
IEEE 802.11
Wireless Access Method and Physical Specification

Title: Proposed Text for Section 7 (Layer Management)

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Author: Produced by a group of "volunteers", including:

Greg Ennis
Symbol Technologies, Inc.
16331 Englewood Ave.
Los Gatos CA 95032
Voice: 408 356-4775
Fax: 408 358-8991
email: gennis@netcom.com

Bob O'Hara
Advanced Micro Devices
136 E. 55th
New York NY 10022
Voice: 408 749-4952
Fax: 408 774-8447
email: bob.ohara@amd.com

Mike Trompower
Aironet Wireless Communications
367 Ghent Rd., Suite 300
Akron OH 44333
Voice: 216 665-7920
Fax: 216 665-7301
email: mtrom@aironet.com

Dean Kawaguchi
Symbol Technologies, Inc.
2145 Hamilton Ave.
San Jose CA 95125
Voice: 408 369-2629
Fax: 408 446-4630
email: DeanK@psd.symbol.com

Michael Fischer
Digital Ocean Inc.
4242-3 Medical Drive
San Antonio TX 78229
Voice: 210 614-4096
Fax: 210 614-8192
email: mfischer@child.com

This submission proposes text for the Layer Management section of the draft 802.11 specification. This section was previously Section 6 (Draft 1.1) but is now Section 7 (Draft 1.2). This section was essentially empty. In this submission we attempt to fill in this hole with text that provides a framework for layer management, describing the various management SAPs and the primitives across these SAPs. The basic model is that these SAPs provide access to the MIB parameters, which can be read and written to perform management functions. A few miscellaneous primitives covering functions which are not easily expressed as MIB operations are identified. Since the actual MIB contents are described in other sections, this section can be relatively short.

7. Layer Management

7.1. Overview of Management Model

Both MAC and PHY layers conceptually include management entities, called MAC Management and PHY Management. These entities provide the layer management service interfaces via which layer management functions may be invoked.

For the purposes of describing the MAC and PHY management functions in the context of a more general system management environment, it is assumed that a Station Management (SM) entity is present within each station. SM is a layer-independent entity which may be viewed as residing in a separate management plane or as residing "off to the side". The exact functions of SM are not specified in this standard, but in general this entity may be viewed as responsible for such functions as the gathering of layer-dependent status from the various layer management entities, and similarly setting the value of layer-specific parameters. SM would typically perform such functions on behalf of general system management entities and would implement standard management protocols.

The following figure depicts the relationship among these entities.

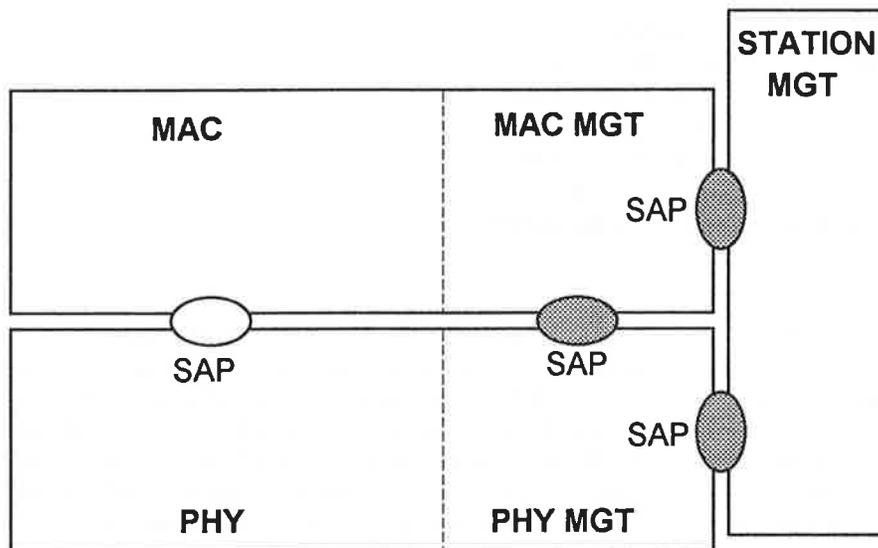


Figure 1: Layer Management Entities and Service Access Points

The various entities within this model interact in various ways. Certain of these interactions are defined explicitly within this standard, via a Service Access Point across which defined primitives are exchanged. Other interactions are not defined explicitly within this standard, such as the interfaces between MAC and MAC MGT and between PHY and PHY MGT, represented as dotted lines within the figure. The specific manner in which these MAC and PHY management entities are integrated into the overall MAC and PHY layers is not specified within this standard. Note that the explicit SAP interfaces, though defined within this standard, are not necessarily exposed interfaces.

The management SAPs within this model are the following:

SM-MACMGT SAP
 SM-PHYMGT SAP
 MACMGT-PHYMGT SAP

The latter two SAPs support identical primitives, and in fact can be viewed as a single SAP which could be used either directly by a MAC MGT entity or by SM. In this fashion, the model reflects what is anticipated to be a common implementation approach in which PHY MGT functions are controlled by the MAC (on behalf of SM). In particular, PHY implementations are not required to have separate interfaces defined other than their interfaces with the MAC.

7.2. Generic Management Primitives

The management information specific to each layer is represented as a Management Information Base (MIB) for that layer. The MAC and PHY management entities are viewed as "containing" the MIB for that layer. The generic model of MIB-related management primitives exchanged across the management SAPs is to allow the SAP user-entity to either GET the value of a MIB parameter, or to SET the value of a MIB parameter. The invocation of a SET primitive may require that the layer entity perform certain defined actions.

The following figure depicts these generic primitives.

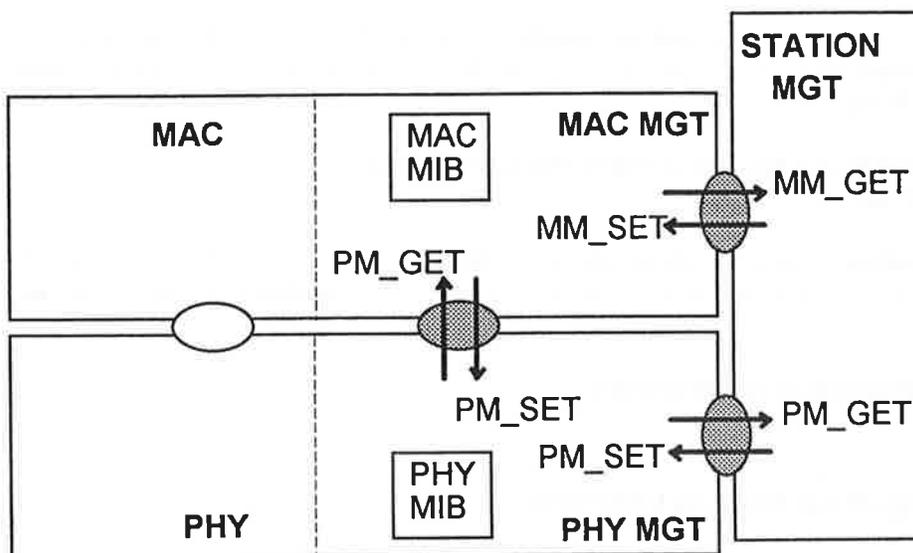


Figure 2: GET and SET Operations

The GET and SET primitives in fact are represented as REQUESTs with associated CONFIRMs. These primitives are prefixed by MM (for MAC Management) or PM (for PHY Management) depending upon whether the MAC or PHY Management SAP is involved. In the following, XX denotes MM or PM:

XX_GET.request (MIB_parameter)

Requests the value of the given MIB_parameter.

XX_GET.confirm (status, MIB_parameter, MIB_parameter_value)

Returns the appropriate MIB parameter value if status = "success", otherwise returns error indication in the status field. Possible error status values include "invalid MIB parameter".

XX_SET.request (MIB_parameter, MIB_parameter_value)

Requests that the indicated MIB parameter be set to the given value. If this MIB_parameter implies a specific action, then this requests that that action be performed.

XX_SET.confirm (status, MIB_parameter)

If status = "success", this confirms that the indicated MIB parameter was set to the requested value, otherwise returns error condition in status field. If this MIB_parameter implies a specific action, then this confirms that that action was performed. Possible error status values include "invalid MIB parameter".

Additionally, there are certain requests (with associated confirms) which may be invoked across a given SAP which do not involve the setting or getting of a specific MIB parameter. One of these is supported across all SAPs, as follows:

XX_RESET.request: where XX is MM or PM as appropriate.
XX_RESET.confirm

This will be used to initialize the management entities, the MIBs and the datapath entities. It may include a list of parameters for items to be initialized to non-default values. The .confirm will indicate success or failure of the request.

Other SAP-specific primitives are identified below.

7.3. MAC Management Service Interface

In addition to the generic MM_GET and MM_SET primitives, there are two additional primitives which can be invoked.

MM_SCAN.request (scan_parameters)
MM_SCAN.confirm

This request shall initiate a scan process when the current transmission/reception is completed. Parameters will select active/passive, starting channel, list of channels to scan, and time to remain on a single channel.

MM_POWER_MGT.request (power_mgt_parameters)

MM_POWER_MGT.confirm

This request shall initiate changes in the power management state of a station. It is used to implement the power saving strategy of an implementation. May include parameters for number of beacon intervals to sleep and a boolean flag controlling waking for DTIMs. Should include a mandatory enable/disable boolean.

7.4. PHY Management Service Interface

The PHY Management Service Interface consists solely of the generic PM_GET and PM_SET primitives on PHY MIB parameters as described above.

