

Virtual – LAN

Weidmueller Technical Support Team

This Tech Note applies the following Weidmueller Industrial Ethernet switches:

- IE-SW-VL08MT-8TX
- IE-SW-VL08MT-5TX-3SC
- IE-SW-VL08MT-6TX-2ST
- IE-SW-VL08MT-6TX-2SCS
- IE-SW-PL08M-8TX
- IE-SW-PL08M-6TX-2SC
- IE-SW-PL08M-6TX-2ST
- IE-SW-PL08M-6TX-2SCS
- IE-SW-PL16M-16TX
- IE-SW-PL16M-14TX-2SC
- IE-SW-PL16M-14TX-2ST
- IE-SW-PL10M-3GT-7TX
- IE-SW-PL10M-1GT-2GS-7TX
- IE-SW-PL18M-2GC-16TX
- IE-SW-PL18M-2GC14TX2SC
- IE-SW-PL18M-2GC14TX2ST
- IE-SW-PL18M-2GC14TX2SCS
- IE-SW-PL09M-5GC-4GT
- IE-SW-PL06M-2TX-4PoE

Why Using Virtual LAN?

Setting up Virtual LAN's (VLAN's) on your Weidmueller managed Switches increases the efficiency of your network by dividing the LAN into logical segments, as opposed to physical segments. In general VLAN's are easier to manage.

The Virtual LAN(VLAN) Concept

A VLAN is a group of devices that can be located anywhere on a network, but which communicate as if they are on the same physical segment.

With VLAN's you can segment you're network without being restricted by physical connections. That is a limitation of the traditional network design.

As an example, with VLAN's you can segment your network according to:

- *Departmental groups*

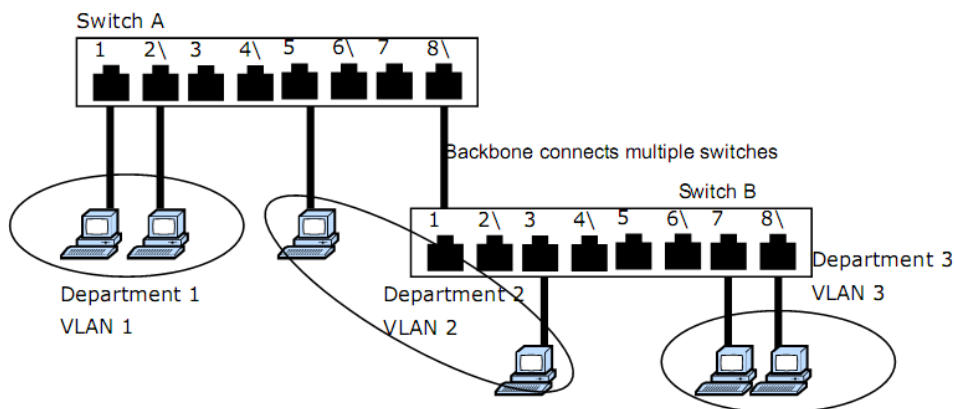
You could have one VLAN for the Marketing department, another for the Finance department, and another for the Development department.

- *Hierarchical groups*

You could have one VLAN for directors, another for managers, and another for general staff.

- *Usage groups*

You could have one VLAN for e-mail users, and another for multimedia users.



Benefits of VLAN's

The main benefit of VLAN'S is that they provide a network segmentation system that is far more flexible than traditional networks.

Using VLAN's also provides you with three other benefits.

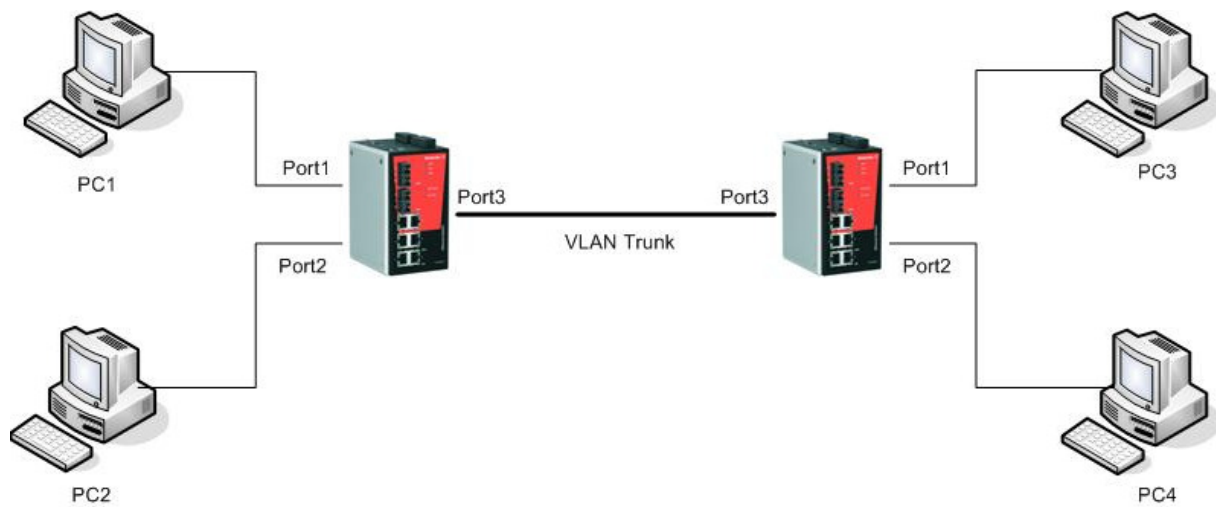
VLAN's easy the relocation of the devices on networks. With traditional networks, network administrators spend most of their time dealing with moves and changes. If users move to a different sub network, the address of each host must be updated manually. With VLAN settings, if a host on VLAN Marketing, for example, is moved to a port in another part of the network, and retains its original subnet membership, you only need to specify that the new port is on VLAN Marketing. You do not need to carry out any re-cabling.

- **VLAN's provide extra security.** Devices with in each VLAN can only communicate with other devices on the same VLAN. If a device on VLAN Marketing needs to communicate with devices on VLAN Finance, the traffic must pass through a routing device or Layer 3 switch.
- **VLAN's help control traffic.** With traditional networks, congestion can be caused by broadcast traffic that is directed to all network devices, regardless of whether or not they need it. VLAN's increase the efficiency of your network. Because each VLAN can be set up to contain only those devices that need to communicate with each other.

Two different Types of VLAN Mode

- **IEEE 802.1Q**
This standard allows traffic from multiple VLAN's to be carried across on physical link.
The standard requires that you define the 802.1Q VLAN ID for each VLAN on your Weidmueller managed switch before the switch can use it to forward traffic.
- **Port Based VLAN**
This method allows you to build VLAN's with different ports of one Weidmueller managed switch

Sample Application of VLAN's



VLAN 1: PC1 and PC3

VLAN 2: PC2 and PC4

Configuring Virtual LAN

To configure the Weidmueller Industrial Ethernet Switch, use the VLAN setting page.

802.1Q VLAN Settings

VLAN Mode:

Management VLAN ID:

Enable GVRP:

| Port | Type | PVID | Fixed VLAN (Tagged) | Forbidden VLAN |
|------|--------|------|---------------------|----------------|
| 1 | Access | 2 | | |
| 2 | Access | 3 | | |
| 3 | Trunk | 4 | 2,3 | |
| 4 | Access | 1 | | |
| 5 | Access | 1 | | |
| 6 | Access | 1 | | |
| 7 | Access | 1 | | |
| 8 | Access | 1 | | |

In this application,

- Port 1 connects a single untagged device and assigns it to VLAN 2, it should be configured as "Access Port" with PVID2.
- Port 2 connects a single untagged device and assigns it to VLAN 3, it should be configured as "Access Port" with PVID3.
- Port 3 connects with another switch. It should be configured as "Trunk Port", GVRP protocol will be used through the "Trunk Port" and should be tagged VID2 and VID3

Note: You have to configure the second switch in the same way!

To configure the Port-based VLAN, use the VLAN setting page to configure the ports.

Port-based VLAN Settings

VLAN Mode Port-based VLAN

| VLAN | Port | | | | | | | | | | | | | | | | | |
|------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | G1 | G2 |
| 1 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

VLAN Table

VLAN Table

VLAN Mode 802.1Q VLAN

Management VLAN 1

Current 802.1Q VLAN List

| Index | VID | Joined Access Port | Joined Trunk Port |
|-------|-----|-------------------------------------------------------|-------------------|
| 1 | 1 | 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, G1, G2, | 3, |
| 2 | 2 | 1, | 3, |
| 3 | 3 | 2, | 3, |
| 4 | 4 | | 3, |

VLAN Table

VLAN Mode

VLAN Mode

Port-based VLAN

Current Port-based VLAN List

| Index | VLAN | Joined Port |
|-------|------|----------------------------------------------------------------|
| 1 | 1 | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, G1, G2, |
| 2 | 2 | 1, |
| 3 | 3 | 2, |
| 4 | 4 | 1, 2, |

In 802.1Q VLAN table, you can review the VLAN groups that were created, joined Access Ports and Trunk Ports.

In Port based VLAN table, you can review the VLAN group and joined port.

Note: The physical network can have a maximum of 64 VLAN settings!