Performance Tuning Oracle E-Business Suite - Part 2
Client and Network Tuning

Andy Tremayne, Senior Architect, Applications Performance
Oracle Development
Agenda

- Client Tuning
- Network Tuning
Client Tuning
A Very In-Depth Paper

- Oracle E-Business Suite 11i and R12 PC Client Performance whitepaper Doc ID 557259.1
  - Do I need CPU, memory, or both?
  - Is a low specification client usable?
  - Is there a difference in client requirements between 11i and R12?
  - Plots Self Service screen and Oracle Form opening times
  - Provides network traffic analysis
Client Tuning
Measuring Memory: Process Explorer

- Memory
- Browser
- Add-ons
Client Tuning
Avoid Minimizing Applications on Low Memory Clients

- Memory optimizers

Private Bytes remains static
Working Set does not recover for a long time

Working Set 14%
Client Tuning
Jar File Validation vs Revalidation

First time use or on upgrade

JAR file download

Normal Usage
(Already on PC)

Common JARs
fndforms.jar
fndaol.jar
6.5MB

Validated
On 1st Use

6.5MB

JRE 6u31 50% more efficient than JRE 1.5

JRE 6u31

Other JARs
This example
4.6MB

Common Jar Files
JRE 1.5 11i: 10.6 MB
JRE 6u31 11i: 5.1 MB 12.1.3: 6.5 MB

Manufacturing
Job Workbench

JAR files shared by:
GL, AP, PO, FA etc
Client Tuning

Minimum Specification 798258.1

• CPU speed
  – Oracle recommends at least 350 MHz processors
  You will experience significant performance improvement with faster (1.4+ GHz) processors
  Note that the minimum requirements will provide minimal performance
  Your requirements may be higher!

• Memory
  – Consider the minimum requirements for the operating system
  Oracle recommends at least 256 MB of RAM for Microsoft Windows/Apple MAC clients
  If running with other apps, you will experience better performance with additional memory

Win XP 233MHz
  64MB min 128MB recommended
Win 7 1GHz 1GB(32 bit) or 2GB(64 bit)

MS Word 2003: 67s to open a doc
Office 2007: 500MHz 512MB min
Many features (grammar and spelling) won’t work with < 1GB

When considering CPU and memory, consider the minimum requirements for the OS, other software that runs concurrently, and external factors such as the network characteristics. Check that the configuration is sufficient to achieve the throughput necessary to sustain your business model. Your requirements may be higher than the minimum specification.
### Client Tuning

**Clients Used in this Test Scenario**

<table>
<thead>
<tr>
<th>Client</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>366MHz Pentium II</td>
<td>128MB</td>
</tr>
<tr>
<td>700MHz Pentium III</td>
<td>256MB</td>
</tr>
<tr>
<td>1.6GHz Pentium</td>
<td>1GB</td>
</tr>
<tr>
<td>1.8GHz T2400 Mobile Core Duo</td>
<td>2GB</td>
</tr>
</tbody>
</table>

- **366MHz Pentium II**: Below the minimum
- **700MHz Pentium III**: Equal to the Oracle minimum
- **1.6GHz Pentium**: Nearest to Recommended
- **1.8GHz T2400 Mobile Core Duo**: Most have at least this spec
Load Times: Fastest Clients Only

First Use (Green & Purple) Validated (Red & Blue)

Convergence: JARs previously validated to get to this Form

No JARs up to this point
Validated JARs (already used) - All Clients

On a WAN
Keep Menus Small
R12 Rearchitected
Validated Jars … Expanded

Load Times for Previously Validated JAR files

All HTML < 7 seconds
Client Tuning

Memory Utilization: 11i and R12
## Windows 7 vs Windows XP

### Employee Self Service View Payslip

<table>
<thead>
<tr>
<th></th>
<th>Windows 7</th>
<th></th>
<th></th>
<th></th>
<th>Windows XP</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Working Set</td>
<td>Packets</td>
<td>Time</td>
<td>Bytes</td>
<td>Working Set</td>
<td>Packets</td>
<td>Time</td>
<td>Bytes</td>
</tr>
<tr>
<td>IE</td>
<td>44,620</td>
<td>82</td>
<td>0.77</td>
<td>93,282</td>
<td>52,310</td>
<td>94</td>
<td>0.90</td>
<td>93,991</td>
</tr>
<tr>
<td>FF</td>
<td>47,829</td>
<td>84</td>
<td>0.86</td>
<td>98,380</td>
<td>50,264</td>
<td>97</td>
<td>0.93</td>
<td>96,960</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Packets</th>
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<td>96,960</td>
</tr>
</tbody>
</table>

### Order Management Sales Orders

<table>
<thead>
<tr>
<th></th>
<th>Windows 7</th>
<th></th>
<th></th>
<th></th>
<th>Windows XP</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
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<td>Working Set</td>
<td>Packets</td>
<td>Time</td>
<td>Bytes</td>
<td>Working Set</td>
<td>Packets</td>
<td>Time</td>
<td>Bytes</td>
</tr>
<tr>
<td>IE</td>
<td>156,845</td>
<td>352</td>
<td>11.0</td>
<td>236,900</td>
<td>149,782</td>
<td>369</td>
<td>9.2</td>
<td>237,395</td>
</tr>
<tr>
<td>FF</td>
<td>153,766</td>
<td>357</td>
<td>9.4</td>
<td>238,900</td>
<td>142,136</td>
<td>367</td>
<td>7.5</td>
<td>238,786</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Packets</th>
<th>Time</th>
<th>Bytes</th>
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<th>Bytes</th>
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<td>357</td>
<td>9.4</td>
<td>238,900</td>
<td>367</td>
<td>7.5</td>
<td>238,786</td>
</tr>
</tbody>
</table>
Client Tuning

Multiple Java Issue

• “The application requires an earlier version of Java. Do you want to continue?”
  – Occurs when you have the version called by the EBS Web Server
  – And a later JRE
  – Huge number of number of “applications turns” - “chatty”

• Refer to Deploying Sun JRE (Native Plug-in)
  – R12 Doc ID 393931.1
  – 11i: Doc ID 290807.1
Client Tuning

Browsers

• Have as many HTML based screens open as you like
• Only IE allows multiple Forms sessions
  – e.g. PO and GL open at the same time (or even 11i and R12)
  – IE 1 cookie per browser session, FF 1 cookie per desktop
  – Important for productivity and saves mixing menus
• Multiple sessions don’t work in IE8
  – Used to be able to use new browser sessions
  – C:\Program Files\Internet Explorer\iexplore.exe" –noframemerging
• Mozilla offers an Extended Support Release (ESR)
Client Tuning
Low Specification PC Clients – Lots of Small Steps

• Benchmark clients with the applications that you use
• Memory is much more important than CPU
• Don’t have lots of other applications running
• Minimize the browser memory footprint
  – Toolbars, themes, extensions, plug-ins, helper applications, and phishing controls
• Use low-spec clients for Self Service and some Oracle Forms
• Old memory is cheap, but might not be cost effective
R12 Client Performance Tips

Major Gains

• JRE6 uses less cache & therefore network than JRE5
  – Avoid 6u10 – 6u13

• Use OAF/HTML where possible - smaller memory profile

• Do not minimize E-Business Suite forms
  – Keep Forms open

• Keep menus small (more later)
  – A few combine menus, but profile options can be problematic
  – Move odd fields to prevent opening multiple screens

• Fast clients can help compensate for poor networks
  – But only up to a point
Agenda

• Client Tuning

• Network Tuning
  – Tools
  – Tuning for High Latency/Low Bandwidth
  – Satellite
Network Tuning

That Old Ping – Again!

- **Ping:** ICMP traffic (32 bytes)
- Full size packets:
  - MTU…typically 1500 bytes*
  - 28 bytes are added to the packet
- **MSDos:** ping -n 30 –f -l 1472 <host/ip address>
- **Linux:** ping -s 1472 -M do <host>
- **Ping –l 1433 <host>** … Packet needs to be fragmented but DF set.
- Understand normal performance on your network
  - Ping with small and large packets …. 35ms vs 75ms
Network

How much traffic?

• Network metrics
  – Different modules: forms/screens
  – Different connection modes: socket/servlet/HTML/SSL
  – Amount of data: Result sets/LOVs
  – User adeptness and Application tuning
  – Application and work load mix
  – Concurrency

• Install Vision and test
  – Ask for a network capture next time you have a product demo

- Keep forms open
- Avoid blind queries
- Don’t use leading %
- Keep LOVs small
- Use defaults (later in this session)
- Make report parameters mandatory
- Type of report: XML/PDF
Network

How much traffic

- **On-Demand**
  - Technical and Operational standards [Doc ID 784666.1]
  - Provides a starting point (if you don’t have one)
    - Oracle E-Business Suite self-service applications: 4-6 kbps
    - Oracle E-Business Suite forms applications: 10-12 kbps
    - Oracle Business Intelligence & Applications On Demand: 12 kbps
  - Oracle recommends minimum link bandwidth is 128 kbps

- **These vary depending on business and workflow**
  - Customer must determine peak usage
  - Recommend upgrade if network link > 80% during peak usage
Network

Concepts Manual

- Oracle E-Business Suite works very well with average latencies up to 300ms, and is usually found to give acceptable performance with latencies up to 500ms. Note that periods when forms are being loaded (for example, on startup) may be an issue in cases where latency is marginal. A consequence of this is that the newer HTML-based Applications (which do not use Forms) may give better performance than the traditional Forms-based Applications.
Network: USA

This diagram shows the performance on our internal dedicated network and not the performance over the internet between these locations. It does not depict the network design, the hops, or traffic path; sites are connected by many different network access types.
Network: Europe

This diagram shows the performance on our internal dedicated network and not the performance over the Internet between these locations. It does not depict the network design, the hops, or traffic path; sites are connected by many different network access types.

<table>
<thead>
<tr>
<th></th>
<th>UK</th>
<th>Germany</th>
<th>Spain</th>
<th>France</th>
<th>Italy</th>
<th>Egypt Heliopolis</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Francisco</td>
<td>177</td>
<td>184</td>
<td>200</td>
<td>170</td>
<td>184</td>
<td>300</td>
</tr>
<tr>
<td>Austin</td>
<td>130</td>
<td>170</td>
<td>170</td>
<td>140</td>
<td>164</td>
<td>235</td>
</tr>
<tr>
<td>UK</td>
<td>40</td>
<td>48</td>
<td>11</td>
<td>35</td>
<td>90</td>
<td></td>
</tr>
</tbody>
</table>

Distance in milliseconds:
- Austin to United Kingdom: 130ms
- Austin to Germany: 140ms
- Austin to Spain: 170ms
- Austin to France: 170ms
- Austin to Italy: 164ms
- Austin to Egypt Heliopolis: 235ms

- United Kingdom to Germany: 40ms
- United Kingdom to Spain: 90ms
Network: Rest of the World

This diagram shows the performance on our internal dedicated network and not the performance over the Internet between these locations. It does not depict the network design, the hops, or traffic path; sites are connected by many different network access types.
Network: Customer Averages

This diagram shows the performance experiences averaged across a range of customers in each of the countries. Where there is a significant disparity, multiple values are shown. At least 50% of the connections are to remote locations in each of the countries. It does not depict the network design, the hops, or traffic path; sites are connected by many different network access types.
Agenda

• Client Tuning

• Network Tuning
  – Tools
  – Tuning for High Latency/Low Bandwidth
  – Satellite
Network Tools

Quality Of Service (QoS)

- A set of features (and tools) – aims to prioritize mission critical traffic
  - Classifies traffic enabling differentiated service levels
  - Usually implemented in routers
- Congestion management
  - Packet Classification
  - Packet Shaping
  - Rate Limiting
  - Priority Queuing
- Administration overhead
Network Tools

Network Test
Network Test Utilities Best Practices (556738.1)

Network Test

Form Ping = 2 x Network + “Offset”

<table>
<thead>
<tr>
<th>Network (Ping times)</th>
<th>Network Test Form</th>
<th>Network</th>
<th>Apps Tier</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 and 1472 normal</td>
<td>No change</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Slower</td>
<td>✓</td>
<td>❌</td>
</tr>
<tr>
<td>1472 slower than 32</td>
<td>No change</td>
<td>❌</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Slower</td>
<td>❌ OR</td>
<td>❌</td>
</tr>
<tr>
<td>32 and/or 1472 slower</td>
<td>No change</td>
<td>❌ OR</td>
<td>❌</td>
</tr>
</tbody>
</table>
Wireshark
Wireshark
Wireshark

Transaction Range
...summary or more analysis

Paste into a text file
Import as CSV
Network Tools

Simulating WAN Latency

- **WANem - native or VM**
  - Open Source
  - GNU General Public License

- **Compatibility issues**
  - Works on XP/VMWare 3.0
  - Problematic on Win7/VMWare 3.1.3

- **Good user manual**
**Network**

**WANem**

`route add DEST Gateway`

IE 192.168.0.1

WANem 192.168.0.10

PC/Laptop

Apps/DB 192.168.0.197

Route add ...197 ...10

Route add ...1 ...10
Client Tuning

WANem
Network
WANem Boot Screen
Network

Boot Procedure

![Network Boot Procedure Image]
Network Configuration
Network Status
Network Status
Network

Home
Network

Basic Mode
## Network

### Advanced Mode

![WANem Network Emulator](image)

<table>
<thead>
<tr>
<th>Interface: eth0</th>
<th>Bandwidth</th>
<th>Packet Limit: Default=1000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1000 (Default=1000)</td>
</tr>
</tbody>
</table>

- **Bandwidth**: Choose BW
- **Packet Limit**: 1000 (Default=1000)

### WANem Commands Successfully Created

<table>
<thead>
<tr>
<th>WANem is running</th>
<th>Stop WANem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### WANem Sample

<table>
<thead>
<tr>
<th>Delay (ms)</th>
<th>Loss (%)</th>
<th>Dilation (%)</th>
<th>Packet Redundancy</th>
<th>Correlation (%)</th>
<th>Correlation (%)</th>
<th>Correlation (%)</th>
<th>Correlation (%)</th>
<th>Correlation (%)</th>
<th>Correlation (%)</th>
<th>Correlation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Network Advanced Mode Features

- **Delay Time**: 150 ms
- **Loss**: 0%
- **Dilation**: 0%
- **Packet Redundancy**: 0%
- **Correlation**: 0%
- Other Specify BW (Kbps): 64

### Additional Options

- **Apply Settings**
- **Reset Settings**

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Network
Checking Latency

Without WANem

WANem Stabilizing

150ms Each Way
Agenda

- Client Tuning
- Network Tuning
  - Tools
  - Tuning for High Latency/Low Bandwidth
    - PC
    - Oracle E-Business Suite issues
    - Tuning between the Keyboard and chair
  - Satellite
Tuning for High Latency/Low Bandwidth

Smoke and Mirrors?

• Windows XP
  – TcpWindowSize/GlobalMaxTcpWindowSize 256KB
  – Tcp1323Opts
    • 1 faster
    • 3 only for VERY lossy connections

• Windows 7
  – Don’t disable Nagle’s algorithm
  – Don’t disable TCP/IP autotunning
    • netsh int tcp show global
      Receive Window Auto-Tuning Level : normal
Tuning for High Latency/Low Bandwidth

Oracle E-Business Suite Issues

• Forms will not start after 300 seconds Bug 6644380
  – Relates to both latency and available bandwidth

• Swan Color Scheme in R12
  – Doc ID 786582.1 has a workaround …Bug 5612353

• Keep menus small (seen on the PC comparison chart)
  – Bug 6329486
Tuning for High Latency/Low Bandwidth
Oracle E-Business Suite 11i Menus
Tuning for High Latency/Low Bandwidth

User Training

• Keep screens open
  – Use multiple sessions if necessary (Browsers slide 16)

• Teach users to query efficiently – avoid leading %
  – Minimize the use of large LOV’s

• Concurrent Requests
  – Tight parameters => Smaller report to transfer
  – Report Type: PDF vs XML

• Tune the Application
  – Default as much information as possible
Application Tuning
Purchase Order Form – Standard Entry

Standard Entry
- Enter Supplier Baxter [TAB]
- Enter Item 0001 [TAB] select 0001-0120H from LOV
- Enter Qty 1
- Enter Price 1
- Click Shipments
- Enter Org V2 [TAB]
- Enter Ship-To A [TAB] select Addison TX from LOV
- Enter Need By
- Click Distributions
[Save] [Approve] [Ok]
Application Tuning
Purchase Order Form – Tuned
Application Tuning
Purchase Order Form – Comparison

Tuned Entry
Enter Supplier Global [TAB]
Enter Item F80000 [TAB]
Enter Qty 1
[Save] [Approve] [Ok]

Standard Entry
Enter Supplier Baxter [TAB]
Enter Item 0001 [TAB] select 0001-0120H from LOV
Enter Qty 1
Enter Price 1
Click Shipments
Enter Org V2 [TAB]
Enter Ship-To A [TAB] select Addison TX from LOV
Enter Need By
Click Distributions
[Save] [Approve] [Ok]
### Application Tuning: Single Line PO Servlet mode

<table>
<thead>
<tr>
<th></th>
<th>Packets</th>
<th>Time</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuned</td>
<td>111</td>
<td>20</td>
<td>42,247</td>
</tr>
<tr>
<td>Standard Entry</td>
<td>316</td>
<td>53</td>
<td>109,334</td>
</tr>
</tbody>
</table>

Tuned is 62% more efficient.
Socket vs Servlet

“Socket Mode uses up to 40% less bandwidth than Forms servlet mode”

• Connection mode:
  – Socket: Direct socket connection to the Forms Listener process
    • Client verification issues on open networks - but ok for secure networks
  – Servlet: Forms Java servlet uses HTTP/HTTPS connections
    • Protocol headers increase traffic
  – 11i: Doc ID 201340.1 (default socket) ...section 6 for dual mode
  – R12: Doc ID 384241.1 (default servlet)

• Use SSL with socket in 11i or with servlet in R12
  – SSL 11i: Doc ID 123718.1  R12: Doc ID 376700.1

You may not be able to use socket mode
Check with your network team
Tuned vs Standard Entry: Servlet

Times are almost identical for Socket Mode
Purchase Order 5 line: Socket vs Servlet

<table>
<thead>
<tr>
<th></th>
<th>Packets</th>
<th>Time</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuned</td>
<td>Socket</td>
<td>346</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>Servlet</td>
<td>274</td>
<td>51</td>
</tr>
<tr>
<td>Defaulted</td>
<td>Socket</td>
<td>749</td>
<td>182</td>
</tr>
<tr>
<td></td>
<td>Servlet</td>
<td>973</td>
<td>155</td>
</tr>
</tbody>
</table>

Socket is more efficient than Servlet

Tuned is more efficient than untuned

53%

65%
Self Service

View Payslip, Employment and Vacation Screens

- Login
- View Payslip
- View Employment Screen
- View Vacation
- Logout

Peaks due to fast data entry with few waits

iExpenses

- Login
- Enter 3 expense lines and submit
- Logout

Receipt Amount: 1.99
Query PO and GL Journal

The only true test is in your own environment

Confirmed this test using an Emulator

~discrepancy/error margin

Peaks due to fast data entry with few waits

Query PO and GL Journal 12.1.3 6u30 (s)
VPN

<table>
<thead>
<tr>
<th>Forms: Query PO and GL Journal</th>
<th>Packets</th>
<th>Time</th>
<th>Bytes</th>
<th>Average</th>
<th>Worst Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN</td>
<td>998</td>
<td>48</td>
<td>620240</td>
<td>6%</td>
<td>7.6%</td>
</tr>
<tr>
<td>VPN</td>
<td>1119</td>
<td>74</td>
<td>657577</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

• Other Metrics
  – JRE 7 vs JRE 6u31 ~ 0%
  – SSL ~10-20% Bytes
Agenda

• Client Tuning

• Network Tuning
  – Tools
  – Tuning for High Latency/Low Bandwidth
  – Satellite
Satellite

GEO vs LEO

• GEO
  – 22,400 miles above the equator
  – 89,600 miles for 1 packet and ACK (1 round trip)
  – Physics => 550 ms latency
  – Prone to packet loss due to network interference
  – Higher but more reliable

• LEO
  – Tends to lose signal every 5 mins
    • Especially if not tracking fast enough
  – Not generally used for bulk data/continuous signal
Satellite
Optimize Everything

• What you can control
  – Amount of traffic (and compressibility: e.g. XML/PDF)
  – Set MTU to avoid packet assembly/disassembly, TCP window size*
  – Minimize number of hops: firewalls, routing
  – Schedule transfers outside peak periods (CM delivery options)
  – Optimal route: land line and one satellite hop vs multi sat-sat hops

• What you can ask for (from the vendor)
  – [Object level] caching, other acceleration, QoS/variant, HTTP prefetching
  – Bandwidth optimization (data deduplication and compression)
Symmetric Network Acceleration Paper R12

Doc ID 967992.1

- Symmetric – two compression devices
  - Hardware <=> Hardware or software client
- Types of traffic
  - HTTP/s, Bulk (reports/Java), Forms, TCF
- Modes
  - Compression, caching, pattern matching for deduplication
- Does not tend to be a “fix all” technology
- Tested using 300ms 1Gbps
Symmetric Network Acceleration Paper R12

WAN Network Traffic Reduction (Servlet)
Oracle E-Business Suite R12 WAN 300ms

WAN Optimization (300ms)
Oracle E-Business Suite R12

- Servlet
- Socket

改善百分比 (%)

- Login
- Menu
- HTML/ASP Screens
- Forms
- JAR Download
- JAR Reuse
- Data Form
- Data Concurrent Requests
- Gantt Chart/TCF
- Special Applet
- GLAC Hierarchy
- HTML/USP
- Workflow Monitor
- JAR Reuse
- Data Form
- Data Concurrent Requests
- Gantt Chart/TCF
- Special Applet
- GLAC Hierarchy
- HTML/USP
- Workflow Monitor
Wan Recommendations
Symmetrical Network Acceleration Paper Doc ID 967992.1

• Compression is a complimentary technology
  – Without acceleration/compression
    • PDF uses 40% of the bandwidth of HTML or Excel format
  – With acceleration/compression
    • Use uncompressed formats such as HTML or Excel formats

• Download/ftp reports during non-peak periods
  – Smaller links are cheaper

• Cost of compression vs cost of infrastructure upgrade
## Riverbed

### Compression Report by Protocol

<table>
<thead>
<tr>
<th>Port</th>
<th>Reduction</th>
<th>LAN Data</th>
<th>WAN Data</th>
<th>Traffic %</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 (HTTP)</td>
<td>71.49%</td>
<td>15.7 TB</td>
<td>6444.0 GB</td>
<td>33.91%</td>
</tr>
<tr>
<td>2049 (NFS)</td>
<td>59.83%</td>
<td>13.6 TB</td>
<td>2444.4 GB</td>
<td>29.48%</td>
</tr>
<tr>
<td>445 (CIFS:TCP)</td>
<td>80.99%</td>
<td>5462.0 GB</td>
<td>1038.6 GB</td>
<td>11.54%</td>
</tr>
<tr>
<td>21 (FTP)</td>
<td>54.09%</td>
<td>3260.3 GB</td>
<td>1496.9 GB</td>
<td>6.89%</td>
</tr>
<tr>
<td>10566 (SnapMirror)</td>
<td>86.87%</td>
<td>2856.1 GB</td>
<td>375.1 GB</td>
<td>6.04%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port</th>
<th>Reduction</th>
<th>LAN Data</th>
<th>WAN Data</th>
<th>Traffic %</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 (HTTP)</td>
<td>0.00%</td>
<td>10.5 TB</td>
<td>10.5 TB</td>
<td>20.75%</td>
</tr>
<tr>
<td>2049 (NFS)</td>
<td>0.00%</td>
<td>7256.3 GB</td>
<td>7256.3 GB</td>
<td>14.02%</td>
</tr>
<tr>
<td>22 (ssh)</td>
<td>0.00%</td>
<td>7116.4 GB</td>
<td>7116.4 GB</td>
<td>13.75%</td>
</tr>
<tr>
<td>25 (smtp)</td>
<td>0.00%</td>
<td>4434.1 GB</td>
<td>4434.1 GB</td>
<td>8.57%</td>
</tr>
<tr>
<td>443 (SSL)</td>
<td>0.00%</td>
<td>2003.2 GB</td>
<td>2003.2 GB</td>
<td>3.87%</td>
</tr>
</tbody>
</table>

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Problem Definition – Baseline now!

• Current Performance
  – Profile the network from remote users (ping & network screen)
  – Time a few repeatable critical transactions
• Obtain a clear definition of the problem
• Analyze
  – Time related problem
    • Is performance bad all the time? When is it better or worse?
  – Location related problem
    • Identify network devices, protocols, and route(s)
• Compare the Network Test Form results
Summary Checklist

• PC and users
  – Consider deploying faster/tuned PCs at remote locations
  – Train the users
  – Avoid multiple Java versions

• Application
  – Tune the application ... concurrent report parameters and output
  – Socket/Servlet ... OAF/HTML screens, small menus

• Network
  – Java version
  – Minimize network latencies (routing using landlines vs satellite)
  – Consider network acceleration

  Keep forms open
  Avoid blind queries
  Leading % prevents index usage
  Keep LOVs small
  Use defaults where possible
  Make report parameters mandatory
  Type of report: XML/PDF
## Useful Documents

<table>
<thead>
<tr>
<th>Category</th>
<th>Document Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic</td>
<td>69565.1</td>
<td>A Holistic Approach To Performance Tuning Oracle Applications Systems Release 11 and 11i</td>
</tr>
<tr>
<td>PC</td>
<td>557259.1</td>
<td>Oracle E-Business Suite 11i and R12 PC Client Performance</td>
</tr>
<tr>
<td>Network</td>
<td>967992.1</td>
<td>Symmetrical Network Acceleration with Oracle E-Business Suite R 12</td>
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<tr>
<td>Socket/Servlet</td>
<td>201340.1</td>
<td>Using Forms Listener Servlet with Oracle Applications 11i</td>
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<td>384241.1</td>
<td>Using Forms Socket Mode with Oracle E-Business Suite R12</td>
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<td>Certification</td>
<td>285218.1</td>
<td>Recommended Browsers for Oracle E-Business Suite 11i</td>
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<td></td>
<td>389422.1</td>
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<td>290807.1</td>
<td>Deploying Sun JRE (Native Plug-in) for Windows Clients in Oracle E-Business Suite 11i</td>
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<td>393931.1</td>
<td>Deploying Sun JRE (Native Plug-in) for Windows Clients in Oracle E-Business Suite R12</td>
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<td></td>
<td>1077728.1</td>
<td>Using Microsoft Office 2007 and 2010 with Oracle E-Business Suite 11i and R12</td>
</tr>
<tr>
<td></td>
<td>277535.1</td>
<td>Recommended Set Up for Client/Server Products with Oracle E-Business Suite 11i and R12</td>
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</tbody>
</table>
Q&A
Hardware and Software

Engineered to Work Together