

Project	<b>IEEE P802.16g Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>IRPs and NRMs for Network Management Portion TGg Specification</b>	
Date Submitted	<b>24 January 2005</b>	
Source(s)	Scott F. Migaldi Jörg Schmidt Dave Raymer	Tel:+1.847.576.0574, <a href="mailto:w10265@motorola.com">w10265@motorola.com</a> Tel:+1.480.732.6493, <a href="mailto:qswi13169@motorola.com">qswi13169@motorola.com</a> Tel:+1.817.245.6834, <a href="mailto:fdr017@motorola.com">fdr017@motorola.com</a>
Re:	IEEE 802.16g-04/03 and IEEE 802.16g-04/04	
Abstract	This contribution begins the process of establishing the protocol neutral specification for network management as part of the P802.16g	
Purpose	To demonstrate an approach that is used for the development of protocol neutral network management specifications	
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or <u>withdraw material contained herein</u> .	
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution <u>may be made public by IEEE 802.16</u> .	
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures < <a href="http://ieee802.org/16/ipr/patents/policy.html">http://ieee802.org/16/ipr/patents/policy.html</a> >, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair < <a href="mailto:chair@wirelessman.org">mailto:chair@wirelessman.org</a> > as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site < <a href="http://ieee802.org/16/ipr/patents/notices">http://ieee802.org/16/ipr/patents/notices</a> >.	

## 2. References

### 2.1 3GPP Requirements, Architecture, and High Level Specifications

- [01] 3GPP TS 32.101: "Telecommunication Management: Principles and High Level Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [02] 3GPP TS 32.102: "Telecommunication Management Architecture"; [http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [03] 3GPP TS 32.401: "Performance Management; Concept and Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [04] 3GPP TS 32.600: "Configuration Management; Concept and High-level";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [05] 3GPP TS 32.300: "Configuration Management; Name Convention for Managed Objects";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [06] 3GPP TS 32.150: "Integration Reference Point (IRP) Concept and Definitions";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [07] 3GPP TS 32.151: "Integration Reference Point (IRP) Information Service (IS) template";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [08] 3GPP TS 32.152: "Integration Reference Point (IRP) Unified Modelling Language (UML) repertoire";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)

### 2.2 3GPP Interface IRPs

- [09] 3GPP TS 32.111-1: "Fault Management; Part 1: 3G Fault Management Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [10] 3GPP TS 32.111-2: "Fault Management; Part 2: Alarm IRP: Information Service";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [11] 3GPP TS 32.111-3: "Fault Management; Part 3: Alarm Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [12] 3GPP TS 32.301: "Configuration Management; Notification IRP: Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [13] 3GPP TS 32.302: "Configuration Management; Notification IRP: Information Service";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [14] 3GPP TS 32.303: "Configuration Management (CM); Notification Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [15] 3GPP TS 32.311: "Generic IRP Management; Requirements"; [http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [16] 3GPP TS 32.312: "Generic IRP Management; Information Service"; [http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [17] 3GPP TS 32.601: "Configuration Management: Basic CM IRP: Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [18] 3GPP TS 32.602: "Configuration Management: Basic CM IRP: Information Service";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [19] 3GPP TS 32.603: "Configuration Management: Basic Configuration Management IRP";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [20] 3GPP TS 32.611: "3G Configuration Management: Bulk CM IRP: Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [21] 3GPP TS 32.612: "Configuration Management: Bulk CM IRP: Information Service";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)

- [22] 3GPP TS 32.613: "Configuration Management: Bulk CM IRP: CORBA Solution Set";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [23] 3GPP TS 32.615: "Configuration Management: Bulk CM IRP: XML File Format  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [24] 3GPP TS 32.661: "Configuration Management; Kernel CM: Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [25] 3GPP TS 32.662: "Configuration management: Kernel CM Information Service";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [26] 3GPP TS 32.663: "Configuration Management; Kernel CM IRP: CORBA solution set";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [27] 3GPP TS 32.331: "Notification Log (NL) Integration Reference Point (IRP): Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [28] 3GPP TS 32.332: "Notification Log (NL) (NL) Integration Reference Point (IRP): Information Service (IS)";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [29] 3GPP TS 32.333: "Notification Log (NL) Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [30] 3GPP TS 32.335: "Notification Log (NL) Integration Reference Point (IRP): eXtensible Markup Language (XML) definitions";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [31] 3GPP TS 32.341: "File Transfer (FT) Integration Reference Point (IRP): Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [32] 3GPP TS 32.342: "File Transfer (FT) Integration Reference Point (IRP): Information Service (IS)";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [33] 3GPP TS 32.343: "File Transfer (FT) Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [34] 3GPP TS 32.411: "Performance Management (PM) Integration Reference Point (IRP): Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [35] 3GPP TS 32.412: "Performance Management (PM) Integration Reference Point (IRP): Information Service (IS)";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [36] 3GPP TS 32.413: "Performance Management (PM) Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [37] 3GPP TS 32.321: "Test management IRP: Requirements"; V5.0.1 (Release 5)  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [38] 3GPP TS 32.322: "Test management IRP: Information Service"; V5.1.0 (Release 5)  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [39] 3GPP TS 32.323: "Test management IRP: CORBA Solution Set"; V5.1.0 (Release 5)  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)

## 2.2 3GPP Network Resource Model (NRM) Specifications

- [40] 3GPP TS 32.621: "Configuration Management: Generic Network Resources IRP: Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [41] 3GPP TS 32.622: "Configuration Management: Generic Network Resources IRP: Network Resource Model";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)

- [42] 3GPP TS 32.623: "Configuration Management: Generic Network Resources IRP: CORBA Solution Set";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [43] 3GPP TS 32.625: "Configuration Management: Generic Network Resources IRP: Bulk CM XML File Format Definition"; [http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [44] 3GPP TS 32.671: "Configuration Management; State Management IRP: Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [45] 3GPP TS 32.672: "Configuration Management; State Management IRP: Information Service";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [46] 3GPP TS 32.673: "Configuration Management; State Management IRP: CORBA Solution Set";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [47] 3GPP TS 32.691: "Inventory Management Network Resources IRP: Requirements";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)
- [48] 3GPP TS 32.692: "Inventory Management Network Resources IRP: Network Resource Model";  
[http://www.3gpp.org/ftp/tsg\\_sa/WG5\\_TM/specs/](http://www.3gpp.org/ftp/tsg_sa/WG5_TM/specs/)

### 14.3 Information Model Aspects

For the purpose of Management Interface development an Interface Methodology known as Integration Reference Point (IRP) was developed to promote the wider adoption of standardized Management interfaces in telecommunication networks. The IRP methodology employs Protocol & Technology Neutral modeling methods as well as protocol specific solution sets to help achieve its goals. The Integration Reference Point is a methodology to aid a modular approach to the development of standards interfaces.

There are three cornerstones to the IRP approach:

1. Top-down, process-driven modeling approach  
 The process begins with a requirements phase, the aim at this step is to provide conceptual and use case definitions for a specific interface aspect as well as defining subsequent requirements for this IRP.
2. Technology-independent modeling  
 The second phase of the process is the development of a protocol independent model of the interface. This protocol independent model is specified in the IRP Information Service.
3. Standards-based technology-dependent modeling  
 The third phase of the process is to create one or more interface technology and protocol dependent models from the Information Service model. This is specified in the IRP Solution Set(s).

#### 14.4.3 Information Service Models

Information Service Models refer to both Interface IRPs and NRM IRPs. For the purpose of this specification it is noted that 802.16 BWA WiMAN systems are reusing Management Interface IRPs and Management NRMs from 3GPP and then noting any specific deltas if necessary. Interface IRPs applicable to 802.16g are:

- Alarm IRP ([09], [10], [11])
- Notification IRP ([12], [13], [14])
- Basic CM IRP ([17], [18], [19])
- Bulk CM IRP ([20], [21], [22], [23])
- Kernel CM IRP ([24], [25], [26])

Generic IRP ([15], [16])  
 Test Management IRP ([37], [38], [39])  
 Notification Log IRP ([27], [28], [29], [30])  
 File Transfer IRP ([31], [32], [33])  
 Performance Management IRP ([34], [35], [36])

Applicable NRM IRPs to 802.16g are:

3GPP Generic NRM IRP ([40], [41], [42], [43])  
 State Management IRP ([44], [45], [46])  
 Inventory NRM IRP ([47], [48])

### 14.4.3.1 Information Services Models Specific to 802.16g

This section is providing the IEEE 802.16 protocol neutral (IS) resource model (NRM/MIB) definitions, using the 3GPP IRP IS template.

#### *Information entities imported and local labels*

<b>Label reference</b>	<b>Local label</b>
32.622 [xx], information object class, ManagedElement	ManagedElement
32.622 [xx], information object class, ManagedFunction	ManagedFunction
32.622 [xx], information object class, SubNetwork	SubNetwork
32.622 [xx], information object class, Top	Top

### 14.4.3.2 Class diagram

#### 14.4.3.2.1 Attributes and relationships

Figure 1. establish the naming and containment for the protocol neutral network management models of the 802.16 standard. The inheritance diagram show in Figure 2. is based on 802.16e and 802.16-2004. This diagram establishes the context of the IOC and shows ME's as inventory items and MF's as the functions that perform functions in the 802.16 network.

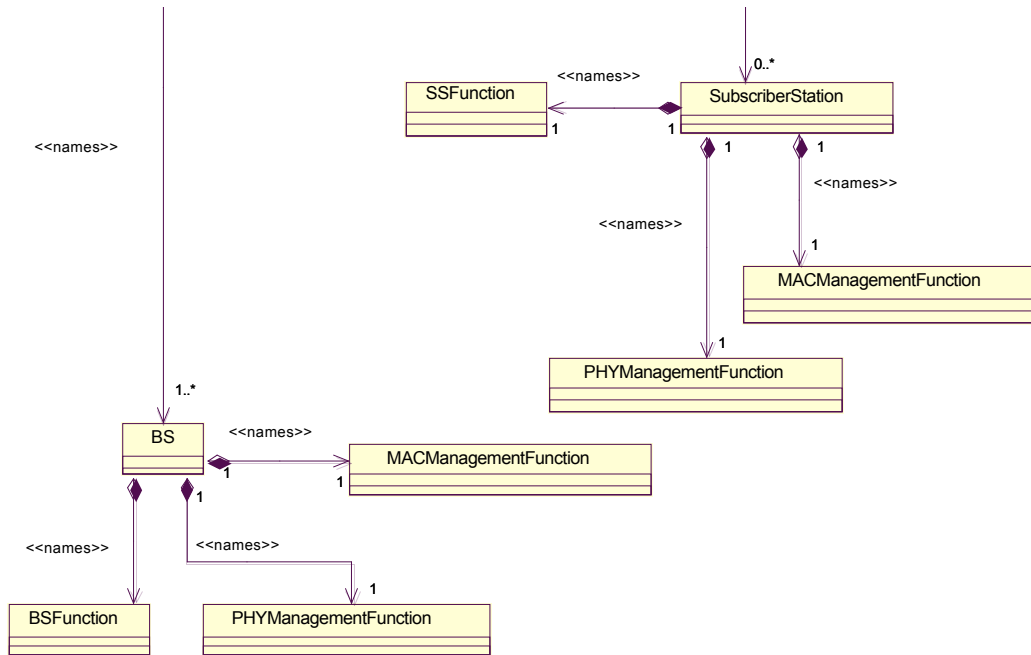


Figure 1. Containment and Naming Diagram

#### 14.4.3.2.2 Inheritance

This clause depicts the inheritance relationships that exist between information object classes.

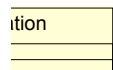
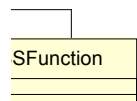
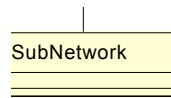


Figure 2. Inheritance Diagram

### ***14.4.3.3 Information object classes definition***

#### **14.4.3.3.1 IOC BsFunction**

##### **14.4.3.3.1.1 Definition**

This IOC represents a WMAN base station. For more information, see [zz]. It is derived from `ManagedFunction`.

### 14.4.3.3.1.2 Attributes

Attribute name	Defined in	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
BsFunctionId	–	+	M	M	–
objectClass	Top	+ <sub>inherited</sub>	M <sub>inherited</sub>	M <sub>inherited</sub>	– <sub>inherited</sub>
objectInstance	Top	+ <sub>inherited</sub>	M <sub>inherited</sub>	M <sub>inherited</sub>	– <sub>inherited</sub>
userLabel	ManagedFunction	+ <sub>inherited</sub>	M <sub>inherited</sub>	M <sub>inherited</sub>	M <sub>inherited</sub>
aaa	–	+	O	M	–
bbb	–	+	O	M	–
yyy	–	+	O	M	–
zzz	–	+	O	M	–

### 14.4.3.3.2 IOC WmanSsFunction

#### 14.4.3.3.2.1 Definition

This IOC represents a WMAN subscriber station. For more information, see [zz]. It is derived from ManagedFunction.

#### 14.4.3.3.2.2 Attributes

Attribute name	Defined in	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
SsFunctionId	–	+	M	M	–
objectClass	Top	+ <sub>inherited</sub>	M <sub>inherited</sub>	M <sub>inherited</sub>	– <sub>inherited</sub>
objectInstance	Top	+ <sub>inherited</sub>	M <sub>inherited</sub>	M <sub>inherited</sub>	– <sub>inherited</sub>
userLabel	ManagedFunction	+ <sub>inherited</sub>	M <sub>inherited</sub>	M <sub>inherited</sub>	M <sub>inherited</sub>
ccc	–	+	O	M	–
ddd	–	+	O	M	–
www	–	+	O	M	–
xxx	–	+	O	M	–



**14.4.3.3.3            IOC xxx**

**14.4.3.3.X            IOC yyy**

#### **14.4.3.4 Information relationships definition**

#### **14.4.3.5 Notifications**

#### **14.4.3.6 Information attributes definition**

##### **14.4.3.6.1            Definition and legal values**

<b>Attribute Name</b>	<b>Definition</b>	<b>Legal Values</b>
BsFunctionId	It contains 'name+value' that is the RDN, when naming an instance, of this object class containing this attribute. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	--
SsFunctionId		--
ZzzId		--
aaa	tbd	tbd
bbb	tbd	tbd
ccc	tbd	tbd
ddd	tbd	tbd
objectClass	As defined in 32.622 [28]: An attribute which captures the name of the class from which the object instance is an occurrence of.	--
objectInstance	As defined in 32.622 [28]: An information which captures the Distinguished Name of any object.	--
userLabel	Based on definition from 32.622 [28]: A user-friendly (and user assigned) name of the associated instance.	--
www	tbd	tbd
xxx	tbd	tbd
yyy	tbd	tbd
zzz	tbd	tbd