YANG Module Classification

draft-ietf-netmod-yang-model-classification-02

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Motivation

- YANG is currently being considered for a wide variety of applications
- Currently no well-known terminology to categorize various types of YANG modules
- Consistent terminology would help with:
  - the categorization of modules
  - assist in the analysis the YANG data modeling efforts in the IETF and other organizations,
  - bring clarity to the YANG-related discussions between the different groups
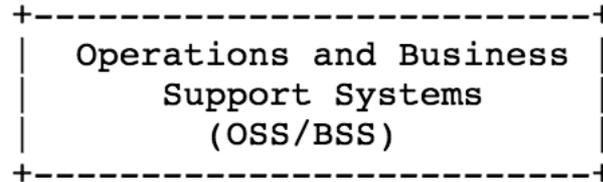
Models and Modules

- From 6020 Terminology:
  - **module:** A YANG module defines a hierarchy of nodes that can be used for NETCONF-based operations. With its definitions and the definitions it imports or includes from elsewhere, a module is self-contained and "compilable"
  - **data model:** A data model describes how data is represented and accessed.
- Modules express models
- We classify modules

Uh-oh!

WORMS

(:-)

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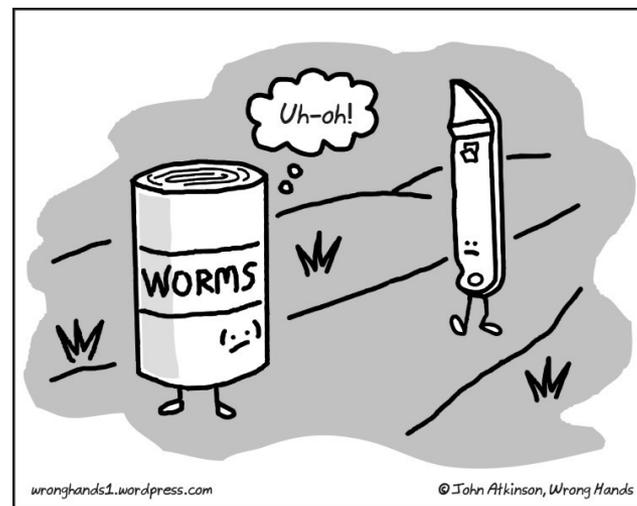
Proposed Taxonomy

- Document presents a set of concepts and terms to form a useful taxonomy for consistent classification of YANG modules in two dimensions

  1. Layering of modules based on their abstraction levels
  2. Type of module based on the nature and intent of the content
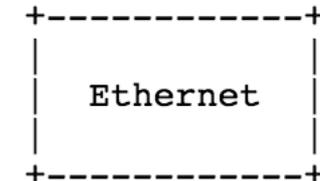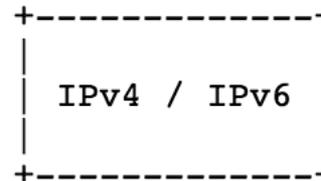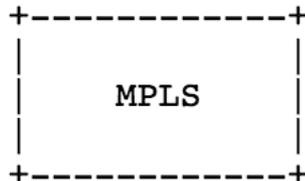
Dimension #1: Layers

```
         +----------------------------+
         | Operations and Business    |
         |      Support Systems       |
         |        (OSS/BSS)           |
         +----------------------------+

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Network Service YANG Modules

   +-------------+   +-------------+   +-------------+
   |             |   |             |   |             |
   |  - L2VPN    |   |  - L2VPN    |   |    L3VPN    |
   |  - VPWS     |   |  - VPLS     |   |             |
   |             |   |             |   |             |
   +-------------+   +-------------+   +-------------+

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Network Element YANG Modules

 +-----------+ +-----------+ +-------------+ +-----------+
 |           | |           | |             | |           |
 |   MPLS    | |    BGP    | | IPv4 / IPv6 | | Ethernet  |
 |           | |           | |             | |           |
 +-----------+ +-----------+ +-------------+ +-----------+
```

Network Service YANG Data Modules

- Describes an abstract model that allows instances of the service to be decomposed into instance data according to the Network Element data modules
- Service-to-element decomposition is a separate process with details depending on how the network operator chooses to realize the service.
- Examples:
  - draft-ietf-l3sm-l3vpn-service-model
  - MEF EVC-based Service Model

Network Element YANG Data modules

- Describe the configuration, state data and operations of a network device
- The decomposition, ordering and execution of changes to the operating system, and application configuration is the task of the management agent framework that implements the module
- Examples:
    - RFC 7223 - A YANG Data Model for Interface Management
    - draft-ietf-netmod-routing-cfg

Dimension #2: Module Types

- Suggested classification applies to **both** Network Element YANG Data Modules and to Network Service YANG Data Modules.

1. Standard YANG Modules

2. Vendor-specific YANG Modules and Extensions

3. User-specific YANG Modules and Extensions
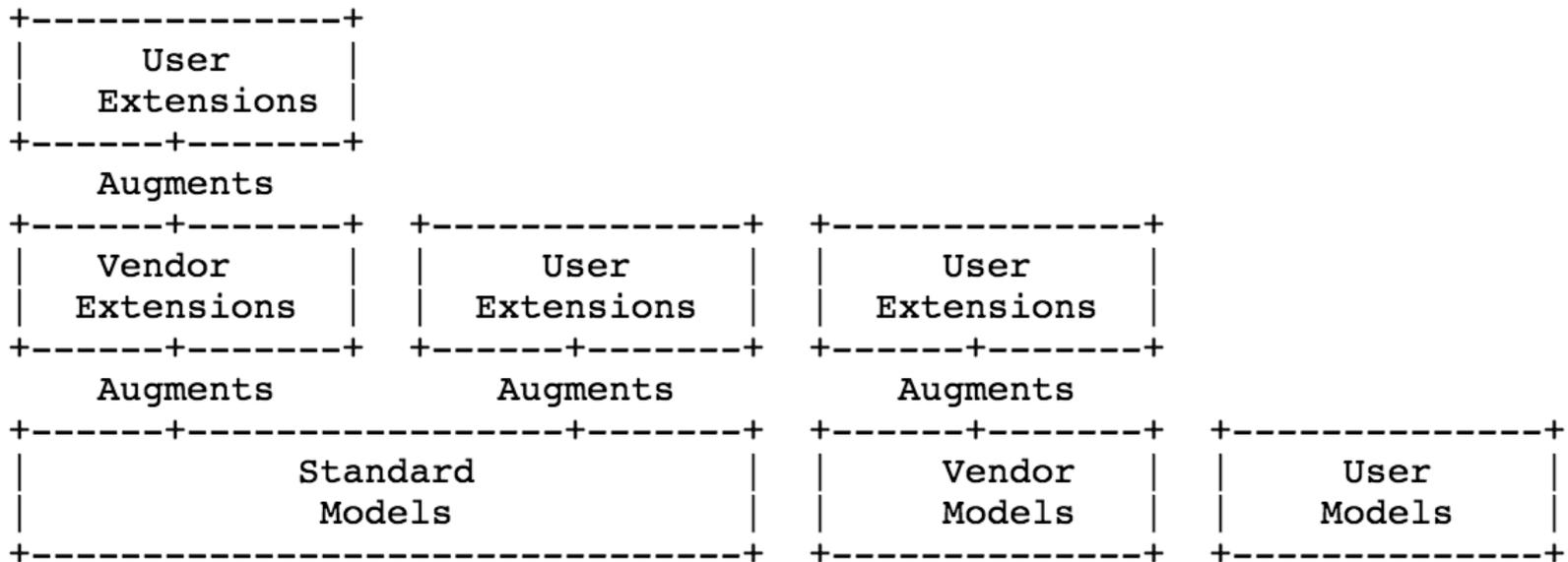
Dimension #2: Module Types

```
+--------------+
|    User      |
| Extensions   |
+------+-------+
    Augments
+------+-------+   +--------------+   +--------------+
|   Vendor     |   |    User      |   |    User      |
| Extensions   |   | Extensions   |   | Extensions   |
+------+-------+   +------+-------+   +------+-------+
    Augments          Augments          Augments
+------+------------------+-------+   +------+-------+   +--------------+
|           Standard              |   |   Vendor     |   |    User      |
|            Models               |   |   Models     |   |   Models     |
+---------------------------------+   +--------------+   +--------------+

          Figure 2: YANG Module Types
```

Standard YANG Modules

- Published by standards defining organizations (SDOs)
- No formal definition of what construes an SDO, common features are:
  - They publish specifications along specific processes reflecting some sort of membership consensus
  - Developed for wide use among the membership or for audiences beyond that
- Lifecycle driven by the editing cycle of the specification and not tied to a specific implementation.
- Examples of SDOs in the networking industry are the IETF, the IEEE and the MEF

Vendor-specific YANG Models and Extensions

- Developed by organizations with the intent to support specific set of implementations under control of that organization

- Intent of models range from open published YANG models to strictly internal models

- Vendors also develop Vendor-specific Extensions to standard modules using YANG constructs for extending data definitions of previously published modules

User-specific YANG Modules and Extensions

- User-specific YANG modules are developed by organizations that operate YANG-based infrastructure including devices and orchestrators
- The intent of these modules is to express the specific needs for a certain implementation, above and beyond what is provided by vendors

Asks

1. Read the draft
2. Provide feedback
3. WGLC