

Cisco 2100 Series Wireless LAN Controllers Best Practices

The Cisco 2100 series of wireless LAN controllers (WLC) provide a cost effective unified wireless solution for small businesses as well as remote or satellite offices. Although the 2100 series WLCs have multiple 10/100 ports, like the larger WLCs, they do not behave like switches or routers. The 2100 is a software switch without full IPv4 connectivity between the individual ports; so it is not good idea to use the different ports as a hub/switch implementation. Understanding this fundamental point is a key aspect of getting the best performance out of the controller.

Because of the lack of full IPv4 support between the individual ports, the 2100s are designed to have a single network connection. This means that all of the interfaces, i.e. management, ap-manager, and dynamic interfaces, on the WLC should all be assigned to the same physical port. Configuration Example 1 shows a 2100 using port 1 as the network distribution port for the WLC.

Configuration Example 1:

(2125wlc) >**show interface summary**

Interface Name	Port	Vlan Id	IP Address	Type	Ap Mgr	Guest
ap-manager	1	39	192.168.203.4	Static	Yes	No
datanet2	1	44	5.5.3.100	Dynamic	No	No
guest	1	900	5.5.5.100	Dynamic	No	No
management	1	5	192.168.5.76	Static	No	No
thirty-five	1	35	192.168.35.76	Dynamic	No	No
twenty-five	1	25	192.168.25.76	Dynamic	No	No
virtual	N/A	N/A	1.1.1.1	Static	No	No

(2125wlc) >**show port summary**

Pr	Type	Stat	Mode	Mode	Status	Status	Trap	POE
1	Normal	Forw	Enable	Auto	100 Full	Up	Enable	N/A
2	Normal	Disa	Enable	Auto	Auto	Down	Enable	N/A
3	Normal	Disa	Enable	Auto	Auto	Down	Enable	N/A
4	Normal	Disa	Enable	Auto	Auto	Down	Enable	N/A

5	Normal	Disa	Enable	Auto	Auto	Down	Enable	N/A
6	Normal	Disa	Enable	Auto	Auto	Down	Enable	N/A
7	Normal	Disa	Enable	Auto	Auto	Down	Enable	Enable (Power Off)
8	Normal	Disa	Enable	Auto	Auto	Down	Enable	Enable (Power Off)

Notice that in the above configuration example, all of the interfaces on the WLC, aside from the virtual interface, are all assigned to port 1. Port 1 is the only physically connected port on the unit to the wired network.

A common misconfiguration with the 2100s is to physically connect multiple ports on the WLC to the switched network. The logical reasoning behind this is to increase bandwidth because the ports on the 2100s are only 10/100. In theory, this makes a lot of sense considering the 2100s can support up to 25 APs, including the 802.11n models. In practice, however, you will commonly see traffic flow problems with this type of deployment. These traffic flow problems usually boil down to ARP issues that are a direct result of the software switch nature of the device.

The traffic flow problems that result from multiple network connections stem from two major causes. The first is that when you have multiple network connections to a WLC, you must either use link aggregation (LAG) or have an ap-manager interface assigned to each port. This ensures proper traffic flow into and out of the WLC. With the 2100s, however, you cannot configure more than one ap-manager interface and LAG is not supported. The second issue is that all of the interfaces on a 2100 use the same MAC address. This fundamental design aspect is the underlying cause for the following bugs filed against the 2100 series controllers:

CSCsj33229 - Unable to ping AP's directly connected to a 2106 controller

CSCsw43518 - Users connected to directly connected AP's not able to pull IP address

CSCsk15792 - Ethernet bridging doesn't work if RAP is directly connected to a 2106

CSCtf26554 - Delay of LWAPP request frame periodically sending from LAP

From the above list of issues, you can also see that having APs directly connected to the WLC can be problematic as well. You can have problems where directly connected APs will not join the WLC and have PoE issues if using ports 7 and 8.

CSCtg09589 Duplex Mismatch When 1140 AP is Directly Connected to 2100 WLC

CSCte24079 2106 LAN hangs after high load with duplex mismatch

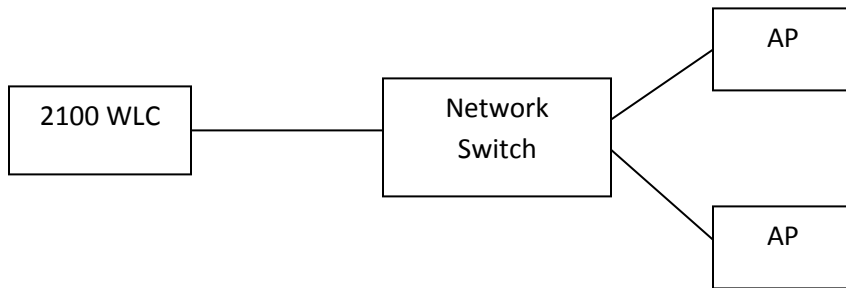
CSCsg23834 - 2106 AP in connected mode cannot join controller

CSCsl46609 - 2106 POE does not power AP properly

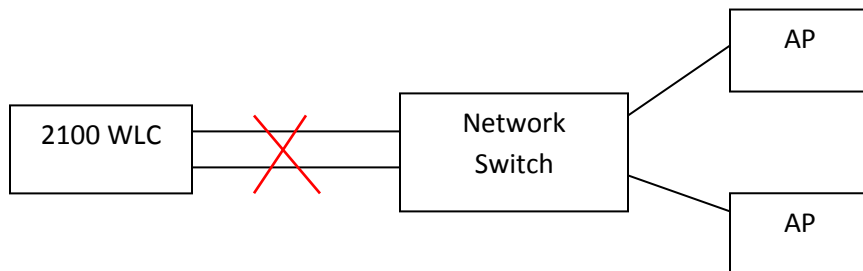
For the best results, you will want to have all of your APs on a network switch as opposed to having them plugged into one of the remaining WLC ports. This goes against the current marketing material for the 2100s and a request to the Technical Market Engineers has been sent to have this information corrected.

The following are some simple logical diagrams illustrating what is best practice and what designs should be avoided:

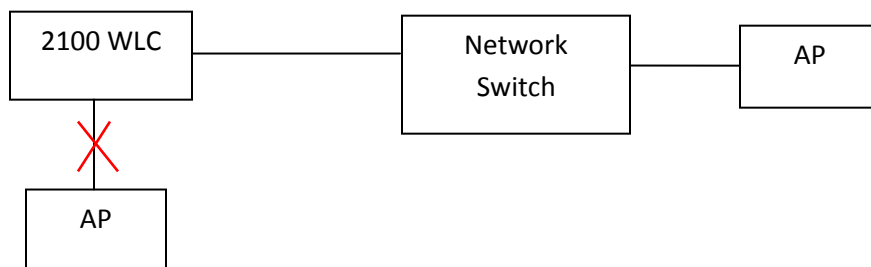
Example 1: Best Practice - Only a single network connection between the WLC and the switched network. APs are not directly connected to the WLC, but instead are connected to a network switch.



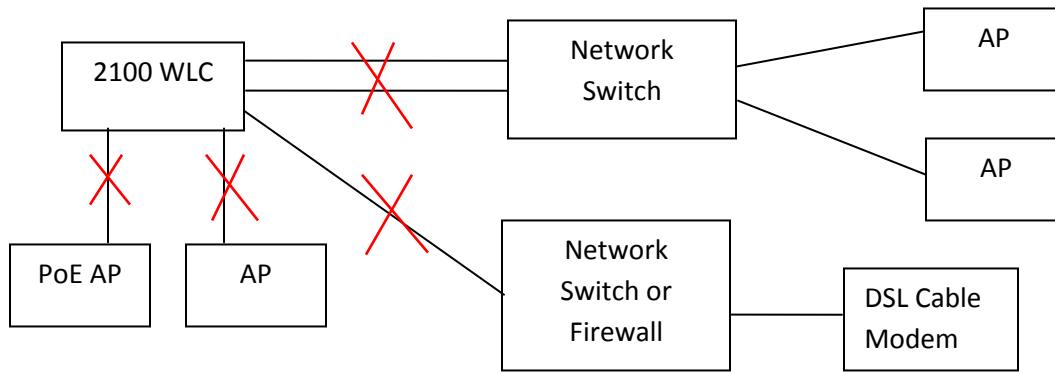
Example 2: Incorrect - Multiple connections from the WLC to the switched network.



Example 3: Incorrect - Although there is only a single network connection between the WLC and the wired network, APs are directly connected to controller.



Example 4: Incorrect - multiple connections to the wired network from the WLC and APs directly connected to the controller. One of the directly connected APs is using PoE.



Aside from the physical connections, it is also important to point out that certain features such as Telnet, SSH, and Syslogging from an AP that is directly connected to a 2100 series WLC will fail unless that AP is registered to the controller. This can be an issue with remote deployments in the event that the AP is not joined and you need to take advantage of those features.

Summary

This document offers insight into how to correctly deploy the 2100 series Cisco Wireless LAN controllers to achieve the best performance from the unit and enhance the wireless experience.