



Picking The Right Wireless Solution For Your Business

The purpose of any wireless network is to allow multiple mobile devices to connect effectively, efficiently and securely. Behind this simple objective there are many critically important aspects of the wireless network that need to be controlled to ensure that all connections are consistently reliable, authorised and safe.

Although the underlying technology is complex and sophisticated, for any organisation, configuring and managing their wireless network needs to be straightforward, cost-effective and hassle free. How this is achieved will vary considerably depending upon factors such as the size and scale of the wireless network, the number of different sites being managed, the number of users, traffic levels on the network as well as the types of applications to be supported.

Of course, there is a large variation between the IT and networking skills available to different organisations. Those with in-house network administrators clearly have different needs and capabilities compared to those looking to outsource the management of their wireless networks.

The good news is that the right solutions exist to optimise and run wireless networks of all shapes and sizes for organisations with all types of internal capabilities. The secret to getting it right is finding the management approach and solution that is best suited any given organisation and its specific needs and budget.

Reducing the time and cost of running the wireless network

Regardless of the size and scale of a wireless network, in practical terms, there are facets of setting up and running it that need to be covered and controlled as easily and painlessly as possible using a network management solution. Gone are the days when network management solutions could only be used by highly-skilled networking engineers with specialist training and where different management consoles were needed to configure each manufacturer's own hardware.

For organisations with in-house IT and network admin staff, be they end-user or service provider focused, time and efficiency are of the essence and the right wireless management solution can streamline the process of setting up and running wireless networks and significantly reduce the workload.

For organisations without internal technical resources, wireless network management solutions can enable them to set-up, configure and run wireless networks with minimal or even no input from network engineers.



The requirements of modern wireless network management

As the use of mobile devices continues to expand in workplace, at home and in other consumer environments, there are increasing levels of expectation from users about network performance. Wireless network management is all about ensuring these expectations are met by delivering the right level of performance in the right places to the right people at the right time. Operating costs should be kept to a minimum, as should the need for specialist skills or training.

Whatever the environment (be it an office, educational establishment, sports arena, coffee shop or retail outlet), a wireless network needs to be easy to configure for use by both internal staff and guests. This includes having simple processes for creating user profiles that determine which applications and which information can be accessed by which users as well as how much bandwidth should be set aside for specific uses.

Running the network and ensuring it continues to operate reliably and securely with minimal need for manual intervention is also critically important. Automated maintenance does away with manual updates while remote management capabilities minimise the number of site visits required to make changes, carry out troubleshooting or to monitor what is going on.

Configuring and managing wireless networks

The easiest way to manage an Access Point (AP) is to connect directly to its web-based management interface using a browser. This gives the user a direct connection to the AP's configurable settings and setup wizard. However, this method is only suitable for the very smallest of wireless networks because using this method each AP needs to be accessed and managed individually, via its own management interface. For most wireless networks, with more than one or two APs, this standalone management approach is too time consuming, cumbersome and can lead to problems maintaining consistent settings across the network.



The hardware-based, on-premises management approach: D-Link Unified Wireless

The classic way to configure and manage medium- to large-scale enterprise wireless networks – which typically have many APs – is to install a hardware-based wireless controller as part of the on-premise set up. Hardware-based wireless controllers are used in business-grade networks in high density environments in medium- and large-sized organisations and in multi-site enterprise networks that also include campuses and branch offices.

The hardware controller is the brain of the wireless network that runs both the control plane (to handle system configuration and management information) and the data plane (to carry user traffic).

The intelligence in the wireless network resides in the controller with all traffic (control plane and data plane) to and from each AP passing through the controller. This gives the hardware controller a complete view of the wireless network and everything that is happening on it. It also means that the APs connected to it can have very little built-in intelligence.

With on-premise hardware controllers, many APs can be configured and managed centrally by technical experts, such as network administrators, using centralised control policies.

D-Link's Unified Wireless line incorporates two hardware-based wireless controllers, the DWC-1000 and the larger DWC-2000. They provide a scalable solution that can accommodate up to 1024 APs in a clustered configuration.



Unified APs

D-Link's hardware-based wireless controllers are deployed alongside Unified Wireless APs to produce a highly manageable, scalable, high performance wireless network. On setup, D-Link's Unified Wireless APs are automatically discovered by the controller allowing administrators to push configurations to them, rather than having to configure them one at a time.

In addition, RF resource management and security are also managed centrally, enabling administrators to pre-emptively identify potential problems with the network.

Key features of the D-Link Unified Wireless line

- **Efficient configuration** with automatic discovery of APs and one-time configurations dispatched to all APs in a group.
- **Scale the network in line with changing needs** - 12 to 256 APs per controller with a maximum of 1024 APs per cluster.
- **Automatic RF Management** greatly reduces interference between APs by automatically selecting a non-interfering channel or lowering transmission power when a Unified AP senses a neighbour nearby. If an AP drops from the network surrounding APs will increase transmission power to expand coverage.
- **Supports roaming** throughout the Wi-Fi network (between APs and even between different controllers) with no dropped connections or slowdown in performance.
- **The Wireless Intrusion Detection System (WIDS)** detects rogue access points, rogue clients, and can anticipate wireless threats, to help prevent potential breaches and illegal access. Captive Portal blocks clients from accessing the network until their identities are verified.
- **Quality of Service (QoS)** features enable the prioritisation of different type of wireless traffic, such as Voice-over-IP (VoIP) or video.
- **Easy Guest Management** with easy temporary account generation and control of guest user bandwidth and accessibility, ticket issuance, user monitoring, session extension and connection to payment gateways.
- **Robust security** using double-layer authentication and authorisation to establish a security fence to avoid attacks from internal networks.
- **Resilient, optimised network** with real-time monitoring of access points, dashboard views, system alarms and statistical reports. Self-organising, self-optimising, self-healing network with built in redundancy that automatically switches AP management to a backup controller in the event of failure.

D-Link's Unified Wireless line

D-Link's Unified Wireless line of products includes two different hardware-based controller models the DWC-1000 that supports up to 66 APs and the larger capacity DWC-2000 that supports up to 256 APs.

D-Link also offers its DWL range of hardware-managed APs used in conjunction with its hardware-based controllers.



The software-managed approach: D-Link Nuclias Connect

An alternative to using hardware-based controllers at the core of wireless networks is to opt for software managed APs that are controlled and configured from a central software-based controller. This reduces costs by removing the need to buy dedicated hardware-based controllers.

D-Link's Nuclias Connect software-based controller can be used for single or multi-site networks and allows up to 1000 APs to be centrally managed. It is provided free of charge as it comes bundled with many D-Link APs and has no per AP license charges.

As a software-based solution, Nuclias Connect can be used either as an on-premises software management platform (installed on a local Windows-based or Linux computer) or as a cloud solution (hosted on a public cloud service) accessed through any device with a web browser such as a smartphone, tablet or computer.

For small to medium sized environments, with up to 100 APs, there is also the option to use the Nuclias Connect Hub, a standalone hub that comes pre-loaded with the Nuclias Connect management software, and provides an easy to install, inexpensive, ready-made solution.

D-Link's DAP range of software-managed APs are used in conjunction with Nuclias Connect for organisations that don't require a hardware-based controller approach.

Software-managed APs

The D-Link DAP series of APs can be managed individually as standalone devices, through the usual web-based management interface, or managed collectively using the Nuclias Connect software-based controller.



Key features of D-Link Nuclias Connect

- **Supports multi-site management** so network administrators can set different configurations and authority levels for head and regional offices. APs can be pre-configured before being dispatched to regional offices.
- **Enables service providers** to send pre-configured APs to their customers and remotely manage customers' wireless network access and security.
- **Manage wireless network traffic** by configuring separate internal networks for different subnets including easily creating guest networks with customisable login pages.
- **Easy to scale the network** as new access points are automatically discovered allowing them to be quickly managed and deployed.
- **Automatically manages RF output** for multiple APs, optimising the number of available wireless channels and coverage. This results in reduced channel interference and provides faster total throughput and connection reliability.
- **Saves power and improves security** with the wireless scheduler feature that switches off wireless connectivity when not needed.

D-Link's Nuclias Connect line

The Nuclias Connect software-based controller, installed on a Windows or Linux computer or hosted in the cloud, supports up to 1000 APs.

The Nuclias Connect Hub (DNH-100) is an all-in-one controller that comes pre-loaded with Nuclias Connect management software and can support up to 100 APs.

D-Link's DAP range of software-managed APs are used in conjunction with its Nuclias Connect software-based management controller.



The cloud-managed approach: D-Link Nuclias Cloud

The easiest to use and most flexible wireless network management solution is a cloud-based system. Using D-Link's Nuclias Cloud Networking Solution users can manage their networks without the complexity or cost of other approaches. The same cloud-based solution can manage both wired and wireless network devices further simplifying the running of the entire network.

With Nuclias Cloud, wireless coverage and hard-wired networking connectivity is provided by high-performance APs and managed wired switches that are deployed on site, with setup, configuration and ongoing management carried out remotely through a web browser on a computer, tablet or smartphone.

In D-Link's Nuclias Cloud Networking Solution the control plane function is performed by a virtual controller in the cloud. The data plane, however, is handled by the APs and switches themselves with all user traffic kept within an organisation's own network.

The advantage of the cloud-based approach is that it is simple to install and easy to use. Network configurations and software updates are pushed out to network devices through the cloud, without the need to have specialised equipment or technical personnel onsite. This reduces the costs of deployment and ongoing management. A key benefit, particularly for small- to medium-sized businesses, is that technical staff do not need to be on site for network installs or for ongoing management.

Cloud-based solutions can be used to manage an unlimited number of supported APs and wired switches so the network can be easily and endlessly scaled. Pricing for Nuclias Cloud is on a subscription model, so there are no large upfront costs and the user only pays for what is needed with the ability to scale back or expand in line with requirements.

Cloud-managed APs and wired switches

Nuclias Cloud can be used to configure and manage both wireless APs and wired network switches with a single platform for the entire network. This provides central management and reporting, zero-touch deployment and over-the-air firmware upgrades for both wired and wireless connections.

D-Link's DBA range of Nuclias Cloud-Managed APs offer dual band concurrent 2.4 GHz and 5 GHz connectivity making them suitable for high footfall locations and bandwidth-intensive applications such as data, voice, and video streaming.

The DBS-2000 Series Cloud-Managed Switches offer a wide selection of port configurations with PoE (Power over Ethernet) and non-PoE models.



Key features of D-Link Nuclias Cloud

- **Easy to use**, efficient, centralised cloud-based management console for single and multi-site applications. Enables even small IT teams to keep on top of creating guest networks, adding Wi-Fi to additional locations, updating devices and keeping the network secure.
- **No engineering site visits** required with zero-touch deployment, meaning APs and wired switches can be shipped from stock without pre-configuring them.
- **A cost-effective, scalable solution** with a subscription model so users only pay for what they need. No large up-front costs and the ability to adapt their subscription as requirements change.
- **Insight into how the network is performing** with detailed statistics and reports of network usage including automated monitoring and alerts and live maps showing network health and device location.
- **Enterprise-grade security** with compliance guarantees. Nuclias Cloud ensures that none of an organisation's own network traffic goes into the cloud, only network configuration (control plane) data. Additionally, all communication between the Nuclias Cloud server and Nuclias devices is encrypted using web socket over SSL.
- **Role and privilege-based access control** enables different privileges to be assigned to users within or outside of an organisation at the touch of a button, controlling network and guest access with customisable Wi-Fi access log-in pages.

D-Link's Nuclias Cloud line

Nuclias Cloud is D-Link's cloud-based network management solution that enables service providers and end user organisations to easily and remotely configure and monitor their networks.

The DBS-2000 Series Cloud-Managed Switches are Nuclias Cloud compatible and offer a wide selection of port configurations and PoE (Power-over-Ethernet) and non-PoE models.



The D-Link DBA range of Nuclias Cloud compatible APs are intelligent, with next generation 802.11ax Wi-Fi 6 devices with each AP supporting up to 16 SSIDs and delivering combined throughput ranging from 1.3Gbps to 3.6Gbps.



		Nuclias Cloud	Nuclias Connect	Unified Wireless
	Controller type	Cloud-based	Software-based (Free)	Hardware-based
	Deployment	Remote	On-premise / remote	On-premise
	Maximum number of devices	Unlimited	1000 (SW Controller) 100 (Hub)	66 per controller/ 264 per cluster (DWC-1000) 256 per controller / 1024 per cluster (DWC-2000)
	Supported devices	Access points, switches and gateways	Access points	Access points
	Backwards compatible	No	With selected DAP- series access points	No
	Easy deployment type	Zero-Touch Provisioning	Setup configuration wizard	On-premise auto discovery & provisioning
	App support	iOS and Android app for tablets	iOS and Android app for smartphones	No
NETWORK MANAGEMENT	Real-time traffic report monitoring and analysis	•	•	•
	Multi-site management	•	•	•
	Device geolocation	• (Google Maps)	No	• (user uploaded map)
	Visualised floor maps	•	No	•
	NAT passthrough	•	•	• (optional VPN license)
	Multi-tenant administration	•	•	•
AUTHENTICATION	Authentication method	Local DB, 802.1x, RADIUS, social Network Login	Local DB, 802.1x, RADIUS, POP3, LDAP	Local DB, 802.1x, RADIUS, POP3, LDAP, AD, NT Domain
	Customisable captive portal	•	•	•
	Social network login for Wi-Fi access	•	No	•
	Guest access	•	•	•
	Payment gateway (PayPal) / billing profile	No	•	•
	Front desk ticket management	No	•	•
WIRELESS FEATURE	Multiple SSID	16 (8 per radio)	16 (8 per radio)	32 (16 per radio)
	Band steering	•	•	•
	Seamless roaming	No	No	•
	Bandwidth optimisation	•	•	•
	AP load balancing	No	•	•
	Auto channel management	•	•	•
	Auto power management	No	•	•
	Self-healing around failed APs	No	•	•
	WPA3-Personal / WPA3-Enterprise	•	No	•
SYSTEM MANAGEMENT	Firmware online check	Automatic	Manual	No
	Firmware upgrade by scheduling	•	•	No
	Configuration by scheduling	No	•	No
	Configuration backup	Last 60 days	Last 7 days	Real-time only
	Dashboard	Automatic	Automatic/manual	Manual

Picking the right solution for your organisation

What is the starting point?

There are number of different factors that determine which wireless solution is right for any given organisation. The first, and most obvious, is what does the organisation currently have in place? If there is an existing wireless network with on-premises controllers then replacing the existing controllers with upgraded models is often the easiest and most appropriate course of action. The same logic applies when there are existing APs in place because adding compatible hardware or software controllers will often make commercial sense. This applies for those looking to expand the existing wireless network as well as for those looking to upgrade the centralised management function in an existing network. Changing from a network with on-premises controllers to a cloud-based system will require reconfiguring the whole network including replacing all APs.



The advantages of on-premises controllers

On-premises hardware controllers have several advantages over cloud-based systems. For organisations with large campuses and high numbers of APs (up into the 1000s), or those with mission-critical wireless networks, on-premises controllers provide a more robust and resilient network architecture that has redundancy and failover protection built in.

On-premises controllers also provide a higher level of control with more detailed and sophisticated configuration options and are more likely to be able to support a wider range of hardware including legacy equipment such as older APs.

Unlike cloud-based networks, on-premises controllers are also much less reliant on a reliable internet connection so if an organisation has patchy or erratic broadband then the on-premises approach would be the better option.

For those organisations where a hardware-based wireless controller is out of their budget, or do not need such high levels of functionality, software wireless controllers enable a lower cost option (free of charge in the case of Nuclias Connect) where multiple APs can be configured, controlled and monitored centrally without the addition of a physical rack-mounted controller.



The advantages of cloud-based management

The key benefit of cloud-based management is its ease of use and its subscription-based pay-as-you-grow structure. Nuclias Cloud provides a single management system for single or multi-site networks incorporating both wireless and wired connections. It allows system health and performance to be easily monitored and managed from wherever there is an internet connection.

Importantly, with cloud-based management, wireless networks can be centrally managed and new sites can be brought online quickly and easily with deployment and configuration handled remotely. APs and switches have zero-touch provisioning that completely does away with the need for technical staff to be onsite to install new hardware, reducing the cost and increasing the speed of new network roll-outs. As there are no network controllers at each site, just cloud-ready APs and wired switches, there is no need to buy additional controllers as the network grows.

One important factor to consider when comparing different cloud-based systems is where an organisation's data is held. With Nuclias Cloud, only the control plane data is in the cloud, all user network traffic (in the data plane) remains within the network.

Finally, like all cloud-based systems, network settings are automatically backed up. In the event of a major network failure, configuration can be quickly restored.



Conclusion

Different organisations are looking for different types of systems to configure and manage their wireless networks depending upon their priorities and needs. D-Link has a range of solutions that encompass all approaches - cloud-based, hardware-based on-premises and software-based on-premises controllers.

Each approach has its advantages but there is no doubt that there is a trend towards cloud-based wireless network management for many organisations driven by the ease of use, efficiency and cost advantages that the cloud brings to running of Wi-Fi networks. Nuclias Cloud is at the forefront of this trend.

That said, D-Link's Unified Wireless and Nuclias Connect lines cater for those organisations that are looking for the more detailed configuration options and sophisticated built-in failover features that on-premises wireless network controllers provide.



For more information, visit eu.dlink.com/wireless
or contact us at eu.dlink.com/contact