



## 2020 InCommon Accomplishments

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## About InCommon

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Through InCommon, Internet2 provides the venue for the research and education community to collaborate on common solutions. How do we do it?

- **Community-driven everything** - We work together with shared passion, directness, respect, and humor.
- **Act locally; think globally** - Our community-built solutions work for collaborations on campus, around the country, and around the world.
- **We have standards** - Our innovative and trusted technology is built on standards and tailored for research and education.
- **The developers use their own stuff** - Our community-designed software solutions are built by the same people who use them daily.

Our identity and access management solutions solve problems related to:

- **Managing access** - Simplifying access control with single sign-on and using groups for provisioning.
- **Scholarly collaborations** - Providing scholars and students access to collaboration tools worldwide without the need for IT intervention.
- **Guest systems** - Allowing guests (alumni, prospective students, visiting faculty) to bring their own ID and access appropriate resources.
- **Identity lifecycle management** - Automating identity and policy decisions and access control.

Here are the services we provide:

- **The InCommon Academy** - Expert-led component training, implementation support, introductory workshops and community-oriented conferences.
- **The InCommon Federation** - Privacy-preserving single sign-on access to services - locally and around the globe.
- **The InCommon Trusted Access Platform** - Community-developed identity and access management software and services.
- **The InCommon Certificate Service** - Unlimited server and user certificates for one annual fee.
- **eduroam** - Managing Internet2's U.S. node for the eduroam global WiFi network for research and education.

## Executive Summary

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*The community demonstrated a 44 percent increase in support for scientific collaboration, through adoption of the Research & Scholarship category.*

## Executive Summary

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*“Yesterday is history. Tomorrow is a mystery. Today is a gift. That is why it is called the present.” - Alice Morse Earle\**

In some ways we can all be glad 2020 is history. Yet circumstances forced organizations to take a hard look at what was done yesterday, how to adapt to the present, and work to stay relevant for tomorrow.

What did this mean for InCommon and how did the community respond?

In light of better enabling collaboration for coronavirus research, the National Institutes of Health laid out the case for InCommon Federation members to support the international Research & Scholarship (R&S) program. Doing so means scientists and researchers automatically gain access to qualifying research services. **The community responded by increasing R&S adoption by 44 percent.**

The BaseCAMP workshop and the annual CAMP and Advance CAMP (ACAMP) meetings moved online. Through the use of Zoom, the Canvas learning management system, Slack, and other applications - and the willingness of the community to adapt - **attendance increased by 28% compared to the previous in-person meetings.**

Given the **community reaching 100 percent adoption of Baseline Expectations for Trust in Federation** in 2019, the InCommon Community Trust and Assurance Board led an effort to add three expectations in what is known as “Baseline Expectations v2.” **The community adopted the additional expectations in 2020**, with the goal of 100 percent adherence by mid-2021.

Responding to the needs expressed by the community in regular survey, the **InCommon Certificate Service made available the Automated Certificate Management Environment (ACME)** for subscribers. This automates the issuance, renewal, and replacement of SSL certificates, saving time and money.

An existing pilot with the [Utah Education and Telehealth Network](#) (UETN) proved fortuitous, as demand for roaming WiFi increased among K12, libraries, museums and other non-profits. The new **eduroam Support Organizations** will facilitate more-rapid eduroam deployment across those communities.

*\*Alice Morse Earle was a late 19th Century historian and author from Worcester, Massachusetts. Her writings, beginning in 1890, included a number of books on colonial America such as *Curious Punishments of Bygone Days*.*

## InCommon Academy

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### InCommon Academy

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*The InCommon Academy increased its scope and reach, including a 30 percent increase in training attendance.*

The InCommon Academy provides:

- opportunities for the community to convene and discuss common challenges and solutions (BaseCAMP, CAMP and Advance CAMP)
- regularly scheduled community-presented webinars (IAM Online)
- training on community-developed InCommon Trusted Access Platform software
- a program to help organizations discover, prototype, and plan IAM services (Collaboration Success Program)

### Community Convening Moves Online

In the face of the pandemic, InCommon moved its entire CAMP series online, even as planning had begun for in-person meetings.

**BaseCAMP** - First up was [BaseCAMP](#), a workshop that provides:

- an introduction to identity and access management
- an overview of the InCommon Federation
- discussions of the InCommon Trusted Access Platform suite of IAM community-built software

Attendance in 2020 increased 13 percent over the 2019 in-person BaseCAMP and 100 percent of attendees completing the evaluation said they would recommend BaseCAMP to a colleague.

	2020	2019
<b>BaseCAMP Attendance</b>	79	70

BaseCAMP 2020 took place over five days (four hours per day) and used the Canvas learning management system to house content, integrated with Zoom for live presentations.

Here is a representative comment from the evaluations:

*“I really enjoyed the half-day virtual format. The cost of the virtual format made it an easy sell to management, plus the ability to review the recordings and slides after the event really enhances the value of the investment.”*

## InCommon Academy

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**CAMP and Advance CAMP (ACAMP)** - The international trust and identity community convened for a week (partial days) in November for the annual [CAMP and ACAMP meetings](#). Community members contributed presentations that filled three tracks over two days, then participated in the unconference Advance CAMP for an additional three days. Attendance rivaled that of the traditional in-person meetings.

*Incredible amount of valuable content! Appreciate the recordings being available quickly for the sessions I could not attend.*

*The conference (esp. ACAMP) was extremely well executed.*

### Software Training Increases in Scope and Reach

It proved fortuitous that InCommon had already started moving to online delivery of training sessions when the pandemic hit in March. During 2020, InCommon held a combined eight [training sessions for the InCommon Trusted Access Platform](#) community-built identity and access management suite of software. Each course uses pre-configured training environments to enable hands-on labs, coupled with lecture and interactive discussion.

Enrollment increased by 30 percent over 2019, as did the number of organizations reached:

Software	# of Courses	Attendees	Unique Orgs	Ave. Rating (0-5 scale)
<b>COmanage</b>	2	29	19	4.7
<b>Grouper</b>	2	42	17	4.4
<b>midPoint</b>	2	55	40	4.8
<b>Shibboleth</b>	2	55	40	4.6
<b>Totals</b>	<b>8</b>	<b>176</b>	<b>91</b>	<b>4.6</b>
<b>2019 Totals</b>	6	135	70	4.5

### Third Collaboration Success Program Welcomes Members

Created in 2017 in response to a community survey, the [Collaboration Success Program](#) (CSP) helps organizations develop and meet their IAM goals, and work

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## InCommon Academy

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to adopt one or more components of the community-developed IAM software suite, the InCommon Trusted Access Platform.

During 2020, the second group of CSP participants, which included six higher education institutions, finished its work. Their project plans and case studies are available on [the InCommon wiki](#).

The class of 2021, including another six research and education organizations, formed in October 2020 and will complete its work in June 2021.



CSP benefits include:

- Tailored recommendations based on an IAM assessment
- Two virtual planning workshops
- Eight registrations for InCommon Trusted Access Platform training
- Two registrations for InCommon BaseCAMP and CAMP
- Priority access to advisors, community implementers, and software developers

Comments from the 2020 cohort include:

*“I appreciate access to the collective intelligence and experience of the community. You can’t buy that from a vendor.”*

*“...our long-term goal of incorporating more components of the InCommon Trusted Access Platform will help standardize on a set of IAM tools developed specifically for higher education.”*

## IAM Online

[IAM Online](#), InCommon’s webinar series, concluded its 11th year of providing information about identity and access management topics. Attendance averages more than 100 per session (including a 2020 high of 194). A list of topics and links to the recordings are included in the [appendix of this report](#). InCommon and GEANT present past IAM Online sessions (both U.S. and Europe) on an identity and access management YouTube channel.

## InCommon Federation

*The Identity Provider as a Service Working Group completed its work, providing three key recommendations for InCommon to make federation participation more accessible.*

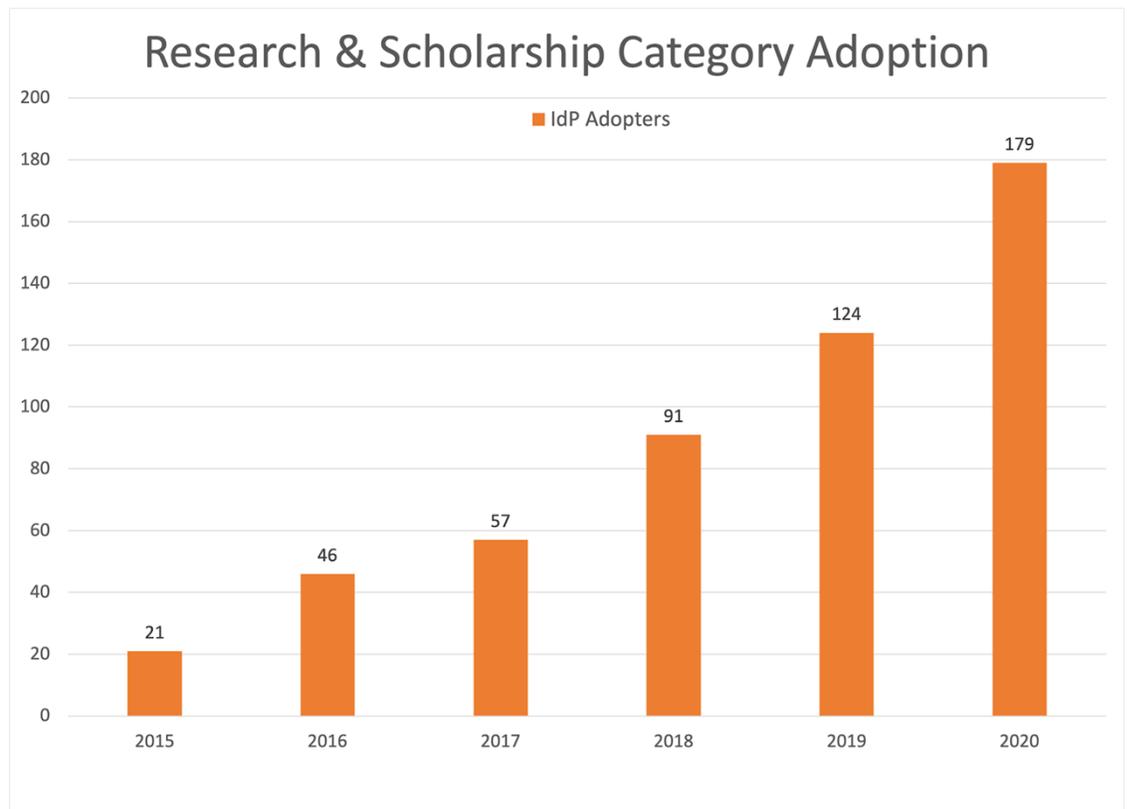
## InCommon Federation

The InCommon Federation provides the infrastructure for secure single sign-on access to cloud and local services, and global collaboration tools. The Federation connects millions of users and hundreds of educational institutions, research organizations, and commercial resource providers.

**Support for Research & Scholarship:** The demand for collaborative research projects increased significantly as the pandemic spread. The National Institute of Health made appeals for identity providers to automatically release a few pieces of information to more than 150 services via the [Research & Scholarship category](#).



This simple change allows for simpler onboarding when a faculty member or researcher joins a collaboration. During 2020, InCommon saw a sharp increase support for R&S.



*This chart shows the number of InCommon Identity Providers that support R&S - that is, they release a small set of information to all services tagged as "R&S."*

## InCommon Federation

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**Cloud-based Identity Providers Subject of Working Group Report** - In December 2020, the InCommon Identity Provider as a Service Working Group [submitted its final report](#). The InCommon Technical Advisory Committee chartered the working group to recommend ways to make federation participation more accessible through the use of cloud-based Identity Provider as a Service (IdPaaS) solutions.

The working group developed three key recommendations for InCommon to pursue:

- Develop a “Federation-Ready Identity Provider” program that would recognize services that support all requirements and standards needed for customers to fully participate in the federation.
- Determine ways to 1) help potential IdPaaS customers to understand common integration models, and (2) identify and compare relevant federation-ready products.
- Place particular focus on promoting a “Federation Adaptor” integration model, which allows institutions to maintain their existing single sign-on (SSO) products in conjunction with a lightweight product that bridges between campus SSO and the federation.

**Enhanced Federation Documentation** - The InCommon Federation information resources and documentation underwent a significant overhaul during 2020. The new [InCommon Federation Library](#) is available on the wiki and includes information about such topics as the Federation Manager (software), metadata service, best practices, and information about getting started with InCommon.

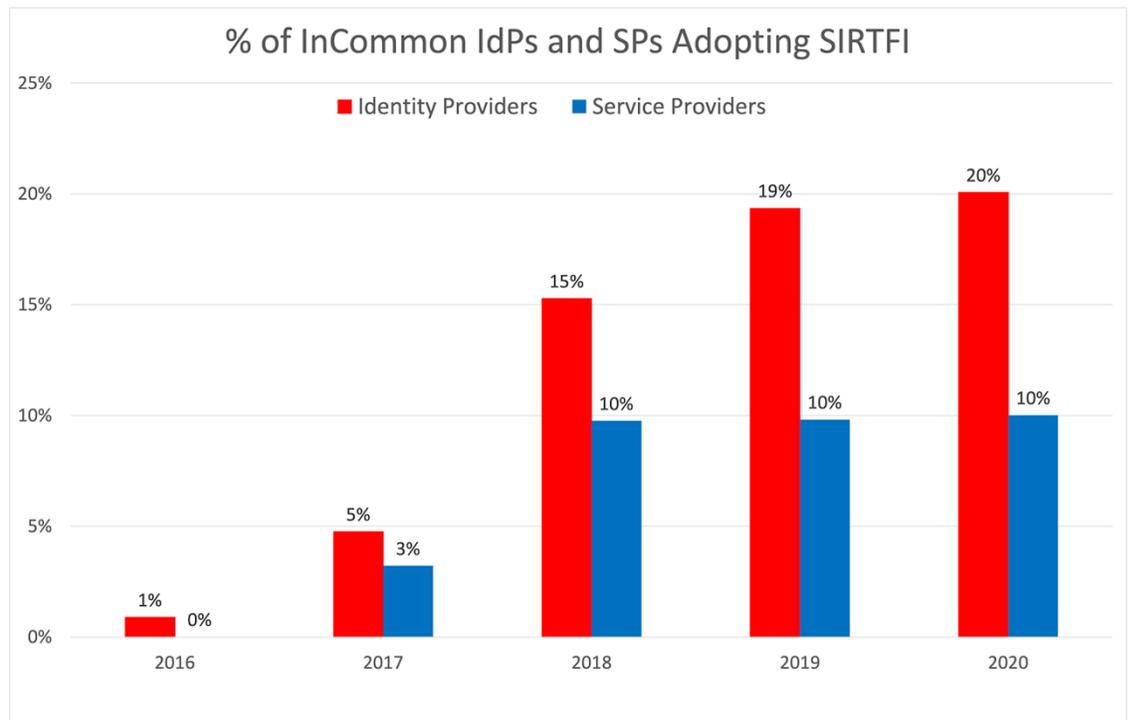
## InCommon Federation

*SIRTFI is one of the components of the next version of Baseline Expectations, with the goal of 100 percent adoption by mid-2021.*

### SIRTFI (Security Incident Response Trust Framework for Federated Identity)



- InCommon supports the [international SIRTFI framework](#). As of 2020, the Community Trust and Assurance Board has added SIRTFI to InCommon's Baseline Expectations to raise it from a best practice to a hallmark of a trustworthy federation.



*This chart shows the percentage of InCommon Identity Providers (red) and InCommon Service Providers (blue) that indicate they support SIRTFI. This represents 107 IdPs and 478 SPs.*

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## InCommon Trusted Access Platform

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### InCommon Trusted Access Platform

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*The InCommon Trusted Access Program is completing the move to containerized packaging, simplifying installation and configuration.*

The [InCommon Trusted Access Platform](#) is a community-built identity and access management services and software for research and education. It is built to integrate with existing systems and is packaged in containers to simplify installation and configuration. The major components are Shibboleth, Grouper, COmanage, and MidPoint.

The suite helps solve common identity and access challenges, including

- single sign-on
- managing access
- managing scholarly collaborations
- enabling guest access
- supporting the identity lifecycle, provisioning and deprovisioning, guest systems, and others

Key accomplishments in 2020 include:

- The Shibboleth team released the [fourth generation of the Identity Provider software \(IdPv4\)](#) with a number of new configuration options, and new features and fixes.
- The Grouper developers [deployed a new release](#) that takes advantage of a new container strategy, simplifying installation and upgrades. The team also released [Grouper Reporting](#), which provides visibility (via a spreadsheet) to see who has access to various groups, candidates for deprovisioning, and other helpful information.
- An international team of [COmanage](#) stakeholders was convened as a working group to share requirements and collaborate on development initiatives. The core development team has also revised the general release cycle to be more agile in providing new features and fixes in shorter intervals.
- The software developers and integration team has [developed a package](#) that integrates midPoint and Grouper, using Shibboleth for authentication. Interest in, and adoption of, midPoint has increased steadily among those considering one or more components of the InCommon Trusted Access Platform.

## InCommon Certificate Service

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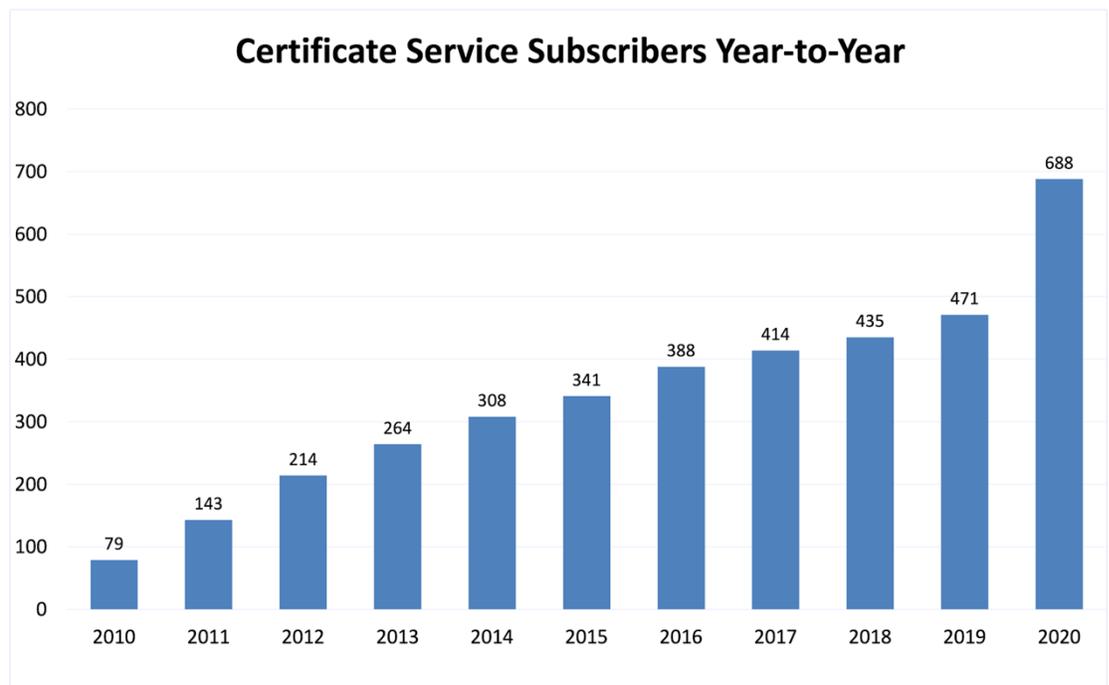
*The InCommon Certificate Service added a feature (ACME) to automate some certificate management functions.*

## InCommon Certificate Service

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The InCommon Certificate Service provides unlimited certificates (SSL, EV, client, and others) for one annual fee. The work is driven, in part, by a bi-annual survey of Certificate Service subscribers. As of December 31, 2020, we had approximately 299,000 active certificates across 512 organizations.

Sectigo, InCommon's partner in the [InCommon Certificate Service](#), has added the ACME (Automated Certificate Management Environment) Service for subscribers. The [last regular survey](#) of InCommon Certificate Service subscribers showed overwhelming interest in ACME.



*This graph shows subscriptions to the InCommon Certificate Service as of December 31 of each year. During 2020, we started including the individual campuses that are part of a system-wide license, so were previously not listed individually.*

*The eduroam Advisory Committee developed a best practices guide.*

## eduroam

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InCommon/Internet2 operates the U.S. node for the global [eduroam roaming WiFi network](#) for research and education. eduroam is available in more than 100 countries, including 942 universities and non-profits in the U.S. Individuals use their campus credentials to use the service no matter where they are.

**eduroam Support Organizations** - [Network Nebraska](#) and the [Sun Corridor Network](#) joined the [Utah Education and Telehealth Network](#) (UETN) as InCommon eduroam Support Organizations, committed to deploying eduroam to the K12s, libraries, and museums in their states. During a pilot, UETN deployed eduroam to 38 K12 schools districts in Utah as well as numerous libraries, museums, and on public transit around the state.

The Support Organizations promote eduroam among their constituents and work with InCommon/Internet2 to:

- Onboard new K12, library, and museum constituents in their area
- Provide first-level support for constituents
- Participate in collaborative meetings with other program participants

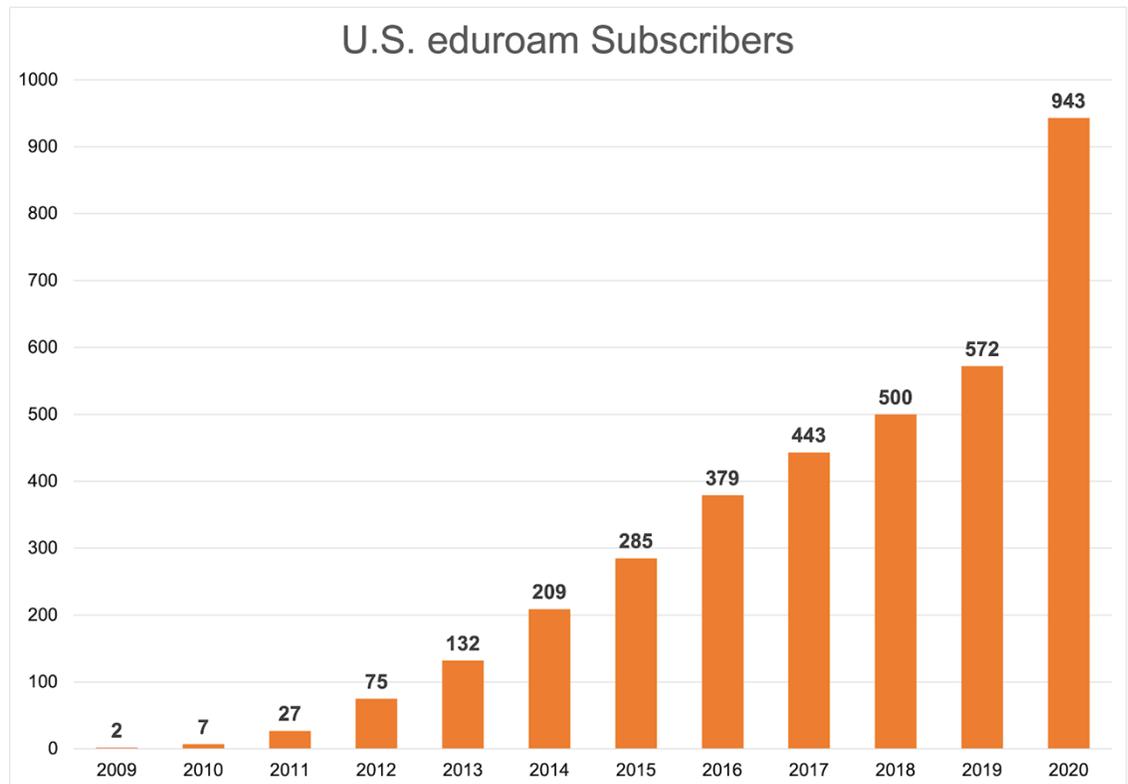
**Community Survey** - There has been a surge in interest in eduroam during the pandemic and the need for more ubiquitous wireless service. Given the need to expand the service, and interest among a range of organizations, the month of October 2020 was spent getting feedback via a survey and open office hours, to ensure the eduroam service evolves to meet the needs of the subscribers.

- Announcement of the Support Organization framework, selection of the newest Support Organizations
- Requirements gathering project
- eAC's creation of the Best Practice Guide (it hasn't been formally accepted by CACTI yet - not sure to what degree that'll matter for most audiences)

**eduroam Best Practices** - The eduroam Advisory Committee developed a [best practices guide](#) that examines tools and strategies for deploying and running eduroam. The goal is to encourage the community to build and operate the service in a way that is as interoperable, scalable, and sustainable as possible while still allowing for the differences in individual environments.

## eduroam

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*This graph shows subscriptions to the eduroam (U.S.) service as of December 31 of each year. During 2020, we started including the individual campuses that are part of a system-wide license, so were previously not listed individually.*

## Community Engagement

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### Community Engagement

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InCommon convenes the community to develop requirements, specifications, and program activities in the form of working groups and advisory groups.

#### Governance and Advisory Groups

Trust and Identity Program Advisory Group

The [Trust and Identity Program Advisory Group \(PAG\)](#) provides community executive input and guidance to the Vice President for Trust and Identity and NET+ Services. Topics discussed in 2020 include:

- Relationship (and overlap) between the PAG and InCommon Steering Committee
- The pandemic and Trust and Identity Services, including eduroam, making collaboration easier, and community engagement
- OpenRoaming (guest access for enterprises) and eduroam (federate WiFi for research and education)

#### InCommon Steering Committee

*Chair: Ted Hanss, Yale University*

The [InCommon Steering Committee](#) is responsible for managing the business affairs of InCommon, including oversight and recommendations on issues arising from the operation and management of InCommon. **Key topics discussed in 2020** include:

- The business case for identity and access management
- The future of InCommon fee increases
- The value proposition of the InCommon Trusted Access Platform
- Engaging and supporting research communities
- Strategy for expanding eduroam
- Community engagement strategies
- Baseline Expectations for Trust in Federation, version 2

#### Community Architecture Committee for Trust and Identity (CACTI)

*Chair: Tom Jordan, University of Wisconsin-Madison*

CACTI ([Community Architecture Committee for Trust and Identity](#)) is the architecture strategy group of community members that provides strategic

## Community Engagement

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architectural input for trust and identity, and manages and evolves community standards, among other duties. **Key topics in 2020 included:**

- Identified a need for a technical/business policy oversight group focused on InCommon's eduroam service, and chartered the eduroam Advisory Committee to take on that governance responsibility. This group recently delivered the "eduroam Best Practices Guide" to CACTI for formal approval/adoption by the community.
- Identified a docket of next-generation trust and identity challenges to discuss in 2021 and attracted new community membership from previously under-represented organization types. Tackling these next generation challenges will require input beyond the "usual suspects."
- Discussed the challenges of operating trust and identity services on-campus in a pandemic, and how our services can enable responses to the pandemic such as remote learning, and secure and privacy-preserving COVID testing regimes.

### **InCommon Community Trust and Assurance Board**

*Chair: David Bantz, University of Alaska*

The [Community Trust and Assurance Board](#) (CTAB) represents the InCommon community with issues and programs related to trust and assurance. The CTAB is an advisory body to the InCommon Steering Committee. **During 2020**, CTAB developed a proposed second round of Baseline Expectations for Trust in Federation, and let the community through the process of adopting three additional expectations.

### **InCommon Technical Advisory Committee**

*Chair: Janemarie Duh, Lafayette College*

The [InCommon Technical Advisory Committee](#) (TAC) supports InCommon's mission "to create and support a common framework for trustworthy shared management of access to online resources." It is an advisory body to the InCommon Steering Committee and provides advice on operational roadmap.

#### **Key topics discussed in 2020:**

- TAC accepted the final report of its IdP-as-a-Service (IdPaaS) Working Group, which provided three key recommendations for InCommon to consider in helping participants navigate decisions around cloud IdP services

## Community Engagement

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- Federation 2.0 – participated in, and supported, this international work defining the possible scenarios for the evolution of research and education federations.
- Next step on identifiers – Based on the work of the Deployment Profile Working Group, TAC held significant discussions on plans for transitioning InCommon to the new SAML Subject Identifier profiles
- Test federation – Did the groundwork for launching a test federation working group early in 2021

## Working Groups

### Identity Provider as a Service Working Group

Chairs: Mary McKee, Duke University; EJ Monte, Duquesne University

Wiki: <https://spaces.at.internet2.edu/x/fIC-C>

In December 2020, the Identity Provider as a Service Working Group [submitted its final report](#) outlining three key recommendations for InCommon to pursue:

- Develop a “Federation-Ready Identity Provider” program that would recognize services that support all requirements and standards needed for customers to fully participate in the federation.
- Determine ways to 1) help potential IdPaaS customers to understand common integration models, and (2) identify and compare relevant federation-ready products.
- Place particular focus on promoting a “Federation Adaptor” integration model, which allows institutions to maintain their existing single sign-on (SSO) products in conjunction with a lightweight product that bridges between campus SSO and the federation.

### InCommon Trusted Access Platform Software Integration Working Group

Chair: Keith Hazelton, Independent Consultant Wiki:

<https://spaces.at.internet2.edu/x/SgFwBQ>

This working group continued to work on integration of the components that comprise the InCommon Trusted Access Platform (Shibboleth, Grouper, COmanage, midPoint), as well as integrating the components with campus identity and access management systems.

### Component Architects Working Group

Chair: Steve Zoppi, Internet2 Wiki: <https://spaces.internet2.edu/x/RAFwBQ>

## Community Engagement

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This group meets regularly to support the advancement and better consolidation of documentation, training, and common support channels for the InCommon Trusted Access Platform. A significant accomplishment in 2020 was [developing a package](#) that integrates midPoint and Grouper, using Shibboleth for authentication.

## Appendix A: IAM Online Topics

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### Appendix A: IAM Online Topics

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[IAM Online](#) is a monthly series delivering interactive education on Identity and Access Management (IAM), sponsored by InCommon, Internet2, and the EDUCAUSE Higher Education Information Security Council. Archived presentations are on the [IAM Online YouTube](#) channel.

**Passwordless Authentication with Shibboleth and WebAuthN** (January 2020)  
*Presenters: Mary McKee and Shilen Patel (Duke University)*

**Community Plans and Priorities for 2020** (February 2020)  
*Presenters: David Bantz (University of Alaska), Janemarie Duh (Lafayette College), Tom Jordan (University of Wisconsin-Madison)*

**Case Studies - Solving IAM Challenges with Community-Built Software** (March 2020)  
*Presenters: Tommy Doan (Southern Methodist University), Keith Hazelton (Internet2), Ethan Kromhout (University of North Carolina-Chapel Hill), Lacey Vickery (University of North Carolina-Charlotte)*

**Implementing Two-Factor Authentication - Lessons Learned** (April 2020)  
*Presenters: Lorrie Burroughs (Georgia Institute of Technology), Hank Foss (Sacred Heart University), Moeen Taj (Montgomery College), Tom Barton-Moderator (University of Chicago and Internet2)*

**Simplifying Federated Access to Scholarly Content and Services** (May 2020)  
*Presenters: Lisa Hinchliffe (University of Illinois at Urbana-Champaign), Ralph Youngen (American Chemical Society), Heather Flanagan-Moderator (Seamless Access)*

**How Do YOU Use eduroam?** (May 2020)  
*Presenters: Saira Hasnain (University of Florida), Shaon Pitt (University of Delaware), Jeff Egly, Utah Education and Telehealth Network), Mike Zawacki-Moderator (Internet2)*

**Hiring for Identity and Access Management** (June 2020)  
*Presenters: Kirk Kelly (Portland State University), Erica Lomax (Oregon State University), Jessica Fink (Internet2), Heather Flanagan (IDPro), Kevin Morooney-Moderator (Internet2)*

**Community Voices: Moving IAM Forward** (October 2020)  
*Presenters: Judith Bush (OCLC), Rob Carter (Duke University), Tommy Doan (Southern Methodist University), Rob Gorrell (University of North Carolina at*

## Appendix A: IAM Online Topics

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Greensboro), Jon Miner (University of Wisconsin-Madison), Laura Paglione (Spherical Cow group), Jessica Fink-Moderator (Internet2)

**Safer Illinois App: Testing, Tracing, Access in the Face of COVID-19**  
(November 2020)

Presenters: Edward Delaporte, Isaac Galvan, Keith Wessel (all University of Illinois at Urbana-Champaign)

## Appendix B - Glossary of Terms and Acronyms

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### Appendix B - Glossary of Terms and Acronyms

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**Baseline Expectations - Baseline Expectations for Trust in Federation** - A set of common expectations that all Participants meet, intended to make collaboration more predictable and improve the user experience. See [www.incommon.org/federation/baseline/](http://www.incommon.org/federation/baseline/)

**CACTI - Community Architecture Committee for Trust and Identity** - [CACTI](#) is an architecture strategy group of community members to advise the Vice President for Trust and Identity and NET+.

**CSP - Collaboration Success Program** - A diverse group of higher education institutions committed to adopting and deploying the TIER software components and helping to accelerate adoption for the rest of the trust and identity community. See <https://spaces.internet2.edu/x/oQrABg>.

**CTAB - Community Trust and Assurance Board** - [CTAB](#) represents the InCommon community in InCommon's trust and assurance related programs and initiatives. It is advisory to the InCommon Steering Committee.

**Certificate Service - InCommon Certificate Service** - A program offering enterprise-scale server and other certificates. Subscribers receive unlimited certificates for one annual fee, including all domains owned or controlled by the institution. Available to US higher education institutions and not-for-profit research and education networks. See [www.incommon.org/certificates](http://www.incommon.org/certificates)

**Docker Container** - A lightweight, stand-alone, executable package of a piece of software that includes everything needed to run the software. It operates regardless of the environment. The TIER program is packaging all components in Docker containers to simplify installation and configuration.

**eAC – eduroam Advisory Committee** – The eduroam-US Advisory Committee role is to help formulate strategies and practices for US and global research and education roaming networks, report any findings, and is advisory to the Community Architecture Committee for Trust and Identity (CACTI) and Internet2, the eduroam-US operator.

**eduGAIN** - An interconnection of identity federations around the world, simplifying access to content, services and resources for the global research and education community. [eduGAIN](#) enables the trustworthy exchange of information related to identity, authentication and authorization.

## Appendix B - Glossary of Terms and Acronyms

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**eduroam** - A global wireless network access service developed for the international research and education community. eduroam allows students, researchers, faculty, and staff secure seamless wireless access at all participating institutions. See [www.incommon.org/eduroam](http://www.incommon.org/eduroam).

**IAM - Identity and Access Management** - IAM refers to a framework of policies and technologies for ensuring that the proper people in an enterprise or virtual organization have the appropriate access to the right technology resources.

**IdP - Identity Provider** - The originating location for a user. For InCommon, an IdP is a campus or other organization that manages and operates an identity management system, including single sign-on that allows members of its community to access protected resources.

**InCommon Trusted Access Platform** - An identity and access management suite of services and software designed to integrate with existing system so it's easy to get started.

**MFA - Multifactor Authentication** - A security system in which a user must provide at least two methods for authentication - say, something you know and something you have - in order to verify identity and gain access to resources.

**OAuth** - OAuth is an open standard for access delegation. See <https://en.wikipedia.org/wiki/OAuth>

**OIDC - Open ID Connect** - OIDC is an identity layer that allows for the verification of an end-user's identity. It sits on top of the OAuth protocol. See [openid.net/connect/](http://openid.net/connect/)

**PAG - Program Advisory Group** - An Internet2 Program Advisory Group (PAG) provide community input to advise and guide the creation and direction of Internet2 programs and services. The Trust and Identity PAG advises the Vice President of Trust and Identity Services.

**R&S - Research & Scholarship Category of Service Providers** - The Research and Scholarship Entity Category (R&S) is an international specification that provides a simple and scalable way for Identity Providers to release a small set of attributes, or information, to an entire group of Service Providers serving the Research and Scholarship Community. Service Providers are vetted prior to being added to the category. See [refeds.org/research-and-scholarship](http://refeds.org/research-and-scholarship).

**REFEDS - Research and Education FEDerations** - REFEDS is a voice that articulates the mutual needs of research and education identity federations worldwide. See [refeds.org](http://refeds.org) for more information.

## Appendix B - Glossary of Terms and Acronyms

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**SIRTFI - Security Incident Response Trust Framework for Federated Identity**

- Enables the coordination of incident response across federated organizations. This framework comprises a list of assertions to which an organization can attest. See [refeds.org/sirtfi](https://refeds.org/sirtfi).

**SP - Sponsored Partner** - A business partner that provides resources to a higher education institution and is sponsored for participation in InCommon by a participating higher education institution.

**SP - Service Provider** - An InCommon Service Provider is a campus, research organization, or commercial organization that makes online resources available to users via federated identity.

**TAC - InCommon Technical Advisory Committee** - An advisory body to the InCommon Steering Committee providing advice on InCommon's operational processes and practices, strategies, capabilities, and roadmap. See <https://spaces.internet2.edu/x/Swk>

**VM - Virtual Machine** - An emulation of a computer system; in this case providing the ability to execute programs in a platform-independent environment.