Why Should I Consider SIF As OUR Data Management And Transport Strategy?
Introduction

This "Access 4 Learning" decision tree has been designed to help you understand how using openly developed technical standards for educational data management can support YOUR work, and has been designed for both the "SIF-newbie" and the "SIF-evangelist". It aims to outline how you can be better served by the marketplace providers to allow you to leverage your investments, maintain control of your data and allow for "best of breed" approaches to systems development.

This tool will point you to information and resources to empower you! Click on the SIF Chevrons or arrows on each slide to navigate your "Access 4 Learning"!
I am a Member of a...

**Regional / District / LEA Staff**

- I would like to effectively manage...
  - Student Enrolment and Un-enrolment
  - Create Student Active Directory Account from SIS Info
  - Receive State Assigned Student/Staff ID
  - Populate 3rd Party Applications with SIS Data

**SEA Staff**

- I would like to effectively manage...
  - Addressing Needs and Reporting of Mobile Students
  - State-Wide Data Collections but Local Control
  - Student Transcripts and Records Exchange
  - Dashboard / Analytics Development

... more?

**Marketplace Products Should Enable YOU!**

Do They?
Why SIF?

- The most comprehensive global educational data model developed in an open manner by end-users and software providers over the past 17 years.
- Has its roots in enabling LEA application interoperability issues “on the ground”.
- There are over 1,000 LEA Members collectively deploying SIF-enabled solutions today.
- More than 15 million students currently benefitting from “SIF-enabled” vendor products in every state of the Union.
- The SIF architecture enforces security and privacy controls at the data source.
Why SIF?

- The most comprehensive global educational data model developed in an open manner over the past 17 years.
- Incorporates ALL of the NCES Common Education Ed Data Standard and puts it “on the wire”.
- Designated as a part of more than 24 State Longitudinal Data System Grants ranging from simple ID management to complete automated state reporting. SIF enabled LEA implementations in all 50 states supporting over 15 million students.
- Enables data management solutions which incorporate early childhood, K12, higher education and the workforce.
Do you have SIF Experience?

Yes, I have SIF experience

No, I have little or no SIF experience
Do you have SIF Experience?

**Without SIF:**

- Many school districts register a child and then have to take the paper registration and enter the information by hand into several other database “silos”.

- SIF promotes application interoperability by standardizing the interface between applications, specifying a verifiable and secure method of data transfer and a common data model which defines the data being transferred.

- Applications that label and store information differently cannot communicate. Human intervention and data manipulation has to take place for the data to flow from one application to another.

**No, I have little or no SIF experience**
Do you have SIF Experience?

- **No, I have little or no SIF experience**

- **With SIF:**
  
  Deploying SIF-compliant solutions eliminates the “partner by partner” integration, since each application conforms to the same interoperability standard. All SIF data exchanges are seamless and secure.

Example shown using a Zone Integration Server (ZIS) as the middleware/message router between applications.
Do you have SIF Experience?

No, I have little or no SIF experience

- **SIF Specifications:**
  - Every SIF Specification release consists of two major components:
    - The **Data Model** which includes the set of XML schemas that define the payload formats of educational “objects” as they are exchanged between SIF-compliant applications.
    - The **Infrastructure** which defines the transport and messaging functionality of the secure and robust “wire” over which those payloads are securely exchanged.

All SIF Implementation Specifications are based on the vendor neutral extensible Markup Language (XML) which is independent of both programming language and operating system. It defines and can be used to enforce common data formats for all data exchanged between multiple applications.
With the August 2013 release of SIF 3.0, significant enhancement were made to the infrastructure component (SIF 3.0). These include:

- **Data Independence**: The SIF 3.0 Infrastructure is now completely independent of the Data Model defining the payloads it carries. As a result, SIF 3.0 conformant infrastructure products can be deployed in SIF solutions of all three locales (US, AU and UK) without change.

- **Fully incorporates REST technology**: The earlier SIF-specific transport has been superseded by one which is fully-compliant to the standard REST design patterns. As a result, SIF 3.0 solutions will “look like everything else in the educational organization’s data center” and recruiting programming and support personnel for SIF 3.0 projects will be far easier.

- **Middleware is Optional**: SIF 3.0 offers a new architectural alternative designed specifically with mobile devices and the cloud in mind, which supports the direct connection of clients to services without requiring an intervening message broker.
Do you have SIF Experience?

Yes, I have SIF experience

- **Increased Scalability**: SIF 3.0 solutions are far more scalable than earlier releases in both performance and organizational coverage. Performance enhancements include the critical ability to carry multiple objects per message, while organization expansion now provides every client access to multiple providers of the same object type (for example, SIS or MIS) separated by site (for example, a specific school), subtype (for example, Special Education) and / or context (this year's students or next year's).

- All SIF Infrastructure Specifications version 3.x and above reflect these new changes. The infrastructure and data model components have been completely separated.
Do you have SIF Experience?

Yes, I have SIF experience

However, the new 3.x infrastructure carries forward the following 2.x functionality:

- Automated Service Discovery
- Guaranteed Message Delivery
- Content Based Routing
- Service Registry and Service Governance Administrative hooks
- Publish / Subscribe
- Baked-in security enforcement (Authentication, Authorization and Encryption) even for minimal implementations.
Which SIF Solution is Right for Me?

**SIF 2.x Solutions**

Consider SIF 2.x solutions especially when:
- Key applications are already SIF 2.x Certified
- Enterprise backbone (middleware, IT Staff) in place
- SIF 2.x solution already deployed within the organization an installed SIF 2.x Broker (ZIS) is available for re-use.

**SIF 3.x Solutions**

Consider SIF 3.0 solutions especially when:
- An SEA wants a Statewide solution fully conformant with the CEDS Logical Data Model
- SIF 2.x-compliant versions of key Applications are unavailable
- REST technology is a supported and/or is desired infrastructure
- External standards (IMS, Ed-Fi) are a part of the overall solution
- Solution will embrace directly connected mobile device clients and/or Cloud Services
Quick Glossary of Terms

- **SIF 2.x Solutions**
  - **Application**
    - An application supplying or providing educational data (i.e. SIS, Student Contact System, Library...)
  - **SIF Agent**
    - Integrates Client application into a SIF Zone (i.e. issues data changes to and requests data from ‘providers’)
  - **Zone Integration Server (ZIS)**
    - Or Message Broker middleware – this is the ‘message hub/router’ for a 2.x Zone
  - **Zone**
    - A collection of applications & agents linked to a ZIS (i.e. within a school, or a group of schools within a district)
The SIF 2.x Zone can be represented as a “hub and spoke”, with a Zone integration Service (ZIS) at the “hub”.

Each spoke is an Application, and between each Application and the ZIS sits the Agent.

SIF defines the “on the wire” data exchanges (transport, messaging and object schema) between the ZIS and the Agent.

The Agent-application connection is application specific.
The Agent must support the following (all of which the application can remain blissfully unaware of):

- Utilizing the HTTPS transport as defined in the standard to ensure message security
- Execution of the SIF message sequences (ex: Register, Subscribe and only then get posted Events)
- Wrapping / unwrapping the Data in Query, Response or Event messages
- Optionally bridging between the way the application defines its data internally, and the way SIF expects to see that data externally

The ZIS provides the following functionality which “glues” the Agents (and their respective applications) together in a SIF Zone:

- Automatic Service Discovery
- Content based routing
- Guaranteed message delivery
- Data Change Event Publish and Subscribe
The SIF-specific secure transport defined over HTTP/S has been provided since the very first release of the SIF Standard. It has dependencies on the SIF Data Model which defines the payloads it carries. It is used within the Zone and is the “golden transport standard” for SIF 2.x Solutions.
Why Choose a SIF 2.x Solution?

The diagram above illustrates a high-level example of the benefits of using SIF, based on figures provided by a school district in the United States. The school district calculated the total time taken to perform regular daily tasks before and after implementing SIF.

Based on the above figures, a school district could save over 40% of their time allocated to these tasks every week using SIF alone.
SIF 2.x Solutions

- SIF architecture requires “opt in” by the local data source, rather than mandating sharing
  - It’s YOUR data – shouldn’t you be in control of it?
  - Federated data usage is the strength in SIF utilization

- The infrastructure is a value-add for any education application
  - *Modularity*: start small and grow seamlessly
  - *Security*: uses HTTPS transport as defined in the standard to ensure message security
  - *Scalability*: handles large traffic to support state-level solutions
  - *Reliability*: robustness in the face of errors
Action Items

- **Assess the needs of your organization**
  - Determine the functionality required of the new systems
  - Define the interoperability requirements between them
  - Determine your [Data Integration Readiness](#)
  - Review our [White Papers](#) to see comparisons of the various data initiatives currently in the marketplace
    - Centralized vs Distributed Educational Solution Architectures - Data Confederacies compared to Data Unions
    - Ed Tech: Ensuring All The Pieces Still Fit Together – metrics for ‘Either-Or’ Data Propositions

- **Demand interoperable solutions**
  - Ask for “SIF-certified” in your RFP
    - Review [RFP wording](#)
  - Ask for an adapter with your purchase!
    - Find out what SIF Agents are available in the marketplace by reviewing the [SIF Certification Registry](#)
  - Minimize integration hassles, maximize quick return on investment
Action Items

- Learn what SIF means for you: [www.sifassociation.org](http://www.sifassociation.org)
  - It will help you “future-proof” your investments
    - Secure, scalable, verifiable SIF conformant solutions
    - Extensive community of compliant vendors and adopters
    - Large pool of savvy SIF developers, integrators and administrators
  - Find out more about the SIF Specification in our [SIF 101 Tutorial](http://www.sifassociation.org)
  - Review our ‘[Resources for Decision Makers’](http://www.sifassociation.org) on the SIF website
  - Review the [SIF Specification](http://www.sifassociation.org) releases

- Take a seat at the table
  - Join and actively participate in the [SIF Community](http://www.sifassociation.org)
  - The BEST WAY to get your voice and needs met!

- Any questions, please [contact us](http://www.sifassociation.org)!

Back to START
Quick Glossary of Terms

- **SIF 3.x Solutions**
  - **Consumer Application**
    - A Software Application accessing Educational Data (i.e. Student Contact System, Library, Assessment)
  - **Client Adapter**
    - Integrates Client Application into SIF Environment
  - **Provider Application**
    - A Software Application supplying Educational Data (i.e. SIS, LMS, Data Warehouse)
  - **Provider Adapter**
    - All functions of Client Adapter PLUS provides Responses to Data Requests and publishes Change Events
  - **Message Broker Middleware / Enterprise Service Bus (ESB)**
    - Provides automatic service discover, content based message routing, guaranteed message delivery, Event publish/subscribe capabilities, ... 
  - **Environment**
    - The “SIF 3.0 Environment” is made available to a Consumer or Provider Adapter when it initially registers. It comprises the totality of every service that may possibly be provisioned. Based upon authentication constraints however, access to some services the Adapter may see might be restricted.
SIF 3.x Solutions

Leveraging Core Data ‘Choice of Infrastructure’

- **Direct Environment**
  - Central Data Service
  - Support multiple Consumers
  - Support mobile Consumers

- **Brokered Environment**
  - Central Message Broker
  - Support for Administrative interfaces
  - Highly scalable

**Infrastructure**
- APIs & Transport
- **SIF Data Model**
  - Local Needs Data Model
  - Early Childhood - pK12
  - FE/Higher Ed - Workforce Data

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Based on the above figures, a school district could save over 40% of their time allocated to these tasks every week using SIF alone.
SIF 3.x Solutions

- NO CEDS Mappings/Alignment Needed!
  - Entire CEDS Data Model is the core *redesign* of the 3.x Data Model – not “one to many” relationships, as with other models.
  - “Lined up” ≠ “Alignment” – if there was, why do others need mapping sessions and separate ETL’s developed?

- SIF architecture requires “opt in” by the local data source, rather than mandating sharing
  - It’s *YOUR* data – shouldn’t you be in control of it?
  - Federated data usage is the strength in SIF utilization

- The “Wire” is a value-add for any education application
  - Modularity: start small and grow seamlessly
  - Security: construction priority at the start of SIF 3.0 – not after
  - Scalability: handles large traffic to support state-level solutions
  - Reliability: robustness in the face of errors
SIF 3.x Solutions

**Direct Environment**
Single source for all data

- Connects Consumers to Providers with no middleware - can be multiple connections.
- Supports cloud based environments
- Low End: SIS accessed by students via mobile devices
- High End: SLDS seeded by multiple District SIS and accessed by data analytic and reporting applications

**Brokered Environment**
Multiple Data Sources

- Connects Consumers to multiple Providers leveraging existing IT middleware (ESB)
- All Direct Consumers can run in brokered environments
- External applications register to provide their data – highly scalable
- Standardized Consumer interface to SIS, LMS, DW
- Centralized enforcement of site data security and privacy policies

**Hybrid Environment**

**Direct**
- District Student Portal utilizes Direct Environment for 20000 students accessing via a mobile device.
- The mobile device software sees standard RESTful Service to display
- Identical information whether Student Portal is local or in the cloud

**Brokered**
- Student Portal is also Consumer in a District Brokered Environment accessing SIS, Assessment and LMS services
- District SIS Provider is also a Consumer of a State-wide Brokered Environment where it seeds Student Data into the SLDS.
Example of a Simple SIF 3.x Solution

Direct Environment

Service Provider Logic
‘Consumer’ Adapter
Direct ‘Provider’ Adapter
Application
SIF 3.0 - Direct Environment

- **SIF 3.0 Direct Environment:**
  - Implemented by a Central Data Service
    - Example: SIS, LMS, Data Store
    - Connects directly to Consumer Applications (no middleware)
    - No 3rd Party Services made available to Consumers

- Supports multiple Consumers
  - Each Consumer is the “only” one in its Environment (promotes Data Security and Privacy)
  - Consumers can see data change Events generated by others

- Ideal for supporting mobile device based Consumer Applications
  - Tablet Dashboards, Smart Phone Queries

- Any ‘Direct’ Consumer Application can be seamlessly re-deployed in a Brokered Environment
SIF 3.0 - Direct Environment

Minimal

Basic RESTful Consumer / Service Connection

• Direct Environment Only
• All Request / Responses immediate
• All Requests / Responses contain only a single object
• No Asynchronous Events supported
• Any minimal consumer application can be seamlessly redeployed in a featureful environment

Example Use: Mobile Device Dashboard application connects to SIS

Featureful

A wide range of individual functionality verifiable in Product Certification reports

• Data synchronization with Service: Real-time asynchronous events
• Significantly enhanced Performance: Multiple objects per Request / Response / Event
• Security: Site Authorization and Privacy polices enforced via Registry Services
• Robustness and Flexibility: Support for self-configuring consumers
Example of a Simple SIF 3.x Solution

Brokered Environment

- Message Broker Middleware
- Brokered ‘Provider’ Adapter
- ‘Consumer’ Adapter
- Direct ‘Provider’ Adapter
- Application

Student Information Services
SIF 3.0 - Brokered Environment

- **SIF 3.0 Brokered Environment:**
  - Contains a Central Message Broker
    - Connects multiple Service Consumers and Providers
    - Enterprise Service Bus + other middleware components
    - Modular (Queues, Connectors, Registries) vs. ZIS

- Provides a More Mature API including a Superset of Direct Environment
  - All Direct Consumers can also run in Brokered Environments

- Supports Administrative Interfaces
  - Centralized Security Policy & Workflow
  - Registries & Service Governance
  - Preventative Maintenance & Diagnostics

- Provides a highly scalable solution
SIF 3.0 - Brokered Environment

Featureful

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- Data synchronization with Service: Real-time asynchronous events
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Securely and safely routes requests, responses and Events between Consumers applications and one or more Object or Functional Services which are provided by external applications which have been specifically authorized to do so.

Can support all SIF 3.0 Consumer applications.
Example of a Hybrid SIF 3.x Multi-Environment Solution

Multi Environment

- Message Broker Middleware
- ‘Consumer’ Adapter
- Direct ‘Provider’ Adapter
- Application

(Any of 20,000 RESTful Mobile Client Applications)
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