SIF Systems Interoperability Framework Association AU

LEARNING PLATFORM INDEPEN-DENCE

→ A NEW WAY TO PROVIDE TEACHERS AND STUDENTS WITH EASY SECURE ACCESS TO ONLINE TOOLS

Teachers want to access diverse teaching and learning tools without creating new accounts for themselves and their students. They also want single-point access to the diverse assessments generated by such tools. Using the various strengths of SIF, OpenID and LDAP, and taking advantage of US and Australian assessment analyses, this pilot takes a leap forward in solving the interoperability puzzle. However, while we are beginning to get interoperability working, the journey will take many steps and require many standards and tools. It is important to find the right tool for the job.

→ WHAT WAS THE PROBLEM?

As part of the DER, jurisdictions are providing more online learning tools for teachers and students. As tools evolve and develop, users want to access both existing and new tools without encountering further barriers, such as teachers being required to manually create accounts on each new platform. For example, one year 7 teacher with 6 English classes may need to establish 160 accounts to use just one tool with their students! Two ways to reduce such burdens on teachers are identity provisioning for access to tools, so that teachers need only sign on once, and the ability to aggregate assessment results from all tools ("identity provisioning" is the supply and maintenance of appropriate identity information in advance of the sign-on process).

The ACT Department of Education and Training (ACT-DET) wished to update its Learning Management System to include existing innovative Learning Tools (LAMS). A standards-based integration could provision login information for teachers and students so a single login would provide access to all systems old and new. It could also allow transfer of student activity information such as assessment results and task progress into a single gradebook tool.

→ HOW WAS THE PROBLEM SOLVED USING SIF?

Rather than using a 'one standard to rule them all' approach, SIF was used in combination with LDAP and OpenID for this pilot. SIF was used to transfer data from an IDAM (identity and access management system) to a LAMS tool using using dummy student, staff, school, course and enrolment information.

Additionally a set of SIF Agents were created to demonstrate transfer of assessment information from LAMS

→ 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.

to a gradebook application. This information included task completions and (if available) a final result from an assessment.

The four agents created for this pilot used 53 mappings across 11 data objects.

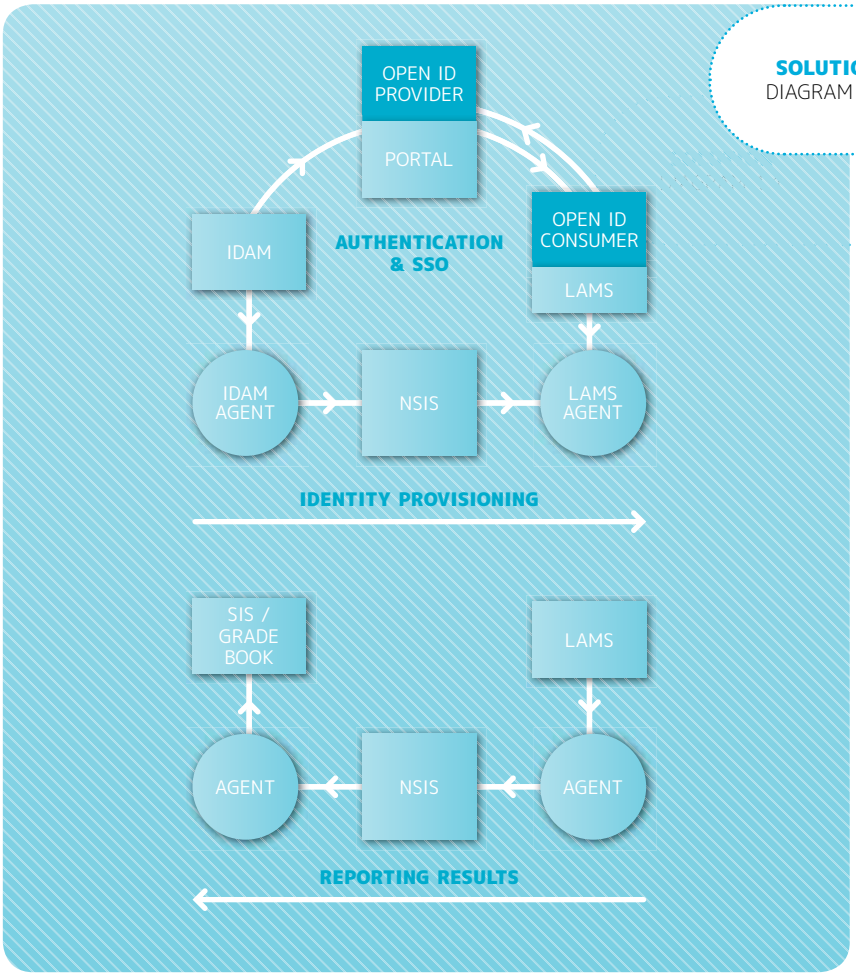
Much analysis went into determining assessment data structure. A key question was how an assessment within LAMS (with its specific learning design structures) could map to a standardised assessment object. The Data Standards Working Group and its Assessment sub-group worked with MELCOE (Macquarie University's E-Learning Centre Of Excellence) on deconstructing assessments into these objects. The team quickly adapted an object using the structure of the SIF US Assessment object. Because of this work, student results could be presented in a different form in Gradebook from the original data in LAMS.

Single Sign On was demonstrated with OpenID, using the test IDAM as identity provider. This enables teachers and students to progress from a session in a portal/LMS to a Learning Tool without the need to reauthenticate. Several solutions for authentication were tested, and a generic architecture using OpenID and SIF was developed.

This project successfully used LDAP both as identity manager and aggregator. Based on research with the ACT Department of Education and Training, a configuration for the LDAP directory was developed. SIF enabled a simple provisioning approach allowing for expansion to meet various jurisdictional needs - for example, where staff and student identities are stored in different databases. This approach was confirmed by other pilots.

This pilot also laid groundwork for a third, more complex aspect of integration - lesson and content-sharing - using SIF.

SOLUTION
DIAGRAM 1.1



→ 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.

BUSINESS BENEFITS

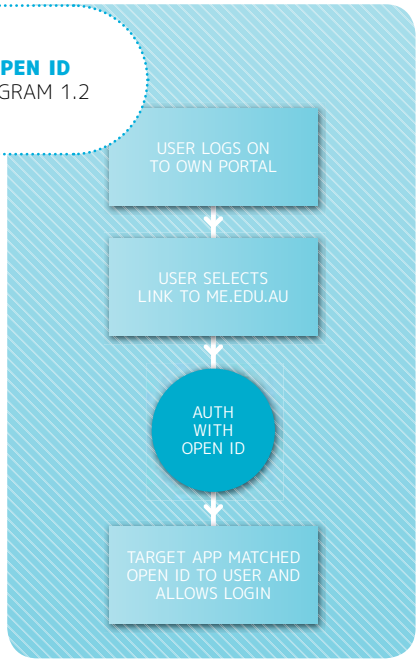
It was demonstrated that SIF works well with OpenID to enable Single Sign On and portal independence for learning tools, continuously managed and controlled from a central identity system. This enables jurisdictions to have confidence that third-party systems will honour their central identity management policies (trusted federation policy beyond the technical scope of this pilot must also be established). It also demonstrated that SIF agents were independent of learning platform software or hardware.

Work done on translation of assessment objects provides a way to undertake and record assessments from diverse tools. Systems can maintain a single data warehouse of student progress even though assessments are undertaken in a wide range of tools.

This pilot generated architectures for the integration of OpenID with SIF which have already been reused in other pilots to provide identity/authorisation solutions. Learnings and structures from this pilot will be reused in production projects for TAS-DoE and other jurisdictions.

This pilot has also laid the foundations for lesson and content sharing using SIF.

OPEN ID
DIAGRAM 1.2



→ PARTICIPANTS

The project was sponsored by Lorraine Nichol, Director Education ICT of the ACT Department of Territory and Municipal Services. Funding was provided through the Towards SIF AU Program as a part of the Federal Government's Digital Education Revolution (DER). All participants contributed in kind to this new approach to solving real-world problems.

MELCOE, a partner based at Macquarie University, supplied all the developmental and architectural work for this project. MELCOE developed three SIF Agents for ACT-DET, and provided time and expertise to this and other pilot projects. The SIF AU team acknowledges the time and effort contributed by this partner.

The National Systems Interoperability Service (NSIS) established by the Towards SIF AU Program supplied infrastructure in the form of a Zone Integration Server (ZIS). RM Asia Pacific and Edustructures provided Agent Software Development Kits (ASDKs) and support for the pilots.

→ PARTICIPANT EXPERIENCE OF THE PILOT

The architectural designs explored by the LPI team provided for both reuse and flexibility, in OpenID and other areas:

"*Multiple architectures allows flexibility. Architectures such as those we created for LDAP and LAMS could be reused.*" [JD 3/5/10]

As the LPI team offered authentication and identity management expertise to other pilot teams, it became clear that this was a complex area affecting many potential SIF projects that could benefit from special expertise:

"*Identity issues need a larger, longer project to address interconnections between SIF, SSO, unique Identifiers and other identity issues.*" [JD 3/5/10]

One developer had written an agent before, and consequently found writing further agents much easier:

"*I was able to write a subscriber and publisher agent "blind" - without testing. It turned out alright, published as expected, went through the ZIS, and was received on the other side by the subscriber agent. Although I had five major problems [with a previously-undeveloped assessment spec] I was able to finish it in one week.*" [LUF 31/05/10]

The same developer reused elements from previous agents:

"*I could copy a lot of the code from [my first] agent to this agent, especially the structure - I changed variable names and database structure but it was essentially the same thing. If someone took my agent and tried to make their own agent it could be easily reused. A sample agent project is very handy for someone starting out - Joerg's sample project was a starting point for me.*" [LUF 31/5/10]

An interesting example of cross-project support involved tests using the US specification and a previously-unexplored and complex Assessment object. Solving the problems raised by this in a very short timeframe required the support of a vendor and two cross-project developers:

"*Great! Thanks! I wouldn't have got very far without [...] your help.*" [LUF 27/05/10]

Assessment emerged as an area where context and understanding is as important as data mapping:

"*User provisioning is straightforward. But how do we share Gradebook information? We had to ask "what is a mark?". Is it a number you get from a teacher, is it a teacher comment, or feedback? ...We found that the US approach was considerably different to ours. ...(there are) cultural informational aspects of how SIF adapts to Australia.*" [EG 7/6/10]

→ KEY FINDINGS

As the pilot progressed, some 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.
- **Reusable architecture:** During the course of this pilot, architectures for LDAP and LAMS were generated that can be reused by other projects.
- **Identity/authorisation expertise is essential:** Expert help from this pilot team to other jurisdictions on identity/authorisation and associated architectures was crucial to the success of three other pilots.
- **SIF development is robust and rapid even in complex new areas.** Assessment is a large and undeveloped area in which the SIF AU specification must reflect Australia's unique needs, very different from those of the US

"ALTHOUGH I HAD FIVE PROBLEMS WITH A PREVIOUSLY-UNDEVELOPED ASSESSMENT SPECIFICATION, I WAS ABLE TO FINISH THE AGENT IN ONE WEEK."

"parent" SIF specification. Despite several difficulties, a working SIF assessment object was developed in a short space of time with the support of experienced developers and vendors.

- **SIF is a suitable medium for transferring large and complex data structures** as well as simpler structures such as staff information.
- **Assessment transfer requires contextual information.** Assessment and learning tools use various assessment philosophies. With thoughtful data analysis, SIF can help aggregate the assessment outputs of such tools.
- **Other tools partner well with SIF:** SIF is not a "one size fits all" solution but is well partnered with other interoperability tools. SIF provided useful features for provisioning, OpenID helped enable Single-Sign-On, and LDAP assisted with aggregation of data. Further technical and policy work is required to solve the range of identity management and single-sign-on problems facing Australian schools now and in the future.

→ NEXT STEPS

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

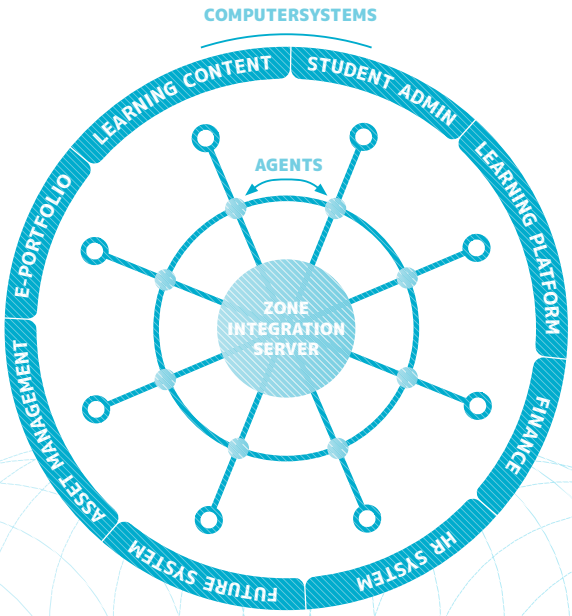
- Actively communicate lessons from this pilot to stakeholders undertaking similar system development
- Pass on any data mappings requiring extension or creation of SIF Objects to the SIF AU Data Standards Working Group (DSWG) to improve the evolving SIF AU specification.
- Include the Assessment object in the SIF AU specification 1.1.
- Make the SIF LDAP agent available for future SIF projects.
- Continue to develop NSIP support of jurisdictions on issues of authorisation/ identity across jurisdictions.
- Develop sustainable models for reuse of knowledge from universities to jurisdictions.

→ 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 Assocation Australian Management Board, and internationally certified by the SIF Association.

THE SIF ARCHITECTURE
DIAGRAM 1.3



→ 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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