

AICC and the LMS

By Stuart Campbell, Director of Software Development, SyberWorks, Inc.

First, a little clarification. “AICC” is not just a standard; it is also the committee that *defines* the standard. The AICC, **A**viation **I**ndustry **C**omputer-based training (CBT) **C**ommittee, was formed in 1988 by aviation manufacturers such as Boeing, Airbus, and McDonnell-Douglas to standardize the delivery of CBT at a time when multimedia training was becoming increasingly popular. Over the years, however, the AICC standard branched out from aviation into a plethora of other industries.

The AICC standard was originally designed for local file-based operations, but was updated in 1998 to include a web-based interface called HACP (pronounced “*hack-P*”). HACP is HTTP-based and stands for **H**TT**P**-based **A**ICC/**C**MI **P**rotocol. The following year, the standard was updated again to include a JavaScript run-time interface. With these additions, AICC courses could integrate with the growing web-based e-Learning initiatives. This AICC HACP standard is now the most common installation configuration of AICC courses on LMS systems.

Technically, the definition of an AICC course is spread across several files, which describe the course’s content and structure. The files are generally known by their file extension and are described below:

- **CRS file**

The CRS file contains information about the course as whole, such as the course creator, title, description, and total number of lessons in the course. Below is a sample CRS file:

```
[Course]
Course_Creator=SyberWorks
Course_ID=OfficeTraining
Course_System=
Course_Title=SyberWorks Office Training
Level=1
Max_Fields_CST=2
Total_AUs=1
Total_Blocks=0
Version=3.0
[Course_Behavior]
Max_Normal=
[Course_Description]Office Training for SyberWorks Inc
```

- **AU file**

The AU file contains details about the Assignable Units. These are akin to the lessons that comprise the course. This information includes the file name to launch the lesson, mastery score, and maximum time allowed. Note that the `file_name` item in the screen shot below is actually a URL. (See the Cross Domain Course Content section below for more details.) Below is a sample AU file:

```
"system_id","type","command_line","max_time_allowed","time_limit_action","file_name","max_score","mastery_score","system_vendor","core_vendor","web_lo  
"A01","","","","http://www.somebsitesomewhere.com/courseware/content/display_AICC.asp","","","partnerid=SW23563&mode=hacp&courseID=SW1092&"
```

- **DES file**

The DES file is the Descriptor file and contains information about every course element in the course. Below is a sample DES file:

```
"system_id","developer_id","title","description"  
"A01","syberworks.1","SyberWorks Office Training",""
```

- **CST file**

The CST file is the course structure file and contains basic information about the structure of the course, including a listing of all AUs. This listing usually determines the order in which lessons are displayed to students. Below is a sample CST file:

```
"block","member"  
"root","A01"
```

Three additional file types also comprise the AICC course but they aren't used as often as the above files. These files are Objectives Relationships (ORT), Prerequisites (PRE), and Completion Requirements (CMP).

Cross Domain Course Content

One of the powerful features of AICC courses is that they support "cross domain course content." This means that, though a course exists on the LMS, the actual course content can reside on another server... even one outside your own network. With cross-domain courses, the course-content provider can host the content on their server and the LMS can call that content when users launch the course.

AICC accomplishes this by using a signed Java applet. The applet must be signed because the domain the course is launched from (i.e. the domain of the LMS) differs from the domain that the content comes from. An unsigned Java applet would reject this process, which it would consider to be cross-site scripting and a potential attack.

AICC accomplishes cross domain course content in the following manner:

- The student launches the lesson and the filename in the AU file is a URL to its content server on the internet.
- In the launch to the URL, call-back information is sent to the remote (content) server, so that it knows which (LMS) server it needs to communicate with.

- The remote content server attempts to establish communication with the LMS server that launched the lesson.
- Once communication is confirmed, the content is displayed through the LMS, from the remote location to the student's web browser.

Course Installation

For the AICC course to be available in the LMS, the course needs to be installed on the LMS. The method of installation varies from LMS to LMS, but typically includes the following steps:

1. The course file (CRS) is located and interpreted.
2. The course identified in the CRS file is created in the LMS and the course properties are populated with the values defined in the CRS file.
3. The course lessons are created in the LMS and the lesson properties are populated with the values from the AU file. Lesson properties include information such as the path to the lesson file, passing grade, and so on.

It's important that the LMS has the ability to overwrite an already-existing AICC course. If updates are made to an existing course, its re-installation would then deploy those changes.

Conclusion

AICC has been developed and implemented over a number of years, and therefore, is robust. However, due to the nature of the AICC committee and the number of revisions to the standard, it remains unclear what the term AICC-compliant actually means. The term has become quite relative, and a number of LMS's claim to be AICC-compliant even when they support only core AICC features... and not all of them. So it's wise to check.

AICC did go out of vogue for a while with the increasing popularity of the SCORM standard, but has seen a resurgence in the last year or two. [For more about SCORM, see my article "SCORM and the Learning Management System (LMS)" (at <http://www.syberworks.com/articles/scorm-and-the-lms-article.htm>.)] The ability to support cross domain course content is a real bonus, as some companies do not want or need their LMS vendor to also host their course content. AICC has been around for a number of years and will continue to maintain a strong presence in the e-Learning market.

About the Author

Stuart Campbell is Director of Software Development for SyberWorks, Inc., a privately-held supplier of e-Learning software and training. A native of the United Kingdom, he had previously served as a Principle Software Engineer, Senior Consultant, Senior Software Engineer, and Development Specialist for companies such as Brooks Automation Inc., Digital Equipment, and Honeywell Control Systems. His areas of expertise include Visual Studio.NET, C#, VB.NET, VB6, VBScript, XML, COBOL, WindowsXP, Windows2000, WindowsNT, VAX/VMS, UNIX, Oracle, SQLServer, Oracle Rdb, Oracle DBMS, and Agile Modeling Methodology.

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