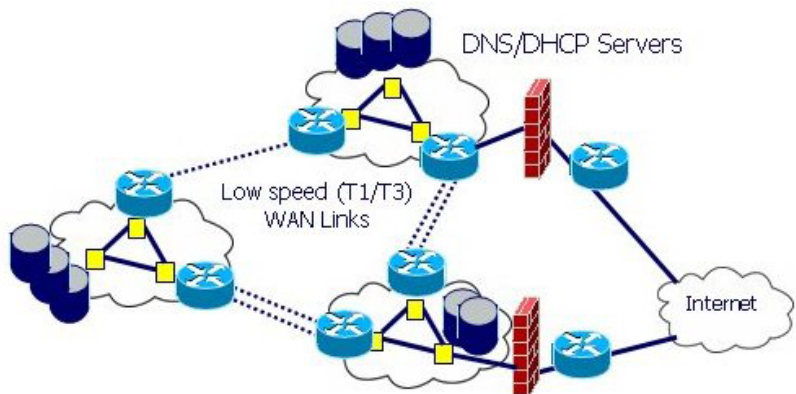


Enterprise Application Note: **Network Consolidation**

Looking for a way to simplify your network and cut IT costs? Network consolidation allows enterprises and other large organizations an effective means to cut costs, increase security, and simplify application deployment or some combination of all three.

Multi-site organizations typically build distributed networks at each geographically separate site. Network resources such as routers, firewalls, as well as “address and name” servers are typically distributed to every site and sit on every subnet. Networks are “subnetted” by geographic site and typically by department or policy within the site as well.

*Figure 1: Example of Today's Network architecture:
(3 Geographic Sites, 3-4 Groups/Subnets per Site, 11 Total Subnets)*



There are significant challenges associated with a fully distributed network for the enterprise. These networks require greater numbers of IT staff, consultants and or contractors to administer and maintain. Additionally, networks with multiple links to the Internet are more challenging to keep secure. Finally, network device additions and new application roll-outs are much more challenging across a fully distributed network.

If your organization’s IT staff were able to simplify the network, wouldn’t that result in reduced operational expense and less equipment to deploy, secure, and manage? The answer is yes and optical Ethernet technology can provide you with the means to achieve this objective.

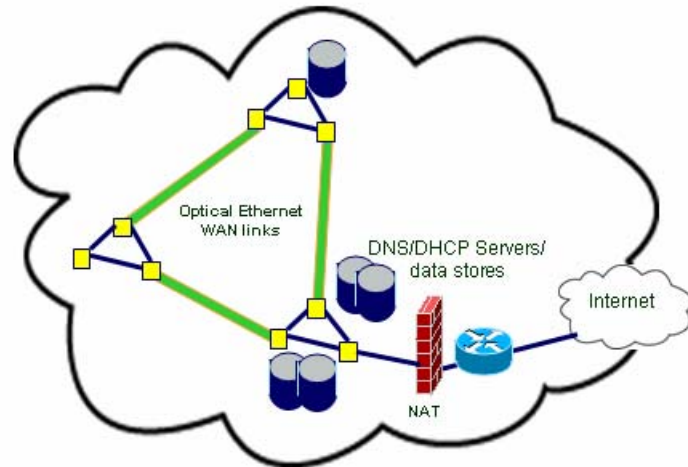
High-speed optical Ethernet WAN services with connection speeds of 100Mbps or 1Gbps ensures that the WAN connections are as fast as the intra-site LAN connections. These optical Ethernet E-Line or E-LAN circuits not only provide high bandwidth, but low fixed latency that allows any application mix to run across the WAN without complicated QoS network tuning.

There are two approaches that enterprises can take when consolidating the network. These approaches are: 1) a simple collapsed network and 2) the more aggressive flattened network, (which goes a step further by simplifying the network address structure).

Collapsing the Network

In a “collapsed” network architecture, the network is simplified down to one site’s data center. All higher-order devices (DNS/WINS, data stores, DHCP servers, etc...) are located and locally interconnected within the data center and connected back to the remote sites with an optical Ethernet private line service.

*Figure 2: Example of the collapsed network (3 Geographic Sites, 11 Subnets)
Or the flattened network (3 Geographic Groups, 3-4 Subnets)*



Here are the steps to consolidation for a collapsed network:

- 1) Extend subnets via VLANs from the remote sites across the WAN to central data center site.
- 2) Move the DHCP and DNS/WINS servers, application servers, and file servers, etc... to data center.
- 3) Move the remote WAN routers and firewalls from the remote sites and consolidate to data center.

There are significant advantages to collapsing the network. First of all, routing is collapsed to the central data center and remote sites are connected via VLANs (customer configured VLANs). These VLANs pass over the high-speed optical Ethernet E-Line circuit. Secondly, because all complex devices are centralized, IT administration is simplified as expensive and redundant resources at remote data centers are no longer needed. Another benefit to centralization is the simplification and reduced cost of network security as there are fewer devices and portals to the outside world. Additionally, rolling-out new applications is much simpler and efficient when the network is collapsed as IT managers can rollout and administer the new application to local servers at a single site. Finally, collapsing the network simplifies and reduces the cost of data back-up as no remote NAS, SAN, or tape back-up is required.

Flattening the Network

Enterprises can take the network consolidation even further by flattening the network. Flattening the network occurs when the number of subnets in the network is reduced. Typically, this requires that the enterprise moves to a private IP address infrastructure 10.0.0.0. Subnets can still be applied by policy rather than by geography. Adding a NAT (Network Address Translation) gateway at the central site enables connectivity to the Internet.

Flattening the network provides additional advantages beyond even collapsing the network. First of all, flattening the network decreases common application response time as the bandwidth bottlenecks are removed and because there are fewer router hops for distributed application RPCs (remote procedure calls) to cross. Secondly, IT administration is again simplified as there are fewer subnets to administer. Finally, fewer VLANs need to be extended to the central data center from remote sites.

Optical Ethernet Enables Network Consolidation

Whether IT managers decide to collapse the network or flatten the network, the reduction in capital and operational expenses are significant. By utilizing highly-reliable, managed optical Ethernet E-Line or E-LAN connections, today's complex enterprise network can become tomorrow's competitive advantage.