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A Review of the Trends in Networking Design and Management

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Abstract

This paper will research and report on the various network design and management trends for the past three years. The report will include several types of research concerning particular network design and administration; particularly virtualization, security, and network management tools. The paper will also discuss the trends with subsets of the mentioned areas of the network design and management in the Information Technology industry.

Keywords: Networking Trends, Virtualization, Security, Network Management Tools

A Review of the Trends in Networking Design and Management

The network design and management in the Information Technology industry has witnessed several trends over the past three years. The world of information management and communications is experiencing dramatic changes because of the large effects incurred by the move along the Information technology transformations (Boero et al. 2018). Although the use of technology has remained one of the drivers or the evolution of future networks, the technology side is undergoing a paradigm change in the design and operation of systems and services. The knowledge of the design system and management trends is essential to ensure proper planning and management facilitating the ability to remain ahead of the curve in the information technology sector. When it comes to Trends in Networking, the evolution of 5G deserves a special mention. Even if the core topics covered in this paper does not specifically mention 5G, it is undoubtedly one of the most significant trend in the industry.

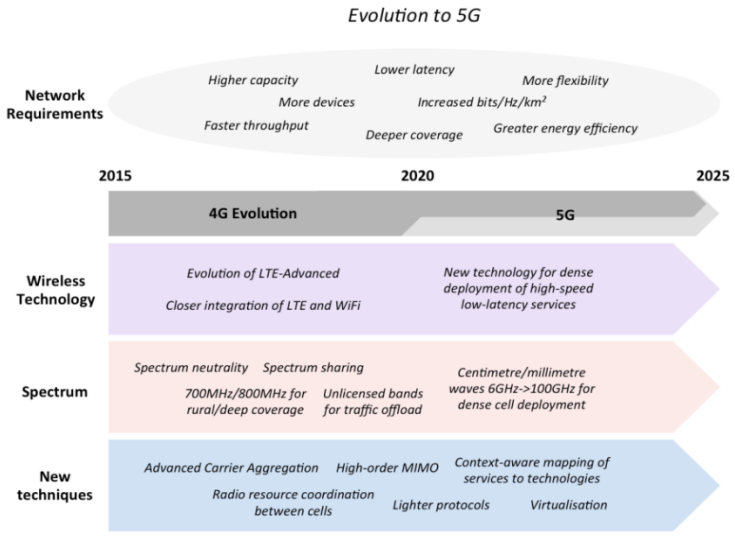

Figure 1. Evolution to 5G

Virtualization

Recently, virtualization has proven to be a major game-changer in the computing field. This is because many enterprises come to bank on the various advantages it offers at every level of business operations and activities. Across the globe, firms of every sizes are creating the transformation to virtual, cloud-based and hybrid infrastructure and network system that will reduce their costs and improve the continuity of the business and information technology management processes (Patel, 2017).

There are some notable changes and developments in the industry, right from the manner of virtualization monitoring and control is handled to ways of the available resources are stored and preserved both internally or externally, to enhance the service and application provisioning together with network uptime. As the technology increase to evolve, newer trends keep on coming to the limelight and will continue its evolution as long as virtualization is maintained.

Server virtualization and consolidation. This is one of the most common trends of virtualization. Many companies have switched to hosting their servers and computing requirements on the cloud while ignoring the physical resources. This trend is here to stay because it runs on cheap commodity processors. Newer hypervisors running on the current x86 commodity processors have opened up the virtualization abilities to bigger audiences. Technology improvement is also one of the reasons why this trend will remain in the industry. Both large and inexpensive technologies are available in the market. Besides, consolidating servers to reduced physical resources enables firms to keep the data or information centers in a more organized manner, which will reduce the hardware cost. Other important reasons for the sustainability of this trend include its impact on energy utilization and the low cost of maintenance.

System and storage virtualization in network design. The Virtual Storage Area Networks (VSANs) has increasingly gained ground because it offers significant ease of usage, security, flexibility, and scalability. Besides, the trend is beneficial because firms may not need to purchase more hardware or rather invest in updating the device while scaling up. It also minimizes hardware redundancy and investment cost. Companies can create individual networks for various business activities and geographic locations, hosting online data for secure and straightforward access (Saxena & Kumar, 2016).

Updated physical resources. In leu of virtualization, the computing and storage tools that IT sections use, together with physical networks such as routers and switches, have indeed undergone dramatic transformations in recent times. The new kinds of hardware available today that support the cloud-based infrastructure, are created and designed to both configure and run VLANs and also offer support to virtual network design and execution, encouraging companies to invest in the new trend and avoid many risks.

Consumer-oriented virtualization: This is one of the trends of software virtualization, which is a subset of virtualization. Companies have designed virtual systems for consumer use rather than only developing virtual systems for enterprises. This trend has been necessitated by the existence of consumer products such as cell phones and software-based virtual SIM cards (Khan et al. 2016).

Security

Newer trends in Information Technology mandates corresponding trends and adaptation of security methods. Because of the continuously improving technologies, it is impossible for any organizations to build and maintain a 100% secure IT infrastructure. To stay digitally secure, the companies should stay on the top of latest networking trends (White, 2015). Due to the same reason, it is a naked fact that there are rapid changes in the network and security industries. The following are some of the recognized trends in network security.

Wireless as continuously replaced wired access. The demand and the subsequent surge in implementing mobility is a very obvious technology trend. There is less wiring of the new enterprise buildings. The wireless mechanisms have dominated mechanisms of network access due to the critical properties of efficient integration with authentication systems. Newer trends in Wireless Security, has enabled organizations to ensure there is productive security and monitoring, which is also a subset of the security network (Odun-Ayo et al. 2017).

Cloud security is continuously becoming important. Many organizations have found that operating in the cloud is more secure because there are more good practices to ensure there is cybersecurity. However, in case a firm has ineffective security practices in their business setting, and the application of lax security applications in the cloud may lead to high expectation of cloud security breaches.

Malware has continued to evolve. Cybercriminals have used malware to reach their targets. This has generated many questions concerning the effectiveness of many internet security software because malware attack has remained a cybersecurity method in the past few years. Although many security vendors have offered various malware defense products, the solutions are ineffective since malware has continued to metamorphism (Odun-Ayo et al. 2017). The emergence of memory-resident malware is one trend that has not survived as it has been difficult to detect malware forensically because the majority of computer users leave their machines running. Surprisingly, attackers have shifted to mobile malware because most enterprises enable cell phones to access cooperate internal Wi-Fi networks, thereby allowing attackers to have access to the work business.

Difficulty in stopping security breaches. As the In recent years, breaches in security, and leakages of data have continuously troubled various companies despite the size. Hence, there is a requirement for new security defense systems to counter the evolving cyber threats. The Defense-In-Depth strategies that the organizations employ have drastically improvised with a lot more number of layers. Companies have always initiated various security software programs such as more comprehensive anti-virus programs that include internet protection and constantly updated threat profiles, to protect the digital safety in the organization, and to manage cybersecurity.

IPv6 traffic as continued to double. The general internets progress or the deployment of IPv6 has been slow but steady in the past three years. Typically, IPv6 has been integrated by the majority of providers of internet services, mobile devices operators, and providers of broadband internet.

Network Management Tools

The network management software will monitor the system performance, calculate the bundle's usage, and scan the traffic for any possible errors through standard protocols such as Simple Network Management Protocol (SNMP), The following are key capabilities and potential benefits in implementing and utilizing good network management tools

Network management software tools automation. The introduction of automated capacity within network management software is an upcoming trend that will satisfy the needs of network management suppliers. Some of the types of automation in network management software tools are used to handle the current problems experienced by vendors. The recent examples of automated network management tools include; automatic discovery, automated setting auditing, policy compliance examination, automated root cause analysis, and automated actions to respond to known issues and concerns (Technavio.com. 2019).

Adoption of integrated revenue optimization solutions. Vendors of network management have developed revenue assurance, fraud management tools, and cost control remedies. Moreover, the suppliers

are developing more advanced technologies such as integrated revenue optimization solutions that have revenue assurance, management of fraud, and margin, and cost analysis abilities.

Outsourcing of network management tools. The majority of network management tools vendors are currently witnessing reduced profit margins, which have been caused by the decrease in AVPU. To minimize their expenses in operation, the suppliers have adopted to outsource the majority of their service programs or functions and network maintenance to managed service providers. At the same time, they have managed to retain; they are the main areas of business operation. The outsourcing strategy has helped the suppliers to maintain high-profit margins (Ding, 2016).

Platformization and Comprehensive Feature coverage: The modern Network Management Tools like the industry leader *SolarWinds*, are making sure to support all possible network management activities (Cooper, 2018). They achieve it by platformizing their products. i.e. they identify all the common functionalities and share those basic underlying capabilities with multiple products, each focusing on a particular network management area. This enable them to customize and mix-and-match various individual products that functions collectively to serve specific customer needs of network management.

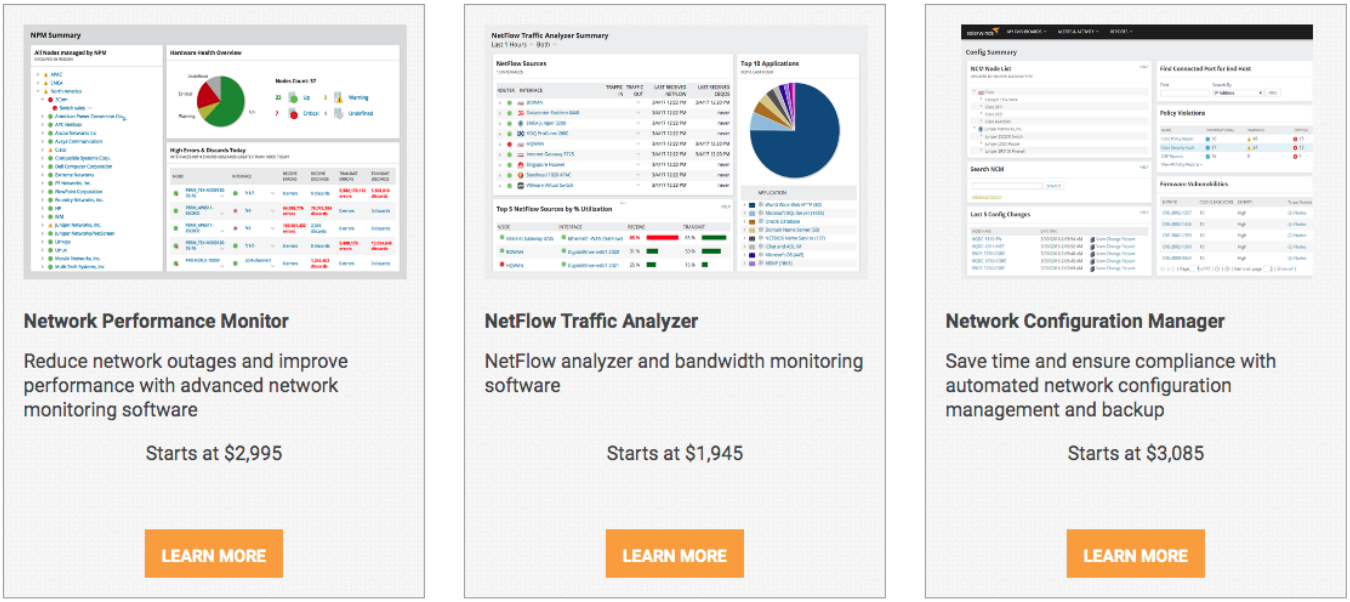

Figure 1. Three of the most popular Network Management products from SolarWinds. Retrieved from https://www.solarwinds.com/network-management-software

Inarguably, companies should examine and analyze the various trends in the design network and management as it will be significant in maintaining their competitive advantage in the IT industry. Specifically, it will be critical to examine the trends of virtualization, security, and network management tools to be at per with the market needs.

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