Broadband Forum

2013
Annual Report

"Innovation fuels the engine room of the Broadband Forum, and it is this forward thinking, delivery and agility that enable broadband to evolve at the speed of life to meet an ever changing landscape of rich opportunities."

— Kevin Foster,
President Broadband Forum

CHAIRMAN'S LETTER

Dear BBF colleagues,

As we reflect on the past year it is clear that we have hit a major inflection point in the industry. With close to 700 million broadband subscribers in the world, we have achieved the Broadband Forum goal of establishing a thriving broadband community– connecting more people to the global economy, extending the reach of education into every corner of the world, and providing a platform to improve lives through telemedicine and teleworking.

We can be proud of our work as the majority of networks around the world are now designed with Broadband Forum specifications, as TR-069 provides THE standard for remote device management, and as each migration from legacy architecture and access options follows our guidelines and uses our testing tool and Certification programs to ensure their next generation network is standards based and interoperable- improving ROI and speed to market.

And now the excitement builds as we see a surge of innovation as BBF members provide a stream of requests to start new projects addressing network function virtualization, software defined networks, cloud services, TR-069 enhancements, and fiber to the distribution point architecture.

As new applications take off, broadband networks around the world must be re-engineered with modified architectures, updated management platforms and new delivery options to address these application requirements and ensure service providers can quickly modernize to capture new markets and customers with personalized services and applications. On top of this, we must address the demand from consumers for higher speeds, as well as more consistent performance and quality standards.

Our role is to help anticipate these new areas of innovation and proactively develop the tools needed to efficiently update legacy networks to support the new requirements, to stay in step with emerging standards so we are ready with day-one compliance and interoperability programs, and to develop globally agreed best practices for implementation of new networks or management scenarios. We are also taking the lead in establishing Performance Metrics and defining the quality standards to be referenced worldwide.

The work at the BBF continuously evolves, and I have been a part of this since day one. I am proud of all we have accomplished over the last 20+ years, but I can say I find this new chapter of work most interesting. We are in the position of helping service providers and vendors build on their success and embedded investment, while forging new network designs, offering better resource management through cloud options, and extending the valuable reach of TR-069 over DSL, fiber, cable and wireless.

As we grow from 700 million to 1 billion customers, the Broadband Forum will be here, helping you engineer the best networks possible, and helping you provide the excellent service and products that we all strive to offer. I look forward to working with each of you in the coming year.

 Sincerely,

Tom Starr
Chairman
The Broadband Forum

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FORUM LEADERSHIP

Board of Directors

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Huawei Technologies

Board Member
Mauro Tilocca
Telecom Italia

COMMITTEE LEADERSHIP

The work of the Broadband Forum is performed under two main working committees, the Technical Committee and the Marketing Committee and includes a new joint technical and marketing working group, Service Innovation and Market Requirements (SIMR) and a special advisory group, the Service Provider Action Council (SPAC).

Service Innovation & Market Requirements Leadership Team

SIMR Co-Chairs: George Dobrowski, *Huawei Technologies* Michael Fargano, *CenturyLink*	**SIMR Vice Chair:** Christele Bouchat, *Alcatel-Lucent*

Technical Leadership Team

Technical Committee Chair: Christophe Alter, *Orange*	**Technical Committee Vice Chair:** Frank Van der Putten, *Alcatel-Lucent*
BroadbandHome Co-Chairs: John Blackford, *Pace* Jason Walls, *QA Café*	
End to End Architecture Co-Chairs: David Thorne, *BT* Dave Allan, *Ericsson*	**End to End Architecture Vice Chair:** Sven Ooghe, *Alcatel-Lucent*
Fiber Access Network Co-Chairs: Mike Shaffer, *Alcatel-Lucent* Alessandro Capurso, *Telecom Italia*	
IP/MPLS & Core Co-Chairs: David Sinicrope, *Ericsson* Charles A. Rexrode II, *Verizon Communications*	
Metallic Transmission Chair: Les Brown, *Huawei Technologies*	**Metallic Transmission Vice Chairs:** Lincoln Lavoie, *UNH InterOperability Laboratory* Massimo Sorbara, *Ikanos Communications*
Operations & Network Management Co-Chairs: Peter Adams, *ADTRAN* Christopher Croot, *BT*	**Operations & Network Management Vice Chair:** Moti Morgenstern, *ECI Telecom*

Marketing Leadership Team

Marketing Committee Chair:
Sultan Dawood, *Cisco Systems*

International Development Co-Chairs:
Nikhil Shah, *Juniper Networks*
Peter Macaulay, *East by North*

Content Development –
White Papers Chair:
Thomas DiMicelli, *Juniper Networks*

Content Development –
Tutorials Chair:
David Christophe, *Alcatel-Lucent*

Service Provider Action Council Leadership Team

SPAC Co-Chairs:
Mauro Tilocca, *Telecom Italia*
Charles A. Rexrode II, *Verizon Communications*

Service Innovation and Market Requirements

In 2012 the BBF began to encourage companies to submit contributions that take a more long range view of industry requirements. In order to recognize key disruptors and opportunities on the horizon, they recognized how critical it is to anticipate the rising trends and applications earlier in development so we can deliver day-one interoperability – expediting industry advancements and success.

A number of disruptors to our current architecture and management framework were identified including Fixed/Mobile convergence, Cloud and Virtualization, M2M and Software Defined Networks. To catalyze these key areas of work, the Service Innovation and Market Requirements (SIMR) working group has taken lead on gathering requirements around these topics.

This group has begun to create Study Documents on emerging applications and services that will impact current broadband architecture, management or quality requirements, and go a step further to stimulate new work in the working groups to proactively address these requirements; thereby providing service providers and their vendors with the tools necessary to efficiently ramp up and take advantage of these new areas of innovation and market opportunities.

The SIMR team was hard at work in 2013, and has already issued the first of these study documents, SD-302 "Framework for Cloud Services in Broadband Networks". Requirements from this document are now being incorporated into TR-144 and beyond. The latest work includes a new SD on Software Defined Networks (SDN) in Broadband Network and a new SD on Flexible Service Chaining in Broadband Networks. The closing out of 2013 laid the ground work for the launch of a new SD in 2014: Network Functions Virtualization (NFV) in Broadband Networks.

TECHNICAL COMMITTEE ACHIEVEMENTS

In 2013, our workload continued to be challenging as we covered 1473 contributions and progressed 46 working texts (WTs), expanded the BBF.247 certification program to cover more ONU profiles, and ultimately approved 20 technical reports (TRs). Following the Board's strategic directive, each working group prioritized their workload to ensure that key architecture, testing and remote management work moved forward quickly. A number of major new work items kicked off including Small Cell, FTTdp/G.fast, Cloud, Network Enhanced Residential Gateways and Performance Metrics.

Broadband Forum Releases for 2013

Two releases were published in 2013, and each was focused on access optimization.

• BroadbandSuite 6.1 "Super-fast Broadband Toolkit" which provides a Super-fast Broadband kit of tools to optimize DSL capabilities (vectoring, bonding, splitters, etc) and the latest in DSL Quality Management

• BroadbandSuite 6.2 "Fiber Interoperability Suite" expands the BBF.247 ONU certification program to address new VLAN profiles and functionality test, and offers a companion OLT/ONU interoperability test plan

BroadbandSuite Release 6.1 Super-fast Broadband Toolkit		
TR-188i2: DSL Quality Suite	TR-114i2: VDSL2 Performance Test Plan	MR-261: Motivation for Testing xDSL Splitters and In-Line Filters
MR-180: Achieving Quality IPTV over DSL	TR-115i2: VDSL2 Functionality Test Plan	
	TR-273: Testing of Bonded, Multi-pair Systems	
	TR-286: Testing of Metallic Line Testing (MELT) functionality on xDSL Ports	
	MR-257: An Overview of G.993.5 Vectoring	

BroadbandSuite Release 6.2 Fiber Interoperability Suite		
WT-287: PON Optical Layer Management	IR-247: G-PON ONU Conformance Test Plan	
	ATP-247: G-PON ONU Conformance Abstract Test Plan	
	TR-255: G-PON Interoperability Test Plan	
	TR-309: XG-PON1 TC Layer Interoperability Test Plan	

2013 Technical Reports

The Technical Committee was incredibly prolific in 2013. There were a number of amendments to established BBF specifications to address new industry requirements as well as some key new work in areas of IPv6, multiservice architecture and testing. Below is the full list of Technical Reports produced in 2013.

Technical Number	Title	Approved Date	Working Group
TR-134 Corrigendum 1	Broadband Policy Control Framework (BPCF)	Jan-13	End to End Architecture
IR-247 Issue 2	GPON ONU Conformance Test Plan	Jan-13	Fiber Access Network
TR-135 Amendment 1 Corrigendum 1	Data Model for a TR-069 Enabled STB	Feb-13	BroadbandHome
TR-187 Issue 2	IPv6 for PPP Broadband Access	Feb-13	End to End Architecture
TR-255	GPON Interoperability Test Plan	Feb-13	Fiber Access Network
ATP-069	TR-069 Abstract Test Plan	Feb-13	BroadbandHome
ATP-247 Issue 2	GPON ONU Conformance Abstract Test Plan	Apr-13	Fiber Access Network
TR-105 Issue 2 Amendment 1	ADSL2/ADSL2plus Functionality Test Plan	May-13	Metallic Transmission
TR-115 Issue 2 Amendment 1	VDSL2 Functionality Test Plan	May-13	Metallic Transmission
TR-146	Subscriber Sessions	May-13	End to End Architecture
TR-106 Amendment 7	Data Model Template for TR-069-Enabled Devices	Sep-13	BroadbandHome
TR-298	Management model for DSL line test	Sep-13	Operations & Network Management
TR-309	XG-PON1 TC Layer Interoperability Test Plan	Sep-13	Fiber Access Network
TR-069 Amendment 5	CPE WAN Management Protocol	Nov-13	BroadbandHome
TR-098 Amendment 7	Internet Gateway Device Data Model for TR-069	Nov-13	BroadbandHome
TR-157 Amendment 8	Component Objects for CWMP	Nov-13	BroadbandHome
TR-181 Issue 2 Amendment 7	Device Data Model for TR-069	Nov-13	BroadbandHome
TR-221 Amendment 1	Technical Specifications for MPLS in Mobile Backhaul Networks	Nov-13	IPMPLS & Core
TR-252 Issue 3	xDSL Protocol-Independent Management Model	Nov-13	Operations & Network Management
TR-296	IPv6 Transition Mechanisms Test Plan	Nov-13	End to End Architecture

Technical Working Group Progress

In the **End-to-End Architecture** working group, the team focuses on interface definitions and nodal requirements for service delivery from the Customer Premises Equipment (CPE) through Access Node, aggregation network and Broadband Network Gateway (BNG), to peering interfaces with network and application service providers.

The work centered on three key themes-

• Service control and convergence built upon the completion of WT-203 to progress work on FMC interworking, and converged wireless and wireline networks. This was part of a broader ongoing theme of defining multiservice networks

• Testing of both implementations and production networks continued to be a key theme with work on IPv6 migration test plans and access line attributes and performance metrics

• Finally virtualization emerged in 2013 with the start of work items on network enhanced residential gateways with this work area expected to expand in scope in 2014

The **Fiber Access Network** working group developed technical specifications related to Optical Access Nodes and associated test plans for conformance and inter-vendors interoperability. They were very active expanding the ONU conformance testing program to address specific ONU profiles, as well as developing the test plans for a proposed Broadband Forum G-PON ONU/OLT test suite, which establishes OLT network interoperability with BBF.247 certified ONUs. Moreover, during 2012, the G-PON test plans were extended to XG-PON1 as well, covering both Physical Layer and upper layers for ITU-T PON technology. Optical layer management for PON access and Layer 2 PON architecture and functional requirements are now in developed and new cross-group projects on Intelligent ODN and Fiber to the Distribution Point just started.

The **Metallic Transmission** working group completed the development work on a new set of documents for the VDSL2 Vectoring technologies. The completion of this work represents a milestone in the overall development of VDSL2 Vectoring project within the Broadband Forum. During the October Broadband World Forum trade show in Amsterdam, several companies demonstrated the interoperability of VDSL2 Vectoring in the Broadband Forum's pavilion booth, made possible by the ongoing work of the Broadband Forum's interoperability plugfests. Additionally, the working group continued with the expansion of other test plans, including the TR-115, "VDSL2 Functionality Test Plan" and TR-286, " Testing of Metallic Line Testing (MELT) functionality on xDSL Ports."

Looking to the road map for 2014, the working group will be starting another large project to develop test plans for the forthcoming G.fast (ITU-T G.9700/G.9701) technologies. This work includes the development of deployment and test scenarios, loop and noise conditions, performance criteria, and functional test requirements. The Forum's goal is to complete the initial test plans in time for the first G.fast standardized products to be tested. The working group is also planning to augment the VDSL2 Vectoring test plan, WT-249, with a second issue to include additional performance requirements.

The **BroadbandHome** working group focused on releasing the next version of CWMP, defined in TR-069 Amendment 5. This included three major advancements to support the rapid expansion of devices in the home. The XMPP Connection Request mechanism was added, allowing an ACS to contact a CPE that would not otherwise be reachable (due to a NAT or Firewall, etc.) for connection requests. To help support devices that may have different levels of activity than "always on", policies have been added for dealing with devices that have a "stand-by" or "sleep" state. Lastly, a lightweight notification mechanism has been added that allows value change notifications to be delivered outside of CWMP Session rules, providing a scaled solution for large volumes of notification messages.

In addition to these improvements to CWMP, BroadbandHome took a major step into its exploration and support of M2M solutions, extending the Data Model for CWMP Devices (Device:2) with ZigBee interface objects, defined in TR-181a7.

In the **Operations & Network Management** working group progress was made on updating several existing Technical Reports. These uplifts included the addition of new text on energy efficiency in DSL within the DSL Quality Management (DQM) Suite and also updated management models for broadband access networks. A new Technical Report was completed on Line Test management models. Good progress was made on projects on the management of fiber access infrastructure and on GPON management requirements. Work on the management of DPUs has started as part of the FTTdp project and two new projects on a Visualised Intelligent Network Platform and Customer Self Install are at various stages of initiation.

The **IP/MPLS & Core** working group focuses on providing the industry with specifications to facilitate deployment of IP, Carrier Ethernet and other services providing the capability to address multiple applications on a single, converged network.

Applications addressed in 2013 included –

· Mobile backhaul - including enhanced OAM, energy efficiency and small cell backhaul

· Packet /optical integration - optimizing the interaction between the two types of networks

· Phase One work on Carrier Ethernet architecture and equipment requirements was nearly completed and subsequent phases with advanced features for virtualization, cloud computing and SDN were proposed for 2014

These first phase documents provide architecture and nodal requirements for implementing specified MEF Ethernet services with IP/MPLS and Ethernet technology. The group worked with the IETF, MEF, Small Cell Forum, 3GPP, ITU-T and other organizations to ensure quality and broad based consensus of their work. The group worked closely with the Marketing Committee to develop and deliver collateral for industry education and awareness of their work and the technologies used.

TECHNICAL PLANS FOR 2014

Moving forward, there are some significant areas of development on the roadmap:

• BBF.069 is extending to cover devices from a wider range of industry segments

  • Small Cells, Cable Modems, Network Printers to M2M just to name a few

• Multi-service Architecture and Nodal Requirements

  • FMC and interworking specifications will be delivered-timed with the 3GPP Release 12

  • Updated BNG and Access Node specifications

  • Optical Line Management and Access Node management models

  • Specifications for IP and WDM integration, driving the completion of the first deliverable

  • Subsequent work on Carrier Ethernet architecture and requirements

  • Conclusion of Energy Efficient Mobile Backhaul• Cloud, NFV, NLRG, SDN and
  Data Center Interconnect will be major topics of work

  • New BB access service attributes will be defined and performance metrics established

  • Define the architecture, nodal and management requirements for FTTdp

  • Establish the functional and performance test plans for G.fast

• Cloud, NFV, NERG, SDN and Data Center Interconnect will be major topics of work

With a holistic approach to broadband solutions and a goal to enable interoperability from day one in future deployments, the Broadband Forum promises again to be very busy and productive in 2014.

LIAISON PROGRAM

The last year has been another busy one for collaboration and cooperation between the Broadband Forum and our liaison partners around the world, as the Broadband Forum has delivered major pieces of work and developed our industry relationships.

We received 74 incoming liaisons and sent out 70 liaisons to 23 different groups in the last year, as well as holding workshops with key partners FSAN and the ITU-T Q415 on our mutual PON work. We also were accepted into partnership in oneM2M, who as a collaboration of SDOs and fora are focused on furthering standardization in this new area.

We liaise our work around the world and as our scope of work has grown to address fiber technologies, business services, mobility and home networking requirements, the number of active partners has grown. We work extensively with many organizations that are key to the industry, and that work will only deepen in the coming year.

Partner Organization	Type of Partnership	BBF Liaison Officer
3GPP	Collaboration	Jaume Rius i Riu, Ericsson
3GPP2	Liaison	Doug Knisely, Qualcomm Incorporated
Alliance for Telecommunications Industry Solutions (ATIS)	Liaison	Tom Starr, AT&T
Digital Living Network Alliance (DLNA)	Liaison	Barbara Stark, AT&T
Digital Video Broadcasting project (DVB)	Liaison	William Lupton, Cisco Systems
European Commission Joint Research Center (EU JRC)	Liaison	Frank Van der Putten, Alcatel-Lucent
European Telecommunications Standards Institute (ETSI)	Cooperation	Robin Mersh, BBF Olivier Van De Wiel, Broadcom Corporation Parviz Yegani, Juniper Networks (NSV ISG)
Full Service Access Network (FSAN)		Michael Shaffer, Alcatel-Lucent
Groupe Speciale Mobile Association (GSMA)	Liaison	Robin Mersh, BBF
HomeGrid Forum (HGF)	Collaboration	Robin Mersh, BBF
Home Gateway Initiative (HGI)	Collaboration	Robin Mersh, BBF
IEEE P1904.1 SIEPON	Liaison	Lowell Lamb, Broadcom
Internet Engineering Task Force (IETF)	Liaison	David Sinicrope, Ericsson
International Telecommunication Union (ITU-T)	Collaboration	Tom Starr, AT&T (WP 1/15) David Sinicrope, Ericsson Frank Van der Putten, Alcatel-Lucent
ISO IEC/JTC 1	Liaison	Robin Mersh, BBF
IPv6 Forum	Liaison	Lincoln Lavoie, UNH InterOperability Lab
Metro Ethernet Forum (MEF)	Liaison	Scott Mansfield, Ericsson
MoCA	Liaison	Robin Mersh, BBF
Open IPTV Forum	Liaison	Robin Mersh, BBF
Open Mobile Alliance (OMA)	Cooperation	Jason Walls, QA Cafe
OSGi	Liaison	Robin Mersh, BBF
Small Cell Forum	Cooperation	Robin Mersh, BBF
Telemanagement Forum (TMF)	Cooperation	Robin Mersh, BBF
Universal Plug And Play Forum (UPnP)	Liaison	Barbara Stark, AT&T William Lupton, Cisco Systems
Wi-Fi Alliance	Liaison	Robin Mersh, BBF
WiMAX Forum	Collaboration	Robin Mersh, BBF
Zigbee Alliance	Liaison	Jason Walls, QA Cafe

MARKETING COMMITTEE ACHIEVEMENTS

Marketing Communications focused on promotion of a number of new areas of work in the BBF, and on sharing our commitment to day-one interoperability, and network migration/upgrade strategies to address the impacts of Cloud, Network Function Virtualization, Network Residing Residential Gateways, Service Chaining and the host of other innovative new work hitting our contributions. To demonstrate our ongoing commitment to interoperability, the BBF hosted the Interoperability Pavilion at Broadband World Forum 2013.

Interoperability Pavilion

The Broadband World Forum 2013 in Amsterdam provided the perfect venue for our Interoperability Pavilion, a unique industry flagship event that promoted multi-vendor equipment interoperability and broadband innovation. The Pavilion showcased some of the latest products that adhere to global standards and some of the companies that are helping to forge the next wave of industry innovation. The exhibit included BBF Certified Product companies, a BBF.247 testing demonstration and provided the first ever multi-vendor demonstration of VDSL2 Vectoring. In the Pavilion, an Innovation Theater provided participants with an area to present to attendees, was where we hosted a Service Provider and Press Reception on opening night, as well where BBF hosted a press conference promoting the new Informa report as well as highlighting the key "must see" demonstrations in the Pavilion.

Thank you to all Pavilion participants- Actelis, ADB SA, ADTRAN, Alcatel-Lucent, AVM, D-Link, Home Grid Forum, Huawei Technologies, Ikanos, Juniper Networks, LAN Laboratories, Technicolor, Telebyte, UNH-IOL, ZTE and ZyXEL.

2013 Educational Booths

Marketing Communications continued the work focused on promotion vehicles, such as tradeshows, conference appearances, PR and enhanced web presence.
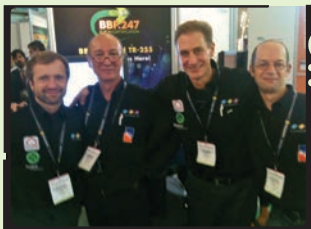
2013 Educational Booth schedule:

Event	Location	Date
FTTH Council Europe	London	February 19 – 23, 2013
Broadband World Forum Europe	Amsterdam, The Netherlands	October 16 - 18, 2013
IEEE Globecom	Atlanta, Georgia	December 9 - 13, 2013

International Development

One of the key goals of the Forum marketing team is to empower growth markets with as much information, best practices and tools available to help them expedite and build their networks on a strong standards platform. In 2013, the key markets that the team focused on were Brazil and growth countries in Asia. We addressed these markets through one-on-one executive meetings, guest invitations to our Nanjing meeting, tradeshow appearances, regional bylines and advertising.
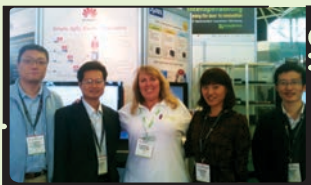
Ambassadors

The Ambassador committee continued to educate the marketplace about new technical solutions and inform them about the work of the Broadband Forum. The Ambassadors, who are Broadband Forum subject matter experts, participated in speaking opportunities that showcased the Forum's work and new specifications. We also hosted five Tutorials at major events around the world, highlighting work around the MPLS and Multi-service Architecture work we are doing.

With 4 new Ambassadors added in 2013, the education efforts were truly global, and in 2013 there were 19 presentations made throughout the world.

Americas	**5**
Europe	**11**
Asia	**3**
Middle East	**0**

Special thanks to our 2013 active ambassadors who spoke at the following events:

• **Dave Sinicrope**, **Bruno De Troche, and Santiago Alvarez** – MPLS & Ethernet World Congress (February 2013)

• **Robin Mersh and David Thorne** – FTTH Council 2013 (February 2013)

• **Robin Mersh and Tom Starr** – DSL Acceleration 2013 (April 2013)

• **Peter Macaulay** – OptiNet China (June 2013)

• **Kevin Foster** – TNO's DSL Seminar 2013 (June 2013)

• **Peter Macaulay** – CommunicAsia 2013 (June 2013)

• **Hongyu Li** – Software Defined Networking Summit (formally Carrier Ethernet World Congress) (September 2013)

• **Robin Mersh** – NextGen Conference 2013 (October 2013)

• **Kevin Foster, Robin Mersh, and David Thorne** – Broadband World Forum Europe (October 2013)

• **Dean Cheng** – Cellular Backhaul Summit 2013 (November 2013)

• **Robin Mersh, George Dobrowski, and Michael Fargano** – IEEE Globecom 2013 (December 2013)

Public Relations

The Public Relations team continued their solid outreach and added social media into the mix. As more people turn to videos, LinkedIn and Twitter for their bite size industry news, the team made it a priority to do more video filming, including onsite interviews of members and TR editors, as well as post weekly to Twitter and LinkedIn. Social media drives more visibility beyond our normal attendees and is creating a more immediate dialog with the industry.

With so many strong Broadband Forum news pieces, it was no surprise that our global coverage was strong, and we saw a marked increase in members and other industry organizations talking about their association with or aligning with us. We also saw a surge of companies and other organizations reporting their BBF certification success, adherence to our TRs or simply promoting that they are engaged in Broadband Forum work- all great indications of the impact that the Forum is having on the industry.

The below table shows the amazing work of the public relations outreach over the last four years:

	2010	2011	2012	2013
Overall coverage tracked	1292	3732	5289	4739
Coverage – BBF press release driven	1051	3404	3331	2821
Coverage - General industry mentions	125	262	491	920
Coverage - Member reference	65	66	1467	991
News releases issued	9	17	12	10
Media interviews	34	104	78	8
Analyst briefings	5	7	10	4
Video/broadcast interviews	4	14	9	26
BBF bylined Articles / Features	13	13	13	7
Press conferences	3	6	3	1
White Paper placements	6	5	13	0
Linked In group members			1007	1202
Twitter followers				135

Below are the key headlines from 2013:

• **January 3, 2013**
  Actiontec Achieves Broadband Forum BBF.069 Certification for Remote Management

• **February 20, 2013**
  FTTx access now serves more than 105 million global subscribers worldwide

• **March 19, 2013**
  Three New Companies Join the Broadband Forum Board of Directors

• **March 26, 2013**
  Broadband Forum Holds Industry's First G.Vector Interoperability Plugfest for VDSL2

• **April 16, 2013**
  FTTx Supercharges Broadband Deployment

• **April 24, 2013**
  Broadband Forum Launches BroadbandSuite™ 6.1

• **June 17, 2013**
  Broadband Forum and TNO team up for Global DSL Seminar 2013

• **June 18, 2013**
  Broadband Forum Launches BroadbandSuite™ 6.2

• **September 5, 2013**
  Broadband Forum to host Interoperability Pavilion at Broadband World Forum

• **October 1, 2013**
  Broadband Forum Pavilion Creates a Center for Interoperability at the
  Broadband World Forum

• **October 15, 2013**
  UNH-IOL Hosts First Ever 100 Mbps Multi-Vendor VDSL2 Vectoring Demonstration
  in Broadband Forum's Interoperability Pavilion

• **October 22, 2013**
  Operators say G-PON interoperability is key to the success of Superfast Broadband

• **December 3, 2013**
  European Telecom Leaders Keynote at Broadband Forum Meeting

BROADBAND FORUM CERTIFICATION PROGRAM

There was a lot of activity in the BBF Certification arena in 2013, as we updated the fiber suite, continued the TR-069 compliance and interoperability efforts, began work in the VDSL2 Vectoring and the FTTdp/G.fast that may result in additional certification options. To establish a clear value proposition for certification, we also commissioned a report on the ROI of Certification.

Analyst Report on Certification Benefits

The resulting report "Optimizing the Fiber Business Case," developed by Informa Telecoms & Media, affirms that interoperability and certification are vital to sustained superfast broadband expansion around the world. This is the largest research project to date on certification and interoperability (C&I) that has been undertaken anywhere across the industry.

To gain a deeper understanding of the challenges, Informa surveyed 237 broadband industry stakeholders and interviewed senior executives at Orange, BT, Chunghwa Telecom, PCCW, Alcatel-Lucent, Calix, Huawei Technologies and PT Inovacao. The case studies from these interviews are included in the detailed report.

Key findings:

• Over half of G-PON operator respondents (53%) said that interoperability issues caused problems related to their internal testing burden, while 44% reported issues with network performance issues and 41% with greater management overhead.

• Interoperability (31%) is ranked number two in the operators' ONU selection criteria behind price (41%), with maintenance costs (10%), software features (8%) hardware features (7%) and number of ports (5%) considerably less important to operator decisions

• Certification is emerging as a key tool to drive the transition to multivendor G-PON networks, with many service providers and vendors confident of deriving benefits.

• Survey respondents said that, on average, certification could help, or has helped, shorten the time spent selecting and testing G-PON ONUs by around 40%.

• 2014 will see increased activity around G-PON interoperability as several major operators move towards deploying multivendor networks, a host of smaller operator RFPs hit the market, and challenger vendors look to shake up the market.

The report is available online for free from Informa at:
http://www.informatandm.com/white-papers/

Broadband Forum Approved Test Laboratories

We also established the Broadband Forum Approved Test Laboratory (ATL) program. We are pleased to have approved three test laboratories under the current requirements –

1) Must be a BBF member in good standing.

2) Lab is open to testing other companies.

3) Lab is accredited or is "in process" of with a nationally recognized regulatory body (adheres to ISO/IEC 17025 general requirements for the competence of testing and calibration laboratories).

4) Lab is actively involved with the BBF (attends at least two meetings per year) and attends appropriate conference calls.

5) Lab has demonstrable knowledge of the technology under test.

6) Lab has demonstrable knowledge of the testing specification under consideration.

7) Lab agrees to independent review by the BBF.

8) Lab agrees to support and actively promote BBF testing programs.

9) Lab agrees to gain approval from the BBF for all public statement regarding BBF testing programs.

10) Lab will supply program rules document to all customers regarding the relationship with BBF programs.

Broadband Forum Approved Test Laboratories

Laboratory	Approved Testing
LAN	PON
UNH-IOL	DSL, PON, TR-069 and IPv6
Telebyte	VDSL2 Vectoring

BBF.247 GPON ONU Certification

In 2013 the BBF.247 program continued to grow and change. The program was updated to include more ONU profile types, and functional testing. Companies can now bring their ONUs in to be tested against specific profiles appropriate to their application. With the addition of TR-255, the OLT/ONU interoperability test plan, companies can test their certified ONUs against OLTs in the industry. Below is the list of publically listed BBF.247 certified ONUs.

BBF.247 G-PON ONU Certified Products

Product			Product Type[1]				VLAN Profiles[4]			Service Features
Company	Product Name	Version (HW & SW)	Single User Port ONU	Multiple User Port ONU	Residential Gateway ONU dual-managed[2]	Residential Gateway ONU multi-managed[3]	1:1	N:1	VBES	Multicast
Alcatel-Lucent	I-010G-P	HW: CP88 94V-0 E243951 SW: R4.2 48G	✓				✓	✓	✓	✓
Calix	T073G	HW: P1A SW: R4.1.1.126.Eric1		✓			✓	✓	✓	✓
Cambridge Industries Group Ltd.	G-93E3	R4.1		✓			✓	✓	✓	✓
FiberHome	AN5506-04	HW: WKE2.134.285 SW: RP2512		✓			✓	✓	✓	✓
Genexis	Element-G1030	HW: 1 SW: 1.0.0-T5	✓				✓	✓	✓	✓
Huawei Technologies Co., Ltd.	HG8010	V100R003C00	✓				✓	✓	✓	✓
Lantiq	FALC™ ON Reference Board	HW: V1.7 SW: 4.5		✓			✓	✓	✓	✓
PT Inovação S.A.	ONT7-SFU	HW: ONT7-SDU-D1 SW: ONT4GE2FXSSW20	✓				✓	✓	✓	✓
Tecom Co. Ltd	OB1004 GPON Indoor Mini ONT	SW: 1.5.3.12	✓				✓	✓	✓	✓
ZTE Corporation	F601	HW: v2 SW: v2.0.0 P4T19	✓				✓	✓	✓	✓

Notes:

[1] Product Types as defined in IR-247: ONU/L2 with Single or Multiple U interfaces, or ONU/RG with single or multiple VEIP (Virtual Ethernet Interface Point), see notes 2 and 3 below.

[2] ONU/RG device with single RG domain (single VEIP). This device is referred to as a dual-managed ONU by ITU-T G.988, where the RG domain is managed via TR-069.

[3] ONU/RG device with multiple RG domains (multiple VEIP). This device is referred here to as a multi-managed, where the multiple domains are managed via TR-069.

[4] VLAN profiles as defined in TR-156: 1:1, N:1 or VBES (VLAN Business Ethernet Service).

BBF.069 CPE Certification

The BBF.069 CPE Certification program also grew in 2013. The program provides the broadband industry with a baseline for the CWMP functionality present in CPE devices. This offers broadband vendors a powerful marketing tool to highlight that their products are market ready and adhere to TR-069. New test documents are in development for ACS/device interoperability testing and the associated plugfests are continuing at UNH-IOL, the Approved Test Lab for this certification program.

Company	Device Type	Model	Software Version	TR-069 Amendment Supported	Optional Features
Broadcom	Internet Gateway Device	96328AVNG	4.12L.07_RC_9	TR-069a2	TLS1.0, Upload, FactoryReset, ACS URL change on DUT by 3rd party means, ScheduleInform
Cisco Systems	Internet Gateway Device	Linksys E4200	1.5.20	TR-069a1	Factory Reset, ACS URL change on the DUT by 3rd party means EnableCWMP set to False, DefaultActiveNotification-Throttle Throttles Active Notification
Lantiq Deutschland GmbH	Internet Gateway Device	EASY80920 XWAY VRX288	UGW-5.2-2204-18Sept12	TR-069a2	SSL3.0, Upload, Factory Reset, ACS URL change on DUT by 3rd party means, ScheduleInform, EnableCWMP set to False
Huawei Technologies	Internet Gateway Device	Speedport W 724V Typ A	02011701. 00.312	TR-069a4	TLS1.0, Upload, Factory Reset, ACS URL change on DUT via 3rd party means, ScheduleInform, EnableCWMP set to False, DefaultActiveNotificationThrottle Throttles Active Notification
D-Link	Internet Gateway Device	DIR-835	1.01NEb23	TR-069a1	DHCPv4 Options, DHCPv6 Options, SSL3.0, TLS1.0 Upload, Factory Reset, ACS URL change on DUT by 3rd party means CancelTransfer, ScheduleInform, GetAll-QueuedTransfer, EnableCWMP set to False
Actiontec	Internet Gateway Device	C1000A	CAC002-31.30L.17cUNH	TR-069a1	DHCPv4, TLS1.0, Managing Objects, Upload, Factory Reset, 3rd Party URL Change, ScheduleInform, EnableCWMP set to False

SERVICE PROVIDER ACTION COUNCIL (SPAC)

The Service Provider Action Council (SPAC) brings the service provider community together to guarantee the Broadband Forum has continuous guidance on service requirements and technical evolution. This engagement of Service Providers guarantees market relevance and timely specification delivery. At each meeting in 2013, the SPAC attendance averaged 33 attendees from over 14 service provider companies.

Topics in 2013 included:
Copper Thread:
- Test Plan(s) for Fast technology
- Vectoring performances

Fiber Thread:
- FTTdp
- PON work
- iODN
- Follow up of CSI BoF
- Analysis for impacts of DPI device deployed in real network
- Requirements for a printer Data Model for TR-069
- Energy Efficient Mobile Backhaul (WT-293) - Status Review
- Customer Self-Install BoF
- Board strategy meeting readout
- Organization of Operators' PON interoperability workshop in Q3
- Content-Aware Network & Test Plan
- Results of the survey on VDSL2 Low Power Mode
- Update on WT-304 and issues service providers need to be aware of
- Cooperation and joint work with HGI to drive the Smart Home ecosystem
- Central Office Consolidation & Convergence

MEMBER RECOGNITION

In 2013 many of our members were recognized for their valuable contributions to the industry and specifically to the Broadband Forum. Below are the lists of awards and recipients. We thank each person and each company for their outstanding support.

Distinguished Fellow

The Distinguished Fellow title is bestowed by the Broadband Forum to exceptional individuals who have over time provided a major influence on the direction and success of broadband development. These are the key individuals who help the Forum chart new technology solutions, drive best practices to overcome deployment obstacles, and whose vision continues to inspire our industry's growth.

- David Thorne, BT
- David Sinicrope, Ericsson

Leadership Award

The Leadership award is given to outgoing, commendable working group chairs or Board members. These individuals, who have dedicated their time and leadership ability to establishing our success, have gone above and beyond the call of duty within the Broadband Forum and we thank them for their service.

- Michael Hanrahan, Huawei Technologies
- Yue Chen, Juniper Networks
- Regis Coat, Orange

Circle of Excellence

The Broadband Forum recognizes the exceptional contributions of its members through the "Circle of Excellence" award, which is awarded at our quarterly meetings. The recipients inducted into the Circle of Excellence are determined by membership nomination with selection based on leadership, diligence, or having provided a contribution that was foremost in advancing the Forum's mission.

- Michael Langhammer, Deutsche Telekom
- Vincent Buchoux, LAN
- Tim Sheehan, UNH IOL

Outstanding Contributor Award

Once a year, at the annual meeting, the Outstanding Contributor awards are given to individuals who, during the previous year, went above and beyond the call of duty within the Forum working groups by making many contributions throughout the year as well as effectively moving the consensus process forward. Both the quantity and quality of the contributions are taken in to consideration.

- Timothy Carey, Alcatel-Lucent
- Konstantin Livanos, Alcatel-Lucent
- Christopher Croot, BT
- Roberto David Carnero Ros, Ericsson
- Rao Cherukuri, Juniper Networks
- Vincent Buchoux, LAN
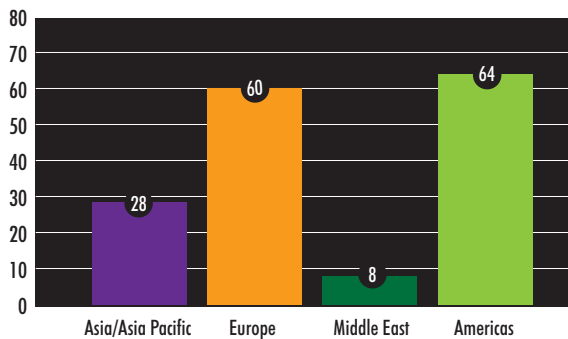- Aleksandra Kozarev, Lantiq
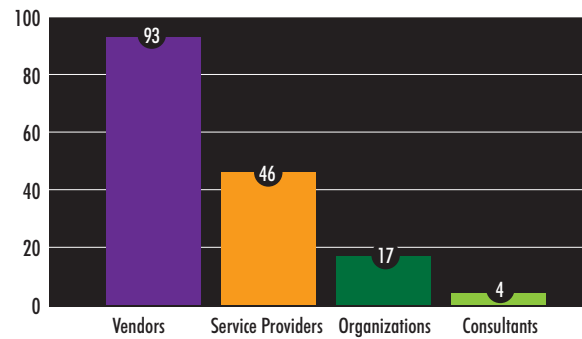
BROADBAND FORUM MEMBERSHIP AND OPERATIONS

The Broadband Forum has been at the forefront of many of the improvements happening in the broadband industry. Despite the economic climate remaining challenging, our membership was again stable in 2013, and we added new service providers, including our first cable companies, as well as fiber and wireless focused members with our new efforts.

The graphs below show the diverse regional and industry segment breakdown.

Regional Membership

Asia/Asia Pacific	Europe	Middle East	Americas
28	60	8	64

Industry Segment Breakdown

Vendors	Service Providers	Organizations	Consultants
93	46	17	4

Date	Location	Number attending	Sponsor
March 4 – 8, 2013	San Antonio, Texas	172	
June 3 – 7, 2013	Nanjing, China	148	Huawei Technologies
September 16 – 20, 2013	Atlanta, Georgia	180	HomeGrid Forum
November 18 – 22, 2013	Rome, Italy	143	

As it is every year our focus in 2013 for Forum operations was to ensure continued member satisfaction, and that services were delivered efficiently and cost effectively. 2013 has seen continued success with key objectives met and best practices maintained.

The website experienced a facelift in 2013, adding new ARO features and sections, modernizing the look of the public site, and adding a variety of new content throughout. It continues to be enhanced with new online member tools and increased support for volunteer editors.

In challenging economic times the Forum continues to strive for the utmost value for the investment our members make in standards. The Forum wants its members to continue to consider Forum membership the best value for money in the industry and will continue to maintain a lean and efficient structure.

Membership List

160 Total Members as of December 31, 2013
New members noted with an * below:

Principal Members (81)

A1 Telekom Austria AG	Cyta	Oracle
Actelis Networks	D-Link	Orange
Actiontec Electronics	Deutsche Telekom	Pace
ADTRAN	ECI Telecom	Portugal Telecom Inovacao, SA
ADVA Optical Networking Ltd	Eircom, Ltd	Qatar National Broadband Network (Q.NBN)
Advanced Digital Broadcasting S.A.	Entropic Communications	Qualcomm Incorporated
Airvana, Inc.	Ericsson	RAD Data Communications
Alcatel-Lucent	EXFO	Ralink Technology Corporation
Aptean	Fastweb SPA	Sagem Communications
Arris	Google	Softbank BB Corp.
AT&T	Hitachi Communications Technologies America	Sumitomo Electric Industries
AVM	Huawei Technologies Co., Ltd.	Swisscom (Switzerland) Ltd.
Belgacom	Ikanos Communications	TDC A/S
Bell Canada	Ixia	Technicolor
British Sky Broadcasting Limited	JDSU	Telecom Italia S.p.A
Broadcom	Juniper Networks	Telefonica Standards
BT	Keymile	Telenet NV
Cable Television Laboratories, Inc.	KPN	Telenor
Calix Networks	Lantiq	TeliaSonera
CenturyLink	LSI Corporation	TELUS Communications, Inc.
Charter Communications*	Marvell Semiconductor Inc.	Time Warner Cable*
China Mobile Communications Corporation	MegaPath	Tollgrade Communications
China Telecom	Microsemi	TTNet A.S.
Chunghwa Telecom Labs	NEC	Tyco Electronics Raychem bvba*
Cisco Systems	Netgear	Verizon Communications
Comcast*	Nokia Siemens Networks GmbH & Co. KG	Vodaphone Group Services
Coriant R&D GmbH*	NTT Corporation	ZTE Corporation

Small Company Principal (30)

Affinegy	Horizon Analog, Inc.	SmartRG
AIMS (INT) Ltd.	Incognito Software	Sparnex Instruments
Alphion	Iphotonix	Starbridge Networks, L.L.C.
ASSIA, Inc.	LAN	Tail-f Systems
AvSystem	Metanoia Communications	Telebyte, Inc.
Axiros	Mitsubishi Electric RCE France	Thinxtream Technologies Pte Ltd *
Cambridge Industries Group Limited	MT2	Tracespan Communications
EANTC	QA Café	UNH Interoperability Lab
East by North	Real Communications	Viagenie
GreenWave Reality *	Sckipio Technologies *	Xtendwave

Auditing (34)

Agama Technologies	Gemtek Technology Co.	Suttle
AirTies	Genexis *	Tecom
Allied Telesis	KCCS Mobile Engineering Co., Ltd.	Telecom New Zealand
Arcadyan Technology Corp.	Observa Telecom	Telekom Slovenia
Askey Computer	OPT New Caledonia	Telkom SA Ltd
Blu-Castle SA *	Reliance Jio Infocomm Ltd	Telstra Corporation Ltd.
Bouygues Telecom	SaskTel	Tilgin
Cortina Systems, Inc.	ServComm Inc.	Transmode
Edimax Technology Co., Ltd	Shenzhen Gongjin Electronics Co., Ltd.	Westermo
Fiberhome Telecommunications Technology Co., Ltd.	Sigma Design	Zhone Technologies
Foxconn	SMC Networks	Zyxel Communications
Friendly Technology (FTL) Ltd.		

Associate (15)

Alabama State University	Layer123
Anacom	National Exchange Carrier Association
ETRI	National Media and infocommunications Authority
Fraunhofer Institute	Point Topic
Fundacao CPqD	Research Institute of Telecommunications Transmission (RITT)
Industry Canada *	Tecnalia Research & Innovation
Informa T&M (BBWF) *	TNO
ITRI	

FINANCIAL REPORT

Auditors John Waddell & Co, Certified Public Accountants, have audited the financial statements of the Broadband Forum. The following gives an overview over the key financial figures and indicators of the Broadband Forum.

STATEMENT OF FINANCIAL POSITION:

December 31

	2013	2012
Assets		
Cash	$698,370	$807,992
Certificates of Deposit	560,000	838,000
Accounts receivable	2,210	—
Accrued interest receivable	5,849	5,008
Prepaid expenses	37,975	13,290
Investments in Marketable securities	1,247,786	890,474
Total Assets	$2,552,190	$2,554,764
Liabilities		
Accounts payable	$113,281	$89,608
Deferred membership dues and sponsorship	555,100	535,275
Total Liabilities	668,381	624,883
Net assets - unrestricted	1,883,809	1,929,881
Total Liabilities and Net Assets	$2,552,190	$2,554,764

STATEMENT OF ACTIVITIES FOR THE YEARS ENDED:

December 31

	2013	2012
Revenue		
Membership dues	$1,318,300	$1,302,550
Meeting fees	276,150	295,365
Sponsorship	58,211	60,797
Interest and Investment Income	72,145	71,839
Other	—	42
Total Revenue	$1,724,806	$1,730,593
Expenses		
Meetings	$568,542	$521,198
Trade shows	34,333	53,950
Management fees	626,600	610,424
Marketing and public relations	324,722	384,031
General and administration	120,709	100,461
BBHome tech fees	—	44,400
Strategic initiatives	95,175	11,897
Miscellaneous/contingency	797	4,699
Total Expenses	$1,770,878	$1,731,060
Change in Net Assets	(46,072)	(467)
Net Assets – unrestricted		
Beginning of year	1,929,881	1,930,348
End of year	$1,883,809	$1,929,881

2014 MEMBERSHIP LEVELS

The Broadband Forum is an international non-profit industry association focused on engineering smarter and faster broadband connections. Our work defines best practices for global networks, enables service and content delivery, establishes technology migration strategies, engineers critical device and service management tools, and is key to redefining broadband.

Principal Members – $ 12,850 US

- Attendance to all annual, general and committee meetings of the Forum

- One vote each on all Forum issues, technical reports, and marketing reports

- Access to all working documents, contributions, technical reports, tutorials and meeting minutes

- Eligibility to run for Board of Director and Committee officer positions

- Eligibility to submit Technical Committee and Marketing Committee contributions

- Eligibility to take part in Forum testing events and programs (including those co-hosted with other organizations)

- Subscription to all Broadband Forum email mailing lists

Small Company Principal Membership – $ 5,550 US

- All the privileges listed above for a Principal Member

Note: In order to allow for a more cost-effective membership for medium-sized companies, the Board of Directors has decided to increase the annual revenue threshold for the Small Principal member category. Starting from 2012, this threshold is set at $20 million USD, which means Small Company Principal Members must have had annual revenues under $20 million USD in the previous year. They are required to submit a letter from their CEO stating this.

Auditing Membership – $ 4,550 US

- Attendance to all annual and general (i.e., Summit and Plenary) meetings of the Forum

- Access to all working documents, contributions, technical reports, tutorials and meeting minutes

- Subscription to all Broadband Forum email mailing lists

- Eligibility to take part in Forum testing events and programs (including those co-hosted with other organizations)

- Auditing members may NOT attend committee meetings (i.e., Technical and Marketing Working Group meetings) of the Forum and are NOT eligible to submit Technical Committee or Marketing Committee contributions or vote on Forum issues, technical reports or marketing reports

Associate Membership – $ 1,200 US

- Attendance to all annual, general and committee meetings of the Forum (but not eligible to vote)

- Access to all working documents, contributions, technical reports, tutorials and meeting minutes

- Subscription to all Broadband Forum email mailing lists

Note: Associate Members must be not for profit or educational institutions. Institutions will be approved for membership annually by a majority vote of the Board of Directors.

REFLECTING ON 2013 AND THE YEAR AHEAD

2013 has been a very productive year for the Broadband Forum and one which the membership and the leadership team can be rightly proud of. We have seen a massive number of technical contributions and very high levels of engagement from our members which have enabled us to deliver a number of very important technical and marketing reports. We have maintained a first class industry profile through our many and varied successes coupled with our high-profile engagement in conferences and events, not forgetting the fantastic coverage we have had through our PR activities. Our interoperability program has developed significantly and is poised to grow further.

Our ultimate success as an organization is dependent on our members, our efficient and effective operations and our industry awareness and leadership. The Board has developed its forward looking views into a strategic plan which will evolve further during 2014 to enable the leadership team to shape our future so that we continue to maximize the Forum's value to the wider broadband industry. The Forum is looking further ahead and reaching out into new and exciting areas such as Network Virtualization, Cloud, and Service Chaining. It is shaping the future in smart CPE diagnostics, M2M and in particular Fiber to the Distribution Point. FTTdp with G.fast is a game changing architecture that will enable speeds up to 1Gbit/s, and it has already embedded itself as a steel thread running through our working groups, from architecture to interoperability.

These are indeed exciting times for the broadband industry and the Forum. I'm sure in ten years' time we will look back and reflect on these as halcyon days of change in the global broadband industry.

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An electronic copy of this report can be downloaded from:
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broadband forum

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