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ATIS-1000074.v003

**Signature-based Handling of Asserted
information using toKENs (SHAKEN)**

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ATIS-1000074.v003, Signature-based Handling of Asserted information using toKENS (SHAKEN)

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Signature-based Handling of Asserted information using toKENs (SHAKEN)

Alliance for Telecommunications Industry Solutions

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Abstract

Signature-based Handling of Asserted information using toKENs (SHAKEN) is an industry framework for managing the deployment of Secure Telephone Identity (STI) technologies with the purpose of providing end-to-end cryptographic authentication and verification of the Telephone Identity and other information in an Internet Protocol (IP)-based service provider voice network. This specification defines the framework for telephone service providers to create signatures in Session Initiation Protocol (SIP) and validate initiators of signatures. It defines the various classes of signers and how the verification of a signature can be used towards the mitigation and identification of illegitimate use of national telecommunications infrastructure.

Foreword

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between providers, 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.

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ATIS Standard on –

Signature-based Handling of Asserted information using toKENS (SHAKEN)

1 Scope & Purpose

1.1 Scope

This document is intended to provide telephone service providers with a framework and guidance on how to utilize Secure Telephone Identity (STI) technologies for the validation of legitimate calls and the mitigation of illegitimate spoofing of telephone identities on IP-based service provider voice networks (also to be referred to as Voice over Internet Protocol [VoIP] networks). The primary focus of this document is on the format of STI claims, the mapping of these claims to the Session Initiation Protocol (SIP) [IETF RFC 3261, *SIP: Session Initiation Protocol*], and the authentication and verification functions.

1.2 Purpose

Using the protocols defined in IETF RFC 8224, *Authenticated Identity Management in the Session Initiation Protocol*, and IETF RFC 8225, *Personal Assertion Token*, this document defines the Signature-based Handling of Asserted information using toKENS (SHAKEN) framework. This framework is targeted at telephone service providers delivering phone calls over VoIP, and addresses the implementation and usage of the Internet Engineering Task Force (IETF) Secure Telephone Identity Revisited (STIR) Working Group protocols and the architecture and use of STI-related X.509-based certificates [IETF RFC 5280, *Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile*]. It also discusses the general architecture of service provider authentication and verification services. Finally, it provides high-level guidance on the use of positive or negative verification of the signature to mitigate illegitimate use of Caller ID spoofing in general.

Illegitimate Caller ID spoofing continues to be a concern for North American telephone service providers and their customers. There are many Caller ID spoofing mechanisms, and illegitimate spoofing can evolve to evade mitigation techniques. Service provider solutions must therefore be flexible to respond to evolving threats in much the same way as cybersecurity solutions do. In addition, the integration of new technologies into established VoIP networks imposes many interoperability and interworking challenges. As a result, this document is a baseline standard on the implementation of the protocol-related requirements for STI. The objective is to provide a baseline that can evolve over time, incorporating more comprehensive functionality and a broader scope in a backwards-compatible and forward-looking manner.

2 References

The following standards contain provisions which, through reference in this text, constitute provisions of this ATIS Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

2.1 Normative References

[Ref 1] IETF RFC 3261, *SIP: Session Initiation Protocol*.¹

¹ Available from the Internet Engineering Task Force (IETF) at: < <https://www.ietf.org/> >.