Connectivity

Meeting the challenge of the digital age with SD-WAN

orange™ Business Services

Contents

Introduction

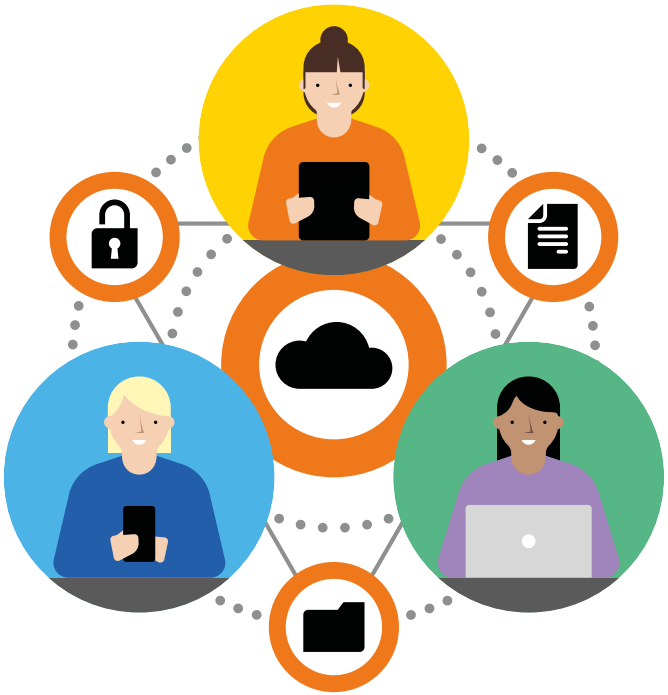
Software-defined wide area networking (SD-WAN) is one of the most exciting and fastest-growing network technologies today, and has the potential to revolutionize your business.

Gartner has predicted a 59 percent compound annual growth rate for SD-WAN through 2021, creating a $1.3 billion market. Conversely, it predicts a 6.3 percent yearly decline in branch office routers, and a 28.1 percent annual shrinkage in legacy routers through 2020. The world is moving toward a software-defined future.

This ebook explains the fundamentals of SD-WAN technology and positions it in an enterprise context. It highlights some of the technology's benefits and explores options for deployment.

Introducing SD-WAN

SD-WAN is the latest development in the move towards software defined services in networking. It abstracts the management of wide area networks (WAN) away from the underlying physical infrastructure. In SD-WAN, equipment at each participating site communicates across virtual private networks.



SD-WAN is an evolution of software-defined networking (SDN), which separates the data layer from the control layer in a network environment. By using VPNs between sites, Orange is bringing the benefits of SDN to WAN-based users and drawing more of the infrastructure into a software-defined environment.

There are several benefits to this software-defined approach.

A platform for customer transformation

Companies face unprecedented challenges as they strive to retain their advantage in an increasingly competitive environment. Digital transformation is the key to evolving in line with market trends, but this requires an underlying infrastructure that can support rapid change. Software-defined architectures, including SD-WAN, are an essential tool in that transformation.

Improve network reliability through end-to-end visibility

Traditional WAN infrastructures are fragmented, and difficult to manage in their entirety. Building a software-defined WAN on top of the existing physical infrastructure provides an end-to-end view of the communications network, enabling administrators to quickly spot and fix emerging problems.

Improve customer experience

Internal users and external customers alike depend on a robust, enjoyable experience when using business applications. This experience, in turn, requires reliable, high-performance applications. SD-WAN's end-to-end visibility enables administrators to monitor application performance from the server to the endpoint, making it easier to maintain an excellent user experience.

Flexible control

IPSec tunneling between sites makes it easy to control traffic routing in software, enabling administrators to quickly define alternative traffic paths in response to changing network conditions. They can also encode automated routing policies that support application performance, further improving the user experience.

Approaches to SD-WAN

SD-WAN deployment involves installing equipment at each participating site, which routes traffic in an overlay network. Smaller companies will typically use a dedicated SD-WAN appliance. Those with more sophisticated network needs will use a virtual device running on hardware that also supports other virtualized network functions such as firewalls.

Key advantages of a fully-bundled solution

- **End-to-end network control: the carrier controls not just the IPSec tunneling, but the underlying physical network from end to end.**
- **Network management experience: customers can benefit from both core and last-mile network management experience from a seasoned provider.**

Whether virtual or physical appliances are used (or a hybrid solution combining both) SD-WAN can support multiple use cases. Different sites such as branch offices can communicate directly with each other. Site-to-site communication is useful in scenarios such as unified communications, which need low latency response times and quality of service guarantees.

SD-WAN equipment can also terminate in enterprise data centers, Orange data centers, or in virtual data centers from third-party providers such as Microsoft and Amazon. Connecting from the site to the virtual data center provides more control over data flows between physical sites and cloud-based services, guaranteeing performance and reliability.

DIY deployment

There are several approaches to SD-WAN implementation. Some SD-WAN solutions provide only the routing equipment for installation at each site, leaving the customer to install and configure the devices themselves in a DIY model. A systems integrator could help install and configure the tools, but you would still need to manage the network on an ongoing basis.

The pros of this approach are carrier independence because you can quickly switch network providers. The downsides are the heavy lifting involved and the lack of a safety net: if the SD-WAN runs into problems, there is little external support.

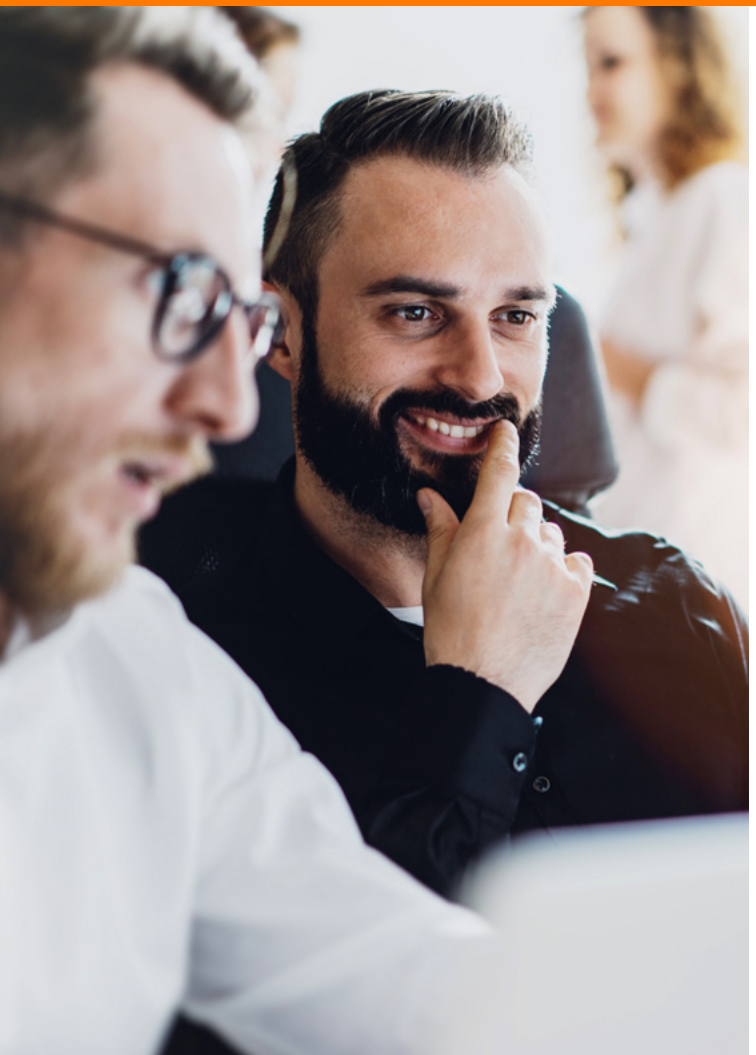
Network partners

Alternatively, you can enlist a partner that provides network services as part of the solution. They would typically provide both the core network and a combination of owned and managed third party connections, along with the installation and configuration of SD-WAN equipment on the customer's premises.

How SD-WAN relates to underlay networks

SD-WAN creates another, software-based network on top of the existing physical infrastructure. The new network is known as the overlay, while the existing physical one is called the underlay.

While the SD-WAN infrastructure is uniform and consistent, the underlay is often diverse and fragmented. Some sites may have a single connection, such as an MPLS link to a carrier's core network. Others may have multiple links built up organically over time or installed to provide redundancy. These can include DSL or 4G cellular connections.



SD-WAN can support underlay networks in different configurations based on your needs

These configurations break down into three main options:

1 **Public internet-based access**
You can choose to use the public internet as your only access network to reach other sites in the network or cloud-based services. Congestion on the open internet is unpredictable though, and this can cause problems with low-latency applications.

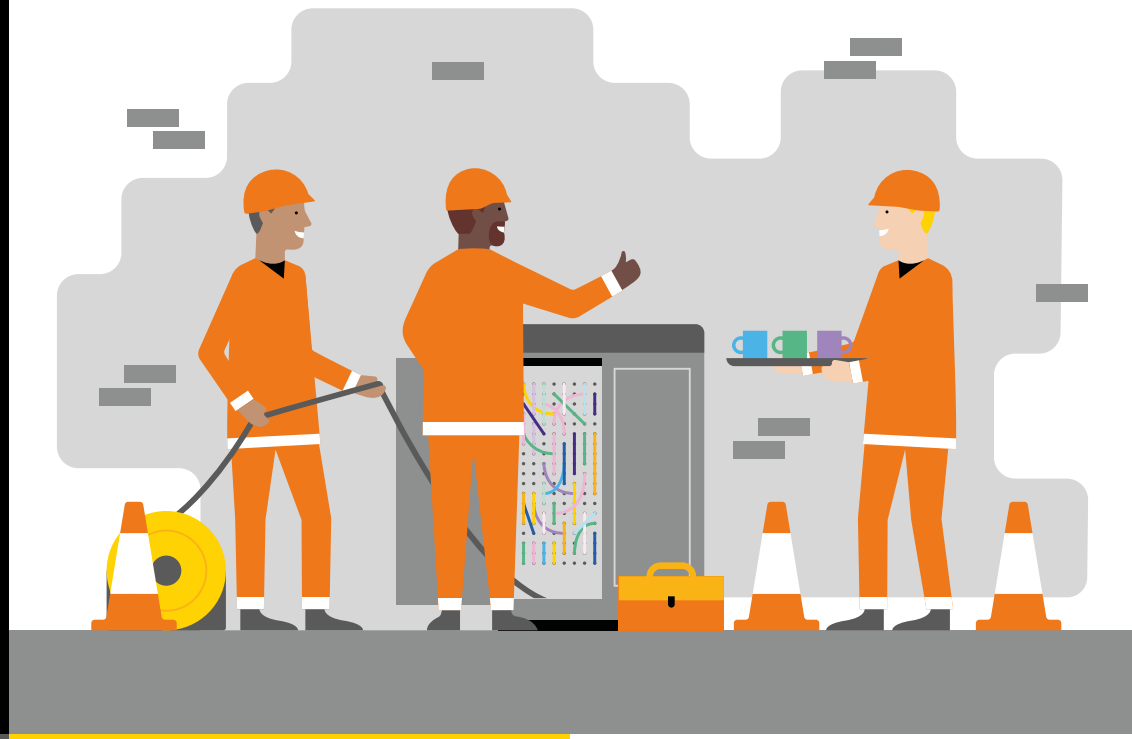
Because DSL connections typically offer no SLA, traditional DSL-based underlays can introduce traffic problems. Using SD-WAN to dynamically manage DSL links with different providers can mitigate performance issues.

2 **Private SD-WAN**
In a private SD-WAN configuration, the connection between source and destination is entirely separate from the public internet. For example, accessing Office 365 would exclusively use an MPLS link from the client site, hitting the operator's cloud-based SD-WAN equipment which would then pass traffic through to an SD-WAN termination in Microsoft's Azure data center. The closed-loop connection would provide guaranteed performance and reliability.

3 **Hybrid WAN**
An alternative is to use a mixture of private and public last-mile networking, combining the cost-benefit of DSL networks with the reliability and guaranteed packet rates of MPLS. You may choose to bring in other connections such as 4G where it makes sense. This approach will suit most companies, and the choice of connectivity will typically depend on site size, function and location.

Dispelling myths about SD-WAN

SD-WAN is still a relatively new technology, and there are naturally some misconceptions about the way it works. Here are some facts to correct common assumptions around the technology and its deployment.



It is not a zero-touch solution

On the surface, SD-WAN seems like a magical technology, creating an entirely new network on top of an existing physical system to make management and provisioning of network resources easier for enterprise administrators.

SD-WAN may provide a more straightforward interface for network management, but it is not a zero-touch solution. You still need to install and manage either a dedicated appliance or a virtual one at each participating site to send and receive traffic.

You will need post-deployment assistance

SD-WAN may improve network management, but it is not a fire-and-forget solution, and it is not self-configuring. Once installed, administrators must configure an SD-WAN appliance's IPSec tunneling and dynamic path routing capabilities. They must then manage network operation, tweaking it to accommodate changes in infrastructure conditions and application performance. Expect to deal with a network management partner for these tasks.

Don't forget the underlay network

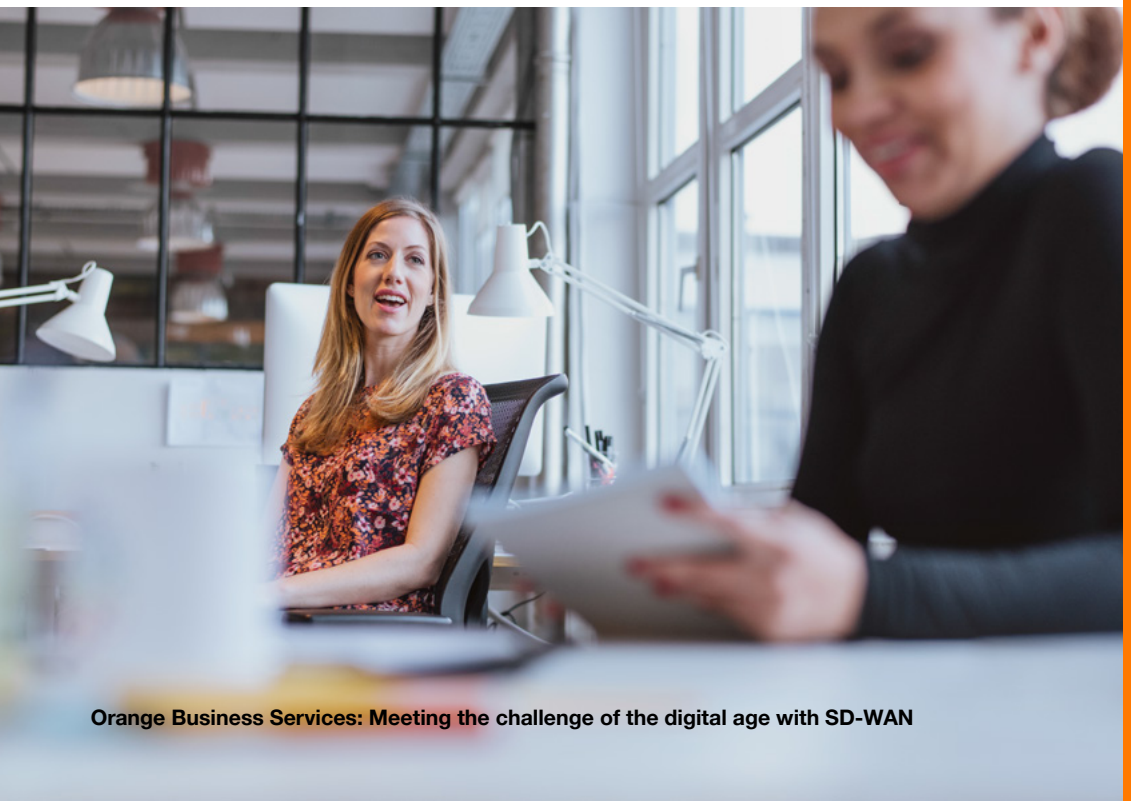
While SD-WAN abstracts the management of wide area traffic using an overlay network, the physical underlay network is still relevant. The technology won't magically solve the problems caused by a collection of low-quality connections. Excellent performance at the network level is crucial.

SD-WAN is only part of the security solution

IPSec tunneling in an SD-WAN scenario encrypts traffic, providing a layer of protection for enterprise users. While this is welcome, you must nevertheless treat it as part of a broader security solution encompassing techniques ranging from micro-segmentation through to role-based access control. SD-WAN is a useful platform on which to build security solutions, but you should not consider it a panacea for network security on its own.

Scenarios and applications for SD-WAN

So far, we have discussed SD-WAN as a tool to help breathe new life into corporate networks. Its real value comes in its application to real-world problems. Here are some scenarios in which SD-WAN can help to create a competitive advantage.



Cloud migration
Migration to the cloud is the primary driver for SD-WAN among our customers today. IT departments migrating to cloud-based infrastructure or software need a robust, manageable communications infrastructure to support the cloud resources on which their business processes rely.

SD-WAN is also an essential tool for IT departments who find themselves becoming service brokers for a variety of SaaS applications. By using SD-WAN to manage multiple applications across different service providers, IT can offer a diverse portfolio of applications while maintaining end-to-end visibility and service quality over the supporting network.

Mergers and acquisitions
In highly-acquisitive industries such as manufacturing, pharmaceuticals, chemicals, transport and logistics, some companies are managing tens of purchases each year. Trying to onboard these acquisitions is a daunting prospect and involves adding and dropping physical sites by the dozen. Using an SD-WAN overlay makes wide-area network provisioning flexible, increasing agility and simplifying the onboarding process.

Volatile business environments
Global enterprises may have to quickly scale their physical presence up or down in specific countries to meet changing demands. Recruitment companies and retailers are perfect examples of organizations with rapidly-shifting local requirements.

Using SD-WAN enables these businesses to adapt their national and international networks quickly, adapting to bricks and mortar changes without hindering local business needs.

Unreliable connections
Multinational companies often have offices in locations with expensive connectivity costs. They often look to SD-WAN to maintain service consistency while using cheaper connections. SD-WAN lets them optimize their use of MPLS by routing appropriate applications over DSL links while hitting performance and security SLAs.

The role of MSI and service management in SD-WAN

By working with a network service provider that has experience in a full range of software-defined offerings, you can enjoy SD-WAN as part of a broader set of integrated managed services.

1. You can adapt services according to your needs by implementing SD-WAN in different flavors. The first, DIY, involves managing the entire SD-WAN-based network themselves. Orange can help install the necessary customer premises equipment as required.

2. Those wanting some involvement in network management, but who still need a little help from an experienced third party, can use a co-managed approach. In this scenario, Orange will take on a specific service set with predefined SLAs. You retain control over a defined subset of services, such as those that support your competitive advantage.

3. The third option is a fully-managed, turnkey SD-WAN service, in which Orange installs and configures equipment onsite, and manages all the overlay network services. A fully-managed service enables you to concentrate on your own business while leaving the management of the network to Orange.

Extended integration

The more services the customer entrusts with Orange, the more important the service integration process becomes. Orange regularly takes customers' physical, non-virtualized data center, and network resources and redefines them as software-based services that it operates for the customer.

The first stage of this transition involves understanding what services and infrastructure you have. It requires auditing and cataloging the computing and networking services in question using a combination of site surveys and appropriate discovery tools.

The Orange team assesses whether a resource can be virtualized or not. It then modifies the contracts accordingly in preparation to transfer it into a software-based service that Orange will run in its own data centers. That includes defining appropriate SLAs before making the change.

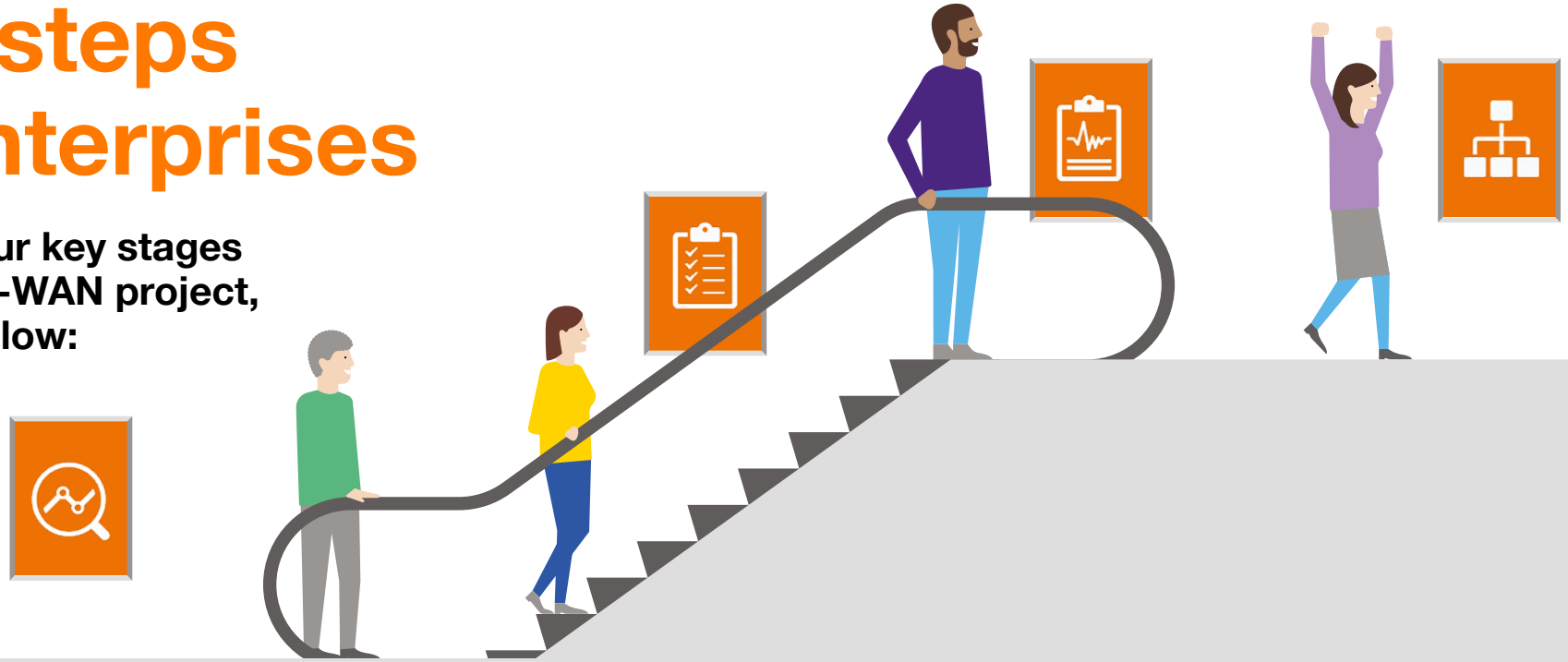
The team prioritizes service continuity when transferring SD-WAN resources into our service environment. It is part of our commitment to avoiding disruption and optimizing your overall experience.

$1.3 billion

Size of SD-WAN market in 2021, according to Gartner

Next steps for enterprises

There are four key stages for every SD-WAN project, as shown below:



1. Due diligence

SD-WAN can help you achieve a range of goals, including cost reduction, more autonomy, and flexibility in network management, or increased application performance. Understand what you hope to achieve by moving to an overlay network so that the project can be structured accordingly. This will involve interviewing key stakeholders including coders, network administrators, and line of business managers to understand what they expect from the project.

Businesses should also understand the effect of an SD-WAN project on the organization. Its scope extends far beyond technology. Successful implementation means changing external partner relationships and internal roles. Employees will not be handling network capacity and demand management in the same way, and when deploying SD-WAN you must prepare for this.

Use the due diligence process to gather information about the applications that will be affected, the underlying network that will support the SD-WAN infrastructure, and the security requirements underpinning it all.into more sites and make SD-WAN your standard approach to managing wide area communications.

2. Test the technology

SD-WAN represents a significant infrastructural shift, and it should not be rushed. Before implementing the technology, create a proof of concept and test it in a lab. Understand how the equipment and software work together and ensure that you are happy with its performance before moving to the next stage. Orange recommends between two and four days of testing.

3. Conduct a pilot

Having tested and endorsed the proof of concept, you can begin rolling out the SD-WAN service, but again this should be a slow, measured process. Choose a handful of sites for initial deployment so that stakeholders can assess the results and learn from any missteps before taking the implementation further.

Select hospitable sites in countries with wide area infrastructure that support a straightforward service rollout.

4. Deploy

Only when the results are in from the pilot phase should you expand deployment into more sites and make SD-WAN your standard approach to managing wide area communications.

What Orange offers

Orange Business Services has been a leader in software-defined networks since launching our Easy Go Network in November 2016. Here are some of our strengths:

Network capacity and scope

With one of the most extensive MPLS networks in the world, we have coverage that enables us to serve the most demanding global customers. We also have partnerships with more than 120 local ISP across the globe, covering over 200 countries. We strongly manage those ISP to ensure high performance.

Security expertise

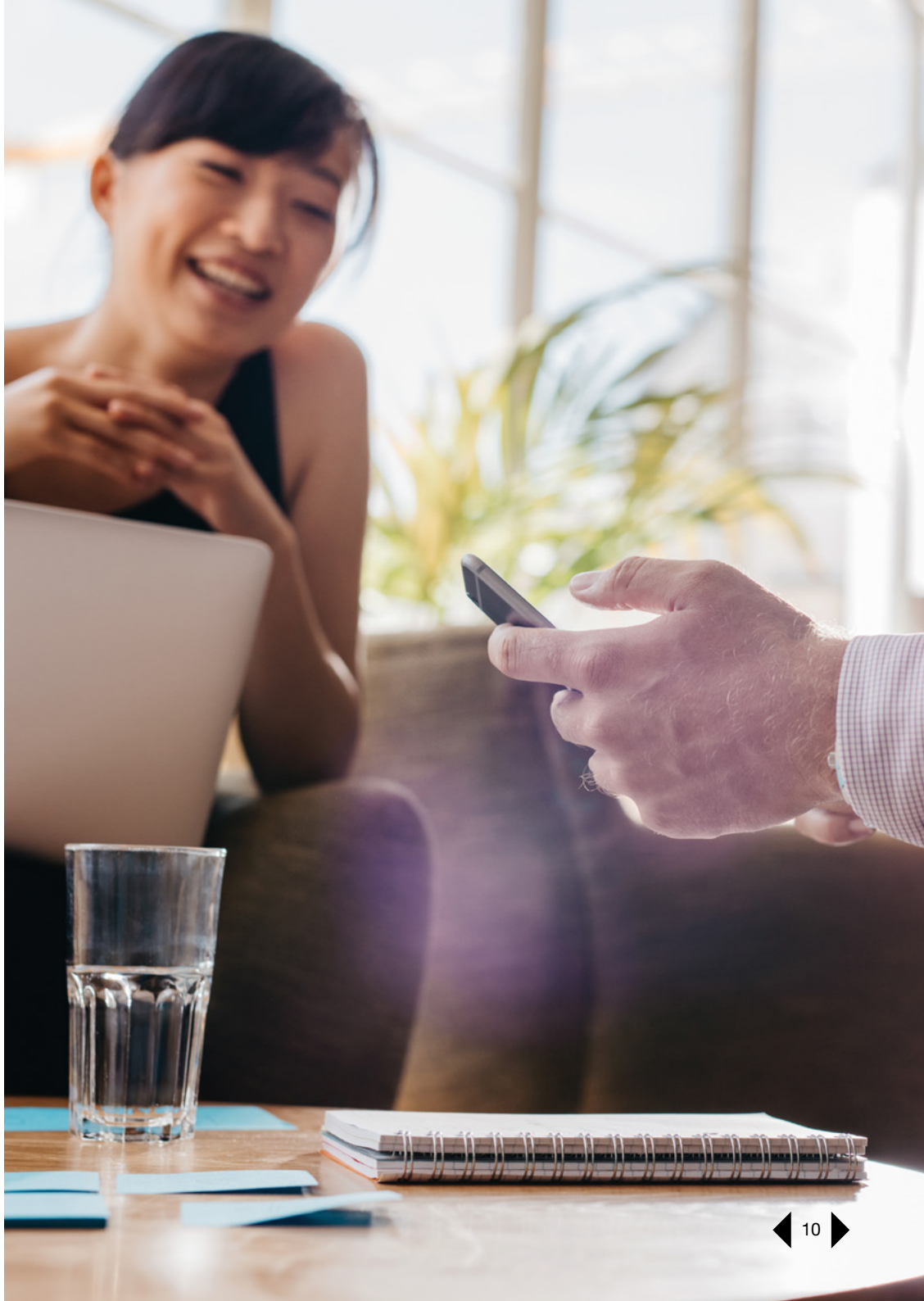
Thanks to Orange Cyberdefense expertise, we provide a choice of on-premise and cloud-based security solutions. This ensures that you don't have to compromise on security or network performance to maximize employee productivity. You can enable your employees to access your network securely, whether they are in the office or on the move.

Technical partnerships

We have formed professional alliances with vendors currently including Cisco, Riverbed and Infovista to install SD-WAN in appliance mode. For more agility, universal customer premise equipment (uCPE) technology enables us to deploy NFV-based SD-WAN technologies, simplifying SD-WAN setup for customers. Our partnership with ServiceNow allows customers to manage their network and IT services on a single service platform.

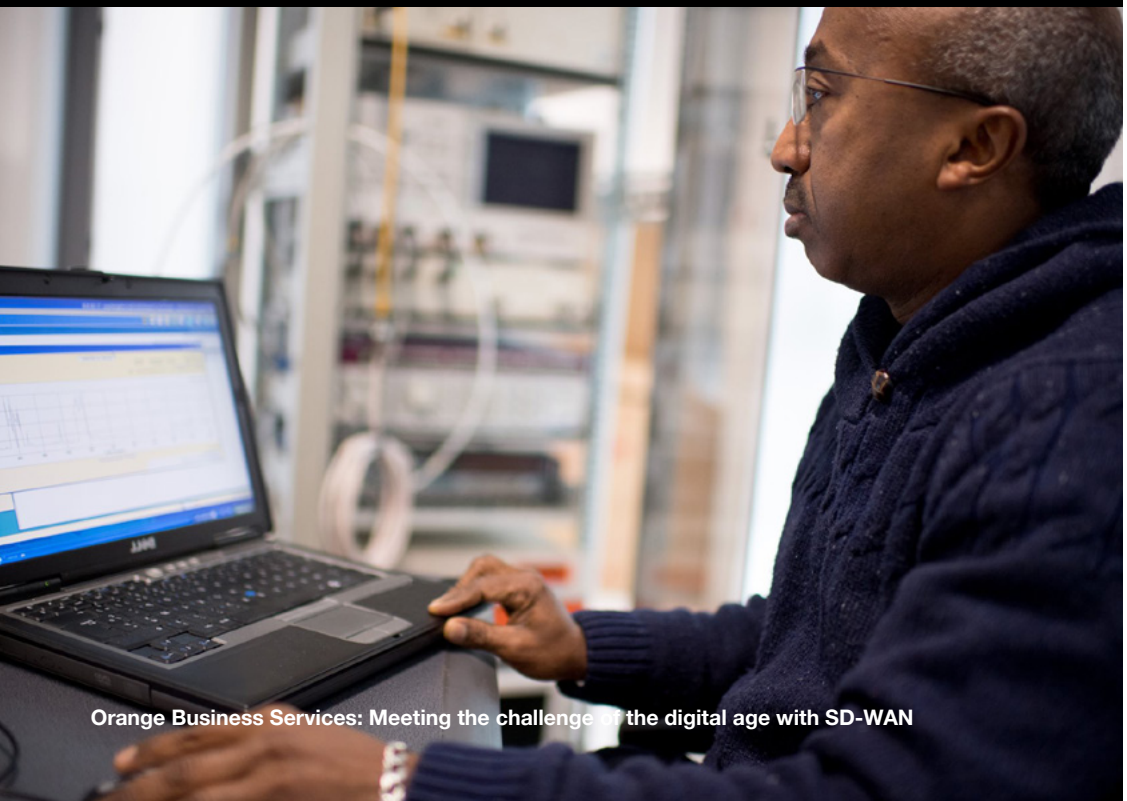
Cloud transformation expertise

Orange maintains relationships with many cloud service providers. Business VPN Galerie already integrates SaaS and IaaS service providers onto the Orange network, allowing you to quickly deploy cloud-based applications. In addition our data center coverage is strong with more than 120 locations in our network PoP presence.



Six key findings from our proof of concept (PoC) projects

Orange has engaged many customers in SD-WAN programs using its tried and tested implementation methodology. We have carefully analyzed customer feedback from the proof of concept phase to identify six common requirements when designing and implementing SD-WAN.



1 Visibility
For years, businesses have grappled with fragmented, siloed wide-area network infrastructures. With SD-WAN, they have identified the ability to see what is happening across their entire network from end-to-end. High visibility gives them the ability to quickly identify network problems.

2 Alerts and notifications
End-to-end visibility needn't be passive. Customers want active warnings of network problems without having to look for them. Receiving signals concerning issues such as SLA breaches are a fundamental customer requirement for SD-WAN.

3 Cloud proxies
Customers using SD-WAN as a tool in the cloud migration process are eager to extend their visibility to cloud-based services. All too often, the cloud is dark to network administrators who do not know what is happening outside of their network. Cloud proxies provide that valuable information, helping them understand what is happening to the network traffic and which users are accessing third-party cloud.

4 Set and manage application policy control
One of the most common customer requirements in an SD-WAN environment is application policy control. The technology allows administrators to configure network behavior around individual application requirements. Policy control is a vital tool in setting and managing SLAs.

5 Production portal
Instead of navigating different applications to manage various aspects of the WAN, customers want to control their network through a single pane of glass. As Orange pulls together technologies from multiple vendors, it is building production portals that enable customers to efficiently manage all facets of wide-area communication from provisioning to performance.

6 High availability and redundancy
Another aspect of an SLA is availability. Customers want high-availability from their SD-WAN deployments, and Orange works closely with them to create redundant connections at mission-critical sites to meet their availability requirements.

Want to know more?

Most enterprises have built up a complex array of legacy routing equipment over many years. Technology dependencies and financial commitments often make a simple rip-and-replace next to impossible.

SD-WAN offers an efficient, productive option for implementing next-generation WAN services, and Orange provides the perfect partnership by integrating SD-WAN as part of a broader software-defined service set.

GlobalData's 2017 Global WAN Services report rated Orange Business Services as "Very Strong", thanks to its worldwide MPLS network, and its extensive sales and support network. Read about what makes Orange a leading player by downloading the report.

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

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