Evaluating the Experience API (xAPI) for Annotation Storage

W3C Workshop on Annotations
2 April 2014, San Francisco

IEEE Learning Technology Standards Committee
Experience API (xAPI) Background

- Based on http://activitystrea.ms
- Collaboration between Google, Facebook, Microsoft and others
- Allows reporting of experiences, not just completions
- Statement format: <Actor> <Verb> <Object> (I did this):
  - Simple: I (actor) watched (verb) a video on protecting employee data (activity)
Experience API (xAPI) Background

- Developed by open source community
- RESTful API
- Tracks experiences, informal learning, real-world experiences (not just courses)
- Allows data storage & retrieval (mobile apps, games, ITS, and virtual worlds experiences, team/group activities)
- Machine and human readable (uses natural language)
What is the Learning Record Store?
xAPI Resources & Adoption

- xAPI Specification & Documentation
  - https://github.com/adlnet/xAPI-Spec/
- xAPI JavaScript Wrapper
  - https://github.com/adlnet/xAPIWrapper
- Learning Record Store
  - https://github.com/adlnet/ADL_LRS
- Adoption
  - 4 LRS Solutions (open source & commercial)
  - Integrated into eLearning authoring tools
  - Over 200 active participants in WG & Cohorts
IEEE Actionable Data Book (ADB)

- IEEE LTSC requests special IEEE R&D Activity
- Goal: Explore EPUB 3 eBook format as technical foundation for mobile, sustainable, accessible content
- Goal: evaluate xAPI as an enabler for data communication with multiple endpoints
- Project approved December 2012 as IEEE Actionable Data Book
- 2013 year long feasibility study
- 2014-2015 implementation effort
Current Status: IEEE ADB Project

- xAPI standardization beginning in IEEE LTSC
- Plan to use project as test bed to support xAPI standardization
- Opportunity to experiment with bringing different kinds of data into an HTML5 mobile learning context
- Free and open collaboration
- New participants or observers welcome
EPUB + xAPI Demos

- EPUB 3 + xAPI in the following readers:
  - iBooks, Readium, EPUB.js, Calibre
- Additional areas to investigate:
  - Widgets
  - Client / reader xAPI implementation
  - Synchronize bookmarks using xAPI across platforms & readers
  - Annotator.js + EPUB testing in more readers
  - Storing open annotation serialized JSON data using xAPI (mapping exercise)
Demo: EPUB + Annotator.js + xAPI
Demo: EPUB + Annotator.js + xAPI
This work is licensed under a Creative Commons Attribution-ShareAlike 3.0 Unported License.

By no means is this an exhaustive example, and I take no responsibility for any problems that arise from this work, but I’m happy that it validates and works in Readium as is, and serves as a practical guide, example and demonstration of the technology.

Based on Blank Book by Jason Hibbs. This book integrates xapiwrapper.js to show examples of communication to a Learning Record Store, such as the ADL LRS.

A session based hash has been appended to an email address for the actor statements to show data persistence across multiple html files using HTML5 local storage.

By now, this book should have sent statements to the LRS.

Try highlighting some text on this page, it includes annotator.js.

You should be able to verify this by logging into the ADL LRS using the following credentials:

ebook / ebooklrs
By now, this book should have sent statements to the LRS.

Try highlighting some text on this page, it includes annotator.js.

You should be able to verify this by logging into the ADL LRS using the following credentials:

```
ebook / ebooklrs
```

this is a comment using annotator.js
Demo: EPUB +Annotator.js + xAPI

By now, this book should have sent statements. Try highlighting some text on the page, it includes annotator.js.

You should be able to verify this by logging into the ADL LRS using the following credentials:

ebook / ebooklrs
Demo: EPUB + Annotator.js + xAPI

This epub passed validation tests.
(almost)

"Works" in:

- Readium
- epub.js

Check out the EPUB3 Support
Demo: EPUB +Annotator.js + xAPI
<xml version="1.0" encoding="UTF-8">
<head>
  <meta name="viewport" content="width=750, height=1000" />
  <meta charset="UTF-8"/>
  <title>Page 01/title>
  <link href="css/style.css" type="text/css" rel="stylesheet"/>
  <!-- Include the xapiframe.js and dependent scripts -->
  <script src="js/xapiframe.js"></script>
  <script src="js/config.js"></script>
  <script src="js/base64.js"></script>
  <script src="js/verbs.js"></script>
  <script src="js/xapiframewrapper.js"></script>
</head>
<body>
  <div class="p01 left">
    <section class="license">
      <!-- This work is licensed under a <a rel="license" href="http://creativecommons.org/licenses/by-sa/3.0/">Creative Commons Attribution
      By no means is this an exhaustive example, and I take no responsibility for any problems that arise from this work, but I'm happy
      Based on a <a href="http://jasonhibbs.co.uk/2012/blank-book">Blank Book</a> by a <a href="http://jasonhibbs.co.uk" title="Jason Hibbs
      A session based hash has been appended to an email address for the actor statements to show data persistence across multiple xhtml
    <img src="images/img_p01.jpg" alt="An image is worth a thousand words, add some here." />
  </div>
  <script>
    // Update the config to use the credentials of your LRS
    ADL.XAPIWrapper.changeConfig(Config);
    var email = getStorage('session');
    //alert(email);
    // Build Statement
    var stmt = {
      "actor": { "mbox": "mailto:" + email },
      "verb": ADL_verbs.experienced,
      "object": {
        "id": "http://cbooks.adlnet.gov/xapi-integration/page-1/experienced",
        "definition": {
          "name": { "en-US": "Page 1" }
        }
      }
    };
    // Send Statement
    ADL.XAPIWrapper.sendStatement(stmt, function(resp, obj) {
      // Callback action
      //alert(obj.id);
    });
  </script>
</body>
</xml>
// Update the config to use the credentials of your LRS
ADL.XAPIWrapper.changeConfig(Config);
var email = getStorage('session');
//alert(email);

// Build Statement
var stmt = {
  "actor": { "mbox": "mailto:" + email },
  "verb": ADL.verbs.experienced,
  "object": {
    "id": "http://ebooks.adlnet.gov/xapi-integration/page-1/experienced",
    "definition": {
      "name": { "en-US": "Page 1" }
    }
  }
};

// Send Statement
ADL.XAPIWrapper.sendStatement(stmt, function(resp, obj) {
  // Callback action
  //alert(obj.id);
});
</script>
LRS Storage View

```json
{
    "verb": {
        "id": "http://adlnet.gov/expapi/verbs/experienced",
        "display": {
            "en-US": "experienced"
        }
    },
    "timestamp": "2014-04-02T05:24:27.397833+00:00",
    "object": {
        "definition": {
            "name": {
                "en-US": "Page 2"
            }
        },
        "objectType": "Activity"
    },
    "authority": {
        "mbox": "mailto:ebook.lrs@adlnet.gov",
        "name": "ebook",
        "objectType": "Agent"
    },
    "stored": "2014-04-02T05:24:27.397833+00:00",
    "version": "1.0.0",
    "actor": {
        "mbox": "mailto:b769qwiwr5h77gb9@adlnet.gov",
        "name": "experienced"
    }
}
```
Open Annotation Serialization

{
  
  "@context": "http://www.w3.org/ns/oa-context-20130208.json",
  "@id": "http://www.example.org/annotations/annol",
  "@type": "oa:Annotation",

  "annotatedAt": "2012-11-10T09:08:07",
  "annotatedBy": {
    
    "@id": "http://www.example.org/people/person1",
    "@type": "foaf:Person",
    "mbox": {
      
      "@id": "mailto:person1@example.org"
    },
    "name": "Person One"
  },

  "hasBody": {
    
    "@id": "urn:uuid:1d823e02-60a1-47ae-a97fa02f2ac348f8",
    "@type": ["cnt:ContentAsText", "dctypes:Text"],
    "chars": "This is part of our logo"
  },

  "hasTarget": {
    
    "@id": "urn:uuid:cc2c8f08-3597-4d73-a529-1c5fed58268b",
    "@type": "oa:SpecificResource",
    "hasSelector": {
      
      "@id": "urn:uuid:7978fa7b-3e03-47e2-89d8-fa39d1280765",
      "@type": "oa:FragmentSelector",
      "conformsTo": "http://www.w3.org/TR/media-frags/",
      "value": "xywh=10,10,5,5"
    },
    "hasSource": {
      
      "@id": "http://www.example.org/images/logo.jpg",
      "@type": "dctypes:Image"
    }
  }

}
An Experience Statement

- Id
- Actor
- Object
- Verb
- Result
- Context
- Timestamp
- Attachments
Thank You! Let’s Collaborate!

Experience API (xAPI)
http://xapi.adlnet.gov

EPUB xAPI Demos
http://z2.vc/r/

Tyde Richards
IEEE LTSC
info@ieee-ltsc.org

Jason Haag
Andy Johnson
xapi-spec@adlnet.gov