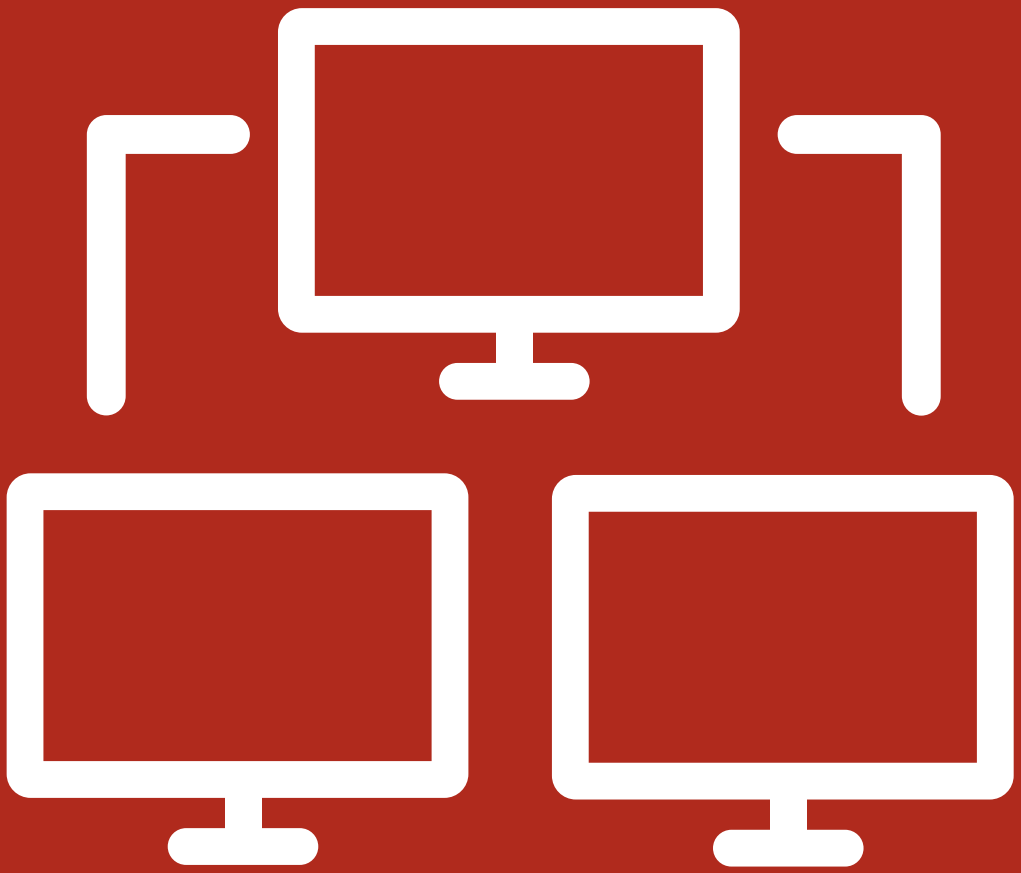

SOFTWARE DEFINED NETWORKING
A BEST PRACTICE GUIDE

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DEMANDING MORE OF YOUR NETWORK

Is your network still fit for purpose? Much of the infrastructure that business relies upon to carry out day-to-day operations is under increasing pressure. The triple-threat of digital disruption, complexity and security is placing an unprecedented strain on enterprise networks; resulting in a lack of insight, an unconstrained attack surface and poor performance.

With millions of new devices joining the IoT every day, big data is growing exponentially. For many organisations, the rise of edge computing brings with it a lack of command and control. Decentralising the processing of data has the unpleasant side effect of reducing visibility of network performance. This in turn leads to a lack of insight, which impacts on IT's ability to make informed decisions.

Security remains one of IT's most pressing concerns. The scope, quantity and sophistication of cyber-security threats continue to grow, with 2017 being the latest in a series of record breaking years for data breach incidents worldwide.

The average cost of a data breach in the UK in 2017 was £2.48million. A more worrying statistic may be the fact that, on average, it takes UK businesses 191 days to identify a breach and a further 66 days to contain it. (Ponemon, 2017)

The influx of new users and devices adds to an already complex technology stack. For many organisations, particularly those that still maintain a significant proportion of their infrastructure on-premises, poor performance can be the result of technology silos.

A complex infrastructure is compounded by the addition of multiple, user-owned devices. These devices feature a variety of operating systems, each demanding rich voice, video and data applications. In addition to driving up the demand for bandwidth, they require greater control and segregation of bandwidth to ensure critical applications are prioritised. This results in higher costs, greater complexity and higher management overhead.

A lack of systems integration sees many businesses spending three times as much on network operations as they do on the network itself. A lack of automation or orchestration sees over 80% of all network changes being carried out manually (Cisco, 2018).

The knock-on effects of poor systems performance are felt in terms of a poor user experience. If it takes time to connect new users or locations to your network, this will impact productivity. If, once connected, there is a lack of visibility, it may prevent the prioritisation of business-critical traffic.

In the face of this increased pressure, IT departments are turning to Software-Defined Networking to help improve bandwidth utility and application performance.

Gartner predicts almost one third of enterprises will have deployed SD-WAN in branch locations by 2019; a trend that is set to grow at a compound annual rate of over 69% between now and 2021 (IDC). The net result, according to Cisco, will be the migration of 25% of all WAN traffic to SD-WAN in the next three years.

AN INTRODUCTION TO SD-WAN

Software-Defined Wide Area Networking (SD-WAN) is the practice of simplifying WAN management by decoupling the hardware itself from the management interface.

In essence, SD-WAN is an overlay VPN that promises reduced costs, greater control over applications and simplified network management. Designed specifically for multi-site deployments, SD-WAN utilises application-aware routing and real-time circuit monitoring to improve network performance.

SD-WAN is both carrier and transport layer agnostic, enabling the application of bandwidth, routing and security policies across a range of connections (MPLS, Internet, 4G etc.)

Application optimisation is enabled through centralised network management and control; including quality of service (QoS) and bandwidth management with traffic shaping.

Intelligent routing leverages dynamic policy and performance-based path selection, with automatic load balancing, to ensure maximum network reliability and performance.

CORE BENEFITS

- Improved application performance
- More efficient bandwidth utilisation
- Streamlined network management
- Rapidly deploy services to new sites
- Align network services to business needs
- Reduce network & application downtime
- Lower total cost of network ownership

HYBRID WAN

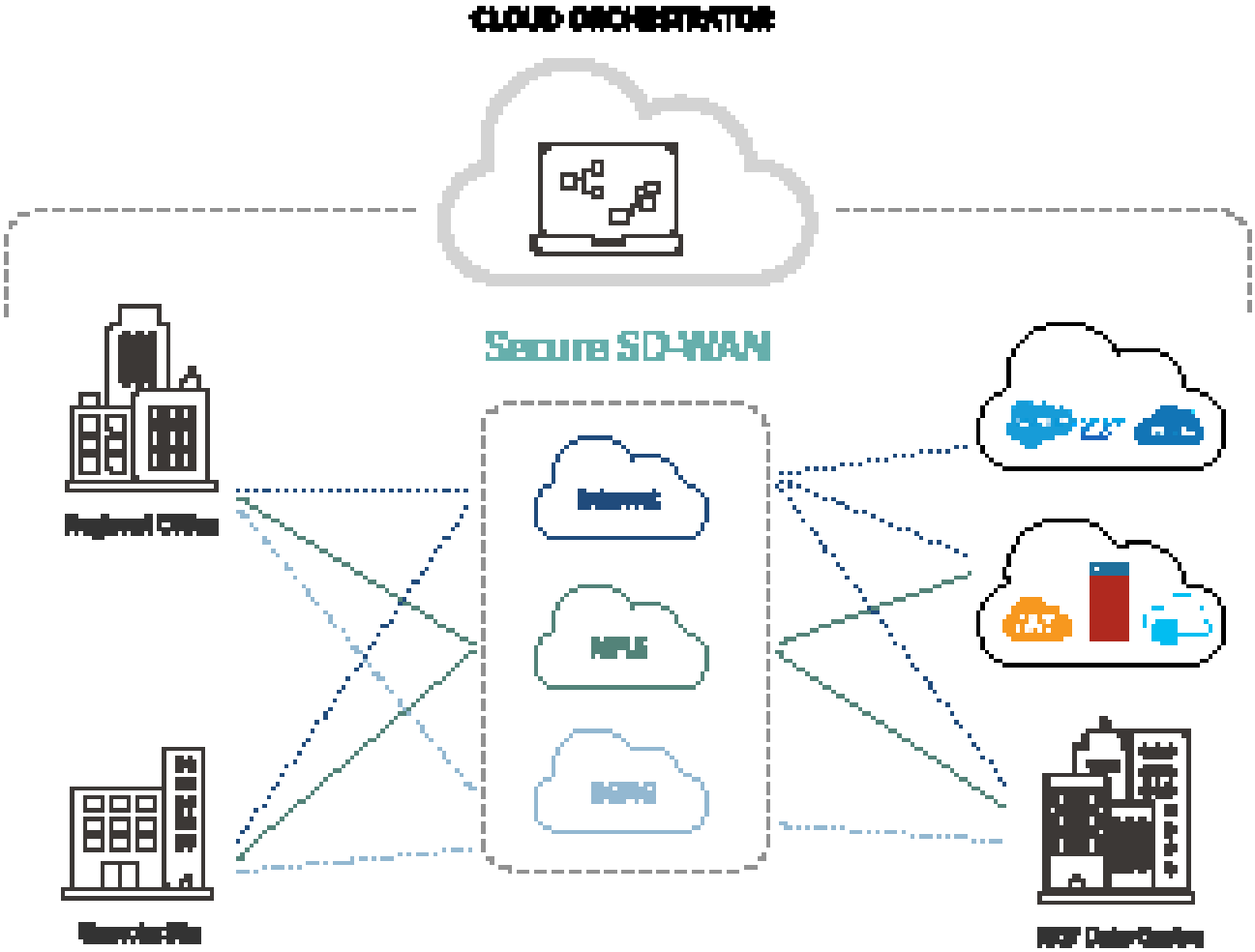
SD-WAN is often associated with services delivered across low-cost Internet connections. However, this is just one option, and is not the optimal solution for every site. Hybrid WAN incorporates elements of Internet, MPLS and 3G/4G connectivity for path selection, each of which has its advantages.

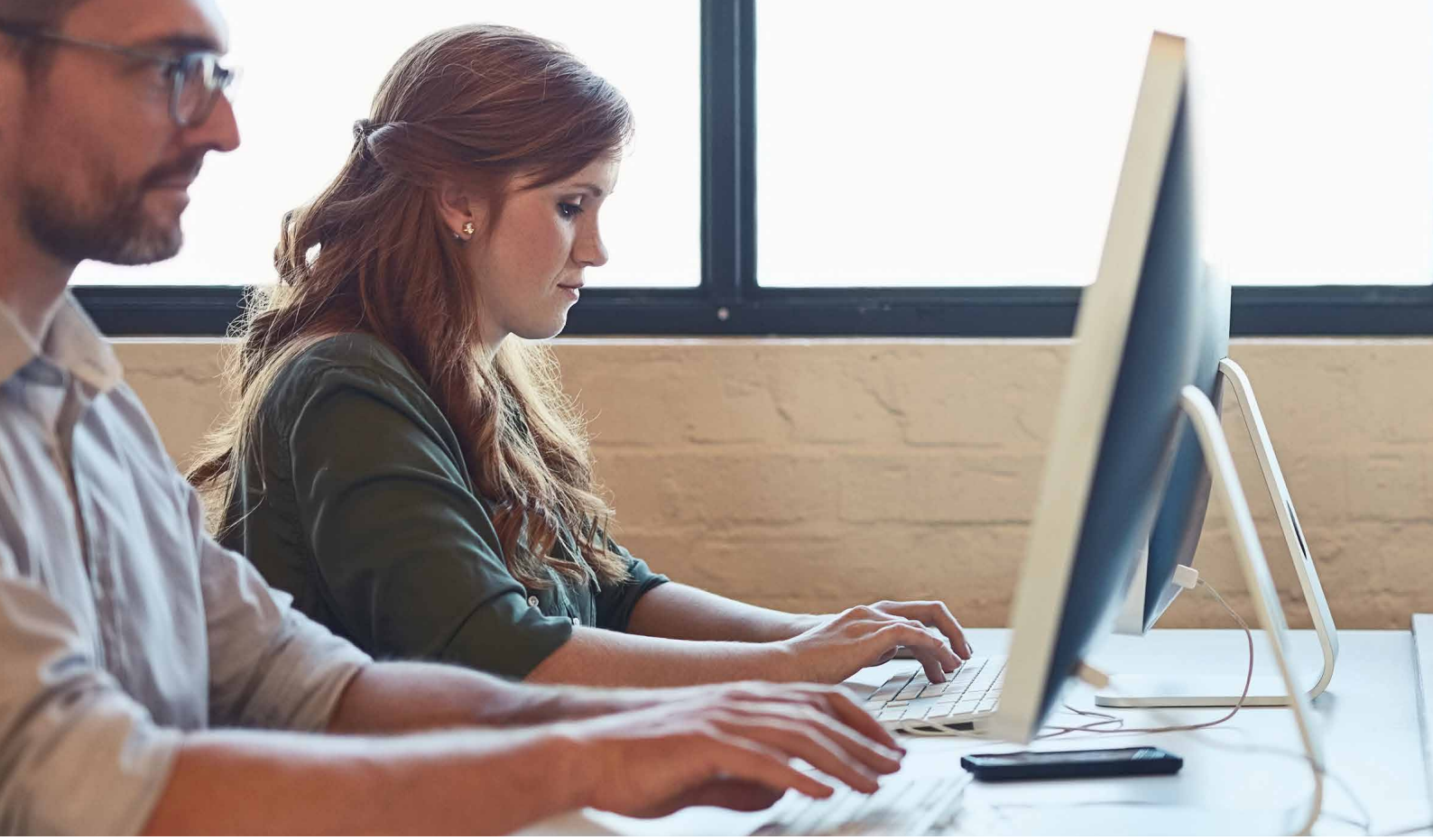
Path selection enables the SD-WAN to establish and/or redirect targeted traffic (for example, that from a critical application) along alternative routes, to meet business objectives or quality of service requirements.

Internet connectivity can be an ideal solution for direct-to-cloud traffic or for basic Internet browsing.

However, Internet can be less secure and may not offer the required latency SLA's for critical business applications; so, it may not be the best choice for accessing in-house financial applications, for example.

When implementing SD-WAN policies, it is important to align the type of connectivity to your business objectives and performance needs. The right SD-WAN solution will ensure that application performance meets service level requirements and user expectations, whether connected via Internet or MPLS.





ALIGNING YOUR NETWORK TO BUSINESS OBJECTIVES

The IT department sits at the heart of many organisations; fulfilling a role that extends well beyond essential infrastructure management.

Digital transformation is often the enabler for a wide range of business initiatives. So, it is vital that your technology estate provides the scalability and agility necessary to align it with these broader business objectives:

1. Manage and support network and cloud access across multiple locations.
2. Deploy bandwidth-intensive applications to improve the customer experience.
3. Enhance application performance without adversely affecting network workloads or security.
4. Control equipment costs for remote/branch locations, especially during refresh cycles.
5. Support the delivery of all business-critical services to remote/branch locations with limited or no on-site technical personnel.
6. Improve service availability and uptime.
7. Reduce the lead times for new service delivery.
8. Reduce overall IT expenditure across the wide area network.

WHAT CHALLENGES DOES SD-WAN ADDRESS?

Deploying an SD-WAN solution can help address many of the challenges affecting businesses in today's fast moving and competitive marketplace.

SD-WAN can offset the increasing cost of delivering WAN services over MPLS, using lower-cost Internet connectivity where appropriate, or utilising secondary back-up links rather than paying for them just to sit there waiting for the day you may need to use them.

As networks become more complex and distributed, having visibility of utilisation and performance is essential. Just as important, is the ability to quickly implement any required changes.

Flexibility, simplicity and scalability are an inherent part of the SD-WAN proposition. Centralised, separated management of the WAN estate enables rapid deployment of security, routing and bandwidth policies.

WHO NEEDS SD-WAN?

Any business that relies on public or private networks to deliver services to their employees, customers or partners could benefit from implementing SD-WAN.

SD-WAN can deliver a wide range of benefits to your business. However, what might be beneficial to one business may not necessarily be the same for another.

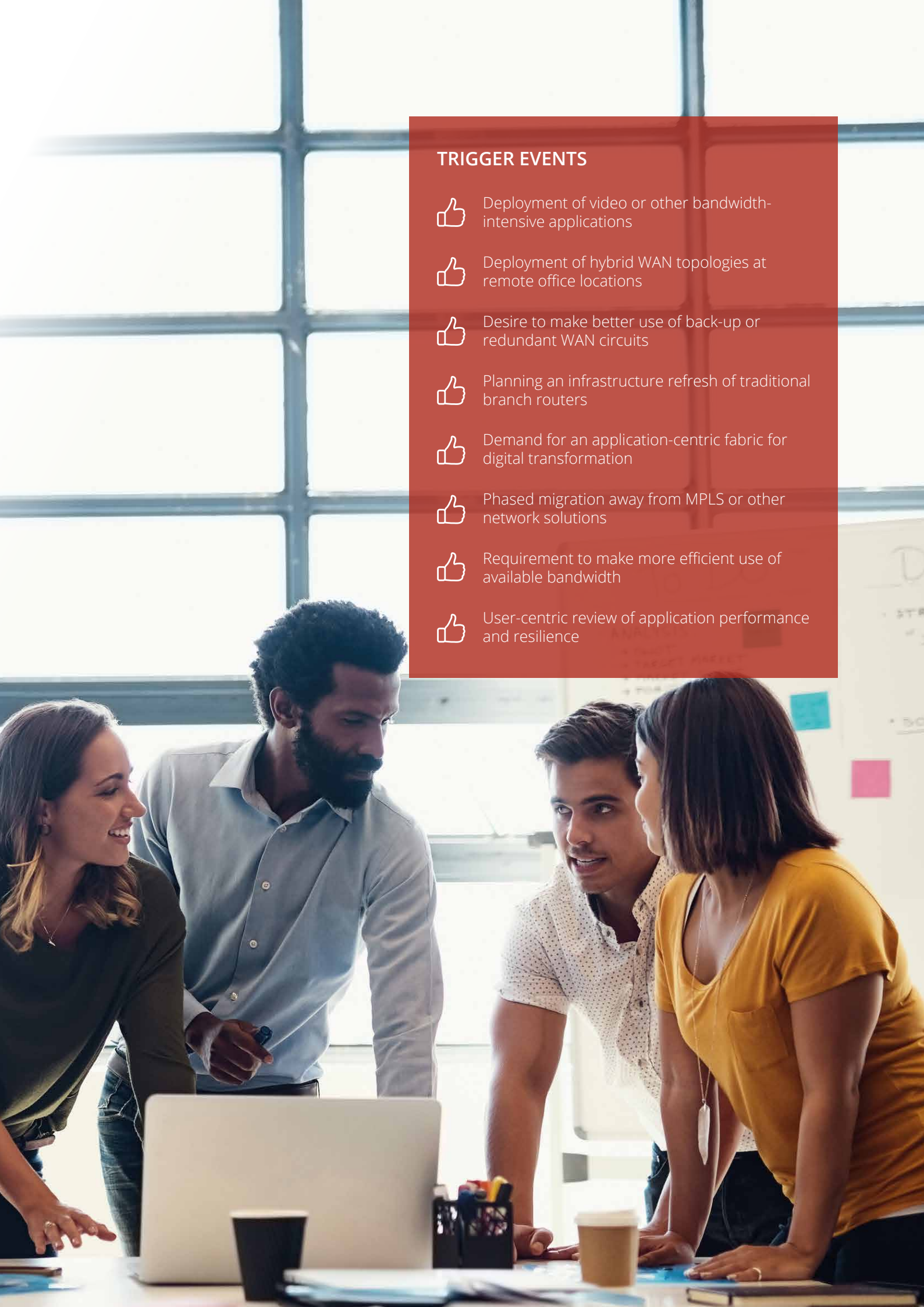
It is important to consider not only the type of network and connectivity needed, but also the applications and services you need to deliver; both now and in the future.

If you are considering an SD-WAN, it is important to note that it may not be necessary to move to a full SD-WAN deployment from day one.

Also, you may not need to wait until your existing WAN solution contract expires to start deploying SD-WAN.

For example, new sites may be provisioned using Internet access rather than adding to the existing MPLS network. If you need to add a resilient link to your existing MPLS network, this could be achieved by adding an Internet link from an alternative carrier, rather than connecting through the existing MPLS core.

A good time to start looking at SD-WAN is when your existing WAN contract is due to expire. However, when other events or changes within your business are planned, SD-WAN should also be considered.



TRIGGER EVENTS

- Deployment of video or other bandwidth-intensive applications
- Deployment of hybrid WAN topologies at remote office locations
- Desire to make better use of back-up or redundant WAN circuits
- Planning an infrastructure refresh of traditional branch routers
- Demand for an application-centric fabric for digital transformation
- Phased migration away from MPLS or other network solutions
- Requirement to make more efficient use of available bandwidth
- User-centric review of application performance and resilience

SD-WAN AS A MANAGED SERVICE

If SD-WAN offers so much better command and control over your network infrastructure, why should you consider SD-WAN as a managed service?

Whilst some of the benefits of SD-WAN are simplicity and visibility, management of the network and suppliers is still a key component of ensuring your WAN is supporting the needs of your business.

A managed service would include all components of an SD-WAN solution under a single SLA, from one provider, including:

- Technical Design
- Set-Up & Configuration
- Proactive Monitoring
- Single Portal View
- 24/7 Support
- Managed Connectivity (including 3G/4G SIMs)

In addition, a managed service may offer further value, by including services such as technical consultancy, enhanced security options and migration support.

SD-WAN as a service can help your organisation realise the full benefits of software-defined networking; delivering simplicity, visibility, availability and cost-efficiency.

A managed service will provide access to a single, 24/7 management portal and a range of automated reports; providing businesses with the management information needed to support improved decision making.

In choosing a managed service there is less emphasis on retaining WAN expertise in-house, and IT teams can concentrate on other projects within the business rather than the day to day running of the network. If you opt for a managed service, you are also able to benefit from the service provider's expertise in systems design, configuration and optimisation.

In addition, there are obvious benefits to be realised if your MSP is able to provide all elements within a single agreement. This could be in the form of cost-efficiencies, but could also be faster resolution of faults, because they have an understanding of the solution as a whole.

Finally, a managed service option would typically come with fixed implementation costs and carrier pricing, plus a predictable monthly operating cost that makes budgets simple to manage.

WHAT TO LOOK FOR IN AN MSP

SD-WAN is still a relatively new technology, so it's important to choose a managed service provider than can deliver on all of the potential benefits.

It seems obvious, but your MSP will need to provide more than just good networking skills. Strong systems design expertise is essential if your solution is going to be fit for purpose and allow you to align your WAN strategy to your wider business needs.

Prior to design, you should expect your MSP to be able to carry out a thorough audit and assessment of your current infrastructure and strategy.

SD-WAN can accommodate a range of security options, so make sure your MSP has a strong security proposition and can ensure strong and effective data security across all WAN links.

Your MSP should have tried and tested processes in place for managing systems migration and implementation. It should also retain sufficient resource in-house to manage complex migrations without the need for external support.

Process and resource will be required beyond implementation. Make sure your MSP has equally robust processes in place for incident and change management.

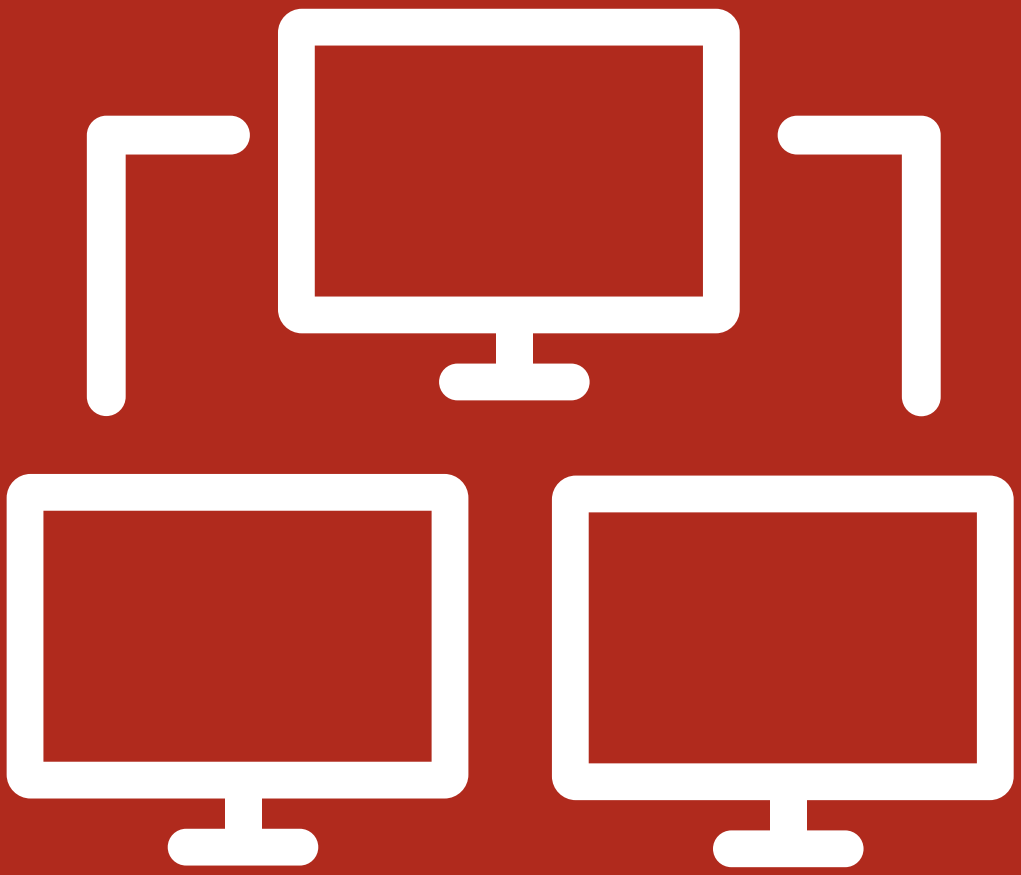
If your infrastructure is currently served by multiple carriers, think about migrating responsibility for this across to your MSP too. Doing so enables you to benefit from the cost and operational efficiencies that a single provider, with knowledge of your complete network, can provide.

Monitoring and management is a key component of SD-WAN. Your MSP should employ a pro-active approach to management, backed by a strict SLA. Remember, responsive is better than reactive.

The elimination of silos within infrastructure has proven benefits in terms of systems performance, agility and availability.

Where applicable, you should look for an MSP that has experience of integrating other services, such as collaboration, cloud infrastructure and back-up/disaster recovery; all of which need to work together seamlessly.

It is important to share your technology roadmap with your MSP and be confident that they understand what you are trying to achieve. Visibility of future transformative projects will help your MSP to make informed decisions about the right solution for your business for now and the future.



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