

Accelerating cmi5 Adoption: Exploring the Conformance Test Suites and Tools

Brian Miller
George Vilches
Andy Johnson

Rustici
Software 



Welcome and introductions



Brian Miller

Director of
Engineering,
Rustici Software



George Vilches

Principal Software
Engineer,
Rustici Software



Andy Johnson

SETA
Contractor,
ADL Initiative

Today's agenda

Part 1

- cmi5 overview
- CATAPULT overview
- Prototype player overview
- LMS Test Suite overview
- Q&As

Part 2

- Content Test Suite overview
- Using course templates
- Q&As

Background on cmi5



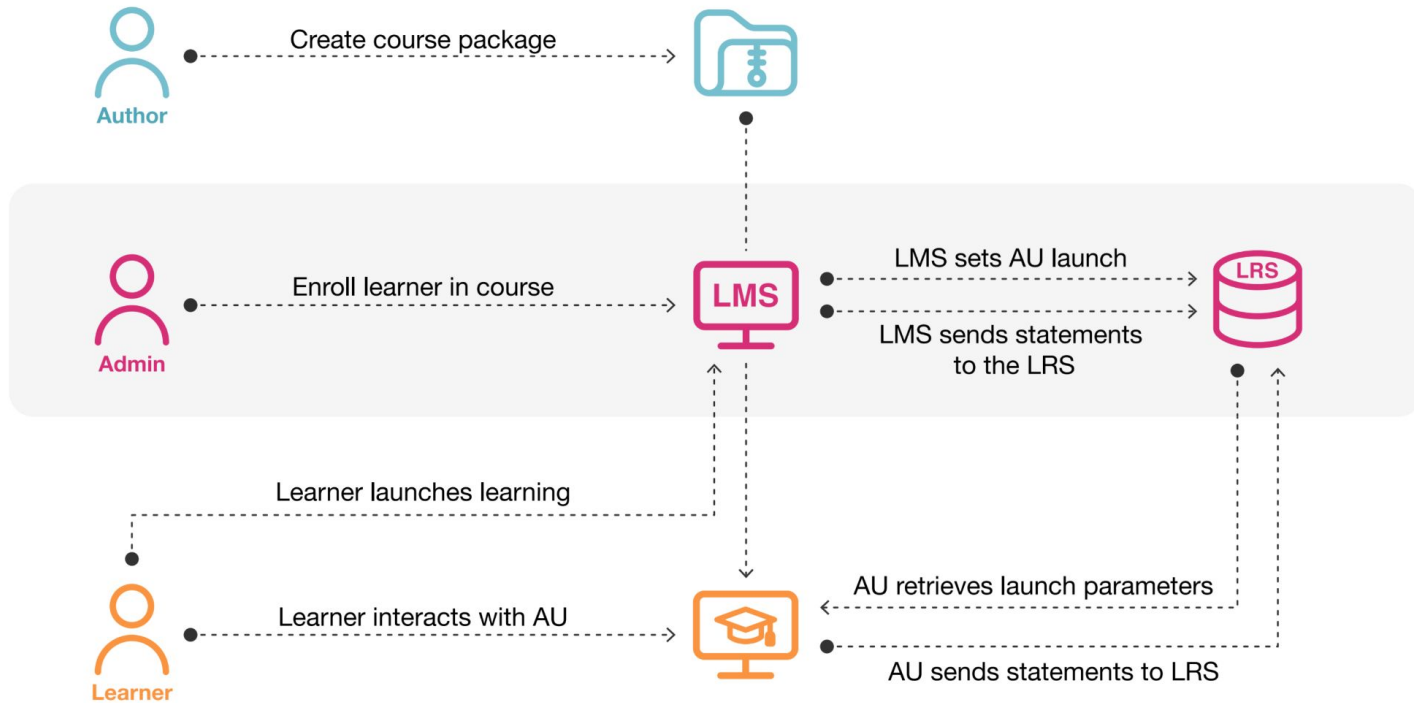
cmi5 is an “xAPI Profile”

- An extra set of rules called a “Profile”
- Ensures plug and play interoperability between learning content and LMS systems
- Designed specifically for when a learner launches from the LMS user interface

Components

- Course package/structure
- Learning Management System (LMS)
- Learning Record Store (LRS)
- Assignable Unit (AU)

Let's see cmi5 in action



Beyond SCORM and xAPI

cmi5 also includes these capabilities:

- Structured launch capabilities outside an LMS
- Wider “session” structure
- Firmer profile control to improve “Big 4” reporting
- Waiving, with structured tracking
- Control of exit behavior
- Launch remote content inside an LMS context

Comparison of key features

Features	SCORM	xAPI	cmi5
Defined content launch	✓	✗	✓
Track “anything”	✗	✓	✓
Normalized reporting	✓	✗	✓
Mobile applications	✗	✓	✓
Distributed content	✗	✓*	✓
Data portability	✗	✓	✓
Extensibility	✗	✓	✓
Normalized completion criteria	✓	✗	✓
Multiple lesson support	✓	✗	✓

cmi5 CATAPULT overview

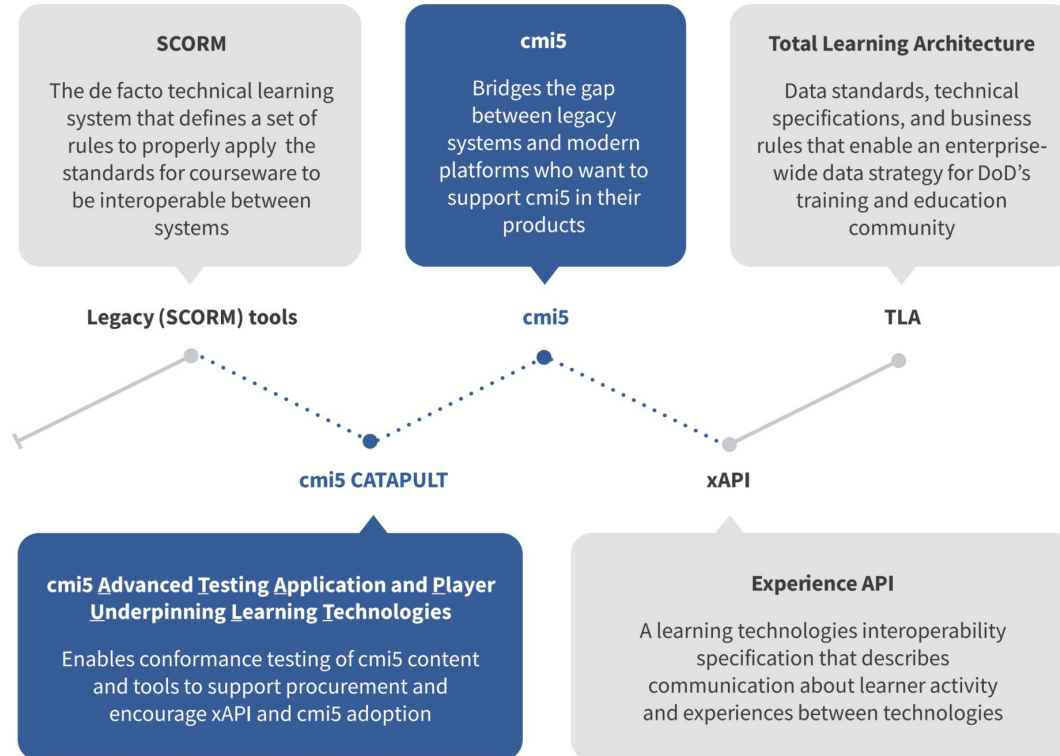
cmi5 Advanced Testing Application and Player Underpinning Learning Technologies

12-month project that includes:

- Open Source cmi5 player Prototype
- cmi5 conformance test suites to test content and platform conformance
- Sample cmi5 course templates
- Best practice guide and documentation for implementing the tools



Where does cmi5 fit?



Expected outcomes

Eliminating barriers to entry

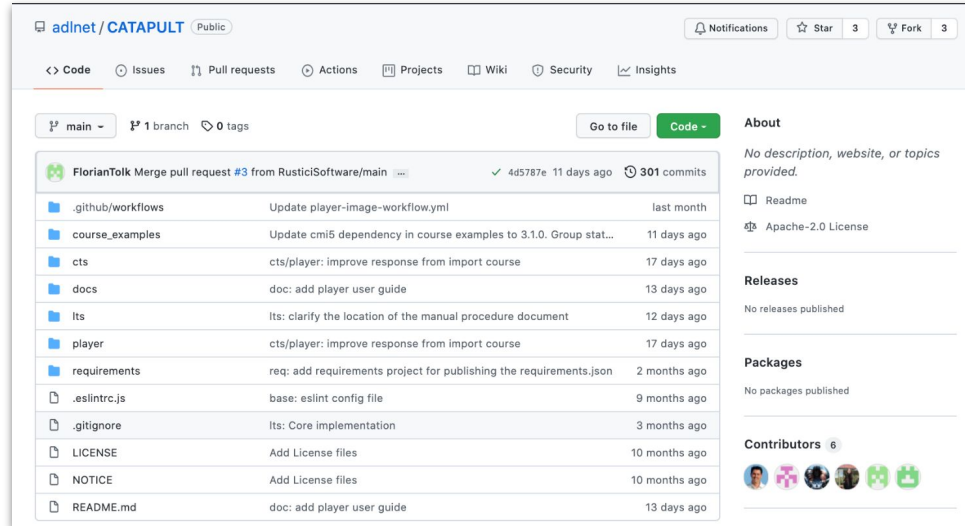
- Lack of LMSs and authoring tools that support cmi5 and xAPI in a consistent manner
- No software conformance test suite for validating whether courseware or platforms adhere to the cmi5 specification

Leveraging lessons learned from SCORM

- The conformance test suites follow a similar approach to what SCORM did to facilitate adoption. The test suites can be used in the acquisition pipeline to ensure conformance of delivered courses and to determine if an LMS correctly plays cmi5 courses.

Open-source tools for all

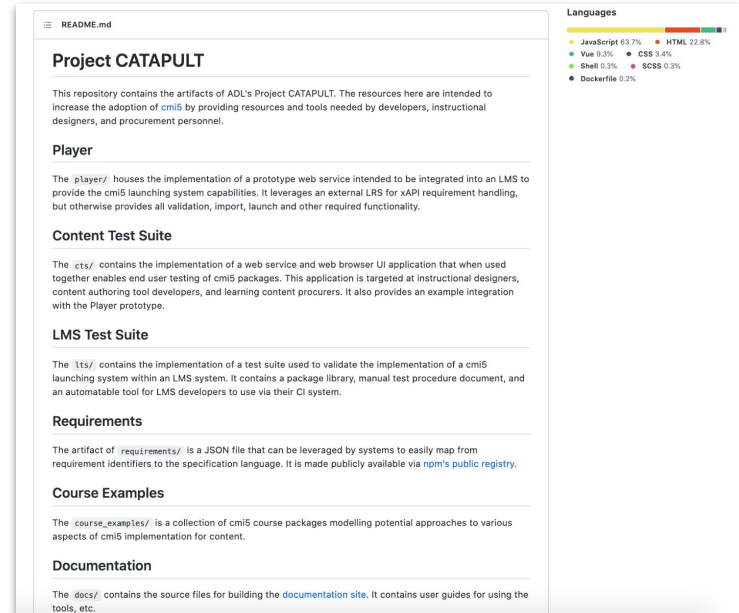
<https://github.com/adlnet/CATAPULT>



The screenshot shows the GitHub repository page for `adlnet/CATAPULT`. The repository is public and has 3 stars and 3 forks. The main branch is `main`. The repository contains a file tree with the following files and their last commit dates:

File	Last Commit
<code>.github/workflows</code>	Update player-image-workflow.yml (last month)
<code>course_examples</code>	Update cmis5 dependency in course examples to 3.1.0. Group stat... (11 days ago)
<code>cts</code>	cts/player: improve response from import course (17 days ago)
<code>docs</code>	doc: add player user guide (13 days ago)
<code>Its</code>	Its: clarify the location of the manual procedure document (12 days ago)
<code>player</code>	cts/player: improve response from import course (17 days ago)
<code>requirements</code>	req: add requirements project for publishing the requirements.json (2 months ago)
<code>.eslintrc.js</code>	base: eslint config file (9 months ago)
<code>.gitignore</code>	Its: Core implementation (3 months ago)
<code>LICENSE</code>	Add License files (10 months ago)
<code>NOTICE</code>	Add License files (10 months ago)
<code>README.md</code>	doc: add player user guide (13 days ago)

The repository also has a section for **About** with the text: "No description, website, or topics provided." and a **Readme** section with the text: "Apache-2.0 License".



The screenshot shows the `README.md` file for the **Project CATAPULT** repository. The repository contains the artifacts of ADL's Project CATAPULT. The resources here are intended to increase the adoption of `cmis5` by providing resources and tools needed by developers, instructional designers, and procurement personnel.

Player

The `player/` houses the implementation of a prototype web service intended to be integrated into an LMS to provide the `cmis5` launching system capabilities. It leverages an external LRS for xAPI requirement handling, but otherwise provides all validation, import, launch and other required functionality.

Content Test Suite

The `cts/` contains the implementation of a web service and web browser UI application that when used together enables end user testing of `cmis5` packages. This application is targeted at instructional designers, content authoring tool developers, and learning content procurers. It also provides an example integration with the Player prototype.

LMS Test Suite

The `lts/` contains the implementation of a test suite used to validate the implementation of a `cmis5` launching system within an LMS system. It contains a package library, manual test procedure document, and an automatable tool for LMS developers to use via their CI system.

Requirements

The artifact of `requirements/` is a JSON file that can be leveraged by systems to easily map from requirement identifiers to the specification language. It is made publicly available via [npm's public registry](#).

Course Examples

The `course_examples/` is a collection of `cmis5` course packages modelling potential approaches to various aspects of `cmis5` implementation for content.

Documentation

The `docs/` contains the source files for building the [documentation site](#). It contains user guides for using the tools, etc.

Languages

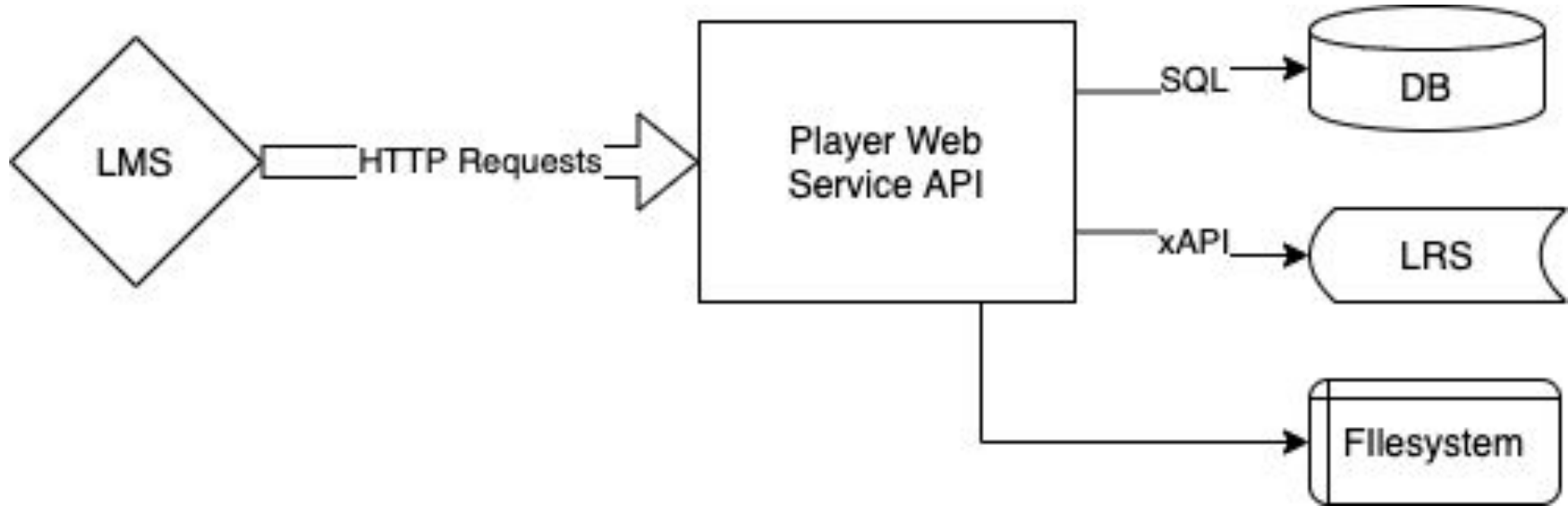
Language	Percentage
JavaScript	63.7%
HTML	22.8%
Vue	9.3%
CSS	3.4%
Shell	0.3%
SCSS	0.3%
Dockerfile	0.3%

cmi5 Player Prototype overview

Open-source cmi5 Player Prototype is freely available and functions as an authenticated, web-based system that connects to an LRS

- Intended for systems developers to use for building a minimally viable cmi5 implementation to test and demonstrate cmi5 learning content
- Imports content from a single list of files and sequences that content dynamically based on the requirements of the cmi5 specification

cmi5 Player Prototype



Using the

cmi5 Player Prototype

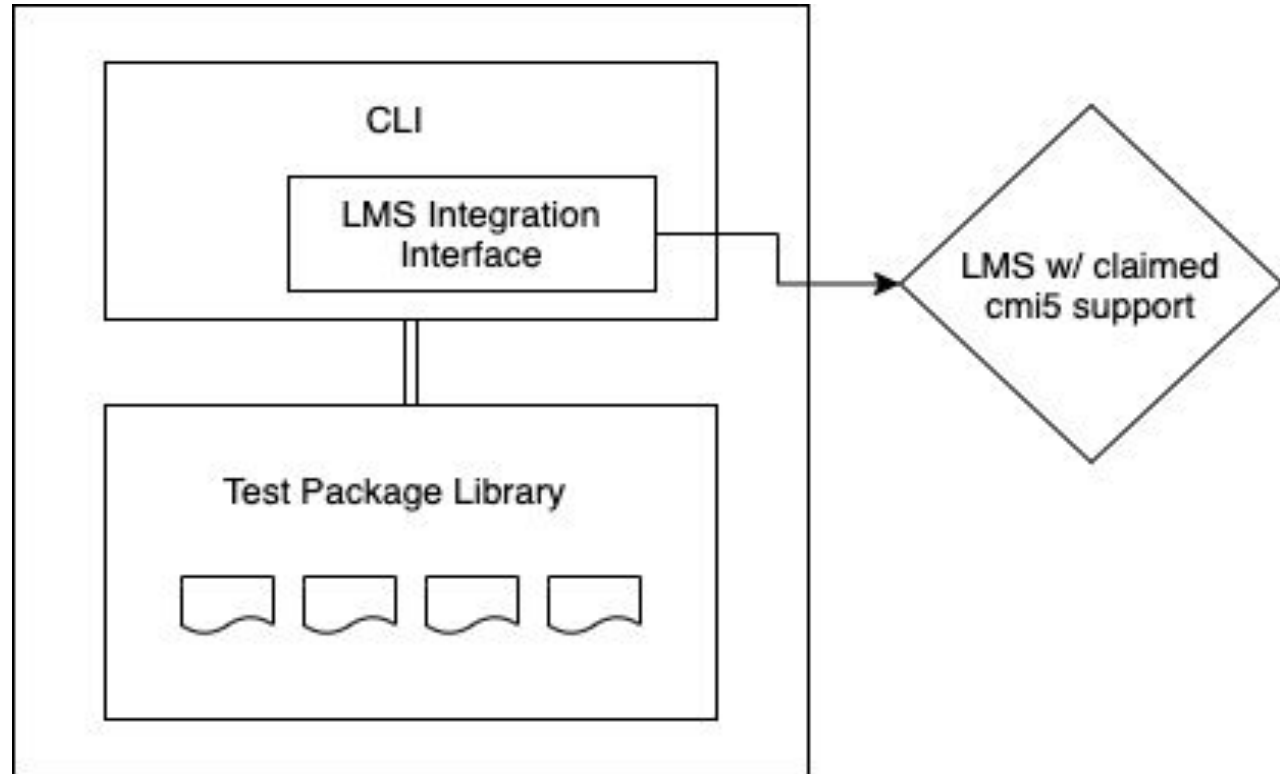
to build a system

cmi5 LMS Test Suite (LTS) overview

The term LMS describes the system that is “launching” the cmi5 content, but doesn’t have to be a traditional LMS

- LTS application is a command line interface (CLI) that leverages the library of test packages to automate the testing of an LMS claiming to have cmi5 capability
- CLI exposes an LMS integration interface that will have to be implemented on a per LMS basis
- Test and validate that the LMS adheres to the cmi5 specification and will be compatible with cmi5 learning activities (content) and with other systems

cmi5 LMS Test Suite



Testing in the

cmi5 LMS Test Suite (LTS)

Have questions? Ask us anything!



Brian Miller
Rustici Software

brian.miller@rusticisoftware.com



George Vilches
Rustici Software

george.vilches@rusticisoftware.com



Andy Johnson
ADL, SETA Contractor

andy.johnson.ctr@adlnet.gov

5 minute break

Return at 14:45 EDT

Agenda for part 2

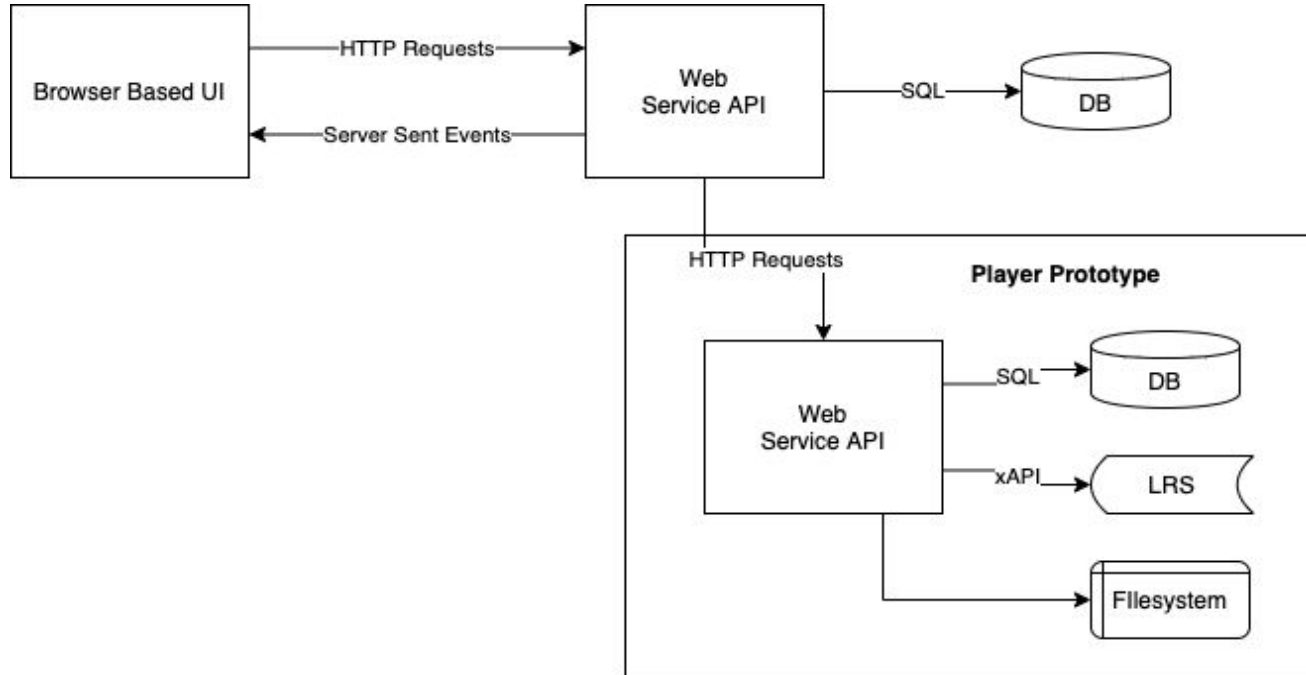
- Content Test Suite overview
- Using course templates
- Q&As

The importance of testing for conformance

Compatibility with other systems

- Without testing in the LTS, the developer won't know what is causing conformance issues (the learning activity or the LMS itself) should they arise.
- In addition, the LMS should be regularly tested, as the test pipeline allows, to ensure that the LMS continues to be conformant to the cmi5 specification.
- Not using the CTS to test learning activities could result in interoperability issues when launched from different LMSs.

cmi5 Content Test Suite



Testing in the

cmi5 Content Test Suite (CTS)

When to migrate legacy content to cmi5

- **Need to revise or update existing content?** This is the perfect opportunity to migrate to cmi5 when you're updating existing content.
- **Want to capture more detailed learning data from existing courseware?** cmi5 provides more detailed data about what happens inside the course or learning activities beyond what the SCORM standards support.
- **Looking to modernize your training per the DoDI 1322.26 fungible resources?** cmi5 is a recommended path towards replacing SCORM.
- **Are you trying to avoid pop up windows?** With cmi5, learning activities (content) can be launched in the same window as the LMS.

Using course templates to build

cmi5 content

and migrate legacy SCORM content

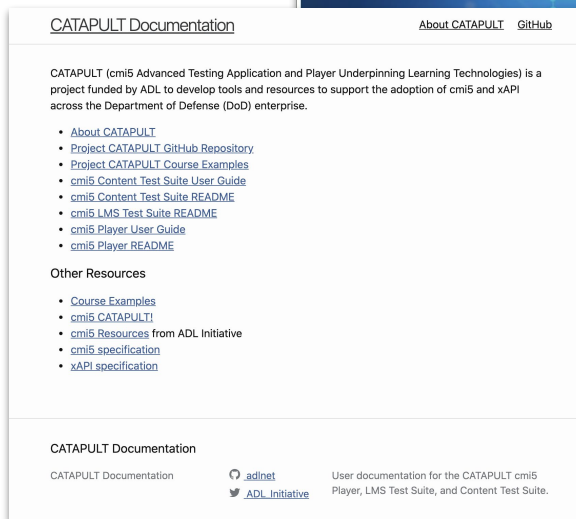
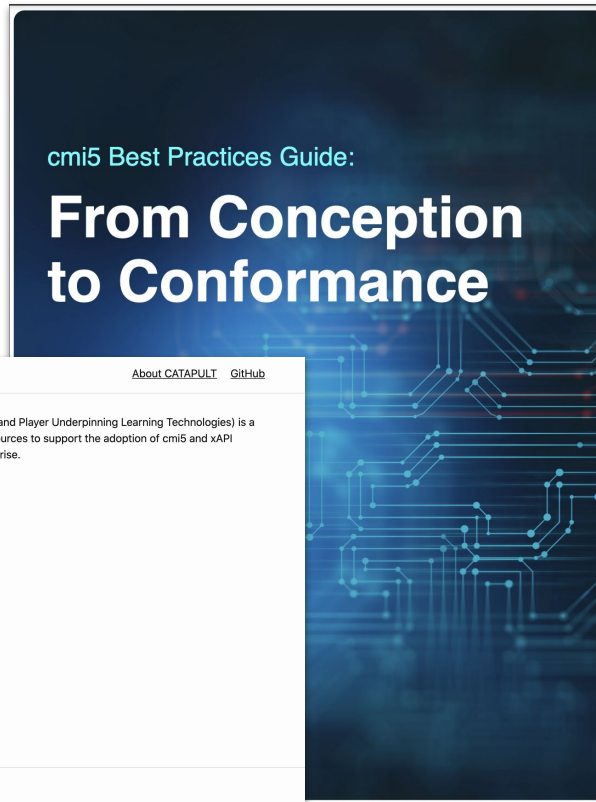
Documentation

GitHub repository, course examples, user guides, installation and deployment instructions can be found at:

<https://adlnet.github.io/CATAPULT/>

cmi5 Best Practices Guide:

<https://adlnet.gov/assets/uploads/cmi5%20Best%20Practices%20Guide%20-%20From%20Conception%20to%20Conformance.pdf>



What's next?

Help accelerate cmi5 adoption

- Assess where you are with cmi5 and determine where it fits with your plans
- Start having open conversations on where cmi5 fits in your existing tools in your environment
- Request your vendors to add cmi5 in their product roadmap and ask when will they have support for cmi5

Expanded tracking capabilities

- The next “step” after implementing cmi5 is to expand into other xAPI tracking
- xAPI Profile Server removes the difficulty of creating, finding and reusing xAPI profiles

Resources

Keep up-to-date on cmi5 CATAPULT
<https://adlnet.gov/projects/cmi5-CATAPULT/> and
<https://xapi.com/cmi5-project-catapult/>

Visit ADL's cmi5 page and xapi.com's cmi5 page for more background
<https://adlnet.gov/projects/cmi5-standard/> and
<https://xapi.com/cmi5/>

View ADL's cmi5 resources
<https://adlnet.gov/resources/cmi5-resources/>

Join the cmi5 weekly working group
http://aicc.github.io/CMI-5_Spec_Current/

Attending conferences? Hear us present!



Mind the Gap: Bridging the SCORM and xAPI Divide with cmi5 on October 21st at 3:30PM PDT



Bridging the SCORM and xAPI Gap: The Role of cmi5 on December 1st at 8:30AM EST in Room 320D

Have questions? Ask us anything!



Brian Miller
Rustici Software

brian.miller@rusticisoftware.com



George Vilches
Rustici Software

george.vilches@rusticisoftware.com



Andy Johnson
ADL, SETA Contractor

andy.johnson.ctr@adlnet.gov