Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>
Title	Contribution in Suppport of Comment Related to the Scope of 802.16i
Date Submitted	2007-01-16
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Re:	This contribution is in response to the call for contributions in 802.16i-06/012.
Abstract	This contribution addresses the requirement in the document scope (and project PAR) that requires “protocol neutral methodologies” and multiple solution sets. It proposes a new informative annex where examples are given showing how the the ASN1 based MIBs may be a basis for management using other paradigms than SNMP, e.g., Web Services or CORBA based management.
Purpose	Discuss proposed approach and agree.
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Contribution in Suppport of Comment Related to the Scope of 802.16i

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Introduction

This contribution addresses the requirement in the document scope (and project PAR) that requires "protocol neutral methodologies" and multiple solution sets. It proposes a new informative annex where examples are given showing how the the ASN1 based MIBs may be a basis for management using other paradigms than SNMP, e.g., Web Services or CORBA based management.

After text related to IRPs was removed from the document, the document became easier to integrate and more consistent with 802.16f, but the removal left a hole in the scope. The sentence in the scope: "It uses protocol neutral methodologies for network management to specify resource models and related solution sets for the management of devices in a multivendor 802.16 mobile network" seems to be written with the Integration Reference Points (IRP) methodology in mind, leaving little room for any other approach. However, we believe that by providing examples and guidelines for managing 802.16 entities using alternate technologies to SNMP, the scope is adequately addressed.

Technolgies used for management systems

Today there are several technolgies including SNMP used for managing networks and network entities:

SNMP
CMIP
CORBA
Web Services (WS)

Some of these technolgies (e.g., SNMP, CMIP) are more oriented towards "on the wire interactions" than to the programmatic interface aspects. They specifiy a limitted set of messages that may be exchanged between a well defined set of players/roles (Agents, Manager). Other technologies (CORBA, Web Services) are more oriented towards easy programming, distribution, multiple language bindings, portability ,etc., and are used in many different types of applications. There has been a general trend in the computing and communications industry towards use of these so-called Distributed Object Techniques (DOTs). There have also been activities aiming at bridging the traditional management technologies CMIP/SNMP and the DOTs. X-open Joint Inter-domain Management working group is addressing the interworking between the different technologies.

Studies have been undertaken to compare the effciency between SNMP, WS and CORBA in terms of response time, traffic load, and memory footprint, which show that SNMP is more efficient when WS and CORBA given certain translations from SNMP to WS/CORBA. However, the true benefits of WS and CORBA are their flexibilty, which allows for the development of applications that scale better. For instance, messages may be specified that for requesting/transferring complex, aggregate chunks of information, rather than sending multiple "primitive" requests.

Web Services (WS)

Web Servicesis is a standard means for interoperating between different software applications. A WS is

implemented by an Agent and may be provided to a requester. The WS Description (WSD) is a machine processable description written in WSD Language (WSDL). Roughly speaking, WSDL is to WS what ASN.1 is to SNMP and a solution set for WS would be a WSDL specification. The protocol for transfering data is SOAP/HTTP/TCP. There is no standard translation from an SNMP MIB to WSDL that we are aware of.

Common Object Request Broker Architecture (CORBA)

A CORBA based solution set would be a set of Interface Description Language specification. The protocol most likely to be used for ransfering data is CORBA Internet inter-ORB protocol (IIOP) although there are other inter-ORB protocols. XoJIDM addresses the translation between the SNMP MIB and the CORBA IDLs. However, this translation is not used much in practice. The translation needs to be semantic, rather than generic/syntactic based (which means it needs to be done manually).

Proposed approach in 802.16i

Rather than providing solution sets for WS and CORBA in 802.16i, which would be very time consuming to develop and maintain, se suggest that efforts be concentrated on refining the current ASN.1 MIBs and to leave the developments of IDLs or WSDL to vendors and operators. The ASN.1 MIBs provide the basis for such alternate solution sets, whether they are derived manually or generated by some tool. As shown in the proposed informative annex, the exact interface between a product encapsulating an 802.16 entity and an external entity is outside the scope of 802.16 standards.

Proposed Text Changes

Insert the following informative annex to 802.16i

Annex G Example Encapsulation of an 802.16 Entity

1. Introduction

Figure 1 in section 1.3 of the IEEE Std. 802.16 (currently in Draft amendment 802.16g) shows the 802.16 Entity Reference Model.

The Network Control and Management System (NCMS) is not part of the 802.16 standards and is treated as a "black box". It may be distributed with parts residing on different nodes in a network. Part of the NCMS may be physically collocated with the 802.16 entity. Figure 2 show a possible deployment of the NCMS.

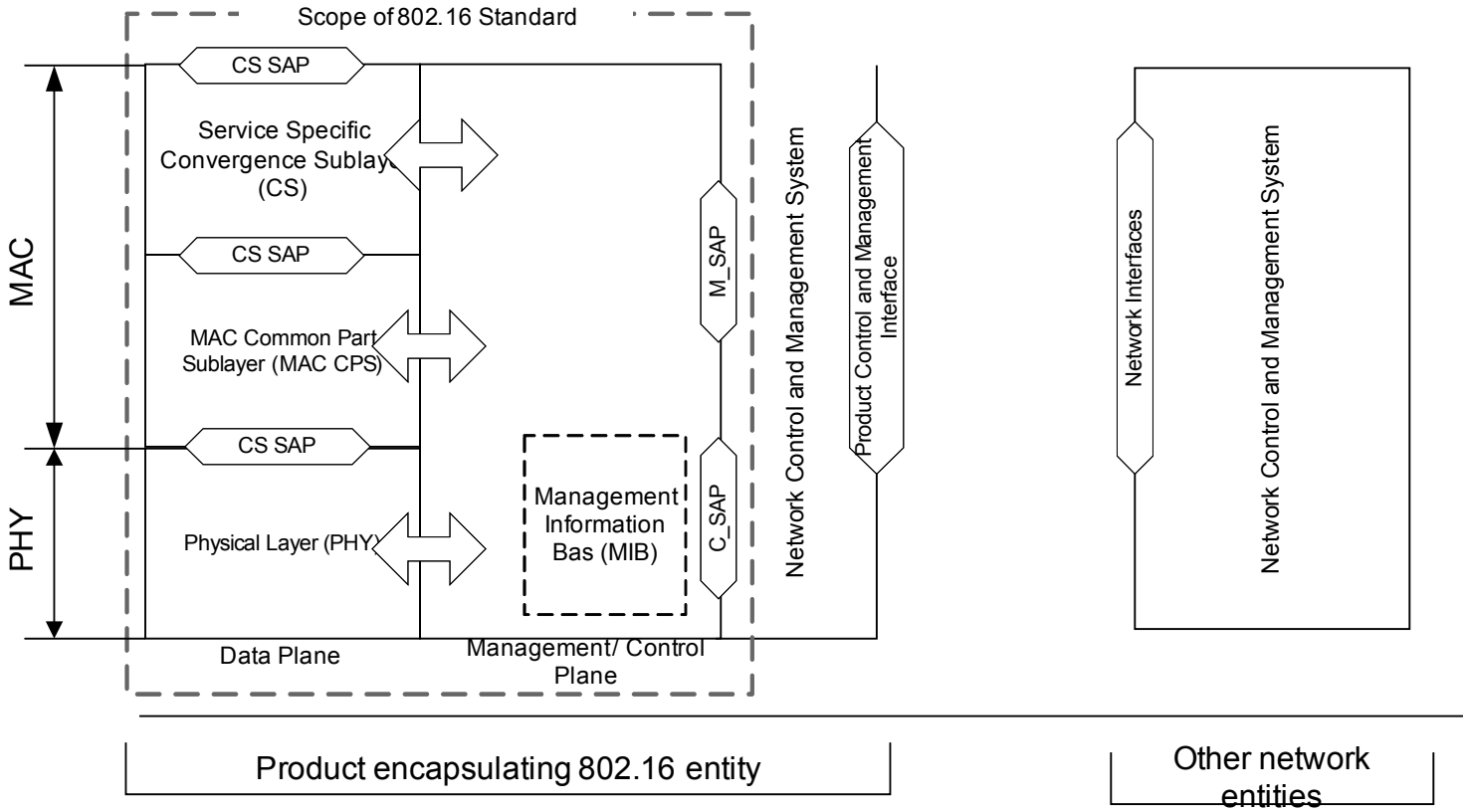

Figure 2 – Possible distribution of the NCMS

The part of the NCMS that is deployed onto the product encapsulating the 802.16 entity may have have its own software platform enhancing the features of the pure 802.16 entity. For instance, it may provide an Object Reques Broker (ORB) and implement a communications protocol stack such as IIOP/TCP/IP allowing the product to interact with components on other network entities based on the CORBA architecture.

The interactions with the MIB are specified in this standard to be based on SNMP (see section 9.3.1) . An implementation may provide a gateway between SNMP and whichever management technology is used on the between the product and the manager in the network. However, the model in Figure 1 is a reference model , and

compliance to the SNMP requirements can only be verified to the extent that the product provides transparent access to the M-SAP.