

# The NextWave Journal

The latest opportunities and challenges in your industry:  
now, next and beyond

Issue Two: Future Network Now

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TELECOMMUNICATIONS EDITION

The EY logo consists of the letters 'EY' in a bold, white, sans-serif font. A yellow diagonal line is positioned above the 'Y'.

Building a better  
working world



# Welcome to The NextWave Journal

The NextWave Journal is an insightful look at the telecommunications industry today, created to inform and inspire your short- and long-term decisions, with actionable insights.

Designed as a response to the rapidly changing world we're living in, this regular series of publications discusses the changing priorities in your industry, highlights the latest challenges businesses such as yours are facing, and shows how we're working with our customers to help them adapt.

We hope you find the information within these pages useful. Please let us know if you have any comments or queries about anything you've read.



## The age of digital opportunity



Adapting to change and taking advantage of a unique situation

## The future network is now



Think forward and think fast to meet the evolving needs of the market

## How to optimize network investment



Introducing a new way to enable decision-making at an executive level



## Accelerating network deployment



How achieving stability can help you roll out the network faster

## Resilience as a competitive advantage



Why keeping the network lights on is no longer enough

## Cybersecurity: embedded, end-to-end and everywhere



Networks are changing - your approach to security needs to change, too

**Tom Loozen**  
Partner and EY Global  
Telecommunications Leader



# The age of digital opportunity

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We understand how use cases are drastically changing and demanding much more from networks than just customer connections.

We're potentially in one of the most exciting periods of time for telecommunications businesses since the internet began. Amid the COVID-19 global pandemic, we've entered an age of digital opportunity - and the time to act is now.

When the pandemic first impacted the world, telcos quickly discovered that many of the drastic, accelerated decisions they were taking to support both employees and customers actually worked flawlessly. They learned that they could do things in new ways to realize new efficiencies and that there were longer-term benefits to be realized, too.

Some of the main benefits came from updating operating models. Today, most networks use specific equipment from a specific vendor, with many people assigned to operate them. However, it's been possible for some time to establish the network as a combination of physical computers and cables - and add the intelligence via software that runs in the cloud. While this approach already existed, the pandemic restrictions on working from the office, and large, unexpected changes in traffic that required immediate action made operators move faster in upgrading their networks, making them software-defined.



More operators are also now acting on the opportunities that machine learning and artificial intelligence (AI) offer - not only reducing the time and cost associated with human input, but strongly increasing quality, too. Whether this is applied in planning, running or securing the networks, it frees up skilled employees to move the business forward, reduces costs and increases customer service. Additionally, traditional infrastructure investment plans, often only reviewed annually are now being assessed monthly - helping to match supply with ever-shifting demand and improve ROI.

In parallel, telcos have experienced broader demand for services. The need for high-speed, reliable, secure connectivity and cloud solutions has soared. However, telcos are now being asked to increase their service offering beyond connectivity. They're being asked to provide security and act as the systems integrator that will work with partners to deliver end-to-end solutions, over both fixed and mobile networks.

While these positive changes are happening, the investment required to adapt and expand the networks - including the full rollout of 5G - means the percentage of revenue being invested continues to increase. There's now a critical need to ensure that these investments are made precisely and lead to the strongest returns. There's an art to how you allocate capital, how you plan, deploy and run a resilient network with quality, at low cost, and how you drive strong returns - and this is where we can help.

The EY organization can provide operators with the complementary skills and assets to maximize their return on network investment. We know the insights you need to make informed executive investment decisions. We can support you to plan a network for maximum financial returns. And we understand network investments, changing customer needs and relevant use cases due to our extensive relationships across all industry sectors. We can also advise on how to deploy your networks with rigor, speed and quality, at the lowest possible cost - delivering a resilient, secure network that reaches further, and supports the deployment of 5G-based IoT and edge cloud solutions.

With these challenges, opportunities and capabilities in mind, we have developed Future Network Now, a solution set designed to help you with your priority issues. Future Network Now brings together our deep skills and knowledge in financial decision-making, AI, asset management, technology and security. It's a solution set that's also complemented by our ecosystem of trusted partners that offers deep knowledge across the aspects of the network that matter most.

In this edition of the NextWave Journal, we'll explore Future Network Now further - and how taking action today can help you make the most of this age of digital opportunity.

**Tom Loozen**  
Partner and EY Global Telecommunications Leader





**By Jose Luis Garcia**  
EY Global Future Network Now,  
Solution Leader

# The future network is now

**Telecommunications is in a good place. The COVID-19 pandemic has reinforced the criticality of the telecommunications sector across the world. Consumers feel positively about the work that communications service providers (CSPs) are doing in general and the market opportunity is there to provide CSPs with the possibility to offer more than just connectivity. However, there are still some challenges to face.**

Unlike other sectors, CSPs must deal with digital transformation in two different ways: they have to ensure the successful transformation of their own businesses and, at the same time, become the

enabler for the digital transformation of all other sectors in our global economy. That is what makes this sector so fascinating, but it also introduces additional complexity.

Generally speaking, but more importantly under a scenario of economic deterioration, CSPs have a need for continual investment to increase the resilience of their networks in mission critical functions; secure the quality and capacity of their services; and make sure that the impact of the economic slowdown in all other sectors is minimized. Quality, security and resilience are vital.

To achieve this overarching goal while remaining profitable - and because telecommunications is a capital-intensive industry - CSPs are faced with the need to implement operational efficiency measures that, once realized, will free up the much-needed funds for transformation. And all of this must be done while attempting to adapt their business models to an ever-changing market.

It can seem daunting. But the opportunities outweigh the challenges and working with us means CSPs can begin to take advantage of today's dynamic environment.





## Think forward

The key to achieving this goal is to be proactive and flexible about change. Think ahead but also have the ability to adapt to changes in your planning in a nimble way. As an example, and when it comes to 5G specifically, the market will inevitably reach a point where there's a lag between supply and demand. As enterprises across all sectors begin to understand what 5G is truly capable of, network demand will soar, thus stressing the supply in the system. CSPs need to model demand scenarios and think ahead to meet them - but also expect the unexpected.

Equally, and to keep up with digital transformation, CSPs need to offer more than just connectivity. The good news is that they do not have to do it all by themselves, but rather can open up to an ecosystem of partners; leverage alliances in new ways; embrace more flexible approaches; share infrastructure; and implement new business models wherever and whenever necessary.

Now's the time to work with over the top (OTT) organizations and other relevant players, as opposed to resisting them - and crucially, seek out the opportunity, look for those companies that might be successful in the future, and transform the business as we know it today or even create new business where none currently exists.

Working with Netflix or Google today would undoubtedly be more expensive and complicated than it was 10 years ago. Partnering with, or acquiring, a business is always easier and cheaper in the early stages. Therefore, CSPs must dare to reimagine their business and take controlled risks to shape the future. Today, they are in a fantastic place to do so.

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The key is to be proactive about change. Think three years ahead – or even further.



# EY solution to the CSP challenge: Future Network Now

To support CSPs in the current and future environment, and to address some of the challenges mentioned above, we have developed Future Network Now, a solution set designed to meet the evolving needs of the communications services market with a focus on network issues with a multidimensional open ecosystem approach.

The ultimate goal and primary focus of Future Network Now is to facilitate the CSP to DSP transformation - and also to enable CSPs to structure their operations as leading-class, both in service quality and efficiency. In doing so, Future Network Now also supports the release of working capital for increased financial performance, helps incubate an ecosystem that leverages alliances and much more. And all of this while making sure the required levels of quality, security and resilience in the network are met to support the wider enterprise and economic transformation at play.

Future Network Now is architected around an open platform that facilitates the integration of the various assets around process, technology and people's capabilities - either ours or a third party's - in a modular way. This modular and flexible approach facilitates the addition of future assets and therefore secures a future-proofed road map for the technologies to come.

Finally, Future Network Now can be delivered with a view to simply assess the current state of your business or to support CSPs to implement and ultimately run the necessary improvements under a managed services construct. It's complete flexibility at work.

Future Network Now directly addresses the following key areas:

## Informed decisions

**Virtual modeling:** Would you like to have access to a digital persona that helps you simulate and ultimately validate the transformational decisions you are about to take? As part of EY services management solution, we have built a virtual chief officer (CXO) to help you do just that.

Digital twin extracts information from your business, which is modeled and mined (process and analytics). AI/ML and related EY consulting capabilities then allow for simulated changes to the various KPIs that drive your business - helping to calibrate the impact of such decisions, identify the investments needed and flag areas of improvement.

It defines and tracks change initiatives, helps optimize operations and even pulls data from across the wider industry to provide benchmarks of leading in class KPIs and business outcomes to facilitate your decision-making process.

**Network investment:** Interested in improving capital allocation? We combine the digital twin with our network investment analyzer service (5G analyzer) to compare trends (regulations, behavioral changes, demand and supply, major industry events) along with the CSP's current business performance - including the operating model - in an alert dashboard that complements existing supply/demand models to optimize capital investments.

Developed jointly with relevant CSPs and the TM Forum, the focus of network investment is on how to deal with unexpected changes in traffic patterns (like those caused by the first wave of COVID-19) and then to be more broadly applicable to other unexpected changes that shape the investment needs.

Finally, we align the defined investment schedule with the network deployment plan for capital optimization.



# EY solution to the CSP challenge: Future Network Now

## Operational excellence

**Network deployment:** We can help you assess the maturity of your network deployment and support you in the implementation of best practices across design, planning, rollout, testing and commissioning.

This module also evaluates the readiness around the 16 capabilities required for planning, designing and delivering networks – including support functions such as supply chain, finance and procurement.

Network deployment includes AI-based and automated network planning smart CAPEX solutions (with partners such as B-Yond) and integrates the latest enablers, such as the use of drones in field services.

We've added additional value to the enhanced telecom operations map (eTOM) framework by enriching it with risk analysis and detection, and mitigation and implementation options to make sure that once applied, it provides a best-in-class and cost-effective way to build out your network.

Network deployment covers the entire life cycle, from spectrum planning to final acceptance and related payment release. It does this by integrating various process and software assets that reduce the deployment-to-collections cycle, thus improving your average cost of capital and increasing the service quality of the deployed assets.

**Network resilience:** Can you imagine a future where telemedicine, smart self-driven cars, key logistic processes, robots, e-sports and a long list of 5G-enabled and supported mission critical functions are not performing flawlessly? From latency, to capacity and density, retainability and much more – all these critical aspects of 5G need to be resilient from end to end.

The network resilience module suite allows you to carry out resilience assessment to the level of the single point of failure. And when improvement opportunities arise, it then defines the improvement plan, implements the needed changes and ultimately operates the same as part of a continuous improvement process under a managed services framework.

In summary, our network resilience module helps communications companies improve their operational agility and resilience by looking into the organization, process and technology aspects of their operations – and by leveraging existing assets from our enterprise resilience framework and related cybersecurity offerings.

**Cybersecurity:** With vast amounts of critical data being processed and with enterprise and telecommunications organizations coming together in new ways, it's critical that security is prioritized. We can wrap security around your entire transformation road map.

We help customers transform the network and IT risks across cybersecurity and data privacy functions. The outcome is to mitigate actions in the business, including cyber risk, compliance and resilience, data protection and privacy, and identity and access management.

## Technology foundations

**5G and IoT:** In support of converging businesses, this module enables our customers to create new and differentiated SaaS solutions that are tailored for specific industry subsectors – as opposed to one-size-fits-all. It includes the rapid deployment of IoT solutions and consists of 140+ 5G industry use cases and a set of capabilities to quickly assess new opportunities.

Understanding that existing and future platforms need to be ready for the billions of sensors and the thousands of companies they connect to, you need to be able to manage and track performance. That's why we have collaborated with professionals that support us to integrate the right technology and prepare you for the changes to come.





As we reflect on Future Network Now and its approach to addressing your issues, we would like to reinforce that it offers complete flexibility around what capabilities you want or need to concentrate on. You can choose to implement our full end-to-end offering, or you can select each module as a standalone solution. Within each module, you can even choose one - or all - of the 'assess', 'implement' or 'operate' services we help deliver.

Ultimately, it's all about meeting your unique needs in a way that works for you.

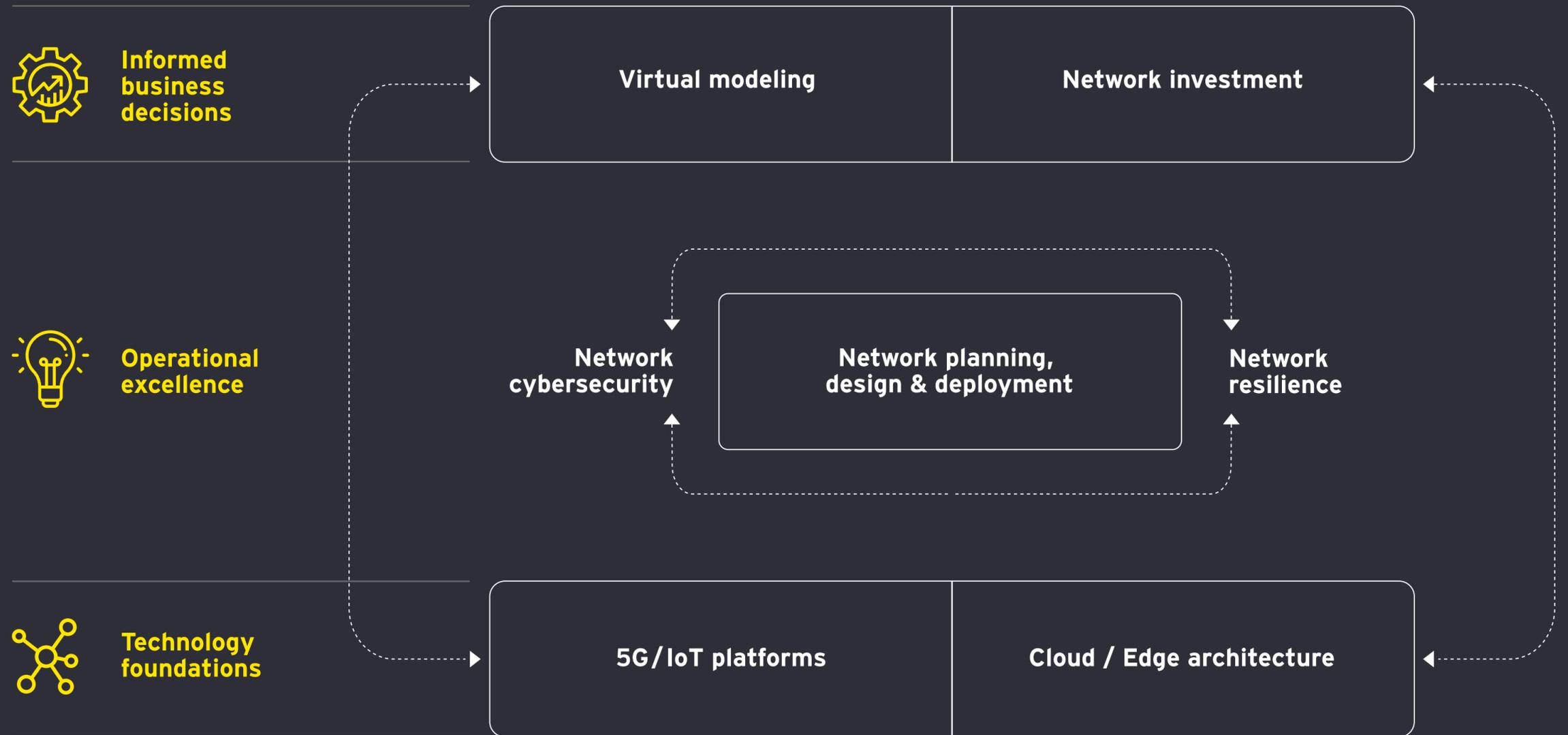
**Jose Luis Garcia**  
EY Global Future Network Now,  
Solution Leader



# Introducing Future Network Now

We help telcos structure their decision-making processes by enabling them with a detailed financial understanding of any changes they want to make. Ultimately, we help businesses to get things done - not only based on ROI and technical specifications - but also on the valuable insight, deep knowledge and wealth of experience we bring to the table.

With our Future Network Now solution set, we can help telcos become more resilient and better at responding to change.





**By Fadi Chedid**  
EY Global Future Network Now,  
Network Investment Lead

# How to optimize network investment



Amid the initial chaos of the COVID-19 crisis, many telcos were striving to understand the implications to their business and react in the best way possible. One particular area of interest was network investment.

As Tom alluded to in the foreword of this publication, it's now more critical than ever to ensure that any investments made are carried out wisely and lead to strong returns. There's an art to how you allocate capital and increase the return on network investment - and it relies on having your finger on the pulse of market changes.

However, if we look at the way telcos have traditionally functioned, many decisions have been driven by historical data. Operators build supply and demand models that identify trends over the last few years, and then use this data to forecast what they believe is going to happen. They identify gaps, or areas that require attention, and adjust their investment plans accordingly.

While this is a logical and established approach, the problem is that it doesn't capture unexpected events that happen within the year, and the potential impact they have on supply and demand. As a result, when such events occur, these models' ability to predict what you need to do next is put in question. So, what's the answer?



# Introducing our network investment dashboard

With an aim to help telcos navigate unexpected events in the future, we began by asking ourselves how to focus more on short-term circumstances to complement the existing models. What was the situation a few months or even weeks ago? And what about real-time? We identified the opportunity to create a solution that would give telcos a strong idea of whether or not there's been a recent departure from the norm in a given area.

Working in collaboration with two leading industry stakeholders, we have built a dynamic and interactive alert dashboard that uses publicly available data and proxies to provide an indication of market supply and demand - and therefore informs customers of any significant recent material changes that might require them to revisit their existing forecasts.

While it's fair to say the pilot we've created was triggered by the pandemic, its capabilities will transcend COVID-19. The solution applies to any event that might have a temporary or more permanent impact on supply and demand behavior in the market - and it will continue to offer value far beyond the health crisis.

# Assessing supply and demand

On the demand side, our dashboard monitors consumption to provide an overview of what's currently happening in the market. Refreshed frequently, it shows where downloads are happening (e.g., gaming, virtual meetings and streaming video); where the consumption is based (e.g., within business parks, in public areas or in homes); and what enterprises are announcing in terms of their strategic plans for the future (e.g., the announcement of working-from-home policies). This information about how demand could look in the future then enables telcos to make more informed decisions.

In the same way, the dashboard also analyzes supply and the ability of telcos to provide the bandwidth and services required to meet demand. So, for example, it enables you to see things such as download speeds, upload speeds and latency - which indirectly informs us whether supply issues are present. Another parameter that's included is updates from operators themselves, announcing things such as the impact of local lockdowns on the movement of their engineers, or the effect of border closures on the transport of vital network equipment.

Based on these two factors - supply and demand - the dashboard can then synthesize directional findings for customers. It brings KPIs together to formulate insights that will help the client make informed decisions at an executive level.



## Local insight, global potential

You can think of our dashboard as a bird's-eye view into a local region - providing insight into a certain country's market. It takes into consideration wireless and fixed telephony, broadband, consumer behavior and B2B performance. It tracks policies and regulations that might enable or inhibit supply and demand. And it also looks at any indications of where investments are currently being made, such as within cloud, 5G or IoT.

The dashboard then collates all of these factors to understand any shifts that are happening in the market and feeds them to the alert output. The approach we've taken is to provide findings on a local market level, enabling meaningful discussions within a defined country. Our pilot is currently focused specifically on the Netherlands but will be rolled out to further regions once it is fully available to customers later in the year.



## Shining a light on market shifts

Our alert dashboard is ultimately designed to bring attention to a certain area that is experiencing change. Based on the findings, we are then happy to offer consultancy around responding to the change - producing tailored advice and direction that relates directly to your unique requirements and collaborating with you to overcome any challenges you might face.

Whether this then takes us into areas such as network deployment, resilience or cybersecurity, we can provide the specific support you need to optimize your investments and move your business forward.

**By Fadi Chedid**  
EY Telecommunications Solutions Architect

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We have built a dynamic and interactive alert dashboard that uses publicly available data to provide an indication of market supply and demand – therefore informing customers of any significant recent change.





**By Matthew Robinson**  
EY Global Future Network Now  
Network Deployment lead

# Accelerating network deployment

Successful network deployment is all about optimizing the right resources in the right place at the right time to deliver a robust network. But what are the foundations of network deployment itself? And why is it important to get them in place before building on top of them? Let's explore the subject a little bit.

In my role, I'm fortunate enough to work with some great clients and see a wide range of network deployment requirements and challenges. I'm also lucky enough to help deliver some truly transformative business outcomes. From this vantage point, I'd like to share with you some of our recent observations and opinions - and provide a point-in-time perspective on how I believe telcos can start to accelerate network deployment.





## The benefit of experience

Network deployment is all about delivering a solution out into the field - but today it requires much more than simply dispatching an engineer to do the work. Whether the deployment is a complete rollout of new hardware and software or an infrastructure migration, it's crucial to have a solid strategy in place, a clear process and a wide range of resources available.

Due to the challenges many telcos currently face around budget constraints, network deployment also needs to become more efficient and agile than ever. We've quickly learnt that by applying some of the proven practices that have come from other areas of the supply chain - where, for some time now, every single aspect of the network has had to be optimized - we can help to bring fresh thinking to what has traditionally been an engineering function.

Additionally, while it's perhaps true of any transformation today, we've learned that the best place to start with network deployment is with the client's strategic priorities. Then, it's important to create a vision and plan that aligns to those strategic priorities and define what you need to do to fulfill it. It's also vital to work out how to make the most of the infrastructure you've already got in place.

Experience has shown us that defining an end-to-end network evolution road map, measurable deployment targets and an integrated process model is crucial. And we've discovered the value of gaining end-to-end visibility for all of the assets in the field in order to understand exactly how they're utilized - which also means they can be easily redeployed if the situation or customer requirement changes.



# Optimizing network deployment

In recent years, we have been helping our customers implement new ways of working so that network deployment becomes more efficient, more structured, more predictable and ultimately far simpler. We are creating clear paths from defining our customer's strategies to delivering against them.

This has translated into a network deployment model that encompasses how you're going to build the infrastructure and roll it out; manage the thousands of contractors involved with executing the plan; and manage the equipment, inventory (both virtual and physical) and end-of-life processes. It's a truly end-to-end model - and that's what network operators of today require.

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Regardless of whether we're dealing with a traditional fixed fiber network, SDN, mobile network, or network-as-a-service, the very foundation of deployment needs to be end-to-end visibility.

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## The foundations of change

Regardless of whether we're dealing with a traditional fixed fiber network, software defined network (SDN), mobile network or network-as-a-service, the very foundation of deployment needs to be end-to-end visibility. Add to this full traceability of how an organization's network inventory, data and vendors impact on their various product and service offerings - and it makes it much easier for Chief Network Officers to meet their customers' needs.

While visibility and traceability may seem like basic elements, they're key to everything - and you'd be surprised how many telcos struggle to get them right. These foundational elements give you the agility to adapt to market changes and quickly harness the power of new technologies. They enable you to grow and scale with confidence.

Typically, customers will engage with us when they are experiencing pain points within one of the following areas:

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**Visibility:** Often, a telco's operational view of its disparate assets is incomplete.

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**Cost:** Network deployment has become far more expensive over the years.

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**Environment:** Many telcos now have sustainability and green targets high on the agenda.

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**Agility:** Dealing with disruption is something we've all had to face recently.



# How EY teams can help

We focus on developing the processes and capabilities you need from a commercial and organizational perspective to deploy networks and infrastructure efficiently and with agility.

From our initial maturity assessment, all the way through to service implementation, we bring all the elements of network deployment together - delivering everything you need to enable long-term programs that offer:

## 1 Cost savings

Achieved via avoiding CAPEX; increasing budget and providing a robust network with fewer issues.

## 2 Speed of deployment

By providing a common plan that everyone can work toward, it makes it easier to deliver change on time.

## 3 Waste reduction

We typically aim for 10% waste reduction, but we've recently been able to support the reuse of 30%-40% of equipment instead of it being scrapped.



We have the experience of working through the design and implementation of a new operating model to deliver the capability required to fill any gaps that are identified. We also strive to drive in-life savings to help ensure that any new solutions self-fund. So, why not talk to us to find out what's possible for your organization?

**Matthew Robinson**  
EY Global Future Network Now  
Network Deployment lead





**By Jaspreet Singh**  
EY Global Future Network Now,  
Network Resilience Lead

# Resilience as a competitive advantage

When I started working with EY teams over 15 years ago, one of the priorities I was tasked with was analyzing the events that could hamper a customer's business - and working out how to prevent them from happening.

The aim was to make sure that our customers' networks could be available 24/7 and I used to spend a lot of my time working with telecommunications organizations specifically. This is when we started talking to customers about the idea of resilience and today, with the advent of 5G and the internet of things (IoT), this concept has only intensified.

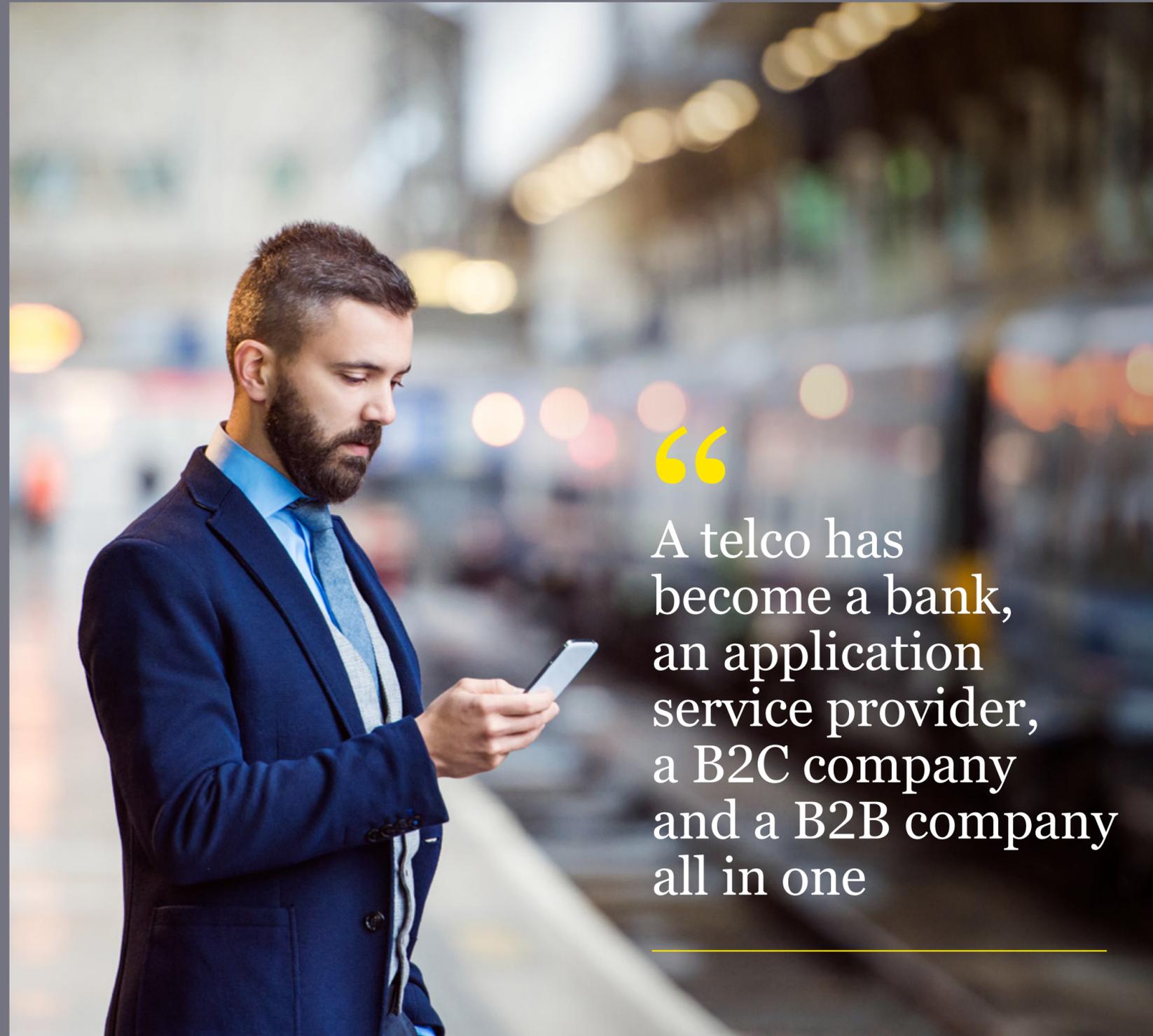


# A telco is no longer just a telco

We now find ourselves surrounded by changing business models. A telco has become a bank, an applications service provider, a B2C company and a B2B company all in one - and it relies on a resilient infrastructure to work.

For instance, with many telcos now supporting payment services from providers such as Google Pay and WhatsApp Pay, what would happen if a critical transaction couldn't be carried out? In health care we're seeing more and more consultations conducted online - there are even surgical procedures being carried out by IoT devices and AI robots - so, what would happen if connectivity was lost at a crucial moment?

A further example can be seen within smart cities, which is currently one of the biggest use cases of 5G and IoT technologies. What would happen if cars lost their connectivity to an app that detects traffic and intelligently changes traffic lights? One single break in this infrastructure could bring the city to its knees.



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A telco has become a bank, an application service provider, a B2C company and a B2B company all in one

# Planning for resilience

With such a reliance on network stability, every organization must plan for resilience. The past year alone has shown us that anything could happen at any time, and the network needs to remain available.

At a moment's notice, for example, thousands of students may be told to study from home, putting vast amounts of pressure on the entire telecommunications infrastructure. If your network hasn't planned for that surge, then you will almost certainly experience bandwidth issues that will affect performance. This, in turn, will negatively impact customer satisfaction, which can ultimately lead to revenue loss with customers choosing to switch to a more reliable provider.

It's a domino effect that can harm a business's reputation and it means that resilience isn't just about keeping the lights on or providing an effective disaster management strategy for devices; it can also be your competitive advantage.



**An end-to-end  
strategy is crucial**



From the impact of new business models, to handling the surge in demand following yet another lockdown, all of these elements need to be accommodated within a single platform. And this is where we can help.

We look at resilience from end to end: from making sure you have the right processes and technologies in place; to checking whether you've factored in a single point of failure for the entire network; to analyzing the distribution between core, access and transmission networks.

# END-TO-END



Every organization has some sort of resilience in their DNA; that's the human way of doing business. But when you're planning to deploy, operate and manage a network, you need resilience built into each of these phases - which can be hard to achieve without support.



# Taking a proactive approach

Typically, we'll start a customer engagement with the network planning piece - and begin by engaging the chief technical officer (CTO) with an assessment exercise. We will look at any pre-existing strategies to see if they are comprehensive enough before going on to provide detailed guidelines that support the resilience of the entire network.

Once a strategy has been designed, we can either hand it over to the customer to manage it or we can help deliver our managed services to support the successful implementation of the plan. We draw upon our in-house team of around 400 dedicated members of staff with deep industry knowledge, as well as our trusted ecosystem of partners, to achieve the desired outcomes.

However, I'm afraid to say that many telcos only look for support when an incident has occurred, which in my opinion is the equivalent of having your home burgled and then going out to buy an alarm! Equally reactive is when telcos approach us solely with the intention of meeting regulatory requirements when applying to governments for licensing.

My best advice, therefore, is to be proactive instead of reactive. Get ahead. Resilience is not only about failover planning; it can help you realize new efficiencies and cost savings; it can make you more attractive than your competitors; and it's ultimately essential within the wider crisis management piece.

**Jaspreet Singh**  
EY Global Future Network Now,  
Network Resilience Lead





**By Tim Best**  
EY Global Future Network Now,  
5G Cybersecurity Lead



# Cybersecurity: embedded, end-to-end and everywhere

You might not think it right now, but we're very lucky. Why? Because if the global pandemic had impacted us only two years ago, we wouldn't have been able to cope as well as we have recently.

I've personally been involved in IT for over 20 years and things have certainly come a long way since then. I now look after EY cybersecurity teams predominantly within the Nordics, and most of the work I do is around providing support to Nokia specifically. What I've seen is that the technological advancements made within the past 24 months have surpassed almost anything I've ever experienced, and it's enabled us to adapt to a rapidly changing environment seamlessly.

As a society, we now have technology that connects and unites. And underpinning all of this, of course, are the networks. While once upon a time, a network was a physical entity and fairly static, it's now the polar opposite. A network can be spun up, wound down, altered and adapted on the fly as situations change. And that's why the CSPs and the services they offer have become far more meaningful to us as individuals.





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Securing the supply chain all the way down to the end business user is our ultimate goal.

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## Selling the dream of endless possibility

Digital transformation is continuing to accelerate because we've seen what's possible in a short space of time. And as we look to a future of 5G-enabled networks, it's quickly apparent that adaptive, flexible and automated capabilities will enable new slices of network with new processes and power that's pushed out to the edge. Almost anything will be possible thanks to virtualization. But are telcos equipped to deliver on these promises?

For the most part, it's fair to say that telcos are generally well-prepared for 5G. We just need to set expectations that new use cases may take a while to establish as we upskill our staff. After years of requiring network engineers and architects, we now need software engineers and architects - as well as security engineers and architects - which are in short supply. That's because understanding security in a 5G environment is complex and enabling it in a way that doesn't prohibit imagination is challenging. So, where do you start?



# The key areas of consideration

If we are working with a customer that wants to secure all of these areas, we'll perform an in-depth assessment of each environment. From there, we'll construct a set of recommendations and put measures in place that protect the things that matter most to the customer. The business case is very important to us - and understanding what the customer wants to achieve in the long run.

We can then help to implement the recommendations. We also monitor networks and track the impact of any changes made. This is, in part, how my teams provide support to Nokia. The EY organization provides specific IT security skills and support - helping the organization to maintain, manage and deliver performance in its network operation and security operation centers.

## 1 Embedded security

Security isn't something that you simply bolt on to 5G. It should be built into all of your hardware and software components from the outset. That's why we work with our customers to help them understand their security requirements and what needs to be included from the start. Additionally, because the concept of perimeter security doesn't apply to 5G because everything is the network - not just the core - your security needs to cover all areas of the network as opposed to the edges. And you need to understand what threats look like in each area.

## 2 Network slicing

Slicing is where your network is divided into several end-to-end virtualized environments - so you need to think about how you isolate each of these network slices. For example, how will you separate a network slice that a bank is using from that of a government department or a hospital? With each slice potentially hosted in physical machines mere meters apart that may even share the same cabling, how do you guarantee data security from end to end; from back-end database to bank teller or hospital nurse? You need to be able to control the access and authentication and monitor each slice.

## 3 Roaming

Cloud and virtualized environments need a flexible yet robust level of security to meet the demands of roaming and interconnectivity. Before, during and no doubt after the impact of COVID-19, people have and will roam across networks and countries, so you need to extend security across the roaming network as well.

## 4 Back-end systems

While there are many more areas, an important one is the back end - the core systems that drive the network. It's essential to make sure that the back-end has dedicated security too, because of its potential knock-on effect to all other areas of your infrastructure.



# Our ultimate goal

Securing the supply chain all the way down to the end business user is our ultimate goal. And to achieve that, cybersecurity needs to be embedded, end-to-end and everywhere across the network. EY teams are well placed to help customers make this a reality. With over 11,000 people working on cybersecurity and IT risk within our organization, we have professionals from a wide range of sectors that can provide support that takes into account the nuances of each industry. We've even been recognized as a Strong Global Managed Security Services Provider 2020 by Forrester Research\*.

Of course, unlike traditional models, 5G networks are much harder to learn and predict. The environment could be vastly different from one minute to the next. Therefore, we're constantly looking to find ways to use machine learning and AI to understand the data, create patterns and raise alerts for humans to action. It's a never-ending challenge, but it's one that we relish tackling on a daily basis.

**Tim Best**

Future Network Now, 5G Cybersecurity Lead

\*The Forrester Wave™: Global Managed Security Services Providers, Q3 2020



# The future network is now

We hope you've found this second edition of the NextWave Journal insightful.

And we hope you've been able to see why we believe that network transformation, from a business, operational and technology perspective, will be key to a resilient and successful future for both telcos and their customers.

If you'd like to share any opinions or ask us any questions about anything you've read so far, please don't hesitate to get in touch with us - we'll be more than happy to start a conversation.

Thank you.

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