

The image features two white, paneled doors standing upright on a lush green field. The doors are positioned on the left and right sides, with their top edges meeting to form a rectangular frame. The background is a clear, bright blue sky. The overall scene is surreal and symbolic, representing an open path or a gateway to a new world.

# **Cleo Communications**

CUEScript Training

**CLEO**

# Introduction

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- RMCS Architecture
- Why CUEScript, What is it?
- How and Where Scripts in RMCS
- XML Primer
- XPath Primer

# Introduction (cont.)

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- Getting Started Scripting
- Scripting Language
- Using System Objects
- Testing and Debugging Your Script
- RMCS Objects
- Different Scripting Contexts  
(specialization, post job, comm server, job server, remote server)

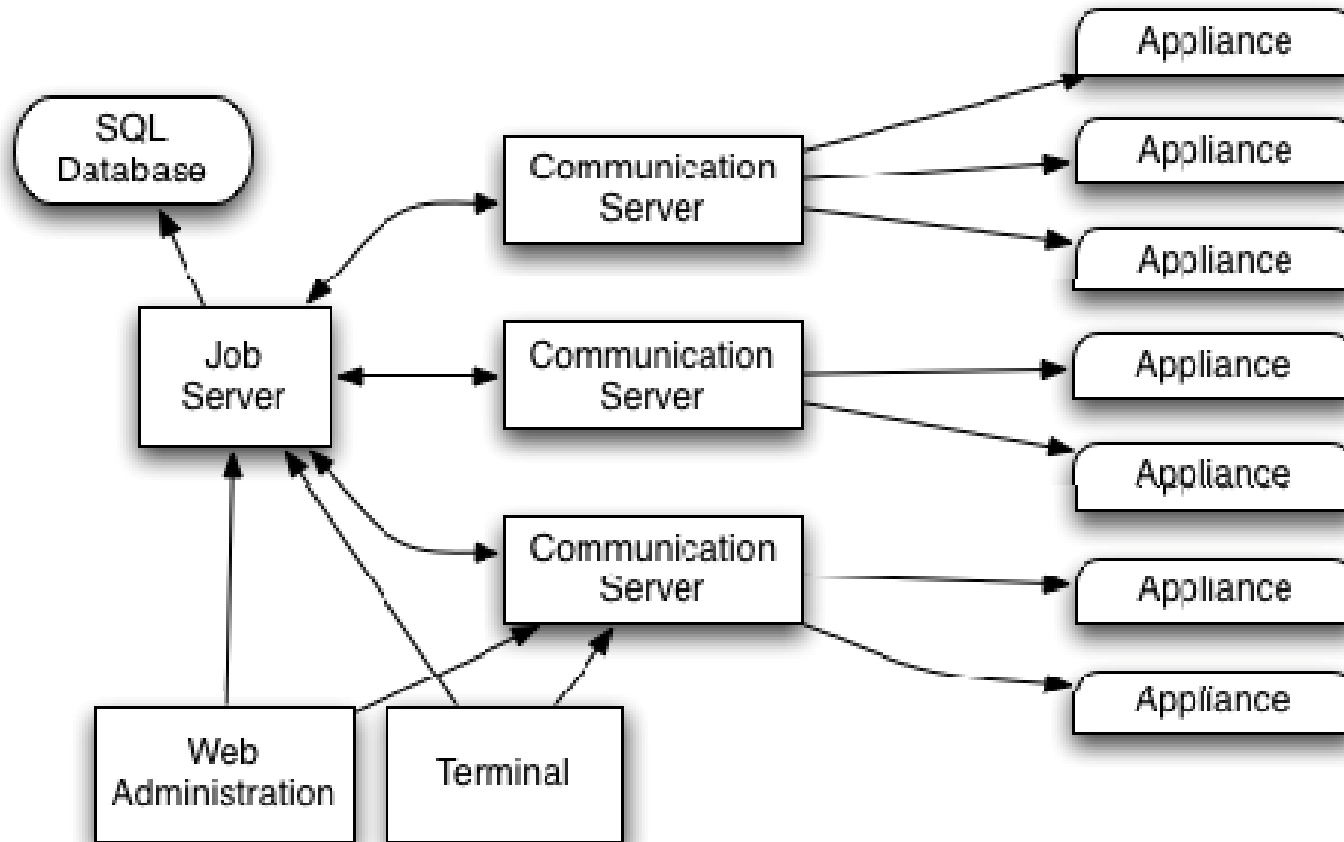
# Introduction (cont.)

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- Building Real-world Scripts
  - Update
  - Changing system configuration
- Advanced Topics
  - .NET objects
  - Value cache
  - Database extensions

# RMCS Architecture

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# Typical Scripting Scenario

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- Job Start
- Specialization
- Script sent with job instance item to Communication Server
- Script runs on Communication Server
- Script completes, reports back to Job Server
- If job complete, run post-job script section



# Why CUEScript?

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- Appropriate system objects are exposed in each context
- Scalability - allows the creation of new .NET objects
- XML is a standard. Readability. Embedding logic and data. Easy to sign.
- Self-referential and self-modifying

# Scripts in RMCS

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- Scripts page
- Adding/modifying script (copy/paste)
- Import/export of scripts
- Job definition (selecting a script)
- The “Interactive” job definition

# XML Primer

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- Confusion about XML
  - XML is NOT a programming language
  - HTML is simply an implementation of XML, it's not XML
- What is XML?
  - Simply a text file or text fragment
  - A way of structuring data with markup

# XML Elements

---

```
<?xml version="1.0"?>  
<note>  
  <to>Tove</to>  
  <from>Jani</from>  
  <heading>Reminder</heading>  
  <body>Don't forget me this weekend!</body>  
</note>
```



# XML Attributes

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```
<bookstore>  
  <book category="CHILDREN">  
    <title>Harry Potter</title>  
    <author>J K. Rowling</author>  
    <year>2005</year>  
    <price>29.99</price>  
  </book>  
</bookstore>
```

# XML Comments

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- You can insert comments in an XML document using `<!--` and `-->`

```
<?xml version="1.0"?>
```

```
<note>
```

```
  <!-- This is a note to my friend -->
```

```
  <to>Tove</to>
```

```
  <from>Jani</from>
```

```
</note>
```

# Other XML Oddities

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- Empty Elements
- Processing Instructions  
`<?action page-break="true" center="false"?>`
- Entities
  - `&lt;`; `&gt;`; `&amp;`; `&quot;`; `&apos;`;
- CDATA Section

# XML Namespaces

---

```
<root>
```

```
<h:table xmlns:h="http://www.w3.org/TR/html4/">
```

```
<h:tr>
```

```
<h:td>Apples</h:td>
```

```
<h:td>Bananas</h:td>
```

```
</h:tr>
```

```
</h:table>
```

```
<f:table xmlns:f="http://www.w3schools.com/furniture">
```

```
<f:name>African Coffee Table</f:name>
```

```
<f:width>80</f:width>
```

```
<f:length>120</f:length>
```

```
</f:table>
```

```
</root>
```

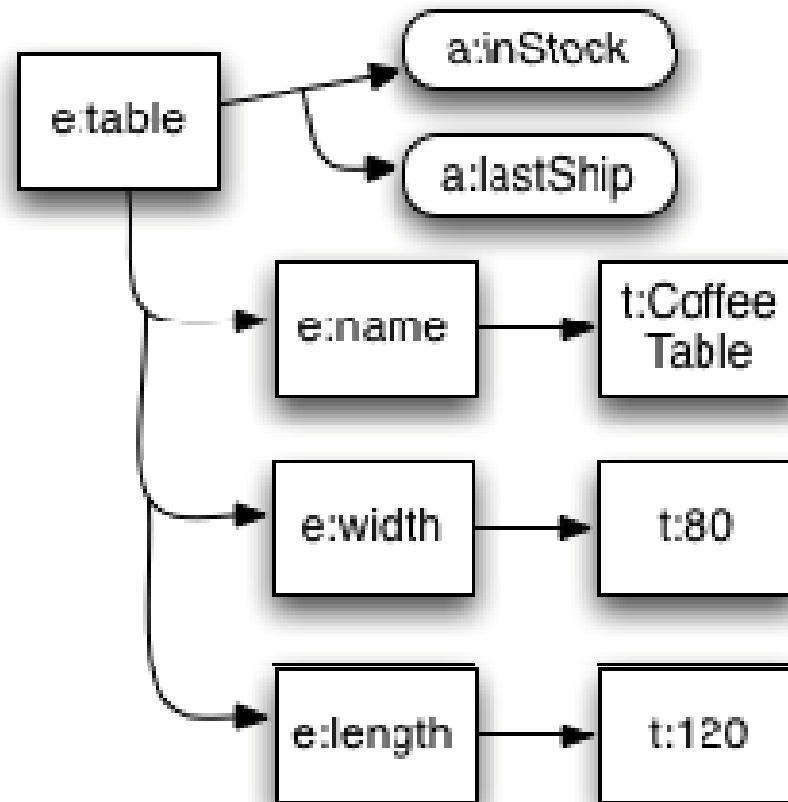
# XML Documents as Nodes

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```
<table inStock="true" lastShip="3/10/2010">  
  <name>Coffee Table</name>  
  <width>80</width>  
  <length>120</length>  
</table>
```

# XML Documents as Nodes

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# XPath Primer

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- XPath is a complex specification for querying one or more nodes from an XML tree
- The result of an XPath expression can be a single node, a list of nodes, a string value, boolean value, or numeric value
- CUEScript can use XPath to locate script nodes and modify those nodes

# XPath Expressions

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- /project/title
- //participant
- //participants/\*
- //item[@val='medium']
- //solutions[item[@val='medium']]

# Getting Started with CUEScript

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- Find an Editor
  - CUEScript Editor
  - XML Professional/Free Editors (XML Spy, Exchanger XML, etc.)
  - Visual Studio
  - Plain text editor

# Hello World

---

```
<module xmlns="http://www.cuesoft.com/CUEScript/1.0">  
  <script>  
    <output>  
      Hello World!  
    </output>  
  </script>  
</module>
```

# Hello World (RMCS version)

---

```
<module xmlns="http://www.cuesoft.com/CUEScript/1.0">  
  <script>  
    <expr>  
      $log.Info("Hello World!");  
    </expr>  
  </script>  
</module>
```

# Using “format”

---

```
<module xmlns="http://www.cuesoft.com/CUEScript/1.0">
  <script name="main">
    <expr>
      $greeting := "Hello";
      $log.Info( format("{0} World!", $greeting) );
    </expr>
  </script>
</module>
```

# Script Syntax

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- “module” tag as a placeholder, define the namespace
- “script” tag as starting points
- “expr” tag as place to put expressions

# Script Syntax - Variables

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- “var” tag to define a variable
- Variables can be defined on first usage in the “expr” tag
- Data Types
  - String
  - Numbers
  - Node Lists
  - Arrays

# Script Syntax – Flow Control

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- if/else
- switch
- for/while/repeat
- foreach
- continue/break

# Script Syntax – Extras

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- Functions
- Library includes
- Embedded expressions

# Exception Handling

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- <try>
- <catch>
  - \$exception variable
  - Named exception
- <raise>/<reraise>
- <finally>
- FatalException

# \$system Object

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- Sleep
- Wait
- CreateNetObject
- Invoke

# \$document Object

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- A variable referencing the script itself
- Can operate or query the document object model
- Refer to ScriptDocument in CUEScript.chm for more information

# Testing/Debugging Principles

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- Reuse existing scripts
- Baby steps
- Using the \$log object
- Build and use library functions
- Test and debug using Job Server
- Test and debug using Communication Server
- Test and debug using Remote Server

# Specialization

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- Walk through Interactive script
- Output of “special” script section is passed through
- Objects available during specialization (\$scriptContext, \$log, \$appliance, \$database, \$refDatabase)

# Post Job Scripting

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- Runs when the job completes
- \$jobServer and \$jobInstance object
- Useful for:
  - Updating database entries
  - Rescheduling a job if there is an error

# Communication Server Scripts

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- Review available objects
  - (\$scriptContext, \$security, \$log, \$connection, \$command, \$session, \$local, \$fileTransfer, \$attempt, \$packetFactory)
- Working with connections
  - Initiated connections vs. listening connections
- Appliance registration
- Sending command to an Appliance
- RMCS event model

# Using the \$session Object

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- Get the job name and instance item id
- Send remote appliance
- Using script timers
- Communicating with the Job Server

# Transferring Files

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- Use \$fileTransfer
  - PutFiles, GetFiles
  - ActiveTransferCount
  - SetMaxDirectionalTransfers
- Events
  - OnTransfersStarted, OnTransfersFinished
  - OnTransferStarted
  - OnTransferSuccess, OnTransferError

# Job Server Scripts

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- Run on the Job Server
- Set the type of script in the Job Definition
- RMCS APIs available to the script
- Useful for server maintenance and configuration

# Remote Server Scripts

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- Run on the Remote Server
- Manually run scripts
- Script Events (start-up, shutdown, connection)
- Scheduled scripts

# Creating a Remote Script

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- Edit script normally
- Signing script with permissions
- Save to XML file
- Transfer to **\*\*SCRIPT\*\*** directory
- Testing
- Viewing remote logs

# RMCS Update

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- Updating the server is as easy as copying new exe and dll files
- 3 steps to update
  - Create .zip with dlls to update or add
  - Transfer .zip files to **\*\*UPDATE\*\*** folder
  - Call “rmanage /update” to unpack the update

# Value Cache

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- Name-value pair store
- Transferred during handshaking
- How to set/get values
- How to persist the store automatically
- How to persist the store manually

# Advanced Topics – Using .NET Assys

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- Using MSDN help
- The CUEScript <assembly> tag
- Creating your own assembly

# Advanced Topics – Database Extensions

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- \$database and management objects
- <dbconnection>, <dbquery>, <dbexec>

# Questions...

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# Thank You

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