



## Orange Solution Brief

OPNFV Critical to Orange's NFV  
Transformation Journey

The OPNFV Project helps Orange with VNF and service on-boarding, reference architectures, simplification of operations and interoperability testing





## COMPANY:

- Major telecommunications operator
- Wireless, fixed telephony, internet, and IPTV solutions
- Major initiative around On-Demand Networks

## SOLUTION:

- OPNFV involvement
- Specific OPNFV initiatives: testing, CI, security

## CHALLENGE:

- Full network automation
- Retraining human resources
- Stability and performance of NFV technology

## BENEFITS:

- Access to open source
- Testing and interoperability of open source NFV architecture
- VNF/ service onboarding
- Operational simplification

“Orange sees OPNFV as the right vehicle to create an end-to-end network made of certified VNFs, NFVI reference architecture and integrated MANO/ONAP.”

- JEHANNE SAVI, EXECUTIVE LEADER OF THE ALL-IP  
AND ON-DEMAND NETWORKS PROGRAMS



# THE BUSINESS

Orange is a leading telecommunications company with headquarters in France. It boasts 265M customers worldwide, 154,000 employees, revenue of \$43B (2016) and has a current market capitalization of \$45B.

Their solutions range from mobile, fixed telephony, internet and IPTV. Orange has 4G wireless deployments in 18 countries, over 3.3M fibre customers and 450,000 Km of undersea cable. The company also offers business solutions and networks, carrier services, and a variety of related telecommunications products and services. They are the largest telecom operator in France and the bulk of their operations are in Europe, Africa and the Middle East.

Orange is making significant investments into future technologies, spending over \$16B between 2015 and 2018 into new networks (4G, 4G+, fixed fiber). Along with access network investments, Orange is also advancing SDN and NFV technologies as a way to create new revenue streams, improve agility, and reduce costs. The program is aptly named “On-Demand Networks.”



*Orange hosted the OPNFV Danube Plugfest in France, April 2017*

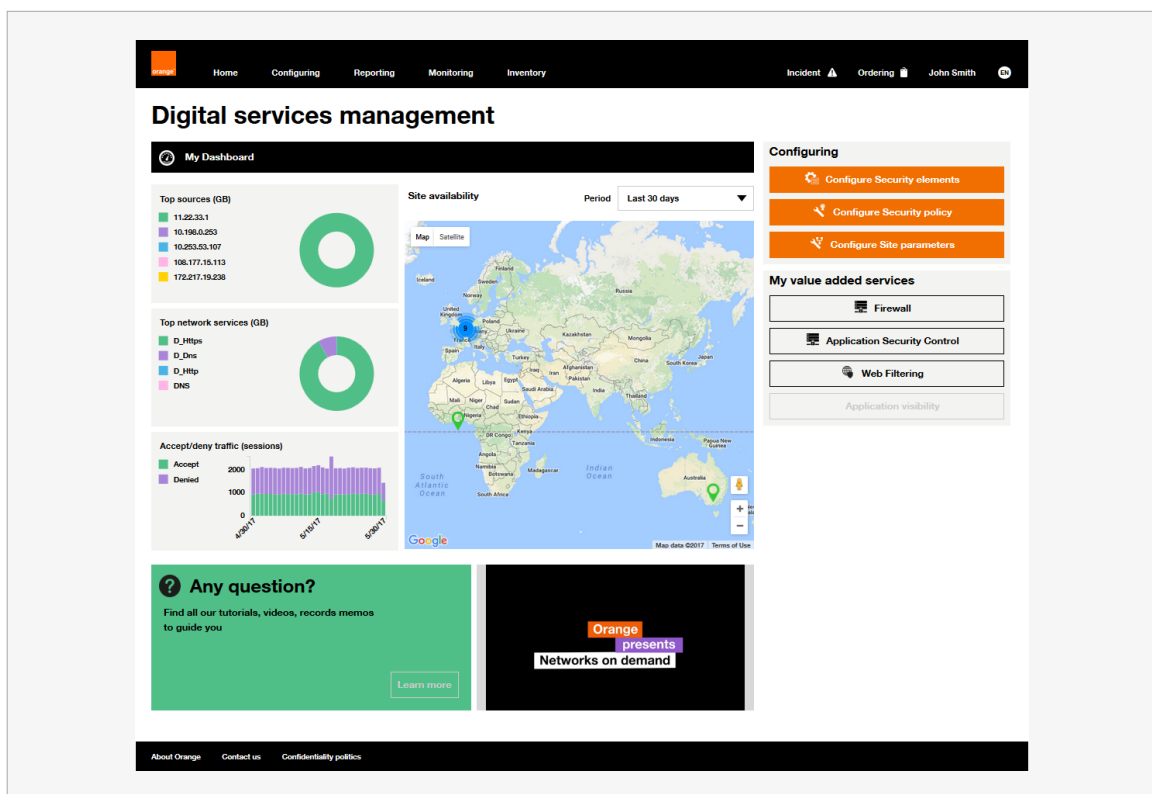
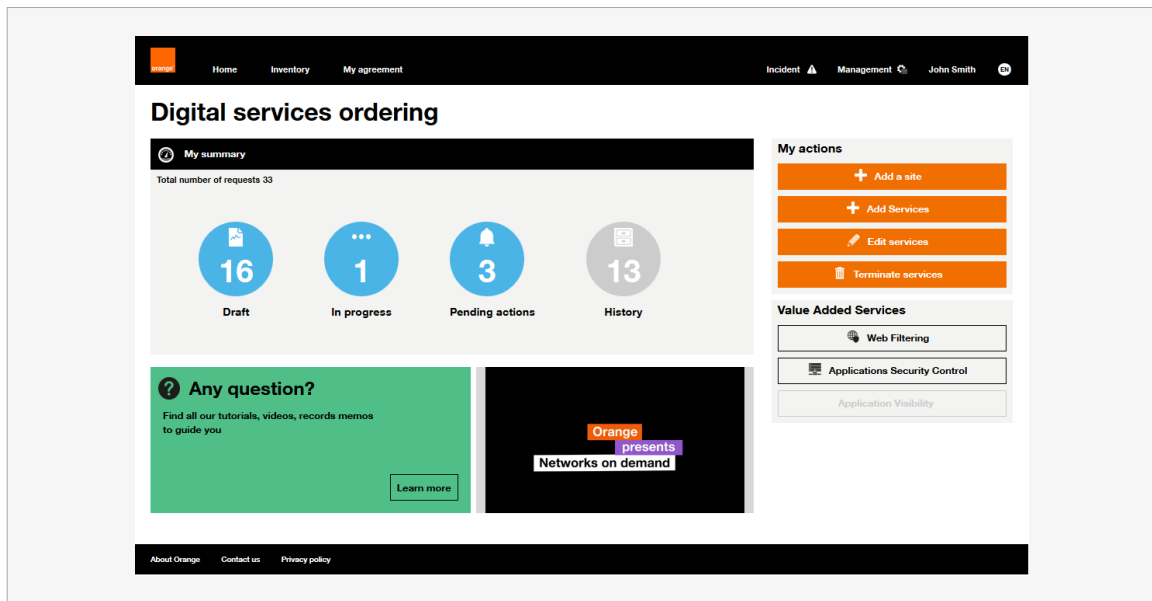


# CHALLENGES

Orange views NFV Similarly to the industrial revolution. “It will profoundly impact our ‘factory’ (i.e. network) and business models along with changing consumer usage and creating a huge societal impact,” says Jehanne Savi, Executive Leader of the All-IP and On-demand Networks Program at Orange.

With 5G and network slicing (end-to-end partitioning of network resources with different performance, availability and scalability characteristics required for rich 5G services) around the corner, both SDN and NFV are major areas of investment. In fact, 5G will be natively virtualized. The On-Demand Network program has the highest level of focus from the management team.

Orange has prioritized the rollout of different NFV use cases, starting with the ones that are narrower in scope or require less maturity from the underlying NFV technology. An example of a publicly announced offering is the Orange [Easy Go](#) Network, a 100% SDN/NFV Network as a Service (NaaS) offering for branch or remote-site connectivity provided by Orange Business Services. The Easy Go Network covers 75 countries and helps companies instantly provision branch connectivity. Customers use a self-service portal to deploy VNFs onto a universal customer premises equipment (uCPE) device. Additionally, security, deep-packet inspection (DPI) and other VNFs are available. Easy Go Network uses eight POPs worldwide and is built on OpenStack cloud infrastructure.



Orange Easy Go Network Portal Screenshot

Additional On-Demand Network services are under development, and Orange has publicly stated that they are sourcing vEPC in 2017 and preparing for vCDN, vRAN, and other services. Several Key Performance Indicators are being reviewed to measure the progress of the NFV journey, ranging from number of VNFs deployed, POPs virtualized, employees retrained, and customers served by virtualized networks.



Based on the Easy Go Network experience, Orange is a firm believer that to experience the entire spectrum of benefits, full-scale NFV is required that includes model driven architectures, policy driven automation, DevOps, closed loop feedback with big data analytics (ultimately utilizing AI and machine learning) and of course hardware disaggregation and virtualization. It is not enough to simply virtualize hardware resources, as other capabilities above are critical to automate operations such as self-healing, scale-out, scale-in and lifecycle management.

In addition to the technology component, there is also a distinct human component to NFV transformation. There is a need to retrain the staff on the new software driven automated models. “Engineers’ focus is likely to move from a device Command-Line Interface (CLI) level to a much broader scope that may impact the whole network and include multiple functions, including security, traffic optimization, and monitoring,” says [Marcel Van Wort](#), Managing Consultant, Orange Business Services. “As a result, network engineers may need to re-train to take on a broader responsibility area that includes a considerable increase in both functional and geographical scope.”



# SOLUTION

OPNFV is a key open source project Orange has chosen to engage with in order to address these challenges. Orange views open source software as a good option for the NFV infrastructure (NFVI) and the Management and Orchestration (MANO) technical components. Given this, OPNFV offers a way to collaboratively work on a set of reference architecture scenarios and testing tools for NFVI and VNF compliance and verification.

“Orange is the top telecom operator contributor in OPNFV, and in the top 5 across all contributors. We were very pleased to host the third OPNFV plugfest in April 2017, and made significant progress during a busy week in Châtillon.” said Morgan Richomme, NFV Architect at Orange and a member of the OPNFV Technical Steering Committee (TSC).

The OPNFV projects of most interest to Orange are Functest, Moon, Yardstick and the OPNFV CI pipeline. These four initiatives are briefly described below:

- **Functest:** This project deals with the tooling and test cases around validation and functional testing of various OPNFV scenarios. The test suites in Functest come from upstream projects (e.g. OpenStack, ODL), OPNFV feature projects (e.g. Doctor) and the Functest team itself. Orange contributed to Functest on the framework and test cases since the first version. Orange developed the end-to-end integration of a vIMS test case. It includes the automation of the deployment of a MANO stack, the deployment of a complex and realistic Telco VNF (vIMS) and the execution of functional tests. During the OPNFV plugfest in April, performance tests were automated, and during the OPNFV Summit in June, the test case was used to



address software upgrade and multi-site deployment, which are two of the OPNFV [End User Advisory Group](#) pain points. This test case was used as the baseline by other contributors to on-board new VNFs and/or new MANO stacks

- **Moon:** The Moon project, led by Ruan He security expert at Orange, is working with the upstream OpenStack Keystone project to improve the isolation, protection and interaction at both infrastructure and VNF levels. The project does so by identifying gaps in OpenStack and the ODL AAA projects and contributing features to upstream projects around authorization, logging, network enforcement, storage enforcement, and so on.
- **Yardstick:** This project runs performance tests on different scenarios and is based on ETSI reference test suites. The Yardstick project is broken down into compute, network, and storage performance tests executed against the NFVI. There are Yardstick plugins to test specific components as well such as the virtual switch, SDN controller, storage etc. The current performance of NFVI does not satisfy telecom operator needs yet, making Yardstick and related projects very important.
- **CI pipeline:** OPNFV uses a very sophisticated CI pipeline that performs health checks upon every commit, integrates various projects into scenarios (combinations of components) on a regular basis and executes daily and weekly tests automatically against those scenarios. The OPNFV CI pipeline can form the basis of a telecom operator's internal CI pipeline as they move into the DevOps model world. The OPNFV CI pipeline has been setup in the Orange integration Center, and is used to provide support to Orange's affiliates and help on the industrialization (hardening) of VNFs.





# RESULTS

The first benefit Orange has gained from OPNFV is access to open source software. Orange uses open source as a way to speed up the industrialization of technology and ensure open APIs to minimize vendor lock-in.

In addition to getting access to open source software, OPNFV offers (and is expected to offer) further benefits in the areas of NFVI testing, reference architecture scenarios, VNF on-boarding and verification, network service onboarding, simplified operations and interoperability:

**NFVI testing:** As a testament to the value of OPNFV test tools, the Orange integration center that put together the current OpenStack-based solution, used OPNFV test projects to validate their NFV infrastructure.

**VNF on-boarding and verification:** The global supply chain of VNF vendors simply cannot customize their offerings to cater to every telecom vendor's architecture. The requirements are too diverse to make this viable. So even though OPNFV does not play this role currently, through the inclusion of the MANO/ONAP software along with automated testing, it can become the de facto platform for VNF on-boarding and characterization. This will create a virtuous cycle — as more VNF vendors test their products against OPNFV, more telecom vendors will join OPNFV, attracting even more VNF vendors. "OPNFV scenarios are important to evaluate VNFs, telecom operators can adapt a scenario for a specific VNF based on, for example, the performance characteristics required," says Jamil Chawki, IT and Cloud Networks Standards Director and OPNFV board member.

**Network service on-boarding:** An extension of VNF on-boarding is to on-board and test an entire service composed using multiple VNFs. OPNFV, in collaboration with ONAP, has the possibility of becoming a de facto platform for this important role as well.



**Simplifying operations:** NFV entails complex architectures making it difficult to guarantee performance and end user service level agreements (SLAs). Simplifying operations is another important value OPNFV brings to the table. Along with the inclusion of MANO technical components, OPNFV's numerous feature projects and reference architecture scenarios can be used to create DevOps style automation. The economic benefits of NFV become difficult to justify if the network has to be managed by highly paid engineers all the time and OPNFV helps ameliorate this concern.

**Interoperability:** "No one vendor can manage the cost of interoperability testing, it must be a collective effort," Savi says. The various test projects in OPNFV are extremely beneficial in establishing interoperability between different open source components. A collective system makes interoperability testing sustainable over the long-term.

In summary, NFV is a company-wide initiative for Orange that is deemed mandatory for the next generation of networks (such as 5G) and services. The NFV transformation effort brings a variety of challenges with it and Orange uses OPNFV to solve a number of important issues ranging from VNF on-boarding, creating reference architecture scenarios, simplifying operations, and interoperability testing.



# REFERENCES

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