



# **Standardized Connectivity Management Objects 3GPP Packet Switched Bearer Parameters**

For use with OMA Device Management  
Candidate Version 1.0 – 12 Aug 2008

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**Open Mobile Alliance**  
OMA-DDS-DM\_ConnMO\_3GPPPS-V1\_0-20080812-C

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# 1. Scope

## 1.1 Connectivity Object – 3GPP Packet Switched Bearer

This document defines a 3GPP Packet Switched (e.g. WCDMA) bearer specific parameters used together with the standardized connectivity management object [CONNMO] in order to have a complete standardized Network Access Point definition for 3GPP Packet Switched connectivity settings in the OMA DM management tree.

While this 3GPP Packet Switched object is optional for any OMA DM implementation, their widespread use will simplify the management of 3GPP Packet Switched connectivity parameters in devices.

The object is defined using the OMA DM Device Description Framework [DMTND]. The object has standardized points of extension to permit implementation-specific parameters to accompany the standardized parameters. This added flexibility is intended to encourage the use of the standardized object while not unnecessarily restricting individual vendor innovations.

## 2. References

### 2.1 Normative References

- [CONNMO] *Standardized Connectivity Management Objects, Version 1.0*, Open Mobile Alliance™, OMA-DDS-DM\_ConnMO\_V1\_0-D, URL:<http://www.openmobilealliance.org>
- [DMTND] *Device Management Tree and Description, Version 1.2*, Open Mobile Alliance™, OMA-TS-DM-DMTND-V1\_2, URL:<http://www.openmobilealliance.org>
- ~~[RFC1321]~~ *RFC1321, The MD5 Message-Digest Algorithm*, R. Rivest 1992, URL: <http://www.ietf.org/rfc/rfc1321.txt>
- [RFC2119] “Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997, URL:<http://www.ietf.org/rfc/rfc2119.txt>
- ~~[RFC2234]~~ “Augmented BNF for Syntax Specifications: ABNF”, D. Crocker, Ed., P. Overell. November 1997, URL:<http://www.ietf.org/rfc/rfc2234.txt>

### 2.2 Normative Authorities of References

Various parameters specified in the management objects defined in this document rely on an authority outside the scope of this specification to supply the set of acceptable values and value formats. In such references to external authority, only the directly cited material is referenced, not the entire external specification. The following authorities of reference are cited in this document:

- [3GPP23.107-Attributes] 3GPP TS 23.107 Quality of Service (QoS) concept and architecture, chapter 6.4 QoS Attributes, URL:<http://www.3gpp.org/>
- [3GPP23.107-Ranges] 3GPP TS 23.107 Quality of Service (QoS) concept and architecture, chapter 6.5 Attribute Value Ranges, URL:<http://www.3gpp.org/>
- [3GPP24.008-PDP] *3GPP TS 24.008 Mobile radio interface Layer 3 specification, chapter 10.5.6.4 Packet data protocol address*, URL:<http://www.3gpp.org/>
- [3GPP24.008-QoS] *3GPP TS 24.008 Mobile radio interface Layer 3 specification, chapter 10.5.6.5 Quality of service*, URL:<http://www.3gpp.org/>
- [AUTH-APN] *3GPP TS 23.003, Numbering, addressing and identification, chapter 9*, URL:<http://www.3gpp.org/>
- [AUTH-PS] *3GPP 27.060, Mobile Station (MS) Supporting Packet Switched Services, chapter 9*, URL:<http://www.3gpp.org/>
- ~~[AUTH-RFC3513-ADDR]~~ *RFC 3513, Internet Protocol Version 6 (IPv6) Addressing Architecture, §§2.2, 2.3* The Internet Society, 2003, URL:<http://www.ietf.org/rfc/rfc3513.txt>
- ~~[RFC1321]~~ *RFC1321, The MD5 Message-Digest Algorithm*, R. Rivest 1992, URL: <http://www.ietf.org/rfc/rfc1321.txt>

### 2.3 Informative References

[None](#)

- ~~[3GPP23.060]~~ *3GPP TS 23.060 General Packet Radio Service (GPRS), Service description, Stage 2* URL:<http://www.3gpp.org/>

## 3. Terminology and Conventions

### 3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

### 3.2 Definitions

See the DM Tree and Description [DMTND] document for definitions of terms related to the management tree.

### 3.3 Abbreviations

NAP	Network Access Point
OMA	Open Mobile Alliance
QoS	Quality of Service
UE	User Equipment

## 4. Introduction

Usually over time network protocols grow and are replaced as the market cycle plays out. Connectivity Management Object [CONNMO] is structured in such a way as to be resilient to the addition of new bearer and proxy types without requiring wholesale replacement of the object definitions. In this way, the common structure survives into future versions of the management objects thus easing the burden of transition from old bearer types to new.

This document specifies 3GPP Packet Switched bearer specific part of the general Network Access Point management object and it also allows for vendor specific extensions.

## 5. Justification

This Reference Release includes several Management Object definitions for use, in conjunction with the OMA Device Management Enabler, to manage data network connectivity settings for mobile terminals over common bearer and proxy types.

### 5.1 Standardized Connectivity Management

Providing a standardized set of management objects for configuration of data network connectivity through the OMA Device Management system will improve the usability and customer experience of mobile terminals that rely upon data services. As proposed, the management object definitions may be used in conjunction with OMA Device Management Candidate and Approved Enabler Releases over a variety of transports including: HTTP, HTTPS, OBEX over IrDA, OBEX over Bluetooth, and various forms of Smart Card.

### 5.2 Application-Neutral

Producing these management object definitions in an application-neutral fashion, we avoid reinvention of solutions to the same set of problems for each of new application that requires data connectivity. This reduces the connectivity parameters that an application must define to a simple reference node, ConRef (Connectivity Reference).

### 5.3 Bearer-Neutral

By presenting the specifications in two parts, a bearer-neutral part and bearer-specific bindings, we reinforce the OMA principle of network neutrality while providing specificity where needed but without bias for or against any particular network type.



## 6. 3GPP Packet Switched Bearer Specific Management Object

### 6.1 Introduction

A general introduction of the connectivity management object is given in the connectivity management object document [CONNMO] as well as the needed compliance rules. This document specifies the CDMA bearer specific NAP Object.

~~The CDMA subtree specified in this document MUST be placed under the *BearerParams* node in [CONNMO].~~

### 6.2 Definitions related to NAP MO

The 3GPPS subtree specified in this document MUST be placed under the *BearerParams* node in [CONNMO].

#### **BearerType**

The *BearerType* node value specified in [CONNMO] MUST be “3GPPS”.

#### **AddrType**

*AddrType* in the NAP MO specified in [ConnMO], if it exists, MUST have the value ‘APN’. The *Addr* value specified in the NAP MO in [ConnMO] MUST be an Access Point Name [AUTH-APN] in dotted alphanumeric notation.

#### **AuthType**

The *AuthType* value in the NAP MO specified in [ConnMO] MUST be from the table below:

<b>AuthType</b>	<b>Description</b>
PAP	Password Authentication Protocol [AUTH-PS]
CHAP	Challenge Handshake Authentication Protocol [AUTH-PS]
MD5	MD5 Message Digest Authentication Protocol [RFC1321]

**Table 1: NAP Authentication Protocol Types**

## 6.3 Graphical Representation (Informative)

The following figure provides the structure of 3GPP Packet Switched bearer specific management object.

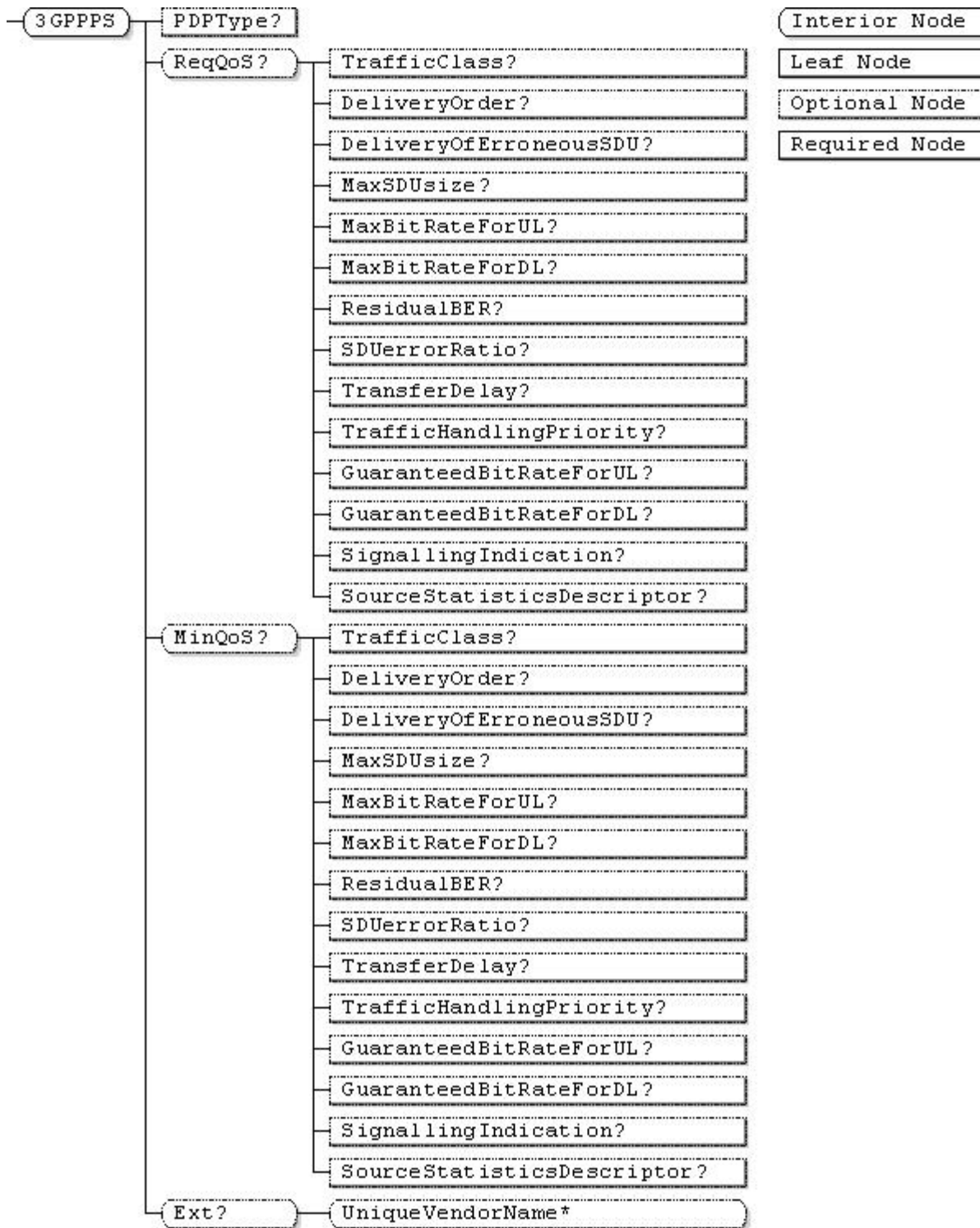


Figure 1. 3GPP Packet Switched bearer specific Management Object

## 6.4 Node descriptions

### .../BearerParams/3GPPS

Status	Occurrence	Format	Min. Access Types
Required	One	node	Get

This interior node specifies the 3GPP Packet Switched bearer specific management object for a *network access point*, or NAP, management object. Management Object Identifier for the 3GPP PS MO MUST be: “urn:oma:mo:oma-connmo-3gppps:1.0”.

### PDPTType

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	chr	Get

This leaf node specifies the 3GPP Packet Data PDP Type. [See as defined](#) in [3GPP24.008-PDP]. Possible PDP types are defined in the following table.

PDPTType	Description
IPv4	IPv4 in use.
IPv6	IPv6 in use.
PPP	PPP in use.

Table 2: 3GPP Packet Data PDP Types

### ReqQoS

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node’s leaf nodes specify the requested QoS parameters. Rules and usage of these leaf nodes parameters are defined in [3GPP24.008-QoS].

### MinQoS

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This interior node’s leaf nodes specify the minimum QoS parameters. Rules and usage of these leaf nodes parameters are defined in [3GPP24.008-QoS]. With this node it is possible to configure the minimum acceptable QoS for this connection in the UE.

**ReqQoS/TrafficClass****MinQoS/TrafficClass**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Traffic Class”. [See as defined](#) in [3GPP24.008-QoS]. The bit pattern shall be encoded as in [3GPP24.008-QoS] with the least significant bit in the rightmost position of the integer. Example: If the parameter is encoded into bit 6, 7 & 8 in [3GPP24.008-QoS] then it must be encoded into bit 1, 2 & 3 in this node.

**ReqQoS/DeliveryOrder****MinQoS/DeliveryOrder**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Delivery order”. [See as defined](#) in [3GPP24.008-QoS]. The bit pattern shall be encoded as in [3GPP24.008-QoS] with the least significant bit in the rightmost position of the integer. Example: If the parameter is encoded into bit 6, 7 & 8 in [3GPP24.008-QoS] then it must be encoded into bit 1, 2 & 3 in this node.

**ReqQoS/DeliveryOfErroneousSDU****MinQoS/DeliveryOfErroneousSDU**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Delivery of erroneous SDU”. [See as defined](#) in [3GPP24.008-QoS].

**ReqQoS/MaxSDUsize****MinQoS/MaxSDUsize**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Maximum SDU size”. [See as defined](#) in [3GPP24.008-QoS].

**ReqQoS/MaxBitRateForUL****MinQoS/MaxBitRateForUL**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

[This node is used for the combined value of the 3GPP parameters: “Maximum bit rate for uplink” and “Maximum bit rate for uplink \(extended\)”. See \[3GPP24.008-QoS\] for definitions and allowed values.](#) The value shall be encoded as an unsigned ~~16bit~~ integer and represents the bit rate in kbit/sec. The value range is defined in [3GPP23.107-Ranges] and the purpose is defined in [3GPP23.107-Attributes].

[This node is used for the 3GPP parameter: “Maximum bit rate for uplink” as defined in \[3GPP24.008-QoS\].](#)

**ReqQoS/MaxBitRateForDL****MinQoS/MaxBitRateForDL**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the combined value of the 3GPP parameters: “Maximum bit rate for downlink” and “Maximum bit rate for downlink (extended)”. See [3GPP24.008-QoS] for definitions and allowed values. The value shall be encoded as an unsigned ~~16bit~~ integer and represents the bit rate in kbit/sec. The value range is defined in [3GPP23.107-Ranges] and the purpose is defined in [3GPP23.107-Attributes].

~~This node is used for the 3GPP parameter: “Maximum bit rate for downlink” and “Maximum bit rate for downlink (extended)” as defined in [3GPP24.008-QoS].~~

**ReqQoS/ResidualBER****MinQoS/ResidualBER**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Residual BER”. ~~See as defined~~ in [3GPP24.008-QoS]. The bit pattern shall be encoded as in [3GPP24.008-QoS] with the least significant bit in the rightmost position of the integer. Example: If the parameter is encoded into bit 6, 7 & 8 in [3GPP24.008-QoS] then it must be encoded into bit 1, 2 & 3 in this node.

**ReqQoS/SDUerrorRatio****MinQoS/SDUerrorRatio**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “SDU error ratio”. ~~See as defined~~ in [3GPP24.008-QoS].

**ReqQoS/TransferDelay****MinQoS/TransferDelay**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Transfer delay”. ~~See as defined~~ in [3GPP24.008-QoS]. The bit pattern shall be encoded as in [3GPP24.008-QoS] with the least significant bit in the rightmost position of the integer. Example: If the parameter is encoded into bit 6, 7 & 8 in [3GPP24.008-QoS] then it must be encoded into bit 1, 2 & 3 in this node.

**ReqQoS/TrafficHandlingPriority****MinQoS/TrafficHandlingPriority**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Traffic Handling priority”. ~~See as defined~~ in [3GPP24.008-QoS].

**ReqQoS/GuaranteedBitRateForUL****MinQoS/GuaranteedBitRateForUL**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

[This node is used for the combined value of the 3GPP parameters: “Guaranteed bit rate for uplink” and “Guaranteed bit rate for uplink \(extended\)”. See \[3GPP24.008-QoS\] for definitions and allowed values.](#) The value shall be encoded as an unsigned ~~16bit~~ integer and represents the bit rate in kbit/sec. The value range is defined in [3GPP23.107-Ranges] and the purpose is defined in [3GPP23.107-Attributes].

~~This node is used for the 3GPP parameter: “Guaranteed bit rate for uplink” as defined in [3GPP24.008-QoS].~~

**ReqQoS/GuaranteedBitRateForDL****MinQoS/GuaranteedBitRateForDL**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

[This node is used for the combined value of the 3GPP parameters: “Guaranteed bit rate for downlink” and “Guaranteed bit rate for downlink \(extended\)”. See \[3GPP24.008-QoS\] for definition and allowed values.](#)~~This leaf node is used for both requested QoS and minimum QoS.~~ The value shall be encoded as an unsigned ~~16bit~~ integer and represents the bit rate in kbit/sec. The value range is defined in [3GPP23.107-Ranges] and the purpose is defined in [3GPP23.107-Attributes].

~~This node is used for the 3GPP parameter: “Guaranteed bit rate for downlink” and “Guaranteed bit rate for downlink (extended)” as defined in [3GPP24.008-QoS].~~

**ReqQoS/SignallingIndication****MinQoS/SignallingIndication**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Signalling Indication”. ~~See -as definitioned~~ in [3GPP24.008-QoS]. The bit pattern shall be encoded as in [3GPP24.008-QoS] with the least significant bit in the rightmost position of the integer. Example: If the parameter is encoded into bit 6, 7 & 8 in [3GPP24.008-QoS] then it must be encoded into bit 1, 2 & 3 in this node.

**ReqQoS/SourceStatisticsDescriptor****MinQoS/SourceStatisticsDescriptor**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	int	Get

This node is used for the 3GPP parameter: “Source Statistics Descriptor”. ~~See -as definitioned~~ in [3GPP24.008-QoS].

**Ext**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrOne	node	Get

This optional interior node designates the single top-level branch of the NAP DM management object tree into which vendor extensions MAY be supported, permanently or dynamically. Ext sub trees, such as this one, are included at various places in the DM connectivity management objects to provide flexible points of extension for implementation-specific parameters. However, vendor extensions MUST NOT be defined outside of the Ext subtrees.

**Ext/UniqueVendorName**

Status	Occurrence	Format	Min. Access Types
Optional	ZeroOrMore	node	Get

This interior node is supplied by a vendor to distinguish their extension from those of other vendors. The *UniqueVendorName* SHOULD be a trademark or company name controlled by each vendor to ensure uniqueness. The structure of any subtree below a *UniqueVendorName* interior node is implementation-specific.

## 7. Operational Considerations

ConnMO is normatively dependent on the DM 1.2 specifications. However, this normative dependency should not be seen as restricting these MO definitions only to DM clients implementing that version of the DM enabler.

For example, a management authority may exchange ConnMO data-files using means not specifically defined in the DM 1.2 enabler.



## Appendix A. Change History (Informative)

### A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

### A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-DDS-DM_ConnMO_3GPPS	3 Oct 2007	All	First version based on the corresponding TS
	7 Oct 2007	5	Added this chapter from the WID
	17 Oct 2007	7	Added from the approved ETR
	8 Feb 2007	All	Editorial updates: - Template - Formatting of node tables
	15 Apr 2008	6	Editorial update
	8 May 2008	2, 6	Editorial update according to consistency review comments F001 & F003
	23 Jun 2008	6.4	Adding CR: OMA-DM-ConnMo-2008-0003-CR_3GPPS_Ref_BugFix.zip
Candidate Versions OMA-DDS-DM_ConnMO_3GPPS	12 Aug 2008	n/a	Status changed to Candidate by TP TP ref#: OMA-TP-2008-0286- INP_Connectivity_Management_Objects_V1_0_RRP_for_Candidate_Approval