



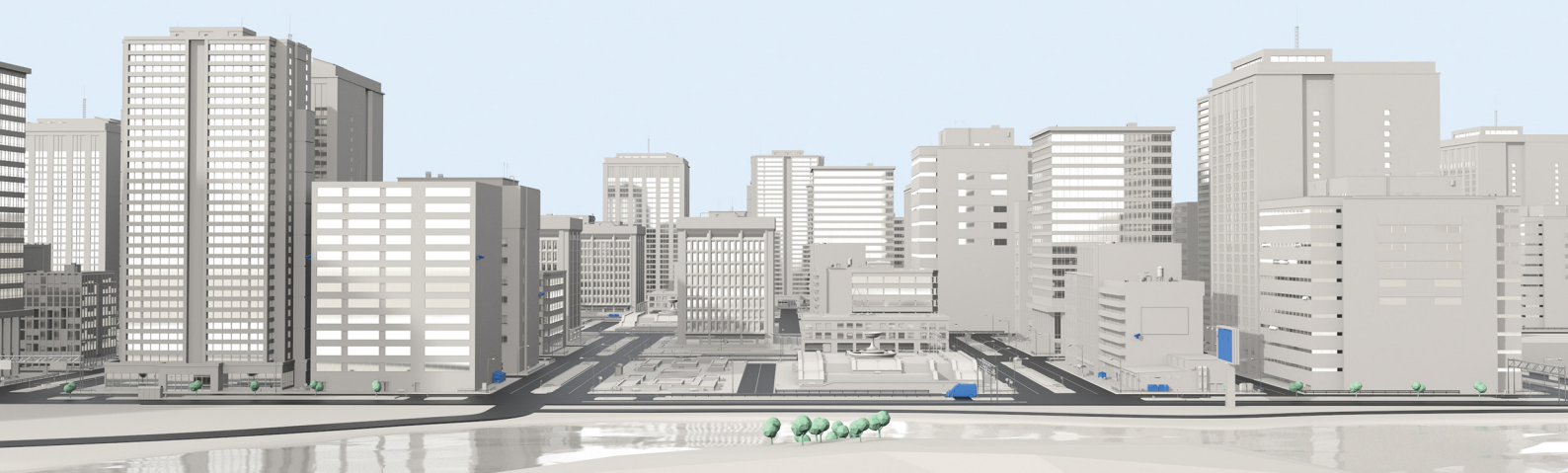
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# Network evolution strategies towards 5G

Extract from the Ericsson Mobility Report  
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# Network evolution strategies towards 5G

Evolving networks today will ensure a smooth 5G switch-on tomorrow.



Among the world's capital cities, Moscow ranks highly for digital development, according to various research institute reports. The 2018 United Nations E-Government Survey ranked Moscow highest among the world's capital cities regarding digital technology development<sup>1</sup> in electronic governance.<sup>2</sup> It was also ranked second in Europe for its number of transportation, health and personal services apps, and among the top five cities in the world prepared to introduce digital technology of the future. Although digital maturity varies across different geographical locations in Russia, these rankings indicate strong customer demand for digital services where there is network support.

In conjunction with vendors and regulators, communications service providers in Russia have ensured mobile networks are built-out and modernized to support this development. Around 75 percent of the Russian population over 16 years old uses the internet (90 million), with a growing mobile internet penetration that reached 61 percent in early 2019.<sup>3</sup> It is

a highly competitive market, in which mobile service price levels are among the lowest in the world, with monthly average revenue per user (ARPU) at USD 4.8 in 2018.

In this market environment, MTS (Russia) is embracing new revenue opportunities through active development of its portfolio of digital services for existing and new customer segments. A key strategic priority to enable MTS to reach this goal is evolution of its existing 4G mobile network and investment in new technology within areas such as 5G, IoT, Cloud, big data, automation and artificial intelligence.

Service providers need to ensure their 4G networks continually evolve to cope with growing mobile traffic demands, and to continue addressing and monetizing existing use cases, while preparing for the future by having an evolutionary path to 5G in place today. It is important to both meet short-term business objectives and have a longer-term strategic direction planned.

This article was written in cooperation with MTC, a market-leading telecommunications group, providing a range of mobile and fixed-line communications-based services in Russia and the Commonwealth of Independent States (CIS).



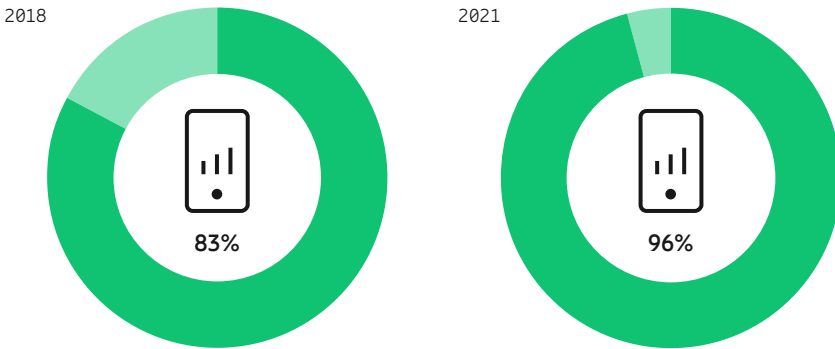
<sup>1</sup> [https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2018-Survey/E-Government%20Survey%202018\\_FINAL%20for%20web.pdf](https://publicadministration.un.org/egovkb/Portals/egovkb/Documents/un/2018-Survey/E-Government%20Survey%202018_FINAL%20for%20web.pdf)

<sup>2</sup> Electronic governance or e-governance is the application of information and communication technology (ICT) for delivering government services

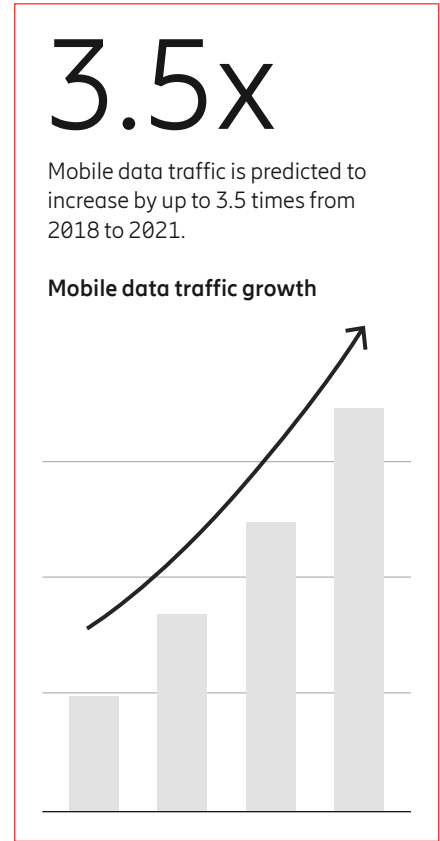
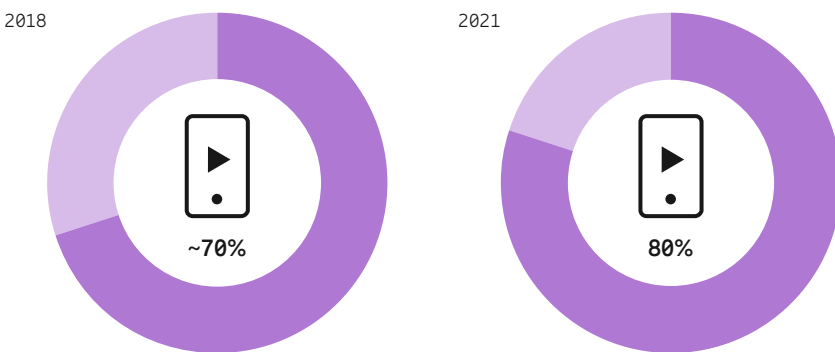
<sup>3</sup> Mobile subscription penetration in Russia is higher than 100 percent due to use of multiple SIM cards

**MTS (Russia) – indicators of traffic growth**

**4G smartphone penetration among MTS data users**



**Video traffic share**



**Managing strong traffic growth**

Mobile data traffic growth in MTS networks has been strong since the introduction of 4G. This is related to increased penetration of 4G subscribers, improved device capabilities and an increase in subscriber consumption of data-intensive content. By late 2018, 4G smartphone penetration among MTS data users had reached 83 percent, and is forecast to reach 96 percent in 2021. In the same period, traffic in MTS networks is expected to grow by a factor of 3–3.5 times according to the most conservative estimates.

Content is increasingly data-intensive. For example, the size of a standard web page has significantly increased in the last five years. Today, an ordinary web page among the number of top-100 visited pages by MTS subscribers can be up to 15MB in size, which is comparable to a small video clip. Five years ago, the average size was only 1.6MB.

For a typical MTS subscriber, video accounts for nearly 70 percent of all traffic, and this is expected to rise to about 80 percent by 2021. The use of 2K and 4K video content is gaining momentum, which requires higher network throughput and capacity. Average data consumption per subscriber has grown by a factor of 7 during the last 3 years, with data consumption by 4G subscribers 3.5 times higher than for 3G subscribers.

Total mobile data traffic in the MTS network has increased fivefold during the last 3 years, whereas 4G traffic has increased by 12 times.

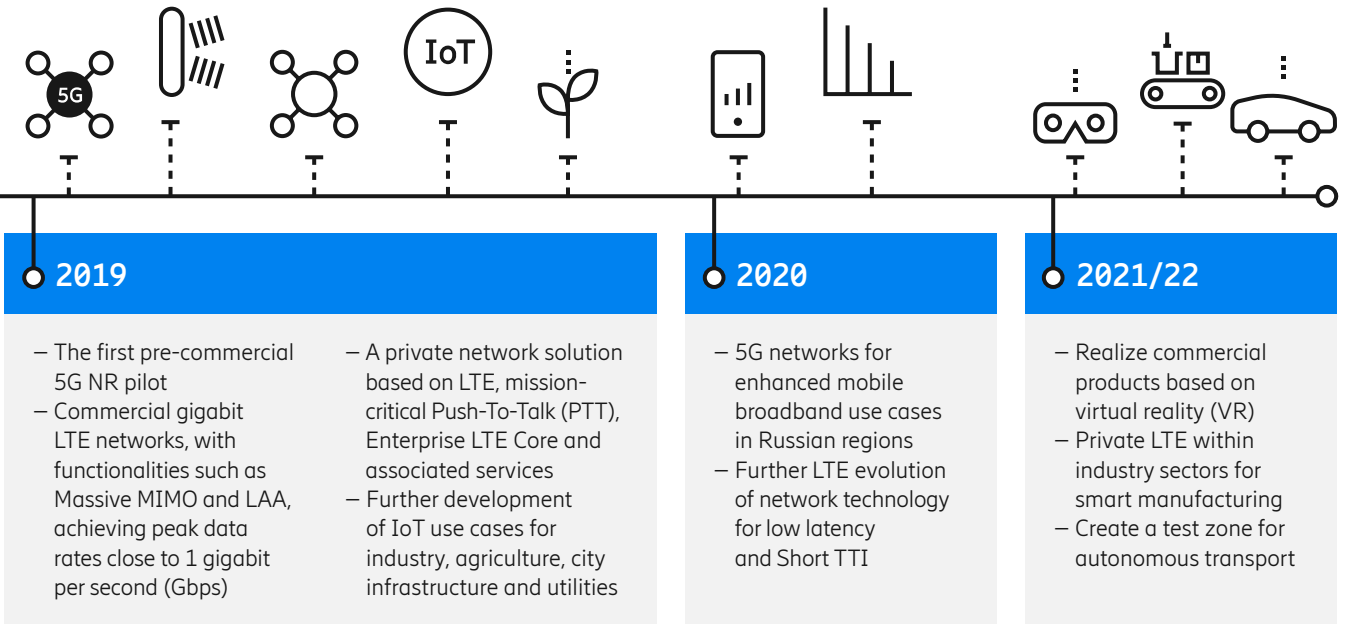
Handling growth in video consumption depends on the capacity and performance of the mobile network. For MTS, ensuring the network evolves to cope with increasing data consumption is vital, and addressing this is considered a priority.

**Strategies for network evolution to 5G**

MTS is modernizing its network and is currently engaging with vendors on testing 5G technology. 5G-ready base stations, which can be switched on with 5G software, have already been deployed in many areas. However, deployment of 5G networks is not only dependent on the preparedness of the operator. There are also external factors that affect deployments, including regulatory decisions on frequency allocations, availability of devices, and preparedness of network equipment vendors. Based on the current situation, the most probable time for launching the first 5G commercial networks in Russia is 2020.

Preparation for introduction of 5G technology includes modernization of the existing mobile network infrastructure for radio, core and transport networks. Today, MTS is deploying 5G-ready, multi-standard base stations for seamless activation of 5G in the future. This includes the use of spectrum sharing which enables deployment of 5G in the same spectrum as 4G. There is also utilization of higher-order MIMO (4x4/8x8) in the higher frequency bands. Massive MIMO is deployed in traffic-congested areas to increase network capacity and provide higher data throughput. To increase capacity, available frequency resources for LTE can also be expanded with Licensed Assisted Access (LAA) functionality, for use of spectrum in the 5GHz band.

Examples of MTS network evolution-related deployments 2019–2021/22



**Introducing new technologies**

MTS is planning to test and introduce technologies such as URLLC-Short Transmission Time Interval (TTI), mobile edge computing, and network slicing<sup>4</sup> in the existing LTE network. Parallel modernization of the transport network with XGS-PON and TWDM-PON and multi-level hierarchic architecture will enable the substantial lowering of latency for latency-critical applications, and will bring the LTE network closer to the future 5G network.

In the next three years, introduction of 5G New Radio (NR) will be done on the basis of a modernized LTE network by use of non-Standalone (NSA) architecture, facilitating a smooth evolution from LTE to 5G. This is more efficient, as it provides the benefits of using LTE equipment as an anchoring point. Network evolution directly based on Standalone (SA) deployment would require significantly more investment to deploy for coverage, as it lacks functionality such as downlink/uplink decoupling and dual connectivity that can leverage the LTE network to efficiently increase coverage, as is the case in NSA deployment. However, for some projects, like important high-profile use cases for verticals, business-to-business (B2B) and business-to-government (B2G), SA 5G deployments may be an option.

**A strategic plan for an evolutionary path to 5G**

MTS has created a strategic plan for 4G/5G deployments during the period 2019 to 2022. During 2019, MTS will deploy 5G networks in pilot areas and commercial clusters as well as build out a nationwide LTE-Advanced network, by using re-farmed spectrum. Furthermore, MTS will deploy “gigabit LTE zones” in city, industrial and business clusters with high data usage and demand for new digital services. MTS estimates that, after modernization, its LTE network will have similarities to a 5G network, reaching peak speeds of about 1 gigabit per second (Gbps), with lower latency in the radio access network as well as providing extensive IoT network coverage. The graph illustrates examples of deployments and use cases in the strategic plan, but their realization depends upon 5G spectrum allocation by Russian regulators.

**Innovation strategy for development of new digital services**

5G is an enabler for existing business growth as well as a platform for business innovation. MTS has a threefold innovation strategy for bringing new services to the market:

- Fostering own innovation efforts by establishing an IoT laboratory and acting as an innovation incubator through the MTS start-up hub, supporting teams with mentoring, training and expert support to prepare a product idea for pilot
- Investing in innovation through mergers and acquisitions (purchasing assets or solutions)
- Innovating in conjunction with partners

Initially, commercial use cases will be for enhanced mobile broadband, with services based on technology such as 360-degree video, UHD TV, VR/AR, holographic services, cloud gaming, and fixed wireless access (FWA).

Further development of new services will be on a case-by-case basis for vertical industries, enterprises and governments, based on customer demand as well as possibilities for equipment to realize them at a specific time. Business models will also be developed case-by-case, and in many instances mainly as integrated go-to-market models in terms of turnkey projects. Other promising, but more difficult, use cases such as complete solutions for Cellular Vehicle-to-Everything (C-V2X)<sup>5</sup>, will probably be realized in about five years’ time.

<sup>4</sup> Division of the network into virtual layers to ensure end-to-end quality of service

<sup>5</sup> Vehicles can communicate with each other and everything around them, such as providing 360-degree non-line-of-sight awareness and a higher level of predictability for enhanced road safety and autonomous driving

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