

The software-defined data centre –
making the **inevitable achievable**



It's likely that the **data centre** will be the **first place in which software-defined networking (SDN) will take hold**. The data centre network is the one under the most pressure and the one that needs to change the most in order to effectively support the demands placed on the data centre itself. Just what these changes will be is difficult to pinpoint at this stage of the 'software-defined' evolution. Our experts set aside the hype to look at the impact this will have on the next-generation data centre.

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Modern data centre network under pressure

Without a robust underlying network, it wouldn't be feasible to work from home, connect to the cloud, or consolidate data centres into fewer locations. As these trends amplify, so does the pressure on the network to be both robust and flexible, driving the need for new, agile network architectures. SDN can help achieve this – as well as save costs – by extracting some of the functionality that currently resides in hardware and placing it in software. This enables the automation and orchestration of network operations, increases the utilisation rates of network devices, and allows organisations to provide connectivity on demand.

Looking at the vast estate of networking, from campus networks to the WAN, there's a strong case for deploying SDN in the data centre first, says Gary Middleton, Business Development Manager – Networking at Dimension Data. 'The data centre is where you have the most dynamic activity taking place on top of the network,' he says. 'Virtual machines, arguably the cornerstone of the modern computing platform, are scaling up and back according to the demand for applications. The consolidation of data centres over the last five years means more demand is placed on the fewer, remaining data centres. The amount of traffic and data in the data centre is growing substantially. There's also a simultaneous increase in the number of more sophisticated, Web-based applications with chatty network protocols, meaning there's a lot of "back and forth" activity on the network.' It's for these reasons, suggests Middleton, that the data centre

network needs to transform. 'The network has to be incredibly robust in order to handle higher volumes of traffic, apply security policies to virtual machines that are constantly moving around the data centre, and of course accelerate application traffic out of the data centre to the end user.'

The software-defined data centre is already here

Service providers that operate their own data centres have been delivering a software-defined architecture for some time, in some way, without the attendant hype. Virtual local area network tagging, multiprotocol label switching, and some of the provisioning tools used are some examples of such an architecture. Frank Casey, Dimension Data's Group Director for Data Centre Services & Managed Services, explains: 'Organisations are trying to do as much as they can through automated run books, scripting, or monolithic toolsets that allow for software provisioning and take the human effort out of setting up and configuring the physical infrastructure that runs the applications.'

There's a strong case for the software-defined data centre in both production and disaster recovery. 'Organisations want to be able to deploy everything from the firewall to operating systems without the need for dedicated equipment,' says Frank Lacomba, Senior Product Architect at Dimension Data. 'They're moving virtual machines across locations, and transferring workloads from multiple locations and environments. New products can monitor the capacity of key thresholds of Web and application servers and automatically spin up virtual machines, to add capacity on the fly.'

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The challenge of the snowflake

The software-defined data centre may not be a novel entity, but the technology and skills needed for successful automation need to develop further in order to produce the promised – and desired – results. Middleton cautions against hype and ‘SDN-washing’. ‘Be careful of scenarios in which everything is software-defined,’ he says. ‘It’s not the panacea yet and we still have a lot to learn from real-life deployments.’

Lacomba refers to ‘the challenge of the snowflake’: the snowflake being the software that accompanies data centre hardware, and is unique to each hardware vendor. While application programming interfaces can be used to connect different mechanisms in the environment, there are so many different toolsets in use that it’s not always easy to keep track of what’s been used, where, and how everything is connected.

As Lacomba notes, the cost of change management increases exponentially as the environment becomes more complex and dependencies more difficult to determine. ‘The idea of automation simplifying the world is great, but the reality is that this isn’t an easy task,’ he says. ‘In the past, when the hardware components of the data centre were discrete, you’d patch a router, a firewall, or a switch and only that component and a few of its related devices would be affected. With a software-defined data centre, the impact of a change as minor as introducing new IP addresses to a monitoring fabric has the potential to bring down the entire data centre.’

Change management processes, including thorough documentation, are therefore vital. ‘Don’t make the mistake of thinking that the software policies and procedures will control and manage everything seamlessly,’ says Casey. ‘Sometimes, they break, and you need to know how to go back and make the correction.’

New skills a necessity

The skills required to run a software-defined data centre successfully, and how to acquire them, are key considerations for organisations considering the move to automation. While engineers may feel more comfortable using their own development and testing processes than automated provisioning, software-defined practices and operational processes do minimise the risk of human error, and reduce the time taken to build a fully functional operating system from hours to minutes. ‘As the business gets to know how quickly things work through automation and software-defined policies, there will be pressure on IT to implement applications in days rather than weeks,’ says Casey.

Engineers can no longer afford to focus only on their area of expertise – the network, systems, or applications. They’ll need an entirely different set of skills to architect, implement, and operate the software-defined data centre infrastructure in order to keep pace with the demands of the business.

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As inevitable as cloud

Organisations are under pressure to do things differently, to save costs and deliver better returns. The software-defined option promises to alleviate some of this pressure by lowering costs and enabling a more flexible infrastructure. However, as with the cloud, the transition won’t happen overnight.

‘Software-defined networking is inevitable, but there will be a long migration period,’ says Middleton. ‘It’s still possible to run a network today without any software. The path will be different for every organisation, but the “all-singing, all-dancing” software-defined network or data centre is probably five to 10 years away.’

Casey agrees. ‘With the data centre, every company’s use case will be different. I also think we have a long way to go before organisations completely redesign and re-architect their data centres to be run through a true software-defined, virtual infrastructure stack from the facility itself all the way up to the application layer.’ In his view, it’s likely that hybrid solutions will be more prevalent, with certain workloads moving to the cloud and others remaining on a physical architecture that’s managed through the software-defined tools which come with that hardware.

With so much to consider, prudent organisations will find partners that can help them determine which workloads to move, and how to optimise the data centre architecture for the applications that remain – weighing the benefits of the software-defined data centre against the investment required to deploy it, and acquire the skills to manage it successfully.

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