ATIS-1000659.1996(R2011)

Mobility Management Application Protocol (MMAP) RCF – RACF Operations

AMERICAN NATIONAL STANDARD FOR TELECOMMUNICATIONS

ATIS is the leading technical planning and standards development organization committed to the rapid development of global, market-driven standards for the information, entertainment and communications industry. More than 250 companies actively formulate standards in ATIS' 18 Committees, covering issues including: IPTV, Service Oriented Networks, Energy Efficiency, IP-Based and Wireless Technologies, Quality of Service, and Billing and Operational Support. In addition, numerous Incubators, Focus and Exploratory Groups address emerging industry priorities including "Green", IP Downloadable Security, Next Generation Carrier Interconnect, IPv6 and Convergence.

ATIS is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP), a member and major U.S. contributor to the International Telecommunication Union (ITU) Radio and Telecommunications' Sectors, and a member of the Inter-American Telecommunication Commission (CITEL). For more information please vis
< http://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 secretariat 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 FEES RECEIVED IN PAYMENT BY ATIS FOR THIS DOCUMENT, WITH RESPECT TO ANY CLAIM, AND IN NO EVENT SHALL ATIS BE LIABLE FOR LOST PROFITS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. ATIS EXPRESSLY ADVISES ANY AND ALL USE OF OR RELIANCE UPON THIS 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.

ATIS-1000659.1996(R2011), *Mobility Management Application Protocol (MMAP) RCF-RACF Operations*

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

ANSI®
T1.659-1996 (R2011)

American National Standard
for Telecommunications –

Mobility Management Application Protocol(MMAP) RCF-RACF Operations

Secretariat

Alliance for Telecommunications Industry Solutions

Approved December 9, 1996

American National Standards Institute, Inc.

Abstract

This standard provides an application layer protocol for the exchange of information between peer applications running in a radio system and other network elements (e.g., mobility management platforms, switching systems, and other radio systems). The basic provisions of the protocol provide the semantics and syntax for operations necessary to support the mobility aspects of telecommunication services and call control in a wireless environment.

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 toward 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 secretariat 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.

Published by

American National Standards Institute
11 West 42nd Street, New York, New York 10036

Printed in the United States of America

insert code here

Contents

Page

Figures

Tables

Annexes

Foreword (This foreword is not part of American National Standard T1.659-1996.)

Subcommittee T1S1 began addressing PCS requirements in ad-hoc committees in 1993. In response to the industry's desire to have a standard solution for support of PCS mobility, T1S1 established the Mobility Management Application Protocol subworking group in 1994 with a charter to create a stage 3 protocol for supporting the mobility management requirements of the radio systems defined by T1P1 and TIA over the T1P1 “C” and “D” interface and the TIA “A” interface.

The focus of this document is the RCF-RACF functional interface. A companion document focusing on the RACF-SCF interface is *American National Standard for Telecommunications – Mobility Management Application Protocol (MMAP),* ANSI T1.651-1996.

This standard has five annexes. All are informative and are not considered part of this standard; that is, these annexes do not include requirements for the specifications, but provide information about the specifications.

Suggestions for improvement of this standard will be welcome. They should be sent to the T1 Secretariat, c/o Alliance for Telecommunications Industry Solutions, 1200 G Street, NW, Suite 500, Washington, DC 20005.

This standard was processed and approved for submittal to ANSI by Accredited Standards Committee on Telecommunications, T1. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the T1 Committee had the following members:

Gerald H. Peterson, Chairman
E. R. Hapeman, Vice-Chairman
Alvin Lai, Secretary

Robin Rossow, Senior Editor
Prakash Panjwani, Technical Editor

Organization Represented	*Name of Representative*
EXCHANGE CARRIERS	
Ameritech Services, Inc.	Laurence A. Young
	Richard Wood (Alt.)
AT&T Wireless Services, Inc.	David Holmes
	Leo Nikkari (Alt.)
Bell Atlantic	John W. Seazholtz
	Roger Nucho (Alt.)
Bellcore	James C. Staats
	Cliff Halevi (Alt.)
BellSouth Telecommunications, Inc.	William J. McNamara, III
	Malcolm Threlkeld, Jr. (Alt.)
Cincinnati Bell Telephone	Randy Daugherty
GTE Telephone Operations	Bernard J. Harris
	Richard L. Cochran (Alt.)
NYNEX	James F. Baskin
	Michael Brusca (Alt.)
Pacific Bell	Sal R. Tesoro
Puerto Rico Telephone Company	Joaquin Rivera
	Alberto E. Morales (Alt.)
SBC Communications, Inc.	C. C. Bailey
	Joseph Mendoza (Alt.)
Sprint – Local Telecommunications Division	Robert P. McCabe
	Harold L. Fuller (Alt.)

Organization Represented	*Name of Representative*
US Telephone Association (USTA)	Dennis Byrne
	Paul Hart (Alt.)
US WEST	James L. Eitel
	Darryl Debault (Alt.)
INTEREXCHANGE CARRIERS	
AT&T Communications	Charles A. Dvorak
	Dennis K. Thovson (Alt.)
Comsat Corporation	Mark T. Neibert
	Prakash Chitre (Alt.)
General Communication, Inc.	Derek L. Welton
	C. R. Baugh (Alt.)
MCI Telecommunications Corporation	Laszlo Szerenyi
	J. Martin Carroll (Alt.)
Sprint – Long Distance Division	Thomas G. Croda
	Peter J. May (Alt.)
Stentor Resource Centre, Inc.	B. Sambasivan
	Al M. Yam (Alt.)
Unitel Communications, Inc.	David H. Whyte
	George Tadros (Alt.)
Worldcom.	Robert Bentley
	Howard Meiseles (Alt.)
MANUFACTURERS	
ADC Telecommunications, Inc.	Ron Weitnauer
	Don Berryman (Alt.)
Alcatel Network Systems (ANS)	Jack Boychuk
	Dale Krisher (Alt.)
AMP, Inc.	George Lawrence
	Jack Bradbery (Alt.)
Apple Computer, Inc.	Jerry Kellenbenz
	David Michael (Alt.)
Ascom Enterprise Networks	L. H. Eberl
	Richard Koepper (Alt.)
DSC Communications Corporation	Peter Waal
	Allen Adams (Alt.)
ECI Telecom, Inc.	Ron Murphy
	Danny Etz-Hadar (Alt.)
Ericsson, Inc.	Linda Troy
	Al Way (Alt.)
Fujitsu America, Inc.	Kenneth T. Coit
	Hirohiko Yamamoto (Alt.)
General DataComm, Inc.	Frederick Lucas
Harris Corporation	Allen Jackson
	Yogi Mistery (Alt.)
Hekimian Laboratories	William H. Duncan
Hewlett-Packard	Don C. Loughry
	Richard van Gelder (Alt.)
Hughes Network Systems	Leonard Golding
	Enrique Laborde (Alt.)
IBM Corporation	William C. Bergman
	Rao J. Cherukuri (Alt.)
Lucent Technologies	John H. Bobsin
	Dave R. Andersen (Alt.)
Motorola, Inc.	Ken Skurnack
	Dan Grossman (Alt.)
NEC America, Inc.	Donovan Nak
	Takayuki Yoshida (Alt.)
Nokia Telecommunications, Inc.	Chris Wallace
	Teuvo Jarvela (Alt.)
Northern Telecom, Inc.	Mel N. Woinsky
	John Pugh (Alt.)
Oki America, Inc.	Henri Suyderhoud
	Hisao Fujikawa (Alt.)
Omnipoint Corporation	Gary K. Jones
Picturetel Corporation	Marshall Schachtman
	David Lindbergh (Alt.)

Organization Represented	*Name of Representative*
Pirelli TSG	Arun Bellary
	John McDonough (Alt.)
Qualcomm, Inc.	Mark Epstein
	Ed Tiedemann (Alt.)
RelTec Corporation	Mark Scott
	Leroy Baker (Alt.)
Rockwell International	Quent C. Cassen
	Carl J. Stehman (Alt.)
Siemens Stromberg-Carlson	David E. Francisco
	Dennis Edinger (Alt.)
Telecom Solutions	M. J. Narasimha
	Don Chislow (Alt.)
Telecommunications Techniques	Bernard E. Worne
Tellabs Operations, Inc.	R. Michael Schafer
	Michael J. Birck (Alt.)
Transwitch Corporation	Daniel C. Upp
	Praveen Goli (Alt.)
GENERAL INTEREST	
Brooktree Corporation	Douglas M. Brady
	Rick Hall (Alt.)
C.S.I. Telecommunications	Michael S. Newman
	William J. Buckley (Alt.)
Capital Cities/ABC, Inc.	Warner W. Johnston
Defense Information Systems Agency	C. Joseph Pasquariello
	Don Choi (Alt.)
EDS Corporation	Dell Schipper
Gemplus	Neal Goman
	Tom Younger (Alt.)
GTE Mobile Communications	Lynn Carlson
National Communications System	Dennis Bodson
	Marshall Cain (Alt.)
National Telecommunications and Information Administration/Institute for Telecommunication Sciences (NTIA/ITS)	William F. Utlaut
	Neal B. Seitz (Alt.)
Pacific Bell Mobile Services	Mark Younge
	Rick Vanderhaar (Alt.)
Rural Utilities Service	Orren E. Cameron III
	George J. Bagnall (Alt.)

Subcommittee T1S1 on ISDN Services, Architectures, and Signaling, which developed this standard, had the following members:

Wayne Zeuch, Chair
Robin Rossow, Vice-Chair
Marcie Geissinger, Secretary

Organization Represented	*Name of Representative*
Alcatel Network Systems (ANS)	Albert Azzam
	Sadik Okar (Alt.)
Ameritech Services, Inc.	Mike Tisiker
Ascom Enterprise Networks	Doug Hunt
	R. MacDonald (Alt.)
AT&T Communications	Vito P. Jokubaitis
	Doris S. Lebovits (Alt.)
Bell Atlantic	Harry A. Hetz
	Dana Shillingburg (Alt.)
Bellcore	E. R. Hapeman
	Robin Rossow (Alt.)
BellSouth Telecommunications, Inc.	Richard C. McNealy
	Robert V. Epley (Alt.)
Brooktree Corporation	Trey Malpass
	Douglas M. Brady (Alt.)

Organization Represented	*Name of Representative*
C.S.I. Telecommunications	Michael S. Newman
Comsat Corporation	Faris Faris
	Prakash Chitre (Alt.)
Defense Information Systems Agency	Don Choi
	Ralph Liguori (Alt.)
Digital Equipment Corporation	Cuneyt Ozveren
	Bob Simcoe (Alt.)
DSC Communications Corporation	Jeff Copley
	Tom Hess (Alt.)
Ericsson, Inc.	Curtis Libey
	Christine Collie (Alt.)
Fujitsu America, Inc.	Karen McCourt
	Amalendu Chatterjee (Alt.)
General DataComm, Inc.	Mike McLoughlin
GTE Mobile Communications	Dale Baldwin
GTE Telephone Operations	Jay R. Hilton
	D. J. Kostas (Alt.)
Hekimian Laboratories	William H. Duncan
Hewlett-Packard	Richard van Gelder
Hughes Network Systems	Leonard Golding
	Carl Symborski (Alt.)
IBM Corporation	William C. Bergman
	Rao J. Cherukuri (Alt.)
Inet	Michael J. Reiman
	Chris Kirk (Alt.)
Lucent Technologies	Robert B. Waller
	Wayne R. Zeuch (Alt.)
MCI Telecommunications Corporation	Yatendra Pathak
	Jim Joerger (Alt.)
Micom Communications Corporation	Simon Lam
	Chris Cotter (Alt.)
Microsoft Corporation	Mark Jeffrey
Mitel Corporation	John Needham
	Peter M. Chase (Alt.)
Motorola, Inc.	Dan Grossman
	Prakash Panjwani (Alt.)
National Communications System	Nicholas Andre
	Dale Barr (Alt.)
National Security Agency (NSA)	Richard C. Brackney
	Richard Dean (Alt.)
National Telecommunications and Information Administration/Institute for Telecommunication Sciences (NTIA/ITS)	Randall S. Bloomfield
	William F. Utlaut (Alt.)
NEC America, Inc.	Kuei Y. Kou
	Donovan Nak (Alt.)
Nokia Telecommunications, Inc.	Shankar Govindasamy
	Chris Wallace (Alt.)
Northern Telecom, Inc.	Mel N. Woinsky
	Rakesh Gupta (Alt.)
NPB Partners, LP	Sunil Hans
	Jay Gadre (Alt.)
NYNEX	Michael Brusca
	Chris Iliopoulos (Alt.)
Oki America, Inc.	Henri Suyderhoud
	Hisao Fujikawa (Alt.)
Omnipoint Corporation	Gary K. Jones
Pacific Bell	Steve Sposato
	Sal R. Tesoro (Alt.)
Qualcomm, Inc.	Mark Epstein
	Ed Tiedemann (Alt.)
Rockwell International	Dan Greene
	Wayne Harbuziuk (Alt.)
SBC Communications, Inc.	Robert J. Hall
	John E. Roquet (Alt.)
Siemens Stromberg-Carlson	Robert S. Stockdale
	Edward P. Campbell (Alt.)

Organization Represented	*Name of Representative*
Sprint – Long Distance Division	James Lord
Stentor Resource Centre, Inc.	B. Sambasivan
	Frank Norman (Alt.)
Tandem Telecommunications Systems, Inc.	John L. Schantz
	Anantha Ramu (Alt.)
Telecom Solutions	Brad Hurte
	Gary Hamann (Alt.)
Transwitch Corporation	Daniel C. Upp
	Praveen Goli (Alt.)
Unitel Communications, Inc.	George Tadros
	D. L. Milloy (Alt.)
US Telephone Association (USTA)	Larry Drake
US WEST	Darryl Debault
	James L. Eitel (Alt.)
Work Shirt Consulting, Inc.	J. Greg Miller
	Mary Lou Miller (Alt.)
Xerox Corporation	J. Bryan Lyles

Working Group T1S1.1 on ISDN Architectures and Services developed this standard. Over the course of its development, the following individuals participated in the Working Group's discussions and made significant contributions to the standard:

Prakash Panjwani, Working Group Acting Chairman
Ronald D. Ryan, MMAP SWG Chairman
Prakash Panjwani, Editor

Robert Beeson
Murat Bilgic
Ed Campbell
Shankar Govindasamy
Bill Krehl
Khiem Le
Jay Mohanty
Ed Moore
Tim Moran
David Morris
Juhani Murto
Francis O'Brien
Vinod Pandey
Dan Prenatt
Stan Rafacz
Sara Shastri
Tom Towle
Vijay Varma
Paul Zablocky

American National Standard
for Telecommunications –

Mobility Management Application Protocol (MMAP) RCF-RACF Operations

1 Scope, purpose, and application

1.1 Scope

The Mobility Management Application Protocol (MMAP) is a communication protocol between a radio system and other network elements (e.g., mobility management platforms, switching systems, and other radio systems). The scope of the radio systems supported are the wireless Personal Communications Services (PCS) radio systems defined by T1 and TIA. The scope of the information and operations is the support of personal and terminal mobility in a wireless environment and includes functionality such as registration, location updating, authentication, roaming, handover, and billing.

In addition, the scope of the protocol includes the exchange of information and invocation of operations as necessary to support the mobility aspects of telecommunication services (e.g., call waiting) and call control (e.g., call origination, call termination, call clearing) in a wireless environment.

1.2 Purpose

The purpose of MMAP is to provide a mechanism for the exchange of information between radio systems and other network elements to support personal and terminal mobility in a wireless environment. MMAP messages are defined to be independent of the air interface protocol. However, where necessary, air interface specific messages are also included.

1.3 Application

The MMAP is applicable to the interfaces between PCS radio systems and other network elements such as the interfaces defined by the “A” Interface in TIA and the “C” and “D” interface in T1.

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 editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI J-STD-007-1996, *Telecommunications – Air interface specification for 1.8 to 2.0 GHz frequency hopping time division multiple access (TDMA) for personal communication services* [1)]

ANSI J-STD-008-1996, *Telecommunications – Personal station-base station compatibility requirements for 1.8 to 2.0 GHz code division multiple access (CDMA) personal communication systems* [1)]

ANSI J-STD-011-1996, *Telecommunications – PCS IS-136 based air interface compatibility 1900 MHz standard* [1)]

———

[1)] These standards are currently in production. Contact the secretariat for more recent information.