



Atos and Red Hat: Accelerating the NFV Journey

In This Partner Spotlight

Communication service providers (CSPs) are being affected by sluggish core telecom markets in EMEA and face fierce competition from Over-The-Top (OTT) players and cloud providers amid pro-consumer regulation. This puts pressure on prices and prevents the in-market consolidation in Europe that would lead to scale benefits. Meanwhile consumers and business customers are consuming more bandwidth and demanding new services — and at the same time requesting more robust security and protection measures.

Digital transformation is having a profound effect on CSPs' business and organization. They need to implement digital channels in sales and care departments to improve customer experience and introduce new digital services more quickly in various ecosystems. Digital channels and digital services are becoming software-defined, with software driving networks, datacenters, and operations.

Network function virtualization (NFV) plays a fundamental role in a software-defined telecommunications world. NFV improves time to market and agility while decreasing costs. More importantly, it enables innovation in new applications, services, and business models, and has a crucial role in 5G, especially with network slicing, and in distributed clouds. But the NFV journey is complex, and there are many hurdles:

- Finding relevant business cases with proven ROI justifying investments and organizational changes
- Transition and migration without compromising service quality and business continuity
- Impact on existing equipment, operations, security, and processes
- Impact on CTO, CIO, and CMO organizations

This IDC Partner Spotlight analyzes the challenges and key success factors in NFV implementation. It discusses how CSPs can leverage the partnership between Red Hat and Atos to accelerate the NFV journey to reap the benefits of NFV in terms of agility, scalability, efficiency, savings, and security.

The NFV Journey

Industry Disruption

In EMEA CSPs continue to face pressure on their core telecom services. They will experience almost flat growth through to 2021, with the Middle East and Africa performing slightly better (+1.3% Compound Annual Growth Rate ([CAGR]) than declining Western Europe (-0.3% CAGR). **CSP leaders maximize the network value** by improving time to market and the customer experience with fixed-mobile convergence and enriched connectivity. Intricately linked to network value maximization, the best performers are expanding into adjacent markets such as entertainment, cloud, security, IoT, and Big Data, as well as vertical offerings. Taking core telecom services and new businesses together, revenues will grow 2.1% year on year on average, according to IDC, but leading CSPs can expect higher growth rates of 4% to 8%.

For CSPs, however, the priority is bottom-line optimization. CSPs need to make significant improvements in efficiency and investment decisions in the context of skyrocketing data traffic growth. IDC forecasts that total fixed and mobile data traffic will rise 22.4% year on year.

On the capex side, CSPs focus on network rationalization, IP transformation, consolidation of mobile and fixed networks, network rollout cost optimization, and IT standardization. The average capex/sales ratio will decrease from 17.5% to 16.8% in 2021, but leading CSPs will sharply reduce this to 12%–14%. Even more importantly, CSPs will accelerate opex reduction programs, with opex representing 80.5% of total spending. The average opex/sales ratio will decrease from 65.7% to 62.1% in 2021, with the best performers achieving close to 55% thanks to improvements in fixed and mobile network management, efficiency gains in IT operations, and digital and simplification initiatives.

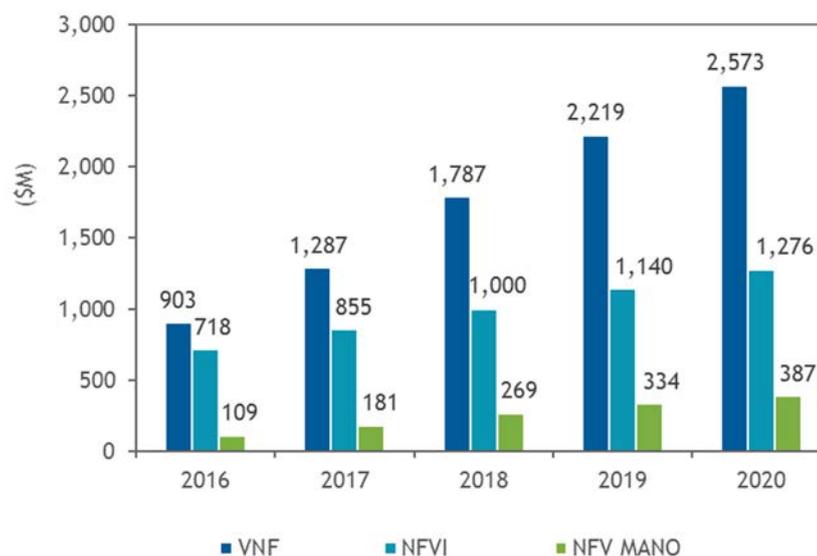
Efficiency and rationalization plans will lead to a number of tough questions. How can I decrease the cost of network load and datacenter resources? How can I improve Fiber-to-the-Home rollout and management costs per home? How can I increase the network utilization rate (which is currently around 30%–40%)? How can I optimize costs in each operational company? How can I increase the proportion of variable costs against fixed costs? How can I use DevOps models to drive innovation in projects and operations?

NFV Key for Evolution of CSP Businesses, But It's a Long, Complex Journey

In the traditional CSP world, new services required between 18 and 36 months before full deployment. The life cycle of agile application development is much shorter, substantially reducing time to market to weeks or days. Agility, flexibility, and scalability are the key benefits of a software-defined environment.

NFV therefore enables CSPs to scale resources up or down rapidly on any industry-standard server hardware to address fluctuating demands. This reduces overprovisioning, delays, and capex and opex spending, thereby significantly improving capital utilization and Total Cost of Ownership. NFV also provides more flexibility in selecting and mixing network function providers depending on technical performances, licensing costs, feature roadmap, and support.

Figure 1
EMEA NFV Spending, 2016–2020



Source: IDC, 2018

In EMEA, NFV spending will grow at a CAGR of 22.2% between 2017 and 2020, according to IDC. CSPs will target specific domains such as Evolved Packet Core (EPC), IP Multimedia Subsystem (IMS), Voice over Long Term Evolution (VoLTE), virtual Customer Premises Equipments for consumers and services for enterprises (routing, Software Defined-WAN [SD-WAN], security, etc.). The most advanced CSPs plan to virtualize a large proportion of their functions in conjunction with 5G roadmaps. CSPs will not achieve significant savings in the first steps, as deploying and managing Virtual Network Function (VNF) is complex and costly. CSPs need to adopt a holistic approach and to virtualize a number of functions before benefiting from the expected savings.

Gains in agility and efficiency are already impressive but the next generation of NFV enabled by network function containerization will bring new benefits. Using microservices instead of monolithic code running on virtual machines will improve agility and time to market by creating distributed microservice network functions. The advantages of containerization include hardware and energy savings, performance, isolation and security, and resilience provided by self-healing features. It enables innovation with promising use cases like 5G network slicing and edge computing, and opens the door to network cloudification, leveraging the benefits of hybrid cloud models.

But technical barriers can slow down NFV deployments: these include a lack of orchestration standards, VNF interoperability, cost-effective VNF onboarding, service assurance, security, hybrid management of physical and virtual resources, and the management of complex ecosystems. To be successful in NFV, CSPs need to conduct a multifaceted transformation that covers processes, mindsets, IT and network management, procurement strategies, and marketing operations. CTOs and CIOs need to work closely with lines of business in a DevOps model.

The battle for NFV relevance will be won on the consulting and advisory level, as CSPs require their technology purchases to produce business outcomes with relevant business cases.

Developing new operating models aligned on technology evolution will drastically change CSPs' internal organizations.

An NFV approach also requires a major shift in network operation models based on a combined community approach with systems integrators, networking vendors, IT vendors, startups, and open source software communities.

Atos, Red Hat Partner to Help CSPs Embrace NFV Transformation

Atos is a global leader in digital transformation with approximately 100,000 employees in 72 countries and annual revenue of around €12 billion. It provides cloud services, infrastructure and data management, business and platform solutions, Big Data, cybersecurity, high-performance computing, and digital workplace as well as transactional services through Worldline, a European leader in the payment industry. The telecommunications sector accounts for over 20% of Atos revenues and the company employs around 8,000 telecommunications experts. It serves more than 100 CSPs, and its key customers include Orange, Telefónica, and Vodafone.

Atos NFV Approach: How Atos Overcomes Multifaceted Challenges

In its approach to the NFV journey, Atos leverages its accumulated expertise in the telecommunications industry and its knowledge of NFV projects both in terms of technology and business outcomes. In NFV projects, Atos has identified six key success factors:

- **Defining a comprehensive strategy:** NFV is not a tactical project but rather enables strategic digital transformation projects. Network and IT technologies, organization, governance, and business cases must be aligned in a strategic plan with strong C-level sponsorship. Atos brings the network and IT technology knowledge and the CSP business knowledge together to help CSPs in their digital transformation journeys. Atos puts services and customers at the center of NFV projects with proven results in terms of time to market and TCO.
- **End-to-end support:** Large-scale NFV deployments are by nature complex and risky projects. Required knowledge encompasses high-level expertise in Business Support System (BSS), Operations Support Systems (OSS), and other CSP frameworks, but also in cloud and open source technologies when it comes to NFV deployment and management. In addition, end-to-end support requires the management of a complex vendor ecosystem with different VNF, orchestration, and management suppliers. Atos has long-term experience in each technology layer and has developed strong expertise by hiring highly skilled engineers and acquiring technology companies such as Convergence Creators Holding in October 2017.
- **Synergies with cloud operations:** The vast majority of CSPs have already developed cloud infrastructures and services for internal use and for business customers. Harmonizing Management and Organisation (MANO) between cloud operations and the core network is critical to improve efficiency and realize cost savings. Atos applies its IT and cloud expertise to

migrate CSP networks into the cloud with different options (private cloud, cloud, or hybrid cloud).

- **Carrier-grade open source:** CSPs value open source solutions as a way to overcome traditional vendor lock-in and benefit from vibrant developer communities. But CSPs' critical infrastructures require carrier-grade open source solutions to implement NFVs at zero risk. Atos works closely with Red Hat, leveraging Red Hat® OpenStack® Platform, Open Platform for NFV, and Open Source MANO to develop and accelerate NFV projects, sometimes in combination with proprietary solutions.
- **Extreme automation:** There are still manual functions and orchestration tools, but massive VNF deployments will require extreme automation based on machine learning and cognitive technologies to improve programmability, network utilization rate, and customer experience. Atos' Codex Analytics Platform, combined with the technologies of multiple partners, optimizes bandwidth allocation based on real-time analysis of traffic, thereby improving customer satisfaction.
- **Security:** There are growing concerns about security because CSPs are critical infrastructure operators and are by nature risk-averse. NFV security challenges encompass a number of domains, including security vulnerabilities in hypervisor codes, container security, dynamic network topologies, multidomain security policy management, security service insertion and onboarding, and security information sharing. Atos brings its in-depth security experience and secures VNF deployments and operations at a functional level with virtualized security functions and at an infrastructure level with Software Defined Networks (SDN).

SFR: Faster Deployments at Lower Risk

SFR, the second largest CSP in France, started a NFV infrastructure (NFVi) project in 2015. The aim was to handle huge Mobile Data growth. The system went live in June 2016 with a Carrier Grade NAT (CG-NAT) use case based on F5's VNF. It was then extended with a vEPC use case based on the SPGW's VNF of Cisco. Significant security features were implemented to get the French Security Agency's green light. The NFVi capacity has been extended by 12 since then to match traffic growth. Smaller use cases like virtual Policy and Charging Rules Function (vPCRF) and virtual Authentication, Authorization and Accounting (vAAA) were also implemented.

The business benefits include a reduction in deployment time (by a factor of four) and reduced capex and opex costs, while providing agility to react more quickly to new market demand. The NFV infrastructure is based on Red Hat OpenStack Platform, Cisco's UCS, and NetApp for the storage. Atos is responsible for the integration, including design, deployment, and 24 x 7 support at carrier-grade levels.

The NFV Lab: Testing and Accelerating

In September 2017, Atos and its technology partners, including Red Hat, announced the launch of an NFV Laboratory in Grenoble, France. Atos and its partners invested in the laboratory to help CSPs test NFVs from different vendors.

"Atos and Red Hat are our long-term partners on this NFV project. We were able to meet our targets with their involvement. Reactivity, innovation, and industrialization are the levers to reduce deployment time and costs."

Frédéric Petignat, head of cloud network infrastructure, SFR

Atos operates and manages the laboratory and uses its NFV and orchestration specialists in Grenoble to help CSPs test NFVs in a DevOps environment.

The laboratory aims to remove the concerns of CTOs when deploying VNFs in open systems with different NFV vendors. It will play a strategic role in the PoC phase without any impact on or risk to CSP networks. In the early phases of a VNF project, network engineers and architects can test their ideas and the technological combinations of their choices outside of their organizations and infrastructure. Engineers will analyze the consistency and the capabilities of a particular VNF, and can test how they can share the infrastructure with multiple VNFs and how VNFs interact with each other.

Atos and its customers have started working on the core network, which is probably the most critical and pivotal step in the NFV journey. The focus is on the EPC, the IMS, the PCRF with a solution developed by Convergence Creators Holding. In a second step the focus will move to customer premise equipment — a promising area in terms of savings but also in terms of agility and service innovation.

Atos expects CSPs to test network function containerization. As mentioned earlier, this brings significant benefits, but testing and proofs of concept are key because it is likely that some VNFs will work better than others with containers. Work must be done to meet production requirements in critical areas: the orchestration of VNFs running on VMs and containers, the maturity of security and isolation technologies, and the impact on operations. These become more complex due to the higher number of exposed interfaces involved with microservices.

The Role of Red Hat in Atos' CSP Strategy

Red Hat and Atos have collaborated for many years to offer joint solutions to CSPs. Together they have more than 20 customers in the telecommunications industry, including Orange, Telefónica, and SFR. Red Hat and Atos have a co-marketing approach to educate the market and accelerate technology cycles.

Red Hat is Atos' main open source partner for providing carrier-grade infrastructures for NFV deployments on Red Hat OpenStack Platform, containerization with the Red Hat OpenShift® Container Platform, and for cloudification of IT applications. Atos leverages Red Hat's strengths in certification, assurance, test, and integration to meet CSPs' requirements in terms of performance and security.

For complex cases or proofs of concept, Red Hat engineers engage with Atos engineers to deploy specific solutions. Red Hat's engineers in Grenoble help Atos experts and collaborate with equipment vendors such as Juniper Networks and Dell EMC to set up the infrastructure layers of the laboratory.

About Red Hat

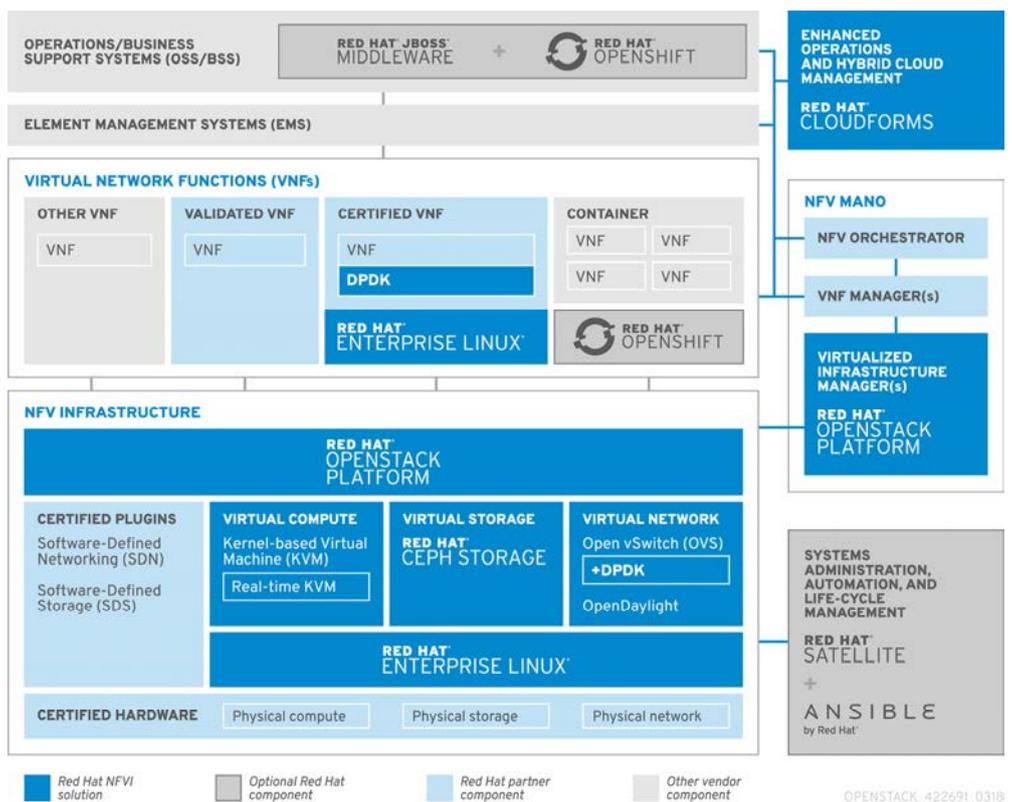
Red Hat Inc., incorporated on October 17, 1998, is the world's largest provider of open source software solutions with revenue of \$2.4 billion in 2016. Red Hat utilizes a community-powered approach to develop and offer operating system, virtualization, management, middleware, cloud, mobile, and storage technologies.

Red Hat's products and services include infrastructure-related offerings, application-development-related and other technology offerings, and consulting, support, and training services.

Red Hat does not just lead in Linux, but it plays a leading role in many different communities. This includes well-known projects such as the Docker container engine, Kubernetes, and OpenStack, which are among the fastest-growing open source projects in recent years. Red Hat has been a key contributor to all of these projects and brings them to market in products such as Red Hat OpenShift Container Platform, Red Hat OpenStack Platform, Red Hat Ansible® Tower, Red Hat CloudForms®, and Red Hat JBoss® Middleware, which are growing at over 40% a year.

Red Hat offers the NFVi/VIM layer based on OpenStack. Red Hat OpenStack is 100% open source and upstream compatible, which enables it to continue to benefit from the innovation of the open source community while avoiding vendor lock-in.

Figure 2
Red Hat NFV Platform



Source: Red Hat

The company has worked with ETSI, Open Platform for NFV, and Open Daylight, and with CSPs, OEMs, ISVs, and Atos to make OpenStack NFV ready. The NFVi/VIM layer consists of a multitude of open source projects such as Linux, KVM, and OpenStack. Red Hat delivers key features to ensure the performance, reliability, and security needed for NFV projects in carrier-grade environments.

Challenges and Opportunities

IDC believes the main challenge for Atos is related to the competition coming from other system integrators. Every large system integrator wants to play a central role in the NFV journey, leveraging its expertise in proprietary and open source solutions. The winners will be those that provide end-to-end technology support and strategic consulting based on business outcomes. Differentiation will come from the articulation of strategic thinking and operational changes in various areas, such as virtual solutions and legacy infrastructure, security, network and IT cloudification, automation, and network operations.

The NFV Lab initiative is likely to accelerate NFV deployments by removing technology concerns. But laboratories and innovation centers are becoming the new normal in system integrators' and equipment vendors' consulting assets. In this battle, key success factors are access to true multivendor NFV ecosystems, testing in a carrier-grade context, testing of trials in a cloud environment, gaining access to NFV/cloud use cases libraries, and knowledge transfer.

Conclusion

Many CSPs have just started their NFV journey by virtualizing a limited number of functions. But to exploit the full potential of the expected benefits in terms of agility, elasticity, and savings, further action is needed: CSPs will need to increase the number of VNFs and expand virtualization to other areas in conjunction with their product roadmap. 5G, IoT, edge computing, next-generation WAN services, and new entertainment services will heavily depend on the speed and success of NFV deployment and network cloudification.

IDC believes that Atos, with more than 30 years' experience in CSP operations, is well placed to play a central role in the NFV journey. The expertise in cloudification, end-to-end support, carrier-grade open source platforms, security, and automation is a key asset to meet CSPs' expectations and help them in their complex and long-term digital transformation. Atos' consulting and advisory services, at both technology and business levels, are very compelling, and can help CSPs select the best partners in complex but promising NFV ecosystems.

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