

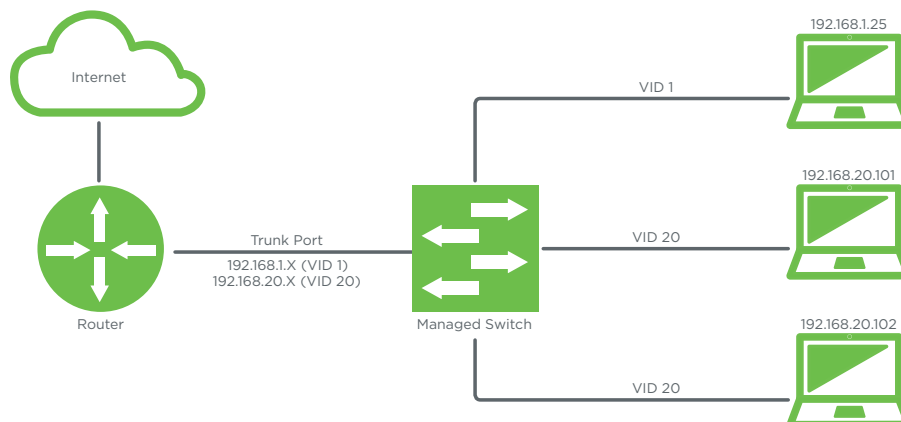
Introduction

This document explains the function and benefits of using VLANs in a network setup. It also provides a walk-through for setting up VLANs in Araknis 300 series routers and switches.

What is a VLAN?

- Stands for Virtual Local Area Network.
- VLANs are created and managed by the network admin using managed network switches and routers with VLAN capability.
- VLANs structure communication between network devices:
 - Without VLANs, network broadcast traffic (packets) from any device is sent to all devices.
 - With VLANs, broadcast packets are tagged with a VLAN ID when they pass through an assigned VLAN port. Tagged packets are only sent to other devices that are members of the same VLAN.
- VLANs break a LAN into smaller sub-networks. For example, VLANs may be used to segment the LAN traffic in a large home network, based on the type of user:
 - VLAN 1 is used for entertainment and end user devices (phones, computers, tablets).
 - VLAN 20 is only for surveillance systems (NVRs, IP cameras).
 - VLAN 30 is only for home automation/control system equipment.
 - VLAN 40 is restricted Wi-Fi for guests.
- Devices can be part of a VLAN based on either:
 - Physical port number on a managed switch or router that a network device is connected to.
 - MAC address of device (VLAN is configured with a list of MAC addresses that are allowed or not allowed to connect to it).
- VLANs can be totally restricted (only devices in the same VLAN can talk to each other) or allow access from/to other VLANs. Inter-VLAN communication is controlled by the router or other Layer 3 devices.

Figure 1. VLAN Network Topography Example



Why Set up VLANs?

- Increased Security – Unknown users can connect to a guest network but can't get access to other parts of the network unless you want them to.
- Minimize Network Equipment – Instead of needing multiple switches to make multiple subnets, you can use one switch and assign each port to a VLAN as needed.

Basic VLAN Setup Recommendations

Planning is the key to success with VLANs. List equipment by the way you want to split up a network, then record what devices are connected to what ports. You need managed switches located correctly to ensure that configuration can be completed, and cables between switches and the router to move data efficiently.

After you have the network organized, you can begin configuring VLANs in the router. We recommend setting up the router before any switches to ensure you don't set the wrong VLAN and lose access to a device.

Use different subnets for different VLANs to make it clear which VLAN a device is in. Example:

- VLAN 1 uses "192.168.1.XXX" addresses.
- VLAN 20 uses "192.168.20.XXX" addresses.
- VLAN 30 uses "192.168.30.XXX" addresses.

Configuration Instructions

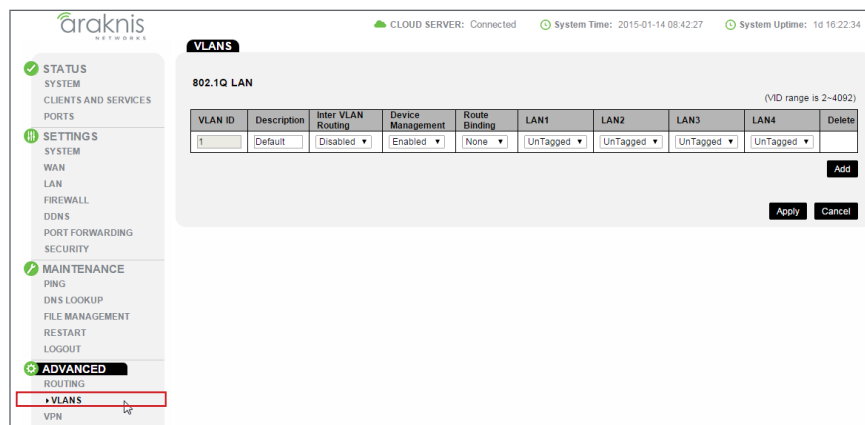
Note: These instructions detail the setup of an Araknis AN-300-RT-4L2W network router and AN-300 managed switch. Setup for other equipment should be similar. Consult the equipment manufacturer for specific setup instructions.

Step 1 – Set Up VLANs in the Router

By default, the entire network is on VLAN 1. Follow these instructions to configure new VLANs in the Araknis router.

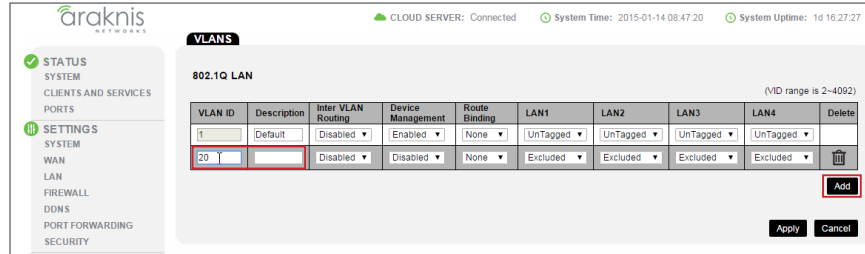
- Log into the router web interface as an administrator, and navigate to **Advanced > VLANs**.

Figure 2. AN-300-RT-4L2W VLANs Menu



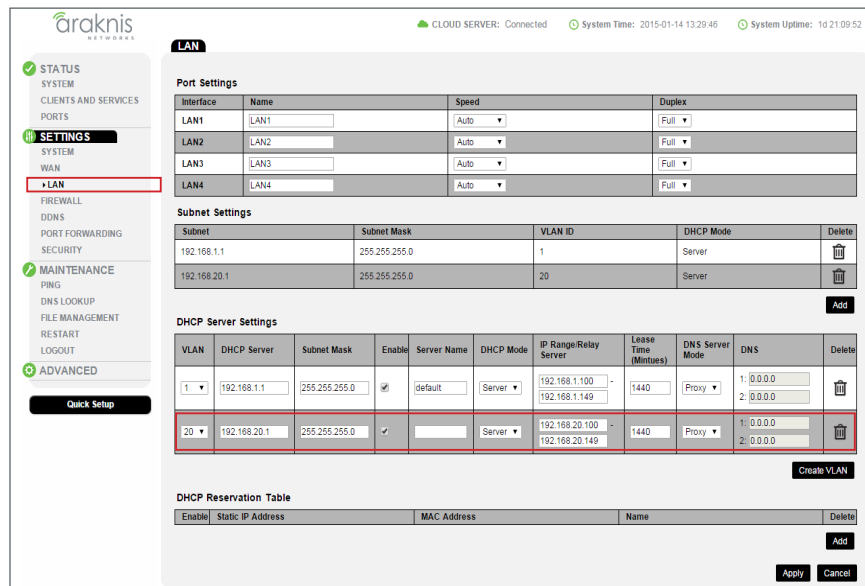
- B. Click the **Add** button to the right and enter a new VLAN ID in the field. For this example, we will add new VLAN 20. *If you add a new entry and do not use it, delete the entry using the Delete (🗑️) button before applying other changes.*

Figure 3. New VLAN Entry



- C. Click **Apply** in the bottom-right corner to save the new LAN entry. Now that the VLAN has been added in this menu, a new DHCP server and subnet has automatically been enabled in the LAN menu.
- D. Navigate to the **LAN** menu and review the settings for the new VLAN. *Note the new subnet and DHCP server settings entries listed for VLAN 20.*

Figure 4. LAN Menu - New VLAN 20



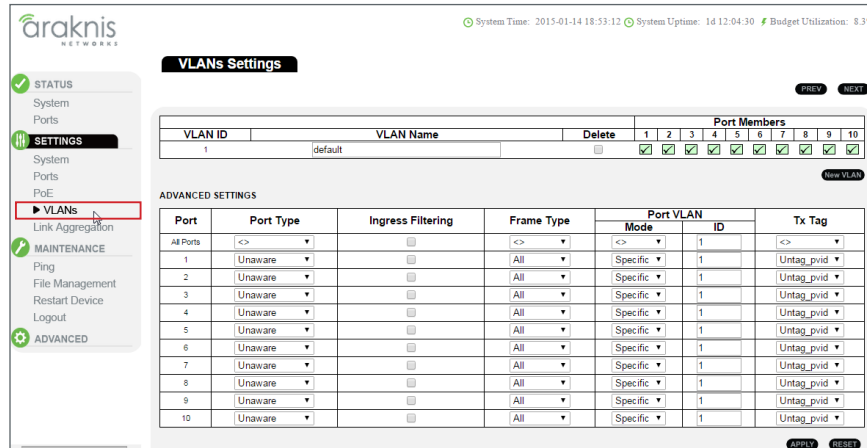
- E. The default settings for the DHCP server are ideal for most VLANs that require it. Change these settings if desired, then click **Apply** in the bottom-right to save the changes. Your router is now configured to issue DHCP IP addresses and handle traffic on VLAN 20.

Step 2 – Switch Configuration

Follow these instructions to configure the VLANs in your AN-300 managed switch.

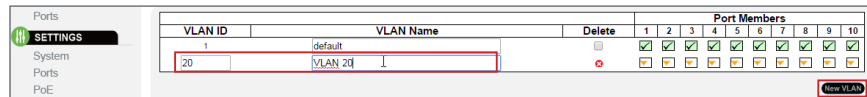
- A. Log into the switch web interface. (Default IP: 192.168.20.254) and navigate to **Settings > VLANs**.

Figure 5. AN-300 Switch – VLANs Menu



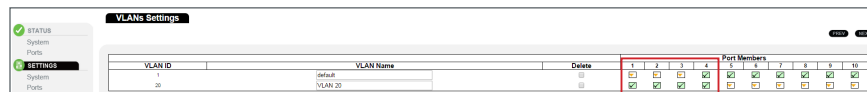
- B. Click **New VLAN** on the right and enter the same ID from the router (20) into the VLAN ID field. Name the VLAN anything you'd like using the VLAN Name field.

Figure 6. AN-300 Switch – New VLAN Entry



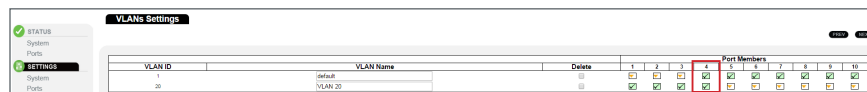
- C. Select which ports you want the VLAN to operate on under the **Port Members** section. Click the box for each port to toggle the checkmark () on the ports using the new VLAN, and toggle the corresponding boxes on the existing VLAN to be unselected ()

Figure 7. Assigning Switch Ports to VLANs



- D. Leave both VLANs enabled () for the port connected to the router, as seen below with Port 4. This is called the Trunk Port. This port will carry the traffic between all VLANs and the router.

Figure 8. Assigning the Trunk Port



- E. Next, scroll down the VLANs menu to Advanced Settings.

- F. Under **Advanced Settings**, set the Trunk Port (4 in the example) to a C-Port from the **Port Type** dropdown menu. *Do not change the VLAN ID from default (1).*

Figure 9. Configuring the Trunk Port to C-Type

Port	Port Type	Ingress Filtering	Frame Type	Port VLAN		Tx Tag
				Mode	ID	
All Ports	<>	<input type="checkbox"/>	<>	<>	1	<>
1	Unaware	<input type="checkbox"/>	All	Specific	20	Untag_pvid
2	Unaware	<input type="checkbox"/>	All	Specific	20	Untag_pvid
3	Unaware	<input type="checkbox"/>	All	Specific	20	Untag_pvid
4	C-port	<input type="checkbox"/>	All	Specific	1	Untag_pvid
5	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
6	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
7	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
8	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
9	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
10	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid

- G. Change the VLAN ID for the remaining ports to match the VLAN assigned in Figure 6.

Figure 10. Configuring the Advanced Port VLAN ID

Port	Port Type	Ingress Filtering	Frame Type	Port VLAN		Tx Tag
				Mode	ID	
All Ports	<>	<input type="checkbox"/>	<>	<>	1	<>
1	Unaware	<input type="checkbox"/>	All	Specific	20	Untag_pvid
2	Unaware	<input type="checkbox"/>	All	Specific	20	Untag_pvid
3	Unaware	<input type="checkbox"/>	All	Specific	20	Untag_pvid
4	C-port	<input type="checkbox"/>	All	Specific	1	Untag_pvid
5	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
6	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
7	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
8	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
9	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid
10	Unaware	<input type="checkbox"/>	All	Specific	1	Untag_pvid

- H. Click **Apply** in the bottom right corner to save the new settings.
- I. See the screenshot of the complete setup below. Ports 1-3 have been assigned to VLAN 20 and ports 5-10 remain on the default VLAN 1. The trunk port (port 4) has been assigned to allow access to both VLAN 20 and default and set to port type C.

Figure 11. Completed Switch VLAN Settings

The screenshot displays the Araknis Networks management interface. At the top, it shows system information: System Time: 2015-01-19 06:50:15, System Uptime: 68 00:01:33, and Budget Utilization: 9%. The main section is titled 'VLANs Settings' and includes a 'PREVIEW' button. Below this, there is a table for 'VLAN ID' and 'VLAN Name'. VLAN 1 is the default, and VLAN 20 is also listed. A 'Delete' button is next to each entry. To the right is a 'Port Members' table with columns for ports 1 through 10. Each port has a checkbox and a dropdown menu. Ports 1, 2, and 3 are checked and set to '20'. Ports 4 through 10 are checked and set to '1'. A 'New VLAN' button is at the bottom right of this section. Below the VLAN settings is the 'ADVANCED SETTINGS' table, which is a detailed configuration table for each port. It includes columns for Port, Port Type, Ingress Filtering, Frame Type, Mode, Port VLAN ID, and Tx Tag. Port 4 is configured as a 'C-port', while all other ports are 'Unaware'. All ports have 'Specific' mode and 'Untag_pvid' as the Tx Tag. 'APPLY' and 'RESET' buttons are at the bottom right of the advanced settings table.

Verifying New VLANs

Use these methods to verify whether a VLAN has been correctly configured:

- Connect your computer to an assigned VLAN port and check to see if it was assigned a new DHCP IP address in the proper subnet.
- Check the IP settings of a connected device to verify that it has a DHCP IP address in the proper subnet.

Contacting Technical Support

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