Dual-RF Wireless Redundancy

Introduction
In this paper we explain the traditional single-RF (single radio frequency) and dual-RF (dual radio frequency) wireless architectures and discuss what Moxa can provide in the way of dual-RF technology

Research has shown that more than 40% of wireless users are concerned about interference, and this issue becomes even more important for industrial and critical applications.

Interference normally occurs at a particular frequency, so if we can use 2 or more different frequencies to communicate at the same time, data transmission will continue even if there is interference on one of the frequencies.

Single-RF Wireless Architecture—the Traditional Approach
The following diagram shows the standard architecture of a wireless infrastructure in which access points (AP) are used to connect many Clients to an Ethernet network. Since the AP and Client are connected by a single-RF connection, if the RF connection fails, the system and network behind the Client will be disconnected.

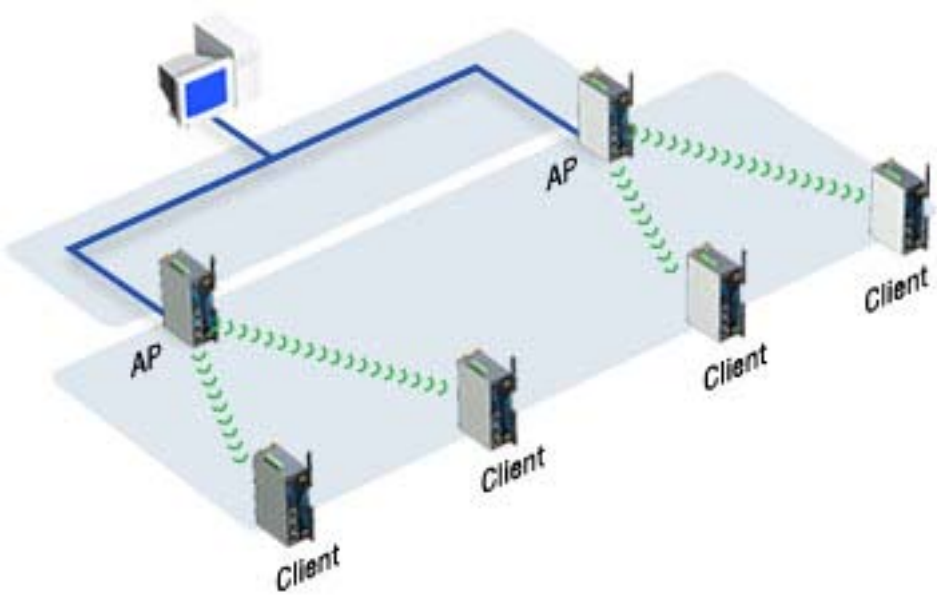

Fig. 1: Traditional Wireless Architecture

Dual-RF Wireless Architecture—a New Approach
One way to achieve network redundancy without needing to change the existing architecture of your wireless LAN is to use APs and Clients that support dual RFs; usually, the two RFs are set to 2.4 GHz and 5 GHz to prevent interference. To ensure that data can be delivered between the APs and Clients even when there is interference on one of the frequencies; Moxa devices provide seamless redundancy by supporting a special protocol with a switching time close to zero. If your application requires more than just wireless redundancy, Ethernet redundancy can also be incorporated. Fast ring redundancy such as RSTP or Turbo Ring is important for the wired Ethernet side of the network.

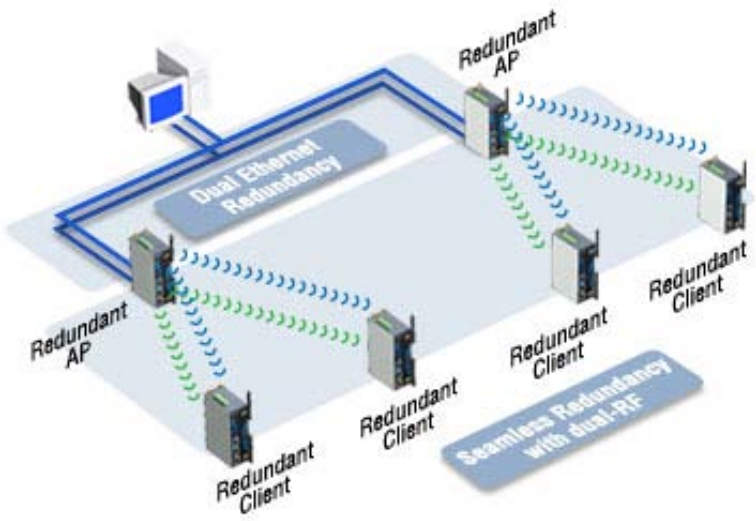

Fig. 2: Redundant Wireless Ethernet

Introduction to Moxa's Dual-RF Redundancy

Moxa's advanced AP/Client AWK-5000/6000 series of products provide Dual-RF redundancy. The configuration is simple; all you need to do is set up redundant AP on the AP side and redundant Client on the Client side, and then set a different SSID for each RF. The following diagram shows the Web console UI for Moxa's AWK-5222, in which WLAN1 is set to SSID1 and WLAN2 is set to SSID2.

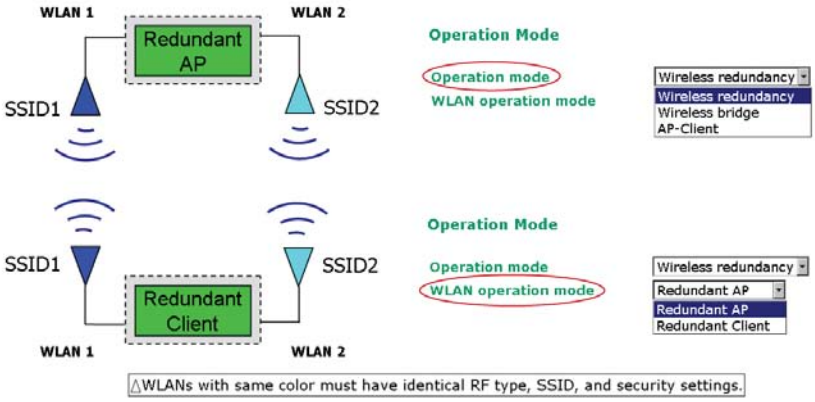

Fig. 3: Dual-RF—Wireless Redundancy Mode

If both the existing Clients and dual-RF clients support redundancy on the same network, Moxa's AWK-5000/6000 Access Point can connect both types of clients to an Ethernet network. As shown in the diagram below, enter SSID (Moxa_1_1) in the 2nd column for the AP to connect traditional wireless clients with this SSID to the AP.

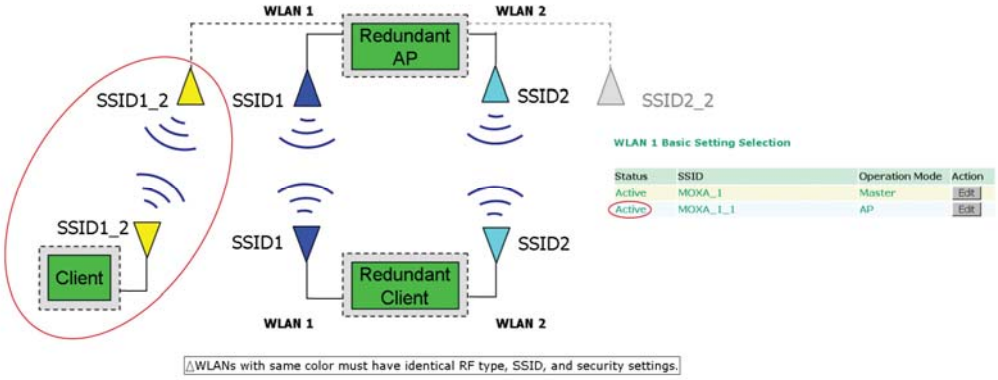

Fig. 4: Single-RF Connection

In addition to wireless redundancy mode, Moxa's AWK-5000/6000 advanced AP/Client devices offer another dual-RF feature called "Wireless Bridge" mode. Wireless Bridge mode is designed to optimize WDS mode in light of known throughput problems. The normal throughput is Throughput = 25 Mbps (n-1) where the variable n represents the number of WDS nodes. For example, the throughput is approximately 8 Mbps with 4 mesh nodes, resulting in poor performance, as shown below.

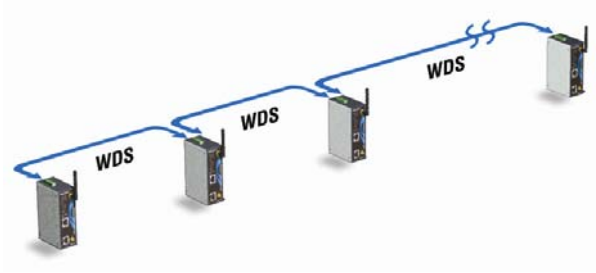

Fig. 5: Single-RF Mesh Network

With Wireless Bridge mode, we can keep the throughput at 10 to 15 Mbps. Configuration is simple; just link the Wireless Bridge master to the Wireless Bridge slave,as shown below.

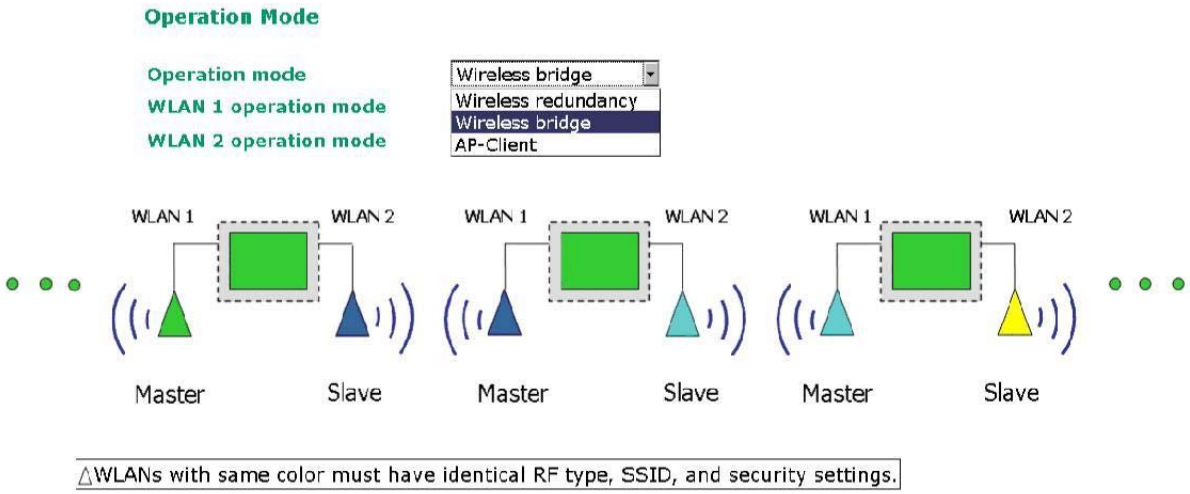

Fig. 6: Wireless Bridge Mode

Wireless bridge mode can also connect wireless clients to another SSID, as shown below, so it can be used in environments where APs cannot be wired.

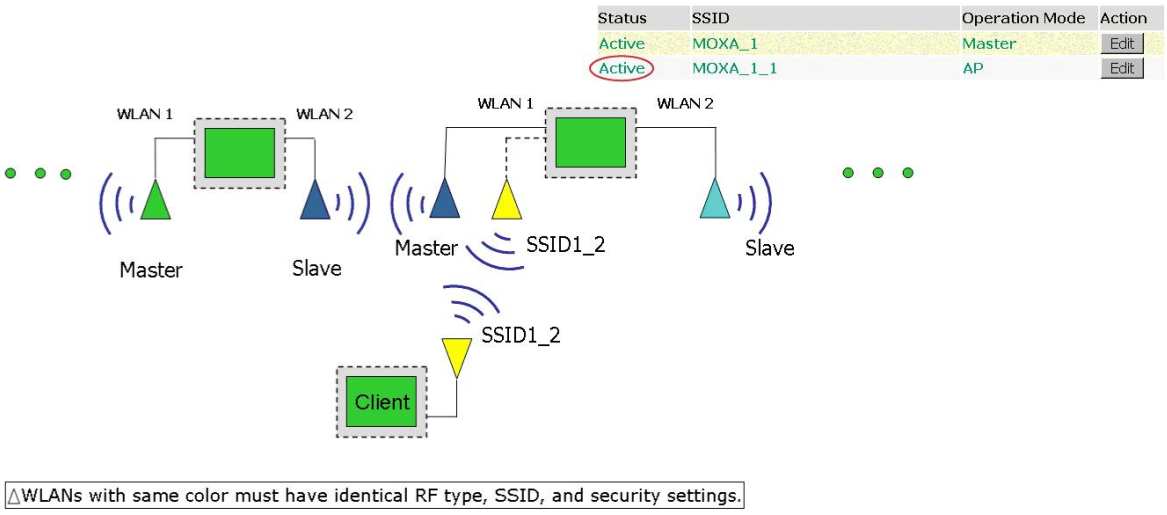

Fig. 7: Bridge Mode for Extra APs

In Conclusion

One of Moxa's latest product offerings uses a dual-RF design in an access point, which provides a wider broadcast range and better coverage, as well as a broad selection of antennas. The product has a rugged, metal housing for operation in an extended temperature range, which is typical of demanding environments. It supports 802.11a/b/g and delivers an industry-leading range and throughput, and meets the performance requirements of industrial applications.