

Application Note

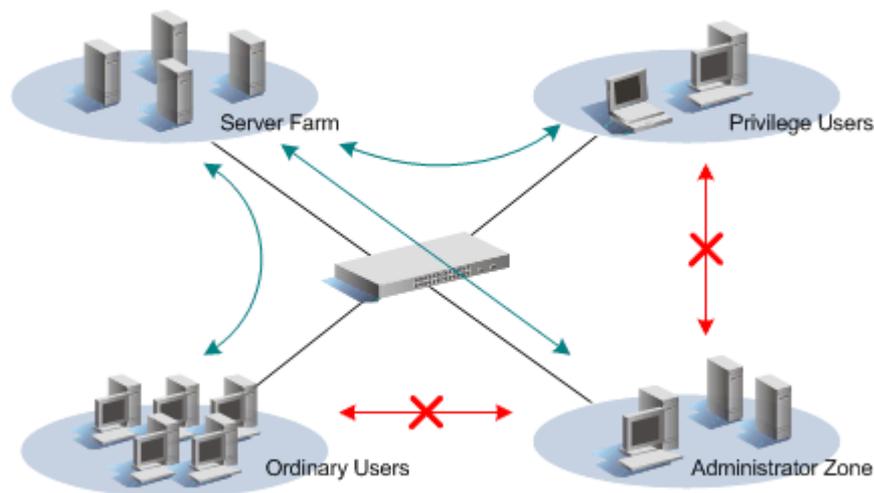
Subject

VLAN Implementation: Resource can be Shared to all VLANs

Description

Some switch has VLAN (Virtual LAN) capability to restrict the flow of broadcast, unicast and multicast traffic. Stations within a given VLAN can communicate with each others. It reduces unnecessary traffic in VLAN, and also achieve security between VLANs if necessary.

In the case that connectivity is restricted, it is still necessary to keep touch with the public resource, the Server Farm, and to share it with all other VLANs.



We try to use common methods of VLAN, **Tag-based VLAN** and **Port-based VLAN** to implement it.

Take a 24+2G smart switch for example. Assign ports to some specified groups:

- Ordinary Users: #1 ~ #12
- Privilege Users: #13 ~ #15
- Admin Zone: #16 ~ #20
- Server Farm: #21 ~ # 26

Installation & Configuration

Port-based VLAN:

Instead of 4 VLAN groups, we only create 3 VLAN groups for the case. The three groups are to prevent stations from communicating with others in different group.

VLAN Setting

ID	01											
Description	Ordinary											
Port	01	02	03	04	05	06	07	08	09	10	11	12
	<input checked="" type="checkbox"/>											
	13	14	15	16	17	18	19	20	21	22	23	24
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							
25	26											
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>											

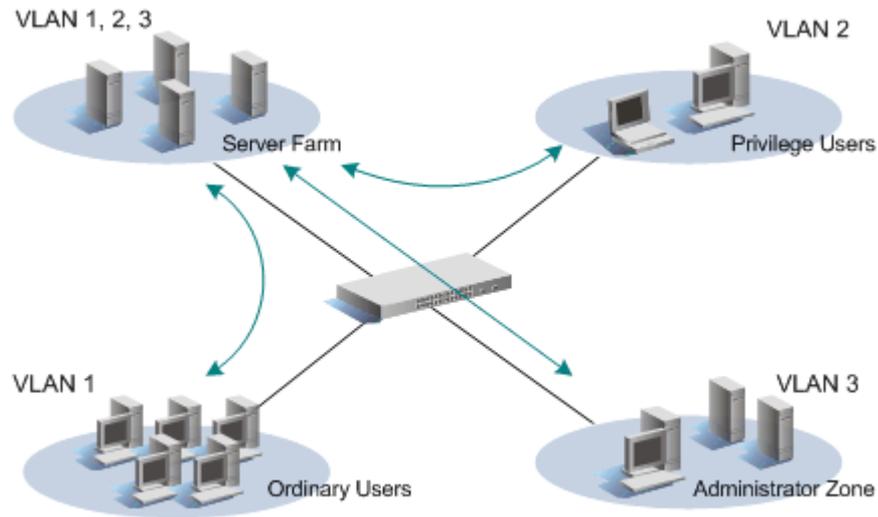
VLAN Setting

ID	02											
Description	Privilege											
Port	01	02	03	04	05	06	07	08	09	10	11	12
	<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"/>
	13	14	15	16	17	18	19	20	21	22	23	24
	<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"/>					
25	26											
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>											

VLAN Setting

ID	03											
Description	Admin											
Port	01	02	03	04	05	06	07	08	09	10	11	12
	<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"/>
	13	14	15	16	17	18	19	20	21	22	23	24
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
25	26											
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>											

(Note: Ports #21 ~ #26 that connect to Server Farm should participate in the three VLANs which resource is shard to.) Then, the three groups, Ordinary users, Privilege users and Admin, can share the servers, and still cannot communicate with others in different group.



Tag-based VLAN:

The switch that we take should support IEEE802.1Q standard.

Step 1. Assign Ports as Members of Group

As we did in last method, we create 3 VLAN groups for the case. Ports #21 ~ #26 that connect to Server Farm should participate in the three VLANs which resource is shard to.

VLAN Setting	
ID	01
Description	Ordinary
Port	01 02 03 04 05 06 07 08 09 10 11 12
	<input checked="" type="checkbox"/>
	13 14 15 16 17 18 19 20 21 22 23 24
	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
	25 26
	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

VLAN Setting

ID	02											
Description	Privilege											
Port	01	02	03	04	05	06	07	08	09	10	11	12
	<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"/>
	13	14	15	16	17	18	19	20	21	22	23	24
	<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"/>					
	25	26										
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										

VLAN Setting

ID	03											
Description	Admin											
Port	01	02	03	04	05	06	07	08	09	10	11	12
	<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"/>
	13	14	15	16	17	18	19	20	21	22	23	24
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
	25	26										
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										

With tag-based VLAN, we need to create a VLAN group (VID=4) that contains ports of group Ordinary, Privilege, Admin and Server.

VLAN Setting

ID	04											
Description	Servers											
Port	01	02	03	04	05	06	07	08	09	10	11	12
	<input checked="" type="checkbox"/>											
	13	14	15	16	17	18	19	20	21	22	23	24
	<input checked="" type="checkbox"/>											
	25	26										
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>										

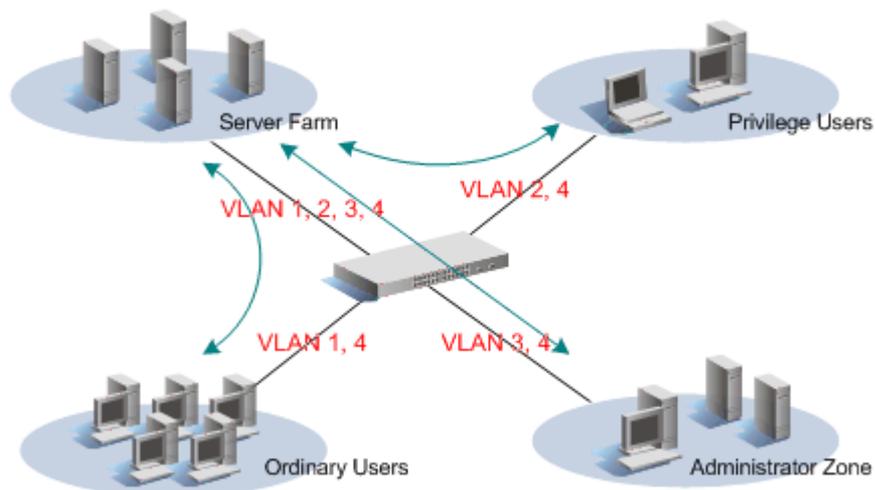
Step 2. Setup PVID to Ports

Port	01	02	03	04	05	06	07	08	09	10	11	12	13
PVID	1	2											
Port	14	15	16	17	18	19	20	21	22	23	24	25	26
PVID	2	2	3	3	3	3	3	4	4	4	4	4	4

When an untagged packet is received on a port, the port will tag the packet with PVID.

Then, the switch forwards the packet to the ports of VLAN group, which of VID is equal to PVID of the entrance port.

Then, the three groups, Ordinary users, Privilege users and Admin, can share the servers, and still cannot communicate with others in different group.



Date: 2004.12.28