INSIGHT SPOTLIGHT

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This Insight Spotlight is the second part of a series – called 5G Next – to help better understand the next phase of the 5G era and highlight promising technology innovations shaping networks. This edition explores automated solutions, also known as orchestration, which can help deliver energy-efficient 5G deployments and achieve the right balance between energy use and user experience.

A shift is occurring from energy-saving solutions that are configuration-based, semi-static and unsynchronised, to those that are intent-driven and able to orchestrate existing and new functionality. This new layer of orchestration can help drive energy cost savings – a key goal, given that energy accounts for approximately 20% of operator opex.

Analysis

Energy-saving solutions can increase complexity

Energy-saving solutions are already available for radio units, basebands, massive MIMO, data centres and passive infrastructure. Rapid developments in energy-saving algorithms, cheaper sensors and computing capacity, and soaring energy prices have spurred a rise in AI-driven solutions that can help operators save energy.

As most of the energy used by network operators is in the RAN (76%, on average, according to GSMA Intelligence data), solutions have naturally focused on this area. AI is delivering for operators more capabilities and efficiency improvements than ever before. New solutions allow network equipment to understand traffic scenarios and the operational environment, provide ways to solve technical challenges and work in a more energy-efficient way.

However, both the number of energy-saving solutions and their complexity have reached levels where operators need to re-examine their efficiency tools. Sleep modes, enhanced scheduling, optimal spectrum-layer selection, boosting and other solutions can all work separately in silos. Alternatively, data and insight can be shared between solutions to orchestrate and harmonise operations. There is clear demand to simplify the operation of energy-efficiency improvement solutions and for one overarching tool to orchestrate them efficiently.

How an intent-driven, energy performance orchestrator helps

Energy management is data-intensive. Operators cannot efficiently process all the information and make real-time decisions at scale without the use of an automated, overarching platform. With a new, network-level orchestrator, they can connect and harmonise different solutions, automatically share insights and simplify network operations. They can also maximise network performance with reduced energy consumption. The orchestrator can use information from various subsystems on current and expected network loads, energy consumption and other variables. It can also factor in the user experience, to configure and orchestrate solutions in the most efficient way.

Orchestrators are expected to integrate existing features from the time domain (sleep and shutdown), spectrum domain (traffic steering between frequencies to enable deactivation of carriers) and spatial domain (massive MIMO). For example, Ericsson has launched its Automated Energy Saver solution. This takes user experience as an input to configure and orchestrate accordingly.

The impact on network economics

A holistic network architecture and the concept of intent-driven networks offer significant potential for operators looking to improve network economics. Operators can expect impacts across the following areas:

Opex

- Energy costs – According to GSMA's Mobile Energy Efficiency benchmarking project, mobile operators spend 20% of their opex on energy. Orchestrators can identify a sweet spot to achieve the right balance of energy consumption and network performance, and reduce superfluous energy use.

- Simplifying operations – Operators spend a significant part of their opex on network operations, energy management and fault management. Orchestrators can use parameters and the intent (user experience, quality-of-service target) to automatically configure energy-saving functionality, freeing up network management capacity and reducing network complexity.

Capex

- Purchasing and operating the orchestrator – Although automation reduces dependency on labour, the solutions have procurement and transition costs, and require updates and new licences. The solutions are expected to measure user experience and optimise/finetune network performance, but this also carries a degree of risk.

Revenue

- User experience: monitoring SLAs and monetising premium layers – Better quality of service and customer satisfaction can be achieved through constant measuring of KPIs in real-time. This can support operators with their network-slicing ambitions and the monetisation of differentiated levels of service.

Implications

Mobile operators

- **Rethinking the approach to energy efficiency** – Since energy-saving solutions first came to market, operators have used them as a bottom-up tool for specific areas. Network engineers have configured solutions and then iterated the input variables (network SLAs) based on outcomes (network performance, network availability or energy consumption). With the introduction of a new orchestration layer, operators can change how they look at AI and autonomous networks to save energy. In 2024, it is time to not just look at lower-level, single-use tools to save energy, but to consider an intent-driven, intelligent orchestrator that can save energy and reduce complexity.

- **Ensuring the user experience** – Energy-saving orchestration software responsible for multi-layer coordination of network resources can heavily impact the user experience. The solutions find the optimum point where users receive what they paid for but with no equipment running unnecessarily. User experience is a fundamental part of the operator value proposition, so such tasks should be carried out with a trusted, experienced partner. Improving network energy efficiency at the expense of user experience could risk network reliability, long-term churn and brand value. Constant monitoring is therefore essential.

- **Investing in AI and automation** – There has been a lot of hype around AI in telecoms, with high implementation costs and questionable tangible impact. In 2024, the difference between AI and the metaverse, for example, should be clear; AI is mature enough for operators to understand it will be permanently incorporated into how successful service providers operate. Network operators need to educate their workforce and build capacity to operate, develop and orchestrate new AI-driven network functions. Otherwise, they could be at a long-lasting competitive disadvantage.

Vendors

- **A new approach for the 'long tail'** – Operators of different sizes have different requirements for their network strategies. Larger operators can fall short of the necessary talent, knowledge and capacity to allow them to transform. Lack of expertise and capacity is even more of an issue for smaller operators (the 'long tail'). There are currently more than 500 mobile operators with fewer than 5 million mobile connections. Vendors should offer flexibility in the form of AI-as-a-service or 'energy-saving-as-a-service' options for smaller operators that are more capex-sensitive.

- **Country-level challenges require country-level solutions** – Regulations regarding data residency vary by country. Local operators and governments are protective of local customer data and are reluctant to give full access to local data to vendors to run algorithms on their premises. Vendors should target regional needs, iterate with local teams, carefully align with the local data regulatory environment and offer a range of deployment scenarios for operators.

- **Time to consider opening up** – It is difficult to integrate many of the energy efficiency solutions currently available with those from other technology providers (even those that are similar). Creating interoperable data pipelines, using standardised metrics, and offering compatible software is a complex task, requiring cross-industry harmonisation and standards. A more open, interoperable market would help increase overall attractiveness for operators, increase innovation and allow more smaller vendors into the market for energy-saving solutions. Vendors should therefore build partnerships and discuss potential collaboration opportunities. This could help increase the attractiveness of solutions and the size of the addressable market.

Related reading

[The essential role of AI in improving energy efficiency](#)

[Global Mobile Trends 2024](#)

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