Siemens PLM Connection

The Network is Slow!
Teamcenter Digital Lifecycle Management Solutions

- Systems Engineering & Requirements Management
- Portfolio, Program & Project Management
- Engineering Process Management
- Bill-of-Materials Management
- Compliance Management
- Supplier Relationship Management
- Mechatronics Process Management
- Manufacturing Process Management
- Simulation Process Management
- Maintenance Repair and Overhaul
- Lifecycle Visualization
- Reporting & Analytics
- Community Collaboration
- Enterprise Knowledge Management

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The introduction of 4-tier Teamcenter brings many advantages especially with WAN deployments but it also increases the opportunity for performance issues. Often problems are reported as a slow network when in fact the problem lies elsewhere and requires more analysis to locate the cause.

We will look at:

- The causes of poor network performance
- Analysis Approaches
- Examining the evidence
- Network analysis resources
- Service level monitoring
Common Causes of Performance Problems

High latency
- Client Processing
- Server Processing
- Database Processing
- Link Delays

Network Configuration problems
Packet loss
Redirections (routing, service)
Interdependencies (third parties)
Low throughput (small packets)
Negotiation faults (protocol or application layer)
Causes of High latency

Client Processing
- Typical issues
  - RAC
    - Heap size too small
    - Too much running on the client
  - Thin Client
    - Rendering speed of the browser

Server Processing
- Web Application Server
  - Typical issues
    - JVM has not been tuned
- Business logic Server
  - Typical Issues
    - Memory
    - Server processes using too much CPU.

Covered in detail in the “Performance Engineering” presentation
Causes of High latency

Database Processing
- Poorly tuned database

Link Delays
- Transmission
  - Physics
    - Transmission speed varies with medium
  - Network topology
    - Poor topology adds to the distance travelled
- Processing
  - Each active network component (switches, routers, firewalls) will slow down the transfer as well
    - The component needs time to receive the packet, analyse what must be done with it, and address the next destination.
- Serialisation Delay,
  - Queuing within components
  - Queuing to cross narrow bandwidth links.
    - Components ‘store and forward’.
**Analysis Approaches**

**How do you know where to look?**
- Database and Business logic can be analysed using Oracle and TC debugging (see “Performance Engineering“ for more details on debugging)
- Analyzing the network traffic.
  - At first packet level analysis may seem extreme but it provides clear pointer to issues in the network and isn’t difficult to do.
How to start

First you need a packet capture and analyses tool
- Snoop
- For example Wireshark [http://www.wireshark.org/](http://www.wireshark.org/)
- For a Thin Client Fiddler can give excellent information [http://www.fiddler2.com/fiddler2/](http://www.fiddler2.com/fiddler2/) for browser analysis, it code decode HTTPS.

Next who is complaining about performance?

Is it general or local?

Collecting traffic
- Run Wireshark on the system with a problem
- Tap-in
Tapping-in – Port Spanning
A simple HUB will not work with full-duplex connection.
Wireshark

Set timing to
- View- > Time display format -> Seconds Since previous displayed packet

Wireshark resources
- www.wiresharkU.com
- http://wiki.wireshark.org/
Syn, Syn Ack, Ack

Time: Seconds since previous displayed packet
### Overload

<table>
<thead>
<tr>
<th>Seq</th>
<th>IP Address</th>
<th>Acknowledgment</th>
<th>Sequence</th>
<th>Window</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>134.244.3.12</td>
<td>134.244.154.183</td>
<td>7001</td>
<td>2570</td>
<td>10</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

*TCP Segment Details:*
- **PSH, ACK:** Seq=82870 Ack=18040 Win=65535 Len=0
- **RST:** Seq=82870 Ack=18040 Win=65535 Len=0
- **ACK:** Seq=83940 Ack=18040 Win=65535 Len=0

*TCP Options:*
- **Window Scale:** 0
- **Checksum:** 0
- **URG:** 0
- **ECN:** 0
- **Options:** None

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**Note:**
- The above table represents a segment of TCP traffic with relevant fields such as sequence, acknowledgment, and window size.
- The table includes specific TCP options and segments for understanding the network traffic behavior.
TCP Windows

Expert info

Window is zero
No data can be received
IO Graphing, estimating bandwidth

Traffic

- Packets: 138
- Between first and last packet: 18.633 sec
- Avg. packets/sec: 7.406
- Avg. packet size: 226.507 bytes
- Bytes: 31258
- Avg. bytes/sec: 1677.593
- Avg. MBit/sec: 0.013

PSE expansion
Service Level Monitoring

Two mechanisms are provided for monitoring the system:

- ARM – Application Response Measurement
- Glance - HP
- MyArm (www.myarm.de)
- JMX _ Java Management Extensions

Most Teamcenter Java elements support JMX can be monitored by tools such as Jconsole, IBM Tivoli Monitoring, HP-Jmeter, Glance.
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