Advantages and disadvantages of normal lan vs. wireless lan

Science, Computer Science

Advantages and disadvantages of normal LAN vs. wireless LAN. Computer networks for the home and small business can be built using either wired or wirelesstechnology. Wired Ethernet has been the traditional choice in homes, but Wi-Fi wireless technologies are gaining ground fast. Both wired and wireless can claim advantages over the other; both represent viable options for home and other local area networks (LANs). Below we compare wired and wireless networking in five key areas: •ease of installation •total cost •reliability •performance •security About Wired LANs

Wired LANs use Ethernet cables and network adapters. Although two computers can be directly wired to each other using an Ethernet crossover cable, wired LANs generally also require central devices like hubs, switches, or routers to accommodate more computers. For dial-up connections to the Internet, the computer hosting the modem must run Internet Connection Sharing or similar software to share the connection with all other computers on the LAN. Broadband routers allow easier sharing of cable modem or DSL Internet connections, plus they often include built-in firewall support.

Installation Ethernet cables must be run from each computer to another computer or to the central device. It can be time-consuming and difficult to run cables under the floor or through walls, especially when computers sit in different rooms. Some newer homes are pre-wired with CAT5 cable, greatly simplifying the cabling process and minimizing unsightly cable runs. The correct cabling configuration for a wired LAN varies depending on the mix of devices, the type of Internet connection, and whether internal or external modems are used.

However, none of these options pose any more difficulty than, for example, wiring a home theater system. After hardware installation, the remaining steps in configuring either wired or wireless LANs do not differ much. Both rely on standard Internet Protocol and network operating system configuration options. Laptops and other portable devices often enjoy greater mobility in wireless home network installations (at least for as long as their batteries allow). Cost Ethernet cables, hubs and switches are very inexpensive.

Some connection sharing software packages, like ICS, are free; some cost a nominal fee. Broadband routers cost more, but these are optional components of a wired LAN, and their higher cost is offset by the benefit of easier installation and built-in security features. Reliability Ethernet cables, hubs and switches are extremely reliable, mainly because manufacturers have been continually improving Ethernet technology over several decades. Loose cables likely remain the single most common and annoying source offailurein a wired network.

When installing a wired LAN or moving any of the components later, be sure to carefully check the cable connections. Broadband routers have also suffered from some reliability problems in the past. Unlike other Ethernet gear, these products are relatively new, multi-function devices. Broadband routers have matured over the past several years and their reliability has improved greatly. Performance Wired LANs offer superior performance. Traditional Ethernet connections offer only 10Mbps bandwidth, but 100 Mbps Fast Ethernet technology costs little more and is readily available.

Although 100 Mbps represents a theoretical maximum performance never really achieved in practice, Fast Ethernet should be sufficient for home file sharing, gaming, and high-speed Internet access for many years into the future. Wired LANs utilizing hubs can suffer performance slowdown if computers heavily utilize the network simultaneously. Use Ethernet switches instead of hubs to avoid this problem; a switch costs little more than a hub. Security For any wired LAN connected to the Internet, firewalls are the primary security consideration. Wired Ethernet hubs and switches do not support firewalls.

However, firewall software products like ZoneAlarm can be installed on the computers themselves. Broadband routers offer equivalent firewall capability built into the device, configurable through its own software. About Wireless LANs Popular WLAN technologies all follow one of the three main Wi-Ficommunicationstandards. The benefits of wireless networking depend on the standard employed: •802. 11b was the first standard to be widely used in WLANs. •The 802. 11a standard is faster but more expensive than 802. 11b; 802. 11a is more commonly found in business networks. •The newest standard, 802. 11g, attempts to combine the best of both 802. 1a and 802. 11b, though it too is more a more expensive home networking option. Installation Wi-Fi networks can be configured in two different ways: •" Ad hoc" mode allows wireless devices to communicate in peer-to-peer mode with each other. •" Infrastructure" mode allows wireless devices to communicate with a central node that in turn can communicate with wired nodes on that LAN. Most LANs require infrastructure mode to access the

Internet, a local printer, or other wired services, whereas ad hoc mode supports only basic file sharing between wireless devices. Both Wi-Fi modes require wireless network adapters, sometimes called WLAN cards.

Infrastructure mode WLANs additionally require a central device called the access point. The access point must be installed in a central location where wireless radio signals can reach it with minimal interference. Although Wi-Fi signals typically reach 100 feet (30 m) or more, obstructions like walls can greatly reduce their range. Cost Wireless gear costs somewhat more than the equivalent wired Ethernet products. At full retail prices, wireless adapters and access points may cost three or four times as much as Ethernet cable adapters and hubs/switches, respectively. 802. 1b products have dropped in price considerably with the release of 802. 11g, and obviously, bargain sales can be found if shoppers are persistent. Reliability Wireless LANs suffer a few more reliability problems than wired LANs, though perhaps not enough to be a significant concern. 802. 11b and 802. 11g wireless signals are subject to interference from other home applicances including microwave ovens, cordless telephones, and garage door openers. With careful installation, the likelihood of interference can be minimized. Wireless networking products, particularly those that implement 802. 11g, are comparatively new.

As with any new technology, expect it will take time for these products to mature. Performance Wireless LANs using 802. 11b support a maximum theoretical bandwidth of 11 Mbps, roughly the same as that of old, traditional Ethernet. 802. 11a and 802. 11g WLANs support 54 Mbps, that is approximately one-half the bandwidth of Fast Ethernet. Furthermore, Wi-Fi

performance is distance sensitive, meaning that maximum performance will degrade on computers farther away from the access point or other communication endpoint. As more wireless devices utilize the WLAN more heavily, performance degrades even further.

Overall, the performance of 802. 11a and 802. 11g is sufficient for home Internet connection sharing and file sharing, but generally not sufficient for home LAN gaming. The greater mobility of wireless LANs helps offset the performance disadvantage. Mobile computers do not need to be tied to an Ethernet cable and can roam freely within the WLAN range. However, many home computers are larger desktop models, and even mobile computers must sometimes be tied to an electrical cord and outlet for power. This undermines the mobility advantage of WLANs in many homes. Security

In theory, wireless LANs are less secure than wired LANs, because wireless communication signals travel through the air and can easily be intercepted. To prove their point, some engineers have promoted the practice of wardriving, that involves traveling through a residential area with Wi-Fi equipment scanning the airwaves for unprotected WLANs. On balance, though, the weaknesses of wireless security are more theoretical than practical. WLANs protect their data through the Wired Equivalent Privacy (WEP) encryption standard, that makes wireless communications reasonably as safe as wired ones in homes.

No computer network is completely secure and homeowners should research this topic to ensure they are aware of and comfortable with the risks.

Important security considerations for homeowners tend to not be related to whether the network is wired or wireless but rather ensuring: •the home's Internet firewall is properly configured •thefamilyis familiar with the danger of Internet " spoof emails" and how to recognize them •the family is familiar with the concept of " spyware" and how to avoid it •babysitters, housekeepers and other visitors do not have unwanted access to the network Conclusion

You've studied the analysis and are ready to make your decision. Bottom line, then, which is better - wired or wireless? The table below summarizes the main criteria we've considered in this article. If you are very cost-conscious, need maximum performance of your home system, and don't care much about mobility, then a wired Ethernet LAN is probably right for you. If on the other hand, cost is less of an issue, you like being an early adopter of leading-edge technologies, and you are really concerned about the task of wiring your home or small business with Ethernet cable, then you should certainly consider a wireless LAN.

Wired vs Wireless Wired Wireless Installationmoderate difficultyeasier, but beware interference Cost less more Reliability High Reasonably high Performancevery good good Security reasonably good reasonably good Mobility limited outstanding