Pump Up Your Home Network

We have a plan for your LAN. Find out how to surf, stream, and access files faster, as well as add cool features.

BY ERIK RHEY

ANYONE READING THIS PROBABLY lives in a digital household. But are you getting the most out of your network? Sure, you're sharing an Internet connection and maybe swapping files. If you're one of the technorati, maybe you're even streaming music. But how would you like to double the speed of your network (see below)? Stream TV from your TiVo or cable box to any TV in the house—or even to a laptop while you're on the road (page 70)? Check on your home while you're away (page 75)? Control your home's lights, curtains, and temperature with a remote (page 74)? If you're ready to take your LAN to the next level, read on.

Boost Your Network with Gigabit

Wireless networks can be as convenient as e-mail—and as slow as the Postal Service. Maybe you haven't noticed this, because you aren't pushing many bits around. But just try to use a home wireless network to back up your digital music collection or copy a 2-hour digital video off your camcorder or DVR.

Today's 100MB Ethernet can be poky, too, and moving big media files can take forever. Tired

Illustration by Andy Potts

of waiting? With real-world speeds of up to 600 megabits per second (Mbps), you need Gigabit Ethernet (Gig E), friend, and you need it now.

The first step toward upgrading to Gig E is to check out your router. If you have a wireless router, chances are it supports only 10/100 Ethernet, so you'll need to upgrade to one that supports Gigabit. Some of the new generation of draft 802.11n routers, such as the Netgear RangeMax Next WNR854T ($159.99 direct, *www.netgear.com*) and the new Linksys WRT350N ($230 street, *www.linksys.com*), offer Gigabit. (The Linksys router also has StorageLink, a technology that turns any USB storage into a network-attached device.) The draft-n routers, however, may not be the best option, as you'll read in the wireless section.

Gig E Wirelessly
The Linksys WRT350N is a draft-n router with Gigabit Ethernet.

If you have a wired network and are already using a standard Ethernet switch, upgrading to a Gig E switch is typically as simple as pulling the old switch and reconnecting the cables' plugs.

Next, you'll need to see if your PCs are Gig E–compatible That's easy enough: In the Windows Control Panel, go to *Device Manager* in *System | Hardware* and check under *Network adapters*. You'll typically see either "1000" or "Gigabit" in the adapter's name, or you can check the manual.

If your PCs don't have Gig E cards, you'll need to add them (about $25 each) to every computer on your network. Cat 5 cable might work, but Cat 5e is better, because it adds some stricter data-control specs. The only thing left is to find some big files to move around—so get out your camera and start recording.

A Plug-In Home Network

It could be a new day for an old technology. Power-line networking uses your home's electrical wiring to transmit broadband signals to your PCs, gaming consoles, VoIP phones, and more via AC outlet adapters and routers. What has dogged power-line in the past, however, is speed. The original version had a throughput of about 10 Mbps, a tenth the speed of regular Ethernet. When wireless networking was introduced with 802.11b, it was comparable with power-line in speed and price, and it didn't hog your power outlets; thus, many people went wireless.

The second generation of power-line products (aka "turbo") got faster, with maximum throughputs around 85 Mbps. Most of the major networking companies, such as Netgear and ZyXEL, sell these adapters at big-box stores for $100 to $200.

Consumers are often confused by the different standards that have cropped up to operate under the umbrella of power-line technology, such as HomePlug and UPA (Universal Powerline Association). The newest HomePlug standard, called HomePlug AV, was announced this summer, but products will not be available until late this year.

WIRED OR WIRELESS? HOW THEY STACK UP

Consider the pros and cons of each technology before choosing one for your home network.

	WIRED			WIRELESS		
	Fast Ethernet	**Gigabit Ethernet**	**Power-Line**	**802.11n**	**802.11g**	**802.11a**
Cost of basic AP, bridge, router, or switch	$40–$100 (switch)	$100–$200 (switch)	$70–$200 (adapter or router)	$100–$200 (AP or router)	$50–$100 (AP or router)	$200–$300 (AP or router)
Cabling requirements	Category 5 or 5e (7¢–30¢ per foot)	Category 5 or 5e (7¢–30¢ per foot)	None	N/A	N/A	N/A
Operational frequency	N/A	N/A	N/A	2.4 GHz	2.4 GHz	5 GHz
Theoretical maximum throughput	100 Mbps	1.0 Gbps	First-gen: 14 Mbps; Turbo: 85 Mbps; HomePlug AV/UPA: 200 Mbps	540 Mbps	54 Mbps	54 Mbps
Actual expected throughput	50–60 Mbps	500–600 Mbps	10 Mbps, 50–60 Mbps, 100 Mbps	150–200 Mbps	15–20 Mbps	15–20 Mbps
Pros	Mature technology; inexpensive devices.	Besides fiber, Gigabit is the fastest home technology available.	No additional wiring needed; operates on existing power sockets.	Much faster than 802.11g.	Backward-compatible with "b" devices; faster than "b."	Faster. Ideal for streaming large media files.
Cons	Cat 5e wiring required; not portable; expensive to install.	Same as for Fast Ethernet. Peripherals must be compatible.	May be inconvenient in rooms where power outlets are limited.	Standards-based products may not be backward-compatible with pre-n equipment.	Less client compatibility than "a/g" devices.	Expensive. Not compatible with 802.11b.

OUR FAVORITE WIRELESS ROUTERS

BELKIN WIRELESS G PLUS MIMO ROUTER

$99.99 list

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The Belkin Wireless G Plus has excellent performance at extended distances and is equipped with a four-port 10/100 Mbps switch, firewall, and a browser-based management interface.

go.pcmag.com/belkinmimo

KYOCERA KR1 MOBILE ROUTER

$299.99 direct

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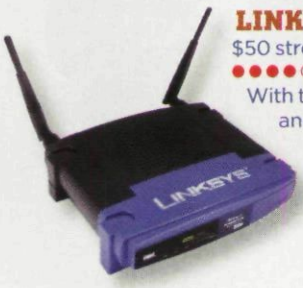
The Kyocera KR1—a full-featured 802.11g wireless router made by D-Link—includes a four-port switch and incorporates a slot in the back for your cell carrier's EV-DO PC Card. Or, if you prefer, you can use a data-capable cell phone as a cellular modem by connecting it to a USB port on the device.

go.pcmag.com/kr1

LINKSYS WRT54G



$50 street

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With the Secure Easy Setup utility and free firmware upgrades, the Linksys WRT54G is a good performer at a bargain price.

go.pcmag.com/wrt54g

NETGEAR RANGEMAX 240 WPNT834 WIRELESS ROUTER

$135 street

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The RangeMax 240, based on True MIMO technology, has great speed and range, as well as a good overall feature set, including port forwarding and triggering, VPN pass-through, dynamic DNS, service blocking, and UPnP.

go.pcmag.com/wpnt834

UPA, on the other hand, has already partnered with Netgear to release the Netgear HDX101 ($100 street), a power-line adapter reportedly capable of speeds up to 200 Mbps. With that kind of speed, power-line could give Wi-Fi a run for its money.

Wireless to the *n*th Degree

If you keep up with the goings on in the Wi-Fi world, you've no doubt heard about the new IEEE wireless standard dubbed 802.11n. Though the final standard hasn't been ratified yet, a draft version was passed recently, and products with the "draft-n" technology hit the market early this year. Given the raw specs, you'd think these devices would be the fastest on the market, but they're far from fully baked.

Products using "pre-n," however, have been available for about a year. These are the best bet for those who need speed. Pre-n routers use MIMO (multiple in, multiple out) technology with three antennas, each dedicated to upstream or downstream traffic. The gains of pre-n over 802.11g are clear: Most of the pre-n routers we tested broke 100 Mbps at close range and got as much as 30 Mbps at 160 feet. By comparison, 802.11g routers maxed out at around 25 Mbps.

So how do the draft-n routers compare? The Netgear RangeMax Next WNR854T is the fastest router we've seen at 10 feet (125.3 Mbps). But at greater distances, it clocks in far *below* pre-n routers such as the Linksys SRX400—and even Netgear's own pre-n RangeMax 240! The draft-n products also seem overly sensitive to antenna adjustments and require many firmware and driver upgrades. We have not yet tested the Linksys WRT350N mentioned earlier, but stay tuned for a full review.

Plug-in power The Netgear HDX101 is a UPA power-line adapter capable of 200-Mbps throughput.

With that in mind, you are better off with a pre-n router and notebook adapter—or wait for the second generation of draft-n products. If you can hold out even longer, wait until the 802.11n standard is ratified and get a true standard-based router.

A Cable-Free Future

Wi-Fi and Bluetooth are no doubt wonderful inventions. But you still have all those devices tethered to your PC. And Wi-Fi keeps you on a short leash. Ultra wideband (UWB) and WiMAX could liberate you and your devices.

UWB is the technology behind Wireless USB, which lets you transmit data to your PC wirelessly from a USB device. Used by police and firefighters since the late 1990s, it's faster and more power-efficient (thanks to its pulse-based frequency) than Bluetooth or 802.11. It could become the standard for cable TV, medical imaging, home theaters, and more. Some people expect Apple to create UWB-enabled iPods.

One of the few Wireless USB products available now is the Belkin CableFree USB Hub and Dongle set ($129.99 list), a four-input hub. Startups such as Staccato are creating their own USB hubs and the first PCI Express Mini Cards.

As for WiMax, a wireless broadband technology with a point-to-multipoint architecture, Sprint Nextel CEO Gary D. Forsee announced in August that the company will build the first nationwide mobile WiMax network, giving 100 million Americans wireless Internet that would boost real-world download speeds to 2 to 4 Mbps—four times faster than the current speed—by the end of 2008.

—Jeremy Kaplan, Sascha Segan, Craig Ellison, Pamela S. Ahn; Tim Gideon, Oliver Kaven, freelance writers