Source:	**SA5 (Telecom Management)**	
Title:	**2 Rel-6 CR 32.101 (Telecommunication management; Principles and high level requirements)**	
Document for:	**Decision**	
Agenda Item:	**7.5.3**	

Doc-1st-	Spec	CR	R	Phas	Subject	Cat	Ver	Doc-2nd-	Workitem
SP-040239	32.101	024	-	Rel-6	Subscription Management Corrections - Align with SA5's 32.140/1	F	5.5.0	S5-042334	OAM-AR
SP-040239	32.101	025	-	Rel-6	Align with SA5 SWGC WT01 Security terminology and architecture	F	5.5.0	S5-042336	OAM-AR

CR-Form-v7

CHANGE REQUEST

⌘ **32.101** CR **024** ⌘ **rev** **-** ⌘ Current version: **5.5.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network **X** Core Network **X**

Title: ⌘	Subscription Management Corrections - Align with SA5's 32.140/1
Source: ⌘	**SA5** (Michael.Truss@motorola.com)
Work item code:⌘	OAM-AR **Date:** ⌘ 14/05/2004
Category: ⌘ **F**	**Release:** ⌘ Rel-6

Use one of the following categories:
  F *(correction)*
  A *(corresponds to a correction in an earlier release)*
  B *(addition of feature),*
  C *(functional modification of feature)*
  D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
  2   *(GSM Phase 2)*
  R96   *(Release 1996)*
  R97   *(Release 1997)*
  R98   *(Release 1998)*
  R99   *(Release 1999)*
  Rel-4   *(Release 4)*
  Rel-5   *(Release 5)*
  Rel-6   *(Release 6)*

Reason for change: ⌘	To correct the Introduction of Subscription Management in TS 32.101
Summary of change:⌘	The Subscription Management Introduction is aligned with TS 32.140, All other Subscription Management detail is deleted and reference is made to TS 32.140 (Subscription Management Requirements) and TS 32.141 (Subscription Management Architecture)
Consequences if not approved: ⌘	The description of Subscription Management would be inaccurate and misleading and not aligned with TS 32.140 and TS 32.141.

Clauses affected: ⌘	2, 7.10 (updated), 7.10.1(removed), 7.10.2(removed)

	Y	N		
Other specs ⌘		X	Other core specifications	⌘
affected:		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘	

Change in Clause 2

2   References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   ITU-T Recommendation M.3010 (2000): "Principles for a telecommunications management network".

[2]   3GPP TS 22.101: "Service aspects; Service Principles".

[3]   3GPP TS 32.111-1: " Telecommunication management; Fault Management; Part 1: 3G fault management requirements".

[4]   IETF RFC 959: "File Transfer Protocol (FTP)"; October 1985, J. Postel, J. Reynolds, ISI. (Status: Standard).

[5]   IETF RFC 783: "Trivial File Transfer Protocol (TFTP)"; rev. 2, June 1981, K.R. Sollins MIT. (Status: Unknown).

[6]   IETF RFC 1157: "Simple Network Management Protocol (SNMP)": May 1990, J. Case, SNMP Research, M. Fedor, Performance Systems International, M. Schoffstall, Performance Systems International, J. Davin, MIT Laboratory for Computer Science. (Status: Standard).

[7]   IETF RFC 2401: "Security Architecture for the Internet Protocol"; November 1998. (Status: Proposed Standard).

[8]   The Object Management Group (OMG) "The Common Object Request Broker: Architecture and Specification", Revision 2.3, June 1999.
           http://www.omg.org/technology/documents/vault.htm#CORBA_IIOP

[9]   ITU-T Recommendation Q.811 (1997): "Lower Layer Protocol Profiles for the Q3 Interface and X interfaces".

[10]   ITU-T Recommendation Q.812 (1997): "Upper Layer Protocol Profiles for the Q3 Interface and X interfaces".

[11]   ITU-T Recommendation X.650 (1996): "Information Technology - Open Systems Interconnection – Basic Reference Model: Naming and Addressing".

[12]   ITU-T Recommendation X.700 (1992): "Management Framework for Open Systems Interconnection (OSI) for CCITT applications".

[13]   ISO 8571-1 (1988): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 1: General Introduction".

[14]   ISO 8571-2 (1988): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 2: Virtual Filestore Definition".

[15]   ISO 8571-3 (1988): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 3: File Service Definition".

[16]   ISO 8571-4 (1988): "Information Processing Systems - Open Systems Interconnection - File Transfer, Access and Management - Part 4: File Protocol Specification".

[17]   ISO/IEC ISP 10607-1 (1995): "Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 1: Specification of ACSE, Presentation and Session Protocols for the use by FTAM".

[18]   ISO/IEC ISP 10607-2 (1995): "Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 2: Definition of Document Types, Constraint sets and Syntaxes".

[19]   ISO/IEC ISP 10607-3 (1995): "Information technology - International Standardized Profiles AFTnn - File Transfer, Access and Management - Part 3: AFT 11 - Simple File Transfer Service (Unstructured)".

[20]   ITU-T Recommendation X.710 (1997): "Information Technology – Open Systems Interconnection - Common Management Information Service".

[21]   ITU-T Recommendation X.711 (1997): "Managed objects for diagnostic information of public switched telephone network connected V-series modem DCE's".

[22]   ITU-T Recommendation X.25 (1996): "Interface between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) for Terminals operating in the Packet Mode and connected to Public Data Networks by Dedicated Circuit".

[23]   ISO/IEC ISP 11183-1 (1992): "Information technology - International Standardized Profiles AOM1n.OSI Management - Management Communications - Part 1: Specification of ACSE, presentation and session protocols for the use by ROSE and CMISE".

[24]   ISO/IEC 9545:1994: "Information technology - Open Systems Interconnection - Application Layer Structure".

[25]   ITU-T Recommendation X.200 (1994): "Information Technology - Open Systems Interconnection - Basic Reference Model: The Basic Model".

[26]   ITU-T Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".

[27]   ITU-T Recommendation X.209 (1988): "Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)".

[28]   ITU-T Recommendation X.210 (1993): "Information Technology - Open Systems Interconnection - Basic Reference Model: Conventions for the definition of OSI Services".

[29]   ITU-T Recommendation X.211 (1995): "Information Technology - Open Systems Interconnection - Physical Service Definition".

[30]   ITU-T Recommendation X.212 (1995): "Information Technology - Open Systems Interconnection - Data link Service Definition".

[31]   ITU-T Recommendation X.213 (1995): "Information Technology - Open Systems Interconnection - Network Service Definition".

[32]   ITU-T Recommendation X.223 (1993): "Use of X.25 to provide the OSI Connection-mode network service for ITU-T applications".

[33]   ITU-T Recommendation X.214 (1995): "Information Technology - Open Systems Interconnection - Transport Service Definition".

[34]   ITU-T Recommendation X.224 (1995): "Information Technology - Open Systems Interconnection - Protocol for providing the connection-mode transport service".

[35]   ITU-T Recommendation X.215 (1995): "Information Technology - Open Systems Interconnection - Session Service Definition".

[36]   ITU-T Recommendation X.225 (1995): "Information Technology - Open Systems Interconnection - Connection-oriented session protocol: Protocol specification".

[37]   ITU-T Recommendation X.216 (1994): "Information Technology - Open Systems Interconnection - Presentation Service Definition".

[38]   ITU-T Recommendation X.226 (1994): "Information Technology - Open Systems Interconnection - Connection-oriented presentation protocol: Protocol specification".

[39]   ITU-T Recommendation X.217 (1995): "Information Technology - Open Systems Interconnection - Service definition for the association control service element".

[40]   ITU-T Recommendation X.227 (1995): "Information Technology - Open Systems Interconnection - Connection-oriented protocol for the association control service element: Protocol specification".

[41]   ITU-T Recommendation X.219 (1988): "Remote Operations: Model, Notation and Service Definition".

[42]   ITU-T Recommendation X.229 (1988): "Remote Operations: Protocol Specification".

[43]   ISO/IEC 7776 (1995): "Information technology - Telecommunications and information exchange between systems - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures".

[44]   ISO/IEC 8208 (2000): "Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment".

[45]   ISO/IEC 8878 (1992): "Information technology - Telecommunications and information exchange between systems - Use of X.25 to provide the OSI Connection-mode Network Service".

[46]   IETF RFC 1006: "ISO Transport on top of the TCP", Marshall T. Rose, Dwight E. Cass, Northrop Research and Technology Center, May 1987. Status: Standard.

[47]   IETF RFC 793: "Transmission Control Protocol (TCP)", September 1981. Status: Standard.

[48]   IETF RFC 791: "Internet Protocol (IP)", September 1981. Status: Standard.

[49]   ITU-T Recommendation X.680 (2002): "Information Technology-Abstract Syntax Notation One (ASN.1): Specification of Basic Notation".

[50]   3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[51]   3GPP TS 22.115: "Service aspects; Charging and Billing".

[52]   The Object Management Group (OMG) "The Common Object Request Broker: Architecture and Specification", Revision 2.1, August 1997.
         http://www.omg.org/technology/documents/vault.htm#CORBA_IIOP

[53]   3GPP TS 32.400-series: "Telecommunication management; Performance Management (PM); Concept and requirements".

[54]   3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[55]   3GPP TS 32.200: "Telecommunication management; Charging management; Charging principles".

[56]   3GPP TR 22.121: Service aspects; The Virtual Home Environment; Stage 1".

[57]   3GPP TS 32.140 : "Telecommunication management; Subscription Management (SuM) requirements".

[58]   3GPP TS 32.141 : "Telecommunication management; Subscription Management (SuM) Architecture".

[59 -to 99]   Void

[100]   TMF GB910: "Telecom Operations Map"; Approved Version 2.1 March 2000, (may be downloaded from http://www.tmforum.org.).

[101]   3GPP TS 32.102: "3G Telecom Management Architecture".

[102]   ITU-T Recommendation M.3013 (2000): "Considerations for a telecommunications management network".

[103]   Void.

[104]   3GPP TR 21.801: "Specification Drafting Rules".

[105]   TMF GB910B: "Telecom Operations Map Application Note-Mobile Services: Performance Management and Mobile Network Fraud and Roaming Agreement Management"; Public Evaluation Version 1.1, September 2000. (May be downloaded free from http://www.tmforum.org.)

End of Change in Clause 2

Change in Clause 7.10

7.10   Subscription Management

Subscription Management (SuM) is a feature that permits Service Providers, Value Added Service Providers and Mobile Operators to provision services for a specific subscriber. The feature is necessary to allow Service Providers and Operators to provision, control, monitor and bill the configuration of services that they offer to their subscribers. SuM focuses on the OAM processes to manage subscription information. These correspond to the 'Fulfillment' Process areas of the TeleManagement Forum Telecom Operations Map [100].

SuM is an area of service operation management that sets a complex challenge for Service Providers and Operators in their support of new or existing subscribers during their every day network operation.

In 2G solutions the main repository of the subscription information is in the Home Locations Register (HLR). However the management and administration interfaces for controlling this information is proprietary to each vendor. The use of proprietary interfaces is inconvenient for those Operators using multiple vendors' equipment since their provisioning systems have to accommodate multiple proprietary interfaces, which perform essentially identical functions. Moreover, it makes it more difficult to generate customer self care applications that allow subscribers to provision, and amend subscription data.

The 3G environment requires more complex service delivery mechanisms than in 2G and SuM is no longer simply an internal matter for a single operator but a capability that is achieved by linking together features across multiple Service Providers and Operators Operations Support Systems (OSS). Historically, the services provided by Operators have been defined within standards groups such as ETSI or 3GPP. With the advent of Open Services Access (OSA) being adopted by 3GPP the User Service Definitions will be replaced by Service Capabilities traded amongst Service Providers and Network Operators. This will allow Operators and Service Providers to define customized service environments that roam with users as they move amongst networks - this is the Virtual Home Environment (VHE) 3GPP TR 22.121 [56]. This customized service environment means that subscription information is held in a number of locations including the Home Network, the Visited Network, the User Equipment, Application VASP Equipment (e.g. servers accessed by the subscriber for content and information based services) and the Operations Systems of the Service Providers, and Operators supporting the subscriber's service subscription.

Service delivery and support across multiple vendors' solutions and organizations is a feature of other industries, and the solutions adopted are secure supply chain solutions based upon mainstream e-commerce principles, methods and technologies.

There is a relationship between this feature and the PS Domain, CS Domain, IP Multimedia Subsystem (IMS), Authentication Center (AuC), Open Services Access (OSA) and Generic User Profile (GUP) documented in other 3GPP specifications.

The conceptual model for SuM is illustrated in figure 1.
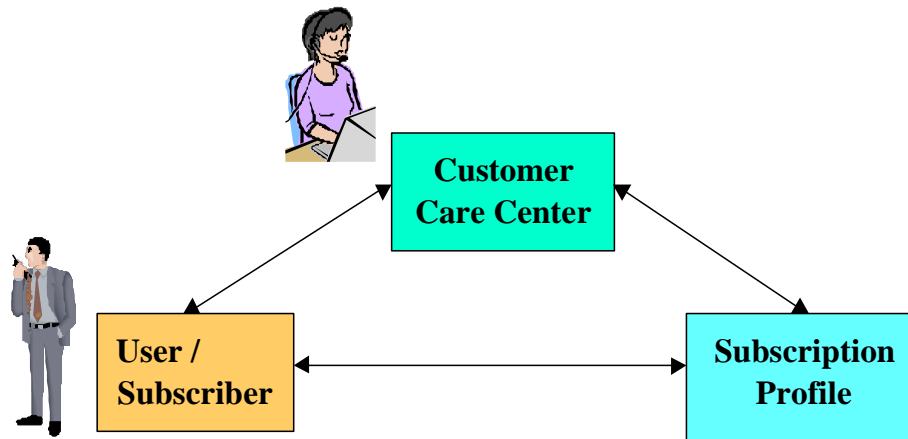
Figure 1: High level view of Subscription Management (SuM)

SuM is concerned with provisioning the subscription profile throughout all the systems and trading partners needed to realize the customer service, SuM provides specifications that define the interfaces and the procedures that interconnect the three points of the SuM triangle: Customer Care Center, the User and the network (s) where the Subscription profile resides (such as HSS, USIM, etc.).

The SuM requirements are described in more detail in TS 32.140 [57] , The SUM Architecture is described in TS 32.141[58]

Subscription Management is a feature that permits operators to provision services for a specific customer subscription. Subscription Management is related to the "Customer Care Processes" and "Service Development and Operations Processes" described above. Subscription Management is an area of Service Operation Management that sets a complex challenge for operators in their support of new or existing customers during their every day network operation.

In 2G solutions the main repository of the subscription information is in the Home Locations Register (HLR). However, the management and administration interfaces that were implemented for controlling this information were proprietary to each vendor.

In 2.5G networks the HLR has been extend to form the Home Subscriber Server (HSS), which also holds information about the customer's data subscription. Again the management and administration implemented for these interfaces were proprietary.

The use of proprietary interfaces is inconvenient for those operators using multiple vendors' equipment since their provisioning systems have to accommodate multiple proprietary interfaces, which perform essentially identical functions. Moreover, it makes it more difficult to generate customer self care applications that allow customer to the provisioning, and amendment of subscription data.

The 3G environment requires more complex service delivery mechanisms than in 2G and subscription management is no longer simply an internal matter for a single operator but a capability that is achieved by linking together features across multiple operators' Operations Support Systems. The parallel trend in 2G toward Virtual Network Operators is accentuating this need.

Service delivery and support across multiple vendors' solutions and organisations is a feature of other industries, and the solutions are adopted are supply chain solutions based upon mainstream e-commerce principles, methods and technologies.

7.10.1   Business Requirements

The justification for the feature "Subscription Management" is defined as follows: the network operator/service provider delivers to its subscribers various forms of services through its network operations. The delivery of such services requires a sophisticated network control that dynamically adjust the manner and the extent of the delivery based on many parameters and variables pertinent to both network and the subscriber such as, e.g., the subscriber's static subscription limitation, the subscriber's service time request, the network's temporal resource availability, etc., etc. It is clear that the subscriber's static subscription profile data is one of the most crucial factors that determine the network's service control mechanism.

Although the network's service delivery mechanism of today's network is very much automated, it still requires the operator's OA&M involvement. One can envision in this picture two different levels of operator's operational involvement, which both fall in the scope of service operations management:

- Operator's management of the network service control mechanism;

- Operator's management of the subscriber's service profile.

Subscription Management is targeted to address the needs of the Service Provider. By providing well thought out standardized management procedures for subscription management, the cost of network deployment and operation will be enormously reduced because of the streamlined customer care activities.

As illustrated in figure 10, the core part of the work will consist of the specifications that will define the interfaces and the procedures that interconnect the three points of the subscription management triangle: network operation center (usually realized as Customer Care Center), the Customers and the network wherever the subscription profile resides (such as HLR/HSS, USIM, etc.).
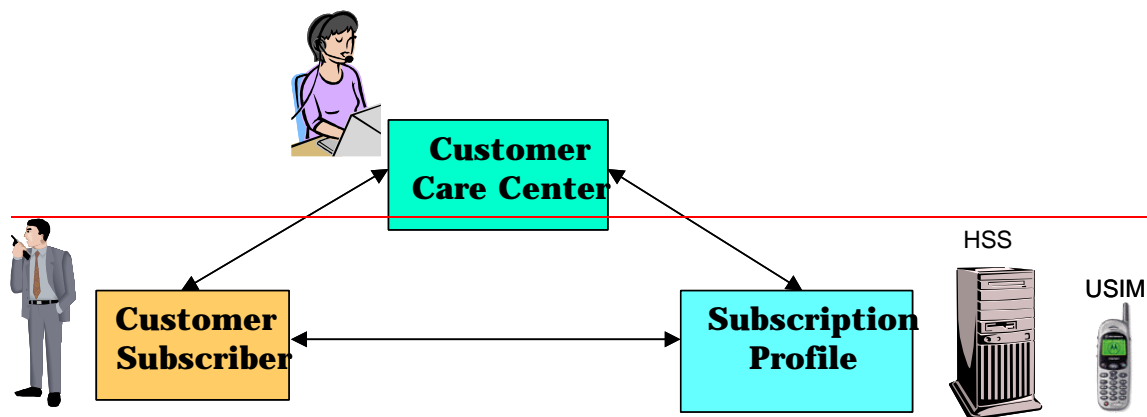
Figure 10: The Subscription Management Triangle

How the static data once provisioned into the subscription profile through the subscription management is used to determine the service control mechanism is a matter to be considered in the service control mechanism level, and it lies beyond the scope of subscription management. In this framework, any derivative forms of the subscription profile produced afterward in the network in order to facilitate the service control mechanism are considered as components defined for the service control mechanism setting and they are not visible in the subscription management realm.

7.10.2 High-level Architecture Overview

This subclause identifies the high level Architecture and Interfaces involved in the subscription management feature.
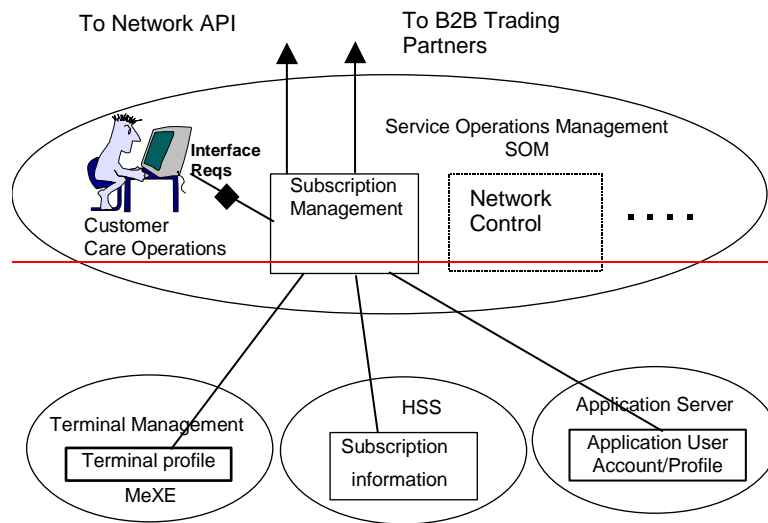
Figure 11: High Level Management Architecture

End of Change in Clause 7.10

Annex E (informative):
Change history

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
Dec 1999	S_06	SP-99577	--	--	Approved at TSG SA #6 and placed under Change Control	--	3.0.0
Mar 2000	S_07	SP-000014	001	--	Clarify use of X.25 as a Network Layer Protocol	3.0.0	3.1.0
Mar 2000	S_07	SP-000014	002	--	Correction of IRP-related terminology	3.0.0	3.1.0
Mar 2000	S_07	SP-000014	003	--	Clarification of Software Management	3.0.0	3.1.0
Mar 2000	--	--	--	--	Cosmetic	3.1.0	3.1.1
Jun 2000	S_08	SP-000225	004	--	Add and Update Correct Normative Reference List	3.1.1	3.2.0
Jun 2000	S_08	SP-000226	005	--	Terminology corrections	3.1.1	3.2.0
Dec 2000	S_10	SP-000522	006	--	Update references to allow both CORBA Versions 2.1 and 2.3	3.2.0	3.3.0
Mar 2001	S_11	SP-010022	007	--	Removal of Reference to 32.105 (not available for R99).	3.3.0	3.4.0
Mar 2001	S_11	--	--	--	Automatic upgrade to Rel-4	3.3.0	4.0.0
Apr 2001	--	--	--	--	Created Rel-4 from the latest R99 version (3.4.0 instead of 3.3.0)	3.4.0	4.0.1
Jun 2001	S_12	SP-010231	008	--	Scope update for Rel4	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	009	--	Updates and Corrections for Rel4	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	010	--	Alignment with TMF GB910 and associated Editorial improvements	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	011	--	Update and re-organisation of clause 8 (Functional Architecture)	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	012	--	Introduce Subscription Management	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	013	--	Introduction of QoS Management Annex	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	014	--	Update the definition of IRP terminology	4.0.1	4.1.0
Jun 2001	S_13	SP-010465	015	--	Reference Corrections	4.1.0	4.2.0
Mar 2002	--	--	--	--	Cosmetics	4.2.0	4.2.1
Mar 2002	S_15	SP-020013	016	--	Correction and update to QoS Management (alignment on Policy Management with S2, CN3 in 23.207, 29.207)	4.2.1	5.0.0
Mar 2002	S_15	SP-020013	017	--	Introduction of Subscriber and Equipment Trace Management	4.2.1	5.0.0
Mar 2002	S_15	SP-020013	018	--	Update of Accounting Management to cover the IMS (alignment with SA5's 32.200 Charging management; Charging Principles)	4.2.1	5.0.0
Sep 2002	S_17	SP-020449	019	--	Introduction of a new subcaluse (7.12) on O&M of the UMTS "Management Infrastructure"	5.0.0	5.1.0
Dec 2002	S_18	SP-020726	020	--	Aligning IRP related terminology with SA5's SWGC IRP specifications (32.6xy)	5.1.0	5.2.0
Mar 2003	S_19	SP-030043	021	--	Align QoS Terminology with SA2's 23.207 & CN3's 29.207	5.2.0	5.3.0
Jun 2003	S_20	SP-030266	022	--	Correction and update of Management System Interactions	5.3.0	5.4.0
Sep 2003	S_21	SP-030401	023	--	Removal/Replacement of the term UMTS - Alignment with SA1/2 specifications	5.4.0	5.5.0

CR-Form-v7

CHANGE REQUEST

| ⌘ | **32.101** CR **025** | ⌘ **rev** | **-** | ⌘ | Current version: | **5.5.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME ☐ Radio Access Network **X** Core Network **X**

Title:	⌘	Align with SA5 SWGC WT01 Security terminology and architecture
Source:	⌘	**SA5** Huawei Technologies Co Ltd (Veronica.Ayers@huawei.com)
Work item code: ⌘	OAM-AR	***Date:*** ⌘ 14/05/2004

Category:	⌘ **F**	***Release:*** ⌘ Rel-6

Use one of the following categories:
   F (correction)
   A (corresponds to a correction in an earlier release)
   B (addition of feature),
   C (functional modification of feature)
   D (editorial modification)
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
   2   (GSM Phase 2)
   R96   (Release 1996)
   R97   (Release 1997)
   R98   (Release 1998)
   R99   (Release 1999)
   Rel-4 (Release 4)
   Rel-5 (Release 5)
   Rel-6 (Release 6)

Reason for change:	⌘	To correct the security management architecture and terminology.
Summary of change:	⌘	Change O&M to OAM&P, refer to transport layer rather than IP layer
Consequences if not approved:	⌘	Misleading security management architecture and terminology.

Clauses affected:	⌘	3.2, 5.1.2, 7.6, 7.12

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	

Other comments:	⌘

3.2   Abbreviations

For the purposes of the present document, the following abbreviations apply:

API	Application Programming Interface
ASN.1	Abstract Syntax Notation One
ATM	Asynchronous Transfer Mode
B2B	Business to Business
B-ISDN	Broadband ISDN
BOOTP	Boot protocol
CLI	Command Line Interface
CMIP	Common Management Information Protocol
CMIP/GDMO	Common Management Information Protocol/Guidelines for the Definition of Managed Objects

COPS	Common Open Policy Service
COPS-PR	COPS Usage for Policy Provisioning
CORBA IIOP	Common Object Request Broker Architecture Internet Inter-ORB Protocol
CORBA	Common Object Request Broker Architecture
CORBA/IDL	Common Object Request Broker Architecture/Interface Definition Language
DCN	Data Communications Network
DECT	Digital Enhanced Cordless Telecommunications
DHCP	Dynamic Host Configuration Protocol
DNS	Directory Name Service
DSS1	Digital Subscriber System 1
EM	Element Manager
EMS	Element Management System
FFS	For Further Study
FTAM	File Transfer Access and Management
FTP	File Transfer Protocol
ftp	FTP
GDMO	Guidelines for the Definition of Managed Objects
GGSN	Gateway GPRS Support Node
Go interface	The interface between the GGSN and the Policy Decision Function (PDF)
GSM	Global System for Mobile communications
HLR	Home Location Register
HSS	Home Subscriber Server
IDL	Interface Definition Language
IETF	Internet Engineering Task Force
IIOP	Internet Inter-ORB Protocol
IN	Intelligent Network
INAP	Intelligent Network Application Part
IRP	Integration Reference Point
IS	Information Service
ISDN	Integrated Services Digital Network
LDAP	Lightweight Directory Access Protocol
LDUP	LDAP Duplication/Replication/Update Protocols
LLA	Logical Layered Architecture
MAP	Mobile Application Part
MExE	Mobile Execution Environment
MIB	Management Information Base
MMI	Man-Machine Interface
NM	Network Manager
NMS	Network Management System
NRM	Network Resource Model
OAM&P	Operations, Administration, Maintenance and Provisioning
OS	Operations System
OSI	Open Systems Interconnection
OSS	Operations Support System
PDF	Policy Decision Function
PDH	Plesiochronous Digital Hierarchy
PDP	Policy Decision Point
PIB	Policy Information Base
PKI	Public Key Infrastructure
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RNC	Radio Network Controller
RSVP	Resource ReserVation Protocol
SDH	Synchronous Digital Hierarchy
SLA	Service Level Agreement
SNMP	Simple Network Management Protocol (IETF)
SNMP/SMI	SNMP/Structure of Management Information
SOM	Service Operations Management
SS	Solution Set

SS7	Signalling System No. 7
TCP/IP	Transmission Control Protocol/ Internet Protocol
tftp	trivial ftp
TM	Telecom Management
TMF	TeleManagement Forum
TMN	Telecommunications Management Network (ITU-T)
TOM	Telecom Operations Map (TMF)
UML	Unified Modelling Language
UPT	Universal Personal Telecommunication
USIM	Universal Subscriber Identity Module
UTRA	Universal Terrestrial Radio Access
VHE	Virtual Home Environment

5.1.2   Interfaces from Operations Systems to NEs (Type 1 & 2)

In some cases, the management interfaces to NEs have been defined bottom-up, trying to standardise the complete O&MOAM&P functionality of the various NEs.

For PLMN management, a top-down approach will be followed to streamline the requirements from the perspective of Operators top priority management processes.

It is assumed that this will not fully cover the O&MOAM&P functionality of all NE types at once; therefore a part of the functionality will be phased for further work and consideration. Some proprietary solutions (local and/or remote) will be needed in the interim. The rationale of this approach is not only the best use of resources, but also to follow a pragmatic step-wise approach that takes into account the market forces (the manufacturers and operators capabilities). A further rationale is to define clear and easy-to-agree steps that allow Management functionality to be implemented in the same time frame as the telecom functionality in the network (i.e. to synchronise the management and network releases).

The approach for NE Management Interfaces will be to concentrate on protocol independent information models, allowing a mapping to several protocol suites. The rational is:

-   due to the convergence of Information and Telecommunication technologies, it is required to work on a more open approach (acknowledging the market status and foreseen evolutions);

-   the life cycle of information flows is 10 to 20 years, while that of protocols is 5 to 10 years;

-   developments in automatic conversion from information models to various protocols/technologies will allow a more pragmatic and open approach (e.g. UML to GDMO, UML to IDL).

However, it is the intention to a least recommend one mapping for each interface.

7.6 Security Management

7.6.1   Overview

This clause describes an architecture for security management of the TMN that is divided into two layers, as shown in figure 7. No individual layer is dependent on any specific technology in the other one.
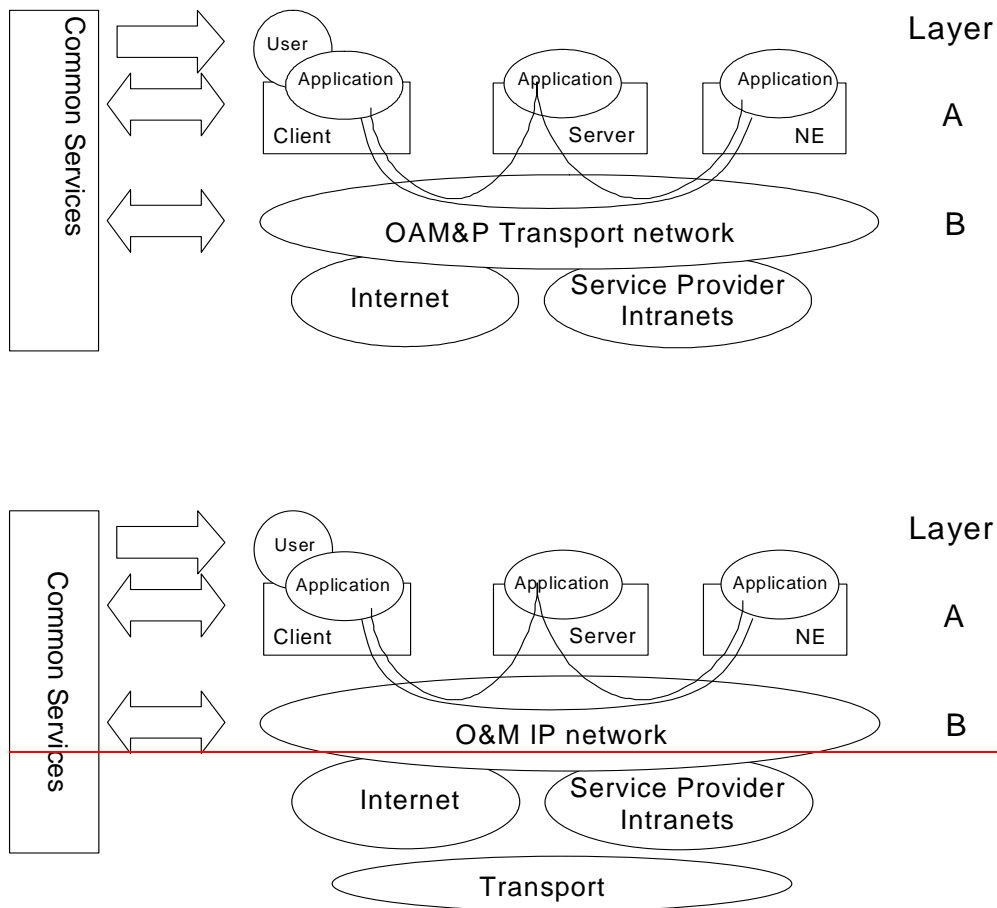
Figure 7: Security Management Architecture

7.6.1.1 Layer B - ~~O&M IP~~OAM&P Transport Network

Some Service Providers might build their ~~O&M~~OAM&P ~~IP~~transport network as a completely private, trusted network. In the normal case though, the ~~O&M IP~~OAM&P transport network should be regarded as partly insecure due to its size, complexity, limited physical security and possible remote access from dial-up connections or from the Internet. The only security service provided then is that the ~~O&M~~ OAM&P transport network when based on IP ~~network~~ is logically separated from the Internet. For IP based transports infrastructure aspects on security are handled to the extent possible utilizing IP classic features (addressing schemes, DNS, DHCP, BOOTP, protection with firewalls etc.).

Additionally, a trusted IP-environment to the application level might be provided, e.g. an environment with no masquerading IP-hosts and where potential intruders cannot communicate. One way to accomplish such a secure DCN is to use IP security mechanisms (IPSec; see IETF RFC2401 [7]) to achieve authentication of IP hosts (servers, gateways, Network Elements) and optional encryption of ~~O&M~~OAM&P traffic. Note however that the secure DCN does not authenticate users.

7.6.1.2 Layer A - Application Layer

On this layer we find Telecom Management applications performing their tasks in the normal management functional areas. Managed objects residing in the network resources are often accessed or manipulated.

Layer A provides authentication of users ensuring that every party involved in ~~O&M~~OAM&P traffic is securely authenticated against every other party. The implementation of the authentication service supports "single log-on" (a user only has to log-on once to get access to all ~~O&M~~OAM&P applications in the network) and "single point of administration" (an administrator only needs to maintain a user and his/her profile in one place).

Layer A also provides authorization (access control) - to verify if a user is authorized to perform a certain operation upon a specified target object at a given time. In addition, it addresses the use of signing and logging of events. Logging of events here means "logging of actions" (not necessarily logging of ALL actions) to be able to check "who did what". At least all "critical" actions (configurations etc.) should be logged.

Interface definitions addressing authentication and authorization are needed. Also note that layer A requires confidentiality. Layer B may provide this service. If not, layer A instead has to provide it itself.

7.6.1.3 Common Services

In common services we find the security infrastructure components:

- Directory (for storage of user information, certificates, etc.);

- PKI (Certificate Authority, Registration Authority, Public Key Certificate, etc.).

Layer A relies on, and interacts with, the Common Services through distribution of certificates and keys, authentication of users, authorization, utilities for security administration (setting access rights), etc.

7.12 ~~O&M~~OAM&P of the PLMN "Management Infrastructure"

As described earlier in the present document, each PLMN organisation has a management infrastructure consisting of a collection of systems (computers and telecommunications) - a TMN in ITU-T parlance - used to manage its network. Though this management network is logically distinct from the PLMN , the operations systems and supporting data communications network comprising it have the same management needs as described for network elements and where possible should be managed using the same principles and similar management processes and functionality.

Annex E (informative):
Change history

Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Dec 1999	S_06	SP-99577	--	--	Approved at TSG SA #6 and placed under Change Control	--	3.0.0
Mar 2000	S_07	SP-000014	001	--	Clarify use of X.25 as a Network Layer Protocol	3.0.0	3.1.0
Mar 2000	S_07	SP-000014	002	--	Correction of IRP-related terminology	3.0.0	3.1.0
Mar 2000	S_07	SP-000014	003	--	Clarification of Software Management	3.0.0	3.1.0
Mar 2000	--	--	--	--	Cosmetic	3.1.0	3.1.1
Jun 2000	S_08	SP-000225	004	--	Add and Update Correct Normative Reference List	3.1.1	3.2.0
Jun 2000	S_08	SP-000226	005	--	Terminology corrections	3.1.1	3.2.0
Dec 2000	S_10	SP-000522	006	--	Update references to allow both CORBA Versions 2.1 and 2.3	3.2.0	3.3.0
Mar 2001	S_11	SP-010022	007	--	Removal of Reference to 32.105 (not available for R99).	3.3.0	3.4.0
Mar 2001	S_11	--	--	--	Automatic upgrade to Rel-4	3.3.0	4.0.0
Apr 2001	--	--	--	--	Created Rel-4 from the latest R99 version (3.4.0 instead of 3.3.0)	3.4.0	4.0.1
Jun 2001	S_12	SP-010231	008	--	Scope update for Rel4	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	009	--	Updates and Corrections for Rel4	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	010	--	Alignment with TMF GB910 and associated Editorial improvements	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	011	--	Update and re-organisation of clause 8 (Functional Architecture)	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	012	--	Introduce Subscription Management	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	013	--	Introduction of QoS Management Annex	4.0.1	4.1.0
Jun 2001	S_12	SP-010231	014	--	Update the definition of IRP terminology	4.0.1	4.1.0
Jun 2001	S_13	SP-010465	015	--	Reference Corrections	4.1.0	4.2.0
Mar 2002	--	--	--	--	Cosmetics	4.2.0	4.2.1
Mar 2002	S_15	SP-020013	016	--	Correction and update to QoS Management (alignment on Policy Management with S2, CN3 in 23.207, 29.207)	4.2.1	5.0.0
Mar 2002	S_15	SP-020013	017	--	Introduction of Subscriber and Equipment Trace Management	4.2.1	5.0.0
Mar 2002	S_15	SP-020013	018	--	Update of Accounting Management to cover the IMS (alignment with SA5's 32.200 Charging management; Charging Principles)	4.2.1	5.0.0
Sep 2002	S_17	SP-020449	019	--	Introduction of a new subcaluse (7.12) on O&M of the UMTS "Management Infrastructure"	5.0.0	5.1.0
Dec 2002	S_18	SP-020726	020	--	Aligning IRP related terminology with SA5's SWGC IRP specifications (32.6xy)	5.1.0	5.2.0
Mar 2003	S_19	SP-030043	021	--	Align QoS Terminology with SA2's 23.207 & CN3's 29.207	5.2.0	5.3.0
Jun 2003	S_20	SP-030266	022	--	Correction and update of Management System Interactions	5.3.0	5.4.0
Sep 2003	S_21	SP-030401	023	--	Removal/Replacement of the term UMTS - Alignment with SA1/2 specifications	5.4.0	5.5.0