

ETSI TS 128 104 V18.7.0 (2025-03)



5G; Management and orchestration; Management Data Analytics (MDA) (3GPP TS 28.104 version 18.7.0 Release 18)

ETSI TS 128 104 V18.7.0 (2025-03)

<https://standards.iteh.ai/catalog/standards/etsi/0f85cbce-10cb-431b-a030-739393293114/etsi-ts-128-104-v18-7-0-2025-03>



ReferenceRTS/TSGS-0528104v170

Keywords5G

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 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from the
[ETSI Search & Browse Standards application](#).

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 prevailing version of an ETSI deliverable is the one made publicly available in PDF format on [ETSI deliver repository](#).

Users should be aware that the present document may be revised or have its status changed,
this information is available in the [Milestones listing](#).

If you find errors in the present document, please send your comments to
the relevant service listed under [Committee Support Staff](#).

If you find a security vulnerability in the present document, please report it through our
[Coordinated Vulnerability Disclosure \(CVD\)](#) program.

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

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.

© ETSI 2025.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are 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 IPR online database](#).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, 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.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™**, **LTE™** and **5G™** logo are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

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. These shall be interpreted as being references to the corresponding ETSI deliverables. (2025-03)

The cross reference between 3GPP and ETSI identities can be found at [3GPP to ETSI numbering cross-referencing](#).

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
Legal Notice	2
Modal verbs terminology.....	2
Foreword.....	9
1 Scope	11
2 References	11
3 Definitions of terms, symbols and abbreviations	12
3.1 Terms.....	12
3.2 Symbols.....	12
3.3 Abbreviations	13
4 Concepts and overview	13
4.1 Overview	13
5 MDA functionality and service framework.....	13
5.1 General framework.....	13
5.2 Interaction with CN and RAN domains	14
5.3 Deployment of multiple MDAs	16
5.4 Network Context	17
5.5 Historical data handling for MDA.....	18
5.6 AI/ML support for MDA.....	18
6 MDA in management loop	18
6.1 MDA role in the management loop	18
6.2 MDA role in the management loop for service assurance	19
6.3 MDA role in cross-domain service assurance	20
7 Use cases and requirements for MDA capabilities and services	22
7.1 General	22
7.2 MDA capabilities	22
7.2.1 Coverage related analytics	22
7.2.1.1 Coverage problem analysis	22
7.2.1.1.1 Description	22
7.2.1.1.2 Use case	23
7.2.1.1.3 Requirements	23
7.2.1.2 Slice coverage analysis	23
7.2.1.2.1 Description	23
7.2.1.2.2 Use case	24
7.2.1.2.3 Requirements	24
7.2.1.3 Paging optimization analysis.....	24
7.2.1.3.1 Description	24
7.2.1.3.2 Use Case	24
7.2.1.3.3 Requirements	25
7.2.2 SLS analysis.....	25
7.2.2.1 Service experience analysis.....	25
7.2.2.1.1 Description	25
7.2.2.1.2 Use case	25
7.2.2.1.3 Requirements	26
7.2.2.2 Network slice throughput analysis	26
7.2.2.2.1 Description	26
7.2.2.2.2 Use case	26
7.2.2.2.3 Requirements	26
7.2.2.3 Network slice traffic prediction.....	27
7.2.2.3.1 Description	27
7.2.2.3.2 Use case	27
7.2.2.3.3 Requirements	27

7.2.2.4	E2E latency analysis	27
7.2.2.4.1	Description	27
7.2.2.4.2	Use case	27
7.2.2.4.3	Requirements	28
7.2.2.5	Network slice load analysis	28
7.2.2.5.1	Description	28
7.2.2.5.2	Use cases	28
7.2.2.5.3	Requirements	28
7.2.3	MDA assisted fault management	29
7.2.3.1	Failure prediction	29
7.2.3.1.1	Description	29
7.2.3.1.2	Use case	29
7.2.3.1.3	Requirements	29
7.2.3.2	Service failure recovery	29
7.2.3.2.1	Description	29
7.2.3.2.2	Use case	30
7.2.3.2.3	Requirements	30
7.2.4	MDA assisted Energy Saving	30
7.2.4.1	Energy saving analysis	30
7.2.4.1.1	Description	30
7.2.4.1.2	Use cases	30
7.2.4.1.3	Requirements	31
7.2.5	MDA assisted mobility management	31
7.2.5.1	Mobility performance analysis	31
7.2.5.1.1	Description	31
7.2.5.1.2	Use case	31
7.2.5.1.3	Requirements	32
7.2.5.2	Handover optimization analysis	32
7.2.5.2.1	Description	32
7.2.5.2.2	Use cases	32
7.2.5.2.3	Requirements	33
7.2.5.3	Inter-gNB beam selection optimization	33
7.2.5.3.1	Description	33
7.2.5.3.2	Use case	33
7.2.5.3.3	Requirements	34
7.2.6	MDA assisted critical maintenance management	34
7.2.6.1	RAN Node Software Upgrade	34
7.2.6.1.1	Description	34
7.2.6.1.2	Use case	34
7.2.6.1.3	Requirements	35
7.2.7	Resource related analytics	35
7.2.7.1	NF resource utilization analysis	35
7.2.8	Prediction and statistics of Management data	37
7.2.8.1	Description	37
7.2.8.2	Use case	37
7.2.8.3	Requirements	37
7.3	MDA MnS	37
7.3.1	MDA request and control	37
7.3.1.1	Description	37
7.3.1.2	Use case	38
7.3.1.3	Requirements	38
7.3.2	Obtaining MDA Output	38
7.3.2.1	Description	38
7.3.2.2	Use case	38
7.3.2.3	Requirements	39
7.3.3	Filtering analytics recommendations	39
7.3.3.1	Description	39
7.3.3.2	Use Case	39
7.3.3.3	Requirements	40
8	Data definitions for MDA capabilities	40
8.1	Introduction	40

8.1.1	MDA Types	40
8.2	About analytics	40
8.2.1	About enabling data	40
8.2.2	About analytics outputs	40
8.3	Common information elements of analytics outputs	40
8.3.0	General	40
8.3.1	Common information element definitions	41
8.4	Data definitions per MDA capability	41
8.4.1	Coverage related analytics	41
8.4.1.1	Coverage problem analysis	41
8.4.1.1.1	MDA type	41
8.4.1.1.2	Enabling data	41
8.4.1.1.3	Analytics output	42
8.4.1.2	Paging Optimization	44
8.4.1.2.1	MDA type	44
8.4.1.2.2	Enabling data	44
8.4.1.2.3	Analytics output	44
8.4.2	SLS analysis	44
8.4.2.1	Service experience analysis	44
8.4.2.1.1	MDA type	44
8.4.2.1.2	Enabling data	44
8.4.2.1.3	Analytics output	46
8.4.2.2	Network slice throughput analysis	46
8.4.2.2.1	MDA type	46
8.4.2.2.2	Enabling data	46
8.4.2.2.3	Analytics output	47
8.4.2.3	Network slice traffic prediction	48
8.4.2.3.1	MDA type	48
8.4.2.3.2	Enabling data	48
8.4.2.3.3	Analytics output	48
8.4.2.4	E2E latency analysis	48
8.4.2.4.1	MDA type	48
8.4.2.4.2	Enabling data	48
8.4.2.4.3	Analytics output	49
8.4.2.5	Network slice load analysis	49
8.4.2.5.1	MDA type	49
8.4.2.5.2	Enabling data	49
8.4.2.5.3	Analytics output	51
8.4.3	MDA assisted fault management	51
8.4.3.1	MDA assisted failure prediction	51
8.4.3.1.1	MDA type	51
8.4.3.1.2	Enabling data	51
8.4.3.1.3	Analytics output	52
8.4.4	MDA assisted energy saving	53
8.4.4.1	Energy saving analysis	53
8.4.4.1.1	MDA type	53
8.4.4.1.2	Enabling data	53
8.4.4.1.3	Analytics output	54
8.4.5	MDA assisted mobility management	55
8.4.5.1	Mobility performance analysis	55
8.4.5.1.1	MDA type	55
8.4.5.1.2	Enabling data	56
8.4.5.1.3	Analytics output	56
8.4.5.2	Handover Optimization analysis	56
8.4.5.2.1	MDA type	56
8.4.5.2.2	Enabling data	56
8.4.5.2.3	Analytics output	57
8.4.6	Maintenance management related analytics	57
8.4.6.1	Maintenance management analysis	57
8.4.6.1.1	MDA type	57
8.4.6.1.2	Enabling data	57
8.4.6.1.3	Analytics output	58

8.4.7.1.2	Physical resource utilization analysis	60
8.4.7.1.2.1	MDA type	60
8.4.7.1.3	5GC Control plane congestion analysis	62
8.4.7.1.3.1	MDA type	62
8.4.7.1.3.2	Enabling data	62
8.4.7.1.3.3	Analytics output	62
8.4.8	Predictions of Management data	63
8.4.8.0	General	63
8.4.8.1	MDA assisted PM predictions	63
8.4.8.1.1	MDA type	63
8.4.8.1.2	Enabling data	63
8.4.8.1.2.1	Mobility management performance related predictions	63
8.4.8.1.2.2	Coverage related predictions	63
8.4.8.1.2.3	SLS related predictions	64
8.4.8.1.2.4	Energy Saving related predictions	65
8.4.8.1.2.5	Critical Maintenance management related predictions	65
8.4.8.1.3	Analytics output	66
8.5	Data type definitions	66
8.5.1	RecommendedAction <<dataType>>	66
8.5.1.1	Definition	66
8.5.1.2	Information elements	67
8.5.2	Recommended3GPPAction <<dataType>>	67
8.5.2.1	Definition	67
8.5.2.2	Information elements	67
8.5.2.3	Constraints	69
8.5.3	TrafficLoadTrend <<dataType>>	69
8.5.3.1	Definition	69
8.5.3.2	Information elements	69
8.5.4	Void	69
8.5.5	EsRecommendationsOnNRcell <<dataType>>	69
8.5.5.1	Definition	69
8.5.5.2	Information elements	70
8.5.6	EsRecommendationsOnUPF <<dataType>>	70
8.5.6.1	Definition	70
8.5.6.2	Information elements	71
8.5.7	StatisticOfCellEsState <<dataType>>	71
8.5.7.1	Definition	71
8.5.7.2	Information elements	71
8.5.8	CurrentUpgrade <<dataType>>	72
8.5.8.1	Definition	72
8.5.8.2	Information elements	72
8.5.9	FutureUpgrade <<dataType>>	72
8.5.9.1	Definition	72
8.5.9.2	Information elements	72
8.5.10	TrafficProjections <<dataType>>	73
8.5.10.1	Definition	73
8.5.10.2	Information elements	73
8.5.11	UPFProj <<dataType>>	73
8.5.11.1	Definition	73
8.5.11.2	Information elements	74
8.5.12	gNBProj <<dataType>>	74
8.5.12.1	Definition	74
8.5.12.2	Information elements	74
8.5.13	HOTargetType <<dataType>>	75
8.5.13.1	Definition	75
8.5.13.2	Information elements	75
8.5.14	FutureOptimal <<dataType>>	76
8.5.14.1	Definition	76
8.5.14.2	Information elements	76
8.5.15	VirRes <<dataType>>	76
8.5.15.1	Definition	76