In-Game Advertising Architecture

Candidate Version 1.0 – 04 May 2010

Open Mobile Alliance

OMA-AD-IGA-V1_0-20100504-C

Contents

Figures

1. Scope   (Informative)

This document defines the architecture of In-game advertising (IGA) Enabler. This architecture is based on the requirements listed in the IGA Requirement Document [OMA-MOBAD-RD].

The IGA Enabler architecture is to support interfacing Game-side and Advertisement-side. The architecture defines server-side and client-side IGA Enabler components, the interface(s) between them and the interface(s) exposed by those components to some entities that serves IGA Service.

Therefore, IGA AD has the scope as followings:

- IGA entities: functions for IGA service itself
- Interface to GS-CSI: Interfacing functions from/to Game Services Client-Server Interface Enabler
- Interface to MobAd: Interfacing functions from/to Mobile Advertising Enabler

2. References

2.1 Normative References

[OMA-ARCH-BEST-PRACTICES]	"Architecture Best Practices", Open Mobile Alliance™, OMA-ORG-Architecture_Best_Practices-V1_4-20081202-A, URL:http://www.openmobilealliance.org/
[OMA- IGA-RD]	"OMA In-Game Advertising Requirement Documents", Version 1.0, Open Mobile Alliance™, OMA- IGA-RD-V1.0, URL:http://www.openmobilealliance.org/
[OMA-MOBAD-RD]	"Mobile Advertising Requirements", Open Mobile Alliance™, OMA-RD-Mobile_Advertising-V1_0, URL:http://www.openmobilealliance.org/
[RFC2119]	"Key words for use in RFCs to Indicate Requirement Levels", S. Bradner, March 1997, URL:http://www.ietf.org/rfc/rfc2119.txt
[RFC2616]	"Hypertext Transfer Protocol – HTTP/1.1, R.Fielding et al, June 1999, URL:http://www.ietf.org/rfc/rfc2616.txt

2.2 Informative References

[OMADICT]	"Dictionary for OMA Specifications", Version 2.7, Open Mobile Alliance™, OMA-ORG-Dictionary-V2.7, URL:http://www.openmobilealliance.org/
[OMA-GS-CSI-AD]	"Game Services Client-Server Interface Architecture Documents", Version 1.0, Open Mobile Alliance™, OMA-GS-CSI-AD-V1.0, URL:http://www.openmobilealliance.org/
[OMA-GS-CSI-RD]	"Game Services Client-Server Interface Requirement Documents", Version 1.0, Open Mobile Alliance™, OMA-GS-CSI-RD-V1.0, URL:http://www.openmobilealliance.org/
[OMA-GS-CSI-TS]	"Game Services Client-Server Interface Technical Specification", Version 1.0, Open Mobile Alliance™, OMA-GS-CSI-TS-V1.0, URL:http://www.openmobilealliance.org/
[OMA-MOBAD-AD]	"Mobile Advertising Architecture", Open Mobile Alliance™, OMA-AD-Mobile_Advertising-V1_0, URL:http://www.openmobilealliance.org/

3. Terminology and Conventions

3.1   Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "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.

For the figures representing architecture diagrams:

- Interfaces are depicted with an arrow line;
- Interfaces which are in scope of IGA are depicted with a solid line;
- Interfaces which are not in scope of IGA are depicted with a dashed line.
- Components within the scope of IGA Enabler are depicted with a solid border line;
- Entities external to the IGA Enabler are depicted with a dashed border line;

For the figures representing call flows:

- Components within the scope of IGA Enabler are depicted with a solid border line;
- Entities external to the IGA Enabler are depicted with a dashed border line;
- Steps within the scope of the IGA Enabler are depicted with a solid arrow line,
- Steps out of scope of the IGA-Enabler are depicted with a dashed arrow line.

3.2   Definitions

IGA-Client	See definition in [OMA-IGA-RD]
IGA-Server	See definition in [OMA-IGA-AD]
Game-Server	See definition in [OMA-GS-CSI-RD]
Game-Client	See definition in [OMA-GS-CSI-RD]
Ad engine	See definition in [OMA-MobAD-RD]
Ad server	see definition in [OMA-MobAD-RD]

3.3   Abbreviations

Ad	Advertisement
IGA	In-Game Advertising
IGA-C	IGA Client
IGA-S	IGA Server
GS-CSI	Game Services – Client Server Interface
MGCF	Mobile Game Centric Function
MobAd	Mobile Advertising
OMA	Open Mobile Alliance

4. Introduction   (Informative)

This document defines the architecture of the IGA Enabler based on the IGA requirements document [OMA-MOBAD-RD].

This Architecture Document defines functional components interfaces and flows related to (list is non-exhaustive):

- Game advertising inventory model

- Handling advertising contents in game

- Handling user interaction to make Ad metrics

- Interactions between IGA and other OMA Enablers

This document describes:

- Functions of the IGA Server

- Functions of the IGA Client

- Interfaces between IGA Server and Game Server

- Interfaces between IGA Server and IGA Client.

- Interfaces between IGA Client and Game Client

The IGA Enabler defines interfaces exposed by entities that are part of the Enabler (i.e.: IGA Server and IGA Client). The IGA enabler Architecture Document describes only IGA intrinsic functional components and related interfaces.

4.1   Version 1.0

The IGA Architecture Document V1.0 addresses all of the functional requirements included in [OMA-IGA-RD].

5. Architectural Model

5.1 Dependencies

The IGA Enabler technical specifications are dependent on the following technologies:

- The HTTP 1.1 [RFC2616]as the default mandatory protocol for IGA-GS and IGA-CS interfaces.

- The MobAd Enabler for delivering Ad to IGA Enabler as described in [OMA- MobAd-AD].

- The Game Services Client-Server Interface Enabler for exchanging IGA data that relative to Ad as described in [OMA-CSI-AD].

5.2 Architectural Diagram

Figure 1: IGA architectural diagram with its interfaces

The IGA Enabler consists of mandatory components (IGA Server and IGA Client) and interfaces exposed by those components.

5.3 Functional Components and Interfaces/reference points definition

5.3.1 Functional Components (Normative)

5.3.1.1 IGA Client

The IGA Client is an IGA enabler component resident on the device that performs actions grouped in the following high-level functions:

- IGA Data acquisition and delivery function

- Handling IGA Ad function

- IGA Ad Metrics data handling function

- Delivery Ad to Game Client based on the Request

5.3.1.1.1   IGA Data acquisition and delivery function

Obtaining appropriate ads from IGA server and Ad Engine and caching them.

- Delivering Ads to Game Client

- Getting game information from Game Client

- Sending advertising model information to IGA Server

- Receiving meta-data for an Ad item from the Game Client

- Receiving game playing information from the Game Client

5.3.1.1.2   Handling IGA Ad function

- Indicating Ad contents   not prepared

- Comparing with the in-game position between game data and Ad data

5.3.1.1.3   IGA Ad Metrics data handling function

- Collecting of user's response from Game Client, Record Ad metrics data ,Separate Ad metrics from all the user interaction within game playing, and refine the valid part of metrics

- Reporting Ad Metrics to IGA Server based on policy, e.g. on-demand, real-time, or store-and-forward , valid part of metrics

- Providing metrics related feedback to IGA server and Ad Engine

5.3.1.2   IGA Server

The IGA Server is an IGA enabler component resident in the network (outside the device) that performs actions grouped in the following high-level functions:

- IGA Data delivery function

- Handling IGA Ad   function

- User / service data management function

5.3.1.2.1   IGA Data delivery function

- Receiving data from Game Server

- Delivering Ad contents to IGA Client

- Delivering Ad contents or Ad contents-related meta-data to the Game Server

- Receiving metrics data from IGA client

5.3.1.2.2   Handling IGA Ad function

- Indicating Ad content not prepared

- Preparing default Ad contents

- Indicating no Ad contents available

- Restricting the integrated Ads with game regarding of the players age

5.3.1.2.3 User / Service Data Management Function

- Maintain stage information which is related to specific advertising model

- Manage Ad and Ad rules

5.3.2 Entities External to the IGA Enabler (Informative)

5.3.2.1 Ad Server

The Ad Server is an external entity that provides Ad(s)/Ad Campaign(s) for IGA Server, and IGA Server embeds them in content that is provided to the Gamers.

IGA Server uses Ad Server functionality exposed by the Ad Server interface (MobAd-2) [OMA-MOBAD-AD].

5.3.2.2 Ad Engine

The Ad Engine is an external entity resident on the device that provides Ad(s) for IGA Client, and IGA Client deliveries them to the game Client. IGA Client also reports Ad Metrics data to the Ad Engine.

IGA Client uses Ad Engine functionality exposed by the Ad Engine interface (MobAd-1) [OMA-MOBAD-AD].

5.3.2.3 Game Client

Game Client exists in the Game Device, and is the portion of a mobile game (connected, multiplayer) that executes on the User's device; it interacts with the OMA Game Service. It may requests and receives Ad(s) from IGA Client, and presents them to the user. Game Client also reports Ad Metrics data to the IGA Client [OMA-GS-CSI-AD]

5.3.2.4 Game Server

Game Server is the part of the game service, which can provide matchmaking, lobbying, registrations, highscores and gameplay functions. It may interact with the IGA Enabler for Ads as part of Game service (e.g. requesting Ads, providing metrics data) [OMA-GS-CSI-AD].

5.3.3 Interfaces (Normative)

5.3.2.1 IGA-CS

IGA-CS is an interface exposed by the IGA Server to the IGA Client. The IGA Client uses this interface to request and obtain Ad(s), Ad Metadata from the IGA Server, sending advertising model information, as well as to report Ad Metrics data to the IGA Server.

5.3.2.2 IGA-GS

IGA-GS is an interface exposed by the IGA Server to the Game Server. The Game Server may use this interface to request and obtain Ad(s) , inform IGA Server information that relative to game, such as stage information.

5.3.2.3 IGA-GC

IGA-GC is an interface exposed by the IGA Client to the Game Client. The Game Client may use this interface to request and receives Ad(s) from IGA Client , Game Client may also reports Ad Metrics data to the IGA Client by the interface.

5.4   Security Considerations

The security considerations described in this section apply to any IGA Enabler implementation, and these considerations may result in different deployment models. Any particular security mechanism that proves to be intrinsic to the IGA Enabler specification will be addressed in the IGA Technical Specifications.

The Service Provider deploying the IGA Enabler implementation needs to ensure that all entities requiring access to information provided via the interfaces exposed by the functional components of the IGA Enabler are subject to the following security considerations:

- The entities (such as Game Client, Game Server) which report Ad Metrics data should be authenticated and authorised, but the chosen authentication/authorisation mechanisms are out-of-scope for the IGA Enabler specification.

- Specific recommendations for transport security, authentication/authorisation, data encryption, etc may be required for communication between IGA Server and IGA Client (components that exchange data over-the-air) and can be considered during the Technical Specification phase.

- The IGA Enabler implementation shall consider protecting the user data, by applying security mechanisms consistent with the applicable Service Provider security policies (e.g. including transport security, user data privacy, data encryption, etc).

- The IGA Enabler implementation shall consider security mechanisms supporting the anonymisation of personal identification information in the Ad Metrics data collected and consolidated report (e.g. user name and contact information), and/or the encryption of such personal information.

Appendix A.   Change History   (Informative)

A.1   Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2   Draft/Candidate Version 1.0 History

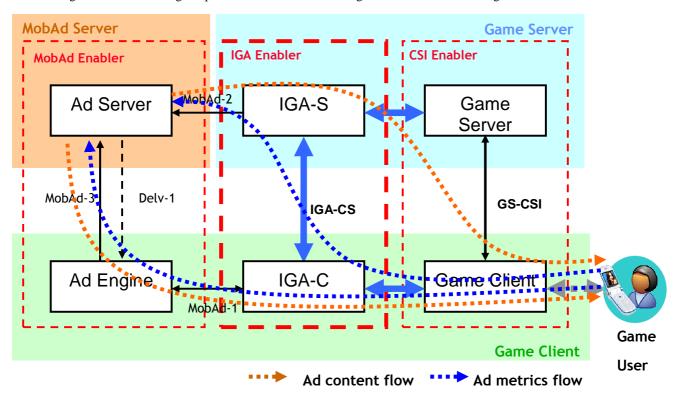| Document Identifier	Date	Sections	Description
Draft Versions OMA-AD_IGA-V1_0	16 Dec 2008	n/a	Initial Draft

	15 Jun 2009	All	Status changed to Draft (demoted) to address important class 1 CR
			    OMA-CD-IGA-2009-0031-CR_AD_Scope
			    OMA-CD-IGA-2009-0032-CR_AD_References
			    OMA-CD-IGA-2009-0033-CR_AD_Introduction
			    OMA-CD-IGA-2009-0034R01-CR_AD_Architecture_Diagram
			    OMA-CD-IGA-2009-0035R01-CR_AD_flow_model
			    OMA-CD-GS-2009-0041R01-INP_IGA_Server_function
			    OMA-CD-IGA-2009-0029R01-CR_AD_IGA_V1_0_0_20081216_D

	25 Aug 2009	All	Status changed to Draft (demoted) to address important class 1 CR
			    OMA-CD-IGA-2009-0047 -INP_IGA_Client_Function_High_Assort
			    OMA-CD-IGA-2009-0055R02-CR_IGA_AD_Conventions
			    OMA-CD-IGA-2009-0056-CR_IGA_AD_Abbreviations
			    OMA-CD-IGA-2009-0058R01-CR_IGA_AD_Dependencies
			    OMA-CD-IGA-2009-0067R01-INP_IGA_CS_interface
			    OMA-CD-IGA-2009-0078R01-INP_IGA_External_Entities

	18 Sep 2009	All	Status changed to Draft (demoted) to address important class 1 CR
			    OMA-CD-IGA-2009-0083-INP_IGA_GS_interface
			    OMA-CD-IGA-2009-0084-INP_IGA_GC_interface
			    OMA-CD-IGA-2009-0087R01-INP_IGA_AD_Ad_Contents_Flow1
			    OMA-CD-IGA-2009-0088-INP_IGA_AD_Ad_Contents_Flow2
			    OMA-CD-IGA-2009-0089R01-INP_IGA_AD_Ad_Metrics_Flow1
			    OMA-CD-IGA-2009-0090R01-INP_IGA_AD_Ad_Metrics_Flow2

	20 Nov 2009	App.B	Status changed to Draft (demoted) to address important class 1 CR OMA-CD-GS-2009-0109R01-CR_Reuse_Report_Metrics_data_in_f

	29 Jan 2010	All	Status changed to Draft (demoted) to address important class 1 CR
			    OMA-CD-GS-2009-0094-INP_IGA_AD_Ad_Contents_Flow3
			    OMA-CD-GS-2009-0096-CR_IGA_Client_catch_Function
			    OMA-CD-GS-2009-0107-INP_IGA_Client_reports_metrics_to_IGA
			    OMA-CD-GS-2009-0113R01-CR_Refine_IGA_Architectural_Diagr

	03 Feb, 2010	All	Incorporates the agreed contributions: OMA-CD-GS-2009-0080-INP_IGA_AD_Section_4.1.zip; OMA-CD-GS-2010-0013R01-INP_AD_Draft_for_Sorrento.doc
	14 Apr, 2010	All	Incorporates the agreed contribution: OMA-CD-GS-2010-0027-ADRR_Comments_A05
Draft Version OMA-AD_IGA-V1_0	04 May 2010	All	Status changed to Candidate by TP TP Ref# OMA-TP-2010-0195- INP_IGA_1_0_AD_for_Candidate_approval

Appendix B. Flows (informative)

B.1   General flow of IGA

B.1.1   Flow Model

To provide IGA service, interactions between MobAd, IGA and CSI are important.
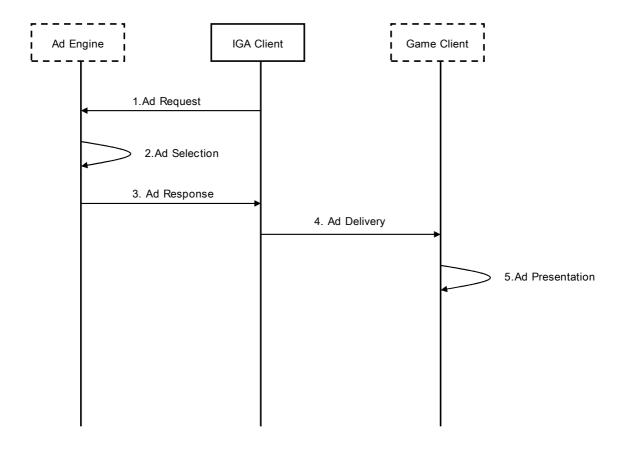
The flowing flows are indicating the path of Ad contents delivering and Ad metrics collecting between the three enalbers.

Flows

- Ad Content Flow 1: the Ad contents deliver to IGA-C through Ad Engine and pass to Game Client.

- Ad Content Flow 2: the Ad contents send to IGA-S and relay to Game Server. The Ad contents are stored in Game Server temporary and downloaded to Game Client when the right time to display the contents comes.

- Ad Metrics Flow1: the game actions from users are collected by Game Client. The actions pass to IGA-C and IGA-C separates game actions and Ad metrics and sends the metrics to Ad Engine. Ad Engine uploads the metrics to Ad Server

- Ad Metrics Flow 2: the game actions from users are collected by Game Client. The actions pass to IGA-C and IGA-C uploads the actions to IGA-S to make Ad metrics by combining Game Server data and user actions. Then IGA-S sends the combined Ad metrics data to Ad Server.
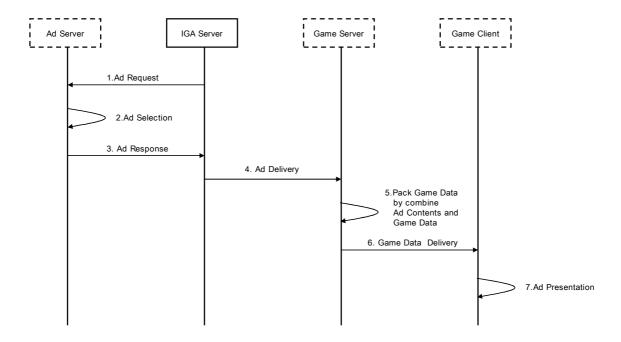
B.1.2   Ad Contents Flow 1

This call flow is started by IGA client execution logic.

1. IGA Client requests Ads from the Ad Engine. The request may contain some contextual information such as:

   - Ad App ID (IGA Client)

   - Ad inventory format

   - Ad size and positioning

   - Content metadata information available to the Ad App (e.g. webpage meta tags indicating user is browsing an automobile web site and would be interested in car Ads, or the topic in case of an Ad-enabled game (soccer))

   - An indication of the urgency of the request, e.g. time-to-live (TTL)

2. The Ad Engine executes the Ad selection logic that analyses Ads stored in the Ad Engine's cache. This Ad selection may result in one, several or no Ads. If needed, the Ad Engine may communicate with the Ad Server, for the purpose of obtaining more Ads (as described in [OMA-MobAd-AD] Appendix B.3)

3. The Ad Engine returns the results of the Ad selection. A selected Ad is accompanied by a unique Ad ID.

4. The returned Ad contents are delivered to Game Client depended on IGA Ad deliver policy and condition.

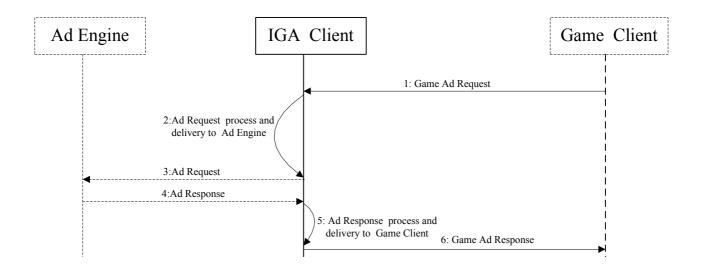5. Game Client presents Ad contents when they are applicable.

B.1.3   Ad Contents Flow 2

This call flow is started by IGA Server execution logic.

1. IGA Server requests Ads from the Ad Server. The request may contain some contextual information such as:

   - Ad SP ID (IGA Client)

   - Ad inventory format

   - Ad size and positioning

   - Content metadata information available to the Ad SP (e.g. webpage meta tags indicating user is browsing an automobile web site and would be interested in car Ads, or the topic in case of an Ad-enabled game (soccer))

   - An indication of the urgency of the request, e.g. time-to-live (TTL)

2. The Ad Server executes the Ad selection logic that analyses Ads stored in the Ad Server's database. This Ad selection may result in one, several or no Ads.

3. The Ad Server returns the results of the Ad selection. A selected Ad is accompanied by a unique Ad ID.

4. The returned Ad contents are delivered to Game Server depended on IGA Ad deliver policy and condition to combine Game Server's game logic and data

5. Game Server makes Game Data Package by combine Game Data and Ad Contents

6. Game Server delivers Game Data Package

7. Game Client presents Ad contents when the Game Data played.
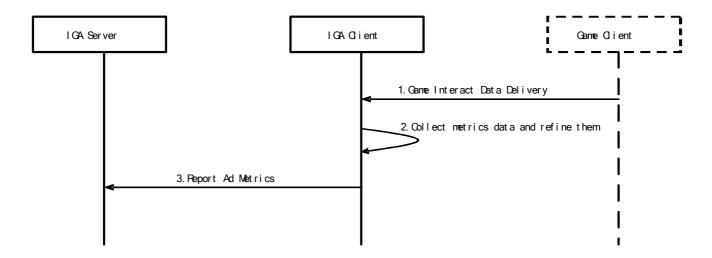

B.1.4   Ad Contents Flow 3

This call flow is triggered by game internal execution logic, for example in a specific scenario .

1.   Game Client requests Ads from the IGA Client. The request may contain some contextual information such as:

   ●   Game ID

   ●   Ad presentation format

   ●   Ad size and positioning

   ●   Meta-data relative to the Game (e.g. topic or scenario)

2.   The IGA Client may process the Game Ad request, if no Ad in its buffer, it may initiates an Ad request to Ad Engine.

3.   The Ad Engine executes the Ad selection logic that analyses Ads stored in the Ad Engine's cache. This Ad selection may result in one, several or no Ads. (as described in MobAd Appendix B.3)

4.   The Ad Engine returns the results of the Ad selection. A selected Ad is accompanied by a unique Ad ID.

5.   IGA Client may process the Game Ad request, then return Game Ad Response to Game Client.

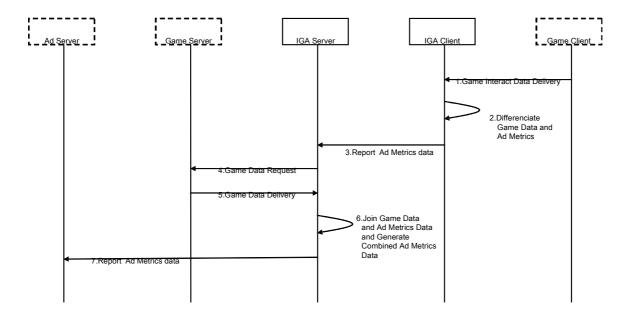Notes: Step 3 and 4 are out of scope.

B.1.5   Ad Metrics Flow 1

This call flow is started by Game Client execution logic.

1. Game Client delivers Game Interaction Data to IGA Client

2. IGA Client differentiates Ad Metrics from Game Interaction Data , then analyses and refines the collected metrics data based the policy

3. IGA Client reports Ad Metrics data to Ad Engine.

B.1.6 Ad Metrics Flow 2

This call flow is started by Game Client execution logic.

1. Game Client delivers Game Interaction Data to IGA Client

2. IGA Client takes apart Ad Metrics from Game Interaction Data, and then analyses and refines the metrics data based the policy.

3. IGA Client reports Ad metrics data to Ad Engine.

4. IGA Server requests related game data to Game Server.

5. Game Server delivers the game data to IGA Server.

6. IGA Server joins the Ad Metrics and game data from Game Server and generates Combined Ad Metrics.

7. IGA Server reports the 2nd level Ad Metrics data to Ad Server.