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HiddenWires – Powerline Versus Wi-Fi for AV Distribution

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Powerline Versus Wi-Fi for AV Distribution (5/9/2011)

HiddenWires Powerline Versus Wi Fi for AV DistributionBy Metin Taskin, AirTies

Most of us today have a wireless network in our homes to enable us to enjoy unfettered access to the Internet and share data between PCs and networked peripherals such as printers. more recently, the trend towards using Ethernet ports to connect home entertainment devices such as TVs, Blu-ray players, and gaming devices has become increasingly commonplace.

Kaspersky Labs estimates that the current number of UK homes with a wireless LAN installed is around 57%. Ofcom estimates that 1.5 million households (out of a total of approximately 22 million households) have deployed powerline technology to connect them up. but how do the two approaches compare and what are the relative pros and cons? This article aims to provide a perspective on both. It will also discuss some current concerns relating to powerline prompted by a recently-released BBC whitepaper, and will examine what impact they are likely to have on future growth of powerline and home networking in general.

HiddenWires Powerline Versus Wi Fi for AV Distribution Home networking is on the increase.

Background to powerline

According to Wikipedia, powerline communications are systems for carrying data on a conductor also used for electric power transmission. Consumers can buy powerline adapter sets at most electronics retailers and use those to establish a wired connection using the existing electrical wiring in the home. the powerline adapters plug into a wall outlet and then are connected via CAT5 cabling to the home's router. Additional adapters can be plugged in at any other outlet to give instant networking and Internet access to an Ethernet-equipped Blu-ray player, a games console (PS3, Xbox 360, etc), a laptop or an Internet TV (also called OTT for Over-the-Top video) box that can access and stream video content to the TV.

The most established and widely-deployed powerline networking standard for these powerline adapter products was developed by the HomePlug Powerline Alliance. HomePlug AV was adopted by the IEEE P1901 group as a baseline technology for their standard, published 30 December 2010. the company estimates that over 45 million of their devices have been deployed worldwide.

Other companies and organisations use different specifications for powerline home networking, and these include the Universal Powerline Association, the HD-PLC Alliance and the ITU-T's G.hn specification.

The pros and cons of powerline

Powerline and wireless are currently being used equally by operators around the globe. some countries such as France, have developed a particular predilection for powerline, but it only works 75% of the time. the two key issues associated with it relate to the cabling configuration and to interference. In order for powerline to work, the devices it is connecting to need to be physically located on the same circuit. This however, is not always the case, as many houses have separate circuits for the three different phases of electric power that comes to the home to reduce the load on each wire. Such a design is particularly common in Germany, and in new builds where the need for increased power necessitates the use of multiple circuits. In these circumstances powerline technology will not work throughout the whole home.

HiddenWires Powerline Versus Wi Fi for AV Distribution Powerline requires all of the networked devices to be on the same electrical circuit.

The second problem is one of interference caused by leakage of RF signals. as the number of powerline devices in the same area increases and powerline technology is being used by multiple households; particularly in a multi-tenanted environment such as a flat, the signals are being shared amongst multiple users and the risk of interference and degradation occurs, leading to a reduction in throughput of data as the signals are all sharing the same frequency. other electrical equipment also injects noise into the electrical wires, resulting in degradation in the performance of powerline adapters (PLAs) nearby.

However, on the positive side, powerline is a well-established technology with a range of suppliers. Powerline technology is now in its third or fourth generation, and the maximum data rate, which was previously around 200Mb/s has now increased to 500Mb/s. yet, whilst its use may be suitable in most cases for sharing data, it is not proven for HD video sharing, and is prone to interference.

Interference

The most recent controversy around powerline relates to the interference that it causes for other electrical equipment. Powerline signals radiate into the air, and so have a tendency to interfere with other electrical devices such as short-wave and medium-wave radios that share the same frequency. What's more, the faster models have also been shown to interfere with DAB and FM radio, and interference levels have also been shown to exceed current EU standards.

If a number of households are using powerline devices in the same area, the leaked signals can build up. Ofcom has received some complaints – although mainly from radio buffs – about this issue of interference, which has largely been ignored due to the small number of complaints. more recently however, the BBC published a whitepaper (downloads.bbc.co.uk/rd/pubs/whp/whp-pdf-files/WHP195.pdf) causing the matter to be discussed in the UK Parliament.

The pros and cons of Wi-Fi

Wi-Fi connects to an IP gateway offering 802.11n high-speed wireless solutions that can provide ultra reliability, predictable bandwidth and unprecedented high-speed performance for real-time data, video and audio distribution in the home. the main challenge associated with Wi-Fi has been overcoming the issues of interference, and being able to adequately permeate through brick walls to deliver a latency- and jitter-free, secure signal, whilst also making the solutions easy enough to install and administer by the consumer.

There are many companies that offer wireless home networking products. AirTies for example, provides a range of wireless products including IP gateways, media servers and set-top boxes, and has patent-pending technology that overcomes the traditional issues of interference and latency. This uses a mesh networking approach to ensure secure delivery of video and data traffic (including HD and 3D video)

around the entire house, at the press of a button.

HiddenWires Powerline Versus Wi Fi for AV Distribution example of the AirTies wireless networking system being used for Internet TV.

One key area where wireless consistently wins out over powerline is in incorporating into the home network mobile devices such as the Apple iPad and other tablet devices which have no Ethernet connection. since video is also increasingly being used by these devices which have no fixed location, wireless is undoubtedly the best option under these circumstances.

Conclusion

How do the two solutions stack up against each other? my belief is that they are largely complementary solutions. Wireless isn't constrained by the existence or quality of the existing cabling infrastructure. It offers higher speeds, greater predictability and quality and the option of moving devices at will. however, as demand for more and more bandwidth in the home heats up, adding powerline into a wireless environment can add extra bandwidth.

So, whilst the answer is not clear-cut – and at some stage the issue of interference will need to be addressed by the powerline standards body – I believe that there is a rosy future ahead for both technologies to co-exist in parallel in the home environment. What's more, the home networking revolution has only just begun, and the ease and efficiency with which all devices in the home will interact and seamlessly share video and data, is set to escalate exponentially in the near future.

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