IETF #99 Broadband Forum (BBF) YANG Update

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Outline

• BBF YANG
  – What’s in and out of scope?
  – What are the BBF YANG projects?
  – Where and how is BBF YANG published?
  – Is in-progress (draft) BBF YANG available?
  – Is BBF YANG shown in the YANG catalog?

• BBF YANG BCPs = {IETF, ...} BCPs + BBF-specific additions
  – What are the dependencies on external YANG?
  – What are some of the BBF-specific BCPs?
BBF YANG Scope

• Emphasis on addressing BBF requirements rather than on general solutions
  – Contrast with “core” SDOs such as IETF, ITU-T and IEEE
  – Current BBF YANG emphasis is on Broadband Access Nodes, e.g. requirements from
    • TR-101 Issue 2: Migration to Ethernet-Based Broadband Aggregation
    • TR-301 Issue 2: Architecture and Requirements for Fiber to the Distribution Point

• What we will define in BBF
  – YANG for BBF-defined protocols or interfaces
  – YANG for non-BBF protocols or interfaces if the owner organization is not interested in defining it

• We will reuse YANG from other organizations whenever possible
<table>
<thead>
<tr>
<th>Area</th>
<th>Project</th>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common YANG</td>
<td>WT-383</td>
<td>Common YANG Modules for Access Networks</td>
<td>Published TR-383; WT-383a1 ongoing</td>
</tr>
<tr>
<td>FTTdp Management</td>
<td>WT-355</td>
<td>YANG Modules for FTTdp Management</td>
<td>Published TR-355 and TR-355c1; WT-355a1 ongoing</td>
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<tr>
<td></td>
<td>WT-374</td>
<td>YANG Models for Management of G.hn Systems</td>
<td>Ongoing</td>
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<td></td>
<td>WT-393</td>
<td>PMAA Management Model</td>
<td>Not started</td>
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<tr>
<td>SDN for MSBN</td>
<td>WT-368</td>
<td>YANG Models for access nodes in SDN</td>
<td>Inactive</td>
</tr>
<tr>
<td>PON Management</td>
<td>WT-385</td>
<td>YANG model for management of ITU-T PON</td>
<td>Published WT-385_draft1; ongoing</td>
</tr>
<tr>
<td></td>
<td>WT-394</td>
<td>YANG Models for Management of PON ONUs</td>
<td>Not started</td>
</tr>
<tr>
<td>FANS</td>
<td>WT-386</td>
<td>Fixed Access Network Sharing Interfaces</td>
<td>Just started</td>
</tr>
</tbody>
</table>
TR-355: YANG Modules for FTTdp Management

- First BBF YANG modules
  - Published July 2016
  - Updated March 2017
- ITU-T VDSL2 and G.fast PHY layer standards; also
  - G.hs (handshake)
  - MELT and SELT (tests)
- IETF dependencies
  - ietf-interaces
  - ietf-inet-types and ietf-yang-types (not shown)
- Now working on new features, e.g.
  - G.9982 bonding
  - Reverse Power Feed (RPF)
TR-383: Common YANG Modules for Access Networks

• Common modules applicable to multiple BBF work areas
  – Published May 2017
  – bbf-yang-types module has moved from TR-355 to TR-383
  – Main emphasis is on addressing TR-101 (Migration to Ethernet-Based Broadband Aggregation) management requirements

• IETF dependencies
  – ietf-interfaces, ietf-inet-types and ietf-yang-types (not shown)
  – ietf-system, ietf-hardware (draft)

• Now working on new features, e.g.
  – Multicast
  – Software management
  – Fault management
  – Alarm management
    • Hence BBF interest in ietf-alarms
BBF YANG Publication

- The BBF [Software Release Registry](https://github.com/BroadbandForum/yang) lists all published BBF software
  - This includes both draft and standard YANG

- BBF YANG is published to a public GitHub repository
  - [https://github.com/BroadbandForum/yang](https://github.com/BroadbandForum/yang)
    - [https://github.com/BroadbandForum/yang/tree/master/draft](https://github.com/BroadbandForum/yang/tree/master/draft)
    - [https://github.com/BroadbandForum/yang/tree/master/standard](https://github.com/BroadbandForum/yang/tree/master/standard)
    - Also available via [https://github.com/YangModels/yang/tree/master/standard](https://github.com/YangModels/yang/tree/master/standard)
      - Its `bbf` sub-directory is a git submodule, i.e. a reference to a specific BBF repository commit

- See examples in background slides
Availability of Draft BBF YANG

• For some projects, BBF has made draft YANG available for study purposes
  – Whereas standard YANG has a BSD 3-clause license, draft YANG has a more restrictive license that expires after (by default) nine months

• Currently working on
  – Making draft YANG available for all projects
  – Ensuring that such drafts are updated reasonably frequently
BBF YANG and the YANG Catalog

- All standard and draft YANG released via https://github.com/BroadbandForum/yang is available in the YANG catalog
BBF YANG and the YANG Catalog: Example

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BBF YANG Dependencies on External YANG

- **Policy**
  - BBF YANG modules MUST use standard IANA/IETF YANG modules whenever possible
  - In this context, “use” implies adherence to the letter and spirit of such modules and of their defining RFCs

- **Published YANG already depends (directly) on**
  - ietf-inet-types, ietf-yang-types
  - iana-if-type, ietf-interfaces
  - iana-hardware, ietf-hardware (draft)
  - ietf-system

- **In-progress YANG is planned (additionally) to depend on**
  - ietf-alarms (draft)
BBF YANG BCPs

• BBF has an OD-360: BBF YANG Best Current Practices document
  – Based on and adhere to RFC 6087bis as much as possible
  – Will incorporate aspects of other SDOs (e.g. ETSI, ONF, ITU, MEF, IEEE) as they adopt YANG BCPs

• Guideline categories
  – Qualifications to and extensions of RFC 6087bis guidelines
  – Additional BBF-specific guidelines

• BBF plans to share OD-360 with IETF

• See examples in background slides
The remaining slides provide further examples and background
BBF YANG Publication: Examples

[GitHub Repository](https://github.com/BroadbandForum/yang/tree/v2.0.0-TR-383/standard/interface)

<table>
<thead>
<tr>
<th>File</th>
<th>Description</th>
<th>Date</th>
<th>Age</th>
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<tbody>
<tr>
<td><code>docs</code></td>
<td>2017-03-13: TR-355c1 YANG Modules for FTTdp Management</td>
<td>3 months</td>
<td>ago</td>
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<tr>
<td><code>bfb-fast-base.yang</code></td>
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<td><code>bfb-fast-channel-performance-b</code></td>
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BBF YANG BCPs: Examples

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- **Examples of IETF RFC 6087bis extensions**
  - Use of YANG 1.1 is mandatory
  - Upper-case letters and underscores aren’t permitted in identifier names
  - Use of `when` or `if-feature` on `augment` is strongly encouraged
  - Use of `revision-date` on `import` and `include` is forbidden
  - Only ASCII characters (CR, LF, printable) are permitted

- **Examples that go beyond IETF RFC 6087bis scope**
  - 70 character line length limit
  - Paragraphs are separated by blank lines
  - YANG mechanisms must be used where available (in preference to requirements in descriptions)
  - Deviations are forbidden in standard BBF modules (with guidelines for usage by implementations)
  - Expedient use of short names is encouraged, e.g. leaf names within possibly large lists
  - Unions should be used to give names to special values (rather than using ‘magic’ values)

- BBF plans to share OD-360 with IETF