

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Resource and Admission Control Sub-System (RACS): Functional Architecture

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ETSI ES 282 003 V3.5.1 \(2011-04\)](https://standards.iteh.ai/catalog/standards/etsi/c8f9c313-e515-4fa0-b28e-c9572cad795f/etsi-es-282-003-v3-5-1-2011-04)

<https://standards.iteh.ai/catalog/standards/etsi/c8f9c313-e515-4fa0-b28e-c9572cad795f/etsi-es-282-003-v3-5-1-2011-04>



Reference

RES/TISPAN-02084-NGN-R3

Keywords

architecture, control, system**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

Document Preview
(<https://standards.iteh.ai>)

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the 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

<http://portal.etsi.org/tb/status/status.asp>

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

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2011.
All rights reserved.

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

3GPPTM is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

LTETM is a Trade Mark of ETSI currently being registered

for the benefit of its Members and of the 3GPP Organizational Partners.

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

Contents

Intellectual Property Rights	10
Foreword.....	10
1 Scope	11
2 References	11
2.1 Normative references	11
2.2 Informative references.....	12
3 Definitions and abbreviations.....	12
3.1 Definitions.....	12
3.2 Abbreviations	14
4 General description of RACS.....	16
4.1 Functional overview	16
4.1.1 Global description.....	16
4.1.2 Basic functionalities.....	16
4.1.3 Restrictions applicable to the present document.....	17
4.2 Functional Requirements.....	17
4.2.1 R1 Requirements	17
4.2.1.1 Overall.....	17
4.2.1.2 Transport Control Service Requests.....	17
4.2.1.3 Resource Handling.....	18
4.2.1.4 QoS Management.....	19
4.2.1.5 Traffic Handling.....	19
4.2.1.6 Charging and Overload Control.....	19
4.2.2 R2 Requirements	19
4.2.2.1 Overall.....	20
4.2.2.2 Resource Handling.....	20
4.2.2.3 QoS Management.....	20
4.2.2.4 e2e QoS Handling	21
4.2.2.5 Multicast/Unicast Handling	21
4.2.2.6 Topology and Resource Information Retrieval	21
4.2.2.7 Network Deployment Scenarios.....	21
4.2.2.8 Charging and Overload Control	22
4.2.3 R3 Requirements	22
4.2.3.1 Interaction with the CPN.....	22
4.2.3.1.1 Direct control by RACS	22
5 RACS functional architecture derivation basis	22
5.1 Resource Control for Unicast and Multicast	22
5.1.1 Resource control scenarios	23
5.1.1.1 Identification of Resources	23
5.1.1.2 Multicast Resource Admission Decision Specifics	23
5.1.1.3 Resource Admission Decision Prerequisites	23
5.1.1.4 Resource Admission Control Approaches	24
5.1.1.5 Multicast Resource Admission Control in the Access Network Domain Transport Nodes	24
5.1.1.6 Unicast/Multicast Resource Reuse in the Access Segment.....	25
5.2 Charging.....	25
5.3 QoS Management Functions in Fixed Access Networks.....	25
5.4 Resource Control for QoS Downgrading	27
6 RACS functional architecture definition.....	28
6.1 General	28
6.2 Functional elements.....	30
6.2.1 SPDF.....	30
6.2.1.1 SPDF main functions	30
6.2.1.2 Summary of SPDF Elementary Functions	30
6.2.1.3 Reference points.....	32

6.2.1.4	User profile	32
6.2.1.5	Priority	32
6.2.1.6	Service request	33
6.2.1.7	Coordination function	33
6.2.1.8	Charging	34
6.2.1.9	Deployment considerations	34
6.2.1.10	Overload control	34
6.2.1.11	Discovery mechanism	34
6.2.2	Generic Resource Admission Control Function	34
6.2.2.1	Main functions	34
6.2.2.1.1	Specializations of x-RACF	35
6.2.2.1.2	Reference points applicable to different specializations of x-RACF	35
6.2.2.1.3	Multiple instantiations of x-RACF	35
6.2.2.2	Summary of generic Resource Admission Control Function Elementary Functions	36
6.2.2.3	A-RACF	38
6.2.2.3.1	A-RACF main functions	38
6.2.2.3.2	Reference points	38
6.2.2.4	C-RACF	39
6.2.2.4.1	C-RACF main functions	39
6.2.2.4.2	Reference points	39
6.2.2.5	Admission control process	39
6.2.2.5.1	A-RACF	39
6.2.2.5.2	C-RACF	41
6.2.2.6	Installation of policies	41
6.2.2.7	Charging	42
6.2.2.8	Abnormal condition handling	42
6.2.2.9	Deployment considerations	42
6.2.2.10	Overload control	42
6.2.2.11	Discovery Mechanism	42
6.2.3	BGF	42
6.2.3.1	BGF main functions	42
6.2.3.2	BGF parameters	43
6.2.3.3	Reference points	43
6.2.3.4	Addressing latching	43
6.2.3.5	Abnormal conditions handling	43
6.2.3.6	Overload control	43
6.2.4	RCEF	44
6.2.4.1	RCEF main functions	44
6.2.4.2	Reference points	44
6.2.4.3	RCEF parameters	44
6.2.5	Application Function (AF)	44
6.2.5.1	AF main functions	44
6.2.5.2	Reference points	45
6.2.5.3	Charging	46
6.2.5.4	Abnormal conditions handling	46
6.2.6	BTF	46
6.3	RACS reference points	46
6.3.1	Rq reference point (SPDF - x-RACF)	46
6.3.1.1	Functional requirements	46
6.3.1.1.1	Resource management mechanisms	46
6.3.1.1.2	Service model	47
6.3.1.1.3	Duration semantics	47
6.3.1.1.4	Audit and synchronization support	48
6.3.1.1.5	Report facilities for unsolicited events	48
6.3.1.2	Non-functional requirements	48
6.3.1.2.1	Reliability requirements	48
6.3.1.2.2	Security requirements	48
6.3.1.3	Information exchanged over the Rq Reference Point	48
6.3.1.3.1	Resource Reservation Request	48
6.3.1.3.2	Resource Modification Request	50
6.3.1.3.3	Resource Request/Modification Confirmation	51
6.3.1.3.4	Resource Release Request	51

6.3.1.3.5	Abort Resource Reservation	51
6.3.2	e4 reference point (A-RACF - NASS).....	52
6.3.3	Ia Reference Point (SPDF - BGF)	52
6.3.3.1	Functional Requirements	52
6.3.3.1.1	Control of NAT, Hosted NAT traversal and Gating.....	52
6.3.3.1.2	Transport Protocol Type Policing.....	52
6.3.3.1.3	Bandwidth control	52
6.3.3.1.4	QoS marking.....	52
6.3.3.1.5	Usage metering and statistics reporting.....	52
6.3.3.1.6	Resource state synchronization	53
6.3.3.2	Non-Functional Requirements	53
6.3.3.2.1	Reliability requirements	53
6.3.3.2.2	Security requirements.....	53
6.3.3.3	Information exchanged over the Ia Reference Point	53
6.3.3.3.1	BGF Service Request	53
6.3.3.3.2	BGF Service Confirmation.....	56
6.3.3.3.3	BGF Service Modify Request.....	57
6.3.3.3.4	BGF Service Modify Confirmation.....	58
6.3.3.3.5	BGF Service Audit Request	59
6.3.3.3.6	BGF Service Audit Response	60
6.3.3.3.7	BGF Service Notify Request	61
6.3.3.3.8	BGF Service Notify Indication.....	62
6.3.3.3.9	BGF Service Release Request	62
6.3.3.3.10	BGF Service Release Confirmation.....	63
6.3.4	Gq' Reference Point (AF - SPDF).....	64
6.3.4.1	Functional Requirements	64
6.3.4.2	Non-Functional Requirements	64
6.3.4.3	Information exchanged over the Gq' Reference Point.....	64
6.3.5	Ri' Reference Point (SPDF-SPDF inter-domain).....	65
6.3.5.1	Functional Requirements	65
6.3.5.1.1	Resource management mechanisms	65
6.3.5.1.2	Service model.....	65
6.3.5.1.3	Duration semantics	65
6.3.5.1.4	Audit and Synchronization support	66
6.3.5.1.5	Report facilities for unsolicited events	66
6.3.5.2	Non-Functional Requirements	66
6.3.5.2.1	Reliability requirements	66
6.3.5.2.2	Security requirements.....	66
6.3.5.3	Information exchanged over the Ri' Reference Point.....	66
6.3.6	Rd' Reference Point (SPDF-SPDF intra-domain).....	66
6.3.6.1	Functional Requirements	66
6.3.6.1.1	Resource management mechanisms	66
6.3.6.1.2	Service model.....	66
6.3.6.1.3	Duration semantics	67
6.3.6.1.4	Audit and Synchronization support	67
6.3.6.1.5	Report facilities for unsolicited events	67
6.3.6.2	Non-Functional Requirements	67
6.3.6.2.1	Reliability requirements	67
6.3.6.2.2	Security requirements.....	67
6.3.6.3	Information exchanged over the Rd' Reference Point.....	67
6.3.7	Re Reference Point (x-RACF - RCEF).....	67
6.3.7.1	Functional Requirements	67
6.3.7.1.1	Policy Enforcement Management.....	67
6.3.7.2	Non-functional requirements.....	68
6.3.7.2.1	Reliability requirements	68
6.3.7.2.2	Security requirements.....	68
6.3.7.3	Information exchanged over the Re Reference Point.....	69
6.3.7.3.1	Information exchanged by using the push mode	69
6.3.7.3.2	Information exchanged by using the pull mode.....	74
6.3.7.3.3	Information exchanged by using both QoS mechanisms.....	81
6.3.8	Rr Reference Point (x-RACF - x-RACF intra-domain).....	82
6.3.8.1	Functional Requirements	82

6.3.8.1.1	Overall features	82
6.3.8.1.2	Resource management mechanisms	83
6.3.8.1.3	Service model	84
6.3.8.1.4	Duration semantics	84
6.3.8.1.5	Audit and Synchronization support	84
6.3.8.1.6	Report facilities for unsolicited events	85
6.3.8.2	Non-Functional Requirements	85
6.3.8.2.1	Reliability requirements	85
6.3.8.2.2	Security requirements	85
6.3.8.3	Information exchanged over the Rr Reference Point	85
6.3.8.3.1	Information exchanged over the Rr Reference Point for request model	85
6.3.8.3.2	Information exchanged over the Rr Reference Point for delegated model	88
6.3.9	Rf Reference Point (SPDF-Charging Functions and x-RACF-Charging Functions)	92
6.4	RACS Flows: Interaction Procedures	92
6.4.1	Subscriber Attaches to the Access Network	93
6.4.2	Request Resource	93
6.4.2.1	Request Resource by using the push mode	93
6.4.2.1.1	Admission control using push mode when only one x-RACF is involved	93
6.4.2.1.2	Admission control using push mode when multiple x-RACFs are involved	95
6.4.2.2	Request Resource by using the pull mode	98
6.4.2.2.1	Admission control using pull mode when only one x-RACF is involved	98
6.4.2.2.2	Admission control using pull mode when multiple x-RACFs are involved	99
6.4.2.3	Request resource by combining push and pull mode	100
6.4.3	Request Resource Wholesale/Retail Scenario	103
6.4.3.1	Request Resource with access to the A-RACF in the retail domain	103
6.4.3.2	Request Resource without access to the A-RACF in the retail domain	105
6.4.4	Release Resource	106
6.4.4.1	Release Resource Request by using the push mode	106
6.4.4.2	Release Resource Request by using the pull mode	107
6.4.4.2.1	Resource Release using pull mode when only one x-RACF is involved	107
6.4.4.2.2	Resource release using pull mode when multiple x-RACFs are involved	108
6.4.5	Commit Resources procedure	110
6.4.6	Resource Modification Request	111
6.4.6.1	Resource Modification Request by using the push mode	111
6.4.6.2	Resource Modification Request by using the pull mode	112
6.4.7	RACS Retrieves Access Profile from NASS	112
6.4.8	Subscriber Detaches from the access network	113
6.4.9	Abnormal event from the RCEF	115
6.4.10	Report of BGF Events	116
6.4.11	Indication of a BGF Service Failure (Autonomous Release of BGF)	116

Annex A (informative):	Binding Information in RACS, NASS and AF	118
-------------------------------	---	------------

Annex B (informative):	Policy nomenclature for RACS	119
-------------------------------	---	------------

B.1	Overview	119
B.2	Policy Terminology	119
B.2.1	Policy	119
B.2.2	Conditions	119
B.2.3	Actions	119
B.2.4	Events	119
B.3	Types of Policy	120
B.3.1	Authorization Policy	120
B.3.2	Obligation Policy	120
B.3.3	Traffic Policy	120
B.3.4	Control Policy	120

Annex C (informative):	Admission control scenarios	121
-------------------------------	--	------------

C.1	Example of the handling of Connection Oriented network in the aggregation segment	121
-----	---	-----

Annex D (informative):	Network deployment scenarios	122
-------------------------------	---	------------

D.1	Resource control scenarios according to distribution of Service-based Policy Decision and Admission Control Functions.....	122
D.1.1	Single NGN operator performs Service-based Policy Decision and Admission Control Functions	122
D.1.1.1	Scenario Overview.....	122
D.1.1.2	Business Need.....	122
D.1.1.3	Mapping to TISPAN Architecture: RACS requirements.....	123
D.1.1.4	Technical Analysis.....	123
D.1.1.4.1	Functional Element Analysis	123
D.1.1.4.2	Elementary Functions Analysis.....	123
D.1.1.4.3	Reference Point Analysis	123
D.1.2	Service-based Policy Decision function handled in two domains	123
D.1.2.1	Scenario Overview.....	123
D.1.2.2	Business Need.....	124
D.1.2.3	Mapping to TISPAN Architecture: RACS requirements.....	124
D.1.2.4	Technical Analysis.....	124
D.1.2.4.1	Functional Element Analysis	124
D.1.2.4.2	Elementary Functions Analysis.....	124
D.1.2.4.3	Reference Point Analysis	124
D.1.3	Service-based Policy Decision and Admission Control functions distributed across two domains	125
D.1.3.1	Scenario Overview.....	125
D.1.3.2	Business Need.....	125
D.1.3.3	Mapping to TISPAN Architecture: RACS requirements.....	125
D.1.3.4	Technical Analysis.....	126
D.1.3.4.1	Functional Element Analysis	126
D.1.3.4.2	Elementary Functions Analysis.....	126
D.1.3.4.3	Reference Point Analysis	126
D.2	Resource control scenarios for Multicast and Unicast	126
D.2.1	Independent scenario - Unicast and Multicast admission control are separated.....	126
D.2.1.1	Scenario Overview.....	126
D.2.1.2	Business Need.....	126
D.2.1.3	Mapping to TISPAN Architecture: RACS requirements.....	126
D.2.1.4	Technical Analysis.....	127
D.2.1.4.1	Functional Element Analysis	127
D.2.1.4.2	Elementary Functions Analysis.....	127
D.2.1.4.3	Reference Point Analysis	127
D.2.2	Synchronized Scenario	127
D.2.2.1	Scenario Overview.....	127
D.2.2.2	Business Need.....	127
D.2.2.3	Mapping to TISPAN Architecture: RACS requirements.....	127
D.2.2.4	Technical Analysis.....	127
D.2.2.4.1	Functional Element Analysis	127
D.2.2.4.2	Elementary Functions Analysis.....	127
D.2.2.4.3	Reference Point Analysis	128
D.2.3	Integrated scenario - Integrated Unicast and Multicast Admission Control	128
D.2.3.1	Scenario Overview.....	128
D.2.3.2	Business Need.....	128
D.2.3.3	Mapping to TISPAN Architecture: RACS requirements.....	128
D.2.3.4	Technical Analysis.....	128
D.2.3.4.1	Functional Element Analysis	128
D.2.3.4.2	Elementary Functions Analysis.....	128
D.2.3.4.3	Reference Point Analysis	128
D.3	Resource control scenario for Metro Network	129
D.3.1	Scenario Overview	129
D.3.2	Business Need	129
D.3.3	Mapping to TISPAN Architecture: RACS requirements	129
D.3.4	Technical Analysis	129
D.3.4.1	Functional Element Analysis	129
D.3.4.2	Elementary Functions Analysis	129
D.3.4.3	Reference Point Analysis.....	130
D.4	Resource control scenario for CPNs.....	130