



ATIS-0300116

ATIS Standard on -

**Interoperability Standards between Next Generation
Networks (NGN) for Signature-Based Handling of Asserted
information Using Tokens (SHAKEN)**



As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's most pressing business priorities. ATIS' nearly 200 member companies are currently working to address the All-IP transition, 5G, network functions virtualization, big data analytics, cloud services, device solutions, emergency services, M2M, cyber security, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle — from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

ATIS is accredited by the American National Standards Institute (ANSI). The organization is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP), a founding Partner of the oneM2M global initiative, a member of and major U.S. contributor to the International Telecommunication Union (ITU), as well as a member of the Inter-American Telecommunication Commission (CITEL). For more information, visit www.atis.org.

Notice of Disclaimer & Limitation of Liability

The information provided in this document is directed solely to professionals who have the appropriate degree of experience to understand and interpret its contents in accordance with generally accepted engineering or other professional standards and applicable regulations. No recommendation as to products or vendors is made or should be implied.

NO REPRESENTATION OR WARRANTY IS MADE THAT THE INFORMATION IS TECHNICALLY ACCURATE OR SUFFICIENT OR CONFORMS TO ANY STATUTE, GOVERNMENTAL RULE OR REGULATION, AND FURTHER, NO REPRESENTATION OR WARRANTY IS MADE OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. ATIS SHALL NOT BE LIABLE, BEYOND THE AMOUNT OF ANY SUM RECEIVED IN PAYMENT BY ATIS FOR THIS DOCUMENT, AND IN NO EVENT SHALL ATIS BE LIABLE FOR LOST PROFITS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. ATIS EXPRESSLY ADVISES THAT ANY AND ALL USE OF OR RELIANCE UPON THE INFORMATION PROVIDED IN THIS DOCUMENT IS AT THE RISK OF THE USER.

NOTE - The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to whether use of an invention covered by patent rights will be required, and if any such use is required no position is taken regarding the validity of this claim or any patent rights in connection therewith. Please refer to [<http://www.atis.org/legal/patentinfo.asp>] to determine if any statement has been filed by a patent holder indicating a willingness to grant a license either without compensation or on reasonable and non-discriminatory terms and conditions to applicants desiring to obtain a license.

Published by

Alliance for Telecommunications Industry Solutions
1200 G Street, NW, Suite 500
Washington, DC 20005

Copyright © 2017 by Alliance for Telecommunications Industry Solutions
All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher. For information contact ATIS at 202.628.6380. ATIS is online at < <http://www.atis.org> >.

Interoperability Standards between Next Generation Networks (NGN) for Signature-Based Handling of Asserted information Using Tokens (SHAKEN)

Alliance for Telecommunications Industry Solutions

Approved December 5, 2016

Abstract

This document is intended to provide Next Generation Network (NGN) telephone service providers (SPs) with a framework and guidance for interoperability as calls process through their networks implementing Signature-Based Handling of Asserted Information Using Tokens (SHAKEN) technologies to ensure the validation as well as the completion of legitimate calls and the mitigation of illegitimate spoofing of telephone identities.

Foreword

The Alliance for Telecommunications Industry Solutions (ATIS) serves the public through improved understanding between carriers, customers, and manufacturers. The Next Generation Interconnection Interoperability Forum (NGIIF) addresses next generation network interconnection and interoperability topics associated with emerging technologies. Specifically, it develops operational procedures that involve the network aspects of architecture, disaster preparedness, installation, maintenance, management, reliability, routing, security, and testing between network operators. In addition, the NGIIF addresses issues that impact the interconnection of existing and next generation networks and facilitate the transition to emerging technologies.

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.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, NGIIF, 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, NGIIF, which was responsible for its development, had the following leadership:

Amy Hindman, Co-Chair (Verizon Wireless)

Mary Retka, Co-Chair (CenturyLink)

Table of Contents

1	Scope and Purpose	1
1.1	Scope	1
1.2	Purpose	1
2	Normative References	1
3	Definitions, Acronyms, and Abbreviations	2
3.1	Definitions	2
3.2	Acronyms & Abbreviations	2
4	Overview	3
4.1	Operationalization Assumptions	4
4.2	STIR/SHAKEN Overview (from ATIS-1000074)	5
4.2.1	<i>STIR Overview</i>	5
4.2.2	<i>Persona Assertion Token (PASSporT) Token</i>	5
4.2.3	<i>RFC 4474bis</i>	5
4.3	SHAKEN Architecture	5
4.4	SHAKEN Call Flow	7
4.5	4474bis Verification Procedures	8
4.5.1	<i>PASSporT and Identity Header Verification</i>	8
4.5.2	<i>Verification Error Conditions</i>	8
5	Certificates	9
5.1	Certificate Assertion in Calls Processed Across Multiple Networks	9
5.2	Attestation Indicator (“attest”)	10
5.3	PASSporT and Identity Header Verification	10
5.4	Call Completion Reporting Related to Certification	11
6	Operational Considerations	12
6.1	Exception Processing	12
6.2	Error Handling	13
6.2.1	<i>403 – Stale Date</i>	13
6.2.2	<i>428 – Use Identity Header</i>	13
6.2.3	<i>436 – Bad-Identity-Info</i>	13
6.2.4	<i>437 – Unsupported Credential</i>	13
6.2.5	<i>438 – Invalid Identity Header</i>	14

Table of Figures

Figure 4.1	– SHAKEN Reference Architecture	6
Figure 4.2	– SHAKEN Reference Call Flow	7

ATIS Standard on –

Interoperability Standards between Next Generation Networks (NGN) for Signature-Based Handling of Asserted Information Using Tokens (SHAKEN)

1 Scope and Purpose

1.1 Scope

This document is intended to provide Next Generation Network (NGN) telephone service providers (SPs) with a framework and guidance for interoperability as calls process through their networks implementing Signature-Based Handling of Asserted Information Using Tokens (SHAKEN) technologies to ensure the validation as well as the completion of legitimate calls and the mitigation of illegitimate spoofing of telephone identities.

1.2 Purpose

This document will define the operationalization, between NGN telephone SPs, for the handling of signature-based and asserted information using the tokens (i.e., SHAKEN) framework.

2 Normative References

The following standards contain provisions that, through reference in this text, constitute provisions of this 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.

ATIS-1000074, *Signature-based Handling of Asserted information using Tokens (SHAKEN) framework document*.¹

Report and Order (R&O) and Further Notice of Proposed Rulemaking (FNPRM) in FCC 13-135 and WC Docket No.13-39, adopted October 28, 2013 and released November 8, 2013.²

Rules and Regulations Implementing the Telephone Consumer Protection Act of 1991, CG Docket No. 02-278, WC Docket No. 07-135, *Declaratory Ruling and Order*, FCC 15-72, (released July 10, 2015).³

ATIS-0300106, *Intercarrier Call Completion/Call Termination Handbook*.⁴

draft-ietf-stir-rtc4474bis-09, *Authenticated Identity Management in the Session Initiation Protocol (SIP)*. This document is an active draft and subject to change.⁵

draft-ietf-stir-passport, *Persona Assertion Token*. This document is an active draft and subject to change.⁶

¹ This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < <https://www.atis.org/docstore/product.aspx?id=28297> >.

² This document is available from the Federal Communications Commission (FCC) at: < <https://www.fcc.gov/> >.

³ This document is available from the Federal Communications Commission (FCC) at < <https://www.fcc.gov/> >.

⁴ This document is available from the Alliance for Telecommunications Industry Solutions (ATIS) at < <https://www.atis.org/docstore/product.aspx?id=26780> >.

⁵ This document is available from the Internet Engineering Task Force (IETF) at: < <https://datatracker.ietf.org/doc/draft-ietf-stir-rtc4474bis/> >.