

# Quilt/InCommon K-14 Identity Federation Pilot Program



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# Quilt/InCommon K-14 Identity Federation Pilot Program

## Background and Introduction

While interest in including K-12 communities in Identity Federations has been around almost since the beginning, a more formal effort emerged in the 2011 timeframe with a Joint Task Force made up of Internet2, InCommon, EDUCAUSE and CoSN community members, to create a K-12 Federated Identity Management Roadmap. The focus was on developing use cases and materials intended to garner interest, adoption and support within the K-12 community. Later in 2011 and 2012, members of State and Regional Networks, which served higher education as well as K-12 and community colleges, developed an interest in working with InCommon to extend the advanced trust and identity solutions developed for higher education to these other communities.

The KAF (K-12 Access and Federation) Working Group was formed during the summer of 2012 with InCommon staff and interested representatives from R&E Networks and others, to brainstorm and strategize on how best to proceed in this direction. Early in this process it was recognized that in order to scale these services to the large number of K-12 schools and community colleges across the country, some of InCommon's administrative tasks and functions would need to be delegated to the regional networks. Realizing that InCommon had an important role to play in developing and coordinating national standards, there was an opportunity to partner with states and regional networks interested in taking on many of the basic administrative functions of operating a federation.

## Quilt/InCommon Workshop on K-14 Federation

The working group decided that the most prudent way to proceed at this point was to launch a Call for Participation across the Quilt membership (the national organization of state and regional networks) for a one-day Quilt/InCommon Federation Workshop in February 2013, designed to develop a distributed framework for federation that would extend InCommon Federation Services to K-14 institutions (K-12 & community colleges). \*Note: Community and Technical Colleges are already part of the higher education participant class of InCommon, however, these smaller institutions often have many of the same challenges as K-12, so it was felt that including them in the pilots would be beneficial to these organizations as well as the pilots.

The workshop was well attended and was a great success, with both general sessions and two tracks: an Administrative/Policy Track, focusing on coming up with an administrative framework for a distributed federation model; and a Technical Track, focused on reviewing various implementation designs or technical federation models. There was also concurrence that InCommon Affiliate Partners (recently renamed Internet2 Trust and Identity Solution Providers), would likely be a welcomed part of the effort, particularly for regionals that were not far along with federation services.

## Workshop Next Steps

At the conclusion of the February 2013 workshop it was agreed that it would make sense to ask the participants to continue the dialog by joining three working groups focused on the pilots:

**InCommon - Quilt Pilot Definition Group** - would define the requirements for the pilots and develop a call for participants and develop timelines

**InCommon - Quilt Technical Group** - would further develop the federation models discussed during the workshop, outlining the pros and cons for regionals to consider, and coordinate with the InCommon TAC Interfederation working group

**InCommon - Quilt - Admin/Policy Group** - would document the distributed administration tasks and roles outlined during the workshop and identify the key policy issues and business models that would need to be addressed in the pilots.

## Post Workshop - Working Group Deliberations

During the post workshop Working Group calls, it was decided that rather than have a formal "Open Call For Proposals", a less formal and interactive process would be used to focus on potential pilot projects the workshop participants had already been considering or were interested in. The process involved working with the regionals to define project proposals that help validate the technical and administrative models under consideration.

The working groups came up with a series of questions as well as supplementary diagrams and information to be included in the initial call for participation, along with an explanation of the pilot program that was distributed to the workshop attendees. This initial information gathering phase allowed the working groups to see how the potential pilots aligned with the criteria and what seemed to be practical. Following this initial phase, conference calls were scheduled with interested regionals, to probe deeper into each proposal and allow the members of the working groups to make suggestions for each pilot regarding use of particular federation models or technical approaches. Following this iterative information exchange, finalized pilot proposals were requested.

While not specifically addressed in this White Paper, the Admin/Policy Working Group mentioned above evolved over time into a “Business Model” working group, which has focused on how to actualize the learnings from the Quilt/InCommon Pilots and propose policy changes that would allow K-12 organizations to join the InCommon Federation. This project continues to work its way through the InCommon TAC and Steering Committee with a trust-model proposal expected to be vetted with the InCommon Community in late 2015 or Early 2016.

## Pilot Projects:

The following states/regional networks participated in the Pilot Program:

Illinois - NCSA & IlliniCloud  
North Carolina - MCNC  
Maryland - MDREN  
Michigan - Merit  
Nebraska - ESUCC  
Ohio - OARnet  
Utah - UETN  
Wisconsin - WiscNet

## Pilot Project Process

As the pilot projects were initiated, the working group conducted bi-weekly conference calls with all pilot project members to provide additional information that was requested, as well as receive regular status reports from each pilot. Outside guest speakers were invited to join these calls to provide more detailed information on a variety of topics to help the pilots with their federation efforts. Conducting these calls with all of the pilots was very beneficial in creating an environment that encouraged learning from each other and sharing of materials between pilots.

As input for this overall summary of the the Pilot Project effort,. each pilot submitted individual pilot summaries that are linked from this site:

<https://spaces.internet2.edu/display/InCQuiltFed/Quilt+InCommon+Pilot+Summaries+as+of+September+2015>

In its summary, each pilot listed the expected participant organizations (the pilot scope) as well as the services or target applications they would be accessing as part of the pilot. These are listed below.

## Summary of Pilot Scopes

- Three to five Community Colleges and three target applications
- Seven K-12 districts serving 60,000 students
- A Community College and an Early College High School Program (K-12)
- A Technical College and a small K-12 school district
- Six K-12 school districts in a state R&E network, provided with single sign-on authentication to state network applications
- A state-based hosted Identity Provider service
- Implement IdPs supporting single sign-on, that enables a community of school districts to adopt federated applications and services in 32 of 800 districts in the state.
- Provide single-sign-on authentication to applications serving Higher Education Institutions in a State R&E Network

## Summary of Targeted Applications and SPs

- Federated Access to a Library Network and State based applications
- Shared Roaming Wireless access
- Safari Montage object repository
- Atomic Learning / Zimbra email / Learn 360
- Google Apps for Education
- NCLive, EBSCO, Moodlerooms, UpSwing and OrgSync
- Coursera / NJVid / Deskton VDI
- Canvas LMS / In Bloom
- K-12 AppPortal / uPortal
- Student data dashboard called ADVISER
- K-12 school access to State DoE Applications

## Use of Internet2 Trust and Identity Solution Providers and Other Vendors

During webinars and workshop sessions, it became clear there was a wide range of experience and knowledge among the regionals with respect to federated identity management. A few were InCommon participants (sponsored partners) and already ran Shibboleth IdPs and SPs in the federation, while others had limited exposure to the technologies. In the follow up meetings and calls, it was decided that at least some of the regional pilots would benefit from partnering with an InCommon Affiliate (now referred to as Internet2 Trust and Identity Solution Providers). Once the pilot summaries were provided by the regionals, those that had an interest in working with a Solution Provider gave permission to share their summaries with interested

vendors to see if a partnership made sense. A number of face-to-face meetings took place between regionals and potential Solution Providers the following April (2014) at the Internet2 Global Summit in Denver.

The following paragraphs briefly describe the experiences of the organizations that engaged a Solution Provider to help with their pilot. In some cases, the vendor filled a critical need that enabled the pilot to move forward. In most, if not all cases, the vendor was seen as a trusted partner who shared their experience and was willing to work closely with the participants to come up with a technical solution to meet the pilot requirements. They also seemed truly interested in the successful outcome of the pilot, beyond simply selling a service or product.

**WiscNet** is working with Aegis Identity Services and plans to implement their Aegis EduZone gateway to link SPs and several interested K-14 IdPs. Aegis was also engaged by the **Illinois** Pilot, which purchased their Trident product as well as some professional services to develop administrative interfaces for LEAs and Service Providers (SPs) and to help acquire the resources remaining after the dissolution of the inBloom project in the spring of 2014.

The **Illinois** Pilot also engaged Unicon as a consultant, to provide an overall project assessment of work requirements necessary to deploy, implement and sustain Shibboleth IdPs and SPs, as well as one of the project Target Applications - uPortal. Unicon also delivered knowledge sharing sessions (eight two-hour sessions over four weeks). After the assessment and training, Unicon deployed and configured uPortal, Shibboleth SP and IdP on the IlliniCloud private cloud, and established a shared development support service. Unicon and Aegis were scheduled to be on-site together to work with the other pilot partners.

**MDREN** plans to work with Fischer International to provide their offerings to MDREN members that choose not to join InCommon or run their own IdPs. The feeling was that Fischer's aggressive pricing being offered to higher education builds on a relationship that had already been developed with Coppin State University (a USM University). **OARnet** originally planned to work with Fischer International as well, however, there was a very low adoption of services from Fischer by their constituents. OARnet eventually developed a preconfigured VM package that had a lot of success.

The **Nebraska** pilot chose to use the Gluu EDU solution - at least for the NNNC region. They ultimately selected Unicon as a contractor to assist in deployment of the SimpleSAMLphp and uPortal software and scaling of this solution, as it moves from pilot to additional early adopters. The project will continue to evaluate future needs and solutions offered by Trust and Identity Solution Providers as the project moves forward.

## Outcomes

Generally speaking, all of the pilot projects were successful in achieving their initial goals and objectives, and most are committed to scaling their projects to additional constituents in their state. What follows is a summary of some of the challenges encountered; an overview of some of the successes/benefits that were achieved; and a summary of lessons learned during the course of conducting the pilots projects.

### Challenges encountered

*Attempting to pilot K-12 federation has its own set of challenges that exceed those found in higher education. These have been highlighted and documented on the [K12 Joint Task Force wiki](https://spaces.internet2.edu/display/K12FedIAMTF/Home) site (<https://spaces.internet2.edu/display/K12FedIAMTF/Home>), and more specifically in the [K12 Roadmap to Federated Identity Management](https://spaces.internet2.edu/display/K12FedIAMTF/K-12+Roadmap) (<https://spaces.internet2.edu/display/K12FedIAMTF/K-12+Roadmap>).*

*Unlike higher education, where establishing an IdP usually involves an effort at a single institution, K-12 education spans many schools, usually within a district, and often with a large state-level involvement. Statewide goals are usually to provide ALL children in public education, an equitable opportunity for a solid elementary and secondary education (that meets a minimum set of standards), to prepare them for higher education or the workforce. Therefore, a federated solution for K-12 may begin with a subset of school districts, however, the vision/goal is ultimately a statewide implementation. Therefore, the challenges listed here are only those encountered in implementing the pilot projects - in many cases a very solid start. However, taking a longer term view, regionals should consider the challenges they might encounter with an eventual statewide implementation.*

Regionals that were part of the Quilt/InCommon Pilot Program encountered specific challenges in trying to establish their individual pilots. Many of the common challenges boiled down to competition with other projects for priority and resources - people, time and funding. Other challenges were more difficult to overcome, such as a lack of knowledge or the expertise required to implement and run a federation Identity Provider (IdP) or Service Provider (SP). Some regionals hadn't anticipated the difficulty the installation and operation of an IdP would present to these smaller organizations.

Some pilots started with a great vision of federated identity management for their constituents, but then faltered when they encountered a lack of basic foundational elements, such as incomplete, inconsistent or non-authoritative data; a wide variance in the availability and suitability of district directory systems; or the lack of an appropriate set of value propositions (service offerings) to engage their institutions' interest. In some cases, intended applications were not SAML compliant.



All K-12 pilots had concerns about privacy, security and federal regulations that applied to their student users (e.g. COPPA, CIPA, FERPA, HIPAA), and needed to consider how these might impact their pilots. We did have a great webinar with information provided by Bob Moore and Jim Siegl, co-authors of the CoSN Privacy Toolkit. CoSN members can download the toolkit from the CoSN website and the webinar was recorded and is available on the [InC-Quilt-Federation wiki](https://spaces.internet2.edu/display/InCQuiltFed/Home) (<https://spaces.internet2.edu/display/InCQuiltFed/Home>) via the Internet2 Spaces dashboard.

While the original intent of the pilots was to explore the use of federations, in many cases the Service Provider vendors weren't willing to participate in InCommon, so bilateral SAML exchanges needed to be implemented (although a successful pilot using bilateral SAML could easily become part of a federated solution as additional shared services (SPs) were added.)

While Trust and Identity Solution Providers were seen as a way to overcome the limited experience and skillsets found in K-14 institutions, very few organizations engaged with these vendors directly. A K-12 school district or Community College was much more likely to work with a known "trusted partner" such as the regional or network consortium, than pay for a commercial vendor to do the work. The model of a Regional implementing and running an IdP or SP for an institution seemed to be a much more desirable approach. At least one regional provided pre-packaged VMs to install and run on a machine provided by the institution. However, providing an affordable, easy-to-consume solution for constituents takes funding to develop.

## **Successes/Benefits**

Most pilots indicated that they benefitted from the regular pilot conference calls and connections made with other projects which allowed them to hear and benefit from those collective experiences and explore a wider variety of solutions and potential service providers. Other pilots noted that they achieved a much better understanding of Federation benefits and requirements and how to communicate the value added benefits that can be achieved.

Some pilots noted that after understanding the requirements, they gained a much better perspective on what was needed to build the foundation for a "future larger-scale" federation. Many of the pilot participants commented on the tremendous value they received from the organizers' and presenters' experience and leadership during workshops, conferences and webinars. Having the support of federation experts that could answer questions that arose during the all pilots conference calls, prevented a lot of "trial and error" efforts that can impact pilot progress.

One pilot included 2 community colleges located in rural Appalachia, a historically underserved and economically distressed community. Adoption of Internet-ready federated services has enabled these institutions to provide their students with services that are the equal of those available at more economically and geographically advantaged institutions.

Non-traditional campus scenarios such as shared campus and remote campuses have been key use cases and are growing in importance. One of the community colleges shares two

of its campuses with 4-year institutions. Federated services made it easier for students and faculty to access services at those shared campus locations without maintaining separate helpdesks at that location. Another community college has a cohort of students attending a remote campus in Europe; the use of federated authentication to services, regardless of location, greatly simplifies the burden of creating and maintaining separate identities for these students.

The federated single sign-on solution piloted in one project, is one of three components that will streamline student, teacher and administrator access to, and management of, an integrated learning environment:

1. The single sign-on framework facilitated easy access to applications by system administrators, allowing for managed access to students and teachers from an application once it has been turned on for their use.
2. A second component of this environment is the collection of applications and resources into a launch portal, where users can see and access a rich set of applications that have been configured and provisioned for their use - --one click away.
3. Finally, automatically correlating user accounts and access across multiple applications, is an important step toward relating formative activity data from these applications and providing real time, actionable data to teachers, students, parents and administrators to personalize and improve student learning and outcomes.

## **Lessons Learned and Recommendations**

High quality solutions are available, and the growing Quilt/InCommon community is very open to sharing experiences, processes, and designs with others who have an interest. The first and best piece of advice is to talk to those around you, those responsible for efforts in other states and institutions. Another, is that while this technology simplifies access to applications and resources, “change” is involved, and can be difficult to understand and to accept. Education is needed at all levels for those who administer, support, and use the federated environment, to build an understanding of the changes to operational processes and daily use, that are possible in the federated environment, and to equip them to effectively use the system. A third recommendation applies to all projects, and that is to consider the sustainability of any solution implemented. It is vital that a solution be implemented which is both available to all constituents (school districts of all sizes, locations and financial conditions), and which can be provided reliably on a long-term basis. We must match our staffing availability and funding sources with the software licensing, hosting, and network requirements.

It’s important to keep in mind that different institutions have different capabilities and preferences; don’t assume that one solution can be exactly replicated across a state. Some institutions will prefer a commercial service provider such as an Internet2 Trust and Identity Solution Provider, others will prefer to “DIY”, others will need a directly-engaged, trusted partner of some kind.

Although eduroam and InCommon have different technological underpinnings (RADIUS and Shibboleth), at the business level these are both seen as kindred federated security technologies that enable collaborative activities, incrementally improve security, and provide an infrastructure for innovative services. The “bundling” of these services was received very positively in one of the pilots.

Finally, federation is not easy. It’s not something school districts or community colleges should undertake without help. Regionals that are committed to working with their constituents to provide guidance and support can be a major asset in enabling federated solutions for K-14 institutions. There are also an increasing number of resources that can be drawn from in getting started, from local higher education institutions already participating in a federation, and commercial vendors that specialize in establishing federation entities and even custom integrations.

## Pilot Costs

The pilot participants were asked to include any costs incurred in the development and implementation of their pilots. Most responses indicated that no specific funding was used (or available) for the pilots, but that time and resources were part of their existing operational budgets or grants. A couple pilots did provide some figures, however. These are listed below:

- ½ FTE + cost of servers (over two years)
- \$250,000 over two year pilot period

## Summary and Next Steps

### Pilot Program

Based on the knowledge and experience gained during the course of their pilots, most participants stated their future plans and longer term goals for extending their projects to additional constituents in their state. Others plan to align the necessary resources to implement their projects, now that they have a better understanding of what is required. Development of case studies detailing some of the pilot projects would also be a valuable product of this program, that can be shared broadly.

The formal part of the Quilt/InCommon Pilot Program is wrapping up at this time and the working group participants will be shifting their focus to working through the issues associated with the business model agreements between InCommon and regional network providers, described in the next section.

### Business Models - Steward Addendum

Although the development of Business Models was mentioned briefly in this paper (as one of the goals of the **InCommon-Quilt Admin/Policy Group**), the work has continued along

a separate path from the Pilots. The primary goal of this effort was to develop business models (processes, agreements and supporting documentation), for regional network providers to extend InCommon Federation services to the regionals' K-14 constituent organizations.

In addition to the specific challenges mentioned earlier in this paper, the cost to join InCommon as a participant has been one of the hurdles for K-12 and smaller institutions. The ability to process and manage a large influx of these new participants has been a concern for InCommon. The Steward Model addresses both of these issues by having the Regional join InCommon under a new participant class, "Support Consortia", and then by fulfilling the requirements spelled out in the Steward Addendum, bring their K-14 "Represented Constituents" (RCs) into the federation through their membership. Any decisions about membership cost recovery from RCs would be up to the regional. The Steward would perform the organizational and metadata vetting of their constituents on behalf of InCommon, and be their representative within the federation.

The Business Models group hopes to begin a pilot of the Steward Model in the near future. MCNC has offered to be the pilot "Steward" and has been working with InCommon, along with input from a few other regionals, to develop the required documents and agreements to support this model. These are currently being reviewed by both InCommon and MCNC, with a pilot expected to begin early next calendar year.

## Next Steps

As mentioned above, the immediate next step will be the piloting of the Steward business model. Once agreements are approved and signed, the development and testing of processes described in some of the supporting business model documentation will take place. Training of regional folks by InCommon Operations, working with a pilot set of Represented Constituents, and MCNC's handling of their RCs' metadata and finalizing organizational vetting procedures are all part of the pilot.

Once the Steward Pilot is completed and reviewed (or possibly during the course of the pilot), other regionals may have an interest in a similar effort to pilot one of the other business models developed by the Business Models group.

As we develop Case Studies and additional use cases for K-12 federation, we also are adding to the value proposition for other regionals and even large school districts to become federation participants. This will be particularly beneficial to other Quilt members who may have been looking at providing federation services to their constituents, but were waiting for some real world examples.

It also seems like an opportune time to re-engage with CoSN (the Consortium for School Networking) which is the premier professional association for K-12 technology leaders. As one of the original participants of the K-12 Joint Task Force (see "Background and Introduction"), this group can help engage other K-12 communities to work with their regional network providers and take advantage of the opportunities and services enabled by a national/global identity federation such as InCommon.

## Resources

The primary resource for the Quilt-InCommon Federation Pilots is found on the Internet2 spaces wiki under the **InC-Quilt-Federation** home page (<https://spaces.internet2.edu/display/InCQuiltFed/Home>). There you will find the initial proposals presented by the pilot groups, presentations, workshop and webinar slides, as well as the final pilot summaries. Additional content includes minutes of the pilot calls, information about the business models, and supporting documentation and resources.