

What the customer wants!

From Networking to Network PaaS



In the recent past, information technologies operated in static infrastructure silos. However, mass adoption of the cloud delivery model has irreversibly changed enterprises' expectations of how IT infrastructure services should be built, provisioned and priced. Retooling carrier networks using virtualization technologies puts the agility of the cloud model within reach. We expect carriers' adoption of these technologies to drive "Platformization" of networks, allowing enterprises to manage all network services, from Internet to data-center interconnection and public cloud connectivity, seamlessly. This will create a substantial opportunity for operators to expand the scope of services beyond connectivity. However, it will also be a significant change, if carriers are to adjust to these new realities.

The enterprise network is gaining prominence because of digitization. Enabled by widespread availability of low-cost connectivity, businesses are using digitization to enable operational efficiencies, service and product innovation and, in some cases, new business models. Sectors as diverse as travel, automotive, finance, retailing and utilities are all increasingly dependent on both their own and third-party infrastructure and application platforms for engagement – hence growth and productivity.

Digitization is driving profound changes in networking traffic. Greater external engagement with customers, employees, ecosystem partners and "things" is also fuelling demand for bandwidth, to interconnect private and public data-processing and storage facilities. Moreover, traditional enterprise client-server application demand is giving way to step-change growth in web applications, collaboration tools and videoconferencing traffic. These new workloads demand substantially higher bandwidth and improved performance and availability. Moreover, fuelling the digital economy from "big data" for real time analytics to artificial intelligence, requires scalable networking services that can expand and shrink on demand, to deploy, for example, a new service across thousands of branches. This effect is exacerbated at multi-local corporations, which are experiencing a step change in external bandwidth growth. They also face internal growth due to emerging application-to-

application traffic across owned data centers and the Internet as well as cloud infrastructure services such as Amazon Web Services (AWS) and Azure, and cloud applications and services such as Salesforce, Office 365 and Google Analytics. In this change, the network has become the pivotal element of digitization, which connects the enterprise to almost everything. However, networking as we know it cannot keep up for long.

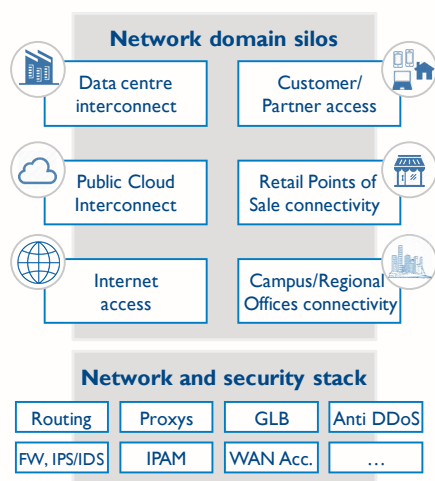
This viewpoint promulgates a platform-centric view of networking. It is the result of 12 months of intense activity, in which BBVA, supported by Arthur D. Little, developed a vision, defined requirements and sourced its global networking platform concept – called "Synapse". BBVA wants to share its insight from its internal architectural development process, in order to give momentum to the shift to platform-centric networking. Project Synapse has also benefited from contributions and open discussions with product managers, network architects and sales teams at dozens of leading carriers and technology suppliers.

Enterprise networking is broken

Large-scale enterprise networks typically consist of large numbers of siloed flows across numerous domains, as shown in Figure below. These flows serve to interconnect and segment diverse endpoints: private and public data centers, regional offices, and retail points of sale, as well as customers and

partners, connected via public and private networks using ethernet, MPLS or 4G. This model has built up over many years, often with little reuse. Each networking flow is built by manually stringing together multiple silos to constitute an end-to-end service. Typically, a piece of custom hardware at the customer site is combined with an “access” and “transport” service to provide connectivity, which, together with a “service-delivery platform” application, provides the service. Stringing together silos is not cheap, requiring long-term customer commitment. This has meant that connectivity services are available only as multi-year, fixed-price contracts for businesses both large and small.

Enterprise network silos and stacks



Source: Arthur D. Little analysis

The largest enterprises have taken this a step further by contracting multiple vendors to ensure resilience, creating additional complexity. This is in stark contrast to the everything-as-a-service model of the cloud.

To add to the complexity, enterprises overlay vast numbers of hardware and software appliances or stacks to provide users with basic networking and security services. Such services include DNS, routing, proxy, WAN acceleration, RAS and firewalls. These appliances or stacks are woven into the networking fabric, and typically configured manually to operationalize connectivity services. The amalgamation of silos and stacks is usually invisible to the user, but is the lubricant of the digital enterprise engine. As companies have expanded their networks, the silos-and-stacks approach to networking has created a patchwork of unimaginable complexity. As a result, the enterprise network has often earned a reputation for lack of responsiveness and high cost.

The silos-and-stack architectures and mode of operation are quite distant from the cloud delivery model, which was born virtualized. The cloud delivery model uses modularity and the ability to string together elements using software to provide a dynamic service model in which almost everything is available

on demand – a critical enabler of the everything-as-a-service paradigm. This is possible due to substantial advances in data-center and network virtualization technologies that make it easier to design and configure virtual infrastructure and IP networks. Such is the success of the data-center cloud model, in that it is redefining expectations for connectivity, networking and security services. In this environment, if corporates are to be competitive in upstarts of the digital era, they need help – a lot of help indeed.

Expected benefits of the new model

Immediate benefits

- Single network platform for all BBVA Group domains
- New approach to “true resilience” by design through total visibility
- Rate card-based pricing for economic predictability and long-term commercial relationships to avoid time-consuming procurement processes
- Step-change reduction in provisioning times

Long-term benefits

- Platform logic enables agile operations, scalability and, eventually, control to optimize user experience
- Programmatic interfaces that allow automated provision of network and security services integrated with DevOps practices
- Tools to embed a global security policy to deal with cyber threats, e.g., service insertion of firewalls and IPS
- Economies of scope or innovation enabled by a carrier

From silos and stacks to Network PaaS

Network-service virtualization turns the silos-and-stack model on its head. It achieves this by abstracting the different elements that belong to each silo, to enable software-based control across all domains. Thereafter, “softwarization” can be used to automate end-to-end network management, service provisioning and delivery, from service turn-up to configurations and turn-down, of pretty much everything provided on-net. It also allows programmable interfaces to be exposed internally to enable network operators to further automate management tasks. But the real power is in making these features available to customers, in the form of browsers or APIs that directly allow users to manage all service elements of bandwidth and topology, with the ease of “drag and drop”. The ability to execute an end-to-end order process, with zero human intervention, is what we refer to as a Network Platformization or NPaaS.

Platformization of the network can also be extended beyond connectivity. Cloudification of network and security appliances means these, too, can be provisioned and configured on

demand. But with a critical difference, it is all done through software and can be located almost anywhere, including the network edge. Using service insertion, deployment of virtual appliances can achieve a comparable degree of automation to that of cloud-infrastructure providers. So rather than calling their suppliers, corporate networking teams can use their customer-facing portals to spin up appliances, at the push of a button, from drag-and-drop menus of services from a wide variety of appliances and vendors. Ultimately, platformization makes putting customer needs at the center of the offering realizable.

Stitching together on-the-fly bandwidth, network and security appliances is the end state of the NPaaS, and will redefine the network proposition for good. To build a credible proposition will require placing product bets or building marketplaces to attract credible vendors. NPaaS will create a new form of differentiation. However, it will require both network-service buyers and sellers to make profound changes.

Aspiring Network PaaS buyers and sellers beware

Using virtualization technologies to recast the network from silos and stacks to a platform emulating the cloud delivery model is a significant opportunity, but also a significant change.

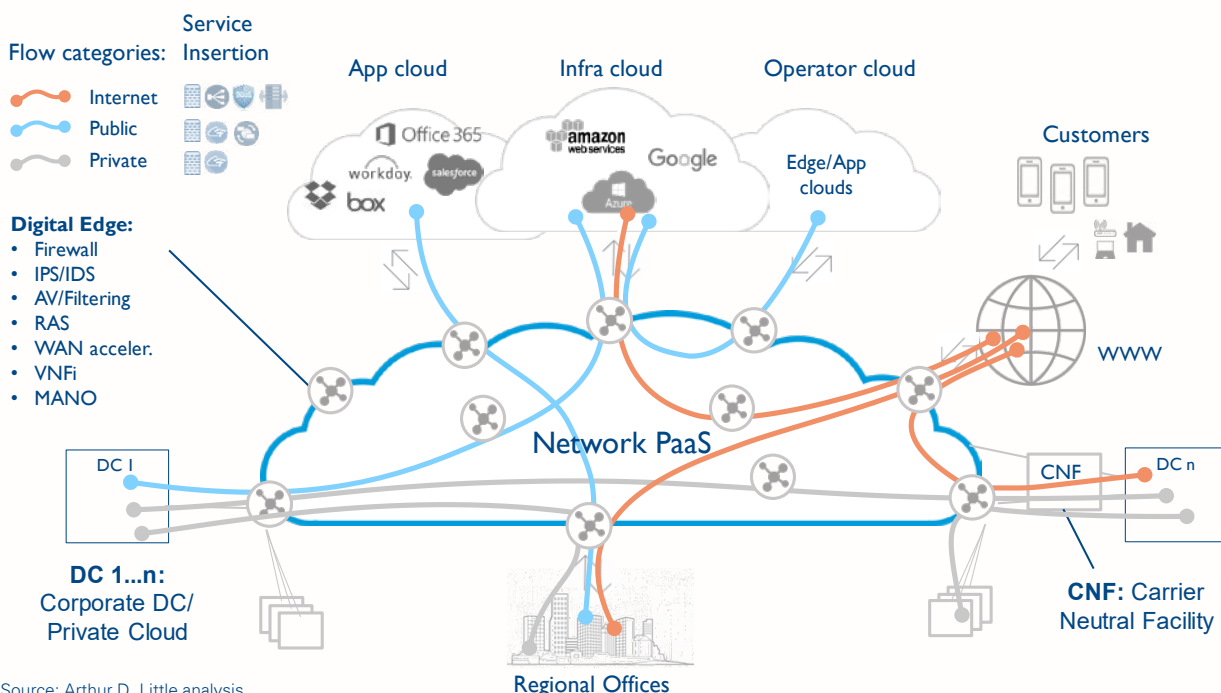
For the carrier, platformization means the need for a single coherent network and cloud infrastructure platform that enables connectivity, networking and security services to be supplied on demand. In addition to developing the infrastructure and a wide offering of network and security services, sellers must “componentize” services and cede or offer shared control of their infrastructure, allowing enterprises to define new flows and

insert services seamlessly, as shown in Figure below. To serve the most demanding global clients, this may require placing network services close to the users or at the edge, where data is generated and/or consumed, rather than in centralized locations. This represents opportunity for highly differentiated services, but also creates the need to develop a comprehensive footprint of resilient infrastructure. This represents a substantial opportunity for carriers to encroach on numerous multi-billion-dollar adjacent niche businesses, and establish early-mover differentiation.

For the customer, platformization means trusting the carrier platform as if it were its own. This means moving to a single supplier and sharing the benefits and risks of service reliability. In this mode of collaboration, the traditional approach to service continuity and SLAs must give way to resilience by design and open-book collaboration for mutual gain. While it may feel like a tough pill to swallow for corporates, the potential benefits of moving to a single supplier are vast. A single supplier opens the possibility of using the network to its fullest potential to enable, among other things, quality of experience and next-generation security management.

A single, end-to-end view of the network means flows can be optimized based on real-time feedback. It also allows the use of micro-segmentation to enable superior isolation and policy-based security. Because security can be automated, so too can security auditing, creating many new possibilities for better protection in the context of rising cyber threats. But current corporate buyers must make changes in procurement practices to consume platform-based services. On-demand means changing contractual models for more open-ended service rate

Network PaaS architecture



Source: Arthur D. Little analysis

cards. Moreover, consuming services will require new tools and management systems to ensure spend is managed and optimized without compromising service and security. Some enterprises, such as GE, are developing automated tools to control spending (i.e., the amounts and nature of acquired services) as they move to IaaS.

Service-oriented architectures have been a game-changer for cloud providers. In the processing and storage domains, cloud-based architectures have radically altered value creation dynamics. (Compare HP and IBM to AWS and Microsoft.) We believe the same will happen in the network space. We expect the change to drive the “Platformization of networks, creating not only substantial opportunity to expand the scope of carrier services, but also significant risks for operators that choose to stand still.

Acknowledgements

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Glossary

AWS	: Amazon Web Services
DNS	: Domain-Name Server
IaaS	: Infrastructure-as-a-Service
MPLS	: MultiProtocol Label Switching
NPaaS	: Network Platform as a Service
RAS	: Remote-access server
SLAs	: Service-Level Agreements
WAN	: Wide-Area Network

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About BBVA

BBVA is a customer-centric global financial services group founded in 1857. The Group is the largest financial institution in Spain and Mexico and it has leading franchises in South America and the Sunbelt Region of the United States; and it is also the leading shareholder in Garanti, Turkey's biggest bank based on market capitalization. Its diversified business is focused on high-growth markets and it relies on technology as a key sustainable competitive advantage. Corporate responsibility is at the core of its business model. BBVA fosters financial education and inclusion, and supports scientific research and culture. It operates with the highest integrity, a long-term vision and applies the best practices.

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