

Recommendations on the Management Interface Strategy

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Abstract: Historically the Management Interfaces used for the management of mobile networks are specified by 3GPP, and those for wireline management are specified by various other organisations. Aligning and harmonizing the approach is a considerable lever to reduce CAPEX and OPEX. In addition to this it also allows for new enhanced management features. The industry has set out to harmonize above mentioned approaches. For various reasons progress is slow.

This is why the supporting companies of this document have seen the necessity to write clear recommendations on the way forward.

These recommendations are summarized as follows:

- The IRP Framework should be used as basis for Management Interfaces used for managing mobile networks and converged (FMC) networks.
- The IRP Framework should be extended if necessary.
- 3GPP should be the only organization that owns, maintains and publishes the IRP Framework.
- 3GPP NRM IRPs, which are part of the IRP Framework, should be used to model mobile network resources for the purpose of management.
- The IRP Framework should make references to relevant fixed network resource models for the purpose of management. 3GPP should not make modifications to these network models. This allows IRP Framework users to manage the fixed networks, whose models are referenced, as well as mobile networks, whose models are defined in 3GPP.
- Interface IRPs, which are part of the IRP Framework, should be used to manage networks whose models are defined or referenced within the IRP Framework.

Note: 3GPP is in cooperation with other relevant industry bodies, such as 3GPP2 and BBF, to extend the IRP Framework in order to ensure its viability for the management of converged (FMC) networks.

This document is supported by:

- Nokia Siemens Networks
- Huawei Technologies
- Ericsson

The companies supporting this paper represent not only a major portion of the wireless equipment market and the wireline equipment market, but also a major portion of the OSS market.

It is the understanding of the companies supporting this paper that the recommendations provided herein fully support the NGMN TOP OPE Recommendations. We are committed with resources to implement the strategy outlined in this document. We encourage and welcome all interested companies (Service providers, equipment and OSS vendors) to join us in implementing this strategy.

1 Introduction

Management Interfaces for the management of mobile networks are specified in 3GPP and Management Interfaces for wireline networks are specified in various other organisations. The industry has realized that a harmonized approach for the management of the different network technologies allows leveraging substantial synergies in terms of OPEX and CAPEX. In addition to this new enhanced management features can be realized.

Discussions are being held on the best way forward, but progress is very slow. In order to conclude the decision making process the companies supporting this document saw the need to formulate clear recommendations. These recommendations are based on a detailed analysis of the situation.

We will present this analysis in the following chapter. After this a clear conclusion is drawn and recommendations are being made.

2 Management Interface Analysis

2.1 Analysis of technical Aspects

2.1.1 Separation of Interface and Model

The capabilities of a management interface are described with data (Model) and the capabilities to interact with the data (Interface). The Interface shall be generic and not depend on the Model. The clear separation between Interface and Model allows Interfaces to be re-used for the management of different network technologies. This design pattern reduces the number of required Interfaces to a minimum. The different capabilities of the different network types to be managed are reflected in the Models.

The 3GPP IRP Framework has been developed right from the beginning with this architectural principle in mind. The 3GPP Interface IRPs are generic and do not feature wireless specific aspects. 3GPP Interface IRPs have not been designed for wireless networks only and are hence fully suitable for the management of other network types.

Conclusion: Existing 3GPP IRPs meet this requirement and do not need any specific adaptation or evolution to manage other technologies.

2.1.2 Separation of the technology-neutral and the technology-dependent Management Interface Specification

Management Interface technology changes over time but the underlying management problems do not. This is why the technology neutral description of the Management Interface is normally quite stable. Especially the Interface part does not need any changes when the design pattern of separation between Interface and Model is strictly applied in case a new network technology needs to be managed. For this reason the technology neutral specification of the Interface part can remain stable over a long period of time during which multiple new network technologies to be managed may be popping up and during which the Management Interface technology may change multiple times.

This is why the approach to standardize and design the Interface and Model shall clearly separate the specification of the functionality in a technology neutral manner from the specification of Management Interface technology.

The 3GPP IRP Framework mandates this approach. The technology neutral specification is called Information Service (IS) and the technology dependent specification is called Solution Set (SS).

The TM Forum Interface Program adopted this approach as well. The technology neutral specification is called Information Agreement (IA) and the technology dependent specification is called Interface Implementation Specification (IIS).

Conclusion: Existing 3GPP IRPs and planned TIP Interfaces meet equally well this requirement.

2.1.3 Tooling for Management Interface Specification

Production of the IIS/SS is a straightforward mapping process. When done manually it can be completed in a few hours. In addition to this, when Interfaces are specified in a network technology neutral manner, this has to be done only very seldom, at least for the Interface part. It is to be noted that the specification designer may use tools to assist in the mapping process.

In 3GPP the usage of tools for the mapping of IA/IS to IIS/SS has been analyzed. 3GPP came to the conclusion that it is not beneficial to mandate the usage of a certain tool for various reasons. Whereas it might be appealing at first glance to produce the IIS/IS by just pressing a button, it has to be noted as well that this comes with numerous problems and disadvantages outweighing the advantages according to 3GPP assessment. Disadvantages include the dependency on the tools, the cost to set up and maintain the tools, the short lifecycle of tools compared to the lifecycle of the IA/IS, the fact that more time has to be spent on tools than time saved later, the tool upgrades required when the IA/IS need to be mapped to the next interface technology after XML.

The TM Forum Interface Program in contrast opted for the usage of tools (RSM and Tigerstripe). These tools are not ready yet. This basically confirms the 3GPP analysis that more effort and time is spent on tools (assuming that they will really work) than saved later.

Conclusion: Tools for the mapping of IA/IS to IIS/SS are not necessary. The classical approach to the specification of Management Interfaces is the most efficient and economical one.

2.1.4 Enhancements to 3GPP Interfaces

3GPP Interfaces are not carved in stone, and 3GPP has always stated their willingness to enhance them. New requirements may be identified during the joint work between 3GPP and TMF. This ensures experience gained with TMF interfaces is not lost. Additional requirements are expected to emanate from OS-OS deployment scenarios. Though 3GPP Interfaces are generic in nature and network specific aspects should be reflected in the model, some very specific wireline management needs may also require some specific Interfaces.

2.1.5 Maturity of Specifications

The majority of the 3GPP Interface IRPs have been specified years ago and enhanced gradually over the last couple of years. The core set of IRPs is now stable and has not been changed any more for a long time.

Conclusion: Above mentioned reasons are clearly in favour of adoption of 3GPP Interface IRPs for the harmonized solution.

2.1.6 Reusability of Management Interface Frameworks

The 3GPP IRP Framework has been adopted by organisations like 3GPP2 and ETSI TISPAN. They re-use the Interface IRPs (without changes) by referencing the 3GPP specifications. The required models were designed by these organisations. The respective specifications are owned and published by them.

3GPP is in cooperation with other relevant industry bodies, such as 3GPP2 and BBF, to extend the IRP Framework in order to ensure its viability for the management of converged (FMC) networks.

Conclusion: The 3GPP IRP Framework has already been adopted by other organisations and represents hence a proven approach demonstrating the re-usability of the IRP Framework for different management needs including wireline management.

2.1.7 Information Models

When pursuing a clear separation between Interfaces and Information Models both topics can be handled quite independently. For models it is necessary to differentiate between the network technology neutral part and the network technology specific part.

The technology specific parts should be developed in the organizations specifying also the network because they have the required expertise to design the models.

The network technology neutral part of the model could have a suitable home in standards organisations not focusing on a specific network technology, like ITU-T.

The technology neutral part can and should be identical for all modelled network technologies.

Conclusion: Information models can be handled independently from the interface part. The technology specific parts should be developed in the organizations specifying also the network.

2.2 Analysis of Business Aspects

2.2.1 Available Implementations

3GPP IRPs are widely deployed for years. They are supported by all major equipment vendors and integrated in the operator's OSS. They do not suffer from childhood diseases any more.

Conclusion: Above mentioned reasons are clearly in favour of adoption of 3GPP Interface IRPs for the harmonized solution.

2.2.2 Effort Estimation for the Specification of the Harmonized Solution

The 3GPP Interface IRPs can be used without any or only small modifications due to some new requirements resulting from the joint 3GPP TMF harmonisation work groups.

The same is true for 3GPP NRM IRPs. Only small modifications are expected to result from the joint work groups.

Wireline network models can be referenced in the existing IRP Framework.

Conclusion: Effort for moving towards the 3GPP Framework is low.

2.2.3 Migration Cost

3GPP Interfaces are deployed. Re-using the 3GPP Interfaces to cover wireline technologies used in mobile networks and converged (FMC) networks would save at least the mobile operators from migrating to new interfaces.

Conclusion: Above mentioned reasons are clearly in favour of adoption of 3GPP Interface IRPs for the harmonized solution.

2.2.4 Time to Market

Given the considerations on the effort estimation for the specification of the harmonized solution and the time required for product implementation, adoption of the 3GPP IRP Framework is a viable solution for converged (FMC) network management in a reasonably short time.

Conclusion: Adoption of the 3GPP IRP Framework as a viable solution for converged (FMC) network management.

3 Conclusion

This document analyses the different options for a harmonized management approach for the different network types. Various technical aspects and business aspects are investigated. This analysis shows that a realistic approach is the adoption of the 3GPP IRP Framework.

The proposed way forward can be summarized as follows:

- The 3GPP IRP Framework should be used as basis for Management Interfaces used for managing mobile networks and converged (FMC) networks.
- The 3GPP IRP Framework should be extended if necessary.
- 3GPP should be the only organization that owns, maintains and publishes the IRP Framework.
- 3GPP NRM IRPs, which are part of the IRP Framework, should be used to model mobile network resources for the purpose of management.
- 3GPP IRP Framework should make references to relevant fixed network resource models for the purpose of management. 3GPP should not make modifications to these network models. This allows IRP Framework users to manage the fixed networks, whose models are referenced, as well as mobile networks, whose models are defined in 3GPP.
- 3GPP Interface IRPs, which are part of the IRP Framework, should be used to manage networks whose models are defined or referenced within the IRP Framework.

The companies signing this document commit to providing resources for implementing the outlined strategy.