



# 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

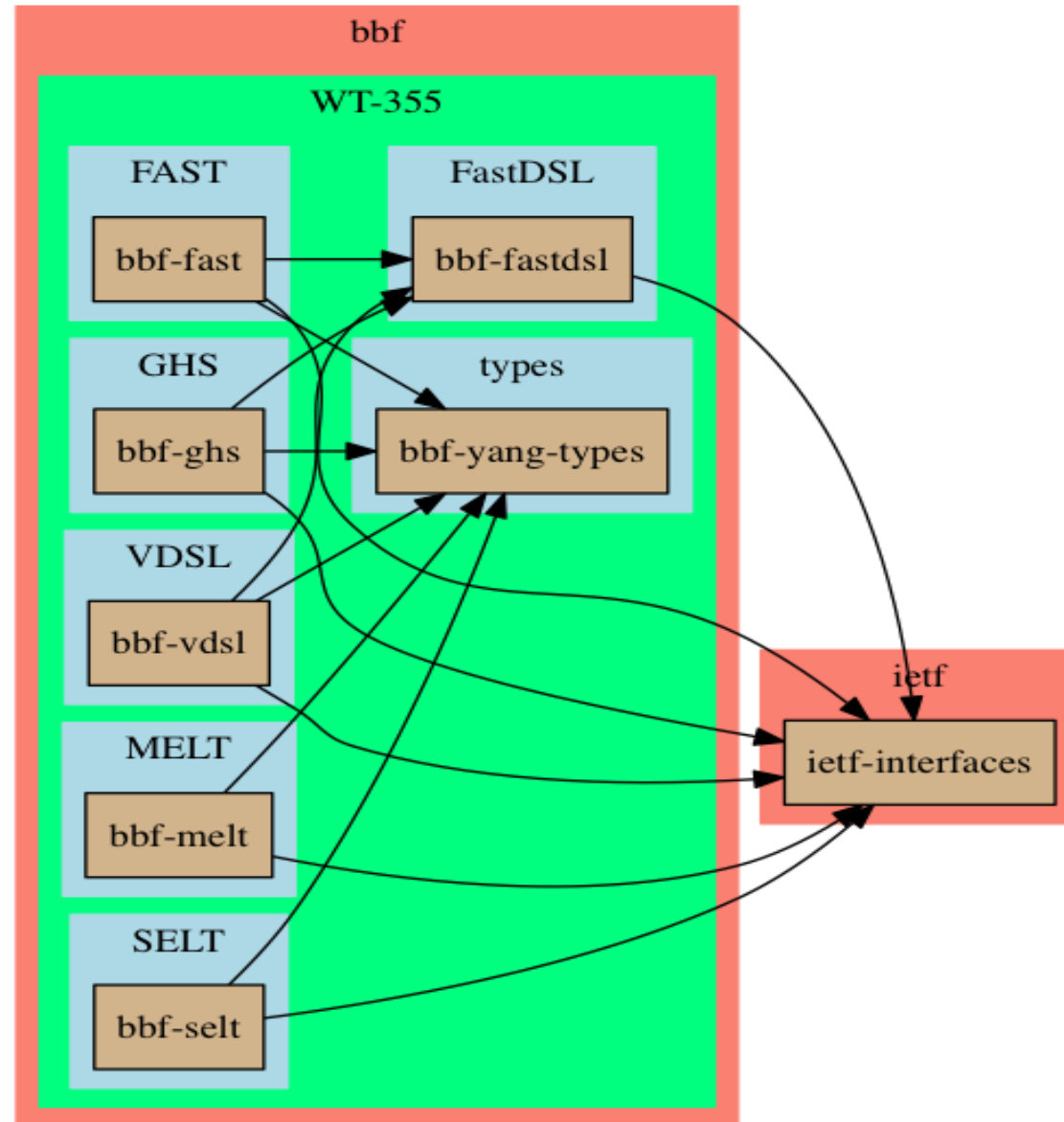
- Emphasis on addressing BBF requirements rather than on general solutions
  - Contrast with “core” SDOs such as IETF, ITU-T and IEEE
  - Current BBF YANG emphasis is on Broadband Access Nodes, e.g. requirements from
    - [TR-101 Issue 2](#): Migration to Ethernet-Based Broadband Aggregation
    - [TR-301 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

# BBF YANG Projects

Area	Project	Name	Status
Common YANG	WT-383	Common YANG Modules for Access Networks	<b>Published TR-383; WT-383a1 ongoing</b>
FTTdp Management	WT-355	YANG Modules for FTTdp Management	<b>Published TR-355 and TR-355c1; WT-355a1 ongoing</b>
	WT-374	YANG Models for Management of G.hn Systems	Ongoing
	WT-393	PMAA Management Model	Not started
SDN for MSBN	WT-368	YANG Models for access nodes in SDN	Inactive
PON Management	WT-385	YANG model for management of ITU-T PON	<b>Published WT-385_draft1; ongoing</b>
	WT-394	YANG Models for Management of PON ONUs	Not started
FANS	WT-386	Fixed Access Network Sharing Interfaces	Just started

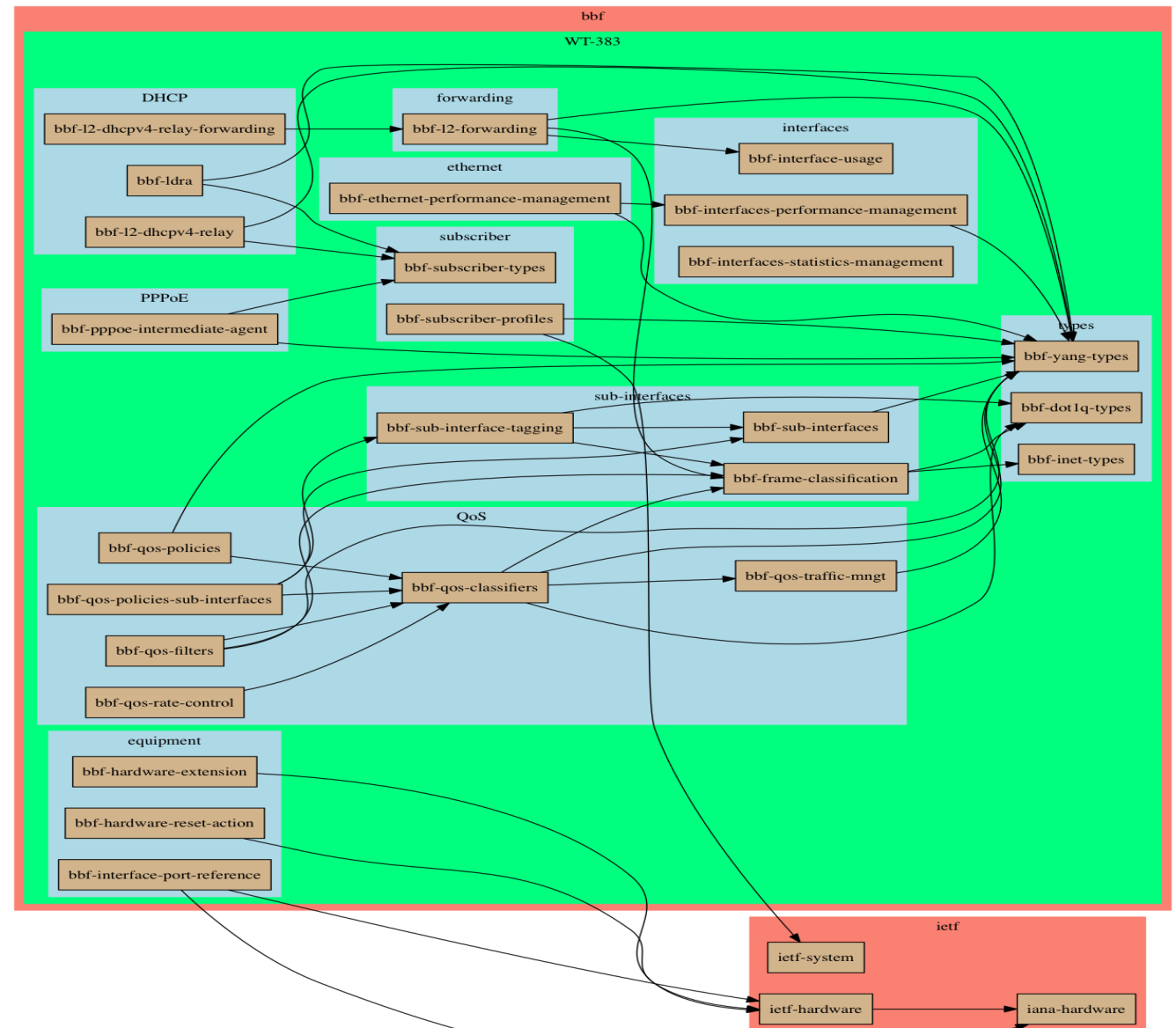
# TR-355: YANG Modules for FTTdp Management

- 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-interfaces
  - 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](#) 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/tree/master/draft>
    - <https://github.com/BroadbandForum/yang/tree/master/standard>
  - Also available via <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

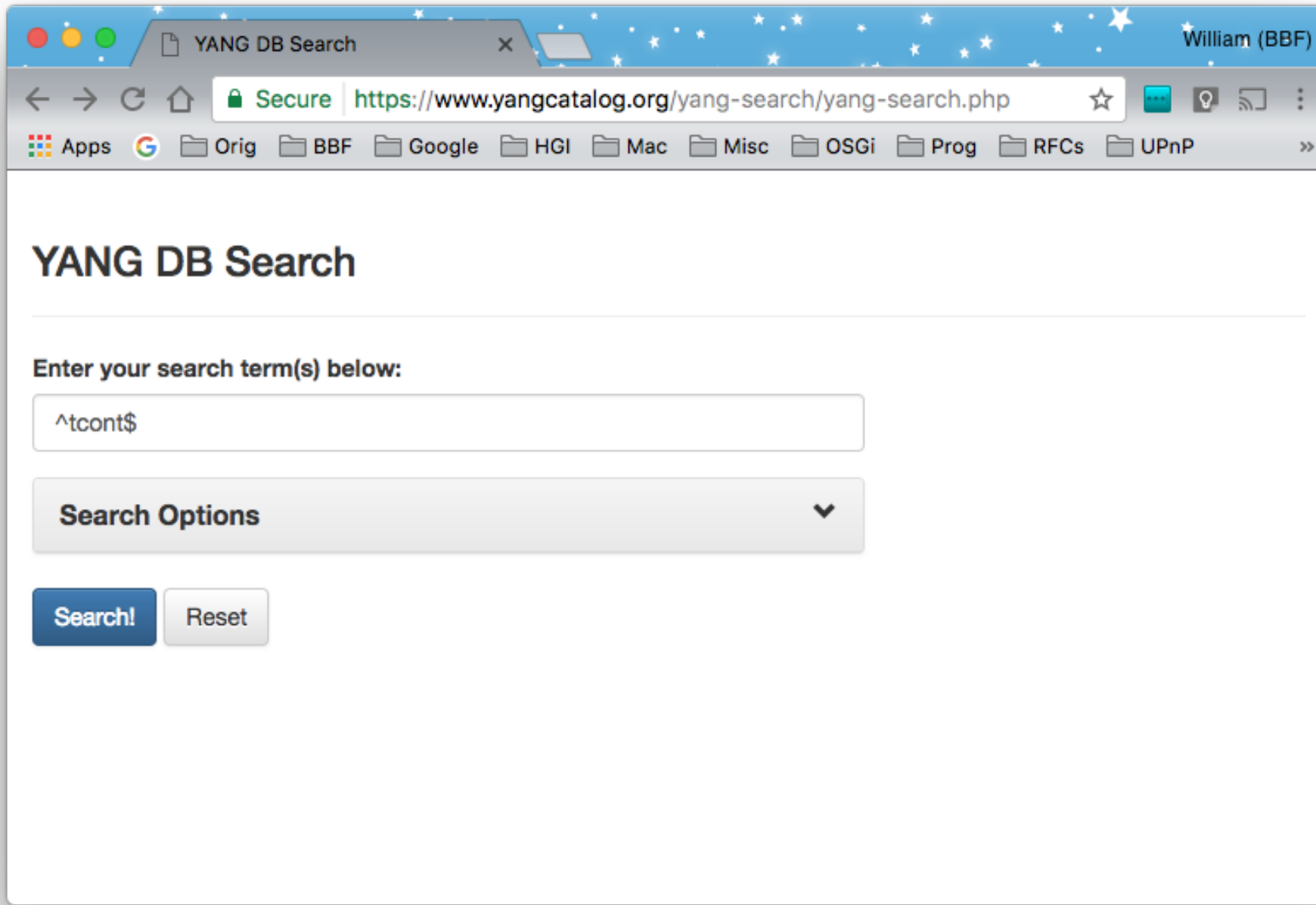
# Availability of Draft BBF YANG

- 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
  - <https://github.com/BroadbandForum/yang/tree/master/draft>
- 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



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[broadbandForum/yang](https://www.broadbandforum.com/yang) is

le

rum/yang is

YANG DB Search Results for '^tcont\$'

Show 10 entries

Search:

Entire Table

Name	Revision	Schema Type	Path	Module	Origin	Organization	Maturity
<a href="#">tcont</a>	2017-05-09	list	/fiber:fiber-tconts-oper/fiber:tcont	<a href="#">bbf-fiber-tcont-body</a> (Impact Analysis)	Industry Standard	bbf	draft

Showing 1 to 1 of 1 entries

Previous 1 Next

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Secure [https://www.yangcatalog.org/yang-search/impact\\_analysis.php...](https://www.yangcatalog.org/yang-search/impact_analysis.php...)

Apps Orig BBF Google HGI Mac Misc OSGi Prog RFCs UPnP

**Legend**

- Status: BBF:DRAFT
- Status: BBF:STANDARD
- Status: IETF:RFC

**NOTE:** Unselected node(s) with a black rim represent bottleneck(s)

```
graph TD; A((bbf-fiber-if-type)) --- B((bbf-fiber-tcont-body)); B --- C((sub-module: bbf-fiber-traffic-descriptor-profile-body)); B --- D((bbf-qos-traffic-mngt)); B --- E((ietf-interfaces));
```

Name	...
tcont	20

Showing 1 to 1

broadband forum

# 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

yang/standard/interface at v2.0.0-TR-383 · William (BBF)

GitHub, Inc. [US] <https://github.com/BroadbandForum/yang/tree/v2.0.0-TR-383/standard/interface>

BroadbandForum / yang

Unwatch 8 Star 1 Fork 4

Code Issues 0 Pull requests 0 Projects 0 Wiki Settings Insights

Tag: v2.0.0-TR-383 yang / standard / interface / Create new file Upload files Find file History

wlupton 2017-05-08: TR-383 Common YANG Modules for Access Networks Latest commit 199e316 on 3 Jun

..		
docs	2017-03-13: TR-355c1 YANG Modules for FTTdp Management	3 months ago
bbf-ethernet-performance-mana...	2017-05-08: TR-383 Common YANG Modules for Access Networks	a month ago
bbf-fast-base.yang	2016-07-18: TR-355 YANG Modules for FTTdp Management	11 months ago
bbf-fast-channel-performance-b...	2016-07-18: TR-355 YANG Modules for FTTdp Management	11 months ago
bbf-fast-channel-status-body.ya...	2016-07-18: TR-355 YANG Modules for FTTdp Management	11 months ago
bbf-fast-channel-threshold-profi...	2017-03-13: TR-355c1 YANG Modules for FTTdp Management	3 months ago
bbf-fast-data-rate-profile-body....	2016-07-18: TR-355 YANG Modules for FTTdp Management	11 months ago
bbf-fast-fast-rate-adaptation-pr...	2017-03-13: TR-355c1 YANG Modules for FTTdp Management	3 months ago
bbf-fast-fast-retrain-policy-profi...	2016-07-18: TR-355 YANG Modules for FTTdp Management	11 months ago
bbf-fast-ftu-inventory-body.yang	2016-07-18: TR-355 YANG Modules for FTTdp Management	11 months ago
bbf-fast-inventory.yang	2016-07-18: TR-355 YANG Modules for FTTdp Management	11 months ago



# BBF YANG Publication: Examples

The screenshot shows a web browser window displaying the GitHub repository page for `BroadbandForum / yang`. The browser's address bar shows the URL `https://github.com/BroadbandForum/yang/tree/v3.0.0-WT-385-draft1/draft/networking`. The repository page includes navigation links for `Code`, `Issues`, `Pull requests`, `Projects`, `Wiki`, `Settings`, and `Insights`. The current view is the `draft/networking` directory, which contains a file named `bbf-qos-traffic-mngt.yang`. The file's commit history shows it was last committed by `wlupton` on 2017-05-09. The repository statistics show 8 watchers, 1 star, and 4 forks. The footer of the page includes copyright information for GitHub, Inc. and links to `Terms`, `Privacy`, `Security`, `Status`, `Help`, `Contact GitHub`, `API`, `Training`, `Shop`, `Blog`, and `About`.

yang/draft/networking at v3.0.0 x

GitHub, Inc. [US] <https://github.com/BroadbandForum/yang/tree/v3.0.0-WT-385-draft1/draft/networking>

Apps Orig BBF Google HGI Mac Misc OSGi Prog RFCs UPnP BGC Honu Imported

This repository Search Pull requests Issues Marketplace Gist

BroadbandForum / yang Unwatch 8 Star 1 Fork 4

Code Issues 0 Pull requests 0 Projects 0 Wiki Settings Insights

Tag: v3.0.0-WT-385-... yang / draft / networking / Create new file Upload files Find file History

wlupton 2017-05-09: WT-385\_draft1 ITU-T PON YANG Modules Latest commit f1647e3 on 9 May

..

bbf-qos-traffic-mngt.yang 2017-05-09: WT-385\_draft1 ITU-T PON YANG Modules 2 months ago

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# BBF YANG BCPs: Examples

- 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
- 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