# Initial Thoughts About MobAR Architecture

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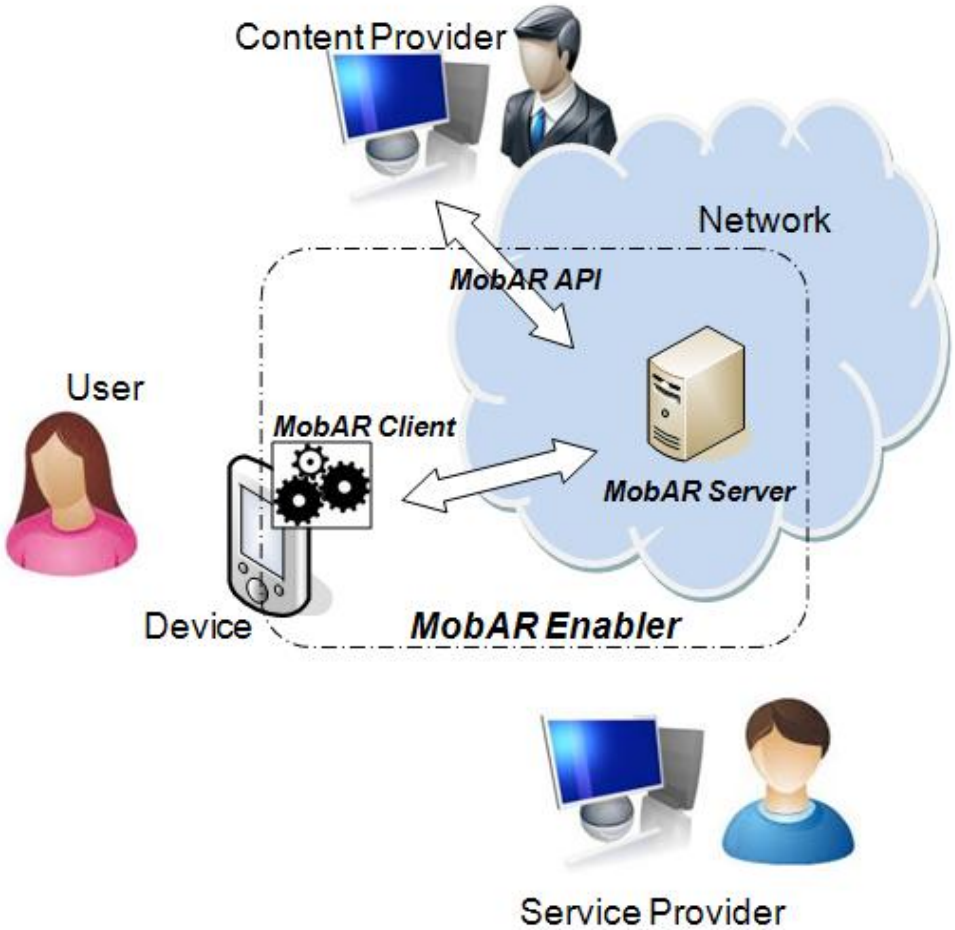
# Introduction

- This contribution proposes to develop the architecture of the MobAR Enabler based on the MobAR requirements identified in [1].




[1] http://member.openmobilealliance.org/ftp/Public_documents/CD/Permanent_documents/OMA-ER-MobAR-V1_0-20110331-D.zip

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# Objective and Scope

- MobAR AD is intended to define functional components, interfaces between functional components and flows related to the following key functionalities identified in MobAR REQ (list is non-exhaustive):
  - MobAR content management (e.g. naming, indexing, association);
  - Filtering of MobAR content;
  - Contextualisation and Personalisation of MobAR contents;
  - MobAR content aggregation;
  - Retrieval & Delivery of MobAR content;
  - Support for cache and caching policy management;
  - Access to Capabilities – Device & Network;
  - Collection and use of MobAR metrics data;
  - Creation and storage of AR View;
  - Support for Network and Client APIs to support MobAR applications.

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# General considerations

- The architecture should be defined as a logical componentized framework such as control, transport and management functions should be arranged in a transparent way;
- The architecture should form the bases for individual AR applications to access AR Contents and/or AR-related functionalities;
- The architecture should be flexible to be deployed, as internal functionalities, in a distributed fashion using cloud computing mechanisms;
- Re-use of technologies already defined in other existing enablers.

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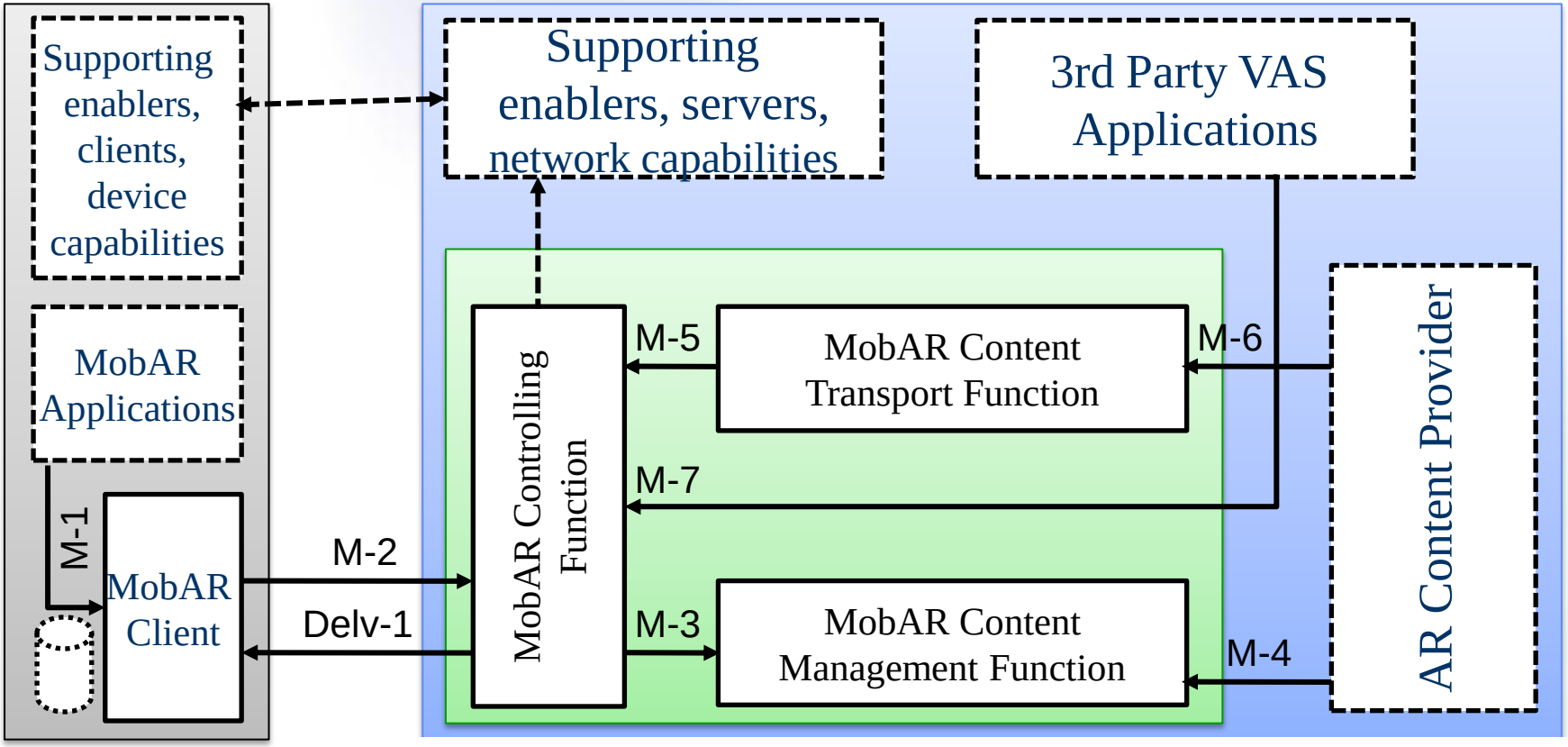
# MobAR Architecture Diagram




Legend:

Components specified by MobAR Enabler.

Components not specified by (external to) MobAR Enabler.

Indicates use of an interface exposed by a MobAR Component. The Component offering or exposing this interface is indicated by the arrowhead.

Indicates use of an interface exposed by an Enabler/Component external to MobAR Enabler.

**M-n** Indicates "MobAR-n" interface identifier

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# MobAR Functional Components (1)

- **NOTE:** Other functionalities supported by the following functional components is FFS.
- **MobAR Client:** The MobAR Client is a MobAR Enabler component resident in the device that performs actions grouped in the following high-level sub-functions:
  - Retrieval and rendering of aggregated AR Content (e.g., marker).
  - Access information from the sensors on the device (e.g. accelerometer, compass)
  - Provide means to the User to specify and update settings and preferences
  - Creation and storage of a multimedia object based on the of AR View.
- **MobAR Application:** The MobAR Application is an external entity resident on the device that accesses MobAR enabler functionalities to provide a specific AR services (e.g. target acquisition, target tracking, gesturing, visual search, and face recognition).
- **External resources:** The following resources (external to MobAR Enabler) resident on the device which provide key role in different aspects of augmentation.
  - Device capabilities (e.g. camera, GPS, screen resolution)
  - Supporting enablers (e.g. DM, XDM, PUSH)
  - Other clients

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# MobAR Functional Components (2)

- **MobAR Controlling Function:** The MobAR Controlling Function is a MobAR Enabler component resident in the network that performs actions grouped in the following high-level sub-functions:
  - AR Content selection function
  - AR Content aggregation
  - AR Content delivery function
  - AR Content metrics and user's feedback data handling function
  - Gather and process User's Contextualization and Personalization data.
- **MobAR Content Management Function:** The MobAR Content Management Function is a MobAR Enabler component resident in the network that performs actions grouped in the following high-level sub-functions:
  - Manage AR Contents and AR Contents Metadata.
  - Manage User's Contextualisation and Personalisation data;
  - Manage MobAR deployment rules;
  - Manage AR Content association with AR Targets;

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# MobAR Functional Components (3)

- **MobAR Content Transport Function:** The MobAR Content Transport Function is a MobAR Enabler component resident in the network that performs actions grouped in the following high-level sub-functions:
  - Receive AR Content requests from MobAR Controlling Function;
  - Obtain AR Content from the AR Content Provider and send to MobAR Controlling Function;
  - Handle AR Channels related to AR Content delivery;
  - Cache AR Contents received from the AR Content Provider;
  - Update cache (e.g. delete) AR Contents previously received from the AR Content Provider.
- **AR Content Provider:** A network resident external entity to MobAR Enabler which advertises availability and deployment rules of AR Contents as well as provides AR Contents to MobAR enabler.

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# MobAR Functional Components (4)

- **3rd Party VAS Applications:** The 3rd Party VAS Applications (external MobAR Enabler) are applications that are resident in the network, and interact with the MobAR Controlling Function in order to access functionalities and related information in the MobAR Enabler to build and customize AR services and applications including insertion of “content screening”, “Advertisements”, “personlized multimedia objects”.
- **External resources:** The following resources (external to MobAR Enabler) resident in the network which provide key role in different aspects of augmentation.
  - Network capabilities including computing(e.g. image recognition, code reader), storage, connectivity, etc.
  - supporting enablers (e.g. XDMS, LOC, PUSH, DPE ) for user preferences/settings, location, delivery mechanisms, and device profile evaluation.
  - Other servers for various purposes such as adding a value to AR service.

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# MobAR Interfaces (1)

- **NOTE:** a) support of other operations of interfaces and b)whether additional interfaces are needed, is FFS in the further development of the release.
- **MobAR-1:** is an interface exposed by the MobAR Client to the AR Apps. The AR Apps use this interface to access AR Contents and AR-related functionalities (e.g. target acquisition).
- **MobAR-2:** is an interface exposed by the MobAR Server to the MobAR Client. MobAR Client use this interface to request AR Contents (e.g. PULL).
- **MobAR-3:** is an interface exposed by the MobAR Content Management Function to the MobAR Controlling Function to select the right AR content based based on specific criteria (e.g. user location or user preference).
- **MobAR-4:** is an interface exposed by the MobAR Content Management Function to the AR CP. The AR CP uses this interface to advertise the availability of AR contents and/or manage the deployment rules for AR contents.

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# MobAR Interfaces (2)

- **MobAR-5:** is an interface exposed by the MobAR Controlling Function to MobAR Content Transport Function. The MobAR Content Transport Function uses this interface to forward AR Contents requested by MobAR Controlling Function.
- **MobAR-6:** is an interface exposed by the MobAR Content Transport Function to AR Content Provider. The AR Content Provider uses this interface to send AR Contents requested by MobAR Content Transport Function.
- **MobAR-7:** is an interface exposed by the MobAR Controlling Function to 3rd Party VAS Applications. The 3rd Party VAS Applications uses this interface to build and customize AR services and applications.
- **Delv-1:** is an interface exposed by the MobAR Client to the MobAR Controlling Function. The MobAR Controlling Function use this interface to deliver AR Contents (e.g. PUSH).

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# Recommendations

- Consider the proposed architecture and related guidelines to develop MobAR AD.

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