ATIS-1000098

Session Initiation Protocol (SIP) Resource-Priority Header (RPH) and Priority Header Signing in Support of Emergency Calling

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ATIS-1000098, Session Initiation Protocol (SIP) Resource-Priority Header (RPH) and Priority Header Signing in Support of Emergency Calling

Is an ATIS & SIP Forum Joint Standard developed by the **ATIS/SIP Forum IP-NNI Task Force** under the **ATIS Packet Technologies and Systems Committee (PTSC)** and the **Technical Working Group (TWG)** under the **SIP Forum**.

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ATIS-1000098

ATIS Standard on

Session Initiation Protocol (SIP) Resource-Priority Header (RPH) and Priority Header Signing in Support of Emergency Calling

Alliance for Telecommunications Industry Solutions

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Abstract

This standard defines how the IETF Personal Assertion Token (PASSporT) Extension for Resource-Priority Authorization [IETF RFC 8443, *PASSporT Extension for Resource-Priority Authorization*], with the extensions defined in RFC 9027, *Assertion Values for Resource Priority Header and SIP Priority Header Claims in Support of Emergency Services Networks*, and the associated STIR mechanisms, are used to sign the Session Initiation Protocol (SIP) Resource-Priority Header (RPH) field and convey assertions of Resource-Priority associated with an emergency call or callback call. This standard also addresses the signing of the SIP Priority header field associated with callback calls. Specifically, this standard describes a procedure for providing cryptographic authentication and verification of the information in the SIP RPH field and SIP Priority header field in Internet Protocol (IP)-based service provider communication networks in support of emergency calling.

Foreword

The Alliance for Telecommunications Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The Packet Technologies and Systems Committee (PTSC) develops and recommends standards and technical reports related to services, architectures, and signaling, in addition to related subjects under consideration in other North American and international standards bodies. PTSC coordinates and develops standards and technical reports relevant to telecommunications networks in the U.S., reviews and prepares contributions on such matters for submission to U.S. International Telecommunication Union Telecommunication Sector (ITU-T) and U.S. ITU Radiocommunication Sector (ITU-R) Study Groups or other standards organizations, and reviews for acceptability or per contra the positions of other countries in related standards development and takes or recommends appropriate actions.

The SIP Forum is an IP communications industry association that engages in numerous activities that promote and advance SIP-based technology, such as the development of industry recommendations, the SIPit, SIPconnect-IT, and RTCWeb-it interoperability testing events, special workshops, educational seminars, and general promotion of SIP in the industry. The SIP Forum is also the producer of the annual SIP Network Operators Conference (SIPNOC), focused on the technical requirements of the service provider community. One of the Forum's notable technical activities is the development of the SIPconnect Technical Recommendation – a standards-based SIP trunking recommendation for direct IP peering and interoperability between IP Private Branch Exchanges (PBXs) and SIP-based service provider networks. Other important Forum initiatives include work in Video Relay Service (VRS) interoperability, security, Network-to-Network Interoperability (NNI), and SIP and IPv6.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, PTSC, 1200 G Street NW, Suite 500, Washington, DC 20005, and/or to the SIP Forum, 733 Turnpike Street, Suite 192, North Andover, MA, 01845.

The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages. The word *may* denotes an optional capability that could augment the standard. The standard is fully functional without the incorporation of this optional capability.

The **ATIS/SIP Forum IP-NNI Task Force** under the **ATIS Packet Technologies and Systems Committee (PTSC)** and the **SIP Forum Technical Working Group (TWG)** was responsible for the development of this document.

Table of Contents

Table of Figures

ATIS Standard on –

Session Initiation Protocol (SIP) Resource-Priority Header (RPH) and Priority Header Signing in Support of Emergency Calling

1 Scope & Purpose

1.1 Scope

As specified in IETF RFC 4412, *Communications Resource Priority for the Session Initiation Protocol (SIP)*, the Session Initiation Protocol (SIP) Resource-Priority Header (RPH) field may be used by SIP user agents, including Public Switched Telephone Network (PSTN) gateways and terminals, and SIP proxy servers to influence prioritization afforded to communication sessions, including PSTN calls. As discussed in 3GPP TS 24.229, *Technical Specification Group Services and System Aspects; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3*, where the network has a requirement to prioritize emergency calls, it can use the "esnet" namespace in the Resource-Priority Header field (as defined in IETF RFC 7135, *Registering a SIP Resource Priority Header Field Namespace for Local Emergency Communications*, to do so. Where the Resource-Priority Header field is used for this purpose, it is inserted by the entity identifying the emergency call, i.e., the Proxy Call Session Control Function (P-CSCF) or the Interconnection Border Control Function (IBCF). There is no usage of this namespace from the User Agent (UA), and when this namespace is used, the trust domain implementation removes it if set by the UA.

After an emergency call is received by a Public Safety Answering Point (PSAP), it is sometimes necessary for the call taker to call the emergency caller back (e.g., if the caller disconnects prematurely). IETF RFC 7090, *Public Safety Answering Point (PSAP) Callback*, describes the use of the SIP Priority header field, with the value "psap-callback" to mark such calls to allow special network handling of the call, such as bypassing services that might preclude the call from completing. There is no protection against misuse of the SIP Priority field, and because, as IETF RFC 7090 [Ref 10] illustrates, the SIP Priority header field may affect routing, it is desirable to protect it from modification.

Like caller identity information associated with emergency calls and callback calls, the SIP RPH and Priority header fields could also be spoofed by unauthorized entities, impacting Public Safety communications and emergency response. Next Generation 9-1-1 (NG9-1-1) Emergency Services Networks receiving SIP RPHs across Internet Protocol Network-to-Network Interfaces (IP NNIs) from Internet Protocol (IP) originating networks cannot easily determine whether the SIP RPH was populated by an authorized Originating Service Provider or by an unauthorized entity. Likewise, the home network of an emergency caller cannot determine whether the SIP Priority header associated with a callback call was populated by an authorized party and can be trusted.

This ATIS standard leverages the Signature-based Handling of Asserted information using toKENs (SHAKEN) model specified in ATIS-1000074-E, *Errata on ATIS Standard on Signature-based Handling of Asserted information using toKENs (SHAKEN)*, to cryptographically sign and verify the SIP RPH and Priority header fields associated with emergency calls and callback calls using the Personal Assertion Token (PASSporT) extension defined in IETF RFC 8443 [Ref 16] with the assertion values described in RFC 9027 [Ref 7] and the associated Secure Telephone Identity (STI) protocols described in 3GPP TS 24.229 [Ref 2]. Note that application of SIP RPH signing to emergency calls and SIP RPH and Priority header signing to callback calls is in addition to the caller identity authentication and verification defined in ATIS-1000074-E [Ref 5].

This ATIS standard is intended to provide a framework and guidance on how to use the PASSporT extension defined in IETF RFC 8443 [Ref 16], with the RPH assertion values and SIP Priority header claim specified in RFC 9027 [Ref 07] and the associated STI protocols to cryptographically sign and verify the SIP RPH and Priority header values associated with emergency calls or callback calls that cross IP NNI boundaries.

The scope of this ATIS standard is limited to the cryptographic signing and verifying of SIP RPH and Priority header field contents associated with emergency and callback calls (i.e., RPH values in the "esnet" namespace and a