be the following files and subdirectories:

JSRV - The Apache job stream file for starting the JServ engine. It contains the necessary

variables for running the engine as a standalone process. JSRVS is the job file for WebWise.

`JSRVOFF` - The Apache job stream file for stopping the JServ engine. JSRVSOFF is the job file for WebWise.

`libexec` - The subdirectory containing mod_jserv.so, the JServ class files (ApacheJServ.jar), and an example file and documentation for creating your own DSOs.

`servlets` - This subdirectory is the pre-configured repository for servlet files. It contains two simple servlet source files and their corresponding class files. These files are used for testing the installation.

`conf/jserv` - A subdirectory containing three new configuration files: jserv.conf, jserv.properties, and root.properties.

`htdocs/jservdocs` - This subdirectory is the root for the Apache JServ documentation including the API specification in javadoc format, a feature list, FAQs, and several in-depth articles on functionality.

`htdocs/JSDK2.0/doc/apidoc/` - This subdirectory contains the JSDK2.0 API specification in javadoc format.

`lib/jsdk.jar` - Class files in jar format of the Java Servlet Development Kit 2.0 (JSDK2.0).

`logs/mod_jserv.log` - The log file created and used by the Apache module, mod_jserv.so.

`logs/jserv.log` - The log file created and used by the servlet engine, JServ.

mod_jserv.so

Mod_jserv is the add-on module to Apache that communicates with the servlet engine, JServ. It converts browser HTTP requests to servlet AJP requests then converts servlet AJP responses to HTTP responses and returns them to the client browser. Mod_jserv has a ".so" suffix because it is a Dynamic Shared Object (DSO), an NMXL on MPE. Mod_jserv is written in C and has the same structure as other Apache compiled-in modules. Because it is a DSO, it is loaded and run at Apache startup or restart.

ApacheJServ.jar

This is the "servlet engine," a 100% pure java application that executes servlets. This servlet engine executes like a regular Java application with a static main method in class org.apache.jserv.JServ. This version of the servlet engine, Apache JServ 1.1, executes servlets that are compliant with JavaSoft's Java Servlet APIs, version 2.0. The servlet engine forwards AJP client request data to the requested servlet and then forwards the servlet response back to the AJP client.

Java Servlet Development Kit 2.0

This version of Java Servlets for MPE/iX uses the class definitions from Sun's Java Servlet Development Kit 2.0 (JSDK2.0). JSDK2.0 is a Sun product that can be downloaded for free from Sun's web site. For your convenience, the JSDK2.0 class definitions are installed as part of Java Servlets for MPE/iX in their complete and unmodified form. These servlet classes come packaged by Sun in a Java archive file, jsdk.jar. Any version of the servlet classes other than JSDK 2.0 (past, present, or future version) may not work with this

release of Java Servlets for MPE/iX and should not be used.

The jsdk.jar class library file is installed in /APACHE/PUB/lib for standard Apache and in /APACHE/SECURE/lib for WebWise.

All servlets use the class definitions in jsdk.jar. Because the servlet engine is itself a servlet, the jsdk.jar file is also required for the servlet engine to run.

The JSDK2.0 API documentation is also distributed in its complete and unmodified form with your installation at http://yourhost.com/JSDK2.0/doc/apidoc. This includes:

- a servlet tutorial
- example servlets
- class source code
- servlet API documentation, Version 2.0

Additional components of the JSDK2.0 are available by downloading the entire package from Sun's site at http://java.sun.com/products/servlet. The JSDK2.0 is not an HP product and is not supported by HP.

jserv.conf

This is the first of three new configuration files. This configuration file contains directives for Apache only and is not read by the servlet engine. It contains directives which, for example, indicate whether mod_jserv.so should be loaded and whether the servlet engine will be run automatically or be manually started. Automatic launching of the servlet engine is not supported on MPE/iX. The ApJServManual directive should always be set to true:

```
ApJServManual on
```

The grammar for this file follows the grammar used by other Apache configuartion files:

DirectiveName value

This file is read once at Apache startup or restart.

jserv.properties

This is the second of three new configuration files. This file contains all the properties required by the servlet engine. Some properties are passed to the Java Virtual Machine (JVM) and others include various security preferences, settings for internal communication between the servlet engine and the Apache web server, properties for enabling logging, and a list of all servlet zones and their respective property files.

The grammar for this file follows a grammar similar to Java property files:

```
property_name=value, value, …
```

This file is read by both mod_jserv and by the servlet engine. It is loaded once at startup, so changes are available only after restart of the web server and of the JVM.

root.properties

This is the third of three new configuration files. Each servlet zone requires its own properties file. The installation and configuration processes set up one servlet zone called

"root" and its corresponding properties file called "root.properties". A properties file contains a list of servlet repositories for a specific zone. This is the location of the servlet class files for that zone. Any other settings that are specific to a zone must also be in the properties file. It also contains aliases and initialization arguments for the servlets in that zone.

Properties files use the same grammar as the jserv.properties file and are usually named using the zonename.properties syntax.

This file is read once by the servlet engine at startup.

Definitions

Servlet Repository - A servlet repository is a collection of servlets and may be either a directory or archive, such as a zip or jar file.

Servlet Zone - The servlet engine partitions its execution space into secured, separated zones. A servlet zone represents a collection of servlets that represent the same security restrictions. They are similar to a web server's virtual host.

Local Mode - This is when the web server and the servlet engine reside on the same machine. This is the fastest and most common mode of operation because the client (web server) communicates with the servlet engine over a local loopback interface (127.0.0.1) instead of over the network.

Remote Mode - This is when the web server and the servlet engine reside on different machines. This mode might be desirable when load balancing.

Installation

Java Servlets is installed by following the patch installation instructions. Successful installation depends on properly installing and configuring the Apache Web Server, the Apache JServ module (mod_jserv), the Jserv servlet engine and the JVM. To ensure success, the following should be verified before beginning installation of Java Servlets:

1. The desired version of Java is on your system and can compile and run a Java program
2. Apache 1.3.9 for MPE/iX or WebWise Secure Web Server for MPE/iX runs successfully

You can check your version of the JVM by invoking the command,

```
:java -version
```
or
```
shell/iX>/usr/local/java/latest/bin/java -version
```

A simple program like HelloWorld can be used to verify if Java is set up correctly. The program below should be created in HelloWorld.java:

```
public class HelloWorld
{
            public static void main(String[] args)
            {
                        System.out.println("Hello World!");
```

```
            }
}
```

To compile HelloWorld.java,

```
shell/iX>javac HelloWorld.java
```

or

```
shell/iX>/usr/local/java/latest/bin/javac HelloWorld.java
```

To run HelloWorld,

```
shell/iX>java HelloWorld
```

or

```
shell/iX>/usr/local/java/latest/bin/java HelloWorld
```

For information on installing and running Java, WebWise, or Apache on MPE/iX, please refer to the Additional Resources section at the end of this document.

Configuration

Java Servlets are configured in a few, easy steps.

1. Copy the sample configuration files to create new ones.
2. Add one line in httpd.conf to load servlets.
3. Change the IP address in jserv.conf to view servlet status.
4. Modify the TZ variable in the job stream files.

Copy the Sample Configuration Files

The servlet installation job creates 3 sample configuration files in the directory conf/jserv. These sample files are derived from their corresponding default files for use on MPE. Copy these sample files to create your own configuration files. Make sure to log on first as MGR.APACHE:

```
:HELLO MGR.APACHE
:xeq sh.hpbin.sys -L
shell/iX>cd /APACHE/SECURE/conf/jserv
```

or

```
shell/iX>cd /APACHE/PUB/conf/jserv
shell/iX>cp jserv.conf.sample jserv.conf
shell/ix>cp jserv.properties.sample jserv.properties
shell/iX>cp root.properties.sample root.properties
```

Modify httpd.conf for Loading Servlets

Modify your conf/httpd.conf file by adding an include directive after the last AddModule directive in the module list. The included file, jserv.conf, contains a LoadModule directive for loading the mod_jserv.so library.

For WebWise Secure Web Server, the include should be added after mod_ssl.c as shown

here:

```
shell/iX>cd /APACHE/SECURE/conf
shell/iX>cat httpd.conf
...
AddModule mod_unique_id.c
AddModule mod_so.c
AddModule mod_setenvif.c
<IfDefine>
AddModule mod_ssl.c
</IfDefine>

Include /APACHE/SECURE/conf/jserv/jserv.conf
```

For Standard Apache, the include should be added after mod_setenvif.c as shown here:

```
shell/iX>cd /APACHE/PUB/conf
shell/iX>cat httpd.conf
...
AddModule mod_unique_id.c
AddModule mod_so.c
AddModule mod_setenvif.c

Include /APACHE/PUB/conf/jserv/jserv.conf
...
```

Edit jserv.conf for Jserv Status

The conf/jserv/jserv.conf file contains configuration directives for viewing servlet status once the servlet engine has started. To enable, replace "your.PC.com" with the IP address of your PC's browser (127.0.0.1 is equivalent to "localhost"). This feature should be enabled for trusted users only (i.e. the system administrator) and probably disabled on production systems. To disable this feature, remove your PC's address from the "allow from" directive.

```
shell/iX>cd /APACHE/SECURE/conf/jserv
```

or

```
shell/iX>cd /APACHE/PUB/conf/jserv
shell/iX>cat jserv.conf
...
<Location /jserv/>
SetHandler jserv-status

order deny, allow
deny from all
allow from 127.0.0.1 your.PC.com
</Location>
...
```

Customize the Job Stream Files

The servlet engine, JServ, is started by streaming JSRV (for standard Apache) or JSRVS (for WebWise Secure Web Server). The servlet engine is stopped by streaming JSRVOFF (for standard Apache) or JSRVSOFF (for WebWise Secure Web Server).

Change the TZ variable for your local timezone in JSRV and JSRVOFF or in JSRVS and JSRVSOFF,

```
shell/iX>cd /APACHE/SECURE
shell/iX>cat ./JSRVS
!job jsrvs,mgr.apache,secure;pri=cs
!setvar TZ 'PST8PDT'
...
!eoj

shell/iX>cd /APACHE/SECURE
shell/iX>cat JSRVSOFF
!job jsrvsoff,mgr.apache,secure;pri=cs
!setvar TZ 'PST8PDT'
...
!eoj
```

JServ should never be terminated using the POSIX shell's `kill` command. Terminating it with `kill` prevents it from cleanly destroying all servlets.

Running the Servlet Engine

Startup

To start WebWise Secure Web Server and the servlet engine,

```
:stream jhttpds.secure.apache
:stream jsrvs.secure.apache
```

To start standard Apache and the servlet engine,

```
:stream jhttpd.pub.apache
:stream jsrv.pub.apache
```

Starting the servlet engine also starts up the Java Virtual Machine (JVM) since the servlet engine itself is a servlet. Because the JVM is starting up, there will a short delay before the engine is running.

Verifying Startup

Successful installation and startup of the servlet engine can be verified by

- Looking at the content of the log files
- Running the servlet status handler to view servlet status
- Running the example servlets provided with the servlet package
- Accessing the online JServ documentation

For the first startup after installation, it is best to start Apache or WebWise Secure Web Server then check the conf/error_log and conf/mod_jserv.log files. This will verify that the web server has started successfully and was able to load the mod_jserv module. Mod_jserv.log is created at Apache startup, if it doesn't already exist. Next, start the servlet engine. Jserv.log is created when the servlet engine is started.

```
shell/iX>cd /APACHE/SECURE/logs
```

or

```
shell/iX>cd /APACHE/PUB/logs
shell/iX>tail error_log
shell/iX>tail mod_jserv.log
shell/iX>tail jserv.log
```

Once the servlet engine is running, you can view servlet status by calling the servlet status handler (the trailing slash is required),

```
http://your.host.com/jserv/
```

To run the example servlets,

```
http://your.host.com/servlets/Hello
http://your.host.com/servlets/IsItWorking
```

To access the Jserv documentation,

```
http://your.host.com/jservdocs
```

Shutdown

To stop WebWise Secure Web Server and the servlet engine,

```
:xeq sh.hpbin.sys "-c 'kill `cat /APACHE/SECURE/logs/httpd.pid`'"
:stream jsrvsoff.secure.apache
```

To stop standard Apache,

```
:xeq sh.hpbin.sys "-c 'kill `cat /APACHE/PUB/logs/httpd.pid`'"
:stream jsrvoff.pub.apache
```

Log Files

mod_jserv.log

Mod_jserv.log records messages and errors encountered by Apache's mod_jserv module. This includes messages about communicating via AJP to JServ, the servlet engine. When this log file is disabled, its messages are redirected to Apache's error_log. The number of messages logged to this file can be adjusted by setting the log level. Directives for disabling or changing the log file (ApJServLogFile) and for setting the logging level (ApJServLogLevel) are found in conf/jserv.conf file. Mod_jserv.log is created at Apache startup time, if it doesn't already exist, similar to Apache's other configuration files.

jserv.log

Jserv.log records messages and errors encountered by the servlet engine. Directives to control this log file are found in the jserv.properties file. Jserv.log can be configured to also log servlet exceptions and various internal debugging information. Due to the large number of objects created and managed for logging, logging to jserv.log can cause performance degradation. This effect of logging should be considered when deciding if or how much to log.

Using Java Servlets

Writing Java Servlets

Java servlets on MPE follow the same rules and conventions as Java programs on MPE.

Any HP e3000 editor can be used to create a servlet file but, like Java programs, Java servlets must be in bytestream format. Servlets created with vi or using Samba from a PC will always be in bytestream format. Servlet files created using traditional HP e3000 editors such as EDIT/3000 and HP EDIT must be converted to bytestream using the tobyte utility. For information on tobyte, execute "man tobyte" in the POSIX shell to invoke the POSIX help facility.

The naming conventions for Java servlets follow those of Java programs:

- The name should be followed by the extension .java.
- The name is case-sensitive. While not a requirement, it is conventional to use mixed case names with an initial capital and with additional capitals used if the class name contains more than one word (for example, HelloWorld.java).

Java Servlet Class Definitions and Documentation

The jsdk.jar servlet classes in the JSDK2.0 are required for proper servlet execution whether you write your own servlets or get them from another source. The jsdk.jar file contains the javax.servlet and javax.servlet.http packages. To view the list of classes in the jsdk.jar file, use the Java Archive Utility:

```
shell/iX>/usr/local/java/latest/bin/jar tvf /APACHE/SECURE/lib/jsdk.jar
```

or

```
shell/iX> /usr/local/java/latest/bin/jar tvf /APACHE/PUB/lib/jsdk.jar
```

For servlet API documentation and examples, use the following URL on your own server:

```
http://yourhost.com/JSDK2.0/doc/apidoc.
```

An Example Servlet

Servlets can be written to call any of the Java APIs available to Java applications. Servlets use the Java standard extension classes in the packages javax.servlet (the basic Servlet framework) and javax.servlet.http (extensions of the servlet framework for servlets that answer HTTP requests) that are in the jsdk.jar file. Since servlets are written in Java and follow a standard framework, they are portable between operating systems.

Here is an example of a simple servlet.

```
File: HelloWorld.java

import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;


/**
 * This is a simple example of an HTTP Servlet.  It responds to the GET
```

```
 * and HEAD methods of the HTTP protocol.
 */
public class HelloWorld extends HttpServlet
{
    public void doGet (HttpServletRequest request,
       HttpServletResponse response)
        throws ServletException, IOException
        {
            PrintWriter out;
            String title = "Hello World Servlet";

            // set content type and other response header fields first
            response.setContentType("text/html");

            // then write the data of the response
            out = response.getWriter();

            out.println("<HTML><HEAD><TITLE>");
            out.println(title);
            out.println("</TITLE></HEAD><BODY bgcolor=\"#FFFFFF\">");
            out.println("<H2><Hello, World!<br>");
            out.println("</BODY></HTML>");
            out.close();
        }
}
```

The above is an example of an HTTP servlet since it extends the HttpServlet class. For HTTP servlets, an HTTP method (i.e., GET) is generally handled by a corresponding Java method (i.e. doGet). The method should return a response which contains a body and header field(s) which describe the body. In this example, the doGet method in the HttpServlet base class is overridden. The body is the HTML output and the header field is the Content-Type "text/html." This is an example of a static servlet that returns the same output every time it is called.

Compiling Java Servlets

The class path is where the JVM looks for class definitions. The jsdk.jar file, which contains servlet class definitons, should be specified to the JVM by adding its path to the CLASSPATH environment variable. CLASSPATH can be set at the command line or in a profile file:

```
shell/iX>export CLASSPATH=/APACHE/PUB/lib/jsdk.jar:$CLASSPATH
```

or

```
shell/iX>export CLASSPATH=/APACHE/SECURE/lib/jsdk.jar:$CLASSPATH
```

Servlets are compiled using the Java compiler, javac. The path to the javac binary can be fully qualified or the PATH variable can be modified to include it. PATH can be set at the command line or in a profile file.

```
shell/iX>/usr/local/java/latest/bin/javac HelloWorld.java
```

or

```
shell/iX>export PATH=/usr/local/java/latest/bin:$PATH
shell/iX>javac HelloWorld.java
```

If you are planning to compile multiple servlets, you may want to set the PATH and CLASSPATH variables in the `.profile` file for MGR.APACHE or in the system-wide `/etc/profile.local` file. To create a new `.profile` file with these variables for MGR.APACHE:

```
:HELLO MGR.APACHE
:XEQ SH.HPBIN.SYS -L
shell/iX>echo export PATH=/usr/local/java/latest/bin:\$PATH > .profile
shell/iX>echo export CLASSPATH=/APACHE/PUB/lib/jsdk.jar:\$CLASSPATH >>
.profile
shell/iX>. ./.profile
```

Running Java Servlets

The sample configuration files are set up to execute servlets from the /APACHE/PUB/servlets directory for standard Apache and from /APACHE/SECURE/servlets for WebWise. This is where your servlet .class files must reside. This directory is a servlet repository in the " root" zone and is configured in the root.properties file:

```
repositories=/APACHE/SECURE/servlets
```

To run the servlet HelloWorld from the servlets repository, enter its URL in your web browser:

```
http://yourhost.com:port/servlets/HelloWorld
```

or

```
http://yourhost.com:port/servlet/HelloWorld
```

"HelloWorld" is the name of the servlet to run and "servlets" and “servlet” are the mount points for the "root" zone. Zone mount points are specified in the jserv.conf file using the ApJServMount directive. Here are the ApJServMount values set in the jserv.conf.sample file:

```
ApJServMount /servlets /root
```

```
ApJServMount /servlet /root
```

Mounting maps a URL to a zone. With the above mounts , requests to a URL starting with /servlets or /servlet will be handled by the servlets in the zone "root."

Servlets can be passed input in a manner similar to CGI. To run the servlet "MyServlet" with an address input value, the URL would be,

```
http://yourhost.com:port/servlets/MyServlet?address=foo@bar.com
```

Additional Resources

The following are additional resources for Java servlets, Java, WebWise Secure Web Server, and Apache. Release documents for Java, WebWise, and Apache are on HP's online documentation site, http://docs.hp.com/mpeix.

Java servlets resources:

- `http://java.apache.org/` - The Apache JServ official home page. This site contains general information about Apache JServ and related projects.
- `http://your.host.com/jservdocs` - Apache JServ 1.1 API specification. This is installed with the Java Servlets product.
- `http://your.host.com/JSDK2.0/doc/apidoc` - JSDK2.0 API specification. This is installed with the Java Servlets product and servlet classes and is useful when writing new servlets.
- `http://java.sun.com/products/servlet` - Sun's servlet site

Apache Web Server for MPE/iX resources:

- Release 6.5 *Communicator*
- Release 6.5 *Configuring and Managing Internet Services for MPE/iX* manual
- Release 6.5 *Express 2 Communicator*
- The home page at http://jazz.external.hp.com/src/apache.

WebWise Secure Web Server for MPE/iX resources:

- Release 6.5+ *Configuring and Managing Internet Services for MPE/iX* manual
- The home page at http://jazz.external.hp.com/src/webwise

Java for MPE/iX resources:

- Release 6.0 Communicator (Developer's Kit for Java/iX)
- Release 6.0 Express 1 Communicator (Java Developers Kit for MPE/iX, Version 1.1.7B Release Notes)
- Release 6.5 Communicator (MPE/iX Software Developer's Kit (SDK) for Java, Version 1.2.2)
- The home page at http://jazz.external.hp.com

Announcing High Availability FailOver for the SureStore E Disk Array XP256

Kendall Sutton
Commercial Systems Division

General Information

High Availability FailOver (HAFO), using the XP256 high availability data storage array, is now available for MPE/iX systems as part of the Fundamental Operating System (FOS). HAFO is supported only with the XP256 with a direct connect SCSI interface..

Once the HAFO utilities are installed, the user configures the LDEV, a primary data path, and an alternate data path. In a normal state, data is routed through the primary path, while HAFO utilities continually monitor SCSI reply messages for failed SCSI data path components. Any of these three occurrences will generate a failover:

- hung I/O
- failed disk controller
- failed I/O host device adapter card

In the event of a failover, the HAFO utilities create the configured alternate data path and reroute I/O to it. No application or higher level MPE/iX Operation System (above I/O subsystem--for example, file subsystem, database management, or memory management subsystem) will experience an abnormal event. All I/Os complete as normal using the alternate data path and alternate array controller.

Who Should Use HAFO

HAFO is for XP256 customers wanting protection against failure for the following components of the I/O subsystem:

- I/O host adapter card
- SCSI bus cabling
- Disk controller

Required Hardware and Software

Required Hardware

- HP e3000
- SureStore E Disk Array XP256

Required Software:

- MPE/iX Version 6.5 or later
- Patches KXD1, KXD2, KXD3, KXD4, LX95

NOTE HAFO is not supported with the A5814A HP SCSI-Fibre Channel Router. HAFO for the SureStore E Disk Array XP512 will be announced in the future.

Documentation

Refer to the manual, *High Availability FailOver/iX Manual* (Part No. 32650-90899) included with the release for more information.

Announcing MPE/iX High Availability Cluster/iX

By Walter McCullough
Commercial Systems Division

General Information

The manual cluster product will be orderable in November 2000 with first customer shipments scheduled for December 2000. The solution will work for the SureStore E Disk Array XP family of disk products and will also support other dual-ported arrays currently supported on HP e3000 platform, such as the 12H and Model-20 disk arrays.

Once Cluster/iX patches and utilities are installed, the system administrator can create a cluster volume set that can be configured onto two different computers. When an outage on the primary system occurs, the system administrator will confirm (manual intervention) that the primary computer is down and issue commands on the secondary system to take ownership of the cluster volume set and notify users to relogon to the secondary machine.

The cluster solution addresses machine outages caused by:

- System Aborts
- Adapter card failures
- Catastrophic hardware errors

Who Should Use Cluster/iX

Users who require a non-complex high availability solution that allows users to move business critical data to a secondary computer within seconds of an outage.

Required Hardware and Software

Required Hardware:

- HP e3000

And one or more of the following:

- SureStore E Disk Array XP Family
- 2H (formally AutoRAID)
- Model-20

Required Software:

- MPE/iX Version 6.5
- Patches MPELX93 and MPELX98, which are included in MPE/iX Release 6.5 Express 2.

Documentation

Refer to the manual, *MPE/iX High Availability Cluster/iX User's Manual,* (Part No. B9480-90001), included with the release, for more information.

4 Increases in Limits

Articles in this chapter on new limits.

1. MPE/iX Release 6.5 Supports >3.75 GBs of Memory
2. New Limits in TurboIMAGE/iX
3. Business BASIC and TurboIMAGE/iX Limits Increase
4. Large Size Datasets in TurboIMAGE/iX

MPE/iX Release 6.5 Supports >3.75 GBs of Memory

Dave Snow,
Hewlett-Packard

With the March 2000 shipment of MPE/iX Release 6.5, HP e3000 Servers now support greater than 3.75 GBs of main memory. This is good news for many applications for which memory sizes limited the number of users that could be supported or for which had the application's performance was limited by the 3.75 GB maximum memory size. However, since the MPE/iX Release 6.5 Communicator only indicates that "some" HP e3000 Servers will benefit form this increase, clarifications need to be given as to which HP e3000 Servers will actually benefit from this maximum memory size increase.

HP e3000 Ordering Menus for adding HP e3000 memory used by HP sales people and by HP e3000 Authorized Resellers already note these limitations.

Only HP e3000 Servers that use the PA8000 or PA8200 processor chips (the PA-RISC 64 bit chips) with MPE/iX Release 6.5 will be able to use memory sizes greater than 3.75 GBs. This includes a number of 9x9KS Servers (the 929KS/030, 939KS/030, 979KS, 989KS/x00 and 989KS/x50 Servers) and the 997 Servers.

A number of HP e3000 Servers based on PA7xxx processor chips (the PA-RISC 32 bit chips) can still use Release 6.5 and many of its added new features (e.g. WebServer software, file sizes up to 128 GBs, up to 511 disk spindles, etc.). However these PA7xxx processor based servers will not be able to support memory sizes greater than 3.75 GBs. These include the 9x7, 9x8, 939KS, 929KS/020, 939KS/020, 959KS, 969KS/x00, 969KS/x20, 992/990, 995/991 and 996 Servers.

For those HP e3000 9x9KS Servers that do support greater than 3.75 GB of memory, the upper limit is now 8 GB with MPE/iX Release 6.5. To achieve these large memory sizes, customers should consider using the 9x9KS 512 MB memory modules, which can be intermixed with the smaller 9x9KS memory modules.

For the HP e3000 997 Servers, the upper limit is now 16 GB with MPE/iX Release 6.5. To achieve these large memory sizes, customers should consider using one or two 8 GB memory carrier cards. This 8 GB memory carrier card can support from one to eight 1 GB memory modules. The 8 GB memory carrier card can be field installed and can be intermixed with the 128 MB (not actively sold), 256 MB, 512 MB and 768 MB HP e3000 997 memory array boards. However, since there are a limited number of slots for plugging memory into the 997 Server, some smaller memory array cards may need to be removed to support large processor and large memory configurations.

Previous communications (e.g., the Spring 2000 HP e3000 Advisor) to 99x end-users have noted that sales of some 99x memory products (the 256 MB, 512 MB and 768 MB memory arrays) would be discontinued as of August 1, 2000. HP e3000 997 customers using MPE/iX Release 6.0 Express 1 or 6.5 can continue to purchase the 8 GB memory carrier board and associated 1 GB memory module (although Release 6.0 Express 1 and beyond customers are limited to using only the first 3.75 GB of any loaded memory).

So in summary, many HP e3000 applications will see added performance or greater numbers of users using larger memory configurations (please check with your application providers for details). However, greater than 3.75 GB memory configurations are limited

to PA8000 and PA8200 based servers (929KS/030, 939KS/030, 979KS, 989KS/x00, 989KS/x50 Servers and the 997 Servers) using MPE/iX Release 6.5.

Limits in TurboIMAGE/iX

By Shobha Pradeep, Nirmala
Commercial Systems Division

Overview

Customers have often expressed the need for increased capacity for some of the elements in TurboIMAGE/iX such as, number of items, number of datasets, number of paths, capacities, etc. This article describes the limits in TurboIMAGE/iX that have been increased.

The following sections describe which elements have increased limits and by how much.

Current Limitations

1. Number of items that the user can currently define in a database - 1023
2. Number of sets per database - 199
3. Number of paths for each master to detail - 16

New Limits

IMAGE and IMAGE/SQL have been enhanced so that the new limits for the above elements are as follows:.

1. Number of items - 1200
2. Number of sets-240
   Naming the datasets: Each database can contain up to 240 datasets. Each dataset is referenced by a unique dataset name. If the root file name is XXXX, the first dataset defined in schema will be XXXX01, the second dataset will be XXXX02, etc. up to XXXXO0. As earlier, any of these datasets can be a Jumbo dataset and any of these datasets can be expanded by using the capacity expansion in the schema, (if it is not Jumbo).
3. Number of paths for master - 64
   The number of paths per master has been extended from 16 to 64. Note that this is only for master data sets.

Compatibility

Any new databases created will have the benefit of these increased limits. However the new limits will not be applicable for databases created prior to this version of TurboIMAGE/iX. Databases created prior to this will continue to function the same, as there is full forward compatibility.

DBSCHEMA changes:

A database with any one of the above new limits will have the 'root version' as C5.

DBSchema has been enhanced to support the new limits.

DBUTIL changes:

New flag in DBUTIL, when enabled, will return an error message if the buffer returned in DBINFO exceeds the old limit. This flag is disabled by default, and is introduced mainly for debugging purposes. To enable this flag, use the enable command in DBUTIL >>ENABLE dbname FOR OLDINFOLIMITS

DBINFO changes:

DBINFO modes 103, 203, 204, 301 have been modified to add the following check. If the flag is enabled and if the limit exceeds the earlier limits, for instance in DBINFO mode 103, if the number of items > 1023 and flag in DBUTIL is enabled, an error message is displayed which says "Data returned by DBINFO may overrun the buffer of the application." So, before calling DBINFO modes 103, 203, 204, 301 be sure that the buffersize allocated is sufficient to hold the data returned in view of the increased limits. Or else, DBINFO buffer may be overwritten resulting in erroneous information. DBINFO has been modified to return information on various features used by the database. Now DBINFO Mode 406 will return in the buffer element # 17 the various features used in the database. The bit # needs to be interpreted as below:

Bit #	Vaule/Description
09	1: Database uses new limits (# of sets = 240, # of items =1200, # paths permaster = 64) 0: Database uses old limits (# of sets = 199, # ofitems = 1023, #paths per master= 16)

DBCONTROL changes:

A new mode, 20, has been introduced in DBCONTROL, by which users can indicate to TurboIMAGE/iX that the application program is aware of increased buffer requirements for certain DBINFO calls on databases with new limits.

SYNTAX: DBCONTROL(base,qualifier,mode,status) where

base	is the name of the array used as the base parameter when opening the database. The first element of the array must contain the base ID returned by DBOPEN.
qualifier	ignored for mode 20
mode	should be 20 for the above mentioned functionality. Mode 20 tells TurboIMAGE/iX that the user is aware of increased buffer requirements for certain DBINFO modes (like 103,203,204,301) for databases with new limits.This mode would cause the above mentioned DBINFO modes to skip the check for database with new limits. This mode would be in effect for the current user only.
status	is the name of the array of 10 halfwords in which TurboIMAGE/iX returns status information.

If oldinfolimits flag is set through DBUTIL and you are sure that the buffer sizes are enough for the new limits, use dbcontrol mode 20 to disable the flag.

Usage

Creating the database and using it continues to be the same. The new definitions of items, sets, paths has to be in the schema after which a database is created using DBUTIL. The number of paths from master to detail alone can be up to 64 but from detail to master remains at 16 only. Sample schema processor output is shown below.

When a new database is created and the size of the buffer allocated in an application is not enough for DBINFO, it may return erroneous results.

A new flag has been set in DBUTIL which is disabled by default. If this flag is enabled, and if the buffer size passed to DBINFO is less than needed, an error message is returned which hints to the user to increase the buffer and try again.

Storing and restoring databases with new limits: no changes to DBSTORE and DBRESTORE utilities because of the increased limits.

IMAGE/SQL

IMAGE/SQL is now capable of attaching the database with increased limits to a dbe and performing the same kinds of manipulation as before.

When a user is moving from B.G2.xx or B.G3.xx to B.G4.04 version of IMAGE/SQL, the user needs to migrate. This can be done with the help of IMAGESQL.PUB.SYS MIGRATE command. For example:

```
>>IMAGESQL.PUB.SYS
>>SET SQLDBE mydbe
>>MIGRATE
```

Sample schema processor output Sample schema processor summary information for a database with 240 sets, 1200 items and 64 paths. In this example, tma001 - tma174 are masters, tma025 is an Automatic master and the rest are manual masters, tma175 - tma240 are detail datasets. item025 in dataset tma025 is linked to item025 in datasets tma175 and tma176. item001 in dataset tma001 has 64 paths, i.e., from tma177 to tma240

```
 NAME              CNT   CT   LGTH   REC   CAPACITY         FAC   LGTH SPACE
   TMA001            M   2     64   6      395   10           1     396   48
   TMA002            M   229   0    505    510   10           1     511   48
   TMA003            M   21    0    47     52    10           6     313   16
   TMA004            M   22    0    50     55    10           6     331   16
   TMA005            M   30    0    66     71    10           5     356   16
   TMA006            M   37    0    84     89    10           4     357   16
   TMA007            M   36    0    77     82    10           6     493   16
   TMA008            M   50    0    111    116   10           4     465   16
   TMA009            M   31    0    69     74    10           5     371   16
   TMA010            M   41    0    92     97    10           5     486   16
   .
   .
```

```
.
TMA025            A  1    2   1     18   100         28   506  32
.
.
.
TMA229            D  2    1   4     8    10          10   81   16
TMA230            D  2    1   4     8    10          10   81   16
TMA231            D  2    1   5     9    10          10   91   16
TMA232            D  2    1   5     9    10          10   91   16
TMA233            D  2    1   5     9    10          10   91   16
TMA234            D  2    1   6     10   10          10   101  16
TMA235            D  2    1   6     10   10          10   101  16
TMA236            D  2    1   6     10   10          10   101  16
TMA237            D  2    1   6     10   10          10   101  16
TMA238            D  2    1   4     8    10          10   81   16
TMA239            D  2    1   4     8    10          10   81   16
TMA240            D  2    1   5     9    10          10   91   16
                            TOTAL DISC SECTORS INCLUDING ROOT: 4464

NUMBER OF ERROR MESSAGES: 0
ITEM NAME COUNT: 1200    DATA SET COUNT: 240
ROOT LENGTH: 30568       BUFFER LENGTH: 511     TRAILER LENGTH: 505

ROOT FILE LIMPT  CREATED.

END OF PROGRAM
```

Availability

The following versions of TurboIMAGE/iX and IMAGE/SQL support the increased limits for datasets, items and paths and are available on MPE/iX version 6.5 Express2 and later.

TurboIMAGE/iX : C.09.02

IMAGE/SQL : B.G4.04

Business BASIC and the TurboIMAGE/iX Limits Increase

by Sue Meloy
Enterprise Support Services Organization

As of MPE/iX 6.5 Express 2, certain TurboIMAGE/iX limits have been increased.

See the article “Large Size Datasets in TurboIMAGE/iX” and the article “Limits in TurboIMAGE/iX” for more details on the changes and their impact on user programs.

The Business BASIC runtime library contains calls using some of the DBINFO modes affected by these changes.

Patch BBRLXA5, which is included in the PowerPatch for MPE/iX 6.5 Express 2, contains expanded buffers to handle the additional information potentially returned by its internal calls to DBINFO.

However, if users call the DBINFO intrinsic directly or use the Business BASIC DBINFO statement, they may need to expand their own buffers if the DBINFO could refer to a database that uses the new limits.

As described in the TurboIMAGE/iX article, a flag can be enabled to tell DBINFO to report an error if the buffer returned by DBINFO exceeds the old limit.

DBCONTROL with mode 20 can be used to indicate that the application is aware of the increased buffer sizes for the database, and so the size check should be skipped.

The user is responsible for calling the DBCONTROL intrinsic, if appropriate; Business BASIC will not do so automatically.

For example, if the user has determined that all DBINFO references to the database MYDB have appropriately sized buffers, the following code will notify TurboIMAGE/iX of that fact:

```
10 GLOBAL INTRINSIC Dbcontrol

20 SHORT INTEGER Status(1:10), Mode
30 DIM Qualifier$[1]
40 DIM Info$[386] ! (64 paths*3 words +1)*2, new max for mode 301
50 Dbname$=”  MYDB”
60 DBOPEN Dbname$
70 Mode=20
80 CALL Dbcontrol(Dbname$, Qualifier$, Mode, Status(*))
   …
100 DBINFO Dbname$,DATASET=1,MODE=301,RETURN=Info$
   …
```

Large Size Datasets in TurboIMAGE/iX

B. T. Vikram Kumar
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Introduction

This enhancement in TurboIMAGE/iX removes the current 80 GB limit on the size of a dataset so as to allow users to have really large datasets. Now the only limiting factor is the number of entries in a dataset, which can be up to 2**31 -1.

As the solution involves changes in the internal data structures of IMAGE, a new utility DBBIGSET provides an easy way for existing databases to migrate to the new structures. Once migrated, the structural details will be transparent to the users. User interface changes have been made to DBSCHEMA, DBUTIL and DBINFO.

Old and new format databases can co-exist in the same system.

Dataset Size Limitations

The IMAGE database management system has been around for more than two decades.

When HP first introduced the product, the maximum size of a dataset was limited to the MPE file size. However, when users felt the need for much larger dataset sizes, the 'JUMBO' feature was introduced. With this feature, a user can create a dataset with a size greater than the MPE file size of 4GB. Even though the dataset physically spans across multiple MPE files called chunk control files and chunkset files, the JUMBO feature allows them to be seen as a single logical file. Even with this feature, users could only define a dataset up to 40 GB in size, because of the limit of block numbers, whereas the JUMBO feature per se doesn't have this restriction. Earlier, IMAGE used to transfer data in blocks, which necessitated addressing of a record through a block number and an offset within the block. The maximum number of blocks allowed to be addressed in IMAGE was 2**23 -1, and the maximum block size was 5120 bytes. The total file size with these, turns out to be 42,949,667,840 bytes (approximately 40 GB). A quick solution has been provided in IMAGE version C.07.10 released with MPE/iX version 6.0, wherein the limit of 40 GB has been extended to 80 GB. This was done by increasing the maximum number of blocks to 2**24 -1.

The current enhancement lifts the 80 GB restriction by changing the way that records are addressed internally.

Entryname vs Entrynumber formats

To understand the solution in detail, a brief discussion of the terms entryname and entrynumber is worthwhile.

As discussed above, in IMAGE, records (entries) were referenced through a 24 bit block number and an 8 bit offset (slot number) within the block. This format is referred to as 'entryname' format. For example, the 101st record in a dataset, with a blocking factor of 8, will be referenced as hex c05, represented as the 24-bit blocknumber of 12 (hex c) and a

slot within the block of 5.

Now we can use a full 32-bit number to refer a record number. We call this 'entrynumber' format. So, the 101st record in a dataset will be represented as just 101, irrespective of the blocking factor used.

All existing databases prior to this release use entryname format. With this solution, a database can be created either in the entrynumber format or the entryname format. However, if large datasets greater than 80 GB are to be created, it can be done only if the database is created in entrynumber format.

Changes in User Interfaces

DBSCHEMA

To protect existing database environments and scripts, the new DBSCHEMA (version C.09.00 of IMAGE) will create databases in entryname format by default. However, if a database needs to be created in the entrynumber format, there is a new $CONTROL LARGESET directive in DBSCHEMA. Once DBSCHEMA encounters this directive, it will create the root file to support large datasets, and set the 'root version' to 'C6'. It may be noted that a database, as a whole, will need to support large size datasets (in other words, one can not define a particular dataset alone to be in entrynumber format).

DBUTIL

DBUTIL changes are nearly transparent to the user, except that `show dbname all`, will have the following message, if entrynumber format is used:

```
This database supports dataset size > 80 GB
```

Also, if the migration process failed, a subsequent `show dbname all` will have the following message:

```
Migration to large dataset failed. Please restore db from backup
```

All other commands in DBUTIL will behave as today.

DBINFO

DBINFO has been modified to return information on various features used by the database. Now, DBINFO Mode 406, will return in the buffer element #17 the various features used in the database. The word is interpreted as below:

Bit #	Value/ Description
15	1: Database contains at least one expandable detail dataset 0: Database contains no expandable detail dataset
14	1: Database has at least one jumbo dataset 0: Database contains no jumbo sets

Bit #	Value/ Description
13	1: At least one master dataset in the database has a B-Tree 0: No datasets in the database have B-trees
12	1: Database has at least one expandable master dataset 0: Database contains no expandable master datasets
11	Unused
10	1: Database is in entrynumber format (i.e support for large size dataset available) 0: Database in entryname format (Dataset size can only be upto 80 GB)
09	1: Database uses new limits (# of sets = 240, # of items = 1200, # paths per masters = 64) 0: Database uses old limits (# of sets = 199, #of items = 1024, # paths per master = 16)
08-01	Unused

Migration Utility

Existing databases can be moved to support large datasets through the migration utility provided with the solution. The migration utility is DBBIGSET.PUB.SYS, which has PM capability and has to be executed from the group where the database exists. Migration is a one-time activity, and it requires exclusive access to the database. Since the internal structures are being changed, **a full backup of the database must be taken before starting the migration**. Alternatively, if sufficient resources are available one could make a copy of the database, do the migration on the copy, verify the integrity and copy the migrated database back to the original. No data integrity checking of the database is performed during this process. During migration, the RL'CONDITION word in root file label #0 will be set to 'LS'. If for any reason the migration can't be completed, appropriate error messages will be displayed, and the user must revert back to the old database environment from the previous backup.
The syntax for running migration utility is

RUN DBBIGSET.PUB.SYS;PARM=*mig-option*;INFO='*dbname'*

Where mig-option =1: migrate from entryname format to entrynumber format
-1: migrate from entrynumber format to entryname format
dbname = unqualified database name (without group or account)

NOTE It should be kept in mind that, migration involves changes to internal structures of the database, and a backup must be taken before starting the migration.

Entrynumber format vs. Jumbos vs. MPE Large Files

It has to be noted that this enhancement per se will not make use of the large file feature of MPE release 6.5. Creating a database in entrynumber format or migrating a database to entrynumber format just allows the datasets to grow beyond 80 GB (which is the current limit). There is no harm in keeping the database in entrynumber or entryname format, if the dataset size is less than 80 GB. Also, there is no impact if some databases are kept in entrynumber format and others in entryname format in the same system. However, as of version C.09.02 of IMAGE, the only mechanism to have a dataset size greater than 4 GB, is to use 'Jumbo' feature. This will be the case, till IMAGE makes use of the large file feature of MPE.

Conclusion

In summary, this release

- Enhances TurboIMAGE/iX to support large dataset sizes beyond 80 GB (currently up to 10 TB, if the maximum entrysize of 2378 halfwords is used, and the dataset contains the maximum number of records 2**31-1).
- Provides a way of migrating existing databases, if large size dataset support is required.
- Ensures that existing databases and applications continue to work as today.

5 Product Release History

This chapter contains tables that provide information on the currently supported Commercial Systems MPE/iX releases and products, and the systems supported for the 6.5 Release..

Product Changes by Releases

The following table provides information on the currently supported Commercial Systems MPE/iX releases and products. Included are the MPE/iX release or SUBSYS VUF and a list of products introduced. It also provides information on significant changes made to a release.

Table 5-1. MPE/iX Product Releases

Release	SUBSYS	Date Code	Product(s) Introduced/Added
C.60.00	C.60.00	R3812	MPE/iX Release 6.0 (Platform Release) User-defined job Queue FTP enhancements Java for MPE/iX Samba/iX Performance enhancements System limit enhancements DNS BIND/iX
C.60.01	C.60.01	R3926	PowerPatch 1 based on Release 6.0 CI Enhancements NPCONFIG Variable on NW Spooler PATCH/iX Enhancements DLT4000/DLT7000 Differential Tape Drives IMAGE/SQL Enhancement: P and Z Data Types HP Driver FOR JDBC Java Developer's Kit Version 1.1.7B Legato NetWorker Storage Node for MPE/iX HP 3000 997 Large Memory Subsystem Support for 36 Gigabyte Disks

Table 5-1. MPE/iX Product Releases

Release	SUBSYS	Date Code	Product(s) Introduced/Added
C.65.00	C.65.00		MPE/iX Release 6.5 (Platform Release) Support for large files Increased TCP connections Support for 511 Disks Support Tools Manager (STM) Enterprise Management Solution HP Secure Web Console Apache for MPE/iX LDAP C-SDK/iX NEWCI Command
C.65.02	C.65.02	R4046	Express 2 based on Release 6.5 High Availability FailOver/iX High Availability Cluster/iX Dataset >80 GB in TurboIMAGE/iX Increase Limits in TurboIMAGE/iX IMAGE/SQL supports increased limits in TurboIMAGE/iX Business BASIC supports increased limits in TurboIMAGE/iX ANSI AS clause in ALLBASE/SQL QUERY/iX enhancements

Supported Releases

The naming conventions for the different types of releases have been changed slightly to clarify the type of release being discussed. The terms used to describe or refer to the releases are:

Mainline Release A mainline release involves the recompilation and reintegration of all software release components (FOS, SLT, and SUBSYS tapes). The release number is changed (for example, 6.0 or 6.5) and the update "UU" field of the V.UU.FF is changed. There are two types of mainline releases: *Platform* and *Non-Platform*.

Platform Release A platform release (previously also known as a "core" release) is a subset of a mainline release. Typically, the release number ends with a "0" such as 6.0. Platform releases are *automatically distributed* to all customers with support contracts.

Non-Platform Release A non-platform release (previously known as a "major" release) is a subset of the mainline release. The release number typically ends with a "5" such as 6.5. Non-platform releases must be *explicitly ordered* by customers.

Both platform and non-platform releases can be referred to as *mainline releases* when not discussing distribution or extended support life.

The following matrix provides information on the supported Commercial Systems MPE/iX mainline releases. It lists the currently supported releases and the SPUs they are supported on. The matrix also provides all known factory support termination dates. When a mainline release becomes unsupported, the factory will not provide any support services for that release. Online calls are not accepted and patches are not created; customers are advised to roll to a supported release.

- In general, HP will support the two most recent mainline releases.
- In order to facilitate customers moving to new releases, we will support the oldest release for at least six months after the new release ships. In other words, Release "N-2" will still be supported for at least six months after Release "N" ships.
- The release of an Express Release or a Powerpatch on any particular release does not extend its support life.

Given the rate with which we ship releases, this new strategy implies that any particular release will be supported for at least three years, and in most cases, most releases will be supported for a significantly longer period of time.

This new strategy is effective now. This implies that Release 5.5 will become obsolete as early as six months after Release 6.5 ships.

Table 5-2. Supported System Release Matrix

Supported Releases	Supported Systems	Support Termination Date
Release 5.5 (C.55.xx)	920*, 922*, 932*, 948*, 955**, 958*, 960**, 980/100, 980/200, 980/300, 980/400, 9x7, 9x7LX, 9x7RX, 9x7SX, 9x8LX, 9x8RX, 939KS, 939KS/020, 959KS/100, 959KS/200, 959KS/300, 959KS/400, 969KS/100, 969KS/200, 969KS/300, 969KS/400, 969KS/120, 969KS/220, 969KS/320, 969KS/420, 979KS/100, 979KS/200, 979KS/300, 979KS/400, 989/100, 989/200, 989/400, 989/600, 989/150, 989/250, 989/300, 989/350, 989/450, 989/500, 989/550, 989/650, 990CX 992/100CX, 992/200CX, 992/300CX, 992/400CX, 990DX, 992/100DX, 992/200DX, 992/300DX, 992/400DX, 991CX, 995/100CX, 995/200CX, 995/300CX, 995/400CX, 995/500CX, 995/600CX, 995/700CX, 995/800CX, 991DX, 995/100DX, 995/200DX, 995/300DX, 995/400DX, 995/500DX, 995/600DX, 995/700DX, 995/800DX, 996/80, 996/100, 996/200, 996/300, 996/400, 996/500, 996/600, 996/700, 996/800, 996/900, 996/1000, 996/1200, 997/100, 997/200, 997/300, 997/400, 997/500, 997/600, 997/800	12/31/00
* Support life ended as of 1/00 ** Support life ended as of 8/00		

Table 5-2. Supported System Release Matrix

Supported Releases	Supported Systems	Support Termination Date
Release 6.0 (60.xx)	920*, 922*, 932*, 948*, 955**, 958*, 960**, 980/100, 980/200, 980/300, 980/400, 9x7, 9x7LX, 9x7RX, 9x7SX, 9x8LX, 9x8RX, 939KS, 939KS/020, 959KS/100, 959KS/200, 959KS/300, 959KS/400, 969KS/100, 969KS/200, 969KS/300, 969KS/400, 969KS/120, 969KS/220, 969KS/320, 969KS/420, 979KS/100, 979KS/200, 979KS/300, 979KS/400, 989/100, 989/200, 989/400, 989/600, 989/150, 989/250, 989/300, 989/350, 989/450, 989/500, 989/550, 990CX 992/100CX, 992/200CX, 992/300CX, 992/400CX, 990DX, 992/100DX, 992/200DX, 992/300DX, 992/400DX, 991CX, 995/100CX, 995/200CX, 995/300CX, 995/400CX, 995/500CX, 995/600CX, 995/700CX, 995/800CX, 991DX, 995/100DX, 995/200DX, 995/300DX, 995/400DX, 995/500DX, 995/600DX, 995/700DX, 995/800DX, 996/80, 996/100, 996/200, 996/300, 996/400, 996/500, 996/600, 996/700, 996/800, 996/900, 996/1000, 996/1200, 997/100, 997/200, 997/300, 997/400, 997/500, 997/600, 997/800	04/30/2002
* Support life ended as of 1/00 ** Support life ended as of 8/00		

Table 5-2. Supported System Release Matrix

Supported Releases	Supported Systems	Support Termination Date
Release 6.5 (65.xx)	9x7, 9x7LX, 9x7RX, 9x7SX, 9x8LX, 9x8RX, 939KS, 939KS/020, 959KS/100, 959KS/200, 959KS/300, 959KS/400, 969KS/100, 969KS/200, 969KS/300, 969KS/400, 969KS/120, 969KS/220, 969KS/320, 969KS/420, 979KS/100, 979KS/200, 979KS/300, 979KS/400, 989/100, 989/200, 989/400, 989/600, 989/150, 989/250, 989/350, 989/300, 989/350, 989/500, 989/550, 989/650 990CX 992/100CX, 992/200CX, 992/300CX, 992/400CX, 990DX, 992/100DX, 992/200DX, 992/300DX, 992/400DX, 991CX, 995/100CX, 995/200CX, 995/300CX, 995/400CX, 995/500CX, 995/600CX, 995/700CX, 995/800CX, 991DX, 995/100DX, 995/200DX, 995/300DX, 995/400DX, 995/500DX, 995/600DX, 995/700DX, 995/800DX, 996/80, 996/100, 996/200, 996/300, 996/400, 996/500, 996/600, 996/700, 996/800, 996/900, 996/1000, 996/1200, 997/100, 997/200, 997/300, 997/400, 997/500, 997/600, 997/800, 997/1000, 997/1200	6 months following next Mainline release after 7.0

6 Catalog of User Documentation

This chapter provides listings of new and/or revised customer manuals for the HP e3000 computer system.:

For detailed information on a particular manual or manual collection, refer to the *MPE/iX Documentation Guide*

If your contract includes Material-Based Services, you will receive both software and manual revisions. For additional copies of new or revised manuals, you can order Manual Update Services (MUS).

Many of the learning products listed in this chapter can be individually ordered by calling HP Parts Direct Ordering at 800-227-8164. Specify the “order part number” of the manual you are interested in when ordering.

New to MPE/iX since Release 6.5 is the PDF CD-ROM. This CD-ROM contains files for manuals in pdf format. These pdf files are viewable and printable using Adobe Acrobat Reader 3.0 or later. Acrobat Reader also allows you to perform key word searches on the entire CD-ROM contents. If you do not have Acrobat Reader on your system, you can download the 4.0 version from the Adobe website, or install the 3.0 version which is included with the PDF CD-ROM.

You can also view MPE/iX document files on an external web site (http://www.docs.hp.com). These files are presented in a html format which is searchable and printable from the web-site.

MPE/iX 6.5 Express 2 New or Updated Manuals

This section lists customer manuals introduced or updated for MPE/iX 6.5 Express 2.

Table 6-1. MPE/iX 6.5 Express 2 New or Updated Manuals

Manual Title	Part No.	Latest Edition
Communicator HP e3000 MPE/iX Release 6.5 Express 2	30216-90322	12/00
HP e3000 MPE/iX System Software Maintenance Manual	30216-90325	12/00
High Availability FailOver/iX Manual	32650-90899	12/00
MPE/iX High Availability Cluster/iX User's Manual	B9840-90001	12/00