



Mobile integration Server (MIS) High Level Design

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1. Document Purpose and Scope

The purpose of this document is to present the high level design of the MIS Web/Mobile Integrator. This High Level design mainly confines itself to a description of the services provided by the application, and the interfaces through which it communicates with other systems and the outside world.

Implementation details are included but only to support a description of the limitations of the current architecture, and a justification of a migration to a full Enterprise solution.



2. Target Audience

This document is primarily intended for technically aware business decision makers. It is structured to provide the information necessary for them to determine whether MIS is suitable for their particular business requirements.

Every effort has been made to minimize the use of technical jargon, and where this is used it should be understandable, either by the context in which it is used, or directly through a nested definition.

Technical staff should use this document as context for the technical information covered in the detailed design.



3. Document Structure

This document starts by defining the purpose of the Mobile Integration Server (MIS), including a justification for its existence and then clearly defines the scope of its operation and demarcation from the business systems it serves.

A high level context diagram is presented early on, which acts as the focal point of this design. All subsequent chapters reference this context diagram.

The context diagram shows each discrete service. These are then described in terms of their features, modes of operation, and dependencies. Then each service interface is described, so that all interactions across the interface are properly understood, and to allow prototype clients to be implemented.

The document then moves on to describe the non functional limitations of the current implementation, and describes an alternative platform and migration plan. It is important to emphasise that these limitations and the migration is NOT a requirement before completing a full working product. Only the most demanding of environments would demand a re-implementation.

Finally this document describes how the system as a whole will be installed, configured, and administered.



4. Context

The last 5 years have seen a substantial growth in the mobile and hand-held IT market. It is becoming increasingly apparent that soon the personal computer will be some form of generic mobile device rather than the traditional desktop machines of the past. This trend can be seen in the larger and larger share of the PC market being taken by laptop, palm top and small mobile phones with qwerty keyboards and traditional office software.

Hardware and software vendors are scrambling to produce attractive new devices and standards are rapidly emerging for the way data is stored and transmitted between devices and the ubiquitous WEB. Nevertheless integrating SMS, MMS, streamed video etc into a traditional business with a web presence remains a daunting undertaking for most companies. Why?

Whilst the mobile gateway providers have settled on HTTP as the interface between themselves and their customers, exploiting these services requires a web server, database and technical staff with the necessary IT integration skills to exploit that interface.

Whilst mobile phone manufacturers are increasingly adopting a set of standards for text, image, audio and video, the support is very patchy and the way SMS, MMS streamed video etc. are packaged and uploaded to the web varies substantially between mobile phones.

Moving from phone to web and back requires that you bridge the gap between the various networks and this coverage is only now beginning to be comprehensive. It is all too easy to sign up with a mobile phone gateway that has partial coverage, unreliable infrastructure or both.

The traditional mediums and technologies of the web do not match those of mobile phones and there remains substantial challenges when transforming from the encoding standards used on mobiles and those required or liked on the web.

COST. Assuming the company is prepared to accept the substantial development and support costs associated with hand cranking their own solution, they also need to enter into a costly monthly arrangement with a gateway provider where they are charged for the numbers the customer uses on top of losing a large percentage of the charge-back made against the customers mobile account. This financial double whammy means that unless they have a very high level of confidence in the traffic they will receive, they are unlikely to enter into a direct arrangement with a gateway provider.



5. Function

MIS is a mobile phone to web integration product. It bridges the gap between the technology used by mobile phones and that typically used in the World Wide Web.

As such MIS is a type of software product known as middle-ware. Middle-ware sits 'in the middle' between different technologies providing a seamless way of communicating back and forth between them.

It is important to appreciate that this is a technology to technology bridge. Middle-ware is not (and should not) be concerned with how the data is used by an organization or business and MIS adheres closely to this principal. MIS is not a business system to business system integration product.

MIS provides a flexible set of services which can be utilized by a business that wishes to integrate mobile messaging into its existing IT systems. It is a turn-key solution which combined with a mobile gateway contract, enables a business to quickly incorporate mobile users into their customer base, or increase the technology options for interacting with existing customers.

Without MIS a business which wishes to incorporate mobile messaging, would have to directly interact with the gateway between the cellular mobile phone network and the Internet. This is a substantial technical challenge as can be seen by a cursory glance at the feature list for MIS. Technical staff would be engaged for months/years in duplicating this functionality rather than concentrating on incorporating mobile messaging into their existing systems.

During MIS development it has become apparent that its interface to an aggregator can readily be extended to send and receive the mobile media feed directly from the carriers.

By adding this layer the integration hub could be used to provide aggregator services and allow the very latest technologies to be incorporated into its portfolio of value added services to business.

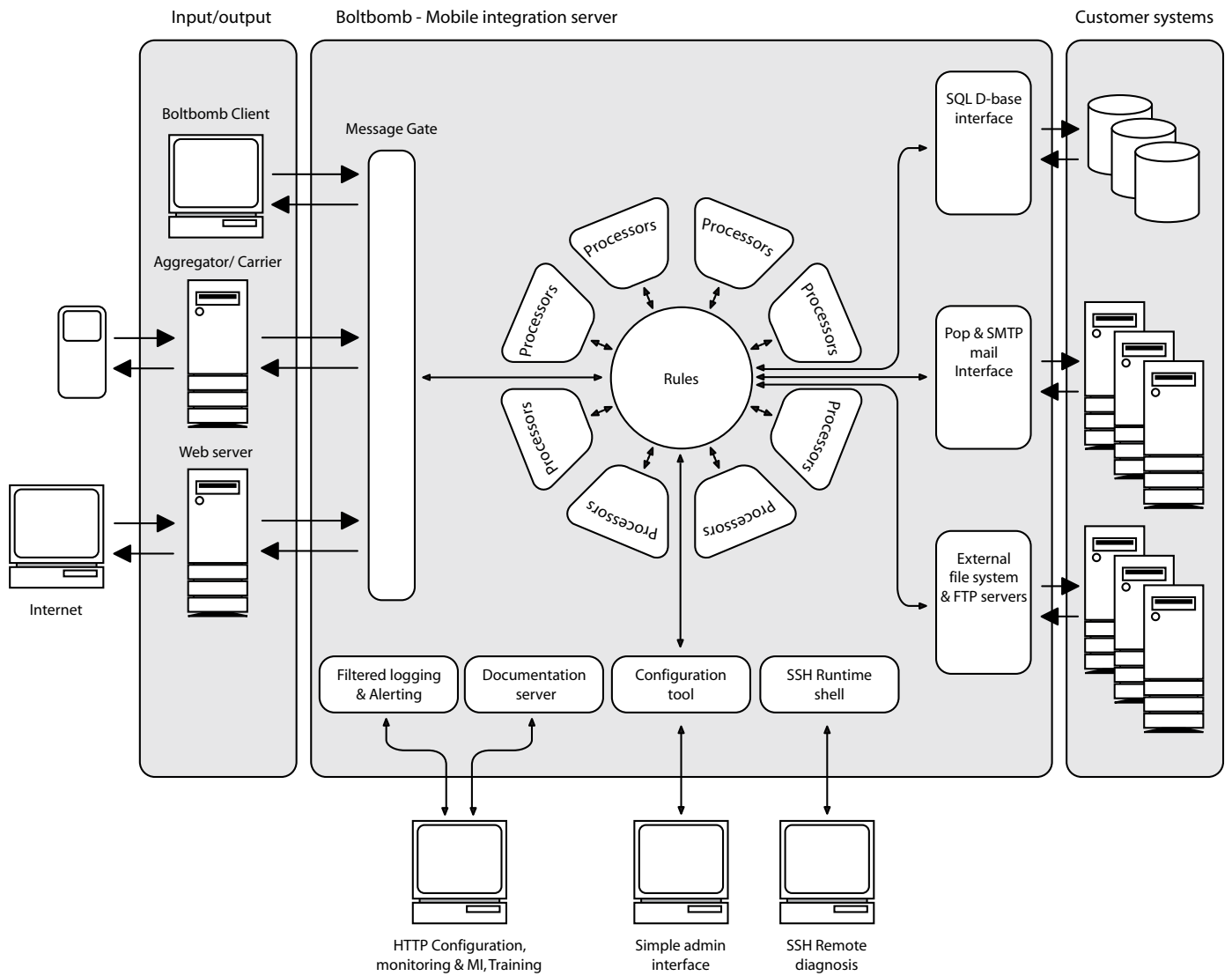


6. Functional Requirements - feature list

As you will see MIS is a feature rich product. Its container based architecture and choice of underlying technology makes it very portable and highly resilient. It also has a very modular design allowing components to be used in configurable chains to provide the particular functionality required at the customer site.

- Runs as a self contained Unix Daemon or Windows Service and does not require a Web Server.
- Multiple deployment options. Can be hosted on the same hardware as the customers web site/business systems, on it's own dedicated hardware inside the customers organization or by a third party on a different but accessible network.
- Highly portable and robust, based on open protocols, standards and languages.
- Receives inbound SMS and MMS communication from mobile users.
- Sends outbound SMS and MMS messages to mobile users.
- Can stream inbound and outbound video to and from mobile phones and streaming video players and streamers.
- Processes inbound messages and transforms them from a encoded stream of data into recognizable text, images, videos and sound files.
- Transforms text files, images, videos, sounds files etc into a data stream that can be sent to a mobile phone.
- Provides a configurable way to transform any mobile phone media type to any typical media type used on the web or in business and visa versa. So will for instance automatically convert a 3gp mobile phone movie with sound to a flash movie with sound as used by YOUTUBE and other such sites.
- Can transform a mobile phone message into an Internet mail with attachments and send it.
- Can transform a Internet mail with attachments into a mobile phone message with multimedia content and send it.
- Can serialize mobile messages into an embedded SQL Database which can be queried by any SQL client system whether local or remote.
- Can serialize mobile messages directly to the customers Relational Database Management System provided that the customer duplicate the database structure of MISs embedded database as described in 5.11.
- Can serialize mobile messages into a local or remote file system using a unique directory and file naming scheme.
- Provides filtered logging and alerting based on traffic, which can be used for management information and security audits.
- Provides instantly viewable status information.
- Provides a highly secure mechanism for debugging runtime problems and mis-configurations through a Secure Shell Interface to its internals.
- Incorporates an embedded micro web server through which it is configured and documented. Install and start MIS and use your browser to read its documentation and configure it.
- Comes complete with a set of script-able standalone applications and clients which can be combined to create new applications. All the functionality incorporated in MIS are available as discrete functional programs for the customer's technical staff to utilize.

6.1 Context diagram





7. MISs Architecture

7.1 MIS Container

MIS itself is a container which runs a number of services. This container manages and monitors the underlying services. The failure of one or all underlying services will not stop the container which is free to restart services, provide diagnostics, and alert technical support staff.

It is this container architecture that gives MIS its tremendous resilience. Additionally this architecture means that the customers site is free to run only the services that are required and to choose how many instances of any given service to have running at the same time, providing limitless vertical scalability.

7.2 Rules and Processing Hub

At the heart of the Container is a Rules and Processing hub, inbound mobile messages are intercepted and processed by content, dependent upon the rules that have been set up using the configuration service.

7.3 Services

7.3.1 Messaging Gateway Service

Almost all mobile web messaging is carried over HTTP today. Therefore any middle-ware in this space must incorporate an HTTP service which can send and receive using tradition HTTP PUT/GET. MIS includes an embedded HTTP Server which can be access by the following clients.

7.3.1.1. Standalone Desktop Client

This is a traditional desktop application which simply allows media to be packed together into HTTP messages and posted into the HTTP Service. This enables businesses that have large volumes of existing media to batch load this into MIS without using a mobile phone. It also permits remote testing of MIS without the need for a mobile phone.

7.3.1.2. Aggregator or Carrier Client

This is the common case where a carrier or aggregator posts in the incoming mobile messages, MIS then intercepts the submission and processes according to the appropriate rule.

7.3.1.3. Browser Based Client

Since MIS includes an embedded HTTP Server it can also service browser based clients from its own web pages or by redirection from other sites. Some of MISS processors such as the media transformation engine are of general use rather than being locked to only the requirements of mobile messaging.

7.3.2 HTTP Filtered Logging and Alerting Service

Another function of the embedded HTTP Server is to provide browser access for systems administrators to the logs and alerts that are generated by MIS. Obviously these logs are access controlled and can be filtered by keywords or processing rule to allow these interested parties to inspect the resources without the need to directly access the hardware.

7.3.3 HTTP Documentation Service

The most appropriate way to learn about MIS is to connect to it's HTTP based documentation server. This means that the entire product is electronically packaged with no requirement for bulky manuals, or optical media.

7.3.4 HTTP Configuration Service

Once a new user has understood MISS documentation they then connects via HTTP to the configuration service that allows them to configure MIS to their use case. Once configured the service then compiles their rules and starts the services necessary to fulfill them.



7.3.5 SSH Runtime Shell Service

Runtime administration of the system and dynamic reconfiguration is achieved by connecting via ssh to the internals of MIS. The embedded ssh service provides a highly secure and very flexible way for administrators to do their work without cluttering the task with unnecessary eye candy.

7.3.5.1 Remote Runtime diagnostics

In addition the ssh runtime shell allows an administrator to inspect the workings of MIS directly looking inside the python runtime environment and all MISS objects, making it very easy to pinpoint problems.

7.3.6 File System Services

Invariably SMS and MMS message contents need to be serialized either to an external Database or local/remote File System. Additionally the media and text in the file systems needs to be incorporated into HTTP messages and dispatch to end user mobile phones. File System Services provides a set of generic functions which can be used interactively or in a batch environment using its scheduler.

7.3.7 FTP Services

Where file systems are remote and not accessible via NFS/shared network drives the FTP service allows remote file systems to be the recipient of serialized messages or the origin of messages to end mobile users.

7.4 Interfaces

Databases, mail servers and other subsystems expose standard interfaces and MIS includes modules which can talk to these interfaces.

7.4.1 SQL Database Interface

An essential interface which allows messages to be serialized to ODBC compliant Relational Databases like ORACLE, DB2 UDB, MYSQL, Microsoft SQLSERVER etc. etc.

7.4.2 Internet Mail Interfaces

Another common case is where mobile messages need to be transformed to or from Internet mail MIME messages. MIS includes POP/IMAP client libraries and micro servers to ease the task of blending mobile messaging with traditional electronic mail.