Introduction To Ed-Fi Technology

Eric Jansson, Ed-Fi Alliance
Why Ed-Fi?
What most teachers know about a new student when they walk into the classroom
Education Sector IT Systems: Complex, Outdated, Compliance-oriented
Educators are using data to inform instruction and improve outcomes for students, but it isn’t easy.
Ed-Fi Data Exchange Standards
A standard makes complex systems run smoothly, coherently, and efficiently for all parties.
What is a technical standard?

• **Technical standard** = established **norm** or **requirement** for technical systems
• **Formal document** that establishes **uniform engineering or technical criteria, methods, processes and practices**
• May be developed privately, unilaterally, or collaboratively (e.g., by a corporation, regulatory body, military, trade association, etc.)

## Interoperability Levels

<table>
<thead>
<tr>
<th>Sophistication of integration</th>
<th>Application Integration</th>
<th>Transport</th>
<th>Serialization</th>
<th>Data Model</th>
<th>Data Dictionary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>What additional application behavior is expected?</strong></td>
<td><strong>What protocols are used to move data between systems?</strong></td>
<td><strong>How are data elements represented in transit?</strong></td>
<td><strong>How do data entities relate to each other?</strong></td>
<td><strong>How are data elements defined?</strong></td>
</tr>
</tbody>
</table>
Ed-Fi Data Standard
- Logical UML model
- Foundation of all Ed-Fi standards
- Ensures that all standards are compatible

Ed-Fi API RFCs & Standards
- Deal with specific use cases
- Defined in Open API and normative guidelines
- Data modeled in JSON

*Note: the Ed-Fi ODS database schema is not a standard. The logical data model is a standard.*
Data Model - Goal and Domains

• Define data related to student performance to help drive decisions to improve student performance

• Includes some domains indirectly related to student performance (staff credentials, etc.)
Unifying Data Model (UDM)

- Often referred to as the “Ed-Fi Data Standard”
- Made up of entities, attributes and associations
- Highly normalized - optimized for storage of very granular data
- Available in UML in Github (all versions) and via Data Handbook (v2.2+)
- Versions
  - Main versions in use are 2.2 and 3.1
  - Watch Request for Comments
Ed-Fi REST API Specifications

- Define Application Programming Interfaces (APIs) for movement of data
- Follow REST(ful) conventions
  - HTTP using verbs GET, POST, PUT, DELETE
- Language
  - Defined as Open API schema
  - Implemented in the Ed-Fi ODS API
  - Watch [Request for Comments](#)

```
GET /sections/FCYW5-UYK32-8YTQ7

{
  "schoolId":12345,
  "classPeriodName":"4th Period",
  "classroomIdentificationCode":"abcde",
  "localCourseCode":"Math 101",
  "termTypeId":1,
  "schoolYear":2012,
  "uniqueSectionCode":"3FJ56",
  "sequenceOfCourse":1,
  "availableCredit":1.5
}
```
Ed-Fi XML (Bulk) Specifications

• Designed for moving large amounts of data in a bulk format

• Two parts
  • Core XML Schema Definition (XSD): defines all entities, attributes and associations
  • Interchange Schemas: defines how entities are packaged (into use-case-based bundles)

Ed-Fi XML formats are not recommended for new adopters – vendor support and ecosystem interest is waning!
Ed-Fi Operational Data Store & API
aka the “Ed-Fi Platform”
Three Main Parts

- API for data exchange
- Relational database for storage
- Utilities and tools

- Implements the Ed-Fi API standards
- Follows the Ed-Fi data model
Typical SEA ODS API Deployment

SEA data specifications are a key input and published 6-8 months in advance of production. Answers question: is the data flowing and what exactly did we submit? Answers question: is our data submission valid and what do we need to fix? Integrity reports should connect data to consequences of that data (AZ).

Publication of integrity rules to LEAs helps complete the circle of expectations.

- Introduces multi-year schema (as integrity rules cross years).
- May be multi-year, derivative format of Ed-Fi ODS DB schema or a separate system.
- LEAs lose sight of data here.

Audit trail useful in both internal and external processes.
Community Tools

Finding important info, asking questions, making suggestions, engaging with the community, etc.
TechDocs

- Community knowledge-base of technical info
- In depth details on tech tools

ED-FI ODS / API V3.2 HOME

Latest Release
July 2019: On behalf of the Ed-Fi community, we are pleased to announce the release of the Ed-Fi ODS / API v3.2.

Born from the practical needs of our community, the Ed-Fi ODS / API gives you a simple, cost-effective way of connecting and maintaining systems, helping you turn data from something you have into something you can use.

Documentation
Documentation for the Ed-Fi ODS / API v3.2 is viewable online:
- What’s New
- Getting Started
- Platform Developers’ Guide
- API Client Developers’ Guide
- How-To Guides

Resources
Here are some resource highlights for the ODS / API v3.2:
- How To: Extend the ODS / API v3.2 (Basic)
- How To: Extend the ODS / API v3.2 (Advanced)
- How To: Add a Composite

https://techdocs.ed-fi.org
Tracker

• Community ticketing system
• If it’s not documented in Tracker, your problem doesn’t exist!

https://tracker.ed-fi.org
Have you checked TechDocs?

Is there a ticket in Tracker?
Implementation Playbooks (Training)

Welcome to the Ed-Fi Implementation Playbook for State Education Agencies (SEAs). This information will help you implement the Ed-Fi solution within your agency.

Who is this information for?

- The first two sections below, "Ed-Fi Data Standard and Technology Overview" and "Why Adopt the Ed-Fi Data Standard and Technology?", are for anyone who works at a state education agency.
- The remaining sections are for software developers (though business analysts may find them helpful too).

Playbook Sections

- Ed-Fi Data Standard and Technology Overview
- Why Adopt the Ed-Fi Data Standard and Technology?
- Ed-Fi Implementation High Level Project Plan - Reference Template
- Elements of an Ed-Fi Architecture

Useful Links

- Roadmap Highlights for State Education Agencies
- Ed-Fi CDS / API Sandbox

https://techdocs.ed-fi.org/display/ETKB/Ed-Fi+Playbooks
I'm trying to install the Ed-Fi ODS API Admin App on-prem. I have "version": "3.0.0", "information version": "3.0", "build": "1.0.0.0". What version of the Admin App do I need to download?

Development environment taking two-server deployment model. This is a question from the field. In a dev environment, source code machine and the db server are going to be different. If we change all the connection strings in Admin/API/Bull Console/Bulk Win Services Projects to point to the separate db server and run the initdev from the source code machine, will the databases install successfully? Has anyone done this?

Hi Crew!
Does anyone know if the SORA website for teachers and Resources, can be connected for the students as well for a reference of practice?

Kudos to Ed-Fi team and Andie Iverson for 3.2 ODS installers. It was fast and easy to follow doc and install.
Ed-Fi Exchange

- Searchable repository of Ed-Fi aligned solutions
- Contributed and maintained by Ed-Fi community members

https://exchange.ed-fi.org/
Technical Suite Version Matrix

- Supported (vs out-of-support)
- Core (vs non-core)
- Compatibility

Technical Suite Three

<table>
<thead>
<tr>
<th>Product</th>
<th>Supported</th>
<th>Out of Supp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed-Fi Data Standard</td>
<td>v3.1</td>
<td>v3.0</td>
</tr>
<tr>
<td>Ed-Fi ODS / API</td>
<td>v3.2</td>
<td>v3.1.x</td>
</tr>
<tr>
<td>Ed-Fi Dashboards</td>
<td>v3.0</td>
<td></td>
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<tr>
<td>MetaEd</td>
<td>v2.0</td>
<td>v1.4.x</td>
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<tr>
<td>MappingEDU</td>
<td>v1.0</td>
<td></td>
</tr>
<tr>
<td>ODS / API Admin App</td>
<td>v1.5.1</td>
<td>v1.5</td>
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<tr>
<td>Data Import</td>
<td>v1.0 (RC1)</td>
<td></td>
</tr>
<tr>
<td>Sample Data Generator</td>
<td>v1.1</td>
<td>v1.0</td>
</tr>
</tbody>
</table>

Technology Roadmap

3.2 ODS/API

Key Features:

- Update of Enrollment API (see Data Standards Enrollment API Update for Suite 3)
- Code Generation Redesign: Separates Code generation into an independent tool that can run prior to MSBuild. This provides better development experience and allows

https://techdocs.ed-fi.org/display/ETKB/Ed-Fi+Technology+Roadmap
Certification and Badging

Programs to assess and report tools that support for one or more Ed-Fi technical standards.

https://techdocs.ed-fi.org/display/EDFICERT/Registry+of+Ed-Fi+Certified+Products

https://techdocs.ed-fi.org/display/EDFIBADGE/Ed-Fi+Badges
Supporting Technology Tools

Software that produces something or assists with some process
<table>
<thead>
<tr>
<th>Tool</th>
<th>Core?</th>
<th>Installation skills</th>
<th>Usage skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Handbook and UML</td>
<td>Yes</td>
<td>n/a (Alliance hosted)</td>
<td>BA</td>
</tr>
<tr>
<td>Public API Sandbox*</td>
<td>Yes</td>
<td>n/a (Alliance hosted)</td>
<td>BA w JSON experience</td>
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<tr>
<td>MetaEd IDE</td>
<td>Yes</td>
<td>BA</td>
<td>BA</td>
</tr>
<tr>
<td>ODS/API Admin App*</td>
<td>Yes</td>
<td>IT Admin</td>
<td>IT Admin</td>
</tr>
<tr>
<td>Data Import*</td>
<td>Yes</td>
<td>IT Admin</td>
<td>BA</td>
</tr>
<tr>
<td>Analytics Middle Tier*</td>
<td>No (Exchange)</td>
<td>Developer</td>
<td>BA</td>
</tr>
<tr>
<td>Learning Standards Sync</td>
<td>Yes</td>
<td>IT Admin</td>
<td>IT Admin (Admin App)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dev (command line)</td>
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<tr>
<td>ODS/API - Cloud Deployments*</td>
<td>No (Exchange)</td>
<td>IT Admin</td>
<td>IT Admin</td>
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<td>ODS/API – Windows Installers*</td>
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<td>IT Admin</td>
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<td>BI Starter Packs</td>
<td>No (Exchange)</td>
<td>Developer</td>
<td>BA w Dev Support</td>
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<td>Mapping Edu</td>
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<td>n/a (Alliance hosted)</td>
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<td>Performance Test Toolkit</td>
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<td>Developer</td>
<td>Developer</td>
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<td>Sample Data Generator</td>
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<td>Developer</td>
<td>BA w Dev support</td>
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<tr>
<td>Ed-Fi Dashboards</td>
<td>Yes</td>
<td>Developer</td>
<td>Educators</td>
</tr>
</tbody>
</table>
Data Handbook and UML Diagrams

https://techdocs.ed-fi.org/display/EFDS31/Ed-Fi+Unifying+Data+Model (latest version)
Public API Sandbox

- Live API for exploration
- Includes sample data
- Do not integrate into local integration and development processes please!

https://api.ed-fi.org/
MetaEd IDE

• Used for extending the Ed-Fi ODS
• Comes with an IDE based on the Atom text editor

https://techdocs.ed-fi.org/display/METAED20/MetaEd+v2.0+Home
ODS/API Admin App

- Web-based ODS administration
  - API authorization
  - vendor management
  - option set (descriptors) management
  - learning standards sync
  - other
Data Import

• For “Long Tail of Data”

• CSV data into ODS
  • Uses Ed-Fi API
  • For data sources not natively available via API

• Roadmap: incorporate into Admin App

https://techdocs.ed-fi.org/display/EDFITOOLS/Data+Import
Analytics Middle Tier

The Analytics Middle Tier is a set of dimension and fact views created to facilitate easier data modeling in self-service business intelligence tools. By Ed-Fi

[Website](http://exchange.ed-fi.org)
Learning Standards Sync

• Synchronizes Academic Benchmarks data to ODS
  • Technically links AB Connect API ➔ Ed-Fi ODS API
  • Also available via Admin App

https://techdocs.ed-fi.org/display/EFLS/Ed-Fi+Learning+Standards+Sync+Utility
ODS/API Cloud Deployments

- Non-extended
- Platforms
  - AWS
  - Azure
  - Google

https://exchange.ed-fi.org/
https://github.com/Ed-Fi-Alliance/Ed-Fi-X-Ods-Deploy-Azure
ODS/API – Windows Installers

- Non-extended
- Windows Server
  - On-premise
  - VM on your cloud platform of choice

https://exchange.ed-fi.org/
BI Starter Packs

Ed-Fi ODS/API and Microsoft Power BI Starter Kit (v2)
A starter kit illustrating the use of Microsoft Power BI to create meaningful visualizations from an Ed-Fi ODS. Includes reports at the district, school, teacher, and student level for early warning indicators described in the Balfanz model. Release 2, utilizing the Analytics Middle Tier.

By Ed-Fi

Ed-Fi Analytics Views for Google Data Studio
This project contains a set of scripts that can extract data from an Ed-Fi ODS to create analytics views in Google Sheets and Google Cloud SQL. The extracted data is transformed to meet a format that’s optimal for building data dashboards in Google Data Studio. The repository also comes with Data Studio report templates that can be copied into your Data Studio instance.

By DataViz Starter Pack / InnovateEdU

https://exchange.ed-fi.org
MappingEDU

Optional online tool for data model mapping

https://mappingedu.ed-fi.org
Performance Test Toolkit

- Performance Test Framework for ODS Technical Suite 3
  - Based on the open source Locust framework - https://locust.io/

https://github.com/Ed-Fi-Alliance/Ed-Fi-X-Performance
Sample Data Generator

• Produces realistic, cohesive, and 100% fictional datasets
• Configurable, and can produce arbitrarily large datasets

https://techdocs.ed-fi.org/display/SDG/Sample+Data+Generator
Ed-Fi Dashboards

https://techdocs.ed-fi.org/display/DASH30/Ed-Fi+Dashboards+v3.0+-+Technical+Preview
Questions?