Component Description – MAS

Content

History

Version	Date	Adjustments
A	2006-10-11	First revision. (ERMTERI)
B	2006-12-04	Minor changes. Updated 3PP table (ERMKESE)
C	2007-06-18	Minor changes. Updated 3PP table (ermkese)
D	2008-02-03	Minor changes. Updated 3PP table (emahagl). Added info about Charging Account Manager.

1 Introduction

This document describes the Media Access Server (MAS) component. MAS is used to execute CCXML/VoiceXML Applications accessed using SIP and XMP.

2 Requirements

The following requirements have been identified on the MAS component

1. Execute VoiceXML documents according to VoiceXML 2.1
2. Execute CCXML documents according to CCXML 1.0 2004-04-30
3. Concurrently handle voice and video calls.
4. Offer a SIP interface for service initiation
5. Offer an XMP interface for service initiation
6. Offer the Application access to various services in the System

3 Functions

3.1 Application Execution

MAS basic functionality is to execute Voice and Video Applications implemented in one or several CCXML and VocieXML documents.

A CCXML document defines the Call Control e.g. creation, answering calls.

A VoiceXML document drives the dialog towards the caller e.g. playing prompts, interpret DTMF entered by the caller, record messages etc.

Normally the VoiceXML and CCXML documents are compiled when MAS starts, but external documents may be retrieved and compiled at request time.

A MAS without an Application cannot handle any calls at all, not even answer a call. In order to do so an Application package and possibly one or several related Media Content packages has to be installed on top of MAS.

Application execution is initiated in one of two ways:

1. A received telephony call via SIP
2. A received Service Request via XMP (ref. [1])

When execution starts, a CCXML document is loaded and executed. Possibly the CCXML document may start a VoiceXML dialog either direct or after it has created an outbound call. Then, MAS executes the VoiceXML document indicated in the start of the dialog. The initial VoiceXML document then may refer to other precompiled or external VoiceXML documents.

Because of the characteristics of VoiceXML MAS also offers *Text to Speech* and *Automatic Speech Recognition* services through external interfaces to such engines.

3.2 Access to System services

MAS publish an interface, Platform Access, used to access various services in the System framework.

The following services are available through this interface:

1. *User register* in order to retrieve and set subscriber profiles
2. *Provisioning* in order to create and delete subscribers
3. *Storage* in order to manage a subscribers mailbox
4. *SMTPStorage* in order to send messages to subscribers in the system or external subscribers.
5. *Event reporting* in order to send traffic events to the event repository
6. *Service Requests* in order to receive or send requests from services defined in the XMP spec.

3.3 Management Information Base (MIB)

MAS publish a Management Information Base (MIB) accessible through SNMP.

3.3.1 Supervision

The MIB contains the following supervision information.

1. General information such as component name, installation date etc.

2. Status such as operation state, uptime etc.
3. Provided Services such as number of current call, peak calls, if the service is operational etc.

3.3.2 Operation

The MIB also contains entries for operating the MAS. Using SNMP, an operator can set the administrative state (locked/unlocked/shutdown) and issue a reload of the MAS configuration.

3.4 Call monitor

3.4.1 Current calls

MAS include a Call monitor which is used in run-time to monitor active calls. The tool has a textual interface.

When used, the tool presents information about involved telephone numbers, call initiator, call state etc for each current call.

3.4.2 Call Statistics

The tool also provides statistical information about number of historical calls (accumulated calls, peak calls etc.).

3.5 Application and Media Content Package builder

When an Application package or a Media Content Package is needed Appliction and Media Content Package builder is used.

For Application Package creation the builder takes a set of CCXML and VoiceXML documents and creates a MAS installable package.

For Media Content Package creation the builder takes a set of media definition files and the media files themselfes and creates a MAS installable package.

This process is described in detail MAS Customization Guide.

4 Architecture

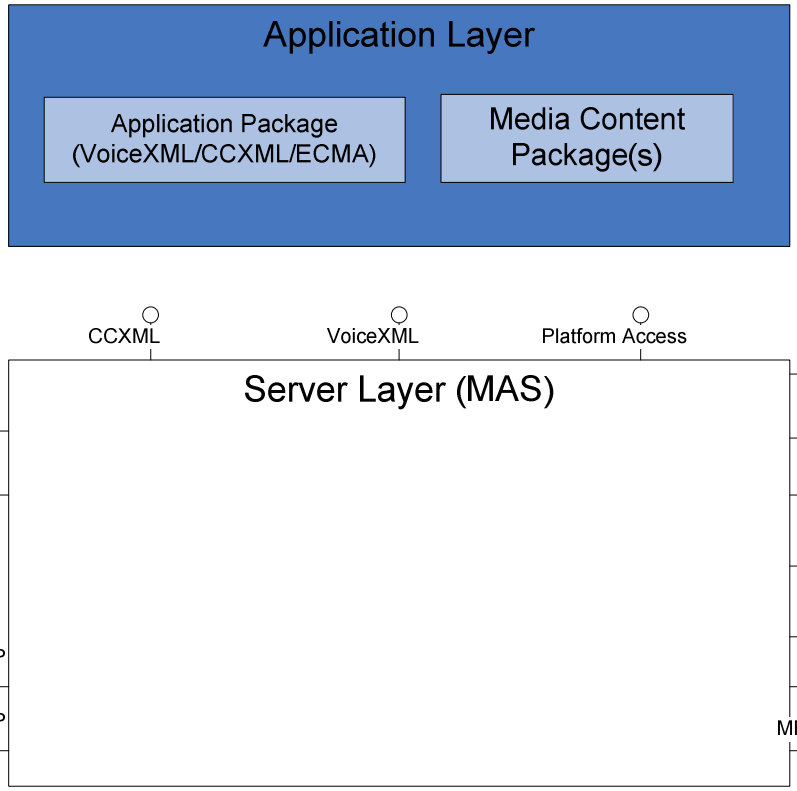

Figure 1 MAS environment and architecture

The figure above shows the MAS external interfaces and the basic architecture with Application and Media Content packages.

Note that for the SIP and XMP interfaces MAS plays the role both as a server and as a client.

5 Delivery Object(-s)

MAS include the following delivery objects:

1. MAS component, used for Application execution
2. Application and Media Content builder used for Application and Media Content Package creation.

6 Design Object(-s)

The internal architecture is shown in Figure 2.

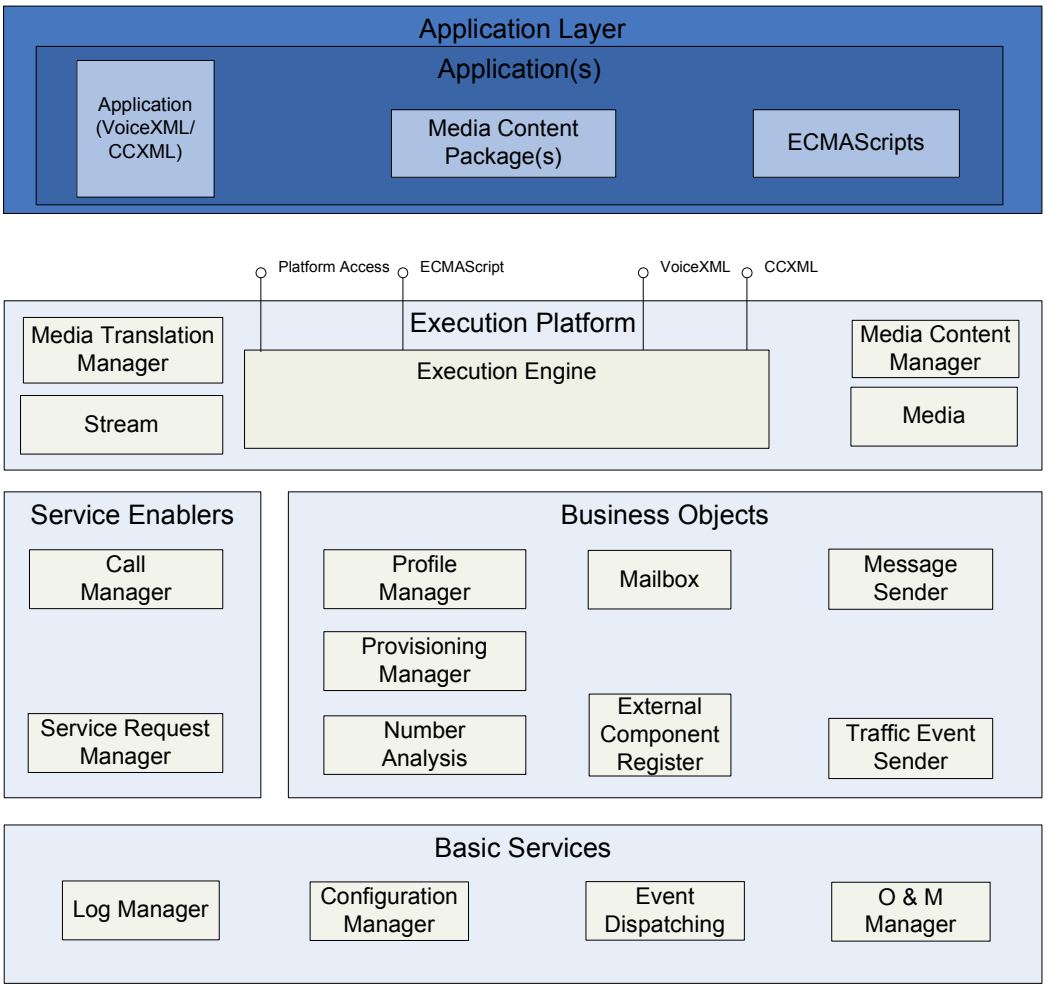

Figure 2 Internal architecture

Below follows a brief description of each design objects. For details see ref. [2]

6.1 Service Enablers

The Service Enablers are used to initiate Application execution.

6.1.1 Call Manager

Handles the SIP interface

6.1.2 Service Request Manager

Handles the inbound and outbound XMP interface

6.1.3 Stream

Handles the RTP interface

6.2 Execution platform

The Execution platform is used to execute Applications written in VoiceXML/CCXML and Platform Access requests.

6.2.1 Execution Engine

Handles application execution i.e. CCXML and VoiceXML applications. Is also the main part of MAS that takes care of the startup procedure.

6.2.2 Media Content Manager

Handles Media Content Packages.

6.2.3 Media Object

Is an internal representation of different media such as WAV-, MOV- and text-files etc.

6.2.4 Media Translation Manager

Handles the interfaces for media translation i.e. Text to Speech and Automatic Speech Recognition.

6.3 Business Objects

The Business Objects are used to access business related information in the System such as user register information and end user messages.

6.3.1 External Component Register

Handles the interface to the Component Register.

6.3.2 Mailbox

Handles the interface to Message Store e.g. to access a subscribers messages.

6.3.3 Message Sender

Handles sending of messages to Message Store.

6.3.4 Number Analyses

Handles number analyses.

6.3.5 Profile Manager

Handles the interface to the User Register to retrieve a subscriber’s profile.

6.3.6 Provisioning Manager

Handles the interface to CAI in order to create subscriptions in the system.

6.3.7 Traffic Event Sender

Handles traffic events and send those to the Event Repository and to Notification.

6.3.8 Charging Account Manager

This component is used to handle the access to an Account Information and Refill server (AIR).

6.4 Basic Services

Basic Services are used for common functionality of a System component, hence could be used in any such.

6.4.1 Configuration Manager

Handles all configuration which is XML based.

6.4.2 O&M Manager

Handles MIB and perform self diagnostics.

6.4.3 Log Manager

Handles the internal log facilities.

7 Capabilities

MAS can handle one Application at a time but as many Media Content Packages as allowed by the hardware resources used i.e. amount of physical memory.

MAS is able to concurrently execute a number of service requests initiated either from SIP or XMP. The amount of concurrent service requests possible to execute is defined during load tests with a well defined traffic scenarios. This is done with each hardware used.

8 Third-Party Products and external interfaces

8.1 Third-Party Products and Freeware

Product name	Product version	Company	Licence	Delivered with the component / Used in	ECCN US/EU	Product No. and R-state
Rhino	1.6R2	The mozilla project	MPL	Yes / Execution Engine	EAR99	SWF005 5R1A
Used for execution of ECMA script.						

Product name	Product version	Company	Licence	Delivered with the component / Used in	ECCN US/EU	Product No. and R-state
XML-RPC	3.1	Apache Software Foundation.	Apache	Yes / OM Manager / Charging Account Manager	EAR99	SWF005 6R1A
Used for XMLRPC communication						

The Java Curses Library	4-Beta	sf.net/projects/javacurses	LGPL	Yes / OM Manager	EAR99	SWF0057R1A
Used as terminal based windowing toolkit for UNIX.						
Dom4j	1.6.1	Apache Software Foundation.	Apache	Yes / Execution Engine, Configuration Manager	EAR99 / 0	SWF0051R1A
Used for VoiceXML and CCXML parsing.						
Log4j	1.2.9	Apache Software Foundation.	Apache	Yes / All	EAR99 / 0	SWF0003R2A
Used for logging facilities for MAS.						
Commons-Collections	3.1	Apache Software Foundation.	Apache	Yes / Config Manager	EAR99 / 0	SWF0053R1A
Used for improved collections.						
Emanate JSADK	16.0.1.61	SNMP Research	Commercial	Yes / Operate and Maintain Manager	EAR99 / 0	SWT0031R1A
SNMP Subagent.						
log4cxx	0.9.7	Apache	Apache	Yes / Stream	EAR99/ 0	N/A
Used for logging in C++.						
ShiftOne Java Object Cache	2.0b	ShiftOne	LGPL	Yes / Media Content Manager	EAR99 / 0	SWF0052R1A
Used to cache Media Objects.						
Foundation Java XMP	P1A_05	(Internal)		Yes / Service Req Manager	EAR99 / 0	SWF0059R1A
XMP server and client implementation.						
GNU ccRTP	1.3.6	www.GNU.org		Yes / Stream	EAR99 / 0	SWF0061R1A
Used for handling the RTP protocol.						
GNU Common CPP Framework	1.3.22	www.GNU.org		Yes / Stream	EAR99 / 0	SWF0062R1A
Required by GNU ccRTP.						
Expect	5.40	Sun		Yes / Stream	EAR99 / 0	SWF0063R1A
Used for Self Diagnostics.						

SUN Javamail API	1.4	Sun Microsystems, inc		Yes / Profile Manager, Mailbox and Message Sender	5D002 / 5D002.c1	SWF0004R1C
Retrieving e-mail with IMAP, parsing and composing Mime formatted messages.						
Jakarta Commons Net	1.4.1	Apache Software Foundation	Apache	Yes / Message Sender	EAR99 / 0	SWF0066R1A
Sending Mime messages with SMTP						
XML Beans	2.1.0	Apache Software Foundation	Apache	Yes / Call Manager	EAR99 / 0	SWF0033R2A
Generation and parsing of media control XML documents in SIP messages.						
Spring	1.2.7	Spring Framework	License	Yes / Execution Engine, External Component Register	EAR99 / 0	SWF0060R1A
Dynamic resolution of class dependencies.						
Velocity, velocity-1.4.jar	1.4	Apache Software Foundation		Yes / Traffic Event Sender	EAR99 / 0	SWF0064R1A
Creating emails for requesting NTF services.						
Xpp	3-1.1.4c	Indiana university		Yes / Execution Engine	EAR99 / 0	SWF0070R1A
Pull parser for parsing XML files.						
NIST-SIP	1.2	National Institute of Standards and Technology	Public domain (Not copyrighted)	Yes / Call Manager	EAR99 / 0	SWF0054R1A
SIP stack						
Java 2 Platform, Standard Edition (J2SE)	1.5	Sun Microsystems, inc.		No / All	5D992 / 5D992.b.1	SWT0032R1A
Used both in development and runtime, but MAS assume a Java environment already exists on the host.						

JavaBeans Activation Framework	1.0.2	Sun Microsystems inc.	License	Yes / Execution Engine, Mailbox, Message Sender, Profile Manager	5D002 / 5D002.c1	SWF0007R1A
Mimetype handling, needed by Javamail						

8.2 External Products

Product Name	Company	Used for	Version of the integration tested product
Radvision Gateway	Radvision	Gateway for video calls	GW N-30 SW-Version 2.5.0.21

8.3 External Protocols

Product Name	Specification	Used for	Version of the protocol
SIP	IWD-SIP	SIP access	RFC 3261

9 References

[1] IWD-XMP
2/155 19-1/HDB 101 02

[2] FD-MAS
1/FD-MAS0001

10 Terminology

Application Package	A set of VoiceXML and CCXML documents together with its configuration files.
MAS	Media Access Server
Media Content Package	A set of media files and their corresponding definition files. One Media Content Package characteristic is e.g. language, media encoding, purpose etc.