A Service Operations Case Study For Enhanced Operations in Telecom Network

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Abstract: Today telecom operators main focus is on managing the network and customer experience. This becomes more important for operators who are functional in multiple countries. With operations spanning across multiple countries and each country having its own infrastructure along with people, process and tools, these telecom operators are incurring a heavy operational expenditure on managing customer experience and service uptime. This case study is for MobNet Networks (Name changed) with operations in multiple countries and is a very large operator in American and Latin American market,. MobNet networks want to move from a network and resource, to a service-oriented monitoring setup, and improve its overall customer experience as well as reduce opex by introducing a new organization model. The case study focuses on introducing the challenges for the MobNet Networks and defining the business model for MobNet to effectively introduce service centric monitoring with focus on customer experience.

Keywords: Service Operations, Network Operations, Operation Model, eTOM, ITIL, Service Monitoring, Telecom, Customer Experience, Service Quality Management, Key Performance Indicators, Quality Indicators, SLA, OLA

1. INTRODUCTION:

For MobNet subscribers it is the service that matters most. The subscriber today are looking at better services aspects — the richer, more personalized and interactive, the better. Also, from a subscriber perspective, networks do not matter, that is something that MobNet should be bothered about. They care about the services that are delivered and the content they're paying for. They also want it on any device at any time and any location. Ironically, it is the advances in connectivity that are driving this demand — but to retain customer satisfaction and to retain customers MobNet has to find a way to meet it.

As per the ongoing changes in the customer perception, MobNet can no longer be limited to being operationally-focused and network-centric but needs to be geared toward achieving customer satisfaction through business transformation via a services-centric approach. The goal is to give customers the services they want, where they want them whenever they want them — whether it is IPTV (Internet Protocol Television), Vo IP (Voice Over Internet Protocol), Internet access or any combination — across a variety of devices. MobNet also has a need for significant reductions in Capital Expenditures / Operational Expenditures to achieve this. MobNet also needed to look into the cloud market which is growing fast and more and more services were moving onto cloud. Due to the dynamic nature of the cloud it is more complicated to manage and guarantee quality level in cloud platforms and services

running on cloud.(Hu et al., 2011). MobNet adopting cloud services wanted to ensure that they pay the reasonable price for the most relevant QoS level.

MobNet also needed to revisit on the Tools, People and Process aspects to cover the gaps from organization perspective as well as any technical limitations and concerns. Not only was there a need for service management tools, but also a transition and enablement path for the existing team on the tools and from a service definition perspective. Management had the challenge to define a framework which would be consistent across all business units in different countries and still help determine the target maturity level for each of these business units. Clearly there was a need to do a pre-analysis study of the network and determine the existing as-is and to-be models for the maturity levels.

Organization Background:

MobNet Networks is a very large telecom operator in American and Latin America market, with operations in more than six different countries. MobNet extends wireless mobile services, wireline broadband services, telephony, internet and Television services to its customers. With a combined yearly turnover exceeding 500 million dollars, the company has multiple base locations, but head quartered in US. Today each of the company unit in each country is a separate entity in itself with its own book keeping. However, MobNet networks want to move from a network and resource, to a service-oriented monitoring setup, and improve its overall customer experience as well as reduce opex by introducing a new organization model. Within this new model the intent is to define an evolution model without disrupting the existing organization structure.

2. LITERATURE REVIEW

Multiple references across the industry were taken under literature review to understand and establish that the problems faced in the MobNet network is not unique and there are several studies on the approach of setting up centralized service operation.

In one of the publications from Tele Management Forum “OSS of the Future” the whitepaper talks about the need for setting up a next generation operations centre and one that is focused on service components coming from underlying multiple partner platforms. The paper talks of a setting up a Service Operations which is the highest profile area for the operations support. This is inline to the maturity model definition taken in consideration by MobNet.(Systems et al., n.d.)

In another journal paper published by Peng Xu, he talks of the challenges faced by networks in traditional network operations and introduction of multi-layer service operations to make the service network operable, manageable and cost efficient.(Xu & Li, 2010)

In another paper by Saumya and Edwin Morris on Framework for Assurance, the author talks about why Centralized Operations or assurance is an essential part to provide confidence and reduce risks. The paper concludes that the more distributed the operations is, the harder it is to provide assurance. The paper talks of a framework around strategy, methods and roles which is inline to the maturity model that MobNet adopted for implementation of their operations centre.(Simanta, Morris, Lewis, & Smith, 2010)

Similarly Warren E Falconer talks of how service reliability can be enhanced by a single service provider with vulnerability designed into its network. The paper talk of loss of services and steps to take to create redundant service path as well as service monitoring to reduce downtimes. The service operations setup of MobNet also took the same approach to build redundancy with local network operations as well service operations both monitoring failures at different levels.(Falconer, 1990)

MobNet also focused on organization structure and changes to the organization structure to bring in more efficiency and for that they had introduced a maturity model as discussed in later sections of this case study. For large service providers, especially like of MobNet, organizational level factor is essential for enterprise operation and management and this is relevant as indicated by Jie Wen in their paper on expanded eTOM Framework.(Wen, Zong, Zhang, & Shu, 2008)

Similar to MobNet there is a US Based operator Verizon who had adopted a similar maturity level assessment and Certification Report for the assessment of the Verizon Enterprise Solutions (VES) Implementation covering Service Assurance and Billing was published by TMForum. Although the report is a assessment result for assurance and billing, however the business model to derive maturity level is important to taken into consideration for comparing it to what MobNet is doing.(TMFORUM, 2015)

3. MOBNET CHALLENGES AND OBJECTIVES:

As part of the pre-study MobNet tried to capture the relevant challenges and objectives to take into consideration for the setup of their centralized operations. The following questions pose major challenges in the area of service monitoring and are therefore appropriate for MobNet to consider:

How do I know what network and service performance levels my end-users are experiencing?

How do I know that my network has the required capabilities to provide optimal performance levels?

How do I ensure that my personnel have the required competence to ensure optimal network and service performance levels?

Which tools and processes are the most effective for achieving optimum network and service performance levels?

How do I know that my network has the required capabilities for future bandwidth requirements?

How do I make sure that I am using my assets in the most efficient way?

As such for MobNet Networks high performance of both networks and services is strategically important. It leads to greater revenue from satisfied end-customers whilst introducing cost efficiencies derived from a continuously improving network and organization. To resolve the above challenges, MobNet intended to have a business solution in place which can take care of the below mentioned objectives. The implemented solution is:

Move to Customer and Service Centric focus on monitoring and operations

Centralize operations to reduce cost

Have visibility into all services spanning across wireless, wireline and Fixed

Redefine the Operating Model with end to end Customer-Centric view in all Technical Processes

Create Service Operation Centres (SOC), with full vision and responsibility over Services (Banke, Lybarger, & Patton, 2002a).

Move from siloed NOC’s to centralized Global Network Operations Centre (GNOC), with full vision and responsibility over MobNet Network

4. IMPLEMENTATION OF CENTRALIZED OPERATIONS MODEL:

To achieve Centralized operations MobNet decided to setup both SOC (Service Operations Centre) and GNOC (Global Network Operations Centre) and the maturity model. Both of these operations centre were co-located at the same location but had different functional setup to cater to operations at different levels. So this paper discusses the different functions of Service Operations Centre and the Global Network Operations Centres (Planning, Division, & Blvd, 1998) and also defines the mapping of these service centres to the telecom operational model from Tele Management Forum – eTOM (enhanced Telecom Operation Model).(Wen et al., 2008).

Defining a Service Operations Centre (SOC) and a Global Network Operations Centre (GNOC):

This section looks at defining the service operations centre and global network operations centre. Although the focus is on the 'service' aspect of operations management the 'network' aspect should not be overlooked. For the purpose of this paper a distinction will be made between what is meant by the terms 'service' and 'network' mean. The term 'service' is used to identify the process by which MobNet engages with its customers, and then meets the customer's expectation through the provision in the Network in a manner that is acceptable to the customer. The term 'Network' is used in this context to describe the underlying infrastructure that helps provide or provision the service requested by the customer. (McLaughlin, 2010).

From a definition point of view, a GNOC (Global Network Operations Centre) is nothing but a NOC (Network Operations Centre) that operates for multiple networks across various geographies from one central location. What it really means is that a network operator lime MobNet located in one country can ensure seamless connectivity for a user based in any other country MobNet is operating in.

GNOC (Global Network Operations Centre) connects with telecom networks, Operation Support Systems, Element Management Systems, and multiple NOCs and operates out of one centralized location. It works as a large delivery centre for network support, fulfilment and readiness. All alarms, customer complaints, service requests flow into the GNOC (Global Network Operations Centre) as inputs, engineers at the GNOC (Global Network Operations Centre) process the inputs and generate corresponding outputs. With a GNOC (Global Network Operations Centre), a MobNet can achieve scale and improve service efficiency, quality and flexibility.

In a customer experience and scenarios where service monitoring is missing, from the top-down approach, if the problem is reported by a customer, the identification of the problem's root cause down to the resource level becomes a major challenge. Identifying the root cause of the problem becomes time consuming as current operations are more resource focused. Customer Experience (CEM) and Service Quality (SQM) from an independent solutions approach can identify this root cause and the underlying element causing the problem as well as take necessary actions that increase the effectiveness. But, within an organization, there comes a question of who runs Service Quality Management (SQM) & Customer Experience Management (CEM)?

According to eTOM, Customer Experience, & Service Quality belongs to the Customer Management, Service Management & Operations functional grouping, (Banke, Lybarger, & Patton, 2002b)(Asic, Bajrami, & Tanovic, 2012). Ideally specking we can have an altogether a separate line of business in itself to manage Customer Experience and Service Quality (eTOM does not mandate it should be separate. This could be a role that can be assigned to an existing department.(Zhuang, Qiu, Cheng, Chen, & Gao, 2010).

Service Operation Centres get introduced as such with the introduction of customer & service quality management concept. Service Operation Centre or SOC is an organizational "department" that will:

Move to a real-time, predictive operations model by managing services, not just resources

Monitor customer service indicators and initiate proactive steps

Utilize tools and processes for proactive assessment of customer impacts

Identify trends that may affect service levels

Monitor and manage KPIs/KQIs as well as SLAs/OLAs

Provide management with up-to-date information on service quality and customer experience

Influence company policy on service quality and customer experience

On the other hand, a Global Network Operation Centres is targeted towards managing the network centrally for MobNet Networks. Global Network Operations Centre (GNOC) is an organizational "department" that will:

Manage network incidents and resolution monitored by local Service Operations Centres as per local service KPIs

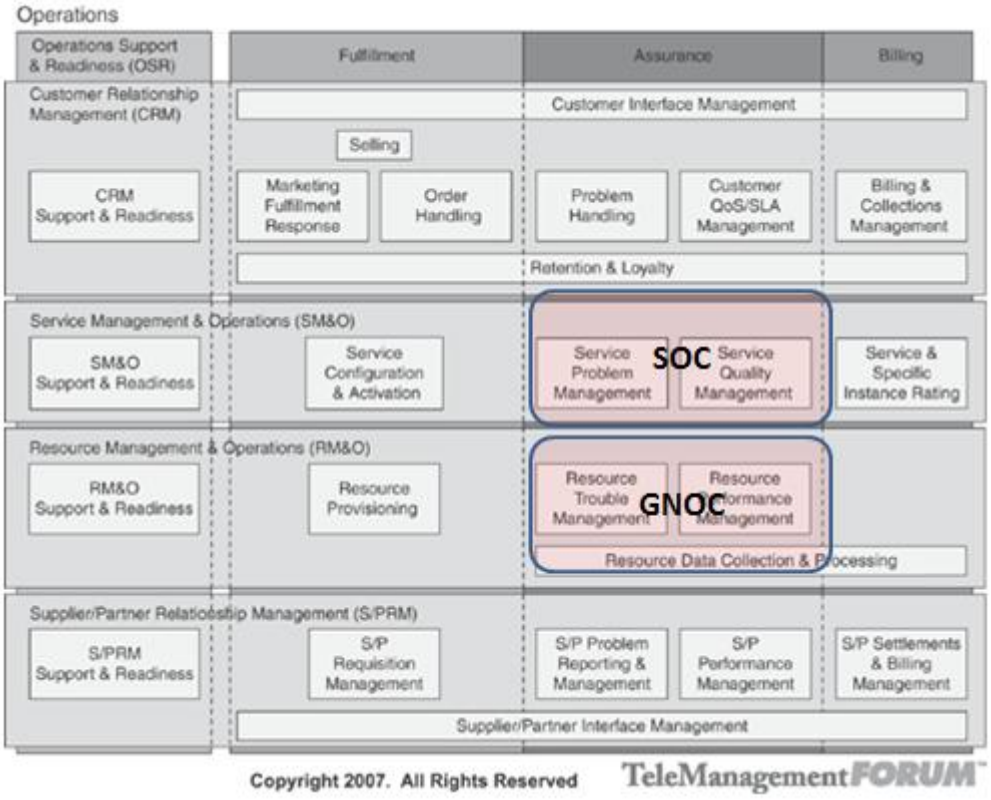
Monitor resource indicators and initiate proactive steps

Utilize tools and processes for proactive assessment of network impacts

Monitor and manage Key Performance Indicators/ Key Quality Indicators as well as Service Level Agreements (SLAs)/ Operational Level Agreements (OLAs)

Provide management with up-to-date information on network quality

The most common and widely accepted of the operations model is the e-TOM operations model (ITU-T, 2017) from Tele Management Forum, and a mapping of the SOC and GNOC positioning in the e-TOM model is given below:

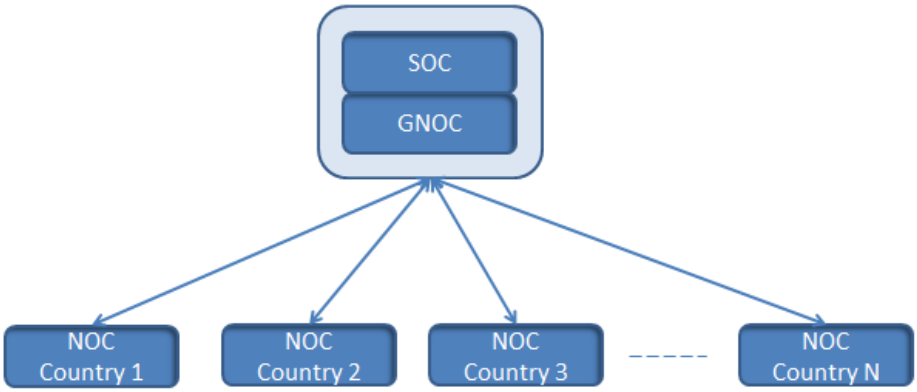


eTOM stands for Enhanced Telecom Operations Map. The enhanced Telecom Operations Map is an ongoing initiative developed by the TM Forum to deliver a business process framework for the telecommunications industry. The eTOM business process framework was developed to map out the processes involved at a enterprise level. TM Forum's eTOM (Enhanced Telecom Operations Map) serves as a blueprint for how a telecommunications operator like MobNet can integrate these processes in order to successfully compete through the implementation of a business process driven methodology. If we refer to level 2 processes under Operations in eTOM, they talk about assurance for Resource Management and for Service Management. The MobNet implementation of SOC (Service Operations Centre) and GNOC (Global Network Operations Centre) maps to these two layers. The resource layer is about all the infrastructure and network resources and as such the GNOC (Global Network Operations Centre) is mapped to the Resource layer assurance. Similarly, SOC (Service Operations Centre) is existing on the service layer of assurance. It is to be noted that resources combined make a service and that is why service layer is always depicted over or on top of resource layer.

Centralized Operations setup and Maturity Model

Below given is a model of the SOC (Service Operations Centre) and GNOC (Global Network Operations Centre) setup that MobNet Networks introduced.

As part of the solution, each country had a Network Operations Centre and centralized Service Operations along with a Global Network Operations was positioned in one of the countries. The centralized SOC (Service Operations Centre) and GNOC (Global Network Operations Centre) combined dictated the Network Operations on the Service Level Agreements, Key Performance Indicators to be monitored and all the relevant day to day operational matters. As such all high-level functions moved to Global Network Operations Centre (GNOC) and Service Operation Centre (SOC).



The Global Network Operations Centre (GNOC) and Service Operation Centre (SOC) combined provides the following functionality:

Intelligence in Tools – for Correlation, RCA, Enrichment, Customer Impact Assessment. The tools are enhanced to take up manager of managers role and automatically correlate relative alarms and provide a root cause analysis at the service layer to operatives in the Operations centre.

Process transformation – Process transformation helps people in Global Network Operations Centre (GNOC) and Service Operation Centre (SOC) to concentrate on more severe and service impacting events and smoother flow of information between teams working in country specific Network Operations Centre and Global Network Operations Centre (GNOC) and Service Operation Centre (SOC).

Org transformation – With the identification of activities to be handled by different organization, there was a need for Organization transformation also in the MobNet. The people working in Global Network Operations Centre (GNOC) and Service Operation Centre (SOC) were at higher competence level to cater to service level incidents while the primary monitoring and reporting could still be happening in country specific Network Operations.

Multi Tenancy and Business Continuity – The centralization of each operations centre also ensured interconnectivity between them and the same set of people having the competence level to manage other locations. This resulted in multi tenancy and business continuity for MobNet.

With the introduction of the new Organization structure of Global Network Operations Centre (GNOC) and Service Operation Centre (SOC), there is a significant level of organization and process changes that needed to happen. MobNet Networks utilized external consultants to help align these processes and define the organization structure (Tung & Kang, 2012)

To assess the level to changes that would be required in each of the country, a maturity level assessment was done for each of the country Network Operations Centre (NOC's) existing capability under the above stated consulting scope. As party of maturity level definition each of the country Network Operations Centre (NOC's) were graded on the scale of 1 to 6. Tool capability and resource capability was accordingly restructured to realize the required operations model. (This is similar to how process decomposition can use Semantic Analysis). In many cases, each Operations Centre is aligned and mapped to appropriate company documentation references solution, methodology or modelling material to derive the maturity level. Below is a brief of the same:

Identified Maturity Level	Description	People/Organization	Process & Tools
1	Very Basic Network Operations Centre with Alarm Monitoring Only	Introduction of L2 Teams	Introduction of Processes and Tools in local setup also
2	Basic Network Operations Centre with Alarm Monitoring and Performance Analysis	Introduction of L2 Teams	Introduction of Processes and Tools remain 'as-is'
3	Basic Network Operations Centre with Alarm Monitoring and Performance Analysis and some view on service	Organization remains 'as-is'	Process and Tools remains 'as-is'
4	Mature Network Operations Centre with pro-active service monitoring	Movement of some to L3 teams GNOC	Leverage some of the tools into GNOC
5	Mature Network Operations Centre with pro-active service monitoring as well as customer experience monitoring	Movement to Global Network Operations Centre (GNOC) and Service Operation Centre (SOC)	Leverage process and tools both into Global Network Operations Centre (GNOC) and Service Operation Centre (SOC)
6	Very Mature Network Operations Centre with advanced analytics and cloud capability	Potential to be identified as setup for Global Network Operations Centre (GNOC) and Service Operation Centre (SOC)	Potential to be identified as setup for Global Network Operations Centre (GNOC) and Service

			Operation Centre (SOC)

5. CONCLUSION

The challenges for MobNet are already discussed in this paper, also providers like MobNet with global presence around the world are each pursuing their own strategic response to these challenges, in almost all cases this will be a combination of renewing and refining their existing setup and business models to become ever more competitive, as well as exploring completely new service offerings and the potential for new business models.

As per the study done, the overall benefit realization of the centralized operations model introduction is as given below:

Proactive monitoring reduced the number of service outages and the associated costs.

Customer satisfaction improved resulting in lower customer churn and attracting new customers.

End-to-end monitoring and potential cause analysis readily identified causes of outages thus helping reduce mean time to response (MTTR).

Reduced operational costs by providing tools that can quickly identify causes of network outages.

Identify list of under-performing equipment.

Unlock revenue by placing equipment that has better performance capability

Going ahead 5G presents a unique opportunity to exploit new technical capabilities such as massive machine type communications for Internet of Everything (IoE) applications, and ultra-low latency technology which opens up opportunities for world changing applications such as self-driving cars. The business potential for these is being explored by MobNet. Whilst many aspects of time reduction to increase business agility are being studied, one of the most crucial is the time to incorporate new functionality. The MobNet implementation as of today works on a timescale where network operations is expected to work to a very different set of timescales and new service onboarding takes minimal time

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