

SIF Technical Deep-Dive

AGENDA

Unity Implementation Conversation

- Code-Set Repository (John Lovell, June Gerred, 10 Minutes)
- Discipline Incident Object (John Lovell, Idaho?, 35 Minutes)
- Events vs. CRUD Requests (Joerg Huber, 45 Minutes, Doors Open)

Refreshment Break (3:15 PM)

SIF Infrastructure Specification 3.7 (Joerg Huber, Mike Reynolds, 1 Hour)

- Enhanced Cloud Friendliness
- Asynchronous Clarity
- Detailed Error Reporting Exemplified

Unity 4.4 Release Details (Alex Jackl, TQ White II, 1 Hour)

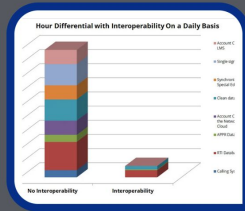
- Full AI Generated Examples
- PESC JSON Upgraded
- JSON Schema Fix
- Enhanced Data Model Changes
- Intuitive Resources Layout
 - Spreadsheet First
 - Emphasis Relaxed Schemas

Code-Set Repository



Why Standards? ▾ SIF Specifications ▾ Certification ▾ Resources ▾ News/Events ▾ Login

State Documentation Repository



Oklahoma

The A4L Community thanks the state of Oklahoma for sharing their detailed information around how they utilising the SIF Specifications.

DOCUMENT	LINK	ARCHIVED
WAVE Code Tables	View	Archive
Discipline Definitions	View	Archive

[Contact Us](#)

- Less is more
 - Each state is in control
 - What is shared
 - Format it is shared in
 - Human friendly
 - Not a complex system
 - Available now!
 - No need to reinvent the wheel
 - <https://data.a4l.org/state-documentation-repository/>
 - Contribute now
 - jlovell@a4l.org

CALL TO ACTION

Send links or documents to: jlovell@a4l.org

Useful links / next steps:

Discipline Incident Object

Additional Information (Idaho, Action List):

- Modified Duration
- Modified Duration Reason
- Active IEP
- Responsible District ID (RefID?)
- Interim Reason
- Notes (Extensions?)

Discipline Incident Object

Let's talk relaxation!

- Actions > Incident
 - Legal Requirements Only
 - Student Privacy
- Elements to Relax
 - IncidentDate
 - IncidentTime
 - IncidentLocation
 - IncidentReporter
 - IncidentCategory
 - OffenderList/Offender/Injury

CALL TO ACTION

Useful links / next steps:

Form a Discipline Incident project team?
Hold another state focused face-to-face meeting?

Events vs. CRUD Requests

Joerg Huber
Systemic Pty Ltd
Perth, Western Australia

Events vs. CRUD Requests

- Core Concepts
 - Service Consumer & Service Provider
 - Synchronous vs. Asynchronous
- CRUD Requests
 - What is CRUD
 - Object Services
- Events
- Choreography/Orchestration

Core Concepts (Events vs. CRUD Requests)

Service Consumer

- A Client in the traditional sense.
- Can be standalone executable or part of a larger web- and/or mobile application.
- It typically **requests** CRUD operations:
 - **Create, Read/Get, Update & Delete** Objects (i.e. Students)
- **“Consumes” services** provided by a provider.
- It can **subscribe** to Events if events are supported by the provider of data.
- A consumer is **not** considered the **“source of truth”**, meaning CRUD requests might be rejected by the provider!

Core Concepts (Events vs. CRUD Requests)

Service Provider

- A 'Server' in the traditional sense.
- Will require web- or application server
- Accepts, processes and **responds** to CRUD requests from Service Consumers
 - **Create, Read/Get, Update & Delete** Objects (i.e. Students)
- Is the **Provider of Service Endpoints!**
- It can **publish** Events if events are required.
- An Object Provider **is** considered the “**source of truth**”, meaning CRUD requests from consumers might be rejected by the provider!

Core Concepts (Events vs. CRUD Requests)

Synchronous vs. Asynchronous

CRUD Request support (aka IMMEDIATE/DELAYED in SIF):

- Synchronous (IMMEDIATE): Request expects a immediate response (Phone call where you reach the other party)
- Asynchronous (DELAYED): Request is issued but a response is not immediately expected (Phone call where you leave a message on answering machine).

Events are an Asynchronous message pattern (Broadcast a message on the radio)

CRUD Requests (Events vs. CRUD Requests)

Create, Read/Get, Uppdate & Delate

- These are the basic operations that can be requested by a service consumer and will be responded to by a service provider.
- Map directly to respective REST operations:
 - **C**reate: HTTP POST
 - **R**ead: HTTP GET
 - **U**ppdate: HTTP PUT
 - **D**elate: HTTP DELETE
- Most commonly used for Object Services...

CRUD Requests (Events vs. CRUD Requests)

Object Services

- The Object Service is the most common service used in SIF.
- Core operations covered by Object Services are the standard CRUD operations.
- In a nutshell, Object Services cover all REST APIs relating to a locale's data model such as Unity, SIF AU etc.
- Each Locale publishes the Objects services as Open API.
 - http://specification.sifassociation.org/Implementation/NA/4.3/ServiceDocs/StudentInformationSystemsAPI_US.html

CRUD Requests (Events vs. CRUD Requests)

Object Services (cont.)

- CRUD operations apply to:
 - Single Objects (Standard REST)
 - Batch of Objects (SIF extension) - Allows CRUD on multiple objects in one call!
- Support of additional Concepts such as:
 - Changes Since (alternate option to Events)
 - Immediate/Delayed Request/Response
 - Query By Example
- More on Object Services can be found on the A4L Confluence space:
 - <https://a4ldocumentation.atlassian.net/wiki/spaces/ARCHITECTU/pages/543850497/Object+Service+s+-+SIF+REST+API+for+Locale+s+Data+Model>

Events (Events vs. CRUD Requests)

- An **asynchronous** way to publish changes.
 - Broadcast!
 - If consumers don't 'listen' or 'record' it is missed.
- Issued/Published by Object Service Provider (“Source of Truth”)
 - Issued whenever data changes
- Consumed/**Subscribed** by Object Service Consumer
 - If not subscribed then no event is delivered to consumer
- A mechanism to keep Consumers up-to-date with “Source of Truth”.
- Event are delivered:
 - In-Order
 - Guaranteed – Event Queues don't drop events

Events (Events vs. CRUD Requests)

There are 3 Event Types

- **Create:** Create a new Object such as a StudentPersonal.
=> Provide full data set in payload
- **Update:** Update an existing Object
 - **FULL:** Data provided is full set (i.e. full StudentPersonal)
 - **PARTIAL:** Only data that has changed is provided (i.e. partial StudentPersonal).
- **Delete:** Remove an existing Object

Event Payload

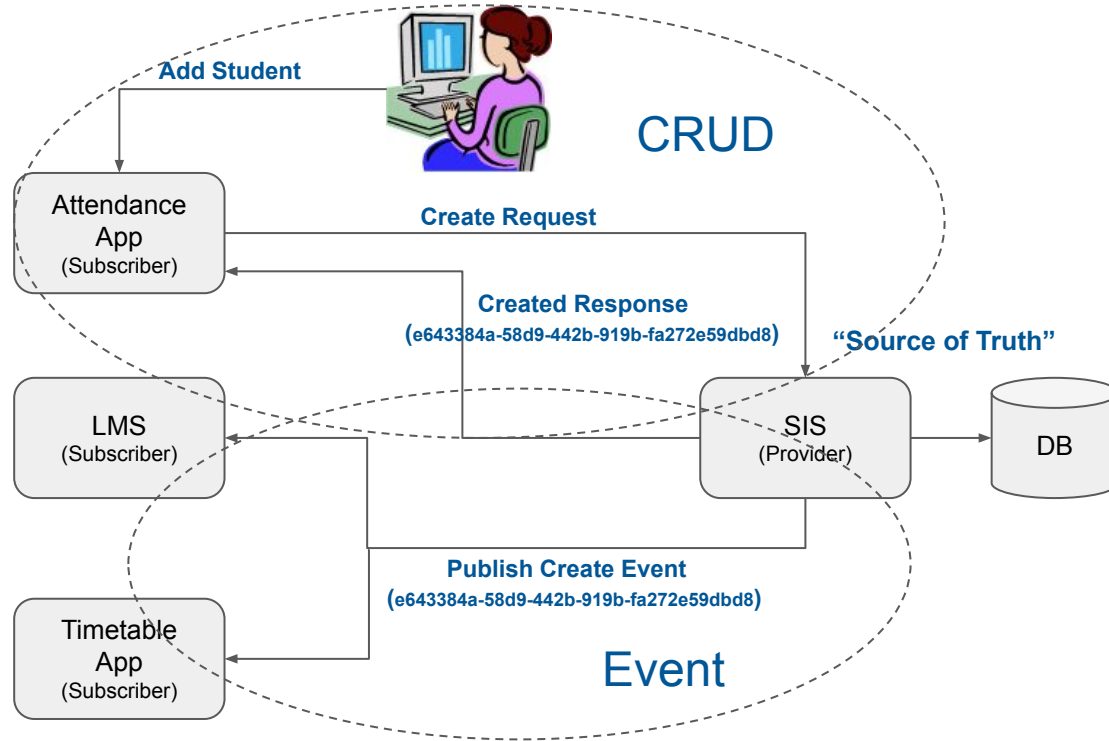
- Can have many objects in a payload. However, each object must:
 - Be of the same type (i.e. StudentPersonal)
 - Event Type applies to all objects in the payload (cannot mix Update, Delete in a single event message)

Choreography/Orchestration (Events vs. CRUD Requests)

How do CRUD & Events work together?

1. Consumer requests an update, create or delete operation.
2. Provider honours the request and therefore will update its data store. Also Provider is considered “Source of Truth”, hence...
3. The change in the Provider’s datastore will cause the Provider to issue a respective event, reflecting the change.
4. All Consumer’s subscribed to events will receive the applicable change event.

Choreography/Orchestration (Events vs. CRUD Requests)



Events vs. CRUD Requests



SIF Infrastructure Specification

3.7

Joerg Huber & Mike Reynolds

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SIF Infrastructure Specification 3.7 (Joerg Huber, Mike Reynolds, 1 Hour)

- Enhanced Cloud Friendliness
- Asynchronous Clarity
- Detailed Error Reporting

Unity 4.4 Release Details (Alex Jackl, TQ White II, 1 Hour)

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SIF 3.7: Enhanced Cloud Friendliness

- **Transitioning Parameter Handling**
 - Moving from **HTTP Matrix Parameters** to **HTTP Header and Path Parameters**
 - Aligns with **Amazon, Google, and Microsoft** cloud requirements
- **Key Benefits**
 - **Enhanced security** and **improved performance**
 - **Future-proofing** our services for long-term sustainability
 - Empowers adaptors to leverage **API gateways and other cloud services**
- **Support & Deprecation Timeline**
 - **Matrix Parameters will be deprecated** but remain fully supported in **versions 3.7 and 3.8**
 - Provides a **smooth transition period** for adaptation

SIF 3.7: Enhanced Cloud Friendliness

HEADER PARAMETERS

authorization required	string Authorization header. Typical values are Basic+token or SIF_HMACSHA256+token.
contextId	string The 'context' of the service request. The range of possible Context token values for a given Object or Functional type Service is defined by either or both the Data Model which the Environment is supporting, and the administrators of the Zone. If not provided, it will default to DEFAULT.
zoneId	string Indicates the Zone the Request should be routed to. If not specified in the Consumer's Request, the Request Connector will assume the Consumer's default Zone ID (assigned to the Consumer when it initially created its Environment).

SIF 3.7: Asynchronous Clarity

- **Enhancing Clarity in Asynchronous Responses**
 - Key documentation updates in:
 - **Paging, Service Paths, Changes Since, and Named eXtended Queries**
- **Compliance & Consistency**
 - Asynchronous requests from the queue must **omit the 'content-type' header for 200 responses without a body**
- **Impact & Benefits**
 - **Streamlines integration** for developers
 - **Enhances system reliability** and ensures compliance

SIF 3.7: Asynchronous Background

With a Broker:

- Increased security
 - Decreased attack surface for Provider
- More control for Provider
 - Especially during high-load/system stress times
- Support for long-running queries
- More stability
 - Doesn't require the Provider to be up at the exact time the request is made
- Easier to implement for Provider
 - Don't need to stand up a web server/endpoint

SIF 3.7: Detailed Error Reporting

- **Building on Our Previous Quality Release**
 - Further **refining documentation** and **enhancing error reporting**
- **Streamlining the Integration Experience**
 - Clarifications help implementers **better understand and troubleshoot** the specification
 - Clearer guidance on **handling errors** and **common integration scenarios**
- **Empowering Technology Providers**
 - Improves **diagnostics and issue resolution**
 - Ensures **smoother data exchange** and **greater interoperability** in the global education marketplace

SIF 3.7: Detailed Error Reporting

Resolve Ambiguity with Sub-Codes

Example: “ChangesSince” request with Data Privacy enforced

- Requires “changesSinceMarker” and “dataPrivacyMarker” in request
- If any of them or both are expired or invalid the service provider will respond with an overall HTTP Status Code of 410 (Gone).
 - What does it mean? Which of the “markers” has expired. => Ambiguity

=> Resolution: Sub-Error code in the detailed error message:

Sub-Code	Type	Meaning
410-01	INFRASTRUCTURE & DATA	The ‘changesSinceMarker’ has expired.
410-02	DATA	The ‘dataPrivacyMarker’ has expired.

SIF 3.7: Detailed Error Reporting

Resolve Ambiguity with Sub-Codes cont.

```
<error id="5b72f2d4-7a83-4297-a71f-8b5fb26cbf14">
  <code>410</code>
  <scope>Provider</scope>
  <type>DATA</type>
  <message>Gone</message>
  <description>The provided HTTP header dataPrivacyMarker is no longer valid. changesSinceMarker is expired.</description>
  <errorDetails>
    <errorDetail id="89209C52-E5C4-416F-BBAF-974D09AA79F4">
      <type>DATA</type>
      <subCode>410-02</subCode>
      <message>Invalid dataPrivacyMarker</message>
      <description>The provided HTTP header dataPrivacyMarker is no longer valid.</description>
    </errorDetail>
    <errorDetail id="0394E69C-4A73-4755-9C92-A64FA7F16AB8">
      <type>DATA</type>
      <subCode>410-01</subCode>
      <message>Expired changesSinceMarker</message>
      <description>The provided URL Query parameter changesSinceMarker is no longer valid.</description>
    </errorDetail>
  </errorDetails>
</error>
```

CALL TO ACTION

Useful links / next steps:

Access it now!

<https://data.a4l.org/sif-infrastructure-specification-3-7/>

Unity 4.4 Release Details

Alex Jackl & TQ White II

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Unity 4.4: Full AI Generated Examples

```
<iepPlan>
  <effectivePeriod>
    <start>2023-10-15</start>
    <end>2024-10-15</end>
    <evaluationDate>2023-10-05</evaluationDate>
  </effectivePeriod>
  <enrollmentGradeLevel>
    <standardGradeLevel>05</standardGradeLevel>
    <explanation>Student is in fifth grade.</explanation>
  </enrollmentGradeLevel>
```

Unity 4.4: PESC JSON Upgrade

<https://pesc.org/json-task-force/>

Supporting emerging technologies

Type: Task Force

Membership: Open

Schedule: First Monday of the month at 12pm ET

Resources: [PESC COMPLIANT JSON V 1.0](#)

([Contact us](#) for participant details)

Chair:

Michael Morris

Software Engineer in Test EIS-Quality Assurance,
ACT (retired) and Chair, PESC Technical Advisory
Board

The **JSON Task Force** is collaborative forum focused on supporting the coordinated development of JSON and JSON-LD across education and employment. The Task Force serves as an information clearinghouse for providers who participate in JSON initiatives and data standards.

The JSON Task Force was founded in 2017. With the issuance of [PESC Compliant JSON v 1.0](#) released in 2019, the Task Force provided current users with standardized design guidelines to bridge XML and JSON.

The Task Force includes discussion on migration strategies to JSON-LD, synchronicity and harmonization across education and workforce, supporting data privacy and security, and identifying opportunities for use and implementation of JSON-LD.

Understanding and Using JSON

[Understanding JSON Schema](#)

[Using JSON Schema](#)

JSON Reading and Resources

► [JSON Reading and Resources](#)

Unity 4.4: Enhanced Data Model Changes

	A	B	C	D
1	Object	(Bad) ID	Field	Resolution
2	AssessmentSubTest	000399	NumberOfItems	No longer mappable because of adaptive assesment varying the number of items for the same subtest.
3	EmployeeCredential	000259	SSN	No longer a seperate element. Must be declared via a identification system type.
4	ItemCharacteristics	000608	PercentCorrect	Update mapping to: 000391 (Assessment Item Difficulty)
5	LearningStandardItem	002616	@RefId	Remove mapping.
6	RoomInfo	002507	RoomNumber	Remove mapping, do not update to 000364 as it is already in use elsewhere in the same object.
7	SEAINfo	002191	SEAName	Update mapping to: 000204 (Organization Name)
8	SEAINfo	000052	FIPSSStateCode	Update mapping to: 000424 (State ANSI Code)
9	SchoolCourseInfo	000246	CourseDescription	Update mapping to: 001517 (School Courses for the Exchange of Data Course Code)
10	StaffAssignment	002276	TeachingAssignment/Code	Only candidate: 000021 (Assessment Academic Subject) [Aligns with several NCES codes, as used in SIF 2.x.]
11	StudentContactRelationship	000721	Relationship/Code	Update mapping to: 000425 (Person Relationship Type)
12	StudentResponseSet	002397	ItemAidSetUsed	Update mapping to: 000406 (Assessment Item Response Aid Set Used)
13	StudentScoreSet	000394	DiagnosticStatement	Update mapping to: 001219 (Assessment Result Diagnostic Statement)
14	TestAccommodation	000022	ActualTestAdministrationDate	Remove mapping. They have gone to a start and finish date for the administration of assessments.
15	xIndividualizedEducationPlan	1236	start	Missing leading 0s. Already corrected!
16	LEAInfo & SchoolInfo	000534	OperationalStatusDate	Make mandatory element optional (request from Idaho).
17	xIndividualizedEducationPlan	001320	DisabilityCondition	Add (per FLOTUS)
18	TermInfo		CalendarSummaryRefId	Add (per WY) So date granularity questions can be answered about a term. Optional! TermInfoCalendarType similar to SchoolInfoCalendarType.
19	AnnualItemListType		AccountType	Add CEDS reference (WY): 001345
20	AnnualItemListType		Function	(WY): Only applicable when acquired, so we will make it Optional? Should it be mapped to 001354 or maybe 002004?

Unity 4.4: JSON Schema Fix

```
1 {
2   "$schema": "http://json-schema.org/draft-07/schema#",
3   "title": "SIF US v4.3",
4   "description": "JSON Schema derived from SIF US v4.3",
5   "type": "array",
6   "items": {
7     "oneOf": [
8       {
9         "required": [
10           "AccountingPeriod"
11         ] /required
12       }, /oneOf[0]
13       {
14         "required": [
15           "Activity"
16         ] /required
17       }, /oneOf[1]
18       {
19         "required": [
20           "ActivityProvider"
21         ] /required
22       }, /oneOf[2]
23       {
24         "required": [
25           "Address"
26         ] /required
27       }, /oneOf[3]
28       {
29         "required": [
30           "AggregateCharacteristicInfo"
31         ] /required
32       }, /oneOf[4]
33     ]
34   }
```

❗ #/definitions/MonetaryAmount/properties/value: expected type is one of Boolean or JsonObject, found: JsonArray

Text Grid Design

Unity 4.4: Intuitive Resources Layout

- Spreadsheet First
 - Give access to people who are business users
- Emphasis Relaxed Schemas
 - Allow use cases that are distinct from the standard use case
 - May be integrated with profiles

CALL TO ACTION

Useful links / next steps:

Care about quality.

Contribute!

Review.

Release.

Share!