

# eduroam: Desde la idea original hasta hoy y visions de futuro

**Klaas Wierenga**  
**CCSO, Géant**

TICAL2019

2-4 Septiembre 2019

Cancún, México

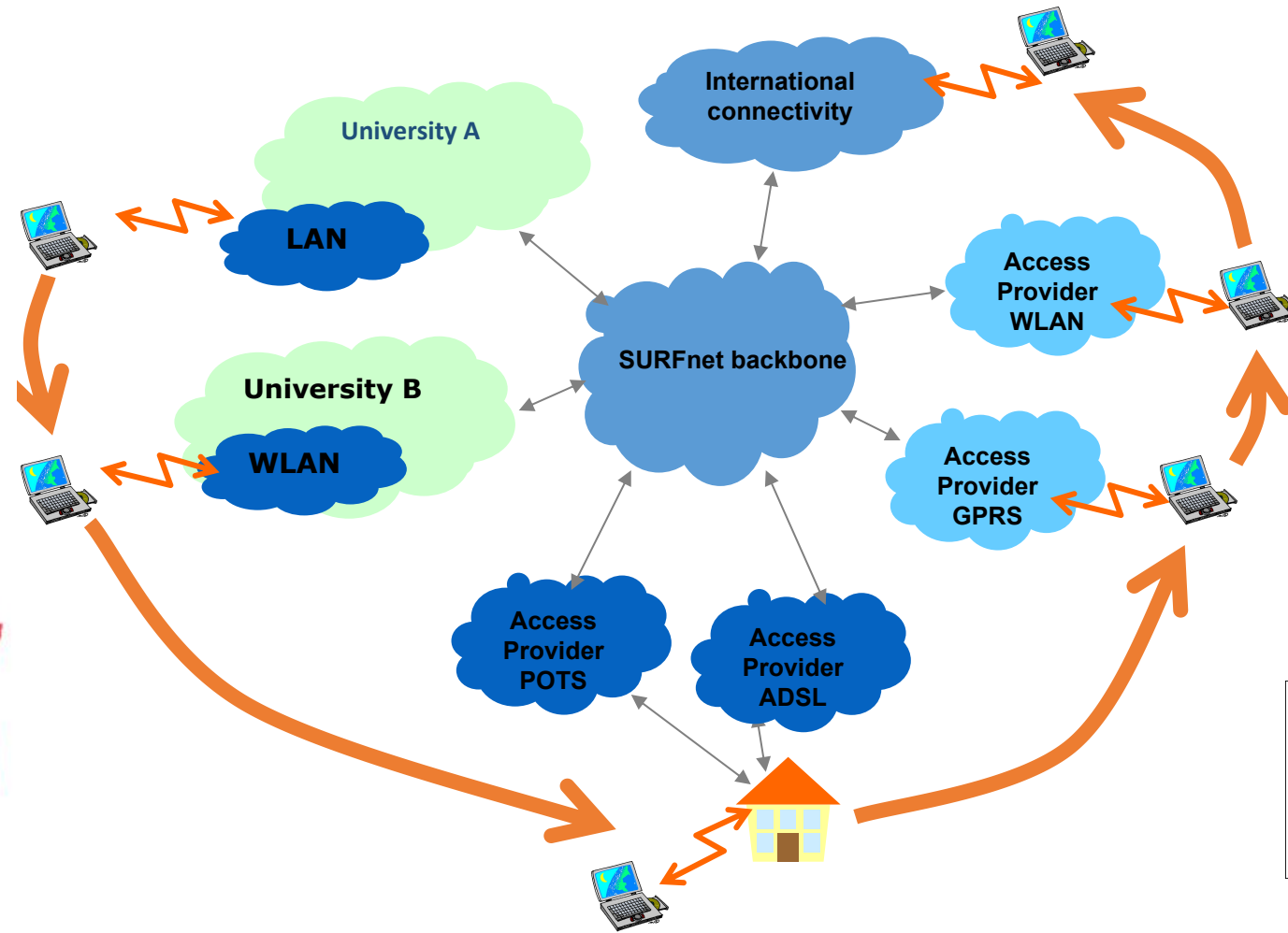


- History of eduroam
- How does eduroam work?
- Lessons Learned
- Outlook to the future
  - But there is a clear pattern....
  - eduGAIN
  - eduTEAMS
- Go west young (wo)man!



# History lesson and eduroam 101

# 2003



**Subject:** [mobility] proposal for inter NREN roaming  
**From:** Klaas Wierenga <Klaas.Wierenga@surfnet.nl>  
**Date:** Thu, 30 May 2002 12:46:43 +0200  
**To:** mobility@terena.nl

Dear all,

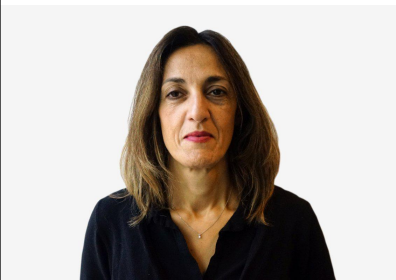
As promised at the mobility workshop a proposal for an inter-NREN wireless LAN roaming test. Based on some investigation we have done in the Netherlands we propose to experiment with the 802.1x standard as that seems the most likely candidate for inter-NREN roaming since it gets a lot of industry attention and scales relatively easy.

I'm looking forward to hear your comments or better ideas.

Cheers,

Klaas

<http://www.terena.org/activities/tf-mobility/start-of-eduroam.pdf>



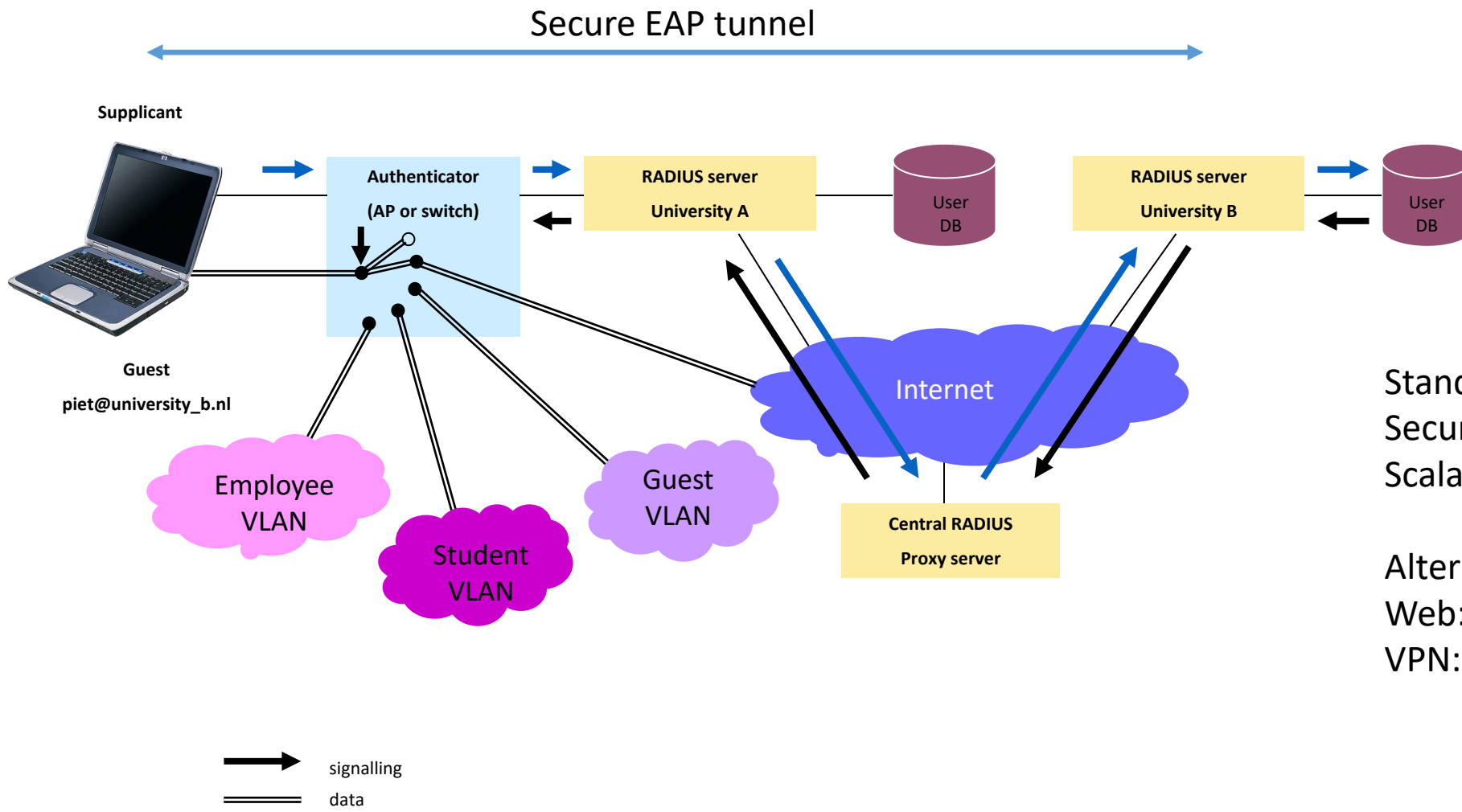
# Requirements

2003

- Identify users uniquely at the edge of the network
  - No session hijacking
- Allow for guest usage
- Scalable
  - Local user administration and authN!
  - Using existing RADIUS infrastructure
- Easy to install and use
- Open
  - Support for all common OSes
  - Vendor independent
- After proper AuthN open connectivity

# Cross-domain 802.1X with VLAN assignment

2003

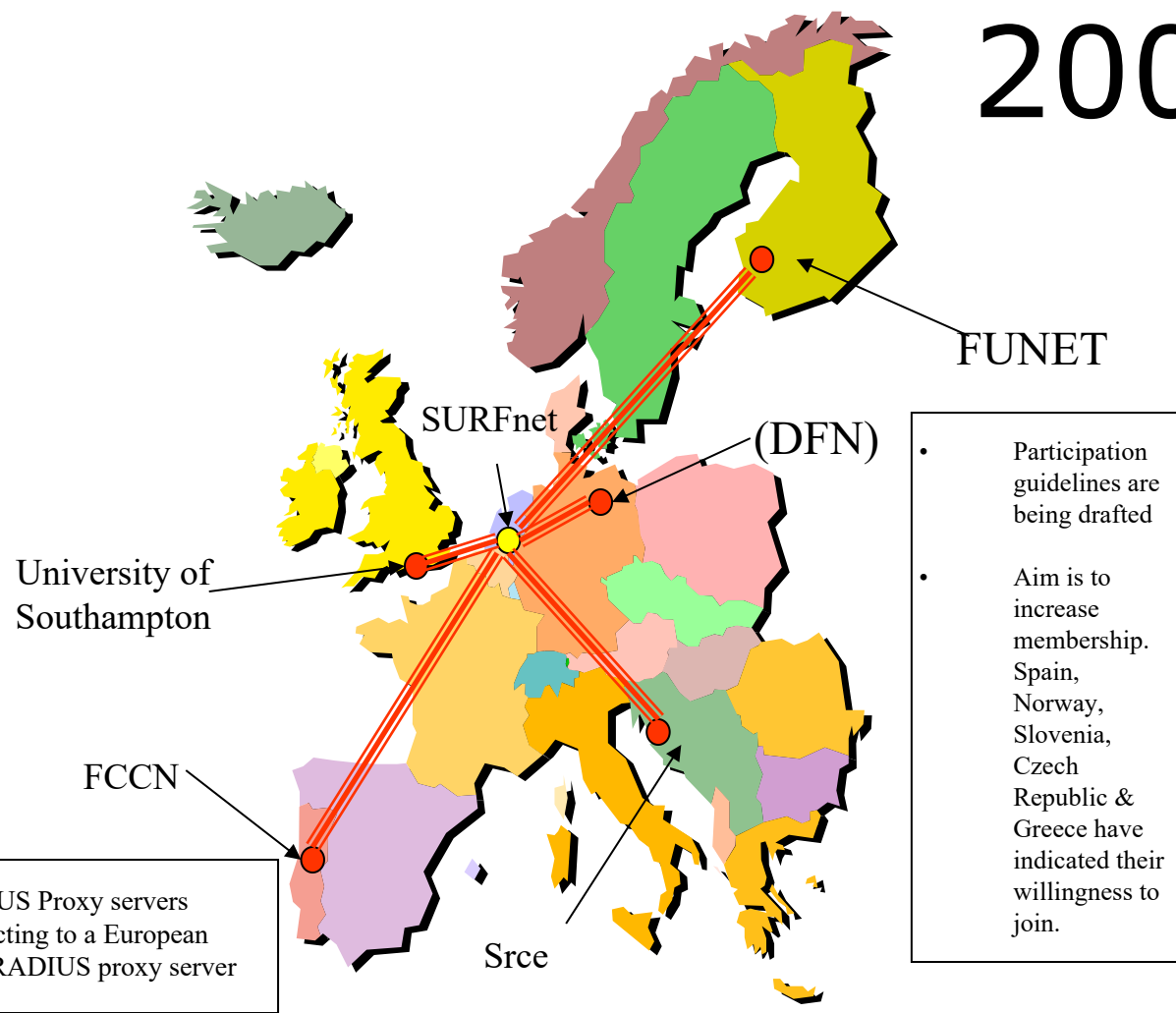


Standardized: 802.1X  
Secure: EAP, vLAN  
Scalable: RADIUS

Alternatives:  
Web: insecure  
VPN: not scalable

# Radius proxy hierarchy

# 2004



- Participation guidelines are being drafted
- Aim is to increase membership. Spain, Norway, Slovenia, Czech Republic & Greece have indicated their willingness to join.

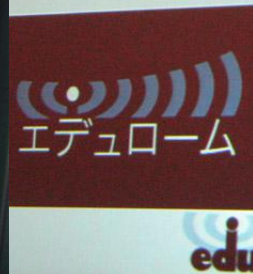


# GEANT2: from a pilot to a service

- JRA5 (2004) → SA5 (2007)
- European eduroam Policy v .1.0 (January 2008)
- Supporting services
- European eduroam confederation
- Service officially started on September 1, 2008
- <http://www.eduroam.org>



2012



## Latest News



TNC2012 closes with a coded invitation to TNC2013 in Maastricht



eduroam® celebrates a decade of providing secure roaming Internet access for users



Jorge Somavilla wins the TNC2012 student poster competition



Postgraduate student posters are highlighted at TNC2012



Video reports from TNC2012

## eduroam® celebrates a decade of providing secure roaming Internet access for users

24/05/2012



eduroam®, the ground-breaking secure roaming connectivity service has passed a major milestone: since its inception 10 years ago eduroam has now spread to over 50 countries globally, with more than 5,000 locations in Europe alone where researchers, students and teachers with eduroam credentials can securely access the Internet while away from their home institution.

A celebration of eduroam's ten-year anniversary took place during the 2012 TERENA Networking Conference (TNC2012), with special recognition for the role of Klaas Wierenga who had the original idea for eduroam while employed at SURFnet, the Dutch National Research and Education Network (NREN) organisation. The anniversary is 30 May 2012.

### Secure roaming access

Internet Engineering Task Force (IETF)  
Request for Comments: 6614  
Category: Experimental  
ISSN: 2070-1721

S. Winter  
RESTENA  
M. McCauley  
OSC  
S. Venaas  
K. Wierenga  
Cisco  
May 2012



## Transport Layer Security (TLS) Encryption for RADIUS

### Abstract

This document specifies a transport profile for RADIUS using Transport Layer Security (TLS) over TCP as the transport protocol. This enables dynamic trust relationships between RADIUS servers.

### Status of This Memo

This document is not an Internet Standards Track specification; it is published for examination, experimental implementation, and evaluation.

This document defines an Experimental Protocol for the Internet community. This document is a product of the Internet Engineering

# 2012

- Global eduroam Governance committee (GeGC)
  - eduroam Compliance Statement, October 2011
- 50+ countries
  - European confederation (43 countries)
  - Australia, Canada, Japan, USA, ...
  - Asia & Pacific, Latin America, Africa, ...
- 5000+ service locations only in Europe
- cumulative stats from 20+ European countries
  - total of over 250 million successful authN ( $\approx$  6% is international)
- ETRLS servers (March 2012):
  - 3.000.000+ successful authN
  - $\approx$  400.000 CSI/days (device/days)
- eduroam is ranked as 27<sup>th</sup> most widely used SSID (no. 10 in 2019!) (<http://www.wigle.net/gps/gps/main/ssidstats>)



Início > Serviços > Serviços Avançados > **eduroam**

## eduroam

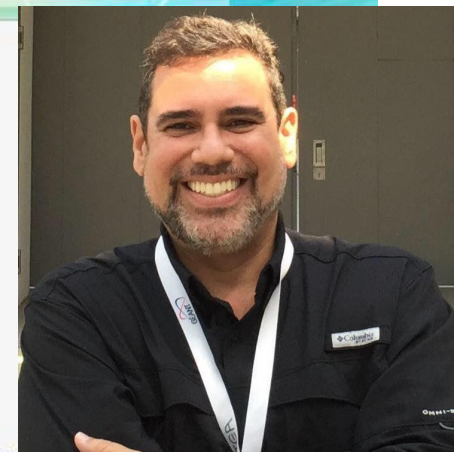


Mobilidade. Esse é o principal benefício que o eduroam (education roaming) oferece à comunidade acadêmica – alunos, professores e servidores. Com o eduroam, você se conecta à rede Wi-Fi da sua instituição de ensino e pesquisa ou de qualquer localidade do mundo, desde que haja pontos de acesso. Se já é um usuário, basta ativar o Wi-Fi do seu computador, celular ou tablet para se conectar à rede sem fio de forma automática. Assim, não é necessário solicitar contas temporárias ou realizar qualquer outro procedimento com o apoio de um suporte local. É só ativar o dispositivo e ficar on-line.

Conheça um pouco mais sobre o serviço!



- CAFE
- Conferência Web
- eduroam
- FileSender@RNP
- fone@RNP
- ICPEdu
- IDC
- Telepresença
- Transmissão de Sinal de TV
- Transmissão de Vídeo ao Vivo
- Videoaula@RNP
- Videoconferência
- Vídeo sob Demanda



# eduroam se consolida y alcanza cifra histórica de roamings en Chile

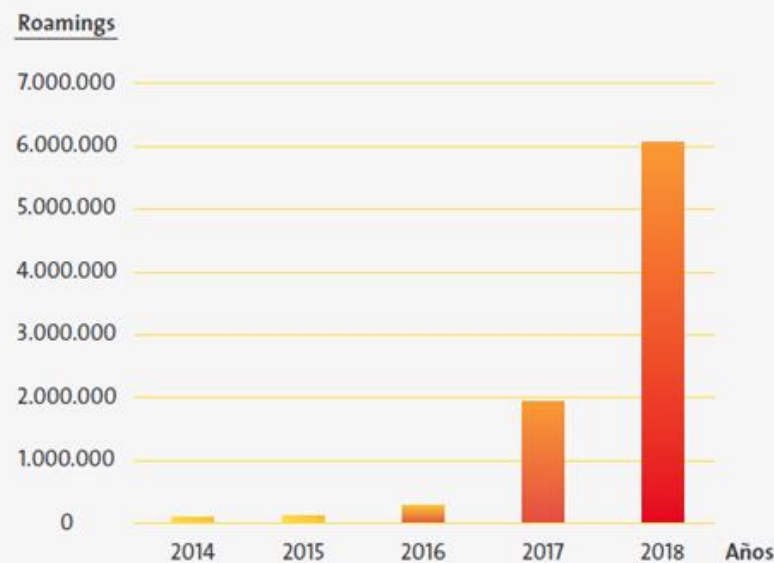
MAYO 27, 2019

- Con más de mil millones de autenticaciones a nivel mundial y presencia en más de 100 países, eduroam se ha convertido en un servicio esencial para estudiantes, académicos, investigadores y funcionarios, brindándoles conectividad en todo el mundo sin interrupciones.

En Chile, ya cuentan con este servicio 15 instituciones asociadas a REUNA y el año 2018 marcó un record en el número de autenticaciones realizadas por usuarios nacionales en Chile y el extranjero, con la histórica cifra de **6.093.030 roamings**. Esto significa un **crecimiento del 217% respecto al año anterior** (ver gráfico).

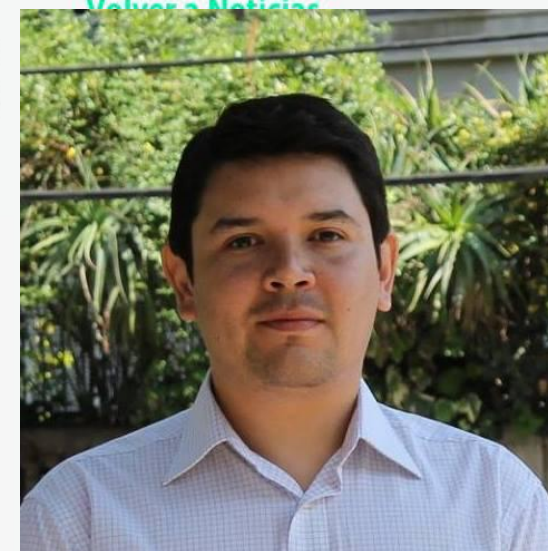
En cuanto a las conexiones realizadas por institución, la Universidad Católica lidera el uso de este servicio, seguida por la Universidad de Chile, la Universidad de Valparaíso y la Universidad Técnica Federico Santa María.

Respecto a los usuarios extranjeros que hicieron roaming en Chile durante 2018, la mayoría de las conexiones fue de España, Alemania, Reino Unido, Estados Unidos y



## Todas las Noticias

Volver a Noticias



VIDEOCONFERENCIAS (49)  
 NOTICIAS (856)  
 CIENCIA Y TECNOLOGÍA (32)  
 NUESTROS SOCIOS (219)  
 PORTADA (140)

# eduroam status in may/2012



Less than  
100 hotspots  
and 10 IdPs  
in Latin  
America



European Commission  
Information Society and Media



## Noticias

# eduroam® celebra una década de proporcionar acceso seguro a Internet móvil para los usuarios

POSTED BY **TERENA /GÉANT** | 24 MAYO 2012 | NOTICIAS - REDCLARA | 24 MAYO 2012

**Un servicio innovador apoyado por GÉANT y TERENA que permite la movilidad para investigadores y estudiantes en 54 países.**

**Cambridge, Reino Unido y Ámsterdam, Países Bajos:** eduroam®, el innovador servicio de conectividad segura y móvil ha alcanzado un hito importante: desde su creación hace 10 años eduroam se ha extendido a más de 50 países a nivel mundial, con más de 5.000 puntos sólo en Europa donde investigadores, estudiantes y académicos con credenciales eduroam puede acceder a Internet de forma segura mientras están fuera de su institución de origen.

La celebración del décimo aniversario de eduroam se llevará a cabo durante la Conferencia de Redes 2012 TERENA (TNC2012), con un reconocimiento especial al aporte de Klaas Wierenga quien tuvo la idea original para el desarrollo de eduroam, mientras trabajaba en SURFnet, la Red Nacional para la investigación y la Educación (RNIE) de Holanda. El aniversario es el 30 de mayo de 2012.



### Acceso seguro a Internet

La comunidad educativa e investigativa de hoy es cada vez más móvil, y depende de la tecnología e Internet para colaborar y comunicarse. eduroam fue creado para satisfacer estas necesidades. Sin necesidad de registrarse en el caso de las cuentas para invitados o de recordar contraseñas adicionales, los usuarios simplemente tienen que abrir sus computadores portátiles o activar sus dispositivos móviles, y

## ¿CÓMO INSTALAR EDUROAM?



### ¡Cómo instalar Eduroam en 3 pasos!

◆ Si tienes Android descarga Eduroam de Play Store

1

Desde cualquier dispositivo ingresa en [Cat.Eduroam.org](http://Cat.Eduroam.org) y haz click en descarga



2

Coloca tu usuario y contraseña



¡Estás LISTO para navegar!

3

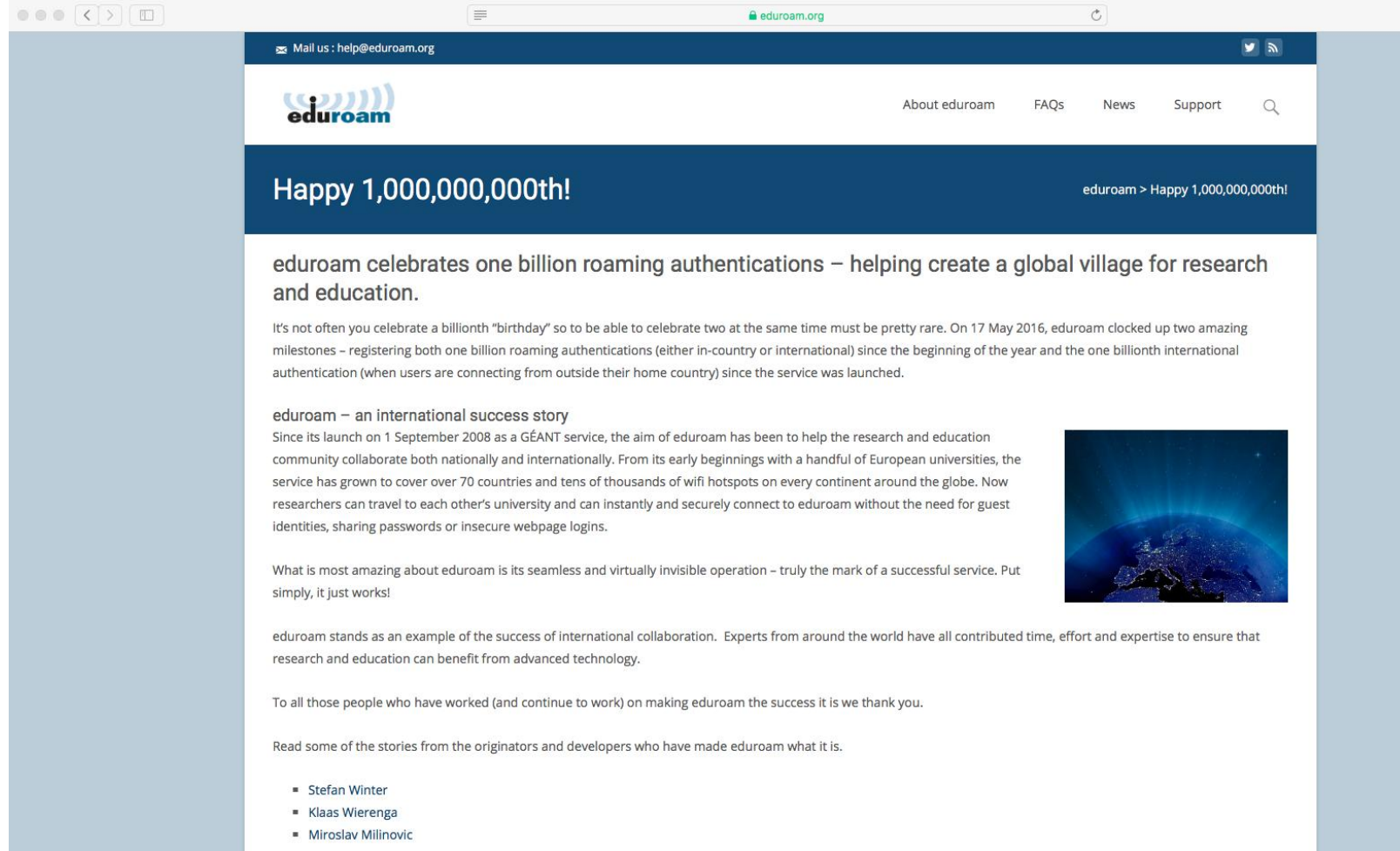
# THE FIELD

EXPLORA HISTORIAS POR: TEMAS ▼ PAÍS ▼ VER TODO SEARCH...



eduroam se está extendiendo rápidamente a través de México

And growing....



The screenshot shows a web browser window displaying the eduroam website. The browser's address bar shows "eduroam.org". The website has a dark blue header with the eduroam logo on the left and navigation links for "About eduroam", "FAQs", "News", and "Support" on the right. Below the header is a dark blue banner with the text "Happy 1,000,000,000th!" and a breadcrumb "eduroam > Happy 1,000,000,000th!". The main content area has a white background and features a headline: "eduroam celebrates one billion roaming authentications – helping create a global village for research and education." Below the headline is a paragraph of text: "It's not often you celebrate a billionth 'birthday' so to be able to celebrate two at the same time must be pretty rare. On 17 May 2016, eduroam clocked up two amazing milestones – registering both one billion roaming authentications (either in-country or international) since the beginning of the year and the one billionth international authentication (when users are connecting from outside their home country) since the service was launched." This is followed by a sub-section titled "eduroam – an international success story" with a paragraph of text. To the right of this text is a small image of Earth from space. Below that is another paragraph of text. Further down is a paragraph of text, and then a list of names: Stefan Winter, Klaas Wierenga, and Miroslav Milinovic.

Mail us : [help@eduroam.org](mailto:help@eduroam.org)

**eduroam** About eduroam FAQs News Support

## Happy 1,000,000,000th!


eduroam > Happy 1,000,000,000th!

### eduroam celebrates one billion roaming authentications – helping create a global village for research and education.

It's not often you celebrate a billionth "birthday" so to be able to celebrate two at the same time must be pretty rare. On 17 May 2016, eduroam clocked up two amazing milestones – registering both one billion roaming authentications (either in-country or international) since the beginning of the year and the one billionth international authentication (when users are connecting from outside their home country) since the service was launched.

#### eduroam – an international success story

Since its launch on 1 September 2008 as a GÉANT service, the aim of eduroam has been to help the research and education community collaborate both nationally and internationally. From its early beginnings with a handful of European universities, the service has grown to cover over 70 countries and tens of thousands of wifi hotspots on every continent around the globe. Now researchers can travel to each other's university and can instantly and securely connect to eduroam without the need for guest identities, sharing passwords or insecure webpage logins.



What is most amazing about eduroam is its seamless and virtually invisible operation – truly the mark of a successful service. Put simply, it just works!

eduroam stands as an example of the success of International collaboration. Experts from around the world have all contributed time, effort and expertise to ensure that research and education can benefit from advanced technology.

To all those people who have worked (and continue to work) on making eduroam the success it is we thank you.

Read some of the stories from the originators and developers who have made eduroam what it is.

- Stefan Winter
- Klaas Wierenga
- Miroslav Milinovic

2016

Independent Submission  
Request for Comments: 7593  
Category: Informational  
ISSN: 2070-1721

K. Wierenga  
Cisco Systems  
S. Winter  
RESTENA  
T. Wolniewicz  
Nicolaus Copernicus University  
September 2015

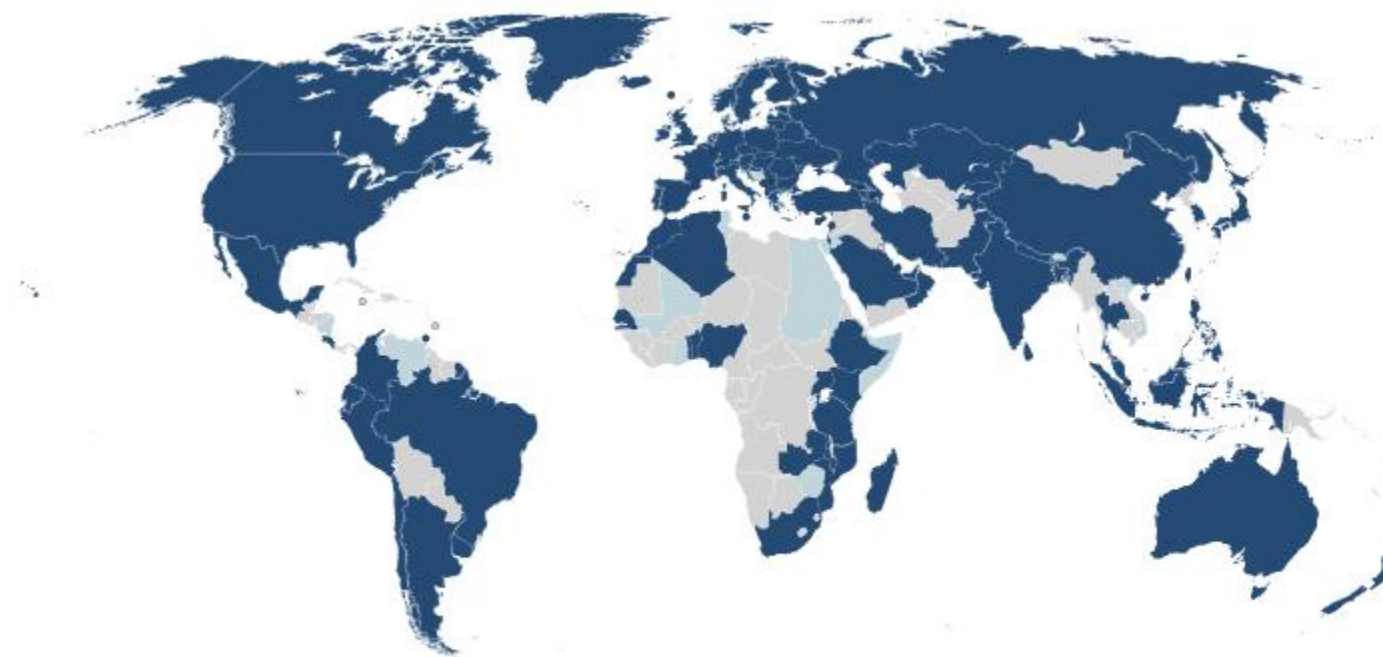


## The eduroam Architecture for Network Roaming

### Abstract

This document describes the architecture of the eduroam service for federated (wireless) network access in academia. The combination of IEEE 802.1X, the Extensible Authentication Protocol (EAP), and RADIUS that is used in eduroam provides a secure, scalable, and deployable service for roaming network access. The successful deployment of eduroam over the last decade in the educational sector may serve as an example for other sectors, hence this document. In particular, the initial architectural choices and selection of standards are





Roaming Operators	101
Pilots	18

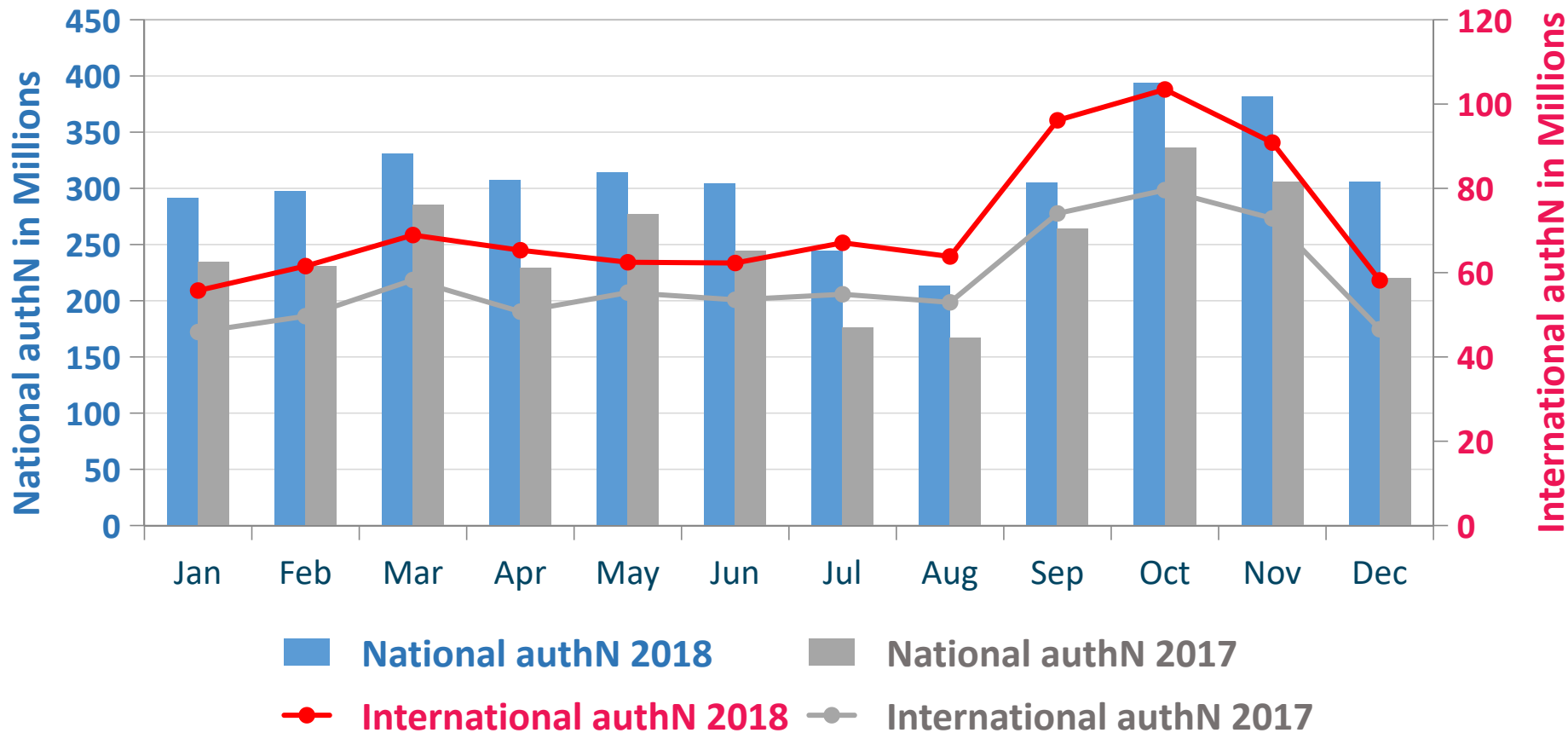


- 101 NROs members (49 in Europe)
- 18 NROs candidates
- New NROs: Albania, Benin, Ethiopia, Madagascar, Nigeria, Tanzania, Togo, Bangladesh, Iran, Oman, Nepal, Malaysia
- eduroam database facts from 80 reporting countries (46 in Europe)
  - 25,015 Service locations registered (17,128 in Europe)
  - 6,269 Institutions registered (5,524 in Europe)

**12 new NROs**

**11% growth**

**21% growth**



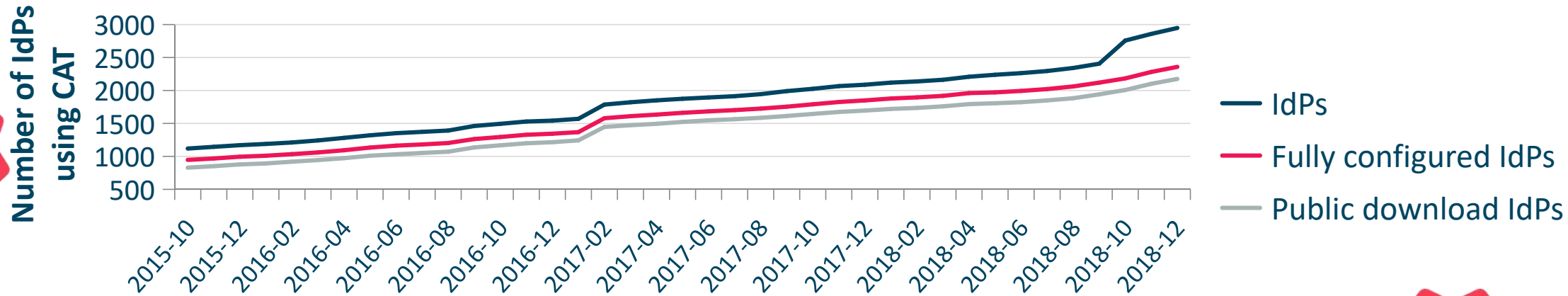
24% year growth national authN

23% year growth international authN

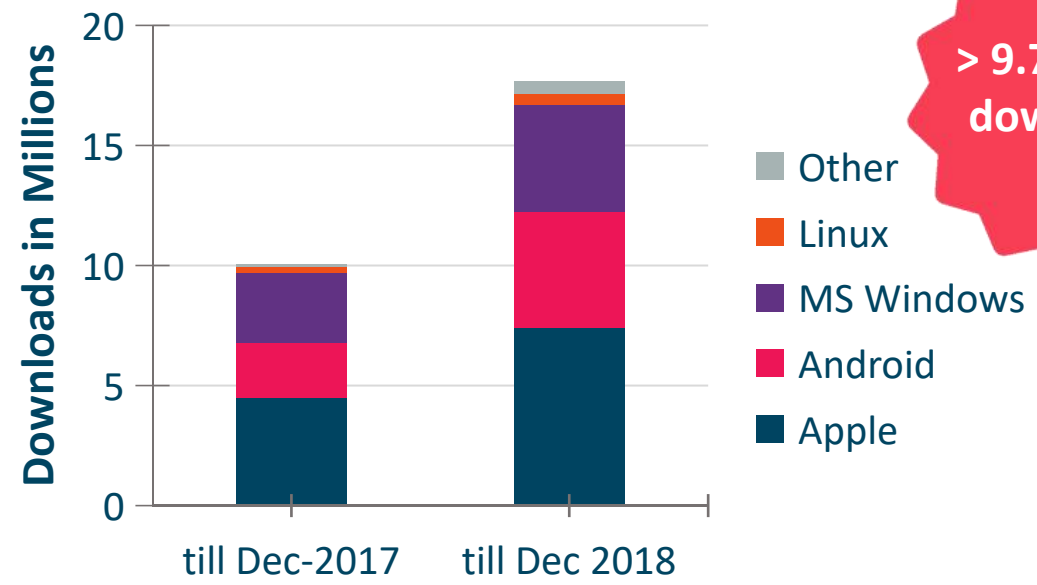
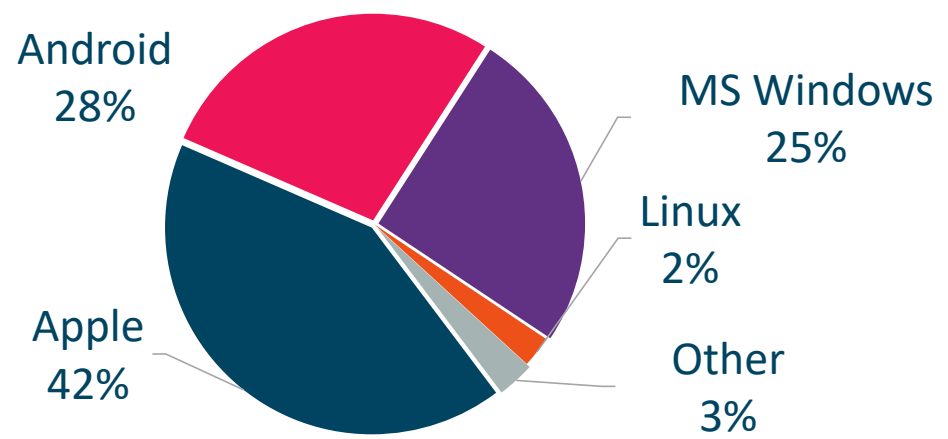
> 1 billion international authN

# Service uptake – Configuration Assistant Tool (CAT)

**2948 IdPs  
> 50%  
growth**



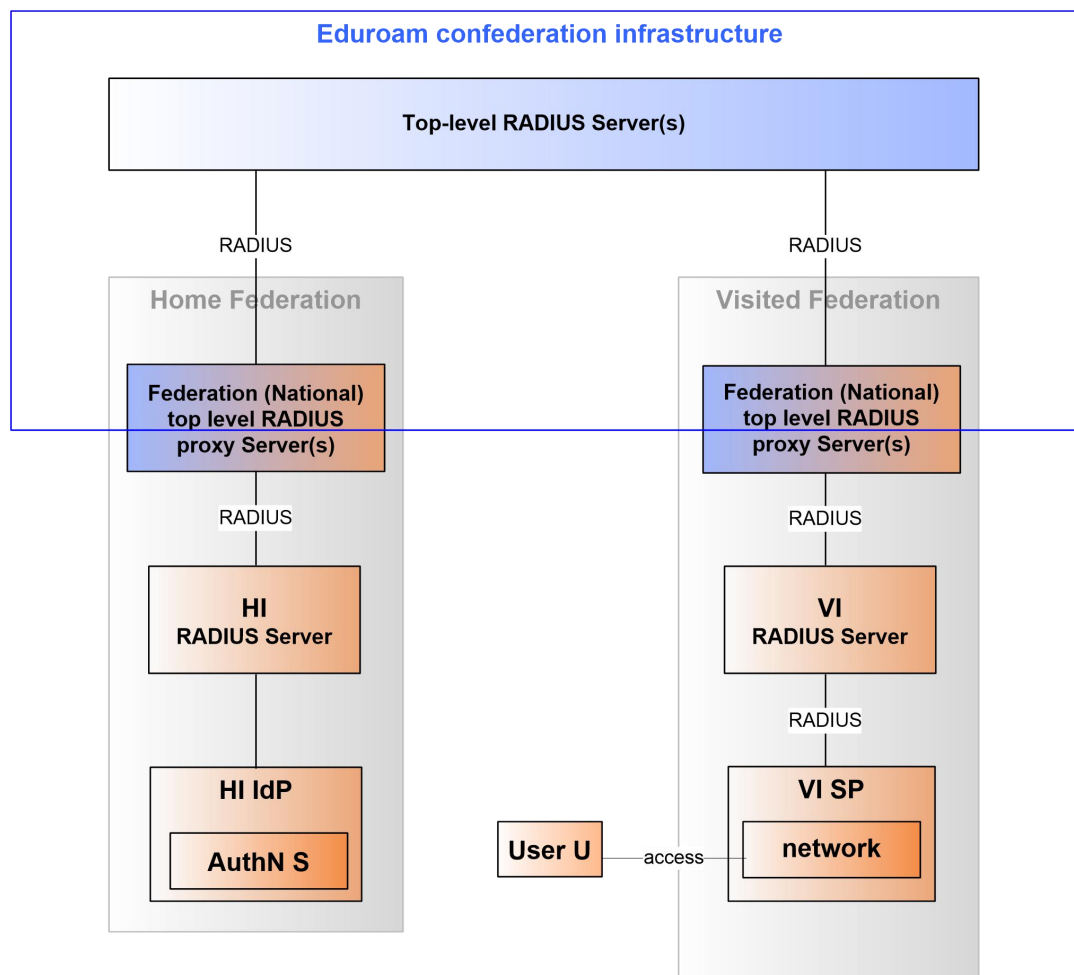
## Installers download statistics all time



**> 9.7 million  
downloads**



# Lessons learned

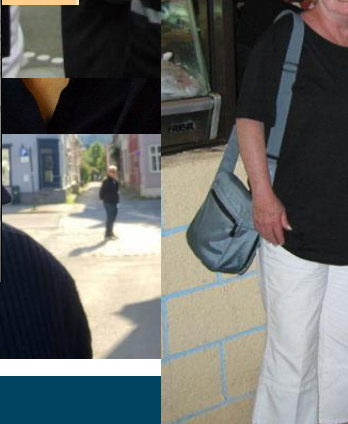
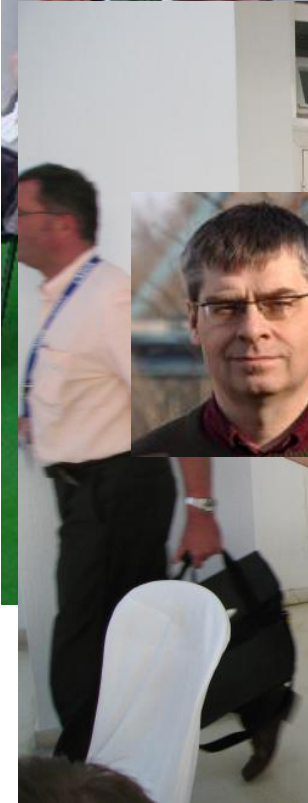
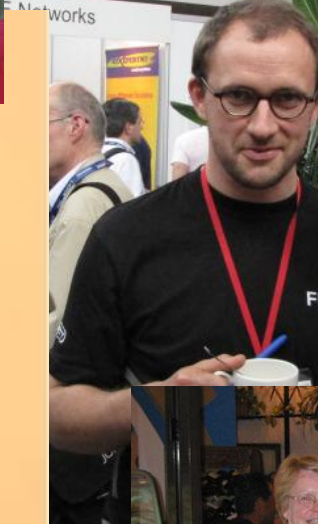
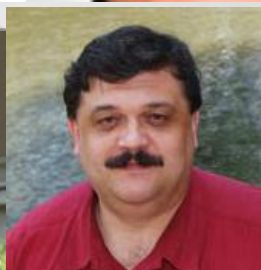
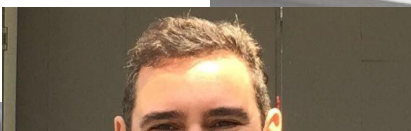


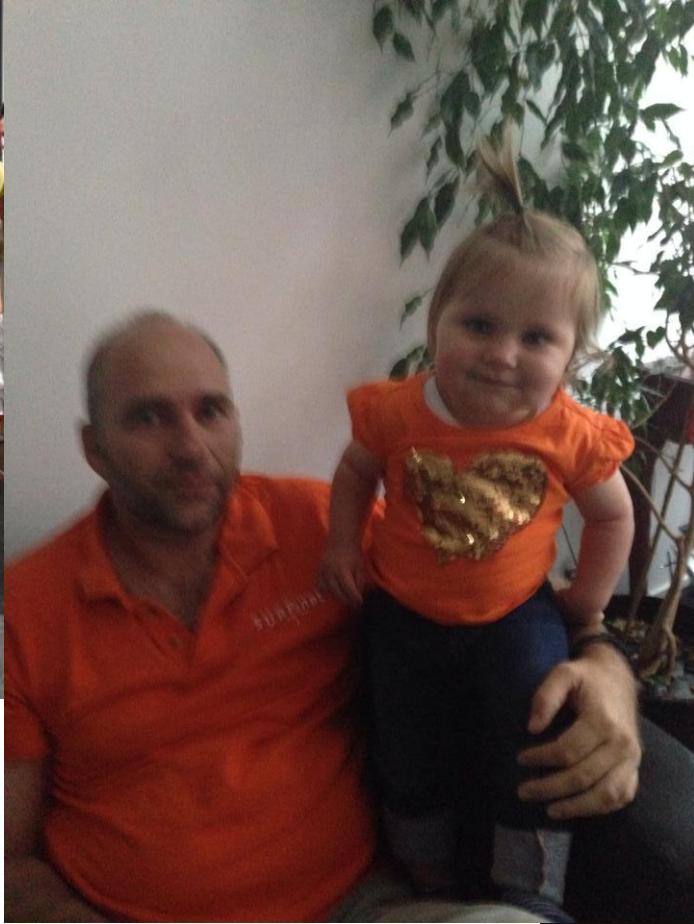
- TERENA TF-Mobility
- GN2 JRA5
  - IETF
- GN2 SA5
  - European eduroam policy
- GeGC
  - eduroam compliance statement
- GN4-3 WP5
  - WBA, WFA

Luck



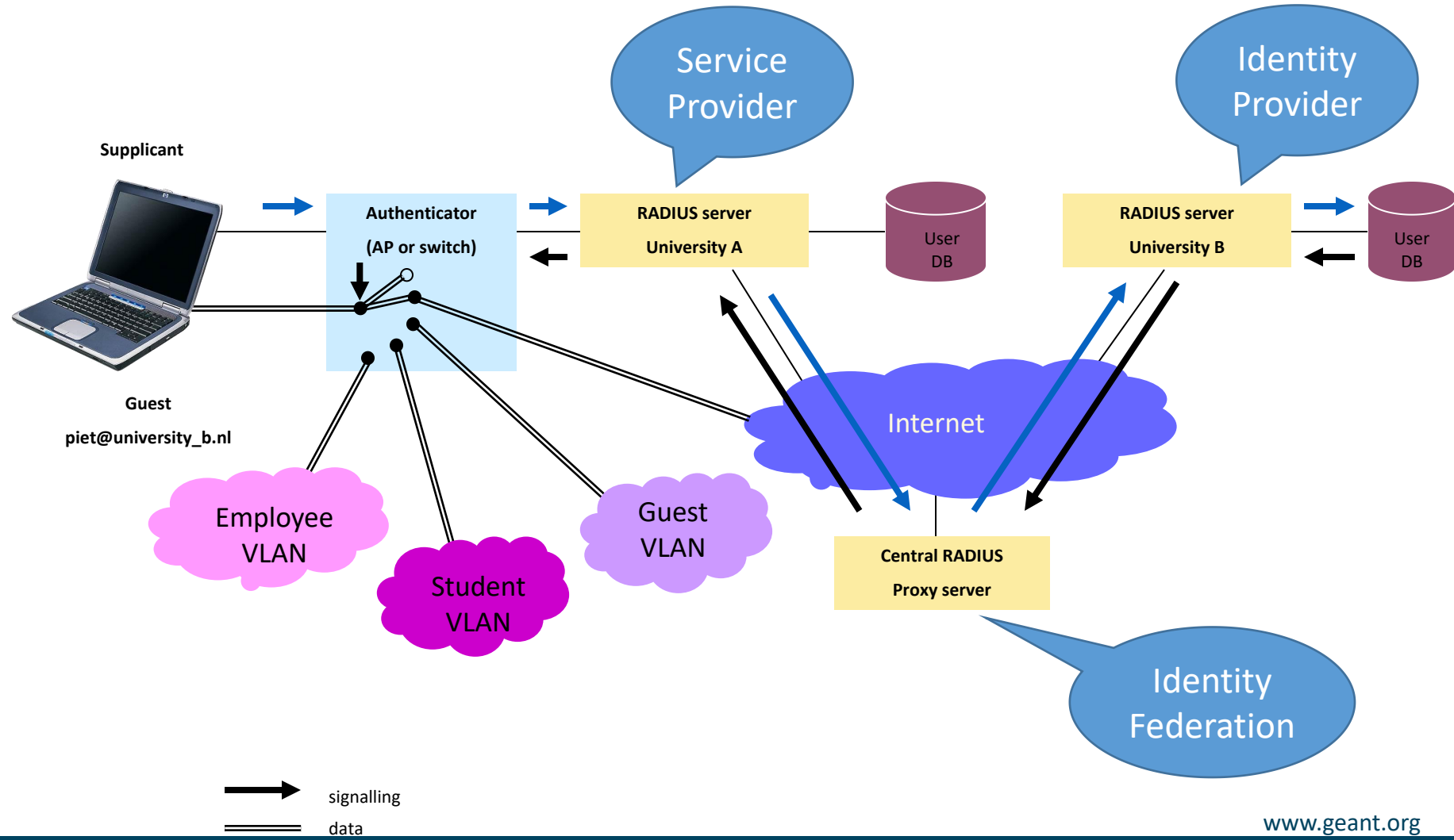
# People

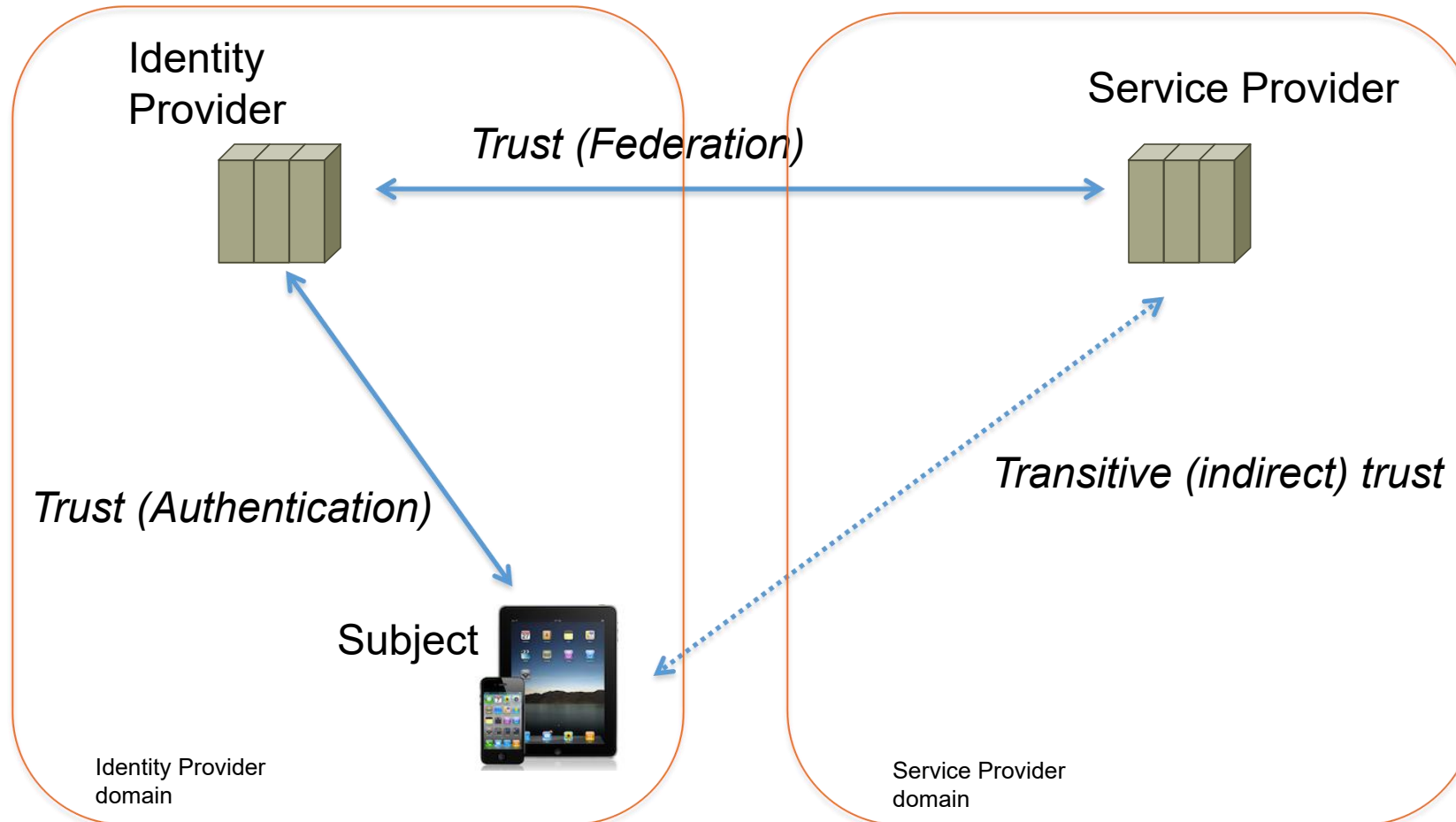




Hasta el futuro,  
siempre!

# Federated access

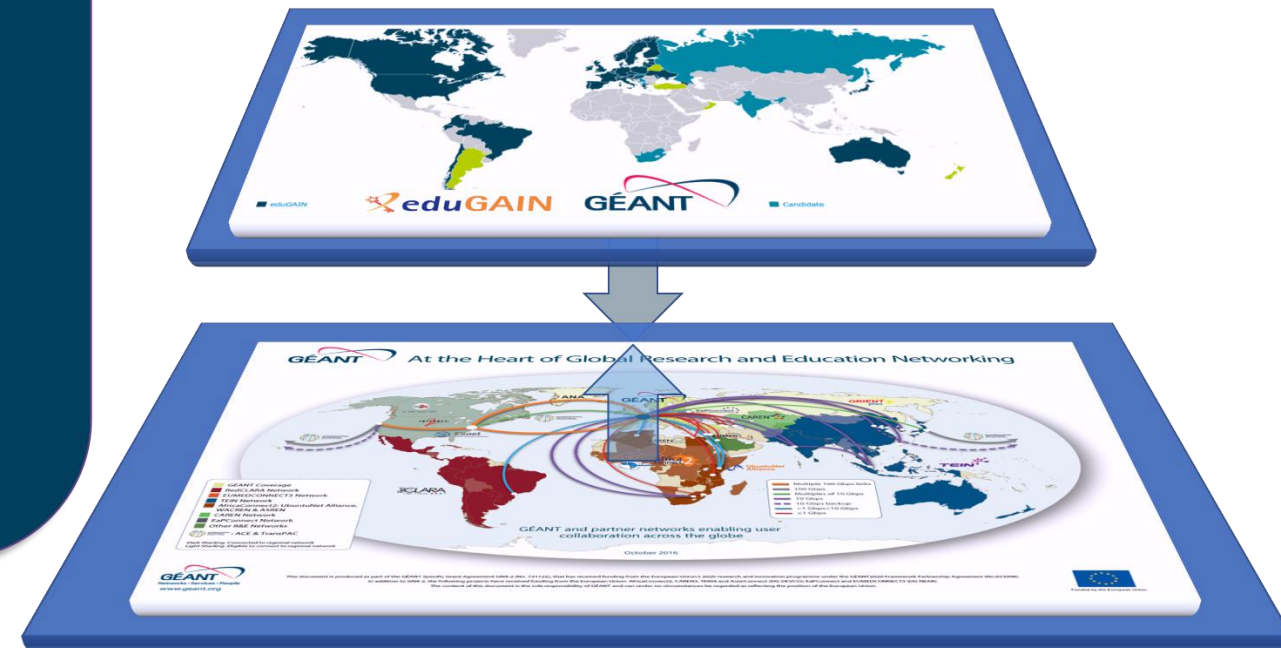




*“I, IdP, claim that the Subject is successfully authenticated and is authorized to access the service offered by Relying Party”*



- Allows researchers to use ONE digital identity to access MANY services and resources available in eduGAIN
- Access to resources based on the user's affiliation
  - AuthZ done by resources

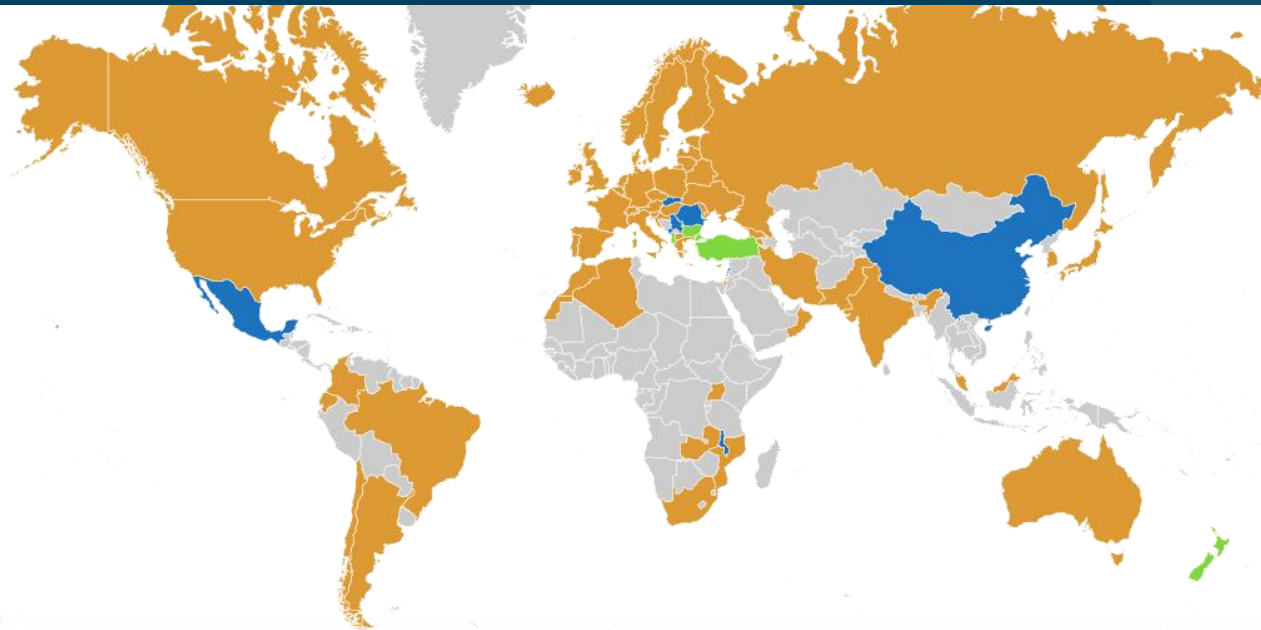


# eduGAIN depends on federations



SWITCHaai

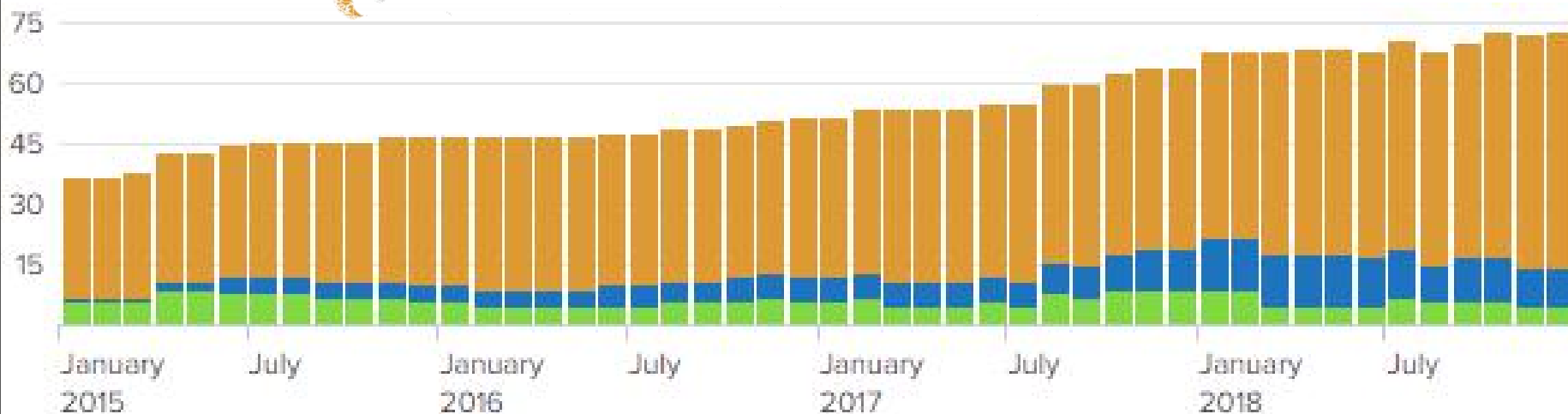




■ Members - 59  
■ Voting only - 5  
■ Candidates - 9

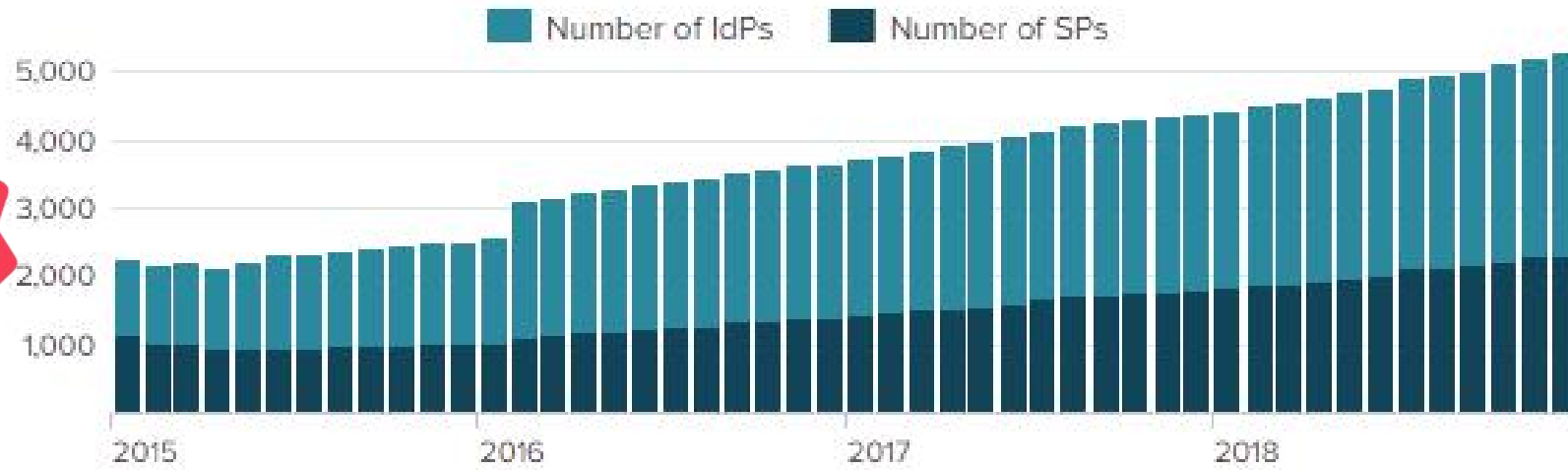
12 new members

- Albania – RASH
- Bulgaria – BIF
- Hong Kong – HKAF
- Malaysia – SIFULAN
- Morocco – eduIDM.ma
- Mozambique – CAFMoz
- Oman – OMREN
- Pakistan – PKIFED
- Russia – RUNNET and φEDUrus
- Uganda – RIF
- Zambia – FIDREN



# Service uptake – Number of entities and entity categories

**72.6% IdPs  
eduGAIN  
world  
coverage**



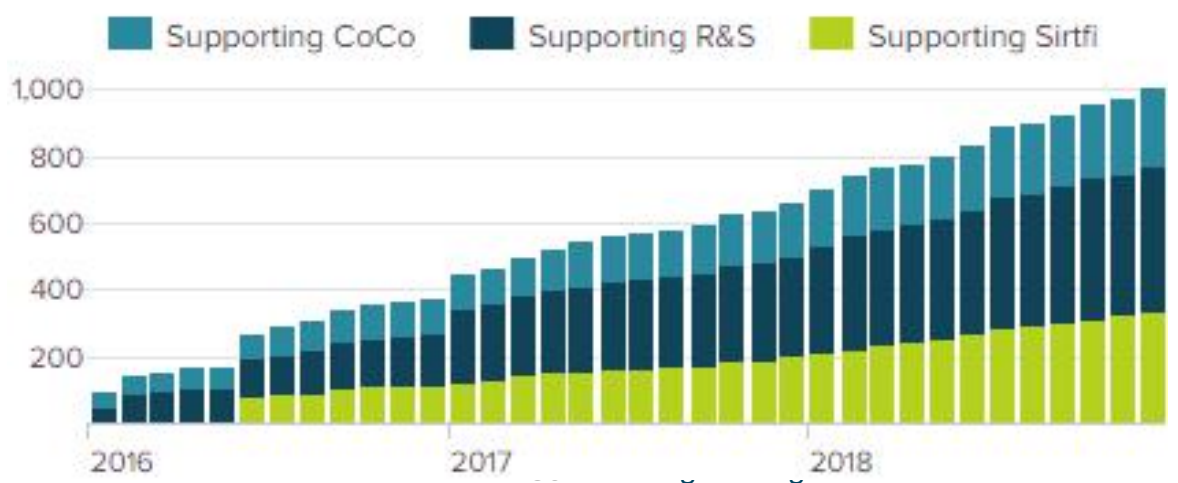
Entities in eduGAIN	
All entities	5281
IdPs	2962
SPs	2318
Standalone AAs	4

**39%  
more  
SPs**

Number of eduGAIN SPs supporting Entity Categories



Number of eduGAIN IdPs supporting Entity Categories



# AARC Blueprint Architecture - Enabling an ecosystem of solution on top of eduGAIN

- A Blueprint **Architecture** for authentication and authorization
  - A set of architectural and policy building blocks on top of eduGAIN
- eduGAIN and the Identity Federations
  - A solid foundation for federated access in Research and Education



A service to enable use of federated identities in research communities

Partner for any e-Infra or Research Infra inc. “long tail”, informal groups



### Components

- Proxy & Identity Hub
- Membership Management service
- Discovery Service
- Metadata Service
- **Second Factor Authentication (Pilot!)**

### Characteristics

- Full implementation AARC Blueprint Architecture
- Single- and multi-tenant options
- Sustainability and strategic partnerships

## Parting thoughts

- Science is global
- The R&F
- eduroam  
collaboration
- eduGAIN  
international
- It is all about trust
  - Tech
  - **Inte**

“Without trust we don’t truly collaborate; we merely coordinate or, at best, cooperate. It is trust that transforms a group of people into a team.”

Stephen Covey

Thank you!

- Questions?
- Preguntas?
- Questões?
- Vragen?
- Domande?



Thanks to: Miro (stats), Martin Bech (pics), eduroam crowd (pics)