Kipper – a Grid bridge to Identity Federation

Andrey Kiryanov

Brief

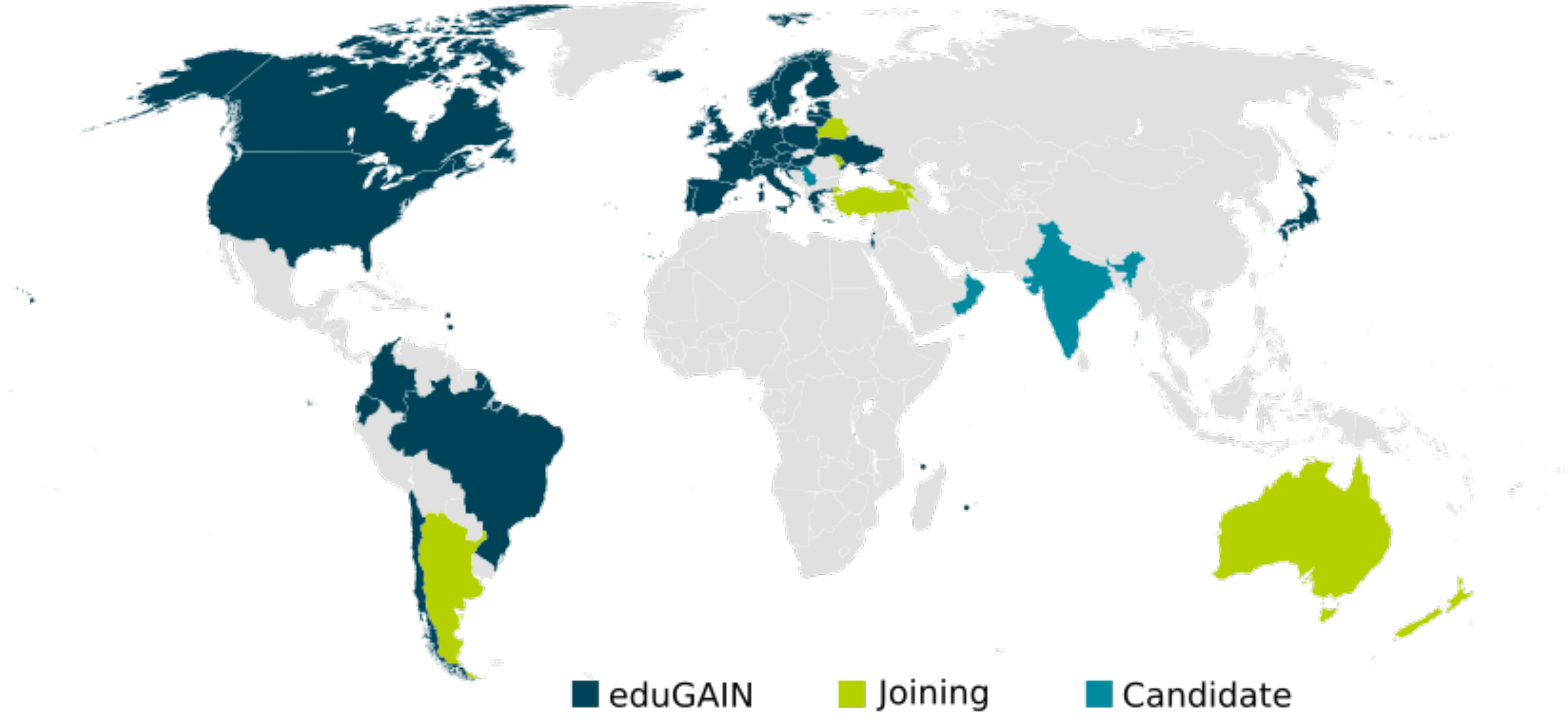
The Kipper client software combines tools and utilities to extend a Web Application to:

- Enable login via federated SSO like eduGAIN
- Retrieve a SAML2 Identity Assertion from SSO
- Transform a SAML2 Identity Assertion into an X.509 proxy certificate with VOMS extensions
- Do it all directly in browser context with JavaScript API
- The result: “X.509-free” access to the Grid

WLCG pilot service

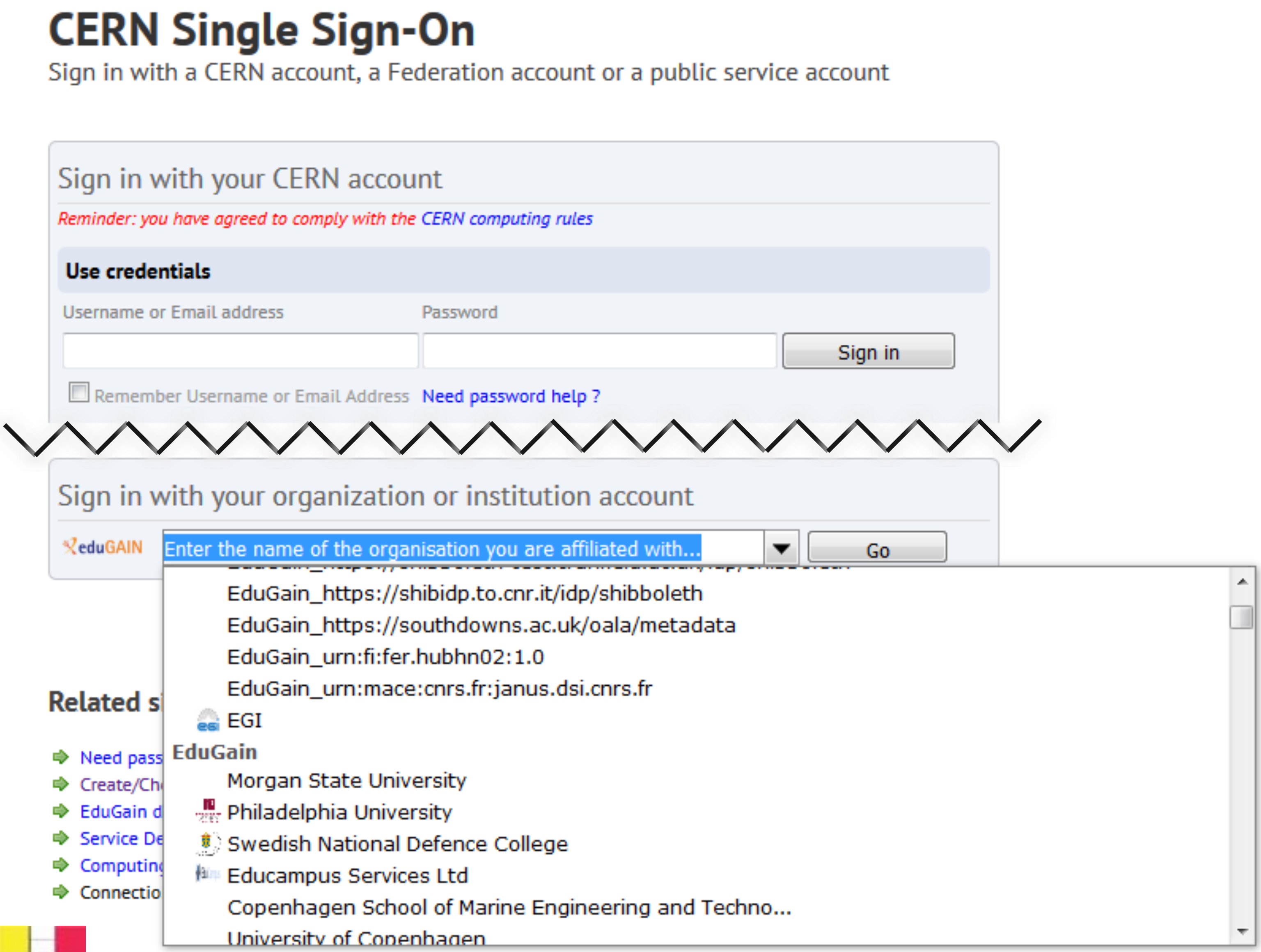
- Goal: give access to WLCG resources using home institute's credentials
  - No need for X.509 certificates
- WLCG working group dedicated to Identity Federation
  - CLI (job submission, admin tasks)
  - Web-based (grid portals for job submission, data transfers, etc.)
- Focus on the web-based solution

eduGAIN



- Built on existing federations and infrastructures
- CERN participates in eduGAIN via SWITCHaai
- Many NRENs participate in eduGAIN too

Access via CERN SSO



CERN Single Sign-On

Sign in with a CERN account, a Federation account or a public service account

Sign in with your CERN account

Reminder: you have agreed to comply with the CERN computing rules

Use credentials

Username or Email address

Password

□ Remember Username or Email Address

Need password help ?

Sign in with your organization or institution account

Enter the name of the organisation you are affiliated with...

EduGain_https://shibidp.to.cnr.it/idp/shibboleth

EduGain_https://southdowns.ac.uk/oala/metadata

EduGain_urn:fi:fer.hubhn02:1.0

EduGain_urn:mace:cnrs.fr:janus.dsi.cnrs.fr

EGI

EduGain

Morgan State University

Philadelphia University

Swedish National Defence College

Educampus Services Ltd

Copenhagen School of Marine Engineering and Techno...

University of Copenhagen

Related si

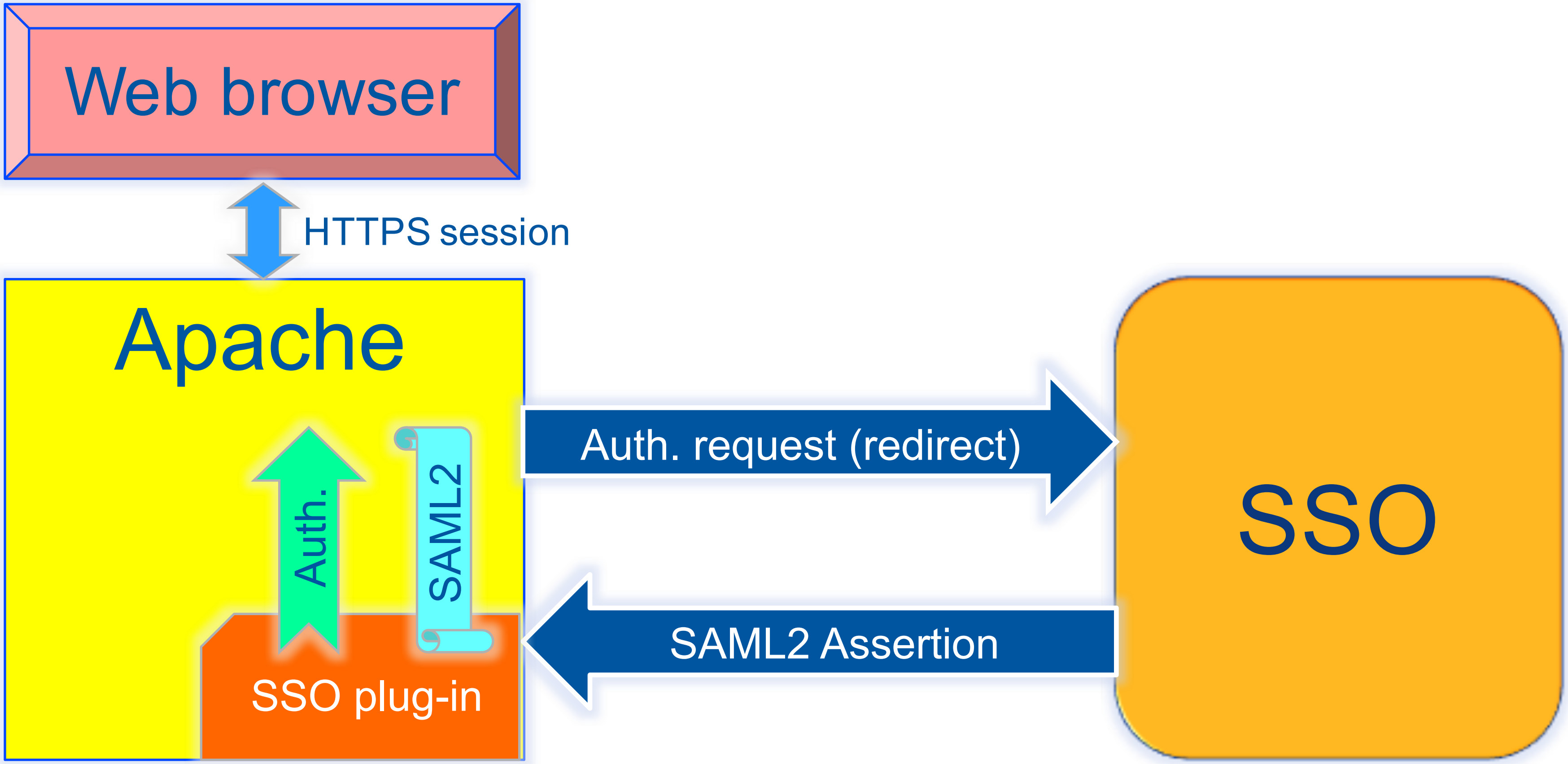
- Need pass
- Create/Ch
- EduGain d
- Service De
- Computing
- Connectio

IdF and CERN SSO

- CERN SSO service is based on Microsoft ADFS (Active Directory Federation Services)
- In order to benefit from SSO your Apache web server needs a special plug-in:
  - Shibboleth – first solution supported by CERN, widespread, supports all possible standards, not easy to configure
  - Mellon – pure SAML2 SP. Minimal configuration, supported by CERN since 2015

Kipper supports both natively

SSO log-in process



SAML2 assertion is an XML-formatted signed attribute list, which contains your name, e-mail address, e-groups, etc.

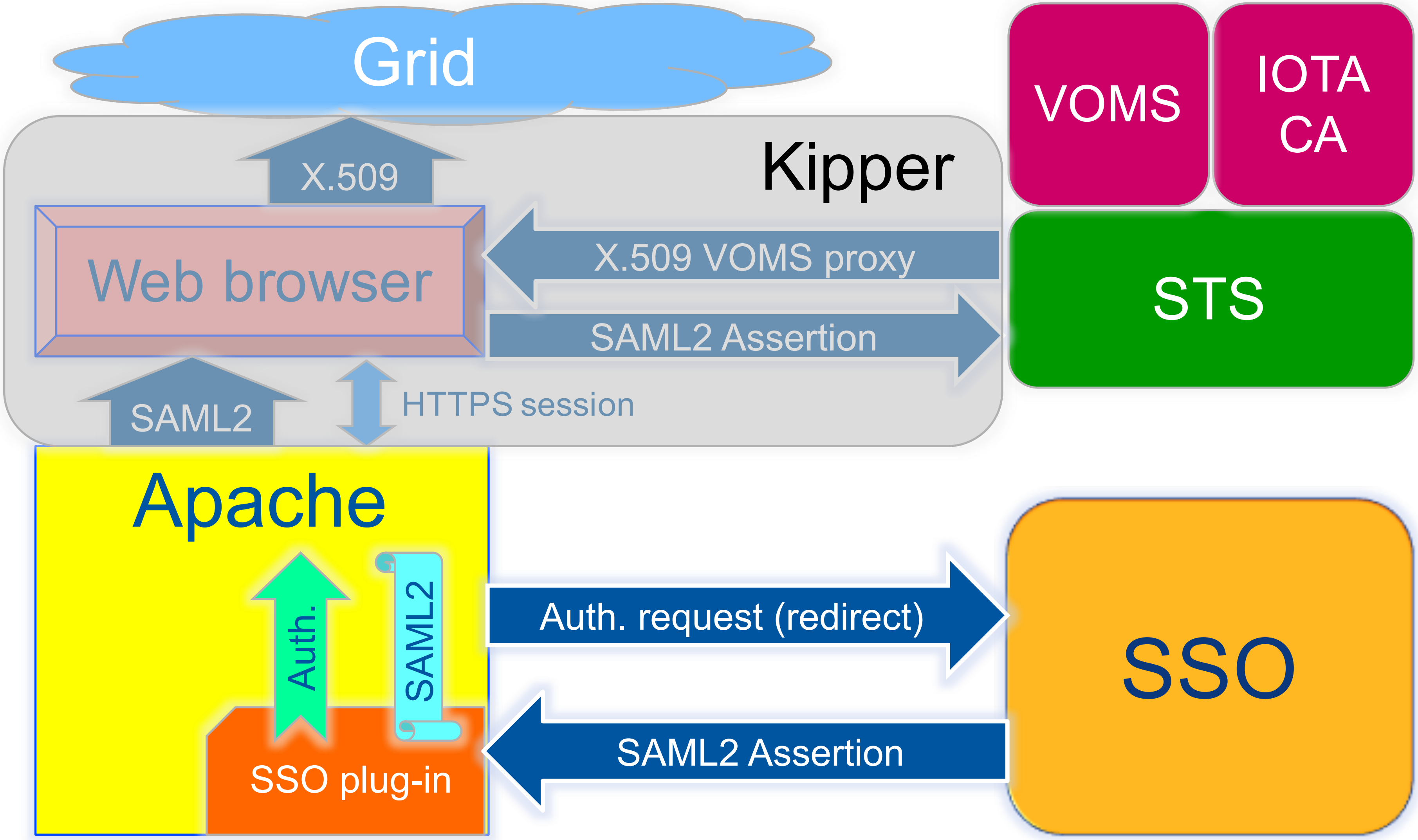
Kipper cornerstones

- SAML2 to X.509 translation
  - STS
- Short-living X.509 certificates
  - IOTA CA
- VO membership
  - VOMS

STS

- Security Token Service (STS) consumes SAML2 assertions and produces X.509 credentials in return
  - STS is an implementation of WS-Trust OASIS standard and it speaks SOAP
- STS has been developed in the context of the EMI project and was extended at CERN to support:
  - CERN IOTA CA specific client
  - VOMS DN mapping registration and caching (IOTA DN is an alias to VOMS DN)

STS integration in a Web Application



IOTA CA

- IOTA CA (Identifier-Only Trust Assurance Certification Authority) issues short-living (days) X.509 certificates
- First implementation was issuing certificates to any STS client (provided that it had a valid assertion)
- Now STS can ask to sign certificates only for users registered in the configured VOMS
  - Handy if you need a restricted set of eduGAIN members that would get a valid certificate

DN uniqueness

- IOTA CA should use an eduGAIN persistent identifier attribute to return a unique DN
- Which attribute(s) can be considered persistent and unique in eduGAIN?
  - *eduPersonPrincipalName* is considered unique in theory but it can be reassigned according to local policy
  - Only IDPs providing unique *eduPersonPrincipalName* will be enabled in STS

CERN LCG IOTA CA

- A document containing all the details for the new CA at CERN has been prepared in 2015 by CERN IT IdF Team with help from us
- The document went through the review process of EUGridPMA and was accepted
- CERN LCG IOTA CA is included in IGTF Trusted Anchor Distribution since version 1.72

Open issues

- The new DN is associated by STS to the already existing one in VOMS, but the grid middleware is not aware of this alias
  - Two different users (not always an issue since proper VOMS extensions are included in the certificate)
- Dedicated STS instance per each WebApp+VO combination
  - VOMS DN mapping and checks
  - WebApp and STS need to consume the same SAML2 assertion

Use cases

- What kind of web applications could benefit from Kipper?
  - All kinds of portals that need to talk directly to Grid resources with X.509 authentication
  - Data and workload management interfaces
- What are the benefits?
  - Clear distinction between users (no catch-all robot proxies)
  - No need to maintain App-specific user database
  - Security, VOMS support
- What needs to be changed in the WebApp?
  - Backend web server needs to be Apache on Linux (no IIS yet)
  - Server side needs to accept user proxies from browser via specific delegation mechanism
  - A dedicated instance of STS needs to be deployed

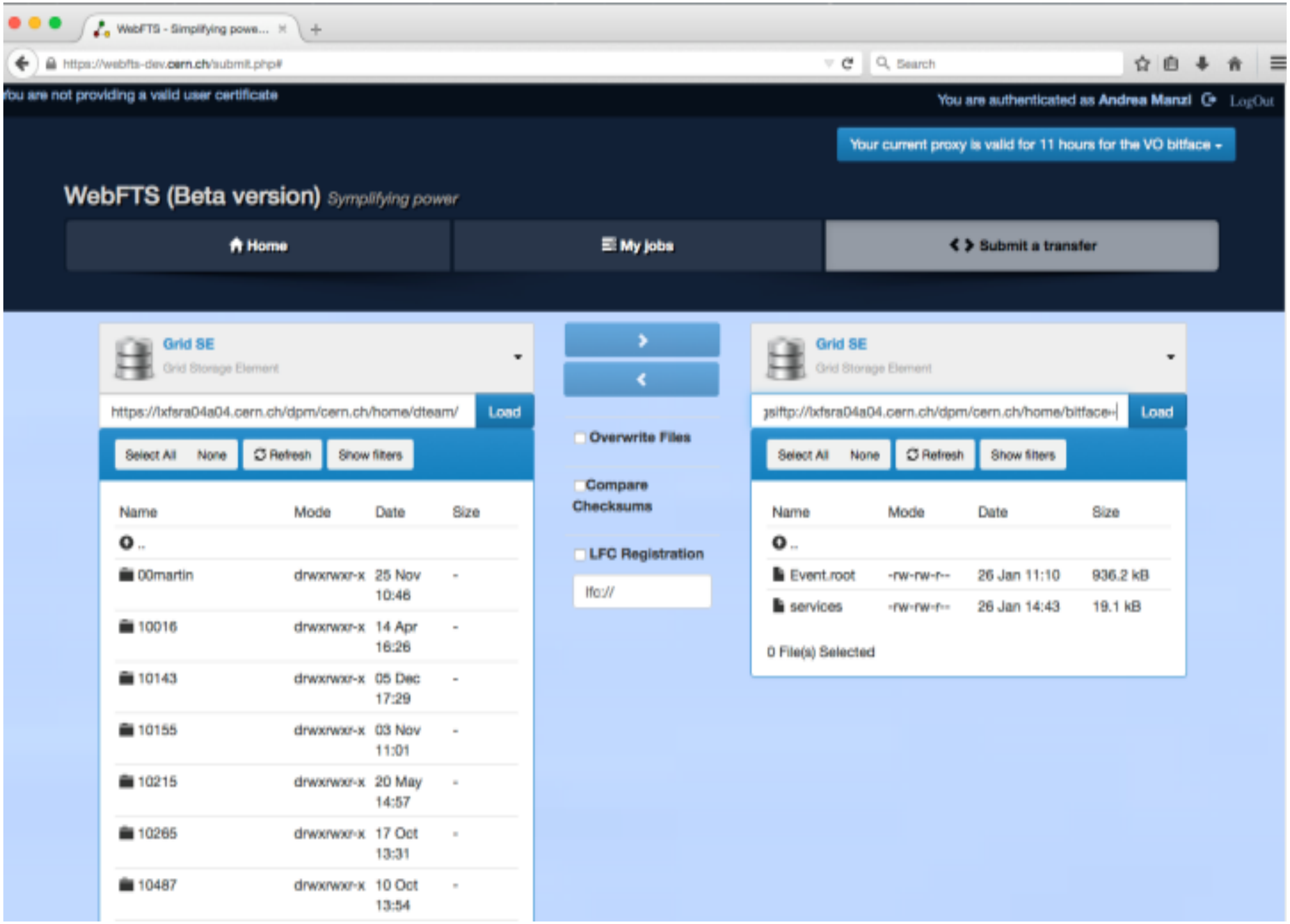
Ongoing work

- CERN is developing a portal to enable eduGAIN members that are also members of LHC VOs to get a proxy certificate out of their eduGAIN credentials
- There's an ongoing integration of ATLAS Panda Monitor with SSO which will allow then exploiting Kipper to transparently access job/monitoring log files stored on Grid storage elements

What is WebFTS?

- https://webfts.cern.ch
- Web-based tool to transfer files between Grid/cloud storages
- Modular protocol support
    - gsiftp, http/dav, xroot and srm
    - Cloud extensions: Dropbox

WebFTS pilot



WebFTS - Simplifying powe...
https://webfts-dev.cern.ch/submit.php#
Search

ou are not providing a valid user certificate

You are authenticated as Andrea Manzi LogOut

Your current proxy is valid for 11 hours for the VO bitface

WebFTS (Beta version) *Symplifying power*

Grid SE
Grid Storage Element

https://lxfsra04a04.cern.ch/dpm/cern.ch/home/dteam/ Load

Name	Mode	Date	Size
..			
00martin	drwxrwxr-x	25 Nov 10:46	-
10016	drwxrwxr-x	14 Apr 16:26	-
10143	drwxrwxr-x	05 Dec 17:29	-
10155	drwxrwxr-x	03 Nov 11:01	-
10215	drwxrwxr-x	20 May 14:57	-
10265	drwxrwxr-x	17 Oct 13:31	-
10487	drwxrwxr-x	10 Oct 13:54	-

□ Overwrite Files

□ Compare Checksums

□ LFC Registration

lfc://

Grid SE
Grid Storage Element

gsiftp://lxfsra04a04.cern.ch/dpm/cern.ch/home/bitface Load

Name	Mode	Date	Size
..			
Event.root	-rw-rw-r--	26 Jan 11:10	936.2 kB
services	-rw-rw-r--	26 Jan 14:43	19.1 kB

0 File(s) Selected

“X.509-free” access

- X.509 delegation is needed to let WebFTS access the Grid resources on user’s behalf
  - User needs to make his private key available to the browser
  - Browser keystore is not accessible via JavaScript API
- A first prototype integrated with STS and IOTA CA was implemented at the end of 2014
  - WebFTS-specific solution, no Kipper yet
  - Initially STS returned a plain certificate then delegated to FTS3 which was in charge of requesting VOMS extensions

Segregation of Kipper from WebFTS

- Detached codebase of STS and Kipper
- WebFTS uses Kipper as a library
- Following the changes in STS with the generation of VO-specific certificates, we have adapted WebFTS (and Kipper) to use proxy certificates and delegate them to FTS3
  - Move to RFC proxy generation was needed
  - Still both scenarios are supported
- WebFTS is the first technology demonstrator

Conclusions

- Kipper enables Federated Identity Web-based access to WLCG resources
- IdF-enabled WebFTS is a working prototype (available only inside CERN so far)
  - ATLAS has kindly agreed to provide its VOMS for testing purposes
  - CERN LCG IOTA CA is globally deployed on WLCG sites
- This is an important step towards “X.509-free” access to Grid resources

Acknowledgements

Andrea Manzi

Oliver Keeble

Henri Mikkonen

Romain Wartel

Emmanuel Ormancey

This work was funded in part by the Russian Ministry of Education and Science
under contract №14.Z50.31.0024

References

- https://gitlab.cern.ch/sts
  - STS and Kipper sources

- https://cafiles.cern.ch/cafiles/
  - CERN LCG IOTA CA certificates and documents

Thank you!