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TECHNICAL SPECIFICATION

Publicly Available Specification (PAS); O-RAN R1 interface General Aspects and Principles (O-RAN.WG2.TS.R1GAP-R004-v11.00)

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Foreword

This Technical Specification (TS) has been produced by O-RAN Alliance and approved by ETSI Technical Committee Mobile Standards Group (MSG).

Modal verbs terminology

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1 Scope

The present document specifies the general aspects and principles of the R1 interface. It is part of a TS-family covering the R1 interface specifications.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found in the ETSI docbox.

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The following referenced documents are necessary for the application of the present document.

[1] O-RAN.WG2.TS.A1AP-R004: "O-RAN A1 interface: Application Protocol".

[2] O-RAN.WG2.TS.Use-Case-Requirements-R004: "O-RAN Non-RT RIC & A1/R1 Interface: Use Cases and Requirements".

[3] O-RAN.WG2.TS.Non-RT-RIC-ARCH-R004: "O-RAN Non-RT RIC: Architecture".

[4] O-RAN.WG11.TS.SecProtSpec.O-R003: "O-RAN Security Protocols Specifications".

[5] O-RAN.WG2.TS.R1TP-R004: "O-RAN Transport protocols for R1 Services".

[6] O-RAN.WG6.TS.O2IMS-INTERFACE-R004: "O-RAN O2IMS-Interface Specification".

[7] O-RAN.WG6.O2DMS-INTERFACE-ETSI-NFV-PROFILE-R004: "O-RAN O2dms Interface Specification: Profile based on ETSI NFV Protocol and Data Models".

[8] O-RAN.WG6.TS.O2-GA&P-R004: "O-RAN O2 Interface General Aspects and Principles".

[9] O-RAN.WG11.TS.SRCS.0-R004: "O-RAN Security Requirements and Controls Specification".

[10] O-RAN.WG1.OAM-Architecture: "O-RAN Operations and Maintenance Architecture".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents may be useful in implementing an ETSI deliverable or add to the reader's understanding, but are not required for conformance to the present document.

[i.1] ETSI TR 121 905: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Vocabulary for 3GPP Specifications (3GPP TR 21.905 version 9.4.0 Release 9)".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

AI/ML model: algorithm that applies AI/ML techniques to produce model output data based on model input data

AI/ML model training: process to train an AI/ML model by learning the input/output relationship in a data driven manner and obtain a trained AI/ML model that can be used for inference

data instance: set of data which resulted from a data job

data job: entity that provides data related to a DME type

DME type: data type managed and exposed by the DME services and identified by a DME type identifier

O-RAN Non-real-time RAN Intelligent Controller (Non-RT RIC): logical function in the SMO framework that enables non-real-time control and optimization of RAN elements and resources, AI/ML workflow including model training and updates, and policy-based guidance of applications/features in Near-RT RIC

NOTE: The Non-RT RIC is comprised of the Non-RT RIC framework and Non-RT RIC applications (rApps).

Non-RT RIC framework: functionality internal to the SMO framework that logically terminates the A1 interface and provides the R1 services to rApps through the R1 interface

R1 interface: interface between rApps and Non-RT RIC framework via which R1 Services can be produced and consumed

R1 services: collection of services including, but not limited to, service registration and discovery services, authentication and authorization services, AI/ML workflow services, RAN OAM-related services as well as A1and O2 related services

Non-RT RIC application rApp: application designed to consume and/or produce R1 Services

NOTE: rApps can leverage the functionality provided by the SMO/Non-RT RIC framework to deliver value added services related to intelligent RAN optimization and operation.

rApp instance: individual occurrence of a Non-RT RIC application running in the Non-RT RIC runtime environment

rApp instance identifier: unique identifier for each rApp instance, assigned by the SMO/Non-RT RIC framework during rApp registration

3.2 Symbols

Void.

3.3 Abbreviations

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

AI	Artificial Intelligence
API	Application Programming Interface
CM	Configuration Management
DME	Data Management and Exposure
DMS	Deployment Management Service
EI	Enrichment Information
FM	Fault Management
FQDN	Fully Qualified Domain Name
ID	Identifier
IMS	Infrastructure Management Service

ML	Machine Learning
OAM	Operation And Maintenance
PM	Performance Management
RAN	Radio Access Network
rAppId	rApp Instance Identifier
RBAC	Role Based Access Control
RIC	RAN Intelligent Controller
RT	Real-Time
SME	Service Management and Exposure
SMO	Service Management and Orchestration
SPS	Security Protocols Specification
SRS	Security Requirements and controls Specification
TBAC	Target Based Access Control
UCR	Use Cases and Requirement
URI	Uniform Resource Identifier

4 General Aspects of R1 Interface and R1 Services

4.1 Introduction

The following clauses cover the general aspects for R1 interface.

4.2 General principles

The general principles for the specification of the R1 interface are as follows:

- The R1 interface is an open logical interface within the O-RAN architecture between the rApps and the Non-RT RIC framework.
- The R1 interface supports the exchange of control signalling information and the collection and delivery of data between endpoints.
- The R1 interface enables multi-vendor rApps to consume or produce the R1 services and is independent of specific implementations of the SMO and Non-RT RIC framework.
- The R1 interface is defined in an extensible way that enables new services and data types to be added without needing to change the protocols or the procedures.

4.3 Specification objectives

The R1 interface specifications shall:

- Facilitate inter-connection between rApps and Non-RT RIC framework supplied by different vendors.
- Provide a level of abstraction between rApps and SMO/Non-RT RIC framework that can be the consumers and or producers of R1 services.

4.4 Capabilities

As described in [2] the R1 interface shall support:

- Registration and Deregistration of R1 services.
- Authentication of rApps.
- Authorization of requests to access R1 services.