

ETSI TS 132 101 V14.0.0 (2017-04)



**Digital cellular telecommunications system (Phase 2+) (GSM);
Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
Principles and high level requirements
(3GPP TS 32.101 version 14.0.0 Release 14)**



Reference

RTS/TSGS-0532101ve00

Keywords

GSM,LTE,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2017.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M logo is protected for the benefit of its Members

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI 3rd Generation Partnership Project (3GPP).

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	6
1 Scope	7
2 References	7
3 Definitions and abbreviations.....	10
3.1 Definitions	10
3.2 Abbreviations	11
4 General	13
4.1 PLMN Telecom Management	13
4.1.1 Basic objectives for PLMN management	13
4.1.2 3GPP reference model	14
4.1.3 3GPP provisioning entities	14
4.1.4 Management infrastructure of the PLMN.....	14
4.2 ITU-T TMN.....	15
5 Architectural framework	16
5.1 Management reference model and interfaces	16
5.1.1 Overview	16
5.1.2 Interfaces from Operations Systems to NEs (Type 1 & 2)	17
5.1.2.1 Interfaces from EM Operations Systems to NEs (Type 1).....	18
5.1.2.2 Interfaces from NM Operations Systems to NEs (Type 2)	18
5.1.3 Interfaces to Enterprise Systems (Type 3)	19
5.1.3a Interface between Network Managers (Type 4).....	19
5.1.3b Interface between Domain Managers (Type 4a) - the Itf-P2P Interface	19
5.1.4 Interfaces to Operations Systems in other organisations (Type 5).....	19
5.1.5 Inter-NE interfaces (Type 6).....	19
5.1.6 Interface between NMLS and NM (Type 7).....	20
5.2 Interface levels	20
5.2.1 Overview	20
5.2.2 Information Model level	20
5.2.3 Solution Set (SS) level.....	20
5.2.4 Management-application-layer-protocol level.....	20
5.2.5 Networking protocol level	21
5.2.6 Physical level.....	21
5.3 3GPP compliance conditions.....	21
5.4 Service Oriented Architecture (SOA).....	21
5.4.1 Basic elements of SOA	21
5.4.2 Aggregation of SOA basic elements	22
5.4.3 Information transfer bus.....	23
5.4.4 SOA elements within the Management reference model.....	23
5.4.5 SOA-based representation of the Management Reference Model	24
5.4.6 SOA-supporting Solution Set	25
5.5 Converged Management.....	25
5.5.1 Introduction to FNIM.....	25
5.5.2 FNIM Features	25
5.5.3 FNIM Elements	26
5.5.3.1 FNIM components	26
5.5.3.2 Relations between model components (including UIM).....	26
5.5.3.3 Relations among pairs of model components.....	27
6 PLMN management processes	28
6.1 Process decomposition	28

6.2	Void.....	29
6.3	Void.....	29
6.4	Void.....	29
6.5	Customer Relationship Management (CRM) processes.....	29
6.5.1	CRM Support & Readiness.....	29
6.5.2	Customer Interface Management.....	30
6.5.3	Marketing Fulfilment Response.....	30
6.5.4	Selling.....	30
6.5.5	Order Handling.....	30
6.5.6	Problem Handling.....	30
6.5.7	Customer QoS/SLA Management.....	30
6.5.8	Billing & Collections Management).....	30
6.5.9	Retention & Loyalty.....	30
6.6	Service Management & Operations (SM&O) Processes.....	31
6.6.1	SM&O Support & Readiness.....	31
6.6.2	Service Configuration & Activation.....	32
6.6.3	Service Problem Management.....	32
6.6.4	Service Quality Management.....	32
6.6.5	Service & Specific Instance Rating.....	32
6.7	Resource Management & Operations (RM&O) Processes.....	32
6.7.1	RM&O Support & Readiness.....	33
6.7.2	Resource Provisioning.....	33
6.7.3	Resource Trouble Management.....	34
6.7.4	Resource Performance Management.....	34
6.7.5	Resource Data Collection & Processing.....	34
6.8	Supplier/Partner Relationship Management (S/PRM) processes.....	35
6.8.1	S/PRM Support & Readiness.....	35
6.8.2	S/P Requisition Management.....	35
6.8.3	S/P Problem Reporting & Management.....	35
6.8.4	S/P Performance Management.....	36
6.8.5	S/P Settlements & Billing Management.....	36
6.8.6	S/P Interface Management.....	36
7	PLMN management functional architecture.....	37
7.1	TM architectural aspects.....	37
7.2	Performance Management.....	38
7.2.1	Overview.....	38
7.2.2	Standardisation objectives.....	38
7.3	Roaming management overview.....	39
7.4	Fraud management overview.....	39
7.5	Fault Management.....	40
7.5.1	Overview.....	40
7.5.2	Standardisation objectives.....	41
7.6	Security Management.....	42
7.6.1	Overview.....	42
7.6.1.1	Layer B - OAM&P Transport IP Network.....	42
7.6.1.2	Layer A - Application Layer.....	42
7.6.1.3	Common Services.....	43
7.7	Software Management.....	44
7.7.1	Overview.....	44
7.7.1.1	Main Software Management process.....	44
7.7.1.2	Software Fault Management.....	46
7.8	Configuration Management.....	48
7.9	Accounting Management.....	48
7.10	Subscription Management.....	49
7.11	Subscriber and Equipment Trace Management.....	50
7.12	OAM&P of the PLMN "Management Infrastructure".....	50
7.13	Service Level Trace Management.....	50
Annex A (normative):	3GPP Management-application-layer-protocols.....	51
Annex B (normative):	3GPP management network layer protocols.....	52

Annex C (normative):	3GPP management IRP Solution Sets.....	53
Annex D (informative):	QoS Management.....	54
D.1	Overview	54
D.2	QoS Provisioning	55
D.2.1	Conceptual Architecture.....	56
D.2.2	NML QoS Policy Provisioning	57
D.2.3	EML QoS Policy Provisioning.....	57
D.2.4	Policy Decision Point	58
D.2.5	Policy Enforcement Point.....	58
D.3	QoS Monitoring.....	59
D.3.1	QoS Monitoring Conceptual Architecture.....	59
D.3.2	Network Element.....	59
D.3.3	Element Management Layer.....	61
D.3.4	Network Management Layer	62
D.4	QoS Management References	63
D.4.1	Policy Based QoS Provisioning References.....	63
D.4.2	Policy Based QoS Monitoring References	64
Annex E (normative):	Type 2 protocols and information model for use in Type 4a management interface	66
Annex F (informative):	Change history	67
History		68

Foreword

This Technical Specification (TS) 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:

Version x.y.z

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.-

1 Scope

The present document establishes and defines the management principles and high-level requirements for the management of PLMNs.

In particular, the present document identifies the requirements for:

- the upper level of a management system;
- the reference model, showing the elements the management system interacts with;
- the network operator processes needed to run, operate and maintain a network;
- the functional architecture of the management system;
- the principles to be applied to management interfaces.

The requirements identified in the present document are directed to the further development of management specifications as well as the development of management products. The present document can be seen as guidance for the development of all other Technical Specification addressing the management of PLMNs.

The present document does not provide physical architectures of the management system. These aspects are defined and discussed in more detail in TS 32.102 [101].

Verbal forms used to indicate requirements in the present document (e.g. "shall", "should", "may") are used in compliance with 3GPP specification Drafting Rules TR 21.801 [104].

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] ITU-T Recommendation M.3010 (2000): "Principles for a telecommunications management network".
- [2] 3GPP TS 22.101: "Service aspects; Service Principles".
- [3] 3GPP TS 32.111-1: "Telecommunication management; Fault Management; Part 1: 3G fault management requirements".
- [4] IETF RFC 959: "File Transfer Protocol (FTP)"; October 1985, J. Postel, J. Reynolds, ISI. (Status: Standard).
- [5] IETF RFC 783: "Trivial File Transfer Protocol (TFTP)"; rev. 2, June 1981, K.R. Sollins MIT. (Status: Unknown).
- [6] IETF RFC 1157: "Simple Network Management Protocol (SNMP)": May 1990, J. Case, SNMP Research, M. Fedor, Performance Systems International, M. Schoffstall, Performance Systems International, J. Davin, MIT Laboratory for Computer Science. (Status: Standard).
- [7] IETF RFC 2401: "Security Architecture for the Internet Protocol"; November 1998. (Status: Proposed Standard).