SyncML Device Management Standardised Objects

Abstract

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

SyncML Initiative

The following companies are Sponsors of the SyncML Initiative:

Ericsson
IBM
Lotus
Matsushita Communication Industrial Co, Ltd.
Motorola
Nokia
Openwave Systems, Inc.
Starfish Software
Symbian

Revision History

Revision	Date	Comments
0.8	2001-11-21	Alpha release (as a part of the SyncML Device Management Tree and Description document)
1.1	2002-02-15	First release

Copyright Notice

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1 Introduction

Other SyncML DM specifications define the syntax and semantic of the SyncML 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 behaviours. To avoid this situation this specification defines a number of mandatory management objects for various uses in devices. These objects are primarily associated with SyncML DM and SyncML configuration.

Since device manufacturers always will develop new functions in their devices and since these functions often are proprietary, no standardised management objects exist for them. To still make these functions manageable in the devices that has them a device description framework is needed that can provide the 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. Organisations operating device management servers should then only have to feed the new description to their servers for them to automatically recognise and manage the new functions in the devices.

2 Formatting Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in [1].

3 Terminology

This section defines terminology used throughout the specification.

Description Framework

A specification for how to describe the management syntax and semantics for a particular device type. Can also be used to describe individual management objects.

Management object

A manageable entity in a managed device. A management object can have other management objects linked to it as children and a collection of management objects can thus form a tree structure. Management objects can be dynamic or permanent, permanent objects cannot be deleted but their value can be changed.

Management client

A software component in a managed device that correctly interprets SyncML DM commands, executes appropriate actions in the device and sends back relevant responses to the issuing management server.

Management server

A network based entity that issues SyncML DM commands to devices and correctly interprets responses sent from the devices.

Management tree

The mechanism by which the management client interacts with the device, e.g. by storing and retrieving values from it and by manipulating the properties of it, for example access control.

4 Management Objects

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

4.1 Definition and description of objects

SyncML DM objects are defined using the SyncML DM Device Description Framework [2], or DDF. The use of this description framework produces detailed information about the object or 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 an object is organised and it's intended use, a simplified graphical notation 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 an object. These are mainly borrowed from the syntax of DTD's for XML. The characters and their meaning are defined in the following table.

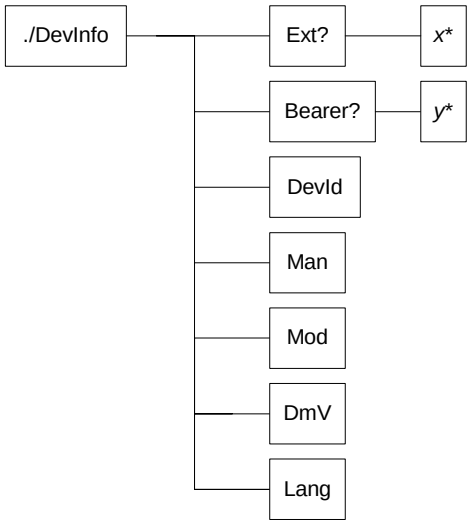
Character	Meaning
+	one or many occurrences
*	zero or more occurrences
?	zero or one occurrences

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 object. These are objects that act as placeholders for in the description and are instantiated with information when the object are used at run-time. Un-named objects in the description are represented by a lower case character in italics, e.g. *x*.

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

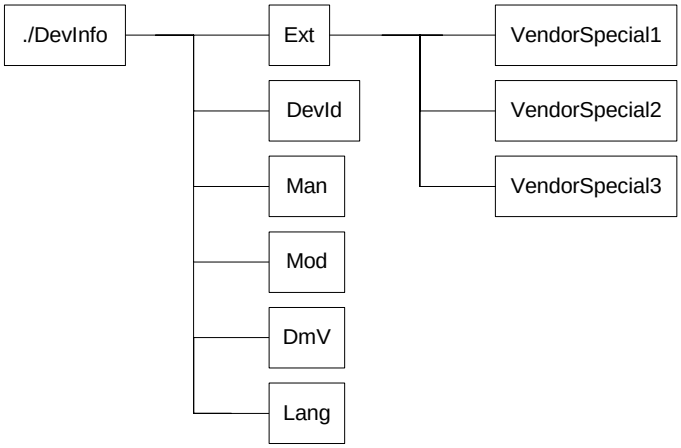
The following is an example of what an object can look like when it is expressed using the graphical notation. This particular object is the SyncML DM Device Information object.



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 objects. Although the figure only provides an elevated view of the description, there are still some things worth noticing. All the objects with names in place occur exactly once. One of these named objects has child objects; it is an interior object. None of the child objects has any children of their own; they are leaf objects and so are some of the named objects as well. The un-named leaf object is marked with *. This means that although the description only contains one object description at this position in the tree, there can be any number of instantiated objects at run-time, including none. The only limit is that the object names must be unique and memory must be available to store the objects.

The next figure shows an example of what the device information object could look like at run-time. Note that there is no XML document corresponding to this figure. The DTD for this type of management tree description has not been defined.



Example of an instantiated ./DevInfo object

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

5 Management objects standardised by other organisations

SyncML DM has been designed so that existing management objects can be managed. These existing management objects have typically already been standardised by other standards organisations.

Currently there are no objects standardised by other organisations in use with SyncML DM.

6 The SyncML DM management objects

Clients implementing SyncML DM MUST support the SyncML DM management object, SyncML DevInfo object and the SyncML DevDetail object. SyncML DM servers MUST support all three objects

.

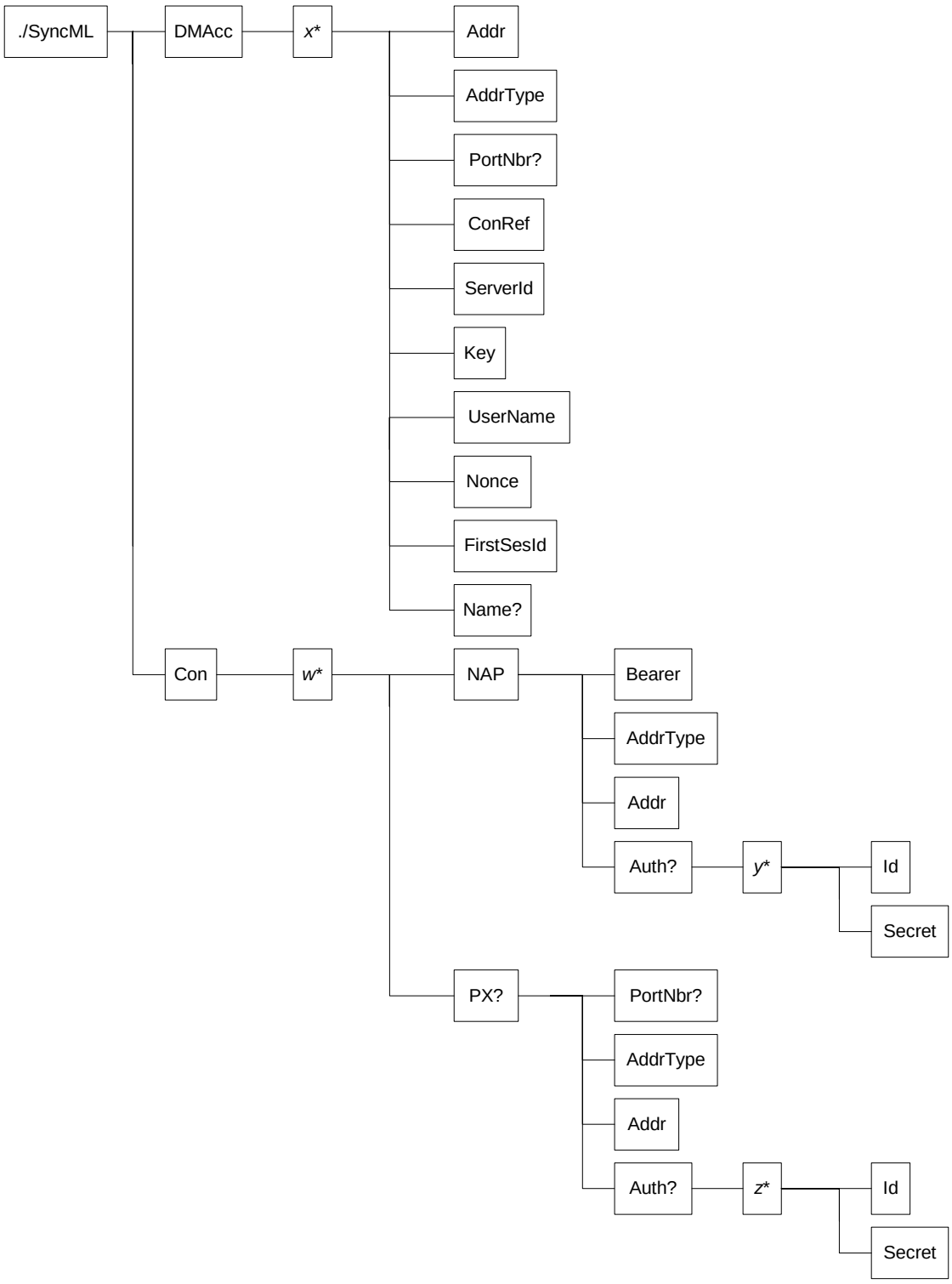
Object	Client Support	Server Support	Description
SyncML DM	MUST	MUST	Settings for the SyncML DM client in a managed device.
DevInfo	MUST	MUST	Device information for the SyncML DM server. Sent from the client to the server.
DevDetail	MUST	MUST	General device information that benefits from standardisation.

The difference between DevInfo and DevDetail is that the DevInfo parameters are needed by the management server for problem free operation of the SyncML 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 SyncML DM commands.

6.1 The SyncML DM object

This object is used to manage settings for the SyncML DM protocol. This object is also used for bootstrapping SyncML DM devices [3]. The following figure gives an overview of the SyncML DM object.



The SyncML DM management object

The SyncML DM object consists of two parts. The first part is the `DMAcc` object which is where the SyncML DM specific settings are stored. These settings are collectively referred to as a SyncML DM account.

The second part is `Con`, which is used for connectivity settings needed to communicate with a SyncML DM server. The `Con` object is similar to what a generic connectivity object might

look like and there is also substantial overlap with WAP Provisioning parameters here. For these reasons it is obvious that the Con object does not really belong at this point in the management tree. However, since there currently is no other defined way to manage these parameters it is included here in this version of the specification. It will be removed in future versions.

The objects making up SyncML DM have the following meanings: (Note that all URI is given as relative URI with ./SyncML as the base URI.)

DMAcc

This interior object is a common parent to all SyncML DM accounts objects.

DMAcc/*x*

This interior object acts as a placeholder for one or more SyncML DM account. The object name MUST be assigned by the server at bootstrap.

DMAcc/*x*/Addr

This object can store addresses of different kinds. The type of address stored is specified by the value of the DMAcc/*x*/AddrType object.

DMAcc/*x*/AddrType

This object specifies the format and interpretation of the DMAcc/*x*/Addr object value. The value is numeric and encoded as inline string, as specified in the table below. Note that the quotes are not part of the value.

Address Type	Value	Description
HTTP	'1'	A URL, [4].
WSP	'2'	A URL, [4].
OBEX	'3'	

DMAcc/*x*/PortNbr

This object specifies the port number to use, if applicable for the current bearer. The port number given as a decimal number and must fit with in the range of a 16 bit unsigned integer.

DMAcc/*x*/ConRef

This object is used to point to connectivity information stored elsewhere in the device. This is needed in order to locate connectivity information stored separately from the SyncML DM object. In the current release of this specification the value of DMAcc/*x*/ConRef SHOULD provide a logical link to an existing connectivity object. If for instance the value of DMAcc/*x*/ConRef is “My_ISP”, then the name of the referenced connectivity object should be Con/My_ISP. Note that this example refers to the use of the connectivity object with in ./SyncML. However the value of DMAcc/*x*/ConRef can be a reference to any connectivity object in a device.

DMAcc/*x*/ServerId

This object stores the server identifier for the current SyncML DM account. The server sets this value during bootstrap.

DMAcc/*x*/UserName

This object stores the user name of the user (or device), for use in SyncML DM authentication.

DMAcc/*x*/Key

This object stores the shared secret used in SyncML DM authentication.

DMAcc/*x*/Nonce

This object stores the next nonce to be used by the client when initiating a session with the server.

DMAcc/*x*/FirstSesId

This object stores the first session identifier that a client must use when initiating a session with the server immediately after bootstrap.

DMAcc/*x*/Name

This optional object stores the user displayable name for the current SyncML DM account.

Con

This interior object is a common parent to all connectivity objects.

Con/*w*

This interior object acts as a placeholder for one or more connectivity objects. The object name MUST be assigned by the server. To logically link the a SyncML DM account with a connectivity object the name of this object MUST be the same as the value of the `DMAcc/x/ConRef` object, i.e. name(`Con/w`) = value(`DMAcc/x/ConRef`)

Con/*w*/NAP/Bearer

This object specifies the bearer type of the connection information. The value is numeric and encoded as inline string, as specified in the table below. Note that the quotes are not part of the value.

Bearer type	Value
OBEX	‘1’
GSM-USSD	'2'
GSM-SMS	'3'
ANSI-136-GUTS	‘4’
IS-95-CDMA-SMS	‘5’
IS-95-CDMA-CSD	‘6’
IS-95-CDMA-PACKET	‘7’
ANSI-136-CSD	‘8’
ANSI-136-GPRS	‘9’
GSM-CSD	‘10’
GSM-GPRS	‘11’
AMPS-CDPD	‘12’
PDC-CSD	‘13’
PDC-PACKET	‘14’
IDEN-SMS	‘15’
IDEN-CSD	‘16’
IDEN-PACKET	‘17’
FLEX/REFLEX	‘18’
PHS-SMS	‘19’
PHS-CSD	‘20’
TETRA-SDS	‘21’
TETRA-PACKET	‘22’
MOBITEX MPAK	'23’
ANSI-136-GHOST	'24’

Con/*w*/NAP/AddrType

This element specifies the address type value of the connection information. The value is numeric and encoded as inline string, as specified in the table below. Note that the quotes are not part of the value.

NAP/Address Type	Value	Description
IPV4	'1'	An IPv4 address [8] represented in decimal format with dots as delimiters
IPV6	'2'	An IPv6 address [9] represented as hexadecimal numbers with colons as delimiters or as a combination of hexadecimal and decimal numbers with dots and colons as delimiters
E164	'3'	A phone number according to the E164 scheme defined in [7]
ALPHA	'4'	Generic alphanumeric address, [4]
APN	'5'	Access Point Name, [7]

Con/*w*/NAP/Addr

Contains all the digits and pauses needed to communicate with a remote entity and is defined in [7]. The format and content of the object depend on the bearer type. This object might, for instance, contain the phone number of an access router, a calling card sequence, a GPRS APN or the address of an SMSC. The object value SHOULD be in international format whenever possible, e.g. using the "+" notation as in GSM. The `Con/w/NAP/AddrType` object defines the type of address present in this object.

Con/*w*/NAP/Auth/*y*

This interior object specifies a NAP authentication method. This object does not specify the actual method to use when connecting to the NAP, but it links the authentication parameters, Id and Secret, to an authentication method. The name of the object species for which authentication method the associated Id and Secret objects are valid. The name of this object SHOULD be "PAP" or "CHAP". The name is case sensitive.

Con/*w*/NAP/Auth/*y*/Id

Specifies the NAP authentication identifier, e.g. use name.

Con/*w*/NAP/Auth/*y*/Secret

Specifies the NAP authentication secret, e.g. password.

Con/*w*/PX/PortNbr

This object specifies the port number to use. The port number given as a decimal number and must fit with in the range of a 16 bit unsigned integer.

Con/*w*/PX/AddrType

This object specifies the format and interpretation of the `Con/w/PX/Addr` object value. The value is numeric and encoded as inline string, as specified in the table below. Note that the quotes are not part of the value.

Address Type	Value	Description
IPV4	'1'	An IPv4 address [8] represented in decimal format with dots as delimiters
IPV6	'2'	An IPv6 address [9] represented as hexadecimal numbers with colons as delimiters or as a combination of hexadecimal and decimal numbers with dots and colons as delimiters
E164	'3'	A phone number according to the E164 scheme defined in [7]
ALPHA	'4'	Generic alphanumeric address, [4]

Con/*w*/PX/Addr

This object can store addresses of different kinds. The type of address stored is specified by the value of the `Con/w/PX/AddrType` object.

Con/*w*/PX/Auth/*z*

This interior object specifies a NAP authentication method. This object does not specify the actual method to use when connecting to the NAP, but it links the authentication parameters, Id and Secret, to an authentication method. The name of the object species for which authentication method the associated Id and Secret objects are valid. The name of this object SHOULD be “HTTP_BASIC”, “HTTP_DIGEST” or “WTLS_SS”. The name is case sensitive.

Con/*w*/PX/Auth/*z*/Id

Specifies the proxy authentication identifier, e.g. user name.

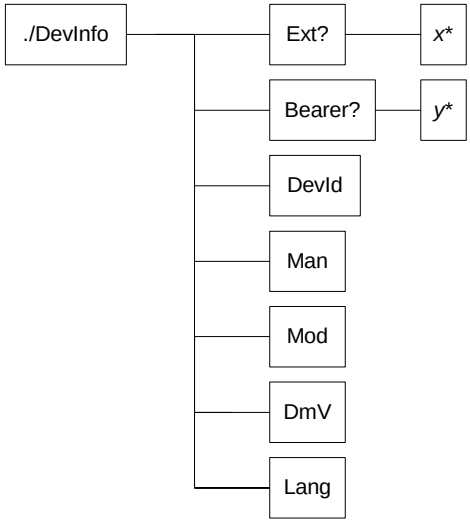
Con/*w*/PX/Auth/*z*/Secret

Specifies the proxy authentication secret, e.g. password.

The complete DDF description of this object can be found in Appendix A.

6.2 The DevInfo object

The following figure shows an overview of the DevInfo object.



The DevInfo management object

The objects making up DevInfo have the following meanings:

Ext

An optional, internal object, marking up the single branch of the DevInfo sub tree into which extensions can be added, permanently or dynamically.

Bearer

An optional, internal object, marking up a branch of the DevInfo sub tree into 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. Defined in [6].

Man

The manufacturer identifier. Defined in [6].

Mod

A model identifier (manufacturer specified string). Defined in [6].

DmV

A SyncML device management client version identifier (manufacturer specified string).

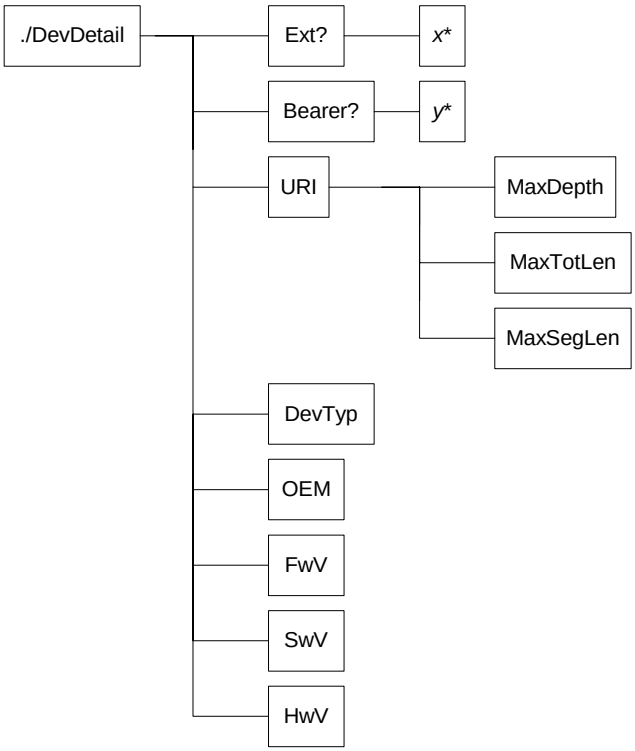
Lang

The current language setting of the device. The syntax of the language tags and their use are defined in [5]. Language codes are defined by ISO in the standard ISO639.

The complete DDF description of this object can be found in Appendix B.

6.3 The DevDetail object

The following figure shows an overview of the DevDetail object.



The DevDetail management object

The objects making up DevDetail have the following meanings:

Ext

An optional, internal object, marking up the single branch of the DevDetail sub tree into which extensions can be added, permanently or dynamically.

Bearer

An optional, internal object, marking up 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 management object or management object property. The maximum total length of a URI is defined as the total number of characters making up the URI. 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 of ‘unlimited’ length.

URI/MaxSegLen

Specifies the maximum total length of any URI segment in a URI used to address a management object or management object property. The maximum total length of a URI segment is defined as the total number of characters making up the 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. Defined in [6].

OEM

Original Equipment Manufacturer. Defined in [6].

FwV

Firmware version. Defined in [6].

SwV

Software version. Defined in [6].

HwV

Hardware version. Defined in [6].

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 object can be found in Appendix C.

7 References

[1] Key words for use in RFCs to Indicate Requirement Levels, RFC 2119, **IETF**.

[2] SyncML Device Management Tree and Description, version 1.1, **SyncML**.

[3] SyncML Device Management Bootstrap, version 1.1, **SyncML**.

[4] Uniform Resource Identifiers (URI): Generic Syntax, RFC 2396, **IETF**.

[5] Tags for the Identification of Languages, RFC 1766, **IETF**.

[6] SyncML Device Information DTD, version 1.1, **SyncML**.

[7] General formats Specifications, WAP-188-WAPGenFormats, **WAP Forum**.

[8] Internet Protocol: Darpa internet protocol program specification, RFC791, **IETF**.

[9] Internet Protocol Version 6 addressing architecture, RFC2373, **IETF**.

Appendix A – SyncML DM

This appendix contains the description of the SyncML DM object, according to the SyncML DM Description Framework.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MgmtTree SYSTEM "http://www.syncml.org/docs/syncml_dm_ddf_v11_20020213.dtd">
<MgmtTree>
    <VerDTD>1.1</VerDTD>
    <Man>--The device manufacterer--</Man>
    <Mod>--The device model--</Mod>
    <Node>
        <NodeName>SyncML</NodeName>
        <!--The Path element must be used here so that the SyncML object can be correctly positioned in the management tree.--
>
        <Path>./</Path>
        <DFProperties>
            <AccessType>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <Description>SyncML settings</Description>
            <DFFormat>
                <node/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>SyncML object</DFTitle>
        </DFProperties>
        <Node>
            <NodeName>DMAcc</NodeName>
            <DFProperties>
                <AccessType>
                    <Add/>
                    <Copy/>
                    <Delete/>
                    <Get/>
                    <Replace/>
                </AccessType>
                <DFFormat>
                    <node/>
                </DFFormat>
                <Occurrence>
                    <One/>
                </Occurrence>
                <Scope>
                    <Permanent/>
                </Scope>
                <DFTitle>A collection of all SyncML DM accounts</DFTitle>
            </DFProperties>
            <Node>
                <NodeName/>
                <DFProperties>
                    <AccessType>
                        <Add/>
                        <Delete/>
                        <Get/>
                        <Replace/>
                    </AccessType>
                    <DFFormat>
                        <node/>
                    </DFFormat>
                    <Occurrence>
```

```
            <ZeroOrMore/>
        </Occurrence>
        <Scope>
            <Permanent/>
        </Scope>
        <DFTitle>The "name" node for a connectivity object</DFTitle>
    </DFProperties>
    <Node>
        <NodeName>Addr</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>Host address of the SyncML server, IP or URL.</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>AddrType</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>The type of address specified in the Addr object</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>PortNbr</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DefaultValue>80</DefaultValue>
            <DFFormat>
```

```
                <chr/>
            </DFFormat>
            <Occurrence>
                <ZeroOrOne/>
            </Occurrence>
            <Scope>
                <Dynamic/>
            </Scope>
            <DFTitle>SyncML Server port</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>ConRef</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>Logical reference to a connectivity object</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>ServerId</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>The "ServerId" value for this server.</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>Key</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
```

```
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>The shared secret between the server and the device</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>UserName</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>The username of the device (or user).</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>Nonce</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>The nonce value that the device must use.</DFTitle>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>FirstSesId</NodeName>
```

```
                <DFProperties>
                    <AccessType>
                        <Add/>
                        <Copy/>
                        <Delete/>
                        <Get/>
                        <Replace/>
                    </AccessType>
                    <DFFormat>
                        <chr/>
                    </DFFormat>
                    <Occurrence>
                        <One/>
                    </Occurrence>
                    <Scope>
                        <Permanent/>
                    </Scope>
                    <DFTitle>The session Id that the device must use in the first session.</DFTitle>
                    <DFType>
                        <MIME>text/plain</MIME>
                    </DFType>
                </DFProperties>
            </Node>
            <Node>
                <NodeName>Name</NodeName>
                <DFProperties>
                    <AccessType>
                        <Add/>
                        <Copy/>
                        <Delete/>
                        <Get/>
                        <Replace/>
                    </AccessType>
                    <DFFormat>
                        <chr/>
                    </DFFormat>
                    <Occurrence>
                        <ZeroOrOne/>
                    </Occurrence>
                    <Scope>
                        <Dynamic/>
                    </Scope>
                    <DFTitle>Displayable name for the SyncML setings</DFTitle>
                    <DFType>
                        <MIME>text/plain</MIME>
                    </DFType>
                </DFProperties>
            </Node>
        </Node>
    </Node>
    <Node>
        <NodeName>Con</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <node/>
            </DFFormat>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>A collection of connectivity objects for SyncML</DFTitle>
        </DFProperties>
        <Node>
```

```
<NodeName/>
<DFProperties>
    <AccessType>
        <Add/>
        <Delete/>
        <Get/>
        <Replace/>
    </AccessType>
    <DFFormat>
        <node/>
    </DFFormat>
    <Occurrence>
        <ZeroOrMore/>
    </Occurrence>
    <Scope>
        <Permanent/>
    </Scope>
    <DFTitle>The "name" node for a connectivity object</DFTitle>
</DFProperties>
<Node>
    <NodeName>NAP</NodeName>
    <DFProperties>
        <AccessType>
            <Copy/>
            <Delete/>
            <Get/>
            <Replace/>
        </AccessType>
        <DFFormat>
            <node/>
        </DFFormat>
        <Occurrence>
            <One/>
        </Occurrence>
        <Scope>
            <Permanent/>
        </Scope>
    </DFProperties>
    <Node>
        <NodeName>Bearer</NodeName>
        <DFProperties>
            <AccessType>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <One/>
            </Occurrence>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>The specified bearer to use</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>AddrType</NodeName>
        <DFProperties>
            <AccessType>
                <Copy/>
                <Delete/>
                <Get/>
```

```
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <ZeroOrOne/>
            </Occurrence>
            <Scope>
                <Dynamic/>
            </Scope>
            <DFTitle>The type of address specified</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>Addr</NodeName>
        <DFProperties>
            <AccessType>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <ZeroOrOne/>
            </Occurrence>
            <Scope>
                <Dynamic/>
            </Scope>
            <DFTitle>The NAP address</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>Auth</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <node/>
            </DFFormat>
            <Occurrence>
                <ZeroOrOne/>
            </Occurrence>
            <Scope>
                <Dynamic/>
            </Scope>
            <DFTitle>Authentication data for this NAP.</DFTitle>
        </DFProperties>
        <Node>
            <NodeName/>
            <DFProperties>
                <AccessType>
                    <Copy/>
                    <Delete/>
                    <Get/>
```

```
                    <Replace/>
                </AccessType>
                <Description>The "name" object for one set of authentication data.</Description>
                <DFFormat>
                    <node/>
                </DFFormat>
                <Occurrence>
                    <OneOrMore/>
                </Occurrence>
                <Scope>
                    <Dynamic/>
                </Scope>
                <DFTitle>One set of authentication data</DFTitle>
            </DFProperties>
            <Node>
                <NodeName>Id</NodeName>
                <DFProperties>
                    <AccessType>
                        <Copy/>
                        <Delete/>
                        <Get/>
                        <Replace/>
                    </AccessType>
                    <DFFormat>
                        <chr/>
                    </DFFormat>
                    <Occurrence>
                        <One/>
                    </Occurrence>
                    <Scope>
                        <Dynamic/>
                    </Scope>
                    <DFTitle>Id (or username) </DFTitle>
                    <DFType>
                        <MIME>text/plain</MIME>
                    </DFType>
                </DFProperties>
            </Node>
            <Node>
                <NodeName>Secret</NodeName>
                <DFProperties>
                    <AccessType>
                        <Copy/>
                        <Delete/>
                        <Get/>
                        <Replace/>
                    </AccessType>
                    <DFFormat>
                        <chr/>
                    </DFFormat>
                    <Occurrence>
                        <One/>
                    </Occurrence>
                    <Scope>
                        <Dynamic/>
                    </Scope>
                    <DFTitle>Secret (or password) for this Id</DFTitle>
                    <DFType>
                        <MIME>text/plain</MIME>
                    </DFType>
                </DFProperties>
            </Node>
        </Node>
    </Node>
</Node>
<Node>
    <NodeName>PX</NodeName>
    <DFProperties>
        <AccessType>
```

```
            <Copy/>
            <Delete/>
            <Get/>
            <Replace/>
        </AccessType>
        <DFFormat>
            <node/>
        </DFFormat>
        <Occurrence>
            <One/>
        </Occurrence>
        <Scope>
            <Dynamic/>
        </Scope>
    </DFProperties>
    <Node>
        <NodeName>PortNbr</NodeName>
        <DFProperties>
            <AccessType>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <ZeroOrOne/>
            </Occurrence>
            <Scope>
                <Dynamic/>
            </Scope>
            <DFTitle>The port number to use for this proxy.</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>AddrType</NodeName>
        <DFProperties>
            <AccessType>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <ZeroOrOne/>
            </Occurrence>
            <Scope>
                <Dynamic/>
            </Scope>
            <DFTitle>The type of address specified</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>Addr</NodeName>
        <DFProperties>
            <AccessType>
                <Copy/>
                <Delete/>
```

```
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <chr/>
            </DFFormat>
            <Occurrence>
                <ZeroOrOne/>
            </Occurrence>
            <Scope>
                <Dynamic/>
            </Scope>
            <DFTitle>The proxy address</DFTitle>
            <DFType>
                <MIME>text/plain</MIME>
            </DFType>
        </DFProperties>
    </Node>
    <Node>
        <NodeName>Auth</NodeName>
        <DFProperties>
            <AccessType>
                <Add/>
                <Copy/>
                <Delete/>
                <Get/>
                <Replace/>
            </AccessType>
            <DFFormat>
                <node/>
            </DFFormat>
            <Occurrence>
                <ZeroOrOne/>
            </Occurrence>
            <Scope>
                <Dynamic/>
            </Scope>
            <DFTitle>Authentication data for this proxy.</DFTitle>
        </DFProperties>
        <Node>
            <NodeName/>
            <DFProperties>
                <AccessType>
                    <Copy/>
                    <Delete/>
                    <Get/>
                    <Replace/>
                </AccessType>
                <Description>The "name" object for one set of authentication data.</Description>
                <DFFormat>
                    <node/>
                </DFFormat>
                <Occurrence>
                    <OneOrMore/>
                </Occurrence>
                <Scope>
                    <Dynamic/>
                </Scope>
                <DFTitle>One set of authentication data</DFTitle>
            </DFProperties>
            <Node>
                <NodeName>Id</NodeName>
                <DFProperties>
                    <AccessType>
                        <Copy/>
                        <Delete/>
                        <Get/>
                        <Replace/>
                    </AccessType>
```

```
                    <DFFormat>
                        <chr/>
                    </DFFormat>
                    <Occurrence>
                        <One/>
                    </Occurrence>
                    <Scope>
                        <Dynamic/>
                    </Scope>
                    <DFTitle>Id (or username) </DFTitle>
                    <DFType>
                        <MIME>text/plain</MIME>
                    </DFType>
                </DFProperties>
            </Node>
            <Node>
                <NodeName>Secret</NodeName>
                <DFProperties>
                    <AccessType>
                        <Copy/>
                        <Delete/>
                        <Get/>
                        <Replace/>
                    </AccessType>
                    <DFFormat>
                        <chr/>
                    </DFFormat>
                    <Occurrence>
                        <One/>
                    </Occurrence>
                    <Scope>
                        <Dynamic/>
                    </Scope>
                    <DFTitle>Secret (or password) for this Id</DFTitle>
                    <DFType>
                        <MIME>text/plain</MIME>
                    </DFType>
                </DFProperties>
            </Node>
        </Node>
    </Node>
</Node>
</Node>
</MgmtTree>
```

Appendix B – DevInfo

This appendix contains the description of the SyncML DM DevInfo object, according to the SyncML DM Description Framework.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MgmtTree SYSTEM "http://www.syncml.org/docs/syncml_dm_ddf_v11_20020213.dtd">
<MgmtTree>
    <VerDTD>1.1</VerDTD>
    <Node>
        <NodeName>DevInfo</NodeName>
        <!--The './' shows that this object is located imediately under the root.-->
        <Path>./</Path>
        <DFProperties>
            <AccessType>
                <Get/>
            </AccessType>
            <DFFormat>
                <node/>
            </DFFormat>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>The interior object holding all devinfo objects</DFTitle>
        </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>
            </DFProperties>
        </Node>
        <Node>
            <NodeName>Bearer</NodeName>
            <!--There are no further items here at the moment.-->
            <DFProperties>
                <AccessType>
                    <Get/>
                </AccessType>
                <DFFormat>
                    <node/>
                </DFFormat>
                <Scope>
                    <Dynamic/>
                </Scope>
                <DFTitle>The bearer specific DevInfo branch.</DFTitle>
            </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 identifiner.</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>
</Node>
</MgmtTree>
```

Appendix C – DevDetail

This appendix contains the description of the SyncML DM DevDetail object, according to the SyncML DM Description Framework.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE MgmtTree SYSTEM "http://www.syncml.org/docs/syncml_dm_ddf_v11_20020213.dtd">
<MgmtTree>
    <VerDTD>1.1</VerDTD>
    <Node>
        <NodeName>DevInfo</NodeName>
        <!--The './' shows that this object is located imediately under the root.-->
        <Path>./</Path>
        <DFProperties>
            <AccessType>
                <Get/>
            </AccessType>
            <DFFormat>
                <node/>
            </DFFormat>
            <Scope>
                <Permanent/>
            </Scope>
            <DFTitle>The interior object holding all devinfo objects</DFTitle>
        </DFProperties>
        <Node>
            <NodeName>Ext</NodeName>
            <!--There are no further items here at the moment.-->
            <DFProperties>
                <AccessType>
                    <Get/>
                </AccessType>
                <DFFormat>
                    <node/>
                </DFFormat>
                <Scope>
                    <Dynamic/>
                </Scope>
                <DFTitle>The extendable DevInfo branch.</DFTitle>
            </DFProperties>
        </Node>
        <Node>
            <NodeName>Bearer</NodeName>
            <!--There are no further items here at the moment.-->
            <DFProperties>
                <AccessType>
                    <Get/>
                </AccessType>
                <DFFormat>
                    <node/>
                </DFFormat>
                <Scope>
                    <Dynamic/>
                </Scope>
                <DFTitle>The bearer specific DevInfo branch.</DFTitle>
            </DFProperties>
        </Node>
        <Node>
            <NodeName>URI</NodeName>
            <DFProperties>
                <AccessType>
                    <Get/>
                </AccessType>
                <DFFormat>
                    <node/>
                </DFFormat>
                <Scope>
                    <Permanent/>
```

```
            </Scope>
            <DFTitle>The tree limitations branch.</DFTitle>
        </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>
    <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>
</MgmtTree>
```