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Tuning WebHound™ 4.0 and SAS® 8.2 for Enterprise Windows Systems

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Overview

- Determine maximum “scalability” of WebHound™ application on Enterprise Windows System (ES7000).
- Provide Commodity / Enterprise System Comparisons
- Document results and provide sizing guidelines as a result of the benchmarking activities

Scalability

“Achieving Improved Performance Benefits when Increasing System Capacity (CPUs, I/O, Memory)”

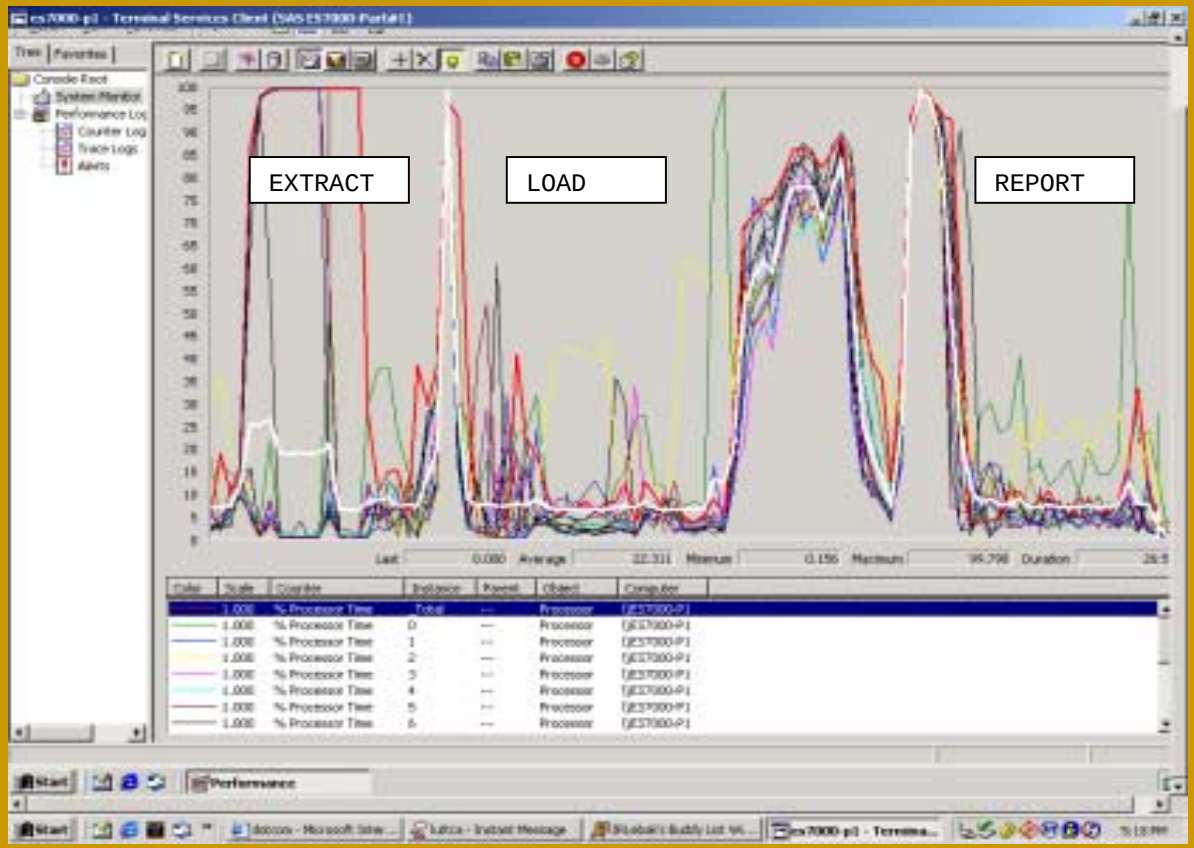
Topics to be Covered

- WebHound™ Architecture and Applicability to Enterprise Systems
- Benchmarking Testing Description and Methodology
- Results achieved
  - Commodity .vs Enterprise Servers
- Sizing Guidelines for Windows Enterprise Systems

WebHound™ Architecture

- Batch-oriented Processing
- Command-driven
- 3 distinct processing phases
  - Extract
  - Load
  - Report
- Parallel Processing Capability
  - SAS/CONNECT® w/ MP Connect Feature
  - Provides potential for “scalability” results
  - Parent/Child relationship provide concurrent SAS sessions

WebHound™
MP Connect Processing



Testing Methodology

- **Define Workload(s)**
- **Determine Key Performance Metric(s) to Measure**
  - **Total Processing Time**
    - ***Extract, Load and Report Phases***
- **Establish Baseline for Comparisons**
  - **Unisys 8 CPU Commodity Windows Server**
    - **ES5085 Server**
- **System and Application -Level Tuning Only (No Code Changes!)**

Workload Characterizations

9 different workloads varied by:

1. **Number of days to process**
   - **One Day**
   - **Seven Days**
   - **Thirty Days**
2. **Web Log**
   - **Sizes and Number of files to process**

Web Log Data Input Sizes: (Each one a workload)

	1 DAY	7 DAY	30 DAY
SMALL	41MB	798MB	3.13GB
MEDIUM	219 MB	2.61GB	11.0GB
LARGE	2.9 GB	17.3 GB	40.1 GB

Baseline System Configuration 8 CPU Commodity Server

- Unisys ES5085 Server
  - 8 700 MHZ XEON Processors
  - 8 GB RAM
  - 2 I/O Channels
    - Emulex Fibre channel controllers
  - Disk Subsystem
    - 1 ESM7800 EMC Clariion
    - 20 36 GB Drives (720 GB) configured as RAID 1/0
- Windows 2000 Advanced Server SP2

Target System Configuration ES7000 Enterprise Server

- Unisys ES7000 16 CPUs
  - 16 700 MHZ Xeon Processors
  - 16 GB RAM
  - 2 Fibre Channel Paths to 720 GB Disk Subsystem
  - Hardware RAID 1/0 (Striped then Mirrored) Disks
  - 2 Brocade SAN Switches

- Windows 2000 Datacenter Server SP2

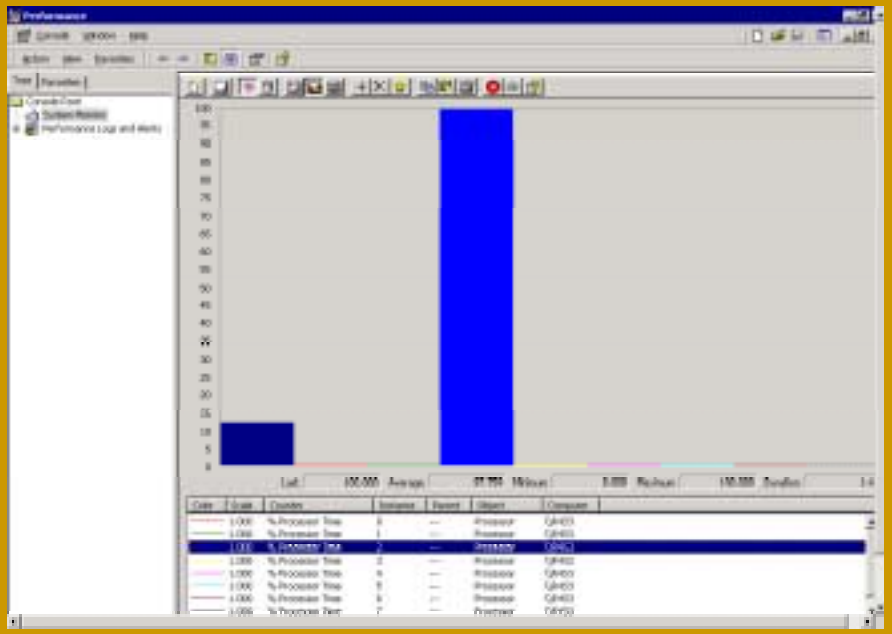
Tuning Methodology

- **Establish a Baseline (ES5085 Server)**
- **Proper Monitoring**
  - **W2K Datacenter Performance Monitor**
  - **W2k Datacenter Task Manager**
  - **W2K/Unisys Process Manager (Affinity)**
- **Make Changes Individually (One at a Time)**
- **Repeat Tests…..Repeat Tests…..Repeat Tests…..**

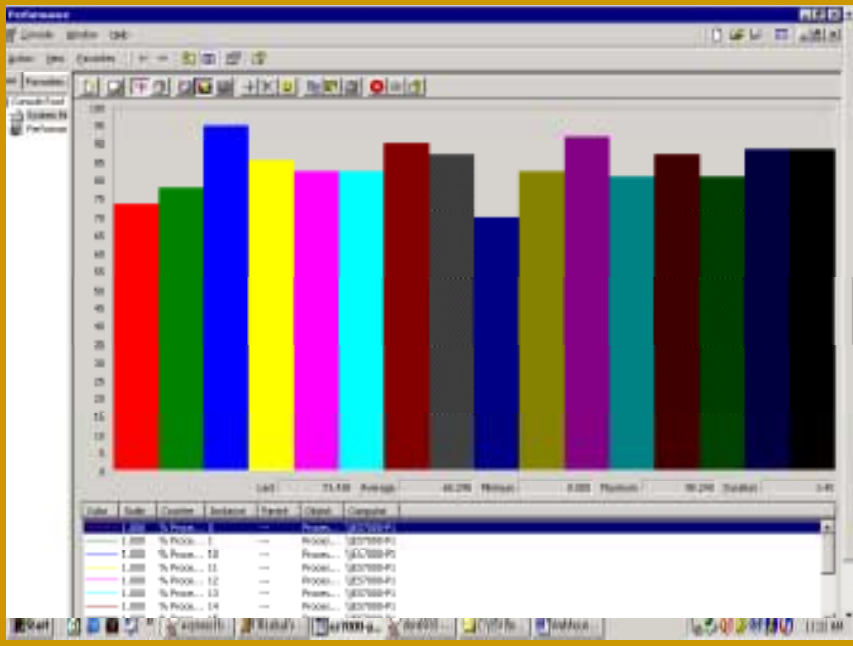
Where are the the Bottleneck(s)

- CPU
  - Processor Utilization
  - CPU Queuing
  - Thread Management
- I/O
  - Disk Queuing
  - I/O Per Second
- Memory
  - Pages/sec
  - Available Bytes

Results ...CPU Scalability.....



1 Job CPU Utilization (No parallel processing)



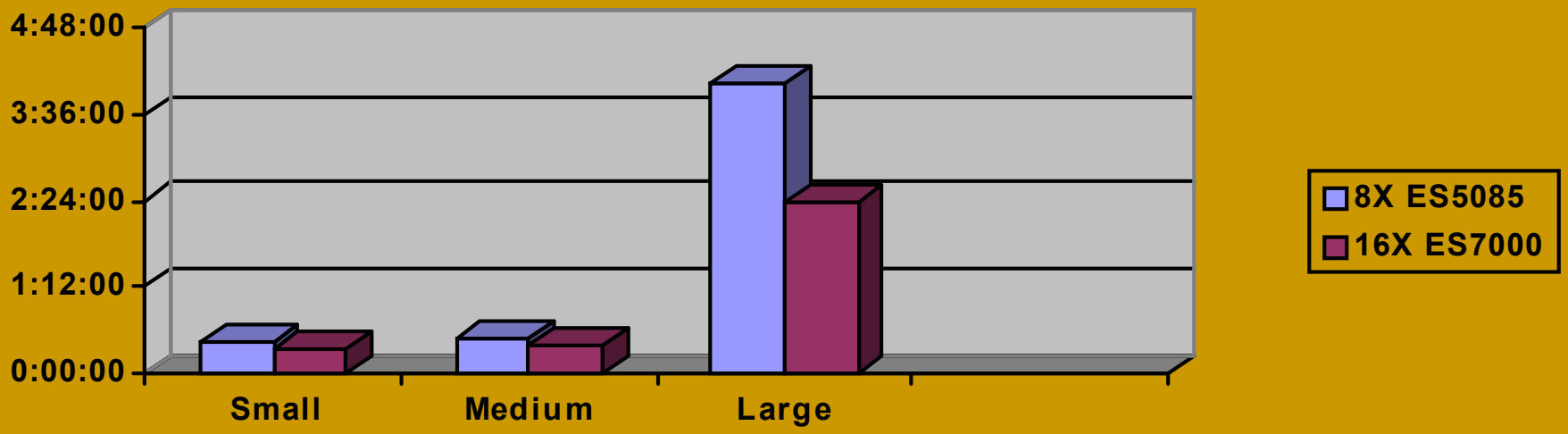
14 Job (SAS Sessions) CPU Utilization

Results I/O

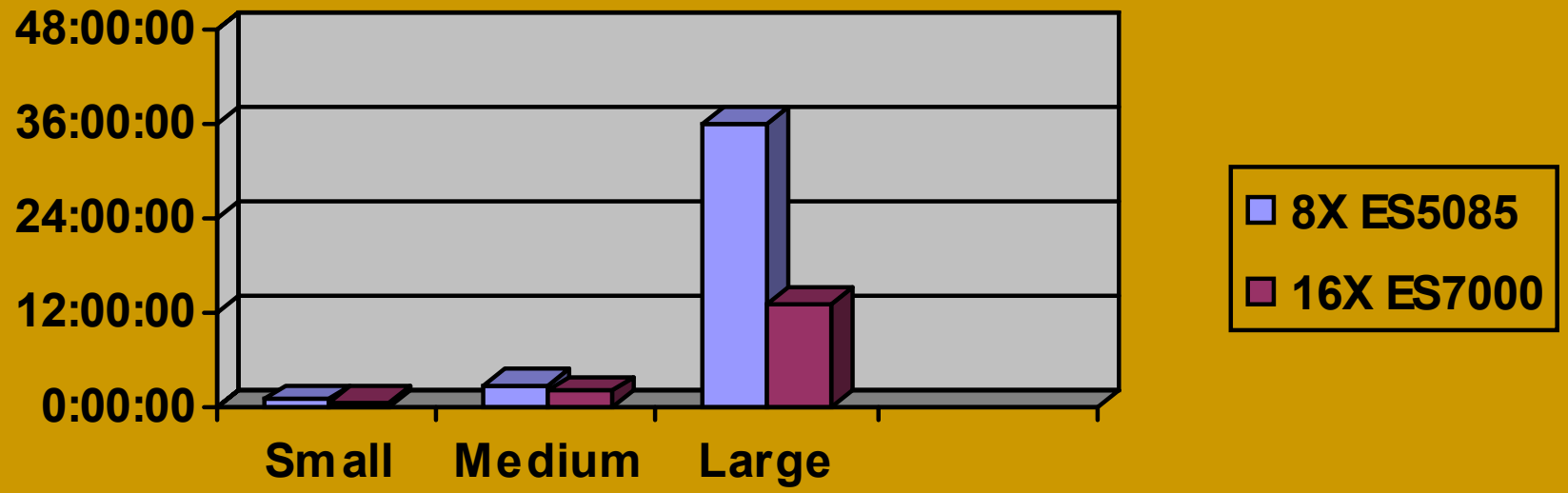
- **High Disk Queuing**
  - **Multiple SAS sessions produces contention for SASWORK Area**
  - **Initially prevented improved performance when testing more than 8 CPUs**

Majority of Tuning activity focused on resolving this issue to obtain higher scalability results

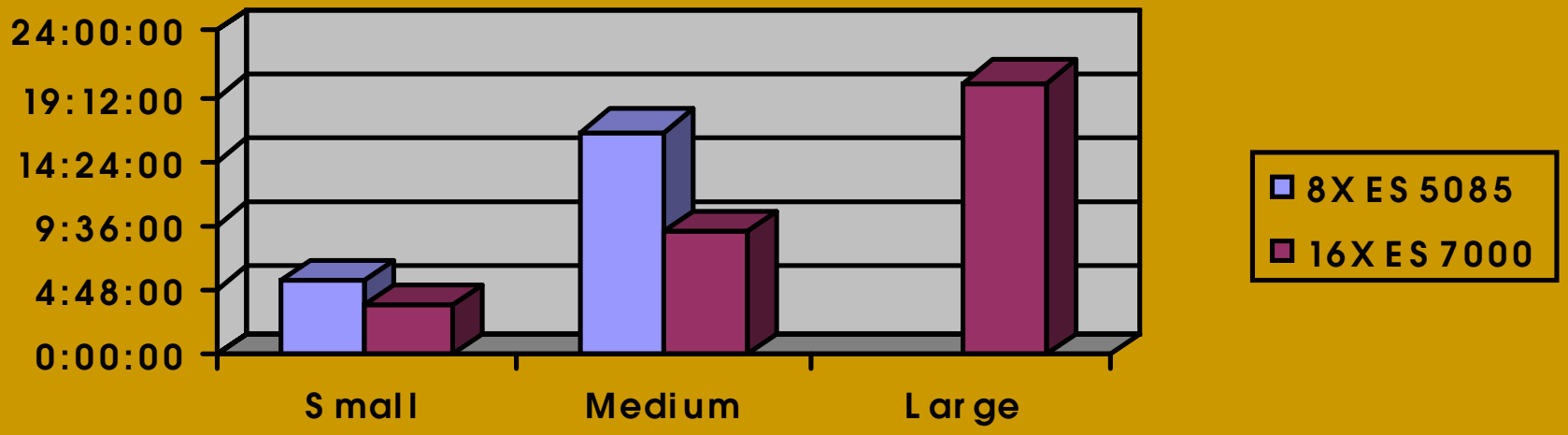
Final Processing Time Comparison… (One Day)



Seven Day Processing Results...



30 Day's Processing...



Obtaining Optimal Performance…

- **Robust Disk Configuration**
  - **Multiple I/O Channels**
  - **External Disk Subsystem**
    - **Multiple Logical Units (LUNs)**
  - **Hardware RAID**
  - **Software RAID (RAID over RAID)**

- **8-16 Processor (Symmetrical Multi-Processing) Server**
  - **Most Effectively handles multiple SAS sessions**

ES7000 Guidelines Hardware

- Processors
  - Most effective when number of SAS child sessions is 2 less than total number of CPUs
- Memory
  - 16 GB
  - /3 GB Boot.ini Switch
    - Allows SAS sessions more than 2 GB
- I/O
  - 2 or More Fibre-Channel Controllers
  - Storage Area Networks (SAN)
  - Multiple (at least 2) Disk Subsystems
  - Split LUNs (Disks) across all channels

WebHound™ Application Guidelines

- **SASWORK (Temporary Area used by ALL SAS Sessions)**
  - **Hardware RAID across multiple spindles**
  - **Create at least 4 Logical Units (LUNs)**
  - **Split LUNs (I/O activity) across multiple (>2) channels**
  - **Group LUNs together in Windows as single Volume**
    - **Provides Software Striping**

- **SAS MART (STAY Area)**
  - **Raid 1/0**

WebHound™ Sizing…

- File sizing guidelines are provided in the SUGI paper proceedings…
- Engage SAS®/Unisys CTC and COE for assistance

Conclusion

- WebHound™ 4.0 benefits from scalable hardware in Enterprise Windows Environments
- Reduced Processing Time is the end result
- Enterprise Systems provide maximum benefits for larger workloads

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Questions?

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