Analyst Insight

Nokia Deepfield scores big in the crowded analytics field

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Acquired in 2016, Deepfield is delivering on its promise

On 30 May 2019, Telefónica de España selected Nokia's Deepfield Cloud Intelligence analytics platform to improve user experience and troubleshoot content delivery in real time. With this tool, Telefónica expects to attain unprecedented real-time visibility into application and service traffic on its network with data-driven insight and analytics that can be turned into automated actions to significantly improve service assurance and performance.

Why winning this Telefónica deal is a big deal

First, Telefónica is the world's seventh-largest telecom service provider by 2018 revenue. Second, it is one of the world's most innovative and aggressive telecom service providers, known for continuously experimenting and introducing new technologies. And third, to win a deal at Telefónica, a vendor needs to meet a series of stringent selection criteria while staying on a well-defined budget—the vendor is typically asked to deliver more than the budget allows.

As Deepfield is tied to Nokia's IP routing portfolio and Telefónica de España was already a big customer of theirs, the deal might appear to be the extension of an ongoing relationship rather than a new win. There is no question this existing relationship gave Nokia a leg up, but the win came out of a very crowded field involving traditional IP players like Cisco and Juniper Networks, as well as deep packet inspection (DPI) and data analytics specialists, all involved in Telefónica's multi-domain network transformation project illustrated in Exhibit 1. Telefónica's project is based on three pillars: UNICA, the virtualization program; FUSIÓN, the disaggregation of the IP network layer; and OPA, which is the development of an open access architecture. This deal is related to FUSIÓN.

At Mobile World Congress in Barcelona this year, SVP of Technology and Architecture Juan Carlos Garcia presented an update on this ongoing network transformation, which is aimed at building one agile automated network for everything by disaggregating hardware from software for every function. To some extent, this project is very similar to what AT&T has been doing over the past four years or so. It's all about building one physical network infrastructure with multiple logical functions.

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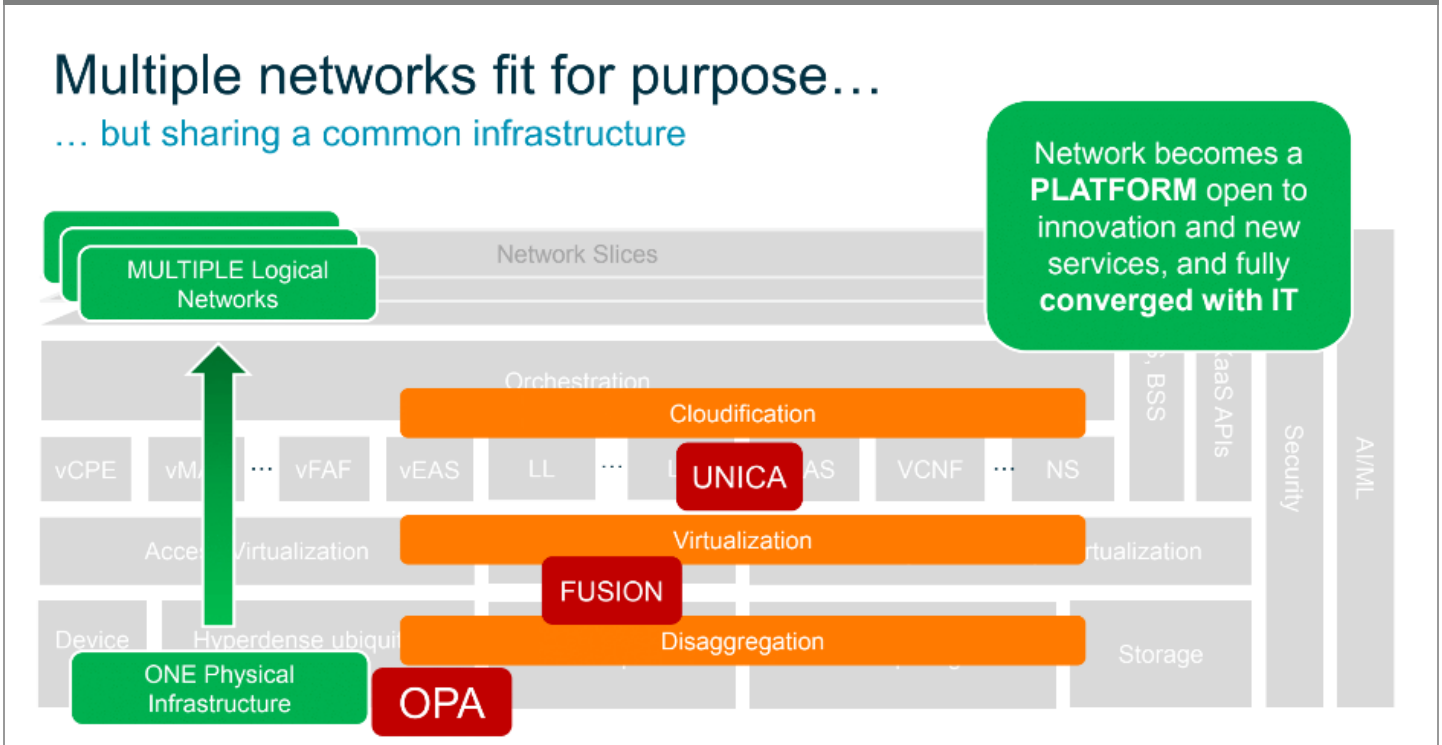
Exhibit 1 Telefónica's network transformation



Source: Telefónica

As an entry point, UNICA paved the way for Deepfield in FUSIÓN

Nokia has been a key player in Telefónica's network virtualization program UNICA, which started in 2014, about 18 months after ETSI created the NFV industry standards group—the industry's best-known wide-scale virtualization initiative. As part of the UNICA project, Telefónica deployed self-organized network (SON) tools and its radio access network architecture to not only implement self-configuration functions but also develop the building blocks of an automatically orchestrated and managed design using ETSI's Open Source MANO (OSM) alongside zero-touch operations, aligned with ETSI's zero touch service management (ZSM) model. The company also engaged with the TM Forum on zero touch and supporting open APIs.

Covered in our *Mobile Infrastructure Intelligence Service* (see the IHS Markit *SON & Optimization Software Market Report - Regional – 2018*), the SON activity provides valuable competitive insight into Telefonica's stringent needs and requirements for the automation of new domains enabled by 5G network slicing and the needs of future backhaul and MIMO optimization. Not entirely satisfied with its 2015 investment in Cellwize (deployed first in Telefónica O2 in the UK for basic LTE network optimization) to create new open architectures suitable for 5G, the company brought the Nokia EdenNet SON tool to add machine learning into the mix and turned to PI Works to plan for the future integration of OSM, OpenRAN, and 5G Core with a set of AI-powered new automated use cases. As part of this process, Nokia's automation capabilities made a great impression.

Deepfield fully meets FUSIÓN's automation objectives

Although Deepfield is fundamentally a security play that replaces the DDoS protection scheme used by Arbor Networks (it was started by the same team, which is now part of NETSCOUT Systems), the deal is all about analytics and automation. As Telefónica dives deeper into the transformation of its IP network, the need to introduce more automation capabilities in various domains quickly surfaced. As the company faced an onslaught of online video traffic and cloud applications, it became clear that real-time detailed knowledge of network and service performance was required to truly achieve the benefits of automation. Since this is the IP layer, Telefónica engaged with all the usual suspects while again opening the door to its vast ecosystem. Already on board with its EdenNet SON tool, Nokia had a leading edge and saw a unique opportunity to introduce Deepfield as a perfect fit. After thorough evaluation, the Nokia Deepfield tool was selected because it gave the best necessary network visibility and actionable analytics that allow Telefónica to automate its operations and continue to improve its network and service capabilities. We believe Deepfield's four chief differentiators are:

- **Real-time visibility of what's happening in the IP layer:** According to Deepfield's Internet traffic research and analysis, cloud applications such as Netflix, Hulu, HBO Go, Google Docs, and Facebook account for 60% of today's Internet traffic, which is characterized by rapid stochastic pattern changes triggered by a wide variety of events (e.g., iPhone iOS updates, new episodes on Netflix, viral YouTube videos, cyber-attacks). These unpredictable patterns have serious damaging effects on IP networks and need to be managed in real time.

- **Automation:** Deepfield allows for easy and fast integration in the Open Source MANO (OSM) environment. As Telefónica is using OSM to automate its NaaS (Network as a Service, which can be seen as one way to implement end-to-end network slicing) delivery across different NFVI, domains, and network functions, it is evolving its FUSIÓN SDN project into iFusión, with domain-specific SDN controllers eventually replaced by a single end-to-end open source SDN controller. In this environment, Deepfield provides the necessary real-time big data analytics.

- **Probe-less:** All of the above is achieved without probes.

- **No need for DPI appliances:** DPI is the traditional way of collecting Internet traffic data and consists of deploying appliances at select network locations, mainly at the access entry and peering points, which would be insufficient for real-time visibility and very expensive in this FUSIÓN project given the high number of appliances required. With Net Neutrality rules in effect in many countries, the use of DPI can be either restricted or prohibited.

Connecting the dots between Nokia and Deepfield

At a meeting at Mobile World Congress Americas 2017 in San Francisco, California, Nokia CEO Rajeev Suri was very keen to talk about five acquisitions he had made within five months: Deepfield was one of them, along with Nakina Systems, Eta Devices, Comptel, and Gainspeed. As the event focused on mobile, especially on 5G, it was somewhat difficult to connect the dots between those acquired companies and what exactly they were bringing to Nokia. To help us, Rajeev said, "Nokia makes strategic acquisitions where we see trends." He also said that Nokia was looking at verticals, including web-scale companies. At the time, it was difficult to understand the potential fit, but in retrospect, looking at the origins of Deepfield with its deep roots in Internet traffic analysis, the acquisition sounds very compelling—even more so when we discovered that web-scale companies are actually using Deepfield.

From Internet routing instability to Internet video and cloud traffic analytics

Founded in 2011, Deepfield was privately held, headquartered in Ann Arbor, Michigan, and employed approximately 65 people. At Nokia, because of its IP roots, the entity resides in the Network's IP and Optical business unit instead of Software, and CEO and founder Craig Labovitz stayed and became CTO.

The origins of Deepfield come from the mid to late nineties after Labovitz, fellow scientist G. Robert Malan, and University of Michigan Professor Farnam Jahanian published a paper titled "Internet Routing Instability" that quickly became one of the most comprehensive contributions in the field and remains recognized as such by the ACM SIGCOMM today. In this paper, the authors describe several unexpected trends in routing instability and examine a number of anomalies and pathologies observed in the exchange of inter-domain routing information.

The analysis is based on data collected from border gateway protocol (BGP) routing messages generated by border routers at five of the Internet core's public exchange points during a nine-month period. The study shows that the volume of these routing updates is several orders of magnitude more than expected and that the majority of this routing information is redundant, or pathological. In addition, the study reveals several unexpected trends and ill-behaved systematic properties in Internet routing. The authors provide a number of explanations for these anomalies and evaluate their potential impact on the Internet infrastructure. This work led to the creation of DPI appliances and built the foundation of Deepfield, which is based on data ingestion from both network and back office data sources (e.g., Flow, DNS, BGP, SNMP, AAA). The data is then mapped with an Internet map provided by Cloud Genome, Deepfield's core technology.

The Genome technology tracks 30,000 popular cloud applications and services and tracks how this traffic runs to and through networks to reach subscribers, in real time. The result is a comprehensive, multi-dimensional view of the network and the applications that flow through it that can support advanced IP network engineering and assurance use cases.

Bottom line: Playing in a crowded field, Deepfield stands out and adds security

Deepfield addresses four use cases: real-time network insight, performance, security, and automation. We only analyze three. On the security front, Deepfield provides real-time DDoS detection via its network telemetry function and agile mitigation with its FP4-based service routers or scrubbing centers. That too is currently gaining traction and making a lot noise among the established players, notably NETSCOUT.

From a pure analytics/performance/automation standpoint, this acquisition has already propelled Nokia in a very crowded field dominated by a flurry of established players. And from a security standpoint, after Arbor Networks was working with everyone else in the industry and was too expensive to be acquired, Nokia needed a sound security strategy; Deepfield delivers on both fronts and won the Telefónica deal on analytics.

The company told us they now have more than 40 customers globally and they have already doubled the number of customers in EMEA alone so far this year. All of this includes telecom service providers like Telefónica, hyperscale and web-scale companies, and a few digital enterprises.

It may be time for us to look more closely at the Deepfield versus NETSCOUT security race.

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