What Is Zero Configuration Networking (Zeroconf)?

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Zero Configuration Networking (Zeroconf[1]) is a set of technologies used together to allow for automated network configuration of devices and services, without the use of central services such as DNS or DHCP. These technologies cover Addressing, Name Resolution and Service Discovery. Zeroconf deployments are typically small in size, to support home networking or ad-hoc networks where simplicity, ease of use and customer experience are essential. Tablets, printers, and scanners that use Zeroconf protocols have seen widespread adoption in the consumer electronics market and home networking. However, with the large increase of "Bring Your Own Device" (BYOD) occurring in the Enterprise, users want the same experience they have at home within the Enterprise Network, creating the need to support Zeroconf across the Enterprise or university campus.

Zeroconf, initially proposed by Apple, is not limited to only Apple products. In fact, almost every printer with network connectivity supports Zeroconf by default. Cameras, network speakers and network appliances (such as storage appliances, gateways, wireless routers, etc.) also use Zeroconf to facilitate initial service discovery, configuration and ease of use in daily operation.

What Are The Challenges Faced In Zeroconf?

A common architecture design practice in Enterprise networks is to control Layer 2 broadcast domains for segmentation and to limit fault domains. Another common architectural practice is to separate different access technologies (like wireless and wired devices) into different network segments, as well as segmenting different types of users and devices by Layer 3 boundaries. However, current implementations of Zeroconf technology have been designed to *work within a single Layer 2 domain and not across Layer 3 boundaries.* Network users still expect to have the same type of service visibility and connectivity that is available at home in their work environment as well.

A typical scenario is a user with a wireless tablet who wants to print a document to a network attached printer connected to the wired network. Typically, the mobile user is on a different subnet than the printer and while the tablet should be able to reach the printer it does not have exposure to it because the service announcement will not make it across the Layer 3 boundaries that connects the wired and the wireless segment.
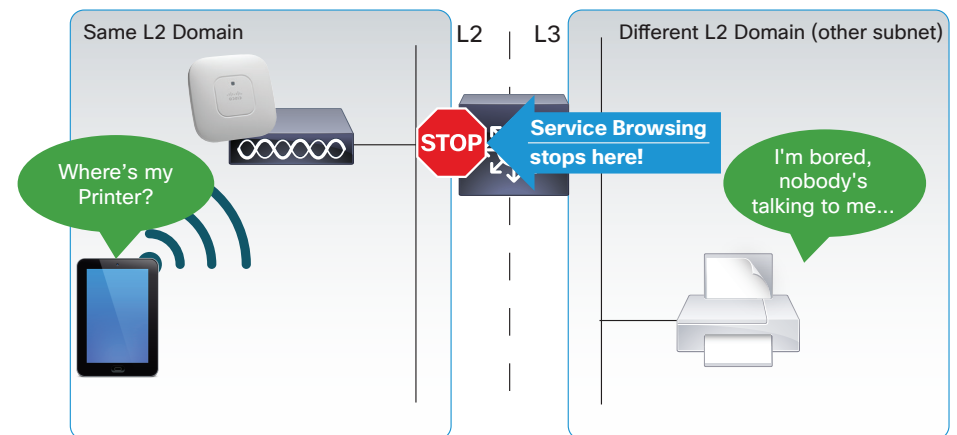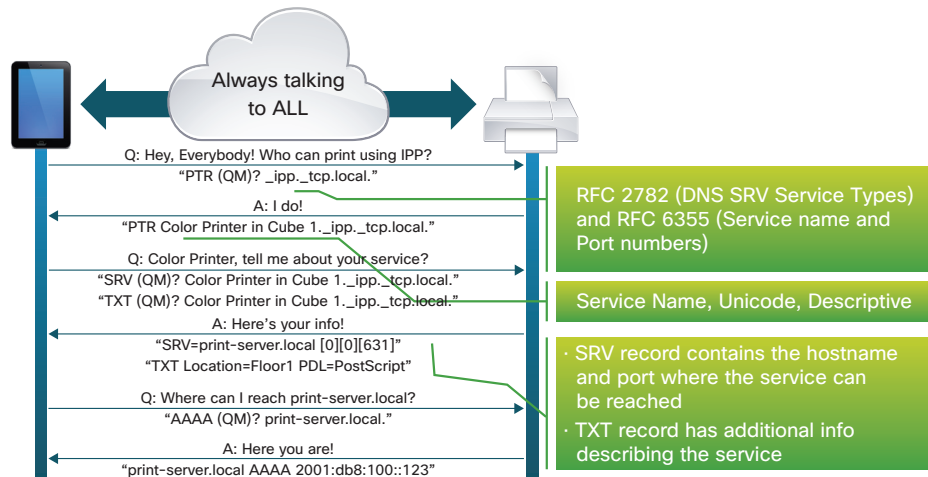

What Is The Cisco Service Discovery Gateway?

The Cisco Service Discovery Gateway provides a solution to allow Zeroconf service information to propagate over Layer 3 boundaries; this allows devices in one Layer 2 domain to discover services in a different Layer 2 domain.

The Cisco Service Discovery Gateway solution listens to service announcements on configured network segments and builds a cache of services and corresponding addresses. Then, it can be configured to proxy these requests to other segments and apply filters based on various service attributes. These filters can limit which services will be seen or allowed to be advertised.

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[1] http://www.cisco.com/web/about/ac123/ac147/archived_issues/ipj_5-4/zero_config_networking.html

Q: Hey, Everybody! Who can print using IPP?
"PTR (QM)? _ipp._tcp.local."

A: I do!
"PTR Color Printer in Cube 1._ipp._tcp.local."

Q: Color Printer, tell me about your service?
"SRV (QM)? Color Printer in Cube 1._ipp._tcp.local."
"TXT (QM)? Color Printer in Cube 1._ipp._tcp.local."

A: Here's your info!
"SRV=print-server.local [0][0][631]"
"TXT Location=Floor1 PDL=PostScript"

Q: Where can I reach print-server.local?
"AAAA (QM)? print-server.local."

A: Here you are!
"print-server.local AAAA 2001:db8:100::123"

RFC 2782 (DNS SRV Service Types) and RFC 6355 (Service name and Port numbers)

Service Name, Unicode, Descriptive

· SRV record contains the hostname and port where the service can be reached
· TXT record has additional info describing the service

Benefits Of The Service Discovery Gateway

Cisco Service Discovery Gateway integrates devices that offer services with those that use them, even if they are not connected to the same broadcast domain. Administrators can easily manage which services are to be advertised, or withdrawn, on a particular segment by applying filters.

Specifically, the Cisco Service Discovery Gateway provides:

- The ability to filter services based on criteria such as:
  - Service type
  - Instance name
  - Message type

- Granular application on either a global or per-interface basis
- IPv4 and IPv6 support
- Simultaneous integrated wired and wireless network support
- BYOD readiness—the service is transparent to end devices

The Cisco Service Discovery Gateway feature will be available on:

- Cisco Catalyst 3750-X, and 3560-X Series Switches
- Cisco Catalyst 4500-X, and 4500-E Series Switches
- Cisco Catalyst 6500 Series Switches
- Cisco ISR and ASR Series Routers
- Cisco 5760 Wireless LAN Controllers

Why Cisco?

- By combining the existing feature set of IOS with advanced new capabilities, such as the Cisco Service Discovery Gateway, Cisco provides flexibility and versatility without sacrificing scalability and security.

- Cisco not only delivers comprehensive campus network solutions in both the wired and wireless technologies, but also joins them together to provide seamless integration for service discovery and beyond.

- The Cisco Service Discovery Gateway is designed to integrate future services, devices, network applications and management tools, to accommodate evolving organizational requirements and facilitate an unrivalled customer choice.