Pentech – White Paper

Tiered Network

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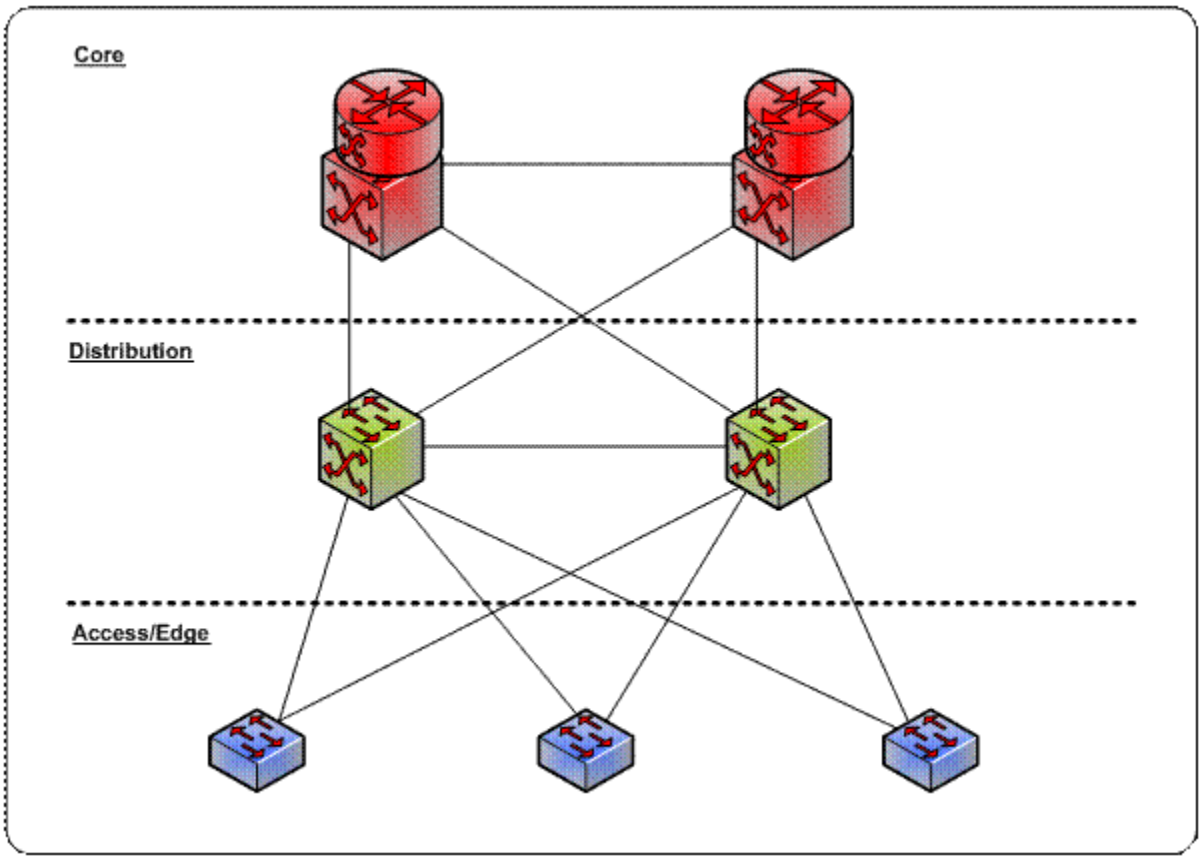
When designing a network, Pentech's Design Methodology determines the use of an industry standard hierarchical (or tiered) network model (see figure below). The hierarchical model consists of Core, Distribution, and Access/Edge layers. Each layer has specific features that need to be implemented to achieve a consistent, well designed network.



Hierarchical network model

Core Layer

The main function of the core layer is to transport large amounts of traffic reliably and quickly. Speed and latency are two of the major factors in the core layer design. Failure at the core layer can affect every user and system. High availability and fault tolerance are major considerations when designing the core layer.

A pure core layer should not have any packet filtering, VLAN routing or support for workgroup access. Typically, routing protocols would be used for low convergence times.

Distribution Layer

The role of the distribution layer is to provide a communications point between the access and core layer. Its primary functions include packet filtering, rate limiting, security and network policies (such as private VLANS), VLAN routing, the creation of broadcast/multicast domains and any media translation that may need to occur.

Access/Edge Layer

The access/edge layer controls local end user access to network resources. The primary function is to provide workgroup connectivity (or port density) to the distribution layer. The access layer also supports features such as LAN security, network resiliency and localised functionality such as Power Over Ethernet (POE).

Consistency

A level of consistency is required to provide a network that is easy to maintain and optimise in the future. However, it has been recognised that consistency is not the be all and end all, but rather a component of the design.

Manageability

The design of the network and the associated equipment will allow a higher level of management capability than is currently available on SME's existing network. This will be achieved through a consistent design approach and the appropriate selection of a manufacturer(s) and models of networking equipment. The new network will enable easier and more thorough management capability.

Tiered Network within a SME

Due to the size of the SME network, the tiered network design model would be very expensive to implement. Therefore the network design for SME would require collapsing the tiers into one logical switch or a couple of physical switches.

The concept of a 'collapsed backbone' network is considered a best practise when designing for a smaller organisation, particularly when they have a limited number of remote locations to service.

The focus of the approach is to provide a consistent network that is both easy to manage and monitor. At the same time there needs to be a service that can provide routing of traffic for both voice and data applications.

High speed access to servers and external connections can be incorporated into the switching platform, thus reducing bottlenecks within the LAN environment and providing a better user experience.