MSF Access Network Architectural Framework For Baseband Access for Analog Lines

MSFR4-ARCH-BASEBAND

MultiService Forum
Architectural Framework

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Abstract:

The MultiService Forum (MSF) is responsible for developing Implementation Agreements or Architectural Frameworks which can be used by developers and network operators to ensure interoperability between components from different vendors. MSF Implementation Agreements are formally ratified via a Straw Ballot and then a Principal Member Ballot.

Draft MSF Implementation Agreements or Architectural Framework may be published before formal ratification via Straw or Principal Member Ballot. In order for this to take place, the MSF Technical Committee must formally agree that a draft Implementation Agreement or Architectural Framework should be progressed through the balloting process. A Draft MSF Implementation Agreement or Architectural Framework is given a document number in the same manner as an Implementation Agreement.

Draft Implementation Agreements may be revised before or during the full balloting process. The revised document is allocated a new major or minor number and is published. The original Draft Implementation Agreement or Architectural Framework remains published until the Technical Committee votes to withdraw it.

After being ratified by a Principal Member Ballot, the Draft Implementation Agreement or Architectural Framework becomes final. Earlier Draft Implementation Agreements or Architectural Frameworks remain published until the Technical Committee votes to withdraw them.

The use of capitalization of the key words “MUST”, “SHALL”, “REQUIRED”, “MUST NOT”, “SHOULD NOT”, “SHOULD”, “RECOMMENDED”, “NOT RECOMMENDED”, “MAY” or “OPTIONAL” is as described in section V-B of the MSF Technical Committee Operating Procedures.

The goal of the MSF is to promote multi-vendor interoperability as part of a drive to accelerate the deployment of next generation networks. To this end the MSF looks to

adopt pragmatic solutions in order to maximize the chances for early deployment in real world networks.

To date the MSF has defined a number of detailed Implementation Agreements and detailed Test Plans for the signaling protocols between network components and is developing additional Implementation Agreements and Test Plans addressing some of the other technical issues such as QoS and Security to assist vendors and operators in deploying interoperable solutions.

The MSF welcomes feedback and comment and would encourage interested parties to get involved in this work program. Information about the MSF and membership options can be found on the MSF website http://www.msforum.org/

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The MultiService Forum (MSF) is a global association of service providers and system suppliers committed to developing and promoting open-architecture, multiservice communication systems. Founded in 1998, the MSF is an open-membership organization comprised of the world's leading telecommunications companies.

The MSF's activities include developing implementation agreements, promoting worldwide compatibility and interoperability, and encouraging input to appropriate national and international standards bodies.

As part of MSF's effort to drive and promote interoperability, the MSF created the Global MSF Interoperability (GMI) event. GMI provides a real-world setting for vendors to test their solutions and offers proof that carriers can purchase their products, confident that they meet the interoperability standards set forth by MSF Implementation Agreements. Each MSF GMI event has been built around a given set of capabilities defined for a given release of the MSF Architecture.

II. An introduction to MSF documentation and GMI 2008

This specification is part of the MSF Release 4 set of architectural, protocol and test documentation.

The MSF Release 4 Architecture is a physical implementation of the functional architectures that have been proposed by the key Standards Development Organizations. As such the MSF Release 4 Architecture represents the current state of the industry and it identifies current open interfaces between physically separate network elements.

MSF Implementation Agreements define the protocols to be used over a given open interface. Where possible MSF Implementation Agreements are based on industry standard protocols but provide additional information so as to ensure interoperability between two network elements. In general this is achieved by closing any gaps in the standards and tightening any optional capabilities defined in the standard to remove the danger of mutually incompatible selections by two vendors. An MSF Implementation Agreement is targeted at a given GMI event but can be used in any circumstance where an operator wishes to deploy the open interface and its functionality within their own network.

The MSF Release 4 architecture and its associated implementation agreements support GMI 2008. GMI 2008 demonstrates multi-vendor, multi-service interoperability based around IMS and includes IPTV and web based services.

As part of GMI 2008 a number of detailed test scenarios have been developed and a number of test plans defined. Test plans contain the set of test cases required to demonstrate a given MSF Release 4 capability and serve to exercise and validate the set of Implementation Agreements required to realize the capability.

Following the completion of GMI 2008 the MSF Release 4 architecture and individual implementation agreements are updated if the testing identified any deficiencies in the document.

For more information about the scope of GMI2008 please go to http://www.msforum.org

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The MSF's activities include developing implementation agreements, promoting worldwide compatibility and interoperability, and encouraging input to appropriate national and international standards bodies.

As part of MSF's effort to drive and promote interoperability, the MSF has created a number of programs geared toward accelerating real world network deployments:

1. Global MSF Interoperability (GMI) events. GMI events provide a real-world setting for vendors to test their solutions and provide evidence that vendor products meet the interoperability standards set forth by MSF Implementation Agreements. Each MSF GMI event is built around a set of capabilities defined for a given release of the MSF Architecture.

2. Next Generation Network (NGN) Test Bed. The NGN test bed provides a facility to enable carriers and vendors to perform in-depth testing of a specific interface as defined in a given release of the MSF architecture.

3. Certification Programs. For more mature technologies the MSF can provide Certification of compliance to a given Implementation Agreement where MSF members believe that it is of value to the industry to do so.

II. An introduction to MSF documentation and GMI 2008

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MSF Implementation Agreements define the protocols to be used over specific open interfaces. Where possible MSF Implementation Agreements are based on industry standard protocols augmented with additional information so as to ensure interoperability between communicating network elements. This level of interoperability is achieved by closing any gaps and tightening any optional capabilities in those industry standards to remove the danger of mutually incompatible selections by vendors. An MSF Implementation Agreement is targeted at a given release of the MSF architecture but can be used in any circumstance where an operator wishes to deploy the open interface and its functionality within their own network.

The MSF Release 4 architecture and its associated implementation agreements are used as the basis for GMI 2008. GMI 2008 is a global test event executed to demonstrate multi-vendor, multi-service interoperability based around IMS and includes IPTV and web based services.

As part of GMI 2008 a number of detailed test scenarios have been developed and a number of test plans defined. Test plans contain the set of test cases required to demonstrate a given MSF Release 4 capability and serve to exercise and validate the set of Implementation Agreements required to realize the capability.

Following the completion of GMI 2008 the MSF Release 4 architecture and individual implementation agreements will be updated if the testing identifies any deficiencies in the documents.

For more information about the scope of GMI2008 please go to http://www.msforum.org

III. Impact on previously published MSF documents

< To contain either >

This is a new specification for MSF release 4 and GMI 2008.

< or >

This specification is for MSF release 4 and GMI 2008. It replaces the following earlier MSF documents

- <document name>
- <document name>

1. Introduction

1.1. Scope

The MSF architecture required for the access domain varies significantly depending on the technology which is being connected. However in order that the objective of a multi-service network can be realised it is necessary that whilst the architecture within the domain will vary, the interfaces towards the MSF Core Architecture Domain must be standardised. Each access architecture supports a different access technology and is referred to as an Access Tile. This document specifies the architecture for the Baseband Access Tile which is used to support baseband access for analog lines.

1.2. Tile Prefix

The Tile Prefix for the Baseband access tile SHALL be “BA”

1.3. References

[1] MSF Release 4 Access Architecture (MSF-ARCH-ACCESS-004.00-FINAL)

[2] DES/TISPAN 2029 v1.2.6, "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IP Multimedia Subsystem (IMS); Functional Architecture". Also known as Draft ETSI ES 282 007 v1.2.6 (2005-12)

1.4. Definitions and Abbreviations

1.4.1. Definitions

Access Network Domain	The part of the MSF overall architecture framework that generically represents an access network, independent of its technology
Access Network Tile	A specification of the architecture for a specific access network technology or a grouping of similar access technologies.
MSF Core Architecture Domain	The functionality contained in the Transport, Session and Common Blocks defines in the MSF Architecture [1]
Customer Domain	The part of the overall MSF architecture framework that represents equipment residing with the customer or end user.

1.4.2. Abbreviations

A-MGF	Access Media Gateway Function
A-RACS	Access Resource Allocation Control Server
AWG	Access Gateway
Cu	Indicates metallic line to customer premises (literally Copper)
DSL	Digital Subscriber Line
IP TV	Internet Protocol Television
IP	Internet Protocol
NGN	Next Generation Network
RTCP	Real time Control Protocol
RTP	Real time Protocol
SPDS	Service Policy Decision Server
xDSL	Any of the available standards for DSL

2. Purpose

This Access Network Tile is used to service an analog phone connected to the baseband of a copper line and allow an H248 capable Call Agent to offer a potentially traditional telephony service within a converged NGN network

3. Architecture Overview

The MSF Release 4 architecture [1] introduced an Access Network Domain into its architectural framework (see Figure 1). The Access Network Domain has a number of standard interfaces defined that are independent of the network access technology. This allows the architectural framework to define the interaction between MSF core architecture domain and access network entities in order to support common capabilities such as extracting location information associated with access network attachment and managing access bandwidth allocation. As access technologies differ from one another, so do the mechanisms internal to that access network domain that support these interfaces. To accommodate this, a generic access network domain is defined with the MSF architectural framework with common interfaces. To facilitate adding different and multiple access networks to the overall architecture, each access network technology or group of similar technologies is defined in its own ‘Access Network Tile’ architecture that can be substituted for the generic access network domain. Each Access Network Tile specifies how it operates internally and supports the common interfaces with the core architecture domain.

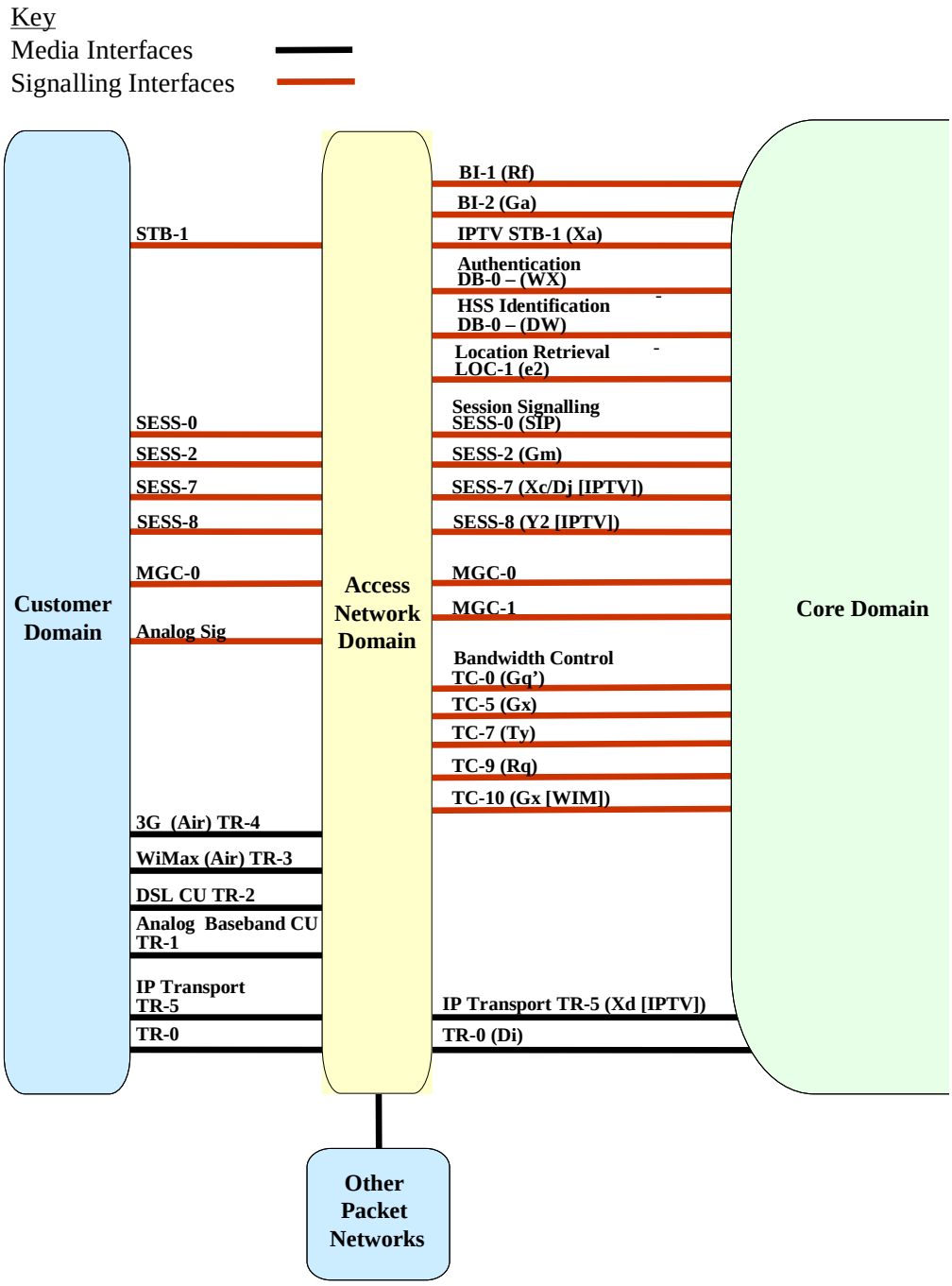

Figure 1: Generic Relationship of an Access Network Tile within MSF Architectural Framework

4. Internal Architecture

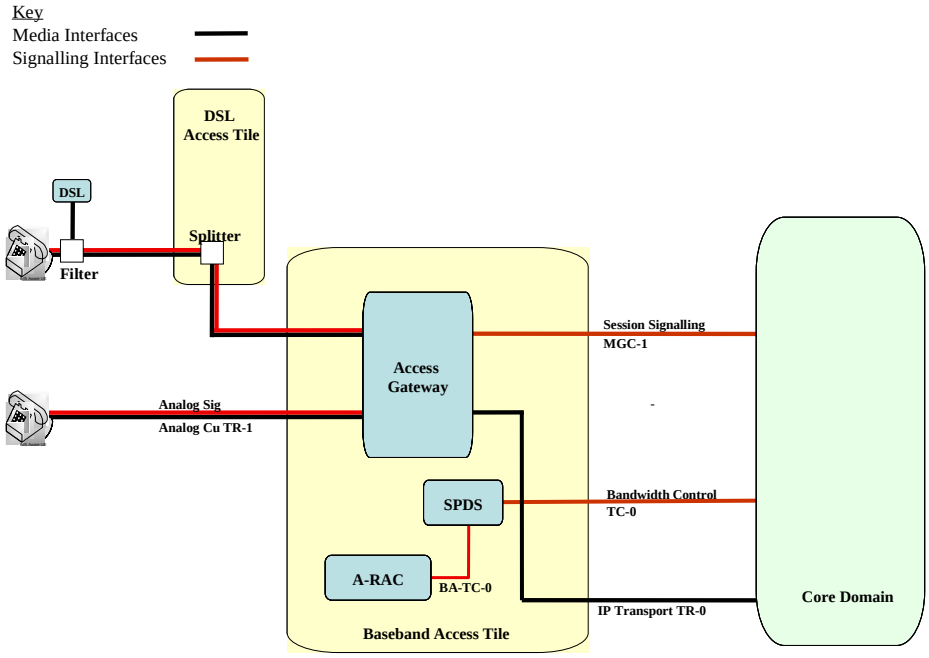

Figure 2: Internal Structure of Access Network Tile

5. Trust

The Baseband access tile SHALL be in the same trust domain as the core network to which it is connected. The signalling capability from the customer equipment is very limited thus restricting the ability of a used to adversely interact with the network. Within these constraints the customer equipment may also be regarded as part of the same trust domain. The IP connectivity within the Baseband Access Tile SHALL use the same address space as the core domain.

6. Element Definitions

6.1. Access Gateway (AGW)

The Access Gateway mediates between the analog phones and the Service Provider's network (acting as an H.248 end point on their behalf). The Access Gateway resides in the Service Provider's premises, and hence is a trusted element for transport. It implements the Access Media Gateway Function (A-MGF) as defined in [2].

6.2. Service Policy Decision Server (SPDS)

The SPDS determines what resource and admission control elements need to be employed for the bandwidth reservation for the set-up of a data flow controlled by the

Access Gateway. These are passed to the Access Resource Allocation Control Server which determines if the requests can be fulfilled over the BA-TC-0 reference point.

6.3. Access Resource Allocation Control Server (A-RACS)

Access Resource Allocation Control Server receives requests for the allocation and de-allocation of bandwidth for connections across the access tile and responds indicating that the allocations have either been made or rejected. The policy against which this decision is taken may depend on the priority of the request as specified in the request. This is set by the session control.
In this scenario the A-RACS does not take part in the establishment of policy on network border elements to allow the session.
The A-RACS MAY receive reports from the underlying infrastructure indicating changes to the status of the service availability of that infrastructure. The A-RACS MAY use these to modify the admission control policy.

7. Principles of operation

The access tile includes the following functionality:

- the termination and control of an analog line served by the baseband of a metallic pair
- the encoding of analogue media into RTP over IP
- where required support for RTCP on the RTP flow
- detecting and forwarding signalling stimuli detected on the analog line as signalling within H248 across the MGC-1 reference towards the core.
- acting upon signalling within the H248 to manipulate the media stream
- acting upon signalling within the H248 to provide stimulus signalling on the metallic pair
- where required overload control
- provide A-RACS functionality so that the availability of bandwidth for media transport within the Access Tile to carry a session can be determined by the Session Control within the core prior to the session being established.

The copper loop connected to the Baseband Access Tile may extend directly to the telephone or if the customer also has a DSL service to a splitter within the xDSL access tile where the DSL service is separated off for processing within the xDSL access tile.

8. External Reference points

Since the customer equipment is assumed to be static, data on the location of the customer equipment can be provisioned within the MSF Core Architecture Domain. This Access Network Tile does not therefore support the location retrieval and the LOC-1 reference point is not required.

Since the customer equipment is static and part of the trust domain Authentication via the DB-0 reference points is not required.

Since this access tile does not support IP connectivity to the customer is cannot support an IP TV service. STB-1, SESS-7, SESS-8 and TR-5 are therefore not required.

The Baseband Access tile supports IP transport (TR-0) towards the Core and Baseband Analog Metallic Path transport (TR-1) towards the Customer. There may either be a direct metallic path (or emulation of such a path) directly to the Customer, or where the customer also has a DSL service over the same metallic pair, it may be routed via a splitter within the xDSL Access Tile.

Interface Designation	ETSI Equivalent	Description	Based Standard	MSF IA
Transport Interfaces				
TR-0	N/A	IP Interconnect to/from the core	N/A	N/A
TR-1	N/A	Analog media stream to & from the Analog terminal device	N/A	N/A
Session Signalling				
MGC-1	P1	Media Gateway Control Protocol	H248	MSF-IA-MEGACO.010-FINAL
Analog Signalling	N/A	Signalling towards and from the analog terminal device.	Country Specific	N/A
Bandwidth management				
TC-0	Gq’	MSF Core to SPDS	DIAMETER	MSF-IA-DIAMETER.004-FINAL

9. Internal Reference points

Interface Designation	ETSI Equivalent	Description	Based Standard	MSF IA
Bandwidth management				
BA-TC-0	Rq	SPDS to A-RACS	Diameter	MSF-IA.DIAMETER.005-FINAL

--- End of Document ---