

# Refining Network Design for Massive IoT Deployments



Stevan Filipovic, Head of Portfolio Network Design and Optimization

By 2022, it is expected that there will be nearly 29 billion Internet of Things (IoT) devices with cellular connections. With new standards specifically targeting the connectivity requirements of Massive Internet of Things applications, cellular networks can deliver reliable, secure and diverse IoT services using existing network infrastructure.

InfoVista sits down with Ericsson's Head of Portfolio Network Design and Optimization, Stevan Filipovic, to discuss how Ericsson, with the support of InfoVista's network planning software, Planet, is helping operators get to market faster and capitalize on new IoT opportunities to create new revenue streams.

**How do you see the Internet of Things market evolving in the near future - what does Ericsson see as being key likely developments, and what is Ericsson's role in helping its customers with this shift?**

From 2017, we'll start to see the deployment of what we define as 'Massive IoT', followed after 2020 by a second phase of so-called 'Critical IoT' solutions, which will use 5G. Massive IoT connections are characterized by high connection volumes and small data traffic volumes, low-cost devices and low energy consumption. Such solutions enable cellular networks to support applications such as Smart Cities, Smart Metering, Smart Agriculture, Logistics and Transportation, etc.

Ericsson's Massive IoT RAN products are new SW features that can be added to existing LTE and GSM networks, enabling 15-20 dB extended coverage when compared with today's performance baselines, with more than 10 years' battery life, and lower device costs.

The IoT core network portfolio, including Evolved Packet Core or Virtual Evolved Packet Core and Unified Data Management, enables separation of resources for MBB and IoT, as well as the flexibility and scalability needed to meet predicted growth.

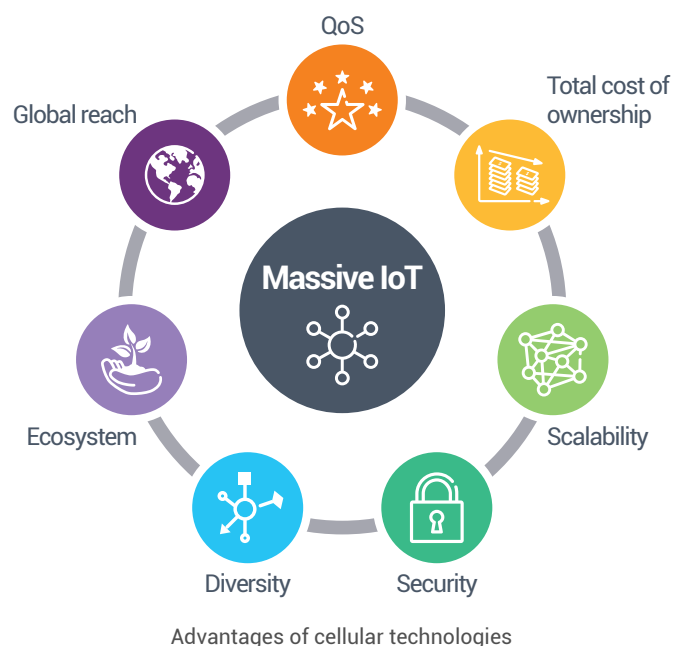
Ericsson also provides an IoT platform solution and IoT Accelerator and Professional Services in combination with a wide range of innovative industry-specific solutions.

**With NB-IoT finally attracting attention alongside other, unlicensed LPWA network technologies, which approach do you think existing mobile operators will be more likely to embrace for their IoT strategy, and why?**

There will be no undisputed champion of IoT. Each application vertical will have its specific requirements and considerations, which will lead to the adoption of different technologies. There are technical and commercial trade-offs for NB-IoT and LoRa, and both will have their place in the IoT market. LoRa targets the lower-cost high-volume application segments, while NB-IoT will serve the higher-value applications that require higher quality of service.

While I believe most operators will adopt 3GPP IoT solutions, due to the potential to reuse existing infrastructure and spectrum, there are also cases in which operators will combine both solutions, depending on the use case.

Operating with licensed spectrum ensures that capacity and coverage performance targets can be guaranteed for the lifetime of a device. This contrasts with technologies that use unlicensed spectrum, which run the risk of uncontrolled interference emerging - even years after deployment, potentially disabling large populations of deployed MTC devices.



**There is a long list of IoT applications that span a variety of vertical sectors. What key issues do operators need to be aware of when planning their network? How is Ericsson supporting them to prepare for diversity of applications and sectors they may address?**

The key issues to consider when planning IoT service include: the balance between coverage and capacity; battery life; the expanding range of scenarios; and the impact on users, and more. Of course, Ericsson can help with all of these.

- **Optimum coverage and capacity balance:** The buzz word in massive IoT is "repetitions", which provide the extra coverage with up to +20dB extra coupling loss. But, when you are increasing the coverage, repetitions will increase too and will reduce the maximum number of messages or maximum number of devices that can be supported in the system. With a reduction in the system capacity, this calls for the right balance between capacity and coverage for the best IoT performance.
- **Battery life:** If we are planning for extra coverage we must consider that UE (User Equipment) tends to transmit in full power and use higher repetitions to secure the coverage. This means a reduction in the battery life.
- **Diversity can't be tested:** Different use cases of NB-IoT have different design requirements - such as extra coverage, battery life, minimum required latency, minimum required bit rate, mobility, and so on. It will be difficult to test and verify all these scenarios in a network.
- **Understanding the impact on existing MBB (LTE) users:** If we activate CAT-m1 or In-band NB-IoT, there will be an impact on existing LTE MBB users, due to resource sharing. This impact will vary depending on the existing site traffic, bandwidth, number of IoT devices, and size of the payloads.

Ericsson can help to:

- **Achieve best IoT performance:** By simulating and predicting different use case behavior and performance (using the tools like Planet), Ericsson can help operators who are designing their networks with the optimum configuration and parameter settings. We can also identify the frequency strategies, measure future capacity bottlenecks, and all for different traffic models, supported by deep understanding of the geography to be covered.
- **Minimize MBB impact proactively:** By predicting the possible impact to MBB users, well before launching the IoT network, operators will have enough time to understand and proactively mitigate any impact to LTE, as it may lead to customer complaints

post-launch. By doing so, Ericsson's planning service can help to increase operators' brand image.

- **Minimize CAPEX and OPEX for IoT launch:** Reduction of numerous testing and drive tests in each and every use case and location, which helps to lower IoT service launch costs
- **Build Confidence and increase time to market:** It will be much easier for operators to work with B2B partners to agree the network SLA for each vertical. As a result of the planning services, operators will more accurately understand the performance, coverage, and the KPIs that will result in target areas. This will give operators an edge over the competition when releasing offers to the market.

**With numerous different IoT trials and deployments in progress globally, how is Ericsson using InfoVista's solutions, such as Planet to support these activities? What has been the experience so far?**

For the first customer IoT projects (such as in Japan), InfoVista accelerated its roadmap to support Ericsson through aggressive deployment plans. Leveraging Ericsson's expertise and providing feedback on development in the agile and interactive collaboration allowed us both to meet challenging project plans. We will continue using Planet in other projects and work on the advanced features.

**“ Simulation tools like Planet, coupled with the field experience of Ericsson, are key for operators to answer questions on IOT performance, required investment and business models.... ”**

**Why is having a partner like InfoVista important to help Ericsson become the leading player in building IoT networks?**

Currently, we are experiencing an unprecedented rate of technology change. This includes: Advanced Antenna Systems (Massive and multi user MIMO), IoT, 5G, and mmW waves. Operators want rapid technology adoption, fast time to market, and increased effectiveness. As a result, it is more important than ever to partner with the leading players in the ecosystem so that each can bring their expertise and vision to the table.

In the early phases of technology planning, design is the first challenge to be addressed. Therefore, InfoVista's ability to fast and accurately model technology based on our requirements was the key for us to be the first to market.

Watch the video of this interview at this link:  
<http://bit.ly/2kkosMQ>

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