Reinventing telco networks: Five elements of a successful transformation

For telcos to keep and grow market share, the network division needs a makeover that lets it shed its cost-center past to become a leading function that influences the digital and analytics metamorphosis of the core.

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You move to a new city for work and decide to switch to the well-regarded local leader in mobile services. You go to its website and port your number over, and, in seconds, your new service is working.

Soon, however, you experience some dropped calls and sluggish data in your apartment. The problem clears up quickly, though, after your provider's analytics identify you as a new customer in a key demographic who is experiencing service issues in a location where you frequently use your mobile phone. The provider's automated remediation confirms your apartment is in a strategic region with spare spectrum available and promptly provisions additional capacity.

That level of seamless customer service may seem like a distant dream. But if telcos are going not just to survive but also to thrive amid today's competitive disruption, it needs to become a reality in the not-too-distant future. Critical to that happening is the network, which must enable such superior customer experience.

But to do so, the network itself must undergo a radical transformation, shifting from a black-box cost center to a genuine change agent. It needs to leverage its unique position as the owner of the company's largest asset and the richest source of the data that generate key customer insights.

A makeover for the network

Despite (or perhaps because) the network accounts for such a large share of both operating and capital budgets (typically 30 to 40 percent), it has traditionally been relegated to the back of the organization, asked to help with cost cutting, while real change is led by commercial units (such as product and customer care) or the IT team (through system and software). This status goes hand in hand with the network and the network organization's long-standing image as monolithic and mired in complexity. The work done is still rooted in the technological limitations of the past: basic functions require long lead times, standard feature sets offer little customization, capacity can't be scaled dynamically, and processes are complex and rigid.

However, technologies have evolved to a point that networks can now be more digital and, as a result, more dynamic, flexible, and customizable. The use of analytics and artificial-intelligence (AI) techniques, like machine learning, can make the systems intelligent and more automated, enabling predictive and near-real-time actions. These solutions, coupled with an agile organizational model, can catapult the network team to become the driver of any telco's digital agenda.

Before telcos get there and fully realize the potential of the network of the future, they must make sure it is defined by five key characteristics (Exhibit 1). And once it is, the payoff could be substantial.

Exhibit 1

Five key characteristics define the network of the future.

	Perception of networks today	Future of networks
Modular	Monolithic (distributed pieces of equipment interconnected and controlled through core)	Software-defined modular architecture; network as a service
Agile	Slow, with long lead times (eg, to order and deploy equipment)	2-speed, agile organization between configuration and infrastructure management
Automated	Manual operations; reactive maintenance after issue identification	Digitized and automated end-to-end processes and work flows based on best-in-class digital architecture to enable proactive interventions
Personalized	Standard feature sets applicable to given area, with very little customization	"Hyperpersonalized" based on class of service, customer segment, or geography
Insight generating	Network data used for quality tracking and improvements	Network data to generate broader business insights for strategic differentiation

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Modular

Today's network architectures are made up of multiple hardware boxes interconnected through the core. Network functions are loosely tied to customer-facing functions. The network of the future, however, will be more software based and modular—otherwise known as network as a service (NaaS)—allowing it to adapt to changing customer needs much more quickly and efficiently and to scale capacity dynamically based on user or application when needed (Exhibit 2).

Bringing modularity to the network involves three key considerations:
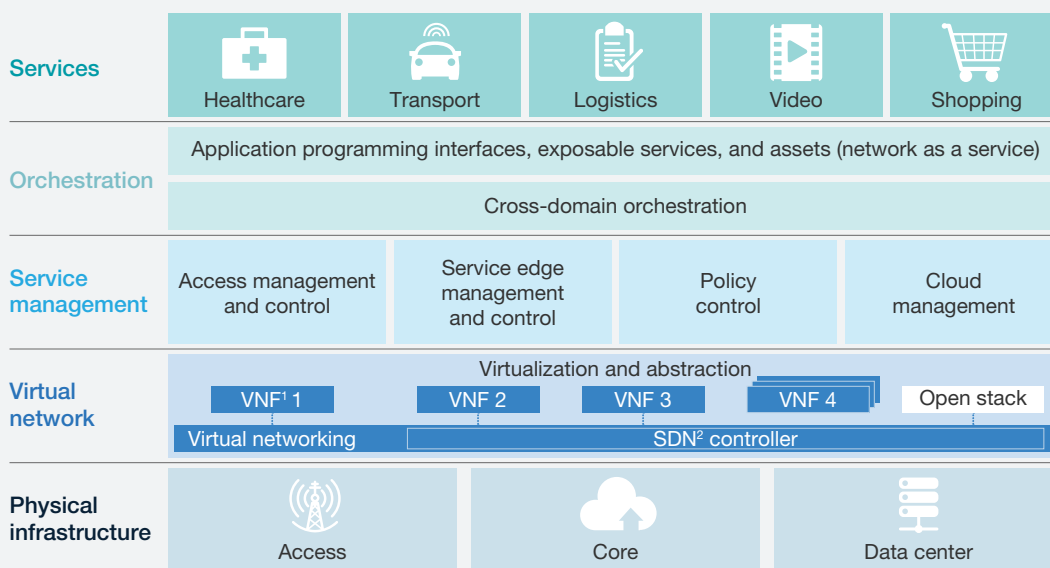
■ *End-to-end process changes and simplification.* Deploying the latest technologies, such as network-functions virtualization (NFV) and software-defined networking (SDN), should be accompanied by changes in the associated processes. One European operator had to rethink

the B2B service-provisioning process completely by leveraging the virtual customer-premises equipment (vCPE) to provision services remotely based on demand. In doing so, it was able to reduce the service-provisioning time from two weeks to just a few minutes.

■ *Jointly defined use cases.* Typically, these initiatives led by the network team are viewed as technology solutions. However, deploying them also offers business use cases. For that reason, the network and business teams need to work together to craft the use cases and road map for building them. A European operator's network organization worked with the commercial teams to define and prioritize Internet of Things (IoT) use cases that would be supported in the network through application programming interfaces (APIs) for provisioning the service and to provide additional capacity.

Exhibit 2   Network as a service is software based and modular.

Network as a service structure

Services	Healthcare	Transport	Logistics	Video	Shopping

Orchestration	Application programming interfaces, exposable services, and assets (network as a service)
	Cross-domain orchestration

Service management	Access management and control	Service edge management and control	Policy control	Cloud management

Virtual network	Virtualization and abstraction				
	VNF[1] 1	VNF 2	VNF 3	VNF 4	Open stack
	Virtual networking	SDN[2] controller			

Physical infrastructure	Access	Core	Data center

[1]Virtual network function.
[2]Software-defined network.

■ *Capability enhancements.* Moving toward a NaaS model requires new capabilities within the network team. Previously, network teams were more engineering and operations focused; they now need to develop service-management and software-development capabilities.

Agile

The way network teams organize themselves is a critical determinant of how effective telcos are in leveraging the new network paradigm. Such organizations today are typically centered around major functions, such as planning, engineering, and operations, which has served them well.

Yet, as telcos go digital, the overall organization design is being revamped. Agile structures centered around digital tribes are taking root, mainly driven by the need to respond immediately to customer demands. This requires rapid iterations and decision making enabled by simplified processes and governance (Exhibit 3).

This is a complex transition that requires telcos to ask themselves two important questions:

■ *What should be the scope of agile transformation within the network team?* There are two potential models to choose from:

— *Based on the nature of activities.* Functions that have shorter lead times and are closer to the customer, such as provisioning and configuration changes, move to an agile model, while infrastructure changes that require longer lead times remain traditionally managed.
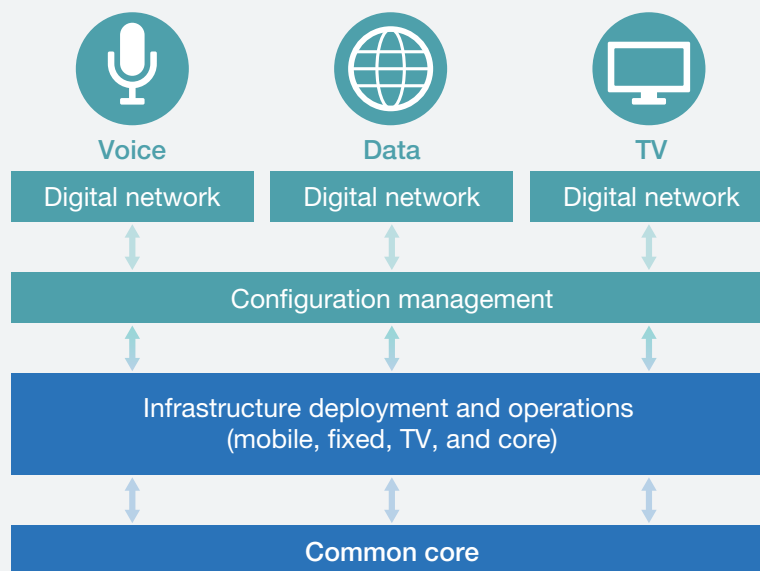
Exhibit 3

An agile network organization simplifies processes and governance.

Agile network organization

■ Agile product teams (2-week release cycle for change)
■ Network-infrastructure teams (longer lead times)

Voice	Data	TV

Digital network	Digital network	Digital network

Configuration management

Infrastructure deployment and operations (mobile, fixed, TV, and core)

Common core

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— *Full agile.* In this model, all functions are moved into agile tribes. A leading Asian telco, for instance, revamped its network organization into two tribes from a previous state of six subdepartments.

■ *What should be the agile organizational design?* Multiple agile design choices, such as flow to work, self-managing teams, end-to-end cross-functional teams, and agile overlay, could be evaluated. The choice of the design should be based on factors such as the scope of the functions going agile, the interface with the rest of the organization, and ease of implementation.

Automated

Adoption of analytics and automation is increasing, and many telcos have started building use cases and setting up centers of excellence. As network teams evaluate the next steps in their automation journeys, leaders need to assess three considerations:

■ *Look beyond telecom.* Inspiration for the automation journey should come from the best places and organizations, not just from within the industry. Telcos need to step outside of their peer set to look for inspiration on leading practices. For example, in transforming the customer-care journey, one telco took inspiration from various sources: a healthtech provider for building an AI engine to diagnose CPE issues and a heavy-machinery manufacturer for deploying augmented reality within its field-installation guides. Going outside the industry helped the telco capture an additional 5 to 7 percent productivity spike.
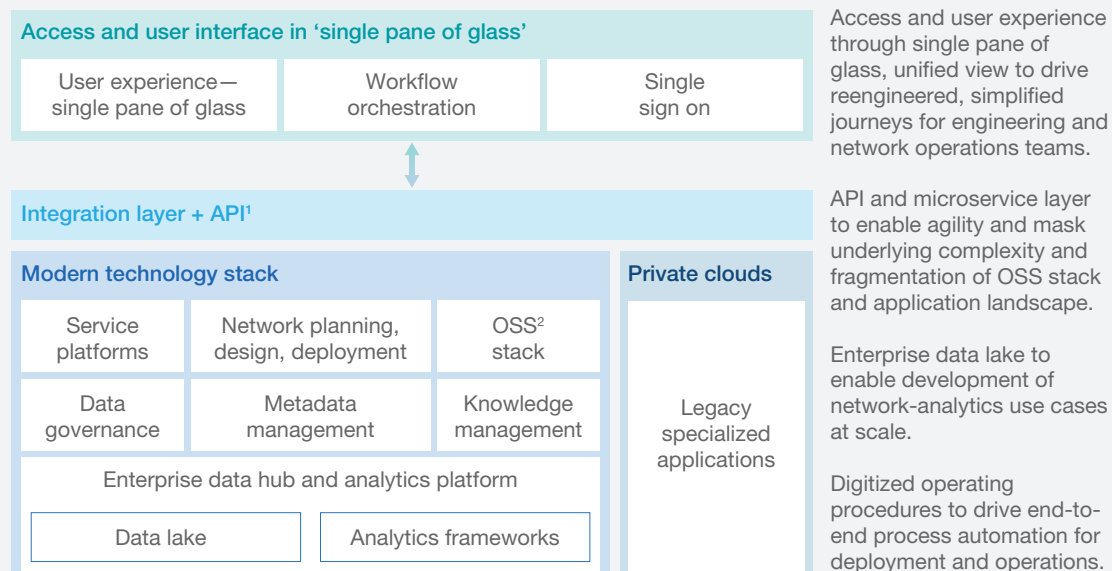
- *End-to-end automation.* Ensuring end-to-end digitization across the network life cycle, as opposed to tactical automation of a single process, is essential. Consider the entire deployment journey, starting with the design of the network and continuing all the way to implementation and optimization. One telco used a zero-based-design approach to reimagine the entire deployment journey, weaving together disparate legacy tools, tactical process robotics, and machine-learning use cases to reduce end-to-end deployment time by 30 percent.

- *Architecture that supports scale.* Driving impact at scale would be challenging if the digital architecture that supports network deployment and operations tools is neglected. Network teams should consider how they can build a modern, future-proof digital architecture that allows them to reduce their technical debt, adapt rapidly to new technologies, and capture and build on a wealth of data about the network (Exhibit 4).

Exhibit 4

Network teams will need to build next-generation digital architectures to unlock new productivity.

Guiding principles …

- Set best-in-class vision
- Leverage existing tools pragmatically and minimize cost to rebuild
- Introduce new tools and technologies selectively to modernize and future-proof

- Build next-generation data architecture and enable (near) real-time view from customer down to network element
- Enable engineers to focus efforts on service delivery rather than on learning complex tools

… to create next-generation digital architecture

Access and user interface in 'single pane of glass'		
User experience— single pane of glass	Workflow orchestration	Single sign on

Access and user experience through single pane of glass, unified view to drive reengineered, simplified journeys for engineering and network operations teams.

Integration layer + API[1]

API and microservice layer to enable agility and mask underlying complexity and fragmentation of OSS stack and application landscape.

Modern technology stack			Private clouds
Service platforms	Network planning, design, deployment	OSS[2] stack	Legacy specialized applications
Data governance	Metadata management	Knowledge management	
Enterprise data hub and analytics platform			
Data lake	Analytics frameworks		

Enterprise data lake to enable development of network-analytics use cases at scale.

Digitized operating procedures to drive end-to-end process automation for deployment and operations.

[1]Application programming interface.
[2]Operating support system.

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Personalized

With the advent of NaaS, there will be increasing demand to offer customized bandwidth for different types of services. Network slicing enables operators to configure multiple logical networks to run on top of a shared physical infrastructure. Deploying network slicing involves two important considerations for operators:

- *'Hyperpersonalized' business models.* Network slicing allows for operators to provide personalization at various levels. At the highest level, operators can distinguish between B2B and B2C services. Within B2B, for example, they can offer different classes of services (such as for IoT and vehicular communications). In B2C, operators can differentiate among the bandwidths being offered to various customer segments. This enables operators to move toward new business models centered around hyperpersonalization that require close coordination with business teams.

- *Trade-offs between multiple virtual layers and multiple physical layers.* As the list of possible next-generation services keeps growing, implementing multiple virtual-network slices for each type of service may be very inefficient in terms of resources. Alternatively, deploying separate physical subnetworks with their own physical and functional layers may be a more viable option, but it requires more investment. The right balance between these two options needs to be studied based on the overall company strategy and outlook.

Insight generating

Given that all customer services have to pass through the network in one form or another, the network collects a trove of valuable information on the customers. This can include mobility patterns, call-usage records, and credit information, for example. Moreover, since network nodes and sites are distributed across a given country in which coverage is being provided, the network data can be localized to particular microlocations. (Such solutions would, of course, require careful consideration of matters around regulation, privacy, and customer consent.)

By leveraging advanced-analytics techniques on these data, operators are starting to tap into rich insights to which they previously didn't have access. However, chief technology officers (CTOs) should look to three key areas to take full advantage of these insights:

- *Going beyond the network.* While telcos are already making progress in leveraging advanced analytics on network data to drive operational insights (such as predictive-maintenance models), network teams can potentially increase impact from these data significantly by combining them with customer insights. For example, can propensity to churn models improve precision by incorporating recent network key performance indicators (KPIs) as inputs? Similarly, can KPIs go beyond network focus into measuring customer experience by combining data from devices, service touchpoints, and network operations?

- *Cross-functional engagement.* Getting the most value from analytics use cases would require engaging cross-functionally with other relevant teams to ensure there is a holistic view of value and there are robust approaches to execute. CTOs should consider whether the current engagement model (including forums, frequency, and ways of working) among their own network teams and others (including marketing and finance teams) are enabling or hindering such cross-team collaboration and what might be needed to knock down organizational silos.

- *Data architecture.* Bringing data from multiple sources (network elements or organizational data, for example) requires scalable, cohesive data strategy and architecture to enable use-case deployment at scale. In an environment dominated by budget constraints, network teams should critically evaluate their data strategies to ensure that they optimize value from existing investments, that additions are backed by specific use cases, and that there is a clear link between the architectural road map and business value.

In this vision of network transformation, it's not just the network stature that is transformed. The role of the CTO is enhanced, going from playing a supporting role to leading the charge on digital transformation. As 5G deployments weigh heavily on already stretched capital budgets, such a transformation could also enable CTOs to achieve significantly lower costs with operating-budget benefits of 20 to 30 percent per year and capital-budget improvements of 15 to 20 percent per year (on a like-for-like basis).

The vision for this network is long term, but without concrete steps now, network teams might face an increasingly uphill task, and offering the best network to subscribers might come at a heavy price. To get started, network teams should define a holistic end-state idea for networks based on the five elements of the network of the future, their own guiding principles, and the operating models required to achieve them. Network teams should also consider conducting proofs of concept in selected areas (for example, agile B2B provisioning or analytics-driven field dispatch) to start making the vision a reality.

Transformation, after all, is about changing mind-sets and how we do things—and, ultimately, about perceived positioning in the company and external world. The question for CTOs and network leaders is: Do you want to play defense and keep explaining and justifying capital expenditures to the board, or do you want to shape the whole company's agenda? ∎

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