11. Allocation of object identifier values in IEEE 802 standards

11.1 General

From time to time, various IEEE 802 standards have a requirement to allocate Object Identifier (OID) values—the most common example being for the purpose of defining SNMP management information base (MIB) objects, but other examples exist. MIBs describe the structure of the management data of a device subsystem and use a hierarchical namespace based on object identifiers (OID) to identify variables. This clause defines a simple and consistent Object Identifier hierarchy, based on the use of the Object Identifier value that has been assigned by ISO to identify the IEEE 802 series of standards. This hierarchy can be used by all current and future IEEE 802 Working Groups, and can be used flexibly to meet the needs of the standards defined by those working groups. This will establish a consistent practice within IEEE 802 for the development and allocation of object identifiers. Consistency of Object Identifier allocation will facilitate implementation and operation of IEEE 802 compliant equipment.

11.2 Object Identifiers and ISO standards

An Object Identifier is an ASN.1 data type that is used as a means of defining unique identifiers for objects. Values of the Object Identifier data type can then be used to name the objects to which they relate.

The Object Identifier data type consists of a sequence of one or more non-negative integers, often referred to as arcs, that define a hierarchy, or tree, of object identifier values. The first arc in the sequence identifies the registration authority responsible for allocating the values of the second and subsequent arcs. For example:

  iso(1)

indicates that an initial arc value of 1 identifies ISO as the registration authority. Subsequent arcs in the sequence will have been determined by ISO, or will have been allocated by registration authorities subordinate to ISO.

Under the iso arc, a second arc has been allocated to identify organizations recognized by ISO, such as the IEEE; hence, the two-integer sequence

  iso(1) iso-identified-organization(3)

Under the iso-identified-organization arc, a subsequent arc has been allocated to identify the IEEE; hence, the three-integer sequence

  iso(1) iso-identified-organization(3) ieee(111)

indicates that the fourth integer identifies a particular registry within the IEEE, and that the allocation of the fourth and subsequent arcs is the responsibility of the IEEE. Under the ieee arc, the IEEE Registration Authority has defined an arc for the numbered series of IEEE standards; hence, the four-integer sequence

  iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2)

indicates that the fifth integer is used to identify a particular IEEE numbered series standard. The actual number corresponding to the numbered series standard is used in the fifth arc; hence the following identifies the IEEE 802 series of standards:

  iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802)

The responsibility for allocating the subsequent arcs under iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802) lies with IEEE 802.

As the standard number 802 is used to identify the member of the family of IEEE 802 standards, this particular sequence of integer values can form the basis of an Object Identifier hierarchy for use by the individual standards in the 802 family. The act of assigning a number to a standard has the effect of automatically assigning an OID arc to that standard, and therefore no further administrative effort is needed before that standard can allocate OID values under that point in the tree, using the subsequent arcs.

11.3 The Object Identifier hierarchy for IEEE 802

The Object Identifier value assigned to the family of IEEE 802 standards is:

> iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802)

The next arc under iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802) shall be used to differentiate between members of the family of IEEE 802 standards, by using it as a working group designator, as follows:

> iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802) ieee802dotXX(XX)

where XX is the working group number of the IEEE 802 Working Group responsible for that standard. These arcs are assigned for use in all current and future IEEE 802.XX standards.

For example, under this hierarchy, the value used within the standards defined by the IEEE 802.3 Working Group is:

> iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802) ieee802dot3(3)

and the value used within the IEEE 802.11™ standards is:

> iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802) ieee802dot11(11)

The working group concerned is free to decide how further arcs will be allocated within their standards, in a manner that makes sense for their particular needs. For example, in the IEEE 802.1 Working Group, the next arc is used to define the type of allocations that are being made. The only type defined so far is for MIBs, but others can be added in the future:

> iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802) ieee802dot1(1) ieee802dot1mibs(1)

Below this arc, each individual IEEE 802.1 MIB can get its own identifier. ~~Again~~The first assignment is for ~~, only~~ IEEE 802.1Q~~X~~'s Textual Convention MIB(ieee8021Tc~~pae~~MIB) ~~appears in this scheme so far, b~~and~~ut clearly~~ others can easily be added[10]:

> iso(1) iso-identified-organization(3) ieee(111) standards-association-numbered-series-standards(2) ieee-802(802) ieee802dot1(1) ieee802dot1mibs(1) ieee8021Tc~~pae~~MIB(1)

---

[10]More information on IEEE 802.1 OIDs can be found on the working group web site, http://www.ieee802.org/1/pages/OIDS.html

It is the responsibility of each working group to ensure that any values that are allocated to the fifth and subsequent arcs are documented, in a manner that ensures that the same OID value cannot be assigned to two different objects. In the IEEE 802.1 Working Group, this has been achieved in the past by placing tables of OID allocations in an annex within the standard concerned; in the IEEE 802.3 Working Group, a master spreadsheet of allocated OID values is maintained by the Chair and posted on their website. For future allocations, adopting a master spreadsheet approach is appropriate.

It is important that the allocation scheme for the fifth and subsequent arcs is constructed in a manner that leaves appropriate "escapes" for uses that cannot be foreseen. The simple expedient of allocating a "type of allocation" value as the fifth arc (as in the IEEE 802.1 Working Group usage described above) is sufficient to ensure that such an escape is always available.

11.4 The Object Identifier hierarchy under iso(1) std(0) iso8802(8802)

The 2001 revision of this standard documented the use of iso(1) std(0) iso8802(8802) as the root arc under which 802 Standards would develop their object identifier hierarchies. The use of this root arc is deprecated.

11.5 Migration from previous Object Identifier allocations

The Object Identifier hierarchy described in this clause need not have any effect upon existing IEEE 802 standards that have already solved this problem by using a specific allocation obtained elsewhere (for example, from ANSI). The primary aims of documenting this procedure are:

    a)   To ensure that Object Identifiers can be allocated under iso(1) std(0) iso8802(8802) in a manner that ensures that they are unique, and

    b)   To avoid the need for any further administrative overhead (such as applying for the use of an Object Identifier arc) for any future uses of Object Identifiers in IEEE 802 standards.

With the hierarchy as defined in this clause, as new working groups are created in IEEE 802, their base Object Identifier arc is also created automatically, so no administrative effort is required on the part of the working group, other than to determine how the fifth and subsequent arcs will be used in their standards.

For those working groups that have already made use of other allocation schemes (e.g., IEEE Std 802.3 and IEEE Std 802.1), it may be considered appropriate to migrate existing allocations to the hierarchy defined in this clause. In considering this, the following should be borne in mind:

    — While it might be perceived as "tidy" to have all IEEE 802 Object Identifiers allocated under a single arc of the Object Identifier tree, this is not a requirement for any other reason; one Object Identifier value is no better or no worse than any other from a technical point of view (with the possible exception that the encoded length can vary with the number of arcs to be encoded), as long as any given Object Identifier identifies a single object.

    — If migration is desired, there is no requirement to remove the old Object Identifier values; indeed, this is not permitted for objects defined in SNMP MIB modules, nor is it permitted to associate such objects with more than one Object Identifier value. Instead, new definitions shall be created and registered under the desired Object Identifier tree.