Carrier IP network transformations will help operators in the Middle East to meet their 5G objectives

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Most mobile operators are currently planning their 5G launches, and many are simultaneously moving towards telco cloud platforms. These two trends will enable operators to use a cost-effective platform to support a huge variety of new services and revenue streams.

However, this will only be possible if the carrier IP network is first transformed to allow it to support a challenging combination of automation and intelligence. It will be impossible to deliver all the promises of 5G without a high-performance, flexible, automated and simplified IP network. This is especially true in the Middle East, which has some of the highest mobile data usage rates in the world, and where several operators plan to launch 5G this year.

The 5G launches in the Middle East will intensify IP challenges

Huawei hosted the Middle East IP Gala in Dubai in April 2019. Over 150 attendees, including representatives from 20 operators in the region, gathered to discuss the challenges that they are facing in the era of 5G and the telco cloud. These operators know that there is an urgent requirement to rethink their transport networks due to the very high levels of mobile traffic in the region. Kuwait had the highest data usage per SIM in the world at the start of 2019,[1] and Analysys Mason forecasts that mobile traffic in the Middle East will increase by a factor of 48 in the next 5 years.

Supporting this traffic increase while improving the quality of service will necessitate significant investment in the IP network, and consensus estimates, based on Analysys Mason interviews with 12 operators in the region, suggest that operators in the Middle East will need 20 times as much fibre capacity in 2023 as there is now to support 5G. This reflects the need for increased speed and quality of service in backhaul, as well as the shift to a disaggregated RAN architecture, in which very fast, very low-latency fronthaul links are needed to connect centralised baseband units to remote radio heads.

Operators at Huawei's event said that other challenges surrounding the carrier IP network relate to the convergence of 5G connectivity with the cloud, and the need to support cloud workloads with very high response rates, such as those using machine learning.

Omar Almansoori (Head of Network Architecture at Etisalat UAE) talked about the company's roadmap to migrate "from pipelines to clouds", with the goal of making the IP network fully intelligent and able to support a wide variety of cloud workloads in a flexible way.

Mohammad Jaber Al-Tarawneh (Head of IP and Transport at Zain Group) emphasised the need to simplify the network at the same time as supporting more-complex combinations of use cases. This was one of the key themes of the day. He discussed plans to remove the aggregation layer between the access and backbone

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[1] Tefficient (2019), *Mobile data – full year 2018*. Available at *https://tefficient.com/wp-content/uploads/2019/03/tefficient-industry-analysis-1-2019-mobile-data-usage-and-revenue-FY-2018-per-operator-29-March.pdf.*

networks, while adding more metro nodes to support the distributed nature of 5G-enabled cloud and edge platforms.

A transport network that is flexible, automated and intelligent is required for success

The key requirements for the next-generation transport networks of operators in the Middle East can be summarised as 'flexibility, automation and simplicity'. These three requirements will enable operators to support a high-capacity converged network cost-effectively. This is illustrated in Figure 1, which shows the top drivers of investment in next-generation IP networks for operators in the Middle East.

Figure 1: Top drivers of investment in next-generation IP networks, based on a survey of 24 operators in the Middle East, 1Q 2019
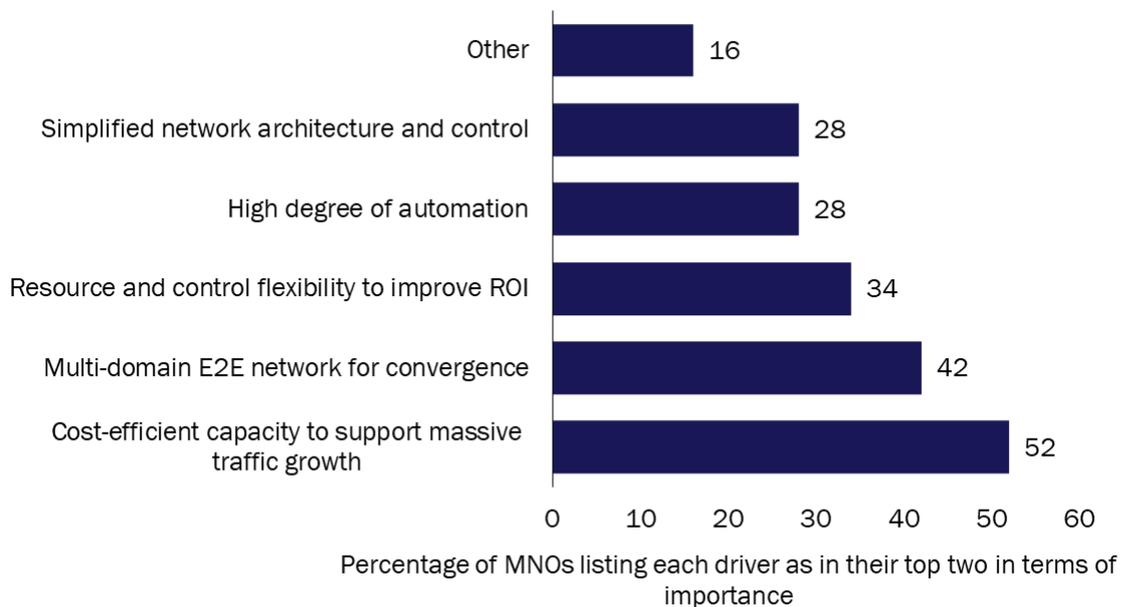
Source: Analysys Mason, 2019

Several critical enablers are emerging, and these must be deployed in parallel

There was consensus among the speakers at the event that there was no single solution to their requirements, but that success would rely on a combination of enablers, deployed in a co-ordinated way. The most important enablers that emerged from the presentations were the following.

- **NFV/SDN to revolutionise the total cost of ownership and the flexibility of the transport network.** 44% of operators in the Middle East plan to deploy end-to-end NFV/SDN in the transport network by the end of 2023, according to an Analysys Mason survey. The main objectives of this are automation, reduced complexity, constant reconfigurability and improved flexibility.

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- **The use of machine learning to transform operations.** Patrick McCarthy, Huawei's chief AI expert in the Network Cloud Engine (NCE) unit, discussed how an automated, AI-driven platform, such as NCE, can help operators to control and constantly reconfigure their IP networks as traffic patterns change.

- **A combination of an IPv6 layer with segment routing (SRv6) to achieve far greater simplicity and to enable slicing.** Huawei's James Guichard, Chair of the IETF Service Function Chaining (SFC) Working Group, argued that SRv6 is the best enabler of a simplified IP transport network, and outlined its progress in carrier tests and the first deployments in China and Japan.

SRv6 (which enables forwarding functions to be represented as IPv6 addresses) is potentially very significant for 5G and slicing. 3GPP has a study item for the forthcoming Release 16 5G standards, and is looking at a single layer into which all the user plane functions of the 5G protocol stack can be integrated to simplify the network dramatically. Many believe that SRv6 is the best candidate for this. The IETF is working on an SRv6 mobile user plane which would allow all mobile applications to run with just one IPv6 layer. Any network resources in a 5G network or slice could be represented as an IPv6 address, and optimised paths could be created to support specific requirements such as low latency.

This particular topic is an example of how IP evolution and 5G are becoming fully inter-dependent, with their vendors and standards bodies working increasingly closely together. Event chair Rajiv Papneja (CTO for SDN/fixed networks at Huawei) highlighted in his closing remarks the need for stakeholders on all sides to work together to address the challenges of IP in the 5G era.

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