

LAN Performance within MMSD's Technical Environment

LAN performance concerns:

Microtechs and many people in schools and administrative sites (most recently, Memorial, La Follette and Doyle) have been expressing great frustration with desktop performance, which Technical Services (reaffirmed by an outside consultant in a Jan-Feb 2003 study of LAN infrastructure in all district buildings) traced to LAN traffic capacity issues. Edited excerpts of the conclusions of the consultant's report, follows:

During network slowdowns, high server utilization rates are observed. High server utilization rates are likely caused by communications traffic from hubs. The majority of PCs in MMSD are connected to their LANs (Local Area Networks) via shared 10MB/sec hubs. As users try to login and access resources on their networks, data collisions with hubs prevent computers and local servers from communication in a timely fashion. Packets are sent, dropped, and resent repeatedly, sometimes to the point that one side or the other times-out and drops connections. When a server is trying to handle hundreds of requests at once and some of them are missing packets or getting delayed, the server will spend more time managing each connection, re-sending data, waiting for responses and dropping connections. Time and resources are taken away from handling requests from users that are on a less congested network segment, slowing down their server response rates, too. Only a few workstations can saturate 10Mb/s hubs. This is especially easy with an entire classroom of computers all logging into the server, running login scripts, NAL and pulling files off the server at the same time. One classroom could impact 4 or 5 hubs, slowing down an entire IDF (Intermediate Distribution Facility = all communications traffic on an entire floor). 100 or more computers having trouble communicating with a server will slowdown an entire server, affecting everyone throughout the building (even including any PCs already moved to switches, such as in parts of Memorial).

Solution: The only way to effectively fix slowdowns is to move all users to fully switched networks. Switches eliminate collisions by dedicating full duplex links to every device. Switched computers also have faster uplinks all the way back to the MDF (Main Distribution Facility = connects IDFs) and server, allowing each server to most efficiently manage resources for each PCs requests. By handling requests in a timely fashion, conversations with desktops take less time and leave the server better able to other new requests.

Note:

Network traffic has grown rapidly due to:

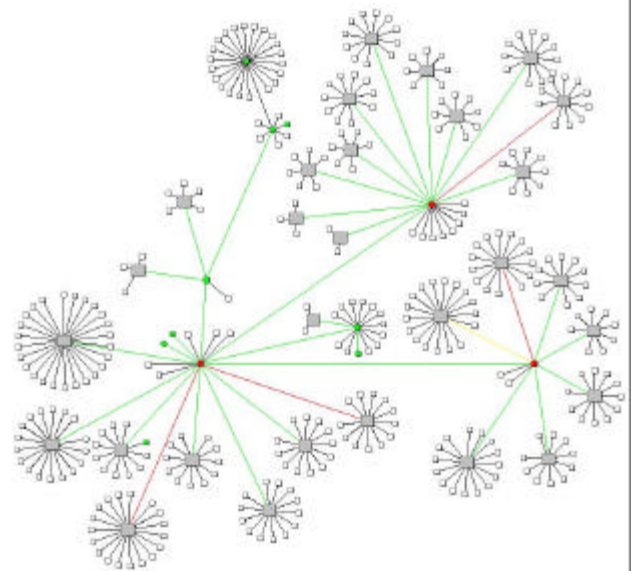
- the addition of more computers in some buildings over the past few years (50+ in La Follette, 150 in Memorial, 120 in West, 70 in East)
- the rapid increase in the use of more data intensive applications, including Internet use, both for instruction as well as support and business management applications

Currently, using shared hubs:

1. LAN traffic is frequently slowed due to data collisions and often dramatically reduces server performance, slowing down network communications throughout an entire building; a graphic representation of significant network traffic problems is displayed to the right (captured with a LAN management tool on 14Feb03, dynamically monitoring communications on LAN segments within La Follette; red denotes severe traffic congestion)
2. Technical Services can remotely monitor only groups of devices; if one is causing network traffic problems, staff have to go on-site and use a sniffer on each separate line to determine the source of problems

Once buildings are in a fully switched environment:

1. desktop performance speeds will dramatically improve [Chavez desktop performance is about 100 times faster]
2. Technical Services staff will be able to monitor traffic from each individual PC or other device and quickly isolate communications problems caused by specific devices



Note:

There is a large class of network mgmt tools from HP (HP OpenView), IBM, 3Com and Cisco & other companies; all do work with each other to some extent. Technical Services currently uses 3Com Network Supervisor because it was free. We may upgrade to What'sUpGold, Computer Associates' Unicenter or Tivoli after upgrading all buildings to a fully switched environment to improve the use of remote management tools.