



Virtual Local Area Network

APPLICATION NOTE



Used symbols



Danger – Information regarding user safety or potential damage to the router.



Attention – Problems that can arise in specific situations.



Information, notice – Useful tips or information of special interest.



Example – Example of function, command or script.

GPL license

Source codes under GPL license are available free of charge by sending an email to:

techSupport@advantech-bb.com



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1. Introduction to VLAN

A VLAN (Virtual Local Area Network) is an entity that uses IP header tagging to simulate multiple LANs within a single physical LAN. By identifying or tagging specific headers to indicate a specific broadcast domain they belong to, VLANs allow you to assign either physical or virtual ports to reside within partitioned port groups within the existing LAN on the device. This allows you to create specialized domains that have common topical or geographical attributes, giving you flexibility in your network setup.

While multiple VLANs are distinct from one another, like multiple LANs are, multiple VLANs can exist together on the same physical networking segment. VLANs require VLAN-aware networking devices to offer this kind of virtualization. These include switches, routers and firewalls that can recognize, process, remove and insert VLAN tags to direct packets to the correct VLAN location after arriving at the device.

1.1 VLAN Example

Imagine that you have a house with two floors. There are three computer stations connected to one switch on each floor. The backbone line connects switches. If you want to connect PC stations to two independent groups (VLAN1 and VLAN2 – see the picture above), create a VLAN for each group because the physical network would be complicated to create (due to two floors).

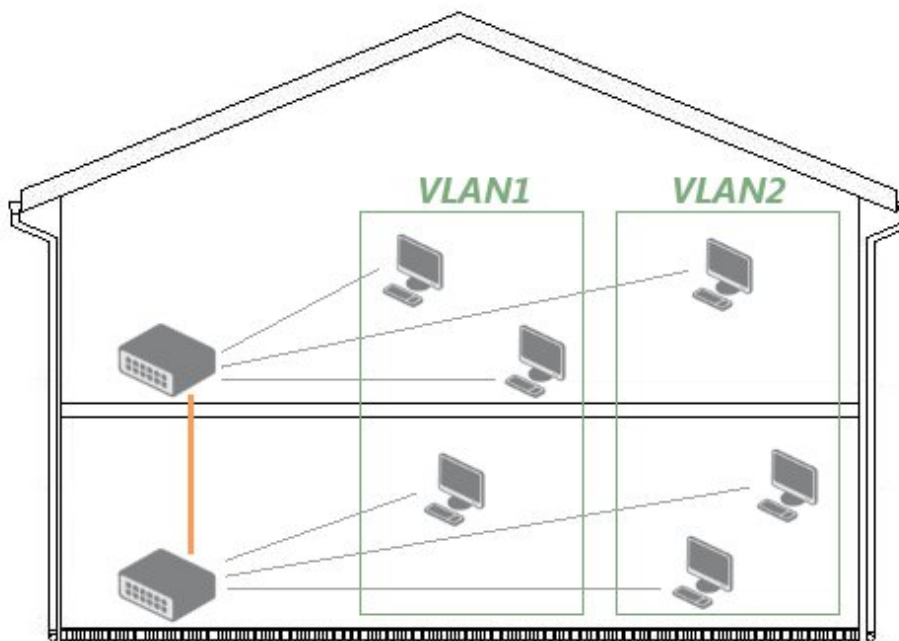


Figure 1: VLAN example

2. Configuration

The following configuration is supported by routers with firmware 3.0.6 and later.

2.1 Create VLAN interface

It will be used eth1 interface. However, at first, it is necessary to have to bring the interface up without an IP address assigned to it before eth1 can be used.



```
ifconfig eth1 0.0.0.0 up
```

Now it can be created interface vlan 11 and vlan 12 on this eth1 interface. To create a vlan interface, use *vconfig add* command as below:



```
vconfig add eth1 11
Added VLAN with VID == 11 to IF -:eth1:-

vconfig add eth1 12
Added VLAN with VID == 12 to IF -:eth1:-
```

These commands (mentioned above) create virtual interfaces eth1.11 and eth1.12 that are considered by the system as other network devices so you can configure and assign IP addresses like others. You can see the VLAN interfaces by typing *ifconfig -a* command:



```
ifconfig -a

eth1.11 Link encap:Ethernet HWaddr 00:30:48:BF:4E:BD
BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)

eth1.12 Link encap:Ethernet HWaddr 00:30:48:BF:4E:BD
BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
```

2.2 Assign IP address to the VLAN interfaces

The VLAN interfaces were successfully created on the previous section. Now we assign IP address on those interfaces using `ifconfig` command as below:



```
ifconfig eth1.11 192.168.11.254 netmask 255.255.255.0 up
ifconfig eth1.12 192.168.12.254 netmask 255.255.255.0 up
```

Make sure that the IP addresses were assigned successfully on the interfaces. It can be done by running the `ifconfig` command with interface name as a parameter:



```
ifconfig eth1.11

eth1.11 Link encap:Ethernet HWaddr 00:30:48:BF:4E:BD
10mm  inet addr:192.168.11.254 Bcast:192.168.11.255 Mask:255.255.255.0
UP BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)

ifconfig eth1.12

eth1.12 Link encap:Ethernet HWaddr 00:30:48:BF:4E:BD
inet addr:192.168.12.254 Bcast:192.168.12.255 Mask:255.255.255.0
UP BROADCAST MULTICAST MTU:1500 Metric:1
RX packets:0 errors:0 dropped:0 overruns:0 frame:0
TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
collisions:0 txqueuelen:0
RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)
```

3. Related Documents

- [1] Advantech Czech: **v2 Routers Configuration Manual** (MAN-0021-EN)
- [2] Advantech Czech: **SmartFlex Configuration Manual** (MAN-0023-EN)
- [3] Advantech Czech: **SmartMotion Configuration Manual** (MAN-0024-EN)
- [4] Advantech Czech: **SmartStart Configuration Manual** (MAN-0022-EN)
- [5] Advantech Czech: **ICR-3200 Configuration Manual** (MAN-0042-EN)
- [6] Advantech Czech: **ICR-4400 Configuration Manual** (MAN-0062-EN)
- [7] Internet: techtarget.com/searchnetworking/definition/virtual-LAN



Product-related documents can be obtained on *Engineering Portal* at www.icr.advantech.cz address.