SD-LAN: enabling resilient networking

orange™ Business Services

SD-LAN: the gatekeeper to resilient networking

SD-LAN brings the power of software defined networking to local area networks. It comes with the promise of networks that are easier to operate, integrate and scale.

SD-WAN continues to be one of the fastest-growing segments of the network infrastructure market, according to IDC. Now the move to the next phase, SD-LAN, is ready to progress. Many enterprises are assessing what SD-LAN will bring to their networking roadmap and how they should prepare for this next connected chapter.

To get you into the driving seat, our ebook explains SD-LAN technology and looks at the business challenges it can address. It spotlights some of the technologies benefits and outlines what enterprises need to do to get “SD-LAN ready”.

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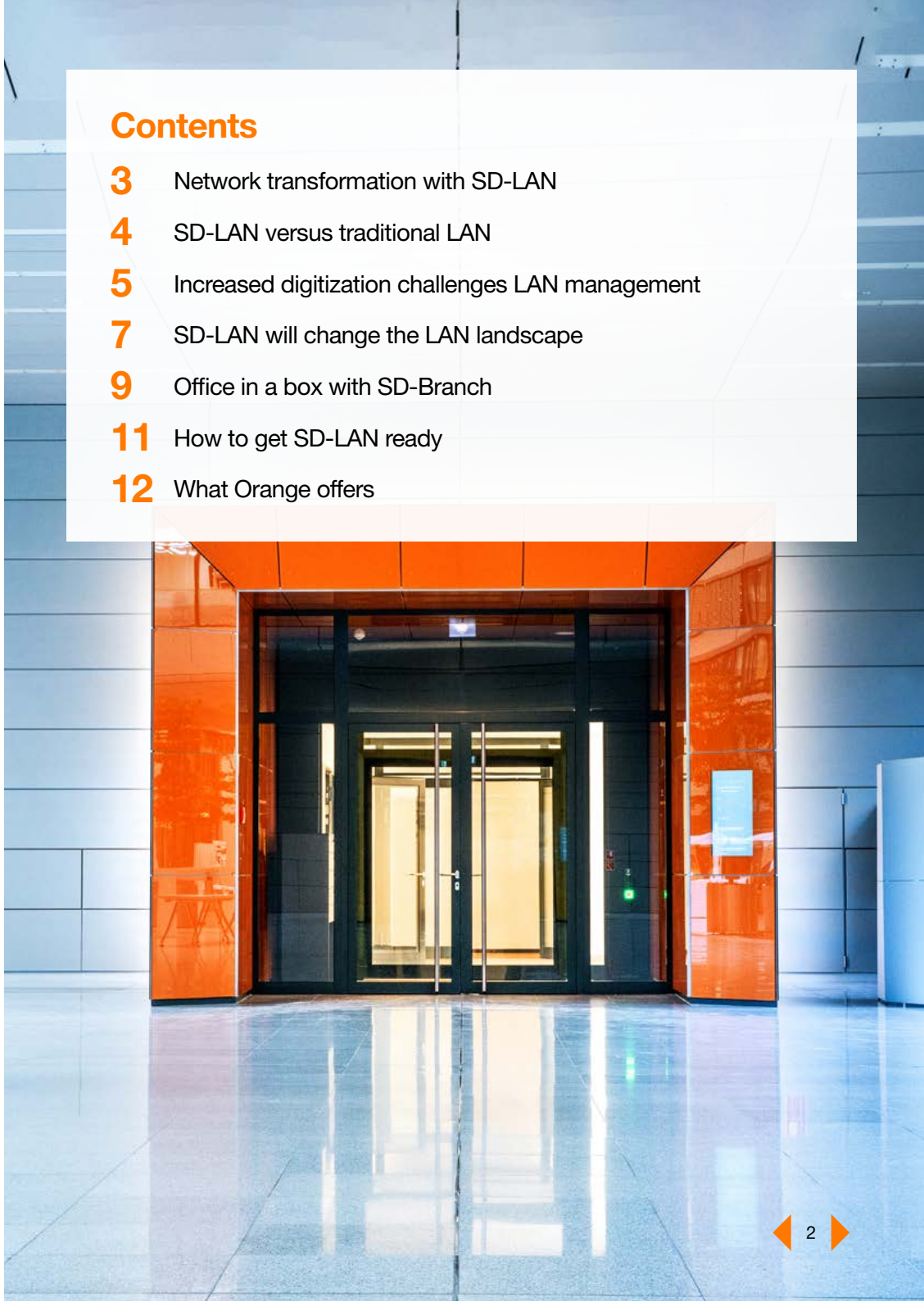


Network transformation with SD-LAN

These uncertain times have highlighted the importance of secure, agile IT in keeping business operations running during a crisis. This has put network transformation right at the top of the corporate agenda.

At the same time networks are becoming more complex and exposed to risk. SD-LAN is an emerging technology that offers enhanced security and flexibility. It extends the scope of software defined networking (SDN) to create centrally managed self-healing and self-optimized networks. It is the ultimate gatekeeper to resilient, optimized local area networking.

With the number of devices connecting to the LAN increasing, quality of connection, user experience and security are paramount. In addition, enterprises are seeing their network needs and workloads change as they ease into a very new way of working. To ensure network performance and agility moving forward, now is the time to get SD-LAN ready.

What is SD-LAN?

It is important to remember that SD-LAN is still in its infancy, so there are still some differences in the way vendors and service providers define SD-LAN. Current offerings on the market could be termed “pre-SD-LAN” solutions. The first true SD-LANs incorporating intent-based management, will emerge early next year and take a couple of years to go fully mainstream.

SD-LAN utilizes the key principles of software defined networking in the data center and SD-WAN to offer up several benefits to wired and wireless networks. These include centralized management, access management, adaptability, flexibility dynamic bandwidth sharing, cost-effectiveness, and scalability. All of this is achieved while providing mission-critical business continuity to the network’s access layer.

Despite having cloud-based network administration, there are always technologies that require some form of highly secure localized management. This is where SD-LAN steps in, working with or without the cloud.

Some enterprises, for example, are worried about cloud-based technology and its requirement to open up information at the network level, such as those in the pharmaceutical industry. SD-LAN provides far greater control of the LAN right down to the application level and provides granular reporting on performance, traffic use and ultimately the user experience.

SD-LAN/WAN integration

The goal of SD-LAN is to provide integration with the WAN, alongside security, IoT and segmentation. This provides full policy integration between the LAN and the WAN. By setting policies and bandwidth limits between the LAN and the WAN, data can be monitored from end-to-end, enabling IT teams to optimize business processes and the user experience.

SD-LAN versus traditional LAN

Unlike traditional LANs, SD-LAN doesn't require enterprises to invest heavily in physical infrastructures, which allows for better cost control.

Traditional LANs are built on fixed-function devices that work together to operate the network. Although it works well as a concept, dedicated hardware is by its very nature inflexible and hard to customize. The physical location of the control plane makes traffic visibility and control difficult.

Today's users are mobile thanks to a proliferation of cloud services. SD-LAN provides the power of an application and policy driven architecture that separates the hardware and software layers. The result is an agile, secure, automated and centrally managed network that gets over the rigidity and management issues of traditional LANs – technologies that require some form of highly secure localized management. This is where SD-LAN steps in, working with or without the cloud.

Five key differences between SD-LAN and traditional LANs

1. **SD-LAN is software based, which makes it easier to control and manage resources and bandwidths virtually.** It contrasts to traditional LANs that use switches, routers and other physical devices to create connections and run the network.

2. **SD-LAN brings automation to the LAN and enables minimum provisioning.** This allows for automatic or scheduled updates with no network downtime, and rapid onboarding of devices attached to the network.

3. **Unlike the LAN which has a static architecture, an SD-LAN's control-plane is software based.** This allows IT managers to manage traffic flow from a central user simplifying network configuration and management.

4. **SD-LAN security is easier to manage centrally.** Without it, LAN security is time consuming to manage. SD-LAN eliminates the need to manual manage settings or apply patches on routers and firewalls, for example, to keep out malicious actors.

5. **SD-LAN extends network segmentation to the LAN.** This improves security by segmenting traffic on pre-set policies. Security can be micro-managed for full-time employees, guests and contractors, for example. Identity-driven access dynamically defines the users and devices that can access the network and what then can do when they get there.

Increased digitization challenges LAN management

LANs are not typically managed globally. The connected world, however, is changing this requirement fast. The number of connected devices is predicted to grow to an impressive 29 billion by 2023.[2]

Enterprises need to focus on securely and dynamically interconnecting all the different areas of their diverse infrastructures including the LAN, campus/branch, WAN, IT/OT, data centers and cloud to provide end-to-end management and visibility.

The rapid growth in data and devices is outpacing the management capabilities of IT teams. Manual approaches to managing the LAN are time consuming and outmoded. Often local support is inconsistent leading to a degradation in performance, lack of central governance, incompatibilities in LAN, Wi-Fi and hardware standards leading to discrepancies in service quality and a poor user experience.

Demand for office wireless access growing

People are coming back to the office, some permanent, some on a flexible basis. In the future there will likely be more visitors to offices and more employees using BYOD devices.

Enterprises need to give users the same Wi-Fi experience in the office that the majority get at home. Wireless has been standard in many offices for a decade or so, but many offices were wired up before then. Implementing high-quality Wi-Fi into this physical environment is difficult and expensive.

Securing the LAN and keeping it healthy

Today's LANs need to support more traffic than ever and this is only going to increase. Mobile devices and connected hardware accessing LANs are growing at a phenomenal rate, opening outside access points that pose a major security risk. If a LAN switch is not patched, or support are under the misapprehension it has been done, malicious actors will quickly identify this backdoor onto the network.

In addition to security, LAN management has become an increasingly complex business-critical task. Protecting both the stability and performance of applications and processes has become arduous in the traditional LAN environment. At the same time troubleshooting is more difficult as it necessitates functional checks on a host of components and devices with a variety of configuration options, including switches and appliances.

More expected from the LAN

Demand for greater bandwidth has rocketed recently, driven by cloud computing, and bandwidth-hungry applications such as video and big data. LANs are now expected to deliver greater performance and availability securely than ever before. Many enterprises are attempting this on an aging infrastructure. In addition, increasing management complexity is tying up considerable resources that could be focused on strategic initiatives.

60% of breaches are linked to a vulnerability where a patch was available, but not applied[3]

SD-LAN will change the LAN landscape

The LAN has now become the point of entry into IT for the enterprises. It touches every element of the infrastructure. Security and the end-user experience are now paramount.

Every entry point needs to deliver a quality service to the user with the right level of security. This is where SD-LAN comes in, supporting increased wired and wireless adaptability for a truly agile business environment.

How SD-LAN addresses your key business challenges:

SD-LAN builds a self-organizing and centrally managed network that is designed to simplify management, integration, operation and scalability. Its make-up provides the following business benefits:

Centralized management: SD-LAN makes it easy for IT administrators to apply business policies to the network, quickly and efficiently across geographically distributed locations. Centralization allows for simplified resource planning, deployment and troubleshooting.

Wireless: Today LANs are made up of not just switches, but a host of wireless access points. Unlike traditional LANs, SD-LANs incorporate wireless connectivity without the presence of a physical controller, making it quick and easy to deploy and manage wireless connectivity. This means that on the LAN side, enterprises can move from primarily wired networks to almost completely wireless networks for edge access. For example, SD-LAN will enable Wi-Fi 6 to support more bandwidth and devices for smart campus and factories.

Enhanced security: Microsegmentation enables policies that are far more granular and flexible. This makes it easier to manage additional risks posed by mobile and IoT devices, because access can be limited by device as well as user. IoT devices can be uniquely identified on the Wi-Fi network using software-defined private pre-shared keys.

Network visibility: granular application visibility and control at the network edge provides dynamic optimization of the LAN for enhanced performance and a consistent user experience.

Network segmentation: SD-LAN provides microsegmentation, which improves security and performance. It does this by dividing a computer network into smaller parts to better control how traffic flows across the network. Data traffic can be stopped from reaching one destination, for example, or it can be limited by sources, specific users and other criteria.

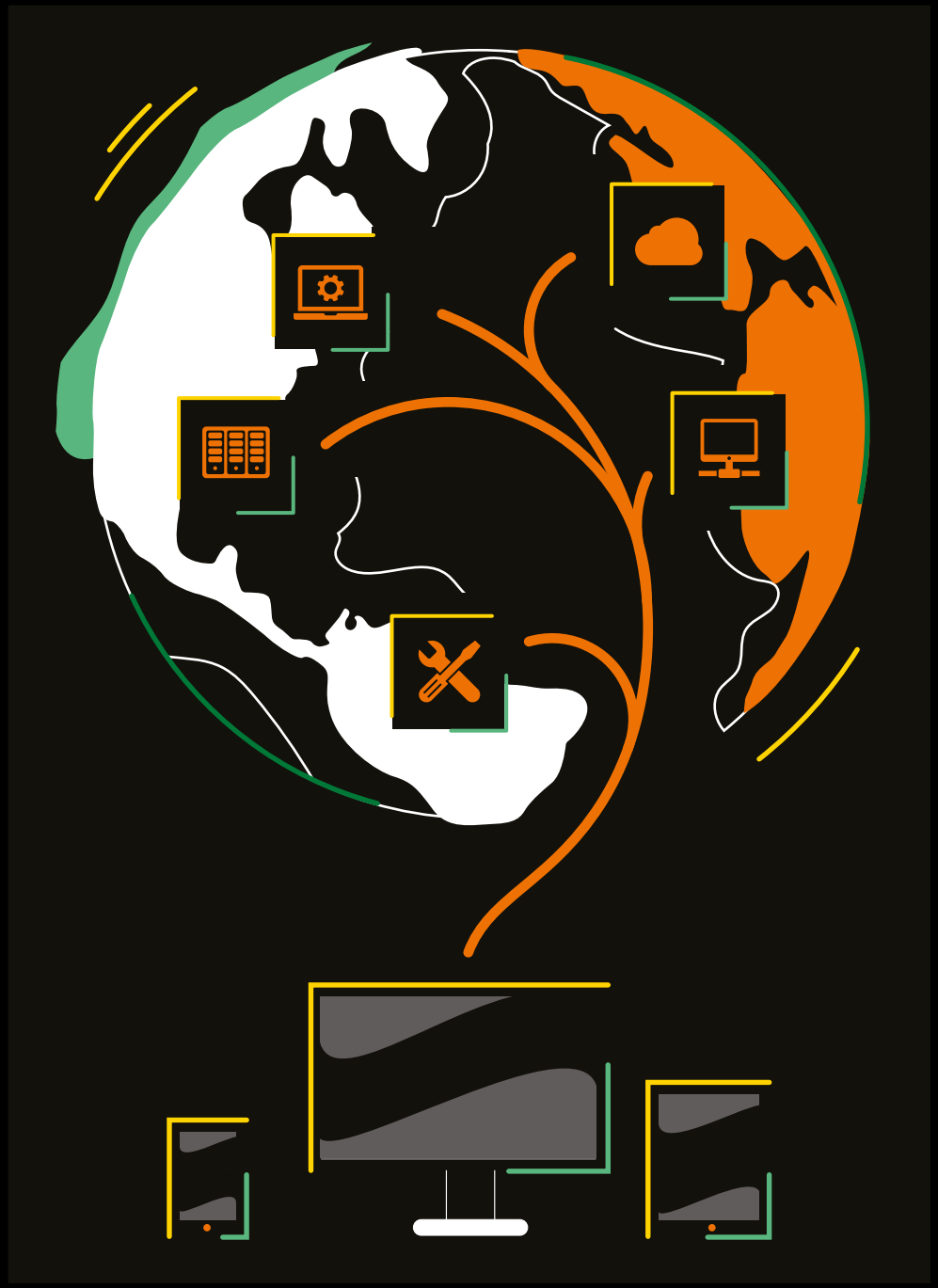
Application awareness: SD-LAN can provide visibility up to the application layer using deep packet inspection capabilities. As well as implementing security features to control applications, traffic can be prioritized for business-critical user groups or applications. All real-time collaboration tools, for example, could be diverted to the MPLS network to make sure a reliable connection is available.

Open APIs and programmable interfaces: The majority of SD-LANs have been designed to offer open APIs and programmable interfaces, so that network management can analyze data to better program the network, ensuring ultimate efficiency.

A self-sufficient LAN: SD-LAN incorporates automation technology designed to make the planning, configuration, management, optimization and healing of the network easier. These together provide better network performance, health and scalability. Device coverage, for example, can intelligently adapt across the network to meet data loads. Auto detection and automatic notification of faults on the network and devices reduces downtime.

Cloud or non-cloud based: Cloud-based centralized management can reduce complexity and the cost of network operations through public or private cloud networking. Policy changes can be made rapidly and easily across geographic regions. Enterprises with high security environments can opt for a virtualized/hosted deployment on premises or in a data center.

Minimum provisioning: This covers automatic or scheduled firmware updates with the promise of no network downtime and fast onboarding of additional network devices. It allows the network to quickly adapt to business needs.



Office in a box with SD-Branch

By combining SD-LAN and SD-WAN in a single appliance, enterprises can simplify end-to-end network management and improve performance.

SD-Branch extends the concept of software-defined principles to a branch location. Its benefits include a simplified hardware infrastructure, remote centralized management, and programmable automation. Think of it as an office in a box – SD-LAN plus SD-WAN. SD-Branch enables branches to deliver a high-quality user experience with zero provisioning, regardless of the branch location.

SD-Branch, according to IDC, this is “an opportunity to rethink enterprise network architecture and design; embrace virtualized, containerized or cloud hosted functions; enable flexibility, agility and simplify management”.[4]

With SD-Branch, network administrators can set automated policies that prioritize business-critical traffic over non-essential customer traffic. Centralized management allows services to be added, altered or removed without disrupting the network. This makes sure that services are delivered on demand without the expense of on-site personnel to make any configuration changes.

Wi-Fi support

SD-Branch’s Wi-Fi support however is pertinent right now in helping to get workers and visitors back into offices as lockdowns are lifted. Supporting apps, for example, will allow enterprises to track how workers are using a space and if there are any hotspots where social distancing is being ignored.

Implementing Wi-Fi into physical office environments can be complex, especially in older buildings. A software defined approach overcomes the complexity as it requires a much smaller footprint.

SD-Branch management solutions are designed to deal with the unique requirements of Wi-Fi in the office space including prioritizing certain users and applications and putting in place end-to-end policies.

In the longer term, SD-Branch technology might even find a place in a home office, in particular for power home users such as stock traders whose work demands the ultimate in user experience.

Key benefits of SD-Branch include:

- Rapidly deploy and provision a network in a box to diverse geographical locations
- Centralized management allows network administrators to control all branch network functions and security policies
- Improved end-to-end performance by combining SD-WAN and SD-LAN functionality
- The ability to right size solutions to branch requirements
- Easy network scalability

SD-Branch management solutions are designed to deal with the unique requirements of Wi-Fi in the office space

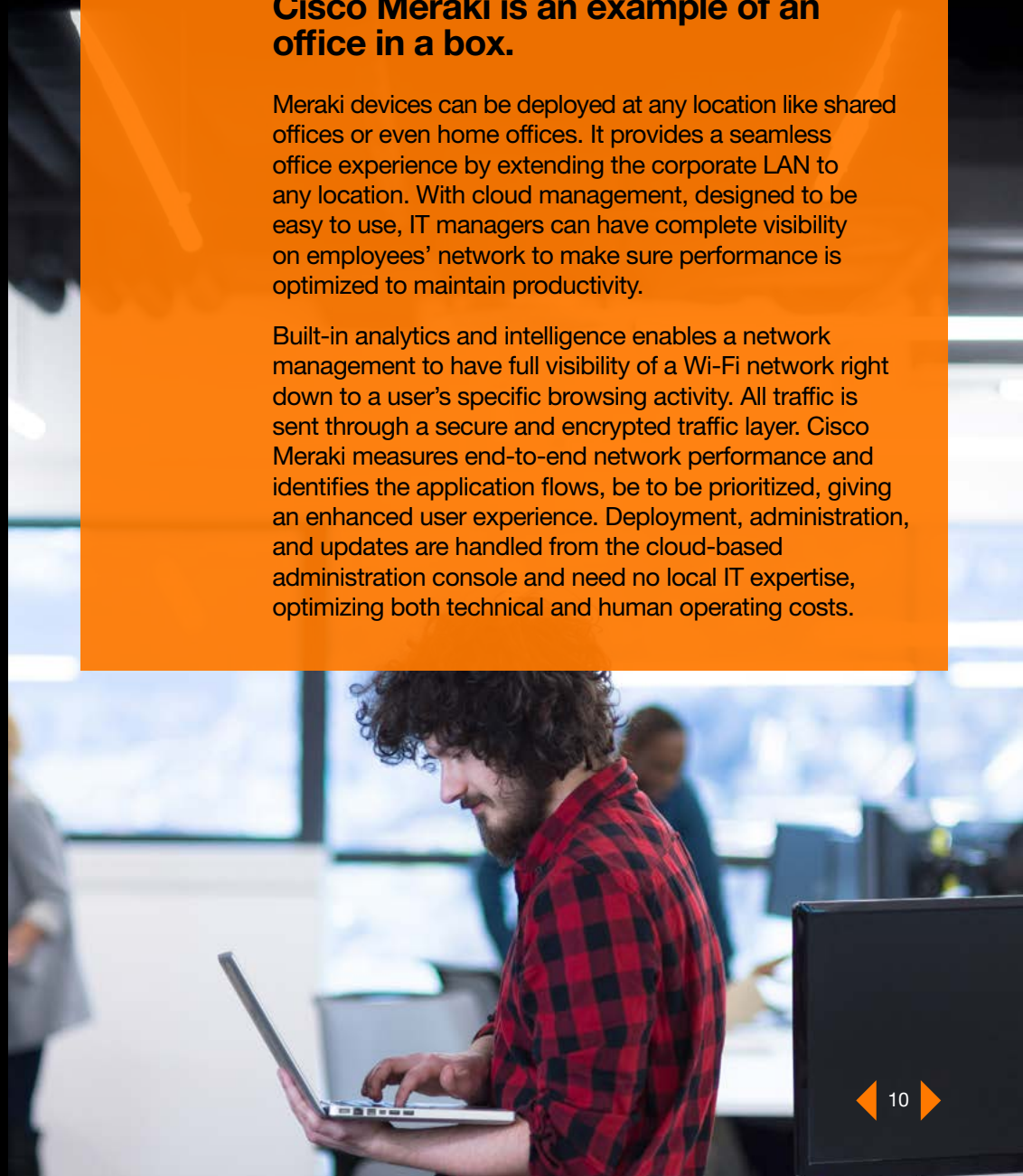
Case Study

Cisco Meraki: Powering remote working

Cisco Meraki is an example of an office in a box.

Meraki devices can be deployed at any location like shared offices or even home offices. It provides a seamless office experience by extending the corporate LAN to any location. With cloud management, designed to be easy to use, IT managers can have complete visibility on employees' network to make sure performance is optimized to maintain productivity.

Built-in analytics and intelligence enables a network management to have full visibility of a Wi-Fi network right down to a user's specific browsing activity. All traffic is sent through a secure and encrypted traffic layer. Cisco Meraki measures end-to-end network performance and identifies the application flows, be to be prioritized, giving an enhanced user experience. Deployment, administration, and updates are handled from the cloud-based administration console and need no local IT expertise, optimizing both technical and human operating costs.

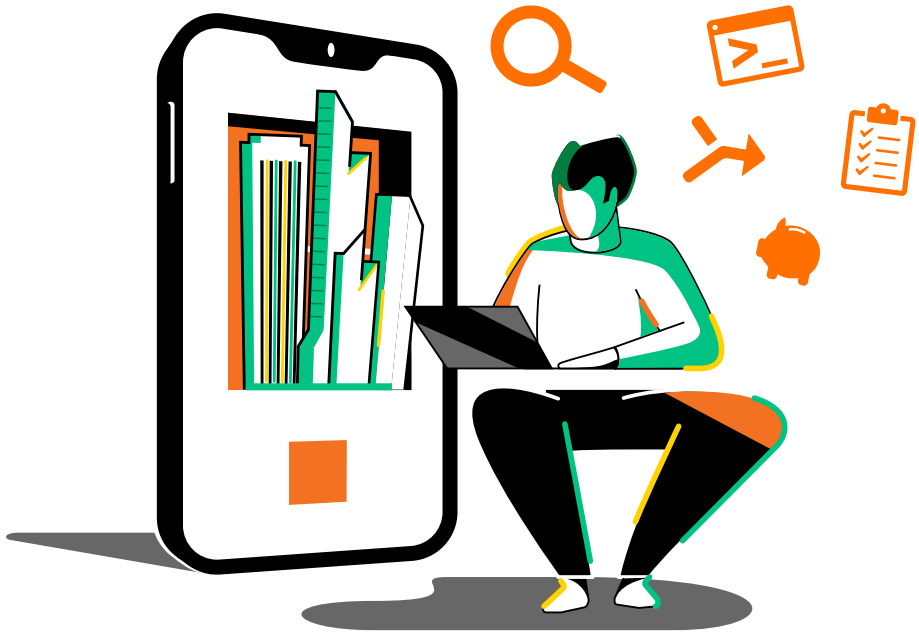


How to get SD-LAN ready

Now is the time to get ready for intent-driven SD-LANs that are specifically designed with the flexibility and scalability to support future applications.

The enormous growth in data and devices connected to the LAN is stretching IT teams and a manual approach will not be able to keep up with the increasing complexity of networks. More automation and centrally managed SD-LANs coupled with advanced security are the way forward in providing enterprises with the business agility they need to compete a high tech, low touch economy.

SD-LAN provides centralization and orchestration that hasn't previously been possible. But, SD-LAN is more than a technology, it is a methodology that requires careful planning and solid foundations for a successful journey. Every enterprise is different and there is no one size SD-LAN that fits all.



Seven key considerations for getting SD-LAN ready

1. **Carry out due diligence on the current LAN.** SD-LAN preparation will depend on your investment in the network. Enterprises that have recently invested in their LAN might wait to move to SD-LAN until they start to see a return on their current investment. Nonetheless, we recommend preparing for an SD-LAN transition plan as older legacy systems may not be able to leapfrog to SD-LAN.

2. **Be prepared for SD-LAN as a transformational process.** SD-LAN demands a state-of-the art underlying infrastructure. This will require infrastructure changes as most networks haven't been continuously modernized. Networks need to be completely up-to-date and patched from the off to avoid deployment issues. Expect SD-LAN implementation to be a continual process as the technology develops.

3. **SD-LAN necessitates a well thought out implementation strategy.** SD-LAN demands a phased approach and not a seismic, end-to-end change to ensure the continuous availability of business processes. This needs to be well thought out and carefully planned. Enterprises who are not confident about planning their own SD-LAN journey would be advised to seek consultancy advice.

4. **SD-LAN is not a zero-touch technology.** As an emerging technology, most enterprises will require network consultancy, migration assistance and a change in the IT team's mind set in managing both the LAN and devices going forward.

5. **Start small, think big. In other words, begin small on big sites.** Run proof of concept (PoC) projects and pilots on hand-picked sites that will benefit most from the technology. These sites will return the most immediate value based on scale and scope.

6. **Don't expect massive cost reductions overnight.** SD-LAN service management costs will be reduced, but it is too early to say by how much as the technology is still emerging. But, as more devices are attached to the LAN, it will increase in value by simplifying management.

7. **SD-LAN requires significant investment and thought leadership.** Finally, invest in technology that will modernize your LAN infrastructure and ensure you are SD-LAN ready. In the longer term, build SD-LAN firmly into your digital transformation strategy to optimize network resources to capitalize on your data.

What Orange offers

Orange Business Services is a leader in software defined networking. We have engaged many customers in transforming their LAN and WAN to software-defined networks using a tried and tested implementation methodology.

We have the expertise to help you harness the power of SD-LAN to add enhanced security, scalability and network management to your LAN. This includes:

We have a global footprint and a team of engineering experts on hand that are continually being trained in the very latest software-defined technologies. Our centralized resources and skills centers provide the global capabilities required for the successful deployment of SD-LAN.

The networking world is moving from a hardware-centric existence to a software-centric, open, agile and flexible environment. Our portfolio of consulting services can quickly support you in planning your SD-LAN roadmap.

Our cyberdefense expertise can help you build your business resilience to deal with today's dynamic threat landscape to ensure your employees can access your network securely from wherever they are.

We are technology agnostic. We work with best-in-breed partners, helping to influence the development of tooling and software-defined strategies that will better support our customers into the future. Through our Orange Labs program, designed to address individual customers' business challenges and use cases with network automation, analytics and security, we can provide customers with demonstrations of SD-LAN as a proof of value.

We are continually investing in labs and training facilities for our support staff and running continuity testing. We can rapidly provide proof of concepts (PoC) and pilots to help customers make smart decisions about where to invest in their LAN for the future.

Want to learn more?

More and more devices now connect to campus LANs, including smartphones, tablets, wearables and other IoT devices. SD-LAN will enable players across the ecosystem to connect, secure and scale new services, transforming industries globally and enable a growing number of home office power users.

The foundation, however, is critical. Choosing the right SD-LAN provider that can accelerate your global business by removing the complexities from your LAN to enable an enhanced and secure user experience is essential to move forward in a touchless economy that is hyper connected.

SD-LAN is part of an evolving ecosystem. We are delivering an SD-LAN solution that meets the demands of the fourth industrial revolution, campus connectivity and flexible workspaces.

Contact your account manager to find out more about SD-LAN or for further information go to:
https://www.orange-business.com/en/solutions/connectivity

Sources:
1. IDC SD-WAN Infrastructure Market Forecast 2019 - 2023
2. Cisco's Annual Internet Report 2020
3. Ponemon Institute Costs and consequences of Gaps in Vulnerability Response 2019
4. IDC SD-WAN to SD-Branch – the evolution at the end of the edge of the enterprise network 2020

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