Software Requirement Specification Document

Home Subscriber Server SRS

Version 1.0

Document Information

Document Sign Off

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April 22, 2008	1.0	Qamar Ejaz	Details of API specification

Document Purpose

The information provided in this document explains both functional and non functional requirements for HSS and supported reference points. It clearly identifies the requirements and contains detailed information about it. For complete scope of HSS please see the **Project Proposal.**

Table of Contents

1. References & Abbreviations

1.1 References

Following is the 3GPP reference document list, which are related to the information present in this document:

[1] 3GPP TS 29.228: " IP Multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and message contents".

[2] 3GPP TS 23.002: "Network Architecture".

1.2 Abbreviations

Following are the abbreviations that have been used in the document:

CDR Charging Data Record
OCS Online Charging System
3GPP Third Generation Partnership Protocol
IMS IP Multimedia Subsystem
CGF Charging Gateway Function
CDF Charging Data Function
CTF Charging Trigger Function
UMTS Universal Mobile Telecommunications System
HSS Home Subscriber Server
GPRS General Packet Radio Service
GSM Global System For Mobile Communications

2. Project Overview

The Home Subscriber Server, in its basic role, is a centralized database for IMS, Packet Switched (PS) and Circuit Switched (CS) entities. These entities include CSCFs, AS, GPRS Support Nodes and MSCs.

The Home Subscriber Server (HSS) is core network entity that plays a very central role in user authentication, authorization and session management. The HSS along with call state control functions completes IMS Control Layer functionality for subscription and session management. The HSS Server supports different interfaces to the IMS network, PS/GPRS network, CS/GSM network and general purpose IP network. The HSS Server contains user information necessary for call control mechanism in IMS and other networks (GPRS, GSM or Internet). The Call State Control Functions query HSS over Cx/Dx DIAMETER Interface in IMS network for retrieving of subscription, authentication, authorization and services profiles related data. This data helps these entities in providing the secure and authorized call control over IMS network. The Application Servers query HSS over Sh Interface for service specific data for a particular subscriber using DIAMETER commands. Similarly the IM-SSF can query HSS over Si DIAMETER interface for CAMEL specific service data. The PS (GPRS) and CS (GSM/UMTS) domains entities interact with HSS over Gr/Gc MAP interfaces. The home subscriber server hosts DIAMETER and MAP applications for communicating with IMS entities and GPRS/GSM/UMTS entities respectively. These applications receive requests and generate response to the caller applications.

In this project we will be implementing the HSS for IMS entities only.

The HSS will be responsible for holding the following user related information for IMS Network:

- User Identification, Numbering and addressing information;
- User Security information: Network access control information for authentication and authorization;
- User Location information at inter-system level
- User profile information.

The HSS also generates User Security information for mutual authentication, communication integrity check and ciphering.

Based on this information, the HSS also is responsible to support the call control and session management entities of the different Domains and Subsystems

In addition to providing the Requirement Specifications for the HSS, this document also provides the Requirement Specifications for three Reference points used for communication to/from the HSS/SLF and other IMS entities. These three reference points are the following:

1) Cx Reference Point

   The Cx Reference point describes the interface between the I-CSCF/S-CSCF and the HSS.

2) Dx Reference Point

   The Dx Reference point describes the interface between the I-CSCF/S-CSCF and the SLF.

3) Sh Reference Point

   The Sh Reference point describes the interface between an AS / SCS and the HSS.

3. Functional Requirements

Following are the functional requirements of Home Subscriber Server.

3.1 Home Subscriber Server

Requirement: 1 - 3GPP Compliance

ID	DIM – 00150
Group Name	Home Subscriber Server.
Name	3GPP compliance.
Description	The HSS will be compliant with the IMS entities standardized by 3GPP.

Requirement: 2 - Support for Authentication & Ciphering

ID	DIM – 00156
Group Name	Home Subscriber Server.
Name	Support for Authentication & Ciphering.
Description	The HSS implementation will provide full support for following authentication schemes: - Authentication and Key Agreement (AKA). - HTTP Digest.

Requirement: 3 - Support for MySQL database

ID	DIM – 00153
Group Name	Home Subscriber Server.
Name	Support for MySQL database.
Description	The HSS implementation will natively support the MySQL DBMS as the actual data repository.

Requirement: 4 - Support for Routing & Addressing

ID	DIM – 00155
Group Name	Home Subscriber Server.
Name	Support for routing & addressing.
Description	The HSS implementation will provide full support for the routing and addressing specified in the 3GPP TS 23.002 specification.

Requirement: 5 - Support of Authentication & Authorization

ID	DIM – 00152
Group Name	Home Subscriber Server.
Name	Support of authentication & authorization.
Description	The HSS implementation should provide full support for the authentication and authorization functionality specified in 3GPP TS 29.228 specification.

Requirement: 6 - Support of Cx, Dx and Sh Reference Points

ID	DIM – 00151
Group Name	Home Subscriber Server.
Name	Support of Cx, Dx and Sh Reference Points.
Description	The HSS will fully implement the functionality of Cx, Dx and Sh Reference Points as specified by the 3GPP.

Requirement: 7 - Support of Subscriber Profiles & Service Profiles

ID	DIM – 00154.
Group Name	Home Subscriber Server.
Name	Support of Subscriber Profiles & Service Profiles.
Description	The HSS implementation will fully support the storage and retrieval of Subscriber Profiles and Service Profiles.

3.2 Reference Points Supported

3.2.1 Cx/Dx Reference Point

Requirement: 1 - Features to be implemented on Cx/Dx interfaces

ID	DIM – 00162
Group Name	Cx/Dx Reference Point.
Name	Features to be implemented on Cx/Dx interfaces.
Description	The following features will be implemented on the Cx/Dx interfaces : a) User Registration Status Query b) SCSCF-Registration/De-Registration Notification c) Network Initiated De-Registration d) User Location Query e) Authentication Procedures

Requirement: 2 - Primitive operations to be implemented on Cx/Dx reference points

ID	DIM – 00163
Group Name	Cx/Dx Reference Point.
Name	Primitive operations to be implemented on Cx/Dx reference points.
Description	The following primitive operations will be implemented on the Cx/Dx reference points: a) Cx-Query b) Cx-Select-Pull c) Cx-Put e) Cx-Pull f) Cx-Deregister g) Cx-Location-Query h) Cx-AV-Req

3.2.2 Sh Reference Point

Requirement: 1 - Features to be implemented on Sh reference point

ID	DIM – 00164
Group Name	Sh Reference Point.
Name	Features to be implemented on Sh reference point.
Description	The following features will be implemented on the Sh reference point: a) Reading Data b) Data Update c) Subscription To Notifications d) Notifications

Requirement: 2 - Primitive operations to be implemented on Sh reference point

ID	DIM – 00165
Group Name	Sh Reference Point.
Name	Primitive operations to be implemented on Sh reference point.
Description	The following primitives will be implemented on the Sh Reference point: a) Sh-Pull b) Sh-Update c) Sh-Subs-Notif d) Sh-Notif

4. Non-Functional Requirements

Following are the non-functional requirements of Home Subscriber Server.

Requirement: 1- Database extensibility for CS and PS domain entities' information requirements

ID	DIM – 00158
Group Name	Home Subscriber Server.
Name	Database Schema extendibility for CS and PS domain entities' information requirements.
Description	The Database design/schema of the HSS will be flexible enough to support the CS and PS entities in the future.

Requirement: 2 - Easy to use HSS configuration application will be provided

ID	DIM – 00159
Group Name	Home Subscriber Server.
Name	Easy to use HSS configuration application will be provided.
Description	An easy to use application will be provided to configure the HSS.

Requirement: 3 - Extendibility for other IMS, CS and PS cores related interfaces

ID	DIM – 00157
Group Name	Home Subscriber Server.
Name	Extensibility for other IMS, CS and PS cores related interfaces.
Description	The HSS (design and architecture will be generic/open) for extendibility for further IMS , CS and PS entities specific interfaces to be supported over the same architecture and design

Requirement: 4 – Performance metrics to be adhered to for HSS

ID	DIM – 00161
Group Name	Home Subscriber Server.
Name	Performance metrics for number of concurrent diameter messages
Description	The HSS will provide acceptable performance without degrading for a maximum of 500 concurrent diameter messages overall all of the reference points implemented on it.

5. Operating Environment Requirements

The system will primarily be developed and tested on Linux/Unix based Operating Systems. But our goal is to make it a platform independent solution. The target platforms are:

- Linux ,
- Microsoft Windows &
- Solaris.