The Case for Interoperability

Stories from Australia
Introduction

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- Program Manager – National Schools Interoperability Program (NSIP), part of Education Services Australia
- Bachelor of Physiotherapy
- Masters Business Information Technology
- Graduate Certificate Information Security
- 2 naughty dogs
- 2 naughty teenage kids (daughter senior secondary, son biomed/eSports)
- 1 great wife
How did I get here?

• 1.5 hour flight to Sydney
• 2 hour layover
• 14 hour flight to LA
• 7 hour layover
• 4.5 hour flight to D.C.
Journey

What did I do in those 30 hours…

• Worked
• Read
• Watched movies
• Email
• More email
• Even more email
So why are we here?

Volunteer please
Our challenge

• Product choice - schools use anything/everything
• A lot of data moving
• A lot of data sitting outside of schools/departments/districts
• +++ Effort to connect products
• +++ Effort to maintain student/user details in those products
• +++ Effort to move between products
• +++ Effort to secure
• +++ Effort to recognise privacy
• +++ Effort for vertical/horizontal reporting
• +++ Effort to obtain meaningful insights from data
Our challenge

- Integration/interoperability is hard with so many moving parts
Our challenge
Australia

- 10,000 schools
- 8 States and Territories (~2/3)
- Catholic and Independent schools (~1/3)
- 4 million students
- 290,000 teachers
- ~5,000 different software applications/products/services???

- 50 million kangaroos
- 100,000 koalas
- 250,000 crocodiles
Different patterns, methods and formats used for moving data

- Direct connections
- Hub/spoke models
- Facilitated connections
Real Problems

1. Call from Department: Do we have an absence code covering long term COVID-related illness?

2. We need to transfer student related data from a school on the east coast to the west coast.

3. We need to get a pilot running to show that vendors can request and maintain a new student identifier. When can we have this ready by?

4. We’ve had a data breach. What does application X have access to and is this the vendor’s problem or our school’s problem?
Working on it…

• Establish a community
  NSIP
  • Data Standards Working Group
  • JLUG
  • ST4S Working Group
  • Data Analytics Working Group (2022)

• Communicate

• Re-use

• Referenceable standards/resources
1. Call from Department: Do we have an absence code covering long term COVID-related illness?

Reference the SIF AU Data model

<table>
<thead>
<tr>
<th>Attendance Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not Marked</td>
</tr>
<tr>
<td>100</td>
<td>Present</td>
</tr>
<tr>
<td>101</td>
<td>Absent - General</td>
</tr>
<tr>
<td>102</td>
<td>Absent - Unjustified</td>
</tr>
<tr>
<td>111</td>
<td>Late arrival at School</td>
</tr>
<tr>
<td>112</td>
<td>Early departure from School</td>
</tr>
<tr>
<td>113</td>
<td>Late arrival unexplained</td>
</tr>
<tr>
<td>114</td>
<td>Early departure unexplained</td>
</tr>
<tr>
<td>115</td>
<td>Late arrival to Class</td>
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<tr>
<td>117</td>
<td>Early leaver from Class</td>
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<tr>
<td>118</td>
<td>Late Class Unexplained</td>
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<tr>
<td>120</td>
<td>Early Class Unexplained</td>
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<tr>
<td>120</td>
<td>Transport Delay</td>
</tr>
<tr>
<td>200</td>
<td>Medical</td>
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<tr>
<td>201</td>
<td>Illness</td>
</tr>
<tr>
<td>202</td>
<td>Accident</td>
</tr>
<tr>
<td>203</td>
<td>Counselling</td>
</tr>
<tr>
<td>204</td>
<td>Sick Bay</td>
</tr>
<tr>
<td>205</td>
<td>Medical Appointment</td>
</tr>
<tr>
<td>206</td>
<td>Hospitalised</td>
</tr>
<tr>
<td>207</td>
<td>Quarantine</td>
</tr>
</tbody>
</table>
2. We need to transfer student related data from a school on the east coast to the west coast.

What data?
First name, preferred name, family name
Date of birth
Previous academic results

What are the privacy impacts?
Data Standards Working Group
3. We need to get a pilot running to show that vendors can request and maintain a new student identifier. When can we have this ready by?

Great!
What is the conversation that will be held? Who starts talking first?
What is the payload (data they want to transfer)?
Are vendors involved standards ready?

JLUG
SIF Infrastructure
4. We’ve had a data breach. What does application X have access to and is this the vendor’s problem or our school’s problem?

*Yikes!*

*Have they completed an ST4S assessment?*
*Great – we know the data that has been shared*

*What was the nature of the breach?*
*What was the root cause? Failure of one or more controls/mis-use?*
Global collaboration

- Data Model
- Infrastructure
- Privacy
- Security
- Community
  - Education and IT are super-dynamic
  - Tackle new problems as they arise
  - Many hands…
Architecture

The Global SIF Infrastructure wraps data in an API for movement across a network.

The SIF Implementation Specification defines architecture requirements and communication protocols for software components and the interfaces between them; it makes no assumption of specific hardware or software products needed to develop SIF-enabled applications and middleware implementations, other than their ability to support technologies leveraged as the foundation for SIF.

Every SIF Specification release consists of two major components:

- The **Data Model** which includes the set of JSON & 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.
Since SIF utilises standard REST for all its APIs (data model services or infrastructure services) it also supports the most common authentication methods. These typical authentication methods include Basic and OAuth but also an HMAC/SHA based authentication. As with typical REST APIs the authentication information is provided in the standard HTTP Header called "Authorization". Details for each SIF supported authentication method are outlined in the sections below.

- Basic Authentication
- HMAC/SHA1 Based Authentication
- OAuth Authentication
SIF Message Parameters

Enabling exchanges of service consumer-issued requests and service provider-issued responses, including events, in a secure and robust manner, over a SIF-conformant REST transport layer, is the primary function of any SIF API. Every message exchanged has any of the following elements, provided by the sender that specifies the source of the message and the security, destination and context information. In REST, these element are carried over HTTP(S) and may carry any of the following value:

- A **payload**: Typically in XML or JSON format.
- Fields in an **HTTP header** (name of HTTP parameter is case-insensitive as per HTTP specification)
- **Matrix parameters** in a request URL (located after the last URL path segment only; name of matrix parameter is case-sensitive as...
Extensions

- Data, data, data
- Data is the key
- Do something with it
  - Predictive analytics
  - Machine learning
  - Business intelligence
  - AI
- Data Analytics working group in AU.
Key Take-Aways

- Community is important
- We can all contribute
- Reuse/recycle wherever possible
Thank-you for your time 😊

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