



TRI- BORDERS

→ SUPPORTING STUDENTS
ACROSS SA, NT AND WA

To track the attendance of students who move between schools and state borders in WA, SA and NT, a cross-jurisdiction project used SIF to gather data from each jurisdiction, then matched them centrally to provide a view of attendance across all three jurisdictions.

→ WHAT WAS THE PROBLEM?

Schools try to track attendance to better understand a student's progress and wellbeing. To give students a relevant learning plan, teachers need to consider their previous schools and historical attendance. This helps in planning lessons, and ultimately assists high-risk students to improve their attendance.

Attendance data is aggregated for each education jurisdiction. If the student changes schools, their historical attendance can still be tracked by their new school.

With highly mobile indigenous populations, schools in the NT, WA and SA find attendance tracking harder. Some students cross state borders several times a year, making it hard to track their attendance history. Each jurisdiction manages its student records independently; when a student's enrolled name, address, school and jurisdiction may all change, it can be hard to tell who is who.

Currently cross-jurisdiction census information is aggregated manually twice a year. To improve student outcomes, it is better to have attendance information

on a daily basis, but this would be prohibitively complex and resource-intensive with existing information gathering and analysis systems.

The Tri-Borders pilot project was initiated as a response to this problem, and used SIF to address some of its unique requirements.

→ HOW WAS THE PROBLEM SOLVED USING SIF?

To monitor student attendance, one must first know who the student is. Addresses, names and other identifiers can change across multiple systems. A multi-level approach, involving both local and jurisdiction-level identifiers, is necessary. Importantly the top-level view of attendance is managed by back-end linking of existing identity and attendance data, thus avoiding the creation of an entire new data gathering system. To track attendance daily and supply it in a timely manner, SIF provided robust infrastructure, secure transport and allowed near-real-time data aggregation from existing diverse sources. During the project, consistent ways of determining identity, attendance and school information were implemented

→ BACKGROUND

The Digital Education Revolution envisages "technology enriched learning environments" for all young Australians. Putting the right information at the right time into the hands of learners, teachers, parents and policy makers is critical for its success.

Since 2007 Chief Information Officers from Australia's state and territory education systems, together with colleagues from the Catholic and Independent school sectors, supported by the Commonwealth Department of Education, Employment and Workplace Relations, have been building an open standard for interoperability between Australian schools to enable information to be used when and where it is needed. The work has centered on the use of the Systems Interoperability Framework (SIF) to facilitate the exchange of information.

This initiative, known as "Towards SIF AU", has developed a national specification - the SIF Implementation Specification (Australia) - and a business case identifying the costs and benefits of adopting SIF. A program of 12 pilot projects solving practical interoperability challenges has shown the clear benefits of working together and using SIF to solve common problems.

This is a summary case study of one of these pilots.

by combining SIF Agents with staging databases. For example, the Tri-Borders project needs a record of attendance for students, whereas SA's EDSAS database records absence rather than attendance.

Attendance data is gathered by all three jurisdictions and sent via SIF to a "Central Schools" application (a separate development of the Tri-Borders project) which monitors continuity of education for students moving between remote schools across jurisdictional borders. Each jurisdiction created a publishing SIF Agent for their student information database. A fourth subscribing SIF Agent was created for the Central Schools application.

In SA and NT, more complex data transformations are preprocessed in a staging database, allowing for simpler SIF Agents. This approach allowed jurisdiction staff to focus on their strengths (database construction) rather than SIF development. SA chose the configurable Visual SIF Agent as their publishing agent. Although more complex to set up than ASDK-developed agents, it can be configured with no programming skills.

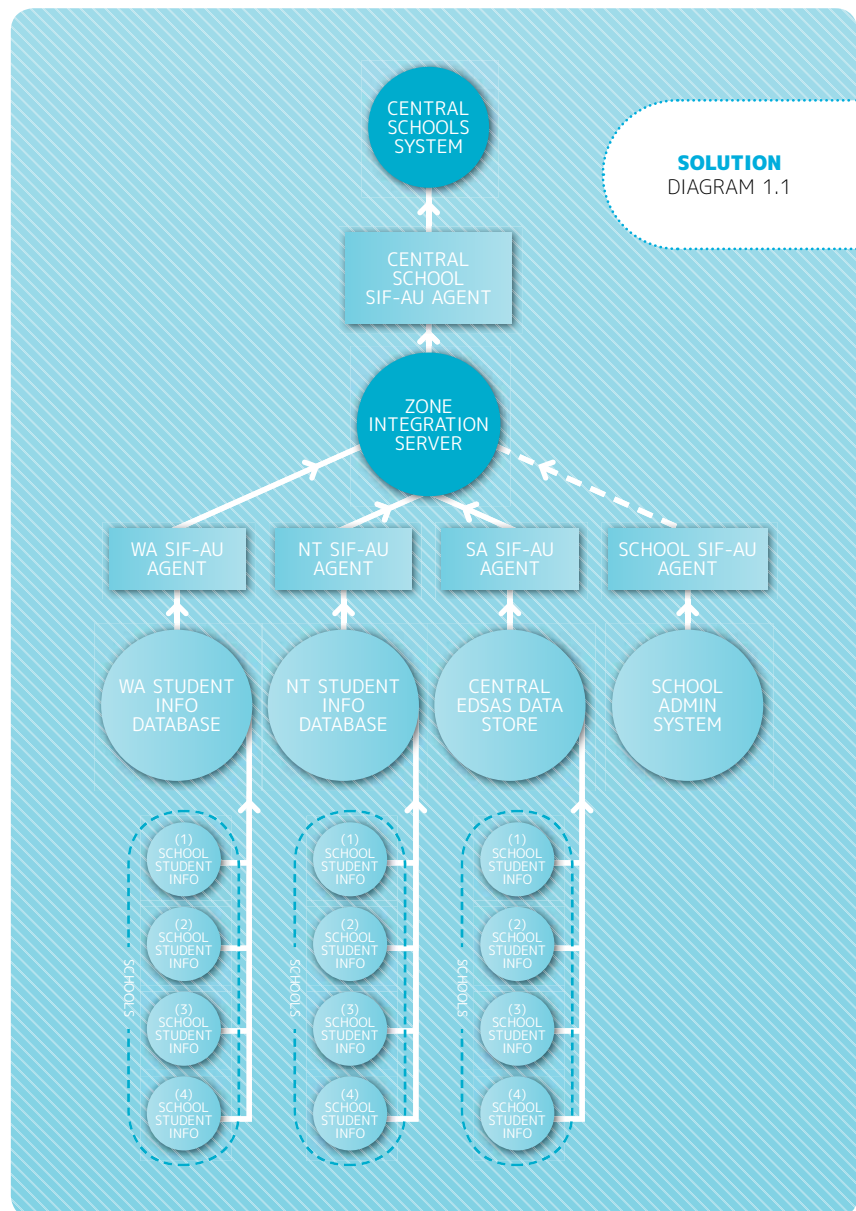
The Central Schools application aggregates attendance data and links it to a Unique Student Identifier (USI). Privacy is protected because the student does not need to know their USI. WA and NT apply data matching rules (Master Data) to create a single identity for each student, regardless of how many schools they are enrolled in, before sending data into the Central Schools application. When a student is enrolled across states, the Central Schools application applies its own Masters Data matching rules to link student records, providing a single, accurate view of that student's attendance in a secure interface. This approach uses the available information in an optimin way, and reuses the work already done in jurisdictions.

This pilot protected its data with the highest level of SIF security, including SSL-certificated encryption and segmentation of jurisdiction data into separate ZIS zones. This is the first pilot to use multiple ZIS zones.

→ BENEFITS

JURISDICTION BENEFITS

Many insights have been gained though having a SIF solution tested in the context of cross-jurisdictional needs and infrastructure. Development staff have increased their capability in interoperability. Methods, examples and an emerging culture of sharing of information about interoperability has



been established. Additionally, the pilot projects provided a model for replacing existing bespoke solutions with an approach based on open standards, and explored real-world issues associated with that process.

Participants have gained tangible benefits from helping to create a piece of national infrastructure. The open source agents and frameworks created can be reused collaboratively, with the advantage that shared maintenance reduces costs, expertise is preserved and a larger pool of users can share problem solving. This continues the development of a knowledge- and code-base that can be reused across Australia, distributing capability to assist jurisdictions as they address the complex challenges of the Digital Education Revolution.

WIDER BENEFITS

This pilot has assisted in the testing and implementation of the newly-developed Australian SIF standard. In addition, SIF skills are transferable to other jurisdictions or vendors, and both open source code and the lessons preserved in the knowledge base can be reused in future projects. Finally, the national SIF AU program took responsibility for reducing barriers and costs of the current problems that jurisdictions are trying to solve, developing through this project a solution pattern directly applicable to other situations

PILOT-SPECIFIC BENEFITS

- **50% saving on 'business as usual' development costs** due to nomenclature, taxonomy and data structures reuse from previous pilots.
- **Agents, code and frameworks**

developed for this pilot will be reused in the Tri-Borders production project which goes live in 2010.

- **Tangible feedback on implementation issues for a USI.** This program has tested some implementation issues for unique student identifiers, such as continuity of identification for a student crossing jurisdictions without revealing that unique identity to system users. This includes a working prototype USI usable across multiple jurisdictions.
- **Allows jurisdiction to maintain control** of student IDs in a multi-jurisdictional system.
- **Accessible learnings and recommendations** are documented and available for future projects.

→ PARTICIPANTS

This pilot was charged to explore the interoperability needs of the Tri-Borders production project sponsored by the Federal Government. It was sponsored by Ingrid Strong, Project Manager, Tri-Border Attendance Strategy; Janine Harvey, Assistant Director Child & Student Wellbeing, SA-DECS; and Kevin Gillan, Head of School Education and Training operations from NT-DET. It was managed by Justin Magraith from WA-DoE. Project support was provided by the SIF AU team.

The project used infrastructure provided by the National Systems Interoperability Service (NSIS), a product of another SIF AU pilot project. This included a Zone Integration Server (ZIS) and agent software development kits (ASDKs) supplied and supported by Edustructures and Visual Software.

→ PARTICIPANT EXPERIENCE OF THE PILOT

Developers found that using SIF avoided the resource-draining problems of bespoke integration:

"I (previously) worked on a number of integrations...define your protocol -- messages, parameters, logic, choreography. Easy for one person, or between two

systems. Difficult in a team that is not geographically co-located, like Tri-Borders -- in Europe there would be several countries in between! What information do you have? What is the attendance? What school information do you need? I have done it before...a lot of politics... they may agree two years later, by then it is outdated. With SIF, those problems are gone - protocols, messaging is all given. (In typical integration projects) 50% of project cost is sucked away talking about information that needs to be exchanged... (with SIF) it's pretty much 'start developing; start writing the architecture of your agent'. You go to the core of your problem and start solving it." [Senior developer, WA-DoE]

"...having the standard there makes it much easier..." [Architect, NT-DET]

The SA development team found that working with an international vendor requires planning to avoid delays:

"Interaction with the vendor in the US can cause delays (although they are very helpful when we do connect)." [Architect, SA-DECS]

Restrictive jurisdiction firewall practices caused difficulties in cross-jurisdiction integration, especially with an external vendor trying to gain access:

"[installing the vendor product] proved to be less simple as we needed to install the product within our environment in a manner which allowed it to access the source database. This involved appropriately negotiating the SA-DECS security environment in order to provide access to data externally." [Architect, SA-DECS]

Fortunately this vendor was able to send a representative onsite, which proved to be very helpful:

"Having access to Rob was very advantageous for getting the product installed and configured correctly. This then gave us the connectivity we needed." [Architect, SA-DECS]

Documentation and expert help reduced learning time for a developer new to SIF:

"Using technical resources available created shorter learning curves". [Developer, NT-DET]

Recognition of the value of SIF came over a period of time for project participants who hadn't used it before:

"At first, I wasn't sure why SIF was chosen as the key technology - I didn't see how it could make things easier. I'd done many data integrations previously so why SIF? But with integrations the devil is in the details. Being a project that spanned multiple jurisdictions each with multiple school management systems and database platforms the project team could have spent a huge amount of time coming up with data specifications. With SIF we had an agreed specification that we could all work to. Joerg's previous experience with SIF helped us sort out complexity of detail quickly, also [the NT developer] Raf could learn from another expert, then pass on his expertise in turn." [Architect, NT-DET]

→ KEY FINDINGS

As the pilot progressed, a number of key findings emerged:

- **Development time and cost was reduced** due to co-learning, collaboration and working to a common data specification. Using the groupsite, people worked together with increasing enthusiasm and confidence, updating each other's documents, helping each other across jurisdictions, and sharing access to experts.
- **The SIF AU Specification supported the interoperability needs of the pilot program.** However, to continue to serve the needs of the Australian education sector, the SIF AU specification requires ongoing development, including regular engagement with local industry and SIF vendors.
- **It was more efficient to use jurisdictional expertise in databases** to deal with mappings rather than building more logic into an agent.
- **Good management of international vendor support needed.** Vendors need access to infrastructure within jurisdictions, and a regular

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"IN MOST INTEGRATIONS 50% OF PROJECT COST IS SUCKED AWAY TALKING ABOUT INFORMATION EXCHANGE...WITH SIF IT'S PRETTY MUCH 'START WRITING YOUR AGENT'."

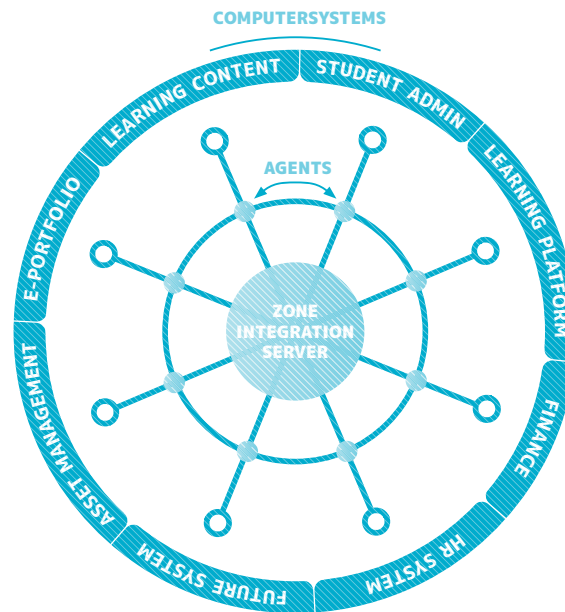
communication regime that works across timezones.

- **SIF works for complex inter-jurisdictional data projects.** The Tri-Borders project worked across three jurisdictions using eight SIF Objects with one face-to-face meeting between participants. The pilot's project methodology allowed flexibility around delays in the wider project.
- **High technical expertise helped solve integration problems fast.** For example, attendance definitions and cross-jurisdictional data integration issues were speeded by a senior developer experienced in SIF integrations and the education domain.
- **Less effort is required when project manager has domain knowledge.** Unnecessary actions and cross-communications are generated when a project manager has no domain knowledge. Although this was the most complex of all the pilots, due to project manager domain knowledge it required only half the number of meetings compared with other pilots.

→ NEXT STEPS

On successful conclusion of this pilot the following steps were recommended:

- Actively communicate lessons from this pilot to stakeholders undertaking similar system development.
- Pass on any data mappings requiring extension or creation of SIF Objects to the SIF AU Data Standards Working Group (DSWG) to improve the evolving SIF AU specification.
- This project plans to go to production in October 2010, reusing agents, frameworks, expertise and project methodology from the pilot project.
- Learnings from this project assists the national discussion on student identifiers.
- This pilot provides a model of inter-jurisdictional project management for national projects.



THE SIF ARCHITECTURE
DIAGRAM 1.2

→ ABOUT THE SYSTEMS INTEROPERABILITY FRAMEWORK

The Systems Interoperability Framework (SIF) is a simple but powerful approach to integrating information from diverse computer systems. SIF manages both the "what" and the "how" of information sharing. Its core components are: a specification of what is to be transferred (the SIF Implementation Specification); a software agent that maps the information in a computer system to the Specification; and a "traffic cop" directing the flow of information between systems known as the Zone Integration Server (ZIS).

The SIF Implementation Specification (Australia) is administered in Australia by the SIF Association Australian Management Board, and internationally certified by the SIF Association.

→ ACKNOWLEDGEMENTS

The Towards SIF AU Program acknowledges support provided by participating education authorities and the Online Curriculum Resources and Digital Architecture initiative, one of a suite of initiatives under the Australian Government's Digital Education Revolution (DER) provided by the Department of

Education, Employment and Workplace Relations. The program was managed by the Towards SIF AU team based at the Victorian Department of Education and Early Childhood Development.

→ MORE INFORMATION

This study forms one of 12 case studies on pilots from Tasmania, WA, SA, Catholic Education Office Melbourne, Enterprise Scale SIF, National Systems Interoperability Service and the SIF AU Specification, as well as Scootle Integration (TAS), Tri-Borders (WA, SA & NT), Cross Jurisdiction Integration (VIC & CEO), Reuse of National Infrastructure (CEOM & ESA) and Learning Platform Independence (ACT & MELCOE).

For more detailed information: Find case studies, the SIF AU Pilot Program Report and other useful information on the SIF AU website: <http://au.sifassociation.org/>

Contact SIF AU by email: info-au@sifassociation.org

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