



ATIS STANDARD

ATIS-1000045.2012(S2022)

**ATIS Identity Management:
Mechanisms and Procedures Standard**

AMERICAN NATIONAL STANDARD FOR TELECOMMUNICATIONS



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 the International Telecommunication Union (ITU), as well as a member of the Inter-American Telecommunication Commission (CITEL). For more information, visit www.atis.org.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made towards their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretary or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

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.

ATIS-1000045.2012(S2022), ATIS Identity Management: Mechanisms and Procedures Standard

Is an American National Standard developed by the ATIS **Packet Technologies and Systems Committee (PTSC)**.

Published by

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

Copyright © 2022 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> >.

ATIS-1000045.2012(S2022)

American National Standard for Telecommunications for

**ATIS Identity Management: Mechanisms and
Procedures Standard**

Alliance for Telecommunications Industry Solutions

Approved August 20, 2012

American National Standards Institute, Inc.

Abstract

This standard describes the specific IdM mechanisms and suites of options that should be used to meet the requirements defined in the ATIS IdM Requirements and Use Cases Standard.

Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

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. ITU-T and U.S. 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.

ANSI guidelines specify two categories of requirements: mandatory and recommendation. 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.

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.

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

- M. Dolly, PTSC Chair (AT&T)
- V. Shaikh, PTSC Vice-Chair (Applied Communication Sciences)
- M. Dolly, PTSC SAC Chair (AT&T)
- W. Downum, Technical Editor (Ericsson)
- C. Underkoffler, ATIS Chief Editor

The Signaling, Architecture, and Control (SAC) Subcommittee was responsible for the development of this document.

Table of Contents

1	SCOPE	1
2	NORMATIVE REFERENCES	1
2.1	ATIS REFERENCES	1
2.2	IU-T REFERENCES.....	2
3	DEFINITIONS	2
4	ABBREVIATIONS	2
5	CONVENTIONS	3
6	MECHANISMS & PROCEDURES SUPPORTING IDM FUNCTIONS	4
6.1	LIFECYCLE MANAGEMENT.....	4
6.2	AUTHENTICATION & AUTHORIZATION ASSURANCE.....	4
6.2.1	<i>Authentication Based on WS Security SAML Profile</i>	4
6.2.2	<i>Certificate-based Authentication</i>	8
6.2.3	<i>Password-based Authentication</i>	8
6.2.4	<i>One-time Password</i>	9
6.2.5	<i>Use of Authentication & Key Agreement (AKA) for Mutual Authentication</i>	9
6.2.6	<i>The PKI-based Authentication That Leverages IMS Service User Profile Functional Entity (SUP-FE)</i>	9
6.2.7	<i>Integration of the PKI-based Authentication & the SAML Assertion Mechanisms</i>	14
6.2.8	<i>Integration of OpenID-based Authentication with the AKA Authentication</i>	18
6.2.9	<i>GBA</i>	22
6.3	CORRELATION & BINDING	24
6.4	DISCOVERY.....	24
6.4.1	<i>Intra-network Discovery</i>	25
6.4.2	<i>Inter-network Discovery</i>	25
6.5	IDM COMMUNICATIONS & INFORMATION EXCHANGE	25
6.5.1	<i>Security of IdM Communications & Exchange</i>	25
6.6	PROTECTION OF PERSONALLY-IDENTIFIABLE INFORMATION (PII)	29
6.7	FEDERATED IDENTITY FUNCTIONS	30
6.7.1	<i>Bridging & Interworking</i>	30
6.7.2	<i>Discovery of IdSPs in Federated Environment</i>	30
6.8	IDENTITY INFORMATION ACCESS CONTROL	30
6.8.1	<i>SAML-based Mechanism for Attribute Sharing</i>	30
6.8.2	<i>X.509-based Privilege Management Infrastructure</i>	30
6.9	SINGLE SIGN-ON (SSO)	31
6.9.1	<i>GBA-based Mechanism</i>	31
6.9.2	<i>SAML-based Mechanism</i>	31
6.9.3	<i>OpenID-based Mechanism</i>	31
6.10	SINGLE SIGN-OFF.....	31
6.10.1	<i>The User Signs Off from One of the Sessions & Indicates That She or He Wishes to Logout of All Sessions That Have Been Initiated by IdSP</i>	32
6.10.2	<i>The User Indicates Directly to IdSP That She or He Wishes to Logout of All Sessions</i>	34
7	SECURITY	35
A	WSS X.509 V3 MESSAGE AUTHENTICATION	36
B	“OPENID+OAUTH”-BASED MECHANISM FOR ACCESS CONTROL	39
B.1	OAUTH [B-IETF RFC 5849].....	39
B.2	USING OPENID IN CONJUNCTION WITH OAUTH	39
B.3	OPENID + OAUTH AUTHORIZATION FLOW.....	39
C	BIBLIOGRAPHY	42

Table of Figures

FIGURE 1 - TYPICAL STEPS OF CONSTRUCTION AND PROCESSING OF A SOAP MESSAGE WITH A SAML TOKEN	5
FIGURE 2 - STRUCTURE OF THE SOAP MESSAGE WITH SAML ASSERTION	6

ATIS-1000045.2012(S2022)

FIGURE 3 - THE STRUCTURE OF THE SAML ASSERTION USED FOR THE HOLDER-OF-KEY SUBJECT CONFIRMATION METHOD 7

FIGURE 4 - THE STRUCTURE OF THE SAML ASSERTION USED FOR THE SENDER-VOUCHES SUBJECT CONFIRMATION METHOD 8

FIGURE 5 - LEVERAGING THE IMS AUTHENTICATION MECHANISM AND PKI-BASED AUTHENTICATION 11

FIGURE 6 - LEVERAGING THE IMS AUTHENTICATION MECHANISM AND PKI-BASED AUTHENTICATION 12

FIGURE 7 - THE BASIC STEPS OF DATA EXCHANGE FOR THE PKI-BASED AUTHENTICATION WITH SAML-ASSERTION..... 16

FIGURE 8 - INTEGRATION OF THE AKA AUTHENTICATION MECHANISM WITH OPENID..... 20

FIGURE 9 - SAMPLE NETWORK MODEL FOR BOOTSTRAPPING..... 23

FIGURE 10 - CORRELATION OF IDENTITY INFORMATION 24

FIGURE 11 - SAML-BASED SINGLE SIGN-OFF REQUESTED BY A USER AT A PARTICIPATING SESSION 33

FIGURE 12 - SAML-BASED SINGLE SIGN-OFF REQUESTED BY A USER AT IDSP 34

Table of Tables

TABLE 1 - COMPARISON OF OPTION 1 AND OPTION 2 FOR THE KEY AGREEMENT BETWEEN THE END-USER FUNCTION AND S-5 ON THE CK AND IK KEYS 13

American National Standard on –

ATIS Identity Management Mechanisms and Procedures Standard

1 Scope

[ATIS 1000044] *NGN Identity Management Requirements and Use Cases*, specifies identity management (IdM) requirements for the Next Generation Network (NGN). This standard describes the specific IdM mechanisms and suites of options that should be used to meet the requirements specified in [ATIS 1000044]. In addition, it provides best practices and guidelines to support interoperability and other needs.

This standard is intended to be used together with [ATIS-1000035], [ATIS-1000044], [ITU-T Y.2720], and [ITU-T Y.2721] as the fundamental architectural concepts, requirements and use cases are not repeated in this standard.

2 Normative References

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

2.1 ATIS References¹

[ATIS-33102] ATIS.3GPP.33.102V710-2007, *3G; Security Architecture*.

[ATIS-1000010] ATIS-1000010.2006 (R2011), *Support of Emergency Telecommunications Service in IP Networks*.

[ATIS-1000018] ATIS-1000018, *NGN Architecture*.

[ATIS-1000029] ATIS-1000029.2008, *Security Requirements for NGN*.

[ATIS-1000030] ATIS-1000030.2008, *Authentication and Authorization Requirements for Next Generation Network (NGN)*.

[ATIS-1000034] ATIS-1000034.2010, *Next Generation Network (NGN): Security Mechanisms and Procedures*.

[ATIS-1000035] ATIS-1000035.2009, *Next Generation Network (NGN) Identity Management (IdM) Framework*.

[ATIS-1000044] ATIS-1000044.2011, *ATIS Identity Management: Requirements and Use Cases Standard*.

[ATIS-1000046] ATIS-1000046, *Data Border Functions and Requirements*.

¹ This document is available from the Alliance for Telecommunications Industry Solutions (ATIS), 1200 G Street N.W., Suite 500, Washington, DC 20005. < <https://www.atis.org/docstore/default.aspx> >