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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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1 Scope

The present document defines the stage 3 network protocol description to the 3GPP Generic User Profile (GUP), which includes the elements necessary to realise the stage 2 requirements in 3GPP TS 23.240 [1].

The fact of having several domains within the 3GPP mobile system (e.g. Circuit-Switched, Packet-Switched, IP Multimedia Subsystem) and access technologies (e.g. GERAN, UTRAN and WLAN) introduces a wide distribution of data associated with the user. Further, the new functions both in terminals and networks mean that the data related to users, services and user equipment will be increased greatly. This causes difficulties for users, subscribers, network operators and value added service providers to create, access and manage the user-related data located in different entities.

The objective of specifying the 3GPP Generic User Profile is to provide a conceptual description to enable harmonised usage of the user-related information located in different entities. Technically the 3GPP Generic User Profile provides an architecture, data description and interface with mechanisms to handle the data.

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] 3GPP TS 23.240: "3GPP Generic User Profile - Architecture; Stage 2".

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[5] "Simple Object Access Protocol (SOAP) 1.1," Box, Don, Ehnebuske, David , Kakivaya, Gopal, Layman, Andrew, Mendelsohn, Noah, Nielsen, Henrik Frystyk, Thatte, Satish, Winer, Dave, eds. World Wide Web Consortium W3C Note (08 May 2000). http://www.w3.org/TR/2000/NOTE-SOAP-20000508/.

[6] Void.

[7] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx and Dx interfaces; Signalling flows and message contents".

[8] 3GPP TS 23.008: "Organization of subscriber data".

[9] 3GPP TS 23.228: "IP Multimedia Subsystems (IMS); Stage 2".

[10] 3GPP TS 29.328: "IP Multimedia (IM) Subsystem Sh interface; Signalling flows and message contents".

[11] 3GPP TS 33.102: "3G Security; Security architecture".

[12] 3GPP TS 33.203: "3G security; Access security for IP-based services".

[13] "Liberty ID-WSF Data Services Template Specification", Liberty Alliance Project. http://www.projectliberty.org/specs/draft-liberty-idwsf-dst-v2.0-01.pdf (draft)

[14] "Liberty ID-WSF SOAP Binding Specification", Liberty Alliance Project. http://www.projectliberty.org/specs/liberty-idwsf-soap-binding-v1.1.pdf

[15] "Liberty ID-WSF Security Mechanisms Specification", Liberty Alliance Project. http://www.projectliberty.org/specs/liberty-idwsf-security-mechanisms-v1.0.pdf

[16] Void.

[17] "Liberty ID-WSF Discovery Service Specification", Liberty Alliance Project. http://www.projectliberty.org/specs/liberty-idwsf-disco-svc-v1.0.pdf

[18] IETF RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax".

[19] IETF RFC 3261: "SIP: Session Initiation Protocol".

[20] IETF RFC 2486:" The Network Access Identifier".

[21] 3GPP TS 23.003: "Numbering, addressing and identification".

[22] IETF RFC 2821:"Simple Mail Transfer Protocol".

[23] "Liberty ID-WSF Interaction Service Specification", Liberty Alliance Project. http://www.projectliberty.org/specs/draft-liberty-idwsf-interaction-svc-1.0-errata-v1.0.pdf12

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[25] IETF RFC 7230: "Hypertext Transfer Protocol (HTTP/1.1): Message Syntax and Routing".

[26] IETF RFC 7231: "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content".

[27] IETF RFC 7232: "Hypertext Transfer Protocol (HTTP/1.1): Conditional Requests".

[28] IETF RFC 7233: "Hypertext Transfer Protocol (HTTP/1.1): Range Requests".

[29] IETF RFC 7234: "Hypertext Transfer Protocol (HTTP/1.1): Caching".

[30] IETF RFC 7235: "Hypertext Transfer Protocol (HTTP/1.1): Authentication".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document the following definitions apply:

3GPP Generic User Profile (GUP): The 3GPP Generic User Profile is the collection of user related data which affects the way in which an individual user experiences services and which may be accessed in a standardised manner as described in this specification.

GUP Component: A GUP component is logically an individual part of the Generic User Profile.

Data Element: the indivisible unit of Generic User Profile information.

Data Element Group: A pre-defined set of Data Elements and/or other Data Element Groups closely related to each other. One or more Data Element Groups can constitute the GUP Component.

Data Description Method: A method describing how to define the data contained in the Generic User Profile

3.2 Symbols

For the purposes of the present document the following symbols apply:

Rg Reference Point between Applications and the GUP Server.
Rp Reference Point between the GUP Server and GUP Data Repositories, and between Applications and GUP Data Repositories.

3.3 Abbreviations

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

GUP 3GPP Generic User Profile
SOAP Simple Object Access Protocol
RAF Repository Access Function

4 Main concept

This specification defines the binding of the GUP interfaces and procedures to SOAP protocol (defined in "Simple Object Access Protocol (SOAP) 1.1" [5]). Each interface is defined in terms of the messages sent and received. The payload of each message is XML, defined using an XML schema language. The framework, procedures, SOAP binding and security solutions of GUP are based on the Liberty Alliance Project work.

Throughout the rest of this specification the SOAP based binding of the 3GPP GUP is described

5 Definition methodology

The definition of the interfaces can be divided into the following clauses:

Definition of the operations (WSDL/XML)

Common functions like security, authentication and authorisation (WSDL/XML)

Repository Access Function specific data contents for the operations (XML Schema)

5.1 Protocol layers

The protocol architecture of the Rg reference point is depicted in the figure 1. The essential contents of this specification describe the functionality, semantics and the WSDL/XML definitions of the interfaces. Additionally the special characteristics of the SOAP and http usage are defined. It is worth noting that part of the data is passed in the SOAP headers but the most GUP specific data is placed in the SOAP message body.

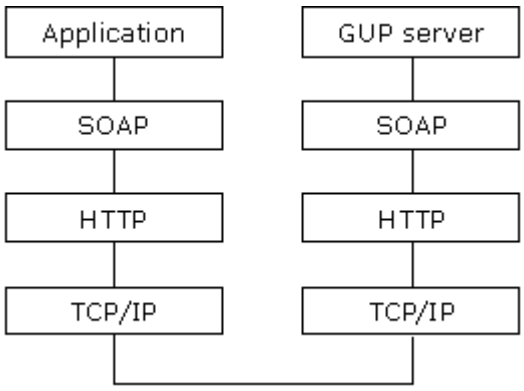

Figure 7.2.1 GUP Rg reference point protocol architecture

The protocol architecture of the Rp reference point is depicted in the figure 2.

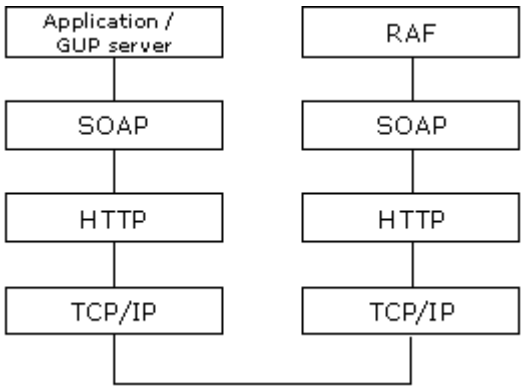

Figure 7.7.2 GUP Rp reference point protocol architecture

The interface between Repository Access Function (RAF) and GUP Data Repository is not defined by the present specification because it is not required to be standardised in 3GPP TS 23.240: "3GPP Generic User Profile - Architecture; Stage 2 [1] The protocol contains following layers:

- Application layer
  - Application level interface specification. All the operations and data are described by XML elements and attributes in an XML Schema and WSDL. The WSDL is defined by W3C in Web Services Description Language (WSDL) 1.1 [2].
  - The standard XML Schema is defined by W3C in "XML Schema Part 1: Structures", Recommendation [3] and "XML Schema Part 2: Datatypes," Recommendation [4].
- SOAP (Session layer)
  - SOAP is an XML based messaging protocol that provides support for remote procedure calls by messaging. The SOAP protocol is defined by W3C in "Simple Object Access Protocol (SOAP) 1.1" [5].
  - A few specific header types are defined for GUP e.g. for message IDs and time stamps.
- HTTP (Transport layer)
  - HTTP defines how messages are transmitted and formatted. HTTP is a stateless protocol, i.e. each command is executed independently. HTTP/1.1 is defined by IETF RFC 7230 [25], IETF RFC 7231 [26], IETF RFC 7232 [27], IETF RFC 7233 [28], IETF RFC 7234 [29] and IETF RFC 7235 [30].
- TCP/IP (Network layer)
  - TCP/IP handles network communications between network nodes. GUP does not define any special requirements for this layer.

6 General guidelines

The GUP architecture has identified three kinds of entities: (1) client applications, (2) GUP servers and (3) data repositories [point to stage 2]. For the communication between these entities, two interfaces have been defined, namely Rp and Rg.

Communication between GUP entities is performed via the exchange of messages expressed as XML documents. XML documents should include the XML declaration with the version and encoding attributes. The XML documents shall be well-formed and valid. The W3C XML Schema [3,4] is used in GUP to define the structure of valid XML documents.

The implementation of the Rp and Rg interfaces follows the Liberty Alliance Data Service Template specification [Liberty Alliance].

From a Liberty Alliance point of view, GUP servers and data repositories will play the role of Liberty Alliance data services.

6.1 Reusing Liberty Alliance DST

Liberty Alliance Data Service Template [13] specification proposes a framework for web services that offer access to data in general. In the context of GUP, the data services should be restricted to GUP user profile data.

The Data Service Template defines: (1) some abstract definitions about messages that are sent and received by the web service and (2) some guidelines regarding the structure of the data offered through the service.

More concretely, the Liberty Alliance Data Service Template [13] specification offers a set of incomplete XML schemas with placeholders (for data types) that need to be filled based on the nature of the data offered by the data service.

In the context of GUP, we will:

- fill the place holders with some GUP specific data types, and
- add some new messages that are not offered by the Data Service Template specification

The details of this instantiation of the Liberty Alliance Data Service Template for each GUP component are summarized in corresponding check list tables presented in Annex A together with the actual definition of the GUP component.

The guidelines and naming conventions recommended by Liberty alliance when using XML and XML Schemas are directly applicable to GUP.

6.2 Guidelines for XML usage

As described in Liberty ID-WSF Data Services Template Specification [13], the schemas of the different data services, and GUP in particular, should follow a set of guidelines that are included in this specification with the purpose of completeness.

6.3 GUP Specific Naming and Namespaces

The namespace URI for GUP specific XML documents is a 3GPP specific namespace identifier 'http://3gpp' followed by a namespace specific string starting with 'gup' followed by 'ns' and a sub-namespace specific for a certain namespace. (The 'ns' is used to grouping instances of the namespace type of URIs together. Other types of usage of URIs may be defined later.) The sub-namespaces are defined in GUP specifications and/or implementations.

Thus the syntax of the URI for all GUP specific namespaces is: 'http://3gpp/gup/ns/<sub-namespace>'.

The sub-namespace for the GUP Component specific Profile Components consists of the common 'comp' part followed by the component name.

The following namespaces are defined for GUP:

- GUP Profile: 'http://3gpp/gup/ns/profile'
- Common Attributes: 'http://3gpp/gup/ns/common/<name>'
- GUP procedures: 'http://3gpp/gup/ns/proc/<name>'
- GUP Components: 'http://3gpp/gup/ns/comp/<component name>'.

For example an HSS related component URN could be 'http://3gpp/gup/ns/comp/IMSSubscription'.

Editor's note: This clause should go into 23.003 when the specification is getting to a stable condition.

6.4 GUP Profile schema

If the Liberty Alliance data service template specifies the interfaces that can be used to access this data, it does not specify the exact nature of the data. In the context of GUP, we need to explicitly define what the subscriber profile data consists of.

3GPP GUP defines a global schema for the XML content of the user profile.

This schema is unique and the same for every user. The schema is defined using W3C XML schemas.

The GUP user profile consists of profile components.

There are many manners to generate the schema for Generic User Profile. But irrespectively of the manner (e.g. one single XML schema vs many schema nested within each other), the schema can always be transformed into a single "canonical" XML schema. A user profile will be a valid instance of this "canonical" schema.
way to define the global schema
will be to define a set of sub-schemas, each with its own namespace. The schema defines a set a single rooted XML documents, each of them being a valid instance of one component defined by the schema. This fact enables easier schema management as applications should not have to worry about the whole schema, but only the parts they are interested in; when one schema component gets modified, only applications using this component should care about the change. Guidelines for the construction of the profile schema

When designing the schema we want to achieve:

- Modularity
- Extensibility
- Readability
- Easy support for versioning
- Isolation (only applications concerned by the schema component should be affected)

The recommended way to design the GUP schema is to split the schema into schema components, each component being defined as a separate XML schema document, with its own namespace.

Components are assembled together as optional content (minOccurs=0, maxOccurs=1) of an <all> construct.

Common attributes as defined in Liberty ID-WSF Data Services Template Specification [13] shall be used for GUP.

6.4.1 Example

To illustrate this, it is shown how the the top-level component of the GUP schema could be defined as the "concatenation" of four different sub-schemas.

The component is defined by an XML schema document. The component namespace is defined by the targetNamespace of the schema.

The sub-schemas used in the definition are referenced by (1) their namespace declaration in the <xsd:schema> element and (2) by importing their corresponding schema documents (<xsd:import>).