



MSF Release I Implementation Guidelines

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Abstract

The *MSF Release 1 Implementation Guidelines* will assist Service Providers and their suppliers evolve their networks toward an MSF compliant Multiservice Switched Network.

Introduction

The Multiservice Switching Forum's mission has two principle aspects.

- 1) *To accelerate the deployment of open communications systems that realize economic benefits, resulting in the flexible support of a full range of network services using multiple infrastructure technologies.*
- 2) *To focus on the development of architectures and industry agreements that enable interoperability and innovation in a rapidly evolving environment.*

Much of the MSF 's work is directed towards developing Implementation Agreements (IAs) that further this mission and simplify the process of architecting and integrating more modular, multivendor systems. A key aspect of this approach is to leverage the work of other industry bodies, which have also developed standards, and protocols that support this goal.

The MSF recognizes that a fully standardized multiservice switch based network is not an immediate reality, but is the result of an evolutionary process. Through evolution, technical understanding grows and businesses and networks can be built. There are significant economic benefits to the industry by enabling pragmatic evolutionary steps.

This document provides the first set (Release 1) of guidelines that service providers and their suppliers can use to enable evolution of networks toward a multivendor, multiservice switched network as documented by the MSF. The MSF expects to release revised sets of guidelines as the industry matures and Implementation Agreements (IAs) become deployable.

Evolutionary Stages

Multiservice networks provide the industry with an option for sharing transmission and switching between multiple services in a flexible manner. There are capital and operational cost benefits that can be achieved through this approach.

A significant value proposition of these networks is the inherent ability to add additional services at marginal cost. This value proposition is strengthened if the network is architected to enable modules to be provided by different vendors. The network integration costs of using multiple vendors are reduced by using open protocols and interfaces and through the development of standardized profiles that guarantee interoperability.

Some implementations of multiservice switched networks have evolved and will continue to evolve through many stages. The stages that have been seen in this evolution may be categorized as:

Proprietary Protocols – The network is built using proprietary protocols, but achieves the benefits of shared switching and transmission resources.

Multivendor Protocols – The network uses open protocols that are published either by a standards body or an industry forum. This allows multiple vendors to be integrated into the network to further extend its capabilities. This integration typically requires the parties to agree on the precise options of each protocol.

Standardized Protocols – The network uses open protocols with well-defined profiles. This allows other vendors to be integrated into the network in a systematic fashion with minimum network integration cost and complexity.

The MSF encourages this evolution and supports the latter two phases of this evolution in the MSF Implementations Guidelines with the goal of accelerating the full availability of standard protocols.

High Level Guidelines

The *MSF Release 1 Implementation Guidelines* are consistent with the architecture documented in the *MSF Architecture Release 1 Implementation Agreement*. There are three high level guidelines that the MSF recommends:

Support for Multiple Network Services

The MSF architecture is intended for the support of a rich set of services including Telephony, IP/Internet Services, Frame Relay and ATM services. Support for Release 1 Architecture would allow this full set of services to be supported on the network.

Support for Physical Separation

The MSF Architecture documents recommended physical separations of a Multiservice Switching System. This separation allows the physical and logical separation of many components including:

- Switches
- Media Gateways
- Media Gateway Controllers

Support for Release 1 Architecture would allow these components to be physically and logically separated.

Support for Multivendor Protocols

The MSF recommends the use of multivendor protocols that are documented by standards bodies and industry fora. This provides greater network flexibility and will improve the industry opportunities for service providers and vendors.

Support for Release 1 Architecture requires that multivendor protocols be used for bearer, control and network management. Where feasible, standardized protocols and MSF Implementation Agreements are recommended.

The following sections recommend multivendor protocols for the support of *MSF Release 1 Architecture*.

Claiming Support for MSF Release 1 Architecture

As specified in the previous text, it is the objective the MSF to provide tools which will enable the industry to evolve to a multiservice, interoperable, network architecture based on open, standards-based interfaces and protocols. As accountability for claiming support for MSF principles is the responsibility of the company making the claim, it is the desire of the MSF to provide guidelines that companies can use to validate their claims independently. The following checklist has been developed to serve that purpose. It should be noted that this checklist is the first step in the evolution toward the MSF vision. As such, some requirements will be relatively general at this time due to the maturity of particular standards and technology. Where specific protocols are used, the list is not meant to be mutually exclusive and only serve to provide examples of the types of protocols being considered. Future releases of this document will refine the checklist and provide additional constraints that will ensure broader interoperability and utilization of standards.

The following definitions are utilized in the below requirements:

MUST - The requirement is firm to claim support for *MSF Release 1 Architecture*.

MAY – The statement notes an implementation option that is acceptable for claiming support for *MSF Release 1 Architecture*.

SHOULD – The statement is recommended for implementations, but is not a requirement to claim support for *MSF Release 1 Architecture*.

1.0 Generic Requirements: All requirements in this section **MUST** be met for any device that would claim support for *MSF Release 1 Architecture*.

Req. 1.1: **MUST** support the functional requirements of MSF Architecture Release 1 (MSF-ARCH-001.00-FINAL IA)

Req. 1.2: **MUST** allow the physical separation of components providing the ability for equipment to act as one or more of the following: Media Gateway, Media Gateway Controller, Signaling Gateway, Feature Server and Media Servers, Core Switch and/or Core Router, SIP Proxy. Detailed requirements for claiming support for each device are provided respectively in the following sections.

Req. 1.3: **MUST** utilize proven multivendor protocols for interoperability between components. Detailed multivendor protocol examples are listed in the component specific sections. All of the following criteria **MUST** be met to be considered a “proven multivendor protocol”.

- Req. 1.3.1: Protocol **MUST** be documented and available to general industry
- Req. 1.3.2: Protocol **MUST** be published by an open membership standards body or industry forum
- Req. 1.3.3: Interoperability of independently developed implementations between 2 or more legally unique vendors **MUST** be demonstrated. Acceptable demonstrations include industry interoperability events,

Service Provider labs, and/or Supplier labs. Results of the event(s) MUST be published by an open membership standards body or industry forum

Req. 1.4: Component MUST support management access via proven multivendor mechanisms (e.g. SNMP, CORBA, XML, TL1) in a secure manner

2.0 Media Gateways: For a Media Gateway to claim support for the *MSF Release 1 Architecture*, all requirements in this section MUST be met. Media Gateway implementations MAY include either Access Gateways or Trunking Gateways.

- Req. 2.1: The Media Gateway MUST support at least two types of bearer services (e.g. TDM, ATM, IP, FR, MPLS)
- Req. 2.2: The Media Gateway MUST provide interworking of the bearer services supported on the platform
- Req. 2.3: The Media Gateway MUST utilize a proven multivendor control protocol and be able to interoperate with an independent Media Gateway Controller (e.g. h.248/Megaco, MGCP).
- Req. 2.3.1: If the Media Gateway utilizes a multivendor control protocol other than h.248/megaco, it MUST have an upgrade path to h.248/megaco that requires software changes only.
- Req. 2.4: The Media Gateway MUST be able to capture and transport adaptation signaling to the Media Gateway Controller (e.g. tones, facility associated user signaling)
- Req. 2.5: The Media Gateway MUST utilize proven multivendor transport protocols and be able to interoperate with an independent Media Gateway Controller (e.g. SCTP, TCP, UDP).
- Req. 2.5.1: If the Media Gateway utilizes multivendor transport protocols other than SCTP for the transmission of protocols available over SCTP (e.g. IUA), it SHOULD then have an upgrade path to SCTP that requires software changes only.
- Req. 2.6: The Media Gateway MUST be able to interoperate with an independent core switch/router.
- Req. 2.7: If the Media Gateway utilizes signaling to set up bearers it MUST utilize a proven multivendor bearer signaling protocol (e.g. UNI 4.0, PNNI signaling, LDP, RSVP-TE, CR-LDP)
- Req. 2.8: If the Media Gateway utilizes a routing protocol it MUST use a proven multivendor routing protocol (e.g. PNNI routing, OSPF, IS-IS)

3.0 Media Gateway Controllers: For a Media Gateway Controller to claim support for the *MSF Release 1 Architecture*, all requirements in this section MUST be met.

- Req. 3.1: The Media Gateway Controller MUST utilize proven multivendor control protocols and be able to interoperate with an independent Media Gateway (e.g. h.248/megaco, MGCP).

- Req. 3.1.1: If the Media Gateway Controller utilizes a multivendor control protocol other than h.248/megaco, it must then have an upgrade path to h.248/megaco that requires software changes only
- Req. 3.2: The Media Gateway Controller MUST utilize proven multivendor inter-controller protocols (e.g. SIP, SIP-t, BICC)
- Req. 3.3: The Media Gateway Controller MUST be able to interoperate with an independent Media Gateway Controller over proven multivendor transport protocols (e.g. UDP, MTP3, SCTP)
- Req. 3.4: Signaling Gateway functionality MAY be physically coupled with the Media Gateway Controller or provided externally over proven multivendor signaling transport protocols (e.g. SCTP, TCP, UDP and IUA, M2UA).
- Req. 3.4.1: If the Media Gateway Controller utilizes multivendor transport protocols other than SCTP for the transmission of protocols available over SCTP (e.g. M3UA, M2UA, IUA, SUA), it SHOULD then have an upgrade path to SCTP that requires software changes only.
- Req. 3.5: The Media Gateway Controller MUST utilize proven multivendor service protocols to interoperate with the Application Plane components such as SCPs and Feature Servers. Example protocols would include AIN and CS-x, and could include SIP as it matures.
- Req. 3.6: The Media Gateway Controller MAY include enhanced service logic.
- Req. 3.6.1: If the Media Gateway Controller includes enhanced service logic, then it MUST have an upgrade path to support off board services and interworking with off-board services. This upgrade path SHOULD be able to support multiple feature servers and interworking between them.
- Req. 3.7: The Media Gateway Controller MAY utilize proven multivendor service API's (e.g. Parlay, JAIN).

4.0 Signaling Gateway: Explicit separation of the Signaling Gateway from the Media Gateway Controller is not required to support *MSF Release 1 Architecture*. The following guidelines SHOULD be considered in the implementation of stand alone Signaling Gateways.

- Req. 4.1: If the Signaling Gateway is physically separated from the Media Gateway Controller and utilizes a multivendor transport protocol other than SCTP for the transmission of protocols available over SCTP (e.g. M3UA, M2UA, IUA, SUA), it SHOULD then have an upgrade path to SCTP that requires software changes only.

5.0 Feature Servers: Explicit support for IP Feature Servers and Media Servers are not required for support for *MSF Release 1 Architecture*.

- Req. 5.1: The Feature Server MAY utilize proven multivendor service API's (e.g. Parlay, JAIN).

6.0 Core Switches and Routers: For a Core Switch or Router to claim support for *MSF Release 1 Architecture*, all requirements in this section MUST be met.

Req. 6.1: The Core Switch or Router MUST utilize a proven multivendor bearer signaling protocol and be able to interoperate with a vendor independent Media Gateway and Core Switch/Router (e.g. UNI 4.0, PNNI signaling, LDP, RSVP-TE, CR-LDP)

Req. 6.2: The Core Switch or Router MUST utilize a proven multivendor routing protocol and be able to interoperate and a vendor independent Media Gateway and Core Switch/Router (e.g. PNNI routing, OSPF, IS-IS, BGP-4)

7.0 SIP Proxy: A SIP proxy function is currently under review for the initial implementation stages of the MSF architecture but are not required for support for *MSF Release 1 Architecture*.

Req. 7.1 A SIP proxy MAY be used when communicating between two different controllers.

Req. 7.1.1 If a SIP proxy is used between two different controllers, it MUST be able to handle SIP-t and not modify or alter the content when received or sent.

Req. 7.2 A SIP proxy MAY be used when communicating between a native client and a controller based origination or termination

Conclusion

The MSF expects this document to be the first of a series of releases, which provides implementation guidelines to service providers and suppliers. The intent of the document is to assist in the evolution of networks and equipment towards a goal of simpler network integration and operations and the delivery of more powerful services.

Companies can contribute to future releases of these Implementation Guidelines as well as other Implementation Agreements through membership of the Multiservice Switching Forum. The MSF may be contacted at info@msforum.org.