hp e3000

MPE/iX Performance Update

MPE/iX Performance Update:

New HP e3000 Servers and Release 7.0

Presented by:

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Overview

- HP e3000 and MPE/iX Performance Objective
- New HP e3000 N-class and A-class systems
- Memory "Rules of Thumb"
- New operating system release, MPE/iX 7.0
- MPE/iX 6.5 and 7.0 Performance Patches
- HP e3000 Performance Benchmarks

HP e3000 and MPE/iX Performance Objective for 2001

30% performance increase
in overall system throughput

for a new
N-class 550MHz 4-way
system running
7.0 Express 1

over a
Series 997/1200
running 6.5

hp e3000

MPE/iX Performance Update

New Highest-Performing HP e3000 System

- The N4000-400-550 delivers **72** MPE/iX Relative Performance Units, running on MPE/iX 7.0 Express 1.
- Last year's high-end system, the Series 997/1200 on MPE/iX 6.5, measured **52.3** MPE/iX Relative Performance Units.
- This represents a gain of **over 35%** in overall system throughput at the high end.

New Highest-Performing HP e3000 System - Batch

- The N4000 with 550MHz processors is the fastest batch processing HP e3000 ever!
- The N4000 with 440MHz processors is also much faster than any Series 900 system.
- CPU-intensive batch jobs may complete in 1/3 - 1/2 of their run time on a Series 997.
- This represents a gain of 100-200% in batch performance at the high end.

Batch Processing Example

CPU time to sort an 800MB file (10 million 80-byte records):

- 997 — 13 minutes
- 989/X00 — 10 minutes
- 989/X50 — 8 minutes
- N4000-440 — 5 minutes
- N4000-550 — 4 minutes

Other New High-End HP e3000 Systems

- These require MPE/iX 7.0 Express 1:

N4000-300-440	46 MPE/iX Perf. Units
N4000-400-440	57
N4000-300-550	58

- Upgrade these Series 900 systems:

Series 989/600	33.2
Series 997/800	39
Series 989/650	43.8

New Mid-Range HP e3000 Systems

- Supported on base MPE/iX 7.0 release:

N4000-100-440	18

- Upgrade these Series 900 systems:

Series 989/150	11.1
Series 969/220	12.4
Series 996/400	13.0
Series 997/200	13.2
Series 959/400	14.3
Series 979/200	14.6

New Mid-Range HP e3000 Systems

- With 7.0 Express 1, add a second processor and memory to your N4000-100-440 system, for a significant performance gain:

N4000-200-440	33

- Upgrade these Series 900 systems:

Series 989/200	17.2
Series 989/250	21.3
Series 997/400	23.7
Series 979/400	24.4

New Mid-Range HP e3000 Systems

- Supported on base MPE/iX 7.0 release:
  - N4000-100-330 13

- Upgrade these Series 900 systems:
  - Series 987/200 7.8
  - Series 979/100 7.9
  - Series 989/100 9.1
  - Series 969/200 9.2

New Mid-Range HP e3000 Systems

- Supported on base MPE/iX 7.0 release:

N4000-100-220	9

- Upgrade these Series 900 systems:

Series 959/100	4.6
Series 988	5.1
Series 969/100	5.2
Series 939/030	5.4
Series 987/150	5.9
Series 969/120	6.7

New Entry-Level HP e3000 Systems

- Supported on base MPE/iX 7.0 release:

A400-100-110	2.2

- Upgrade these Series 900 systems:

Series 917/27/37/47	1.3
Series 918	1.3
Series 928	1.8

New Entry-Level HP e3000 Systems

- Supported on base MPE/iX 7.0 release:

A500-100-140	3.2

- Upgrade these Series 900 systems:

Series 957	2.1
Series 967	2.6
Series 968	2.8

New Entry-Level HP e3000 Systems

- Requires MPE/iX 7.0 Express 1 release:

A500-200-140	5.4

- Upgrade these Series 900 systems:

Series 977	3.4
Series 978	3.4
Series 987/100	4.2

Memory "Rules of Thumb" - N-Class and A-Class Minimums

- 1 GB per processor for 440 and 550 MHz N-class systems
- 512 MB for 220 and 330 MHz N-class systems
- 256 MB per A-class processor

Memory "Rules of Thumb" - When to Add More

- For memory-intensive applications (such as those using 4GLs)
- For heavy batch processing
- For a high number of online user sessions
- When adding processors to a system

MPE/iX 7.0 Software Changes - PCI

- The I/O subsystem is completely new on the N-class and A-class, based on PCI.
- This affects the I/O and networking drivers, but little else in the operating system. So these changes have little user impact.
- PCI provides I/O bus throughput in the range of 500 MB/sec, up from 32 MB/sec on NIO.
- For more information on PCI, attend Steve Macsisak's presentation on Friday at 11AM.

MPE/iX 7.0 Express 1 Capacity and Performance Enhancements

- 50% more processes on an N-class system (increased from 8K to 12K), by enabling the new BIGPIN option in SYSGEN.
- TurboIMAGE dataset sizes greater than 80GB and some other increased TurboIMAGE limits.
- Improved threads performance, resulting in better Java performance.
- Increased performance of classic Java Virtual Machine.

MPE/iX 7.0 Software Changes

- There are very few other software changes between MPE/iX 6.5 and MPE/iX 7.0.

- When comparing 7.0 with 6.5, note that MPE/iX 7.0 Express 1 has the same patch level as MPE/iX 6.5 Express 2.

MPE/iX 6.5 and 7.0 Performance Patches

- As of June, 2001, two patches have been released which may improve performance on some larger systems running 6.5 or 7.0:
  - MPELXH8 (Memory Manager)
  - MPELXH3 (TurboSTORE)
- These patches are NOT included in MPE/iX 6.5 Express 2 or MPE/iX 7.0 Express 1.
- Up-to-date information on the latest patches will be provided during the conference.

MPE/iX 6.5 and 7.0 Performance Patches

- Changes in MPELXH8 (Memory Manager):
  - Provide a new "make_absent" option so MPE/iX system programs and privileged mode third-party tools can explicitly free memory pages they no longer need.
  - Reduce how often the memory manager tries to proactively make free pages.
  - Reduce the number of pages the memory manager tries to make free in each call.

MPE/iX 6.5 and 7.0 Performance Patches

- Changes in MPELXH8 (continued):
  - Reduce background overhead when closed files are mapped out of memory.
  - Throttle back memory manager I/Os, by not flushing out dirty pages when the I/O system is busy. (Later patch MPELXM5 makes the same change at an additional code location in the memory manager.)

MPE/iX 6.5 and 7.0 Performance Patches

- Changes in MPELXH8 (continued):
  - Reduce unnecessary overhead during Transaction Manager checkpoints, caused by a side effect from an earlier 6.5 patch, MPELX75 (which fixed a system hang).
  - Include the best fixes from some early 6.5 patches developed last year, MPELX66 in 6.5 PowerPatch 1 and MPELXB0 in PP2.
  - Collect all 6.5 memory manager patches into one "good" patch for both 6.5 and 7.0.

MPE/iX 6.5 and 7.0 Performance Patches

- Changes in MPELXH3 (TurboSTORE):
  - After storing a file, instruct the memory manager to immediately free up all pages of that file remaining in memory.
  - This uses the new "make_absent" option provided as part of MPELXH8.

HP e3000 Performance Benchmarks

- To measure MPE/iX Relative Performance, HP uses real customer applications and data.
- The HP e3000 system is loaded to 95% busy on average, using separate driver systems to simulate the activity of online sessions.
- Throughput is measured by the number of application transactions completed during 15 minutes of stable execution at this level.
- Some batch processing is run separately.

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