Resource Performance Management - DDP BA

TMF518_RPM

Version 1.2

September, 2011

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Executive Summary

This document entails the Business Agreement (BA) aspect of the MTNM / MTOSI Resource Performance Management (RPM) Document Delivery Package (DDP). It covers requirements and use cases concerning resource performance management.

The following management capabilities are covered:

- Monitor Performance Management
  - PM Retrieval – this includes the retrieval of both current and historical PM data
  - Threshold Crossing Alert (TCA) Notifications
- Control Performance Management
  - PM Control – this includes, for example, the enabling and disabling of PM collection
  - TCA Control – this includes, for example, the enabling and disabling of TCA generation.

This document generalizes and extends the performance management requirements and use cases from TMF 513 v3.0. TMF 513 focuses exclusively on the NML-EML interface. However, this document considers the more general scenario of OS-OS communications with NML-EML as a special case.

1 Introduction

1.1 DDP Structure

In order to allow for more efficient release delivery, the previous monolithic BA, IA and SS documents have been partitioned into smaller self-contained (though not independent) units called Document Delivery Packages (DDPs).

This is similar to the 3GPP concept of Integration Reference Point (IRP). The basic idea is that the Interface, which is specified by the entire document set (of a release), is partitioned into DDPs where each DDP specifies “a certain aspect” of the Interface, which needs to be very clearly scoped.

There are three kinds of DDPs:

- the FrameWork DDP (FMW) – this DDP contains the generic artifacts that are applicable to all the other DDPs.
- Data Model DDP (DM-DDP) – a DDP that concerns a data model (entities, data structures, attributes, state, but no operations)
- Operation Model DDP (OM-DDP) – a DDP that concerns a computational model (operations, notifications, transactions) for a given functional area (such as resource inventory management)

The unified deliverables structure for any given MTOSI / MTNM product release is as follows:

- Product Release Notes:
  - a scope specification for the type and extent of the delivered product,
  - the partitioning of the release into DDPs (i.e., definitions of various aspects of the release),
  - and an overview of the release’s (delta) deliverables;
- For each DDP:
  - Business Agreements (BAs): a business view specification
  - Information Agreements (IAs): a system view specification
  - Interface Implementation Specifications (ISSs): implementation and deployment view specification per supported enabling technology (mapping of the IA to either CORBA (IDL, services usage) or XML (WSDL, XSD, bindings…)
  - Supporting Documentation: normative and informative supporting documents.
- Reference Implementation (optional) of core IIS fragments for selected interfaces and enabling technologies.

1.2 Document Overview

This document entails the Business Agreement (BA) aspect of the MTNM / MTOSI Resource Performance Management (RPM) Document Delivery Package (DDP). It covers requirements and use cases concerning resource performance management.

This document is intended to be used in conjunction with the other documents in the RPM DDP, i.e.,

- TMF518_RPM_IA – this covers the computational aspect of the PM information model, i.e., the operations.
- TMF518_RPM_IIS – this is the XML specification for the performance management interface.

The document references and depends on the following documents:

- TMF518_NRA, *Network Resource Assurance BA*, Version 1.0, September 2007.
- SD1-19, *Location Identification*
- SD1-28, *Performance Parameters*
- SD1-30, *PM File Format Definition*
- SD1-37, *PM Threshold Types*.

1.3 Document Structure

The following sections are included in this document:

- Section 1 is this introduction.
- Section 2 defines the business problem and project scope
- Section 3 has the requirements and associated descriptive text.
- Section 4 contains the use cases.
- Section 5 has a traceability matrix between the use cases and associated requirements.
- Section 6 provides a list of open issues and possible future work items to be considered in later versions of this document.
- Section 7 lists references and states IPR claims, if any.
- Section 8 lists the contacts for this document and provides administrative details such as document history and acknowledgements.

1.4 Terminology Used In This Document

Many of the object types used in this document are defined in the associated BA for the NRA DDP, i.e., TMF518_NRA.
For other terms, refer to the SD0-1 supporting document..

2 Business Problem Description, Project Scope

2.1 Project Scope

The TM Forum Integration Program is responsible for all of the interface and business services work within the TM Forum. In some cases, interface work is delegated to other teams but the final verification for technical uniformity and integrity is the responsibility of the TM Forum Integration Program.

Initially, the TM Forum Integration Program was formed to coordinate the various existing TM Forum interfaces activities (as shown in **Figure 2-1**). In particular, the responsibility for maintaining MTOSI and MTNM is now covered by the MTOSI-MTNM Users Group which is a team within the TM Forum Integration Program. The long term plan (which is already well under progress) is to migration the various input work to a single harmonized suite of interfaces.

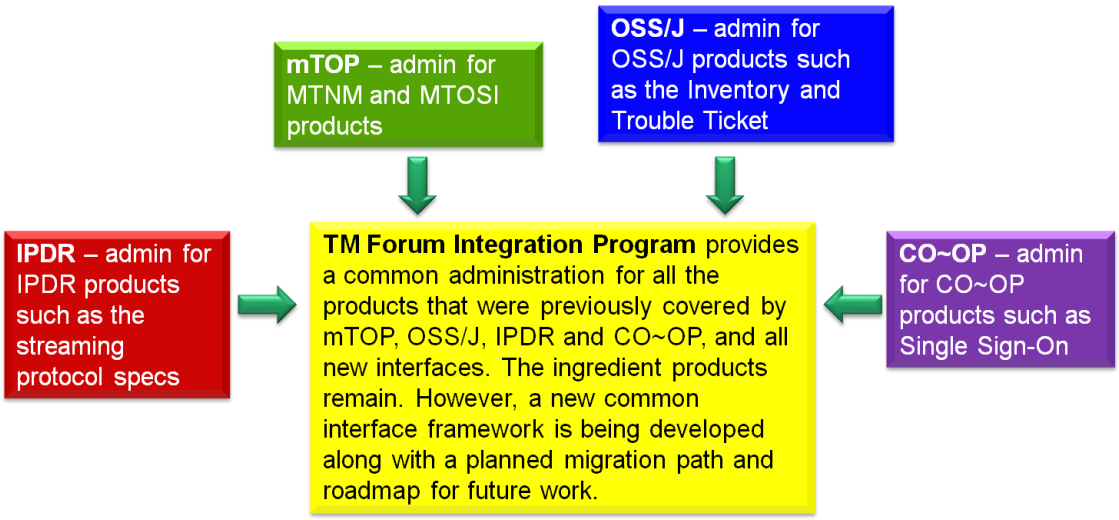

Figure 2-1**. Inputs to the TM Forum Integration Program**

Figure 2-2 provides a summary of the team within the TM Forum Integration Program as well as a few teams outside of the program but which also do some interface work. In terms of MTOSI and MTNM, the main input for updates come from the Resource and Service Management Team.

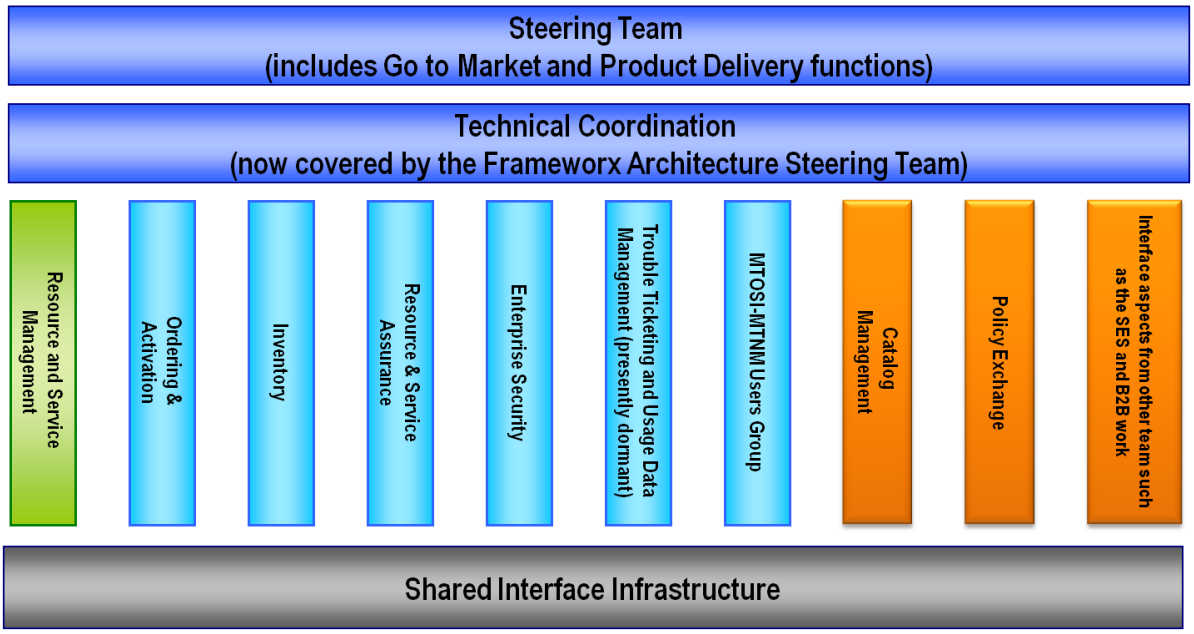

Figure 2-2**. TM Forum Integration Program**

2.2 Benefits

MTOSI and MTNM provide a set of Interface specifications that allow for resource and service management (with only MTOSI covering service management, but with MTOSI and MTNM both covering resource management, using very much the same information model).

These specifications are intended to lower design, implementation, Verification Validation & Testing (VVT), and maintenance costs for management interfaces. These Interfaces are intended for use by service providers, suppliers of equipment and OSS suppliers. The intention is to also encourage system integrator usage of management systems that make use of the Interfaces.

In particular, the followed approach tends to minimize the cost of integration, provide access to all necessary information and control, and support all vendor/operator differentiation. The intent of the interface is to provide compatibility among different version, for a detailed description see SD2-6_VersioningAndExtensibility.

2.2.1 Service Provider Benefits

The service provider benefits are as follows:

- One stop shopping concerning feature requests for much of the TM Forum contract specification work is part of the defined Change Control Group (CCG) process that TM Forum makes available in order to control the interface.
- The technical deliverables are also of high value to the service provider. The Interface specifications allow for an open, multi-supplier environment, shorten delivery times and lower integration costs.
- The MTOSI and MTNM products provide an integrated, multi-technology interface with support for most key layer 1 and layer 2 transport technologies. This is in contrast to earlier approaches where

each technology-specific forum provided a single-technology management interface. The service provider was faced with having to use many different, uncoordinated management interfaces.

- These products are not bound to any one middleware, transport or computing language. So, the service provider will be able to evolve to new technologies as they arise.

2.2.2 Supplier Benefits

The supplier benefits are as follows:

- Fewer Adapters leads to Lower Costs – in as much as MTOSI and MTNM gain market penetration (and there has already been significant market acceptance of these interfaces), the supplier is faced with the need to build fewer adapters between their products and the products of their partners. A supplier can also directly see cost savings in the use of the Interfaces among its own products (as the need for an open interface arises).
- Lower Middleware Transitions Costs – the Interfaces are defined to be middleware and transport independent. So, the supplier can migrate from one middleware or transport technology to another without changing the supporting business logic in the code.
- Increase Usage by System Integrators (SIs) – a supplier's support of their own "open" interfaces goes only so far to encourage SIs. Clearly, an SI would like to make use of supplier products (both equipment and OSS suppliers) that make use of well supported standard interfaces rather than supplier specific interfaces. The latter case forces the SI into a situation characterized by many pair-wise negotiations between various suppliers.
- Lower Training Cost – in as much as a supplier re-uses the Interfaces for multiple products and for multiple customers, the various training costs are lower because the designers, system engineers, developers and testers are using the same Interfaces over and over again.

3 Business Processes

3.1 Business Requirements

The following business requirements are stated:

R_TMF518_RPM_BR_0001	The Interface shall support the retrieval of current and historical performance measurements for network resources.
Source	TMF518_RPM, Version 1.0

R_TMF518_RPM_BR_0002	The Interface shall support the distribution of Threshold Crossing Alerts (TCAs) to subscribed OSs.
Source	TMF518_RPM, Version 1.0

R_TMF518_RPM_BR_0003	The Interface shall support the control of performance monitoring in the network. This includes PM control, e.g., the enabling and disabling of PM collection and TCA control, e.g., the enabling and disabling of TCA generation.
Source	TMF518_RPM, Version 1.0

3.2 Category I: Static and Structural Requirements

The Category I requirements for assurance (including performance) can be found in TMF518_NRA, *Network Resource Assurance BA*.

3.3 Category II: Normal Sequences, Dynamic Requirements

In the following requirements, the OS sending a request over the Interface is called the “requesting OS” and the OS receiving the request is called the “target OS”.

3.3.1 Monitor Performance Management

3.3.1.1 PM Retrieval

The requirements in this section entail the retrieval of PM data such as

- current PM data
- historical PM data
- the set of supported PM measurements
- PM holding times.

R_TMF518_RPM_II_0004	The Interface shall allow the requesting OS to retrieve the set of supported PM parameters for a given Managed Element (ME).
Source	TMF 513, Version 3.0, Requirement II.054

R_TMF518_RPM_II_0005	The Interface shall allow the requesting OS to monitor and collect current and historical PM parameters (including counters and analogue gauge measurements) for 24 hours (uni- or bi-directional) and 15 minutes (unidirectional) measurement intervals.
Source	TMF 513, Version 3.0, Requirement II.118

R_TMF518_RPM_II_0006	The Interface shall allow the requesting OS to monitor and collect the PM parameters defined in R_TMF518_RPM_II_0005 on a per TP basis.
Source	TMF 513, Version 3.0, Requirement II.119

R_TMF518_RPM_II_0007	The Interface shall allow the requesting OS to retrieve the values of all (or a specific number of) historical 24-hour registers of all the PM measurement points that have been activated within the view of the target OS. The information included in the request and response is defined in R_TMF518_RPM_II_0010 and R_TMF518_RPM_II_0011, respectively.
Source	TMF 513, Version 3.0, Requirement II.129

R_TMF518_RPM_II_0008	The Interface shall allow the requesting OS to retrieve the values of all (or a specific number of) historical 15-minute registers of all the PM measurement points that have been activated within the view of the target OS. The information included in the request and response is defined in R_TMF518_RPM_II_0010 and R_TMF518_RPM_II_0011, respectively.
Source	TMF 513, Version 3.0, Requirement II.130

R_TMF518_RPM_II_0009	The Interface shall allow the requesting OS to query a target OS for the number of supported previous or historical day-registers and 15minute-registers.

Source	TMF 513, Version 3.0, Requirement II.124

Quality of Service (QoS), resource availability, and network configuration evaluation are the typical scopes for which PM data are collected and analyzed. Between a target OS (a source of PM data) and several requesting OSs (collectors of PM data), PM measurements can be forwarded via a bulk transfer (e.g., file-based) interface.

There are three somewhat different usage scenarios that need to be supported concerning the transfer of PM data:

a. Query of large amounts of data from a database: case of a single target OS persistently storing PM data, and several requesting OSs querying large amounts of data from the target OS;

b. Query of distributed and medium amounts of data from several databases: case of distributed PM data storage, and client applications gathering distributed data (i.e., the server OS is charged with gathering the data stored in different databases);

c. Frequent and regular requests for usually small amounts of data: case of server OS with non-persistent storage of PM data, therefore client applications should frequently gather small amount of PM data from server OS.

The following requirement supports the high-level needs stated above.

R_TMF518_RPM_II_0010	The Interface shall allow the requesting OS to query a target OS for ***historical*** or ***current*** PM data related to one or more TPs. The requested PM data is identified by the following parameters: ***Start Time*** – specifies the start of the time for which the selected PM measurements shall be retrieved (this parameter only applies for the retrieval of historical PM data). ***End Time*** – specifies the end of the time for which the selected PM measurements shall be retrieved (this parameter only applies for the retrieval of historical PM data). ***Parameter Name List*** – specifies which PM parameters within the scope of the PM TP Select Item list shall be contained in the returned data. An empty list means all supported parameters should be returned. The returned parameters are best effort, i.e., from the set of parameters specified only the subset of supported parameters will be returned. Each ***PM Object Select Item*** has the following attributes: • name – the name of the object to which this selection applies. The name can refer to: ○ Managed Element: In this case, the selection item applies to all TPs contained within the managed element. ○ Termination Point: In this case, the selection applies only to the named termination point which will be a PTP, an FTP or a CTP. Unlike

	the case for managed element, the operation will not apply to any "contained" TPs. ○ Management Domain: In this case, the selection item applies to all TPs contained within the Managed Element. ○ Subnetwork Connection (SNC): In this case, the selection applies to all TPs along the SNC, at the same layerRate as the SNC. ○ Subnetwork: In this case, the selection applies to all TPs within all the managed elements in the subnetwork. ○ OS: In this case, the selection applies to all TPs within all the managed elements associated with the OS. • LayerRate List – identifies the set of layers to which the selection item applies. An empty list means all layers supported by the named entities. • PM Location List – identifies the set of locations to which the selection applies. An empty list means all locations supported by the named entities. A detailed description of the concept of PM location is provided in SD1-19, *Location Identification*. • Granularity List – identifies set of granularities to which the selection applies where "granularity" refers to the collection duration of PM measurement data, i.e., either 15 minutes or 24 hours. This attribute is not applicable for instantaneous measurements (i.e. gauge type measurements). An empty list means all granularities supported by the named entities. If for a given PM Object Select item data collection has not been enabled, the target OS will provide an indication.
Source	This requirement is a consolidation and extension of the following PM requirements from TMF 513, Version 3.0: • Requirement II.128 (retrieval of historical PM data via file transfer) • Requirement II.163 (on demand retrieval of historical PM data) • Requirement II.131 (current PM data retrieval)

R_TMF518_RPM_II_0011	For the retrieval of historical and current PM data, the Interface shall support the return of data in the following formats: • The requested information may be returned in a file as specified in SD1-30, *PM File Format*. The format shall be readable by spreadsheet programs. • The requested information may be returned in a list

	data structure. Each element in the list corresponds to a PM TP Select Item and has the following parameters: ○ TP Name – the name of the TP related to this measurement. ○ LayerRate – the layerRate of the PM data concerning this measurement. ○ Granularity – identifies the granularity of the data where "granularity" refers to the collection duration of PM measurement data, i.e., either 15 minutes or 24 hours. This attribute is not applicable for instantaneous measurements (i.e. gauge type measurements). ○ Retrieval Time – the point in time at which the PM measurement were obtained from the ME. ○ PM Measurement List – the requested measurements for the given PM TP Select Item. Each PM Measurement shall have the following parameters: ▪ PM Parameter Name – the name of the PM Measurement. ▪ PM Location – the location of the PM Measure. ▪ Value – the measurement itself. ▪ Unit – the unit of measurement. ▪ Interval Status – refers to the quality of the measurement. The following values are allowed: – Valid – valid data – Incomplete – data not available for the complete interval – Invalid – data available but marked as invalid for the interval – Unavailable – no data available at all for this interval – Zero-suppressed - zero - suppressed interval.
Source	This requirement is a consolidation and extension of the following PM requirements from TMF 513, Version 3.0: • Requirement II.282 and 283 (return format for the current data) • Requirement II.284 (PM file format)

3.3.1.2 TCA Parameter Profile Retrieval

R_TMF518_RPM_II_0012	The Interface shall allow an OS to retrieve the names of all the TPs known to the target OS that are associated with a specified Threshold Crossing Alert (TCA) Parameter Profile.
Source	TMF 513, Version 3.0, Requirement II.285

R_TMF518_RPM_II_0014	The Interface shall allow an OS to retrieve the *attributes* of all the Threshold Crossing Alert (TCA) Parameter Profiles that are being managed by the given ME.
Source	TMF 513, Version 3.0, Requirement II.273

R_TMF518_RPM_II_0015	The Interface shall allow an OS to retrieve all the attributes of a given Threshold Crossing Alert (TCA) Parameter Profile.
Source	TMF 513, Version 3.0, Requirement II.234 (with typo correction)

3.3.1.3 Threshold Crossing Alert (TCA) Notifications

R_TMF518_RPM_II_0016	The Interface shall allow an OS to send Threshold Crossing Alerts (TCAs) upon a threshold violation. The TCA is sent spontaneously, i.e., as soon as a threshold violation is detected.
Source	TMF 513, Version 3.0, Requirement II.126

3.3.2 Performance Management Control

3.3.2.1 PM Control

The following requirement pertains to the retrieval of PMPs which contain information related to PM and TCA control.

R_TMF518_RPM_II_0018	The Interface shall allow the requesting OS to retrieve the *attributes* of all the Performance Monitoring Point (PMP) supported by a Managed Element (ME) or a Termination Point (TP) as identified by a given ME or TP name. In the case of the OS supplied ME name, the PMPs associated with all the TPs contained within the ME shall be returned. In the case of the OS supplied TP name, only those PMPs associated with the named TP shall be returned.
Source	TMF 513, Version 3.0, Requirement II.222

R_TMF518_RPM_II_0019	The Interface shall allow the requesting OS to enable and disable PM collection at the endpoints of a given SNC.
Source	TMF 513, Version 3.0, Requirement II.120

R_TMF518_RPM_II_0020	The Interface shall allow the requesting OS to enable and disable the collection of PM data for a given list of TP names or list of Managed Element (ME)s.
Source	TMF 513, Version 3.0, Requirement II.121

R_TMF518_RPM_II_0021	The Interface shall allow the requesting OS to clear (reset) the PM Data for a list of TPs or for all the TPs associated with a list of Operations Systems, Management Domains, Managed Elements, Subnetworks or Subnetwork Connections.
Source	TMF 513, Version 3.0, Requirement II.132

3.3.2.2 TCA Control

R_TMF518_RPM_II_0022	The Interface shall allow the requesting OS to retrieve the value of a specific Threshold Crossing Alert (TCA) Parameter for a Termination Point (TP) identified by a given TP name, layer rate, granularity and location.
Source	TMF 513, Version 3.0, Requirement II.055

R_TMF518_RPM_II_0024	The Interface shall allow the requesting OS to retrieve the *attributes* of all the Threshold Crossing Alert (TCA) Parameter Profiles that are being managed by a specified OS. The "specified OS" does not need to be the given ME.
Source	TMF 513, Version 3.0, Requirement II.273

R_TMF518_RPM_II_0025	The Interface shall allow the requesting OS to retrieve all the attributes of a given Threshold Crossing Alert (TCA) Parameter Profile as identified by its name.
Source	TMF 513, Version 3.0, Requirement II.234 (with rewording to fix a typo)

R_TMF518_RPM_II_0026	The Interface shall allow the requesting OS to enable and disable the notification of Threshold Crossing Alerts on a given list of TPs or list of Managed Element (ME)s.
Source	TMF 513, Version 3.0, Requirement II.122

R_TMF518_RPM_II_0027	The Interface shall allow the requesting OS to set the value of

	specific Threshold Crossing Alert (TCA) Parameters for a Termination Point (TP) as identified by a given TP name, layer rate, granularity and location.
Source	TMF 513, Version 3.0, Requirement II.125

3.3.2.3 Threshold Crossing Alert (TCA) Parameter Profile Management

R_TMF518_RPM_II_0028	The Interface shall allow an OS to request the creation of a Threshold Crossing Alert (TCA) Parameter Profile in the target OS. The following creation parameters such be supplied by the requesting OS: • User label • User label uniqueness – this parameter shall indicate to the EMS that the value of the user label attribute must be unique amongst the TCA Parameter Profiles within the EMS. • Owner • Layer rate – this parameter shall represent the layer to which the TCA parameter threshold values apply. • TCA Parameters– this represents the actual parameter settings for the TCA Parameter Profile.
Source	TMF 513, Version 3.0, Requirement II.236 and 237. However, Page : 23 the requirement was changed from TMF513, in that the ME name is no longer an input parameter. In other words, the new requirement does not constrain the TCAPP implementation to be local to an ME, as the old requirement did.

R_TMF518_RPM_II_0029	The Interface shall allow an OS to request the deletion of a Threshold Crossing Alert (TCA) Parameter Profile. The target OS shall refuse/fail this request if at least one object is pointing to this TCA Parameter Profile instance.
Source	TMF 513, Version 3.0, Requirement II.240

R_TMF518_RPM_II_0030	The Interface shall allow an OS to request the modification of a Threshold Crossing Alert (TCA) Parameter Profile. The following parameters shall be supplied by the requesting OS: • TCA Parameter Profile name – this parameter shall represent the name of the TCA Parameter Profile that is to be modified. • TCA Parameters– this represents the parameter

	modifications for the TCA Parameter Profile.
Source	TMF 513, Version 3.0, Requirement II.238 and 239

R_TMF518_RPM_II_0031	The Interface shall allow an OS to request the association of a Threshold Crossing Alert (TCA) Parameter Profile with a Termination Point (TP).
Source	TMF 513, Version 3.0, Requirement II.235

3.4 Category III: Abnormal or Exception Conditions, Dynamic Requirements

No requirements have been identified for this category.

3.5 Category IV: Expectations and Non-Functional Requirements

No requirements have been identified for this category.

3.6 Category V: System Administration Requirements

No requirements have been identified for this category.

4 Use Cases

4.1 Monitor Performance Management

4.1.1 PM Retrieval

4.1.1.1 Requesting OS retrieves the storage time of 24hr and 15min Performance Monitoring Data (PMD) records

Use Case Id	UC_TMF518_RPM_0001
Use Case Name	Requesting OS retrieves the storage time of 24hr and 15min Performance Monitoring Data (PMD) records
Summary	The requesting OS asks the target OS to return the storage (or holding) time in hours it keeps 24hr and 15min PMD records after the corresponding 24hr or 15min collecting registers have been closed. This is supposed to be the worst case time (i.e., the minimum storage time). There is no requirement on the target OS to support any predefined holding times. If the target OS does not store PM data, it (the returned value) is the minimum holding time supported in the subtending systems (possibly MEs) that actually store the data.
Actor(s)	Requesting OS
Pre-Conditions	The requesting OS and target OS have successfully executed the OS (Re)Starts use case (defined in TMF518_FMW). If the target OS has to contact the MEs to get the capacity, the target OS must also have an active communications link established with each ME.
Begins When	The requesting OS sends a request to the target OS concerning PMD storage times.
Description	1. The requesting OS sends a request to the target OS concerning PMD holding times. 2. The target OS validates the request. 3. If the target OS does not support the storage of PMD, the minimum time across all the subtending systems that actually store the data is calculated by the target OS (if necessary by consulting each subtending system in its domain). 4. The target OS returns one PMD storage time for all 24hr collection registers and one PMD storage time for all 15min collection registers.
Ends When	In case of success:

	The requesting OS receives a response with the required information. In case of failure: The requesting OS receives an exception.
Post-Conditions	In case of success: Nothing has changed in the target OS domain. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1) Not implemented: The target OS does not support this service. 2) Internal error: The requested operation could not be performed. 3) Communication loss.
Traceability	R_TMF518_RPM_II_0009 This is use case is a generalization of Use Case 5.11.4 from TMF 513 v3.0.

4.1.1.2 Requesting OS retrieves PM capabilities of a Managed Element (ME)

Use Case Id	UC_TMF518_RPM_0002
Use Case Name	Requesting OS retrieves PM capabilities of a Managed Element (ME)
Summary	The requesting OS asks the target OS to return the PM capabilities (list of supported PM Parameters and location) of a ME for a specified layer rate
Actor(s)	Requesting OS
Pre-Conditions	The requesting OS and target OS have successfully executed the OS (Re)Starts use case.
Begins When	The requesting OS sends a request to the target OS to be informed about PM capabilities of a given ME.
Description	1. The requesting OS sends a request to the target OS: Within the request the requesting OS specifies the ME and the layer rate for which PM capabilities are to be returned. 2. The target OS validates the provided parameters. 3. The target OS returns a list of PM parameters that are supported for the ME at the specified layer rate.
Ends When	In case of success: The requesting OS receives a response with the required information. In case of failure: The requesting OS receives an exception.

Post-Conditions	In case of success: Nothing has changed in the target OS domain. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1) Internal error: The requested operation could not be performed. 2) Invalid input: The provided name does not reference an ME or the layer rate is undefined. 3) Entity not found: The provided name references an object which does not exist 4) Communication loss: In cases where the target OS needs to obtain the requested information from another system and communication is lost
Traceability	R_TMF518_RPM_II_0004 This is use case is a generalization of Use Case 5.11.5 from TMF 513 v3.0.

4.1.1.3 Requesting OS retrieves Performance Monitoring Points (PMP) contained in an ME or a TP

Use Case Id	UC_TMF518_RPM_0003
Use Case Name	Requesting OS retrieves Performance Monitoring Points (PMP) contained in an ME or a TP
Summary	The requesting OS instructs the target OS to return all Performance Monitoring Points (PMPs) contained in an ME or a TP. Note that the result provides not only the monitoring and supervision states but also the PM thresholds on a per TP basis.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) Communication between the target OS and the relevant ME must be possible (this could be via several intermediate systems).
Begins When	The requesting OS sends a request to the target OS to get all PMPs contained in an ME or a TP.
Description	1. The requesting OS sends a request to the target OS. Within the request, the requesting OS specifies the ME or the TP for which the contained PMPs are to be returned. 2. The target OS validates the provided parameters. 3. The target OS returns a list of PMPs that are contained in the specified ME or TP.
Ends When	In case of success:

	The requesting OS receives a response with the requested PMPs. In case of failure: The requesting OS receives an exception.
Post-Conditions	In case of success: Nothing has changed in the target OS domain. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1) Not implemented: The target OS does not support this service. 2) Internal error: The requested operation could not be performed. 3) Invalid input: The provided name does not reference a ME or TP. 4) Entity not found: The provided name references an object which does not exist. 5) Communication loss
Traceability	R_TMF518_RPM_II_0018 This is use case is a generalization of Use Case 5.11.12 from TMF 513 v3.0.

4.1.1.4 Requesting OS retrieves current PM data for a list of TP measurement points

Use Case Id	UC_TMF518_RPM_0004
Use Case Name	Requesting OS retrieves current PM data for a list of TP measurement points
Summary	The requesting OS instructs the target OS to return current PM data concerning a given set of PM measurement points. It is possible to filter the amount of requested PMD based on a list of PM parameters. For each measurement point, location category and granularity (15min register and/or, 24hr register and/or NA) have to be specified. The requested information is to be provided in one of the formats noted in R_TMF518_RPM_II_0011.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) The requesting OS must have knowledge of the MEs and TPs specified. 3) PM data collection must have been enabled for the TPs specified. 4) The target OS must have active communications established with system(s) that have the requested PM data.
Begins When	The requesting OS sends a request to the target OS to get current PM

	data for a specified set of PM measurement points.
Description	1. The requesting OS sends a request to retrieve a specified set of PM data from the target OS. The requesting OS specifies the measurement points and a list of PM parameters (e.g. BBE, ES) for which the current PMD are requested. It is possible to identify all TPs of an ME or a set of individual TPs (PTPs and/or CTPs). For each measurement point, the requesting OS has to define: • the layer rate • the granularity (15min-register and/or 24hr-register and/or NA) and • the location (nearEnd (unidirectional) and/or farEnd (unidirectional) and/or bidirectional) An empty list for PM parameter, layer rate, granularity or location means that all values are to be covered. 2. The target OS validates the provided parameters. 3. If the determination of a PM parameter is zero for a specified TP, the target OS will still return these records. 4. If current performance information is not available for a PM parameter related to a TP specified in the request, the target OS returns UNAVAILABLE for that record. 5. The operation mode will be best-effort. Only the supported PM parameters have to be sent by the target OS. 6. The target OS returns the specified PM data to the requesting OS, using the format selected by the requesting OS.
Ends When	In case of success: The NMS receives a response with the requested current PMD. In case of failure: The NMS receives an exception.
Post-Conditions	In case of success: Nothing has changed in the target OS domain. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1. Not implemented: The target OS does not support this service. 2. Internal error: The requested operation could not be performed. 3. Invalid input: No TP/ME is specified in the input data or it contains at least one invalid data item. 4. Entity not found: One or more of the referenced TPs does not exist. 5. Communication loss
Traceability	R_TMF518_RPM_II_0010 and R_TMF518_RPM_II_0011

	This use case extends and generalizes Use Case 5.11.3 from TMF 513 v3.0.

4.1.1.5 Requesting OS retrieves historical PM data for a list of TP measurement points

Use Case Id	UC_TMF518_RPM_0005
Use Case Name	Requesting OS retrieves historical PM data for a list of TP measurement points
Summary	The requesting OS instructs the target OS to return historical PM data concerning a given set of PM measurement points. It is possible to filter the amount of requested PMD based on a list of PM parameters. For each measurement point, location category and granularity (15min register and/or, 24hr register and/or NA) have to be specified. The requested information is to be provided in one of the formats noted in R_TMF518_RPM_II_0011.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) The requesting OS must have knowledge of the MEs and TPs specified. 3) PM data collection must have been enabled for the TPs specified. 4) The target must have active communications established with system(s) that have the requested PM data.
Begins When	The requesting OS sends a request to the target OS to get historical PM data for a specified set of PM measurement points.
Description	1. The requesting OS sends a request to retrieve a specified set of PM data from the target OS. The requesting OS specifies the measurement points and a list of PM parameters (e.g. BBE, ES) for which the historical PMD are requested. It is possible to identify all TPs of an ME or a set of individual TPs (PTPs and/or CTPs). For each measurement point, the requesting OS has to define: • the layer rate • the granularity (15min-register and/or 24hr-register and/or NA) and • the location (nearEnd (unidirectional) and/or farEnd (unidirectional) and/or bidirectional) An empty list for PM parameter, layer rate, granularity or location means that values are to be covered. 2. The target OS validates the provided parameters. 3. If the determination of a PM parameter is zero for a specified TP, the target OS will still return these records.

	4. If historical performance information is not available for a PM parameter related to a TP and time interval specified in the request, the target OS returns UNAVAILABLE for that record. 5. The operation mode will be best-effort. Only the supported PM parameters have to be sent by the target OS. 6. The target OS returns the specified PM data to the requesting OS, using the format selected by the requesting OS.
Ends When	In case of success: The requesting OS receives a response (or several responses) with the requested historical PMD. In case of failure: The requesting OS receives an exception.
Post-Conditions	In case of success: Nothing has changed in the target OS domain. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1) Not implemented: The target OS does not support this service. 2) Internal error: The requested operation could not be performed. 3) Invalid input: No TP/ME is specified in the input data or it contains at least one invalid data item. 4) Communication loss. 5) Unable to comply: The target supports retrieval of PM data only for a few buckets in the past and request exceeds that time period. 6) Entity not found: One of the TPs does not exist.
Traceability	R_TMF518_RPM_II_0010 and R_TMF518_RPM_II_0011 This use case combines and generalizes Use Cases 5.11.6 and 5.11.11 from TMF 513 v3.0.

4.2 Control Performance Management

4.2.1 PM Control

4.2.1.1 Requesting OS activates collection of Performance Monitoring Data (PMD) for a specified set of TPs

Use Case Id	UC_TMF518_RPM_0006

Use Case Name	Requesting OS activates collection of Performance Monitoring Data (PMD) for a specified set of TPs
Summary	The requesting OS instructs the target OS to activate measurement of PMD for a list of TP and layer rate measurement points. For each measurement point, location category and granularity (15min register and/or, 24hr register and/or NA) can be specified. Note that “activated” and “enabled” or used interchangeably in this use case.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) The requesting OS must have knowledge of the ME or the TPs specified. 3) The target OS must have access (direct or via other systems) to the MEs containing the TPs for which PMD collection is to be activated.
Begins When	The requesting OS sends a request to the target OS to activate measurement of PMD.
Description	1. The requesting OS sends a PMD activation request to the target OS: The requesting OS specifies the measurement points to which the request shall be applied. It is possible to identify all TPs of an ME or a set of individual TPs. For each measurement point the requesting OS has to define: • the layer rate • the granularity (15min-register and/or 24hr-register and/or NA) and • the location (near-end receive, far-end receive, near-end transmit, far-end transmit, bidirectional, contra-near-end receive and/or contra-far-end receive). See SD1-19 for more details concerning the possible monitoring locations. An empty list for layer rate, granularity or location means that the ME has to use every supported item. 2. The target OS validates the provided parameters. 3. If necessary the target OS sends the appropriate command(s) to the ME (either directly or via other systems) to activate collection of PMD for the specified measurement points. • PM data collection starts immediately, i.e., before the completion of the current 15-minute or 24-hour monitoring period. This may lead to incomplete collection periods. • If PMD collection is already active for one or more of the specified measurement points, the operation shall be considered a success. • The target OS may clear the affected PM registers as part

	of the PM collection activation request (this is not required behavior, however). Alternately, the requesting OS may first request that the PM registers be cleared and then send the PMD collection activation request. • If nearEnd/farEnd/bidirectional PMD collection cannot be separately activated for an ME, the target OS should hide this from the requesting OS. The expected behavior is best effort, i.e., the target OS should turn "on" PMD collection for as many locations as possible. It is also possible that the target OS turn "on" more locations than requested. For example, the requesting OS may ask for nearEnd only, but the target OS is only able to turn "on" monitoring for all locations. 4. The target OS informs the requesting OS concerning the results of the operation. The operation is best-effort. If Performance Monitoring could not be enabled for a subset of the TPs specified, a list identifying the non-enabled subset is returned. 5. For every item activated, the target OS sends a state change notification on the monitoring state of the affected Performance Monitoring Point to the notification service
Ends When	In case of success: • The requesting OS receives a confirmation. In case of failure: • The requesting OS receives an exception or gets an indication of the subset of measurement points that could not be enabled.
Post-Conditions	In case of success: • The specified measurement points are enabled for the collection of PMD. In case of failure: • When an exception is received, nothing has changed in the target OS domain; otherwise, the specified measurement points are enabled for collection of PMD **except** the ones identified as not enabled.
Exceptions	1. Not implemented: The target OS does not support this service. 2. Invalid input: No TP/ME is specified in the input data or it contains at least one invalid data item 3. Internal error: The requested operation could not be performed. 4. Entity not found: The referenced TP does not exist. 5. Communication loss 6. Capacity exceeded: The maximum number of simultaneous enabled measurement points is exceeded
Traceability	R_TMF518_RPM_II_0020 This is use case is a generalization of Use Case 5.11.1 from TMF 513

	v3.0.

4.2.1.2 Requesting OS deactivates collection of Performance Monitoring Data (PMD) for a specified set of TPs

Use Case Id	UC_TMF518_RPM_0007
Use Case Name	Requesting OS deactivates collection of Performance Monitoring Data (PMD) for a specified set of TPs
Summary	The requesting OS instructs the target to deactivate the measurement of PMD for a list of TP and layer rate measurement points. For each measurement point, location category and granularity (15min-register and/or 24hr-register and/or NA) has to be specified. Note that “deactivated” and “disabled” or used interchangeably in this use case.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) The requesting OS must have knowledge of the ME or the TPs specified. 3) The target OS must have access (direct or via other systems) to the MEs containing the TPs for which PMD collection is to be activated.
Begins When	The requesting OS sends a request to the target OS to stop measurement of PMD.
Description	1. The requesting OS sends a PMD collection deactivation request to the target OS. The requesting OS specifies the measurement points to which the request shall be applied. It is possible to identify all TPs of a ME or a set of individual TPs. For each measurement point the requesting OS has to define: • the layer rate • the granularity (15min-register and/or 24hr-register and/or NA) and • the location (near-end receive, far-end receive, near-end transmit, far-end transmit, bidirectional, contra-near-end receive and/or contra-far-end receive) An empty list for layer rate, granularity or location means that the ME has to stop the collection of every supported item. Stop of data collection does not imply deleting data for the particular measurement point. 2. The target OS validates the provided parameters. 3. The target OS sends the appropriate command(s) to the ME

	(either directly or via other systems) to stop collecting of PMD for the specified set of TPs. • Following successful processing of the appropriate command(s), data collection stops immediately. This leads to incomplete collection period(s).These incomplete periods have to be marked by an appropriate status when reported. • If PMD collection is not active for one or more of the specified TPs, the operation shall be considered a success. • If nearEnd/farEnd/bidirectional PMD collection cannot be separately de-activated for an ME, the target OS should hide this from the requesting OS. The expected behavior is best effort, i.e., the target OS should turn “on” PMD collection for as many locations as possible. It is also possible that the target OS turn “on” more locations than requested. For example, the requesting OS may ask for nearEnd only, but the target OS is only able to turn “on” monitoring for all locations. 4. The target OS informs the requesting OS concerning the results of the operation. The operation is best-effort. If Performance Monitoring could not be disabled for a subset of the TPs specified, a list identifying the non-disabled subset is returned. 5. For every item deactivated, the target OS sends a state change notification on the monitoring state of the affected Performance Monitoring Point to the notification service.
Ends When	In case of success: • The requesting OS receives a confirmation In case of failure: • The requesting OS receives an exception or gets an indication of the subset of TPs that could not be disabled.
Post-Conditions	In case of success • The specified measurement points are disabled for the collection of PMD. In case of failure: • When an exception is received, nothing has changed in the target OS domain; otherwise, the specified measurement points are disabled for collection of PMD **except** the ones identified as not disabled.
Exceptions	1. Not implemented: The target OS does not support this service. 2. Internal error: The requested operation could not be performed. 3. Invalid input: No TP/ME is specified in the input data or it contains at least one invalid data item. 4. Entity not found: Referenced TP(s) which do not exist.

	5. Communication loss.
Traceability	R_TMF518_RPM_II_0020 This is use case is a generalization of Use Case 5.11.2 from TMF 513 v3.0.

4.2.2 TCA Control

4.2.2.1 Requesting OS retrieves PM threshold settings for a TP

Use Case Id	UC_TMF518_RPM_0008
Use Case Name	Requesting OS retrieves PM threshold settings for a TP
Summary	The purpose of this use case is to retrieve the current values of 15min, 24hr and/or instantaneous measurement PM Thresholds for one or more measurement points associated with a given TP.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) The requesting OS must have knowledge of the TP specified. 3) If the target OS has to contact the ME or some other system to get this information, then a communication between the target OS and the relevant system has to be active.
Begins When	The requesting OS sends the request to the target OS.
Description	1) The requesting OS sends the PM threshold retrieval request to the target OS. • The requesting OS specifies the specific TP measurement point (as identified by TP name, granularity and layerRate) to which the request shall be applied. Also specified are the specific PM parameters of interest (i.e., the parameter for which the thresholds are requested). • The request is best-effort. Results are returned in the out parameter of this operation. • The request can be applied to a PTP, an FTP or a CTP. 2) The target OS checks if the operation is supported, validates the input parameters and verifies the existence of the given TP. 3) The requested PM Threshold values are returned by the target OS.
Ends When	In case of success: The requesting OS receives a response with the current threshold settings for the TP. In case of failure:

	The requesting OS receives an exception.
Post-Conditions	In case of success: Nothing has changed in the target OS domain. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1) Internal error: The requested operation could not be performed. 2) Invalid input: The name of the TP does not reference a Termination Point, the layer rate is undefined or the granularity is undefined. 3) Entity not found: The referenced TP does not exist. 4) Communication loss
Traceability	R_TMF518_RPM_II_0004 and R_TMF518_RPM_II_0022 This is use case is a generalization of Use Case 5.11.8 from TMF 513 v3.0.

4.2.2.2 Requesting OS sets PM thresholds on a TP

Use Case Id	UC_TMF518_RPM_0009
Use Case Name	Requesting OS sets PM thresholds on a TP
Summary	The purpose of this use case is to modify the values of 15min, 24hr and/or instantaneous measurement PM Thresholds for one or more measurement points associated with a given TP.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) The requesting OS must have knowledge of the TP specified. 3) Communication between the target OS and the relevant ME needs to be possible (this could be through one or more intermediate systems). Note: A TCA parameter profile may active previous to this use case on the specified TP. It is still possible, however, to modify a parameter in the Target that is also contained in the TMD. In this case, the Profile and the Target are no longer in line.
Begins When	The requesting OS sends the request to the target OS.
Description	1. The requesting OS specifies the specific TP measurement point (as identified by TP name, granularity and layerRate) to which the request shall be applied. Also specified are the specific PM parameters of interest (i.e., the parameter for which the thresholds are to be set). The requesting OS then sends the request to the target OS

	• Note that the request can be applied to a PTP, an FTP or a CTP. 2. The target OS validates the input parameters and checks the existence of the TP. 3. The target OS set the thresholds of the TP in the ME as requested. • This part is best effort. • Thresholds within the TP that are not defined in the request remain as they are (i.e. thresholds currently applied at the specified TP and layer rate measurement points are not modified if the requesting OS does not explicitly specify them in the request). 4. The target OS returns a complete list of the current PM Thresholds for the specified TP. 5. For every set of PM thresholds set on a TP the target OS generates AVC notifications for the affected PMPs.
Ends When	In case of success: The requesting OS receives a complete list of the current PM Thresholds for the specified TP response. In case of failure: The requesting OS receives an exception.
Post-Conditions	In case of success: The requested PM Thresholds are modified on the TP. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1) Not implemented: The target OS does not support this service. 2) Internal error: The requested operation could not be performed. 3) Invalid input: The name of the TP does not reference a Termination Point, or at least one of the provided parameters is not valid. 4) Entity not found: The TP name references a TP which does not exist. 5) Communication loss
Traceability	R_TMF518_RPM_II_0004 and R_TMF518_RPM_II_0027 This is use case is a generalization of Use Case 5.11.7 from TMF 513 v3.0.

4.2.2.3 Requesting OS enables Threshold Crossing Alerts (TCA) for a specified set of TPs

Use Case Id	UC_TMF518_RPM_0010

Use Case Name	Requesting OS enables Threshold Crossing Alerts (TCA) for a specified set of TPs
Summary	The requesting OS instructs the target OS to enable the spontaneous (immediately after getting the event from the ME) generation of TCA notifications for a list of TP measurement points whenever a PM threshold value is reached or crossed.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) The requesting OS must have knowledge of the MEs and the specified TPs. 3) If the target OS needs to enable the alert generation in the ME, the target OS must also have an active communications link to the ME to which the TP belongs (possibly through one or more intermediate systems).
Begins When	The requesting OS sends a request to the target OS to enable the generation of TCAs for a specified set of TP measurement points.
Description	1. The requesting OS sends a TCA notification enabling request command to the target OS. The requesting OS specifies the measurement points to which the request shall be applied. It is possible to identify all TPs of a ME or a set of individual TPs. For each measurement point the requesting OS has to define: • the layer rate • the granularity (15min-register, 24hr-register and/or NA) • the location (near-end receive, far-end receive, near-end transmit, far-end transmit, bidirectional, contra-near-end receive and/or contra-far-end receive) An empty list for layer rate, granularity or location means that the ME has to use every supported item. 2. The target OS validates the provided parameters. 3. If necessary the target OS sends the appropriate command(s) to the ME to enable the reporting of TCAs from the MEs to the target OS. The request may need to flow through several intermediate systems before reaching the ME. 4. Following successful processing of the appropriate command(s), the generation of TCA notifications is enabled for the specified TP measurement points. • If generation of TCAs is already enabled for one or more of the specified TP measurement points, the operation shall be considered a success. • The operation is best-effort. • If alert generation could not be enabled for a subset of the specified TP measurement points, a list identifying the non-enabled subset is returned.

	5. The target OS will report back to the requesting OS concerning the request and will provide a list of the TP measurement points for which TCA notification generation could not be enabled. 6. For every item enabled the target OS generates a state change notification concerning the supervision state of the affected Performance Monitoring Point.
Ends When	In case of success: The requesting OS receives a confirmation. In case of failure: The requesting OS receives an exception or gets an indication of the subset of TP measurement points that could not be enabled for TCA generation.
Post-Conditions	In case of success: The requested TP measurement points have been enabled for the generation of TCA notifications. In case of failure: If the requesting OS receives an exception, nothing has changed in the target OS domain; otherwise, the requested TP measurement points have been enabled for the generation of TCA notifications **except** the ones identified as not enabled.
Exceptions	1) Not implemented: The target OS does not support this service. 2) Internal error: The requested operation could not be performed. 3) Invalid input: Some input data contains invalid data. 4) Unable to comply: The target OS is not able to enable TCA notifications for the specified TP measurement points. 5) Communication loss
Traceability	R_TMF518_RPM_II_0016 and R_TMF518_RPM_II_0026 This is use case is a generalization of Use Case 5.11.9 from TMF 513 v3.0.

4.2.2.4 Requesting OS disables Threshold Crossing Alerts (TCA) for a specified set of TPs

Use Case Id	UC_TMF518_RPM_0011
Use Case Name	Requesting OS disables Threshold Crossing Alerts (TCA) for a specified set of TPs
Summary	The requesting OS instructs the target OS to disable the generation of a TCA for a list of TP measurement points.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the

	OS (Re)Starts use case. 2) The requesting OS must have knowledge of the MEs and the specified TPs.
Begins When	The requesting OS sends a request to the target OS to disable the generation of TCAs for a specified set of TP measurement points.
Description	1. The requesting OS sends a TCA notification disabling request command to the target OS. The requesting OS specifies the measurement points to which the request shall be applied. It is possible to identify all TPs of a ME or a set of individual TPs. For each measurement point the requesting OS has to define: • the layer rate • the granularity (15min-register and/or 24hr-register and/or NA) • the location (near-end receive, far-end receive, near-end transmit, far-end transmit, bidirectional, contra-near-end receive and/or contra-far-end receive) An empty list for layer rate, granularity or location means that the ME has to use every supported item. 2. The target OS validates the provided parameters. 3. If necessary the target OS sends the appropriate command(s) to the ME to disable the reporting of TCAs from the MEs to the target OS. The request may need to flow through several intermediate systems before reaching the ME. 4. Following successful processing of the command, the generation of TCA notifications is disabled for the specified TP measurement points. • If generation of TCAs is already disabled for one or more of the specified TP measurement points, the operation shall be considered a success. • The operation is best-effort. • If alert generation could not be disabled for a subset of the specified TP measurement points, a list identifying the non-disabled subset is returned. • If alert generation can only be disabled for a super-set (typically, for all TCAs of the TP/layer rate whereas the requesting OS has only asked for a subset of them), this should be done by the target OS and the operation shall be considered a success. 5. The target OS will report back to the requesting OS concerning the request and will provide a list of the TP measurement points for which TCA notification generation could not be disabled. 6. For every item disabled the target OS sends a state change notification on the supervision state of the affected Performance Monitoring Point to the notification service.
Ends When	In case of success:

	The requesting OS receives a confirmation. In case of failure: The requesting OS receives an exception or gets an indication of the subset of TP measurement points that could not be disabled.
Post-Conditions	In case of success: The requested TP measurement points have been disabled for the generation of TCA notifications. In case of failure: When the requesting OS receives an exception, nothing has changed in the target OS domain; otherwise, the requested TP measurement points have been disabled for the generation of TCA notifications **except** the ones identified as not disabled.
Exceptions	1. Not implemented: The target OS does not support this service. 2. Internal error: The requested operation could not be performed. 3. Invalid input: Some input data contains invalid data. 4. Unable to comply: The target OS is unable to disable TCA notification generation for the specified TP measurement points, i.e. no TP measurement points were disabled. 5. Communication loss
Traceability	R_TMF518_RPM_II_0026 This is use case is a generalization of Use Case 5.11.10 from TMF 513 v3.0.

4.2.2.5 Requesting OS updates a TCA Parameter Profile Pointer

Use Case Id	UC_TMF518_RPM_0012
Use Case Name	Requesting OS updates a TCA Parameter Profile Pointer
Summary	The purpose of this use case is to add/remove TCA Parameter Profiles to/from a TP. The new threshold values contained in the added profiles will be copied to the corresponding PMPs of the TP. The addition of an already associated profile to a TP overwrites the corresponding thresholds in the PMPs of the TP. The threshold values that have been configured via a profile to be removed will be kept in the PMPs. No further automatic updating based on changes in the profile will be done.
Actor(s)	Requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case.

	2) The specified TP must exist. 3) TCA Parameter Profile specified must exist. 4) Communication between the target OS and the relevant ME must be possible (this could be via several intermediate systems).
Begins When	The requesting OS sends the TCAPP configuration request to the target OS.
Description	1. The requesting OS sends the request to the target OS. The requesting OS specifies the TP to which the request shall be applied. It can be applied to a PTP, a FTP or a CTP. The requesting OS has to define: • the TCA Parameter Profile to be removed (could be empty) • the TCA Parameter Profile to be added (could be empty) 2. The target OS checks if the operation is supported. 3. The target OS validates the input parameters. 4. The target OS checks the existence of the TP. 5. If a TCA Parameter Profile is to be removed, **only** the attribute TCA Parameter Profile Pointer of the TP is updated (i.e., the existing PM thresholds are left with their current values) and an AVC notification is send. 6. If a TCA Parameter Profile is to be added, the target OS checks the existence of the TCA Parameter Profile to be added. • If the TCA Parameter Profile to be added is already assigned to the TP, the target OS shall overwrite the threshold values in the TP if necessary to make the values in the PMPs consistent with the values in the profile. (Note: Individual values may have been changed in the PMPs before via UC_TMF518_RPM_0009, Requesting OS sets PM thresholds on a TP). • When the update is not successful, the target OS shall send an exception to the requesting OS explaining the reason. • If the TCA Parameter Profile is not already assigned to the TP but defines thresholds of the same layer as an already assigned TCA Parameter Profile the target OS shall send an exception to the requesting OS explaining the reason. • If the TCA Parameter Profile is not already assigned to the TP and defines thresholds of a different layer than the already assigned TCA Parameter Profiles, then the target OS shall set the threshold values as defined in the TCA Parameter Profile. If the thresholds can not be set, the target OS shall send an exception to the requesting OS explaining the reason. **Note:**

	The TCA Parameter Profile Pointer attribute of the TP shall only be updated once within this use case and only one AVC notification shall be sent.
Ends When	In case of success: The threshold values of the TP are consistent with the added/removed TCA Parameter Profiles. In case of failure: The requesting OS receives an exception.
Post-Conditions	In case of success: The threshold values of the TP are consistent with the added/removed TCA Parameter Profiles. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1) Not implemented: The target OS does not support this service. 2) Internal error: The requested operation could not be performed. 3) Invalid input: Any input parameter are syntactical incorrect. 4) Entity not found: TP or TCA Parameter Profile to be assigned does not exist. 5) Object in use: TCA Parameter Profile of the same layer is already assigned to the TP. 6) Unable to comply: The threshold values in the TP could not be configured. 7) Communication loss
Traceability	R_TMF518_RPM_II_0031 This is use case is a generalization of Use Case 5.11.13 from TMF 513 v3.0.

4.2.2.6 Requesting OS configures TCA Parameter Profile

Use Case Id	UC_TMF518_RPM_0013
Use Case Name	Requesting OS configures TCA Parameter Profile
Summary	The purpose of this use case is to modify all the TCA thresholds contained in an already created TCA Parameter Profile. This operation overwrites all the existing threshold values of the profile with the new provided threshold values; i.e. it changes the profile completely.
Actor(s)	requesting OS
Pre-Conditions	1) The requesting OS and target OS have successfully executed the OS (Re)Starts use case. 2) The specified TCA Parameter Profile must exist.

	3) Communication between the target OS and the relevant ME must be possible (this could be via several intermediate systems).
Begins When	The requesting OS sends a TCAPP configuration request to the target OS.
Description	1. The requesting OS send the TCAPP configuration request to the target OS. The requesting OS specifies the TCA Parameter Profile to which the request shall be applied to. 2. The requesting OS has to define the list of TCA parameters which contains the following information for each threshold value: • layer rate - already defined via the instance of the TCA Parameter Profile • parameter name - e.g. BBE, ES • granularity - i.e., 15 minute, 24 hours, N/A • location of the measurement • type of threshold - e.g., high, low • trigger flag - indicates if the threshold is for the trigger or the clear· • value of the threshold • unit of the threshold 3. The target OS checks if the operation is supported. 4. The target OS validates the input parameters. 5. The target OS checks the existence of the TCA Parameter Profile. 6. The target OS overwrites all parameters of the TCA Parameter Profile with the provided ones. **Note:** This includes also deletion of thresholds if the threshold is no longer contained in the provided list of TCA Parameters. 7. The target OS changes all threshold values of all the TPs associated to this profile according to the new values. **Note:** Thresholds which have been deleted in the Profile will not be changed in the PMPs of the associated TPs. 8. The target OS has to return all TPs that could not be changed to the new threshold values due to some error reasons.
Ends When	In case of success: The TCA Parameter Profile contains the new threshold values and every TP (except the TPs returned as failed TPs) assigned to this profile has been set to the new threshold values. In case of failure:

	The requesting OS receives an exception.
Post-Conditions	In case of success: The TCA Parameter Profile contains the provided threshold values. Every TP (except the TPs returned as failed TPs) assigned to this profile has been set to the new threshold values and if supervision is switched on, starts to use the new values for supervision. In case of failure: Nothing has changed in the target OS domain.
Exceptions	1) Not implemented: The target OS does not support this service. 2) Internal error: The requested operation could not be performed. 3) Invalid input: One or more input parameters are syntactically incorrect. 4) Entity not found: The TCA Parameter Profile to be changed does not exist. 5) Communication loss
Traceability	R_TMF518_RPM_II_0030 This is use case is a generalization of Use Case 5.11.14 from TMF 513 v3.0.

5 Traceability Matrices

Table 5-1. Use Cases – Requirements Traceability Matrix

Requirement Id	Use Case Name	Use Case Id
R_TMF518_RPM_BR_0001		
R_TMF518_RPM_BR_0002		
R_TMF518_RPM_BR_0003		
R_TMF518_RPM_II_0004	Requesting OS sets PM thresholds on a TP Requesting OS retrieves PM threshold settings for a TP Requesting OS retrieves PM capabilities of a Managed Element (ME)	UC_TMF518_RPM_0009 UC_TMF518_RPM_0008 UC_TMF518_RPM_0002
R_TMF518_RPM_II_0005		
R_TMF518_RPM_II_0006		
R_TMF518_RPM_II_0007		
R_TMF518_RPM_II_0008		
R_TMF518_RPM_II_0009	Requesting OS retrieves the storage time of 24hr and 15min Performance Monitoring Data (PMD) records	UC_TMF518_RPM_0001
R_TMF518_RPM_II_0010	Requesting OS retrieves historical PM data for a list of TP measurement points Requesting OS retrieves current PM data for a list of TP measurement points	UC_TMF518_RPM_0005 UC_TMF518_RPM_0004
R_TMF518_RPM_II_0011	Requesting OS retrieves historical PM data for a list of TP measurement points Requesting OS retrieves current PM data for a list of TP measurement points	UC_TMF518_RPM_0005 UC_TMF518_RPM_0004
R_TMF518_RPM_II_0012		
R_TMF518_RPM_II_0014		
R_TMF518_RPM_II_0015		

R_TMF518_RPM_II_0016	Requesting OS enables Threshold Crossing Alerts (TCA) for a specified set of TPs	UC_TMF518_RPM_0010
R_TMF518_RPM_II_0018	Requesting OS retrieves Performance Monitoring Points (PMP) contained in an ME or a TP	UC_TMF518_RPM_0003
R_TMF518_RPM_II_0019		
R_TMF518_RPM_II_0020	Requesting OS deactivates collection of Performance Monitoring Data (PMD) for a specified set of TPs Requesting OS activates collection of Performance Monitoring Data (PMD) for a specified set of TPs	UC_TMF518_RPM_0007 UC_TMF518_RPM_0006
R_TMF518_RPM_II_0021		
R_TMF518_RPM_II_0022	Requesting OS retrieves PM threshold settings for a TP	UC_TMF518_RPM_0008
R_TMF518_RPM_II_0024		
R_TMF518_RPM_II_0025		
R_TMF518_RPM_II_0026	Requesting OS disables Threshold Crossing Alerts (TCA) for a specified set of TPs Requesting OS enables Threshold Crossing Alerts (TCA) for a specified set of TPs	UC_TMF518_RPM_0011 UC_TMF518_RPM_0010
R_TMF518_RPM_II_0027	Requesting OS sets PM thresholds on a TP	UC_TMF518_RPM_0009
R_TMF518_RPM_II_0028		
R_TMF518_RPM_II_0029		
R_TMF518_RPM_II_0030	Requesting OS configures TCA Parameter Profile	UC_TMF518_RPM_0013
R_TMF518_RPM_II_0031	Requesting OS updates a TCA Parameter Profile Pointer	UC_TMF518_RPM_0012

Table 5-2. Requirements – Use Cases Traceability Matrix

Use Case Id	Use Case Name	Requirements
UC_TMF518_RPM_0001	Requesting OS retrieves the storage time of 24hr and 15min Performance Monitoring Data (PMD) records	R_TMF518_RPM_II_0009 This is use case is a generalization of Use Case 5.11.4 from TMF 513 v3.0.
UC_TMF518_RPM_0002	Requesting OS retrieves PM capabilities of a Managed Element (ME)	R_TMF518_RPM_II_0004 This is use case is a generalization of Use Case 5.11.5 from TMF 513 v3.0.
UC_TMF518_RPM_0003	Requesting OS retrieves Performance Monitoring Points (PMP) contained in an ME or a TP	R_TMF518_RPM_II_0018 This is use case is a generalization of Use Case 5.11.12 from TMF 513 v3.0.
UC_TMF518_RPM_0004	Requesting OS retrieves current PM data for a list of TP measurement points	R_TMF518_RPM_II_0010 and R_TMF518_RPM_II_0011 This use case extends and generalizes Use Case 5.11.3 from TMF 513 v3.0.
UC_TMF518_RPM_0005	Requesting OS retrieves historical PM data for a list of TP measurement points	R_TMF518_RPM_II_0010 and R_TMF518_RPM_II_0011 This use case combines and generalizes Use Cases 5.11.6 and 5.11.11 from TMF 513 v3.0.
UC_TMF518_RPM_0006	Requesting OS activates collection of Performance Monitoring Data (PMD) for a specified set of TPs	R_TMF518_RPM_II_0020 This is use case is a generalization of Use Case 5.11.1 from TMF 513 v3.0.
UC_TMF518_RPM_0007	Requesting OS deactivates collection of Performance Monitoring Data (PMD) for a specified set of TPs	R_TMF518_RPM_II_0020 This is use case is a generalization of Use Case 5.11.2 from TMF 513 v3.0.
UC_TMF518_RPM_0008	Requesting OS retrieves PM threshold settings for a TP	R_TMF518_RPM_II_0004 and R_TMF518_RPM_II_0022 This is use case is a generalization of Use Case 5.11.8 from TMF 513 v3.0.
UC_TMF518_RPM_0009	Requesting OS sets PM thresholds on a TP	R_TMF518_RPM_II_0004 and R_TMF518_RPM_II_0027 This is use case is a generalization of Use Case 5.11.7 from TMF 513 v3.0.

UC_TMF518_RPM_0010	Requesting OS enables Threshold Crossing Alerts (TCA) for a specified set of TPs	R_TMF518_RPM_II_0016 and R_TMF518_RPM_II_0026 This is use case is a generalization of Use Case 5.11.9 from TMF 513 v3.0.
UC_TMF518_RPM_0011	Requesting OS disables Threshold Crossing Alerts (TCA) for a specified set of TPs	R_TMF518_RPM_II_0026 This is use case is a generalization of Use Case 5.11.10 from TMF 513 v3.0.
UC_TMF518_RPM_0012	Requesting OS updates a TCA Parameter Profile Pointer	R_TMF518_RPM_II_0031 This is use case is a generalization of Use Case 5.11.13 from TMF 513 v3.0.
UC_TMF518_RPM_0013	Requesting OS configures TCA Parameter Profile	R_TMF518_RPM_II_0030 This is use case is a generalization of Use Case 5.11.14 from TMF 513 v3.0.

6 Future Directions

6.1 Open Issues

6.1.1 XML Version of PM File Format

Do we want to also provide an XML version of the PM File Format? This is more of an IIS issue, but we not it here since it come up during the BA discussions.

6.2 Possible Future Work Items

6.2.1 PM on Entities other than TPs

Comment from Gerard Vila: MTNM / MTOSI has always restricted PM points to TPs. But now that we are going to have a sophisticated equipment model, it might be a good idea to revisit this. My point is that, e.g., for WDM equipment, there can be several analog measurements of the same kind associated with a single TP. For instance, you may have a PTP that is a WDM line port, supported by several optical amplifiers. In such cases it makes more sense to identify the PM point by the equipment than by the TP. You can even have measurements on equipment that is not associated with any TP at all – e.g., power supply measurements, temperature measurements…

My idea would be to change “on a per TP basis” to “on a per TP or per equipment basis” (or we could add another requirement). I realize that it is not feasible to do this in the current delivery, but it might be worked into a future release.

7 References

7.1 References

[1] TMF518_NRA, Network Resource Assurance BA

[2] TMF513, Multi-Technology Network Management (MTNM) Business Agreement, Version 3.1, March 2007

[3] TMF517, Multi-Technology Operations System Interface (MTOSI) Business Agreement, Version 1.2, December 2006

[4] TMF612_RPM, Resource Performance Management IA

[5] TMF864_RPM, Resource Performance Management IIS

[6] SD0-1, Dictionary

[7] SD1-19, Location Identification

[8] SD1-28, Performance Parameters

[9] SD1-30, PM File Format Definition

[10] SD1-37, PM Threshold Types

7.2 Source or use

The various sources for the requirements in this document are listed in the “Source” field of each requirement.

The following documents make use of this document:

- TMF612_RPM, *Resource Performance Management IA*.
- TMF864_RPM, *Resource Performance Management IIS*.

7.3 IPR Releases and Patent Disclosure

There are no known IPR claims on the material in this document. As per the TM Forum bylaws, any TM Forum member company that has IPR claims on this or any TM Forum specification needs to make the claims known to the TM Forum membership immediately.

8 Administrative Appendix

This Appendix provides additional background material about the TM Forum and this document.

8.1 About this document

This document has been generated from the SD0-3_Template_BA.dot Word template.

8.2 Use and Extension of a TM Forum Business Agreement

This document defines the business problem and requirement model for the resource performance management. The Business Agreement is used to gain consensus on the business requirements for exchanging information among processes and systems in order to solve a specific business problem. The Business Agreement should feed the development of Information Agreement(s), which is a technology-neutral model of one or more interfaces. While the Business Agreement contains sufficient information to be a "stand alone" document, it is better read together with the Information Agreement document TMF518_RPM when the Information Agreement is available. Reviewing the two documents together helps in gaining a full understanding of how the technology neutral information model solution is defined for this requirement model. An initial Business Agreement may only deal with a subset of the requirements. It is acceptable for subsequent issues of the document to add additional requirements not addressed by earlier releases of the BA. Business Agreements are the basis for requirement traceability for information models.

It is expected that this document will be used:

- As the foundation for a TM Forum Information Agreement(s)
- To facilitate requirement agreement between Service Providers and vendors
- As input to a service Provider's Request for Information / Request for Proposal (RFI/RFP—RFX)
- As input for vendors developing COTS products
- As a source of requirements for other bodies working in this area

8.3 Document History

Version	Date Modified	Description of changes
1.0	October 2007	This is the first version of the document and as such, there are no changes to report.
1.1	May 2008	Made updates based on member evaluation of MTOSI 2.0 BAs.

1.2	September 2011	Updated sections 1.1 and 2. Replaced mTOP by MTNM / MTOSI everywhere in the document

8.4 Company Contact Details

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8.5 Acknowledgments

This document was prepared by the members of the TM Forum MTNM / MTOSI RM team.

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Additional input was provided by the following people:

- Gerard Vila, Alcatel-Lucent