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A Viadex White Paper

Networking: The software defined way

This white paper from Viadex, the Global Virtual Infrastructure and Deployment Experts, in association with Cisco Meraki, the leader in cloud controlled Wi-Fi, routing, and security, presents a straightforward assessment of the whys and wherefores of Software-Defined Networking, and why it deserves any organisation's full attention.

Section one: Setting the scene

'Boxes' is perhaps key to getting to grips with the issue.

As organisations move away from the physical – delivering applications and services with next generation agility – every sector, industry, and business is recognising the need to become a software-based operation.

Why change the habits of a lifetime?

There are two ways to manage and configure today's network. One is to do it the way it has always been done. Nothing wrong with that, you might say; it has always worked, you have a robust and functioning network and, after all, you've put a lot of investment into it. They're all valid points. They beg the question, however, as to how flexible, responsive and adaptable to the changing demands of today's market environments, users and customers the network is capable of being.

The other management approach is to take these observations into account and think long and hard about the challenges of the future, as opposed to the achievements of the past, no matter how recent. Areas to consider would include:

- Are there limitations within the traditional network infrastructure?
- Would you judge your current network architecture to be pretty complex?
- Is your physical network infrastructure compatible with the requirements of, and receptive to the operational advantages of, virtualisation?
- With Software Defined Everything (SDx) changing the shape of the datacentre, is the network, as it is now, up to playing its part in essential digital transformation across the business, or is it still stuck in its 'box'?

Debox your system

SDN has been on the radar as an emerging technology since around the turn of the decade. Organisations like Cisco (ACI), Arista, Juniper Networks (Contrail) and VMware (NSX) all have SDN initiatives as part of their portfolio. SDN is now delivering the benefits of network virtualisation; promoting cloud and various other technologies that Server and Desktop Virtualisation have been delivering for the past 15 years.

This means that the network is now in its own phase of digital transformation, able to align speed, efficiency and agility with life, and user expectations, in the digital world. These capabilities come about by simplifying network management.

Simplification comes about by realising that technologies have moved on rapidly since your network was created. You can effectively 'add on' new technologies without having to recreate the network from scratch.

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SDN brings into networking the ability to leverage a software approach in the same way that other aspects of IT already do.

What will transformation bring?

There is a lot of glitz and glamour emerging around software defined networking, not least because it sounds so cool, and seems so right. Technology for technology's sake, however, is rarely a robust strategy. It sometimes works out, but at other times can leave you saddled with capabilities you either didn't need in the first place, or aren't completely au fait with how to leverage them now that you have them.

This can't ever be the case with SDN, which every organisation that considers the network to be the backbone and core of what it does should consider a 'must-have'; mission-critical and expected to deliver high performance at all times.

Section two: Exploring the possibilities

All things must change

Reliance on old networking practices is at best retrograde thinking and at worst an acceptance that progress is not yet on the agenda; sweat existing assets, wait and see, and hope it all works out.

What is SDN?

The Open Networking Foundation (ONF) defines Software-Defined Networking (SDN) as:

"The physical separation of the network control plane from the forwarding plane, and where a control plane controls several devices… (SDN is) dynamic, manageable, cost-effective, and adaptable, making it ideal for the high-bandwidth, dynamic nature of today's applications."

SDN technology is:

- An **approach** to cloud computing
- A **facilitator** of network management
- Which **enables** programmatically efficient network configuration
- In order **to improve** network performance and monitoring
- **Independent** of closed and proprietary firmware run on specific vendors' network devices.

You can look at it as a 'liberator'; a way of removing constraints from network management and unlocking greater potential from the network. Examples of SDN that work independent of a network vendor's technology are BigSwitch and Cumulus Networks.

Network Functions Virtualisation (NFV) is a network architecture concept that helps speed things up. It accelerates provisioning and service innovation, by using the technologies of IT virtualisation. With NFV, entire classes of network node functions can be virtualised into building blocks that may connect, or chain together, to create communication services.

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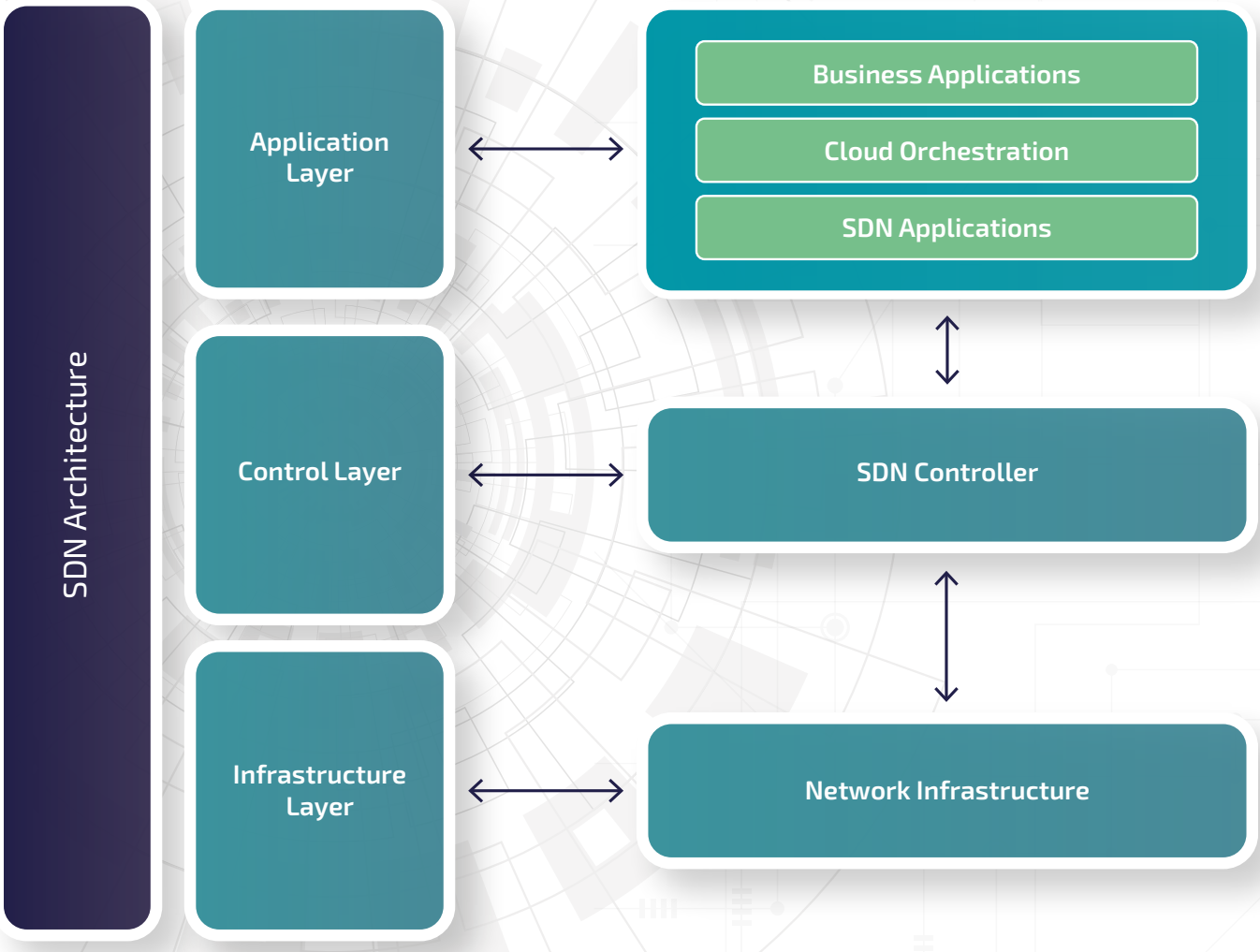

In its SDN forecast of 2016, IDC observed:

"Virtualisation, cloud, mobility, and now the Internet of Things (IoT) have exposed the limitations of traditional network architectures and operational models."

SDN combined with NFV allows today's networks to scale securely at speed providing a more agile and flexible environment for organisations and consumers to work within. SDN and NFV both utilise open-source technologies like OpenFlow and OpenDaylightController. Many networking vendors have built their SDN solutions on top of these technologies – some have used the open platform directly, while others have provided their own custom parts.

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Managed Wireless with Cisco Meraki

This solution offers centralised management in the cloud delivering multi-gigabit Ethernet per access point, and offering location analytics to show where users access Wi-Fi services, improving coverage.

It provides full visibility of applications in use enabling you to control bandwidth usage for corporate applications:

- A single pane of glass dashboard to manage all access points and users globally
- Visibility into where usage is high and what applications are in demand
- Security services built-in to continuously scan and protect against threats

Working it all out

Moving away from box-by-box control is important. For one thing, it is a time-consuming process, and it's manual. It is open to human error. It costs more to do than you need to be spending. While there will be start-up costs in adopting SDN, the cost benefits will accrue quickly as automation and control kick in.

At Viadex we use SDN technology from Cisco Meraki to support our global operations comprising offices in six different countries and remote workers in a further three. It enables us to provide coverage across four continents, via centralised IT. Reducing the administration and management time is essential for our IT team, while still keeping us secure with centralised cloud control and management at the touch of a button.

Using time more productively

The traditional approach that many organisations are still working with involves managing the traditional wired enterprise network, wireless access points, and WAN systems independently. It entails configuring each box, while manually trying to keep policies consistent.

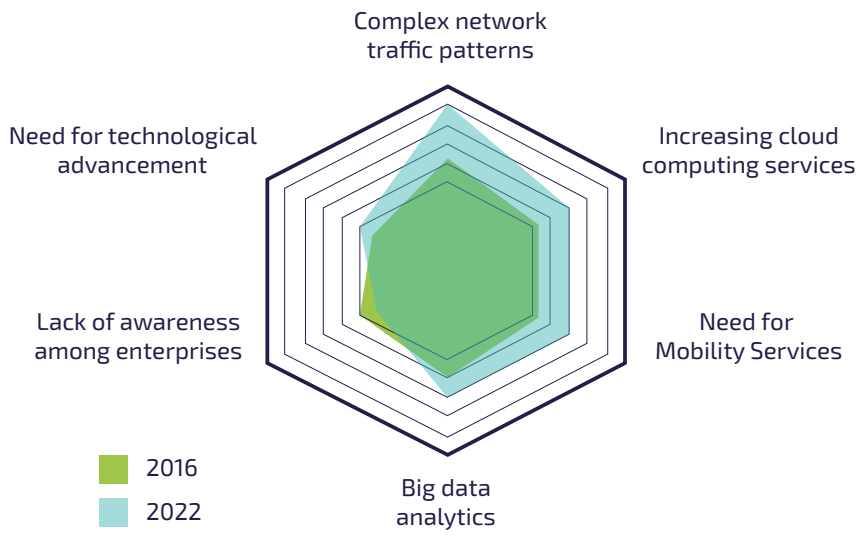
The automated system afforded by SDN and NFV helps reduce the time needed and eliminate errors. It enables network engineers to spend their time more productively, designing innovative services and supporting the business in constantly reinforcing its competitive advantage.

Section three: The irresistible force

The long-popular adage now rings truer than ever before:

Work is not somewhere you go, it's something you do. Productivity and collaboration are no longer contained by location. The liberating effect on the enterprise is that work is now possible everywhere you go, and there's nothing you cannot do.

Top factors impacting SDN market[1]



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The formula for success

The network has to up its game to support the accelerated pace set by the very capabilities it is largely responsible for having created. SDN delivers the formula to stimulate this energy, dynamism and innovation.

SDN's three 'pull' factors:

The three main factors driving SDN adoption within the competitive environment, and the digital world, make for a compelling business case for any organisation, before one even touches upon areas such as increased efficiency, lower risk and reduced operating costs.

Consider the following:

- **The need for mobility services**

  Mobility has now assumed what will be its enduring pattern: insatiability. The need will grow. The digital workplace is becoming increasingly dispersed and unrestrictedly fluid, because it can. Cloud technologies allow anywhere access to organisations' core systems and applications.

  In our own operations at Viadex, referred to earlier, the simplicity and ease of SDN technology we use allows a small internal IT team to support the business without having IT spread all over the world just because our employees are.

- **Cloud and virtualisation**

  The network is the essential conduit for the delivery and dynamic allocation of resources, from datacentres to remote users via software, in the form of cloud-based services. Virtualisation is an essential enabling technology for cloud. This is about moving away from the box. The potential which has for so long been muted within the physical server can now be unleashed via virtual machines which can be run up on demand to meet scalability requirements.

  Put simply (and simplicity is key) the network has to up its game to support the accelerated pace set by the very capabilities it is largely responsible for having created. SDN delivers the formula to stimulate this energy, dynamism and innovation.

  Functions are increasingly being extracted from the datacentre, enabling the organisation to trim down and speed up. Cloud and virtualisation are empowering these new capabilities, and now the transformation is upon the network. The time has come for some 'deboxing'; casting off a reliance on hardware and harnessing the power of software.

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SDN enables an organisation to deliver access to bandwidth on demand, as traffic patterns change, dealing with geographically distributed databases and servers through private and public clouds. It helps an organisation to add adds value to the value of data.

- **Big Data analytics**

  Data environments are getting bigger as data proliferates. Every organisation has now come to two realisations about data. The first is, it can't be ignored; something has to be done about it, and regulators are very interested to see precisely what organisations do do about it (GDPR contextualises the data management issue with its daunting 'upper level' fine structure of up to €20 million, or 4% of the worldwide annual revenue of the prior financial year, whichever is higher)[2].

  The second realisation came with the advent of 'Big Data'. The World Economic Forum provides an engaging history of Big Data, tracking its foundations back to back to 18,000 BCE[3]. Within the last five to eight years, however, organisations have seen its enormous business value in providing information that allows better understanding of consumers and customers. This understanding enables the creation of vastly improved customer experience to sharpen the competitive edge and better serve customers (commercial world) or citizens (society) or the relationship between machines and sensors (the IoT, industry, manufacturing, and life in general in the modern world). To exploit this value, the network has to be capable of simply and surely dealing with mammoth data flows.

SDN in a wireless environment

Everything depends on the network. The network therefore has to be as dependable as it can be. The digital workforce, mobility, remote working, the optimisation and responsibility of Big Data and the operational needs of a geo-dispersed organisation all highlight the business-critical if not mission-critical importance of the wireless environment.

Cisco Meraki is an example of how SDN technology is deployed within wireless environments by providing a centralised configuration for security, network, device and user policies on a wireless controller (often cloud-based). The controller then deploys these policies to wireless access points, removing the manual configuration of access points from the equation. Meraki offers:

- A single pane of glass dashboard for centralised cloud-based management of all access points and users globally
- Visibility into where usage is high and what applications are in demand
- Security services built-in to continuously scan and protect against threats

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Cisco and SDN

Cisco has accelerated its moves to update traditional networking capabilities, including bringing in new technologies that have already been proven. In April, 2016, Cisco acquired CliQr to help enable cloud as part of its offerings. CliQr provides an application-defined cloud orchestration platform to enable customers to easily model, deploy and manage new and existing applications to any cloud and datacentre environment. They offer a single, intuitive platform that helps organisations manage the entire application lifecycle across hybrid IT environments, whether simple or complex.

In August 2017, Cisco also acquired Viptela for its SDN technology, focused on SD-WAN, which offers advanced routing, segmentation and security capabilities for interconnecting complex enterprise networks. Cisco's ACI (Application Centric Infrastructure) platform is embracing these technologies as part of its intent-based platform. Cisco's new intent-based platform brings modern elements such as automation, security and analytics to work together in a unified system. With intent-based networking, you define *what* you want done in the network instead of how it's done.

Section four: The bottom line

SDN is to the network what digital transformation has been to the rest of the organisation; enabling, empowering and enhancing.

Concluding thoughts…

Technically speaking, the bottom line is that SDN enables the network control to become directly programmable and the underlying infrastructure to be abstracted for applications and network services.

- **SDN simplifies and streamlines** the setup and management of networking layers and security across the datacentre, enterprise offices (SD-WAN) and the edge, a case in point being the increasingly high number of IoT devices deployed requiring traffic prioritisation and analysis.
- **SDN allows the micro-segmentation of data** from a user all the way to the server and onto the many third-party connections required to deliver cloud services.
- **SDN allows you to create policies and security settings** at each network layer, as the data transits through the multiple network layers – allowing you to group segments horizontally (east to west – server to server) and vertically (user/endpoint to server).

In business terms, the bottom line is that SDN is to the network what digital transformation has been to the rest of the organisation; enabling, empowering and enhancing. It is the way forward.

It may not be an 'innovate or die' scenario with SDN, but it is certainly a case of move fast forward or be content to stay on pause.

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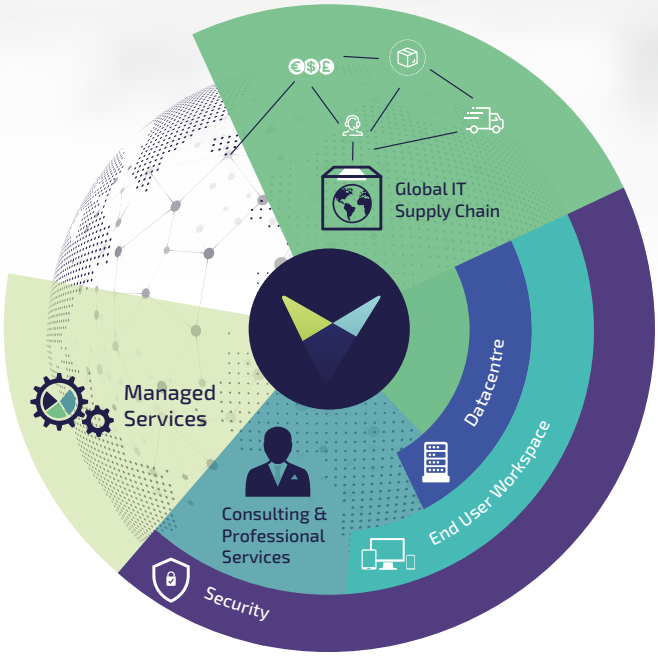
ABOUT VIADEX

Viadex offer global services to IT teams to take the stress, complexity, risk, and costs out of everyday operations while getting the business in great shape for future challenges and opportunities.

With a combination of Managed Services and Consultancy we offer the skills, insights, experience, and partner ecosystem that your business can depend on across the complete IT landscape, from the datacentre to the farthest flung branch office and the remotest user.

We support businesses with both on premise and cloud/hosted services. Viadex have been working across Europe, the Middle East, Asia Pacific, and Oceania, supporting enterprise organisations for over 16 years.

We provide interconnections across more than 150 countries, to more than 140 datacentres, and Public Cloud environments across 6 continents; delivering the highest quality connectivity: supporting your international operations with 24x7x365 global coverage from the UK, Europe and South Africa, and driving your competitive advantage.



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[1]*Diagram courtesy of Allied Market Research: www.alliedmarketresearch.com*

[2]*GDPR EU.ORG*

[3]*A brief history of Big Data everyone should read: World Economic Forum, 2015*