Access and Transport Architecture

Note: For work and wiki pages predating the January 2019 formation of the Access and Transport Architecture Work Area, see the retired Architectur e and Migration Work Area and the Routing and Transport Work Area wiki pages.



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2. ATA Work Area Project Streams and Projects

Project Deliverable and Document Numbering Note

Most projects use deliverable (e.g., tutorial slide deck) and document numbers assigned independent of inter-relation or project association. (e.g., TR-421, MR-433, MR-238, TR-224, TR-350, MR-367)

However, some deliverables or documents are numbered in a series associating them together as related or part of the same project using a suffix notation (e.g., TR-452.1, TR-452.2, TR-452.3, etc.; MR-452.1, MR-452.2, MR-452.3, etc.; TR-319 Base, TR-319 Part A, TR-319 Part B, etc.) The suffix, when used, is treated as an integral part of the document number for purposes of revision (e.g., TR.459.2 Issue 2), amendment (e.g. WT-390.2 Amendment 1), or correction (e.g., MD-521.2 Corrigendum 1). Note that the first deliverable in a series may or may not use the .1 suffix. (e.g., TR-459, TR-459.2, TR-459.3 vs. TR-452.1, TR-452.2, TR-452.3, etc., MR-521.1, MR-521.2, etc.).

Questions on ATA document numbering should be directed to the Work Area Directors.

2.1. ATA New Project Initiation Forms (NPIFs)

Project Page: ATA New Project Initiation Forms (NPIFs)

Work Area Director: Jonathan Newton , Vodafone.

Description: Proposed new projects for ATA or combination of Work Areas including ATA.

2.2. ATA Non-PS Assigned Projects

Project Stream Page: ATA Non-PS Assigned Projects

- 3. Work Area Overview
- 3.1. Mission Statement:

The Access and Transport Architecture (ATA) Work Area (WA) defines and specifies the architecture and equipment requirements for access and transport network infrastructure. ATA produces industry-agreed specifications for applications such as broadband Internet access as well as specifications for managing, testing, and maintaining these networks and their applications. This work typically takes the form of architecture, equipment requirements, test & implementation guidance, and education materials.

Work Area Director:

- Jonathan Newton , Vodafone
- 3.2. Business Impact:

Work Area Director: Jonathan Newton , Vodafone.

Description: Projects that don't fit under the scope of an existing Project Stream or if they fit under the scope of more than one Project Stream, are developed under the Non-PS Assigned category.

2.3. Access Architecture (AA) Project Stream

Project Stream Page: Access Architecture (AA) Project Stream

Project Stream Leads: Jonathan Newton, Vodafone

Mission:

The project stream mission is to advance access broadband network architecture in traditional and new areas to ensure quality connectivity leading to quality user experience. Identify and document the key functionalities and relationships between entities to facilitate the transition of networks to encompass new practices such as virtualization while documenting the key functionalities that need to be brought forward to enable a seamless evolution path.A critical element of the work is the long term support of existing and new physical and statically management network elements alongside agile and virtualized functions in what effectively will be a stable hybrid network. This enables seamless migration based on market acceptance on new technologies, protection of existing infrastructure investment and normal spread of deployment in different territories. The project stream will focus on:

- 1. New, distributed access network architectures, including some or all of which is virtualized.
- 2. Defining the access (e.g., AN, BNG) function, interfaces and interactions of the equipment within these new architectures
- 3. Defining the equipment requirements needed to support the new architectures
- 4. Migration from existing access networks to those deployed leveraging the new architectures, functions and equipment
- 5. Maintenance of existing access architecture, functions and equipment requirements

Business Impact:

The work creates the necessary foundation for all of the broadband network. It underpins new value-added services and application delivery for fixed access networks, for home and business that can now be deployed at the pace of each market. Co-existence of physical and virtualized solutions and from static and dynamic services will create a broadband network mitigating the risks to existing revenue and enabling market-paced migration. Drive evolution of the network to improve scale, resiliency, reliability and security.

Scope:

Specifically the project stream covers the following areas:

- Overall broadband access network architecture from RG through BNG.
- Conventional Broadband Network Gateway (BNG) definition, architecture, function definition and requirements.
- Disaggregated Broadband Network Gateway definition, architecture, function definition and requirements.

A critical element of the work is the long term support of existing network elements alongside virtualized software based network functions, resulting in a stable network that may be evolved over time. This enables seamless migration of new networking technologies based on their market acceptance, at the same time protecting existing infrastructure investment, and deployment into new different territories. ATA specifications underpin the network infrastructure, valueadded services and application delivery for fixed access networks, and allow deployment at the pace of each relevant market. Coexistence of physical and virtualized solutions for static and dynamic services create a network infrastructure mitigating the risks to existing revenue at the same time it leverages new networking technology according to market demand.

3.3. Scope:

ATA maintains the primary architectures for the work of Broadband Forum. The architectures, requirements and other deliverables reflect the control, management. and data plane aspects of the access, transport and routed networks used to provide operator, enterprise and "over-the-top" Internet based connectivity services. The deliverables of the work area are designed to leverage and integrate new industry technologies while protecting investment of current deployments. These deliverables provide the industry with a collective and consistent methodology to drive product development and service deployment.

• Conventional Access Node (AN)- definition, architecture, function definition and requirements.

Projects

Project Name and Page Link	Project Overview
459 - Multi- Service Disaggre gated BNG with CUPS	Overview The Architecture and Transport Architecture (ATA) Working Area (WA) has a rich history in defining various BNG architectures and requirements, from classic functions such as L2TP LAC to more recent functions such as Network Enhanced Residential Gateway (NERG) and Public Wi-Fi access in MS-BNG. The MS-Disaggregated BNG (DBNG) is an on-going project at ATA. TR-459 serve as a foundation document in defining the the architecture and requirements for a DBNG. Standardizing interfaces and protocols will ensure interoperability between various types of control planes and user planes deployments. One of the key objective TR-459 is to ensure the DBNG provides the same broadband service offerings as a classic MS-BNG. Compared to a classic MS-BNG, the MS-DBNG have several key advantages such as independent user plane and control plane scaling, independent control and user plane enables more efficient use of resources and simplifies operations. In addition, BBF is a forum that allows synergy amon gst various work area and creates a unified vision for the broadband industry. An example of this is WT-459 the protocol selected for the State Control Interface (SCI) named, Packet Forwarding Control Protocol (PFCP). PFCP, a protocol defined by 3GPP in TS 29.244 for control and user plane separation (CU PS) communication, is used for 4G and 5G 3GPP architecture. In WT-458, CUPS for fixed mobile convergence, BBF again selected PFCP for the SCI. This is one of many examples of how BBF is providing a platform for all stakeholders to collaborate and create synergy across different Working Areas with a unified vision for Broadband. The DBNG project continue to define and study new architecture and new requirement of interest to service providers and vendors. DBNG YANG modeling, DBNG CG-NAT, and DBNG User Plane traffic steering are just some of the current working projects related to DBNG. New DBNG topics are encouraged to be brought to the ATA group through contributions, the following link provide the most up-to-date topics

Project Deliverables under Development

See BBF Work in Progress - Projects, Project Streams, and Jira Links

Filter the table at the link above on Work Area = "ATA" and Project Stream = "Access Architecture"

3.4. Email List:

ATA Work Area (WA): ata@br oadband-forum.org

 used for ATA meeting notification, agendas, discussion, etc.

Join or Leave BBF Groups and Email Lists

 Go to your JIRA profile page to see all of your current BBF group memberships.

3.5. ATA Calls, Minutes, Agendas

Each Project has its own agenda and set of minutes.

See the ATA Calendar and Deadlines for details on conference calls and meetings.

3.6. See Also:

 ATA Practices for Markdown Documents and Software Projects (Accepted 6th March 24)

Complet	bleted Project Deliverables			
Title	Number	Description	Resources	Editors
Disagg regate d BNG	MR-459			Kenneth Wan
Improv ing Servic e Resilie nce throug h BNG Disagg regation	MR- 459.2			Jonatha n Newton
Five Key Questi ons on the Disagg regate d BNG	MR- 459.3			Kenneth Wan
CUPS for a disagg regate d BNG: Objecti ve and Scope	MD- 459.4			ТВА
IPTV Multic ast for the Disagg regate d BNG	TR-459.3	This document defines the architecture and requirements to support IP Multicast for a disaggregated BNG defined in TR-459.		Nagaraj S Turaiyur

	CGN Functi onality for Disagg regate d BNG Project	TR-459.2	This document defines the architecture and requirements to support CG- NAT for a MS- DBNG defined in TR-459.		Kenneth Wan
	Contro I and User Plane Separ ation for a Disagg regate d BNG	TR-459i2	This document defines the architecture, the requirements, and the protocol for a control and user plane separation of a disaggregated BNG.		Kenneth Wan
Subscribe r Session Steering	Project C Purpose: As Broad control ar programm individual advantag to differen (such as cloud nat and the a functions) load. The disaggreg (dBNG), t newly aut request th moved be define an network o cloud-nat	band Netwo and Cloud Cen natically con subscriber s es for an op- nt customers the BNG) an- ive, with cen bility to scale to manage re is a need gated service to be able to thenticating s at existing s etween UP ir architecture can offer an i ive user plar	rks become more ntral office, it is no trol which User Pla should be connect erator to offer diffe s.At the same time e becoming increat tralised control pla e out (add addition short term or long for a standardised function ,such as be able to identify subscribers should subscribers should nstances. In other e and interfaces su ingress load-balan ne functions	dynamic with S w possible to ane (UP) function and (UP) function are to. This created to. This created are and subscription and UP procession of the procesi	DN on each ates many opositions nctions gated and ber state ng in a ed BNG istance , or to ed or ess towards

Network Operators will not be able to effectively deploy disaggregated service functions such as the dBNG without a standardized approach to balance and move subscribers between UP instances. Service Providers increasingly desire to differentiate the services that are offered to individual customers (eg low latency / by revenue / for high throughput). This project will enable increasing differentiation by steering subscribers to a suitable UP function. This could include UP that are deployed to offer different SLA (i.e edge services). It may also include use cases where a subscriber-specific User Plane is created on demand, to which the subscriber session is then dynamically connected.Network Operators need new tools to be able to manage and upgrade networks as the industry moved to sdn /nfv. Session Steering will enable software deployment approaches in line with the cloud paradigm (such as automated incremental upgrades with canary testing on a small number of subscribers), as well as additional network resilience.Our industry is under increasing pressure to reduce power usage. The ability to dynamically move active subscribers between functions without service impact will allow hardware / software to be temporarily removed from service at certain times of the day.

Scope:

This project will create a WT that defines an architecture for Subscriber Session Steering, using the dBNG as an exemplary function.

The following are in scope for inclusion in the project: Phase 1:

• Identification & definition of the opportunities and use cases for session steering.

Phase 2:

- How to identify the UP instances that can serve a subscribers requirements
- How to balance newly authenticating subscribers amongst the available UP instances that can meet their requirements.
- How to request that a subscriber or group of subscribers is moved from one UP instance to a different UP instance (without customer impact if at all possible).
- How a change in subscriber policy can trigger a change in the placement of a subscriber.
- Requirements on the SDN controller to support session steering
- Requirements for the Service Function (eg dBNG) to support session steering
- Identification of the protocols and interfaces that will be used

Note: the term 'Subscriber Session' is used within the context of this NPIF as per the definition in TR-146. It is recognized that there may be use cases for steering with a different context of session (IP session or even IP Flow), but this is currently out of scope.

Project Deliverables under Development

	See BBF Work in Progress - Projects, Project Streams, and Jira Links				
	Filter the Project S	e table at the Stream = "Ac	link above on Wo cess Architecture'	rk Area = "ATA" '	and
	Complet	ted Project I	Deliverables		
	Title	Number	Description	Resources	Editors
497 - Public Wi-Fi User Authentic ation					

Project Overview

Public Wi-Fi user authentication and data local forwarding technical requirements

Purpose:

This project aims to define the network architecture and technical requirements for Wi-Fi users to be uniformly authenticated by AC and local forwarding of user data, so that Wi-Fi devices developed by device manufacturers can meet the requirements of Wi-Fi networking and operation requirements. This project is to focus on the requirements and use case aligned and complementary to TR-321.

Motivation:

Further promote the development of Wi-Fi networking technology. The implementation of this project can realize the networking technology of Wi-Fi users focusing on AC authentication and management and local forwarding of user data. A variety of AC devices can be used for networking, including traditional dedicated AC and NFV based virtual AC (vAC), etc. AC can also be deployed in the cloud. This networking mode can meet the new requirements of operators.

Scope:

Based on the TR-321 architecture 3, the project contents including the following three aspects shall be carried out

1.Define networking scenarios.

1The AC is deployed on the network cloud, and the AP connects to the AC through the Internet by a gateway device.

2The AC is deployed on the edge of the metropolitan area network or on the access network side, and APs access the AC through dedicated lines.

2. Propose user cases and formulate operation processes,

1) User address allocation operation process.

- 2) User association process.
- 3) User online operation process.
- 4) User offline operation process.

3.Put forward equipment technical requirements.

Project Deliverables under Development

See BBF Work in Progress - Projects, Project Streams, and Jira Links

Filter the table at the link above on Work Area = "ATA" and Project Stream = "Access Architecture"

	Completed Project Deliverables				
	Title	Number	Description	Resources	Editors
515 - Security Consider ations for IPv6 Broadban d Networks	Purpose: To provid risks, and network e Scope: Phase 1:	e some ipv6 I then also s equipment in	deployment cons pecify the IPv6 se broadband netwo	iderations to m curity requiremo ork.	itigate Ipv6 ents of
	 Review the current BBF specifications on IPv6 security, including TR-146, TR-177, TR-187, TR-242, TR-296, to help understand the impacts and updates brought by this project. Introduce IPv6 security techniques, such as CGA, SEND, IPsec, BGPsec, RPKI, SAVI & SAVNET etc. Specify IPv6 security requirements for the network elements at broadband network, including RG, access nodes and BNG. Provide deployment considerations for IPv6 security (e.g., SLAAC, DHCPv6, IPv6 Transition/Co-existence, SRv6 energy in the provide deployment of the security is applied on the security of the security (e.g., SLAAC, DHCPv6, IPv6 Transition/Co-existence, SRv6 energy in the security of the security (e.g., SLAAC, DHCPv6, IPv6 Transition/Co-existence, SRv6 energy is the security of the securit				
	Phase 2:				
	 Speci 	fy test plan f	for IPv6 security re	equirements	
	Project D)eliverables	under Developn	nent	
	See BBF Jira Link	Work in Pr s	ogress - Projects	s, Project Strea	ams, and
	Filter the Project S	table at the tream = "Ace	link above on Wor cess Architecture"	k Area = "ATA"	and
	Complete	ed Project I	Deliverables		
	Title	Number	Description	Resources	Editors

2.4. Performance, Experience, and Application Testing (PEAT) Project Stream

Project Stream Page: Performance, Experience, and Application Testing (PEAT) Project Stream

Project Stream Leads: Fabio Giudici

Mission:

The project stream mission is to advance testing in traditional and new areas to ensure quality connectivity leading to quality user experience.

The project stream will focus mainly in two areas:

- 1. Enhanced packet layer performance testing e.g.,bandwidth/capacity, min/average/max latency measurements and jitter, loss, etc and
- 2. Testing that goes beyond traditional packet layer performance to test and analyze the application and service layer quality

Both are needed to provide insight into quality of experience and application outcomes such that the network, while essential, becomes an invisible part of the customer experience.

Business Impact:

Provide the information needed to analyze a network's detailed performance allowing service providers to offer not only higher capacity connectivity services, but also higher quality connectivity services.

This in turn enables and accelerates industry adoption and deployment of new services and infrastructure.

Scope:

Specifically the project stream covers the following areas of connectivity quality testing:

- CE to IP Edge testing extends Broadband Forum's OAM framework with architectural and nodal requirements to enable Customer Equipment to IP Edge service assurance of broadband subscribers, both for business and residential connections.
- IP Layer Capacity Metrics and Measurements harmonizes the Industry around a specific set of Capacity metrics and measurement method with clear benefits of multi-dimensional performance assessment at existing and new Gigabit-rate access speeds.
- Quality Experience Delivered is a method of systems performance analysis that decomposes a round trip time into constituent components enabling the networks performance to be analyzed and traced to sources causing performance degradation (packet loss/delay), be they structural (architecture/design), network dimensioning (link speeds etc.) or network load/scheduling related.
- Broadband Service Metrics Project aims to identify sets or suites of metrics or Key Performance Indicators (KPIs) that impact service delivery.

Project Name and Page Link	Project Overview
Performa nce Measure ment from CE to IP Edge Project	Project Overview This project will extend Broadband Forum's OAM framework with architectural and nodal requirements to enable Customer Equipment to IP Edge service assurance of broadband subscribers, both for business and residential connections. The main business drivers for this work are:

- Define standardized mechanisms for performance measurement (e.g. delay, jitter, loss) between network side of the RG/CPE and access side of the BNG/PE
- Give service providers insight on how their access network is performing
- Ability to use existing but not currently deployed tools

The BBF is in a unique position to give service providers the tools they need in this subject matter, defining a solution that allows measurement and exposure of RG/CPE to BNG/PE network performance and addresses the current gap.

Project Deliverables under Development

See BBF Work in Progress - Projects, Project Streams, and Jira Links

Filter the table at the link above on Work Area = "ATA" and Project Stream = "Performance, Experience, and Application Testing (PEAT)"

Completed Project Deliverables

	Title	Number	Description	Resources	Editor (s)
	Perfor mance Measu remen t from Custo mer Equip ment to IP Edge	TR-390	This specification extends Broadband Forum's OAM framework with architectural and nodal requirements to enable Customer Equipment to IP Edge service assurance of broadband subscribers, both for business and residential connections.		Guiu Fabreg as , Nokia
	Perfor mance Measu remen t from Custo mer Equip ment to IP Edge	TR-390i2	This specification extends Broadband Forum's OAM framework with architectural and nodal requirements to enable Customer Equipment to IP Edge service assurance of broadband subscribers, both for business and residential connections Using STAMP		Gregor y Mirsky Fricsson
	Perfor mance Measu remen t betwe en Custo mer Equip ment and IP Edge	TR-390.2 a1	Quality Attenuation Measurement in Broadband Access Network using STAMP		Gregor y Mirsky, Ericson
Broadban d Quality Experienc e	Project (Overview			

Delivered (Broadba nd QED) Project

This project will deliver documentation that gives a comprehensive overview of Quality Attenuation and its applicability to broadband networks. It will cover the theory, measurement technique, usecases and benefits of the approach.

Project Deliverables under Development

See BBF Work in Progress - Projects, Project Streams, and Jira Links

Filter the table at the link above on Work Area = "ATA" and Project Stream = "Performance, Experience, and Application Testing (PEAT)"

Title	Number	Description	Resources	Editor (s)
Broa dban d Qualit y Exper ience Deliv ered (Broa dban d QED)		Documentati on of broad- ranging study	CONTRIB- 21189 - Getting issue details STATUS	Peter Thomp son , PNSol Bruno Cornag lia, Vodafo ne
Motiv ation for Qualit y Broa dban d (QED & Qualit y Atten uatio n)	MR- 452.1	First MD in the series for MD452, describing the motivation for QED	CONTRIB- 21664 - Getting issue details STATUS	Jonath an Newton , Vodafo ne

Completed Project Deliverables

Text for MR on QED Uses in Lab Evalu ation & Netw ork Design	MR- 452.4	draft Marketing Document on use of Quality Attenuation in NW design & lab evaluation phases	CONTRIB- 22449 - Getting issue details STATUS	Gavin Young , Vodafo ne Pete r Thomp son , PNSol
propo sed text for MD on QED for creati on of applic ation SLA	MR- 452.2	Proposes a draft for an MR in the MR-452.x series to cover the use of DeltaQ in managing customer SLA.	CONTRIB- 22309 - Getting issue details STATUS CONTRIB- 22673 - Getting issue details STATUS CONTRIB- 22674 - Getting issue details STATUS	Jonath an Newton , Vodafo ne
Qualit y Atten uatio n Archit ectur e and Requi reme nts	TR-452.1	First TR for the revised NPIF - in Final Ballot	CONTRIB- 22003 - Getting issue details STATUS CONTRIB- 22012 - Getting issue details STATUS CONTRIB- 22119 - Getting issue details STATUS Outstanding issues	Peter Thomp son , PNSol Rudy Hernan dez , Spirent

Quality Atten uatio n Meas urem ents using Activ e Test Proto cols	t TR-452.2	Second WT for the revised NPIF	CONTRIB- 22056 - Getting issue details STATUS CONTRIB- 22800 - Getting issue details STATUS CONTRIB- 22825 - Getting issue details STATUS	Peter Thomp son , PNSol
Quali y Atten uatio n Meas urem ents Using L2 PM OAM	t TR-452.5	This Technical Report addresses the implementati on of Quality Attenuation (Q) measuremen t using Data Link Layer (L2) Active Test Protocols.		Fabrizi o Guidotti OutSys Fabio Giudici , OutSys

IP-Layer Capacity Metric, Related Metrics, and Measure ment Methods Project

Project Overview

Standardize the IP-Layer Capacity Metric and Measurements with the benefit of BBF membership's unique expertise and perspectives. Ideally, to harmonize the Industry around a specific Capacity metric and method with clear benefits of multi-

dimensional performance assessment at existing and new Gigabitrate access speeds.

Project Deliverables under Development

See BBF Work in Progress - Projects, Project Streams, and Jira Links

Filter the table at the link above on Work Area = "ATA" and Project Stream = "Performance, Experience, and Application Testing (PEAT)"

Completed Project Deliverables

Title	Number	Description	Resources	Editor (s)
Maximum IP-Layer Capacity Metric, Related Metrics, and Measurem ents	TR-471 TR-471i2 TR-471i3		Click Here	Al Morton, AT&T
Maximum IP-Layer Capacity Metric and Measurem ent	MR- 471.1 MR- 471.2		Click Here	Al Morton, AT&T

Broadban d Service Metrics Project	Project C This proje assure a slices acr originatio The scop Performa metrics c and there Project C See BBF Jira Link Filter the Stream = (PEAT)"	Overview ect is to addres platform for se oss the netwo n such as com e is limited to i nce Indicators an each apply is also a com Deliverables u Work in Prog s table at the lin "Performance	es the needs of a ervice delivery, er rk as well as vita puting platforms identifying sets of (KPIs) that impa- to a class of service ander Developm gress - Projects k above on Worl e, Experience, an	an operator to m ncompassing Q Il aspects of ser resources and or suites of metr act service deliv vices or applica ce metrics. nent , Project Strea k Area = "ATA" d Application T	nonitor and toS flows or rvice d sessions. ics or Key ery. Sets of tion flows, ms, and and Project esting	
	Completed Project Deliverables					
	Title	Number	Description	Resources	Editor (s)	