

5G and IPv6

Prof. dr Zoran Veljović

University of Montenegro, Faculty of EE

veljovic@ucg.ac.me

Basic categories of 5G services according to ITU-R

Unlike previous generation networks, 5G networks are designed to support a variety of service requirements.

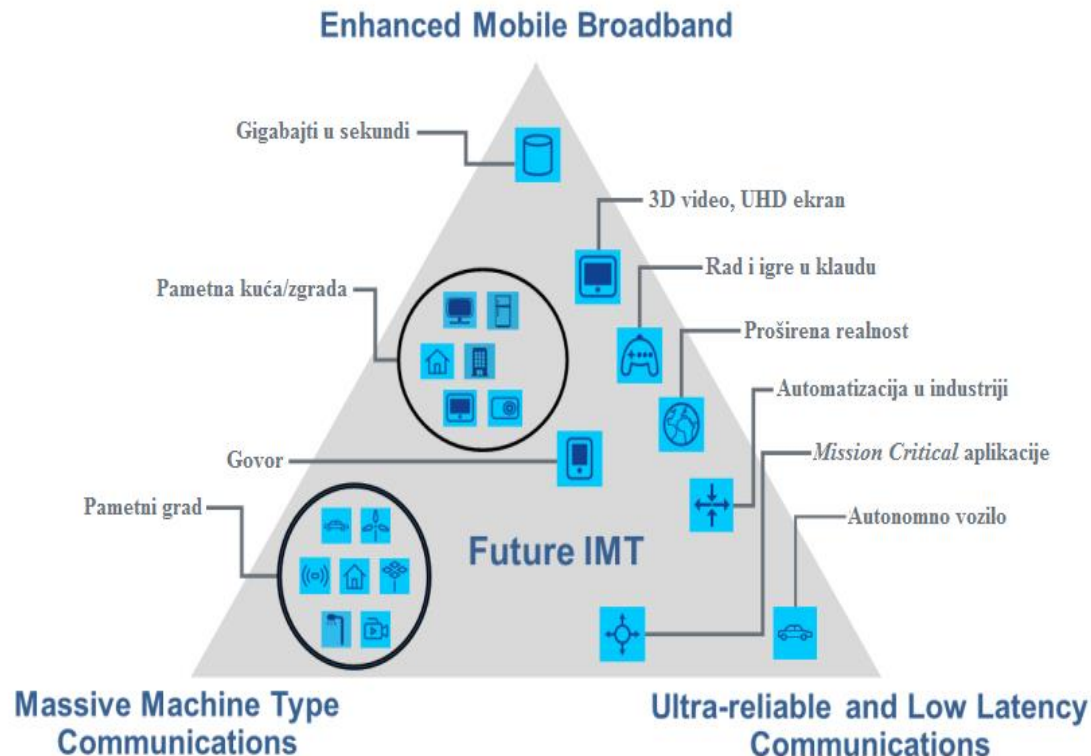
These requirements include very high data rates, connecting a large number of devices to the network, and requirements for very low latency and high reliability.

These three trends are recognized as service requirements that must be met by the 5G network.

Basic categories of 5G services according to ITU-R

In 2015, the ITU-R defined three basic categories of mobile communication systems services (IMT-2020), as follows:

- ✓ eMBB - *Enhanced Mobile Broadband*,
- ✓ mMTC - *Massive Machine Type Communications* and
- ✓ URLLC - *Ultra Reliable and Low Latency Communications*.



Numbering in 5G

IoT services implemented in existing mobile networks use E.164 numbering. Therefore, it makes sense to expand the use of the current E.164 numbering for these applications.

Despite the increased use of IPv6 and the possible development of new standards, it is expected that the use of E.164 numerical resources for IoT/M2M communications will be necessary in the foreseeable future.

Numbering in 5G

Back in 2011, CEPT recognized the need for numerical resources necessary for M2M communications. Accordingly, Recommendation ECC/ERC/(11) 03 was adopted.

This Recommendation provides for national regulatory authorities to establish numbering solutions for M2M applications as part of the national numbering plan.

As a long-term solution for M2M applications, the use of IPv6 addresses or numbers/addresses is envisaged, provided that the transition to new address/numerical resources does not prevent the development of the market or competition.

Addressing in 5G

The transition to IPv6 is not only necessary from the aspect of providing address space.

This transition is also important because of the range of benefits that IPv6 provides, such as support for more secure multilayer networking and the scalability required by IoT.

Due to the fact that a small number of applications and services are only available in IPv6, it is assumed that it will take a long time to fully migrate from IPv4 to IPv6.

IPv4 and IPv6 are expected to coexist for some time.

Addressing in 5G

Currently, several IPv6 transition strategies can be identified that can be applied by mobile network operators implementing 5G technology:

- ✓ Only IPv4 scenario, in which the mobile operator postpones the introduction of IPv6 for a later period and leaves the IPv4 network completely;
- ✓ Coexistence of IPv4 and IPv6, which involves the introduction of IPv6 into the network in addition to IPv4 and requires the use of dual-stack;
- ✓ Only IPv6 scenario, in which the mobile operator introduces IPv6 into the network and completely removes IPv4.
- ✓ Only enhanced IPv6 + NAT64, in which the mobile operator in addition to offering only IPv6, also offers IPv4 as a service over IPv6 for DNS-based applications.
- ✓ Improved IPv6 + 464KSLAT only, taking advantage of the "Improved IPv6 + NAT64 Only" scenario and at the same time addressing the shortcomings associated with non-DNS application support.

Agency activities

The Agency for Electronic Communications and Postal Services has prepared two important documents:

- ✓ Study on the strategy for the introduction of 5G networks in Montenegro;
- ✓ Migration plan for IPv6 protocol in Montenegro.

In addition, in December 2020, the Agency for Electronic Communications and Postal Services, in accordance with the BEREC guidelines, initiated a public consultation procedure regarding the introduction of numerical bands for the needs of M2M communications.

The proposal of the numbering range for the needs of M2M communications in Montenegro (non-geographic numbers for mobile network with NDC access code from the range 7x, with the length of the national number of 9 or 10 digits) has been determined, with the implementation deadline until 31.12.2023. years.

Guidelines

FIRST GUIDELINE:

The timely implementation of CEPT Recommendation ECC/ERC/(11) 03 from 2011 is proposed. The use of IPv6 addresses or numbers/addresses is proposed as a long-term solution for M2M applications, provided that the transition to new address/numerical resources does not prevent the development of the market or competition. In addition, the relevant BEREC guidelines and best comparative practices should be borne in mind.

SECOND GUIDELINE:

In terms of addressing, it is proposed to work on the accelerated transition to IPv6, in accordance with the "Plan of migration to the IPv6 protocol in Montenegro".

Thank you for attention!