# Basic guide: wireless network - Wireless

This article shows you how to set up or 'tune' your wireless network, then connect more printers, music players, and TVs to this wireless network.

**This article shows you how to set up or 'tune' your wireless network, then connect more printers, music players, and TVs to this wireless network.**

Previously, only 'technical people' used wireless networks, but only for a short time wireless networks became popular, thanks to reduced prices, faster new standards and broadband Internet services. popular everywhere.Now, switching to wireless networks is much cheaper and easier than before, and the latest devices are fast enough to handle heavy tasks like transferring large files, watching movies, listening to music. Online online.

Modern wireless networks not only provide wireless Internet connectivity;Music and movie listening devices also have wireless features that allow you to share movies and music throughout the house.You can also connect to the wireless network, even without wireless connectivity devices, such as printers and game consoles, thanks to the help of products that turn them into wireless quickly and easily. easy.

To help you build the best wireless network, we have chosen and introduced the products tested by TestLab, including routers, wireless network cards, print servers, wireless bridges. Some devices that watch movies and listen to music, and travel routers are not available in the Vietnamese market, we get information from PC World Test Center. The TRENDnet product suite of our choice is the most valuable product set at an affordable price, combined with higher average speeds, a fairly simple setup and a 3-year warranty.

Although setting up and maintaining wireless networks is getting easier, it is still not completely smooth. Therefore, we provide tips to 'refine'. We also made some very common mistakes about wireless network security, see page 88, explaining ways to expand coverage, see page 90 and describe the upcoming standards of official recognition. Go ahead and change how wireless networks work, see page 92.

**Improved standard**

Picture 1 of Basic guide: wireless network - Wireless

WLAN SURECOM EP 9610SX g

The two standards currently dominate wireless networks, 802.11b and 802.11g, and the latter are new and faster.Some manufacturers also offer improved versions of 802.11g that they claim can transmit and receive data up to 108Mbps or 125Mbps (over 54Mbps of 802.11g).Super G 108Mbps technology (developed by Atheros) is

used by CNet, D-Link, Infosmart, Netgear, LinkPro, Planet, Surecom, and High-Speed ??Mode (also known as 'Afterburner') technology. products of Belkin, Buffalo, Linksys, TRENDnet and others.Although 802.11b and 802.11g 'standard' are compatible, the above mentioned modes of operation are not compatible.

**Summary:** For the simplest setup and debugging, wireless components must use the same technology, preferably with the same manufacturer.Using products from the same manufacturer also makes it convenient to call for technical support, which is why we only tested the products of the same manufacturer.Typically, manufacturers may not support if you use devices from a variety of sources, except for wireless devices built into the laptop.

## NETWORK PROTECTION

## 5 CONFIDENTIAL PROBLEMS

If the statistics are correct, there are 4 out of 5 wireless home users who don't activate any security mode.By default, manufacturers turn off security mode so that initial setup is easy, when you use it, you must reopen it.However, you need to be careful when enabling security, here are some common mistakes.
Mistake 1. Do not change the password of the manufacturer. When you first install the wireless router, it's easy to forget to change the factory default password. If it does not change, others may use the default password to access the router and change the settings to access the network. Experience: Always change the default password
Mistake 2. Do not enable encryption. If you don't enable encryption, you will promote your password and e-mail to anyone within range, others may intentionally use free eavesdropping software like AirSnort (airsnort.shmoo .com) to get information and analyze the data. Experience: Turn on encryption mode so others can read your e-mail.
Mistake 3. Don't check security mode. You buy a wireless router, a broadband Internet connection, install a printer, and then buy more wireless devices. Maybe someday, the printer will automatically print out the paper because you did not set up security features. Experience: Don't assume your network is safe. Ask the people who are knowledgeable about the household.
Mistake 4. Too positive with security settings. Each wireless network card has a hardware address (MAC address) that the wireless router can use to control which computers are allowed to connect to the network. When turning on MAC address filtering, it is likely that you will forget to add the MAC address of the computer you are using to the list, so you will isolate yourself, similar to removing a key in a car. lock the door. Experience: Be careful when setting up security features.
Mistake 5. Allow people to access.You may be the first to have a wireless network and want to 'show off' by naming the network 'easy access'.Your neighbors can use this connection to download a lot of nudity photos, for example, and the network will run as slowly as a turtle.Experience: Wireless networks make sharing Internet connections easy, however, do not leave out because there will be abusers.

**How to choose**

**First choose the right device**

This tutorial will present the hardware components in the wireless network, from the router is the center of the network, to the network card to connect the desktop and laptop to the network, and bridge to turn the device wired into wireless.

**Router and Wi-Fi network card**

Picture 2 of Basic guide: wireless network - Wireless

WLAN TRENDnet TEW 411BRPplus

The router is the center of your wireless network: It connects your network to the Internet via a cable / DSL modem, shares your Internet connection with many computers and other devices, and controls who can access it. Access your network.That's why routers are considered the most important component.

Through testing many broadband routers, we found that most routers have the same basic features - all the ones we tested had four Ethernet ports (for connecting wired devices), and there were Many ways to control who connects to the network. All routers we tested have NAT (Network Address Translation) firewalls, some have built-in firewalls to prevent DoS attacks and allow to establish additional rules to prohibit or allow based on service type, code WEP (Wireless Encryption Protocol) and WPA (Wi-Fi Protected Access), MAC (Media Access Control) filtering. Each network device has a unique MAC address, the router can determine access by allowing only devices with MAC addresses declared in the list to be connected to the network. Some routers have the necessary features for parents to manage their children in Internet access and remote management.

Because of the top security and speed issues, among all the broadband routers TestLab has tested so far, we only choose those that support WPA encryption, with built-in firewall, and 802.11g standard. The current price of most products is lower than when we tested. Each product set includes 1 router, 1 PC Card inserted into the laptop and 1 PCI card inserted into the desktop computer. Particularly for 802.11g USB wireless network card, TestLab just started to receive from a few manufacturers in the past month. You should contact the product distributor directly to inquire.

The routers in this list are relatively easy to use, there are many other types (not listed in the table) that have a troublesome menu that makes us 'snooping' to find WPA features and when activated sometimes encounter many confusing cases. The SMC2804WBR is easy to set up and use thanks to the clear quick guide.

These routers all have removable antennae, so you can replace them with more sensitive antennae or directional antennae (see 'Extending range' on page 90).

The speed of the product sets is also different in our testing way.Once again, because of the security issue, we

only compared the speed in WPA-PSK encryption mode and did not activate special features like Super G or 'Afterburner'.

Picture 3 of Basic guide: wireless network - Wireless

WLAN SMC SMC2555W AG

Leading by the Surecom product set, the speed remains stable at 17.951Mbps, faster than other products.However, you need to know that this difference is only in the internal network, and the speed of Internet connection is not different.In terms of coverage, Test Lab has not tested yet to compare the coverage because it does not ensure the same environment.But according to practical experience, routers with two antennae have wider coverage.

All routers use a web browser to manage, some with a step-by-step wizard.However, the wizard only helps you set up the device to work, but doesn't help you set up higher features (such as MAC address filtering, parent control).Whichever setup you choose, you should first use a wired computer to set up, and then set up a wireless network card to do so.This is much simpler than setting up the router and wireless network card at the same time.

Picture 4 of Basic guide: wireless network - Wireless

PLANET WRT 413

Setting up speed modes is not always easy, because there may be many other wireless devices (such as laptops that integrate someone else's wireless network card) trying to connect to Your network, causing interference and reducing the speed of the router.With improved routers, you can handle this problem by setting them to work in high-speed mode and ignoring any 802.11g devices that don't have speed enhancements.Enabling MAC address filtering also helps solve this problem.
In general, the PCI and PC Card network cards of the same manufacturer share the same software (the device driver for hardware control is different).Most of these software are easy to use and make it easier to set up network cards.

**Print server**

Although you can use the print feature that is available in the Windows operating system to share a USB communication printer over the wireless network, but the computer with the printer must be running, others can print. If you have a Wi-Fi printing server, you do not need a computer to install the printer and you can set the printer to any location as long as it is still within Wi-Fi network coverage.

Most manufacturers have at least one type of Wi-Fi router with built-in USB communication print server. Routers in our selected list have no built-in USB ports. You can choose the type of CNP101UW wireless print server ($ 105) or TRENDnet's TEW-P1U ($ 125). In our opinion, both have the same origin and are completely the same except brand and color. Both are very small, only 802.11b compatible, have a standard USB 2.0 port

and support both Macintosh and PC, most wireless print servers do not support the two computers simultaneously.

Setting up these print servers is not difficult: you run the configuration utility, insert the printer into the USB port of the print server, and then install and set up the utility on computers that want to use the device. print.If it takes time to set up Wi-Fi print server and printer, it takes about 30 minutes.All have clear installation documentation.Another highlight is that both support Internet printing protocols, IPP - Internet Printing Protocol.IPP allow you to print a report, for example, to a printer located in the office while you are outside the office.

Picture 5 of Basic guide: wireless network - Wireless

PrintServer TRENDnet TEW P1U

In general, print servers are compatible with inkjet and laser printers, but they may not be compatible with multifunction printers.Most multifunction printers when connected to the server can only print, not scan and fax.And finally, if you're looking for a new printer, check out HP printers that come with a built-in wireless print server, such as Photosmart 8450 (find.pcworld.com/44230) and Photosmart 2710 all. -in-one (find.pcworld.com/44232), meaning there's no need to buy a print server.

**Wi-Fi bridge**

Adding a Wi-Fi bridge is that you can connect almost any device with an Ethernet port, such as a network printer, to a wireless network. You use the cable to connect the device to the Ethernet port of the bridge, and the bridge will transfer data from this device to wireless devices. At this time, the device itself works no different from when installing on a wired network.
Setting up the bridge is not difficult, only a little lost when typing the encryption key.You should buy bridges and routers from the same manufacturer, especially when you want to take advantage of modes like Super G, Afterburner, and remember to choose the type that supports WPA encryption.

EAT-TEN REPLACEMENT

**EXPANDING THE COATING AREA**

Because it is impossible to create a completely identical test environment to compare antennae, TestLab has not officially tested antennae.We recorded the experience of the PC World USA Test Center team for reference.
If you have tried to place the wireless router in a variety of locations and still have some 'dead spots' (locations without waves) in your home, consider the coverage extension device. Signal strength determines the speed of wireless networks, the network speed decreases greatly when the signal strength is weak. The easiest and least expensive way to increase network coverage is to replace the antenna of another antenna router with the ability to receive / transmit better signals. However, not all routers have removable antenna. (Check in the feature comparison table).
In any case, only directional antennae should be used when you want to cover a certain area, because rooms that are not in the antenna direction will not receive the signal, if any, very weak.
Some antennae allow to adjust signal strength, only the signal strength should be increased enough to cover dead spots, avoiding expanding coverage to neighbors.
Most wireless device manufacturers have antennae that enhance coverage.You should contact the official product distributors directly to inquire and consult the appropriate antenna options.

**Wireless camera**

You can install a wireless camera almost anywhere as long as it is available. You can review TGV A 09/2004, page 74 to select some types of wireless Internet cameras that can be found in Vietnam market, such as Axis 206W (413USD), TRENDnet TV-IP200W / E (269USD), LinkPro IWC-330W (155USD), Planet ICA-100W (350USD). These cameras have built-in web servers so you can view images from any computer with a web browser. Want to know if your children went to school or checked the office while on a business trip? Just open the web browser. Some cameras are capable of detecting motion, enabling recording and sending alerts via e-mail. In addition, some models have a microphone for recording and a motor that allows you to remotely control the camera to areas to observe, but the price is more expensive. These types have applications to capture / playback images and manage multiple cameras at the same time. However, none of these can be installed outdoors and cannot be obtained in low-light environments.

**Device for listening to music and watching movies**

Currently in Vietnam market, it is difficult to find movies and music players that support wireless connection. Perhaps these products will soon appear because of the increasing demand for wireless networks. Linksys has the WMLS11B (find.pcworld.com/44128), you can connect to the sound system or just use it as a normal music player because it has speakers (it can be detached), apart from This device's LCD screen is large and easy to read. Another is MacSense's HomePod (find.pcworld.com/44130), which also has speakers but is small and the sound is also weaker. However, HomePod automatically finds music files on multiple computers (Macintosh or PC) and has a USB 1.1 port for you to install storage devices. while LinkSys works with just one computer and must run MusicMatch Jukebox. In addition to MusicMatch, HomePod also works with iTunes, Winamp, and some other music players. Both Linksys and HomePod let you listen to Internet and Linksys stations that can capture Rhapsody music services. But none of them supports WPA so they can't connect to the network that has encryption enabled.

Actiontec's Wireless Digital Media Player (find.pcworld.com/44132) amplifies DVI output to excel in high-end television. However, installing and using the bundled software (which must be installed on a computer with movie and music files stored) is a bit confusing and the remote control device does not have a volume control button.

If you have a Windows Media Center computer, you have another option: Media Center Extenders from many different vendors will allow you to access all Media Center content (like TV shows and recorded music) on TV or sound system. Microsoft will also release a software to turn the Xbox into a Media Center Extender. The advantage of these devices is that you don't need to spend more time learning how to use them, they will work like a Media Center computer.

**Travel router**

Travel routers are miniature versions of large types that can be pocketed, they come with installation utilities to share the connection (such as an Ethernet port in a hotel or conference room) for several people. They also allow you to save multiple configuration settings, for hotel rooms, for home stays, for meeting rooms in the office, making connecting easier and faster because only the configuration settings are needed. available.

Apple has an Airport Express, Asus has WL-330g (find.pcworld.com/44374) and Netgear has WGR101 (find.pcworld.com/44376). Airport Express has built-in power (the other two use large and heavy external adapters that are almost double the device) and are capable of being like a wireless printing server. Installing and using these devices is easy, but setting up more like enabling encryption can be more difficult. NETGEAR's model does not support WPA encryption.

**How to use**

**Make the most of your wireless network**

Suppose you've bought all the things you need for wireless networks, now is the time to connect them all together. Despite installing and using relatively simple Wi-Fi devices (see the installation guide at find.pcworld.com/44170), if you want them to work with the highest performance, more work is needed. power. Read the instructions below to improve your Wi-Fi network speed.

**Choose an extremely important location**

The location determines the coverage of the Wi-Fi router. Wireless performance drops dramatically when signal strength drops (from the highest speed of 54Mbps to 802.11g to 1 to 2Mbps when the signal strength is lowest). So, if possible, you should change the router position so that all computers receive good signal strength.

Ideally, you should place your Wi-Fi router in the center of your home or office to get the best coverage, but at the same time you have to put it near the cable / DSL modem. To check coverage, first place the router in the same room as the broadband modem, then connect the laptop to a wireless network card and move around the house or office to control the signal strength, use it primarily. Management software comes with wireless network card. Metal, stone, concrete, water, and people absorb or reflect signals, while wood and glass are almost completely passed. Therefore, place the router high above, as far away from obstacles as possible, parallel to the wall, and away from the window so that the signal does not come out of the house. Also, try adjusting the antenna, because just like a TV antenna, moving only a few centimeters can make the signal strength significantly changed. Ask a partner to use the laptop in the room far away to tell you when the signal strength is best.

If there are several dead spots (no signal locations) in your home or office, you can install a high-capacity antenna (see 'Extending range' page 90).

Try to minimize noise. 802.11g wireless networks operate at 2.4GHz frequency, with the same frequency of microwave ovens and many cordless phones (cordless phones). If the wireless desk phone operates at 2.4GHz frequency that interferes with your Wi-Fi network, the only solution is to switch to 900MHz or 5.8GHz phones.

Another source of interference is between Wi-Fi networks. Wi-Fi started to be popular, so in the same apartment or office building there could be many Wi-Fi networks, all of which operate at the same frequency. The free NetStumbler utility (www.netstumber.com) will help you discover Wi-Fi networks around. Record channels with high signal strength, then set up your network using another channel. Also, check to make sure your 'SSID' (network name) is different from other networks to prevent your computer from accidentally connecting to another Wi-Fi network.

Activating WEP or WPA can reduce data transfer speed.Therefore, it is important to start when the strong signal to attenuate speed is minimal.Also, never turn off encryption mode just because you want to get the best possible level, as it helps outsiders easily access information in your network.To learn more about how to protect Wi-Fi networks, you should see the '5 common security mistakes' page 88.

WIRELESS STANDARDS

**FUTURE WIRELESS NETWORK**

Although current 802.11g products are quite fast, there are many tasks such as simultaneous downloading of multiple image streams on the same wireless connection, requiring bandwidth to be greater than the capabilities of Current products can meet.The upcoming 802.11n standard can expand bandwidth and increase wireless coverage.This standard is still being discussed, but there is one version that will provide bandwidth over 250Mbps, which is 4 times higher than the bandwidth of current 802.11g products.The 802.11n standard increases bandwidth by compressing data more efficiently and using antenna to allow multiple signals to be transmitted at once (this technique is called MIMO - Multi In, Multi Out, roughly translated as 'multi-input' , multi-output ').This standard may not be published until 2006.
If you don't wait until then, you might be interested in this news: Some firms (like Belkin; see find.pcworld.com/44450) have released Pre-N devices that use the standard they propose. and stated that it can be upgraded to 802.11n when it is approved.

**WIRELESS CIRCULATION CONTROL**
Meanwhile, two other new standards will soon appear as 802.11e and 802.11i, which are designed to improve existing 802.11g networks. The 802.11e standard allows for prioritization of traffic so that real-time data (such as video streams or VoIP calls) will be transmitted before less important data (such as e-mail or webpage). Some products used in part of this standard (called WMM - Wi-Fi Multimedia) will begin to appear later this year.

The 802.11i standard increases network security by adding encryption and access controls;products using part of this standard (called WPA2 - Wireless Protected Access 2) will appear sometime later this year.Most of the current routers will upgrade to the new standard, many said they are planning to upgrade to WPA2 for their older 802.11g products.G?n ?ây, Hi?p H?i Wi-Fi (www.wi-fi.org) thông báo ?ang th? nghi?m ?? c?p ch?ng nh?n kh? n ?ng t??ng thích c?a các s?n ph?m chu?n WMM và WPA2, t??ng t? nh? cách ?ánh giá và c?p ch?ng nh?n tính t?? ng thích c?a các s?n ph?m 802.11g.

Picture 6 of Basic guide: wireless network - Wireless

**X? lý s? c? m?ng**

N?u máy tính d??ng nh? không th? nh?n ra router, ho?c n?u b?n không th? k?t n?i Internet, nh?ng b??c g? r?i c?n b?n sau có th? giúp kh?c ph?c s? c? tr??c khi g?i nhà s?n xu?t h? tr?.

B??c th? nh?t c?n làm ??i v?i b?t k? m?ng nào ho?t ??ng 'ch?p ch?n' là cách ly vùng có s? c?. Card m?ng và router ph?i có cùng 'SSID', cùng ch? ?? mã hoá (WEP ho?c WPA), và cùng khoá mã hoá - m?t trong ba ?i?u ki?n này không th?a thì b?n không k?t n?i ???c. N?u có th?, th? k?t n?i m?t máy tính v?i router b?ng cáp m?ng. N?u b ?n có th? truy c?p ???c giao di?n qu?n lý router qua k?t n?i có dây, nh?ng l?i không ???c qua k?t n?i không dây, b?n c?n ki?m tra l?i trình ?i?u khi?n card m?ng ?ã ???c cài ??t ?úng ch?a. Th??ng ph?n m?m ?i kèm v?i card m? ng có ch? ?? ki?m tra.

B?n c?ng ph?i ??m b?o card m?ng và router t??ng thích. Các router 802.11g khi ???c thi?t l?p ch? ho?t ??ng ch? ?? g s? không th? giao ti?p ???c v?i card m?ng chu?n 802.11b ho?c khi ? ch? ?? t?ng t?c (Super G), router c?ng không làm vi?c ???c v?i card m?ng chu?n 802.11g bình th??ng.

Ngoài ra, ?? t?ng c??ng b?o m?t, router c?ng có th? ???c thi?t l?p saoo cho ch? các card m?ng có ??a ch? MAC ? ã ???c khai báo tr??c m?i có th? k?t n?i, c?ng nh? ph?m vi b?o m?t. Ki?m tra xem card m?ng có trong danh sách này không.

N?u k?t n?i không dây ??n router ???c nh?ng l?i không duy?t ???c Internet, nghía là card m?ng c?a b?n làm vi?c t?t, v?n ?? n?m ? router. Hãy ki?m tra l?i c?u hình router. Ch?y l?i ti?n ích thi?t l?p, ki?m tra ch? ?? (nh? PPPoE ho?c DHCP, tùy thu?c vào ISP, xem thêm bài vi?t ADSL c?ng trong s? này), tên và m?t kh?u ??ng nh?p. Các thông s? này do nhà cung c?p d?ch v? k?t n?i b?ng r?ng cung c?p. M?t s? modem b?ng r?ng 'ghi nh?' ??a ch? MAC c?a máy tính ??u tiên dùng ?? thi?t l?p k?t n?i, vì v?y có th? b?n c?n ??n tính n?ng MAC 'clone' (hay MAC Spoofing) ?? ?ánh l?a modem b?ng r?ng là nó ?ang k?t n?i ??n máy tính, dù th?t s? ?ang k?t n?i v?i router.

Ki?m tra cáp k?t n?i gi?a modem b?ng r?ng và router, ?èn LED hi?n th? tr?ng thái c?a k?t n?i này. N?u ?èn LED

này t?t thì có th? dây cáp có v?n ??, ho?c c?ng có th? b?n ?ang dùng dây cáp chéo (crossover). M?t vài router có kèm theo cáp chéo ?? s? d?ng trong khi thi?t l?p, nh?ng cáp chéo không dùng ?? k?t n?i router và modem b?ng r ?ng, mà ph?i dùng cáp th??ng.
N?u b? r?t m?ng ho?c m?t k?t n?i Internet, ki?m tra xem b?n có ?ang dùng 'firmware' m?i nh?t cho c? router và card m?ng không. Các nhà cung c?p Wi-Fi phát hành th??ng xuyên b?n c?p nh?t ?? s?a l?i và thêm các tính n?ng m?i.

Và cu?i cùng, m?t ?i?u c?n nh? là ph?i th??ng xuyên c?p nh?t các b?n s?a l?i c?a Microsoft.

? **B?ng so sánh tính n?ng**

**PC World M? 11/2004**
**Minh - Tuyên**