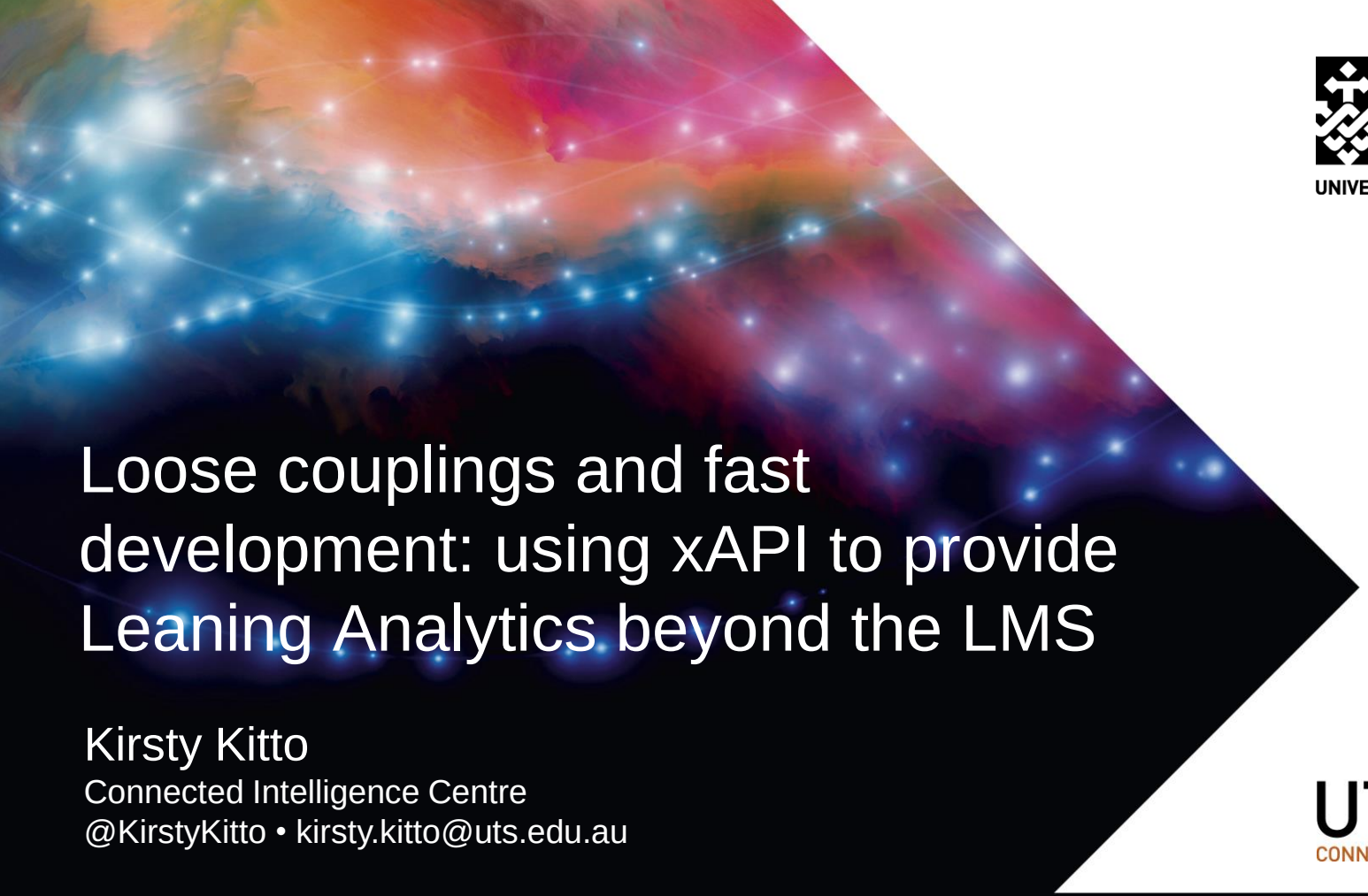


UTS
UNIVERSITY OF TECHNOLOGY SYDNEY

Loose couplings and fast development: using xAPI to provide Leaning Analytics beyond the LMS

Kirsty Kitto
Connected Intelligence Centre
@KirstyKitto • kirsty.kitto@uts.edu.au

UTS:CIC
CONNECTED INTELLIGENCE CENTRE

utscic.edu.au

what is learning analytics? (LA)

Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs

SoLAR definition

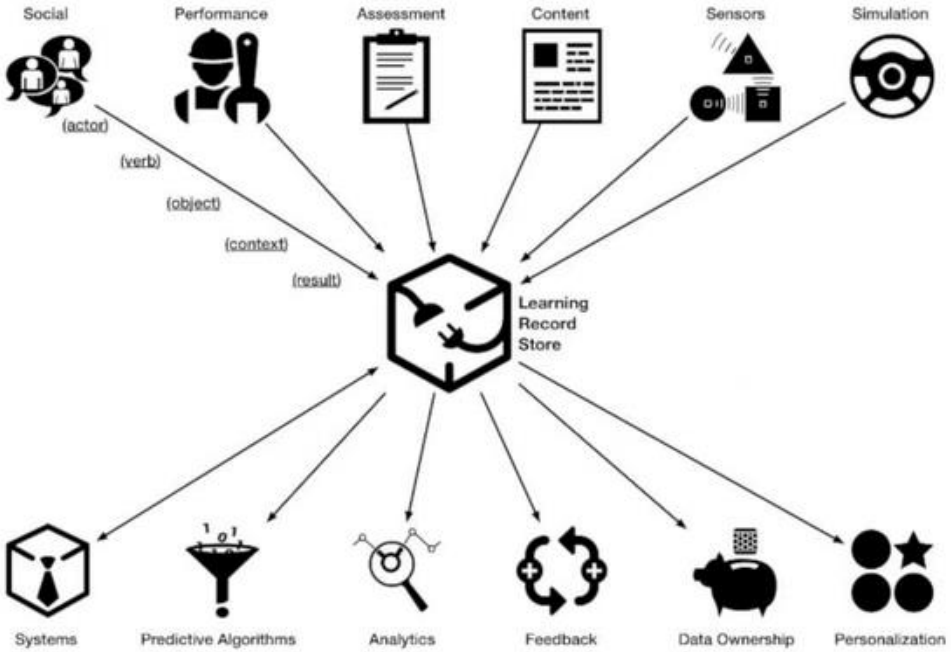
where does learning happen?

learning happens anywhere!

https://commons.wikimedia.org/wiki/File:Andrea_Leslie_helps_students_search_(8696541130).jpg

but new data standards are emerging…

…new possibilities for capturing and using data!

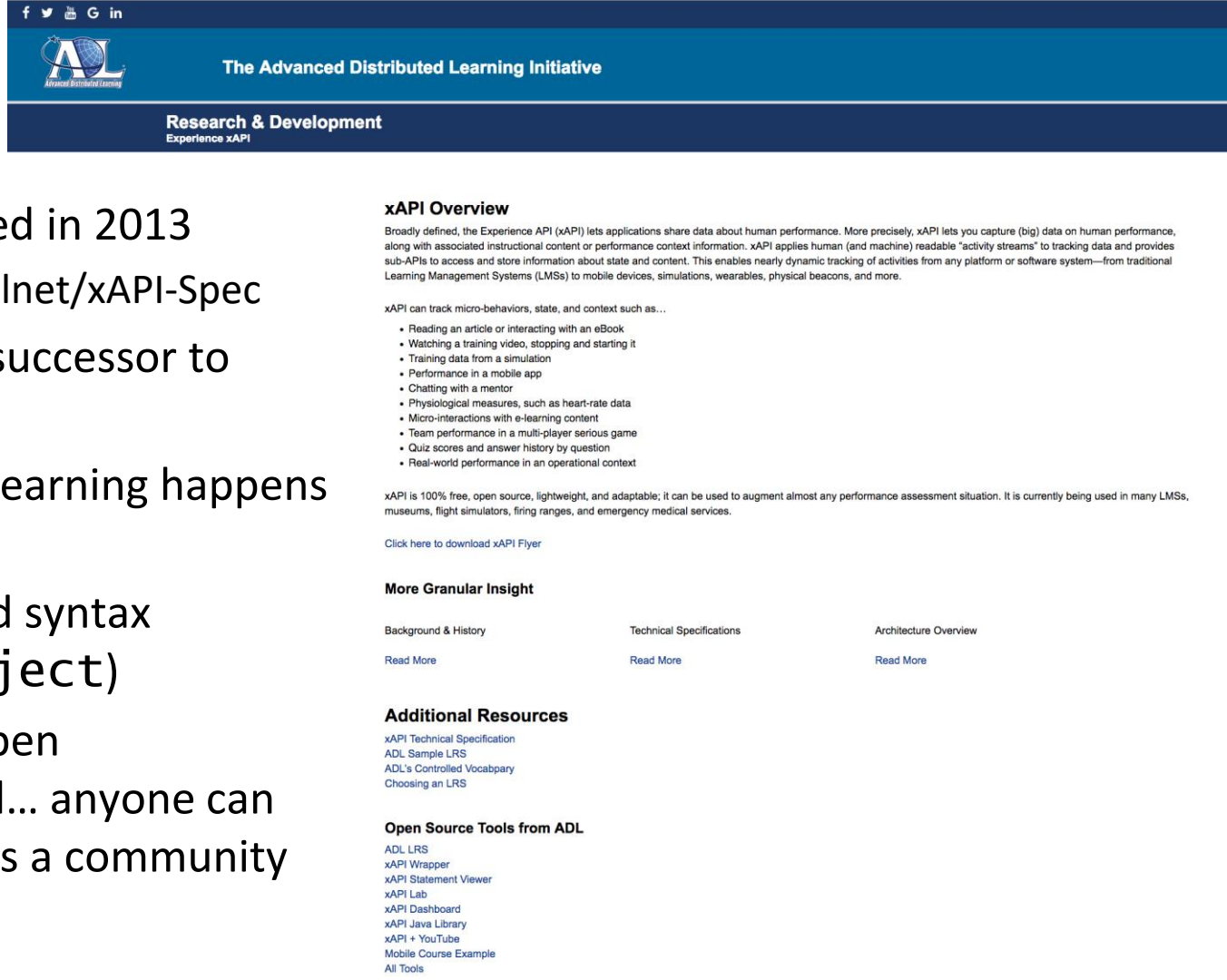


https://www.apereo.org/communities/learning-analytics-initiative/learning-analytics-webinar-state-xapi-and-imsglobal

xAPI

- specification released in 2013

  https://github.com/adlnet/xAPI-Spec
- initially meant as a successor to SCORM
- acknowledges that learning happens everywhere…
- very simple required syntax (`actor`, `verb`, `object`)
- open source with open development model… anyone can contribute to what is a community effort



The Advanced Distributed Learning Initiative

Research & Development

Experience xAPI

xAPI Overview

Broadly defined, the Experience API (xAPI) lets applications share data about human performance. More precisely, xAPI lets you capture (big) data on human performance, along with associated instructional content or performance context information. xAPI applies human (and machine) readable "activity streams" to tracking data and provides sub-APIs to access and store information about state and content. This enables nearly dynamic tracking of activities from any platform or software system—from traditional Learning Management Systems (LMSs) to mobile devices, simulations, wearables, physical beacons, and more.

xAPI can track micro-behaviors, state, and context such as…

- Reading an article or interacting with an eBook
- Watching a training video, stopping and starting it
- Training data from a simulation
- Performance in a mobile app
- Chatting with a mentor
- Physiological measures, such as heart-rate data
- Micro-interactions with e-learning content
- Team performance in a multi-player serious game
- Quiz scores and answer history by question
- Real-world performance in an operational context

xAPI is 100% free, open source, lightweight, and adaptable; it can be used to augment almost any performance assessment situation. It is currently being used in many LMSs, museums, flight simulators, firing ranges, and emergency medical services.

Click here to download xAPI Flyer

More Granular Insight

Background & History	Technical Specifications	Architecture Overview
Read More	Read More	Read More

Additional Resources

xAPI Technical Specification
ADL Sample LRS
ADL's Controlled Vocabpary
Choosing an LRS

Open Source Tools from ADL

ADL LRS
xAPI Wrapper
xAPI Statement Viewer
xAPI Lab
xAPI Dashboard
xAPI Java Library
xAPI + YouTube
Mobile Course Example
All Tools

xAPI data flow

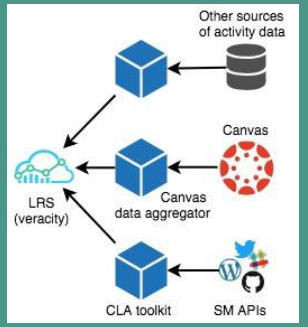
xAPI data flow

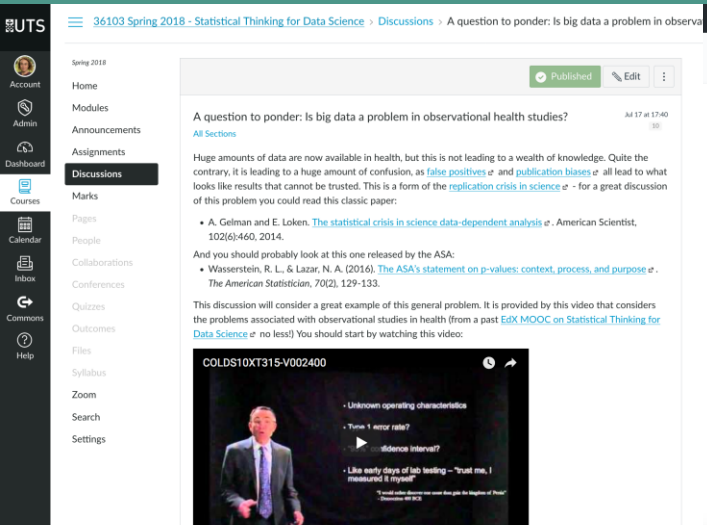
we are going to cover this whole flow today!

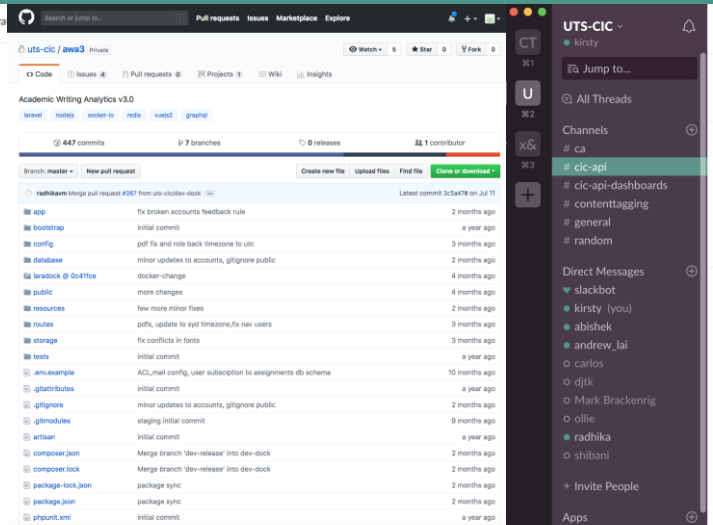
Learning Record Providers (LRPs)

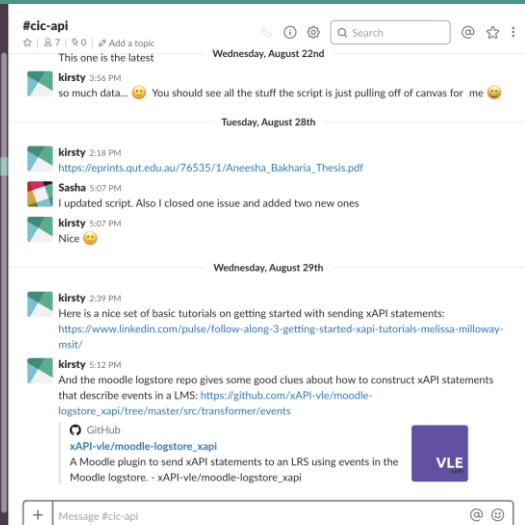
what is a learning record provider? (LRP)

- something that monitors a learner
- extracts data about what they are doing
- creates an xAPI statement
- and sends it to a Learning Record Store (LRS)









an example?

ID14-3821: ENABLING CONNECTED LEARNING VIA OPEN SOURCE ANALYTICS IN THE WILD: LEARNING ANALYTICS BEYOND THE LMS

This project was supported by the Australian Government's office for learning and teaching

QUEENSLAND UNIVERSITY OF TECHNOLOGY:
Kirsty Kitto (Lead Investigator), Mandy Lupton, John Banks, Dann Mallet, Peter Bruza

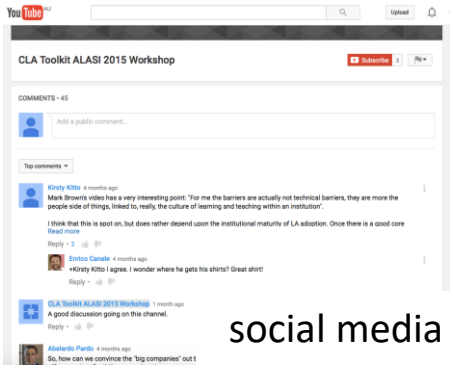
UNIVERSITY OF SOUTH AUSTRALIA
Shane Dawson, Dragan Gašević (Uni of Edinburgh)

UNIVERSITY OF TECHNOLOGY SYDNEY
Simon Buckingham Shum (and now Kirsty Kitto!)

UNIVERSITY OF SYDNEY
Abelardo Pardo

UNIVERSITY OF TEXAS (ARLINGTON)
George Siemens

the connected learning analytics toolkit



social media

Learning
Record Store

scraping

xAPI

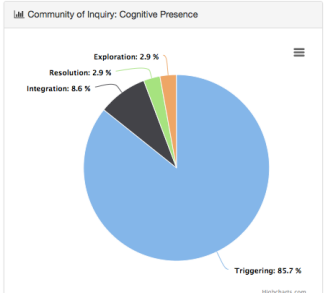
analysis

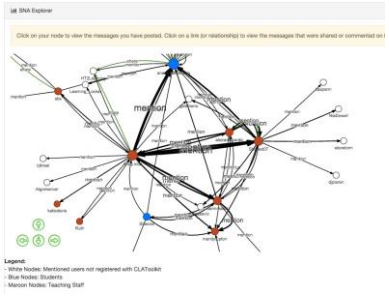
learning analytics

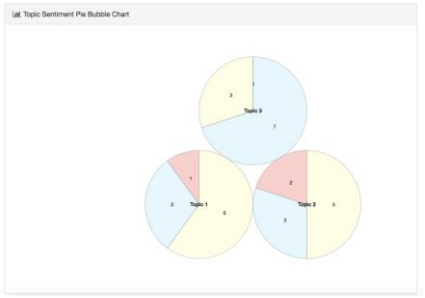
students

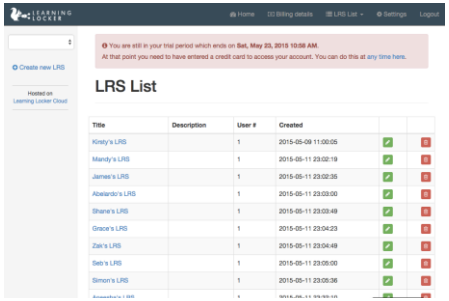
academics

admin & developers









Kitto, K., Cross, S., Waters, Z., Lupton, M. (2015). Learning Analytics beyond the LMS: the Connected Learning Analytics Toolkit. In Proceedings of the Fifth International Conference on Learning Analytics and Knowledge (LAK15). ACM, New York, NY, USA, 11-15.

some details (CLA toolkit V1)

1. Has a philosophy of going to the students where they are actually learning (rather than expecting them to come to us)
2. V1 could access data from: wordpress blogs, twitter, youtube, facebook, trello, github, slack
3. Stores data in xAPI format (to ensure future interoperability)
4. Only retrieves data for specific learning activities and only if students sign up
5. And gives students access to their own analytics

Version 2 just released! (we will return to that later)
https://github.com/uts-cic/CLAtoolkitv2

using xAPI to build LRPs

https://www.cmswire.com/cms/customer-experience/the-iot-will-drive-the-future-of-digital-experience-027937.php

a simplest possible legal xAPI statement

```
{
    "id": "12345678-1234-5678-1234-567812345678",
    "actor":{
        "mbox":"mailto:xapi@adlnet.gov"
    },
    "verb":{
        "id":"http://adlnet.gov/expapi/verbs/created",
        "display":{
            "en-US":"created"
        }
    },
    "object":{
        "id":"http://example.adlnet.gov/xapi/example/activity"
    }
}
```

statement properties

Property	Type	Description	Required
id	UUID	UUID assigned by LRS if not set by the Learning Record Provider.	Recommended
actor	Object	Whom the Statement is about, as an Agent or Group Object.	Required
verb	Object	Action taken by the Actor.	Required
object	Object	Activity, Agent, or another Statement that is the Object of the Statement.	Required
result	Object	Result Object, further details representing a measured outcome.	Optional
context	Object	Context that gives the Statement more meaning. Examples: a team the Actor is working with, altitude at which a scenario was attempted in a flight simulator.	Optional
timestamp	Timestamp	Timestamp of when the events described within this Statement occurred. Set by the LRS if not provided.	Optional
stored	Timestamp	Timestamp of when this Statement was recorded. Set by LRS.	Set by LRS
authority	Object	Agent or Group who is asserting this Statement is true. Verified by the LRS based on authentication. Set by LRS if not provided or if a strong trust relationship between the Learning Record Provider and LRS has not been established.	Optional
version	Version	The Statement's associated xAPI version, formatted according to Semantic Versioning 1.0.0.	Not Recommended
attachments	Ordered array of Attachment Objects	Headers for Attachments to the Statement	Optional

https://github.com/adlnet/xAPI-Spec/blob/master/xAPI-Data.md#statement-properties

a more realistic example xAPI statement

(but its still very simple!)

https://github.com/adlnet/xAPI-Spec/blob/master/xAPI-Data.md#Appendix2A


```
{
 "actor": {
   "mbox": "mailto:kirsty.kitto@uts.edu.au",
   "name": "Kirsty Kitto",
   "objectType": "Agent",
   "id": "mailto:kirsty.kitto@uts.edu.au"
 },
 "verb": {
   "id": "http://activitystrea.ms/create",
   "display": {
     "en-US": "created"
   }
 },
 "object": {
   "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095",
   "definition": {
     "name": {
       "en-US": "Note"
     },
     "description": {
       "en-US": "<p>Something that has really helped! I cant <strong>believe</strong> you aren't using it
     }
   },
   "objectType": "Activity"
 },
 "context": {
   "platform": "Canvas",
   "contextActivities": {
     "category": [
       {
         "id": "http://activitystrea.ms/schema/1.0.0"
       }
     ],
     "parent": [
       {
         "id": "https://canvas.uts.edu.au/courses/604"
       }
     ],
     "grouping": [
       {
         "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095"
       }
     ]
   }
 },
 "id": "214cf69b-c4ad-416f-8073-cd9d30282f37",
 "timestamp": "2018-09-07T01:58:14.359Z",
 "stored": "2018-09-07T01:58:14.359Z",
 "authority": {
   "objectType": "Agent",
   "account": {
     "homePage": "https://canvas-cic.lrs.io/keys/canvas-cic",
     "name": "canvas-cic"
   }
 }
}
```

a more realistic example xAPI statement

(but its still very simple!)

https://github.com/adlnet/xAPI-Spec/blob/master/xAPI-Data.md#Appendix2A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{
  "actor": {
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    "name": "Kirsty Kitto",
    "objectType": "Agent",
    "id": "mailto:kirsty.kitto@uts.edu.au"
  },
  "verb": {
    "id": "http://activitystrea.ms/create",
    "display": {
      "en-US": "created"
    }
  },
  "object": {
    "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095",
    "definition": {
      "name": {
        "en-US": "Note"
      },
      "description": {
        "en-US": "<p>Something that has really helped! I cant <strong>believe</strong> you aren't using it
      }
    },
    "objectType": "Activity"
  },
  "context": {
    "platform": "Canvas",
    "contextActivities": {
      "category": [
        {
          "id": "http://activitystrea.ms/schema/1.0.0"
        }
      ],
      "parent": [
        {
          "id": "https://canvas.uts.edu.au/courses/604"
        }
      ],
      "grouping": [
        {
          "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095"
        }
      ]
    }
  },
  "id": "214cf69b-c4ad-416f-8073-cd9d30282f37",
  "timestamp": "2018-09-07T01:58:14.359Z",
  "stored": "2018-09-07T01:58:14.359Z",
  "authority": {
    "objectType": "Agent",
    "account": {
      "homePage": "https://canvas-cic.lrs.io/keys/canvas-cic",
      "name": "canvas-cic"
    }
  }
}
```

a more realistic example xAPI statement

(but its still very simple!)

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    "name": "Kirsty Kitto",
    "objectType": "Agent",
    "id": "mailto:kirsty.kitto@uts.edu.au"
  },
  "verb": {
    "id": "http://activitystrea.ms/create",
    "display": {
      "en-US": "created"
    }
  },
  "object": {
    "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095",
    "definition": {
      "name": {
        "en-US": "Note"
      },
      "description": {
        "en-US": "<p>Something that has really helped! I cant <strong>believe</strong> you aren't using it
      }
    },
    "objectType": "Activity"
  },
  "context": {
    "platform": "Canvas",
    "contextActivities": {
      "category": [
        {
          "id": "http://activitystrea.ms/schema/1.0.0"
        }
      ],
      "parent": [
        {
          "id": "https://canvas.uts.edu.au/courses/604"
        }
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        {
          "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095"
        }
      ]
    }
  },
  "id": "214cf69b-c4ad-416f-8073-cd9d30282f37",
  "timestamp": "2018-09-07T01:58:14.359Z",
  "stored": "2018-09-07T01:58:14.359Z",
  "authority": {
    "objectType": "Agent",
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    "objectType": "Agent",
    "id": "mailto:kirsty.kitto@uts.edu.au"
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    "id": "http://activitystrea.ms/create",
    "display": {
      "en-US": "created"
    }
  },
  "object": {
    "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095",
    "definition": {
      "name": {
        "en-US": "Note"
      },
      "description": {
        "en-US": "<p>Something that has really helped! I cant <strong>believe</strong> you aren't using it
      }
    },
    "objectType": "Activity"
  },
  "context": {
    "platform": "Canvas",
    "contextActivities": {
      "category": [
        {
          "id": "http://activitystrea.ms/schema/1.0.0"
        }
      ],
      "parent": [
        {
          "id": "https://canvas.uts.edu.au/courses/604"
        }
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      "grouping": [
        {
          "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095"
        }
      ]
    }
  },
  "id": "214cf69b-c4ad-416f-8073-cd9d30282f37",
  "timestamp": "2018-09-07T01:58:14.359Z",
  "stored": "2018-09-07T01:58:14.359Z",
  "authority": {
    "objectType": "Agent",
    "account": {
      "homePage": "https://canvas-cic.lrs.io/keys/canvas-cic",
      "name": "canvas-cic"
    }
  }
}
```

a more realistic example xAPI statement

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     },
     "description": {
       "en-US": "<p>Something that has really helped! I cant <strong>believe</strong> you aren't using it
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   "objectType": "Activity"
 },
 "context": {
   "platform": "Canvas",
   "contextActivities": {
     "category": [
       {
         "id": "http://activitystrea.ms/schema/1.0.0"
       }
     ],
     "parent": [
       {
         "id": "https://canvas.uts.edu.au/courses/604"
       }
     ],
     "grouping": [
       {
         "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095"
       }
     ]
   }
 },
 "id": "214cf69b-c4ad-416f-8073-cd9d30202f37",
 "timestamp": "2018-09-07T01:58:14.359Z",
 "stored": "2018-09-07T01:58:14.359Z",
 "authority": {
   "objectType": "Agent",
   "account": {
     "homePage": "https://canvas-cic.lrs.io/keys/canvas-cic",
     "name": "canvas-cic"
   }
 }
}
```

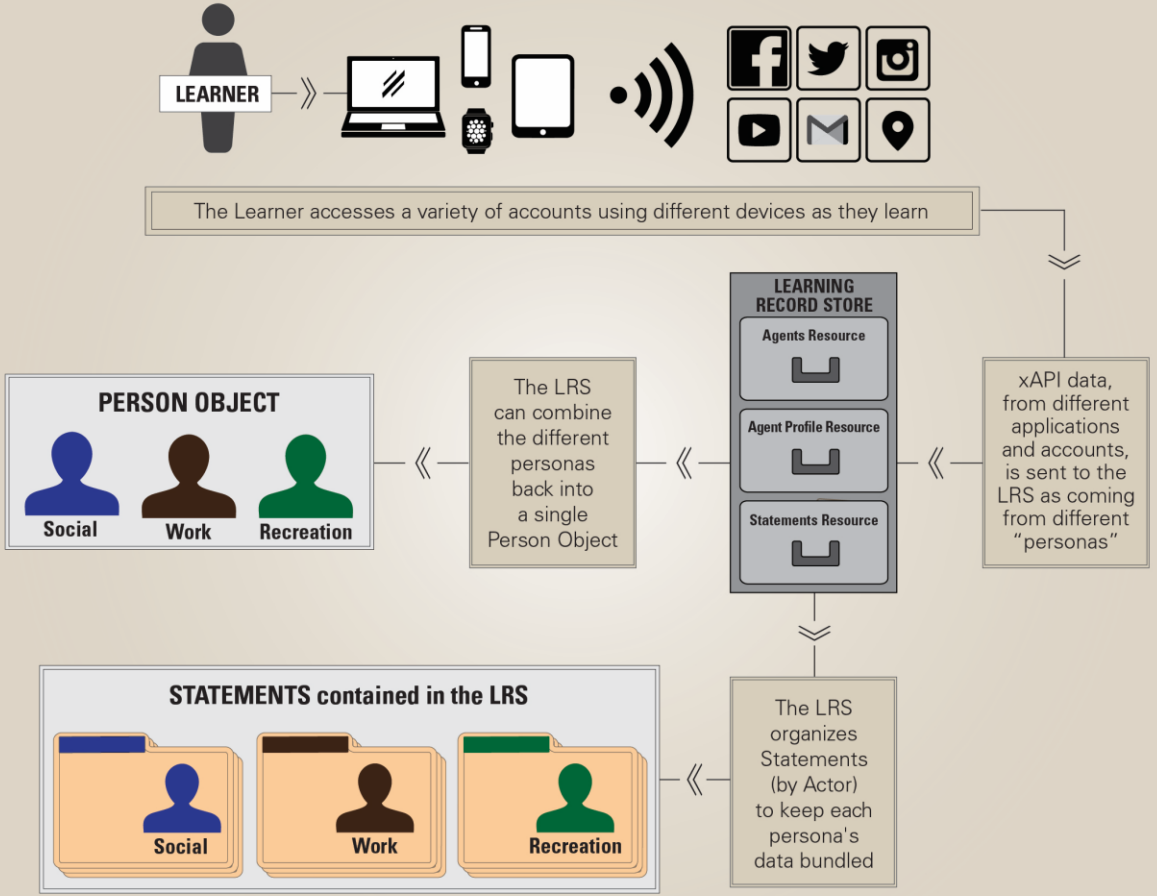
actors

- **Actor**: An individual or group performing an action within an Activity
  - Individual: `Agent`
  - Group: `Group`
- an actor is the “I” in “I did this”
- they are the thing doing the learning!

Property	Type	Description	Required
objectType	string	`Agent`. This property is optional except when the Agent is used as a Statement's object.	Optional
name	String	Full name of the Agent.	Optional
see 2.4.2.3 Inverse Functional Identifier		An Inverse Functional Identifier unique to the Agent.	Required

Property	Type	Description	Required
objectType	String	`Group`.	Required
name	String	Name of the Group.	Optional
member	Array of Agent Objects	The members of this Group. This is an unordered list.	Optional
see 2.4.2.3 Inverse Functional Identifier		An Inverse Functional Identifier unique to the Group.	Required

actors can have many different roles – termed **persona**



verbs

- define the action between an Actor and an Activity
- the specification does not define verbs
- instead, it defines how to create verbs so that communities of practice can establish verbs meaningful to their members an make them available for use by anyone…
- new xAPI profile specification helps… more on this later

objects

- define the thing acted on:
  - Activity
  - Agent/Group
  - SubStatement
  - StatementReference

Property	Type	Description	Required
objectType	String	MUST be `Activity` when present	Optional
id	IRI	An identifier for a single unique Activity	Required
definition	Object	Metadata, See below	Optional

Property	Type	Description	Required
name	Language Map	The human readable/visual name of the Activity	Recommended
description	Language Map	A description of the Activity	Recommended
type	IRI	The type of Activity.	Recommended
moreInfo	IRL	Resolves to a document with human-readable information about the Activity, which could include a way to launch the activity.	Optional
Interaction properties, See: Interaction Activities			
extensions	Object	A map of other properties as needed (see: Extensions)	Optional

Statement Explorer

Learn more about how statements work

This example statement does not include every possible property of the statement. To get a fuller picture, click on each section and then follow the links through to the relevant deep dive. You should also read about attachments and extensions.

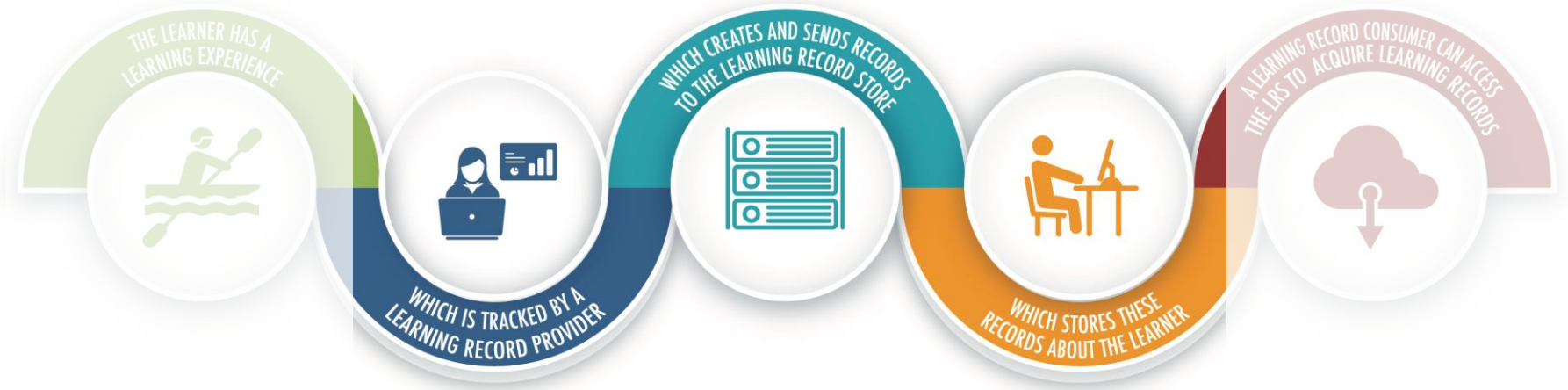

```
{
    "actor": {
        "name": "Example Learner",
        "mbox": "mailto:learner@example.com",
        "objectType": "Agent",
    },
    "verb": {
```


Explanation

Select each element of the statement to read the explanation.

but where do these statements go?
…and what can you do with them when they get there?

xAPI data flow



canvas-cic Home
Analytics
xAPI Data
Statements
Activity State
Activity Profile
Agent Profile
Attachments
Management
Content
Learner Portal
Tools
Help
Getting Started
Integrating xAPI in Web Content
Supporting xAPI Launch

Amela Peric	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...
Yuanyuan Zhao	created	Note	31 minutes ago	(Fri Sep ...
Ingrid Brady	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...
Yuanyuan Zhao	created	Note	31 minutes ago	(Fri Sep ...
Kirsty Kitto	created	Note	31 minutes ago	(Fri Sep ...

canvas-cic Home
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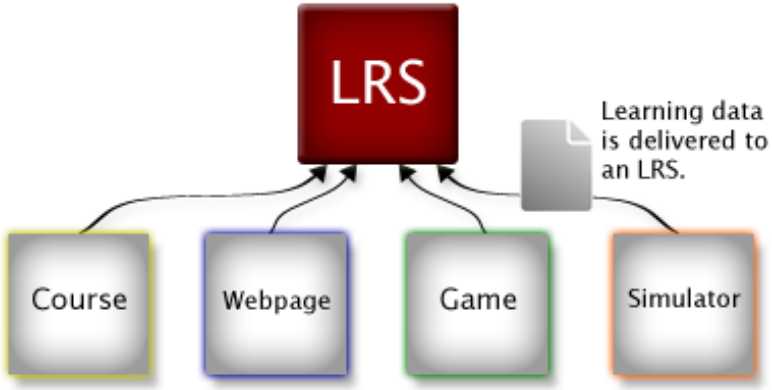
▶	*Amela Peric*	**created**	Note	31 minutes ago *(Fri Sep ...*
▶	*Kirsty Kitto*	**created**	Note	31 minutes ago *(Fri Sep ...*
▼	*Kirsty Kitto*	**created**	Note	31 minutes ago *(Fri Sep ...*


```
{
 "actor": {
   "mbox": "mailto:kirsty.kitto@uts.edu.au",
   "name": "Kirsty Kitto",
   "objectType": "Agent",
   "id": "mailto:kirsty.kitto@uts.edu.au"
 },
 "verb": {
   "id": "http://activitystrea.ms/create",
   "display": {
     "en-US": "created"
   }
 },
 "object": {
   "id": "https://canvas.uts.edu.au/courses/604/discussion_topics/8095",
   "definition": {
     "name": {
       "en-US": "Note"
     },
     "description": {
       "en-US": "<p>Something that has really helped! I cant <strong>believe</strong> you aren't using it alread
     }
   },
   "objectType": "Activity"
 },
 "context": {
   "platform": "Canvas",
   "contextActivities": {
```

learning record stores (LRS)

- accept and send xAPI statements!
- the specification is **very clear** about how these must behave
- but different vendors often enhance their LRS with further functionality (especially in the analytics and reporting)



- quite a few vendors have a free service:
  - Veracity: https://lrs.io/
  - HT2 (LearningLocker): https://www.ht2labs.com/learning-locker/
  - Rustici (Watershed): https://www.watershedlrs.com/product/pricing/essentials-learning-record-store

https://www.ht2labs.com/resources/free-lrs-mooc/

GET IN TOUCH: UK: +44 (0)1865 873862 | US: +1 (857) 284 1420 hello@ht2labs.com

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RUN YOUR OWN LRS IN 4-WEEKS OR LESS

How to Get Up-and-Running with a Learning Record Store

GET STARTED

This course focuses on the technical side of xAPI: getting up-and-running with a Learning Record Store.

You won't need to be a programmer to take part, but you will need some experience of

sending xAPI statements to a LRS

- Step 1: Define a variable that holds the URL address of the LRS and the username and password to authenticate.
- Step 2: Tell your xAPI wrapper to use that variable for the LRS.
- Step 3: create a variable to hold the xAPI statement
- Step 4: Send the statement!

https://www.learningsolutionsmag.com/articles/2322/getting-started-with-xapi-four-lines-of-code

https://www.linkedin.com/pulse/follow-along-3-getting-started-xapi-tutorials-melissa-milloway-msit/

view plain print ?

```
<!doctype html>
<head>
   <!-- Includes for ADL's xAPI Wrapper -->
   <!-- Download the files from: -->
   <!-- https://github.com/adlnet/xAPIWrapper -->
   <script type="text/javascript" src="./js/cryptojs_v3.1.2.js"></script>
    <script type="text/javascript" src="./js/xapiwrapper.js"></script>
    <!------------------------------------>

    <script>
    function send_statement(){
        var conf = {
              "endpoint" : "https://lrs.adlnet.gov/xapi/",
              "auth" : "Basic " + toBase64("xapi-tools:xapi-tools")
              };

        ADL.XAPIWrapper.changeConfig(conf);

        //define the xapi statement being sent
        var statement = {
            "actor": {
                "mbox": "mailto:Tester@example.com",
                "name": "Your Name Here",
                "objectType": "Agent"
            },
            "verb": {
                "id": "http://example.com/xapi/interacted",
                "display": {"en-US": "interacted"}
            },
            "object": {
                "id": "http://example.com/button_example",
                "definition": {
                    "name": {"en-US": "Button example"},
                    "description": {"en-US": "Example xAPI Button"}
                },
                "objectType": "Activity"
            }
        }; //end statement definition

        // Dispatch the statement to the LRS
        var result = ADL.XAPIWrapper.sendStatement(statement);
        }
    </script>

</head>

<body>
    <button type="button" onclick="send_statement()">Send Statem
</body>
</html>
```

some things people get wrong

- keep track of the version of the spec supported by your LRS!
- make sure you use a wrapper! (https://github.com/adlnet/xAPIWrapper)
- xAPI v1.0.3 is quite strict so statements accepted by LRSs conformant with earlier versions of the specification might accept statements that newer ones do not
- often you need web links (which can make e.g. contextActivities can be a bit spicy to define)
- make sure you use the statement validators! (most LRSs have them)
- look at the log files… they will tell you a lot (if your LRS is good)

the importance of context for xAPI

Property	Type	Description	Required
id	UUID	UUID assigned by LRS if not set by the Learning Record Provider.	Recommended
actor	Object	Whom the Statement is about, as an Agent or Group Object.	Required
verb	Object	Action taken by the Actor.	Required
object	Object	Activity, Agent, or another Statement that is the Object of the Statement.	Required
result	Object	Result Object, further details representing a measured outcome.	Optional
context	Object	Context that gives the Statement more meaning. Examples: a team the Actor is working with, altitude at which a scenario was attempted in a flight simulator.	Optional
timestamp	Timestamp	Timestamp of when the events described within this Statement occurred. Set by the LRS if not provided.	Optional
stored	Timestamp	Timestamp of when this Statement was recorded. Set by LRS.	Set by LRS
authority	Object	Agent or Group who is asserting this Statement is true. Verified by the LRS based on authentication. Set by LRS if not provided or if a strong trust relationship between the Learning Record Provider and LRS has not been established.	Optional
version	Version	The Statement's associated xAPI version, formatted according to Semantic Versioning 1.0.0.	Not Recommended
attachments	Ordered array of Attachment Objects	Headers for Attachments to the Statement	Optional

the importance of context for xAPI

optional?

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the importance of context for xAPI

optional?

for LA?

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but just how big is a context?

Property	Type	Description	Required
registration	UUID	The registration that the Statement is associated with.	Optional
instructor	Agent (MAY be a Group)	Instructor that the Statement relates to, if not included as the Actor of the Statement.	Optional
team	Group	Team that this Statement relates to, if not included as the Actor of the Statement.	Optional
contextActivities	contextActivities Object	A map of the types of learning activity context that this Statement is related to. Valid context types are: `parent`, `"grouping"`, `"category"` and `"other"`.	Optional
revision	String	Revision of the learning activity associated with this Statement. Format is free.	Optional
platform	String	Platform used in the experience of this learning activity.	Optional
language	String (as defined in RFC 5646)	Code representing the language in which the experience being recorded in this Statement (mainly) occurred in, if applicable and known.	Optional
statement	Statement Reference	Another Statement to be considered as context for this Statement.	Optional
extensions	Object	A map of any other domain-specific context relevant to this Statement. For example, in a flight simulator altitude, airspeed, wind, attitude, GPS coordinates might all be relevant (See Extensions)	Optional

how long might this information need to make sense for?

but just how **big** is a context?

how long might this information need to make sense for?

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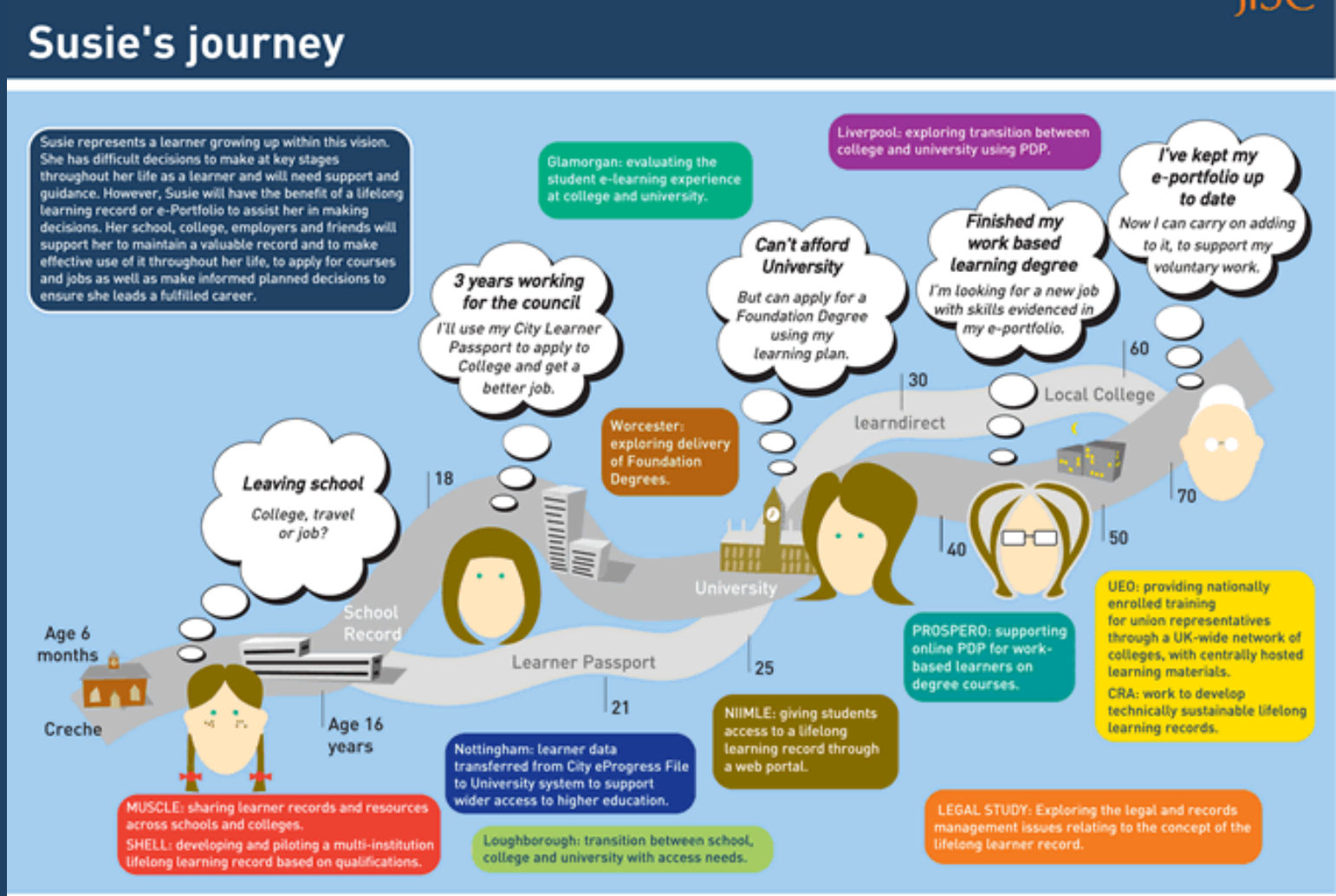
learning goes on for a lifetime!



data interoperability

- so contexts have to make sense across many phases of a person's life…
- and people are going to interface with a lot of different systems
- increasingly they are going to enter into porous relationships with educational institutions
- recognizing prior learning is going to be essential

there are two basic ways to do this…

big and comprehensive?

or loose and modular?

you could ensure that *all* educational technology uses one data stack…

- but how long would this remain current?
- and how quickly will it evolve as new use cases arise?
- and who is control of it anyway?
- and how comprehensive can this approach actually be?

or you could try and do something that is more modular…

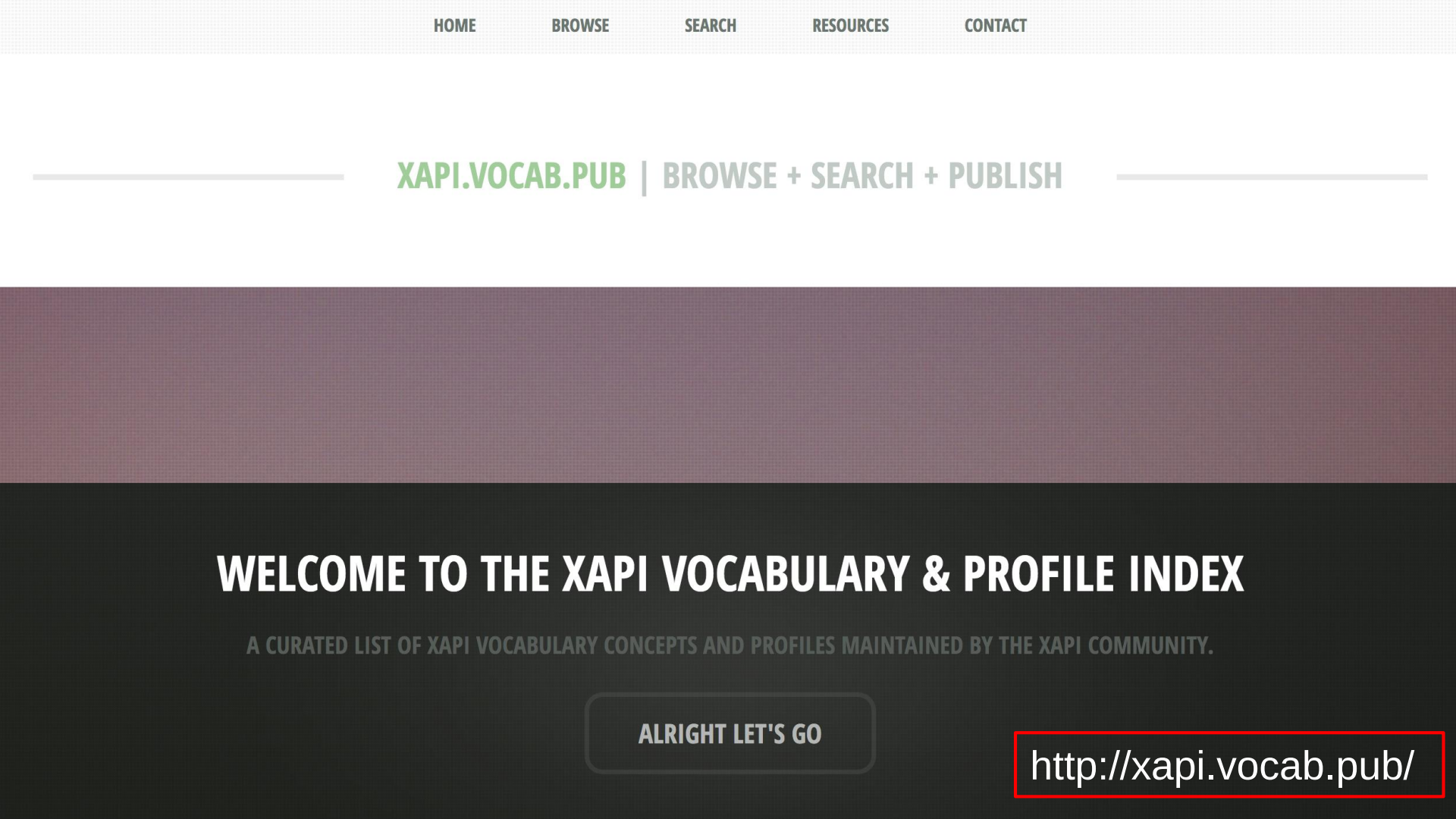
EXPERIENCE API™

- where any LRP can get up and running quickly to provide data
- but then you need to ensure that there is a way to map data between different providers

each solution has advantages and disadvantages…
www.allenandallen.com
44

xAPI profiles for data interoperability

- a companion specification to the core xAPI standard
  (https://github.com/adlnet/xapi-profiles)
- blueprint for a successful, semantically interoperable xAPI implementation… defined by communities of practice
  - offer a common way to express controlled vocabularies
  - provide instruction on xAPI Statement formation
  - describe patterns of xAPI Statements which are meaningful in some way to a profile
- extend the notion of xAPI recipes using linked data standards
  - JSON-LD (to specify the profile)
  - SKOS (to connect xAPI concepts together)
  - PROV (to describe provenance of profiles)
  - SPARQL (to find profiles on the web)


HOME
BROWSE
SEARCH
RESOURCES
CONTACT
XAPI.VOCAB.PUB | BROWSE + SEARCH + PUBLISH
WELCOME TO THE XAPI VOCABULARY & PROFILE INDEX
A CURATED LIST OF XAPI VOCABULARY CONCEPTS AND PROFILES MAINTAINED BY THE XAPI COMMUNITY.
ALRIGHT LET'S GO
http://xapi.vocab.pub/

xAPI profile properties

Property	Type	Description	Required
`id`	IRI	The IRI of the Profile overall (not a specific version)	Required
`@context`	URI	SHOULD be `https://w3id.org/xapi/profiles/context` and MUST contain this URI if array-valued.	Required
`type`	String	MUST be `Profile`.	Required
`conformsTo`	URI	Canonical URI of the Profile specification version conformed to. The Profile specification version of this document is https://w3id.org/xapi/profiles#1.0.	Required
`prefLabel`	Object	Language map of names for this Profile.	Required
`definition`	Object	Language map of descriptions for this Profile. If there are additional rules for the Profile as a whole that cannot be expressed using this specification, include them here, or at the seeAlso URL.	Required
`seeAlso`	URL	A URL containing information about the Profile. Recommended instead of especially long definitions.	Optional
`versions`	Array	An array of all Profile version objects for this Profile.	Required
`author`	Object	An Organization or Person.	Required
`concepts`	Array	An array of Concepts that make up this Profile.	Optional
`templates`	Array	An array of Statement Templates for this Profile.	Optional
`patterns`	Array	An array of Patterns for this Profile.	Optional

using xAPI profiles in statements

Using an introduced Concept, such as an activity type, verb, attachment usage type, extension, activity, or document resource, can be done freely, provided the defined usage and meaning are adhered to.

But a Learning Record Provider can go further, and make sure to adhere to Profile-described Statement Templates and Patterns.

https://github.com/adlnet/xapi-profiles/ (section 5)

medical training

MedBiquitous Spaces Log in Sign up

Learning Experience Working Group

Pages

Blog

CHILD PAGES

- Learning Experience Group Home
  - Profile, Recipes and working docu…
    - Apache license notes
    - Development Principles
    - Finding or creating new Verbs o…
  - 12 more child pages

Pages / Learning Experience Group Home

Tools

Profile, Recipes and working documents

Created by Valerie Smothers, last modified on Oct 23, 2015

This page will provide links to draft profiles, recipes, and working documents related to the creation of a profile and recipes.

- Apache license notes
- Development Principles
- Finding or creating new Verbs or Profiles
- Profile: 1. Virtual Patients
- Profile: 2. Human Patient Simulators, Mannequins & Task trainers
- Profile: 3. Preceptor-reviewed simulations - deprecated
- Profile: 4. Standardized (or simulated) patients
- Profile: 5. Virtual Scenarios and blended simulations
- Profile: 6. Virtual worlds, games, virtual reality
- Profile: 7. Clinical training experiences
- Profile: 8. Electronic Medical Records (EMR)
- Profile: 9. Teamwork Profile
- Profile: 9a. Meetings (humor)
- Profile Template
- Verb working definitions

No labels

serious games

```
{
        "title": "Interaction",
        "type": "object",
        "properties": {
                "player": {
                        "type": "object",
                        "description": "The player that generated the interaction"
                },
                "action": {
                        "type": "string",
                        "description": "The type of interaction performed by the player"
                },
                "object": {
                        "type": "string",
                        "description": "Objective of the player's action"
                },
                "value": {
                        "type": "object",
                        "description": "Parameters of the action"
                },
                "timestamp": {
                        "type": "string",
                        "description": "Date and time at which the interaction occurred, formatted according
                }
        },
        "required": ["player", "action", "object", "timestamp"]
}
```

README.md

Serious Games Interactions Model

Table of Contents

- 1. Interactions Model
- 2. Completable
  - 2.1. Predefined types
  - 2.2. Actions
    - 2.2.1. initialized
    - 2.2.2. progressed *progress*
    - 2.2.3. completed *ending*
  - 2.3. Requirements and considerations
  - 2.4. Metrics
- 3. Reachable
  - 3.1. Predefined types
  - 3.2. Actions
    - 3.2.1. accessed
    - 3.2.2 skipped
  - 3.3. Requirements and considerations
  - 3.4. Metrics
- 4. Variable
  - 4.1. Predefined types
  - 4.2. Actions
    - 4.2.1. set *value*
    - 4.2.2. increased/decreased *value*
  - 4.3. Requirements and considerations
  - 4.4. Metrics
- 5. Alternative
  - 5.1. Predefined types
  - 5.2. Actions
    - 5.2.1. selected
    - 5.2.2. unlocked
  - 5.3. Requirements and considerations
  - 5.4. Metrics
- 6. Device
  - 6.1. Predefined types

more resources on xAPI Profiles

Examples of profiles:

- all published profiles: http://xapi.vocab.pub/
- video: https://liveaspankaj.gitbooks.io/xapi-video-profile/content/templates.html
- cmi-5 (LMS data): https://github.com/AICC/CMI-5_Spec_Current/blob/quartz/cmi5_spec.md

More information:

- specification: https://github.com/adlnet/xapi-profiles
- an introduction to their benefits: https://www.learningsolutionsmag.com/articles/2553/benefits-of-xapi-profiles-extend-across-development-teams

here lies a tension!

xAPI Advantages

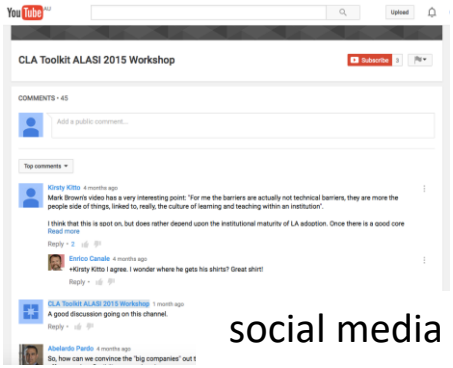
- lightweight
- development easy!
- rapidly extensible to new learning scenarios – someone just needs to write and publish a profile!
- easy to share different profile specifications and to see what people are doing
- easy to join in and influence dev

xAPI Disadvantages

- it's the wild west!
- poor practices are common
- some communities of practice are moving well… but a lot of work remains to be done
- without common practices xAPI statements will only ever make sense in the ecosystem where they were defined

xAPI data flow

example: the CLA toolkit



social media

Learning Record Store

scraping

xAPI

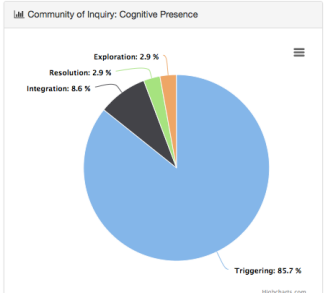
analysis

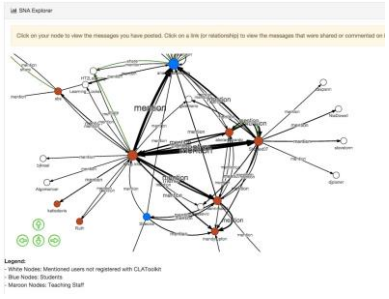
learning analytics

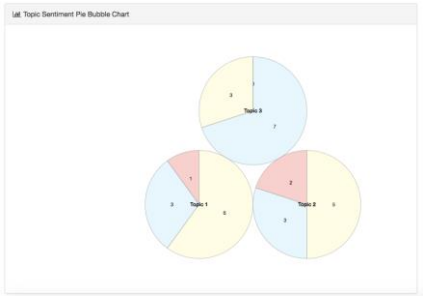
students

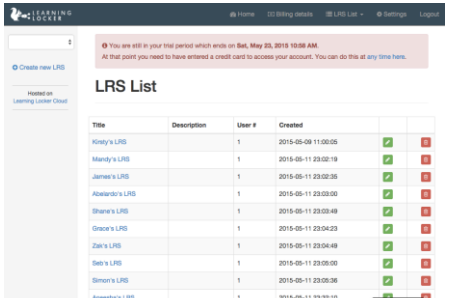
academics

admin & developers







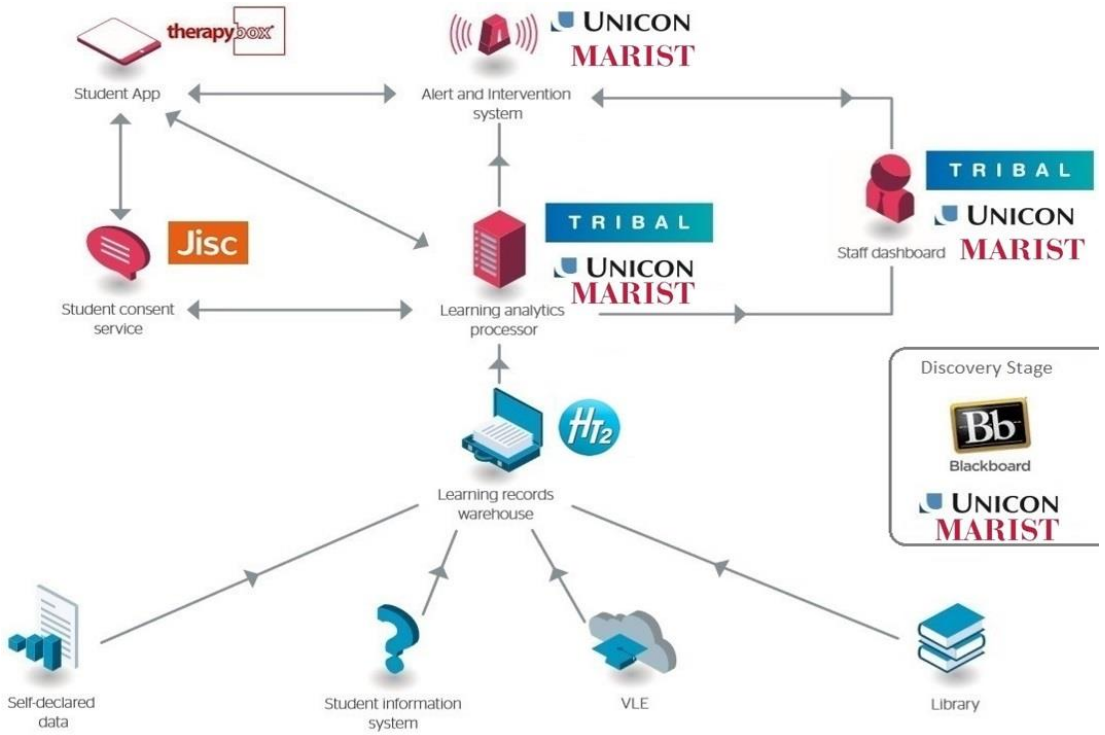


Kitto, K., Cross, S., Waters, Z., Lupton, M. (2015). Learning Analytics beyond the LMS: the Connected Learning Analytics Toolkit. In Proceedings of the Fifth International Conference on Learning Analytics and Knowledge (LAK15). ACM, New York, NY, USA, 11-15.

using xAPI in large scale LA infrastructure projects

effective learning analytics (Jisc)

- freemium student insight tool
- bespoke tool based on Aperio LAP
- student app (privacy management, goalsetting…)



https://www.jisc.ac.uk/rd/projects/effective-learning-analytics

Apereo Learning Analytics Strategic Vision

An Open Learning Analytics Platform

Learning Activities Collection – Standards-based data capture from any potential source using open standards: xAPI and/or IMS Caliper/Sensor API

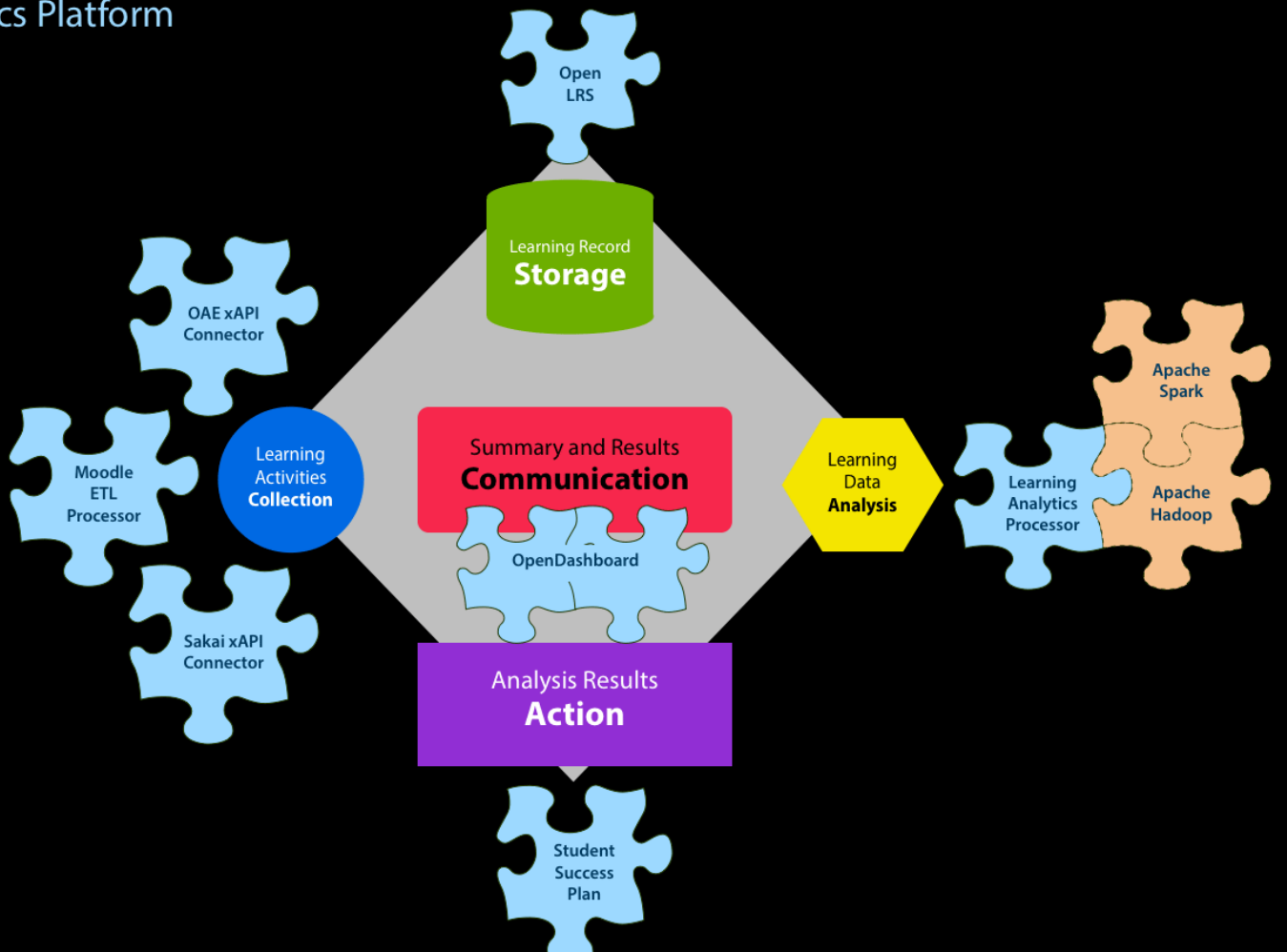
Storage – Single repository for all learning-related data using Learning Record Store (LRS) standard. Over the past year OpenLRS has made significant progress toward maturity. In addition to its support of the Experience API (xAPI), OpenLRS has added support for the IMS Caliper learning event specification. OpenLRS has also seen its first production deployment at the University of Notre Dame. Several additional productions deployments are planned for 2016 at both higher education institutions and global publishers.

Analysis – Flexible Learning Analytics Processor (LAP) that can prototype data mining, data processing (ETL), predictive model scoring and reporting. Work on larger datasets is handled by Apache Hadoop and Apache Spark.

Communication – Dashboard technology for displaying LAP output.

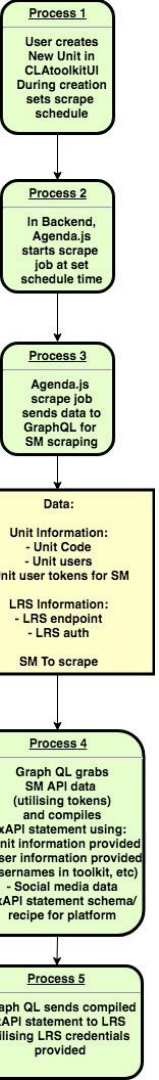
Action – LAP output can be fed into other systems to trigger alerts, etc.

Apereo members are building software around this platform. OpenLRS, Learning Analytics Processor, OpenDashboard and Student Success Plan are early examples of the benefits of a platform-based approach.



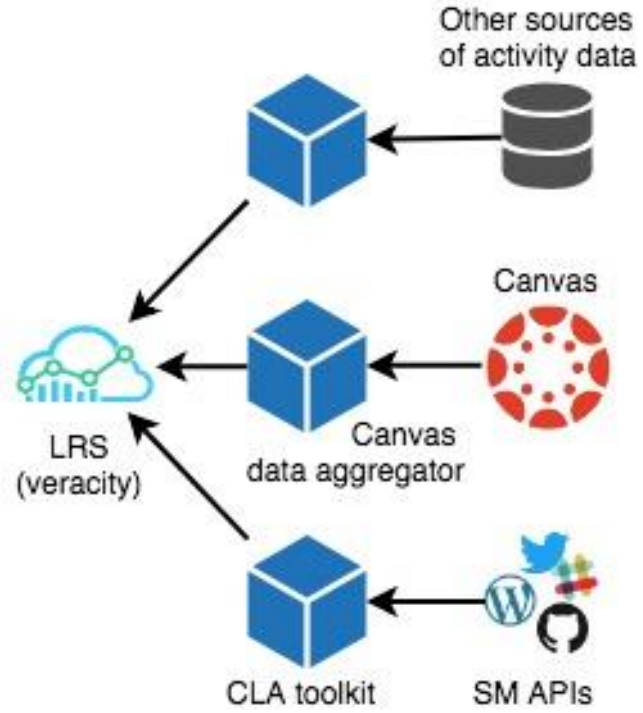
what about UTS?

lets start with a question first…



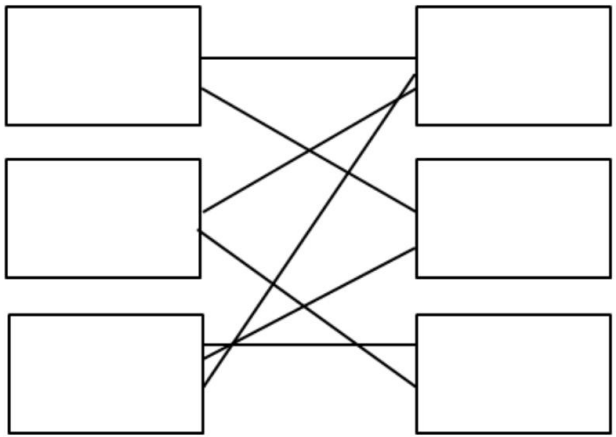
CLA toolkit V2

- no dashboards reports!
- it just collects data and sends it to the LRS
- maintains modularity!
- built in last 2 months!
- trello, slack, twitter, GitHub integrations prioritised
- a second suite of tools are used to deliver LA, dashboards, and other tools (e.g. piping data to OnTask)



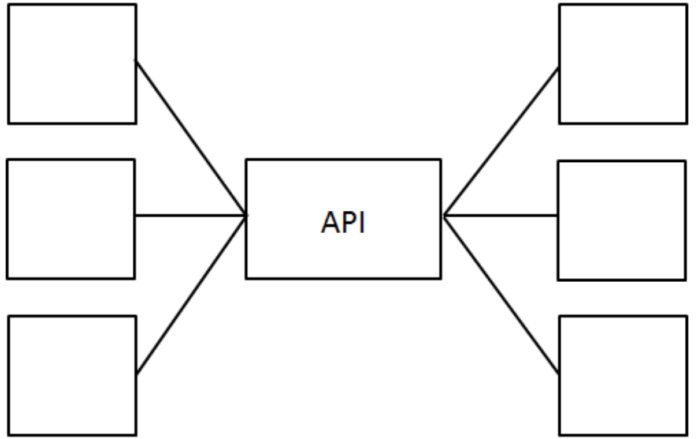
loose couplings

what types of architectures should we be designing for university systems?



Legacy architecture. Point to point integrations mean increased QA efforts whenever any one system is modified or upgraded.

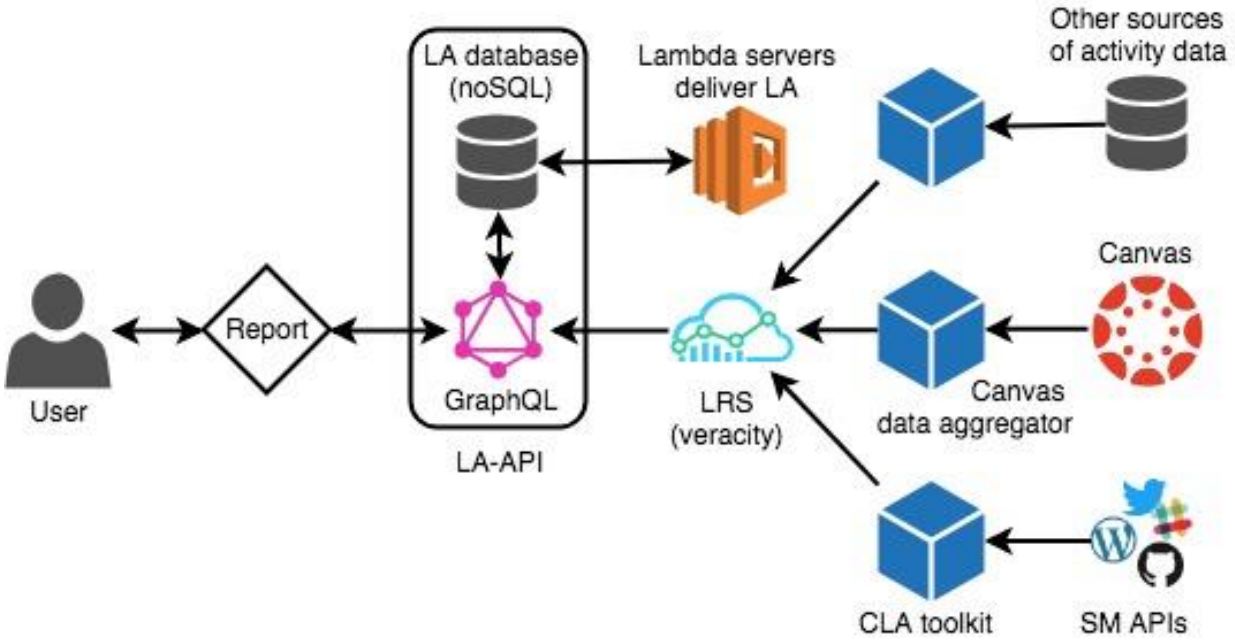
OR



API-based architecture. Systems can be built on top of stable APIs and upgraded/replaced independent of each other with reduced QA effort.

https://edutechnica.com/2015/06/09/flipping-the-model-the-campus-api/

scaling up: a Learning Analytics API



why graphQL?

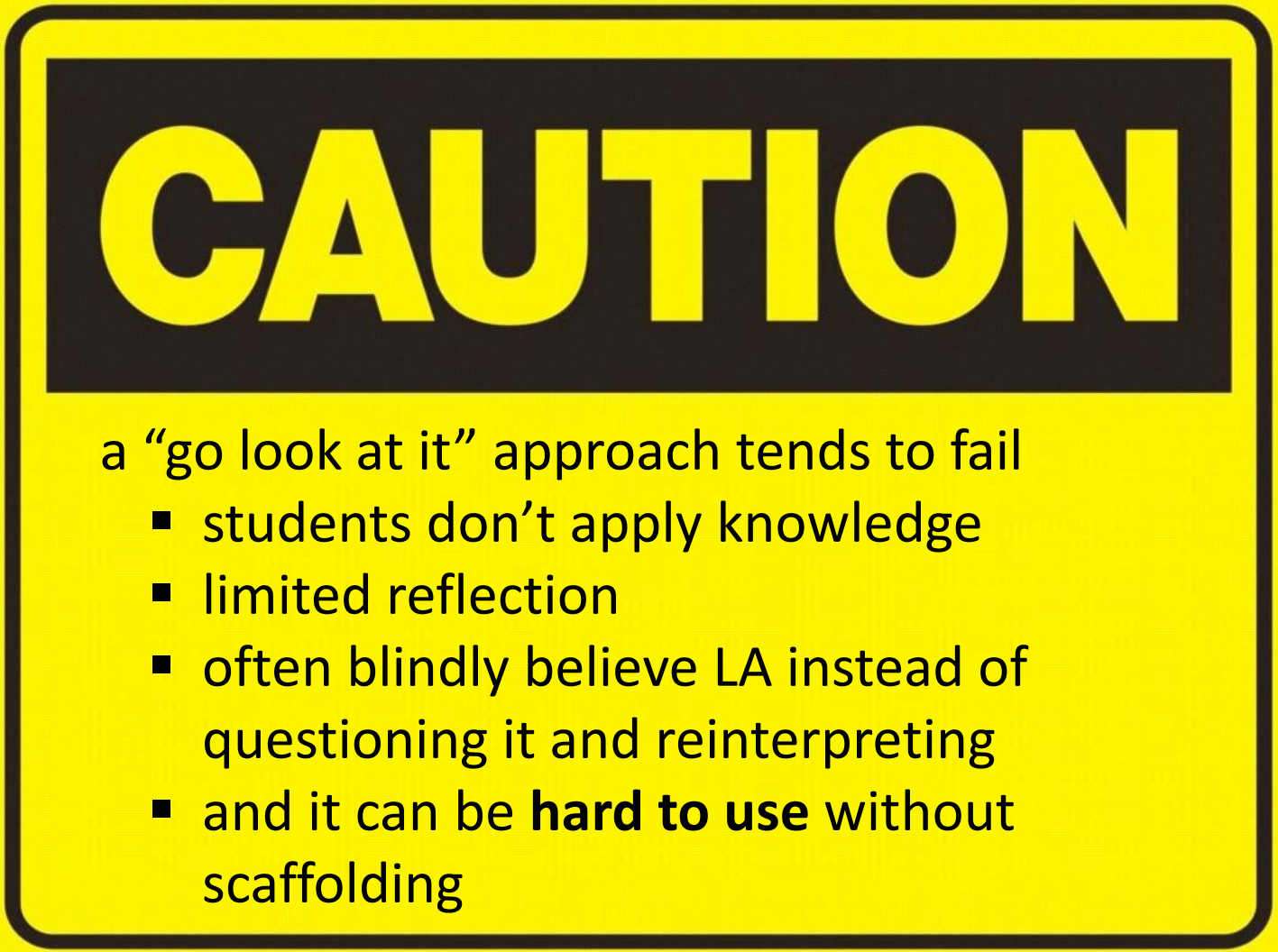
GraphQL is a query language that enables an abstraction of server-side API calls under a single neat wrapper, instead of to multiple endpoints…

- efficient data retrieval - student facing LA applications and dashboards need to be mobile
- flexible - many different applications will need access to student data
- strongly typed - clearly defines how the client can access the data, so acts as an intermediate layer between back end complex infrastructure and front end user interfaces
- extensible – enables ongoing addition of LA services as necessary

but data must be cooked with care!

- *are you capturing all of the relevant data?*
- *is what you are collecting even useful?*
- *or are you just collecting it because you can?*
- *and what metrics are you developing from your data?*

Bowker, G. C. (2005). Memory practices in the sciences (Vol. 205). Cambridge, MA: Mit Press.



a “go look at it” approach tends to fail

- students don’t apply knowledge
- limited reflection
- often blindly believe LA instead of questioning it and reinterpreting
- and it can be **hard to use** without scaffolding

things can go very wrong with naïve approaches

Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study of intrinsic motivation, social comparison, satisfaction, effort, and academic performance. Computers & Education, 8, 152–161.

Khan, I., & Pardo, A. (2016). Data2U: Scalable real time student feedback in active learning environments. In Proceedings of the international conference on learning analytics and knowledge (pp. 249–253). Edinburgh, Scotland: ACM.

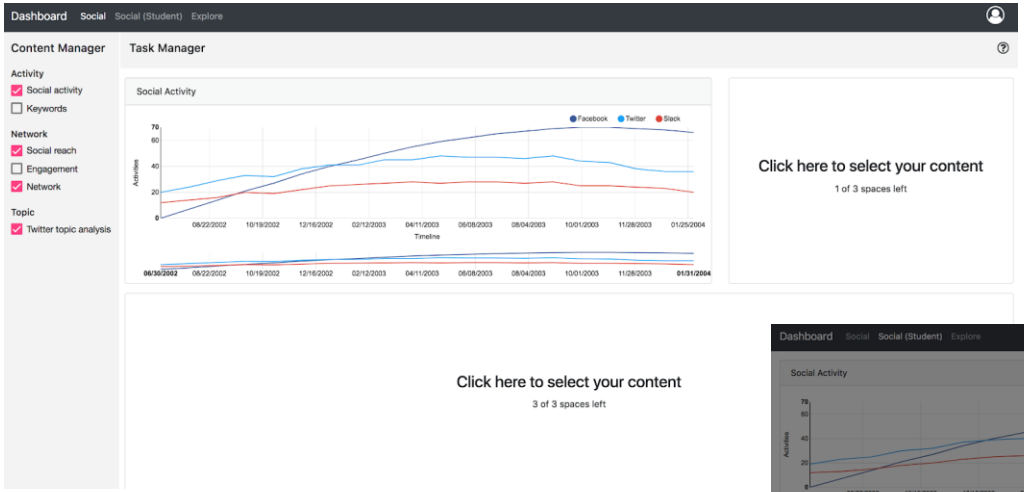
Learning designs for student facing LA

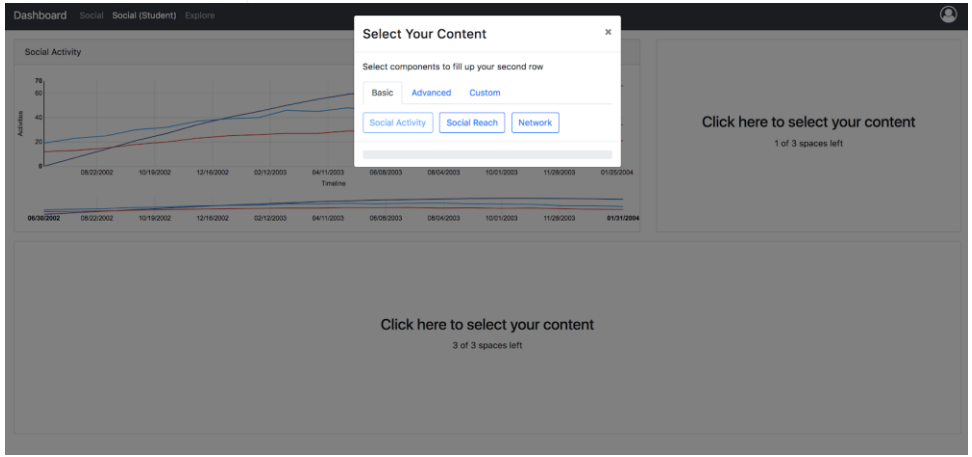
- authentic integration with assessment is necessary
- 3 learning design patterns are being used right now
  - do-analyse-change-reflect
  - active learning squared
  - Groupwork
- More will come in time!

Kitto, K., Lupton, M., Davis, K., Waters, Z. (2017). Designing for Student Facing Learning Analytics, Australasian Journal of Educational Technology, 33(5), 152-168.

Kitto, K., Lupton, M., Davis, K., Waters, Z. (2016). Incorporating student-facing learning analytics into pedagogical practice. In S. Barker, S. Dawson, A. Pardo, & C. Colvin (Eds.), Show Me The Learning. Proceedings ASCILITE 2016 Adelaide, pp. 338-347.

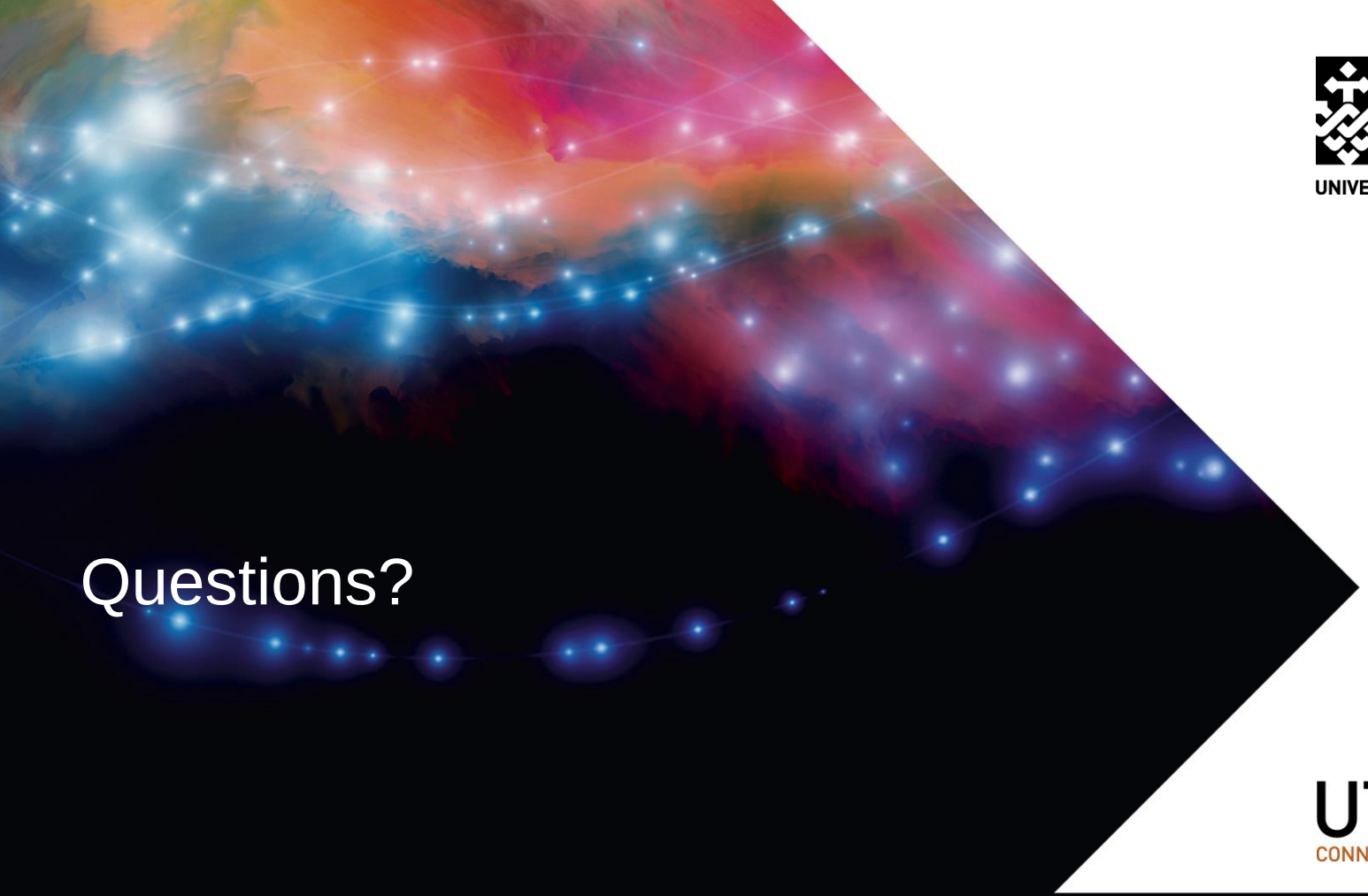
user configurable dashboards





in summary – why do I use xAPI?

- enables rapid development of data infrastructure
- data interoperability (if you follow best practice)
- rapidly evolving and highly flexible
- open development model means that everyone knows what is going on – no nasty surprises if you pay attention
- vibrant and open community effort – anyone can contribute!



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Questions?

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