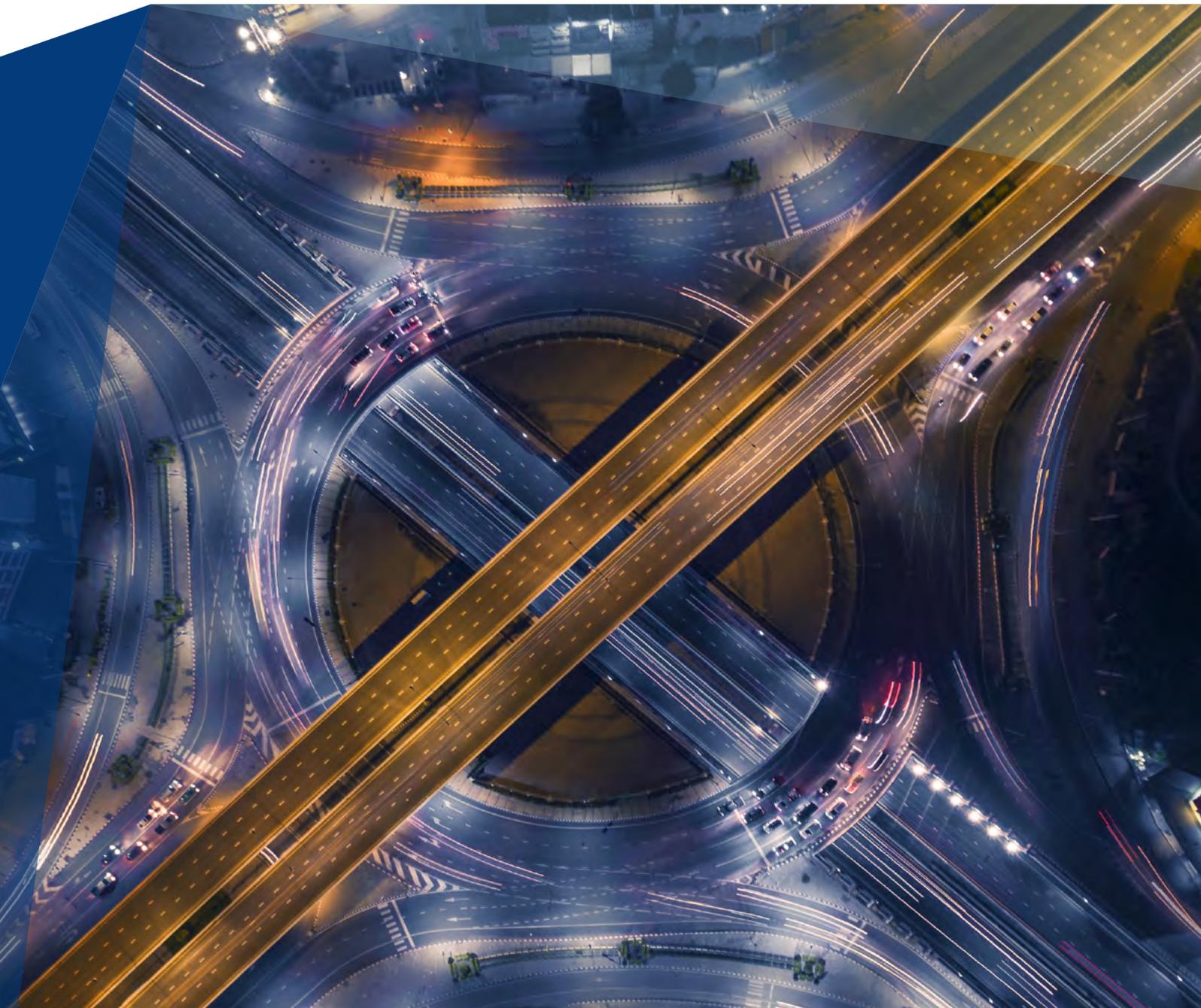


BEYOND THE HYPE

5G: OPERATORS NEED TO PLAN FOR AN
EVOLUTIONARY REVOLUTION



5G: OPERATORS NEED TO PLAN FOR AN EVOLUTIONARY REVOLUTION

BEYOND THE CURRENT MYTHS, MARKETING HYPE, AND PESSIMISTIC PROJECTIONS

Euphoria and hype over 5G do not seem to be driving real investment traction yet. Vendor marketing messages, press stories, and analyst reports of the past few years have highlighted revenue opportunities, mostly from niche applications, and featured optimistic predictions for subscriber uptake. But industry executives, in particular those at many telecom operators, are questioning the overall business case for 5G investments. From a technical perspective, some doubt the ability of 5G millimeter radio to pass through barriers. They have reservations not only about the low latency between users and network, but also the promise that 5G will represent a step change in performance from 4G.

In our view, the priority for operators should now be to develop a target picture for the future of 5G, as well as a migration road map and carefully analyzed scenarios. Operators should start to develop a rational, end-to-end game plan for a network and service transformation with 5G as an integral part.

A successful 5G game plan should be based on the following principles:

- Define service priorities and their timing. After that, planning can move on to the technology platform and related coverage requirements for the services.
- Think “end-to-end”. 5G is not an isolated new wireless standard, so its capabilities and limitations will depend on other technology platforms and services.
- Start preparation now. To avoid missing potential future options, operators need to give early consideration to topics that include their 5G spectrum strategy and sourcing of infrastructure, such as 5G-ready nodes.
- Plan for migration and evolution. In many respects, 5G is an evolution. Operators should figure out how current services and technologies can migrate smoothly.

5G IS MORE THAN ITS TECHNOLOGY BUILDING BLOCKS

Most public discussion of 5G focuses on the air interface, which will deliver higher throughput performance than the current 4G technology. This is not a surprise: The throughput level has a direct impact on customer experience, and the radio network will be a major part of the overall 5G investment. However, the 5G core (successor of the evolved packet core, 4G core network) will enable fundamentally new functionalities. It will support micro-services and new communication protocols, and deliver and orchestrate a sliced network serving various industry-specific communication profiles.

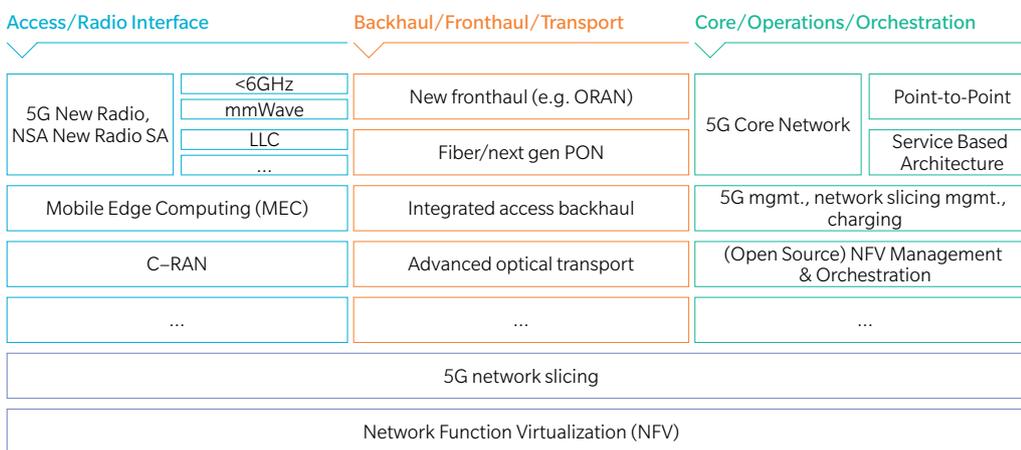
Furthermore, there is a prevailing view that 5G is a platform solely assembled from technology building blocks (See Exhibit 1) out of the construction kit of the 3rd Generation Partnership Project (3GPP), the leading mobile standardization organization. But 5G performance can only be delivered with an adapted network architecture (such as cloud-computing capabilities close to the network edge) and with technology building blocks that go beyond the 3GPP standards (for example, network functions virtualization (NFV) or software-defined networking (SDN) and the related operations and orchestration).

This means that operators have a broad range of technology options (including interdependencies, like network slicing based on NFV). So they need to assess which are needed for which kind of services and when. Added to this, 5G will be an integral part of the overall network transformation, and it cannot be treated in isolation. So, when carrying out an overall network transformation, the integration of 5G-related elements needs to be considered. To achieve maximum benefits from a closely aligned transformation, and ensure that the interdependencies are handled correctly, planning should start right now.

Though 5G will deliver a step change in performance improvement, it is clearly defined as an evolution of existing 3GPP technology. The first 3GPP standard release for 5G is Release 15 (releases 13 and 14 were for LTE-Advanced Pro) and it still contains components related to LTE radio access. So, migration to 5G will need both backward-looking aspects, such as using existing equipment, and forward-looking, such as rolling out forward-compatible elements. Such a migration concept is important both for elements that are related to 3GPP and for those that are unrelated but will be affected by 5G, such as backhaul infrastructure.

Exhibit 1: Service focus

POTENTIAL BUILDING BLOCKS OF A FUTURE NETWORK PLATFORM



Source: Oliver Wyman analysis

SERVICE AND DEPLOYMENT: THERE IS NO SINGLE 5G

Uses for the 5G standard will go well beyond enhanced mobile broadband (for example higher throughput for smartphones) and will range from massive machine-type communication (such as sensors for smart metering) to ultra-low-latency, highly reliable communication (vehicle communication, for instance). These capabilities, flexibility, and variety promise to be a source of increased revenue.

However, not all 5G services will be completely new. Many will be enhanced applications of today's wireless offerings (such as currently rolled-out Internet of Things (IoT) connectivity based on LTE – that is, narrow-band IoT). Therefore, operators must make sure that existing services migrate smoothly towards enhanced-capability services. This requires an immediate start to planning, and the enhanced services should be closely aligned with the overall service strategy. All the required technology capabilities should already be prepared as part of existing platforms, for example the early installation of edge computing sites.

We believe that a common flaw in 5G marketing efforts so far has been to focus on very specific industry use cases, for example utility power systems control, remote surgery, and predictive maintenance for railways. Instead, operators should plan along selected, broader capability classes, such as low-latency applications like augmented reality. They also need to make sure their plans are flexible enough for potential future services.

5G broadband involves massive download and upload speeds, supported by millimeter wave (mmWave), with multiple input and multiple output (MIMO). Under specific competitive and market conditions, we can see that fixed wireless access as a 5G-focus service will provide a large opportunity and a convincing, stand-alone business case driver. Such conditions would include, for instance in the US, cable multiple-system operator competitors moving into mobile while already taking massive proportions of mobile traffic onto WiFi.

Furthermore, not all of the most challenging requirements, such as low latency and high throughput, will be met at the same time, and no single technology will satisfy all of these. That means compromises will have to be made in terms of cost, so for example full-coverage mmWave small cells will be unlikely, and of performance, such as the trade-off between low latency and coverage.

In summary, there is no one, single 5G. Operators need to decide on their individual service priorities and from these derive a migration plan, rollout strategy, and road map. (See Exhibit 2.) Given that the business case for many potential 5G services is still vague or unproven, this planning process will significantly save deployment costs and result in a more targeted investment.

In addition, many operators will be able to take a phased approach. They might start with an offering based on enhanced mobile broadband, enabled by 5G non-stand-alone new radio. They could then migrate their network to deliver vertical services, enabled by 5G stand-alone new radio and the 5G core.

Exhibit 2: Technology building blocks

OPERATORS NEED TO DECIDE ON STRATEGIC PLAYS WITH SERVICE PRIORITIES AND TO DERIVE THE REQUIRED ENABLING TECHNOLOGIES AND MIGRATION STRATEGIES

Examples for Strategic Plays

Key Potential Technology Building Blocks

Strategic Play	Key Potential Technology Building Blocks								
<p>Incremental Transition</p> <p>Focus on Wave 1 5G Building Blocks</p>  <ul style="list-style-type: none"> • BB and basic MTC delivered based on LTE and other alternatives • Later transition and migration to 5G based services <p>Leverage existing NW infrastructure to offer BB and MTC services – postpone 5G investment; wait for technology maturity and clear market demand</p>	<table border="1"> <tr><td>NSA NR</td></tr> <tr><td><6GHz</td></tr> </table>	NSA NR	<6GHz						
NSA NR									
<6GHz									
or									
<p>Broadband Champion</p> <p>Focus on Wave 1 5G Building Blocks</p>  <ul style="list-style-type: none"> • Nationwide 5G coverage at mid/low frequencies to offer mobile BB • High throughput 5G offerings at certain hot spots plus FWA for last mile • No focus on specific 5G service offerings for verticals <p>Early move and technology migration in order to offer nationwide high throughput and density consumer and enterprise access</p>	<table border="1"> <tr><td>NSA NR</td></tr> <tr><td><6GHz + mmW, Small Cell</td></tr> <tr><td>C/V-RAN</td></tr> <tr><td>Fiber BH</td></tr> <tr><td>MANO</td></tr> <tr><td>NFV</td></tr> </table>	NSA NR	<6GHz + mmW, Small Cell	C/V-RAN	Fiber BH	MANO	NFV		
NSA NR									
<6GHz + mmW, Small Cell									
C/V-RAN									
Fiber BH									
MANO									
NFV									
<p>Vertical Specialist</p> <p>Focus on Wave 2 5G Building Blocks</p>  <ul style="list-style-type: none"> • 5G for specific services for vertical industries – focus on low-latency, mission critical applications. Initial business development and technology testing based on 4G (and other) technologies • MBB based first on LTE and later-on 5G <p>Creation of focused portfolio on mission critical, high-value services for verticals</p>	<table border="1"> <tr><td>SA NR</td></tr> <tr><td>MEC</td></tr> <tr><td>C/V-RAN</td></tr> <tr><td>Fiber BH</td></tr> <tr><td>MANO</td></tr> <tr><td>SBA</td></tr> <tr><td>NV Slicing</td></tr> <tr><td>NFV</td></tr> </table>	SA NR	MEC	C/V-RAN	Fiber BH	MANO	SBA	NV Slicing	NFV
SA NR									
MEC									
C/V-RAN									
Fiber BH									
MANO									
SBA									
NV Slicing									
NFV									

<ul style="list-style-type: none"> 5G Pre-5G Access/Radio Interface Backhaul/Fronthaul/Transport Core/Operations/Orchestration Slicing, Virtualization 	<ul style="list-style-type: none"> BH=Backhaul MTC=Machine Type Communication MEC=Mobile Edge Computing NFV/MANO=NW Function Virt./Mgmt.&Orch. NR=New Radio NSA/SA= Non-standalone/standalone SBA=Service Based Architecture
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Source: Oliver Wyman analysis

CONCLUSION: THE 5G GAME PLAN

5G offers increased capacity, efficiency levers, and potential revenue opportunities. To reap these benefits, though, operators first have to understand the technology and service implications. And they need to do so in a way that goes beyond current myths, marketing hype, and pessimistic projections.

- They should define their service priorities in a top-down manner and then design the right technology platform.
- It is important to see 5G as an integral part of the technology and service landscape. So interdependencies with other platforms and services need to be taken into account – for example backhaul and NFV requirements, as well as IoT services.
- Time is of the essence. “Wait-and-see” is not an option, because key elements of the future platform have to be assessed, shaped, and decided right now, even if not all cornerstones (such as detailed service requirements, handset capabilities, or technology performance based on trial results) are completely clear. Otherwise, operators might miss out on potential future options.
- 5G is more an “evolutionary revolution” than a radical, sudden step change. So, an efficient, forward-looking migration of services and technologies will be essential for operators to be able to make good use of their existing assets.

ABOUT OLIVER WYMAN

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