



Q&A

When should I route, and when should I bridge?

Q:

When should I route, and when should I bridge?

A: A router is useful to divide high traffic networks into smaller, logical entities. The bridge also divides networks for the purpose of making them more efficient. The difference is that the bridge does its dividing based on the MAC or layer 2 address, and the router divides based on IP or layer 3 address. So the router divides broadcast domains, and the bridge (or switch) divides the collision domain. As the previous definition implies, the collision domain is that collection of wiring and devices that all contend for the same bandwidth. Consider that we start a company and connect all our workstations and servers to a series of hubs. As the company grows, and finally expands to a second building we notice that our traffic is growing slower. A bridge is selected to connect the 2 buildings together. Since a bridge divides the collision domain each building gets its own 100 Megabit LAN to share among that building's computers. If any Ethernet frame is destined for the other building it is forwarded through the bridge. The bridge learns which computer (MAC address) is in each building. So traffic from one building does not affect the other – except for broadcasts. As broadcasts in the 2-building network grow we replace our bridge with a router. All the computers in each building need to be given an IP address in that building's own unique network. No broadcasts are sent between building because the router divides the broadcast domain.

So:

<u>Bridges</u>	<u>Routers</u>
Divide collision domain	Divide broadcast domains
Forward based on MAC address	Forward based on Network Address
Forward all protocols	Only forward routable protocols
Consume high bandwidth	Bandwidth frugal

If you need to add a building or remote network to your building and only routable protocols like IP are on the LANs, use a router. Lower bandwidth links can be used between locations increasing efficiency. If only a few non-routable protocols are also being used consider setting up simple bridging where IP is routed and all other protocols are bridged. The NetVanta 3200 supports this mode of operation. Finally, if only non-routable protocols are in use, or ample bandwidth is available and simplicity is needed (simple LAN joining desired), use a bridge.
