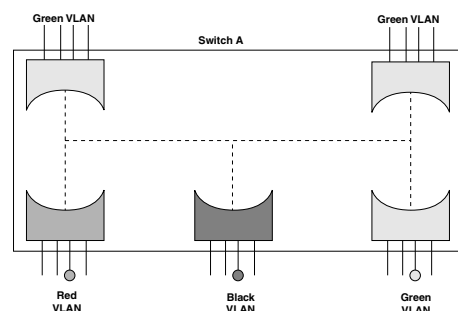


The figure shows a VLAN design. VLANs are defined by user functions rather than locations.

VLAN Operation



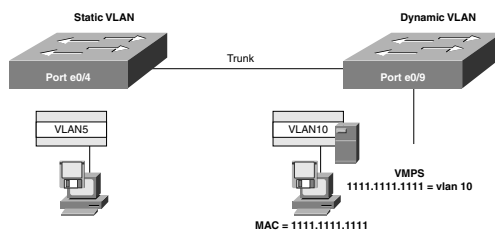
Each VLAN on a switch behaves as if it were a separate physical bridge. The switch forwards packets (including unicasts, multicasts, and broadcasts) only to ports assigned to the same VLAN from which it originated. This reduces on network traffic. VLANs require a trunk to span multiple switches. Each trunk can carry traffic for multiple VLANs.

VLAN Assignment

A port can be assigned (configured) to a given VLAN. VLAN membership can be designated as either static or dynamic:

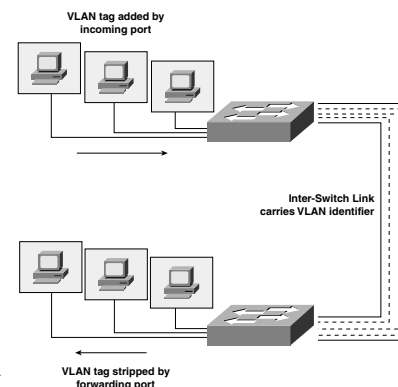
- **Static assignment**—The VLAN port is statically configured by an administrator.

- **Dynamic assignment**—The switch uses a VMPS (VLAN Membership Policy Server). The VMPS is a database that maps MAC addresses to VLANs. A port can belong to only one VLAN at a time. Multiple hosts can exist on a single port only if they are all assigned to the same VLAN.



Inter-Switch Link

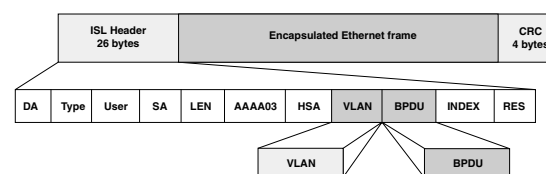
Inter-Switch Link (ISL) is a Cisco-proprietary protocol designed to carry VLAN traffic between switches. ISL provides point-to-point links in full-duplex or half-duplex mode. ISL is performed with ASICs, which operate at wire speeds and let VLANs span the backbone.



ISL Tagging

ISL frame tagging multiplexes VLAN traffic onto a single physical path. It is used for connections between switches, routers, and network interface cards. A non-ISL-capable device treats ISL-encapsulated Ethernet frames as protocol errors if the frame size exceeds the maximum transmission unit (MTU). ISL tagging is a protocol-independent function that occurs at OSI Layer 2. ISL can maintain redundant links and can load-balance traffic.

ISL Encapsulation



ISL-enabled ports encapsulate each frame with a 26-byte ISL header and a 4-byte CRC. ASICs allow this to occur at wire speed (low latency). The number of VLANs supported depends on the switch. The Catalyst 1900 supports 64 VLANs with a separate spanning-tree instance for each VLAN.