Zen & the Art of Perfmon

sqlbits

David Klee

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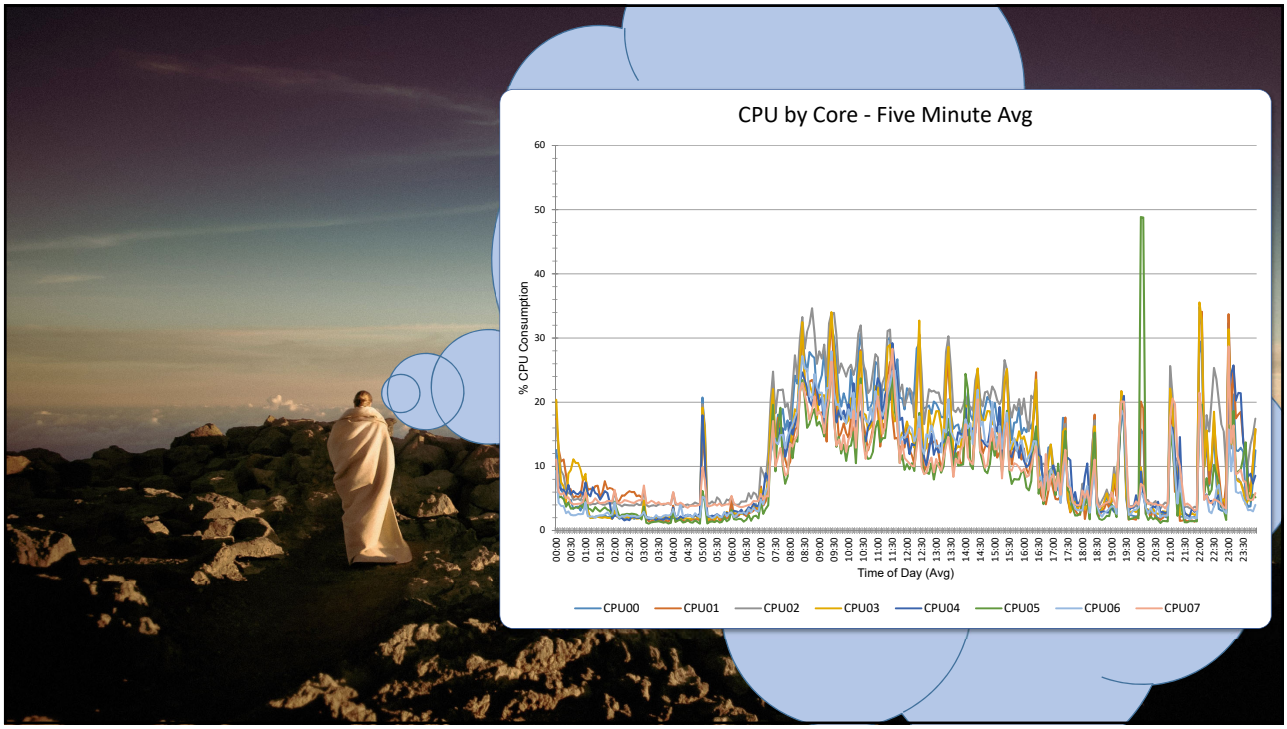

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About David Klee

Microsoft MVP Most Valuable Professional

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Specialties / Focus Areas / Passions:

- Performance Tuning
- Business Continuity
- Virtualization & Cloud
- Infrastructure Architecture
- Health & Efficiency
- Capacity Management

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Founder & Technical Exorcist

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Performance

- Completely subjective…
- … until ***you*** make it objective.
- No more arguments.
- Numbers drive the discussion.

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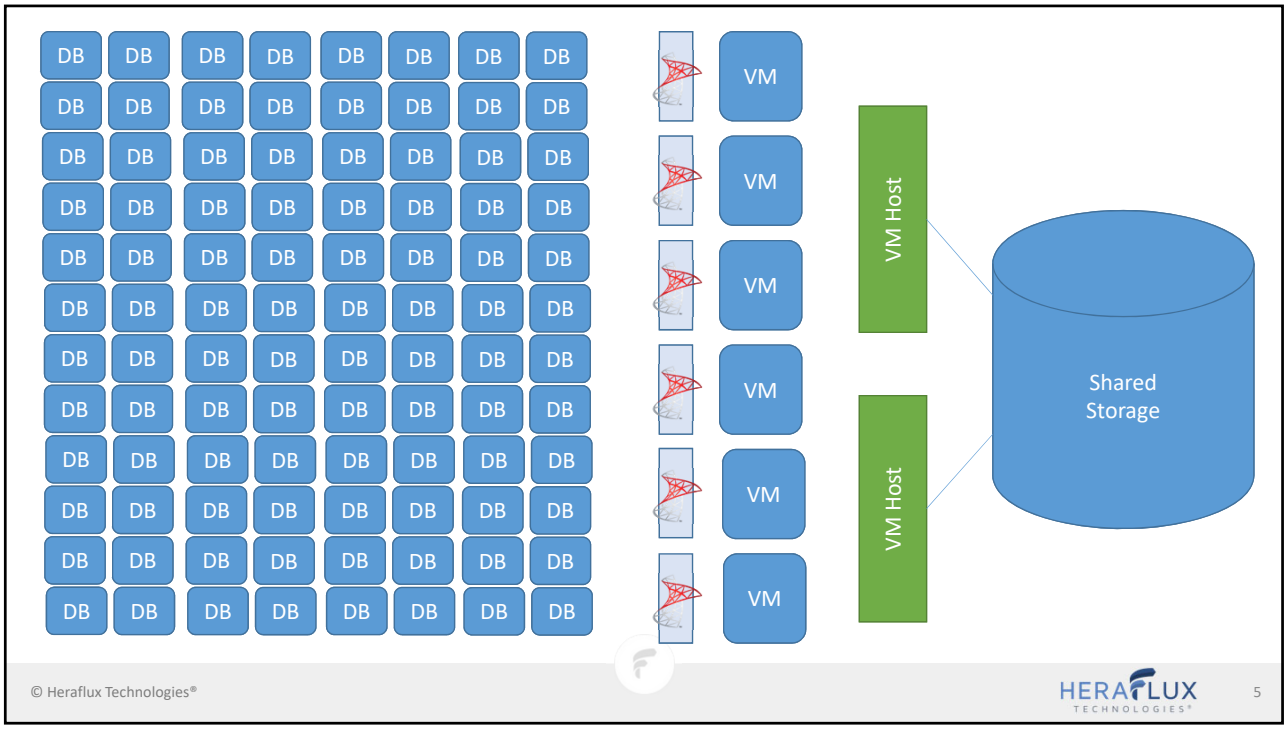

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Straightforward Questions

- Highest CPU consuming instance
- Memory pressure
- Storage throughput consumption

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Harder Questions

- Impact of "noisy neighbors"
  - CPU scheduling impact
  - Storage latency spike not originating in that server
- Impact of system backups on the system
- Correlated (seemingly) random events

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Third-Party Tools

SQLWATCH.IO

redgate

dbWatch DATABASE CONTROL

SentryOne®

solarwinds Database Performance Analyzer

IDERA

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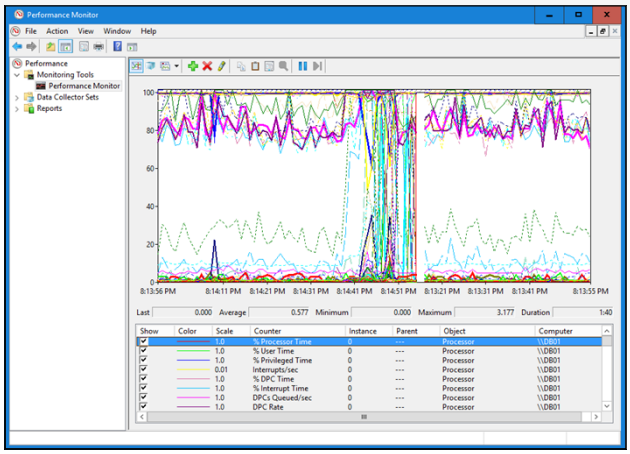
Windows Performance Counters

- Third-Party Tools
- Perfmon built-in to Windows
- Meaning, not just numbers
- Show before and after
- Granularity



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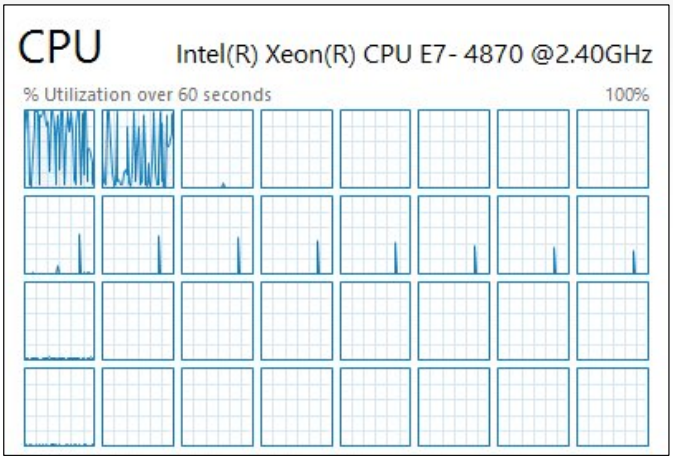
Granularity

- "I have 32 CPUs!"
- 6% CPU consumption average?



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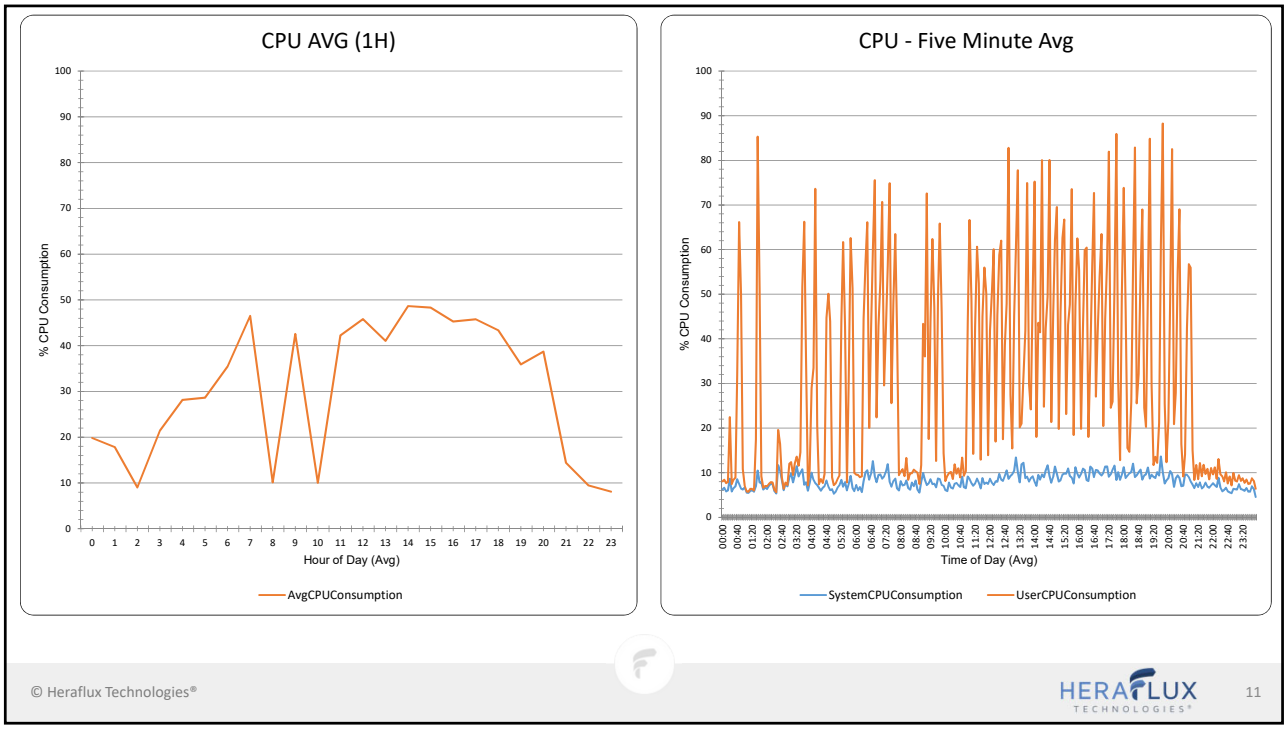

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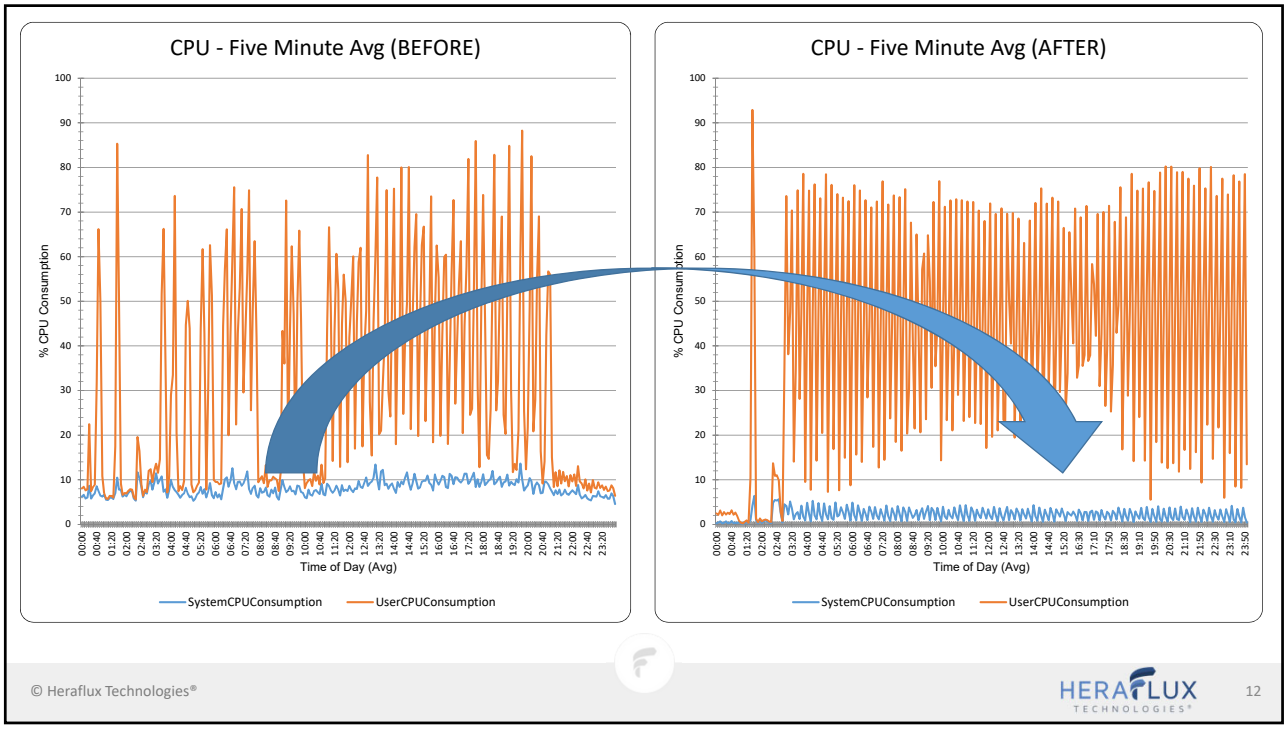

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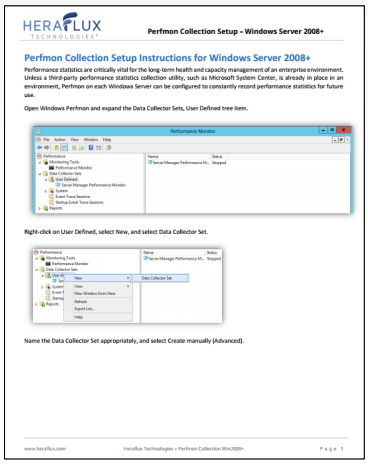
Windows Perfmon

- Collect raw data first
- Perfmon how-to guide
  - Download at hfxte.ch/perfmon
  - No contact info required
- 30-second collection interval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Perfmon Collection Setup - Windows Server 2008+

Perfmon Collection Setup Instructions for Windows Server 2008+

Performance statistics are critically vital for the long-term health and capacity management of an enterprise environment. Unless a third-party performance statistics collection utility, such as Microsoft System Center, is already in place in an environment, Perfmon on each Windows Server can be configured to constantly record performance statistics for future use.

Open Windows Perfmon and expand the Data Collector Sets, User Defined tree item.

Right-click on User Defined, select New, and select Data Collector Set.

Name the Data Collector Set appropriately, and select Create manually (Advanced).

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Perfmon Collector Setup Guide

hfxte.ch/perfmon

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CPU Performance Counters

Counter Set	Counter	Explanation
Processor	% Privileged Time	Windows OS layer CPU consumption
	% User Time	Application CPU consumption
	% Processor Time	% Privileged Time + % User Time
Process	% Processor Time	CPU consumption by process EXE
Processor Information	% of Maximum Frequency	< 100% = CPU core parking (bad)
System	Context Switches / sec	> 5000 x proc count is CPU scheduling pressure
	Processor Queue Length	> 5 x proc count is CPU scheduling pressure

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Memory Performance Counters

Counter Set	Counter	Explanation
Memory	Available MBytes	Windows OS layer CPU consumption
	Lazy Writes / sec	Memory flushed out to disk
	Memory Grants Pending	Processes waiting for memory
	Page Faults / sec	Thought it was in RAM, but it was not
	Page Reads / sec	Memory successfully used to cache blocks of data
	Page Writes / sec	Memory successfully written to
	Pages / sec	Memory paged out of RAM to disk
SQL Server: Buffer Manager	Page Life Expectancy	Average of lifetime of pages in buffer pool
	Buffer Cache Hit Ratio	% of pages found in BP without going to disk
Paging File	% Usage	When available RAM not enough

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Network Performance Counters

Counter Set	Counter	Explanation
Network Interface	Bytes Received / sec	Inbound data traffic rates (convert to MB/s)
	Bytes Sent / sec	Outbound data traffic rates (convert to MB/s)
	Packets Outbound Discarded	Thrown away blocks even though no errors occurred
	Packets Outbound Errors	Failed transmits
	Packets Received Discarded	Thrown away blocks even though no errors occurred
	Packets Received Errors	Failed transmits

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Windows Disk Performance Counters

Counter	Set	Explanation
PhysicalDisk	% Idle Time	Indication of load
	Avg. Disk Bytes / Read	Workload patterns
	Avg. Disk Bytes / Write	
	Avg. Disk sec / Read	Disk Latency (convert to milliseconds)
	Avg. Disk sec / Write	
	Disk Read Bytes / sec	Throughput (convert to MB/s)
	Disk Write Bytes / sec	
	Disk Reads / sec	IOs per second (IOPS)
	Disk Writes / sec	

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SQL Server Performance Counters

Counter Set	Counter	Explanation
SQL Server:Buffer Manager	Buffer Cache Hit Ratio	% in cache without having to go to disk
	Page Life Expectancy	Duration (in sec) data held in buffer pool
SQL Server:SQL Statistics	Batch Requests / sec	# of statements executed per second
	SQL Compilations / sec	Statement compilations
	SQL Re-Compilations / sec	Statement re-compilations
SQL Server:Locks	Lock Waits / sec	Locks that had to wait
SQL Server:General Statistics	Processes Block	# of blocked processes
SQL Server:Database Application	Database transactions / sec	Transactions per second

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Perfmon to SQL

PowerShell Loader for Perfmon Files

github.com/heraflux/BLGtoSQL

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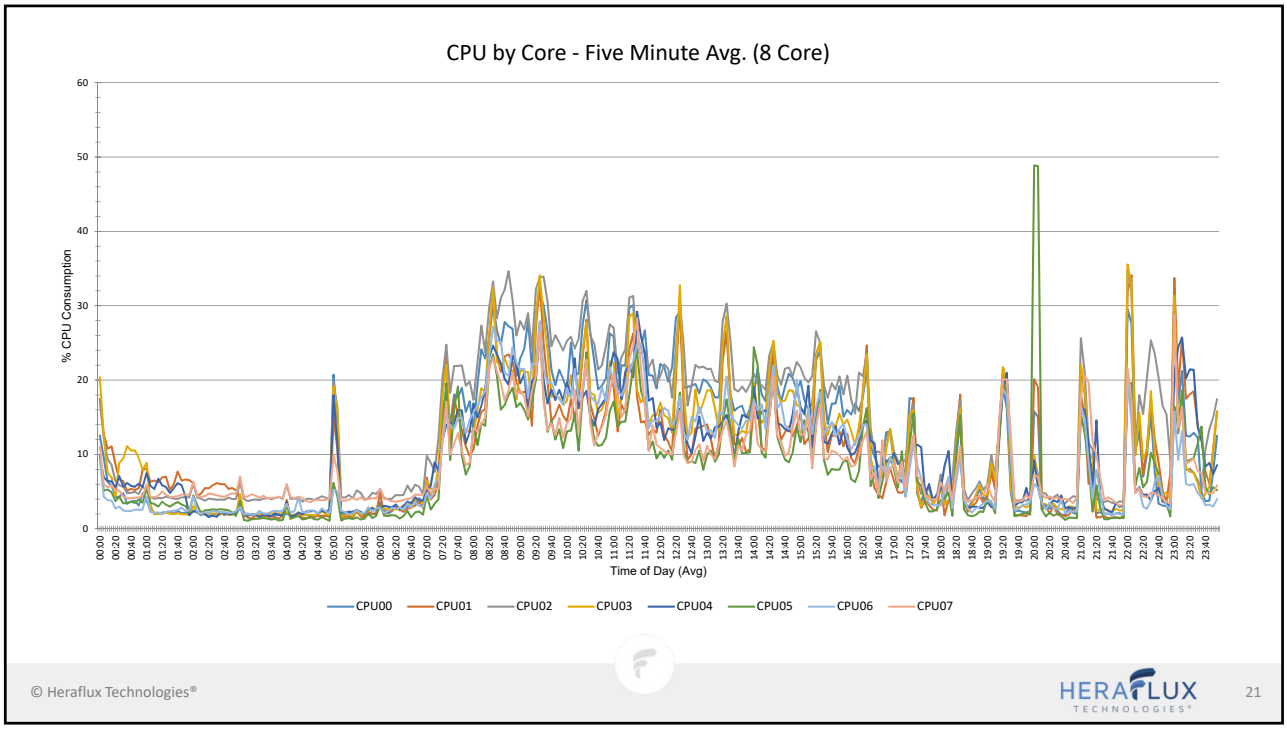

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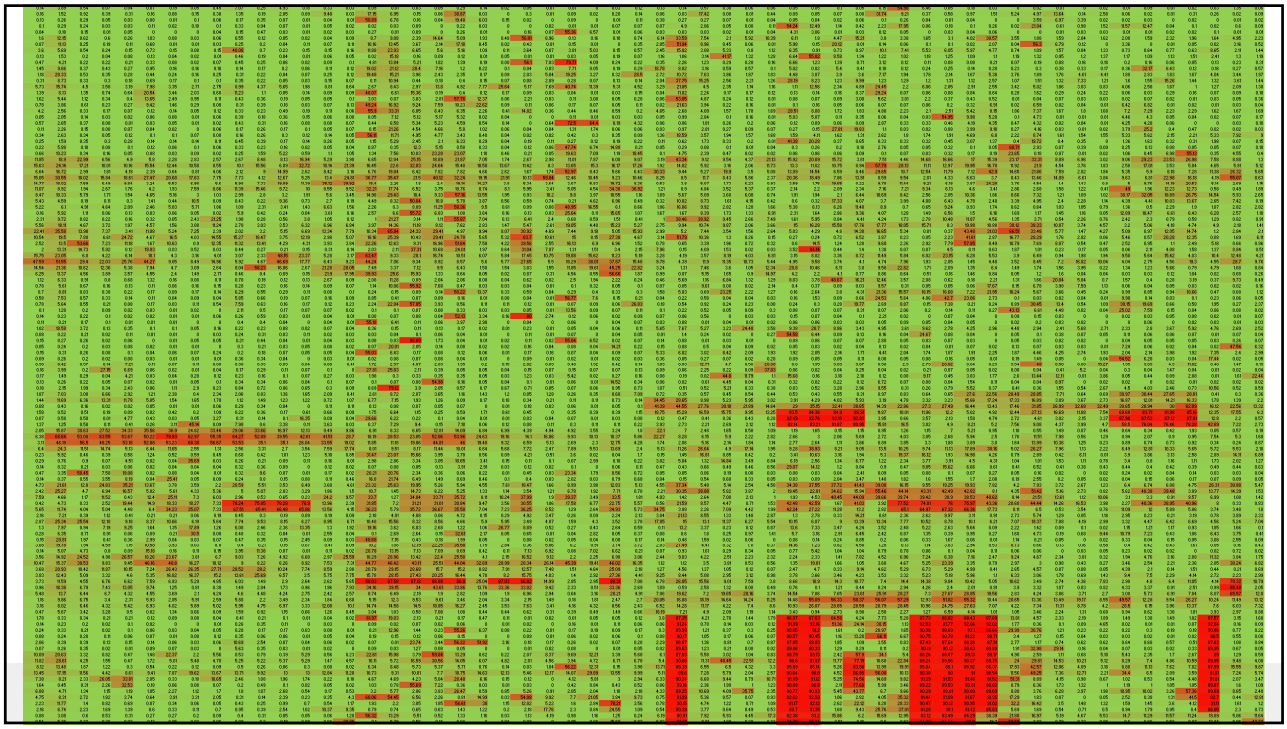

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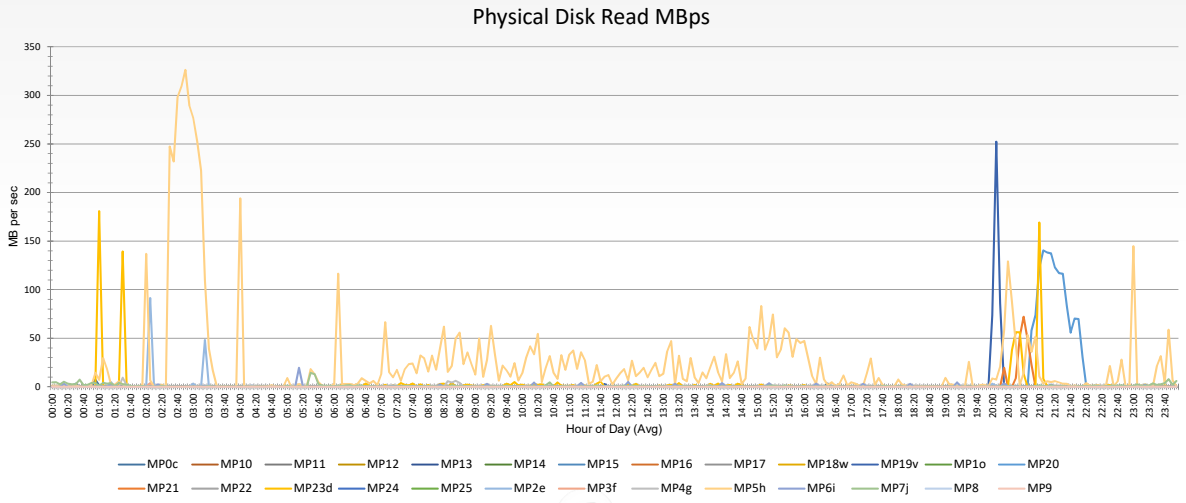
Disk Throughput



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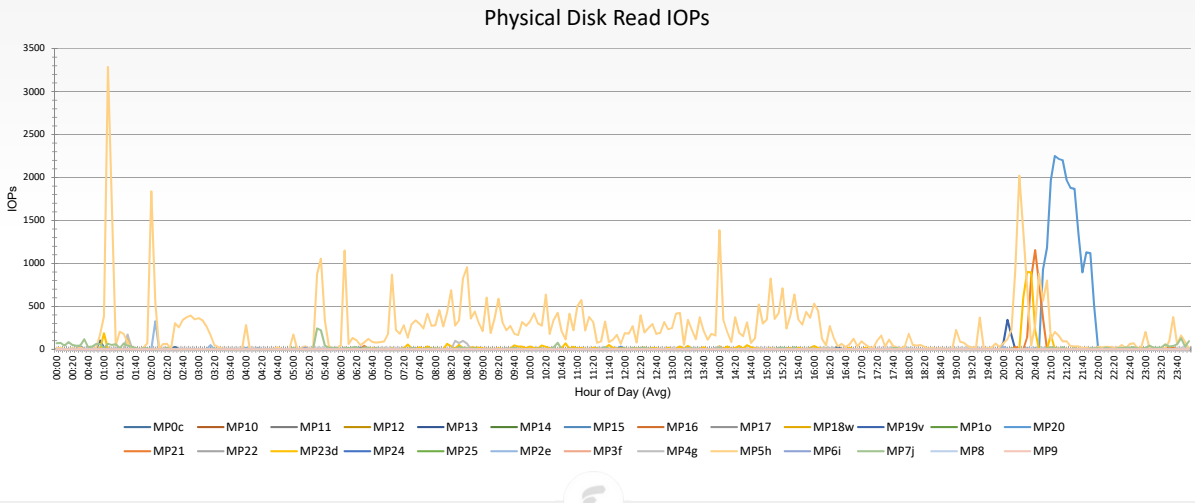
Disk IOPs



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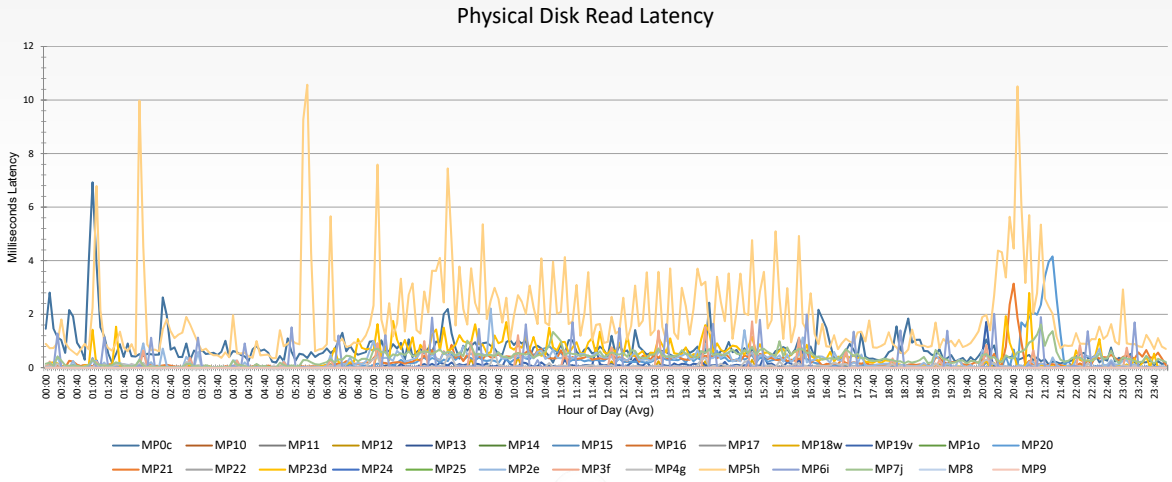
Disk Latency



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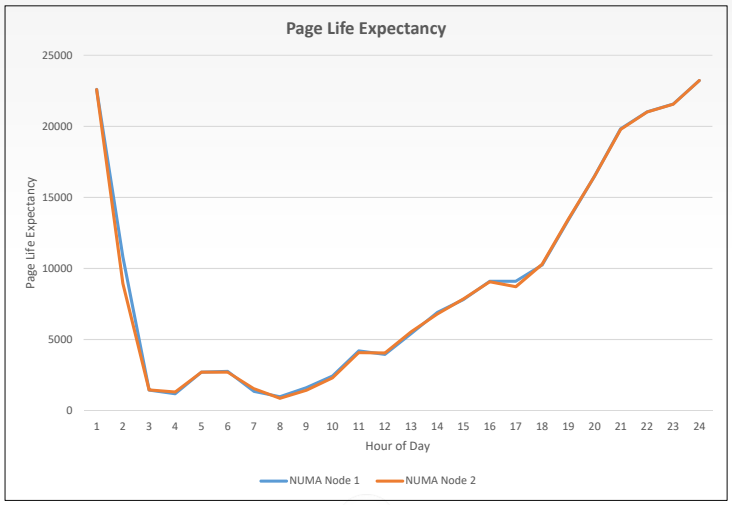
Page Life Expectancy



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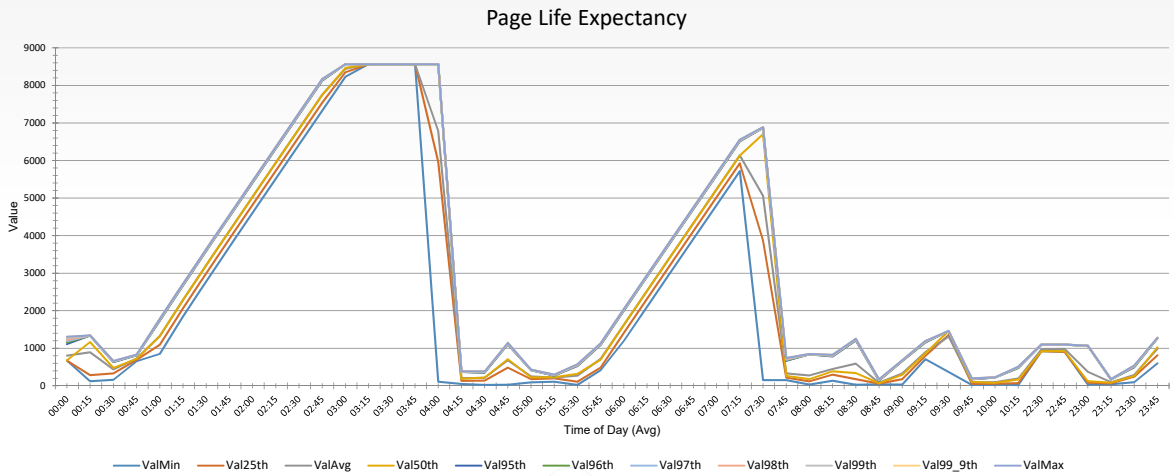
Page Life Expectancy



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Think Bigger

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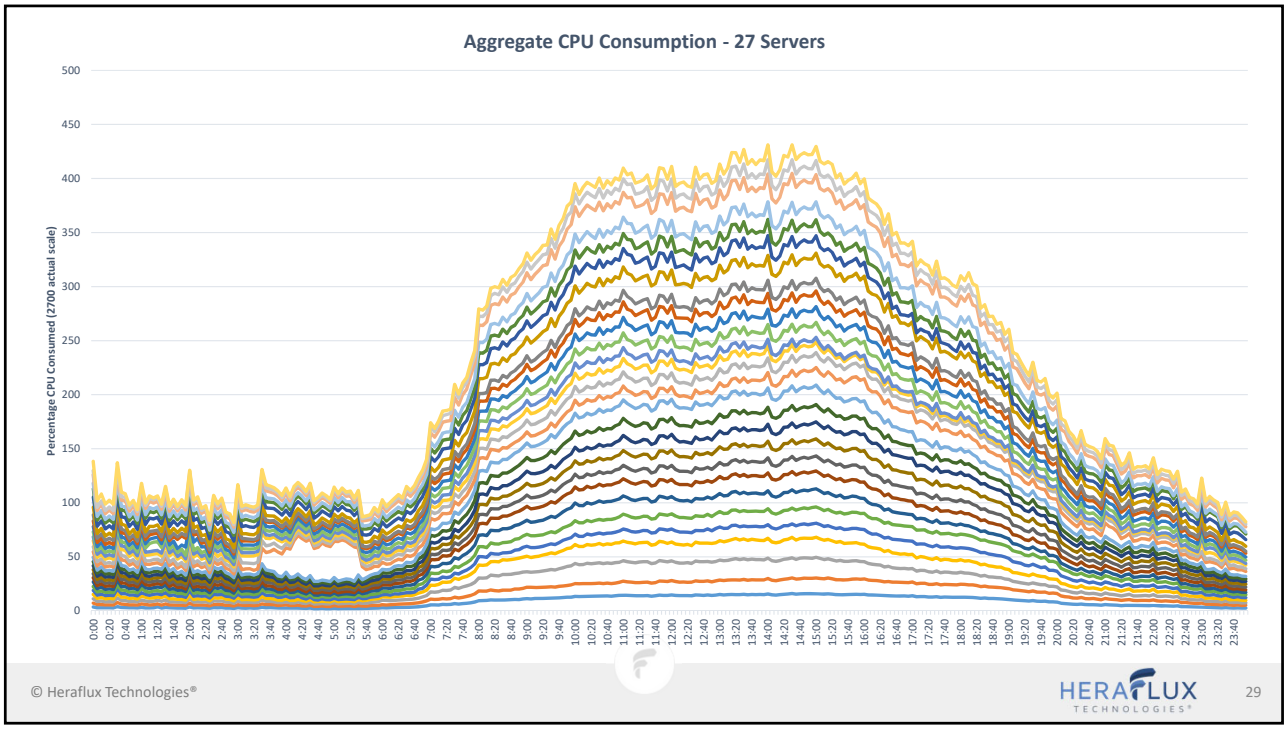

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Put It All Together

- On-going sampling
- Periodic analysis
- Short-term performance triage
- Long-term capacity trends

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Questions?

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Thanks for attending!

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