Wi-Fi Direct

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Wi-Fi Direct, initially called Wi-Fi P2P, is a Wi-Fi standard enabling devices to easily connect with each other without requiring a wireless access point.[1] It is useful for everything from internet browsing to file transfer,[2]to communicate with one or more devices simultaneously at typical Wi-Fi speeds.[3] One advantage of Wi-Fi Direct is even if they are from different manufacturers, only one of the Wi-Fi devices needs to be compliant with Wi-Fi Direct to establish a peer-to-peer connection that transfers data directly between them with greatly reduced setup.

Wi-Fi Direct negotiates the link with a Wi-Fi Protected Setup system that assigns each device a limited wireless access point. The "pairing" of Wi-Fi Direct devices can be set up to require the proximity of a near field communication, a Bluetooth signal, or a button press on one or all the devices.

Contents

Background

Basic Wi-Fi

Conventional Wi-Fi networks are typically based on the presence of controller devices known as wireless access points. These devices normally combine three primary functions:

- Physical support for wireless and wired networking
- Bridging and routing between devices on the network
- Service provisioning to add and remove devices from the network.

A typical Wi-Fi home network includes laptops, tablets and phones, devices like modern printers, music devices and televisions. The majority of Wi-Fi networks are set up in "infrastructure mode", where the access point acts as a central hub to which Wi-Fi capable devices are connected. The devices do not communicate directly with each other (that is, in "*ad-hoc* mode"), but they go through the access point. Wi-Fi Direct devices are able to communicate with each other without requiring a dedicated wireless access point. The Wi-Fi Direct devices negotiate when they first connect to determine which device shall act as an access point.

Automated setup

As the number and type of devices attaching to Wi-Fi systems increased, the basic model of a simple router with smart computers became increasingly strained. At the same time, the increasing sophistication of the hot spots presented setup problems for the users. To address these problems, there have been numerous attempts to simplify certain aspects of the setup task.

A common example is the Wi-Fi Protected Setup system included in most access points built since 2007 when the standard was introduced.[4] Wi-Fi Protected Setup allows access points to be set up simply by entering a PIN or other identification into a connection screen, or in some cases, simply by pressing a button. The Protected Setup system uses this information to send data to a computer, handing it the information needed to complete the network setup and connect to the Internet. From the user's point of view, a single click replaces the multi-step, jargon-filled setup experience formerly required.

While the Protected Setup model works as intended, it was intended only to simplify the connection between the access point and the devices that would make use of its services, primarily accessing the Internet. It provides little help *within* a network - finding and setting up printer access from a computer for instance. To address those roles, a number of different protocols have developed, including Universal Plug and Play (UPnP), Devices Profile for Web Services (DPWS), and Zero Configuration Networking (ZeroConf). These protocols allow devices to seek out other devices within the network, query their capabilities, and provide some level of automatic setup.

New uses

It became common for smart phones and portable media players to include Wi-Fi as a standard feature, and over time it has become common in feature phones as well.[5] The process of adding Wi-Fi to smaller devices has accelerated, and it is now possible to find printers, cameras, scanners and many other common devices with Wi-Fi in addition to other connections, like USB.

The widespread adoption of Wi-Fi in new classes of smaller devices made the need for ad hoc networking much more important. Even without a central Wi-Fi hub or router, it would be useful for a laptop computer to be able to wirelessly connect to a local printer. Although the ad hoc mode was created to address this sort of need, the lack of additional information for discovery makes it difficult to use in practice.[6][7]

Although systems like UPnP and Bonjour provide many of the needed capabilities and are included in some devices, a single widely supported standard was lacking, and support within existing devices was far from universal. A guest using their smart phone would likely be able to find a hot spot and connect to the Internet with ease, perhaps using Protected Setup to do so. But the same device would find streaming music to a computer or printing a file might be difficult, or simply not supported between differing brands of hardware.

Wi-Fi Direct can provide a wireless connection to peripherals. Wireless mice, keyboards, remote controls, headsets, speakers, displays and many other functions can be implemented with Wi-Fi Direct. This has begun with Wi-Fi mouse products,[8] and Wi-Fi Direct remote controls that were shipping circa November 2012.

File sharing applications on Android and BlackBerry 10 devices could use Wi-Fi Direct, with most Android Version 4.1 (Jellybean) and BlackBerry 10.2 supported. Android version 4.2 (Jellybean) included further refinements to Wi-Fi Direct including persistent permissions enabling two-way transfer of data between multiple devices.

Technical description

Wi-Fi Direct essentially embeds a software access point ("Soft AP"), into any device that must support Direct.[6] The soft AP provides a version of Wi-Fi Protected Setup with its push-button or PIN-based setup.

When a device enters the range of the Wi-Fi Direct host, it can connect to it, and then gather setup information using a Protected Setup-style transfer.[6] Connection and setup is so simplified that some suggest it may replace Bluetooth

in some situations.[9]

Soft APs can be as simple or as complex as the role requires. A digital picture frame might provide only the most basic services needed to allow digital cameras to connect and upload images. A smart phone that allows data tethering might run a more complex soft AP that adds the ability to bridge to the Internet. The standard also includes WPA2 security and features to control access within corporate networks.[6] Wi-Fi Direct-certified devices can connect one-to-one or one-to-many and not all connected products need to be Wi-Fi Direct-certified. One Wi-Fi Direct enabled device can connect to legacy Wi-Fi certified devices.

The Wi-Fi Direct certification program is developed and administered by the Wi-Fi Alliance, the industry group that owns the "Wi-Fi" trademark. The specification is available for purchase from the Wi-Fi Alliance.[10]

Commercialization

Laptops

Intel included Wi-Fi Direct on the Centrino 2 platform, in its My WiFi technology by 2008.[11] Wi-Fi Direct devices can connect to a notebook computer that plays the role of a software Access Point (AP). The notebook computer can then provide Internet access to the Wi-Fi Direct-enabled devices without a Wi-Fi AP. Marvell Technology Group,[12] Atheros, Broadcom, Intel, Ralink and Realtek announced their first products in October 2010.[13] Redpine Signals' chipset was Wi-Fi Direct certified in November of the same year.[14]

Mobile devices

Google announced Wi-Fi Direct support in Android 4.0 in October of the following year.[15] While some Android 2.3 devices like Samsung Galaxy S II have had this feature through proprietary operating system extensions developed by OEMs, the Galaxy Nexus (released November 2011) was the first Android device to ship with Google's implementation of this feature and an application programming interface for developers. Ozmo Devices, which developed integrated circuits (chips) designed for Wi-Fi Direct, was acquired by Atmel in 2012.[16][17]

With the Blackberry 10.2 upgrade, Wi-Fi Direct is now available.[18][19]

Game consoles

The Xbox One, released in 2013, supports Wi-Fi Direct.[20]

NVIDIA's SHIELD controller uses Wi-Fi Direct to connect to compatible devices. NVIDIA claims a reduction in latency and increase in throughput over competing Bluetooth controllers.[21]

See also

- Digital Living Network Alliance
- TDLS

References

1. {{cite web|url=http://www.wi-fi.org/discover-and-learn/wi-fi-direct%E2%84%A2 |title=Wi-Fi Direct | Wi-Fi Alliance |publisher=Wi-fi.org |date= |accessdate=2013-07-30}}

2. "Can a network based on devices certified under the Wi-Fi Direct program cross connect to an infrastructure network for Internet connectivity? | Wi-Fi Alliance". Wi-fi.org. Retrieved 2013-07-30.
3. "How fast is Wi-Fi Direct? | Wi-Fi Alliance". Wi-fi.org. Retrieved 2013-07-30.
4. "Wi-Fi Protected Setup" (http://www.wi-fi.org/wifi-protected-setup/), Wi-Fi Alliance Knowledge base
5. Glenn Fleishman, "Broadcom squeezes 11n, Bluetooth, FM into new, cheap chip" (http://arstechnica.com/old/content/2008/12/broadcom-squeezes-11n-bluetooth-fm-into-new-cheap-chip.ars), *Ars Technica*, 8 December 2008
6. Eric Griffith, "New 'Wi-Fi Direct' Spec Revamps Device Networks" (http://www.pcmag.com/article2/0,2817,2354201,00.asp), *PCMag.com*, 14 October 2009
7. Olga Kharif, "Wi-Fi Is About to Get a Whole Lot Easier" (http://www.businessweek.com/technology/content/oct2009/tc20091013_683659.htm), *BusinessWeek*, 14 October 2009
8. [1] (http://www.shopping.hp.com/en_US/home-office/-/products/Accessories/Mice-and-Keyboards/LH571AA?HP-Wi-Fi-Direct-Black-Mobile-Mouse) HP Wi-Fi Direct Mouse
9. Chris Foresman, "Wi-Fi Direct protocol to ease peer-to-peer WiFi connections" (http://arstechnica.com/hardware/news/2009/10/wi-fi-direct-protocol-to-ease-peer-to-peer-wifi-connections.ars), *Ars Technica*, 14 October 2009
10. "Wi-Fi Alliance Published Specifications". Wi-Fi Alliance. Retrieved 2013-07-30.
11. "Welcome to the Freedom of Portable Wi-Fi; Intel® My WiFi Technology: Synch, Share, Show & Print on the Go" (PDF). *Promotional brochure*. Intel. December 3, 2008. Archived from the original (PDF) on February 5, 2009. Retrieved September 27, 2013.
12. "Marvell supports new 'Wi-Fi Direct' standard across entire line of 802.11 devices". *Press release*. Marvell. October 14, 2009. Retrieved September 27, 2013.
13. W. David Gardner (2010-10-25). "Wi-Fi Direct Products Connect Without A Network". Informationweek.com. Retrieved 2013-07-30.
14. "Redpine Signals' Lite-Fi® – Ultra Low Power 802.11n – RS9110 Chipset Achieves Wi-Fi Direct™ Certification". Redpinesignals.com. Retrieved 2013-07-30.
15. "Android 4 at". Developer.android.com. Retrieved 2013-07-30.
16. Peter Clarke (December 21, 2012). "Atmel Wi-Fi buy aimed at Internet of Things". *EE Times*. Retrieved September 27, 2013.
17. "RFaxis and Ozmo Devices Collaborate to Enable 5 GHz Wi-Fi Direct™ Surround Sound Home Theater Systems". *Press release*. December 18, 2012. Retrieved September 27, 2013.
18. "Wi-Fi Direct - BlackBerry Developer". Retrieved 2015-03-21.
19. "Directions for Wi-Fi Direct Connection with Your App - BlackBerry Developer Blog". Retrieved 2015-03-21.
20. "Xbox One's Wi-fi Direct - An understated feature of the Xbox One?". 2013-06-24. Retrieved 2013-09-30.
21. "Wireless Game Controller". Retrieved 2014-08-03.

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