Unlock the possibilities of technology to support your digital transformation journey

Featuring exclusive research from Gartner.
Across the world, economies and societies are being fundamentally transformed by digitalization. New disruptive technologies are changing the way societies face crucial challenges and it is important that the wholesale community’s strategies evolve in parallel and in response to this wider consumer paradigm shift.

The international business landscape is constantly changing and carriers must also adapt to best serve their customers. Telefónica is leading the way with the new technologies and strategies that are shaping communications today, helping our customers to prepare for the future and capture new opportunities.

I hope you find the enclosed exclusive research about disruptive trends for CSPs from Gartner of interest.

Juan Carlos Bernal
CEO, Telefónica International Wholesale Business

An era of change

Telefónica’s transformation journey

During the last few years, Telefónica has been immersed in a period of transition with the end goal to meet our customers’ growing expectations and retain their trust to ensure long term commercial success.

Applying innovation to the way we do business, operate and collaborate has been key to this process. This philosophy has been applied to our four major, distinctive technological platforms. The first platform consists of our physical assets, such as networks and data centres, whilst the second relates to operations and commercial systems along with IT management systems which support the network. The third platform is about delivering the best products and services, while the fourth platform leverages the real value of customer knowledge, closely linked to Big Data and Artificial Intelligence.

The transformation of Telefónica’s international wholesale business is centred on key fundamentals; the way it offers core services to maintain leadership and differentiation, and the need to constantly improve services with better access options through satellite, fibre, mobile, and radio, and widening coverage for ITFS, SIP Trunk and Ethernet services.

“Applying innovation to the way we do business, operate and collaborate...”
Our network is one of our greatest assets, and connectivity is at the very heart of our business. Whilst we have invested in our fixed and mobile networks, the future is digital and as such we are evolving towards a flexible, programmable, software-based, future-proof network. Our journey will allow us to transform our transport and core infrastructure in all geographies; improving communication capabilities for all of our customers.

"...the future is digital and as such we are evolving..."

Automation and virtualization - fundamental for the future of networks

Automation and virtualization are already an essential part of our networks, whilst Network Softwarization is transforming how services are deployed, delivered and consumed.

The automation and softwarization of our infrastructure and services allows us to orchestrate services in a more dynamic, flexible and efficient way whilst improving all processes: pricing, ordering, provisioning, ticketing and billing. It also provides an opportunity to enhance customer experience; a major factor for business success.

We have a fully virtualized network system, which enables our customers to access a virtualized platform, available worldwide, in order to extend their own infrastructure and products globally. Furthermore, we have made significant investment in automation tools meaning our BSS and OSS is structured in a more dynamic Full Stack System, placing our customers in control.

Enhancing Core Services - through open and efficient redesign

We are continuously enhancing our international wholesale portfolio. In Voice services we have been improving routing automation and fraud detection systems, and extending the coverage of our ITFS and Voice in the Cloud services. At the same time, we have begun to support VoLTE traffic.

In our Carrier Enterprise family of services we are providing new SD-WAN and Cloud services which deliver automatic and on-demand network services to meet corporate customer requirements. In addition to our extensive coverage of MPLS, Ethernet or Internet services, we are fully supporting the industry’s effort to develop APIs to provide end-to-end, inter-carrier service settlement.

Our portfolio of Satellite services enables us to provide a complete approach in terms of coverage and combined service solutions, allowing our customers to reach any location across continents.

In addition, within our Mobile services we have developed Marketing Campaigns Manager, which allows operators to generate personalized campaigns, in real-time and through multiple channels, helping them to increase their revenues and create new business models for third parties, as well as monetize every subscriber interaction. We also have a worldwide IPX transport service which leverages our roaming and signalling services and extensive A2P/P2P messaging coverage. Furthermore, we are evolving our Messaging platform to respond to the increasing demand for rich communication services.

New Digital Services - innovating to stay ahead

At the core of our platform strategy is a firm commitment to the advancement of our technological innovation capabilities and integration of new technologies, like the Internet of Things, Big Data, Artificial Intelligence, Cloud, Security and other digital solutions. Digital transformation brings countless opportunities for Service Providers, but the industry also faces a challenge to manage the transition from traditional services and traditional sources of revenue to new digital ones. This is where an innovative and experienced wholesaler such as Telefónica International Wholesale Services (TIWS) can help other service providers to succeed.

We have made considerable effort to establish a Digital service portfolio that meets the needs of the wholesale market. As a result of that focus, we have achieved great success with IoT services, either coverage or coverage+service platform, and security services which can be embedded into the connectivity.

"...we have achieved great success with IoT services..."
Transformation is a continual journey and unlocking the possibilities of new technologies and harnessing their potential will enable us to build both for ours and our customers’ future. Telefónica’s competitive catalogue of services, combined with extensive experience gained from having over 340 million customers operating in 17 countries, as well as the combination of being able to deploy at a global level and execute at a local level, makes us well placed to face all the challenges that lie ahead and to continue to deliver for our customers.

About Telefónica International Wholesale Services

Telefónica International Wholesale Services (TIWS), the wholesale carrier of the Telefónica Group, provides world-class wholesale services to fixed and mobile operators, service providers, carriers and OTT-Media companies. Our comprehensive global portfolio includes Voice, Carrier Enterprise, Mobile and Satellite services, innovative Digital solutions (Security, Cloud, IoT, Big Data) and end-to-end solutions for enterprises. As a leading global provider of a wide range of integrated communication solutions, Telefónica has a global footprint, with presence in over 40 countries (particularly strong in Latin America & Europe) and service reach in more than 170 countries.

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A slew of new technologies will disrupt communications service providers’ business models and the industry structure. This research helps CSPs’ technology business unit leaders to respond effectively and capture opportunities as they arise.

**Key Findings**

- New technologies such as open-source software, virtualization, wireless edge computing and artificial intelligence can radically alter business relationships and competitive structures. In the future, communications service providers (CSPs) may even compete directly with some of their network equipment provider partners.

- Many CSPs still struggle to become early adopters or fast followers of these technologies. It remains difficult for them to develop the bold vision and agility required in order to capture market opportunities proffered by these trends.

- An extensive restructuring/ transformation of the workforce is a critical, secondary disruption arising from these technologies. An adaptable and agile workforce is now key for CSPs to avoid becoming marginalized.

**Recommendations**

CSP technology business unit leaders responsible for exploiting CSP market dynamics should:

- Strengthen strategic flexibility by broadening partnerships to include new or alternative technology providers. This will enable them to maintain sufficient bargaining power (or avoid over-dependency on traditional partners) as business relationships shift.

- Seize opportunities stemming from new, disruptive technologies by enhancing the organization’s ability to link these technologies with business implications, as well as identify promising, novel use cases.

- Rejuvenate the workforce by reskilling and retooling existing employees. Revise incentives and key performance indicators to drive change. Increase the ability to attract talents by revamping the traditional CSP image and introducing modern digital workplace practices.

**Introduction**

As part of Gartner’s communications service provider (CSP) research, we have been identifying major disruptive trends that will impact CSPs’ business prospects and market competitiveness. The previous iteration was published as “Market Trends: Top Five Disruptive Trends for CSPs, Worldwide, 2017-2022,” and this current research continues our study into this area.

Many of the trends identified in our past research continue to filter through the market, even as new disruptive trends emerge to create fresh implications for CSP business models and market opportunities. This research is aimed at informing technology business unit leaders at network-based CSPs (see Note 1 for definition) — hereafter, referred to as CSPs — to new disruptive trends, even as they continue to address the challenges associated with trends we identified in the past.

Specifically, technology business unit leaders in Tier 1 CSPs can use this research to validate and supplement their business paradigms and assumptions, while technology business unit leaders in competitive CSPs can use these insights within their strategic planning exercises.

**Market Trend**

The Pace of Technology Changes Continues to Disrupt CSPs’ Business and Operating Models

New technologies continue to enter the market at an accelerated pace, impacting the CSP’s established business and operating models. The pace of change will challenge the ability of even the most capable CSP organization to adapt and respond.

Gartner identified four primary disruptive trends arising from new technologies for 2018 to 2023 as shown in Figure 1. These four disruptive trends in turn create a secondary disruptive trend onto the CSP’s workforce — the nature of work in CSP organizations will be radically transformed over the coming years.

“By 2023, over 35% of roles in CSP organizations will either be new or redesigned.”

**Market Structure Trend**

Technology-Driven Disruptive Trends Will Present New Opportunities for Visionary and Agile CSPs

The five disruptive trends will simultaneously create new market opportunities and turn existing or traditional businesses on their heads. Whether these disruptive trends create or destroy value for the CSPs will depend heavily on their ability to quickly assess the implications of each trend and effectively harness the new technologies for their own benefit. With good leadership and management, CSPs can benefit greatly from these disruptive trends (see Figure 2) and differentiate themselves from their competitors.

There are key business implications associated with these disruptive trends:

- There is a strong imperative for CSPs to be early adopters or fast followers of the technologies highlighted in this research — they need to acquire bold visions and be agile enough to grasp the market opportunities resulting from these trends. Significant competitive advantage is expected to accrue for these CSPs.
The CSP organization must be adaptable and be able to reinvent themselves since skill sets and competencies will change dramatically. The quality of the CSP leadership will be pivotal to the success of workforce transformation efforts.

The market structure will increase in complexity. Traditional business relationships and bargaining power between CSPs and their vendors will evolve, sometimes radically. Some CSPs may even compete against the vendors. New partnerships may be established as well.

**Trend 1: CSPs’ Use of Open-Source Software Will Enhance Their Competitiveness and Redefine Relationships With Traditional Vendor Partners**

Continued investments in open source for CSP operational technology (OT) evolution is resulting in a gradual yet definitive shift in traditional CSP-vendor relationships. Open-source has started to influence technology investment decisions through increased disaggregation/componentization and introduction of software. The year 2019 could well prove to be the inflection point for change.

Starting with generic IT applications such as databases and application servers, the influence of open source has spread across the CSP technology stack. CSPs are also now working with nontraditional partners such as Big Switch Networks, Mirantis and Red Hat. Major CSPs are gravitating toward open source as one of the primary levers for future technology development. It has now become a wider initiative with CSPs collaborating with successful cloud service providers such as Amazon Web Services, Facebook, Google and Microsoft on many networking-related projects. More CSPs are viewing open source as a faster approach to achieving progress as compared to standards organizations, where lengthy compromises may be required to ratify technology standards.
Impact on CSPs

Open source is a game changer as it can accelerate innovation (and hence go-to-market faster) allowing CSPs to tap new sources of innovation. The cost of application development can potentially be reduced, as CSPs need not pay licensing fees for proprietary software. There is also the advantage of vendor neutrality — CSPs can reduce their reliance on vendors’ proprietary solutions.

New alliances can be forged among CSPs that adhere to a common open-source architecture; gaining global scale and efficiencies from common processes and technology. CSPs can enhance their competitive capabilities to address rivalry from global digital giants and cloud-based CSPs.

The implications of open source extend across multiple activities and can be classified as external or internal (see Figure 3). In order to realize the benefits of open source, internal changes are required from CSPs. They will need to change their entire approach to sourcing and support systems — new skills and competencies are required. Effective utilization of open source will also require changes to the CSP’s operating model.

In the medium- to longer-term, CSPs have to contribute actively to open-source communities if they want to focus on agility and innovation — a shift in mindset is required as CSPs tend to guard their intellectual property closely. The potential value of open source is limited if CSPs restrict themselves to just utilizing the open-source components. Active participation will require a change in engagement approach with open-source communities and partners.

“By 2022, 50% of Tier-1 CSPs will contribute at least one open-source project directly or through partners, up from less than 10% today.”

As CSPs increasingly adopt new technologies such as artificial intelligence (AI) and blockchain in their operational technology stacks, the CSP’s role as contributor will grow. Increased participation in open-source initiatives can enhance CSPs’ bargaining power with their established vendors.

Action Plan for CSPs

- Develop a center of excellence for open source that transcends the CIO and CTO organizations. Charter it to track developments in open-source communities, participate in development efforts on selected projects, collaborate with others within the ecosystem and prepare the organization. The level of participation should be guided by appropriate governance (particularly for sensitive projects).

- Initiate skill-development programs specifically for participation in open-source projects and utilization of open-source systems. Train people not just on technology aspects but also on intellectual property management, including legal aspects associated with contribution to, and utilization of, open source.

- Enhance procurement processes to include sourcing of open-source systems and their support requirements. Realize that open-source software has its own costs that need to be factored into your procurement planning.

Trend 2: Network Virtualization Initiatives Will Require CSPs to Reinvent Themselves First

Network function virtualization (NFV) and software-defined networking (SDN) began nearly two years ago in network-based CSPs. Starting with objectives to reduce capital and operating expenditure, the drivers have evolved into automation, and more effective operational and business models (for example, “as-a-service” models) to justify the business case.

Aspects of network virtualization — such as virtual network function (VNF) life cycle management, licensing and zero-touch orchestration — continue to be challenging. Nonetheless, leading CSPs have realized the importance of this transformation. In most cases, the emphasis is now on the opportunity and cost of avoiding/delaying the transformation. With this posture, network transformation and management have started to influence...
the rest of the CSP organization and its engagement with the external environment.

The CSP’s network virtualization journey will lead to a cloud-based core, edge and access networks; distributed architecture and automated operations. This level of change will be disruptive to CSPs and will demand comprehensive planning.

“By 2020, 60% of network-based CSPs will face deficient outcomes from NFV/SDN implementation programs due to inadequate planning and collaboration.”

Impact on CSPs

To reap the benefits of NFV/SDN, CSPs must take it upon themselves to reinvent their own organization, processes and operations while executing this wave of transformation. These internal disruptions can be broadly classified into four categories (see Figure 4).

The virtualization of network functions and development of application stores along with a virtual customer premises equipment (vCPE) strategy will enable CSPs to target a much broader market segment than previously. Large, global CSPs with powerful brands can launch their own-branded vCPEs (such as AT&T’s FlexWare). These have implications on:

- Product strategy (for example, product composition for network/infrastructure as a service)
- Go-to-market planning (for example, the number of market segments to be targeted concurrently, sales channel and customer acquisition journey)
- Business model and service delivery (for example, the extent of automation)

Since significant value from network virtualization is achieved from the closed-loop automation of business operations, there will be implications on service operations, infrastructure management, product/service development and IT operations. These will require the CSP organization to be restructured into project teams comprising cross-functional expertise. Some CSPs (such as Telefónica and AT&T) have started converging their network and IT organizations.

Large, global CSPs may also develop their own VNF-based services aimed at the enterprise market — as some traditional vendors are now starting to target the same market themselves — this may engender changes to the CSP’s relationships with them.

Action Plan for CSPs

- Include these two broad set of objectives in your NFV/SDN strategy:
  - Value delivery in the short term (for example, through vCPE/software-defined wide-area network [SD-WAN] strategy).
  - Longer-term disruption across the CSP organization.
- Prepare your organization for continuous operations/delivery through training, pilot programs and a gradual shift to DevOps and agile practices.
- Establish a change management office to navigate and monitor the transformation journey across different functions, such as human resources, network operations and maintenance, IT and customer care.
- Look beyond your traditional vendors — for example, niche players, open-source communities and even collaboration with cloud-based service providers — in order to accelerate the pace of change and innovation. Partner with vendor communities to source components such as microservices for your targeted operational architecture, instead of monolithic systems.

CSP = communications service provider; NFV = network function virtualization; SDN = software-defined networking

Source: Gartner (March 2018)
Trend 3: Wireless Edge Computing Will Allow CSPs to Participate in New Cloud Computing Opportunities

Wireless edge computing (WEC) focuses on the CSP providing compute and storage capabilities within the radio access network (RAN) elements, or at the network edge. This will be attractive to application and microservice developers and content providers. The RAN edge offers an ultra-low latency and high bandwidth service environment, as well as direct access to real-time radio network information (for example, subscriber location and cell-load data) that can be used by applications and services to offer context-related services.

WEC is not expected to reach mass-market adoption before 2025, as it is necessary for mobile CSPs to implement reliable SDN/NFV infrastructure in their production platform. Virtualization is needed before CSPs can deploy a distributed micro-data center topology required for WEC and network slicing.

Major Chinese CSPs (such as China Unicom) are already planning to invest in significant numbers of edge data centers in conjunction with their 5G deployment. Meanwhile, Deutsche Telekom has formed an edge computing business unit called MobiledgeX. CSPs such as AT&T, China Unicom, NTT, SK Telecom and Verizon are already involved in the Mobile Central Office Re-architected as a Datacenter (M-CORD) initiative — an alternative approach that will deliver similar benefits as WEC.

Impact on CSPs

Over the past few years, many CSPs (including large, global ones) have found it hard to compete with cloud infrastructure providers such as Amazon Web Services (AWS), Microsoft and Google. With WEC, CSPs can attempt to reclaim lost ground. CSPs can take advantage of its extensive network presence to deliver flexibility and better responsiveness to emerging market opportunities (such as drones, autonomous vehicles, factory automation and robotics) that require reliable, ultra-low latency networks. In addition, enterprises are expected to generate an increasing amount of data from outside the traditional, centralized data center or cloud. The CSP’s distributed network presence is a feature that is not easily replicable by other service providers — it must be viewed as an asset to be exploited by CSPs.

CSPs can also offer new services to their customers (by leveraging better personalization through location information and faster responsiveness) or host/partner over-the-top (OTT) and cloud infrastructure providers (for example, AWS Greengrass). Through these, new revenue opportunities can avail themselves to CSPs. However, CSPs should first focus on the specific needs of industry verticals, as the market is not yet mature.

“By 2020, over 50% of new wireless edge computing deployments in CSP networks will be driven by vertical-specific use cases.”

As WEC is still immature, business and cost models are difficult to determine at this stage. The cost of an extensive deployment can quickly become prohibitive; hence CSPs need to strategize on their go-to-market approach. This may be uncomfortable for CSPs that are risk-averse, but these CSPs must overcome this tendency to seize the rare opportunity afforded by technology disruption.

Action Plan for CSPs

- Commence the WEC journey in a scalable manner; attacking specific, well-defined use cases with a contained area of operations first (for example, oil and gas, mining, utilities and stadiums). Prioritize use cases or applications that require real-time control and low-latency requirements (for example, remote control of processes and video optimization).
- Focus on WEC solutions that are open and able to interwork with other edge providers by including a fluid marketplace for compute, storage, open application programming interfaces (APIs) for other services and microservice providers.

Trend 4: AI Will Drive Operational Efficiencies and Create New Opportunities for CSPs

Across many industries, technology discussions invariably touch upon the role and impact of AI on competitiveness and jobs. Progress in adjacent areas such as machine learning, image recognition, natural-language processing, augmented reality and advanced prescriptive analytics serve to broaden the appeal of AI across multiple functional areas.

Major CSPs have noted this disruptive trend and are exploring possibilities. AT&T is collaborating with Tech Mahindra on an open-source AI platform (Acumos). The potential of AI is vast ranging:

- Sales activity. Sprint employs AI to qualify enterprise sales leads. There are also opportunities to apply AI to optimize pricing.
- AI-based network operations. SK Telecom and Telefónica are employing AI to achieve better operational efficiency.
- Customer care. Examples include Vodafone’s TOBi (an AI chatbot integrated to its webchat system) and Telefónica’s push for customer self-service with Aura (an AI-based voice recognition system). Churn reduction can be a positive outcome stemming from improved customer experience.
- Virtual assistants. Orange’s multiservice home virtual assistant, Djingo, allows customers to better manage services.
Impact on CSPs

It is still difficult to evaluate the returns on investment as AI and associated technologies are still evolving. Gartner expects that it will take CSPs approximately three to five years to reap reasonable benefits from AI. This is because many processes need to be substantially re-engineered and sufficiently large, good quality datasets are required to train the AI application. The right talent also needs to be acquired. These challenges should not deter CSPs since significant competitive advantages can be gained from AI.

“By 2022, 25% of newly automated CSP processes will employ machine learning.”

A well-executed AI strategy promises to deliver improved operational effectiveness, cost-efficiencies and an enhanced customer experience. Such a CSP will be able to further distance itself from its fellow CSP competitors. Examples include better personalization of advertising/promotional material and reduction in customer care calls through effective preventive maintenance and better anticipation of problems.

Monetization opportunities can arise from combining different technologies to create end-to-end solutions. For example, there are potential synergies to be gained from integrating various technologies such as AI, cloud computing, the Internet of Things (IoT) and automation as a holistic solution, aimed at transforming enterprise operations. CSPs can also provide highly reliable, secure networks (and WEC to meet the ultra-low latency requirements of some AI inference functions) to enable critical use cases such as robotics or autonomous vehicles. Ambitious and capable CSPs can build their own AI platforms and establish an ecosystem around it to drive innovative applications and services.

Action Plan for CSPs

- Start the AI journey now, as the technology is evolving rapidly and the learning curve can be steep — delays can cause a CSP to fall behind quickly.
- Focus first on AI projects that have high impact, high visibility and easily measurable outcomes, as the technology is still immature today. These include network planning, trouble ticketing and contact center operations.
- Establish a central team for AI services development to reduce duplication of effort. Maximize returns on investment by facilitating reuse of services already developed through application programming interfaces.
- Strike the right balance between AI-based automation and human involvement as AI technology is insufficiently mature for a zero-touch operating environment.

Trend 5: The Ability of the Workforce to Assimilate New Technologies and Digital Processes Will Determine CSPs’ Future Prospects

Throughout the period examined in this research, the technologies cited previously — together with automation, augmented reality, prescriptive analytics and virtual personal assistants — will continue to mature and be integrated into multitudes of functions/processes within CSP organizations. There are abundant opportunities to improve the quality of decision making, enhance operational efficiency and deliver superior customer experience. These technologies are central to CSPs’ transformation into digital service providers.

Highly adaptable and agile CSPs will quickly assimilate these technologies and convert their mastery over them into a new currency for competitive advantage. These CSPs have developed digital dexterity; and Gartner foresees that they will quickly evolve into highly effective, data-driven organizations. Their workforce will interface and interact with machines in truly transformative and novel ways across many functional areas such as sales, marketing, network operations, maintenance, customer care and human resources.

These CSPs will be better positioned to compete with over-the-top (OTT) service providers and cloud-based CSPs on a more equal footing.

Impact on CSPs

For this to happen, many CSPs need to overcome cultural challenges since not every employee is comfortable with technology-driven changes. Many will be concerned over job security. Restructuring the workforce will be necessary, but highly unsettling. Earlier, we predicted that by 2020, changing market dynamics would drive network-based CSPs in developed markets to reduce their traditional telecom workforce by between 15% and 20%. Gartner expects more restructuring through 2023 due to increased automation and adoption of new technologies.

“By 2023, over 35% of roles in CSP organizations will either be new or redesigned.”

CSPs such as AT&T and Orange Business Services are already addressing their workforce transformation challenges. It will be vital for CSPs to manage the pace of change so that it does not overwhelm their workforce.

New roles (for example, software programmers, data scientists and domain experts in AI) and redesigning of current jobs are required. However, many CSPs lack the new skill sets and competencies. In the past, CSPs had gravitated toward partners to address similar situations, but now this cannot be an effective, long-term solution as the missing capabilities are core/strategic in nature. CSPs without the new competencies may eventually find themselves marginalized. Having the appropriate organizational structure (for example, cross-functional governance and executive sponsorship) are also vital ingredients for success.
Many CSPs need to attract new but scarce and expensive talent. Competition for them is intense — a majority can be expected to be partial toward born-digital companies or dynamic, global digital giants (such as Amazon, Apple, Facebook and Google) as opposed to CSPs that are still closely associated with traditional telecom services.

**Action Plan for CSPs**

- Rejuvenate the workforce by reskilling and retooling existing employees. Ensure that line managers understand the need for change so that they can communicate it on to the rank and file. Revise incentives and key performance indicators to drive change.

- Seek out external talent that is able to link technologies to their business implications. These abilities will help CSPs to identify promising, new market opportunities.

- Attract talent that would otherwise gravitate toward born-digital companies or digital giants by revamping the traditional image of the CSP and introducing modern digital workplace practices.

**Vendors to Watch**

The following vendors are worth tracking for the following reasons:

- Adoption of open-source software: AT&T, Orange, Telefónica

- Network virtualization initiatives: AT&T, NTT Communications, Orange Business Services

- Early movers in edge computing: China Telecom, China Unicom, Deutsche Telekom

- Adoption of AI: AT&T, SK Telecom, Sprint, Telefónica, Vodafone

- Transformation of the workforce: AT&T, Orange Business Services

**Acronym Key and Glossary Terms**

- 5G: fifth generation
- AI: artificial intelligence
- API: application programming interface
- AWS: Amazon Web Services
- CIO: chief information officer
- CSP: communications service provider
- CTO: chief technology officer
- dNOS: disaggregated network operating system (AT&T)
- IoT: Internet of Things
- MANO: management and orchestration
- M-CORD: Mobile Central Office Re-architected as a Datacenter
- MEF: Metro Ethernet Forum
- NFV: network function virtualization
- OCP: Open Compute Project
- ONAP: Open Network Automation Platform
- OpenLSO: Open Lifecycle Service Orchestration
- OSM: Open Source MANO
- OT: operational technology
- OTT: over-the-top
- RAN: radio access network
- SDN: software-defined networking
- SD-WAN: software-defined wide-area network
- TIP: Telecom Infra Project
- vCPE: virtual customer premises equipment
- VNF: virtual network function
- WEC: wireless edge computing
Evidence

This analysis is based on analyst discussions and numerous dialogues with major industry participants. It is also based on Gartner observations of market trends in telecom and adjacent industries.

1 Initiatives like Open Network Automation Platform (ONAP) and Open Source MANO (OSM) are addressing platforms for network management while OpenStack addresses infrastructure management. The Metro Ethernet Forum (MEF)’s Open Lifecycle Service Orchestration (OpenLSO) covers open reference architecture. The Open Compute Project (OCP) and Telecom Infra Project (TIP) go beyond the application layers into access, backhaul, core and management. In November 2017, AT&T released its open architecture vision for a disaggregated network operating system (dNOS). In addition, the Linux Foundation is working with AT&T and Tech Mahindra on Acumos — an open-source artificial intelligence (AI) development platform.

2 “Start Moving Data Management Capabilities Toward the Edge”


4 “Predicts 2017: CSPs Require a New Strategy to Respond to Market Disruptions”

Note 1

Definition of Network-Based CSP

A network-based CSP is defined as a legacy telecom carrier that owns extensive network infrastructure to provide communications services. Further details can be found in “Market Definitions and Methodology Guide: Communications Service Provider Operational Technology.”

Note 2

Definition of Cloud-Based CSP

A cloud-based CSP is defined as a CSP that relies mainly on the cloud or internet to provide communications services. They are often disruptive to network-based CSPs. Further details can be found in “Market Definitions and Methodology Guide: Communications Service Provider Operational Technology.”

Source: Gartner Research Note G00349638, King Yew Foong, Amresh Nandan, Sylvain Fabre, Charlotte Patrick, 28 March 2018