



Future of connectivity—what's on the menu?

Helping CSPs cater to the networking needs of modern enterprises

Putting network services on the menu

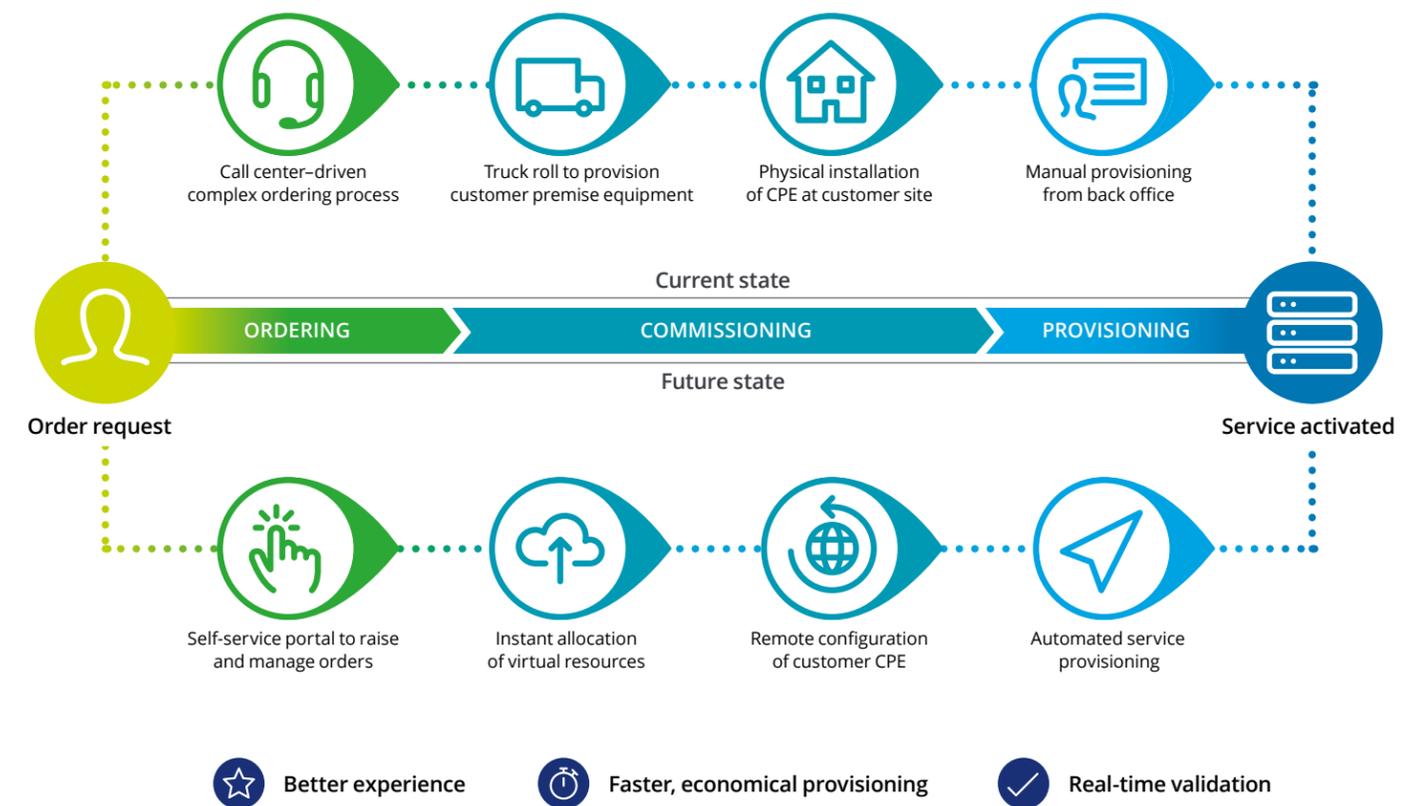
It's 4 p.m. on a Friday afternoon and Bob Smith, the vice president of engineering at SampCo, a Fortune 100 enterprise, just received a request from the CIO. The ask: to increase capacity on the high-speed connectivity to SampCo's 30 global offices for an urgent "all hands" multi-site webcast scheduled for Monday morning. The board had scheduled the webcast to announce the acquisition of a major competitor: CompCo. In addition, Bob was asked to coordinate with his counterpart at CompCo to deliver the webcast simultaneously at their 20 global locations.

Traditionally, the technical complexity and logistics required to arrange this type of webcast would have been an enormous challenge. Bob would have called an emergency meeting with his and CompCo's network teams. This would have led to numerous conversations with communications service provider (CSP) partners to dispatch trucks and coordinate across global locations to deliver network equipment and increase capacity. Teams at both companies would then be faced with the complex task of configuring the networks at SampCo and CompCo to talk to each other.

Also, it was unlikely that Bob would have been successful in this endeavor. An operation at such scale certainly couldn't have been put in place over a single weekend.

But Bob's not worried. He simply relays the details of the task to his engineering team and waits for it to be executed. The team uses the newly designed "network service menu" offered by the CSP partner to get the job done. This menu relies on an assistant based on artificial intelligence (AI) to systematically guide SampCo in finding the service(s) of its choice and making changes to its network in near real time. In this case, SampCo's IT organization simply uses a smartphone application to increase capacity to all 30 SampCo locations and add the 20 CompCo locations.

Figure 1. Current vs. future state of network service positioning



At the click of “Complete Order” button, the CSP network configures the network for Monday’s webcast. Come Tuesday, the team uses the same application to restore capacity to normal levels and decommission CompCo sites until the actual merger goes through.

So, what’s changed? How has the decades-old, time-consuming telecommunications network become so responsive and in

real time? The answer lies not just in an intelligent service menu, but also in the planned adoption of telco-centric technologies, such as network function virtualization (NFV), software defined networks (SDN), fifth-generation (5G) networks, and AI.

In addition, the careful integration of these technologies into a business workflow makes it possible to develop self-service

targeted telco offerings to end customers through a network service menu. This prompts many questions for CSPs, such as: “What services do we offer?” “Which channels should we use?” And “What digital applications should we use to enable our services?” These considerations coexist with the usual design, development, and operational deliberations.

Globally, the demand for connectivity services is expected to triple the global IP traffic between 2016 and 2021, but global enterprise service revenue growth could remain flat^{1,2} (CAGR 0.1 percent). What’s more, the proliferation of alternatives, such as cable providers and over-the-top (OTT) providers, has resulted in a very competitive and cost-sensitive environment. Given the forecast that OTT’s market share of traditional telco services will continue to increase significantly until 2021, CSPs are experiencing tremendous pressure to act now.

In this situation, CSPs and cable providers are increasingly confronted by the same question that baffles the chefs de cuisine of the world’s greatest kitchens: “What should we serve our customers?” At the same time, the customer’s choice of provider has become akin to the question: “Is this my best meal yet?”

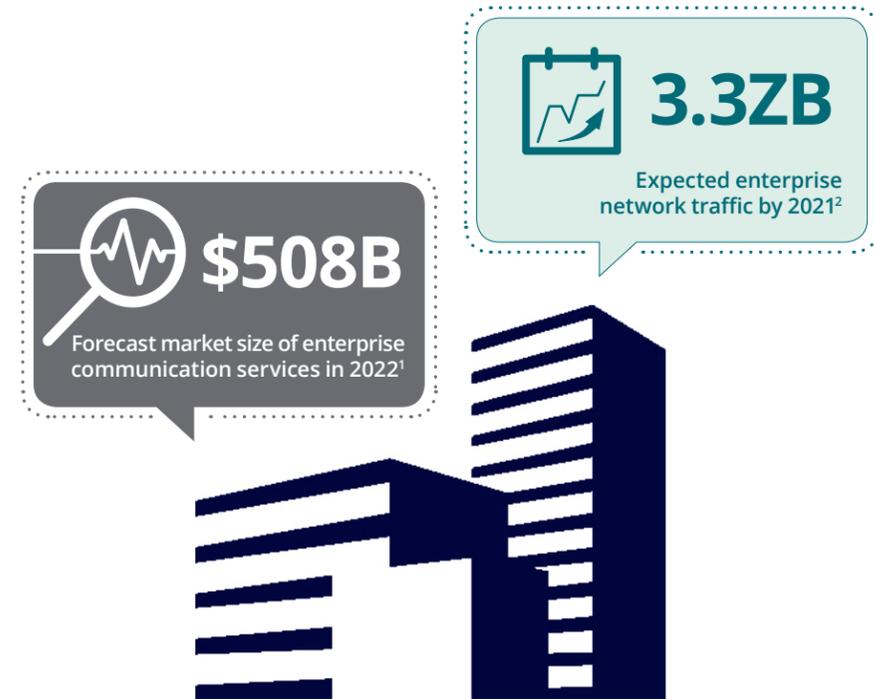
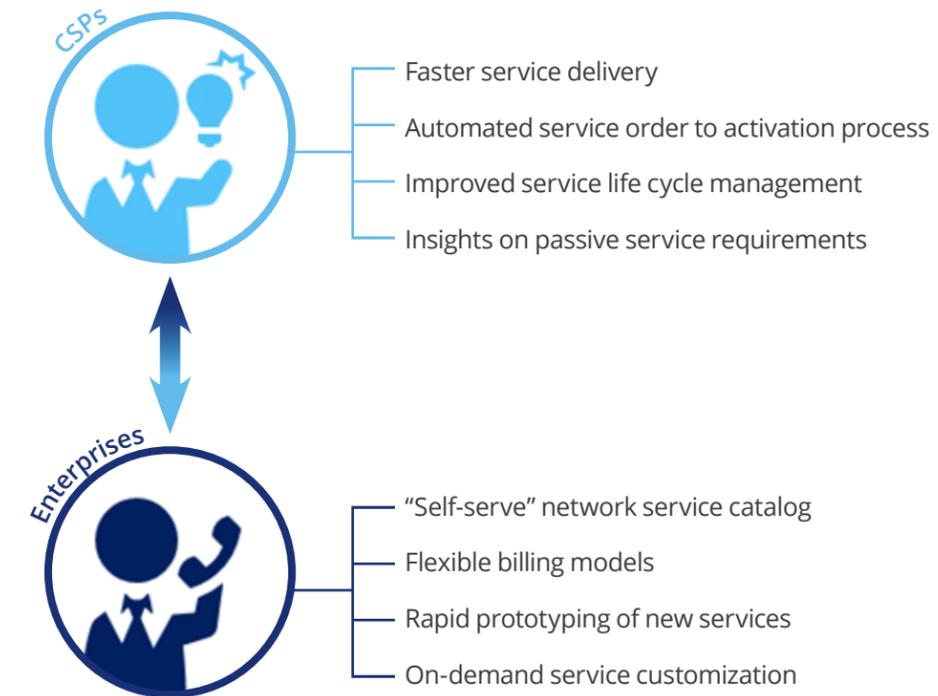


Figure 2. Network service menu offers mutual benefits for CSP and enterprise clients



Whetting the appetite

“By 2021, 25 percent of enterprise telecom contracts will evolve to allow for greater flexibility such as canceling services or introducing new services within the contract period, up from less than 5 percent today.”

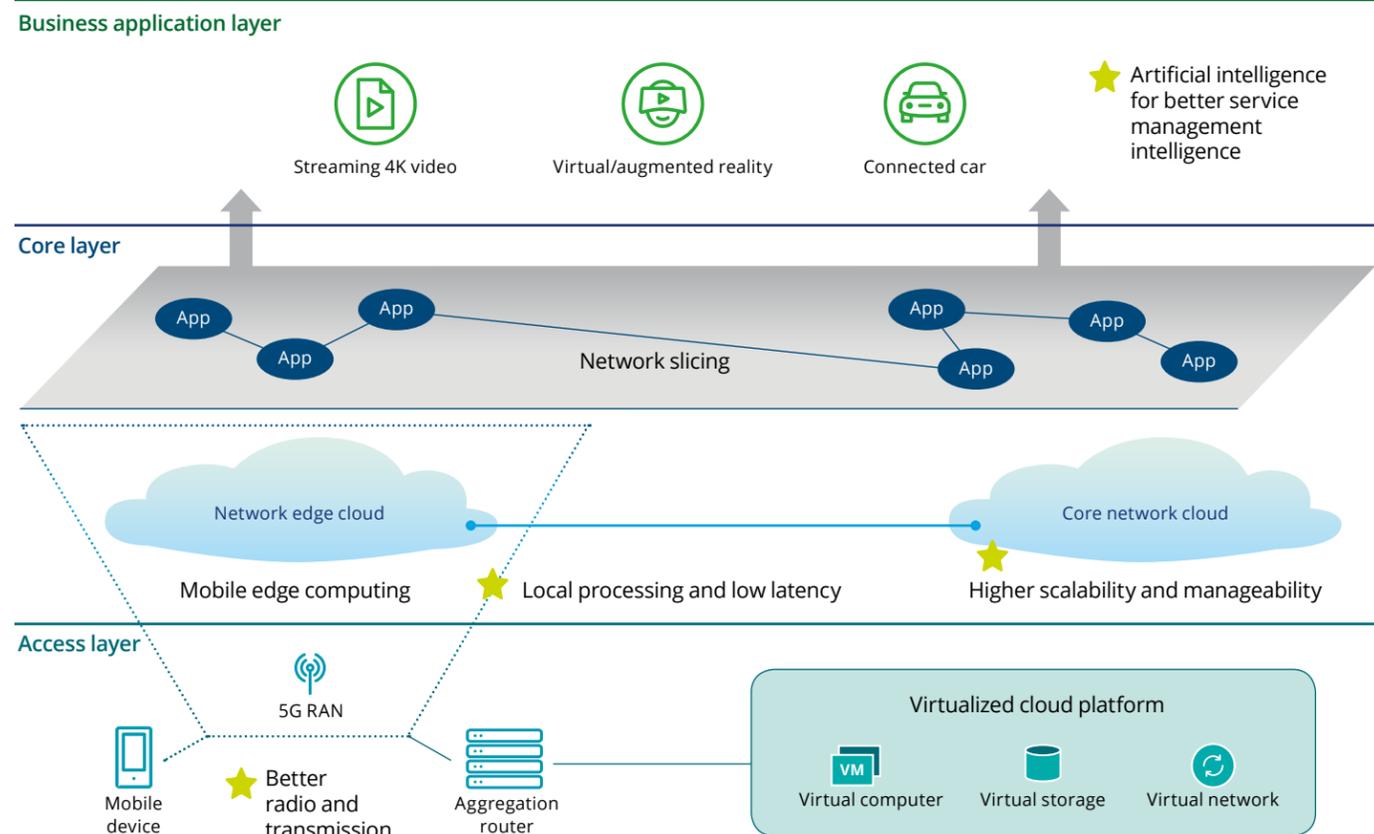
Gartner Research, 2018³

An economy driven by information and communication technology (ICT) is accelerating the push toward a hyperconnected world. This is redefining the way we live, interact, and conduct business. The multitude of connected devices, applications, and services are a testimony

to this shift. Applications have unique network requirements and are increasingly demanding custom configurations. Vehicle-to-everything (V2X) applications need ultra-low latency and high mobility while augmented and virtual reality (AR/VR) applications need higher throughput and

area traffic capacity along with low latency. Depending on the need of the application, various network technologies that enable 5G may be used alone or in combination. These technologies include mobile edge computing (MEC), network function virtualization (NFV)/SDN, and AI.

Figure 3. Key network technologies enabling 5G architecture



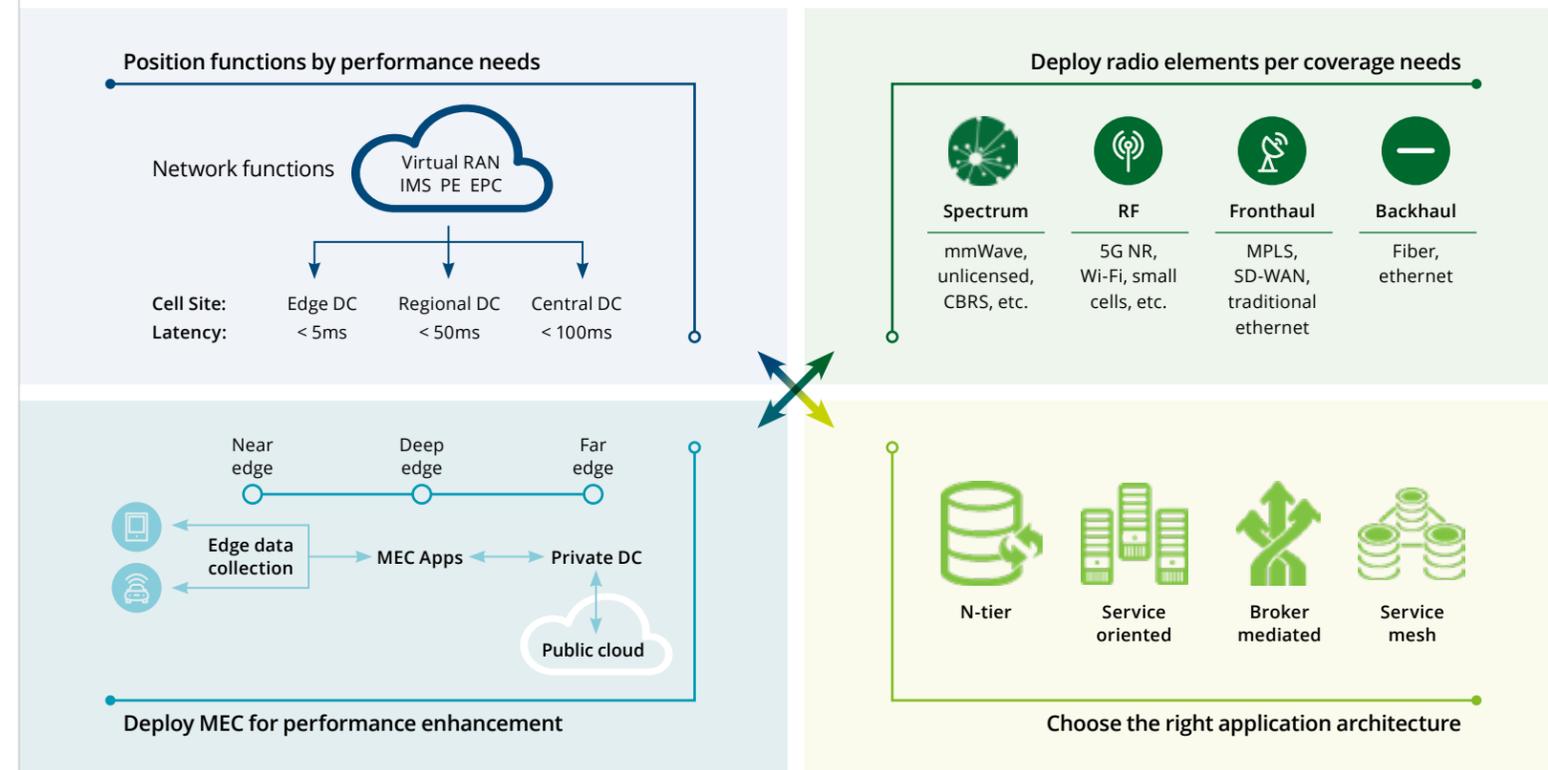
The requirements are often conflicting and diverse in nature (e.g., extremely low latency for autonomous self-driving cars versus ultra-long battery life for Internet of Things [IoT] applications). This diversity impacts application rollout time to market.

Different technologies help solve challenges in a piecemeal fashion. And with every technology outsmarting the other on performance, decision makers are often unclear on the services to choose from. There are many control points that new technologies offer, which must be carefully

tuned by CSPs to provide the experiences that end customers are demanding.

Figure 4 provides an illustration of a situation where several network parameters must be tweaked to provide varying levels of latencies and capacities for applications.

Figure 4. Key network parameters to be optimized for meeting application requirements



As if that weren't enough, most customers are expecting instant gratification. A mix and match of the network requirements (e.g., storage, security, latency, performance, and reliability) and resulting combinations are critical to support diverse services and applications. Equally important to customers is the freedom to test their applications in a sandbox environment to fine-tune the performance and the experience before subscribing to the service.

In such circumstances, it would be best to offer the services that a CSP is considering (connectivity, security solutions, and IoT offerings) in a customizable network service menu format, enabling customers to order à la carte, according to their business needs.

As simple as it sounds, creating a consumable service menu is a labor-intensive task that requires careful planning and execution at multiple levels for the

CSPs. Starting from identifying the right services to offering the best controls for optimization, success of the menu is closely tied to the enterprise customer experience. It is also dependent on effective end-to-end integration of the service menu with the platform performance and the underlying technologies across ordering, fulfillment, billing, and assurance.

Designing an enticing menu

Like any good Michelin-starred restaurant, the optimal network service menu requires certain indispensable components. These components provide convenience to the enterprise's clients and position service providers for success.

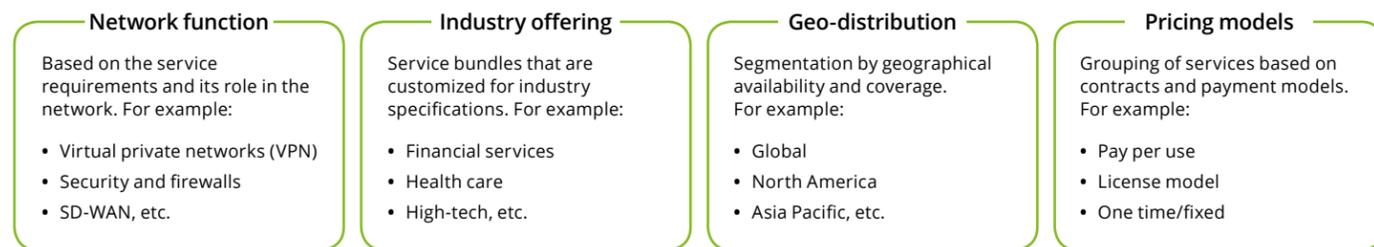
Right theme.

Before they can offer the service menu, CSPs should partner with enterprise clients to carefully plan the categories and the

menu's overall design. A niche focus on connectivity services (SDN, secure cloud connectivity, etc.) or a wider platter of enterprise offerings (application service assurance, high-available connectivity, etc.) is a choice that must be made before crafting the actual catalog. CSPs can choose to either compete on cost leadership, or on truly differentiated services—and the network service menu should clearly reflect this choice.



Figure 5. Services can be organized into one of many themes



Ease of discovery.

Opening a poorly written, stained menu on which only half the dishes look appetizing or interesting doesn't set the tone for a memorable dining experience. And unlike restaurants, where the customer has the luxury of a seasoned maître d' discussing the signature dishes and wine pairings, the

first customer touch for network services is mostly through the network service menu. Therefore, incorporating technology aids, such as chatbots that use AI to curate customer cues and suitably tailor the experience, is pivotal to the success of the service menu.



63.5 percent of global telecommunication organizations are making new technology investment in AI systems.

IDC Report⁴

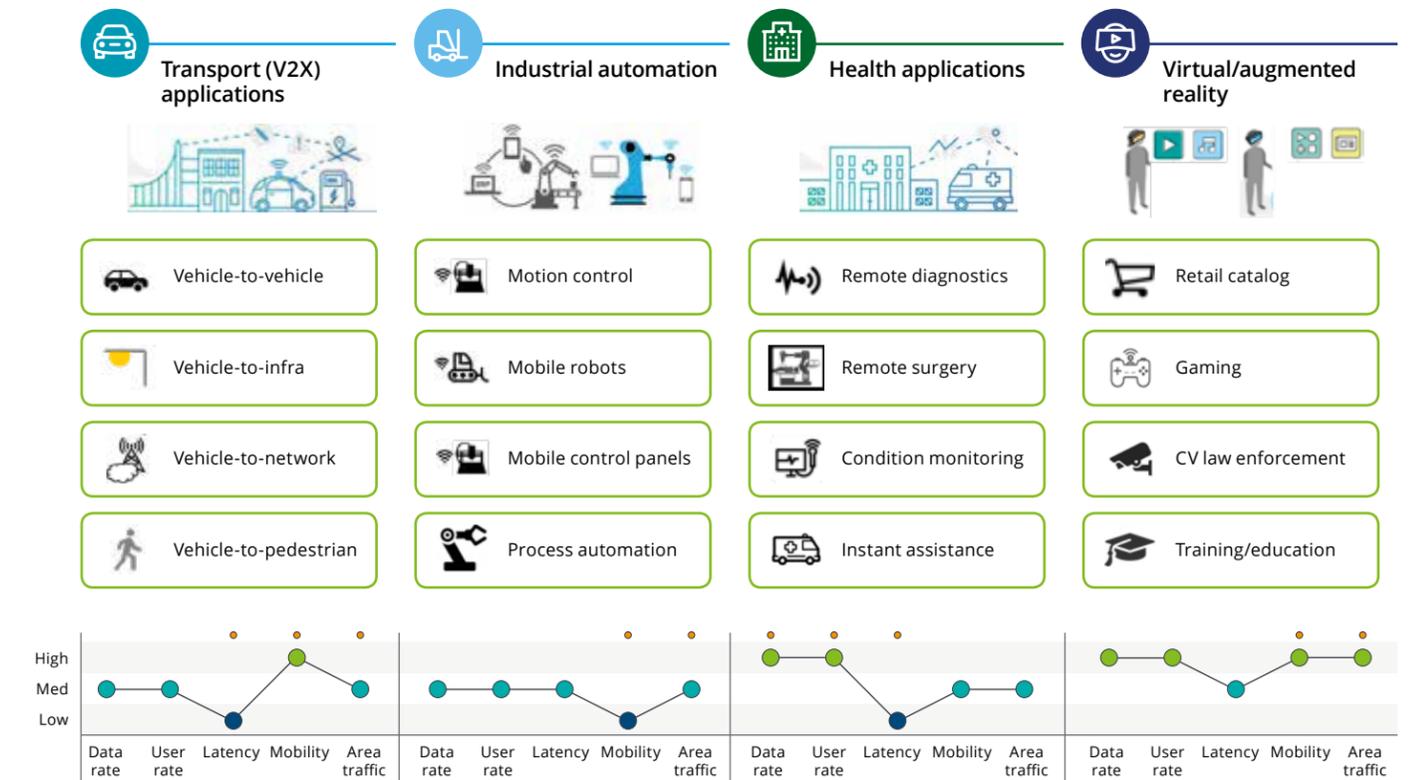


Order to taste.

CSPs have traditionally delivered standard services with little room for customization. Granular, application-based customization (levels of QoS, uptime guarantees, etc.) and a

sandbox environment (to test the platform's ability to meet the application's unique requirements) enhance the value of the network service menu.

Figure 6. New-age applications have custom requirements



Instant delivery.

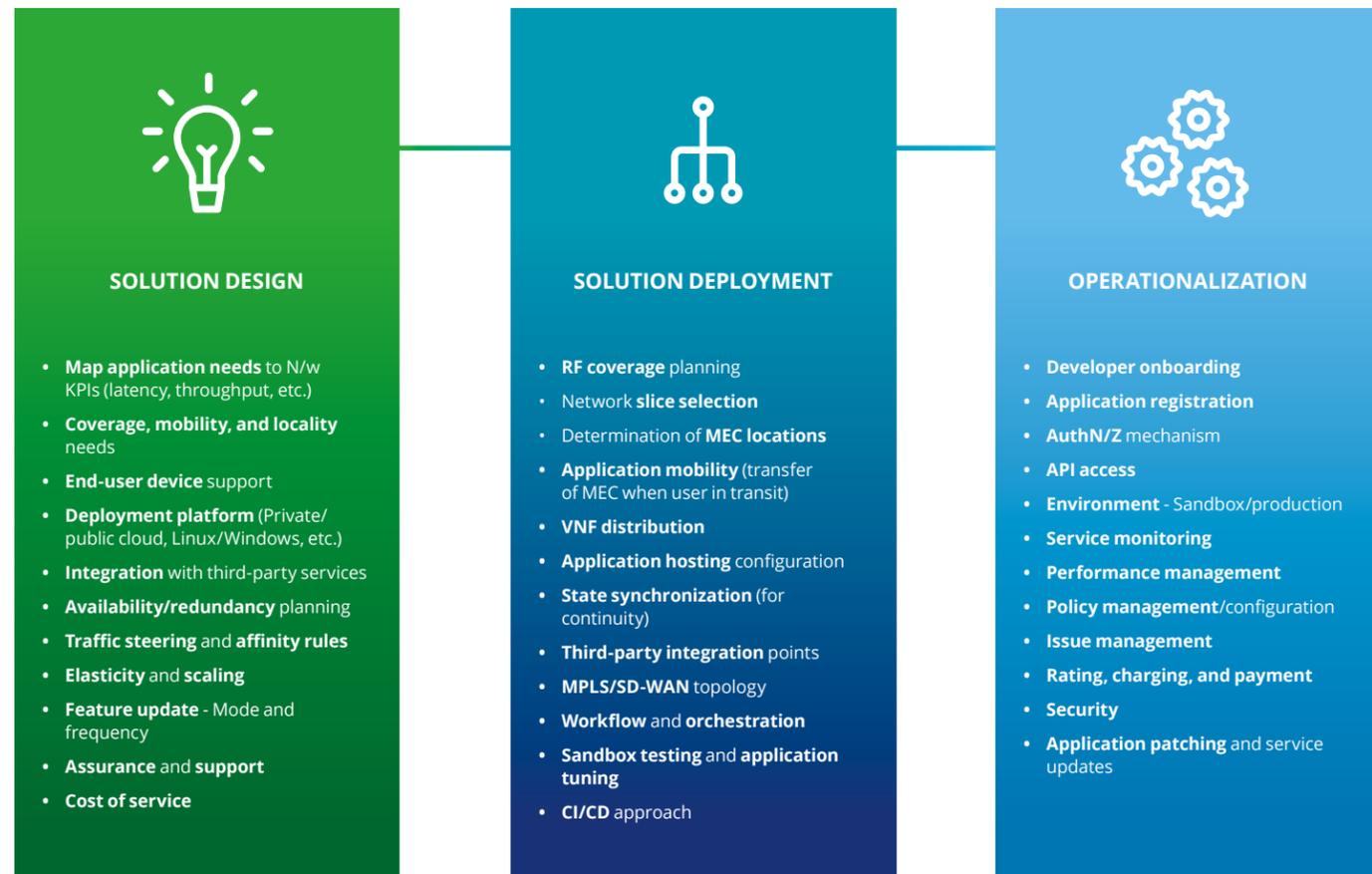
Availability, ordering lead times, shipping delays, scheduling, connectivity, and other factors can have an impact on real-time delivery of the service. So, while it's critical to develop capabilities that deliver services in near real time, it is equally important to establish reasonable expectations with customers where real-time delivery is not possible. Modern cloud and virtual services

technologies have transformed service delivery, eliminating truck rolls and reducing delivery timelines by almost two-thirds for certain services.

While there are multiple factors to consider across the service design and deployment life cycle, results from carefully planned implementations can be quite spectacular.



Figure 7. Key considerations across the solution realization life cycle



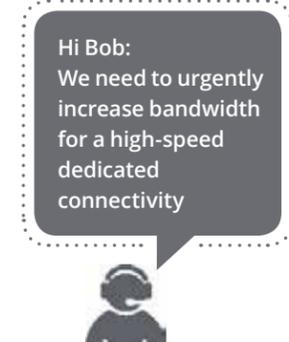
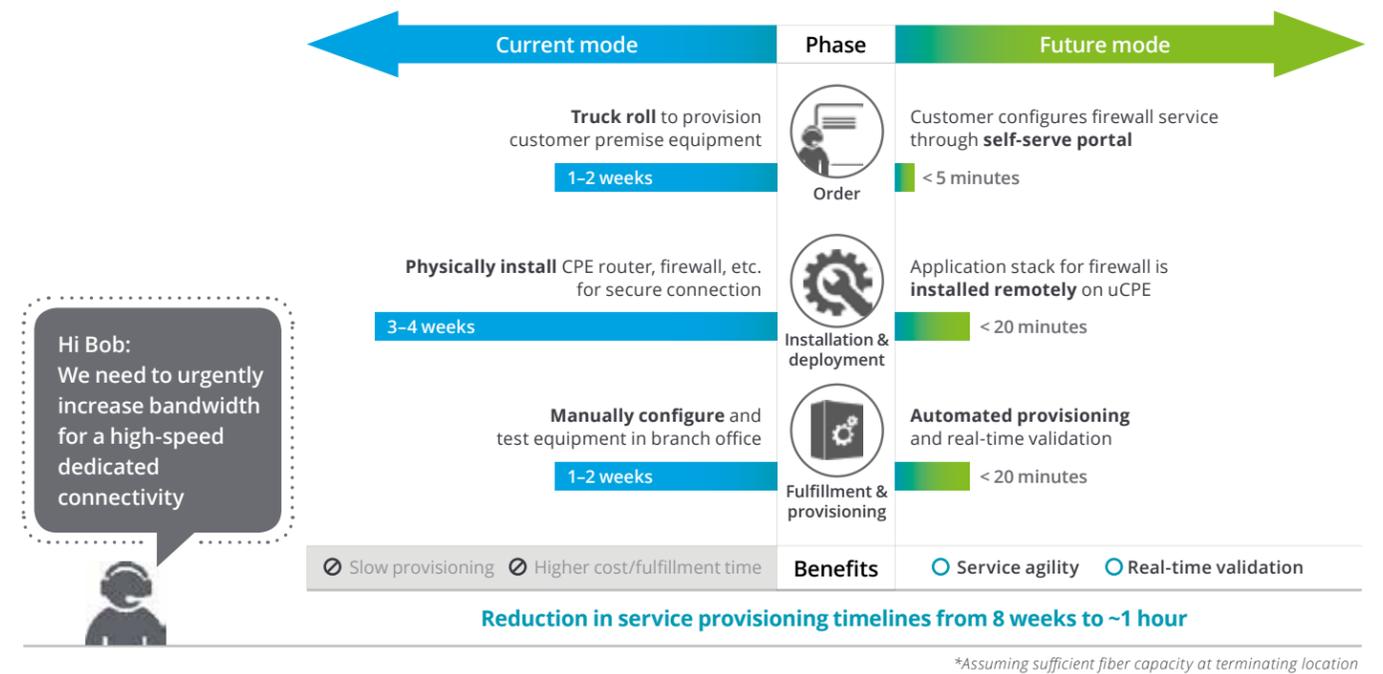
Rapid scalability.

Rapid scalability of the cloud platforms and on-demand capabilities of virtual technologies have made it possible for enterprise customers to demand, in a matter of seconds, services such as provisioning of an additional secure

video delivery channel or firewall for security. While the perfect customer experience requires careful seasoning of a few technologies, it's within the realm of practical implementation today.



Figure 8. Carefully planned implementations leading to radical transformation in the service delivery experience



Offering a network service menu

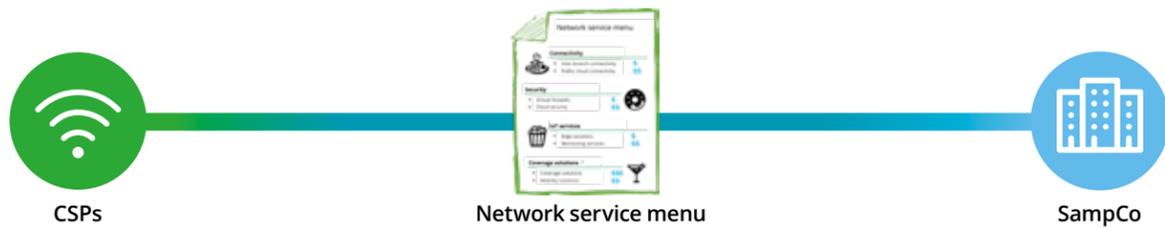
In light of all this, a network service menu that displays the customizable services across a broad category of network capabilities, including mobility, connectivity, and device management, alongside quality of service (QoS) controls and a demand-based pricing card, will create the perfect menu for future enterprise customers to choose from. The platform will enable users to quickly deploy, terminate, or update services on the fly.

The advantage of leveraging such a menu is that enterprises can opt for the network services and service guarantees that specifically meet their application

requirements. For example, a medical IoT enterprise customer typically needs applications like remote diagnostic, long-term condition monitoring, remote surgery, etc. Such applications depend on services like inter-branch connectivity, security solutions, IoT device, and edge deployments to support low-latency, high-data rate applications.

In addition to displaying the various services offered by the CSP, the network service menu should act as a front end for the services offered by CSP, enable custom definitions of service-level agreements (SLAs) such as latency and data, and

facilitate a sandbox environment where they can fine-tune applications for best performance. Customers should be able to easily browse through the menu, assisted by an intuitive, AI-powered portal, and select services based on a projected monthly cost. Additionally, by establishing self-service as the primary method for service enhancement or change requests, CSPs can cut down on operational expenses significantly. At the same time, this capability offers CSPs strategic insights into the client's service delivery and operational requirements, which can be directly leveraged in improving future offerings.



Benefits

- Near real-time delivery of services
- Automated service ordering and provisioning
- Optimized network service management
- Rapid prototyping and validation of services
- Flexible and usage-based payment models
- "On demand" service customization

Network service menu

Connectivity	
▪ Inter-branch connectivity	\$
▪ Public cloud connectivity	\$\$

Security	
▪ Virtual firewalls	\$
▪ Cloud security	\$\$

IoT services	
▪ Edge solutions	\$
▪ Monitoring services	\$\$

Coverage solutions	
▪ Coverage solutions	\$\$\$
▪ Mobility solutions	\$\$

Technology ingredients for CSPs

While CSPs are faced with an ever-expanding range of enabling technologies, a few of these are fundamental to offering a service menu to end customers.

Virtualization through NFV and SDN helps transform traditional network functions into software-based building blocks. These provide CSPs the much-needed flexibility to programmatically create traditional network functions (routing, security, etc.) and reduce the time it takes to provision and launch new services.

Physical infrastructure remains an integral element of the CSP infrastructure. Network automation integrates this infrastructure effectively with cloud-based solutions—enabling agility similar to the virtualized network—and is important for successful network service menu operationalization.

Artificial intelligence-based platforms need to operate in tandem with service offerings on the menu to artfully guide the

customer experience with intuitive statistical feedback. Data analytics can also predict and resolve a range of network issues by studying network data before they impact customers.

Multi-access edge computing (MEC) adds computing resources closer to data collection points (network edge). This restricts the amount of data that needs to be shared back with cloud, relieving network bandwidth and enabling time-sensitive data processing.

Network slicing helps segregate applications into multiple logical slices on common network infrastructure. These slices expose unique network characteristics to individual applications, such as end-to-end latency less than 5 milliseconds, and can be served to customers via the network service menu.

5G technology ecosystem brings together players such as CSPs, edge and public cloud providers, application platforms, infrastructure companies, etc., with meaningful business relationships and technical integration. Given the dependencies of CSPs on external ecosystem partners in the 5G context, the availability of a rich ecosystem becomes foundational for menu-driven next-generation services.

Stories from the kitchen

Despite being in an early adoption phase, real-life deployments with select clients clearly outline the need for careful consideration across some of the following areas:

Scrutinizing the business case.

The foremost step for any CSP developing a service menu should be to vet the business case. Designing a service offering model, developing a list of viable services, and beta-testing that model with trusted customers is crucial for the CTO and CMO. This will ensure viability and adoption of the network service menu after its launch. CSPs should consider analyzing the business case across the service portfolio in totality rather than reviewing cases in silos, which will help examine interdependencies and reduce time to market for deployment.

Evolving the right technology solution.

As standards for programmable network continue to evolve, early adopters have leveraged multiple proprietary options to implement their unique requirements. This makes it difficult for CSPs looking for a flexible and open multivendor architecture because few proven success stories are currently available. It will be imperative for the CIO to make the right technology choices based on the organization's unique need to drive effective transformation. Additionally, the chosen platform must support flexibility in billing models adopted for various services, be it static or dynamic.

Investing in the right team.

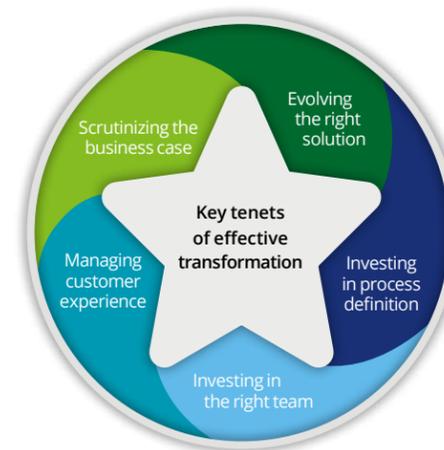
Most technology platforms (AI, MEC, network slicing, etc.) are still in the early adoption phase and will continue to present daily execution challenges. Investing in the right team with the necessary strategy, sales, and technology skills is probably the most important of all the above considerations. Rolling out the technologies across network requires an examination of capabilities that can be developed organically versus those that need to be sourced externally. For the latter, CSPs need to partner with the appropriate industry players to nurture a healthy ecosystem. Time is of the essence, so the selected approach should foster a faster time to market.

Investing in process definition.

One of the common traps that service providers get caught up in is focusing on technology over processes. While the services remain the same, new technology capabilities (for example, remote configuration of equipment that reduces truck rolls) require careful redesign of the entire operating model. Investment in cycle-time analysis of service delivery and processes by the COO and process specialists will help align customer experience and SLAs with new technology capabilities.

Managing customer experience.

The responsibility to the customer doesn't end with the delivery of the service. CSPs require carrier-grade monitoring and a rapid-response mechanism to constantly optimize customer experience across the service life cycle and guarantee security with minimal operational disruptions.



Catering to current— and future—demand

Exponential demand for network services is a hallmark of this decade, but closely intertwined are the plethora of service provider choices. Many enterprise networks are still unable to take advantage of the capabilities that a contemporary network stack makes available. CSPs can remain relevant only by offering their customers a flexible service model that enables them to

customize their applications and tailor their payouts. A network service menu is only the first step toward a customer-oriented service delivery approach that enables easy discovery of available services and the creative freedom to mix and match service options with appropriate performance guarantees—all in a self-service mode with real-time prices.

Nevertheless, the transformation is not simple, and pivoting to a network service menu model requires a systematic change across the underlying technology platforms, methods and processes, and people capabilities.

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