SECURING THE GREAT PROMISE OF NETWORK VIRTUALIZATION
緊握網絡虛擬化大機遇

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An overarching theme across IT in recent years has been the concept of virtualization. From virtual machines and virtual storage, to virtual applications served via the "cloud" model, there are excellent reasons for the virtualization of resources. In a fast-paced business environment, virtualization offers high flexibility. Rapid response to changing needs and market conditions gives companies a significant advantage. Enterprises can also leverage economies of scale to minimize expenses, and maximize scalability, by outsourcing key infrastructure components to a service provider who delivers and manages the virtualized offerings. For all these reasons, and more, it was only a matter of time before the network itself became fully virtualized.

A Paradigm of Possibilities

Network virtualization is not an entirely new concept. For example, Virtual Private Networks (VPNs) have existed for decades. Yet with software-defined networking (SDN) and network functions virtualization (NFV), the transformation of physical data links (such as cabling) and physical network devices (such as routers) into IT abstractions reaches new levels of flexibility, agility, and scalability.

SDN forms the basis for advanced virtualized networks, decoupling the task of creating networks from physical devices such as routers and switches. NFV enhances these virtualized networks, such as with load balancing and firewall functionality, which also have traditionally been performed by physical hardware. With SDN and NFV, even when physical devices may be required, the network functions (such as routing and switching) are defined in software, to be executed on generic boxes that can be dynamically reconfigured to provide other functions.

In fact, the dynamic reconfiguration is where many of the advantages of virtualized networking reside. Comparable to the advantages of cloud computing, where virtual machines can be dynamically created and adjusted on demand, SDN and NFV enable rapid reconfiguration of networks to produce not merely a sufficient topology, but an optimized topology that is perfect for a specific application. Theoretically, network configurations can change from minute to minute, according to application needs, an impossible achievement with traditional physical infrastructure. This dynamic reconfiguration can even be automated, such as in conjunction with the needs of an application running over cloud computing. There are truly powerful possibilities with SDN and NFV.

虛擬化概念近年席捲整個資訊科技界－從虛擬機器（VM）和虛擬存儲，及至透過雲運算模式提供的虛擬應用程式。商業世界節奏急速，虛擬化技術可提升企業的靈活性，以快速應對瞬息萬變的市場需求，保持競爭優勢。透過將關鍵基礎設施組件虛擬化，並交予服務供應商進行管理，可以將開支減至最低，同時增加擴展性，達到規模經濟效果。僅憑以上數點，已足夠揭示假以時日，企業網絡亦會全面虛擬化。

塑造無限可能

網絡虛擬化概念存在已久，例如虛擬專用網絡（VPN）已面世多年。然而，軟件定義網絡（SDN）和網絡功能虛擬化（NFV）的出現，使實體數據鏈路（如佈線）和網絡設備（如路由器）得以融入信息技術領域內，從而令網絡的彈性、靈活性和可擴展性均提升至嶄新水平。

SDN為進階虛擬網絡提供基礎，免除原有須透過實體設備（如路由器和交換器）建立網絡的程序。NFV則再進一步完善虛擬網絡，例如加入負載平衡和防火牆功能，取代原有的實體設備。即使偶爾仍需要實體設備，SDN和NFV仍會令網絡功能變為軟件定義，並在通用框架內執行，使它們能隨時動態重新配置其他功能。

事實上，動態重新配置正是虛擬網絡的優勢所在。與雲運算的動態創建及按需調整虛擬機器的優點相比，SDN和NFV的快速網絡重新配置不但可以建立完整的拓撲，還可將其優化以配合特定應用。對比傳統實體基礎設施，網絡重置可隨時按需更改甚至自動進行，例如可因應雲端上的應用需求作出協調。以上種種都是SDN和NFV強大潛力的明證。

無縫防禦需求日增

然而，虛擬化所帶來的靈活性亦為網絡攻擊者開啟入侵之門。網絡攻擊者一旦入侵虛擬網絡的控制系統，便可竊取修改網絡拓撲的權限，後果將不堪設想。因此，虛擬化的網絡基礎設施需要非常全面的規劃及極嚴謹的保安防護。此外，物聯網（IoT）的出現亦令整全保安解決方案的需求與日俱增，以保護所有連接到網絡的物件及網絡本身。

The Need for Pervasive Protection

Yet, this unprecedented level of agility brings an unprecedented level of vulnerability. Because network functions are virtualized, if control systems are compromised, attackers will gain the unauthorized ability to modify network topology with disastrous consequences. Thus, a virtualized network infrastructure demands thorough planning and significant discipline in security. A related issue is that the emergence of the Internet of Things (IoT) paradigm also drives demand for a total security solution to protect everything connected to the network, and the network itself.

To achieve sufficiently comprehensive protection for IoT-enabled and virtualized networks, a "security fabric" must be implemented across the whole infrastructure, covering everything through a concerted, dynamic and proactive security approach that leaves no gaps to be exploited. The business infrastructure must operate securely at a fundamental level.

Providing Expansive Enterprise Security

As one of the earliest VPN providers, and a pioneer in cutting edge cloud computing, CITIC Telecom CPC has long been aware of the business benefits of network virtualization. With the advent of SDN and NFV, CITIC Telecom CPC's suite of offerings have become more relevant and important than ever, for enterprises that wish to realize the benefits of complete network virtualization and tighter network-application integration, while being thoroughly protected against diverse modern business threats.

In CITIC Telecom CPC's view, protection of digital assets begins at the computing core, with robust security that guards against unauthorized tampering of computing resources that support mission-critical business applications. By offering a best-of-class virtual and dedicated private cloud architecture through its SmartCLOUD™ platform, CITIC Telecom CPC delivers a cost-effective, highly scalable, high performance, and highly secure computing resource for customers. SmartCLOUD™ feature dynamic on-the-fly allocation of processing power, memory, and storage, with secured connectivity that isolates applications and ensures data integrity. As a versatile computing platform, SmartCLOUD™ supports diverse business applications, including backup and recovery services, virtual desktops, workgroup collaboration and communications tools, video conferencing, and traffic and application balancing, among other functions, all running in a fully protected environment. In responding to the aspiration of the cloud management service from customers, CITIC Telecom CPC will launch SmartCLOUD™ professional service to manage the operation system and application which are deployed on SmartCLOUD™ platform for enterprises to ease the management of IT resources on cloud. With 10 SmartCLOUD™ Service Centers across Asia pacific, CITIC Telecom CPC offers a comprehensive suite of solutions that empowers companies to focus on their core competencies and enhance business growth.

Complementing SmartCLOUD™, the TrueCONNECT™ and TrustCSI™ solutions offer secure global virtual networking and comprehensive enterprise-wide security. TrueCONNECT™

因此，企業需要一個能全面覆蓋基礎架構，同時與各相關部件相互協調，主動偵測系統漏洞的「安全網」。要做到滴水不漏，企業的安全架構必須從基礎層面着手。

提供廣泛的企業防護

作為最早期的VPN供應商之一，以及尖端雲運算技術的先驅，中信國際電訊CPC一直關注網絡虛擬化所帶來的商業效益。隨着SDN和NFV面世，更多企業希望享有整全網絡虛擬化和整合網絡及應用所帶來的效益，同時全面防禦現今多元化的企業威脅，令中信國際電訊CPC的全面解決方案更顯重要。

中信國際電訊CPC相信，保障數據資產必須由保護核心運算元件開始。通過SmartCLOUD™平台頂尖的虛擬及專用私有雲架構技術，中信國際電訊CPC為客戶提供了一個性能卓越及安全性高的雲端服務。SmartCLOUD™能動態配置運算資源、記憶體及存儲，同時提供與應用程式分離的高度安全連接以確保數據完整。SmartCLOUD™支援多種業務應用，包括備份及復原、虛擬桌面、協作及通訊支援、視頻會議，以及網絡流量和應用系統負載平衡，所有應用均在安全可靠的環境下運行。此外，為因應客戶對雲管理服務的需求，中信國際電訊CPC將推出SmartCLOUD™專業服務，管理在SmartCLOUD™平台的作業系統及應用程式，為企業簡化資源管理。憑著一系列的SmartCLOUD™解決方案連同遍佈亞太地區的10個雲服務中心，企業可完全專注發揮核心競爭力，推動業務成長。

中信國際電訊CPC的SmartCLOUD™雲端服務可與TrueCONNECT™和TrustCSI™解決方案無縫融合，提供延伸全球的安全虛擬網絡和整全企業級防護。TrueCONNECT™涵蓋一系列VPN產品，由快速設置方案，至託管式虛擬專用網絡，甚至廣域網絡優化管理服務均一應俱全。TrustCSI™則涵蓋其他安全方案，包括端點和網絡保護、主動偵測和智能威脅評估，並提供相應修正措施。而TrustCSI™ ATP（進階威脅防禦）解決方案，則整合了統一威脅管理（UTM）、網絡應用防火牆（WAF）、電子郵件安全設備（SEG）、沙盒及全天候的託管式安全服務（MSS），針對性防禦現今最新興的進階威脅。TrustCSI™由透過擁有ISO認證的安全運作中心及安全專家作24 x 7管理，利用先進的SIEM技術，主動偵測及消除威脅。

中信國際電訊CPC亦針對牽涉龐大數據的應用，提供DataHOUSE雲數據中心服務。DataHOUSE建基於尖端技術平台和運營商級別的網絡基礎設施，客戶可以透過完善的VPN網絡無縫連接亞太以至全球27個數據中心。DataHOUSE並不僅限於提供傳統設施管理、託管或伺服器寄存服務，亦能處理專門針對雲基礎架構、私有雲和混合雲環境的需求。

encompasses a range of VPN services from express setup solutions to fully managed premium virtual WAN solutions, and even WAN optimization for VPNs. TrustCSI™ covers everything else with broad security components that range from end-point and network protection, to proactive and intelligent threat assessment and remediation measures. TrustCSI™ ATP (Advanced Threat Protection)'s non-stop layered security is especially notable for addressing modern advanced threats, by encompassing Unified Threat Management (UTM), Web Application Firewall (WAF), Secure Email Gateway (SEG), Sandboxing and file quarantine, and round-the-clock Managed Security Services (MSS). Furthermore, TrustCSI™ is fully managed by a team of certified security experts complementing 24x7 monitoring by CITIC Telecom CPC's ISO-certified Security Operations Centers with powerful SIEM technology that proactively identifies and mitigates threats.

For data intensive applications, CITIC Telecom CPC also offers its DataHOUSE brand of Cloud Data Center services. These world-class Cloud Data Centers are built on a world-class technological platform and carrier-grade network infrastructure. Taking advantage of the VPN backbone enables enterprises to seamlessly access to 27 data centers within the Asia Pacific and worldwide. The service is not limited to provide traditional facility management; hosting or colocation, but specifically designed to handle the demands of cloud infrastructure, private and hybrid cloud environments.

Advancing to an Era of Immense Advantages

Looking ahead, CITIC Telecom CPC plans to further enhance its support of IoT and network virtualization, augmenting its already impressive and comprehensive suite with innovative new NFV-capable features. These enhancements will lead to even more accelerated services provisioning, plus many other benefits.

As can be seen, the possibilities of enterprise network virtualization are immense, but they can only be safely realized with a holistic approach of total security synergy from a total ICT solution provider. Thankfully, all the hard work has already been done, and with the right managed services provider, businesses can readily look forward to a brighter future where they reap the substantial rewards of a new era of tremendous efficiency, productivity, cost effectiveness, scalability and agility.

邁向無盡優勢時代

展望未來，中信國際電訊CPC將提升對物聯網和虛擬網絡的支援，透過引進創新的NFV兼容功能，進一步完善產品種類，為客戶創造更多效益。

事實上，企業網絡虛擬化已是大勢所趨，但企業需要宏觀的視野、先進的整合技術以及經驗豐富的ICT解決方案供應商才能實現這個宏大藍圖。中信國際電訊CPC很榮幸可以成為企業的強大合作夥伴，協助企業邁向高效益、高擴展性及高靈活性的業務新紀元。