



Back To The Basics

HP e3000 Performance



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Back To The Basics

***Why* should you monitor performance on the HP e3000?**

- **If you don't measure it,
How can you tell if it's broken?
How do you know you fixed it?**

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Performance Ratings

Green Zone – things are running well,
no attention is needed

Yellow Zone – Investigation is needed,
PROACTIVE management starts here!

Red Zone – There is a bottleneck that
needs addressed immediately

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Performance Monitoring Practices

Measure Performance

Measure the environment to establish a baseline. Identify a plan for **modifications** then introduce 1 modification at a time. **Re-measure** against baseline.

Know Your Environment

What activity must complete at the sacrifice of all others. Manage your workload efficiently by **prioritizing** and **grouping**.

System Modification

When upgrading one system resource, the remaining system resources should be upgraded in tandem

CPU - Key Performance Indicators

CPU Subqueue: breakdown of the CPU busy into the system sub-queues along with the percentage of CPU used to manage memory, the dispatcher, and system overhead

Interactive/High Priority	<65%	65-80%	>80%
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*Batch processing should complete in a timely manner and still leave room for ad-hoc requests and growth

CPU Queue Length: number of processes waiting to receive CPU allocation

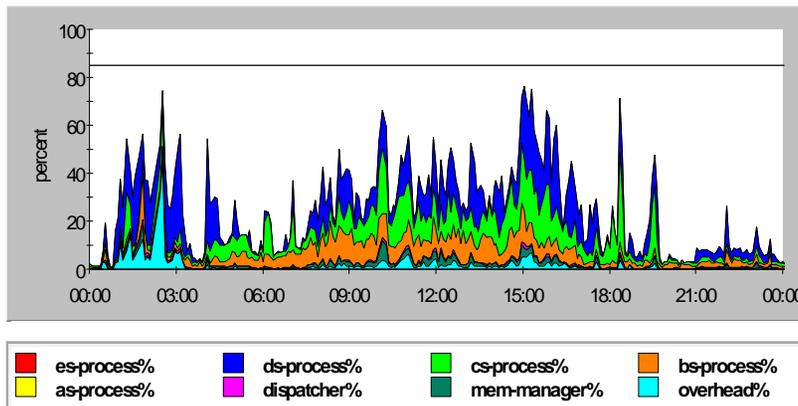
Interactive/High Priority	<5	6-15	>15
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CPU Workload: user-defined grouping of processes

Interactive/High Priority	<50%	50-85%	>85%
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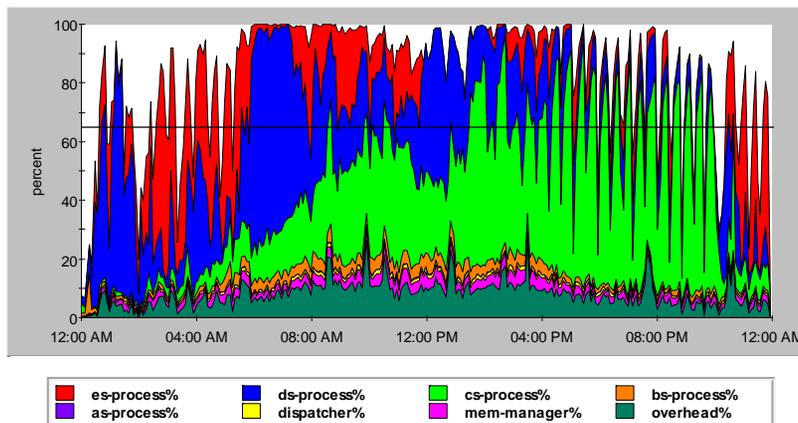
CPU Utilization By Subqueue

CPU Utilization by Sub-Queue
12/20/2000 00:00 - 12/21/2000 00:00



- Light Loading
- Equal distribution between interactive and batch
- Room for growth
- Can anticipate future

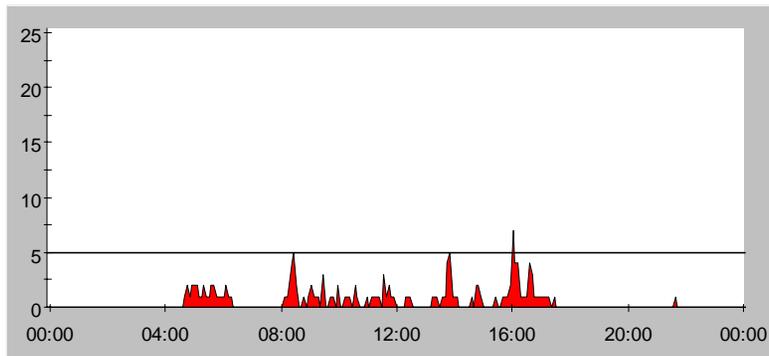
CPU Utilization by Sub-Queue
10/13/2000 12:00 AM - 10/14/2000 12:00 AM



- Heavy Loading
- Exceeds interactive threshold of 65%
- Batch consumes majority of excess CPU

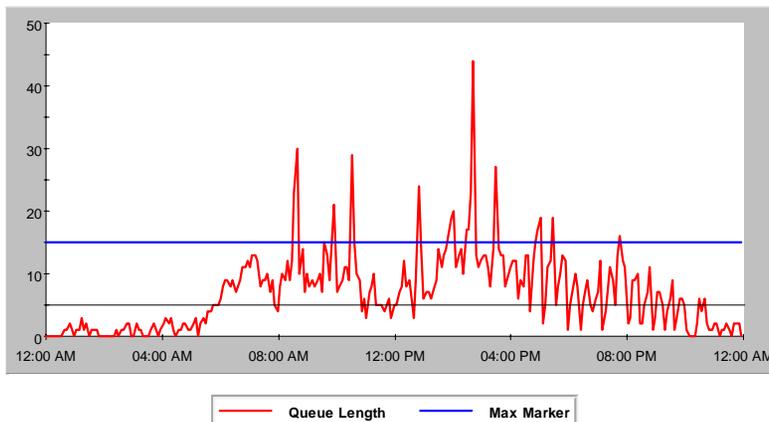
CPU Queue Length

CPU Queue Length
12/04/2000 00:00 - 12/05/2000 00:00



- Entire sample period is below threshold
- Job LIMIT settings
- TUNE queue settings

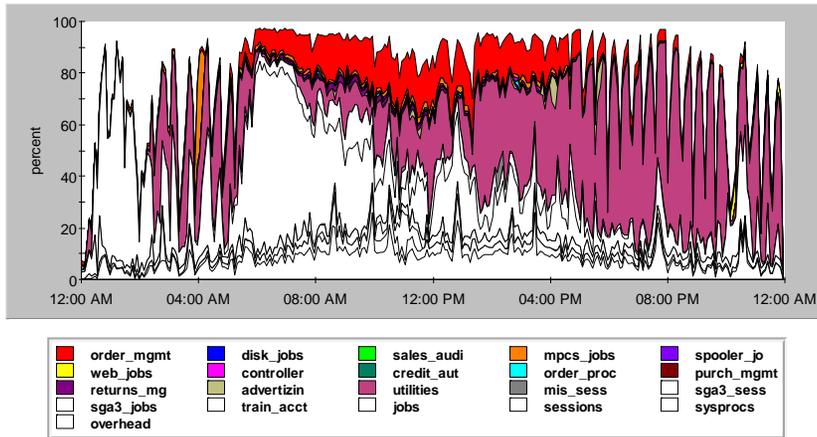
CPU Queue Length
10/13/2000 12:00 AM - 10/14/2000 12:00 AM



- Exceeds queue length threshold of 15

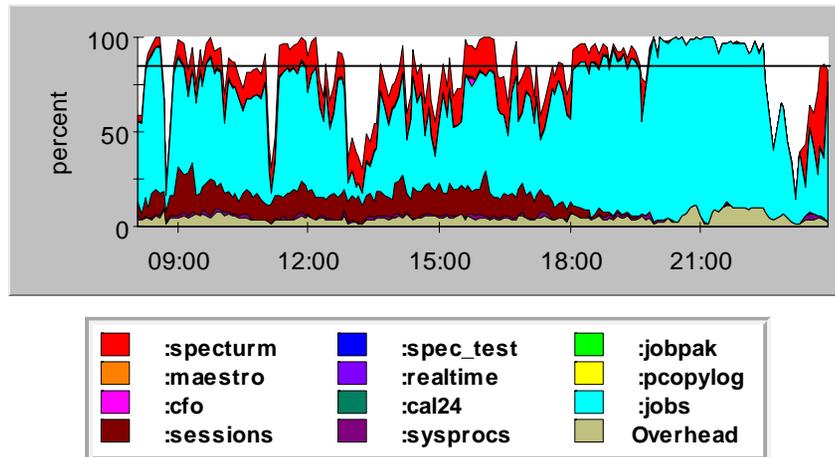
CPU Utilization By Workload

CPU Utilization by Workload
10/13/2000 12:00 AM - 10/14/2000 12:00 AM



- Excellent definition of meaningful workloads
- Leverage activity to make better business decisions

CPU Utilization By Workgroup
12/01/2000 08:05 - 12/01/2000 23:55



- Workloads are defined but not representative
- Majority of workload in default workgroup, containing no description

CPU Summary

What zone are you in?

Yellow Zone

- Batch activity to off-peak hours
- Investigate workload queue priorities

Red Zone

- Upgrade your processing power
- Lower your processing amount

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Memory - Key Performance Indicators

Memory Manager %: Percentage of the CPU used to manager main memory

Memory Manager	<4%	4-8%	>8%
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Clock Cycles: A clock cycle is a complete read of memory from beginning to end to satisfy new placements of data.

Clock Cycles Per Millisecond	>10000	2000-10000	<2000
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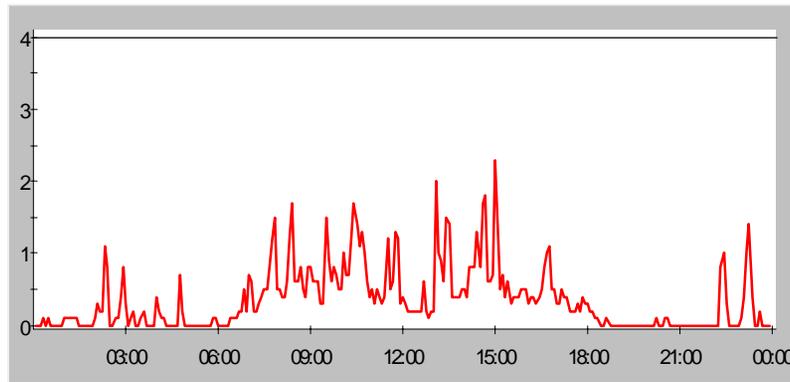
Memory - Key Performance Indicators-cont'd

Page Faults: A page fault is counted when a process needs a memory object (code or data) that is absent from main memory.

Page Fault Rates				
Size	Series	Green	Yellow	Red
Small Single Processor	920, 922, 925, 932, 935	< 4	5 to 8	> 8
Medium Max 2 Way	918, 928, 929, 939, 949	< 8	9 to 12	> 12
Moderate Max 2 Way	950, 955, 957, 967, 977, 987, 960, 968	< 13	14 to 19	> 19
Large Max 2 Way	959, 978, 980, 988, 990	< 20	21 to 40	> 40
Larger Max 4 Way	959, 969, 979, 989, 992, 995, 996, 997	< 40	41 to 60	> 60
Larger Still Max 6 Way	969, 979, 989, 992, 995, 996, 997	< 100	101 to 150	> 150
Very Large Max 8 Way	969, 979, 989, 992, 995, 996, 997	< 150	151 to 200	> 200

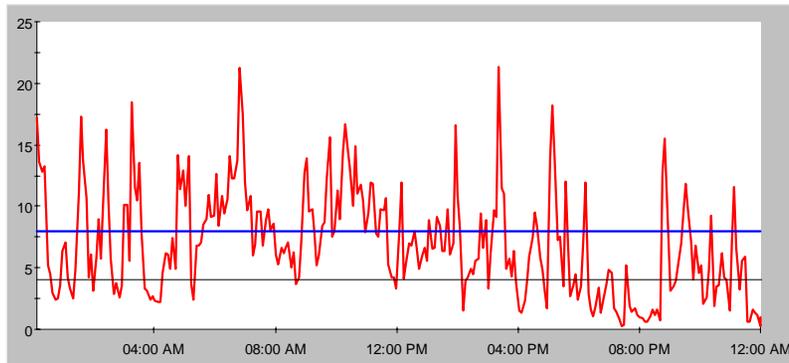
Memory Manager

Memory Manager %
10/23/2000 00:00 - 10/23/2000 23:55



— CPU mem manager % — Max Marker

Memory Manager %
05/25/2001 12:08 AM - 05/26/2001 12:00 AM

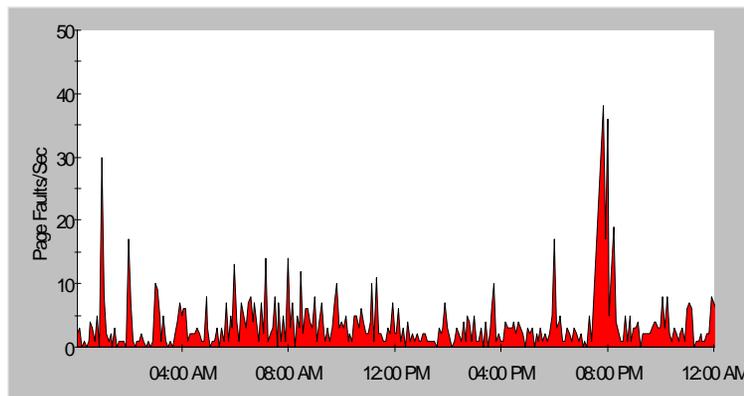


— CPU mem manager % — Max Marker

- Procure more than you need as you can never have too much memory
- Mitigate physical disk writing activity
- Bad to worse more quickly when out of memory
- Exceeds the red threshold of 8%
- MPE/iX is crippled by a memory shortage

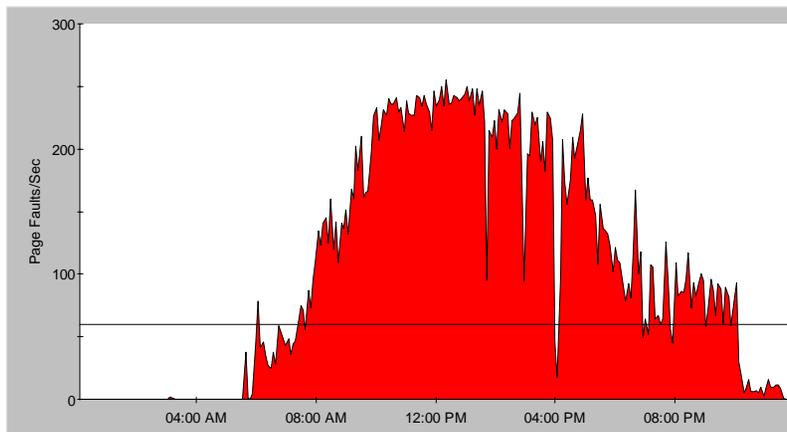
Page Faults

Page Fault Rate
01/18/2001 12:05 AM - 01/19/2001 12:00 AM



- Normal rates throughout the day shift
- Minimal off-shift spikes
- Balance of activity

Page Fault Rate
06/18/2001 12:05 AM - 06/18/2001 11:55 PM



- High page fault rates for primary shift
- Page Faults exceed the red threshold of 60

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Memory Summary

What zone are you in?

Yellow Zone

- Investigate adding more memory

Red Zone

- Add more memory

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Disk - Key Performance Indicators

Disk I/O By Drive: Input/Output of disk data. This is an activity performed by the operating system to retrieve or post data to or from a physical disk device.

Disk Service Time: Amount of time it takes the disk device to complete a disk I/O

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Disk- Key Performance Indicators-cont'd

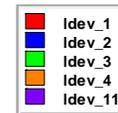
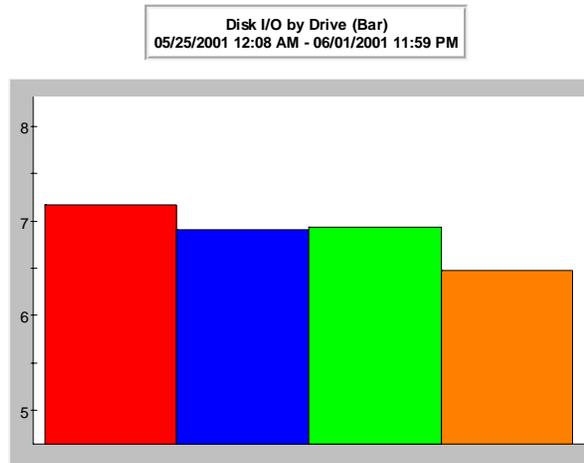
Disk I/O Queue Length: Percentage of the CPU used to manager main memory

Disk I/O Queue Length	<.5%	.5-1%	>1%
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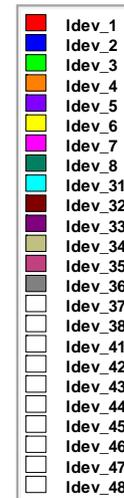
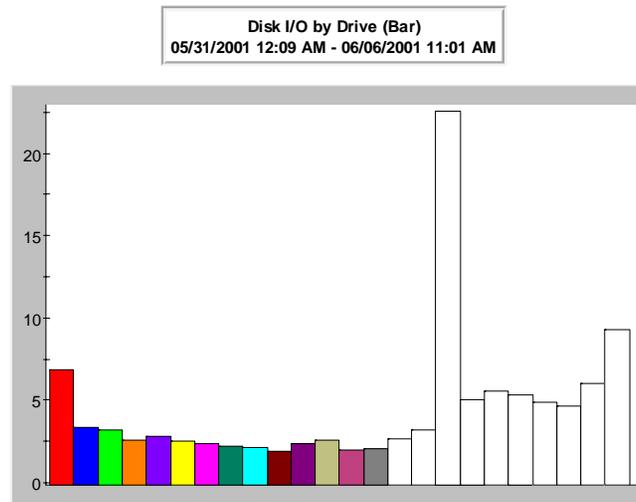
Read Hit %: The read hit percentage is the percentage of all read-type I/Os that are satisfied in memory, thereby eliminating physical I/Os

Read Hit %	>95%	95-85	<85%
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Disk I/O



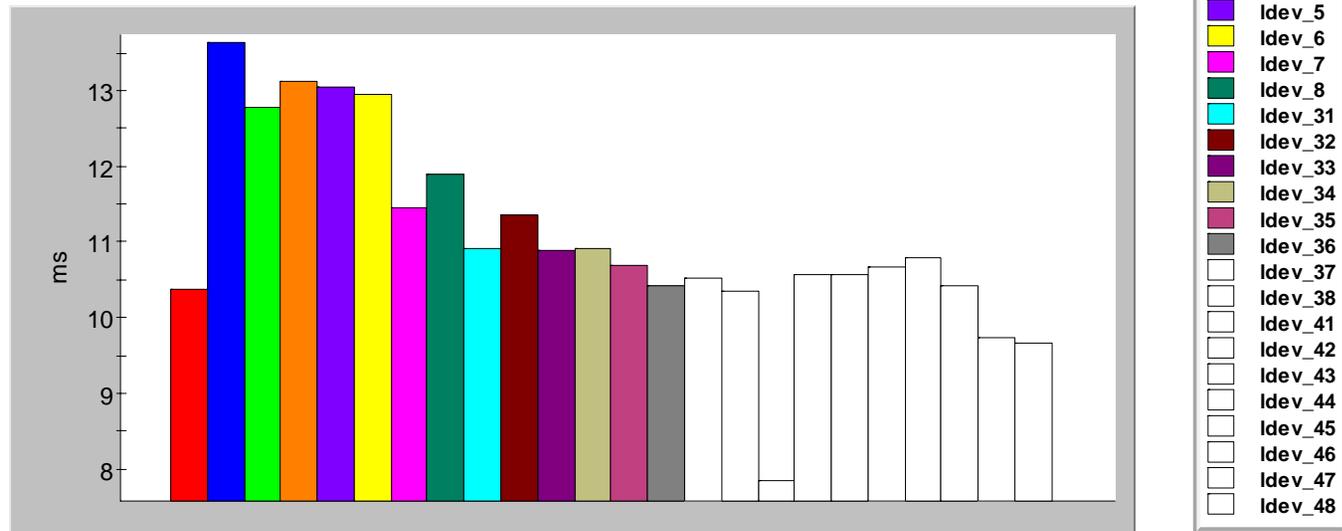
- Excellent balance
- Less than 1 disk I/O variation
- Always look at the Y-axis



- Heavy disk I/O on Ldev 41
- Inefficient use of resources

Disk Service Time

Disk Service Time by Drive (bar)
05/31/2001 12:09 AM - 06/06/2001 11:01 AM



1-10 - characteristics Ultra fast & wide SCSI

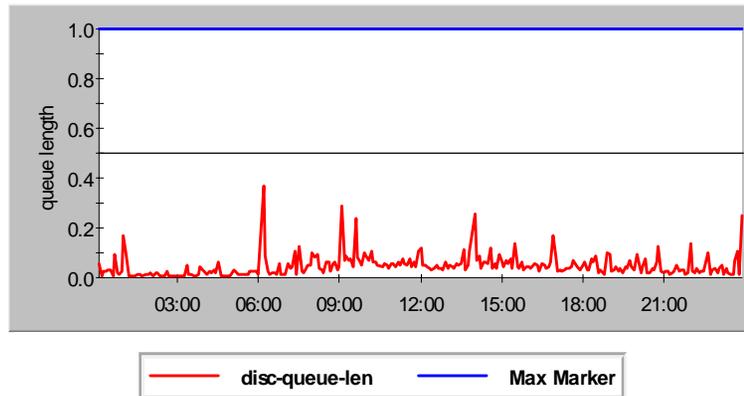
12-18 - characteristics Of fast & wide SCSI

20-25 - characteristics Of single ended SCSI

25+ - characteristics Of older style HPIB & HPSL

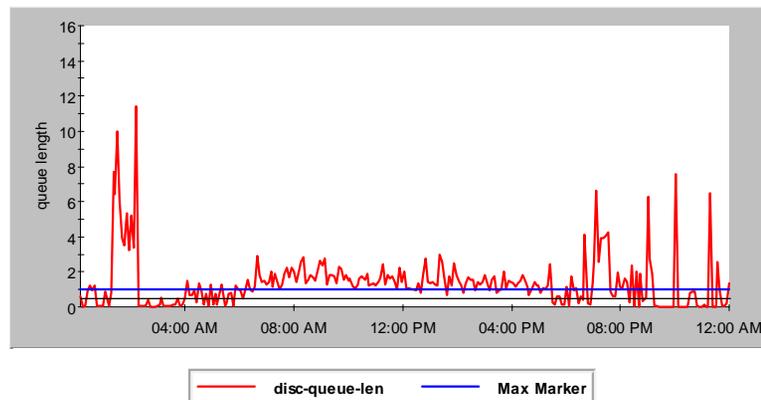
Disk I/O Queue Length

Disk I/O Queue Length
10/12/2000 00:05 - 10/12/2000 23:55



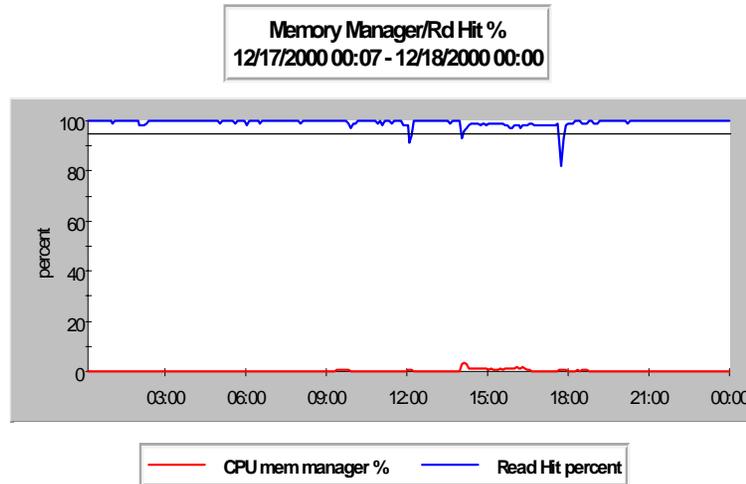
- This is a typical NORMAL system
- Evenly distributed
- Several spikes but all below the warning of .5

Disk I/O Queue Length
05/31/2001 12:09 AM - 06/01/2001 12:00 AM

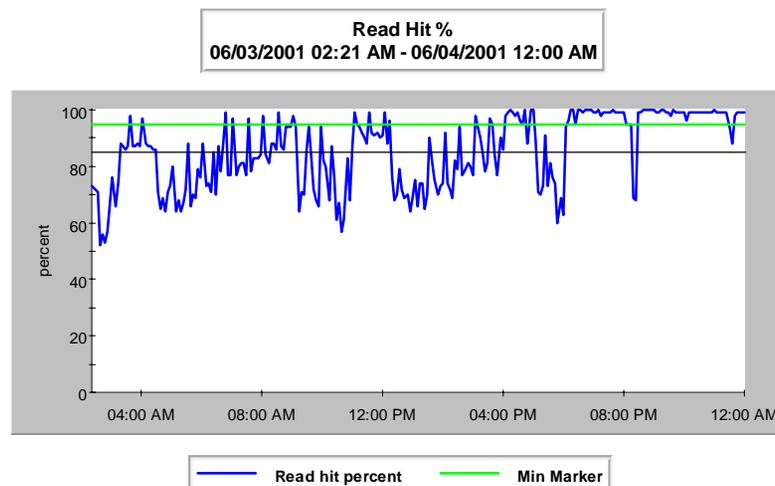


- The greater the queue length, the greater the wait time
- I/O queue lengths over 1 are bad
- Either balance is poor or not enough memory

Read Hits



- Measurement of data locality
- Efficiency of Pre-fetch algorithms



- Poor read %
- Compare to workload activity

Disk Summary

What zone are you in?

Yellow Zone

- Address disk & file fragmentation
- Address database inefficiencies
- Investigate load balancing
- Investigate disk configuration

Red Zone

- Defragment your disk drives and files or reload your system
- Repack and/or reorganize your databases

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Conclusion

- ⚡ **You MUST have a performance monitoring tool**
- ⚡ **Efficiently manage all your resources; CPU, Memory, Disk**
- ⚡ **Removing one bottleneck may reveal another bottleneck**

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