LearnUpon

xAPI and cmi5

Plan Now for the Future of eLearning

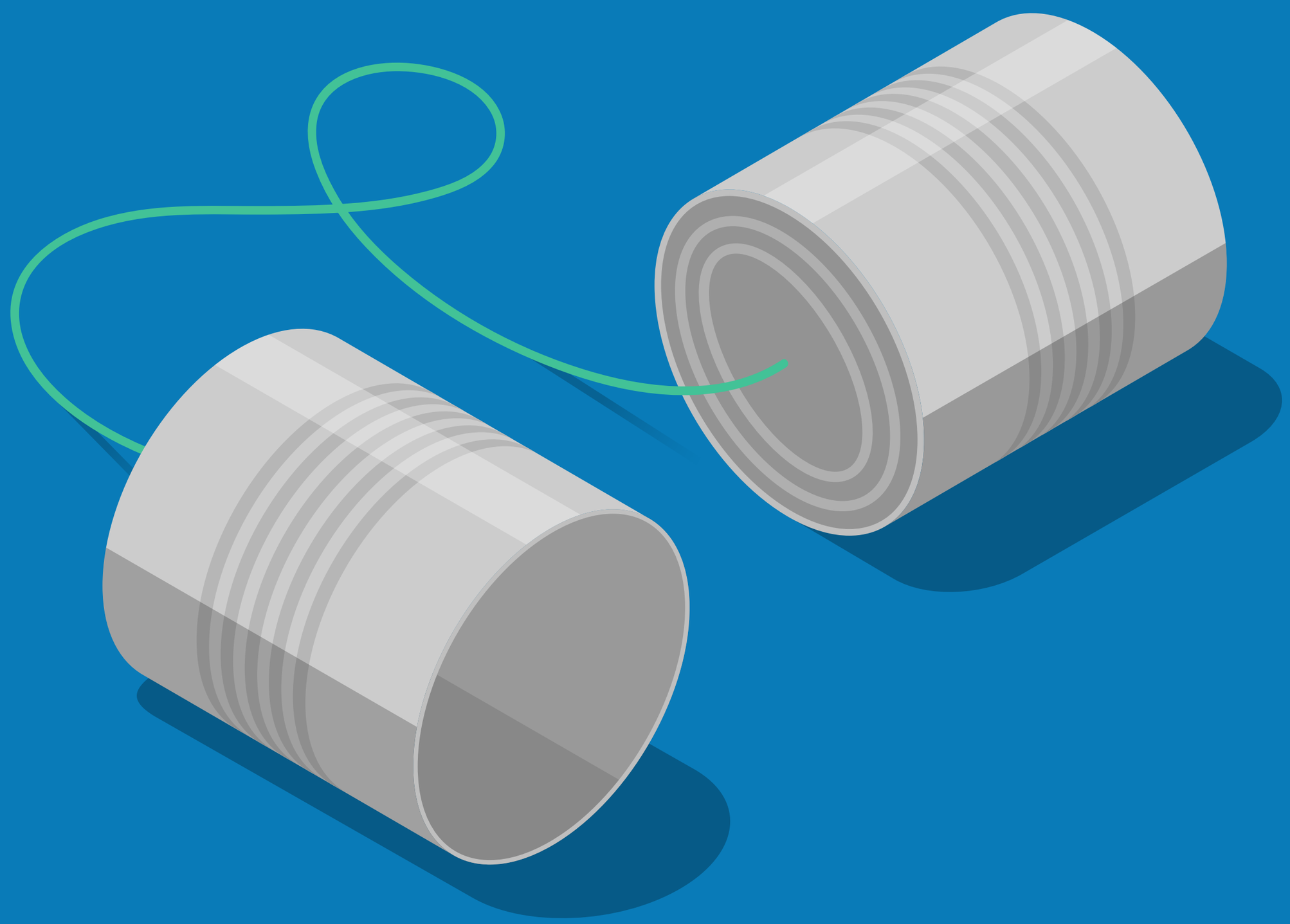


Table of Content

Terminology

ADL: The ADL Initiative is a US government program established to help programs, initiatives, and policies better support flexible, lifelong learning through the use of technology.

AICC: Aviation Industry Computer-Based Training Committee. The first globally recognized eLearning content standard developed in the early 1990's by a number of leading aircraft manufacturers.

Authoring Tool: A content authoring tool is a software application used to create multimedia content, which is delivered through an LMS.

AU: Assignable Units are learning objects. The Assignable Unit file contains information on all the individual assignable units in your course.

CAM: Content Aggregation Model.

CDN: A global network of proxy servers deployed in multiple data centers to enable the high availability and high performance of content being viewed by the learner.

cmi-5: A "profile" for using the xAPI specification with traditional learning management systems.

LMS: Learning Management System. A system to administer, deliver and monitor eLearning courses.

LRS: A Learning Record Store (LRS) is a data store system that serves as a repository for learning records necessary for using xAPI statements.

mLearning: Using mobile devices to engage with eLearning content.

SCORM: Sharable Content Object Reference Model, a collection of standards and specifications for eLearning.

SOAP: Simple Object Access Protocol is an XML-based messaging protocol for exchanging information among computers.

Statement: A unit of xAPI data transferred to an LRS which allow granular reporting because of the volume and frequency of the statements. This allows greater data analysis.

xApi: The experience API or The Tin Can API is a relatively new specification for learning technology that makes it possible to collect data about the wide range of experiences a person has (both online and offline).

Introduction

Over the last couple of years, xAPI has emerged as the hot new standard for delivering online training. xAPI is often described as the next evolution of SCORM. While the SCORM standard isn't going away anytime soon, xAPI has redefined some of the fundamental practices of tracking learning experiences. But what is xAPI? And why do so many experts believe it will soon become the default standard for eLearning content?

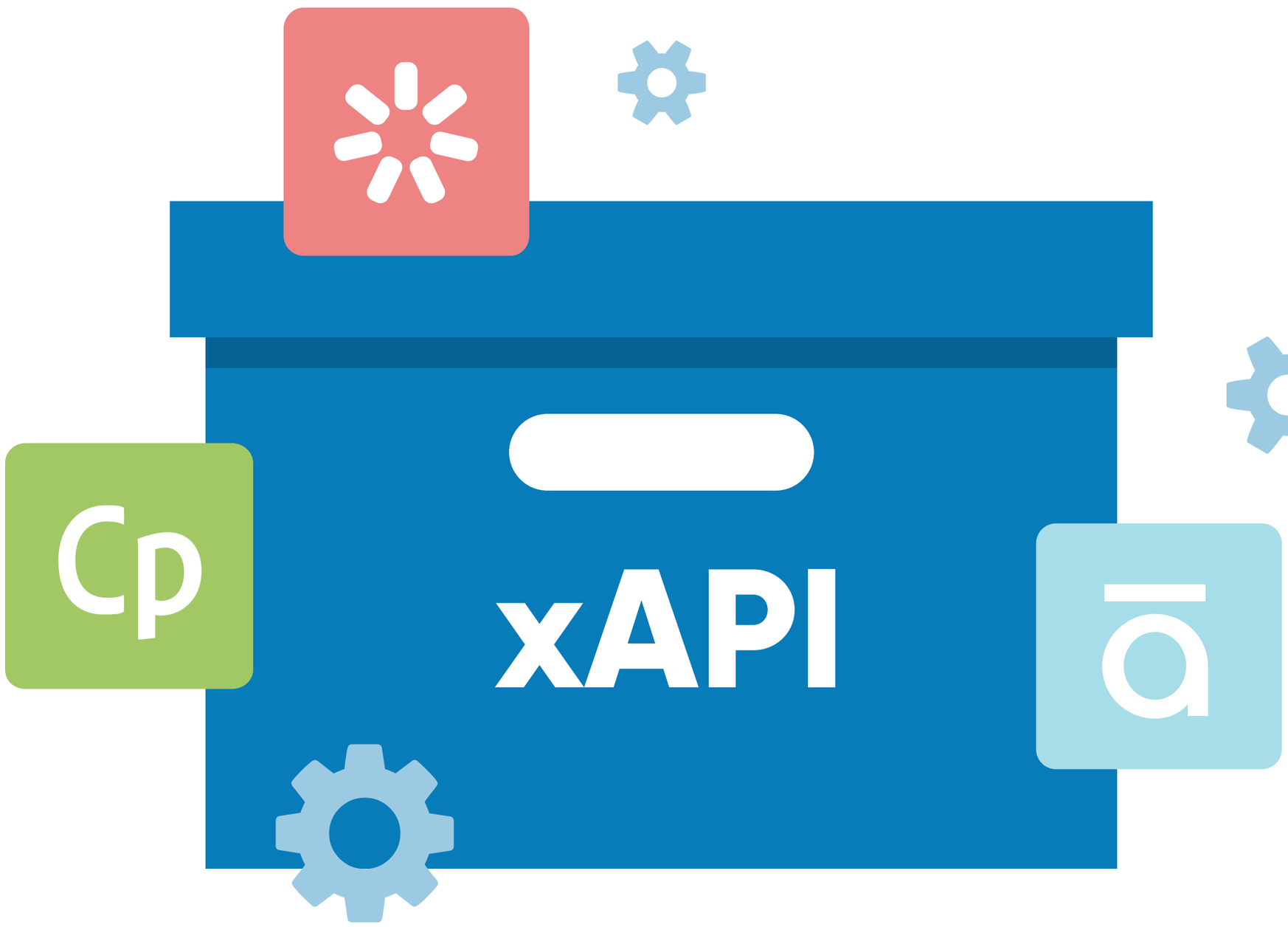
SCORM has been through many iterations. While it has evolved, its primary issue is that SCORM 1.2 (only the

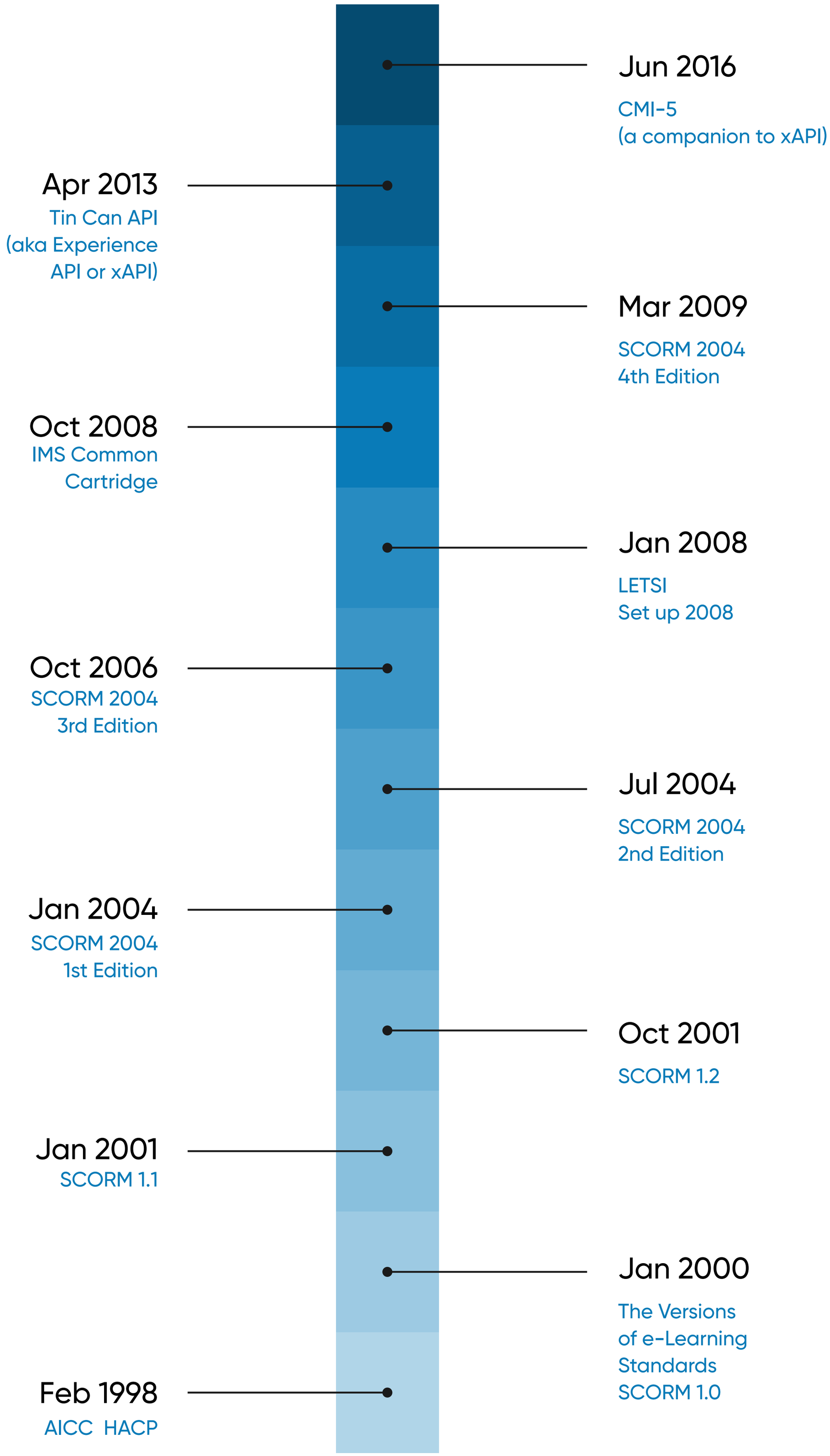
second version in its history, released in 2001) remains the specification commonly implemented with authoring tools and learning management systems. This indicates that, while SCORM is embedded in the industry and will be around for some time, development has stalled and other standards have an opportunity to step in. Other standards have emerged to challenge SCORM. Although xAPi was not originally designed to replace SCORM by itself but, with some further developments, it may have a part to play in doing so.

xAPI: The Basics

xAPI, which is also known as the Tin Can API, was officially released as version 1.0 in April 2015. Rustici initially chose the name "Tin Can" to describe the two-way conversations the technology would track as it made it easier for learning systems to communicate with each other. Upon it's official release the name became the experience API - or xAPI - because of its focus on the learner's experience.

In the past, eLearning was set up to capture and measure the activities of learners against a very linear backdrop. This however does include areas where a person may have learned from 'experiences' outside of standard training. xAPI is doubling down on the principle that learning opportunities reside everywhere and that they come in many different forms, so you should track the full learning experience.




Jun 2016
CMI-5
(a companion to xAPI)
Apr 2013
Tin Can API
(aka Experience
API or xAPI)
Mar 2009
SCORM 2004
4th Edition
Oct 2008
IMS Common
Cartridge
Jan 2008
LETSI
Set up 2008
Oct 2006
SCORM 2004
3rd Edition
Jul 2004
SCORM 2004
2nd Edition
Jan 2004
SCORM 2004
1st Edition
Oct 2001
SCORM 1.2
Jan 2001
SCORM 1.1
Jan 2000
The Versions
of e-Learning
Standards
SCORM 1.0
Feb 1998
AICC HACP

A successor to SCORM?

Pitched as a successor to SCORM, xAPI became widely adopted in a short space of time. Like SCORM, the specification is an API and defines a communications protocol for tracking learning-related activity. xAPI is much more than a JavaScript API that sits in an LMS and talks SCORM. xAPI by design can track learning in almost any context via any technology. As a result, the standard is used to track more real-world scenarios across a broader range of devices and tools than an LMS. The xAPI specification is better defined than the SCORM API and uses more modern technologies to achieve its goals. This makes it easier to use, more accessible to developers, and more robust. xAPI also introduced the concept of an LRS (for example Saltbox or Watershed). An LRS can be located inside or outside an LMS. It's essentially a large unit that understands how to speak the xAPI protocol and is used for storing and retrieving xAPI data (known as statements).

One area in which SCORM is actually superior to xAPI is in relation to the CAM (Content Aggregation Model) specification, or the packaging aspect of your

eLearning. xAPI's creators have published a white paper on how xAPI courses can be packaged, but in reality the white paper is little more than a suggestion, intended to help authoring tools get to grips with xAPI exports that can be consumed by LMS platforms. The specification also enabled learning management systems to import and launch xAPI packages in a manner similar to SCORM. But why does xAPI's lack of packaging matter?

From the perspective of an LMS vendor, the original white paper was received as the definitive word from the people who defined the xAPI standard and quickly became set in stone. eLearning developers believed the paper described exactly how learning platforms and authoring tools should create, package and import xAPI courses. And while the method does work, it's ambiguous. Different authoring tools create packages in different ways, which leads to confusion and misconceptions about how a package should be defined or interpreted. A classic example is that the xAPI package itself can define questions included in a quiz that the course can also define in real-time during its

tracking. That's very inefficient and unreliable, from an LMS implementation perspective. It means that two different ways to source question data from an xAPI package must be implemented, one of which (the packaging) is not well defined. But xAPI was developed to track learning everywhere and 'everywhere' may be difficult to neatly package.

The difference between SCORM and xAPI

The major difference between xAPI and SCORM content is the type of learning each can track. While SCORM is limited to recording online learning, xAPI can track almost any activity. As a result, xAPI delivers a far more detailed view of learner progress, within and beyond traditional learning environments, both online and offline. The kinds of learning it can track are almost infinite, including: reading a webpage, attending an event, borrowing a library book, playing a game, blended learning, and team-based learning.

How to create xAPI files

xAPI files are produced in a very similar manner to SCORM files. You can create your own zip files (i.e. course packages) if you are a technical professional or alternatively you can use an authoring tool to export your course package as xAPI. Authoring tools are a streamlined means to create eLearning courses which are visually engaging and user friendly; you can create your content with the authoring tool's features, and then export the content in the desired format (e.g. xAPI) with

no requirement for coding. At the point of publishing the content any authoring tool that supports xAPI you will have the ability to choose xAPI as the file type to export (it may be called Tin Can API in some authoring tools).

For example, if you use Articulate Storyline you can publish a 'Tin Can file', that will output statements to an LMS or an LRS. Publishing for xAPI in Articulate Storyline is relatively simple – just choose "Tin Can API" in the output options section. Other authoring tools work in a very similar manner. Once the zip file has exported you can then simply upload the file into your LMS, such as LearnUpon, and the content will be a module in your course.

How xAPI works

The information tracked to and from xAPI compliant systems is communicated in the form of statements. xAPI simplifies how learning is recorded by offering multiple ways to track these statements. Each statement is composed of three elements, a structure known as xAPI's syntax:

- **Noun** - Actor – or the ‘who’ part of an action
- **Verb** - The action
- **Object** - The ‘what’ part of an action

For example:

“I – did – this”

“Mary – completed – health and safety training”

“John – read – LearnUpon’s help guide”.

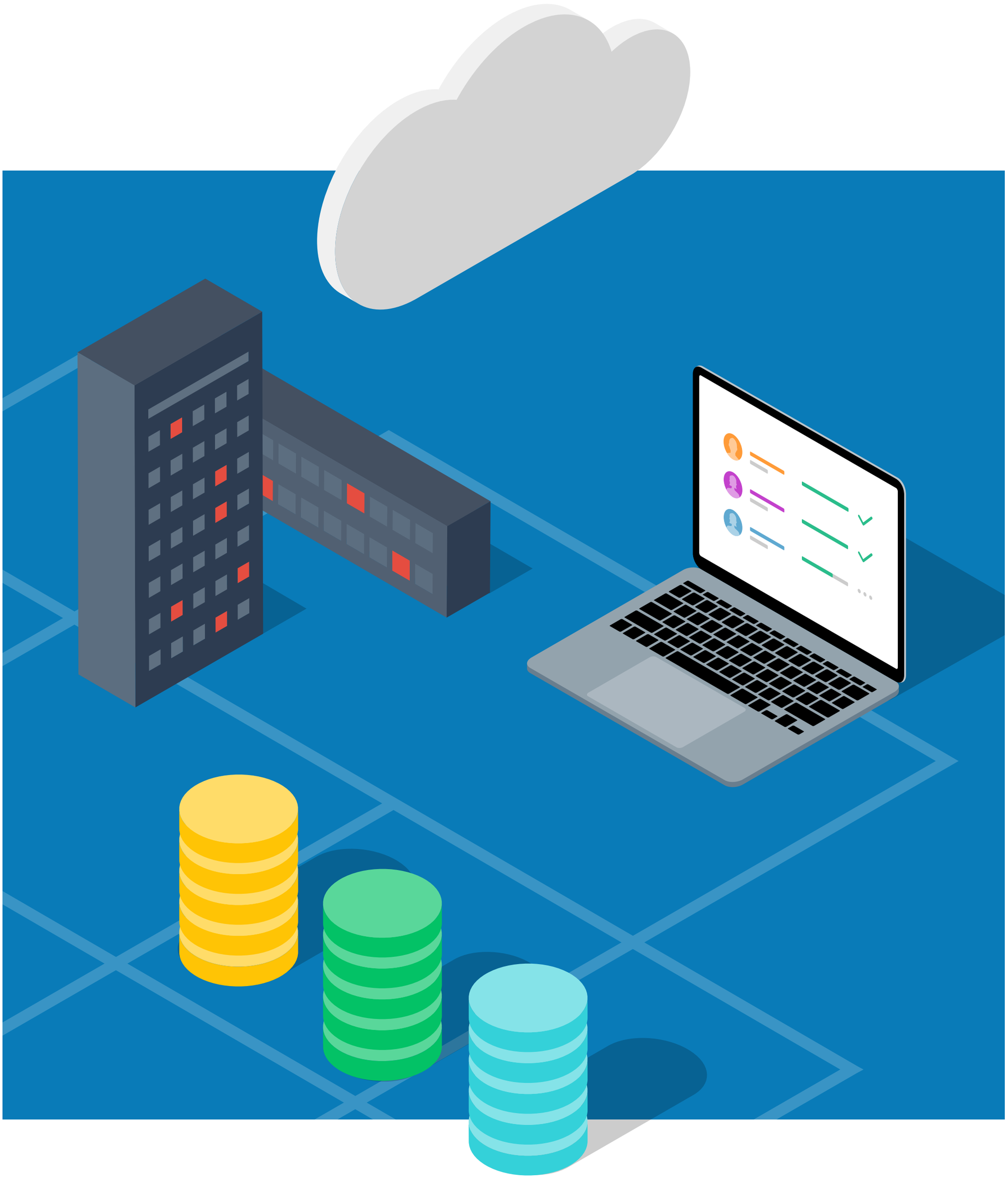
xAPI uses these statements to track data about learner actions and reports them back to a learning management system, Learning Record Store (LRS), or any application that understands the xAPI language.

The benefits of xAPI

Its flexibility makes xAPI well suited to the current environment in which learners access all kinds of materials in all kinds of locations. We can now learn anywhere: while travelling to work, doing our jobs, or socializing with friends. xAPI allows us to track all of these learning experiences in one simple, consistent format. In particular, due to the way xAPI is designed, it lends itself quite well to mLearning and as a result, beats SCORM hands down in many technical ways for mobile learning and mobile LMS usage.

Because xAPI tracks all learning experiences, it allows you to capture each learner's activity and see the bigger picture. The term 'quantified learner' has emerged to describe this ability to track individuated learning data using technology. The data captured can be very valuable for an organization. It can be used to review previous learning experiences, or it can be analyzed to plan for future projects by mapping what the learner knows against what they need to know. The analysis can thereby be used to define goals that the

learner can work towards. The detailed nature of the data also makes it easy for managers to report on who has completed which training components. The result is a far clearer understanding of your learners' training experience.



Limitations of xAPI

Some organizations believe that adopting the xAPI standard will in itself deliver beautifully designed course content. That isn't true. Using xAPI won't alter the presentation or design of a course in any way. The xAPI spec won't help you to improve user experience or give you an intuitive UI; your content will still look and behave in the same way, as xAPI only controls how data is tracked and stored. The quality of eLearning content will still be determined by the quality of the authoring tool and expertise of the Instructional Designer who created it. And while xAPI is better at tracking eLearning on mobile devices, using the format won't automatically deliver responsive course content - these considerations must be built into your approach and design for eLearning to deliver a great mobile experience.

The other criticism of xAPi may seem to be counter intuitive, but while it is praised on the one hand for the myriad ways it can track learning, it has also been called far too open a specification, with this openness making it difficult for people to have a reasonable expectation of its use and outcomes. cmi5, which we cover later in this eBook, goes a long way to address this.

The role of the Learning Record Store (LRS)

An LRS specializes in managing data about learning experiences. Although it can be integrated with an LMS, the LRS itself is a separate application, and an LRS isn't essential to using xAPI course packages to deliver your eLearning. Once an LMS is xAPI compliant, it can track, store and report on relevant statements. LearnUpon is not an LRS for example, but stores, tracks and reports on xAPI statements. LearnUpon can also integrate with an LRS if you need more advanced analytic functionality. An LRS can capture information from sources outside of your LMS that you may have in your learning ecosystem that support xAPI.

If you are interested in exploring what an LRS can offer, some of the main LRS vendors include:

- **Wax LRS**
- **WaterShed**
- **Learning Locker**
- **GrassBlade LRS**

cmi5 originated in 2010 as a project with the AICC. It's purpose was to replace both AICC and SCORM in an effort to modernise and fix the standards used for eLearning content. The basis of the communication was originally a SOAP architecture. Eventually AICC agreed to focus on an xAPi profile as it had far more applications with that spec than it would with AICC. So the SOAP-based architecture was replaced with xAPI and the project was transferred to ADL. AICC subsequently disbanded in 2014.

Enter cmi5

The cmi part of cmi5 stands for 'computer managed instruction', and it is essentially an extra set of rules that harnesses the benefits of xAPI (primarily to enable the capture of eLearning data from anywhere) whilst also adding focus to its otherwise broad, overly flexible specification. It is a profile of xAPI. The cmi5 specification helps to define the package specification for courses that are imported to an LMS and are using xAPI.

Ben Clark of Rustici Software has described how cmi5 augments xAPI as follows:

"xAPI is wide open, there's so much this standard can do that people don't know what to expect out of it and they don't know how to track certain things consistently. cmi5 is there to put some of the rules back on top of xAPI. And even though the new standard does have more rules and provides more structure, instructional designers still have a wide open field to track whatever they want to."

Being pitched as the true next generation of SCORM, cmi5 has started to gather momentum. As ADL have taken over the cmi5 specification there is a suggestion that this will prompt further evolution. With cmi5, ADL are writing the packaging and structuring specification that xAPI failed to deliver. That means if you already support xAPI, implementing cmi5 should be pretty easy. ADL are taking the best parts of AICC, SCORM and xAPI, and combining them with a new specification to improve tracking for online course delivery and reporting systems. In short, the people behind cmi5 are using xAPI as a communications protocol and are defining how courses should be packaged and structured too.

The naming scheme for cmi5 is as follows: major versions of the profile add functionality or interoperability and are named after rocks, minor versions eliminate errors and are named by edition. For example the current release is called Quartz, 1st Edition and was released in June 2016.

Goals of cmi5

Interoperability: A cmi5 "Assignable Unit" is the launchable content within the packaging. Any 'AU' should work across all systems that follow the specification. The structure is imported rather than the content so the content can be hosted anywhere such as on another system, behind a firewall or on a mobile device.

Extensibility: cmi5 supports extensions as it is based on xAPI. This will allow for future growth and prevent the standard becoming obsolete in the future.

mLearning: Like xAPI, cmi5 supports mobile to give true 'on the go' learning with offline/online sync, provided the apps developed for the course support the offline sections of the specifications.

The benefits of cmi

Mobile: As it is built upon xAPI, cmi5 is designed to facilitate the use of mobile devices. This will extend to possibilities not available with SCORM. For example offline/online support for courses in cmi5 will allow a learner to work on a course whilst offline and then upload the content once they have network connectivity once more. This will then sync information back to the LMS for reporting and recording purposes.

It records any kind of activity: As mentioned previously xAPI increases the possibilities for the type of learning recorded. Whether it occurs inside or outside the LMS, it can become part of the overall learning spectrum experienced by the user. cmi5 carries on that ability.

Clearer technical specification: The xAPI specification is far more concise and clear than SCORM; SCORM specifications are often deemed to be long and complex. As cmi5 builds on the xAPI spec it is clear, more understandable and adopted in a far more uniform fashion, which adds to its interoperability.

More modern technology: As it is a more modern standard it is formed from more modern technologies such REST and JSON. It is lightweight, more efficient and easier to scale. It is also browser-independent and so it can work effectively on mobile devices.

A better content distribution model: The SCORM specification dictated that content had to be housed on the same domain as the LMS. With xAPI and cmi5 you can employ the use of Content Delivery Networks (CDN) which allows for a truly global approach to delivering your content. From a learner's point of view they can launch courses and the content is supplied from a server geographically close to them to make the experience as fluid and frictionless as possible.

A better user experience: The end user will also benefit from a better user experience in terms of the actual course window. Courses can be launched in the same window as the LMS which is not only a cleaner way to experience the course, it also reduces the problems which occur from pop-up blockers!

cmi5 Fixes

cmi5 has addressed some of the problematic elements of SCORM whilst also refining the possibilities of xAPI. It builds on the benefits of xAPI but the advantages may not appear as obvious as the jump from SCORM to xAPI.

The type and amount of data that can be tracked has been increased with xAPI; You can track any metric using your LRS. This was something that was not possible in the SCORM or AICC specifications. Anything possible with xAPI in terms of data collection is possible in cmi5. SCORM allows very limited parameters which are generally built on a pass/fail or complete/ incomplete mechanism. The ability to track more intangible activity and interactions opens up a wider array of options for those creating eLearning programs. But that array of options was perhaps too wide.

The additional rules offered by cmi5 are not a limitation on what is possible with xAPI, they actually increase the potency of the specification and will aid adoption. xAPI is boundless and limitless and so daunting and hard for

the industry to adopt in its fullest form, cmi5 on the other hand should allow the full potential to be released in a somewhat controlled manner.

Conclusion

Learning opportunities are everywhere, delivering them and recording them effectively has been 'good enough' up to this point, but not great, and not representative of a learner's day to day, granular learning experiences. With the rise of xAPI and now it's modification with cmi5, the varied possibilities for tracking learning are managed within pragmatic limitations - allowing for a 360° view of learning, how this happens in real time and how it develops over time. cmi 5 is what SCORM should have been and what xAPI at its best can be all in one. It makes it easier for vendors to adhere to the specification which aids interoperability, and it also allows a wide range of options for content creators to be creative with how they design and deliver their courses.

Don't miss our SCORM eBook

Ultimate SCORM overview

Read this blog

Our approach to xAPI at LearnUpon

At LearnUpon, we took the same approach to xAPI as we did to SCORM support: we worked to remove any pain associated with importing third-party content to the LMS. The result is that LearnUpon's xAPI feature allows customers to easily import and launch their content quickly.

LearnUpon seamlessly integrates with leading Learning Record Stores including Wax LRS by Saltbox, WaterShed LRS, Grassblade LRS and Learning Locker. It only takes 30 seconds to configure the integration allowing LearnUpon to ship Tin Can statements to your LRS of choice.

LearnUpon

Learning as it should be

About LearnUpon

LearnUpon LMS helps businesses train their employees, partners, and customers. By combining industry-leading capabilities, unmatched ease of use, and unrivaled customer support, organizations can manage, track, and achieve their diverse learning goals—all through a single, powerful solution. It's learning as it should be.

Learn more