RAN automation is central to the 5G case—but is it a distant dream?

Automation and SON deployments and trends 2018-2025

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This document contains explanatory notes and commentary to accompany the Excel spreadsheet **'RAN automation and SON deployments and trends 2018-2025'**. That contains further data breakdowns including regional patterns. The surveys and forecasts on which the outputs are based were conducted in April to June 2019.

There were 83 responses from Tier 1 and Tier 2 mobile operating companies worldwide. The sample was restricted to operators with plans to deploy 5G commercially before 2024. The commentary refers only to a selected number of the 19 data tables included in the Excel data module. Additional tables are included in the spreadsheet with additional regional and other breakdowns.

The report analyzes the objectives, timelines and barriers for RAN automation as reflected by this sample of MNOs, and those surveys, plus a series of in-depth interviews, are central inputs to the resulting forecast of activity and spending to 2025.
This research was complemented by interviews with selected vendors, standards and open source organizations, and by an overview of R&D efforts in this field.

In some areas, comparisons are made with the results of the same survey, conducted in Q1 2018. In that survey, there were 86 respondents, with more than 80% of the respondents being the same in both studies.

Introduction

Operators have talked for a decade about the benefits of greater automation in their networks. While manual processes have been increasingly removed from many customer-facing operations, progress has been slower in the network itself, especially in the areas examined in this report – planning, deployment, optimisation and maintenance of the RAN and the end-to-end network (including core and transport).

This has been for three broad reasons:

- Immaturity in the technology, which has led to fears that operators would end up automating bad practice, or sufferings trade-offs in the quality of their networks.
- Concerns that the organisational upheaval, including loss of staff, would outweigh the benefits.
- Lack of urgency. While most operators assumed, even in the early days of 4G, that there were cost and efficiency benefits to be derived from automation of the network, these were not seen to be sufficiently dramatic to justify significant investment and disruption.

5G WILL MAKE RAN AUTOMATION A NECESSITY

This is changing as operators start to embark on 4G expansion and 5G roll-out. Three main facets of those processes are changing the economics of the network and making RAN automation more critical to the mobile business case. Those three are:

- Densification with small cells, from indoor picocells to outdoor mini-macro base stations.
- More complex antenna arrays, including Massive MIMO systems with advanced beamforming to enable 5G to operate well in high frequency spectrum.
- Virtualization of the network, beginning with the packet core and gateways, in most cases, but as 5G evolves, extending to the RAN.

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These trends introduce a huge number of new components – from thousands of physical small cell sites to hundreds of dynamically provisioned virtual network functions (VNFs), to millions of connected devices - into the network. This means modern networks are becoming hard for humans to understand, predict or manage.

Increasing levels of virtualization of many elements of the network, including the RAN means all the VNFs will be managed and coordinated with end-to-end orchestrators and SDN (software-defined networking) controllers. This end-to-end virtualized network will lend itself to high levels of automation, which will transform the total cost of ownership (TCO) of the RAN, core and backhaul.

Therefore, the fully automated, 'self-driving telco network' is a one of the cornerstones of the next generation vision for many operators, since it would keep track of all these moving parts, enabling them to be allocated and provisioned optimally and efficiently for each user and application. That would also dramatically improve operating costs and quality of service.

SO WHY ARE OPERATORS STALLING ON THEIR DECISIONS?

As for the three main factors which have slowed uptake so far, some solutions are emerging. Technologies are becoming more intelligent, to address the fears that automation can be dumb – more advanced self-optimizing network (SON) capabilities and the application of machine learning (ML) to network planning and maintenance are examples.

And the fears of organizational upheaval are being offset by rising urgency – automation will not be a luxury in 5G, but a necessity, and its predicted impact on the operating costs of the network are expected to be significant. A consensus prediction among the 83 MNOs surveyed for this report was that operating expenditure on the network (opex) needed to fall by an average of 33% over the first five years of 5G deployment, and that about 30% of those savings would come from RAN and transport automation. That equates to an 11% fall in opex. By contrast, in the first five years of 4G, they believe RAN and transport automation would have had the potential to reduce total opex by only about 3%.

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The potential benefits are well understood, but there are still many challenges. Indeed, compared to Rethink's previous survey related to automation, conducted in the first quarter of 2018, there is a higher degree of short term caution about implementing automation than there was then. Operators' timelines for significant degrees of automation have lengthened, though their goals for 2025 are similar or even more ambitious.

This partly reflects a natural dose of realism that creeps in when the deadline draws near. Automation will be a gradual process for most operators and that is often the best approach, provided each stage delivers benefits and is related both to short term economic goals and to future strategy.

However, the onset of caution also raises the risk that operators will move too slowly, and fail to plan effectively even if they do not need to implement the new processes and technologies immediately. The ultimate goal, according to early movers like AT&T and Deutsche Telekom, is to automate at least 80% of physical network processes and virtual network functions in the RAN and the end-to-end network. That will be a long and disruptive process, which needs to start quickly, or operators risk sacrificing many of the promised TCO and efficiency gains of their 5G roll-outs.
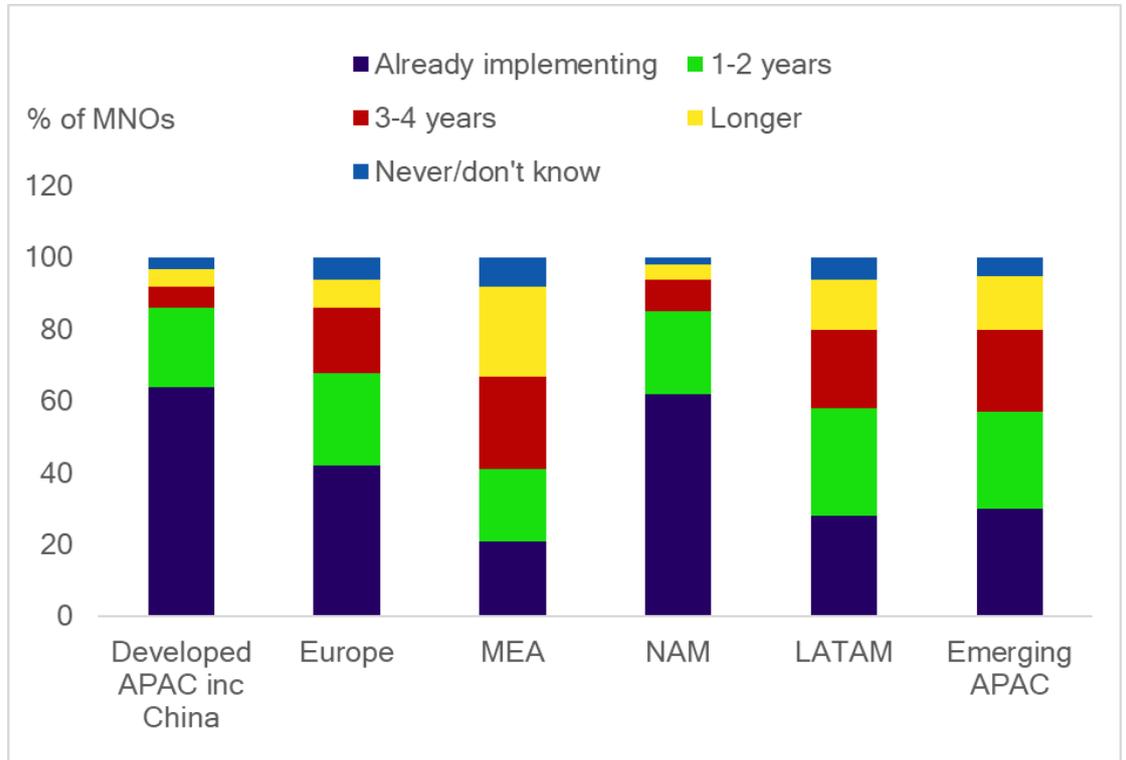
Who should buy this report?

This report is critical to anyone involved in planning the automation of any cellular network or any part of a network. This may be for network providers, technology partners, implementers, equipment suppliers, software providers and investors, at C Suite level down to product marketing and product planning. The RAN Research arm of Rethink Technology Research is essential reading for anyone who wants to stay on top of current trends and thinking among MNOs. It's like being a fly on the wall in their planning meetings and is based on questions MNOs have answered about their planned and future expenditure.

This report will;
- Give you a spreadsheet from which you can compare where you are in automation with other major MNOs
- Help you understand how major tier one operators are going about the job of automating their networks using machine learning, and highlight the obstacles they are encountering
- Show why current plans for automation may be potentially disastrously behind schedule, and help you devise a plan that will make your transition smoother

It will help you understand costs and timescales for 4G and 5G automation

Pricing

Each module of RAN Research costs $2,000 for a single, individual license, and $4,000 for a corporate license for any individual report such as this one. This is the price for "RAN automation is central to the 5 case—but is it a distant dream?' and for any previous reports. The entire service can also be purchased as a subscription, which comes with 6 reports each year. Ask for pricing details.

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This report has been compiled by our Head of Research, Caroline Gabriel who can also be emailed at caroline@rethinkresearch.biz

Methodology

This document contains explanatory notes and commentary to accompany the Excel spreadsheet **'RAN automation and SON deployments and trends 2018-2025'**. That contains further data breakdowns including regional patterns. The surveys and forecasts on which the outputs are based were conducted in April to June 2019.

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The wireless forecast included in this report is based on research on the top 40 international mobile operator groups, which account for 80% of the global mobile subscribers (IMG-40). From this representative group of operators, the macrocell and metrocell forecasts are developed.
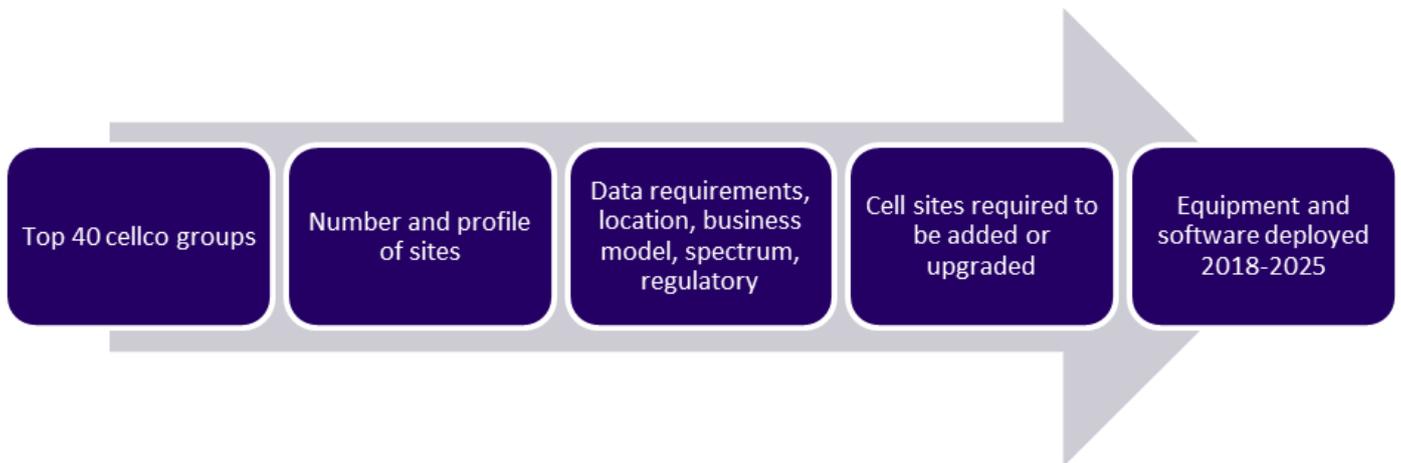
The Rethink RAN Research process summarized

These forecasts were based on a combination of data from:

- Detailed surveys, interviews and operator-by-operator modeling of the IMG-40 groups.
- Studies and modelling of the deployments and strategies of the top 100 4G operators, as tracked by Rethink Technology Research's quarterly surveys, interviews and desk research.
- A survey of 83 Tier 1 and Tier 2 mobile and converged operators about their detailed plans for RAN deployments to 2025.
- Input from ecosystem vendors on shipments, technology strategies and competitive landscape, also updated quarterly.
- Interviews with other stakeholders such as IoT services providers and enterprises
- A calculation of the resources required in each type of location to achieve the MNOs' stated objectives.

Most of the forecasts refer specifically to nodes deployed within MNO networks, either by themselves or by partners. MNOs may also make use of third party nodes deployed outside their network and connected by wireline or WiFi; and many edge cloud services will run on infrastructure that is not used by MNOs at all.

RAN Research: Forecasting disruption in wireless

Rethink Technology Research is a specialized research and consulting firm with 12 years' experience in surveying wireless, broadband, over-the-top and quad play operators. This has resulted in a broad research base of over 140 service providers (MNOs, telcos, cable and satellite operators, over-the-top providers) worldwide. These organizations are surveyed on a regular basis about their network infrastructure and business plans, and have a relationship of trust with Rethink.

Rethink also has deep relationships with the telecoms ecosystem (tier one device OEMs, vendors, technology developers, integrators, regulators etc), and is perceived as a thought leader in many areas of the telecoms and media sectors. Key areas of expertise and research experience include HetNet migration, small cells and carrier WiFi; transformation strategies for the RAN and the BSS/OSS; convergence of IT and network skills and platforms; device and chipset roadmaps; spectrum strategy.

Here are some sample titles of reports we have produced recently:
- Will 5G really be so different after all? 5G Deployment Trends 2018-2025
- MNOs look to MEC to deliver 5G class apps: Edge Computing Forecast 2018 to 2025
- Virtualized RAN rollouts stutter – awaiting vendor interoperability, standards

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About Rethink Technology Research

Rethink is a thought leader in quadruple play and emerging wireless and IoT technologies. It offers consulting, advisory services, research papers, plus three weekly research services; Wireless Watch, a major influence among wireless operators and equipment makers; Faultline, which tracks disruption in the video ecosystem, and OTT video. Riot on enterprise disruption from the combination of AI/IoT and cloud.

"Giving people in leadership the news they need to hear, not want to hear."

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Published July 2019