



# MNS Viewpoint: Mastering QoE Management

## 1. Introduction

Customer experience management has become strategic to many Mobile Network Operators. Indeed, when effectively implemented, customer experience management not only brings satisfaction to customers but reinforces brand reputation and yields revenues. This requires an end-to-end approach, combining touch points (channels), customer care and network services performance. However, the network dimension of any customer experience management strategy, integrating an end-to-end QoE (Quality of Experience) perspective, remains for operators a tricky equation to tackle.

The correlation between CSI (Customer Satisfaction Index) with ARPU and churn does not need to be proven any more. In a context of mobile data explosion and unsatisfactory user experience,

managing the quality of experience from a network perspective is crucial. Four main reasons to this, on top of “simple” customer satisfaction:

- Managing QoE through QoS differentiation is for operators a smart way-out from the flat rate data pricing plans. It offers the possibility to sell network services with QoS premium schemes.
- QoE Management also helps to increase the efficiency on used network resources, thus enabling Capex optimization
- It’s a clear way to innovate in the monetization of networks, making resources available to OTT with negotiated QoS agreements
- Last but not least, it allows operators to establish a strong position, before regulators legislate clearly on Net Neutrality for mobile data use cases.

## 2. QoE Management strategy: what are the challenges?

QoE management is not yet an end-to-end reality in operators’ organizations and sometimes for very valid reasons. The main one being: how to seriously capture measure and effectively make sense of all the performance indicators underlying a network service? It is also difficult to correlate them with actual customer expectations, costs of service delivery and operators expected return on investment.

The voice service has the E-model function to capture QoE dynamics and their relations with network QoS parameters. For mobile data services, which represent most of the overall MNO traffic nowadays, there are not such equivalent functions to depict services dynamics and behavior.

Several initiatives have been launched by standardization bodies to formalize the metrics to measure and control the QoE, and vendors are also proposing various tools. They are either network-based as service-aware functions or device-based with user agent embedded in smartphones or just at the mediation level trying to make sense of user sessions. QoE management is an endeavor that encompasses, on top of a customer subjective dimension, metrics that are influenced by the device types, the access and core network technologies and associated

congestion status, the VAS platforms as well as application servers, which operators do not always control.

Finally, operators’ network organizations still tend to monitor performance on a per-domain basis, with a very limited end-to-end dimension (often limited to drive tests).

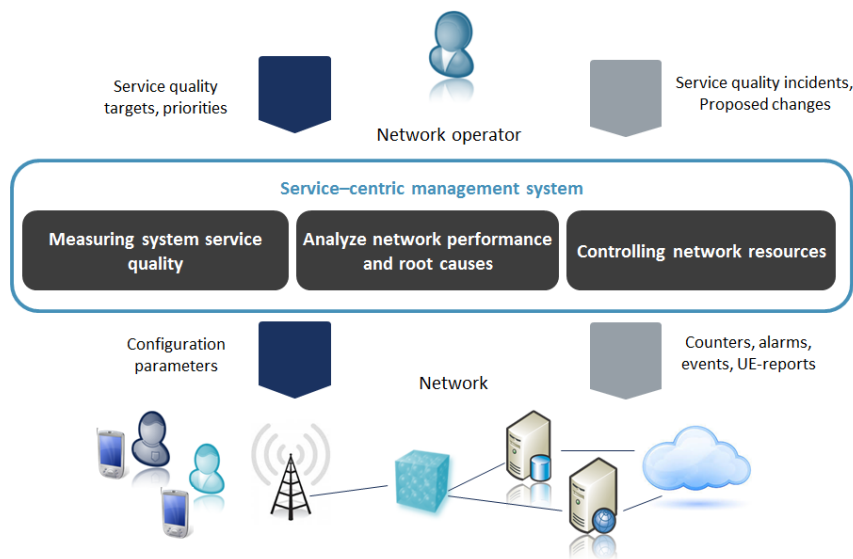
Given all this, operators are looking for the right approach to implement a strong and efficient Network Service Management and sustain QoE Management strategies. Several questions need to be answered by MNOs:



- On which set of services do they intend to focus, by economic or strategic relevance?
- What would be, for each service, the relevant network subsystem indicators contributing to the overall user experience?

- How do we capture, measure and correlate those indicators?
- For which segment of customers do we want to monitor and manage the QoE?
- What type of differentiation to apply for the access to the network resources (service or user centric)?
- What would be the “tools” strategy to capture the performance information and share it across the different company’s functions dealing with Quality of Experience management?
- Which governance organization for continuous improvement of end-to-end network services?

The figure below shows the framework for a service-centric management system.



### 3. QoE management through QoS differentiation

Within a context of high data traffic pressure, it is particularly necessary to control resources used by a limited number of excessive users. A US operator has discovered that about 98% of users consume less than 2GB of monthly traffic while 3% of smartphones generate 40% of the wireless data traffic.

QoS differentiation is standardized in 3GPP since release 99 and was enhanced in release 5. It is negotiated in the core and enforced in the access network under a user perspective (based on QoS profile in HLR or fair usage policies) or under a service perspective. Differentiation offers the benefits of:

1. **Protecting QoS sensitive services** through (pseudo) guaranteed bit rates
2. **Favoring and protecting selected subscribers** by differentiating users
3. **Fair-use optimization** (by decreasing the subscriber priority level or limiting his maximum bit rate).

However, it is important to mention that most of QoS differentiation mechanisms would be more beneficial to end user experience if the load in the network starts to be significant.

It also requires for MNOs to add “Deep Packet Inspection” (DPI) mechanisms interacting with Policy Control and Enforcement functionalities in the Core Network and other features to support the QoS parameters such as Priority Scheduling policies and Radio Bearer modification procedures in the radio access.

## 4. Network service management for effective QoE management

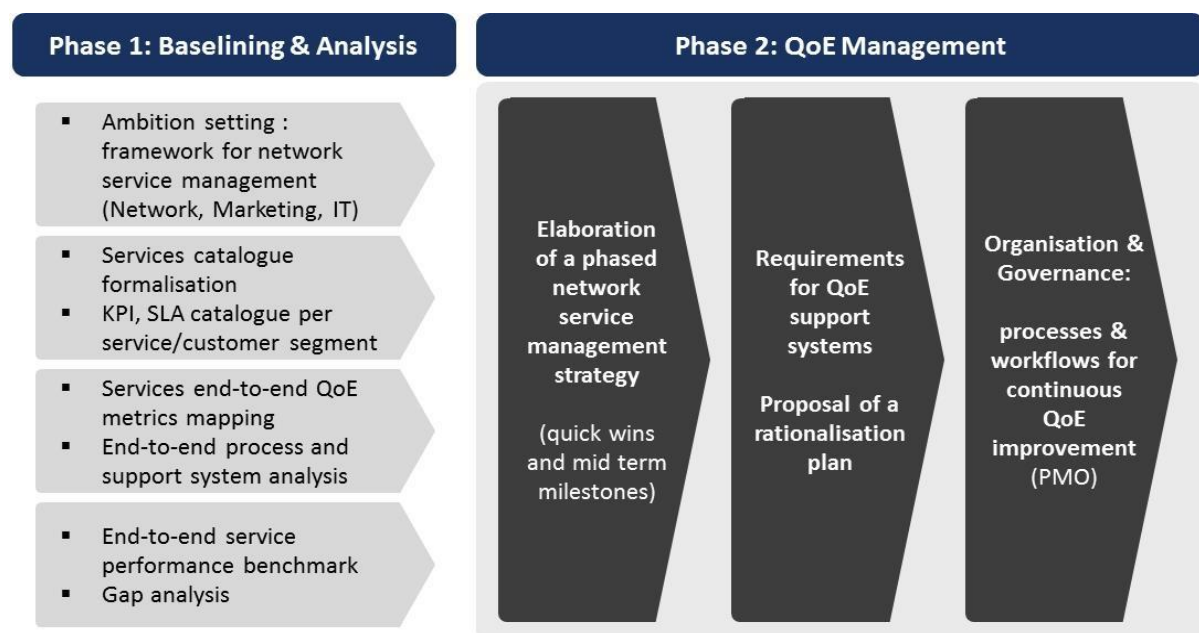
Network service management requires operators to have a fine understanding of the minimum end-to-end performance requirements for each type of service and to identify the QoS parameters that will play a role in a QoS differentiation strategy. This helps to know exactly where to place the effort within the network infrastructure in order to improve the service QoE. For data services, QoE will be possibly driven by several parameters such as latency, bandwidth (uplink and downlink), application behavior, browser

features and performance, as well as server features and performance. Thus, operators need to work on QoS attribution rules in a mapping table depending on the service, on user profiles and device types that will serve as the basis for the network service management strategy. The aim is to deliver reliable tables as inputs for Inspection and Policing functions and, beyond differentiation, to offer to the majority of customers a satisfying user experience.

## 5. QoE Management by MNS

Because no tool in the area of QoE management is really the panacea and because network services are delivered across a wide range of network technologies and across multiple devices, it is of prime importance for operators to set a strong Network Service Management strategy to properly manage network resources and meet

customer expectations. It is also key to switch the focus of performance management teams within the operators' organization from network centric to service centric. MNS has developed strong methodologies and solutions to help operators implement the Network Management function across the organization and address properly the QoE equation.

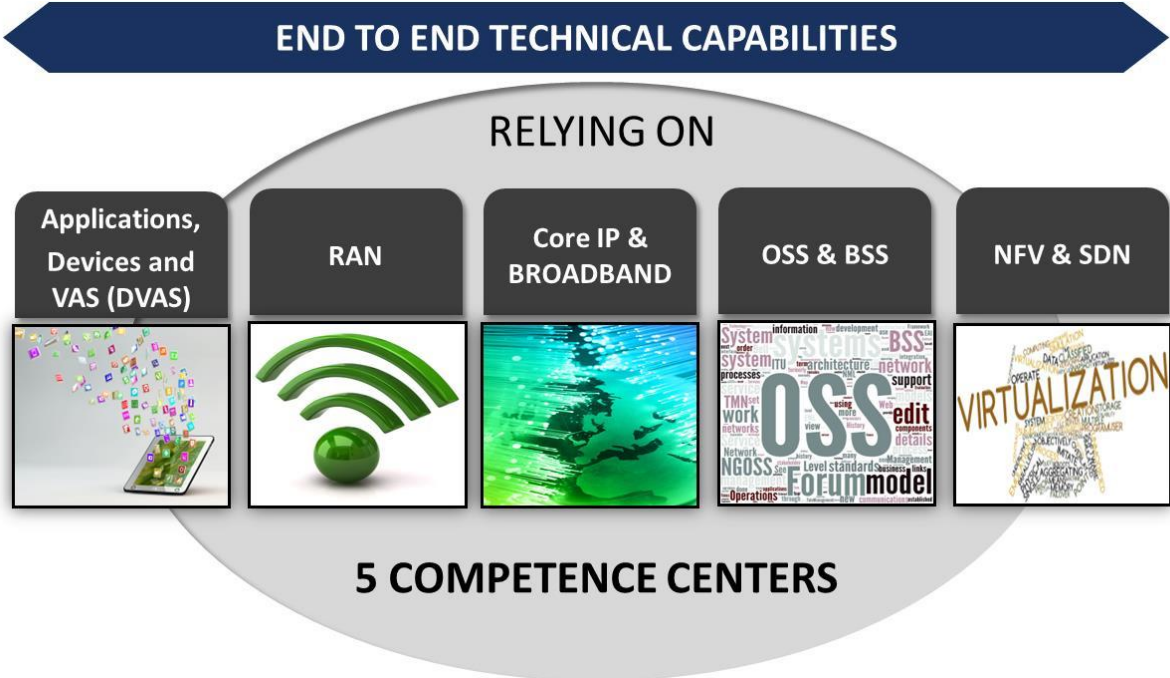


Effective QoE management through a phased network service management strategy

## 6. About MNS

MNS Consulting is an international management and engineering consulting firm specialized in the telecommunications industry. We have developed a unique expertise in Telecoms network domains. We distinguish ourselves with a strong combination of deep technological expertise and strategic vision that allows us to address the challenges of our customers. We are committed to delivering outstanding consulting services and highest value to our clients by helping them to drive growth, manage complexity, and improve operations and performance in a complex and fast changing market. Our engineering consulting capabilities are structured around the 5 competence centers below that allow us to have a full vision of the end-to-end network services management.

MNS is headquartered in Paris and has also operations in Africa and the Middle East.



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