# VLANs

## Trunk Encapsulation

<table>
<thead>
<tr>
<th></th>
<th>ISL</th>
<th>Dest MAC</th>
<th>Source MAC</th>
<th>Type</th>
<th>FCS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>26</strong> bytes</td>
<td>ISL</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Untagged</th>
<th>Dest MAC</th>
<th>Source MAC</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6</strong> bytes</td>
<td></td>
<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>802.1Q</th>
<th>Dest MAC</th>
<th>Source MAC</th>
<th></th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>402</td>
<td>2</td>
</tr>
</tbody>
</table>

## VLAN Creation

Switch(config)# vlan 100
Switch(config-vlan)# name Engineering

## Terminology

### Trunking
Carrying multiple VLANs over the same physical connection

### Native VLAN
By default, frames in this VLAN are untagged when sent across a trunk

### Access VLAN
The VLAN to which an access port is assigned

### Voice VLAN
If configured, enables minimal trunking to support voice traffic in addition to data traffic on an access port

### Dynamic Trunking Protocol (DTP)
Can be used to automatically establish trunks between capable ports (insecure)

### Switched Virtual Interface (SVI)
A virtual interface which provides a routed gateway into and out of a VLAN

## VLAN Numbers

<table>
<thead>
<tr>
<th>Number</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Reserved</td>
</tr>
<tr>
<td>1</td>
<td>default</td>
</tr>
<tr>
<td>1002</td>
<td>fddi-default</td>
</tr>
<tr>
<td>1003</td>
<td>tr</td>
</tr>
<tr>
<td>1004</td>
<td>fdnet</td>
</tr>
<tr>
<td>1005</td>
<td>trnet</td>
</tr>
<tr>
<td>1006-4094</td>
<td>Extended</td>
</tr>
<tr>
<td>4095</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

## VLAN Trunking Protocol (VTP)

**Domain**
Common to all switches participating in VTP

**Server Mode**
Generates and propagates VTP advertisements to clients; default mode on unconfigured switches

**Client Mode**
Receives and forwards advertisements from servers; VLANs cannot be manually configured on switches in client mode

**Transparent Mode**
Forwards advertisements but does not participate in VTP; VLANs must be configured manually

**Pruning**
VLANs not having any access ports on an end switch are removed from the trunk to reduce flooded traffic

## Switch Port Modes

**trunk**
Forms an unconditional trunk

**dynamic desirable**
Attempts to negotiate a trunk with the far end

**dynamic auto**
Forms a trunk only if requested by the far end

**access**
Will never form a trunk

## Troubleshooting

- show vlan
- show interface [status | switchport]
- show interface trunk
- show vtp status
- show vtp password