eSolutions World
SCM | CRM | ERP | ASP/xSP
McCormick Place | Chicago, Illinois | August 22-24, 2001

Optimizing Reduces Bandwidth Constraints in the Network

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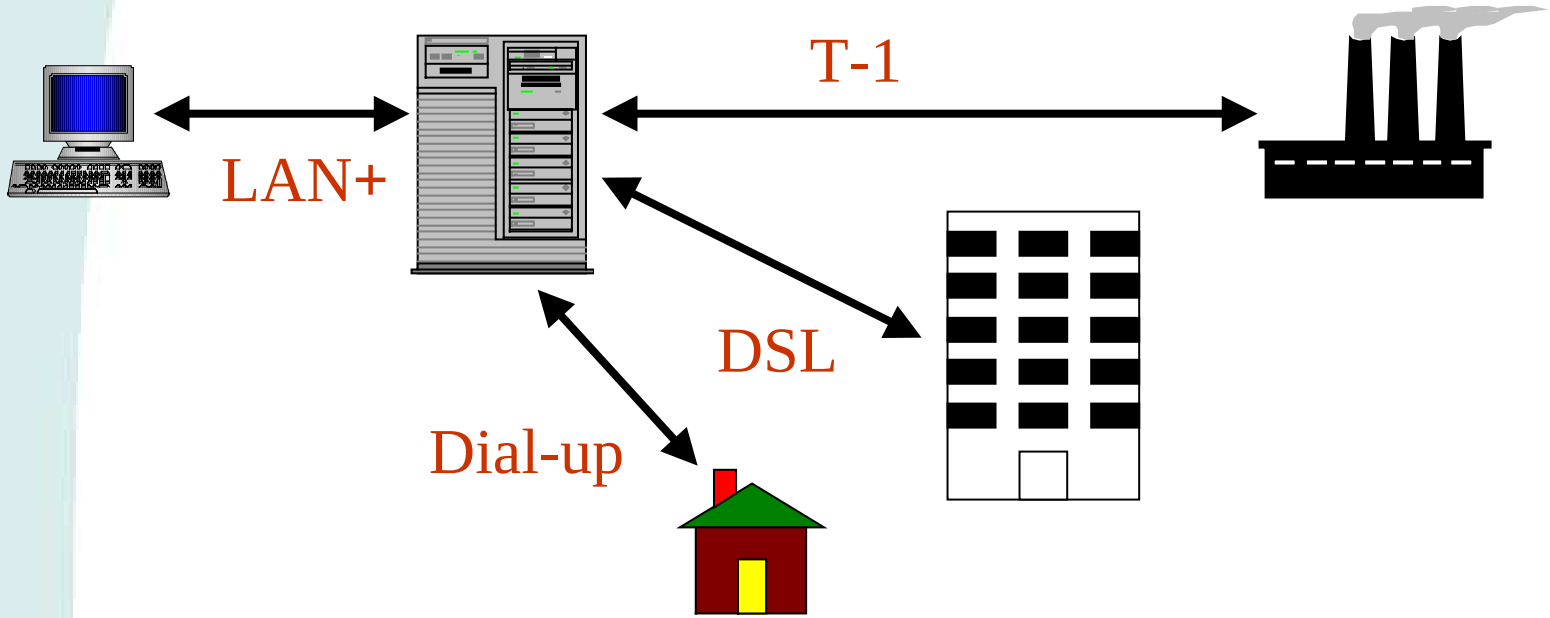
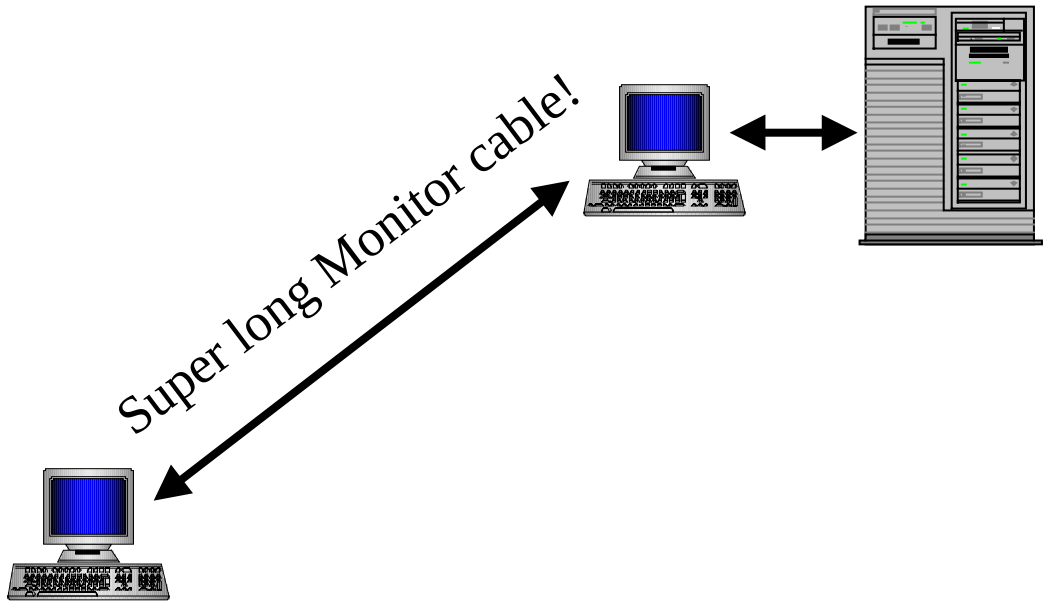
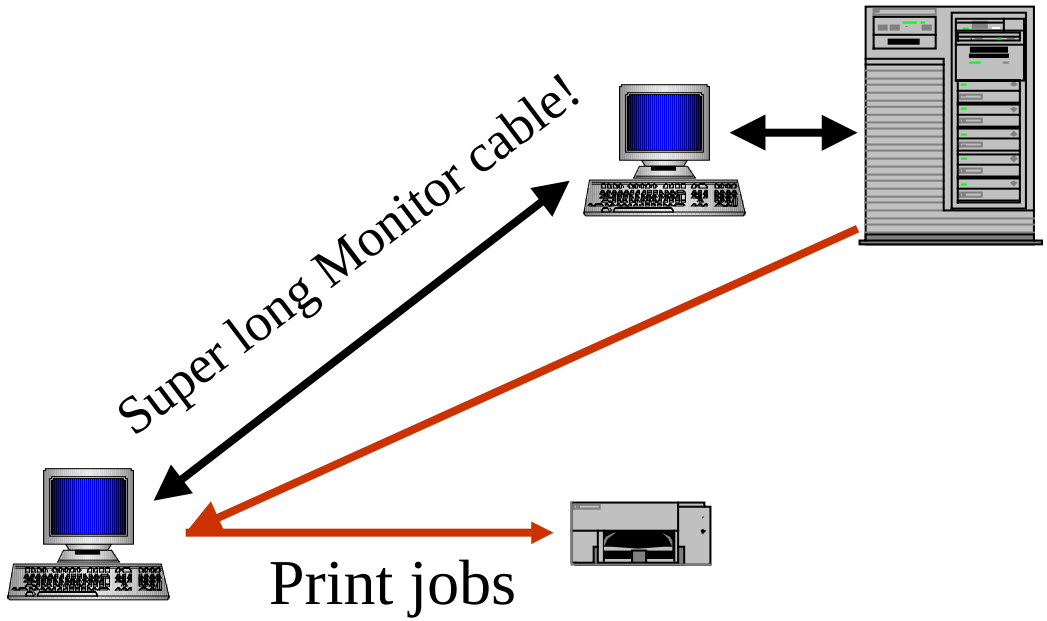
Bandwidth constraints are an issue when considering the ASP model. Some of these problems are solved through applications specifically tailored for the ASP environment.



Network speeds for users of ASP services vary, some have less than optimal network connections.



ASP services run under applications such as Citrix Metaframe / Microsoft Terminal Server handle remote screen grabs and keystroke events extremely well.



However, users feel the network speed impact when printing and/or copying files to their local device.

Managing your bandwidth on both the LAN and WAN, allows for the best performance, regardless of network speed.

There are a number of applications and devices that provide work ways to improve network performance of applications.

What options do I have?

Options Available

- Packet Reduction
- Packet Prioritization
- TCP-IP Stack manipulation
- Application Tuning
- Line Bundling

Packet Reduction

- Printing
- FTP
- Etc…

Packet Reduction

- Printing
  - Currently a number of off-the-shelf printing applications are available that reduce the network hit on printing from remote sites. An example of this is ThinPrint which compresses the print-jobs before leaving a Citrix server then expands the job at the local thin client.
  - Network traffic per job reduced up to 95%!

Packet Reduction

- FTP
  - In much the same way that ThinPrint reduces print-jobs, FTP clients & servers can be built to auto-compress/decompress individual packets during the file transfer process.

Packet Reduction

- FTP
  - Using smart technology to calculate RTT [round trip time], these applications calculate the current network throughput, and, if desirable, individual packets are compressed prior to sending.
  - Bandwidth reduction: up to 99% in some cases!

Packet Reduction

- Etc…
  - Other applications can also be re-engineered to reduce bandwidth across low-speed connections and/or highly congested networks by using built-in compression.

Packet Prioritization

- Packeteer, Cisco, and other hardware manufacturers have built-in functions in their products that allow users to prioritize packet forwarding on the network.
  - While not actually reducing network congestion, these do allow mission-critical applications to receive higher priority, thus making it seem like a less congested network to those processes.

TCP-IP Stack manipulation

- Configuring the window size in your TCP-IP settings can result in better transmission times.

- Effective transfer times are a function of the receivers max window size divided by the networks packet round trip time.

TCP-IP Stack manipulation

- “Window sizes are important for maximum throughput calculations,”… “As .. you cannot go faster than the window size offered by your peer, divided by the *round-trip time (RTT)*.”

TCP-IP Stack manipulation

- “The lower your RTT, the faster you can transmit. The larger your window, the faster you can transmit. If you intend to employ maximum window sizes, you might want to give ‘*tcp_deferred_acks_max*’ another look.”
  - *[Source] Jens-S. VocKler*

http://www.sean.de/Solaris/tune.html#water

Application Tuning

- Examine applications to see if overhead can be reduced.
  - Some applications are delivered assuming conditions that are not applicable in real-world cases. Client server software designed for a LAN environment may exhibit poor performance on the WAN impacting the network with too many screen refreshes, auto-pull of data, etc…

Application Tuning

- Example: E-mail
  - E-mail users often configure their software to poll the mail server, checking for new mail every 10 to 5 minutes, down to some users auto-checking for new mail every minute. This polling of the network, multiplied by thousands of users, over a large WAN will impact network performance.

Application Tuning

- Example: E-mail
  - Solution 1 - Network administrators can police the action of users mandating new e-mail checks every 10+ minutes.
  - This is not a welcome chore!

Application Tuning

- Example: E-mail
  - Solution 2 Using local mail server proxies, LAN workgroup users can feel free to poll their mail server as often as they want, without impacting performance of the WAN.
  - A further benefit is that all intra-group e-mail remains on the LAN without going out to a corporate server then back down again.

Application Tuning

- Example: Fax Services
  - Schedule known bandwidth hogs to process their jobs at non-peak times.
  - Scheduling fax software to run during off hours will reduce traffic during the work day.

Line Bundling

- Devices exist that allow multiple Network lines to be bundled together by creating dynamic router-clustering device for high reliability, redundancy and speed of incoming and outgoing Internet traffic over a WAN

- Example, Fatpipes. http://www.fatpipeinc.com/

Line Bundling

- Traditional WAN connection between an IT site and remote factory location.

Line Bundling

- Increased network speed and reliability achieved through clustering multiple feeds from separate ISPs.
- DSL, T-1 and T-3 lines can be hooked together.

Summary:

Optimizing network performance by management, packet reduction, packet prioritization, and line bundling will reduce network congestion, resulting in improved performance.

Questions?

Copies of this presentation are available by sending email to

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