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Technical Report

**3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Telecommunication management;
Study on alignment of 3GPP Performance Management (PM)
and TeleManagement Forum (TMF) Interface Program (TIP)
Performance Management (Release 10)**



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Keywords

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Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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where:

- x the first digit:
 - 1 presented to TSG for information;
 - 2 presented to TSG for approval;
 - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

Performance Management (PM) is a key functionality that provides the operator with visibility into how its network is performing. Performance measurements and KPIs are critical inputs into optimization of networks. Accurate and a rich set of counters delivered in a timely manner is essential for trouble shooting purposes and enable support for automatic identification of network problems and automatic error correction and optimization of the network.

To that effect, there is a need to provide consistent counters for all elements in a converged network.

3GPP has specified with the PM IRP (3GPP TS 32.41x) an interface for Performance Management. TMF has in MTOSI and OSSJ capabilities for Performance Management as well. Currently TMF TIP studies how Performance Management can be aligned inside TMF.

However, there is no reason why PM functions should be different, and an aligned management approach would greatly benefit the industry. An example of alignment within 3GPP SA5 IRP work is that multiple Solution Sets are aligned in that their supported management features are identical. Advantages of alignment include:

- CAPEX reduction (less development cost, less integration cost)
- OPEX reduction (consistent handling of performance measurements collection)

1 Scope

The present document provides consistent and aligned PM and PM interfaces in 3GPP and TMF. The present document:

- identifies similarities and differences of the PM capabilities in 3GPP and TMF TIP PM BA;
- proposes enhancements to 3GPP PM solutions for converged networks and to satisfy TMF TIP PM BA requirements;
- identifies any required changes in the 3GPP specifications;
- identifies any required changes in the TMF specifications (to be communicated to TMF).

Backwards compatibility of the PM IRP should be maintained as much as possible by re-using existing specifications to the maximum extent.

The counter collected by each of the Network Elements (NE) and the definition of those are NE specific and there is no intention to harmonize those.

However KPIs with a network view should be explored.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

- [2] NGMN Top OPE Recommendations
http://www.ngmn.org/uploads/media/NGMN_Top_OPE_Recommendations_1.0.pdf
- [3] TM Forum business requirements
https://collab.tmforum.org/svn/repos/tip/Features/PerformanceManagement/BA/TMF_TIP_PM_BA_0_2_5.docx

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [x] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [x].

3.2 Symbols

For the purposes of the present document, the following symbols apply:

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [x] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [x].

API	Application programming interface
BA	Business Agreement
CAPEX	Capital Expenditure
DDP	Document Delivery Package
FMW	Framework
IA	Information Agreement
IIS	Interface Implementation Specification
IRP	Integration Reference Point
MTOSI	Multi-Technology Operations System Interface
NRA	Network Resource Assurance
OPEX	Operational Expenditure
OSSJ	OSS (Operations Support System) through Java
PM	Performance Management
RTM	Resource Trouble Management
TIP	TM Forum Interface Program
TMF	TeleManagement Forum

4 Comparison of Performance Management standards

4.1 PM standards in 3GPP and TMF TIP BA

4.1.1 3GPP Performance Management

The following documents are relevant to the 3GPP Performance Management analysis.

3GPP TS32.401: "Performance Management (PM); Concept and requirements".
3GPP TS32.403: "Performance Management (PM); Performance measurements; UMTS and combined UMTS/GSM".
3GPP TS32.404: "Performance Management (PM); Performance measurements; Definitions and template".
3GPP TS32.405: "Performance Management (PM); Performance measurements; Universal Terrestrial Radio Access Network (UTRAN)".
3GPP TS32.406: "Performance Management (PM); Performance measurements; Core Network (CN) Packet Switched (PS) domain".
3GPP TS32.407: "Performance Management (PM); Performance measurements; Core Network (CN) Circuit Switched (CS) domain; UMTS and combined UMTS/GSM".
3GPP TS32.408: "Performance Management (PM); Performance measurements; Teleservice".
3GPP TS32.409: "Performance Management (PM); Performance measurements; IP Multimedia Subsystem (IMS)".

3GPP TS32.410: "Key Performance Indicators (KPI) for UMTS and GSM".

3GPP TS32.450: "Key Performance Indicators (KPI) for Evolved Universal Terrestrial Radio Access Network (E-UTRAN): Definitions".
3GPP TS32.451: "Key Performance Indicators (KPI) for Evolved Universal Terrestrial Radio Access Network (E-UTRAN): Requirements".

3GPP TS32.412: "Performance Management (PM) Integration Reference Point (IRP): Information Service (IS)".
3GPP TS32.413: "Performance Management (PM) Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)".
3GPP TS32.415: "Performance Management (PM) Integration Reference Point (IRP): eXtensible Markup Language (XML) definitions".
3GPP TS32.416: "Performance Management (PM) Integration Reference Point (IRP): Solution Set (SS) definitions".
3GPP TS32.417: "Performance Management (PM) Integration Reference Point (IRP); SOAP Solution Set (SS)".

3GPP TS32.425: "Performance Management (PM); Performance measurements Evolved Universal Terrestrial Radio Access Network (E-UTRAN)".
3GPP TS32.426: "Performance Management (PM); Performance measurements Evolved Packet Core (EPC) network".

3GPP TS32.432: "Performance measurement: File format definition".
3GPP TS32.435: "Performance measurement: eXtensible Markup Language (XML) file format definition".
3GPP TS32.436: "Performance measurement: Abstract Syntax Notation 1 (ASN.1) file format definition".

3GPP TS32.452: "Performance measurements Home Node B Access (HNB) network".
3GPP TS32.453: "Performance measurements Home eNode B Access (HeNB) network".

3GPP TR 32.809: "Telecommunication management; Feasibility study of XML-based (SOAP/HTTP) IRP solution sets".
3GPP TR 32.818: "Study on 3GPP SA5 / MTO SI XML harmonization".

3GPP TR 32.828: "Alignment of 3GPP Generic NRM IRP and TMF Shared Information Data (SID) model".
3GPP TR 32.829: "Harmonization of 3GPP Alarm IRP and TMF Interface Program (TIP) Fault Management".

3GPP TR 32.831: "Alignment of 3GPP PM IRP and TMF TIP PM".
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3GPP TR 32.832: "Study on Alarm Correlation and Alarm Root Cause Analysis".

4.1.2 TMF TIP BA Performance Management

This clause provides a comparison between existing 3GPP PM related specifications and TMF TIP Performance Management Business Agreement. For a potential harmonization of 3GPP and TMF Performance Management functions, it is necessary to compare the Business Agreement (BA) requirements and to understand what already exists.

The comparison is done between the existing and stable 3GPP PM IRP specifications and TMF PM BA requirements. The goal is to analyze and determine any recommendations for updates of the PM IRP, which would satisfy TMF TIP PM BA requirements and identify areas where this work is synergetic with the model harmonization and FM harmonization work.

Source:

https://collab.tmforum.org/svn/repos/tip/Features/PerformanceManagement/BA/TMF_TIP_PM_BA_0_2_5.docx

A Category I: Static and Structural Requirements

A.1 General Requirements

R_TMF_PM_BA_I_0035	<u>Multiple measurement producing applications</u> The performance API shall support a consuming application collecting measurements from multiple producing applications.
3GPP compliance	Compliant
R_TMF_PM_BA_I_0036	<u>Multiple measurement consuming applications</u> The performance API shall support a producing application providing measurements to multiple consuming applications.
3GPP Compliance	Compliant
R_TMF_PM_BA_I_0037	<u>Consuming applications for collecting measurements</u> A consuming application shall be able to collect measurements that were configured to be produced in the producing application externally, not by the same consuming application.
3GPP Compliance	N/A the mechanism is provided in 3GPP but this is a requirement on the consuming application (IRP Manager)
R_TMF_PM_BA_I_0038	<u>Consuming applications ordering measurement production only</u> A Consuming application shall be able to request production of measurement data independent of Consuming application collecting the same. This application need not be the collecting Consumer Application.
3GPP Compliance	N/A the mechanism is provided in 3GPP but this is a requirement on the consuming application (IRP Manager)

A.2 Data Model Requirements

R_TMF_PM_BA_I_0001	<p><u>Supported time granularities for measurement production & collection</u> The performance API shall support the following time granularities for both measurement collection and measurement production:</p> <ul style="list-style-type: none"> • 1 minute • 5 minutes • 15 minutes • 30 minutes • 1 hour • X hours (any multiplication of 1 hour, X < 12) • 1 day (=24 hours) • 7 days (a week) • 1 month • 1 year
3GPP Compliance	Partial. Measurement production: = GP in 3GPP terminology Measurement collection = RP in 3GPP terminology 3GPP supports 5,15,30,60 min granularity for production of counters. Reporting Period in 3GPP (Collection) is multiples of GP
R_TMF_PM_BA_I_0002	<p><u>Execution status values for production/collection jobs</u> The performance API shall support the following status values for production/collection jobs: (YS: To be reviewed)</p> <ul style="list-style-type: none"> • Active • Suspended
3GPP Compliance	Compliant
R_TMF_PM_BA_I_0051	<p><u>Unique JobId for each Production/Collection Job</u> <u>It should be possible for the solution to work based on the premise that each Production/Collection job can be identified uniquely by a jobId.</u></p>
3GPP Compliance	Compliant
R_TMF_PM_BA_I_0003	<p><u>Supported transport mechanisms</u> The performance API shall support a transport mechanism based on file transfer.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_I_0004	<p><u>Supported file formats</u> The performance API shall support:</p> <ul style="list-style-type: none"> • 3GPP file format • MTSI file format
3GPP Compliance	3GPP file format standardized
R_TMF_PM_BA_I_0033	<p><u>proprietary file formats</u> The performance API may support proprietary file formats.(YS: should be reviewed)</p>
3GPP Compliance	Is it forbidden??? Need to check
R_TMF_PM_BA_I_0034	<p><u>Uniqueness of applications</u> Any Performance application (producing application or consuming application) shall have a unique identifier across the OSS systems.</p>
3GPP Compliance	Compliant

B Category II: Normal Sequences, Dynamic Requirements

B.1 Discovery Capabilities - Production

R_TMF_PM_BA_II_0005	<u>Discovery of measurable object classes</u> The Performance Management API shall support a discovery mechanism to find the supported measurable object classes for the purpose of production of measurements.
3GPP Compliance	Not compliant. There is no std mechanism to support this. Measurement are static information and it is not seen as needed.
R_TMF_PM_BA_II_0006	<u>Discovery of measurable object instances</u> The Performance Management API shall support a discovery mechanism to find the measurable object instances (MOs), and any nested MOs, corresponding to a given Management Object Class, that support Performance Measurements.
3GPP Compliance	Not compliant. There is no std mechanism to support this. Measurement are static information and it is not seen as needed.
R_TMF_PM_BA_II_0007	<u>Discovery of measurable attributes</u> The Performance Management API shall support a discovery mechanism to find the supported measurable attributes for a specified measurable object class (MOC).
3GPP Compliance	Not compliant. There is no std mechanism to support this. Measurement are static information and it is not seen as needed.
R_TMF_PM_BA_II_0039	<u>Discovery of Measurable Attribute properties</u> The Performance Management API should support, the possibility retrieving information regarding data type of measurement attribute, counter type (eg:- Peg , Status), aggregation rule (eg:- sum, avg, min,max) etc.,
3GPP Compliance	Not compliant. There is no std mechanism to support this. Measurement are static information and it is not seen as needed
R_TMF_PM_BA_II_0040	<u>Discovery of specific Measurement production job(s)</u> The Performance Management API shall support a discovery mechanism to find specific existing measurement production jobs producing measurements corresponding to a specified MOC and instances of the MOC (list of MOs) (<This is also of interest to the collection part >)
3GPP Compliance	Not compliant. Currently the filter is only on the jobId. Enhancements needed to support additional filters.
R_TMF_PM_BA_II_0010	<u>Discovery of existing measurement production jobs</u> The Performance Management API shall support a discovery mechanism to find the existing measurement production jobs.
3GPP Compliance	Compliant (list measurement jobs) 32.412

B.2 Measurement Production

R_TMF_PM_BA_II_0011	<p><u>Creating measurement production jobs for measurable object classes</u> The Performance Management API shall support the creation of measurement production jobs, specifying a measurement object class or a list of measurement object classes. The production job will create measurements for all the measurable objects (instances) of the specified classes.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0012	<p><u>Creating measurement production jobs for a list of measurable objects</u> The Performance Management API shall support the creation of measurement production jobs, specifying a list of measurable objects. The production job will create measurements for all the measurable objects (instances) that are specified in this list.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0013	<p><u>Setting the granularity of measurement production jobs</u> The Performance Management API shall support setting the granularity of the measurement production to one of the supported granularities. If the requested granularity is not supported by the producing application an appropriate error code should be returned.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0014	<p><u>Scheduling measurement production jobs</u> The Performance Management API shall support setting the scheduling of the measurement production. A schedule of measurement production shall consist of start date, end date, list of daily intervals and a weekly schedule. All these parameters are optional. If start date is omitted the monitoring starts immediately. If end date is omitted the monitoring will run until suspended. If the daily interval is omitted, the monitoring job will run continuously through the day. If the weekly schedule is omitted, the production job will run every day of the week. Alternatively, the weekly schedule will indicate which days of the week the monitoring job will run. If the requested schedule is not supported by the producing application an appropriate error code shall be returned.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0015	<p><u>Scheduling the output creation of measurement production jobs</u> The Performance Management API shall support setting the scheduling of the creation of measurement production jobs output. It may happen that the granularity of output creation will be larger than the granularity of the measurement production. The granularity of output creation should be one of the supported granularities.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0016	<p><u>Modifying measurement production jobs</u> The Performance Management API shall support the modification of a measurement production job that is in stopped/suspended mode. The following parameters can be changed:</p> <ul style="list-style-type: none"> • Measured object classes • Measured objects • Time granularity • Schedule parameters • Output creation schedule
3GPP Compliance	Not Compliant. There is no modification of the job that has been started. Stop is removing the job therefore modifying is not possible
R_TMF_PM_BA_II_0017	<p><u>Suspend/Resume of a measurement production job</u> The Performance Management API shall support the ability to suspend a measurement production job. It shall be possible to resume a suspended measurement job.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0018	<p><u>Deleting a measurement production job</u> The Performance Management API shall support the ability to delete a measurement production job.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0019	<p><u>Monitoring a measurement production job execution status</u> The Performance Management API shall support the ability to query the execution status of a measurement production job.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0052	<p><u>Support State Change Notifications</u> The PM API should support notifications to notify change in state of PM job. It should be possible to raise notifications irrespective of triggering event for the state change</p>
3GPP Compliance	Compliant

R_TMF_PM_BA_II_0053	<u>Filtering State Change Notifications</u> It should be possible to transmit sufficient information as part of state change notifications, so that the listeners can filter based on <u>Production Job id and destination state</u> .
3GPP Compliance	Compliant

B.3 Discover Capabilities - Collection

R_TMF_PM_BA_II_0020	<u>Discovery of measurement transport mechanism</u> The Performance Management API shall support a query that will return the supported transport mechanisms per producing application (data source).
3GPP Compliance	??? N/A. TBD There is not query to do that.

R_TMF_PM_BA_II_0021	<u>Discovery of supported file format</u> The Performance Management API shall support a query that returns the supported output file formats per producing application (data source) in a case where file based transport mechanism is used.
3GPP Compliance	??? N/A. TBD There is no query to do that.

R_TMF_PM_BA_II_0022	<u>Discovery of measured object classes</u> The Performance Management API shall support a discovery mechanism to find the target measured object classes for which measurements are being produced.
3GPP Compliance	N/A See other requirements

R_TMF_PM_BA_II_0023	<u>Discovery of measured objects</u> The Performance Management API shall support a discovery mechanism to find the target measured object instances e.g. specific network elements. These are the objects for which measurements are being produced.
3GPP Compliance	N/A see other requirements

R_TMF_PM_BA_II_0024	<u>Discovery of measured attributes</u> The Performance Management API shall support a discovery mechanism to find the produced measured attributes given the measurable object class, and optionally a counter group.
3GPP Compliance	See above requirements

R_TMF_PM_BA_II_0047	<u>Discovery of common supported time granularity for measured attributes</u> The Performance Management API shall support a discovery of the supported time granularities for a list of measured attributes. It should return the time granularities that are supported for all the supplied measured attributes if such exist.
3GPP Compliance	N/A

B.4 Measurements Collection

R_TMF_PM_BA_II_0025	<p><u>Creating measurement collection jobs for measured object classes</u> The Performance Management API shall support the creation of measurement collection jobs, specifying a measurement object class or a list of measurement object classes. The collection job will collect the already produced measurements based on a transport mechanism and an agreed output format.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0026	<p><u>Creating measurement collection jobs for a list of measured objects</u> The Performance Management API shall support the creation of measurement collection jobs, specifying a list of measured objects. The collection job will collect the already produced measurements based on a transport mechanism and an agreed output format.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0027	<p><u>Setting the granularity of measurement collection jobs</u> The Performance Management API shall support setting the granularity of the measurements collection to one of the supported granularities. If the requested granularity is not supported by the producing application an appropriate error code should be returned.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0028	<p><u>Scheduling measurement collection jobs</u> The Performance Management API shall support setting the scheduling of the measurement collection. A schedule of measurements production shall consist of start date, end date, list of daily intervals and a weekly schedule. All these parameters are optional. If start date is omitted the monitoring starts immediately. If end date is omitted the monitoring will run until suspended. If the daily interval is omitted, the monitoring job will run continuously through the day. If the weekly schedule is omitted, the production job will run every day of the week. Alternatively, the weekly schedule will indicate which days of the week the monitoring job will run. If the requested schedule is not supported by the producing application an appropriate error code should be returned.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0029	<p><u>Modifying measurement collection jobs</u> The Performance Management API shall support the modification of a collection measurement job that is in stopped/suspended mode. The following parameters can be changed:</p> <ul style="list-style-type: none"> • Measured object classes • Measured objects • Time granularity • Schedule parameters
3GPP Compliance	Non Compliant – Manager can stop and start to modify the job
R_TMF_PM_BA_II_0030	<p><u>Suspend/Resume a measurement collection job</u> The Performance Management API shall support the ability to suspend a measurement collection job. It shall be possible to resume a suspended measurement job.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0031	<p><u>Deleting a measurement collection job</u> The Performance Management API shall support the ability to delete a measurement collection job.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0032	<p><u>Monitoring a measurement collection job execution status</u> The Performance Management API shall support the ability to query the execution status of a measurement collection job.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0048	<p><u>Retrieving a collection job based on identifier</u> The Performance Management API shall provide a query mechanism to retrieve a specific measurement job.</p>
3GPP Compliance	Compliant
R_TMF_PM_BA_II_0054	<p><u>Executing collection jobs by identifiers of production jobs</u> The Performance Management API shall support the creation of measurement collection jobs, specifying a list of identifiers of production jobs. The collection job will collect the already produced measurements based on a transport mechanism and an agreed output format</p>
3GPP Compliance	Compliant

B.5 Ad-hoc Collection

R_TMF_PM_BA_II_0041	<u>Ad-hoc measurements queries</u> The Performance Management API shall support the ability to query performance measurements by sending an ad-hoc query
3GPP Compliance	Non Complaint
R_TMF_PM_BA_II_0042	<u>Creating an ad-hoc query for a managed object class</u> An ad-hoc measurement query may request the Performance measurements for a specific object class.
3GPP Compliance	??
R_TMF_PM_BA_II_0046	<u>Creating an ad-hoc query for a list of object instances</u> An ad-hoc measurement query may request the Performance measurements for a list of object instances.
3GPP Compliance	??
R_TMF_PM_BA_II_0044	<u>Parameters of an ad-hoc measurement query</u> An ad-hoc measurement query should request the Performance measurements by specifying: <ul style="list-style-type: none"> • a list of measured attributes • Time granularity • Time interval (start date & time and end date & time may be identical)
3GPP Compliance	??

C Category III: Abnormal or Exception Conditions, Dynamic Requirements

<p>R_TMF_PM_BA_III_0055</p>	<p><u>Reject Production Job Creation</u> PM API should support possibility of the Producing Application to reject a Production Job creation request, and convey Rejection reason to the Consuming Application. The Producing Job May reject for one or more of the following reasons -too many production jobs -incorrect Measurement Attributes -jobid already in use -granularity not supported -incorrect schedule</p>
<p>3GPP Compliance</p>	<p>Compliant except the jobid since it is created</p>

D Category IV: Expectations and Non-Functional Requirements

E Category V: System Administration Requirements

Reference Use Cases from

https://collab.tmforum.org/svn/repos/tip/Features/PerformanceManagement/BA/TMF_TIP_PM_BA_0_2_5.docx

{The use cases should be broken down by categories, if possible. An individual use case may be created by using the “createUC” macro. It is important to fill in every field of the use case, and in particular the traceability section. In this section you should put hyperlinks to the requirements being addressed by the use case }

E.1 Discover Capabilities for PM Collection

E.1.1 Discovery of measured object classes

Use Case Id	UC_TMF_PM_BA_0001
Use Case Name	The consuming PM application retrieves Collected PM Targets – measured object classes
Summary	The PM consuming application asks the PM producing application on Performance Measurements targets
Actor(s)	PM Consuming application
Pre-Conditions	The PM consuming application and PM producing application have successfully completed their initialization procedures.
Begins When	The PM consuming application sends a request to the PM producing application to be informed about Performance Measurements targets
Description	<ol style="list-style-type: none"> 1. The PM consuming application sends a request to a producing application to receive collected PM targets - managed object classes level. No parameters are required. 2. The PM producing application returns a list of measured object classes.
Ends When	<p>In case of success: The consuming application receives a response with the required information.</p> <p>In case of failure: The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success: Nothing has changed on any of the involved applications.</p> <p>In case of failure: Nothing has changed on any of the involved applications.</p>
Exceptions	Exceptions are not defined at this stage. They will be added during the implementation phase.
Traceability	R_TMF_PM_BA_II_0022

E.1.2 Discovery of measured objects

Use Case Id	UC_TMF_PM_BA_0002
Use Case Name	The PM consuming application retrieves collected measured objects
Summary	The PM consuming application asks the PM producing application on measured objects
Actor(s)	PM Consuming application
Pre-Conditions	The PM consuming application and PM producing application have successfully completed their initialization procedures.
Begins When	The PM consuming application sends a request to the PM producing application to be informed about measured objects.
Description	<ol style="list-style-type: none"> 1. The PM consuming application sends a request to the producing application to receive collected objects. A list of object classes has to be specified. 2. The producing application validates the provided list of object classes. 3. The PM producing application returns a list of measured object instances.
Ends When	<p>In case of success: The consuming application receives a response with the required information.</p> <p>In case of failure: The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success: Nothing has changed on any of the involved applications.</p> <p>In case of failure: Nothing has changed on any of the involved applications.</p>
Exceptions	Exceptions are not defined at this stage. They will be added during the implementation phase.
Traceability	R_TMF_PM_BA_II_0023

E.1.3 Discovery of measured attributes

Use Case Id	UC_TMF_PM_BA_0003
Use Case Name	The PM consuming application retrieves measured attributes for a given measured object class.
Summary	The PM consuming application asks the PM producing application on measured attributes of a specific object class and optionally a counter group.
Actor(s)	PM Consuming application
Pre-Conditions	The PM consuming application and PM producing application have successfully completed their initialization procedures.
Begins When	The PM consuming application sends a request to the PM producing application to be informed about measured attributes of a specific managed object class.
Description	<ol style="list-style-type: none"> 1. The PM consuming application sends a request to the producing application to receive measured attributes. An object classes has to be specified and a counter group can be optionally sent. 2. The producing application validates the specified object classes. 3. The PM producing application returns a list of object attributes that are being measured for the specified object class..
Ends When	<p>In case of success: The consuming application receives a response with the required information.</p> <p>In case of failure: The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success: Nothing has changed on any of the involved applications.</p> <p>In case of failure: Nothing has changed on any of the involved applications.</p>
Exceptions	Exceptions are not defined at this stage. They will be added during the implementation phase.
Traceability	R_TMF_PM_BA_II_0024

E.1.4 Discovery of measurement transport mechanism

Use Case Id	UC_TMF_PM_BA_0004
Use Case Name	The PM consuming application retrieves the supported transport mechanisms for a PM producing application.
Summary	The PM consuming application asks the PM producing application on its supported transport mechanisms.
Actor(s)	PM Consuming application
Pre-Conditions	The PM consuming application and PM producing application have successfully completed their initialization procedures.
Begins When	The PM consuming application sends a request to the PM producing application to be informed about its supported transport mechanism.
Description	<ol style="list-style-type: none"> 1. The PM consuming application sends a request to the producing application to receive its supported transport mechanisms. No parameters are required. 2. The PM producing application returns its supported transport mechanism: Files, Streaming, or both.
Ends When	<p>In case of success: The consuming application receives a response with the required information.</p> <p>In case of failure: The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success: Nothing has changed on any of the involved applications.</p> <p>In case of failure: Nothing has changed on any of the involved applications.</p>
Exceptions	Exceptions are not defined at this stage. They will be added during the implementation phase.
Traceability	R_TMF_PM_BA_II_0020

E.1.5 Discovery of supported file format

Use Case Id	UC_TMF_PM_BA_0005
Use Case Name	The PM consuming application retrieves the supported file format for a PM producing application.
Summary	The PM consuming application asks the PM producing application on its supported file format.
Actor(s)	PM Consuming application
Pre-Conditions	The PM consuming application and PM producing application have successfully completed their initialization procedures.
Begins When	The PM consuming application sends a request to the PM producing application to be informed about its supported file format.
Description	<ol style="list-style-type: none"> 1. The PM consuming application sends a request to the producing application to receive its supported file format. No parameters are required. 2. The PM producing application returns its supported file format: 3GPP, MTOSI, or a proprietary name.
Ends When	<p>In case of success: The consuming application receives a response with the required information.</p> <p>In case of failure: The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success: Nothing has changed on any of the involved applications.</p> <p>In case of failure: Nothing has changed on any of the involved applications.</p>
Exceptions	Exceptions are not defined at this stage. They will be added during the implementation phase.
Traceability	R_TMF_PM_BA_II_0021

E.1.6 Discovery of common supported time granularity for measured attributes

Use Case Id	UC_TMF_PM_BA_0006
Use Case Name	The PM consuming application retrieves the common time granularity for a set of measured attributes.
Summary	The PM consuming application asks the PM producing application on common time granularity for a supplied set of measured attributes.
Actor(s)	PM Consuming application
Pre-Conditions	The PM consuming application and PM producing application have successfully completed their initialization procedures.
Begins When	The PM consuming application sends a request to the PM producing application to be informed about the common time granularity of given measured attributes.
Description	<ol style="list-style-type: none"> 1. The PM consuming application sends a request to the producing application to receive the common time granularity for a list of measured attributes. A list of measured attributes has to be specified. 2. The producing application validates the specified measured attributes 3. The PM producing application returns a time granularity out of the supported time granularities. This time granularity reflects the minimal common time granularity of the specified list of measured attributes. If no such granularity exists an empty reply is returned.
Ends When	<p>In case of success: The consuming application receives a response with the required information.</p> <p>In case of failure: The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success: Nothing has changed on any of the involved applications.</p> <p>In case of failure: Nothing has changed on any of the involved applications.</p>
Exceptions	<ol style="list-style-type: none"> 1. Not implemented: The producing application does not support this service. 2. Internal error: The requested operation could not be performed. 3. Entity not found: One or more of the measured attributes is not identified. 4. Entity not collected: One or more of the measured attributes is not collected.
Traceability	R_TMF_PM_BA_II_0047

E.2 Measurements Collection

E.2.1 Creating a measurement job for measured object classes

Use Case Id	UC_TMF_PM_BA_0007
Use Case Name	The PM consuming application creates a collection measurement job for measured object classes.
Summary	The PM consuming application creates a measurement collection job to be executed by the PM producing application based on a list of object classes.
Actor(s)	PM Consuming application
Pre-Conditions	<ol style="list-style-type: none"> 1. The PM consuming application and PM producing application have successfully completed their initialization procedures. 1. Transport related information is set by the consuming application (e.g. IP address, folders for files, etc.) 2. Output format is known and validated by the consuming application.
Begins When	The PM consuming application sends a request to the PM producing application to generate a measurement collection job based on the set of parameters that are sent in the request.
Description	<ol style="list-style-type: none"> 1. The PM consuming application instructs the producing application to generate a measurement collection. Job based on the following parameters: <ol style="list-style-type: none"> a. A measured object class b. Additional filtering mechanisms: counter group... c. The transport mechanism to be used d. A list of measured attributes related to this class. e. Requested time granularity of the measurements f. Scheduling parameters: start date & time, end date & time, list of daily interval and a weekly schedule. All scheduling parameters are optional and have default behavior. 2. The producing application validates all parameters. 3. The PM producing application generates the measurement collection job: <ol style="list-style-type: none"> a. Data is being collected according to the defined schedule, being formatted according to the supported output format and sent by the supported transport mechanism. b. The PM producing application monitors the execution status of the job, enabling queries on its status. c. The PM producing application keeps the data of what is being collected, supporting queries about measured object classes, object instances, measured attributes and collection jobs.
Ends When	<p>In case of success: The consuming application receives a response containing an identifier of the newly created measurement job, indicating the success of measurement job creation.</p> <p>In case of failure: The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success:</p> <ol style="list-style-type: none"> 1. The PM consuming application can potentially send instructions to manipulate the collection suspend, resume or delete the collection job based on its identifier. 2. The PM producing application is able to answer queries about the measured object classes, instances and attributes based, considering the new collection job. 3. The PM producing application is able to answer queries about the status of the new collection job. <p>In case of failure: Nothing has changed on any of the involved applications.</p>

Exceptions	<ol style="list-style-type: none">1. Not implemented: The producing application does not support this service.2. Internal error: The requested operation could not be performed.3. Invalid Input:<ol style="list-style-type: none">a. Illegal scheduling parametersb. Illegal time granularity4. Entity not found:<ol style="list-style-type: none">a. The specified object class cannot be identified.b. One or more of the measured attributes is not identified.5. Data for specified Entity not collected:<ol style="list-style-type: none">a. Data is not produced for the specified object class.b. Data is not collected for specified measured.6. Communication loss with data source.
Traceability	R TMF PM BA II 0025 R TMF PM BA II 0027 R TMF PM BA II 0028

E.2.2 Creating a measurement job for measured objects

Use Case Id	UC_TMF_PM_BA_0008
Use Case Name	The PM consuming application creates a collection measurement job for a list of measured objects.
Summary	The PM consuming application creates a measurement collection job to be executed by the PM producing application based on a list of object classes.
Actor(s)	PM Consuming application
Pre-Conditions	<ol style="list-style-type: none"> 1. The PM consuming application and PM producing application have successfully completed their initialization procedures. 3. Transport related information is set by the consuming application (e.g. IP address, folders for files, etc.) 4. Output format is known and validated by the consuming application.
Begins When	The PM consuming application sends a request to the PM producing application to generate a measurement collection job based on the set of parameters that are sent in the request.
Description	<ol style="list-style-type: none"> 1. The PM consuming application instructs the producing application to generate a measurement collection. Job based on the following parameters: <ol style="list-style-type: none"> a. A measured object class b. Additional filtering mechanisms: counter group... c. The transport mechanism to be used d. A list of measured attributes related to this class. e. Requested time granularity of the measurements f. Scheduling parameters: start date & time, end date & time, list of daily interval and a weekly schedule. All scheduling parameters are optional and have default behavior. 2. The producing application validates all parameters. 3. The PM producing application generates the measurement collection job: <ol style="list-style-type: none"> a. Data is being collected according to the defined schedule, being formatted according to the supported output format and sent by the supported transport mechanism. b. The PM producing application monitors the execution status of the job, enabling queries on its status. <p>The PM producing application keeps the data of what is being collected, supporting queries about measured object classes, object instances, measured attributes and collection jobs.</p>
Ends When	<p>In case of success:</p> <p>The consuming application receives a response containing an identifier of the newly created measurement job, indicating the success of measurement job creation.</p> <p>In case of failure:</p> <p>The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success:</p> <ol style="list-style-type: none"> 1. The PM consuming application can potentially send instructions to manipulate the collection suspend, resume or delete the collection job based on its identifier. 2. The PM producing application is able to answer queries about the measured object classes, instances and attributes based, considering the new collection job. 3. The PM producing application is able to answer queries about the status of the new collection job. <p>In case of failure:</p> <p>Nothing has changed on any of the involved applications.</p>
Exceptions	Exceptions are not defined at this stage. They will be added during the implementation phase.
Traceability	R TMF PM BA II 0026 R TMF PM BA II 0027 R TMF PM BA II 0028

E.2.3 Modifying a measurement collection job

Use Case Id	UC_TMF_PM_BA_0009
Use Case Name	The PM consuming application modifies an existing collection measurement job.
Summary	The PM consuming application modifies an existing measurement collection job supplying its identifier and a list of parameters to be changed.
Actor(s)	PM Consuming application
Pre-Conditions	<ol style="list-style-type: none"> 1. The PM consuming application and PM producing application have successfully completed their initialization procedures. 2. A measurement job is already defined to be executed in the PM producing application
Begins When	The PM consuming application sends a request to the PM producing application to modify a measurement collection job based on the job identifier and a set of parameters that are sent in the request.
Description	<ol style="list-style-type: none"> 1. The PM consuming application instructs the producing application to modify a measurement collection. Job based on the following parameters: <ol style="list-style-type: none"> a. A collection measurement job identifier (mandatory) b. Additional filtering mechanisms: counter group... c. A list of object instances d. Requested time granularity of the measurements e. Scheduling parameters: start date & time, end date & time, list of daily interval and a weekly schedule. All scheduling parameters are optional and have default behavior. 2. The producing application validates all parameters. 3. The PM producing application modifies the measurement collection job: <ol style="list-style-type: none"> a. Data is being collected according to the defined schedule, being formatted according to the supported output format and sent by the supported transport mechanism. b. The PM producing application monitors the execution status of the job, enabling queries on its status. <p>The PM producing application keeps the data of what is being collected, supporting queries about measured object classes, object instances, measured attributes and collection jobs.</p>
Ends When	<p>In case of success: The consuming application receives a response containing an identifier of the modified measurement job, indicating the success of measurement job modification.</p> <p>In case of failure: The consuming application receives an exception.</p>
Post-Conditions	<p>In case of success:</p> <ol style="list-style-type: none"> 1. The PM consuming application can potentially send instructions to manipulate the collection suspend, resume or delete the collection job based on its identifier. 2. The PM producing application is able to answer queries about the measured object classes, instances and attributes based, considering the new collection job. 3. The PM producing application is able to answer queries about the status of the new collection job. <p>In case of failure: Nothing has changed on any of the involved applications.</p>
Exceptions	Exceptions are not defined at this stage. They will be added during the implementation phase.
Traceability	R_TMF_PM_BA_II_0029

4.2 Interface (operations) comparison

There are difference in the operations defined in PM IRP and MTOSI PM interface but at this time harmonization of the two interfaces is seen as low priority in order to focus on fault and model harmonization needs.

Both TMF BA and 3GPP allow and support sftp as one of the interfaces for collection and that provides a common mechanism between TMF and 3GPP for PM collection . The file transfer mechanism is common and more popularly deployed.

4.3 Performance collection methods comparison

The performance management and collection of PM counters business requirements have been compared and compliance addressed in earlier sections. Some of the enhancements that can be addressed in the 3GPP specs to comply with all the requirements have been identified.

Some of the key enhancements identified to align with the BA:

1. R_TMF_PM_BA_I_0001: 3GPP supports 5,15,30,60 min granularities for production of counters. Reporting Period in 3GPP (Collection) is multiples of GP. The Reporting periods allow for collection of PM counter as multiples of GP. BA requirements as for GP of
 - 1 minute
 - 5 minutes
 - 15 minutes
 - 30 minutes
 - 1 hour
 - X hours (any multiplication of 1 hour, X < 12)
 - 1 day (=24 hours)
 - 7 days (a week)
 - 1 month
 - 1 year

3GPP enhancements: 3GPP to analyse this need and update specification accordingly.

2. R_TMF_PM_BA_I_0004: Supported file formats
 - i. The performance API shall support:
 - ii. 3GPP file format
 - iii. MTOSI file format

3GPP discussion: Even though the requirements state both formats, is it really necessary to have two different formats? Perhaps here is an area where adopting a single format will save integration cost with no functional value lost.

3. R_TMF_PM_BA_I_0033: Proprietary format

3GPP discussion: This requirement asks for proprietary format. It is not clear if that helps with off the shelf OSS to provide post processing of PM counters. It seems like the best solution would be to have a standard format. This will save integration cost with no functional value lost. Should the BA be changed? Guidance from Operators required here.

4. R_TMF_PM_BA_II_0040: The Performance Management API shall support a discovery mechanism to find specific existing measurement production jobs producing measurements corresponding to a specified MOC and instances of the MOC (list of MOs) (<This is also of interest to the collection part >)

3GPP enhancements: Enhancement needed to support this. Currently the filter is only on the jobId.

5. R_TMF_PM_BA_II_0020: The Performance Management API shall support a query that will return the supported transport mechanisms per producing application (data source)

3GPP enhancements: Perhaps an enhancement needed here?

6. R_TMF_PM_BA_II_0021: The Performance Management API shall support a query that returns the supported output file formats per producing application (data source) in a case where file based transport mechanism is used

3GPP discussion: If we converge on a single file format there may be no need to have this support.

7. R_TMF_PM_BA_II_0041: Ad-hoc collection - The Performance Management API shall support the ability to query performance measurements by sending an ad-hoc query

3GPP enhancements: Currently there is no support of ad hoc collection. Ad hoc collection may not make sense for all PM counters but may apply to some counters. Enhancements needed to 3GPP to support this capability. This applies to R_TMF_PM_BA_II_0042, R_TMF_PM_BA_II_0046, R_TMF_PM_BA_II_0044.

8. Continue to develop use cases for FMC and as appropriate in the context of the FMC add additional requirements and enhancements to the PM collection and PM IRP.
As part of the use cases add relevant PM counters.

4.4 File content comparison

Currently the PM file format used in 3GPP is available at

http://www.3gpp.org/ftp/specs/archive/32_series/32.432/32432-a10.zip

http://www.3gpp.org/ftp/specs/archive/32_series/32.432/32435-a10.zip

MTOSI 2.0 PM file format can be found at:

<http://www.tmforum.org/browse.aspx?catID=6076&linkID=35252&docID=10580>

The file formats can be harmonized so the integration/parsing and analysing of the PM counters from various systems can be cost effective.

One of the top 10 requirements was to move to a simplified, lightweight PM file format. More analysis will be done on the exact file format and that will become part of the work item.

5 Discussion of PM IF Standards Alignment Options

There are difference in the operations defined in PM IRP and MTOSI PM interface but at this time harmonization of the two interfaces is seen as low priority in order to focus on fault and model harmonization needs.

6 Recommendations for PM IF Standards Alignment

Conclusions drawn from various discussions related to PM collection, interface and file format discussion is detailed in section 4 and summarized below.

There are difference in the operations defined in PM IRP and MTOSI PM interface but at this time harmonization of the two interfaces is seen as low priority in order to focus on fault and model harmonization needs.

Both TMF BA and 3GPP allow and support sftp as one of the interfaces for collection and that provides a common mechanism between TMF and 3GPP for PM collection . The file transfer mechanism is common and more popularly deployed.

Performance measurement types, definition of counters and KPIs are very specific to different domains and are being defined for each Network elements by groups/SDOs that are most knowledgeable in that area. Enhancement of KPIs and clear, rich definition of counters in a manner that is consistent and valid in the domain and cross domain based on various converged management scenarios needs consideration.

The model harmonization work will drive the object modelling and the association of the PM data with the appropriate object. This is addressed in 3GPP TS 32.828 and TS 32.833.

The performance management business requirements have been compared and compliance addressed. Some of the enhancements that can be addressed in the 3GPP specs to reduce the gaps have been identified and can be introduced as CRs.

PM file format in 3GPP and MTOSI are different and there is really no necessity for it to be different. It is proposed to move to a converged PM file format taking into account the recommendation in the top 10 to move to a lightweight format (CSV, ascii, etc).

It is agreed to pursue the relevant changes to address some of the harmonization and enhancements identified in the TR using CRs.

Annex A: Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2011-03	SP-51	SP-110123	--	--	Presentation to SA for Information and Approval	---	1.0.0
2011-03	--	--	--	--	Publication	2.0.0	10.0.0