



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

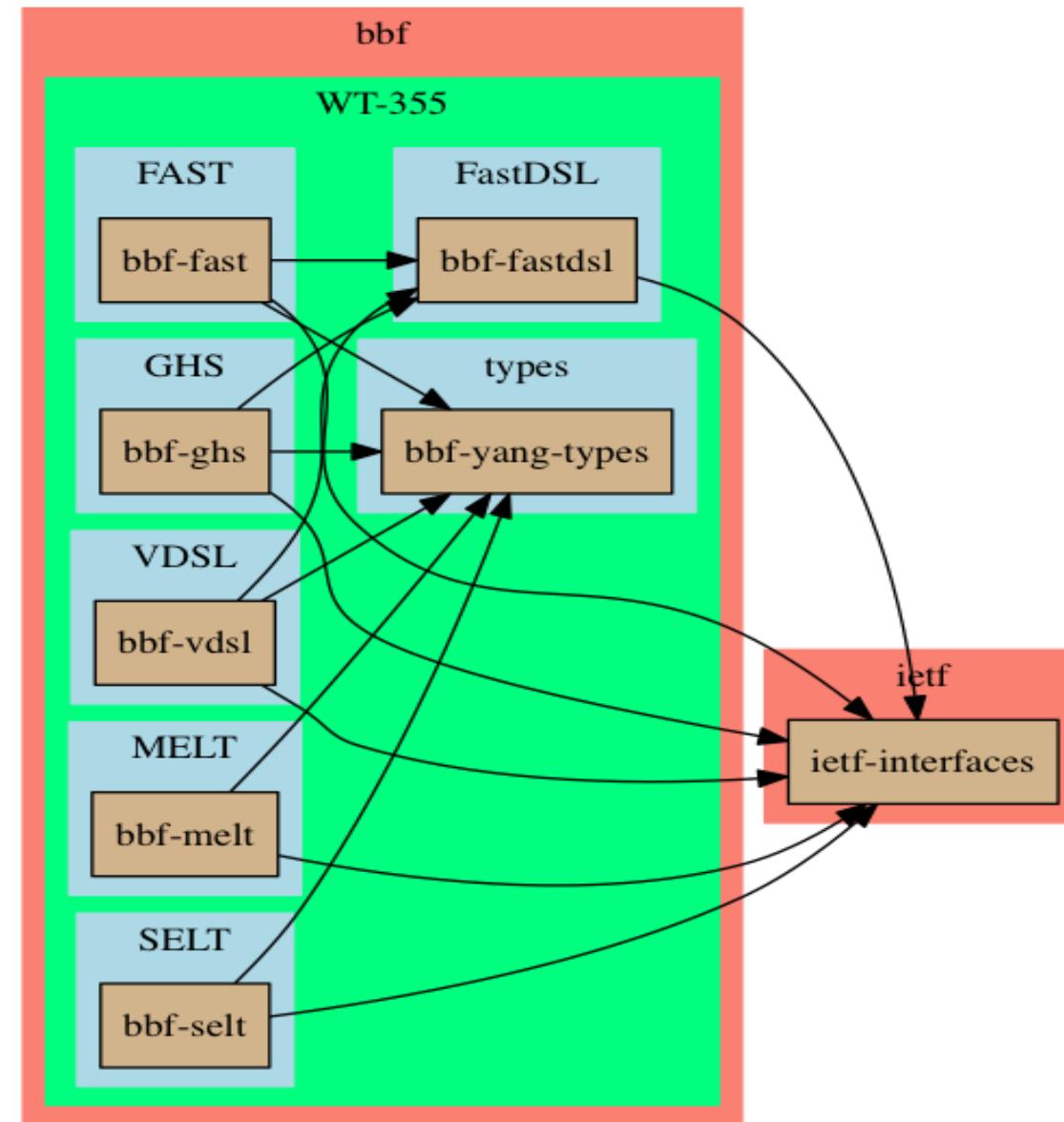
- Emphasis on addressing BBF requirements rather than on general solutions
 - Contrast with “core” SDOs such as IETF, ITU-T and IEEE
 - Current BBF YANG emphasis is on Broadband Access Nodes, e.g. requirements from
 - [TR-101 Issue 2](#): Migration to Ethernet-Based Broadband Aggregation
 - [TR-301 Issue 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	Published TR-383; WT-383a1 ongoing
FTTdp Management	WT-355	YANG Modules for FTTdp Management	Published TR-355 and TR-355c1; WT-355a1 ongoing
	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	Published WT-385_draft1; ongoing
	WT-394	YANG Models for Management of PON ONUs	Not started
FANS	WT-386	Fixed Access Network Sharing Interfaces	Just started

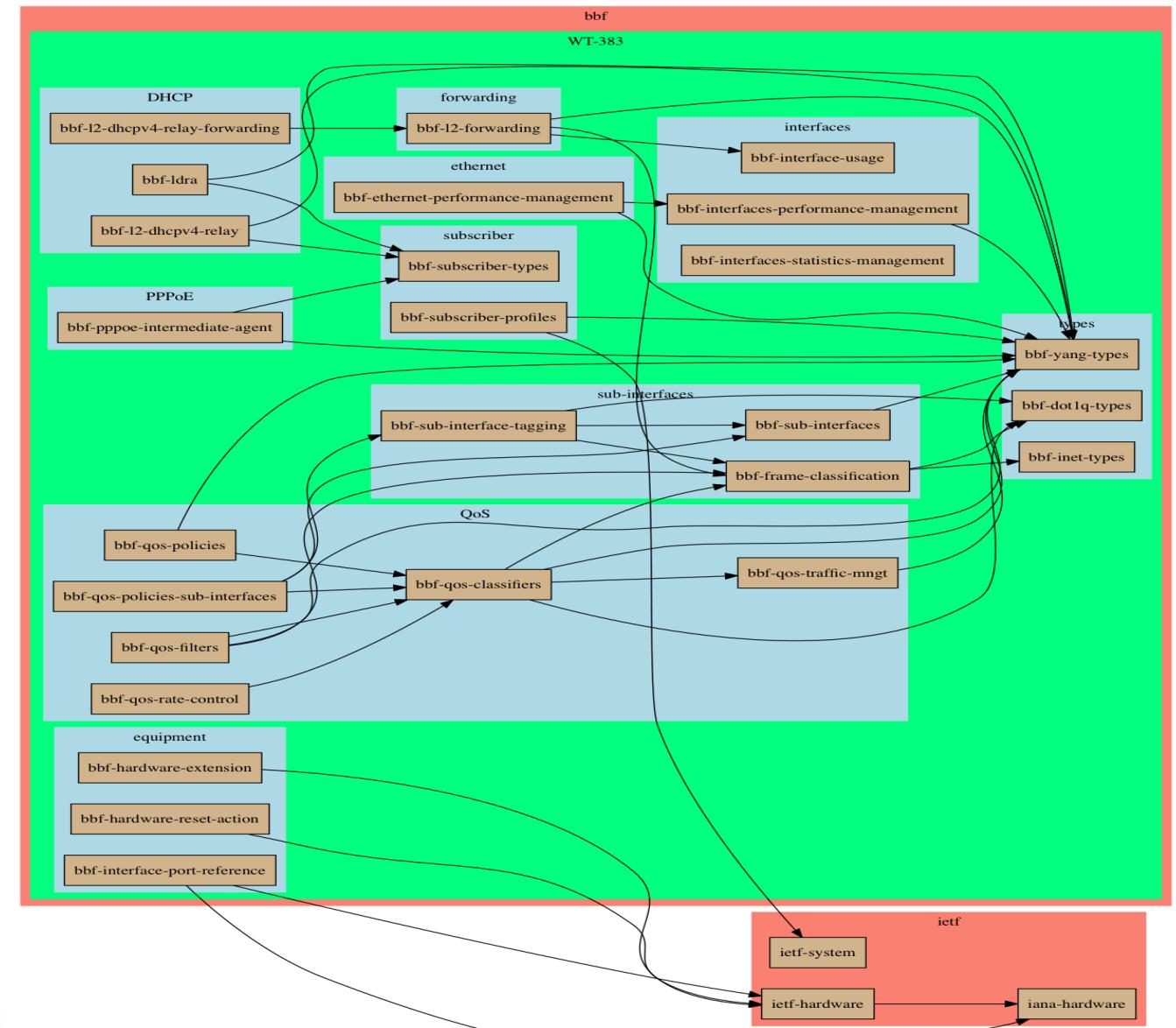
TR-355: YANG Modules for FTtdp Management

- 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 is

The screenshot shows a web browser window titled "YANG DB Search". The address bar indicates a secure connection to <https://www.yangcatalog.org/yang-search/yang-search.php>. The page content is titled "YANG DB Search" and contains a search form. The search term "tcont\$" is entered into the search input field. A "Search Options" dropdown menu is open, showing a single option: "Search Options". Below the input field are two buttons: a blue "Search!" button and a grey "Reset" button.

YANG DB Search

Enter your search term(s) below:

Search Options

Search! Reset

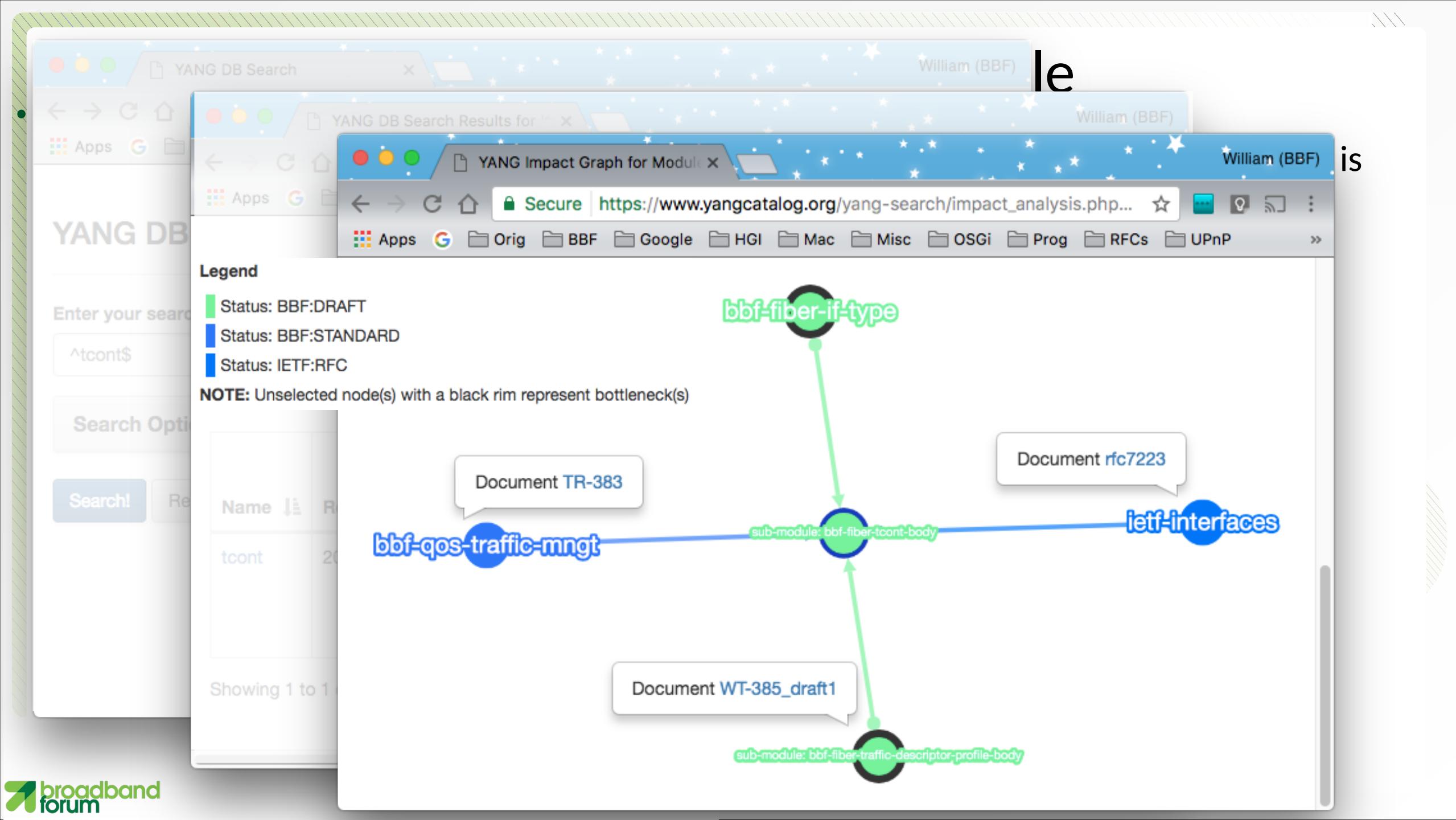
rum/yang is

YANG DB Search Results for '^tcont\$'

Show 10 entries Search: Entire Table

Name	Revision	Type	Path	Module	Origin	Organization	Maturity
tcont	2017-05-09	list	/fiber:fiber-tconts-oper/fiber:tcont	bbf-fiber-tcont-body (Impact Analysis)	Industry Standard	bbf	draft

Showing 1 to 1 of 1 entries Previous 1 Next



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

The screenshot shows a GitHub repository page for the 'yang' module under the 'BroadbandForum' organization. The repository is titled 'yang/standard/interface at v2.0.0-TR-383'. The page includes a navigation bar with links for Apps, Orig, BBF, Google, HGI, Mac, Misc, OSGi, Prog, RFCs, UPnP, BGC, Honu, and Imported. The main content area shows a list of files and their commit history. A sidebar on the left lists categories like Code, Issues (0), Pull requests (0), Projects (0), Wiki, Settings, and Insights. The commit history for the 'docs' file is shown, with the latest commit being '2017-03-13: TR-355c1 YANG Modules for FTTdp Management' by 'wlupton' on 2017-05-08. Other commits listed include '2017-05-08: TR-383 Common YANG Modules for Access Networks' and several commits from 2016-07-18 related to TR-355 YANG Modules for FTTdp Management.

File	Commit Message	Date
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 image shows a Mac OS X desktop environment. On the left, there is a vertical sidebar containing a list of files and folders, including 'BroadbandP...', 'Code', 'docs', 'bbf-ethernet...', 'bbf-fast-base...', 'bbf-fast-char...', 'bbf-fast-char...', 'bbf-fast-data...', 'bbf-fast-fast...', 'bbf-fast-fast...', 'bbf-fast-ftu...', and 'bbf-fast-inve...'. On the right, a GitHub browser window is open, showing the repository 'BroadbandForum / yang' at the commit 'yang / draft / networking / v3.0.0-WT-385-...'. The commit message is 'wlupton 2017-05-09: WT-385_draft1 ITU-T PON YANG Modules'. The commit was made by 'wlupton' on May 9, 2017, and has a status of 'Latest commit f1647e3 on 9 May'. Below the commit message, a file named 'bbf-qos-traffic-mngt.yang' is listed with a commit message '2017-05-09: WT-385_draft1 ITU-T PON YANG Modules' and a timestamp '2 months ago'. At the bottom of the GitHub window, there are links for 'Create new file', 'Upload files', 'Find file', and 'History'. The GitHub interface includes standard navigation buttons like back, forward, and search, along with user statistics for 'Unwatch' (8), 'Star' (1), and 'Fork' (4). The top right corner of the GitHub window shows the user 'William (BBF)'. The overall desktop background is light blue with a starry pattern.

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