



OMA Device Management Standardized Objects

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Contents

- 1. SCOPE5
- 2. REFERENCES6
 - 2.1 NORMATIVE REFERENCES.....6
 - 2.2 INFORMATIVE REFERENCES.....6
- 3. TERMINOLOGY AND CONVENTIONS7
 - 3.1 CONVENTIONS.....7
 - 3.2 DEFINITIONS.....7
 - 3.3 ABBREVIATIONS.....7
- 4. INTRODUCTION8
- 5. STANDARDIZED OBJECTS9
 - 5.1 MANAGEMENT OBJECTS.....9
 - 5.1.1 Definition and description of management objects.....9
 - 5.1.2 DDF compliance.....11
 - 5.2 MANAGEMENT OBJECTS STANDARDIZED BY OTHER ORGANIZATIONS11
 - 5.3 THE OMA DM MANAGEMENT OBJECTS11
 - 5.3.1 The DM Account management object12
 - 5.3.2 The DevInfo management object20
 - 5.3.3 The DevDetail management object.....21
 - 5.3.4 The Inbox URI23
- APPENDIX A. CHANGE HISTORY (INFORMATIVE).....25
 - A.1 APPROVED VERSION HISTORY25
 - A.2 DRAFT/CANDIDATE VERSION 1.2 HISTORY25
- APPENDIX B. STATIC CONFORMANCE REQUIREMENTS (NORMATIVE).....26
 - B.1 SCR FOR DM v1.2 CLIENT.....26
 - B.2 SCR FOR DM v1.2 SERVER26
- APPENDIX C. DM ACCOUNT (NORMATIVE).....27
- APPENDIX D. DEVINFO (NORMATIVE)36
- APPENDIX E. DEVDETAIL (NORMATIVE).....39
- APPENDIX F. MAPPING OF DEVICE MANAGEMENT PARAMETERS.....43

Figures

- Figure 1. Example of a management object pictured using the graphical notation.....10
- Figure 2. Example of an instantiated ./DevInfo object10
- Figure 3. The DM Account Management Object.....13
- Figure 4. The DevInfo management object20
- Figure 5. The DevDetail management object22
- Figure 6. The Inbox URI23

Tables

- Table 1: AAuthLevel Values18
- Table 2: AAuthType Values.....19

1. Scope

This document defines a set of management objects. Some of these are mandatory for all OMA DM compliant devices and others are optional. The objects are defined using the OMA DM Device Description Framework.

2. References

2.1 Normative References

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- [RFC791] “Internet Protocol: Darpa Internet Protocol Program Specification”. September 1981. [URL:http://www.ietf.org/rfc/rfc791.txt](http://www.ietf.org/rfc/rfc791.txt)
- [w7] “OMA w7 Application Characteristic for DM Version 1.0”. Open Mobile Alliance™. OMA-w7-Application-Characteristic-for-DM-V1_0_0. [URL:http://www.openmobilealliance.org](http://www.openmobilealliance.org)

2.2 Informative References

None.

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.

Any reference to components of the DTD's or XML snippets are specified in this `typeface`.

3.2 Definitions

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

3.3 Abbreviations

None.

4. Introduction

Other OMA DM specifications define the syntax and semantics of the OMA DM protocol. However, the usefulness of such a protocol would be limited if the managed entities in devices required different data formats and displayed different behaviors. To avoid this situation this specification defines a number of mandatory management objects for various uses in devices. These objects are primarily associated with OMA DM and SyncML configuration.

Since device manufacturers will always develop new functions in their devices and since these functions often are proprietary, no standardized management objects exist for them. To make these functions manageable in the devices that have them, a device description framework is needed that can provide servers with the necessary information they must have in order to manage the new functions. The intention with this framework is that device manufacturers will publish descriptions of their devices as they enter the market. Organizations operating device management servers should then only have to feed the new description to their servers for them to automatically recognize and manage the new functions in the devices.

5. Standardized Objects

5.1 Management Objects

Management objects are the entities that can be manipulated by management actions carried over the OMA DM protocol. A management object can be as small as an integer or large and complex like a background picture or screen saver. The OMA DM protocol is agnostic about the contents, or values, of the management objects and treats the node values as opaque data

5.1.1 Definition and description of management objects

OMA DM management objects are defined using the OMA DM Device Description Framework [DMTND], or DDF. The use of this description framework produces detailed information about the device in question. However, due to the high level of detail in these descriptions, they are sometimes hard for humans to digest and it can be a time consuming task to get an overview of a particular objects structure.

In order to make it easier to quickly get an overview of how a management object is organized and its intended use, a simplified graphical notation in the shape of a block diagram is used in this document. Even though the notation is graphical, it still uses some printable characters, e.g. to denote the number of occurrences of a node. These are mainly borrowed from the syntax of DTDs for XML. The characters and their meaning are defined in the following table.

Character	Meaning
+	one or many occurrences
*	zero or more occurrences
?	zero or one occurrences

If none of these characters is used the default occurrence is exactly once.

There is one more feature of the DDF that needs to have a corresponding graphical notation, the un-named block. These are blocks that act as placeholders in the description and are instantiated with information when the nodes are used at run-time. Un-named blocks in the description are represented by a lower case character in italics, e.g. *x*.

Each block in the graphical notation corresponds to a described node, and the text is the name of the node. If a block contains an *x*, it means that the name is not known in the description and that it will be assigned at run-time. The names of all ancestral nodes are used to construct the URI for each node in the management object. It is not possible to see the actual parameters, or data, stored in the nodes by looking at the graphical notation of a management object.

The following is an example of what a management object can look like when it is expressed using the graphical notation. This particular object is the OMA DM Device Information management object.

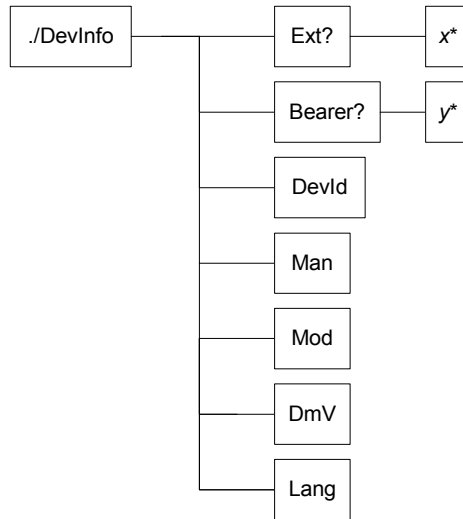


Figure 1. Example of a management object pictured using the graphical notation

Naturally, this graphical overview does not show all the details of the full description, but it provides a good map of the description so that it is easier to find the individual nodes. Although the figure only provides an elevated view of the description, there are still some things worth noticing. All the blocks with names in place occur exactly once, except Ext and Bearer that are optional and may not be present at all. One of the named nodes, DevInfo, has child nodes; it is an interior node. With the exception of Ext and Bearer, none of the other named nodes can have any children of their own; they are leaf nodes. The un-named leaf nodes are marked with *. This means that although the description only contains one node description at this position in the tree, there can be any number of instantiated nodes at run-time, including none. The only limit is that the node names must be unique and memory must be available to store the nodes.

The next figure shows an example of what the device information management object could look like at run-time.

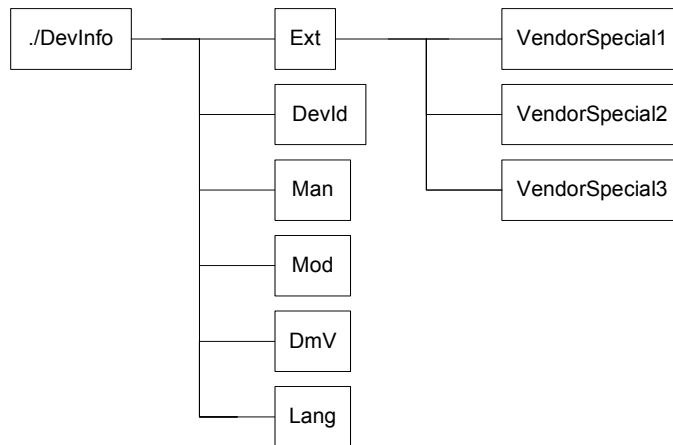


Figure 2. Example of an instantiated ./DevInfo object

The difference between this and the previous figure is that now the un-named blocks have been instantiated. It is also shown that the * character means that a node can occur zero or more times. Note that none of the stored data in the leaf nodes is shown in the figure, what are visible are only the node names.

5.1.2 DDF compliance

The management object descriptions in this document are normative. However, the descriptions also contain a number of informative aspects that could be included to enhance readability or serve as examples. Other informative aspects are, for instance, the `ZeroOrMore` and `OneOrMore` elements, where implementations may introduce restrictions. All these exceptions are listed here:

- All XML comments, e.g. “<!-- some text -->”, are informative.
- The descriptions do not contain an `RTProperties` element, or any of its child elements, but a description of an actual implementation of this object MAY include these.
- If a default value for a leaf node is specified in a description, by the `DefaultValue` element, an implementation MUST supply its own appropriate value for this element. If the `DefaultValue` element is present in the description of a node, it MUST be present in the implementation, but MAY have a different value.
- The value of all `Man`, `Mod`, `Description` and `DFTitle` elements are informative and included only as examples.
- Below the interior nodes `Ext` and `Bearer`, an implementation may add further nodes at will.
- The contents of the `AccessType` element MAY be extended by an implementation.
- If the any of the following `AccessType` values are specified, they MUST NOT be removed in an implementation: `Copy`, `Delete`, `Exec`, `Get`, and `Replace`.
- If the `AccessType` value `Add` is specified it MAY be removed in an implementation if the implementation only supports a fixed number of child nodes.
- An implementation MAY replace the `ZeroOrMore` or `OneOrMore` elements with `ZeroOrN` or `OneOrN` respectively. An appropriate value for N must also be given with the `...OrN` elements.

5.2 Management objects standardized by other organizations

OMA DM has been designed so that existing management objects can be managed. These existing management objects have typically already been standardized by other standards organizations.

Currently there are no management objects standardized by other organizations in use with OMA DM.

5.3 The OMA DM management objects

Clients implementing OMA DM MUST support the OMA DM Account management object, DevInfo management object and the DevDetail management object. OMA DM servers MUST support all three management objects as well.

Management Object	Client Support	Server Support	Description
DMAcc	MUST	MUST	Settings for the DM client in a managed device.
DevInfo	MUST	MUST	Device information for the OMA DM server. Sent from the client to the server.

DevDetail	MUST	MUST	General device information that benefits from standardization.
Inbox	MAY	MAY	Reserved URI where the device SHOULD use the management object identifier to identify the absolute URI.

The difference between DevInfo and DevDetail is that the DevInfo parameters are needed by the management server for problem free operation of the OMA DM protocol. The DevInfo object is sent from client to server in the beginning of every session.

DevDetail contains other device specific parameters that benefits from being standardized and mandatory. The only difference is that these parameters are not sent from client to server automatically. Instead, these parameters are managed by servers as any other parameters and can be manipulated using OMA DM commands.

5.3.1 The DM Account management object

The management object is used to manage settings for OMA DM protocol.

Management object identifier: org.openmobilealliance/1.0/w7

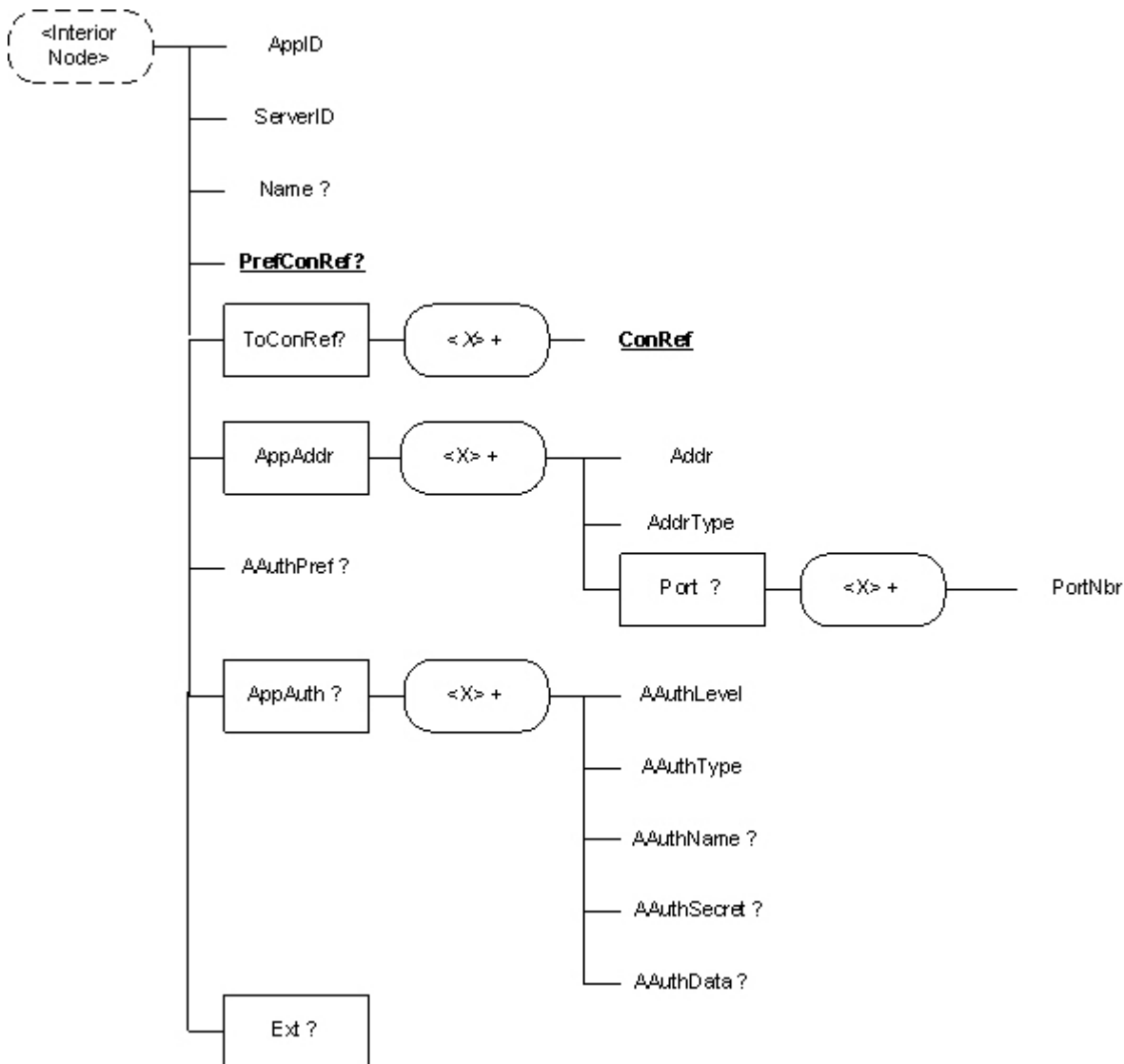


Figure 3. The DM Account Management Object

Parameters are also described in Device Management Application Characteristic registration document [w7] which is used as a part of OMA Client Provisioning specifications [ERELDCP]. General mapping rules of OMA Client Provisioning parameters are described in [DMBOOT]. When the DM Account parameters are derived from OMA Client Provisioning w7 document, see more information about parameter mapping in Appendix B.

The complete DDF description of this management object can be found in [Appendix C].

5.3.1.1 Node: <X>

This interior node acts as a placeholder for one or more accounts or for a fixed node.

- Occurrence: OneOrMore / One

- Format: Node
- Access Types: Get
- Values: N/A

5.3.1.2 Node: <X>/AppID

This node specifies the application ID for device management account object.

- Occurrence: One
- Format: Chr
- Access Types: Get
- Values: w7

5.3.1.3 Node: <X>/ServerID

This node specifies a server identifier for management server used in the management session.

- Occurrence: One
- Format: Chr
- Access Types: Get
- Values: <Server identifier>

5.3.1.4 Node: <X>/Name

This node specifies user displayable name for the management server.

- Occurrence: ZeroOrOne
- Format: Chr
- Access Types: Get
- Values: <User displayable name>

5.3.1.5 Node: <X>/PrefConRef

This node specifies a reference to preferred connectivity. It is expected that either a proxy or NAP MO is specified, but other, implementation-specific connectoids may be referenced.

- Occurrence: ZeroOrOne
- Format: Chr
- Access Types: Get
- Values: URI to a management object or implementation specific identifier.

5.3.1.6 Node: <X>/ToConRef/

The ToConRef interior node is used to allow application to refer to a collection of connectivity definitions. Several connectoids may be listed for a given application under this interior node.

- Occurrence: ZeroOrOne
- Format: Node
- Access Type: Get
- Value: N/A

5.3.1.7 Node: <X>/ToConRef/<X>

This run-time node acts as a placeholder for one or more connectivity parameters.

- Occurrence: OneOrMore
- Format: Node
- Access Type: Get
- Value: N/A

5.3.1.8 Node: <X>/ToConRef/<X>/ConRef

The ConRef leaf indicates the linkage to connectivity parameters.

- Occurrence: One
- Format: Chr
- Access Type: Get
- Value: URI to a management object or implementation specific identifier.

5.3.1.9 Node: <X>/AppAddr

This node is used to specify multiple Management Server addresses.

- Occurrence: One
- Format: Node
- Access Types: Get
- Values: N/A

5.3.1.10 Node: <X>/AppAddr/<X>

This interior node acts as a placeholder for separating one or more Server Addresses.

- Occurrence: OneOrMore
- Format: Node
- Access Types: Get
- Values: N/A

5.3.1.11 Node: <X>/AppAddr/<X>/Addr

This node specifies a Management Server address.

- Occurrence: One
- Format: Chr
- Access Types: Get
- Values: Dependent upon AddrType.

5.3.1.12 Node: <X>/AppAddr/<X>/AddrType

This node specifies a Management Server address type.

- Occurrence: One
- Format: Chr
- Access Types: Get
- Values: “URI”, “IPv4” or “IPv6”. If no value exists the default type MUST be “URI”.

5.3.1.13 Node: <X>/AppAddr/<X>/Port

This node specifies Port information for Management Server address.

- Occurrence: ZeroOrOne
- Format: Node
- Access Types: Get
- Values: N/A

5.3.1.14 Node: <X>/AppAddr/<X>/Port/<X>

This interior node acts as a placeholder for separating one or more Port settings.

- Occurrence: OneOrMore
- Format: Node
- Access Types: Get

- Values: N/A

5.3.1.15 Node: <X>/AppAddr/<X>/Port/<X>/PortNbr

This node specifies port number.

- Occurrence: One
- Format: Chr
- Access Types: Get
- Values: The port number MUST be a decimal number and must fit within the range of a 16 bit unsigned integer.

5.3.1.16 Node: <X>/AAuthPref

This is a string-valued parameter whose possible values are the names of the various possible authentication types (AAuthType values), e.g. "syncml:auth-md5". If this node is present, the client SHOULD use this authentication type when connecting to the server. The use of this node is intended to reduce the number of round trips between client and server that would be caused by authentication challenges. If a client supports this leaf node and the value is empty, the default behaviour is to indicate the authentication mechanism negotiated in the previous session if one exists.

- Occurrence: ZeroOrOne
- Format: Chr
- Access Types: Get
- Values: See AAuthTypes in section 5.3.1.20.

5.3.1.17 Node: <X>/AppAuth

This node specifies authentication information.

- Occurrence: ZeroOrOne
- Format: Node
- Access Types: Get
- Values: N/A

5.3.1.18 Node: <X>/AppAuth/<X>

This interior node acts as a placeholder for separating one or more authentication settings.

- Occurrence: OneOrMore
- Format: Node
- Access Types: Get
- Values: N/A

5.3.1.19 Node: <X>/AppAuth/<X>/AAuthLevel

This node specifies the authentication level.

- Occurrence: One
- Format: Chr
- Access Types: Get
- Values:

	Status	Interpretation
CLCRED	Optional	Credentials client uses to authenticate itself to the OMA DM Server at the DM protocol level.
SRVCRED	Optional	Credentials server uses to authenticate itself to the OMA DM Client at the DM protocol level.
OBEX	Optional	Credentials for OBEX authentication. NOTE: If this AAuthLevel is selected only HTTP-BASIC, HTTP-DIGEST and TRANSPORT are possible AAuthTypes.
HTTP	Optional	Credentials for HTTP (/WSP) authentication. NOTE: If this AAuthLevel is selected only HTTP-BASIC, HTTP-DIGEST and TRANSPORT are possible AAuthTypes.

Table 1: AAuthLevel Values

5.3.1.20 Node: <X>/AppAuth/<X>/AAuthType

This node specifies the authentication type.

- Occurrence: One
- Format: Chr
- Access Types: Get
- Values:

	Status	Interpretation
HTTP-BASIC	Optional	HTTP basic authentication done according to RFC 2617.
HTTP-DIGEST	Optional	HTTP digest authentication done according to RFC 2617.

BASIC	Optional	DM 'syncml:auth-basic' authentication as specified in [DMSEC].
DIGEST	Optional	DM 'syncml:auth-md5' authentication as specified in [DMSEC].
HMAC	Optional	DM 'syncml:auth-MAC' authentication as specified in [DMSEC].
X509	Optional	'syncml:auth-X509' authentication done according to [REPPRO].
SECUREID	Optional	'syncml:auth-secrid' authentication done according to [REPPRO].
SAFWORD	Optional	'syncml:auth-safeword' authentication done according to [REPPRO].
DIGIPASS	Optional	'syncml:auth-digipass' authentication done according to [REPPRO].
TRANSPORT	Optional	Secure Transport authentication is used. Transport layer authentication is beyond the scope of OMA DM Security.

Table 2: AAuthType Values

5.3.1.21 Node: <X>/AppAuth/<X>/AAuthName

This node specifies the authentication name.

- Occurrence: ZeroOrOne
- Format: Chr
- Access Types: Get
- Values: <Authentication name>

5.3.1.22 Node: <X>/AppAuth/<X>/AAuthSecret

This node specifies the authentication secret.

- Occurrence: ZeroOrOne
- Format: Chr
- Access Types: No Get
- Values: <Authentication secret>

5.3.1.23 Node: <X>/AppAuth/<X>/AAAuthData

This node specifies the authentication nonce.

- Occurrence: ZeroOrOne
- Format: Chr
- Access Types: No Get
- Values: <Authentication nonce>

5.3.1.24 Node: <X>/Ext/

The Ext is an interior node for where the vendor specific information about device management application is being placed (vendor meaning application vendor, device vendor, OS vendor etc.). Usually the vendor extension is identified by vendor specific name under the ext node. The tree structure under the vendor identified is not defined and can therefore include a non-standard sub-tree.

- Occurrence: ZeroOrOne
- Format: Node
- Access Types:
- Values: N/A

5.3.2 The DevInfo management object

Management object identifier: org.openmobilealliance.dm/1.0/DevInfo

The following figure shows an overview of the DevInfo management object.

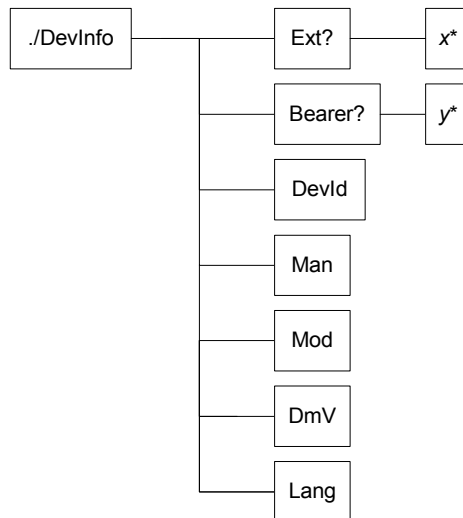


Figure 4. The DevInfo management object

The nodes making up DevInfo have the following meanings:

Ext

An optional, interior node, designating the only branch of the DevInfo sub tree into which extensions can be added, permanently or dynamically.

Bearer

An optional, interior node of the DevInfo sub tree in which items related to the bearer (CDMA, etc.) are stored. Use of this sub tree can be mandated by other standards.

DevId

A unique identifier for the device. SHOULD be globally unique and MUST be formatted as a URN as defined in [RFC2141].

Man

The manufacturer identifier.

Mod

A model identifier (manufacturer specified string).

DmV

OMA device management client version identifier (manufacturer specified string).

Lang

The current language setting of the device. The syntax of the language tags and their use are defined in [RFC1766]. Language codes are defined by ISO in the standard ISO639.

The complete DDF description of this management object can be found in [Appendix D].

5.3.3 The DevDetail management object

Management object identifier: org.openmobilealliance.dm/1.0/DevDetail

The following figure shows an overview of the DevDetail management object.

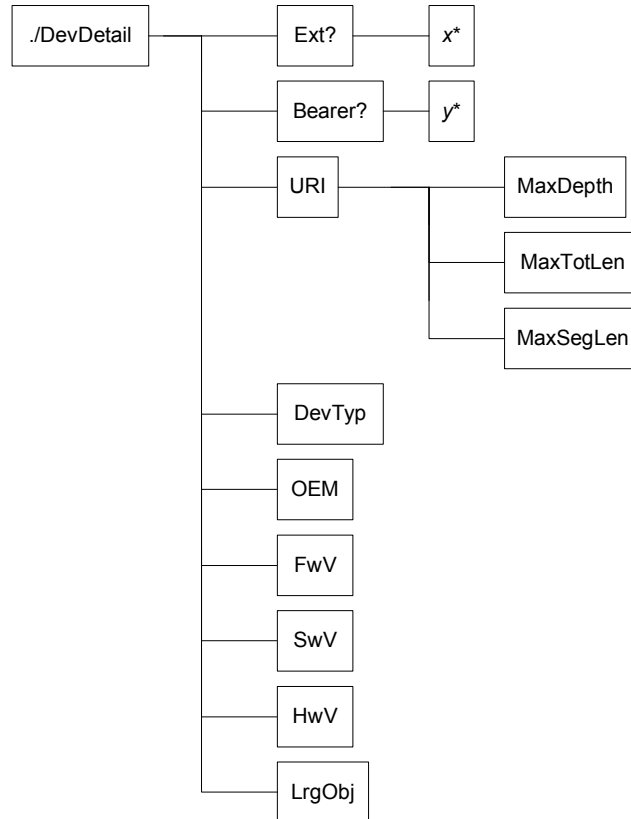


Figure 5. The DevDetail management object

The nodes making up DevDetail have the following meanings:

Ext

An optional, interior node, designating the only branch of the DevDetail sub tree into which extensions can be added, permanently or dynamically.

Bearer

An optional, interior node, designating a branch of the DevDetail sub tree into which items related to the bearer (CDMA, etc.) are stored. Use of this sub tree can be mandated by other standards.

URI/MaxDepth

Specifies the maximum depth of the management tree supported by the device. The maximum depth of the tree is defined as the maximum number of URI segments that the device supports. The value is a 16 bit, unsigned integer encoded as a numerical string. The value '0' means that the device supports a tree of 'unlimited' depth.

URI/MaxTotLen

Specifies the maximum total length of any URI used to address a node or node property. The maximum total length of a URI is defined as the largest total number of characters making up the URI which the device can support. Note that depending on the character set this might not be the same as the number of bytes. The value is a 16 bit, unsigned integer encoded as a numerical string. The value '0' means that the device supports URI of 'unlimited' length.

URI/MaxSegLen

Specifies the maximum total length of any URI segment in a URI used to address a node or node property. The maximum total length of a URI segment is defined as the largest number of characters which the device can support in a single URI segment. Note that depending on the used character set this might not be the same as the number of bytes.

The value is a 16 bit, unsigned integer encoded as a numerical string. The value '0' means that the device supports URI segments of 'unlimited' length.

DevTyp

Device type, e.g. PDA, pager, or phone.

OEM

Original Equipment Manufacturer of the device.

FwV

Firmware version of the device.

SwV

Software version of the device.

HwV

Hardware version of the device.

LrgObj

Indicates whether the device supports the OMA DM Large Object Handling specification, as defined in [DMPRO].

It is RECOMMENDED that the combination of HwV, SwV, FwV, Man, Mod, and OEM provide a unique signature identifying the specific version of software, thus providing a means for other implementations to make special provisions based on that identification.

The complete DDF description of this management object can be found in [Appendix E].

5.3.4 The Inbox URI

Management object identifier: org.openmobilealliance.dm/1.0/Inbox

In some circumstances a Management Object's URI is not the preferred addressing method and the management object identifier is enough information for the device to resolve a suitable location for that Management Object. In that case the URI: "/Inbox" is a reserved location for this purpose.

For example a device's DDF description may indicate if that device is supporting the "/Inbox" concept. In that definition it is possible to define the only access type "Add". Then a server may send a Management Object to that device with the URI: "/Inbox" and then the device should use the management object identifier to resolve the correct location in the management tree to add that Management Object. In this case the server can not Get that object from the URI: "/Inbox" after it is added. The client's ACL for "/Inbox" may also set access rights so only some servers are allowed to use this feature.

DM Clients MUST NOT permit a *Get* operation on the "/Inbox". A DM Client SHALL return the status code "*Command not allowed*" (405) in response to a *Get* which targets "/Inbox" or any direct or indirect child node of "/Inbox".

The following figure shows an overview of the Inbox URI:



Figure 6. The Inbox URI

The node has the following meaning:

Inbox

An optional, interior node.

Appendix A. Change History

(Informative)

A.1 Approved Version History

Reference	Date	Description
OMA-SyncML-DMStdObj-V1_1_2-20031209-A	09 Dec 2003	SyncML DM Standardized Objects V1.1.2 Approved Release.

A.2 Draft/Candidate Version 1.2 History

Document Identifier	Date	Sections	Description
Draft versions OMA-DM-StdObj-V1_2	22 Nov 2004	All	The initial version of this document, based on OMA DM 1.1.2.
	22 Nov 2004	All	Editorial changes.
	15 Dec 2004	All	CR's 2004-0164R04, 2004-0231R02, 2004-0297R01 and 2004-0329R01 incorporated and made editorial changes.
	22 Dec 2004	All	Editorial changes, included w7 in the reference table and added Inbox to object to the SCR table.
	10 Jan 2005	All	CR 2004-350 incorporated. Editorial changes.
	18 Jan 2005	All	Editorial changes and incorporated CR 2005-0007.
	28 Jan 2005	All	Editorial changes.
	31 Jan 2005	All	Updated filenames.
	19 Apr 2005	All	Applied CR's 2005-0156, 0157, 0159R01, 0162, 0161R01, 0179, 0184, 0190 and 0167R01
	03 May 2005	Filename Title page References	Changed version 1.2.0 to 1.2
11 May 2005	5.3.4	Applied CR 2005-0212R02.	
Candidate versions OMA-DM-StdObj-V1_2	07 Jun 2005	n/a	Candidate version approved by TP R&A OMA-TP-2005-0137R01-DM-V1_2-for-Candidate-approval

Appendix B. Static Conformance Requirements (Normative)

The notation used in this appendix is specified in [IOPPROC].

B.1 SCR for DM v1.2 Client

Item	Function	Reference	Status	Requirement
SCR-DM-STDOBJ-C-001	Support of DevInfo object	Section 5.3.2	M	
SCR-DM-STDOBJ-C-002	Support of DevDetail Object	Section 5.3.3	M	
SCR-DM-STDOBJ-C-003	Support of DM Account Object	Section 5.3.1	M	
SCR-DM-STDOBJ-C-004	Support of Inbox Object	Section 5.3.4	O	

B.2 SCR for DM v1.2 Server

Item	Function	Reference	Status	Requirement
SCR-DM-STDOBJ-S-001	Support of DevInfo object	Section 5.3.2	M	
SCR-DM-STDOBJ-S-002	Support of DevDetail Object	Section 5.3.3	M	
SCR-DM-STDOBJ-S-003	Support of DM Account Object	Section 5.3.1	M	
SCR-DM-STDOBJ-S-004	Support of Inbox Object	Section 5.3.4	O	

Appendix C. DM Account

(Normative)

This Appendix is Normative given the restrictions in Section 5.1.2.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MgmtTree PUBLIC "-//OMA//DTD-DM-DDF 1. 2//EN" http://www.openmobilealliance.org/tech/DTD/OMA-TS-DM-DDF-1\_2\_0.dtd>
<MgmtTree>
  <VerDTD>1.2</VerDTD>
  <Man>--The device manufacturer--</Man>
  <Mod>--The device model--</Mod>
  <Node>
    <nodeName/>
    <DFProperties>
      <AccessType/>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <OneOrMore/>
      </Occurrence>
      <DFTitle>--The Interior node--</DFTitle>
    </DFProperties>
  </Node>
  <Node>
    <nodeName>AppID</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <chr/>
      </DFFormat>
      <Occurrence>
        <One/>
      </Occurrence>
      <DFTitle>Application ID for DM Account MO</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <nodeName>ServerID</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
```

```

    <chr/>
  </DFFormat>
  <Occurrence>
    <One/>
  </Occurrence>
  <DFTitle>Server Identifier</DFTitle>
  <DFType>
    <MIME>text/plain</MIME>
  </DFType>
</DFProperties>
</Node>
<Node>
  <NodeName>Name</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <ZeroOrOne/>
    </Occurrence>
    <DFTitle>Displayable name for the Management Server</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <NodeName>PrefConRef</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <ZeroOrOne/>
    </Occurrence>
    <DFTitle>Reference to preferred connectivity</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

```

```

<Node>
  <nodeName>ToConRef</nodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <ZeroOrOne/>
    </Occurrence>
    <DFTitle>A collection of references to connectivity definitions</DFTitle>
  </DFProperties>
  <Node>
    <nodeName/>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <OneOrMore/>
      </Occurrence>
      <DFTitle>The “name” node for one or more connectivity parameters</DFTitle>
    </DFProperties>
  </Node>
  <nodeName>ConRef</nodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <DFTitle>Linkage to connectivity parameters</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
</Node>

```

```

</Node>
<Node>
  <nodeName>AppAddr</nodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <DFTitle>A collection of all references to AppAddr objects</DFTitle>
  </DFProperties>
  <Node>
    <nodeName/>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <OneOrMore/>
      </Occurrence>
      <DFTitle>The “name” node for multiple AppAddr objects</DFTitle>
    </DFProperties>
  </Node>
  <nodeName>Addr</nodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <DFTitle>Management Server Address</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

```

```

<Node>
  <NodeName>AddrType</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <DFTitle>Management Server Address Type</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <NodeName>Port</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <ZeroOrOne/>
    </Occurrence>
    <DFTitle>A collection of all Port objects</DFTitle>
  </DFProperties>
  <Node>
    <NodeName/>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Occurrence>
        <OneOrMore/>
      </Occurrence>
      <DFTitle>The “name” node for a Port object</DFTitle>
    </DFProperties>
  </Node>

```

```

        <NodeName>PortNbr</NodeName>
        <DFProperties>
            <AccessType>
                <Get/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <DFTitle>Port</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
</Node>
</Node>
</Node>
</Node>
<Node>
    <NodeName>AAuthPref</NodeName>
    <DFProperties>
        <AccessType>
            <Get/>
        </AccessType>
        <DFFormat>
            <chr/>
        </DFFormat>
        <Occurrence>
            <ZeroOrOne/>
        </Occurrence>
        <DFTitle>Application Authentication Type preference</DFTitle>
        <DFType>
            <MIME>text/plain</MIME>
        </DFType>
    </DFProperties>
</Node>
<Node>
    <NodeName>AppAuth</NodeName>
    <DFProperties>
        <AccessType>
            <Get/>
        </AccessType>
        <DFFormat>
            <node/>
        </DFFormat>
    </DFProperties>

```



```

</DFFormat>
<Occurrence>
  <ZeroOrOne/>
</Occurrence>
<DFTitle>A collection of all references to multiple Application Authentication objects</DFTitle>
</DFProperties>
<Node>
  <NodeName/>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Occurrence>
      <OneOrMore/>
    </Occurrence>
    <DFTitle>The “name” node for multiple Application Authentication objects</DFTitle>
  </DFProperties>
</Node>
<Node>
  <NodeName>AAuthLevel</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <One/>
    </Occurrence>
    <DFTitle>Application Authentication level</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <NodeName>AAuthType</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>

```

```

    <Occurrence>
      <One/>
    </Occurrence>
    <DFTitle>Application Authentication Type</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <NodeName>AAuthName</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <ZeroOrOne/>
    </Occurrence>
    <DFTitle>Application Authentication Name</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <NodeName>AAuthSecret</NodeName>
  <DFProperties>
    <AccessType>
      <!-- no GET-->
    </AccessType>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Occurrence>
      <ZeroOrOne/>
    </Occurrence>
    <DFTitle>Application Authentication Secret</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <NodeName>AAuthData</NodeName>

```

```

    <DFProperties>
      <AccessType>
        <!-- no GET-->
      </AccessType>
      <DFFormat>
        <chr/>
      </DFFormat>
      <Occurrence>
        <ZeroOrOne/>
      </Occurrence>
      <DFTitle>Application Authentication Data</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
</Node>
</Node>
<NodeName>Ext</NodeName>
<DFProperties>
  <AccessType>
    <!-- None defined -->
  </AccessType>
  <DFFormat>
    <node/>
  </DFFormat>
  <Occurrence>
    <ZeroOrOne/>
  </Occurrence>
  <DFTitle>Vendor specific information</DFTitle>
</DFProperties>
</Node>
</Node>
</MgmtTree>

```

Appendix D. DevInfo

(Normative)

This appendix contains a description of the OMA DM DevInfo management object, according to the OMA DM Description Framework. This Appendix is Normative given the restrictions in Section 5.1.2.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MgmtTree PUBLIC "-//OMA//DTD-DM-DDF 1. 2//EN" http://www.openmobilealliance.org/tech/DTD/OMA-TS-DM-DDF-1\_2\_0.dtd>
<MgmtTree>
  <VerDTD>1.2</VerDTD>
  <Node>
    <NodeName>DevInfo</NodeName>
    <!--The '.' shows that this node is located immediately under the root.-->
    <Path>.</Path>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The interior node holding all devinfo objects</DFTitle>
      <DFType>
        <DDFName></DDFName>
      </DFType>
    </DFProperties>
    <Node>
      <NodeName>Ext</NodeName>
      <!--There are no further items here at the moment.-->
      <DFProperties>
        <AccessType>
          <Get/>
        </AccessType>
        <DFFormat>
          <node/>
        </DFFormat>
        <Scope>
          <Permanent/>
        </Scope>
        <DFTitle>The extendable DevInfo branch.</DFTitle>
        <DFType>
          <DDFName></DDFName>
        </DFType>
      </DFProperties>
    </Node>
    <Node>
      <NodeName>Bearer</NodeName>
      <!--There are no further items here at the moment.-->
      <DFProperties>
        <AccessType>
          <Get/>
        </AccessType>
        <DFFormat>
          <node/>
        </DFFormat>
        <Scope>
          <Permanent/>
        </Scope>
        <DFTitle>The bearer specific DevInfo branch.</DFTitle>
        <DFType>
          <DDFName></DDFName>
        </DFType>
      </DFProperties>
    </Node>
    <Node>
      <NodeName>DevId</NodeName>
      <DFProperties>
        <AccessType>
```

```

    <Get/>
  </AccessType>
  <!--Here the manufacturer must fill in the device ID (serial number) of the device.-->
  <DefaultValue/>
  <Description>A unique device identifier.</Description>
  <DFFormat>
    <chr/>
  </DFFormat>
  <Scope>
    <Permanent/>
  </Scope>
  <DFTitle>The unique device identifier.</DFTitle>
  <DFType>
    <MIME>text/plain</MIME>
  </DFType>
</DFProperties>
</Node>
<Node>
  <nodeName>Man</nodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <!--Here the manufacturer must fill in their name. -->
    <DefaultValue/>
    <Description>The name of the device manufacturer </Description>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The name of the device manufacturer.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <nodeName>Mod</nodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <!--Here the manufacturer must fill in the model name of the device.-->
    <DefaultValue/>
    <Description>The name of the device model</Description>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>Model name</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <nodeName>DmV</nodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <!--Here the manufacturer must fill in the management client revision of the device.-->
    <DefaultValue/>
    <Description>The management client revision of the device.</Description>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Scope>

```

```
        <Permanent/>
      </Scope>
      <DFTitle>The current management client revision of the device.</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <nodeName>Lang</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DefaultValue/>
      <Description>The current language setting of the device.</Description>
      <DFFormat>
        <chr/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>Current language.</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
</MgmtTree>
```

Appendix E. DevDetail (Normative)

This appendix contains a description of the OMA DM DevDetail management object, according to the OMA DM Description Framework. This Appendix is Normative given the restrictions in Section 5.1.2.

```

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MgmtTree PUBLIC "-//OMA//DTD-DM-DDF 1. 2//EN" http://www.openmobilealliance.org/tech/DTD/OMA-TS-DM-DDF-1\_2\_0.dtd>
<MgmtTree>
  <VerDTD>1.2</VerDTD>
  <Node>
    <NodeName>DevDetail</NodeName>
    <!--The '.' shows that this node is located immediately under the root.-->
    <Path>.</Path>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The interior node holding all devinfo nodes</DFTitle>
      <DFType>
        <DDFName></DDFName>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <NodeName>Ext</NodeName>
    <!--There are no further items here at the moment.-->
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The extendable DevInfo branch.</DFTitle>
      <DFType>
        <DDFName></DDFName>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <NodeName>Bearer</NodeName>
    <!--There are no further items here at the moment.-->
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <DFFormat>
        <node/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The bearer specific DevInfo branch.</DFTitle>
      <DFType>
        <DDFName></DDFName>
      </DFType>
    </DFProperties>
  </Node>

```

```

</Node>
<Node>
  <nodeName>URI</nodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <DFFormat>
      <node/>
    </DFFormat>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The tree limitations branch.</DFTitle>
    <DFType>
      <DDFName></DDFName>
    </DFType>
  </DFProperties>
  <Node>
    <nodeName>MaxDepth</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <Description>Maximum tree depth supported by the device.</Description>
      <DFFormat>
        <chr/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>Maximum tree depth</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <nodeName>MaxTotLen</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <Description>Maximum total URI length supported by the device.</Description>
      <DFFormat>
        <chr/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>Maximum URI length</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <nodeName>MaxSegLen</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <Description>Maximum URI segment length supported by the device.</Description>
      <DFFormat>
        <chr/>
      </DFFormat>
      <Scope>
    
```



```

        <Permanent/>
      </Scope>
      <DFTitle>Maximum URI segment length</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
</Node>
<Node>
  <NodeName>DevTyp</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <!--Here the manufacturer must fill in the type of the device.-->
    <DefaultValue>MobilePhone</DefaultValue>
    <Description>The type of the device.</Description>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The device type.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <NodeName>OEM</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <Description>Name of OEM</Description>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The OEM for the device.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>
<Node>
  <NodeName>FwV</NodeName>
  <DFProperties>
    <AccessType>
      <Get/>
    </AccessType>
    <!--Here the manufacturer must fill in the firmware revision of the device.-->
    <Description>The firmware revision of the device.</Description>
    <DFFormat>
      <chr/>
    </DFFormat>
    <Scope>
      <Permanent/>
    </Scope>
    <DFTitle>The current firmware revision of the device.</DFTitle>
    <DFType>
      <MIME>text/plain</MIME>
    </DFType>
  </DFProperties>
</Node>

```

```

    </DFProperties>
  </Node>
  <Node>
    <nodeName>SwV</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <!--Here the manufacturer must fill in the software revision of the device.-->
      <Description>The software revision of the device.</Description>
      <DFFormat>
        <chr/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The current software revision of the device.</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <nodeName>HwV</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <!--Here the manufacturer must fill in the hardware revision of the device.-->
      <DefaultValue/>
      <Description>The hardware revision of the device.</Description>
      <DFFormat>
        <chr/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>The current hardware revision of the device.</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
  <Node>
    <nodeName>LrgObj</nodeName>
    <DFProperties>
      <AccessType>
        <Get/>
      </AccessType>
      <!--Here the manufacturer must fill in whether the device supports large object handling. Typically, this is a property of
the SyncML management agent.-- >
      <DefaultValue/>
      <Description>Large object handling supported if value is true.</Description>
      <DFFormat>
        <bool/>
      </DFFormat>
      <Scope>
        <Permanent/>
      </Scope>
      <DFTitle>Large object handling flag.</DFTitle>
      <DFType>
        <MIME>text/plain</MIME>
      </DFType>
    </DFProperties>
  </Node>
</Node>
</MgmtTree>

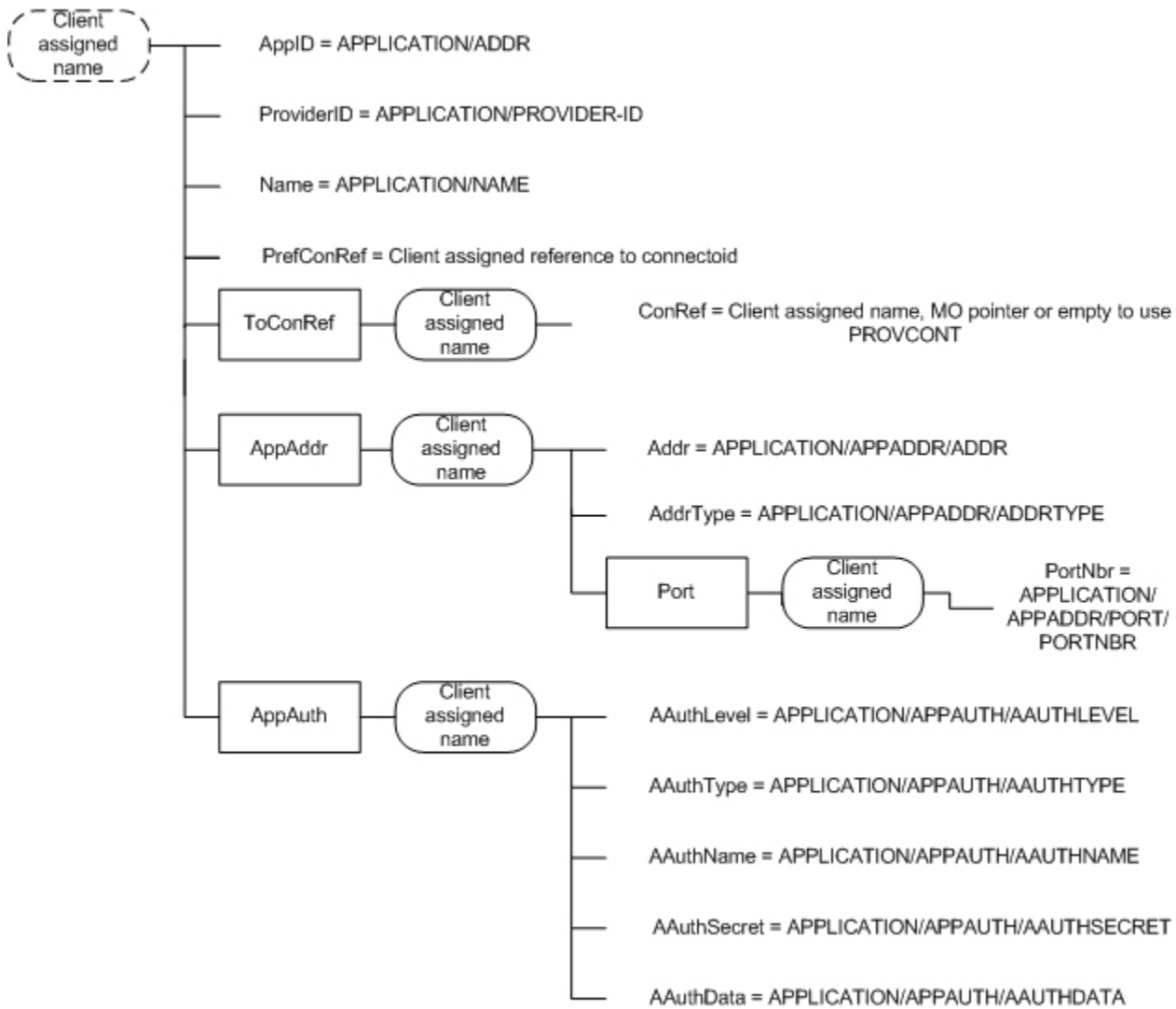
```

Appendix F. Mapping of Device Management parameters

In the below table the Device Management Account Management Object and Device Management Provisioning Content Application characteristic (w7) parameter correspondence is shown.

DEVICE MANAGEMENT ACCOUNT MANAGEMENT OBJECT	DM PROVISIONING CONTENT APPLICATION CHARACTERISTIC (w7)
AppID	APPID
ServerID	PROVIDER-ID
Name	NAME
PrefConRef, if multiple ToConRef/<X>/ConRef	TO-PROXY
PrefConRef, if multiple ToConRef/<X>/ConRef	TO-NAPID
AppAddr/<X>/Addr	APPADDR/ADDR
AppAddr/<X>/AddrType	APPADDR/ADDRTYPE
AppAddr/<X>/Port/<X>/PortNbr	APPADDR/PORT/PORTNBR
AuthPref	N/A
AppAuth/<X>/AuthLevel	APPAUTH/AAUTHLEVEL
AppAuth/<X>/AuthType	APPAUTH/AAUTHTYPE
AppAuth/<X>/AuthName	APPAUTH/AAUTHNAME
AppAuth/<X>/AuthSecret	APPAUTH/AAUTHSECRET
AppAuth/<X>/AuthData	APPAUTH/AAUTHDATA

The following diagram shows how information from the provisioning content and the w7 characteristic are mapped to the management tree.



Requirements for DM client when it converts the w7 APPLICATION characteristic to the management tree:

- DM Client MUST assign a unique name for the <X> (DMAcc Interior node) as specified in Section 5.3.2 in [DMBOOT]. Management server can modify this node name in some subsequent DM session.
- The DM Client MUST grant Get, Replace and Delete ACL rights to the specified ServerId for the <X> (DMAcc Interior node) as specified in Section 5.3.4 in [DMBOOT]. The provisioning server may modify this ACL to provide broader or narrower access in a subsequent DM session.

The values of each leaf in the DMAcc object is derived from a w7 APPLICATION characteristic as follows:

- **AppID** – takes the value of the APPLICATION/APPID = w7.
- **ServerID** – takes the value of APPLICATION/PROVIDER-ID
- **Name** – takes the value of APPLICATION/NAME

- **PrefConRef** – client assigned reference to connectoid, e.g. Connectivity MO or connection information maintained outside of the management tree, for example as specified within PXLOGICAL and NAPDEF.
- **ToConRef/<X>/ConRef** - client assigned name, MO pointer or may be left empty by the DM client to use connection information maintained outside of the management tree, for example as specified within PXLOGICAL and NAPDEF.
- **AppAddr/<X>/Addr** – takes the value of APPLICATION/APPADDR/ADDR
- **AppAddr/<X>/AddrType** - takes the value of APPLICATION/APPADDR/ADDRTYPE
- **AppAddr/<X>/Port/<X>/PortNbr** – takes the value of APPLICATION/APPADDR/PORT/PORTNBR
- **AppAuth/<X>/AAuthLevel** – correspondence to APPLICATION/APPAUTH/AAUTHLEVEL values is as follows:

w7 APPLICATION/APPAUTH/AAUTHLEVEL	DMAcc AppAuth/<x>/AAuthLevel
APPSRV	CLCRED
CLIENT	SRVCRED
OBEX	OBEX

-
- **AppAuth/<X>/AAuthType** – takes the value of APPLICATION/APPAUTH/AAUTHTYPE
- **AppAuth/<X>/AAuthName** – takes the value of APPLICATION/APPAUTH/AAUTHNAME
- **AppAuth/<X>/AAuthSecret** – takes the value of APPLICATION/APPAUTH/AAUTHSECRET
- **AppAuth/<X>/AAuthData** – takes the value of APPLICATION/APPAUTH/AAUTHDATA