Assigned Names and Numbers

About this page

Broadband Forum "assigned names and numbers", i.e. things like URN prefixes, TCP port numbers and DHCP options that are used within BBF standards.

These names and numbers are a mixture of those assigned by outside organizations, e.g. IANA (Internet Assigned Numbers Authority) and those assigned directly by BBF.

Link for Public Visitors

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1. 1. Names and Numbers Assigned by Other Organizations

1.1. 1.1. Enterprise Number and OUI

The Broadband Forum Enterprise Number is 3561 decimal (0x0DE9) and is listed in the IANA Private Enterprise Numbers Registry. The Enterprise Number also identifies the BBF's node in the object identifier (OID) hierarchy, with the full arc extending back to its root defined as follows: 1.3.6.1.4.1.3561. Information on the object identifier hierarchy can be found at ITU-T X.660 and ISO/IEC 9834.

The Broadband Forum IEEE OUI is 0x00256D. More information regarding IEEE OUI is at https://standards.ieee.org/develop/regauth/oui/.

1.2. 1.2. IANA Interface Types

The following interface types were registered by BBF with IANA and are listed on the IANA MIB Module Registrations page, which references the iana-if-type YANG module and the IANAifType MIB.

Interface Type	Reference	Notes
fastdsl	TR-355	
ghn	TR-374	
ptm	TR-383	

1.3. 1.3. TCP and UDP Ports

The following ports were registered by BBF with IANA and are listed in the IANA Service Name and Transport Protocol Port Number Registry.

Service Name	Port Number	Transport Protocol	Reference	Notes
pon-ictp	7202	tcp	TR-352	
cwmp	7547	tcp	TR-069	ACS and Connection Request URLs can use this port
cwmp	7547	udp	TR-069	UDP Connection Request URL can use this port (it's the default)

1.4. 1.4. Service Names

The following Service Names (without ports) were registered by BBF and are listed in the IANA Service Name and Transport Protocol Port Number Registry. Additional links are provided here to identify references for use of these Services Names, and defined TXT parameters associated with them.

Service Name	Transport Protocol	Published Reference or Current Project	TXT Parameters	Subtypes
usp-agt-coap	udp	TR-369	path=<resource path> name=<device or USP friendly name> encrypt code=<provisioning code> retry-min=< USP retry minimum wait interval> retry-mult=< USP retry interval multiplier>	No defined subtypes
usp-agt-http	tcp	TR-369		
usp-agt-mqtt	tcp	TR-369		
usp-agt-stomp	tcp	TR-369		
usp-agt-ws	tcp	TR-369		
usp-ctr-coap	udp	TR-369		
usp-ctr-http	tcp	TR-369		

usp-ctr-mqtt	tcp	TR-369		
usp-ctr-stomp	tcp	TR-369		
usp-ctr-ws	tcp	TR-369		

1.5. 1.5. URN Namespaces

The `dslforum-org`, `broadband-forum-org` and `bbf` URN namespaces have been registered with IANA. Se e RFC 8057 (URN Namespaces for Broadband Forum).

The first two (old) prefixes will continue to be used for new assignments relating to the standards with which they are already used, and the third (new) prefix will be used for assignments relating to all new standards.

To get a namespace assignment, requesters must go through the Broadband Forum project and documentation creation process.

1.6. 1.6. Media Types

IANA media type assignments are listed at https://www.iana.org/assignments/media-types/media-types.xhtml.

The following Media Types have been assigned to BBF.

Media Type	Reference
application /vnd.bbf. usp.error	TR-369: User Services Platform (USP) This Media Type is currently described in the draft Issue 1 Amendment 1 of TR-369. This will be available at the above-referenced URL after TR-369i1a1 is published.
application/ vnd.bbf. usp.msg	TR-369: User Services Platform (USP)
application /vnd.bbf. usp. msg+json	TR-369: User Services Platform (USP) This Media Type is not mentioned in the USP specification, as it is not intended for use in active deployments. It is intended for debugging and testing purposes only. It indicates the USP Record and Message headers are expressed in JSON without Protobuf encoding.

1.7. 1.7. WebSocket Assignments

IANA WebSocket assignments are listed at https://www.iana.org/assignments/websocket/websocket.xhtml.

The following WebSocket Subprotocol Names have been assigned to BBF.

WebSocket Subprotocol Name	Reference
v1.usp	TR-369: User Services Platform (USP)

The following WebSocket Extension Names have been assigned to BBF.

WebSocket Extension Name	Reference
bbf-usp-protocol	TR-369: User Services Platform (USP)

1.8. 1.8. Constrained RESTful Environments (CoRE) Parameters

IANA CoRE parameter assignments are listed at https://www.iana.org/assignments/core-parameters/core-parameters.xhtml.

The following CoRE parameter values have been assigned to BBF.

Registry	CoRE Parameter Value	Reference
Resource Type (rt=) Link Target Attribute	bbf.usp.endpoint	TR-369: User Services Platform (USP)
Interface Description (if=) Link Target Attribute	bbf.usp.c	TR-369: User Services Platform (USP)
Interface Description (if=) Link Target Attribute	bbf.usp.a	TR-369: User Services Platform (USP)

1.9. 1.9. Network Service Header (NSH) Parameters

IANA NSH parameter assignments are listed at https://www.iana.org/assignments/nsh.

The following NSH Metadata (MD) classes have been assigned to BBF.

Range	Meaning
0x0200	BBF Specific NSH Metadata

1.10. 1.10. TLS Exporter Labels

IANA TLS Exporter Label assignments are listed at https://www.iana.org/assignments/tls-parameters/tls-parameters.xhtml. The process for registering new labels is defined in RFC 8447; registration requests should be sent to the tls-reg-review@ietf.org mailing list as specified in section 17.

BBF-registered TLS Exporter Label names will be of the form "EXPORTER-BBF-<*function*>" where "<*function*>" is a unique function name within the BBF scope.

- "<*function*>" should use words (not acronyms), with initial capital letters and hyphen separators. For example, "EXPORTER-BBF-Dying-Gasp"

The following TLS Exporter Labels have been assigned to BBF.

Label	DTLS-OK	Recommended	Reference
EXPORTER-BBF-Dying-Gasp	N	N	TR-301i2a1: Architecture and Requirements for Fiber to the Distribution Point
EXPORTER-BBF-USP-Record	N	N	TR-369i1a2: User Services Platform (USP)

2. 2. URN Namespaces

2.1. 2.1. urn:dslforum-org:

Namespace	Usage	Reference	Notes
urn:dslforum-org:device:	BBF-defined UPnP devices	TR-064i1 TR-133	Both these TRs are DEPRECATED TR-064i2 is not deprecated, but does not make use of this namespace.
urn:dslforum-org:service:	BBF-defined UPnP services	TR-064i1 TR-133	Both these TRs are DEPRECATED TR-064i2 is not deprecated, but does not make use of this namespace.
urn:dslforum-org:cwmp-*n*-*m*	CWMP version *n.m*	TR-069	*n* and *m* indicate the CWMP major and minor version respectively Some examples: • urn:dslforum-org:cwmp-1-0 • urn:dslforum-org:cwmp-1-1
urn:dslforum-org:sip urn:dslforum-org:h.323 urn:dslforum-org:h.248 urn:dslforum-org:mgcp urn:dslforum-org:pppoe urn:dslforum-org:sdp-*m*-*t*	QoS protocol and flow identifiers	TR-181 Issue 2	*m* and *t* indicate media type and transport respectively Note: pppoe is used both as a protocol and a flow identifier, and sdp is used only as a flow identifier. In theory additional protocol and flow identifiers could be defined, but this is unlikely

2.2. 2.2. urn:broadband-forum-org:

Namespace	Usage	Reference	Notes
urn:broadband-forum-org:tr-*nnn*-*i*-*a*-*c* urn:broadband-forum-org:tr-*nnn*-*i*-*a*	References to BBF Technical Reports	TR-106 TR-181 etc.	*nnn*, *i*, *a* and *c* indicate the TR number, Issue, Amendment and Corrigendum respectively (-*c* is optional) Note: *wt* is used instead of *tr* to reference a BBF Working Text (never in a published standard) Some examples: • urn:broadband-forum-org:tr-069-1-5-0 • urn:broadband-forum-org:tr-181-2-11

urn:broadband-forum-org:cwmp:	XML Schemas used with CWMP	TR-069 TR-106	Some examples: • urn:broadband-forum-org:cwmp:xmppConnReq-1-0 • urn:broadband-forum-org:cwmp:lwnotif-1-0 • urn:broadband-forum-org:cwmp:datamodel-1-5 • urn:broadband-forum-org:cwmp:datamodel-report-0-1 • urn:broadband-forum-org:cwmp:devicetype-1-3 • urn:broadband-forum-org:cwmp:devicetype-features
urn:broadband-forum-org:ipdr:	XML Schemas used with IPDR	TR-232	Some examples: • urn:broadband-forum-org:ipdr:tr-232-1-0

2.3. 2.3. urn:bbf:

Namespace	Usage	Reference	Notes
urn:bbf:yang:	BBF YANG module namespaces	YANG Projects	Within this namespace, the following have been defined: • urn:bbf:yang:bbf-alarm-types • urn:bbf:yang:bbf-ancp • urn:bbf:yang:bbf-ancp-alarm-types • urn:bbf:yang:bbf-ancp-fastdsl-access-extensions • urn:bbf:yang:bbf-ancp-fastdsl-thresholds • urn:bbf:yang:bbf-ancp-interfaces • urn:bbf:yang:bbf-availability • urn:bbf:yang:bbf-baa-pan • urn:bbf:yang:bbf-contact • urn:bbf:yang:bbf-d-olt-dhcpra • urn:bbf:yang:bbf-d-olt-message-monitor • urn:bbf:yang:bbf-d-olt-mgmd • urn:bbf:yang:bbf-d-olt-network-function-types • urn:bbf:yang:bbf-d-olt-onuauth-types • urn:bbf:yang:bbf-d-olt-onuauth • urn:bbf:yang:bbf-d-olt-pppoe-intermediate-agent • urn:bbf:yang:bbf-device • urn:bbf:yang:bbf-device-aggregation • urn:bbf:yang:bbf-device-types • urn:bbf:yang:bbf-dot1q-cfm • urn:bbf:yang:bbf-dot1q-cfm-alarm-types • urn:bbf:yang:bbf-dot1q-cfm-interfaces • urn:bbf:yang:bbf-dot1q-cfm-interfaces-state • urn:bbf:yang:bbf-dot1q-cfm-l2-forwarding • urn:bbf:yang:bbf-dot1q-types • urn:bbf:yang:bbf-end-user • urn:bbf:yang:bbf-equipment-inventory • urn:bbf:yang:bbf-ethernet-performance-management • urn:bbf:yang:bbf-fast • urn:bbf:yang:bbf-fast-alarm-types • urn:bbf:yang:bbf-fastdsl

			• urn:bbf:yang:bbf-frame-classification • urn:bbf:yang:bbf-frame-processing-profiles • urn:bbf:yang:bbf-frame-processing-types • urn:bbf:yang:bbf-gbond • urn:bbf:yang:bbf-gbond-state • urn:bbf:yang:bbf-ghn • urn:bbf:yang:bbf-ghs • urn:bbf:yang:bbf-grpc-client • urn:bbf:yang:bbf-grpc-server • urn:bbf:yang:bbf-hardware • urn:bbf:yang:bbf-hardware-cpu • urn:bbf:yang:bbf-hardware-storage-drives • urn:bbf:yang:bbf-hardware-rpf-dpu • urn:bbf:yang:bbf-hardware-rpf-dpu-alarm-types • urn:bbf:yang:bbf-hardware-rpf-dpu-state • urn:bbf:yang:bbf-hardware-transceiver-alarm-types • urn:bbf:yang:bbf-hardware-transceivers • urn:bbf:yang:bbf-hardware-transceivers-xpon • urn:bbf:yang:bbf-hardware-types • urn:bbf:yang:bbf-icmpv6 • urn:bbf:yang:bbf-icmpv6-forwarding • urn:bbf:yang:bbf-icmpv6-profile-common • urn:bbf:yang:bbf-if-type • urn:bbf:yang:bbf-inet-types • urn:bbf:yang:bbf-interface-usage • urn:bbf:yang:bbf-interfaces-performance-management • urn:bbf:yang:bbf-interfaces-remote-hardware-state • urn:bbf:yang:bbf-interfaces-statistics-management • urn:bbf:yang:bbf-l2-dhcpv4-relay • urn:bbf:yang:bbf-l2-dhcpv4-relay-forwarding • urn:bbf:yang:bbf-l2-dhcpv4-relay-profile-common • urn:bbf:yang:bbf-l2-forwarding • urn:bbf:yang:bbf-l2-forwarding-alarm-types • urn:bbf:yang:bbf-l2-forwarding-shared-fdb • urn:bbf:yang:bbf-l2-terminations • urn:bbf:yang:bbf-ldra • urn:bbf:yang:bbf-ldra-profile-common • urn:bbf:yang:bbf-link-table • urn:bbf:yang:bbf-location • urn:bbf:yang:bbf-location-types • urn:bbf:yang:bbf-melt • urn:bbf:yang:bbf-mgmd • urn:bbf:yang:bbf-mgmd-common • urn:bbf:yang:bbf-mgmd-mrd • urn:bbf:yang:bbf-mgmd-types • urn:bbf:yang:bbf-network-function • urn:bbf:yang:bbf-network-function-client • urn:bbf:yang:bbf-network-function-server • urn:bbf:yang:bbf-network-function-types • urn:bbf:yang:bbf-network-map • urn:bbf:yang:bbf-network-types • urn:bbf:yang:bbf-node-types • urn:bbf:yang:bbf-olt-relay-agent-sci • urn:bbf:yang:bbf-olt-d-olt • urn:bbf:yang:bbf-pppoe-intermediate-agent

			• urn:bbf:yang:bbf-ptm • urn:bbf:yang:bbf-qos-classifiers • urn:bbf:yang:bbf-qos-composite-filters • urn:bbf:yang:bbf-qos-enhanced-scheduling • urn:bbf:yang:bbf-qos-enhanced-scheduling-state • urn:bbf:yang:bbf-qos-filters • urn:bbf:yang:bbf-qos-policer-envelope-profiles • urn:bbf:yang:bbf-qos-policies • urn:bbf:yang:bbf-qos-policies-state • urn:bbf:yang:bbf-qos-policies-sub-interface-rewrite • urn:bbf:yang:bbf-qos-policies-sub-interfaces • urn:bbf:yang:bbf-qos-policing • urn:bbf:yang:bbf-qos-policing-state • urn:bbf:yang:bbf-qos-policing-types • urn:bbf:yang:bbf-qos-rate-control • urn:bbf:yang:bbf-qos-shaping • urn:bbf:yang:bbf-qos-traffic-mngt • urn:bbf:yang:bbf-qos-traffic-mngt-state • urn:bbf:yang:bbf-qos-types • urn:bbf:yang:bbf-selt • urn:bbf:yang:bbf-software-management • urn:bbf:yang:bbf-software-management-voice • urn:bbf:yang:bbf-sub-interface-tagging • urn:bbf:yang:bbf-sub-interfaces • urn:bbf:yang:bbf-subscriber-profile-common • urn:bbf:yang:bbf-subscriber-profiles • urn:bbf:yang:bbf-subscriber-types • urn:bbf:yang:bbf-vlan-sub-interface-profile-dhcpv4 • urn:bbf:yang:bbf-vlan-sub-interface-profile-dhcpv6 • urn:bbf:yang:bbf-vlan-sub-interface-profile-fp • urn:bbf:yang:bbf-vlan-sub-interface-profile-icmpv6 • urn:bbf:yang:bbf-vlan-sub-interface-profile-pppoe • urn:bbf:yang:bbf-vlan-sub-interface-profile-qos • urn:bbf:yang:bbf-vlan-sub-interface-profile-usage • urn:bbf:yang:bbf-vlan-sub-interface-profiles • urn:bbf:yang:bbf-xpon • urn:bbf:yang:bbf-xpon-burst-profiles • urn:bbf:yang:bbf-xponani • urn:bbf:yang:bbf-xponani-power-management • urn:bbf:yang:bbf-xpongemtcont • urn:bbf:yang:bbf-xpongemtcont-performance-management • urn:bbf:yang:bbf-xpongemtcont-qos • urn:bbf:yang:bbf-xpon-defects • urn:bbf:yang:bbf-xpon-if-type • urn:bbf:yang:bbf-xpon-onu-authentication-features • urn:bbf:yang:bbf-xpon-onu-authentication-types • urn:bbf:yang:bbf-xpon-onu-authentication • urn:bbf:yang:bbf-xpon-onu-state • urn:bbf:yang:bbf-xpon-onu-types

			• urn:bbf:yang:bbf-xpon-performance-management • urn:bbf:yang:bbf-xpon-power-management • urn:bbf:yang:bbf-xpon-types • urn:bbf:yang:bbf-xponvani • urn:bbf:yang:bbf-xponvani-onu-authentication-groupings • urn:bbf:yang:bbf-xponvani-onu-authentication • urn:bbf:yang:bbf-xponvani-power-management • urn:bbf:yang:bbf-vdsl • urn:bbf:yang:bbf-vdsl-alarm-types • urn:bbf:yang:bbf-vlan-sub-interface-profile-dhcpv4 • urn:bbf:yang:bbf-vlan-sub-interface-profile-dhcpv6 • urn:bbf:yang:bbf-vlan-sub-interface-profile-fp • urn:bbf:yang:bbf-vlan-sub-interface-profile-pppoe • urn:bbf:yang:bbf-vlan-sub-interface-profile-qos • urn:bbf:yang:bbf-vlan-sub-interface-profile-usage • urn:bbf:yang:bbf-vlan-sub-interface-profiles • urn:bbf:yang:bbf-yang-types
urn:bbf:lmap:	BBF LMAP Performance Metrics Registry	TR-181i2a12 Appendix XX	TR-181i2a12 Appendix XX provides Theory of Operation and describes usage. The format for a registry entry within this namespace is: • urn:bbf:lmap:<BBF TR>:<DiagnosticProfileName> Example: • urn:bbf:lmap:tr-181-2-11-0:UploadDiagnostics-1 The following IETF references define format of a registry entry and provide examples. • draft-ietf-ippm-metric-registry • draft-ietf-ippm-initial-registry
urn:bbf:usp:	USP	TR-369	Within this namespace, the following have been defined in TR-369: • urn:bbf:usp:id:<Endpoint ID>

3. 3. Common Sub-options

Common Sub-option codes used with DHCPv4, DHCPv6, PPPoE and RADIUS. Code range: 1-254 (0x01-0xfe), 8 bits.

Dec	Hex	Usage	Reference	Notes

1	0x01	Agent Circuit ID	TR-156 / TR-177	
2	0x02	Agent Remote ID	TR-156 / TR-177	
3-128	0x03-0x80	Unassigned		
129	0x81	Actual data rate Upstream	TR-156 / TR-177	32 bit binary value in kbps
130	0x82	Actual data rate Downstream	TR-156 / TR-177	32 bit binary value in kbps
131	0x83	Minimum Data Rate Upstream	TR-156 / TR-177	32 bit binary value in kbps
132	0x84	Minimum Data Rate Downstream	TR-156 / TR-177	32 bit binary value in kbps
133	0x85	Attainable Data Rate Upstream	TR-156 / TR-177	32 bit binary value in kbps
134	0x86	Attainable Data Rate Downstream	TR-156 / TR-177	32 bit binary value in kbps
135	0x87	Maximum Data Rate Upstream	TR-156 / TR-177	32 bit binary value in kbps
136	0x88	Maximum Data Rate Downstream	TR-156 / TR-177	32 bit binary value in kbps
137	0x89	Minimum Data Rate Upstream in low power state	TR-156 / TR-177	32 bit binary value in kbps
138	0x8a	Minimum Data Rate Downstream in low power state	TR-156 / TR-177	32 bit binary value in kbps
139	0x8b	Maximum Interleaving Delay Upstream	TR-156 / TR-177	32 bit binary value in milliseconds
140	0x8c	Actual interleaving Delay Upstream	TR-156 / TR-177	32 bit binary value in milliseconds
141	0x8d	Maximum Interleaving Delay Downstream	TR-156 / TR-177	32 bit binary value in milliseconds
142	0x8e	Actual interleaving Delay Downstream	TR-156 / TR-177	32 bit binary value in milliseconds
143	0x8f	Unassigned		
144	0x90	Access loop encapsulation	TR-101 Appendix A	24 bit binary value
145-154	0x91-0x9a	Unassigned		
155	0x9b	Expected throughput (ETR) upstream	TR-301	32 bit binary value in kbps
156	0x9c	Expected throughput (ETR) downstream	TR-301	32 bit binary value in kbps

157	0x9d	Attainable expected throughput (ATTETR) upstream	TR-301	32 bit binary value in kbps
158	0x9e	Attainable expected throughput (ATTETR) downstream	TR-301	32 bit binary value in kbps
159	0x9f	Gamma data rate (GDR) upstream	TR-301	32 bit binary value in kbps
160	0xa0	Gamma data rate (GDR) downstream	TR-301	32 bit binary value in kbps
161	0xa1	Attainable gamma data rate (ATTGDR) upstream	TR-301	32 bit binary value in kbps
162	0xa2	Attainable gamma data rate (ATTGDR) downstream	TR-301	32 bit binary value in kbps
163-191	0xa3-0xbf	Unassigned		
192	0xc0	DPU Discovery	TR-301 Issue 2 Section 16.5.2.1	
193	0xc1	PMA Offer	TR-301 Issue 2 Section 16.5.2.2	
194-254	0xc2-0xfe	Unassigned		

4. 4. DHCP Sub-options

4.1. 4.1. DHCPv4 Option 43 Sub-options (Codes)

RFC 2132 Section 8.4: Option 43: Vendor Specific Information. Code range: 1-254 (0x01-0xfe), 8 bits.

Dec	Hex	Usage	Reference	Notes
1-4	0x01-0x04	ACS discovery	TR-069 Section 3.1	Sub-option usage: • 1: ACS URL • 2: Provisioning code • 3: CWMP retry minimum wait interval • 4: CWMP retry interval multiplier
5-254	0x05-0xfe	Unassigned		

4.2. 4.2. DHCPv4 Option 82, Sub-option 9 Codes

RFC 4243: Vendor-Specific Information Suboption for the Dynamic Host Configuration Protocol (DHCP) Relay Agent Option. Code range 1-254 (0x01-0xfe), 8 bits.

The following Sub-options are used with enterprise number 3561 (BBF).

Dec	Hex	Usage	Reference	Notes

1-2	0x01-0x02	Common Sub-options	TR-156 / TR-177	
3-128	0x03-0x80	Unassigned		
129-142	0x81-0x8e	Common Sub-options	TR-156 / TR-177	
143	0x8f	Unassigned		
144	0x90	Common Sub-options	TR-101 Appendix A	
145-154	0x91-0x9a	Unassigned		
155-162	0x9b-0xa2	Common Sub-options	TR-301	
163-191	0xa3-0xbf	Unassigned		
192-193	0xc0-0xc1	Common Sub-options	TR-301 Issue 2	
194-254	0xc2-0xfe	Unassigned		

4.3. 4.3. DHCPv4 Option 125 Sub-options

RFC 3925 Section 4: Option 125: Vendor-Identifying Vendor-Specific Information. Sub-option range: 1-254 (0x01-0xfe), 8 bits.

The following Sub-options are used with enterprise number 3561 (BBF).

Dec	Hex	Usage	Reference	Notes
1-4	0x01-0x04	Device info	TR-124 WAN.DHCPC	Sub-option usage: • 1: Manufacturer OUI • 2: Product class • 3: Model name • 4: Serial number **Sub-options 1-4 overlap with TR-069 Annex F**

1-6	0x01-0x06	Device / Gateway association	TR-069 Annex F	Sub-option usage: • 1: Device manufacturer OUI • 2: Device serial number • 3: Device product class • 4: Gateway manufacturer OUI • 5: Gateway serial number • 6: Gateway product class **Sub-options 1-4 overlap with TR-124**
7-10	0x07-0x0a	Unassigned		
11-14	0x0b-0x0e	ACS discovery	TR-069 Section 3.1	Sub-option usage: • 11: ACS URL • 12: Provisioning code • 13: CWMP retry minimum wait interval • 14: CWMP retry interval multiplier
15-16	0x0f-0x10	Reserved	TR-069	Reserved because they're assigned as DHCPv6 option 17 sub-options
17-20	0x11-0x14	Unassigned		
21-23	0x15-0x17	GRE tunneling	TR-317 Section 7.1.3.3.2	Sub-option usage: • 21: Tunnel type • 22: Server endpoint • 23: Client endpoint
24	0x18	Client requirements	TR-317 Section 7.4.3.7	Sub-option usage: • 24: Device type
25-29	0x19-0x1d	USP Controller Discovery	TR-369 Discovery and Advertisement	Sub-option usage: • 25: URL of the Controller • 26: Provisioning code • 27: USP retry mini-mum wait interval • 28: USP retry interval multiplier • 29: Controller Endpoint ID
30-191	0x1e-0xbf	Unassigned		
192-193	0xc0-0xc1	Common Sub-options	TR-301 Issue 2	
194-254	0xc2-0xfe	Unassigned		

4.4. 4.4. DHCPv6 Option 17 Sub-options

RFC 3315 Section 22.17: Option 17: Vendor-specific Information. Sub-option range: 1-65534 (0x0001-0xfffe), 16 bits.

The following Sub-options are used with enterprise number 3561 (BBF).

Dec	Hex	Usage	Reference	Notes
1-2	0x0001-0x0002	Common Sub-options	TR-156 / TR-177	**Sub-options 1-2 overlap with TR-069**
1-4	0x0001-0x0004	ACS discovery	TR-069 Section 3.1	Sub-option usage: • 1: URL of the ACS • 2: Provisioning code • 3: CWMP retry minimum wait interval • 4: CWMP retry interval multiplier **Sub-options 1-2 overlap with TR-156 / TR-177**
5-6	0x0005-0x0006	Reserved	TR-069	Reserved because they were used prior to TR-069 Amendment 5, and because they're assigned as DHCPv4 option 125 sub-options
7-10	0x0007-0x000a	Unassigned		
11-16	0x000b-0x0010	Device / Gateway association	TR-069 Annex F	Sub-option usage: • 11: Device manufacturer OUI • 12: Device serial number • 13: Device product class • 14: Gateway manufacturer OUI • 15: Gateway serial number • 16: Gateway product class Sub-options 1-6 were used prior to TR-069 Amendment 5
17-20	0x0011-0x0014	Unassigned		
21	0x0015	Reserved	TR-317	Reserved because it's assigned as a DHCPv4 option 125 sub-option
22-23	0x0016-0x0017	GRE tunneling	TR-317 Section 7.1.3.3.2	Sub-option usage: • 22: Server endpoint • 23: Client endpoint
24	0x0018	Reserved	TR-317	Reserved because it's assigned as a DHCPv4 option 125 sub-option

25-29	0x0019-0x001d	USP Controller Discovery	TR-369 Discovery and Advertisement	Sub-option usage: • 25: URL of the Controller • 26: Provisioning code • 27: USP retry mini-mum wait interval • 28: USP retry interval multiplier • 29: Controller Endpoint ID
30-128	0x001e-0x0080	Unassigned		
129-142	0x0081-0x008e	Common Sub-options	TR-156 / TR-177	
143	0x008f	Unassigned		
144	0x0090	Common Sub-options	TR-101 Appendix A	
145-154	0x0091-0x009a	Unassigned		
155-162	0x009b-0x00a2	Common Sub-options	TR-301	
163-191	0x00a3-0x00bf	Unassigned		
192-193	0x00c0-0x00c1	Common Sub-options	TR-301 Issue 2	
194-65534	0x00c2-0xfffe	Unassigned		

5. 5. PPPoE Tags

PPPoE Tag 261 Sub-options

RFC 2516 Appendix A: Tag 261 (0x0105): Vendor-Specific. Sub-option range: 1-254 (0x01-0xfe), 8 bits.

The following Sub-options are used with enterprise number 3561 (BBF).

Dec	Hex	Usage	Reference	Notes

1-2	0x01-0x02	Common Sub-options	TR-156 / TR-177	
3-128	0x03-0x80	Unassigned		
129-142	0x81-0x8e	Common Sub-options	TR-156 / TR-177	
143	0x8f	Unassigned		
144	0x90	Common Sub-options	TR-101 Appendix A	
145-154	0x91-0x9a	Unassigned		
155-162	0x9b-0xa2	Common Sub-options	TR-301	
163-253	0xa3-0xfd	Unassigned		
254	0xfe	PPPoA/oE IWF session flag	TR-101	Indicates the presence of PPPoA/oE IWF session

6. 6. RADIUS Attributes

RADIUS Attribute 26 Sub-options

RFC 2865 Section 5.26: Tag 26: Vendor-Specific. Sub-option range: 1-254 (0x01-0xfe), 8 bits.

The following Sub-options are used with enterprise number 3561 (BBF).

Dec	Hex	Usage	Reference	Notes
1-2	0x01-0x02	Common Sub-options	TR-156 / TR-177	
3-128	0x03-0x80	Unassigned		
129-142	0x81-0x8e	Common Sub-options	TR-156 / TR-177	
143	0x8f	Unassigned		
144	0x90	Common Sub-options	TR-101 Appendix A	
145-154	0x91-0x9a	Unassigned		
155-162	0x9b-0xa2	Common Sub-options	TR-301	
163-253	0xa3-0xfd	Unassigned		

254	0xfe	PPPoA/oE IWF session flag	TR-101	Indicates the presence of PPPoA/oE IWF session

7. 7. IP Flow Information Export (IPFIX) Information Element Identifiers

The following IPFIX IEs are defined by BBF for use with enterprise number 3561 (BBF).

Element-ID	Name	Abstract Data Type	Data Type Semantics	Status	Description	Units	Reference
0	Reserved				Reserved		TR-352 Issue 2
1	ng2sys-id	unsigned32	identifier	current	G.989.3 NG2Sys ID (20 bits)	none	TR-352 Issue 2
2	src-ct-id	unsigned32	identifier	current	The identifier of the individual CT issuing the ICTP message, represented by the TC layer PON-ID of the sender CT. For PON-ID definition, see Clause 6.1.5.3 of ITU-T G.989 [2] and Clause C.6.1.5.3 of G.9807.1 [6].	none	TR-352 Issue 2
3	dst-ct-id	unsigned32	identifier	current	The DST-CT-ID is the identifier of the individual CT receiving the ICTP message represented by the TC layer PON-ID of recipient CT. For PON-ID definition, see Clause 6.1.5.3 of ITU-T G.989 [2] and Clause C.6.1.5.3 of G.9807.1 [6].	none	TR-352 Issue 2
4	onu-identifier	unsigned16	identifier	current	G.989.3 Clause 6.1.5.6 defines the ONU-ID as a 10-bit identifier	none	TR-352 Issue 2
5	onu-serial-number	unsigned64	default	current	G.989.3 Clause 11.2.6.1 ONU Serial Number. It is comprised of Vendor-ID (4 bytes) and the VSSN (4-byte unsigned integer)	none	TR-352 Issue 2

6	xgem-port-id	unsigned16	identifier	current	G.989.3 Clause 6.1.5.8 defines the XGEM Port-ID as a 16-bit integer	none	TR-352 Issue 2
7	ipv4-address-gateway	ipv4Address	default	current	The IPv4 Access Router Gateway address.	none	TR-352 Issue 2
8	ipv6-address-gateway	ipv6Address	default	current	The IPv6 Access Router Gateway address.	none	TR-352 Issue 2
9	dhcpv4-server	ipv4Address	default	current	DHCPv4 Server Address	none	TR-352 Issue 2
10	dhcpv6-server	ipv6Address	default	current	DHCPv6 Server Address	none	TR-352 Issue 2
11	expiration	unsigned32	default	current	DHCP Expiry (seconds)	none	TR-352 Issue 2
12	Is-static	boolean	default	current	Is static address	none	TR-352 Issue 2
13	pppoe-session-identifier	unsigned16	identifier	current	RFC 2516 defines the session ID for Discovery packets. The value is fixed for a given PPP session. The Ethernet Source and Destination Address uniquely identify a PPPoE session.	none	TR-352 Issue 2

14	client-mac-address	macAddress	default	current	Subscriber MAC address for this flow	none	TR-352 Issue 2
15	bras-mac-address	macAddress	default	current	BRAS MAC address for this flow.	none	TR-352 Issue 2
16	sflag	unsigned16	default	current	Session status flag bitmaps: • Bit 0: indicates that BNG sent a PPP_MAX_PAYLOAD tag • Bit 1: indicates that the inactivity timer is pending • Bit 2: indicates that the the IWF timer is pending • Bit 3: indicates not to send PADT on terminate	none	TR-352 Issue 2
17	birthtime	dateTimeSeconds	default	current	Birth Time for the PPPoE Session	seconds	TR-352 Issue 2
18	querier-source-ipv4-address	ipv4Address	default	current	The Querier IPv4 source address	none	TR-352 Issue 2
19	querier-source-ipv6-address	ipv6Address	default	current	The Querier IPv6 source address	none	TR-352 Issue 2
20	querier-uptime	dateTimeSeconds		current	The time since mgmdRouterInterfaceQuerier was last changed	seconds	TR-352 Issue 2
21	host-reporter-ipv4-address	ipv4Address	default	current	The host reporter IPv4 source address	none	TR-352 Issue 2

22	host-reporter-ipv6-address	ipv6Address	default	current	The host reporter IPv6 source address	none	TR-352 Issue 2
23	group-ipv4-address	ipv4Address	default	current	The multicast group address	none	TR-352 Issue 2
24	group-ipv6-address	ipv6Address	default	current	The multicast group address	none	TR-352 Issue 2
25	entity-class	unsigned16	default	current	G.988 Entity Class	none	TR-352 Issue 2
26	entity-instance	unsigned16	default	current	G.988 Entity Instance	none	TR-352 Issue 2
27	attribute-mask	unsigned16	default	current	G.988 Attribute Mask	none	TR-352 Issue 2
28	attribute-values	octetArray	default	current	G.988 Attribute Value	none	TR-352 Issue 2
29	table-entity-class	unsigned16	default	current	G.988 Entity Class	none	TR-352 Issue 2

30	table-entity-instance	unsigned16	default	current	G.988 Entity Instance	none	TR-352 Issue 2
31	table-attribute-mask	unsigned16	default	current	G.988 Attribute Mask	none	TR-352 Issue 2
32	array-tablerows	octetArray	default	current	G.988 Array of Table Rows	none	TR-352 Issue 2
33-32767	Unassigned						

8. 8. Packet Forwarding Control Protocol (PFCP) Information Element (IE) Extensions

The Broadband Forum (BBF) Enterprise Number is 3561 decimal (0x0DE9) and is listed in the IANA Private Enterprise Numbers Registry.

PFCP IEs extended by BBF follow the 3GPP TS 29.244 specified format of vendor-specific IEs.

Type Identifier	Name	Reference(s)	Notes

32768	BBF UP Function Features	TR-459, TR-459.2, TR-459.3, TR-459 Issue 2	Supported UP Features: Bit 7/1: PPPoE (459) Bit 7/2: IPoE (459) Bit 7/3: LAC (459) Bit 7/4: LNS (459) Bit 7/5: LCP keepalive offload (459) Bit 7/6: IPTV (459.3) Bit 7/7: NAT-CP (459.2) Bit 7/8: NAT-UP (459.2) Bit 8/1: Issue 2 Minimum Feature Set (459i2) Bit 8/2: Volume quota and thresholds (459i2) Bit 8/3: ACL (459i2) Bit 8/4: Server Control Packet Redirection (459i2)
32769	Logical Port	TR-459	
32770	BBF Outer Header Creation	TR-459	Supported Outer Headers: Bit 1: CPR-NSH Bit 2: Traffic-Endpoint Bit 3: L2TP Bit 4: PPP
32771	BBF Outer Header Removal	TR-459	Supported Outer Removals: Value 1: Ethernet Value 2: PPPoE/Ethernet Value 3: PPP/PPPoE/Ethernet Value 4: L2TP Value 5: PPP/L2TP
32772	PPPoE Session ID	TR-459	
32773	PPP protocol	TR-459	Supported Flags: Bit 1: Specific Bit 2: Data Bit 3: Control

32774	Verification Timers	TR-459	
32775	PPP LCP Magic Number	TR-459	
32776	MTU	TR-459	
32777	L2TP Tunnel Endpoint	TR-459	
32778	L2TP Session ID	TR-459	
32779	L2TP Type	TR-459	
32780	PPP LCP Connectivity	TR-459	
32781	L2TP Tunnel	TR-459	
32782	BBF Multicast Flags	TR-459.3	Supported Flags: Bit 1: Fast Leave Bit 2: Router Alert Off
32783	BBF Multicast Query Parameters	TR-459.3	
32784	BBF Multicast Group Limit	TR-459.3	
32785	BBF Multicast Protocol Control	TR-459.3	
32787	BBF Apply Action	TR-459.2, TR-459 Issue 2	Supported Actions: Bit 1: NAT (459.2) Bit 2: Reply-To-Request (459i2)
32788	BBF NAT External Port Range	TR-459.2	
23789	BBF NAT Port Forward	TR-459.2	
23790	BBF Report Trigger	TR-459.2	Supported Triggers: Value 1: DBNG-UP allocated NAT blocks needs to be reported
32791	BBF Dynamic NAT Block Port Range	TR-459.2	
32792	BBF Event Time Stamp	TR-459.2	

32793	BBF-node-info-create	TR-459 Issue 2	
32794	BBF-node-info-modify	TR-459 Issue 2	
32795	BBF-node-info-delete	TR-459 Issue 2	
32796	BBF Logical Port Report	TR-459 Issue 2	
32797	BBF SGRP Notification Report	TR-459 Issue 2	
32798	BBF Network Instance Report	TR-459 Issue 2	
32799	BBF SGRP Error	TR-459 Issue 2	
32800	BBF SGRP	TR-459 Issue 2	
32801	BBF UP Subscriber Prefix	TR-459 Issue 2	
32819	BBF Prefix Error	TR-459 Issue 2	
32802	BBF ACL	TR-459 Issue 2	
32803	BBF Direction	TR-459 Issue 2	Value 0 - Input/Ingress/Upstream direction Value 1 - Output/Egress/Downstream direction
32804	BBF Family	TR-459 Issue 2	Value 0 - IPv4 Value 1 - IPv4 Value 2 - IPv46 Value 3 - L2eth
32806	BBF SGRP Identifier	TR-459 Issue 2	
32807	BBF SGRP State	TR-459 Issue 2	Value 0 - reserved Value 1 - Active Value 2 - Backup Value 3 - Track-Logical-Port
32808	BBF SGRP Flags	TR-459 Issue 2	Bit 1 : Router Advertisement State Bit 2 : Partial State Allowed

32809	BBF Operational Condition	TR-459 Issue 2	Value 0 - Up Value 1 - Down Value 2 - Not-ready Value 3 - Up-active Value 4 - Up-backup
32810	BBF IPv4 Prefix	TR-459 Issue 2	
32811	BBF IPv6 Prefix	TR-459 Issue 2	
32812	BBF Prefix Tag	TR-459 Issue 2	

32813	BBF Error Code	TR-459 Issue 2	Values: 0x0: Reserved 0x1: SGRP programming error because of resource exhaustion 0x2: SGRP programming error because of configuration mismatch or incomplete 0x3: SGRP programming error related to vMAC 0x4: SGRP Partial state is not supported on DBNG-UP 0x5: SGRP Track logical port is not supported by DBNG-UP on the Logical ports specified for this SGRP 0x6: ACL name not found 0x7: Prefix programming error because of resource exhaustion 0x8: Prefix programming error because of configuration mismatch or incomplete 0x9: Prefix's Network Instance not found 0xA: Prefix Active Tag matching not found 0xB: Prefix Backup Tag matching not found 0xC: Prefix's SGRP ID not found 0xD Prefix not found (on prefix modify or prefix delete) 0xE Prefix in use (when SGRP delete is performed before prefix delete) 0xF SGRP programming error because of ongoing SGRP deletion 0xFFFF Other error
32814	BBF Error Message	TR-459 Issue 2	
32815	BBF Maximum ACL Chain Length	TR-459 Issue 2	
32816	BBF Forwarding Capacity	TR-459 Issue 2	

32817	BBF Connectivity Status	TR-459 Issue 2	Value 0 - Reserved Value 1 - Connected Value 2 - Isolated
32818	Vendor-specific Node Report Type	TR-459 Issue 2	Bit 1 - Logical Port Report Bit 2 - Subscriber Group Report Bit 3 - Network Instance Report
32820	BBF C-Tag Range	TR-459 Issue 2	
32821	BBF S-Tag Range	TR-459 Issue 2	
32822	BBF 5WE Session ID	TR-458	
32823	BBF Traffic Enforcement Type	TR-458	
32824	BBF PCP	TR-458	
32825	BBF TC Name	TR-458	
32826	BBF PBS	TR-458	Bit 1 - Uplink PBS Bit 2 - Downlink PBS
32827	BBF CBS	TR-458	Bit 1 - Uplink CBS Bit 2 - Downlink CBS
32828	BBF CIRmax	TR-458	Bit 1 - Uplink CIR max Bit 2 - Downlink CIR max
32829	BBF Parent QER ID	TR-458	
32830	BBF QoS Profile Name	TR-458	
32832	BBF UL Policing Descriptor Name	TR-458	
32833	BBF DL Policing Descriptor Name	TR-458	
32834	BBF UL TC Policing Descriptor Name	TR-458	
32835	BBF DL TC Policing Descriptor Name	TR-458	

32836	BBF DL Descriptor Name	TR-458	
32837	BBF DL TC Descriptor Name	TR-458	