Better Business Wi-Fi

Your guide to building a better Wi-Fi network in your office

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With more employees wanting to bring their own devices to work (BYOD), and the increased prominence of wireless devices like laptops, smartphones and tablets in the workplace, business owners are taking a new look at wireless local area networks (WLAN) and the positive impact these can have on the bottom line.
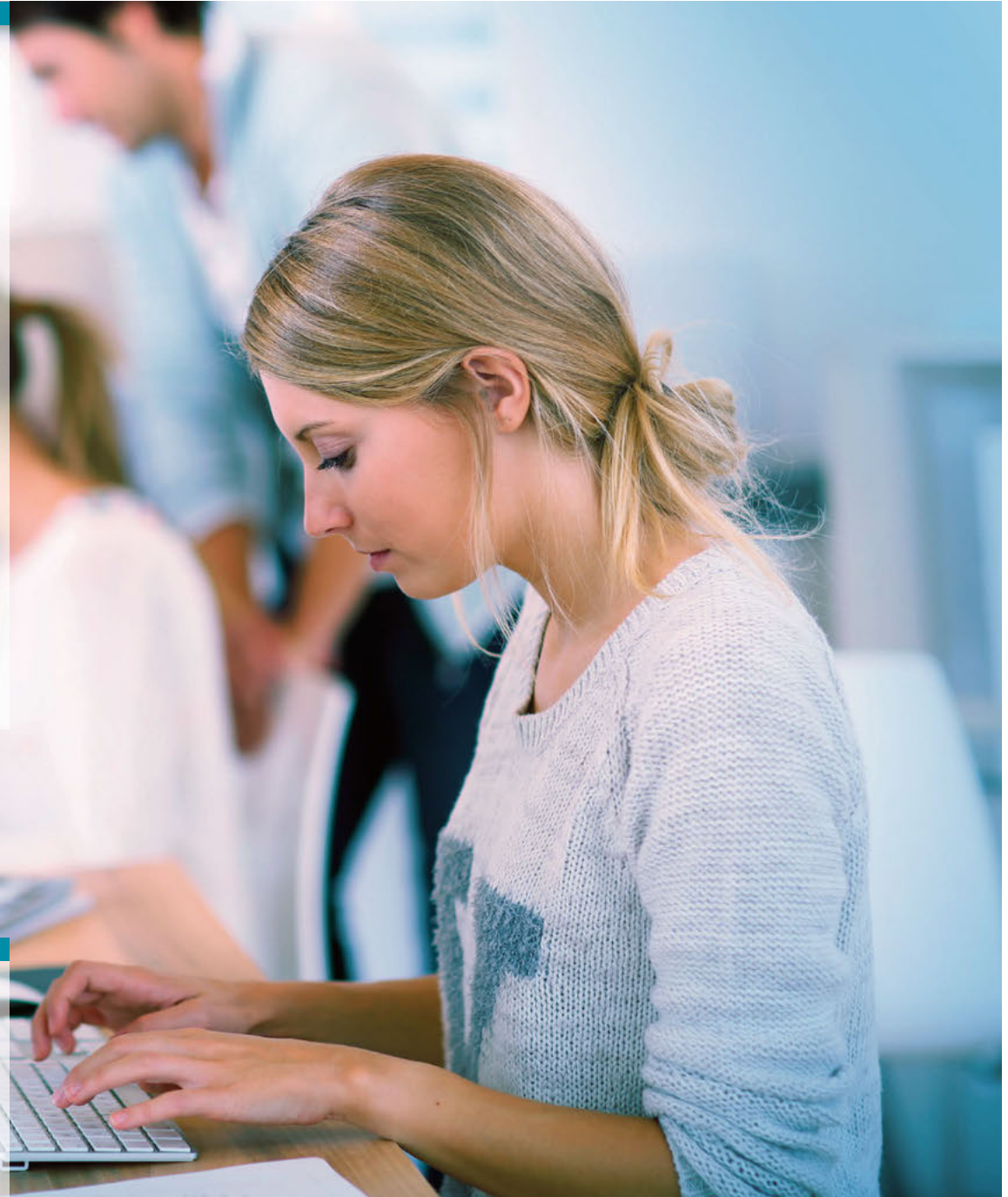
Every minute counts in a small company and wireless networks are a powerful tool for boosting productivity and encouraging information sharing. With untethered access to documents, emails, applications and other network resources, employees can roam where they need to and have constant access to the tools required to do their jobs.

However, a wireless network is sometimes exposed to interference from outside and obstacles inside, which weaken or block the signals, resulting in poorer coverage and performance. But there are various ways of optimising a wireless network and reducing interference and obstacles. This Guide will show you how...

Things to Consider...

» **Today's wireless networks are faster, and the technology more affordable than ever.**

» **Wireless networks can improve employee satisfaction by increasing productivity, flexibility and accessibility.**
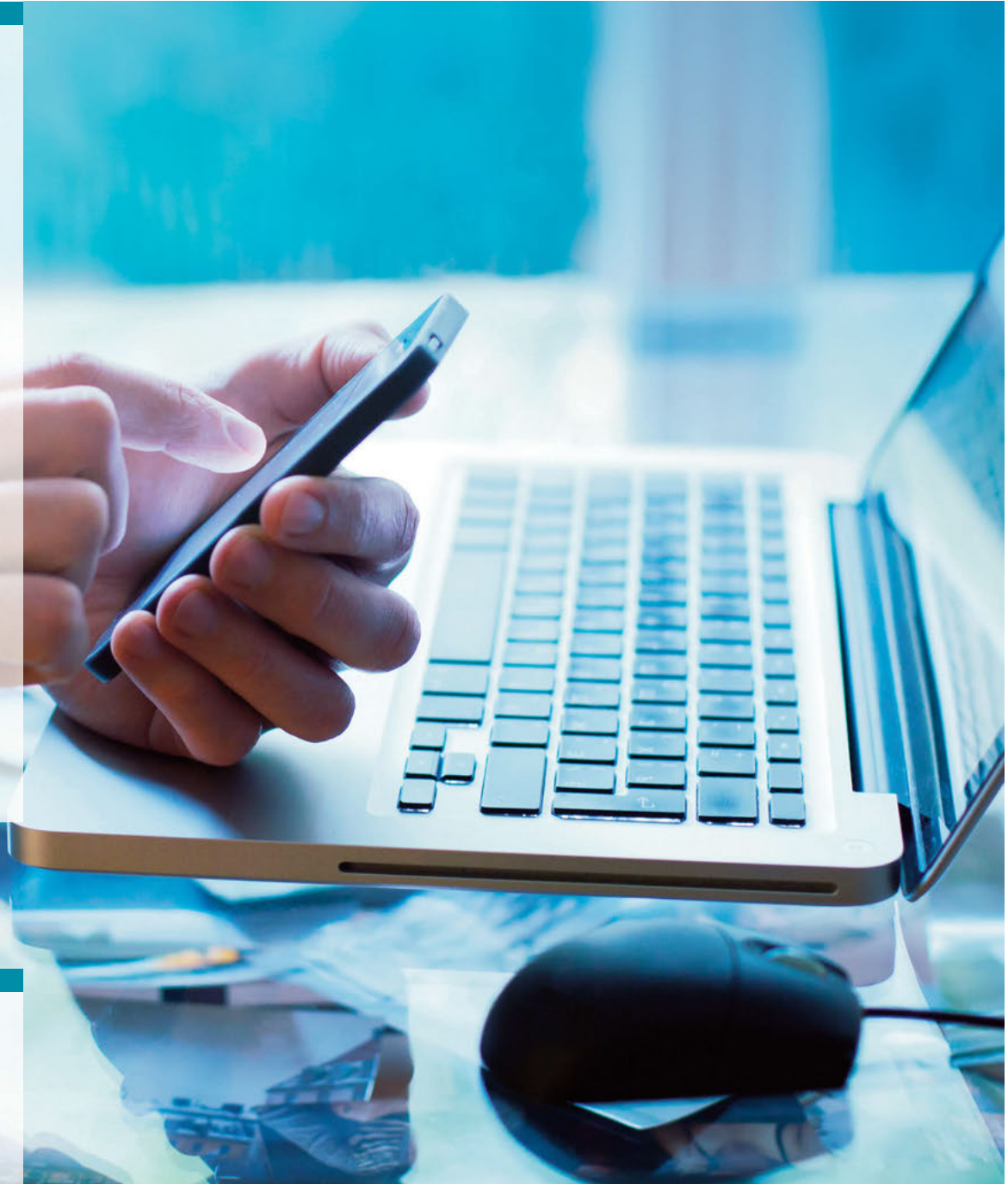
Choose the Right Wireless Standard

We recommend that you use the latest technology to achieve the fastest wireless speeds; today that is 802.11ac, sometimes referred to as Wireless AC. So your first step is to check the wireless standard used by your company's existing access points (which might be a router, range extender or dedicated access point).

• 802.11n is the standard that has been most commonly in use until now, with three speeds 'available' – 'up to 150 Mbps', 'up to 300 Mbps' and 'up to 450 Mbps'. Certain access points can have speeds of up to 600 Mbps. Bear in mind that 300 Mbps Dual-Band (which we call N600) is limited to 300 Mbps per band and does not therefore offer any more than the theoretical maximum speed of 300 Mbps.

• 802.11ac is the latest standard if you want to have the fastest, most future-proof wireless network. The new standard is backward compatible and thus works with older Wi-Fi devices. 11ac operates at speeds of up to 1300 Mbps in the 5 GHz band. The first 11ac access points for businesses were released in 2013, but only now are mobile phones and computers with built-in 11ac appearing on the market. If your company's laptops do not have built-in 11ac capability, this function can easily be added using a USB dongle, such as D-Link's DWA-182 or DWA-171, to achieve 11ac speed.

Things to Consider...

» **802.11g is the oldest Wi-Fi protocol and is very slow by modern standards. If you have equipment and devices with this standard in your network, they may reduce overall performance, so it may well be worth upgrading.**

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Can you handle the 5 GHz band?

If your office location has several wireless networks close by (such as you might typically find in a business complex or shared office space), or other wireless sources of interference such as DECT (Digital Enhanced Cordless Telecommunications) phones or an intruder alarm, you would be well advsied to install a 'Dual-Band' access point. This can transmit on both the 2.4 GHz and 5 GHz bands, which (on the latter) means fewer sources of interference and the option of choosing more channels.

All wireless devices sold today support the 'usual' 2.4 GHz band. The latest, more technologically advanced, models also support the 5 GHz band, which is particularly suitable for streaming images and sound, large file transfers and cloud backup.

Things to Consider...

» **The 5 GHz band is currently much less congested than the 2.4 GHz band, so will generally lead to faster speeds and less interference.**

» **Most modern tablets and laptops can connect to 5 GHz wireless networks.**

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Consider your office layout to identify the best possible location

Do you know what your building is made from? Before you install or adapt your wireless network, you should. Dense building materials like filled cinder blocks, brick, rock, adobe or stucco (cement render) can significantly reduce the strength of your wireless signal, thus increasing the number of access points you need to ensure a fast, reliable connection.

Even though the latest 802.11ac wireless standard has better coverage than before, wireless access points have limited coverage. It is therefore important that the access point is, where possible, in a central position.

An open-plan office has fewer obstacles and is easier to equip, but each obstacle (such as a wall, filing cabinet or water cooler), causes the signal to lose power. Ideally, line of sight is best, so position the access point high up on a wall with an unrestricted 'view'; two metres up is ideal, but avoid positioning the access point close to metal.

Performance is increased by correctly orientating external antennas. If you install your access point against a wall, the antennas should point vertically, and if the device is installed on the ceiling, the antennas should point towards the floor, but you should test what works best in your particular environment. On certain models, the omni-directional antenna can be replaced with a directional version, for example in a narrow passage such as a corridor.

Things to Consider...

» **A wireless network consists of radio waves that often have to pass through various obstacles. Materials such as stone and concrete are harder for radio waves to penetrate than, for example, glass, wood or plaster.**

» **Wireless signals do not like water, so things such as pipes, plumbing, water tanks and the like are the enemy.**

Identify bottlenecks

If your office has a fibre coupler, you should focus on reducing bottlenecks. Make sure that you have a Gigabit access point that, as a minimum, can handle 802.11n and N600 to cope with the high fibre speed. If you choose a Gigabit access point with 802.11ac capability, you will further increase throughput speed.
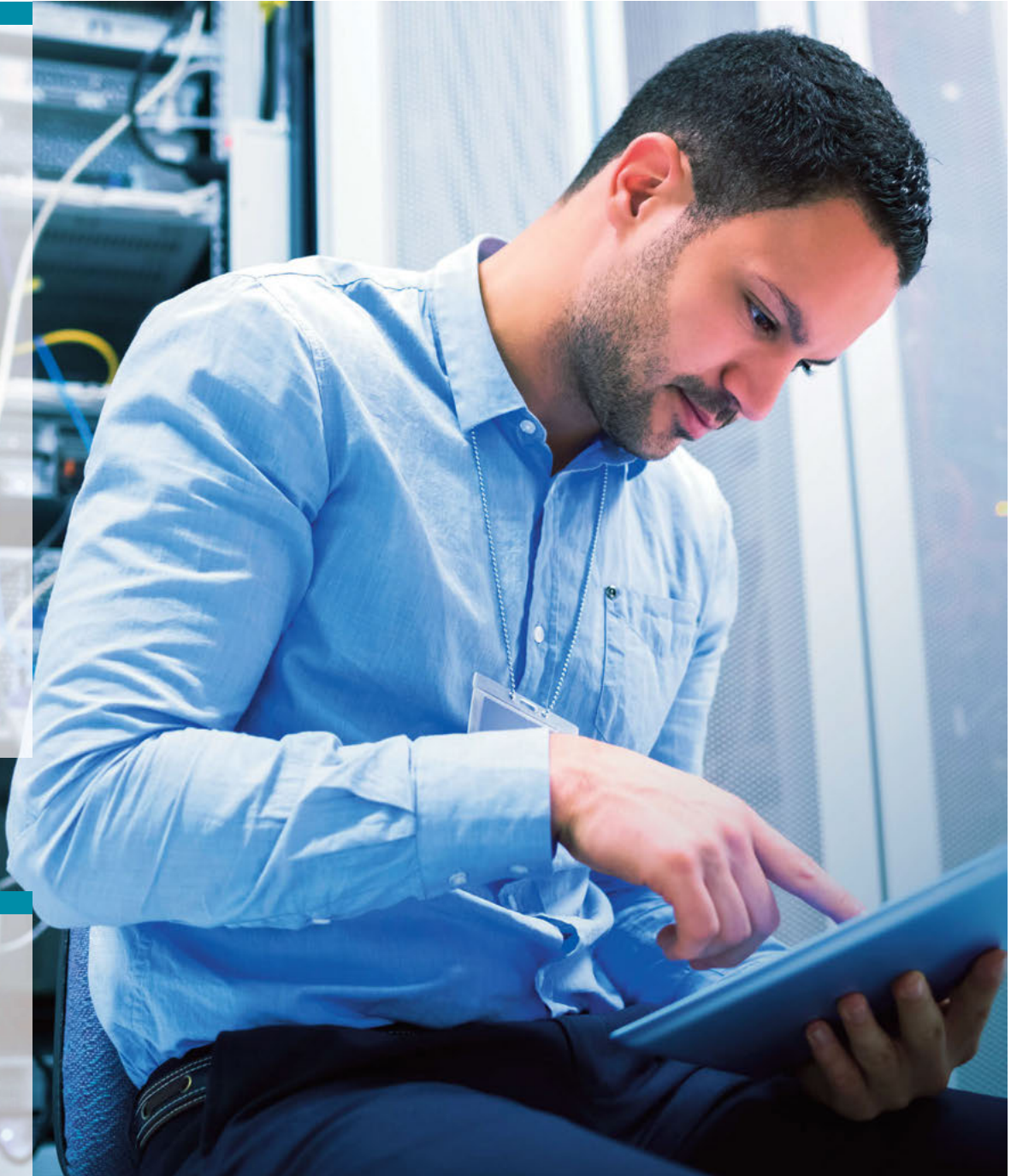
However, if your Internet connection uses an ADSL 24 Mbps modem, any potential bottleneck lies in the Internet access itself, but it is still a good idea to have a faster access point, not least to maximise the speed-transfer capability of your internal network.

Check that your company's network equipment, such as switches, routers, servers and computers, supports Gigabit Ethernet and/or 802.11ac (or at the very least 802.11n Dual-Band). Your switch should, ideally, be a Smart Switch. These have the same network functions as more advanced, more expensive switches, but are easier to install and cost less. Smart Switches also provide small businesses with the important functions needed to create a wireless network with high performance and reliability, so before you buy make sure it can handle Auto Surveillance VLAN, Auto Voice VLAN and Loop-back detection, thus ensuring that wireless communication flows smoothly in the network.

Things to Consider...

» A new (faster) access point is better than an old one for prioritising the flow of data traffic, ensuring that video, music, sound and Skype calls do not 'freeze' thanks to, for example, the in-built QoS (Quality of Service) function.

» To ensure future compatibility, make sure that all equipment has Gigabit speed and that Ethernet cables in the network are category 6 cables (known as CAT6).

Build an access point network

Does your company have a large area of office space to cover, another floor that the signal cannot reach, a neighbouring building maybe, or does the signal have to try to pass through impenetrable walls? If so, then you need to build a network of 'connected' access points.

The roaming function between various access points allows employees to move between different rooms or even buildings with a tablet or PC without losing their Internet access. And with load balancing, wireless data traffic at high volumes is optimised. Multiple access points can be centrally and easily managed using D-Link's free bespoke web-based management software – Central WiFiManager – which allows setup, management and control of an entire network from any Internet-connected device.

If you are looking to extend or enlarge your wireless network, then a wireless bridge is a simple solution, and if your company has several buildings and needs to transmit wireless signals between them, this can be achieved by installing access points adapted for outdoor use. If, on the other hand, you have a large office space and the wireless signal is dropping off, a range extender will do exactly as the name suggests and extend the wireless signal range.

Things to Consider...

» **When you install multiple access points, make sure you overlap the coverage of the various access points by around 30 per cent, in order to minimise the risk of interference.**

» **If you need to extend the reach of your wireless network then a range extender is a simple and very cost-effective option.**
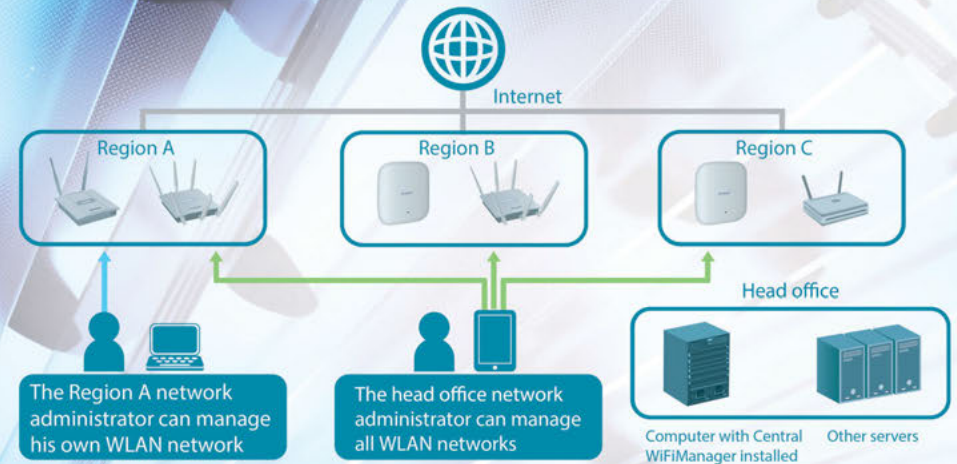
Manage your Wi-Fi networks for free

D-Link's free bespoke web-based Wi-Fi network management software – Central WiFiManager – allows setup, management and control of an entire network from one central location from any Internet-connected device.

Supporting all Wi-Fi speeds up to and including Wireless AC, the free Central WiFiManager program, which supports multiple languages, enables you to configure settings just once and then apply to up to 500 access points. Totally scalable, the web-based software enables you to access the settings for any of your network's access points from any Internet-connected device, and monitor your network in real time, optimise your bandwidth and access detailed reports of network activity.

You can monitor and control information (including accross multiple sites) such as connected devices, authentication settings, Power Save Mode, MAC and IP adresses, wireless band, SSID broadcast and so on, all within a custom-designed control panel which presents information in easy-to-read graphical and tabular form.

Find out more at www.dlink.com.wifidownload

Diagram

Internet

Region A | Region B | Region C

Head office

The Region A network administrator can manage his own WLAN network

The head office network administrator can manage all WLAN networks

Computer with Central WiFiManager installed | Other servers

Things to Consider...

» **Central WiFiManager is free and offers easy access to Wi-Fi network set-up and support for all businesses, whether you have just a few employees or hundreds. And unlike traditional hardware controller solutions for managing wireless access points, Central WiFiManager has a much lower initial investment cost as it comes bundled with many D-Link access points and there are no per-access point license charges.**

Security is important

You should always use encryption for your network traffic. We suggest WPA2 or WPA2 Enterprise, which offer the highest level of security. The key, your password, should have at least eight characters, or to be really secure go for 14 characters, and combine numbers and letters in the password.

Make sure that you always use the hardware firewall in your router. It is also a good idea to supplement this by enabling the hardware firewall on all client computers. Also, remember to update the firmware in all of your devices to the latest version as this often incorporates essential security patches.

Remember that all network equipment such as routers, firewalls, switches and access points should support VLAN (virtual LAN) and be able to handle multiple SSIDs for enhanced secrecy and security. Every SSID (which stands for Service Set Identifier – the name of your wireless network) creates a unique key that is used by connecting devices to identify that wireless network. This key prevents any other unauthorised wireless device from accessing your network. The facility to create multiple SSIDs enables you to differentiate between an admin network and a guest network: guests can access the Internet, but not the admin network.

Things to Consider...

» **When selecting your wireless network password, avoid obvious words that might be associated with your company to make it harder to 'crack' the key.**

» **It is a good idea to 'hide' your SSID (your network name) from public broadcast, so that casual snoopers won't even see it exists.**

Fine-tune the network using an analysis program

You can use the inSSIDer program or Tamograph Site Survey for PCs to fine-tune your wireless network. For Macs, you could use iStumbler, WiFi Explorer or WiFi Signal.

These programs look for sources of interference and identify which networks and channels are being used by nearby offices. Your choice of channels for your own network can then be adapted so that it does not coincide with those around it.

If you switch to a channel that is not being used by anyone else, there will be far less interference and your company will achieve the optimal wireless speed, which will make your Wi-Fi network perform even better.

Things to Consider...

» **Using a Wi-Fi signal analysis program could seriously improve your wireless performance as you could choose a network channel that is not in use by other networks.**

What products should I use to improve my business Wi-Fi?

D-Link offers a vast range of wireless networking products such as routers, access points and range extenders, many of which offer the very latest in wireless technology such as Wireless AC speeds, dual-band connectivity (2.4 GHz and 5 GHz) and robust security, along with proprietary technology such as AC SmartBeam™. What you need will depend on your own individual circumstances, and the speed of your Internet connection itself, but ideally you should opt for the best you can afford.

Here are two products that typically offer the sort of functionally and facilities that will make setting up and running a wireless network the most advanced it can be:

DAP-2695
- Up to 1300 Mbps, 4 x faster than wireless N
- Dual-band, support 5 GHz to avoid congested 2.4 GHz band
- AC SmartBeam™, allowing you to provide better coverage and speed to connected devices

DAP-1665
- Easily extend your wireless network with Wireless AC Dual-Band connectivity
- Multiple modes for when your business Wi-Fi needs change
- Robust set of security encryption standards

Things to Consider...

» **Think about how you might want to scale your Wi-Fi network in the future, what your needs are right now, and how many people you will have logging on to the network.**

Find out more about D-Link
products for wireless networks at:

dlink.com/BusinessWireless