



Game Services Requirements

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1. Scope

(Informative)

This document presents the Requirements for the OMA Game Service 2.0, and the Use Cases from which they are derived. The Requirements herein should be understood as those minimally necessary to implement a service that supports connect and multiplayer gaming over mobile networks and devices; a more comprehensive Game Service RD is planned. The document notes when Requirements overlap with, or can be satisfied by, other OMA working groups or other standards external to OMA. The Requirements fall in to five distinct phases of the User's interaction with the Game Service: obtaining the game over the the air from the Game Service; activating the game in connected, or multiplayer, mode and subsequent accounting, access, authentication and authorization; creating a new, or entering an existing game session; game play and User experience despite network lapses; and finally statistics, usage capture, and personalization. It should be noted that portions of these five phases may be implemented by different business entities.

2. References

2.1 Normative References

- [RFC2119] “Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997, [URL:http://www.ietf.org/rfc/rfc2119.txt](http://www.ietf.org/rfc/rfc2119.txt)
- [IOPPROC] “OMA Interoperability Policy and Process”, Version 1.1, Open Mobile Alliance™, OMA-IOP-Process-V1_1, [URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [RFC2234] “Augmented BNF for Syntax Specifications: ABNF”. D. Crocker, Ed., P. Overell. November 1997, [URL:http://www.ietf.org/rfc/rfc2234.txt](http://www.ietf.org/rfc/rfc2234.txt)
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- [GSARCH] “OMA Game Services Architecture ”, Version 1.0, Open Mobile Alliance™, V0_0_1-20040501-D, [URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [GP20SERVER] “OMA Game Platform Server Framework”, Version 2.0, Open Mobile Alliance™, OMA-GS-2004-0009, [URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)
- [GP20PROTOCOL] “Gaming Platform version 2.0 Client/Server Protocol” Version 2, Open Mobile Alliance™, OMA-GS-2004-0022, [URL:http://www.openmobilealliance.org/](http://www.openmobilealliance.org/)

2.2 Informative References

- [ANSIC] ISO/IEC JTC1/SC22/WG14 "Rationale for International Standard-Programming Languages - C" <http://www.open-std.org>
- [JAVA] “The Java Language Specification”, <http://java.sun.com>
- [J2ME] JSR-68 "J2ME Platform Specification" <http://www.jcp.org/en/jsr/all>
- [MIDP10] JSR-37 "Mobile Information Device Profile for the J2ME Platform"
- [MIDP20] JSR-118 "J2ME Mobile Information Device Profile"
- [MSNET] "Getting Started with Visual Studio .NET and the Microsoft .NET Compact Framework", <http://msdn.microsoft.com>
- [WIPI] KWISFS.K-05-002 "Wireless Internet Platform for Interoperability"

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope” and “Introduction”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

User (also: end-user, player, game player, gamer, customer, consumer)	The human being who is playing a game.
Device (also: handset, game device, mobile device, phone, mobile phone)	The electronic terminal on which the user is playing a game. It is assumed to be able to send and receive information via a mobile operator’s network.
Operator (also: carrier, mobile operator, network operator)	
Game Service	The collection of end-to-end functionality provided that enables connected and/or multiplayer mobile games.
Game Service Provider	The business entity that provides the functionality of a Game Service to Users. A GSP may provide and manage all Game Service functionality itself, or make these available through business-to-business relationships.
Game Client	The portion of a mobile game (connected, multiplayer) that executes on the User’s device that is specifically concerned with interacting with the OMA Game Service. General reference to the game client excludes device-resident game fiction.
Mobile application (game)	An application that executes on a mobile device. (A mobile application that is a game)
Connected (multiplayer) mobile game	A mobile game in which some of the User’s experience involves entities that are not resident on the User’s device; a Lottery is a connected mobile game, as is a game that admits high-score posting, or the downloading of ghost racers. (A mobile game in which multiple players simultaneously interact with one another through, or as a necessary part of, the game fiction)
Turn-based Game	A game in which, at each point in time, only a subset of players are allowed to make a move that alters the game’s shared state.
Matchmaking	The process whereby a User indicates interest in participating in a multiplayer mobile application (multiplayer game), possibly specifying criteria that the other participants must meet. The result is either a game session in which the User has been placed, or an indication that it is not possible to meet the specified criteria.

3.3 Abbreviations

OMA	Open Mobile Alliance
OTA	Over The Air.

http HyperText Transmission Protocol
tcp/ip Transmission Control Protocol over Internet Protocol

4. Introduction (Informative)

Connected mobile games are mobile games that use a wireless mobile network to extend the game and/or game player's experience to other players. The extension may be as simple as posting a high score to a server so that other players can see it, or as complex as head-to-head competitive play in which players' moves alter shared game state. Connected mobile games offer new revenue opportunities for all members of the value chain: mobile network operators can reap revenue from data traffic, publishers and content or brand owners can build loyal communities, and handset vendors will see demand for high-calibre devices.

This document presents the Requirements for the OMA Game Service 2.0, which is intended to support connected mobile games, and the Use Cases from which they are derived. The Use Cases and Requirements fall in to five distinct phases of the User's connected gaming experience:

1. Distribution and rights management. Obtaining the game over the air (OTA) or establishing ownership of the game client when the client is obtained through other means.
2. User account management. Activating the game in connected, or multiplayer mode and subsequent accounting, access, authentication, and authorization.
3. User participation. Creating a new, or entering an existing, game session.
4. In-game experience. Game play and user experience despite network lapses, user inattention, or device-originating interruptions. Interaction with remote game services. Player-to-player chat-style communication.
5. Extended game experience. Statistics, usage capture, and personalization.

The end-to-end business chain for interactive games includes many entities – operators, publishers, game developers, handset vendors, and application hosting facilities. Thus, the phases above may or may not be supplied directly by a Game Service Provider. Specifically,

1. Distribution and rights management. The Game Service Provider may implement OTA provisioning and digital rights management itself, or rely on third party distribution and rights management partners.
2. User account management. The Game Service Provider may use an operator's or other on-line community's existing user account management.
3. User participation. The connected game may be the mobile extension of an existing on-line game. Chat features can be provided by an existing Instant Messaging service. Presence features can be provided by existing Presence Services.
4. In-game experience. Third parties may offer "virtual goods" for sale within a game.
5. Extended game experience. The Game Service Provider may capture game-specific usage statistics within a larger usage monitoring capability.

Moreover, there is, as expected, interaction with and dependencies on other OMA services, which we note. There are also possible areas of overlap with other standards bodies, which we make an effort to note as comprehensively as possible.

5. Use Cases (Informative)

5.1 Use Case Distribution and Rights Management, Obtain Game

5.1.1 Short Description

Obtain a game over the air (OTA) (phase 1). The mechanisms for handling charges assessed for the delivery and/or ownership of the content falls under the mandate of OMA's MCC (M-Commerce and Charging) working group. When User-to-User distribution is considered (Alternative Flow 1), the OMA DRM (Digital Rights Management) standard will be referenced.

5.1.2 Actors

John – User

Game Service Provider

5.1.2.1 Actor Specific Issues

John wants to obtain and play a game he does not currently possess. The Game Service Provider wants to ensure that all appropriate fees are collected from the user at the time of purchase.

5.1.2.2 Actor Specific Benefits

John gets to own and play a new game. The Game Service Provider can vouchsafe the revenues to be distributed through the value chain (game publisher, developer, operator).

5.1.3 Pre-conditions

John must have a device and network access that allow him to receive content OTA, install content, and execute applications. The Game Service Provider may need to be aware of device attributes such as model, operating system, firmware, storage limits, and OTA limits, to name a few.

5.1.4 Post-conditions

The game in executable form is stored on John's device.

5.1.5 Normal Flow

John uses his device's browser to enter the Game Service Provider's portal site and search for the desired game. John is only shown games that are compatible with his handset (Alternative Flow 1). Games may or may not have a fee associated with purchasing the content, and a fee may or may not be assessed for delivering the game OTA. John browses the list of titles and selects one by clicking the link. (Alternative Flow 2) (Alternative Flow 3). The OTA download commences. The game is stored on John's device for future use.

5.1.6 Alternative Flow

1. John may obtain the game from a friend via BlueTooth, infrared, or other mechanisms that do not involve a network operator distributing the game. The OMA DRM standard would be applied to ensure the proper sharing and applicable billing of the game content.
2. If there is a cost associated with purchasing the title, John is asked to confirm his willingness to pay this.
3. If there is a charge for delivering the game OTA, John is asked to confirm his willingness to pay this.

5.1.7 Operational and Quality of Experience Requirements

The User should not need to, but may be allowed to for optimization or personalization, configure the device to receive, store, or execute the game. The received game should be the correct build and version for the User's device. The game should be installed in an expected default location, or the User should be informed where the game will be installed.

5.2 Use Case User Account Management, Activate Game

5.2.1 Short Description

Activating and charging for the use of a game (phase 2). The Game Service will support various mechanisms for restricting a User's access to the game in order to implement trial use, a subscription service model, and game upgrade purchases.

5.2.2 Actors

John – User

Game Service Provider

5.2.2.1 Actor Specific Issues

John wants to play a newly obtained game in connected, or multiplayer, mode on his handset. The Game Service Provider wants to establish a user account for a new user.

5.2.2.2 Actor Specific Benefits

John gets to play the game. The Game Service Provider can associate usage with individual users.

5.2.3 Pre-conditions

John has the game client installed on his device (as previously described by Use Case 5.1). John's device allows the game application to communicate with the Game Service Provider, and must also be able to store and retrieve data written by an application. The Game Service Provider may need to be aware of device attributes such as model, operating system, firmware, storage limits, and OTA limits, to name a few. The Game Service Provider has access to valid billing information for John, and a mechanism for billing John.

5.2.4 Post-conditions

John will be charged for his use of the game.

5.2.5 Normal Flow

John launches (that is, begins to execute) the game client on his handset. The game client contacts the Game Service to ascertain whether John's usage limits have expired (Alternative flow 1a). If they have, John is asked whether he wishes to extend his limits, and is told what the cost, if any, will be. Upon responding affirmatively, the game client contacts the Game Service to establish account and billing credentials for John. After successfully, and transactionally, completing the billing request, the Game Service Provider sends a positive response to the client game, the limits stored at the Game Service are revised, and game play can proceed (Alternative flow 1b).

- Examples of usage limits are the number of times the game is started, the total duration of game play, a date at which the use of the game expires, or functional restrictions (Alternative flow 2).

5.2.6 Alternative Flow

1. a) The game client checks with local storage to ascertain whether John's usage limits have expired; b) the game client revises the local limits on the handset.

2. While playing the game, John desires to activate additional game functionality. The game client contacts the Game Service and presents John with the associated charges. When John confirms, the functionality is made available (either by unlocking functionality already present on the stored game client, or by delivering the new functionality OTA).

5.2.7 Operational and Quality of Experience Requirements

Charges for extending use should be explicit. During the billing transaction, the User should be informed of the transaction's progress. When adding additional functionality, clear instructions on how to access the new functionality must be presented.

5.3 Use Case User Participation, Player Matching

5.3.1 Short Description

Player matching on zero, one, or more attributes. When users wish to play directly against one another, they must first be matched – or grouped – in a game session or “table”. Random matching and more selective matching are discussed.

5.3.2 Actors

Alice – user

Birgitt – user

Game Service Provider

5.3.2.1 Actor Specific Issues

Alice wants to play a game.

At the same time, Birgitt also wants to play the same game.

5.3.2.2 Actor Specific Benefits

Alice and Birgitt are both able to play against each other, without previous planning or knowing each other.

5.3.3 Pre-conditions

Alice and Birgitt have functionally identical versions of the game (cosmetic differences are allowed) on their respective handsets. Both players' handsets are able to contact the Game Service.

5.3.4 Post-conditions

Alice and Birgitt are able to play the game against each other.

5.3.5 Normal Flow

Alice starts the game on her handset and selects the head-to-head option. Alice is given the option to describe her desired opponent(s) according to pre-designed, and possibly game-specific attributes. The Game Server searches through the on-line, but idle and unmatched players of the game. A match with Birgitt is made. (Alternative flow 1) Both Alice and Birgitt are notified that a match has been made. (Alternative flow 2) (Alternative flow 3)

5.3.6 Alternative Flow

1. If no matches are found, the Game Server indicates this to Alice's game.
2. Alice's and Birgitt's identities are protected through, for example, the use of self-selected nicknames or pure anonymity.
3. Alice and Birgitt may be given the option to consent to or deny this matching. If either player denies the match, it is dissolved.

5.3.7 Operational and Quality of Experience Requirements

The User should be informed of the state and progress of the matching process.

5.4 Use Case User Participation, In-Progress Games

5.4.1 Short Description

Joining an on-going game session. In many games, it will be permissible to allow players to join after the initial session has been created and after the game has begun; for some games, such as Chess or Bridge this will not apply.

5.4.2 Actors

Perri – User

Player 2, ..., Player N - Users

Game Service Provider

5.4.2.1 Actor Specific Issues

Perri wants to play a game that has already begun and is currently active.

5.4.2.2 Actor Specific Benefits

Perri can play immediately and does not need to wait to establish, or be matched into, a new game session.

5.4.3 Pre-conditions

Perri and Player 2, ... Player N, have functionally identical versions of the game on their respective handsets. All players' handsets are able to contact the Game Service.

5.4.4 Post-conditions

Perri will play the game with Player 2, ..., Player N. .

5.4.5 Normal Flow

Perri queries the Game Service for open (that is, joinable), active sessions of the game (Alternative flow 1). She selects one, in which Player 2, ..., Player N are currently playing. Perri is joined to the game session. Player 2, ..., Player N are notified that Perri has joined the game session.

5.4.6 Alternative Flow

1. Perri can be shown open, active game sessions that are prioritized according her personal preferences, such as the presence of her friends or the total number of active players, or game-specific preferences, such as the skill of players in the session.

5.4.7 Operational and Quality of Experience Requirements

When the User is joined to the game session, the game state she first sees is consistent with that of the other players, and their mutually shared game state evolves consistently. The number of open, active games presented must be sensible for the handset display capabilities and sensitive of network costs incurred by the User.

5.5 Use Case Extended Game Experience, Read Data

5.5.1 Short Description

Read data such as best scores from a server. Players will want to access information external to actual game play, such as other players' scores, or upcoming tournaments.

5.5.2 Actors

Axel – user

Game Service Provider

5.5.2.1 Actor Specific Issues

Axel wants to see data posted about a game, such as high scores or upcoming events.

5.5.2.2 Actor Specific Benefits

Axel's game experience is extended beyond the mechanics of simple game play, for example by being able to compare his own achievements in the game with people from all over the world, or by registering for upcoming competitions.

5.5.3 Pre-conditions

Axel has a handset that is able to contact the game server, and is able to receive and display text and graphical data. The Game Service may need to be aware of device attributes such as model, operating system, firmware, storage limits, and OTA limits, to name a few.

5.5.4 Post-conditions

Axel will be able to view the requested data on his handset

5.5.5 Normal Flow

Axel launches the game and selects the option 'Retrieve Best Scores' (Alternative flow 1) from the game menu. Axel is now presented with a list of the top X players and their scores (Alternative flow 2).

5.5.6 Alternative Flow

1. The data retrieved need not be scores, but may be notifications of upcoming challenge events, new feature availability, presence information, and so forth.
2. Scores may be purposefully submitted by players or automatically submitted by the game to the Game Service.

5.5.7 Operational and Quality of Experience Requirements

The amount of data sent to the handset to be displayed must be sensible for the handset display capabilities and sensitive of network costs incurred by the User.

5.6 Use Case Extended Game Experience, Post Data

5.6.1 Short Description

Writing data to a remote server. Users will want to post information external to actual game play, such as their scores or virtual goods offered for "sale".

5.6.2 Actors

Peter – User

Game Service Provider

5.6.2.1 Actor Specific Issues

Peter wants to submit and store data about his game play to the Game Service.

5.6.2.2 Actor Specific Benefits

Peter will be able to share his experience playing the game with the larger community of game players.

5.6.3 Pre-conditions

Peter has a handset that is able to contact the game server.

5.6.4 Post-conditions

Peter's submitted data will be stored, possibly after evaluation, by the game server.

5.6.5 Normal Flow

Peter has just finished playing the game, and wants to submit his score for inclusion in a best score list. (Alternative flow 1) He selects the option 'Submit score to Game Service'. The score (Alternative flow 2) is sent to the server and stored there.

5.6.6 Alternative Flow

1. Data may be submitted automatically by the game to the Game Server.
2. The data submitted may be virtual goods offered "for sale" or entered in an "auction" to other players, and other information about Peter's game play.

5.6.7 Operational and Quality of Experience Requirements

Peter should receive confirmation when submitted data have been received.

5.7 Use Case In-game Experience, Disconnect

5.7.1 Short Description

User presented with the option to exit the game if their opponent is unresponsive. Unresponsiveness may be caused by network overload, the opponent moving into a zone of poor or no coverage, the opponent shutting their phone off, or the opponent may simply be distracted from the current game session (e.g., the light turned green). ***How the last condition is handled – a reachable phone and game application, but an unresponsive player – is game specific and is not discussed here.***

5.7.2 Actors

Carly – User

Dennis – User

Game Service Provider

5.7.2.1 Actor Specific Issues

Carly does not want to wait 'forever' for Dennis's response (i.e., move) in a game. However, she does also not want to be deemed to have forfeited if she exits the game session.

5.7.2.2 Actor Specific Benefits

Carly's end-to-end experience while playing the game is smooth; neither player need be penalized or dissatisfied when the one of them is not reachable.

5.7.3 Pre-conditions

Carly and Dennis have handsets that can contact the Game Service when network service is available. The Game Service can accurately determine that a player's handset is not reachable.

5.7.4 Post-conditions

Carly exits the game yet is not penalized. She can start a new game with another player.

5.7.5 Normal Flow

Carly is playing a game with Dennis, when Dennis's game is no longer reachable by the Game Service through the network. The game, with information from the Game Service, notifies Carly (after a suitable, game-specific period). If Carly exits the game now (Alternative Flow 1) (Alternative Flow 2) (Alternative Flow 3) the game logic is responsible for deciding whether she can be declared the winner, or whether the game was a draw. Carly cannot lose the game by exiting in this condition.

5.7.6 Alternative Flow

1. Carly may be presented (game-specific) with the option to wait for Dennis.
2. Carly may be presented (game-specific) with the option to "park" the game so that she and Dennis can resume it later.
3. Upon reestablishing connectivity, Dennis is notified that Carly has ended the game session. If the game has been "parked" he will be notified of that, too.

5.7.7 Operational and Quality of Experience Requirements

The game and Game Service must wait a reasonable amount of time before declaring Dennis unreachable. Once Dennis is declared unreachable to Carly, Carly's decisions must be followed regarding exiting the game; specifically, if Carly opts to exit concurrently with Dennis reestablishing connectivity, her decision to exit is followed.

5.8 Use Case In-game Experience, Chat

5.8.1 Short Description

Text is exchanged amongst a subset of the players of a game.

5.8.2 Actors

Alice: User.

Ron: User.

Player X: User.

Game Service Provider

5.8.2.1 Actor Specific Issues

Alice wants to communicate with Ron privately to seek advice from him.

5.8.2.2 Actor Specific Benefits

Alice can share her game plan and have advice from Ron without exposing the information to other Users.

5.8.3 Pre-conditions

Alice and Ron have joined a game and both can see each other's game identities.

5.8.4 Post-conditions

Alice and Ron have communicated only to each other and without Player X seeing the conversation.

5.8.5 Normal Flow

Alice, Ron, and Player X are playing a game together. Ron examines the player list, and selects Alice to chat with. During the game, Alice and Ron use text-based messages from within the game to converse. Both are notified of incoming text message.

5.8.6 Alternative Flow

None.

5.8.7 Operational and Quality of Experience Requirements

Incoming messages do not automatically suspend or interrupt game play. Players can opt in/out of chat.

5.9 Open Issues

The Game Services Group is aware that the Use Cases described herein are only a first step in a complete Game Service. These additional Use Cases will be addressed in future releases and will account for market and technology evolution.

6. Requirements

(Normative)

6.1 High-Level Functional Requirements

REQ-1	Use Case 5.1	The Game Service MAY provide a mechanism whereby the mobile handset portion of a game can be acquired by a User..	Covered by OMA DLDRM
REQ-2	Use Case 5.1, 5.2	The Game Service SHALL provide a mechanism whereby game content and game use can be charged to, and collected from, a User.	Covered by OMA Charging
REQ-3	Use Case 5.2	The Game Service SHALL provide mechanisms to capture, store, and retrieve the: <ul style="list-style-type: none"> • number of times a game is played • date and time per user, per title	Specific to OMA GS
REQ-4	Use Case 5.2	The Game Service SHALL provide a mechanisms whereby a user can purchase services such as: : <ul style="list-style-type: none"> • additional playing time • additional playing sessions • additional features and virtual goods within the game 	OMA GS and Charging
REQ-5	Use Case 5.3, 5.4	The Game Service SHALL provide a mechanism for random (ie, no criteria) matchmaking.	Specific to OMA GS
REQ-6	Use Case 5.3, 5.4	The Game Service SHALL ensure that any User data that are securely kept will not be revealed to other Users without explicit permission from the first User to do so.	OMA REQ-IMF; OMA Privacy
REQ-7	Use Case 5.5, 5.6	The Game Service SHALL provide mechanisms whereby Users can store a score and whereby Users can retrieve a list of stored scores.	Specific to OMA GS
REQ-8	Use Case 5.3, 5.4, 5.7	The Game Service SHALL provide mechanisms that manage the membership of game sessions that: <ul style="list-style-type: none"> • Add new members to open game sessions • Remove members from game sessions • Notify members of membership changes • Accurately indicate, when feasible, the reason a member has left a game session (e.g., willful exit, unreachable device). 	Specific to OMA GS

REQ-9	Use Case 5.9	The Game Service SHALL provide a mechanism for Users to send game data (for example game moves or text) to one or all of the other players in a game session.	Specific to OMA GS
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Table 1: High-Level Functional Requirements

6.1.1 Security

REQ-10	Use Case 5.1-5.7	The Game Service SHALL ensure that any information and policies that are securely kept and maintained within the Game Service will remain so despite interactions with external systems.	See OMA-SEC
REQ-11		User SHALL be authenticated to the Game Service and permissions will be authorized.	OMA-SEC
REQ-12		A standard secure communication protocol SHOULD be used to relay users' sensitive and personal data.	

Table 2: High-Level Functional Requirements – Security Items

6.1.2 Charging

REQ-13	Use Case 5.1, 5.2	The Game Service SHALL provide secure, verifiable, non-repudiatable mechanisms whereby Users can be charged for acquiring functionality. For example: <ul style="list-style-type: none"> • The initial game download • On-going use of the game, whether in connected or single-player mode • Extensions to game functionality • The purchase of virtual goods 	OMA-MCC
REQ-14		The Game Service SHALL indicate to the User whenever charges will be incurred, the amount of the charges, and require the User's explicit consent to these charges.	OMA-MCC

Table 3: High-Level Functional Requirements – Charging Items

6.1.3 Administration and Configuration

	None
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Table 4: High-Level Functional Requirements – Administration and Configuration Items

6.1.4 Usability

REQ-15		Industry standard solutions MAY be used for filtering the message content	OMA MWG-IM
REQ-16	Use Case 5.1, 5.2	All received content SHOULD be the correct build for the User's device.	OMA BAC-MAE
REQ-17	Use Case 5.1, 5.2	All received content SHOULD be installed in an expected default location, or the User should be informed where the content will be installed.	OMA BAC-MAE
REQ-18		Though other referenced services may be independent of the gaming service, the gaming service SHOULD avoid making the user aware of that.	OMA

Table 5: High-Level Functional Requirements – Usability Items

6.1.5 Interoperability

REQ-19	Use Case 5.1-5.7	The Game Client SHALL be able to communicate with the Game Server using standard protocols, such as HTTP, TCP, HTTPS, UDP.	Specific to OMA GS
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Table 6: High-Level Functional Requirements – Interoperability Items

6.1.6 Privacy

REQ-20	Use Case 5.3-5.7	The Game Service SHALL NOT make visible, without a User's explicit permission, any information through which one User could directly contact another User.	REQ-IMF?
REQ-21	Use Case 5.5, 5.6	The Game Service SHOULD NOT expose User game play statistics or usage statistics to other Users without explicit permission from the first User to do so.	REQ-IMF?
REQ-22		The Game Service SHALL ensure that any User data that are securely kept will not be revealed to other Users without explicit permission from the first User to do so	

Table 7: High-Level Functional Requirements – Privacy Items

6.2 Overall System Requirements

REQ-23	Prereq-uisite	The game device MUST provide persistent storage to the Game Client
REQ-24	Prereq-uisite	The game device MUST provide access to date and time to the Game Client
REQ-25	Prereq-uisite	The game device MUST provide an http implementation to the Game Client

Table 8: High-Level Functional Requirements – System Requirements

6.3 System Elements

As can be seen from the requirements above, numerous independent or modular elements comprise a Game Service: billing, charging, provisioning, presence, authentication, monitoring and management. Those are the concern of other OMA enablers. Those that are specific to the OMA Game Service Enabler are :

A	Game Client, which resides and executes on a mobile device. The game client when used herein excludes game-specific logic, and refers only to the required logic to communicate with the Game Servers.
B	Game Servers, which are accessible by the Game Client.

Table 9: System Elements

6.3.1 System Element A: Game Client

	The Game Client MUST support the ability to
REQ-26	<ul style="list-style-type: none"> send data to an OMA GS Game Server
REQ-27	<ul style="list-style-type: none"> login to the Game Server and participate in authenticating a User

REQ-28	<ul style="list-style-type: none"> initiate a multiplayer game session by requesting a randomly selected opponent
REQ-29	<ul style="list-style-type: none"> receive data from an OMA GS Game Server
REQ-30	<ul style="list-style-type: none"> exploit OMA MCC payment methods when available
REQ-31	<ul style="list-style-type: none"> exploit OMA BAC-DLDRM to acquire content and services
REQ-32	<ul style="list-style-type: none"> permanently store data locally and to retrieve it
REQ-33	<ul style="list-style-type: none"> capture the date and time, and number of game sessions, per user, per game title
REQ-34	<ul style="list-style-type: none"> receive updates from an OMA GS Game Server regarding opponents' status within a game
REQ-35	<ul style="list-style-type: none"> terminate a game session

Table 10: Requirements for System Element A: Game Client

6.3.1.1 Interfaces to System Element B (Game Servers)

Within the GS architecture, there are only two components – the Game Client and Game Server. Table 9 defines the interfaces from the Game Client to the Game Server.

6.3.2 System Element B: Game Servers

	The Game Server(s) MUST support the ability to
REQ-36	<ul style="list-style-type: none"> receive data from an OMA GS Game Client
REQ-37	<ul style="list-style-type: none"> perform a login and authenticate a User
REQ-38	<ul style="list-style-type: none"> instantiate a multiplayer game session and select a random opponent
REQ-39	<ul style="list-style-type: none"> send data to an OMA GS Game Client
REQ-40	<ul style="list-style-type: none"> exploit OMA MCC payment methods when available
REQ-41	<ul style="list-style-type: none"> exploit OMA BAC-DLDRM to deliver content and services to a Game Client
REQ-42	<ul style="list-style-type: none"> capture the date and time, and number of game sessions, per user, per game title
REQ-43	<ul style="list-style-type: none"> accurately update the Game Client regarding other players' status within a game
REQ-44	<ul style="list-style-type: none"> ensure that any information and policies that are securely kept and maintained will remain so despite interactions with external systems
REQ-45	<ul style="list-style-type: none"> ensure that any User data that are securely kept will not be revealed to other Users without explicit permission from the first User to do so
REQ-46	<ul style="list-style-type: none"> terminate a game session

	The Game Server(s) SHALL NOT
REQ-47	<ul style="list-style-type: none">make visible, without a User's explicit permission, any information through which one User could directly contact another User

Table 11: Requirements for System Element B: Game Servers

6.3.2.1 Interfaces to System Element A (Game Client)

Within the GS architecture, there are only two components – the Game Client and Game Server. Table 12 defines the interfaces from the Game Client to the Game Server.

6.3.3 Network interfaces

REQ-48		The Game Client SHALL be able to communicate with the Game Server using standard protocols, such as HTTP, TCP, HTTPS, UDP.
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Table 12: Requirements for Network Interfaces

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version

A.2 Candidate Version 1_0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-RD_Game-Services-V1_0	8 Apr 2005		
Candidate Version OMA-RD-Game-Services-V1_0	23 Apr 2005		Status changed to Candidate by TP TP ref # OMA-TP-2005-0092-GS-RD-for-Review-and-Approval

Appendix B. <Additional Information>

B.1 Interoperability

In the context of the Game Service, Interoperability refers to the ability of the OMA Game Client to work with any OMA Game Server. Game Service Providers will differentiate on Quality of Service, performance, and other game-related features that are not specified in this version of the OMA Game Service. Thus, the likely reality is that a game will exploit features that are unique to a given Game Service Provider, and while the rules of some common games are invariant, the experiences provided will be vastly different. For reasons of fairness and functional interoperability, we anticipate the scenario depicted in Figure 1, where the red game is specific to and hosted by Game Service A, and the green game with Game Service B.

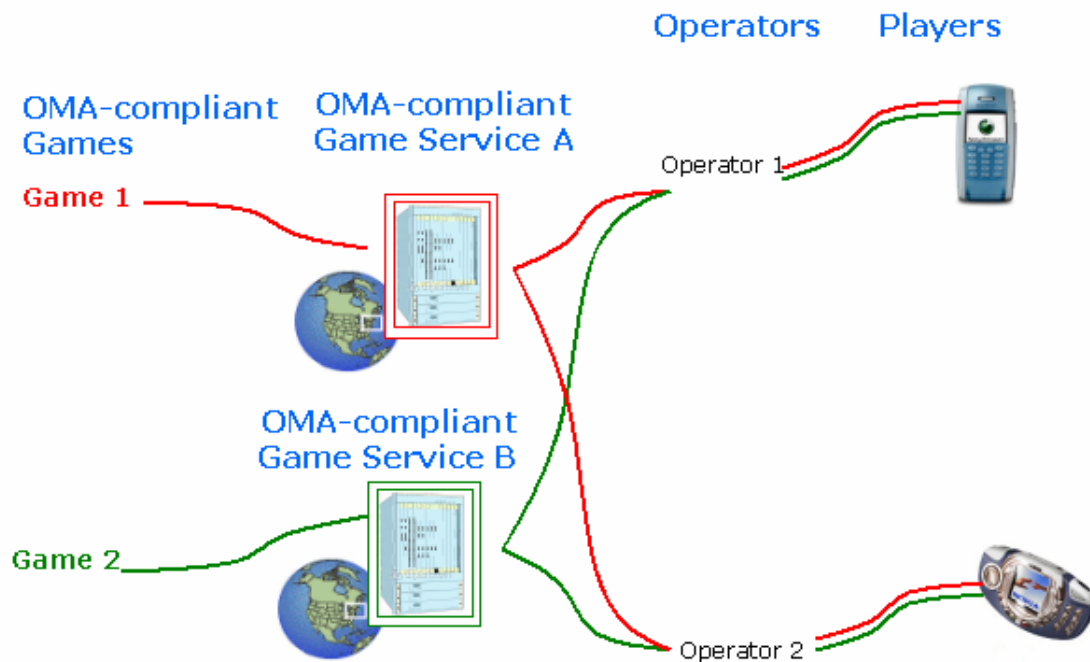


Figure 1 Anticipated interoperability

A further choice exists considering the implementation of the OMA Game Client; a handset vendor may choose to implement it directly, or it can be delivered as part of the device-resident game logic. In the former scenario, depicted in Figure 2, the game logic uses the embedded OMA client for OMA-specified tasks, and the special interfaces of the Game Service Provider for all other tasks. Embedding frees more space for game logic and, once properly implemented, minimizes QA for all games. The latter scenario, Figure 3, is likely to reach markets more quickly; the OMA game client software can be provided by a game publisher, developer, or the Game Service Provider.

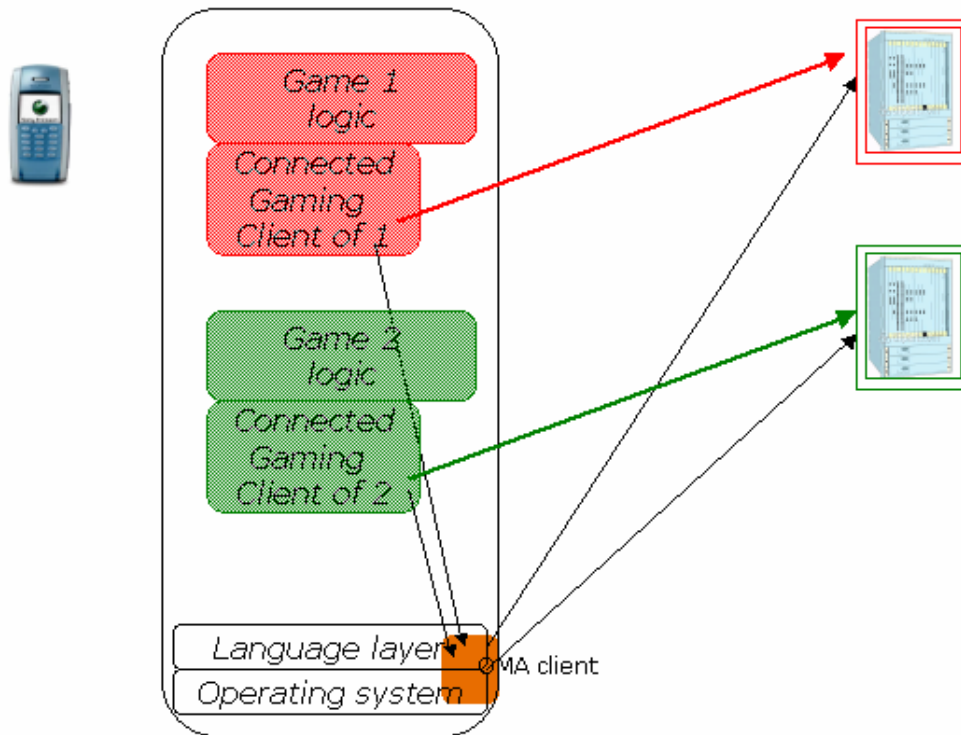


Figure 2 Embedded OMA Game Client

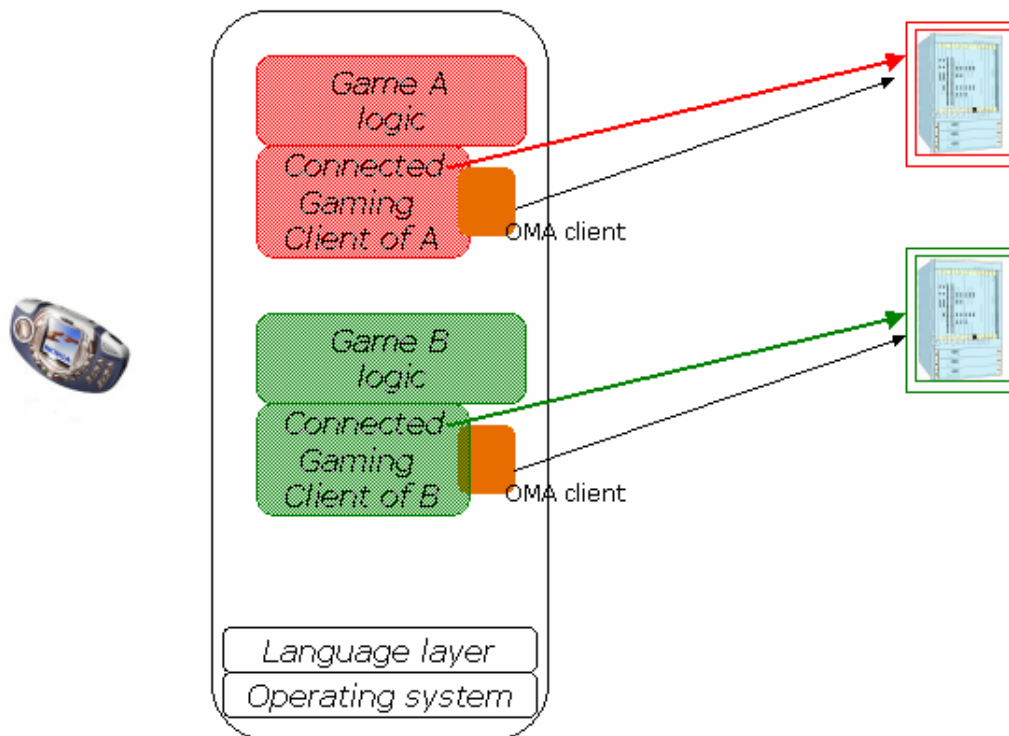


Figure 3 OMA Game Client provided as part of each game