



Massive M2M Communications: Challenges for NRAs

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What is M2M?

- Machine-to-machine (M2M) solutions are rolling out worldwide and across all industries - possibly being a key enabler of applications and services covering a broad range of vertical markets (e.g., health-care, utilities, transport, education-research and development, logistics etc.).
- To capitalize on the projected expansion of the M2M market, both regulators and telecommunications operators (as well as service providers) will have to be agile and flexible.





GLOBAL Strategy: UN AGENDA 2030

Goals for a Sustainable Future : The SDGs



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M2M and IoT Ecosystem

- UNDP Agenda 2030 for Sustainable Development: defines direction of future services and need worldwide
- EU Digital Agenda 2020: towards Digital Single Market
- EU – Western Balkans Digital Agenda (May, 2018): The Roadmap
- ITU Recommendations and Standards
- Other Policies, Strategies, Recommendations...



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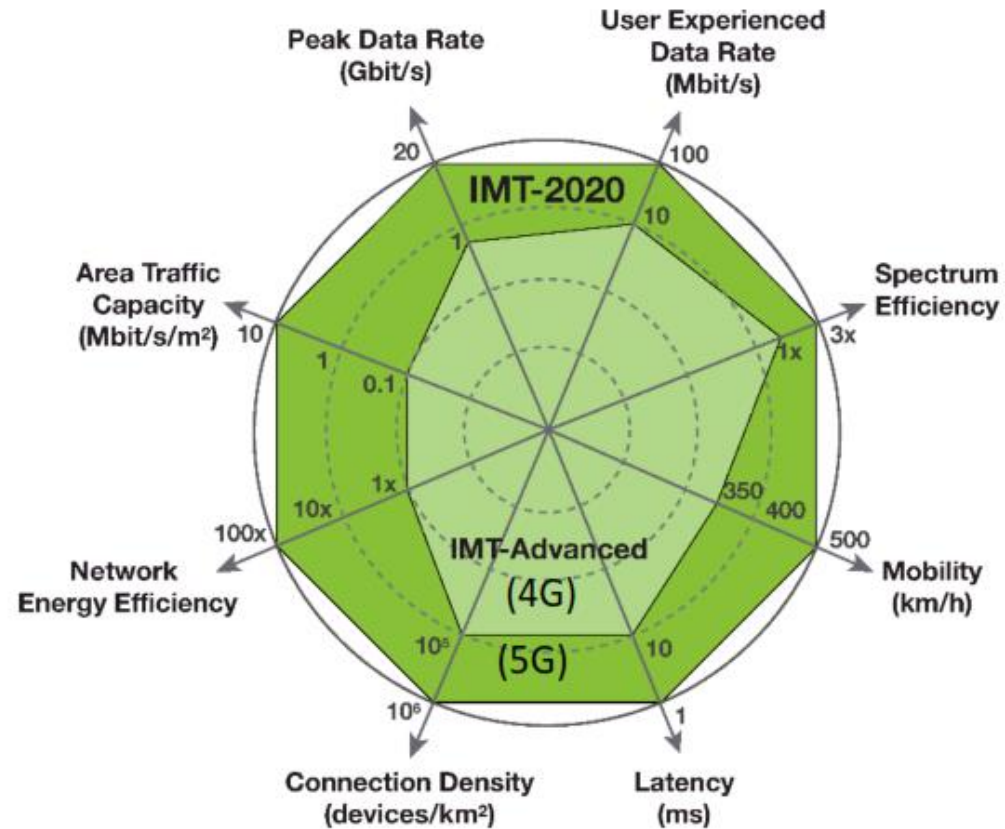
M2M and IoT Market Potential

- Related to Gartner Inc. and CISCO market analysis and prediction, we can expect 90% of total Internet traffic is generated by M2M services before 2024 and there is a market value potential, in the same period, up to 140 billions US\$
- Smart Technologies based on Massive and Critical M2M (mM2M, cM2M): Smart Grid, Green Technologies, Smart and Responsive Cities (with many smart services and massive data collection), V2X technologies, 5G, Big Data...





M2M and IoT: Key Enabler is 5G



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M2M and IoT Regulation

- Roaming & Switching
- Addressing & Numbering
- Licensing & Spectrum Management
- Market Competition
- Security & Privacy



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M2M and IoT: Roaming and Switching

- Goal: Encourage development of SIMs and mobile network accounts suitable for large M2M users, roaming mobile devices, and fixed devices in areas of poor reception. This means software-based eSIM technology with higher flexibility
- Best practice: Mobile network operators develop M2M-specific business units with appropriate billing and management. Further development and deployment of embedded, remotely provisioned SIMs in M2M systems.
- Potential measures: Global agreement on updated E.212 standards, making appropriate use of GSMA standards. Provision of Mobile Network Codes to IoT service providers





M2M and IoT: Roaming and Switching

- **Permanent Roaming:** offer services globally is a critical one for supporting many vertical sectors including automotive and consumer electronics
- **National Roaming:** multiple networks within a territory
- **Data Sovereignty:** different countries -> different data management regulation; EU creates GDPR, as a step toward Digital Single Market





Permanent Roaming

- The arguments in favor of permitting permanent roaming:
 - EU Free Movement principles: national-based regulation is old fashion, Digital Single Market asks for EU harmonized regulation
 - Massive Disruption: in the ecosystem of massive M2M, it is very costly and painful to switch
 - IPv6 addressing in long-term and subscription management in short





M2M and IoT: Addressing and Numbering

- Goal: Large address space needed for globally addressable things.
- Best practice: Deployment of IPv6 by ISPs, public and private sector organizations. Use of IMSI for M2M applications.
- Potential measures: Universal IPv6 adoption by governments in their own services and procurements, and other incentives for private sector adoption.





M2M and IoT: Addressing and Numbering

- Numbering: E.164 dedicated numbering for M2M
- Logical addressing for M2M applications, IPv6-based only
- Challenge: Extra-territorial use of E.164 numbering for enabling Permanent Roaming??
- Permanent Roaming SIM / eSIM as a solution?





M2M and IoT: Spectrum Management

- Goal: Ensure spectrum is available for a wide range of IoT applications, at short and long range, in licensed and unlicensed bands.
- Best practice: spectrum for short- and long-range IoT communications and backhaul network capacity, including LPWAN technologies: LoRa, Sigfox, NB-IoT. Encourage deployment and use of Small-Cell (including Pico- and Femto-Cells).
- Potential measures: Encourage development of LTE-A and 5G networks, what means using spectrum even higher than 30 GHz with channel bandwidth up to 1 GHz.





M2M and IoT: Market Competition

- Goal: Avoid IoT user lock-in and new barriers to entry. It is already against EU Directive 2002/21/EC. We have to define a new market (wholesale and/or retail)
- Best practice: Ensure competition regulators have capability to monitor IoT markets for abuses of dominant positions. Provide institutional mechanism for ongoing review of laws and regulations for impact on IoT competitiveness.
- Potential measures: Consider measures to increase interoperability through competition and consumer law. Give users a right to easy access to raw data (Open Data movement, as a fundamentals for future R&D in Data Science and to build start-up community).
 - Support global standardization and deployment of remotely provisioned SIMs for greater M2M competition.





M2M and IoT: Security and Privacy

- Goal: Significantly reduce security vulnerabilities in IoT systems let attackers access private data and cause physical harm in cases such as **medical devices** and **connected vehicles**. Encourage security and vulnerability patching of devices. Smart city vulnerabilities can be hard to fix but present significant safety issues (e.g. in traffic lights). Ensure individual control of profiles, which can be used to infer sensitive personal information, such as medical disorders. Reduce potential for discrimination in employment, financial and healthcare services.
- Best practice: Ensuring security and privacy from outset of IoT system design process. Development of co-regulation by all stakeholders to protect security and privacy. Further development of privacy and consumer protection rules to ensure security testing of IoT systems that process sensitive personal data.





M2M and IoT: Security and Privacy

- Potential measures:

- R&D on more hardware and software security and privacy mechanisms for resource-constrained IoT systems, particularly targeted towards start-ups and individual entrepreneurs that lack resources to easily develop this functionality.
- Incentives for companies to develop new mechanisms to improve transparency of IoT personal data use, and for gaining informed consent from individuals concerned when sensitive data is gathered or inferences drawn.
- Greater use of Privacy Impact Assessments by organizations building and configuring IoT systems. • Development of further guidance from global privacy regulators on application of the principles of data minimization and purpose limitation in IoT systems.
- More cooperation between telecoms and other regulators such as privacy/data protection agencies.





M2M and IoT: CRA Bosnia and Herzegovina

- B&H is very small and depended market: 3.5 million inhabitants with medium-low average salary and limited consumption potential
- CRA has experts and full understanding of this topic, we are ready to start before the market reaction
- CRA looking for the alignment with actions of other organizations: ITU, EU NRAs including BEREC...
- Nowadays: we are empty market space, without regulation in M2M



