

# Metreos Communications Environment Training Version 2.2 (3/2006)



**METREOS**  
COMMUNICATIONS

innovate   integrate   develop   deploy™



## Agenda

1. Overview
2. MCE Architecture
3. MCE Applications
4. Administration
5. Developing MCE Applications
6. Examples and Walkthroughs

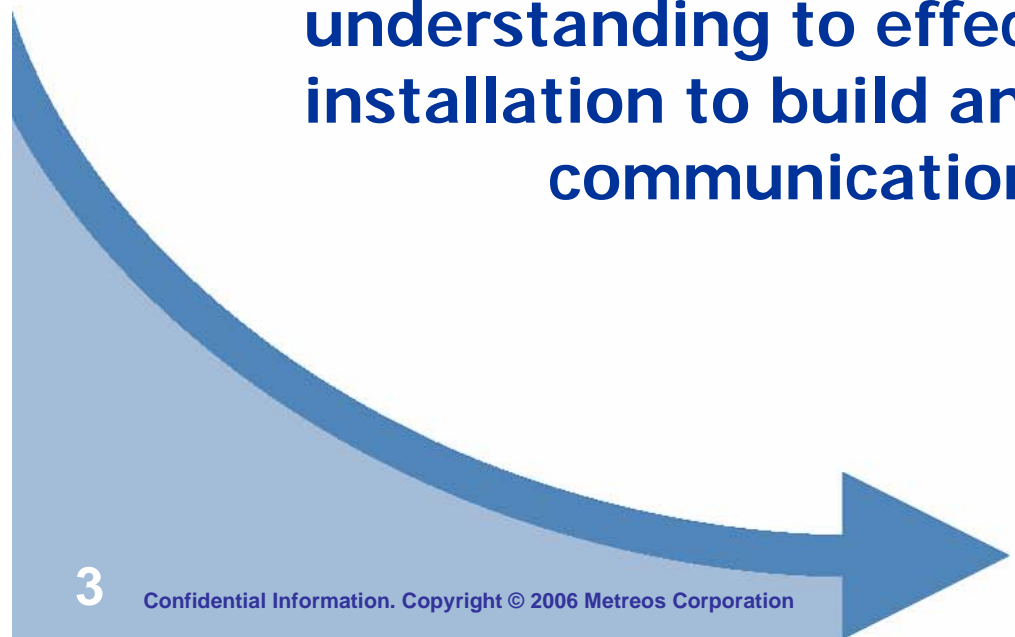
# Training Objectives



- Educate you on the Metreos Communications Environment (MCE) architecture and operation.
- Train you on how to use the Metreos Visual Designer to build MCE applications.

## Primary Goal:

**Leave you with the necessary materials and understanding to effectively utilize your MCE installation to build and deploy innovative IP communications applications.**



# Overview

## History and the MCE

# History Repeats Itself



- IP telephony as a technology has matured but development and deployment tools have not.
- The first web applications were:
  - CGI-based (first generation technology)
  - Hard to build
  - Hard to manage
  - Hard to deploy
- Lack of a robust framework, toolset, and platform hinders adoption until...
  - Frameworks and toolsets like ASP, ColdFusion, etc.
  - Web application servers like WebLogic, WebSphere, etc.



# Metreos Communications Environment (MCE)

- Presents a new model for developing and deploying integrated, media-rich IP telephony applications.
- Eliminates the mystery of telephony and the underlying communications platform enabling developers to leverage convergence for innovation.
- Uniquely blends ease-of-use and power by allowing developers to quickly build applications without taking anything away from developer freedom.
- Delivers a secure, stable and scalable runtime platform.

**The MCE allows you to focus on delivering value without the worrying about the details of how the telephony components work.**

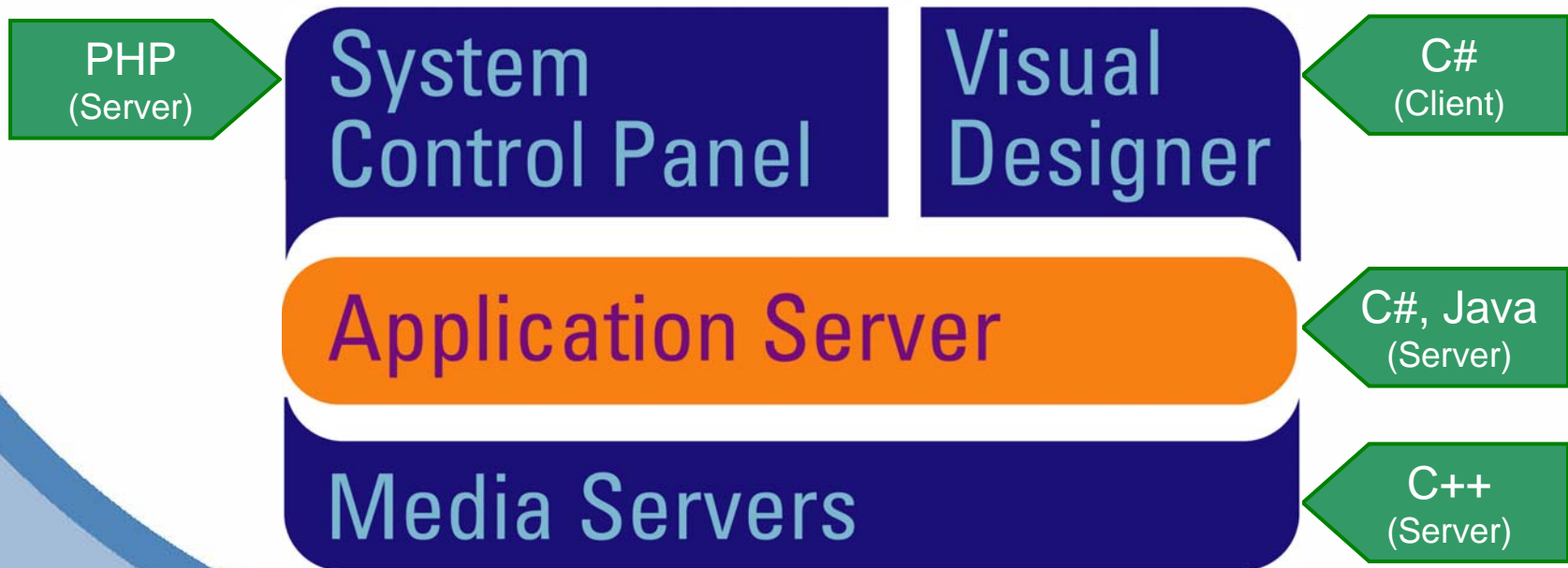
# MCE Architecture

## System Overview

MCE Application Lifecycle  
Language Architecture

# System Overview

- Application Server is the heart of the system.
- Media Servers provide audio stream control.
- Visual Designer enables developers to build applications.
- System Control Panel is the web administration portal.



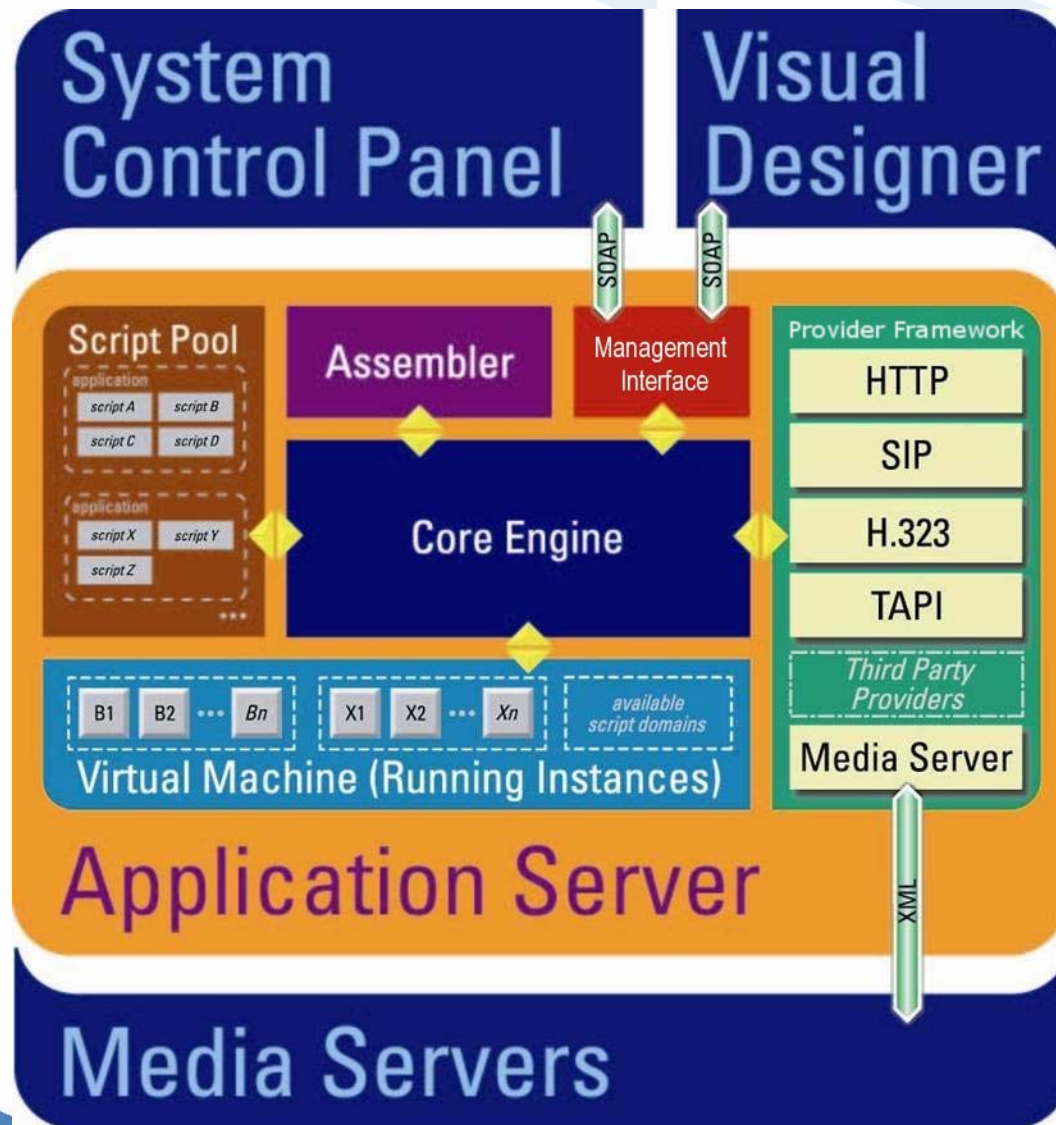


# Metreos Application Server (MAS)



- Core of the MCE system.
- MCE applications are stored and execute within the application server.
- Applications scripts are assembled from an XML intermediate language into in-memory compiled applications ready for execution.
- A virtual machine inside the application server manages the execution of the application.
- Facilitates communication with external systems through “protocol providers”.

# Metreos Application Server – How it Works



# MAS – Protocol Providers



- Provide the “glue” between the MAS and external systems.
- Functional equivalent of a Unix daemon process or Windows service.
- Able to persist data and maintain state.
- Expose Events and Actions to MCE applications.

# Metreos Media Server (MMS)

- Pure software media processor.
- Originates and terminates voice media for applications running within an MCE.
- Tightly coupled with the Metreos Application Server via an XML RPC interface.
- Capable of processing up to 240 (soon 400) distinct media streams.
- Scalable independent of the application server.
- **All media processing capabilities exposed in an easy to use manner inside of Metreos Visual Designer.**

# MMS Feature Highlights

## ▪ Scalability

- Up to 240 (soon 400) concurrent connections per box.
- Scales independent of application server nodes.

## ▪ IVR

- Play and Record in VOX and WAV format.
- Play multiple prompts in sequence.
- DTMF detection; in-band (including RFC2833) and out-of-band.
- "Half-Connect" capable.
- Complex "termination" conditions.

## ▪ Conferencing

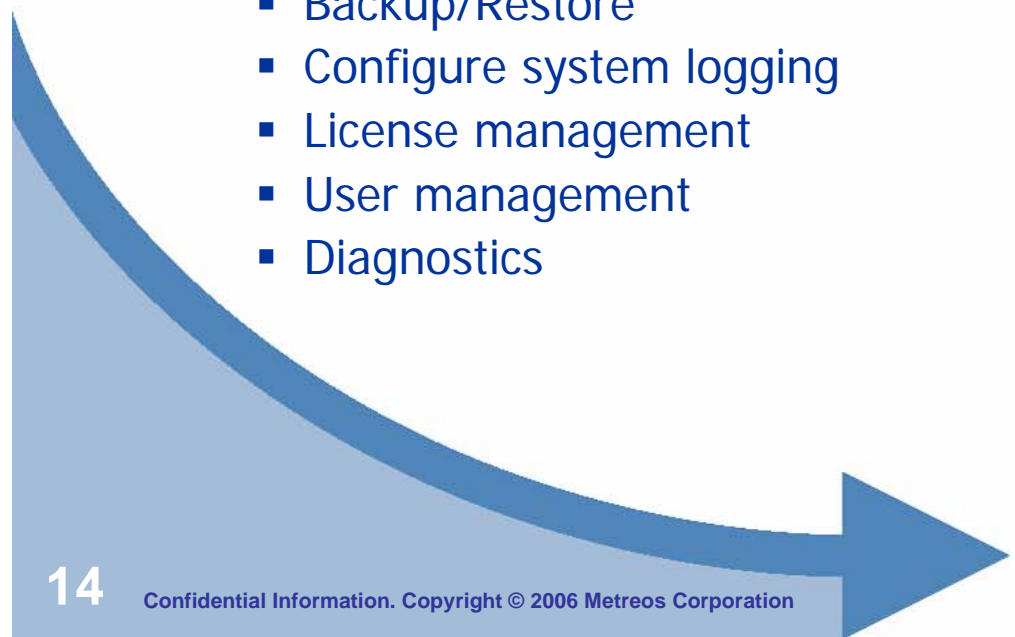
- Individual conferee mute and kick.
- Conference recording. Up to 64 concurrent conferences being recorded per box.

## ▪ Advanced Features

- Multicast support for IVR.
- Speech support using Nuance or Speechworks.
- Low bit-rate coders (G.723 and G.729a).

# MCE System Control Panel



- Web-based management console.
  - Consumes the Web Services API of the application server.
  - Provides access to all necessary administrative functions:
    - Add/Remove/Configure applications
    - Add/Remove/Configure protocol providers
    - Invoke protocol provider extensions
    - Add/Remove media servers
    - Add/Remove telephony servers
    - Upgrade the software/firmware
    - Backup/Restore
    - Configure system logging
    - License management
    - User management
    - Diagnostics
- 



# Metreos Visual Designer



- Visually construct Communications Business Logic.
  - Extensive catalog of communications actions.
  - Abstracts and consolidates IP telephony protocols into the Metreos CallControl API (SIP, H.323, JTAPI, SCCP)
  - Encapsulates common technology interfaces for modern applications; LDAP, SQL, Web Services, CCM APIs, ...
- Single tool for building complete IPT apps.
- Targeted at the network admin and software developer.
- Integrated with the Metreos Application Server for on-the-fly deployment.
- Comprehensive reference designs.
  - Accelerate developer learning curve.

# Visual Designer - Core Feature Set



- Graphical Application Definition
- Application Integrity Checks
- Extensible Toolbox
- Embedded Code
- One Click Deployment
- Runtime Debugging

# MCE Architecture

System Components

**MCE Application Lifecycle**

Language Architecture

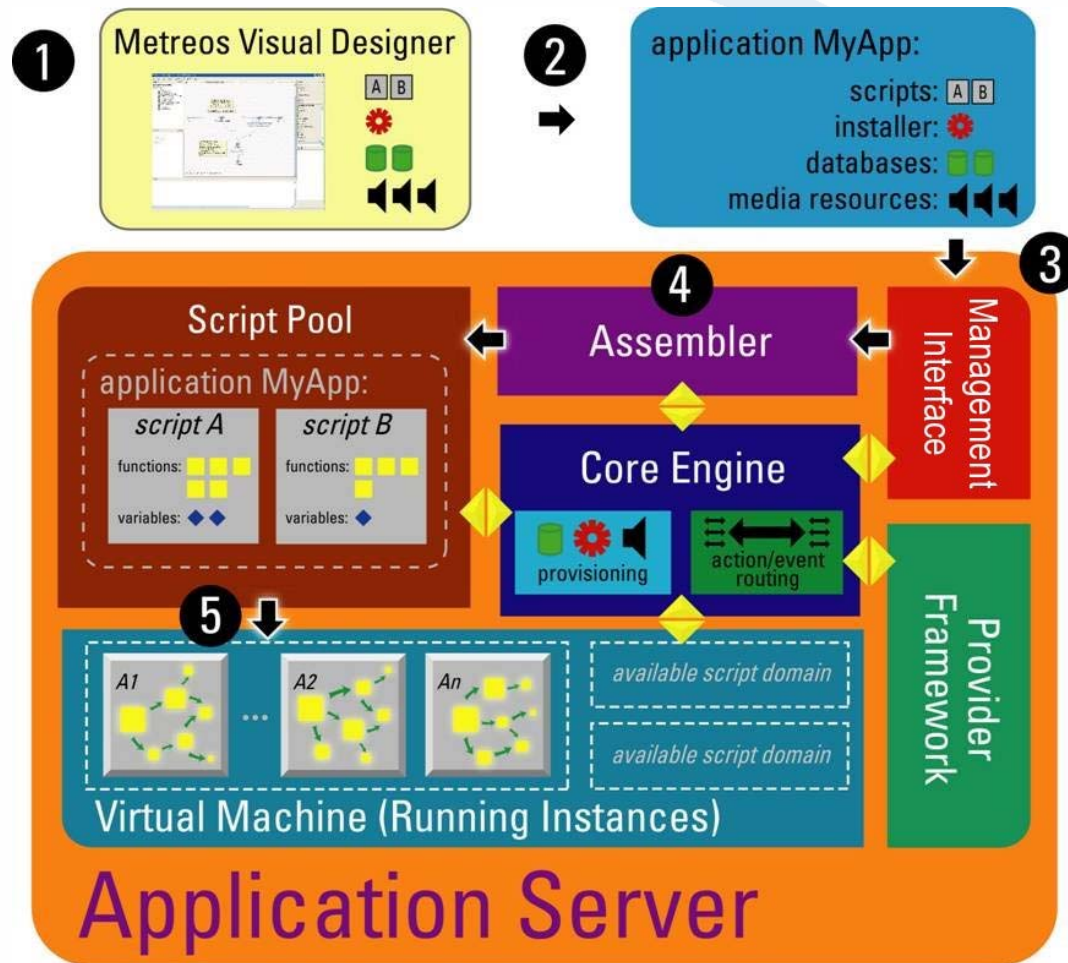
# MCE Application Lifecycle



- Describes the flow of applications within the MCE from development to deployment.
- Five primary steps during which error checking is done.

# MCE Application Lifecycle (continued)

1. Development
2. Build
  - Compilation
  - Packaging
3. Deployment
4. Installation
  - Extraction
  - Provisioning
5. Execution



# MCE Architecture

System Components

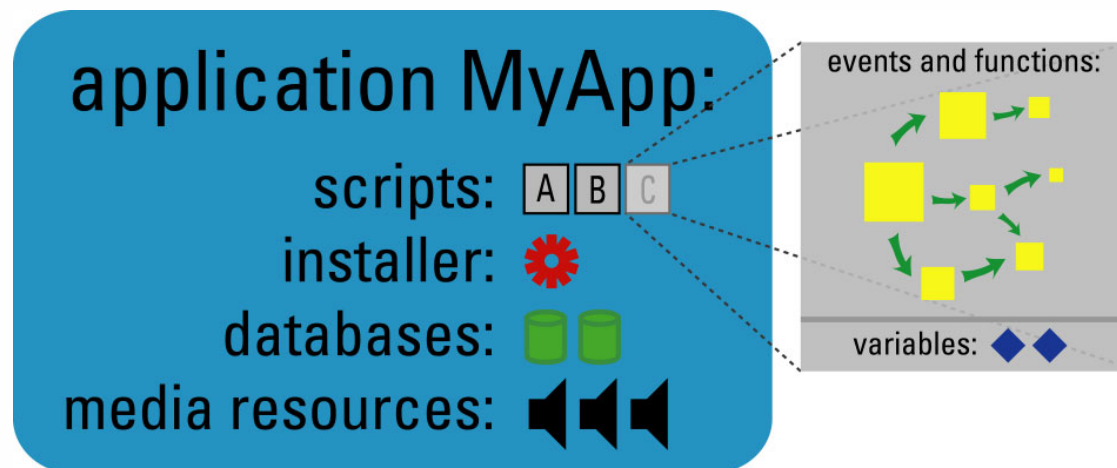
MCE Application Lifecycle

**Language Architecture**



# Application Structure

- Four types of components:
  - Scripts** contain all application logic and define application flow.
  - Installer** defines the configuration required for the application.
  - Databases** are SQL creation scripts for database tables.
  - Media** resources are audio prompts utilized by the application as well as voice recognition grammar definition files.



# MCE Application Packages

- All elements of an MCE application required to deploy and run it are packaged into a single file.
- The file is known as a “Metreos Communications Archive” and has a .MCA file extension.
- The MCA package uses the TAR archive format and is the functional equivalent of a Java JAR file.
- The Metreos Visual Designer handles the packaging automatically for the developer during the build process.
- The command line tool ‘mca.exe’ can be used to manually build and extract MCA archive packages.

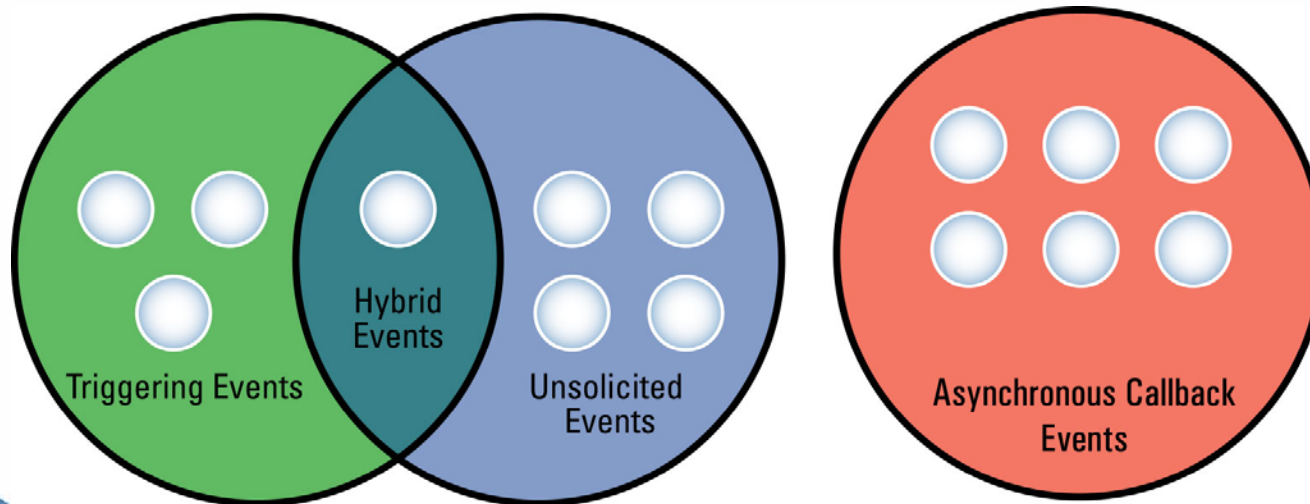
# Action-Event Model



- MCE Applications are driven by a concept known as the **action-event** model.
- Applications communicate with the application server through actions.
- The application server sends information to the applications using events.

# Events

- Three types of events within the MCE:
  - Triggering
  - Unsolicited
  - Asynchronous Callback
- Hybrid events are those which may either be triggering or unsolicited (e.g., "Http.GotRequest").



## Events (continued)

- An event signature is the unique identifier of an event handler based on the event type and event parameters.
- All event handlers have event signatures.
  - Triggering event signatures define the criteria that must be met for a script to start.
  - Unsolicited and asynchronous callback event signatures define which event handler function to use.
- Triggering event signatures must be unique across the entire application server.
- Unsolicited and asynchronous callback event signatures must be unique within a script.

# Actions



- MCE application scripts are constructed by linking actions together, to create a logical flow of actions.
- Actions allow scripts to send data to the outside world or carry out specialized application logic.
- Three types of actions:
  - Core
  - Native
  - Provider
- Each type of action executes in a slightly different manner which will be covered later.



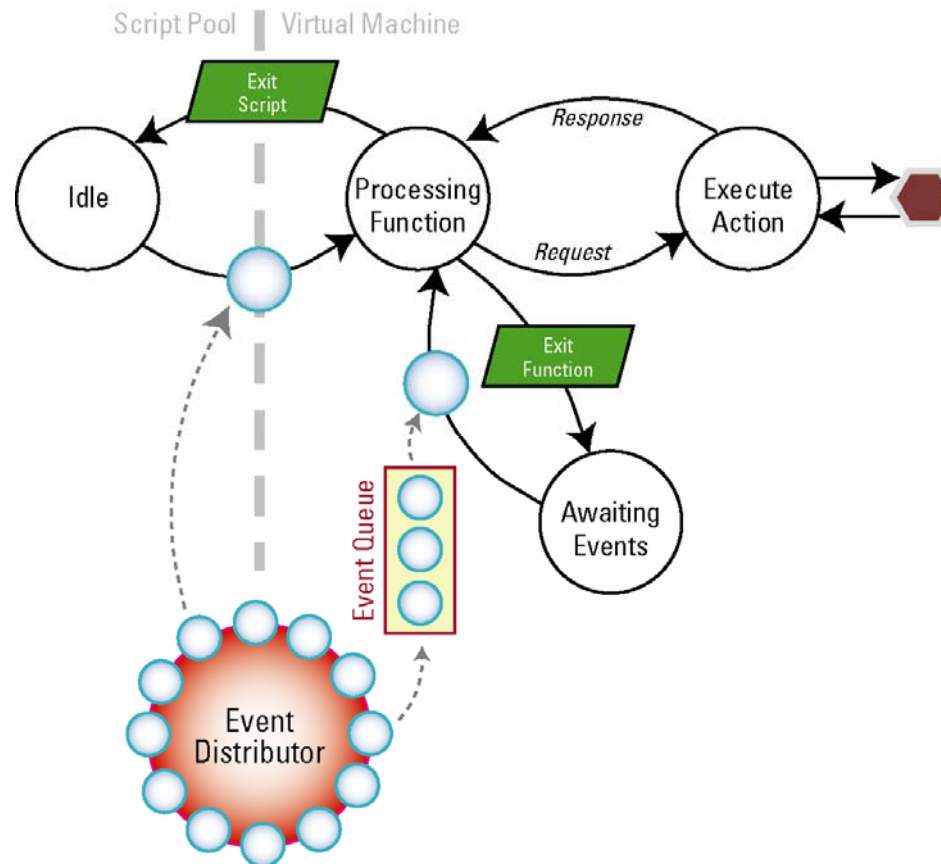
# MCE Applications

## Execution Model

Application Script Elements

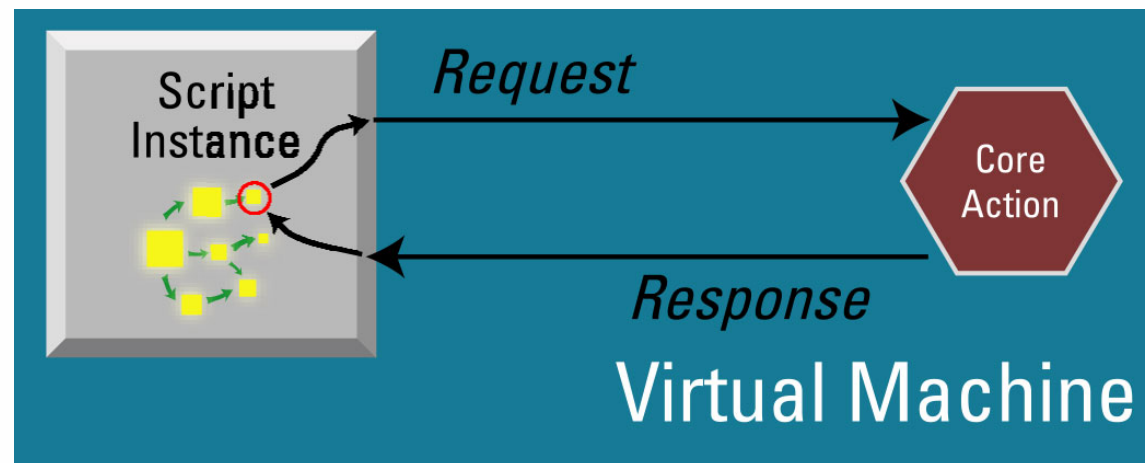
# Execution Model

- Recall that the MCE utilizes an “action-event” execution model.
- Each type of action executes differently:
  - Core
  - Native
  - Provider



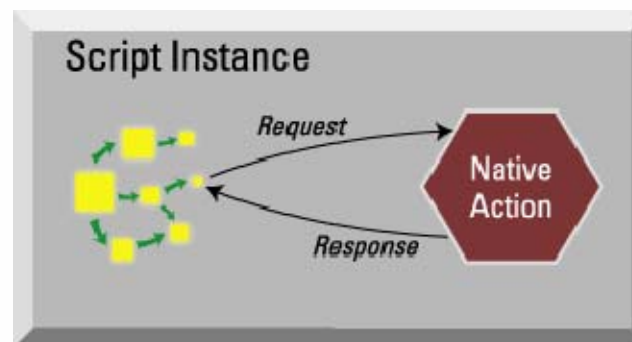
# Core Actions

- Execute synchronously.
- Handled natively by the virtual machine.
- Represent fundamental functionality:
  - End Script, End Function, Call Function
  - Send Event, Forward All Events



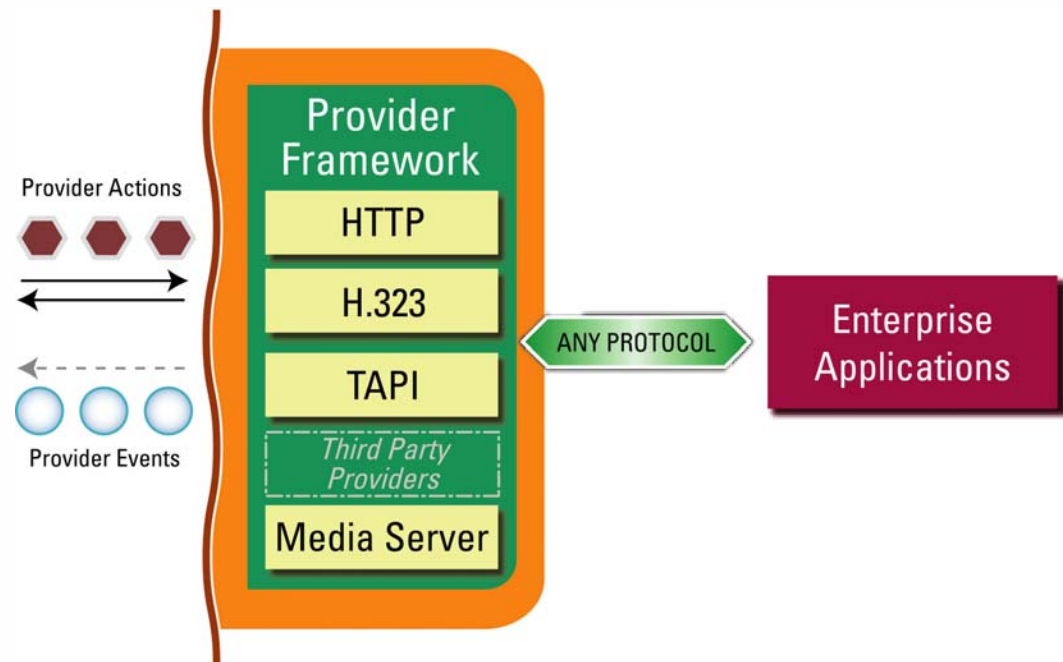
# Native Actions

- Execute synchronously.
- Execution never leaves the context of the script instance.
- Execution logic provided by external .NET assembly:
  1. Virtual machine recognizes native action.
  2. Virtual machine has previously loaded the assembly and invokes the "Execute()" method of the native action.
  3. Execution leaves the virtual machine and executes the code for that native action.
  4. "Execute()" method finishes and virtual machine continues.



# Provider Actions

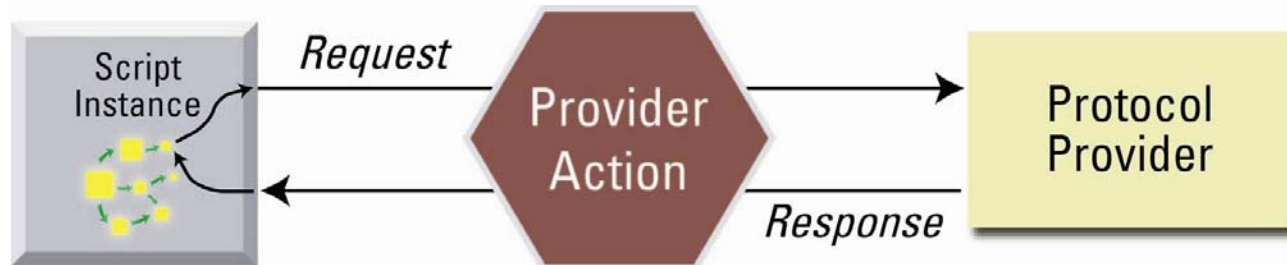
- Recall that a “protocol provider” facilitates communication between external systems and MCE applications.
- Providers execute within their own virtual process space and are entirely separated from the virtual machine.
- Two types of provider actions:
  - Synchronous
  - Asynchronous



# Provider Actions – Synchronous

1. Virtual machine constructs a provider message.
2. Virtual machine sends provider message to core engine.
3. Core engine routes provider message to the right provider.
4. Provider sends a final response.

**Application script blocks until a response is received.**



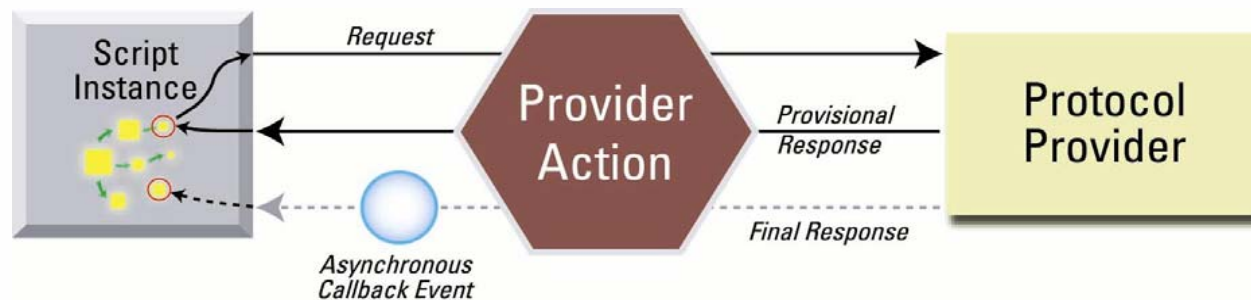


# Provider Actions – Asynchronous

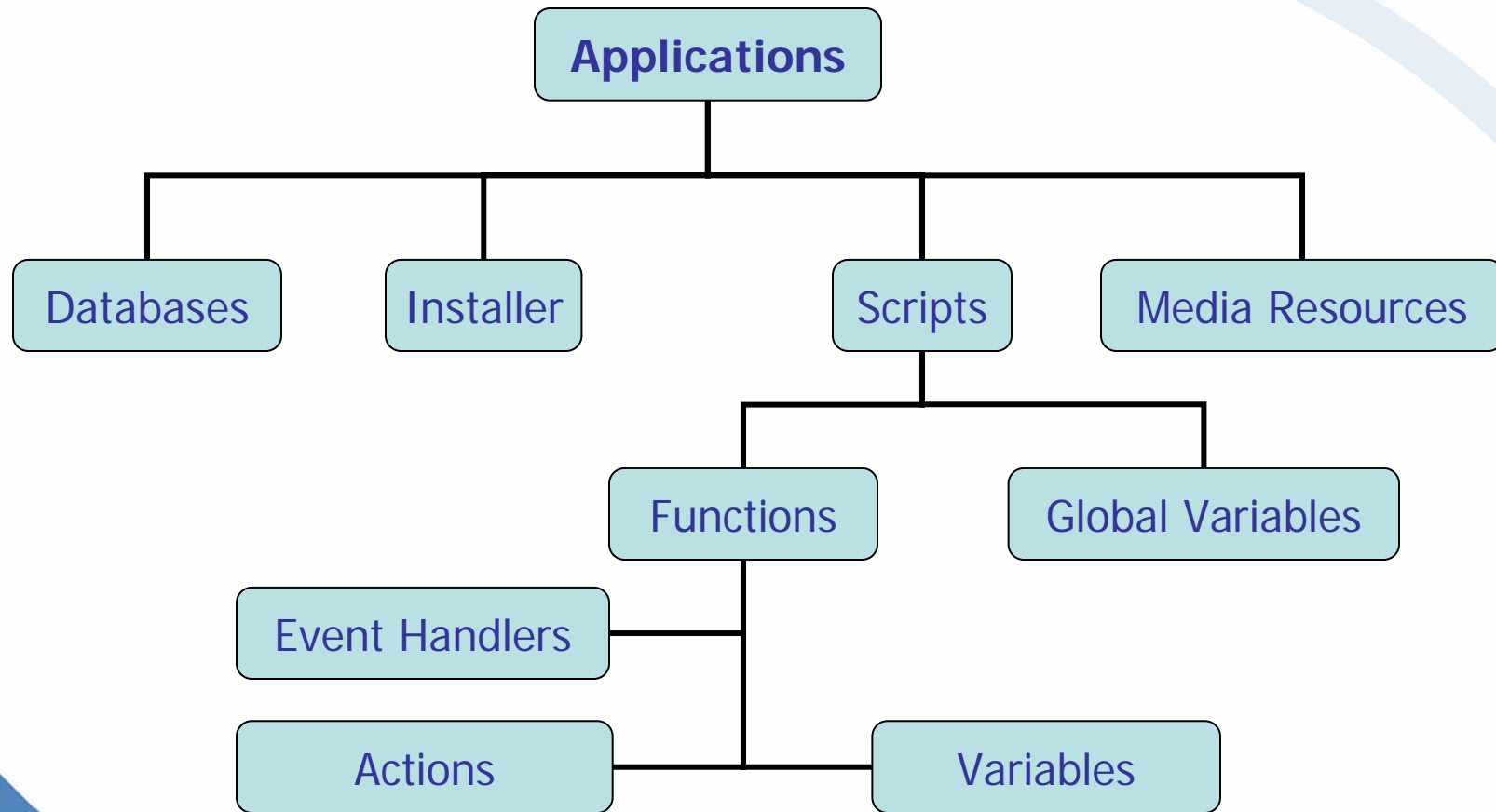
1. Virtual machine constructs a provider message.
2. Virtual machine sends provider message to core engine.
3. Core engine routes provider message to the right provider.
4. Provider sends a provisional response.

**Application script blocks until a response is received.**

5. Provider finishes processing the action request and sends a final response in the form of an asynchronous event callback.



# Application Elements



# Application Script Elements

- Application scripts contain these primary elements:
  - **Trigger:** Indicates when a new instance of an application script should begin.
  - **Functions:** Logical grouping of functionality defined using actions. Optionally, functions may be flagged as event handlers.
  - **Variables:** Encapsulate data within the script and may be scoped locally to the function or globally to the script.
  - **Actions:** Execute finite pieces of logic on behalf of the script (e.g., make a phone call).
- More details on all of these elements will be demonstrated using the Metreos Visual Designer.

# Administration

## **MCE Administration Terminology**

Environment Configuration

Platform Maintenance

Applications, Providers, Media & Telephony Servers

Troubleshooting

# MCE Administration Terminology

- **mceadmin** – The common name for the web management console.
- **Application** – An application is contained within an MCA file and installed either via the Visual Designer or mceadmin.
- **Provider** – A plug-in component that is installed via mceadmin.
- **Media Firmware License** – A license that unlocks “ports” within the media server’s underlying firmware making features available to the system.
- **Telephony Server** – A component that defines a link to a Cisco CallManager, Cisco SIP Domain, IETF SIP Domain, or H.323 gateway.
- **System Update** – The act of uploading and applying a software update file (.upd) via mceadmin.

# mceadmin Overview



- Tasks are segmented into four main groups.
  - **Environment** – System service parameters, global configuration of software.
  - **System** – Platform related tasks such as network setup, date & time configuration, and licensing.
  - **Components** – Management of applications, providers, media servers, and telephony servers.
  - **Logs** – Log file management and download.

# mceadmin Main Page

## Main Control Panel

Config  
Portal

Environment	Components
<ul style="list-style-type: none"><li>• Console Configuration</li><li>• User Management</li><li>• Core Components</li><li>• Media Server Configuration</li><li>• RTP Relay Configuration</li><li>• Log Server Configuration</li><li>• Alarm Management</li></ul>	<ul style="list-style-type: none"><li>• Applications</li><li>• Media Servers</li><li>• Providers</li><li>• Telephony Servers</li></ul>
System	Logs
<ul style="list-style-type: none"><li>• Network Configuration</li><li>• Service Control</li><li>• Media Firmware</li><li>• Text to Speech</li><li>• SSL Management</li><li>• Date and Time</li><li>• Redundancy Setup</li><li>• System Update</li><li>• System Backup</li><li>• System Restore</li></ul>	<ul style="list-style-type: none"><li>• Server Logs</li><li>• Event Log</li><li>• Audit Log</li></ul>

Firmware v2-1-0 / Software v2.2.0.1083 DEV

Current Firmware and  
Software Versions

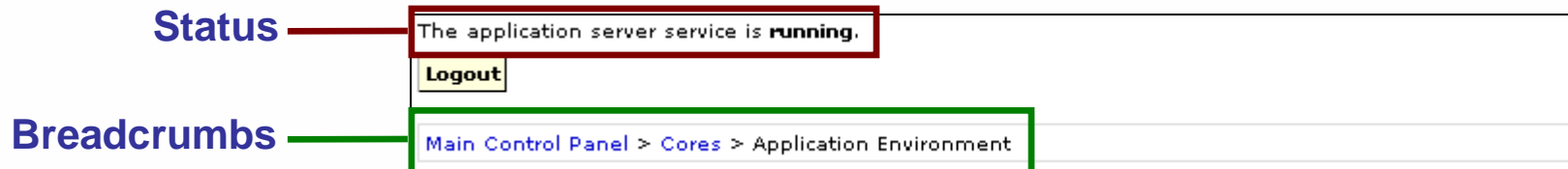
Current Time: 03/20/06 10:46:44 PM Etc/GMT

Current Date & Time



# mceadmin Navigation

- Breadcrumbs will show you where you are at in mceadmin.
- Above the logout button a status will be displayed indicating whether mceadmin is currently communicating with the application server.



# Administration

MCE Administration Terminology

**Environment Configuration**

Platform Maintenance

Applications, Providers, Media & Telephony Servers

Troubleshooting

## Environment

- Console Configuration
- User Management
- Core Components
- Media Server Configuration
- RTP Relay Configuration
- Log Server Configuration
- Alarm Management

# Environment – Console Configuration

- Basic system settings and remote access configuration.

## Console Configuration

Set system name and timezone

<u>Configuration</u>	
System Name	MCEDEMO
Time Zone	Etc/GMT

Apply

### Desktop Administration

You may toggle services that allow you to administer by remotely accessing the system's desktop.

Control which remote access solution to use

Remote Desktop	<input checked="" type="checkbox"/>	For use with the Windows native Remote Desktop client
VNC Server	<input type="checkbox"/>	For use with VNC software

Apply

### Web Server Restart

If any of the pages hosted by the Web server fail to load, or if any changes were made to the Web server configuration, you must restart the Web server.

Restart Webserver

Restart Apache if necessary

Firmware v2-1-0 / Software v2.2.0.1083 DEV

Current Time: 03/20/06 10:52:30 PM Etc/GMT

# Environment – User Management

- Control administrative and developer access.

## Users

By Alphabet: [\*] [A] [B] [C] [D] [E] [F] [G] [H] [I] [J] [K] [L] [M] [N] [O] [P] [Q] [R] [S] [T] [U] [V] [W] [X] [Y] [Z]

Page: [1]

Username	Access Level	Actions
Administrator	1	<a href="#">Edit User</a> <a href="#">Delete User</a>

Page: [1]

[Add a User](#)

Active User List

Edit User

Username	Administrator
New Password (Leave empty for no change)	<input type="text"/>
Re-type New Password	<input type="text"/>
<a href="#">Update User</a>	<a href="#">Delete User</a> <a href="#">Go Back</a>

Add User

Username	<input type="text"/>	Valid characters are alphabetic, numeric, and the characters @, -, _ and must start with a letter
Password	<input type="text"/>	
Verify (Reenter) Password	<input type="text"/>	
Access Level	<div>Normal User Normal User Administrator</div>	
<a href="#">Add User</a>	<a href="#">Go Back</a>	

Access Level for New User

Firmware v2-1-0 / Software

Current Time: 03/20/06 11:02:26 PM Etc/GMT

# Environment – Core Components Configuration

- Set system level parameters that control the operation of Metreos software.

## Cores

Core components are the main components of the Environment.

### Is the component operational?

Name	Status	Version
Application Environment	Enabled Running	2.2.0.1083
Application Server	Enabled Running	2.2.0.1083
Application Manager	Enabled Running	2.2.0.1083
Cluster Interface	Enabled Running	2.2.0.1083
Logger	Enabled Running	2.2.0.1083
Management Interface	Enabled Running	2.2.0.1083
Provider Manager	Enabled Running	2.2.0.1083
Router	Enabled Running	2.2.0.1
Telephony Manager	Enabled Running	2.2.0.1

Some config options have input criteria as shown here.

### Application Environment

Indicates which core component to edit

Available config options

Update

Done

Log Level	Info	Filters all debug output below the specified level
GC Interval	10	How often the Application Environment performs advanced garbage collection (in seconds) <b>Valid Range: 1 - 3600</b>
Max Threads	10	Represents the max number of actions that can be executed simultaneously <b>Valid Range: 5 - 50</b>

Update

Done

# Environment – Media Server Configuration

- Controls the **local** password used to deploy media files to **the current** media server.

## Media Server Configuration

Specify the password used whenever audio files are deployed to the local media server resident on this appliance. This password must be supplied whenever any application server is configured to use this media server.

### Change Password

New Password

Must be at least 7 characters long

Verify Password

Please retype the new password

**Submit**

# Environment – Alarm Management

- Add/Remove alarm destinations (SNMP or SMTP) and manage active alarms.

## Alarms

Name	Type
Test SNMP Manager	SNMP Manager

Create an Alarm

SMTP Manager

Active Alarms						
Time Occurred	Message ID	Message	Details	Severtiy	Status	Action
01/11/06 10:19:50 AM	9000	MCE required service 'MetreosH323Stack' is unavailable.	9000.MCE required service 'MetreosH323Stack' is unavailable..Red	ERROR	Open	<input type="button" value="Acknowledge"/>

Existing alarm destinations already configured

Active alarms (if any)

## Add SNMP Manager

Name	<input type="text"/>	
Description	<input type="text"/>	
SNMP Manager	<input type="text"/>	IP address for the SNMP manager
Trigger Level	Yellow <input type="button" value="v"/>	Error trigger level(s) for the alarm
<input type="button" value="Add SNMP Manager"/> <input type="button" value="Cancel"/>		



# Administration

MCE Administration Terminology

Environment Configuration

**Platform Maintenance**

Applications, Providers, Media & Telephony Servers

Troubleshooting

## System

- Network Configuration
- Service Control
- Media Firmware
- Text to Speech
- SSL Management
- Date and Time
- Redundancy Setup
- System Update
- System Backup
- System Restore

# Platform Maintenance – Service Control

- Enable, Disable, Start, Stop platform services

## Service Status

Service Name	Description	Enabled	Status	Actions			
				Refresh Service Status			
Metreos Application Server	Application server	Yes	Running	Disable	Restart	Stop	Kill
Metreos Media Server	Media server	Yes	Running	Disable	Restart	Stop	Kill
H.323 Stack	H.323	Yes	Running	Disable	Restart	Stop	Kill
Watchdog	Watches all of the services and handles failovers	Yes	Running	Disable	Restart	Stop	Kill
Log Server	Logging	Yes	Running	Disable	Restart	Stop	Kill
Alarm Server	Alarms	No	Stopped	Enable			
SMI Server	SMI	Yes	Running	Disable	Restart	Stop	Kill
RTP Relay	RTP Relay Service	Yes	Running	Disable	Restart	Stop	Kill
JTAPI Stack CCM-3-3	JTAPI CCM-3-3	Yes	Running	Disable	Restart	Stop	Kill
JTAPI Stack CCM-4-0	JTAPI CCM-4-0	Yes	Running	Disable	Restart	Stop	Kill
JTAPI Stack CCM-4-1	JTAPI CCM-4-1	Yes	Running	Disable	Restart	Stop	Kill
PCap Service	Packet capturing service	No	Stopped	Enable			
Sip Stack	SIP	No	Stopped	Enable			
JTAPI Stack CCM-4-2	JTAPI CCM-4-2	Yes	Running	Disable	Restart	Stop	Kill
JTAPI Stack CCM-5-0	JTAPI CCM-5-0	Yes	Running	Disable	Restart	Stop	Kill
				Refresh Service Status			

# Platform Maintenance – Firmware Licensing

- Install licenses to unlock media and TTS ports

## Media Firmware

### Current Media Firmware License

Version	0104
Serial No.	auto-generated
Control No.	7797
Type	Purchased
Creation Date	20050819
Expiration Date	99991231
Conferencing Ports	100
Enhanced RTP Ports	0
RTP G.711 Ports	100
Speech Integration Ports	0
T.38 Fax Termination Ports	0
Voice Ports	100

### Current license details

[Download a backup of this license](#)

### Upload New Media Firmware License

Upload a media firmware license file to activate it for use on this machine.

This will require that the media server momentarily be shut down and restarted.

License File:

## Text to Speech

### Current Text to Speech License

CODE	VoiceText-063F-022C-66F1
Site Name	Metreos
Host ID	000E0C4E5E4E
Expiration Date	20060730
Maximum Channel	16
Operating System	WindowsNT2KXP

### Upload New Text to Speech License

License File:

Install a new media  
firmware or TTS license

# Platform Maintenance – Network Configuration

- Set all relevant network parameters
- Synchronize settings with the operating system

## Network Configuration

Current  
Settings

Local Area Connection	
DHCP	Enabled
Gateways	10.1.14.1
DNS Servers	10.1.10.12 10.1.10.13
WINS Servers	
Local Area Connection IPs	
IP Address	Subnet Mask
10.1.14.107	255.255.255.0
10.1.14.181	255.255.255.0
<input type="button" value="Edit"/>	
<input type="button" value="Synchronize Console with System"/>	

# Platform Maintenance – Date & Time Config

- Set system date & time
- Enable and configure NTP

## System Date and Time

Current  
Date/Time

Date	January	10	2006
Time	19	11	10 GMT

Note: Date and time changes do not apply if you use NTP servers

NTP  
Settings

### NTP Server Configuration

Enable Use of NTP Servers	<input checked="" type="radio"/> Yes <input type="radio"/> No
NTP Servers	pool.ntp.org <small>Enter each NTP server on a separate line</small>
NTP Server Polling Interval	900 second(s)
Max Positive Phase Correction	1800 second(s)
Max Negative Phase Correction	1800 second(s)

Changing the system time settings requires briefly shutting down services and restarting them.

[Update Time Settings](#) [Go Back](#)

# Platform Maintenance – System Update

- Update the software on the MCE-2400 appliance

## Release Notes

You can perform an update to the Metreos firmware or software by uploading and installing a Metreos update package.

For the system update to work properly, you must use one of the following browsers, and JavaScript must be enabled:

- Internet Explorer
- Mozilla, Firefox, or any Mozilla-based browser
- Opera 8
- Konqueror

**Current Software Version:** v2.1.3.0826  
**Current Firmware Version:** v2-1-0

## Current Software Version

Firmware v2-1-0 / Software v2.1.3.0826 GA Current Time: 01/10/06 01:17:57 PM Etc/GMT+6

Upload the Updater

The following notes have been provided about this system update:

= Release Notes for Release 2-2-0-1083 (DEV)

Release 2.2 of the Metreos Communications Environment is a significant new release. This release implements over 200 individual bug fixes and improvements.

### Notable changes:

- \* SIP Support. SIP is now a fully supported protocol in the Metreos Communications Environment.
- \* CCM 4.2 Support.
- \* CCM 5.0 Support.
- \* Speaker Verification Integration.
- \* Voice Recognition Integration.
- \* WebServices interface for AppSuite Administration and MCE Administration.

Click "Continue" to perform the update.

No change is made until you confirm the update

2

# Platform Maintenance – Backup/Restore

- Save and load configuration settings for an appliance.

**View Existing Backups**

**Stored Backups**

Name	Date	Status	
MCEDEMO-Jan312006-210936	01/31/06 09:09:43 PM	Ready	<a href="#">Download</a> <a href="#">Delete</a>

**Perform Backup**

A system backup consists of a full backup of the main configuration database and applications. Optionally, it can contain a full or pure schema backup of peripheral databases.

**Backup Additional Databases**

☐ activerelay  
☐ application\_suite  
☐ ciscodevicelistx  
☐ clicktotalk  
☐ mce\_standby  
☒ recordingwithbarga  
☒ remoteagent  
☒ scheduledconference  
☒ test  
  
☒ Backup data and schema for these databases.

**Perform Backup**

Backup additional  
databases and schemas

## System Restore

System Restore allows restoration of the application server from a previously created system backup file. You may select from currently stored backups or upload an external backup file.

Select a Backup:  [Restore from Backup](#)

Upload Restore File:  [Browse...](#) [Upload File](#)

Restore an existing backup  
or from a backup file



# Administration

MCE Administration Terminology

Environment Configuration

Platform Maintenance

**Applications, Providers, Media & Telephony Servers**

Troubleshooting

## Components

- Applications
- Media Servers
- Providers
- Telephony Servers

# Components – Application Management

- Install and manage applications.

**Applications**

Is the application operational?

Currently installed applications

Name	Status	Version
ActiveRelay	Enabled Running	1.0
AppSuiteDirectory	Enabled Running	1.0
ClickToTalk	Enabled Running	1.0
Example	Enabled Running	1.0
IntercomAndTalkback	Enabled Running	1.0
OutboundCallTester	Enabled Running	1.0
ProductSku	Enabled Running	1.0
RapidRecord	Enabled Running	1.0
RemoteAgentConcept	Disabled	1.0
SccpProxy	Enabled Running	1.0
ScheduledConference	Enabled Running	1.0
Test	Enabled Running	1.0
VoiceMail	Enabled Running	1.0
VoiceTunnel	Enabled Running	1.0

Current version of the application

**Install An Application**

Upload the application MCA file to install the application.

Install a new application

# Components – Application Management (cont)

- Configuring an application.

## AppSuiteDirectory

Global config  
for all partitions

UpdateDisable ApplicationDone

Application controls

DbName	application_suite	Name of the application suite database
Db ConnectionName	ApplicationSuite	Name of the application suite database connection
Server	localhost	Address of the server
Port	3306	Port of the database server
Username	root	The username to connect to database
Password	Read Only	Password
CompanyName	Metreos	Name of the company whose directory will be displayed.

UpdateDisable ApplicationDone

Scripts

Name	Event Type
EntryPoint	Metreos.Providers.Http.GotRequest

Partitions

Name	Description	Actions
Default	Automatically generated partition	Edit

Create Partition

Update Application

To update this application to a new version, disable the application first.

Application  
partitions

# Components – Application Management (cont)

- Editing a partition brings up partition specific config information and trigger parameters.

Automatically generated partition **Partition specific config**

**Configuration**

Enabled	<input checked="" type="radio"/> Yes <input type="radio"/> No	Indicate whether or not the partition is active
Use Early Media	<input type="radio"/> Yes <input checked="" type="radio"/> No	Reserve media ports early to reduce setup time
Call Route Group	Default H.323	Associate partition with a call route group
Media Resource Group	Default	Associate partition with a media resource group
Preferred Codec	G.711u_20ms	Preferred media resource codec

Server: localhost (Optional) Address of the server

Port: 3306 (Optional) Port of the database server

Username: root (Optional) The username to connect to database

Password: [Change Password](#) (Optional) Password

CCM\_Device\_Username: metreos (Optional) CallManager User associated with all phone devices which will use this application

CCM\_Device\_Password: [Change Password](#) (Optional) Password of CallManager user

[Apply Configuration](#) [Done](#)

**Scripts**

Name	Event Type	
IntercomAddWorker	Metreos.Providers.Http.GotRequest	<a href="#">Edit Trigger Parameters</a>
ShowIntercomGroups	Metreos.Providers.Http.GotRequest	<a href="#">Edit Trigger Parameters</a>
LaunchIntercom	Metreos.Providers.Http.GotRequest	<a href="#">Edit Trigger Parameters</a>

## Script Trigger Parameters for EntryPoint

**Edit existing trigger parameters**

Trigger Parameters

Event Type: Metreos.Providers.Http.GotRequest

Parameter Name	Values	
url	/AppSuiteDirectory	<a href="#">Delete Value</a>
		<a href="#">Add Value</a>

[Delete Parameter](#) [Update Parameter Values](#)

**Add Trigger Parameter**

Parameter Name:

Initial Value:

[Add Parameter](#)

[Done](#)

Add new trigger parameters

# Components – Provider Management

- Install and manage providers.

**Providers**

Is provider operational?

Currently installed providers

Name	Status	Version
Cisco DeviceListX Provider	Enabled Running	2.2.0.1083
H.323 Provider	Enabled Running	2.2.0.1083
HTTP Provider	Enabled Running	2.2.0.1083
JTAPI Provider	Enabled Running	2.2.0.1083
Media Control Provider	Enabled Running	2.2.0.1083
Packet Capture Provider	Enabled Running	2.2.0.1083
SCCP Provider	Enabled Running	2.2.0.1083
SCCP Proxy Provider	Enabled Running	2.2.0.1083
SIP Provider	Enabled Running	2.2.0.1083
Timer Provider	Enabled Running	2.2.0.1083

Current version of the provider

**Install A Provider**

To install a provider, you will need to upload the provider assembly (.dll file).

Install a new application

# Components – Provider Management (cont)

- Edit provider configuration and invoke provider extensions.

**CiscoDeviceListX**

**Provider controls**

**Provider configuration**

**Tell the provider to do something**

**Update** **Disable Provider** **Done**

**Log Level** Warning Filters all debug output below the specified level

**PollInterval** 15 CallManager poll interval  
Valid Range: 1 - 120

**Update** **Disable Provider** **Done**

**Extensions**

*Metreos.Providers.CiscoDeviceListX.Refresh*

Refreshes the DeviceListX cache  
Status: Ready

**Parameters**

No Parameters

**Invoke Extension**

# Components – Media Servers

- Add and remove media servers. If a media server is listed here the application server on the appliance maintains a connection to it.

## Media Servers

Media Servers

Name	IP Address	Status	
localhost	127.0.0.1	Connected	<input type="button" value="Edit"/> <input type="button" value="Remove"/> <input type="button" value="Disable"/>

Existing media servers

## Media Resource Groups

Default

Edit or create media resource groups

## Edit Group: Default

Group Properties

Name	Default
Type	Media Resource Group
Description	Default media resource group
Failover Group	None

Members

localhost
-----------

Group members



# Components – Telephony Servers

- Add, remove, and edit telephony servers.
- Add and edit call route groups.

## Telephony Servers

The screenshot displays the Metreos Telephony configuration interface. A red box highlights the 'Telephony Servers' table, which lists existing servers. A green box highlights the 'Add a Telephony Server' section, including a dropdown menu and an 'Add Server' button. A purple box highlights the 'Call Route Groups' section, showing a list of groups and buttons for editing or creating new groups. An orange arrow points from the 'Edit Group' button in the 'Call Route Groups' section to the 'Edit Group: Default H.323' panel on the right. This panel shows the 'Group Properties' and 'Members' for the selected group.

**Existing telephony servers**

Name	Type
Product CCM	H.323 Gateway
production	CallManager 4.0 Cluster

**Add a Telephony Server**

CallManager

**Add new server**

**Call Route Groups**

Default H.323

SCCP Device Pool Group

**Add and edit call route groups**

**Edit group membership and priority**

**Edit Group: Default H.323**

**Group Properties**

Name	Default H.323
Type	H.323 Group
Description	Default H323 Gateway resource group
Failover Group	None

**Members**

Product CCM

# Administration

MCE Administration Terminology

Environment Configuration

Platform Maintenance

Applications, Providers, Media & Telephony Servers

**Troubleshooting**

## Logs

- Server Logs
- Event Log
- Audit Log

# Troubleshooting – Viewing Log Files

- Download, view, and delete logs on the system.

## Server Logs

To view a log or open a directory, click on the file name. To create an archive of the logs, check the box next to each file you want to archive and click on the "Archive Selected Logs" button.

Page: [1]

Select	File Name	Last Modified
<input type="checkbox"/>	Select All	
<input type="checkbox"/>	[ DIR ] <a href="#">Watchdog/</a>	03/21/06 02:25:42 AM
<input type="checkbox"/>	[ DIR ] <a href="#">SystemUpdates/</a>	03/20/06 05:22:21 PM
<input type="checkbox"/>	[ DIR ] <a href="#">SMIService/</a>	01/11/06 11:39:50 PM
<input type="checkbox"/>	[ DIR ] <a href="#">Sip/</a>	03/20/06 06:41:54 PM
<input type="checkbox"/>	[ DIR ] <a href="#">RTPRelay/</a>	03/20/06 05:24:57 PM
<input type="checkbox"/>	[ DIR ] <a href="#">MediaServer/</a>	03/20/06 10:20:36 PM
<input type="checkbox"/>	[ DIR ] <a href="#">Management/</a>	03/21/06 12:21:39 AM
<input type="checkbox"/>	[ DIR ] <a href="#">LogServer/</a>	03/20/06 05:24:18 PM
<input type="checkbox"/>	[ DIR ] <a href="#">JTapiService-4-1/</a>	01/11/06 02:56:06 AM
<input type="checkbox"/>	[ DIR ] <a href="#">JTapiService-4-0/</a>	01/16/06 09:38:41 PM
<input type="checkbox"/>	[ DIR ] <a href="#">JTapiService-3-3/</a>	03/20/06 05:24:59 PM
<input type="checkbox"/>	[ DIR ] <a href="#">H323/</a>	03/20/06 05:24:53 PM
<input type="checkbox"/>	[ DIR ] <a href="#">AppServer/</a>	03/21/06 12:50:36 AM
<input type="checkbox"/>	[ DIR ] <a href="#">AlarmAgent/</a>	03/20/06 05:24:49 PM

Page: [1]

[Archive Selected Logs](#) [Delete Selected Logs](#)

Existing log file  
directories

Log operations

# Troubleshooting – The Event Log

- Provides a list of system wide events and whether those events have been resolved.

## Event Log

Page: [1]

Id	Event Time	Recovered Time	Severity	Status	Code	Message	Details
837	01/11/06 10:19:50 AM	01/11/06 10:19:52 AM	ERROR	Resolved	9000	MCE required service 'MetreosH323Stack' is unavailable.	System Recovered
836	01/11/06 10:19:19 AM	01/11/06 10:19:20 AM	ERROR	Resolved	9000	MCE required service 'MetreosH323Stack' is unavailable.	System Recovered
827	01/06/06 11:12:11 PM	01/06/06 11:13:00 PM	ERROR	Resolved	9001	Media server 127.0.0.1 (127.0.0.1) is unavailable.	System Recovered
776	01/05/06 01:03:26 PM	01/05/06 01:03:26 PM	ERROR	Resolved	9000	MCE required service 'MetreosAppServerService' is unavailable.	System Recovered
772	01/05/06 12:34:19 PM	01/05/06 12:34:19 PM	ERROR	Resolved	9001	Media server 127.0.0.1 (127.0.0.1) is unavailable.	System Recovered
738	12/16/05 11:06:01 AM	11/30/99 12:00:00 AM	ERROR	Resolved	9000	E9000: MCE required service 'PCap Service' is unavailable.	4d8991bd-8d81-4845-a1f4-59bc343d7619

# Troubleshooting – Audit Log (Who to blame?)

- Every management operation is recorded.
- Provides a detailed view as to what has changed on the system and by whom.

## Audit Log

Page: [1] [2] [3] [4] [5] [6] [7] [8] [9] [10] [11] [12] [13] [14] [15] [16] [17] [ Next ]

Id	Event Time	Severity	Code	Message	Details
846	01/11/06 03:41:16 PM	OK	1083	administrator logged in	User: administrator
845	01/11/06 02:53:28 PM	OK	1112	Metreos Application Server service was started	User: Administrator
844	01/11/06 02:53:01 PM	OK	1113	Metreos Application Server service was stopped	
843	01/11/06 02:52:30 PM	OK	1083	Administrator logged in	
842	01/11/06 02:39:11 PM	OK	1112	Metreos Application Server service was started	

## Audit Detail

Log Message Id	833
Log Message Type	Audit
Timestamp	01/11/06 10:13:43 AM
Status	OK
Message Code	1070
Message	SNMP Manager Created
Details	User: administrator Array ( [name] => Test SNMP Manager [description] => [MetreosReserved_ManagerIp] => 10.1.5.1 [MetreosReserved_TriggerLevel] => Yellow [type] => 51 [add] => Add SNMP Manager )

[Go Back](#)

# Developing MCE Applications

## Using the Metreos Visual Designer

MCE Extensibility

Building Native Actions

Building Native Types

Building Protocol Providers



## Live Demonstration

# Developing MCE Applications

Using the Metreos Visual Designer

## **MCE Extensibility**

Building Native Actions

Building Native Types

Building Protocol Providers



# MCE Application Development

- MCE applications can be constructed entirely within the Metreos Visual Designer.
- If the developer wishes to extend the capabilities of the platform there are three options:
  - Native Actions
  - Native Types
  - Protocol Providers
- Extensions may be built using .NET enabled languages:
  - C#, C++, VB, Python, Java, etc.
- The choice of which type of extension to build is based on the general requirements of what that extension must provide.

# Native Actions vs. Protocol Providers



- Native actions:
  - Are light-weight and easy to build.
  - Execute within the same context as the script instance itself.
- Protocol Providers
  - Can generate events.
  - Can maintain state.
  - Can create threads.
  - Are more complex to build.
- **Developers should build a protocol provider when:**
  - They need to monitor external systems for events.
  - They need to maintain state independent of script instances.

# Native Types



- Allow developers to extend the type system provided by the MCE.
- Native types provide the functionality behind variables.
- Native types are easy to build.
- **Developers should build a native type when:**
  - There is a need to store complex data in a single variable.

# Action/Event Package Definition

- Describe the inputs and outputs of native actions, types and providers.
- Meta-data is used by the Metreos Visual Designer in populating the toolbox.
- The action/event package meta-data is embedded into the native action, type or provider assembly using .NET attributes.

```
[Action("OpenDatabase", false, "Open Database", "Create a DB connection.")]  
public string Execute(  
    SessionData sessionData,  
    IConfigUtility configUtility)  
{  
    // Do Something Useful  
}
```

## A Standard Native Action Execute Method

# Adding MCE Extensions to the Designer



- Add the custom assembly as a reference to an application project.
- The Metreos Visual Designer will then inspect the assembly for Action/Event attributes.
- Populates the list of actions and events available for use in that project accordingly.



# Developing MCE Applications

Using the Metreos Visual Designer  
MCE Extensibility

## **Building Native Actions**

Building Native Types

Building Protocol Providers

# Implementing a Native Action

- Key namespaces:
  - **Metreos.Core**
  - **Metreos.Interfaces**
  - **Metreos.LoggingFramework**
  - **Metreos.ApplicationFramework**
  - **Metreos.PackageGeneratorCore.Attributes**
- 6 Basic Steps:
  1. Create a new class that implements **INativeAction**
  2. Decorate the class with a **PackageDeclAttribute**
  3. Add **set** properties for any input parameters and decorate those properties with **ActionParamFieldAttributes**
  4. Add **get** properties for any output parameters and decorate with **ResultDataFieldAttributes**
  5. Override the **Execute** method with custom code
  6. Decorate the **Execute** method with an **ActionAttribute**
  7. Add a **LogWriter Log** property that defines a **set** accessor



## Live Demonstration



# Developing MCE Applications

Using the Metreos Visual Designer

MCE Extensibility

Building Native Actions

**Building Native Types**

Building Protocol Providers

# Implementing a Native Type



- Key namespaces:
  - `Metreos.ApplicationFramework`
  - `Metreos.PackageGeneratorCore.Attributes`
- 2 Basic Steps:
  1. Create a new class that implements **IVariable**
  2. Implement the **Parse** method



## Live Demonstration

# Developing MCE Applications

Using the Metreos Visual Designer

MCE Extensibility

Building Native Actions

Building Native Types

**Building Protocol Providers**

# Implementing a Protocol Provider

- Key namespaces:
  - `Metreos.Core`
  - `Metreos.Interfaces`
  - `Metreos.Messaging`
  - `Metreos.LoggingFramework`
  - `Metreos.ProviderFramework`
  - `Metreos.PackageGeneratorCore.Attributes`
- Implementation is more complex than either a Native Action or Type, but follows a very straight forward pattern.

# Implementing a Protocol Provider (cont)

1. Create a new class that derives from `ProviderBase`
2. Decorate the class with a `ProviderDeclAttribute` and `PackageDeclAttribute`
3. Override the `Initialize`, `RefreshConfiguration`, `OnStartup`, `OnShutdown` and `cleanup` methods with custom code
4. Implement action handling methods and decorate those methods with `ActionAttribute`, `ActionParamAttributes`, and `ResultDataAttributes`
5. Decorate the methods which generate events with the `EventAttribute` and `EventParamAttributes`



## Live Demonstration

# Examples and Walkthroughs





## Live Demonstration

# Metreos Communications Environment Training Version 2.2 (3/2006)

Thank You!



**METREOS**  
COMMUNICATIONS

innovate   integrate   develop   deploy™