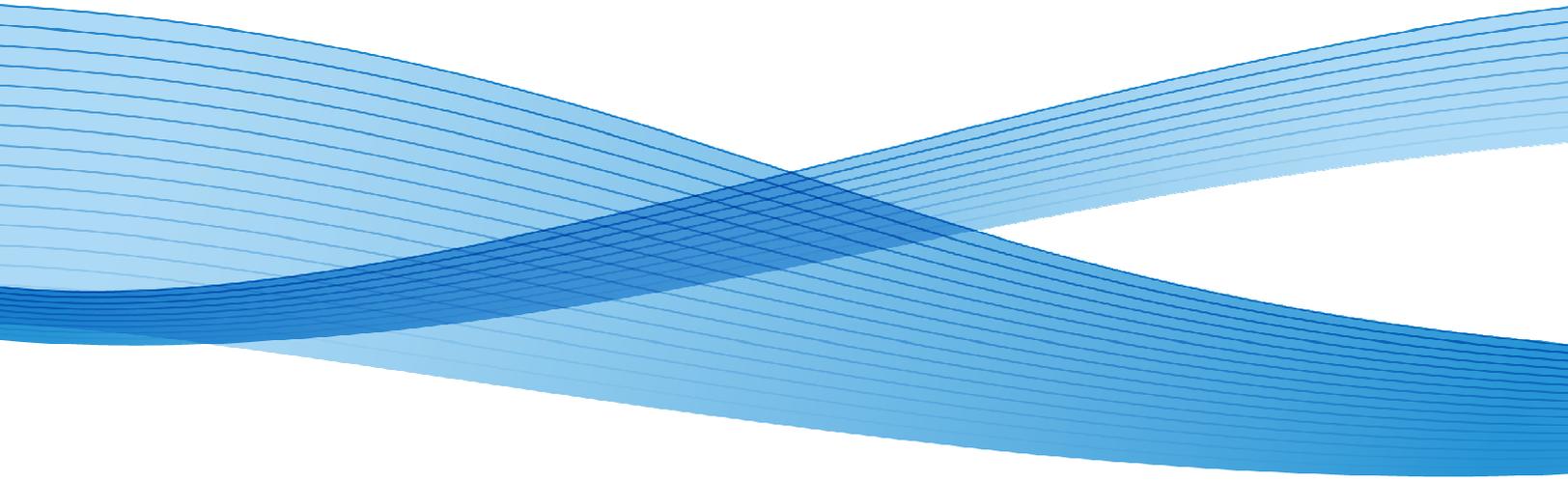




Xerox<sup>®</sup> ConnectKey<sup>™</sup> Devices Deliver  
Apple<sup>®</sup> AirPrint<sup>™</sup> to the Enterprise  
White Paper



# Executive Summary

Apple AirPrint is a driverless printing technology introduced with iOS version 4.2 in November of 2010. It enables Apple's iOS® devices including iPhones®, iPads®, iPod® Touches, and Mac® OS X® to print without the need to install drivers or download software. AirPrint uses familiar, well-established technologies already in use today including Bonjour®, IPP, PDF and JPEG.

One of the big benefits of AirPrint is that it gives users the speed and convenience of direct print capability from their iOS-based wireless devices without cloud services or proxy devices in the print path. AirPrint works best in flat Wi-Fi networks, which are typically found in home and small offices. Using AirPrint in mid- to large-size enterprises may require making some changes to your network infrastructure to allow this service to traverse the multiple subnets found in enterprise environments.

Many Xerox customers have expressed an interest in taking full advantage of the AirPrint capabilities that are available for Xerox® ConnectKey™ devices. Unfortunately, subnets or multiple smaller networks that are designed to enhance efficiency, space allocation and security issues are not well understood. Ideally, users want AirPrint to “just work” – as it already does on their own home networks. To allow this to happen, it is imperative to set-up an environment that allows the end user's Apple iOS devices to find and access network printers that are AirPrint capable.

This white paper provides some insight into the ways in which you can help your network infrastructure support AirPrint.

The information presented in this document is divided into the following sections:

Basic Mechanisms To Make Your Enterprise AirPrint Ready .....	3
Bonjour Gateway Servers .....	3
Wide Area DNS Service Discovery .....	3
Bonjour Gateways Embedded in Wireless Controllers and Appliances .....	4
Conclusion .....	4
Appendix A – Cisco® Link Approach to Bonjour Gateways .....	5
Appendix B – Websites on How to Implement Wide-Area DNS-SD in Your Network .....	5

# Basic Mechanisms to Make Your Enterprise AirPrint Ready

While every company has a unique IT infrastructure and there is no single answer that fits all networks, we can recommend three basic mechanisms that can be used to make your enterprise AirPrint ready:

- Bonjour Gateways servers
- Wide Area DNS Service Discovery
- Wireless LAN controllers with embedded Bonjour Gateways

Let's explore each of these options to see which may be the best fit for your needs. As you may guess, each of these mechanisms has its pros and cons. Your IT department is best qualified to review the alternatives and choose the mechanism that best fits the unique needs of your organization.

## Apple Bonjour Gateway Software

Apple Bonjour Gateways allow Apple services such as AirPrint to be usable across subnets. When you decide to deploy a Bonjour Gateway in your network, your IT organization may have to configure your IT infrastructure to enable the Bonjour protocol in your network. Apple's Bonjour protocol requires Multicast DNS (mDNS) to be enabled in your network. It is also requires that the client and device offering the service be on the same VLANs. For a large-scale deployments, using a single VLAN may not be practical so you may have to place clients on one VLAN and the AirPrint devices on another.

The Apple Bonjour Gateway software works in conjunction with your appropriately configured network to allow Bonjour requests to travel across multiple subnets. The Bonjour Gateway software can be installed on a PC or in a Virtual Machine connected to a trunk port on the network. If a trunk port is not available, the gateway can use the less efficient method of attaching to multiple physical Ethernet uplinks to connect to multiple subnets.

The process to configure mDNS, VLANs, and Bonjour Gateways varies depending on your network topology, brand of network components, and IT policies. Your IT team should determine the optimal configuration for your environment. As an example, Appendix A provides a link to an approach recommended by Cisco.

## Wide-Area DNS Service Discovery

Wide-Area DNS Service Discovery (DNS-SD) provides another mechanism to enable AirPrint across medium to large enterprise work environments. There are several ways to deploy Wide-Area DNS SD. You can set up a Dynamic DNS Server to allow machines to automatically advertise their services. Another mechanism is to add DNS entries describing the services you want to advertise for clients to discover.

To activate Wide-Area DNS-SD in your network, you will need to enable the DNS-SD service in your DNS server. You will also need register the DNS-SD records with the DNS server. This implementation requires a disciplined process to register and deregister printing devices. Appendix B provides a few websites that provide additional context on how to implement Wide-Area DNS-SD in your network.

# Bonjour Gateways Embedded in Wireless Controllers and Appliances

Many network equipment manufacturers are responding to customer requests to use AirPrint in enterprise environments by embedding Bonjour gateways in wireless LAN controllers (WLC) and appliances. This approach eliminates the need to set up and maintain Bonjour gateways or DNS servers that are specially configured to enable Bonjour services.

Here we will focus on a Cisco solution. Cisco offers one of the most complete AirPrint solutions for enterprise networks. Cisco's new WLC embeds Bonjour Gateway capabilities allowing customers to overcome AirPrint subnet limitations. It also offers the added benefit of providing policy-based end user privileges. Cisco's solution listens for Bonjour services and caches those Bonjour advertisements (such as AirPrint) from the source/host. Clients requesting Bonjour services are routed to the appropriate endpoint.

## Putting the Solution to the Test

Xerox partnered with Cisco to pilot Cisco's new WLC in the Xerox network. The pilot included an office environment with over 100 users serviced by four Xerox<sup>®</sup> ConnectKey™ devices attached to three different subnets. After the initial configuration by the Xerox IT personnel, office users were able to use AirPrint from the Apple iOS devices to four ConnectKey devices with the same ease of use and simplicity to which they are accustomed at home. The pilot was very successful, achieving near perfect uptime and great degree of end user satisfaction.

## Conclusion

This document presents software and hardware based solutions to enable AirPrint to work in enterprise networks. In general, software solutions such as special Wide area DNS-SD and Bonjour Gateways require small to no capital expenditure investments but involve varying degrees of design, configuration, and deployment expenses. Hardware solutions that embed Bonjour Gateways require the least amount of set-up and configuration expenses but involve capital expenditures. Each organization must determine the most effective way to enable AirPrint in their enterprise networks.

# Appendix A: Cisco Link Approach to Bonjour Gateways

## Apple Bonjour gateway recommended by Cisco

The instructions can be found at:

[http://www.cisco.com/en/US/products/hw/wireless/ps4570/products\\_tech\\_note09186a0080bb1d7c.shtml](http://www.cisco.com/en/US/products/hw/wireless/ps4570/products_tech_note09186a0080bb1d7c.shtml)

# Appendix B: Websites on How to Implement Wide-Area DNS-SD in Your Network

## References

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