NORDIC ADL Conference 2019

Choosing a Learning Record Store

Biljana Presnall
@Gradina
www.jeffersoninst.org

Today’s Agenda

01 Catch that Experience: xAPI

02 Store that Experience: LRS

03 LRS options

04 Developing matrix guidelines for purchase of an LRS

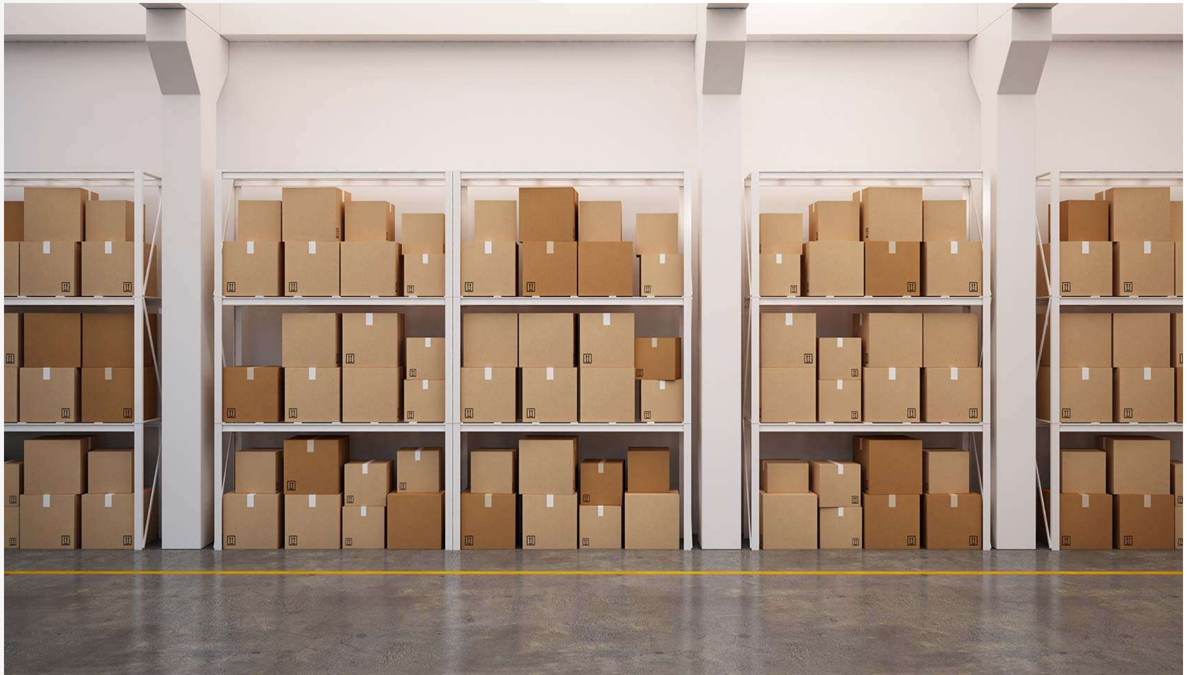
xAPI recap

- Track learning events or experiences
- Collect data at very granular levels
- Track a single user though an entire stream
- You can collect and store data on your own server
- Allows you to launch your content from outside your LMS

Is xAPI the unique activity tracker?

What are you going to do?

- I can pronounce it (finally)
- I am collecting xAPI statements
- I have a plan how to use it



You need an LRS

Learning Record Store

What is LRS?

EXPERIENCE API

- Learning record store
- It’s a storage for the training data
- It’s a database where we send xAPI activity statements and retrieve them later for decision –making.

The learning universe

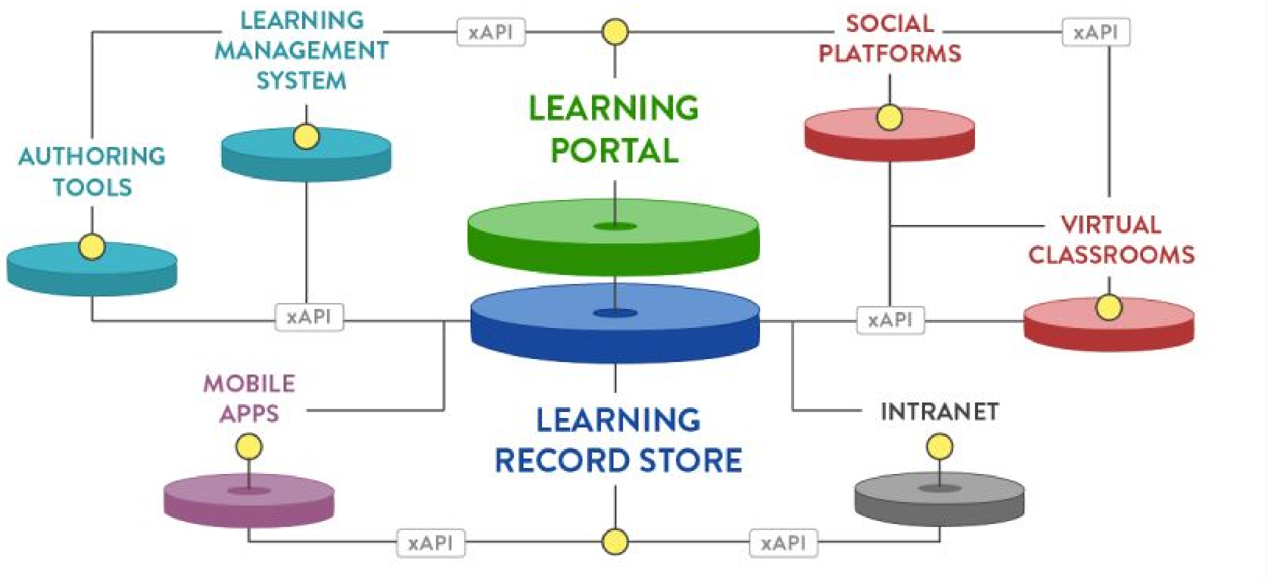
SOME DAY WHEN SCIENTISTS DISCOVER THE CENTER OF THE UNIVERSE,
MANY PEOPLE ARE GOING TO BE DISAPPOINTED TO FIND OUT THAT IT ISN'T THEM.
memegenerator.net

Interacts with every (almost) other tool which sends or retrieves learning activity

The Learning Record Store

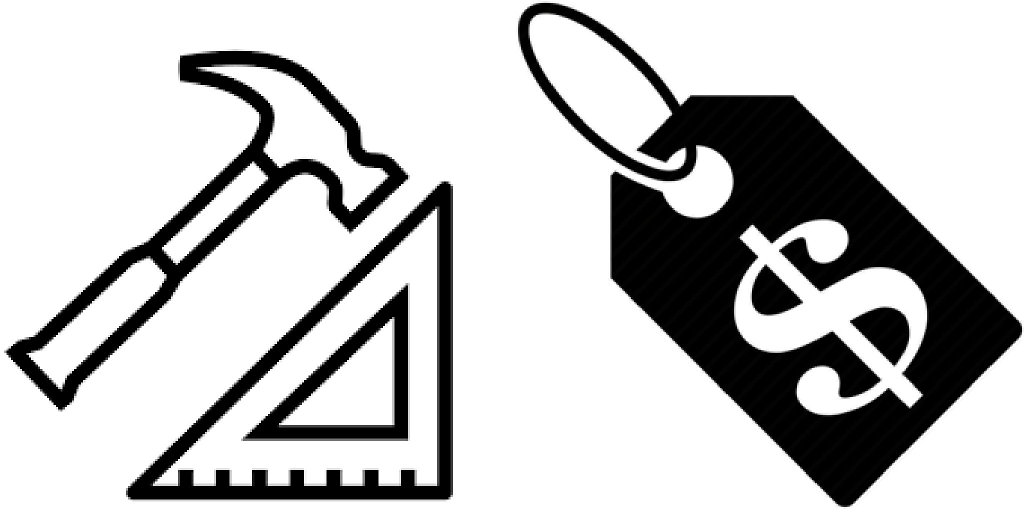
Making xAPI work, but to justify itself, the LRS needs to:

- Do or serve analysis
- Provides proves in a form of data (facts) about the training we are delivering
- Help us understand the learners needs, so we can optimize the training itself



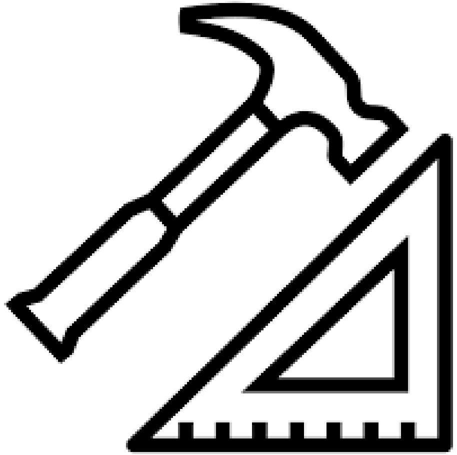
Build it or buy it?

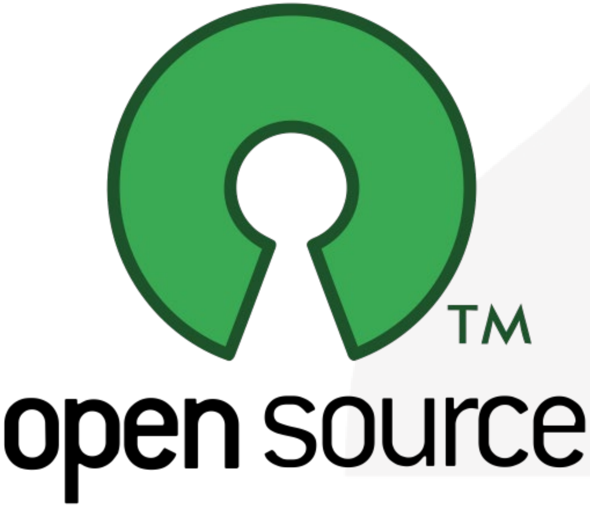
- To answer this question the first step is to get an in-depth understanding of requirements.



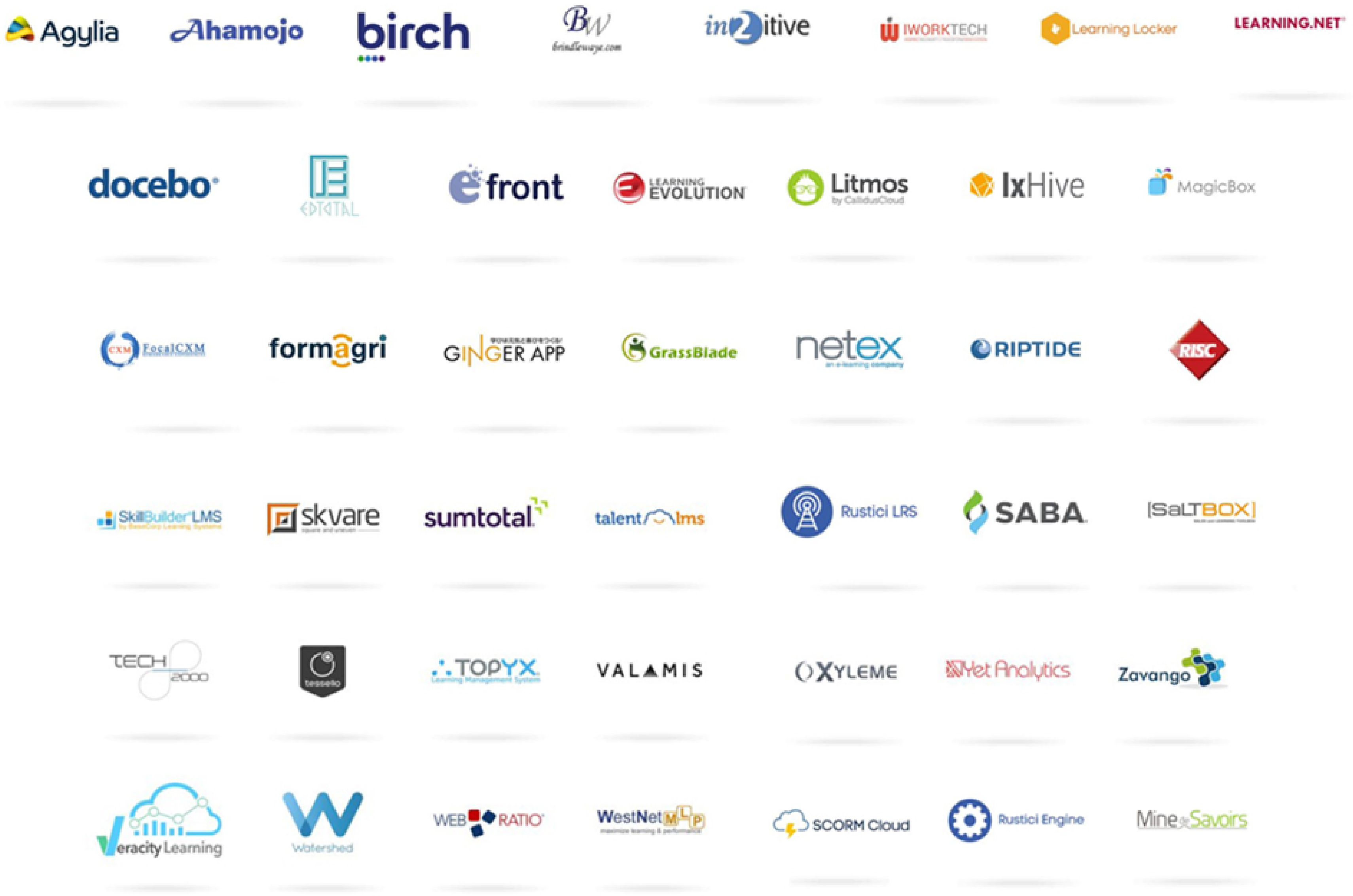
Build it or buy it?

- **Strategic value** and the third option





Many options



Categories

- Line up major requirements to the category of system you need

- Not mutually exclusive

- Categorized by functions

LRS without Data Analytics Engine

ADL LRS

https://github.com/adlnet/ADL_LRS

- Storing and retrieving statements
- Intended as poof of concept
- Python interface
- Postgres DB
- standalone
- FREE!

LRS without Data Analytics Engine

TRAX LRS

http://traxlrs.fr

https://github.com/trax-project/trax-lrs

- ADL conformant with the latest xAPI specification
- Minimalist set of features, but can be extended
- PHP/Laravel interface
- php/js MySQL, MariaDB, PostgreSQL, MongoDB
- Standalone
- FREE!

LRS with Data Analytics Engine (LAP)

Usually highly customizable to work with your learning and business intelligence tools

Largest group few EXAMPLES:

- **Learning Locker** https://www.ht2labs.com/learning-locker/
- **Watershed** https://www.watershedlrs.com/
- **Yet xAPI LRS** https://www.yetanalytics.com/xapi-lrs
- **Veracity** https://lrs.io/download/
- **Rustici LRS** https://rusticisoftware.com/products/rustici-engine/
- **Bracken LRS** https://www.brackenlearning.com/
- **Saba Cloud** https://www.saba.com/uk
- **Onpoint Digital LRS** http://www.onpointdigital.com/technologies/xapi-lrs.php
- **GingerApp LRS** http://www.gingerapp.co.jp/index_e.php
- **Riptide** https://learning.riptidesoftware.com/
- **GrassBlade** https://www.nextsoftwaresolutions.com/grassblade-lrs-experience-api/
- **Mzinga** http://mzinga.com/mzinga-learning-record-store/

LRS with Data Analytics Engine (LAP)

LRS with Data Analytics Engine (LAP)

- **Learning Locker**

Open source, **FREE**, standalone

To download and install https://github.com/LearningLocker/learninglocker

More info: https://www.ht2labs.com/learning-locker/

- **Watershed**

Essentials free service

Analytics service $

https://www.watershedlrs.com/

- **Yet xAPI LRS**

Sandbox free service $

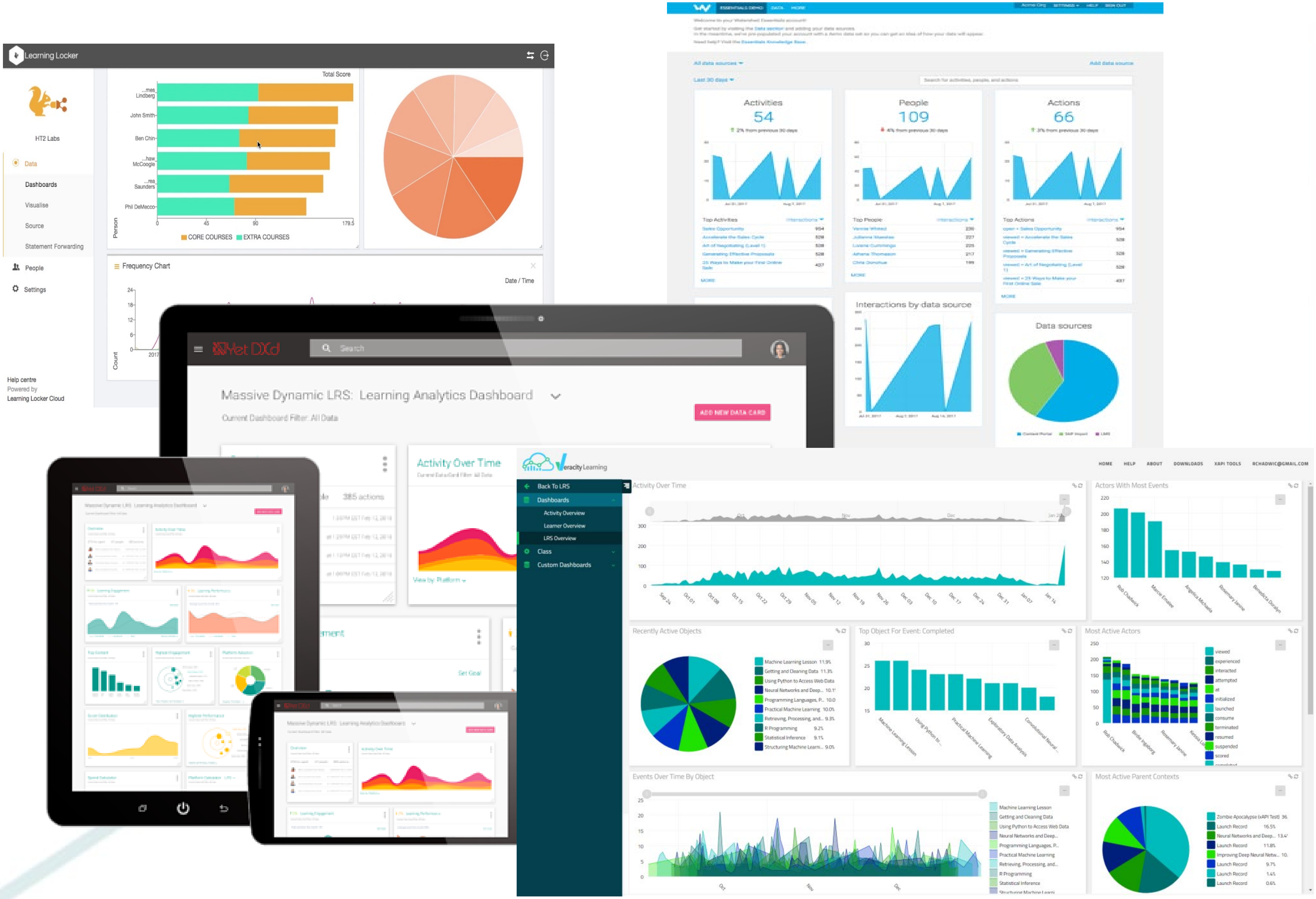
https://www.yetanalytics.com/xapi-lrs

- **Veracity**

Standalone, FREE (LITE version) Service $

To download and install https://lrs.io/download/

LRS with Data Analytics Engine (LAP)



LMS with Integrated LRS

PROS:

+ Adds to capabilities of the LMS

+ Measure micro-level learning behaviors

+ Track data from sources outside the LMS

+ Receive types of data previously unknown to the system

CONS:

- LRS inheriting limitations of LMS – less standalone interoperability
- LRS subject to same upgrade schedule as LMS
- LMSs focused on offering “SCORM-like” functionality using xAPI
- Eventually LMS product model will be rethought by vendors

LMS with Integrated LRS

SOME EXAMPLES:

meridian
KNOWLEDGE SOLUTIONS

UL
LearnShare

LMS with external LRS

Integratable or has built-in API that connects to LRS (LRS is not included):

- Blackboard
- eFront
- LearnUpon
- LitmosLMS
- Moodle
- ProProfs LMS
- TalentLMS

All of them could send statements to LRS but non of them, at the moment, use LRSs API to get data from it because they have learning analytics included in LMS.

Developing requirement matrix

- Conformance Requirements
- System integration
- SCORM to xAPI Roadmap
- In-house technical expertise
- Cost
- Learning paths and workflows
- Security considerations
- Hosting options
- Data analytics requirement

xAPI LRS Conformance

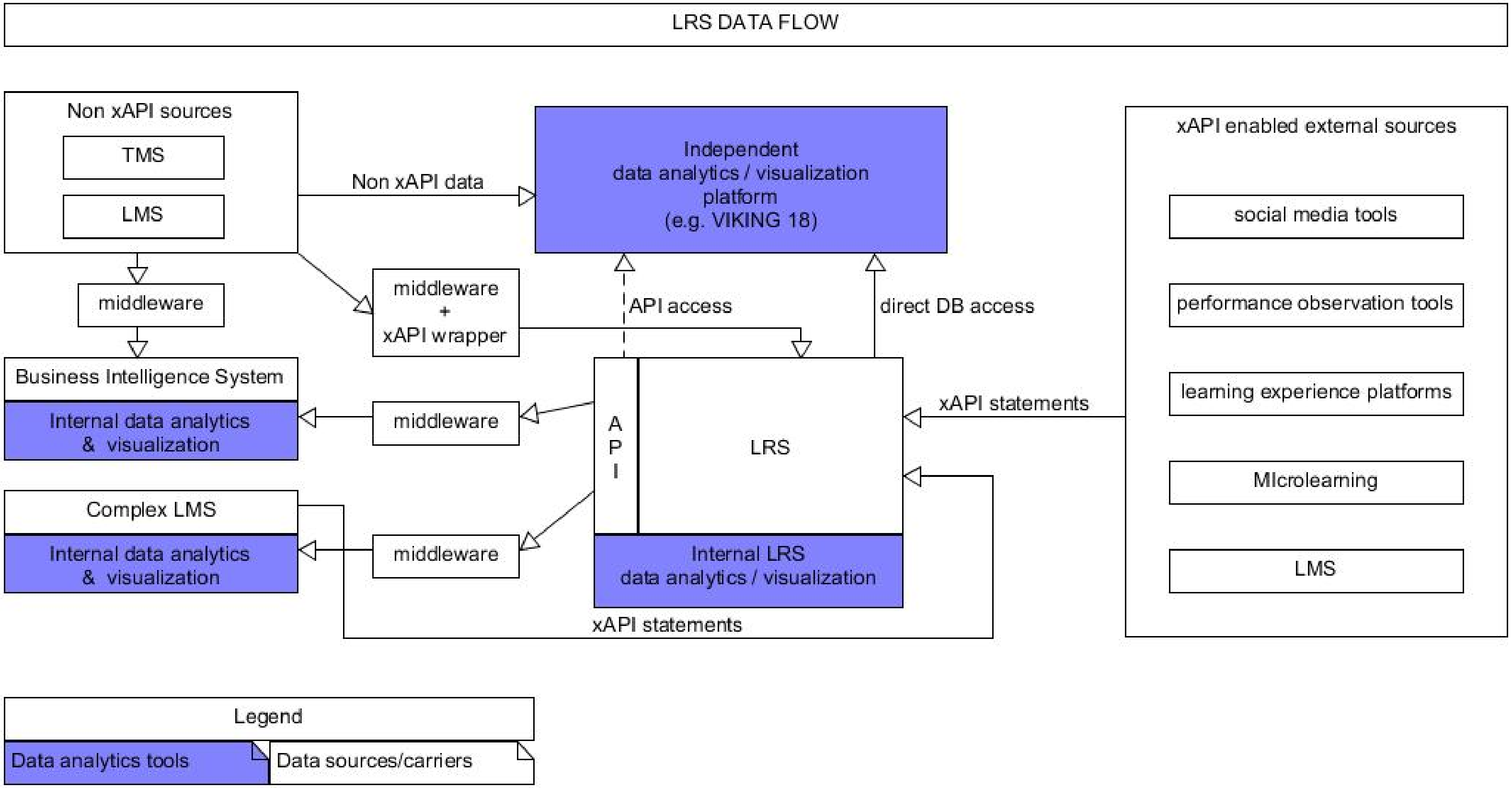
Advanced Distributed Learning Initiative (ADL) LRS Test Suite validates conformance to the xAPI specification.

Covers over 1,300 strict criteria

- LRS Test Suite: https://lrstest.adlnet.gov/
- Registry : https://adopters.adlnet.gov/products/all/0

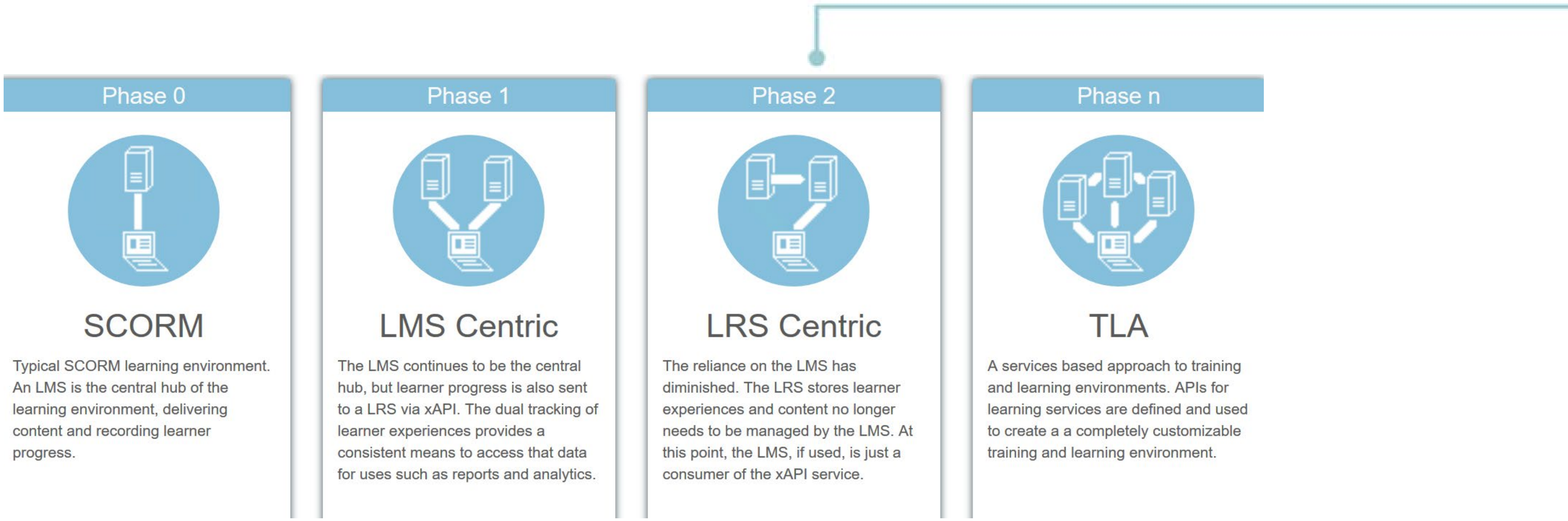
System integration

- The data flow is ultimately defined by the position and power of data analytics/visualization engine. Here is an example:


LRS DATA FLOW
Non xAPI sources
TMS
LMS
Non xAPI data
Independent data analytics / visualization platform (e.g. VIKING 18)
xAPI enabled external sources
social media tools
performance observation tools
learning experience platforms
MIcrolearning
LMS
middleware
middleware + xAPI wrapper
API access
direct DB access
Business Intelligence System
Internal data analytics & visualization
middleware
A P I
LRS
xAPI statements
Complex LMS
Internal data analytics & visualization
middleware
Internal LRS data analytics / visualization
xAPI statements
Legend
Data analytics tools
Data sources/carriers

SCORM to xAPI Roadmap

http://adlnet.github.io/SCORM-to-TLA-Roadmap/



Phase 0

SCORM

Typical SCORM learning environment. An LMS is the central hub of the learning environment, delivering content and recording learner progress.

Phase 1

LMS Centric

The LMS continues to be the central hub, but learner progress is also sent to a LRS via xAPI. The dual tracking of learner experiences provides a consistent means to access that data for uses such as reports and analytics.

Phase 2

LRS Centric

The reliance on the LMS has diminished. The LRS stores learner experiences and content no longer needs to be managed by the LMS. At this point, the LMS, if used, is just a consumer of the xAPI service.

Phase n

TLA

A services based approach to training and learning environments. APIs for learning services are defined and used to create a a completely customizable training and learning environment.

Phase 0 = SCORM only
Phase 1 = Dual Track Implementation
Phase 2 = LMS as a Service
Phase 3 = Training and Learning Architecture (xAPIdriven)

In-house technical expertise

LRSs come in a variety of programming languages and related technologies:

EXAMPLES:

- Learning Locker - js (ES6 - node.js)
- ADL LRS - Python interface
- Trax LRS - php/js
- Veracity Learning - js (ES6 - node.js)
- Valamis LRS - Scala/JVM
- lrs.j18cloud.com - .Net

Cost

Types of pricing models:

- **Seat-based** – (number of employees / learners)
- **Analyst-based –** (number of analysts, e.g. users with the authenticated access)
- **Usage-based** – (number of xAPI statements sent to it per month)
- **Capability-based** – (e.g. with or without analytics, interactivity, real time analytics, etc.)

Most vendors use a mixed model. For example, **J18Cloud** offers packages that are seat, analyst and usage based (e.g. restrict the number of learners, number of analysts and number of statements), while **Watershed** combines seat and capability based models.

Hosting Options

Vendor-hosted - (managed by their staff)

- Reduced hardware / network infrastructure & maintenance costs
- Requires little or no internal technical support or development
- Generally faster implementation (e.g. weeks vs months)
- Security issues generally transferred to the vendor
- Vendor takes responsibility for overall upgrades and patches
- Incentives and guarantees for maintaining uptime (via financial penalties against vendor).
- Data center compliance handled by the vendor
- Generally scales more easily to account for temporary surges in usage **(**no need to purchase and maintain additional servers and bandwidth for increased activity periods)
- Usage-based pricing models may be more economical

Behind your firewall - (managed by your staff)

- Unrestricted customization scope
- Full control over your data and data flow
- May be more cost effective, provided sufficient internal IT resources
- Possibility to set up a top level security environment for classified data

Hosting Options

Vendor-hosted options

- Watershed LRS Analytics
- Yet xAPI
- Valamis LRS
- Delphire
- lrs.j18cloud.com
- Bracken LRS
- Fox Training Management System
- Saba Cloud
- Meridian LRS
- Virtual Training Assistant
- OnPoint Digital LRS

Behind your firewall options

- Veracity Learning - Commercial (ES6 - node.js / MongoDB)
- Learning Locker - Open source (ES6 - node.js/ MongoDB)
- ADL LRS - (Python interface / Postgres DB - Open source)
- Trax LRS - Open source (php(Laravel)/js / MySQL, MariaDB, PostgreSQL, MongoDB)
- GrassBlade - Commercial

Security considerations

Application level:

- Broken Authentication
- Hostile data Injection
- Broken Access Control
- Security (miss)configuration
- Using Components with Known Vulnerabilities
- Continuous Logging & Monitoring

Server level:

- Restricting all communication with the server to secure encrypted (https) protocols
- Protection against f brute force attacks on the subnet level
- Continuous Logging and monitoring all server activity
- Continuous data backup (outside web root)

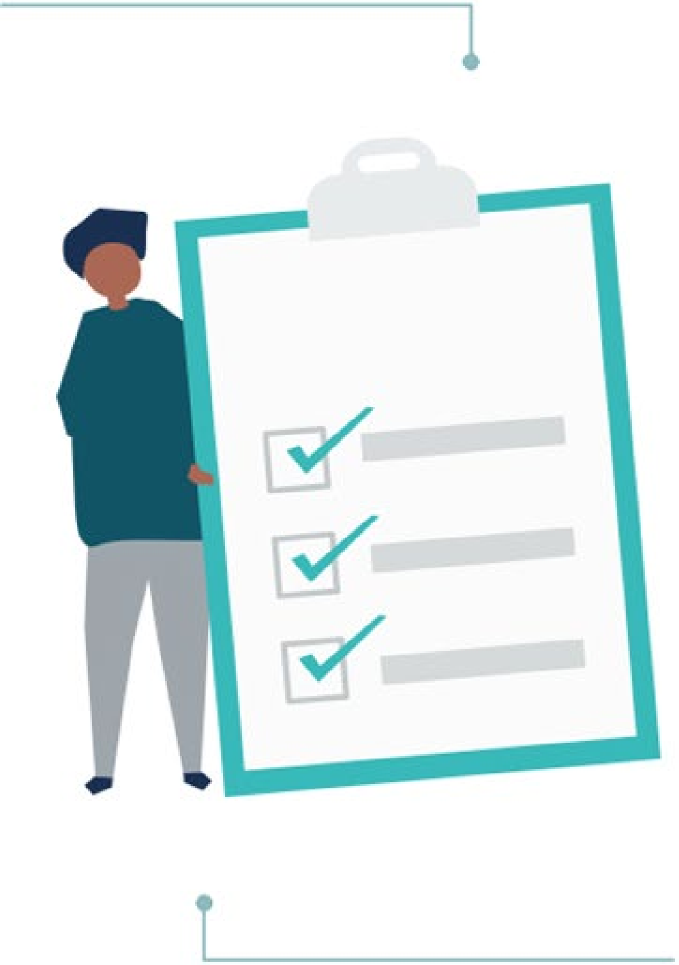
Open source is no longer considered necessarily less safe (as of 2009, U.S. DoD guidance establishes open source software as having equal weight as proprietary software during acquisition evaluations).

Data analytics requirement

LRSs with data analytics/visualization engines by type / specialization

- Learning Locker – general purpose - Open source – standalone
- Veracity Learning - general purpose - standalone
- Watershed Analytics – general purpose – SaaS (Software as a Service)
- Yet Analytics – general purpose - SaaS
- Valamis LRS – general purpose - SaaS - health services, government
- Delphire – general purpose - SaaS - mobile centered
- Fox Training Management System – general purpose - SaaS - Civil Aviation
- Saba Cloud – general purpose - SaaS - talent management
- Meridian – general purpose – SaaS - mobile micro learning
- Virtual Training Assistant – general purpose – SaaS - regulatory & compliance focused
- OnPoint Digital – general purpose – SaaS – mobile, “offline xAPI” statement tracking

LRS Features rating matrix



Based on your requirements such as: schedule, budget and other elements, develop weighing criteria:

- Filter list of potential candidates, eliminating those that do not meet criteria.
- Compile detailed, comprehensive features list for all remaining candidate systems

Additional Resources

- ADL
  https://adlnet.gov/xapi-adopters/

- Conformance Test
  https://xapi.com/conformance-test/

TLA roadmap

- http://adlnet.github.io/SCORM-to-TLA-Roadmap/

Thank you!

Jefferson
Institute

bpresnall@jeffersoninst.org