Project Moonshot

2010 Kerberos Conference

MIT, Cambridge

26-27 October, 2010

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Contents

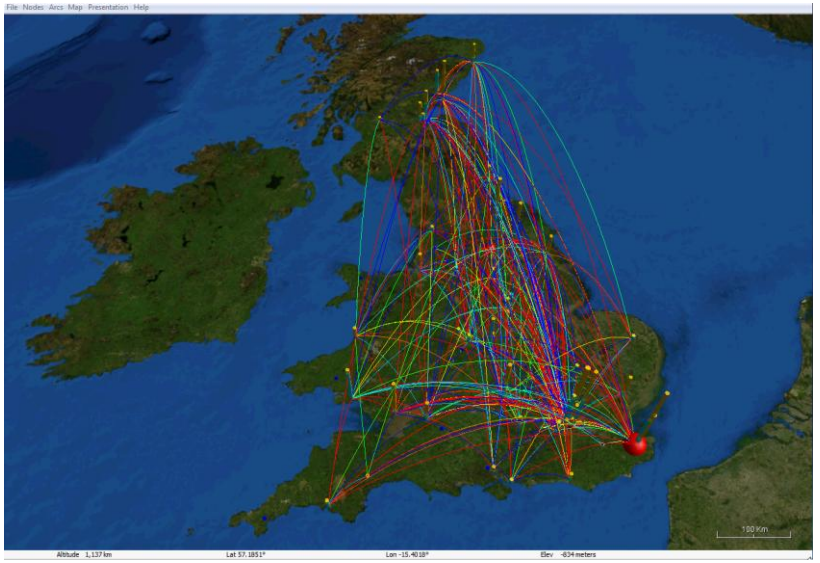
- Background
- Use-cases
- Brief overview of architecture
- Progress to date, and future plans
- Kerberos & Moonshot integration proposal

Research & Education Networks

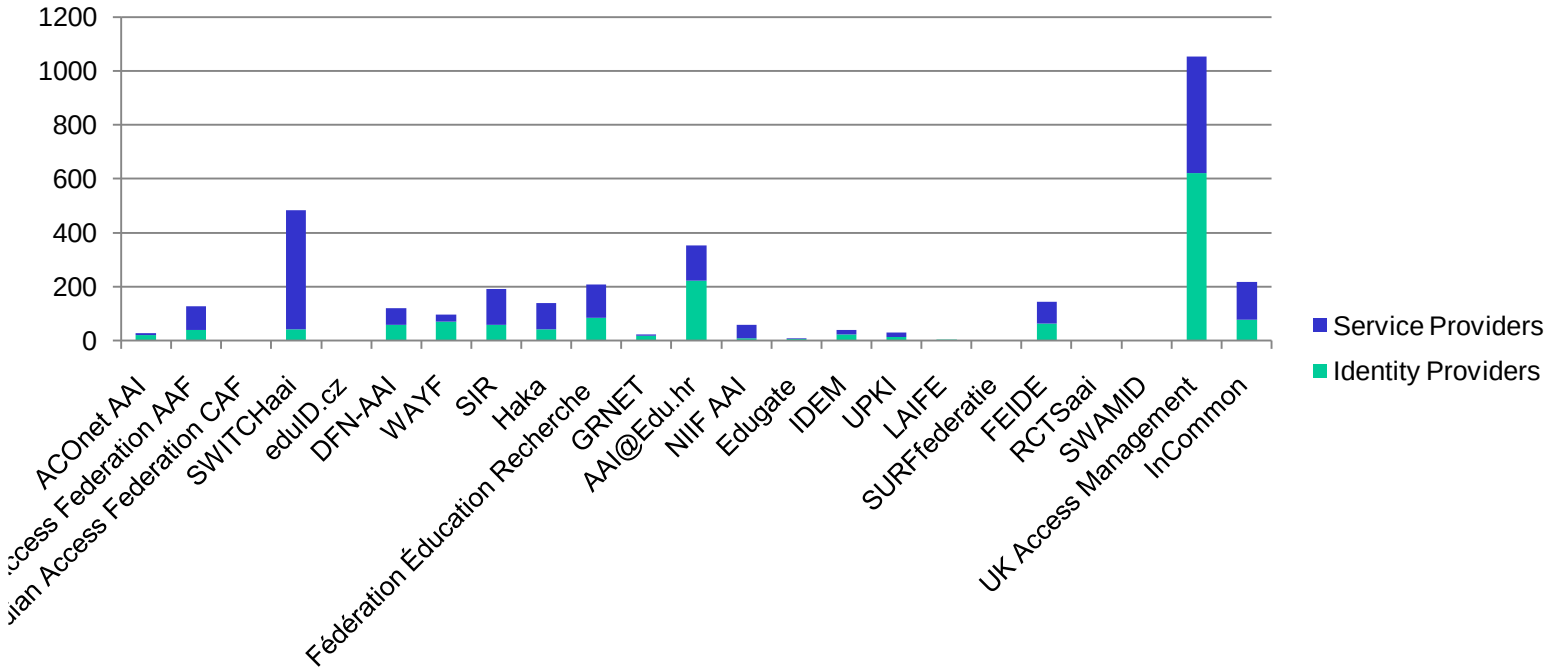
- Provide advanced network services for R&E.
- Traditionally focused on connectivity services.
- Rapid growth in trust and identity services.
  - X.509 PKI
  - RADIUS federation
  - SAML federation

RADIUS federation for network authentication

eduroam



SAML federation for Web single sign-on



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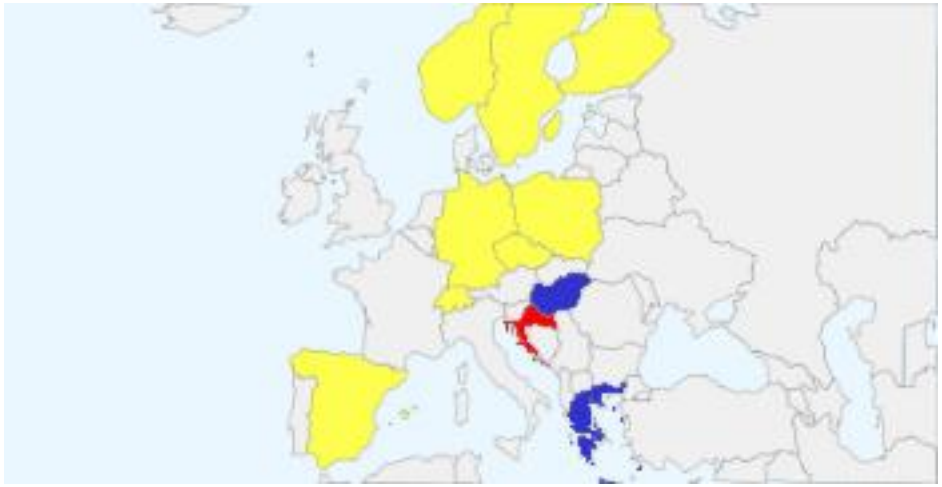


Motivations

1. Provide customers with a single ‘federation backhaul’.

2. Address our customers’ emerging use-cases.

3. Fix some known issues with SAML and RADIUS federation today.

Use-case 1: Out-sourcing

- Our customers increasingly want to:
  - Reduce costs by out-sourcing commodity services to third party service providers.
  - Use their own managed identities to provide SSO and enable conformance to data protection legislation.
- SAML provides this for Web-based services...
- ...but not other types of services (IMAP, POP3, SMTP, CalDAV, etc).
- Identity Provisioning APIs exist, but they're typically not appropriate.

Use-case 2: High Performance Computing

- HPC facilities are increasingly critical to our customers.

- Requirements:
  - Improve Business Continuity by federating access to HPC facilities.
  - Offer HPC-as-a-service to external customers.
  - Reduce costs incurred in operating HPC-specific authentication service.
  - Provide a better user experience.

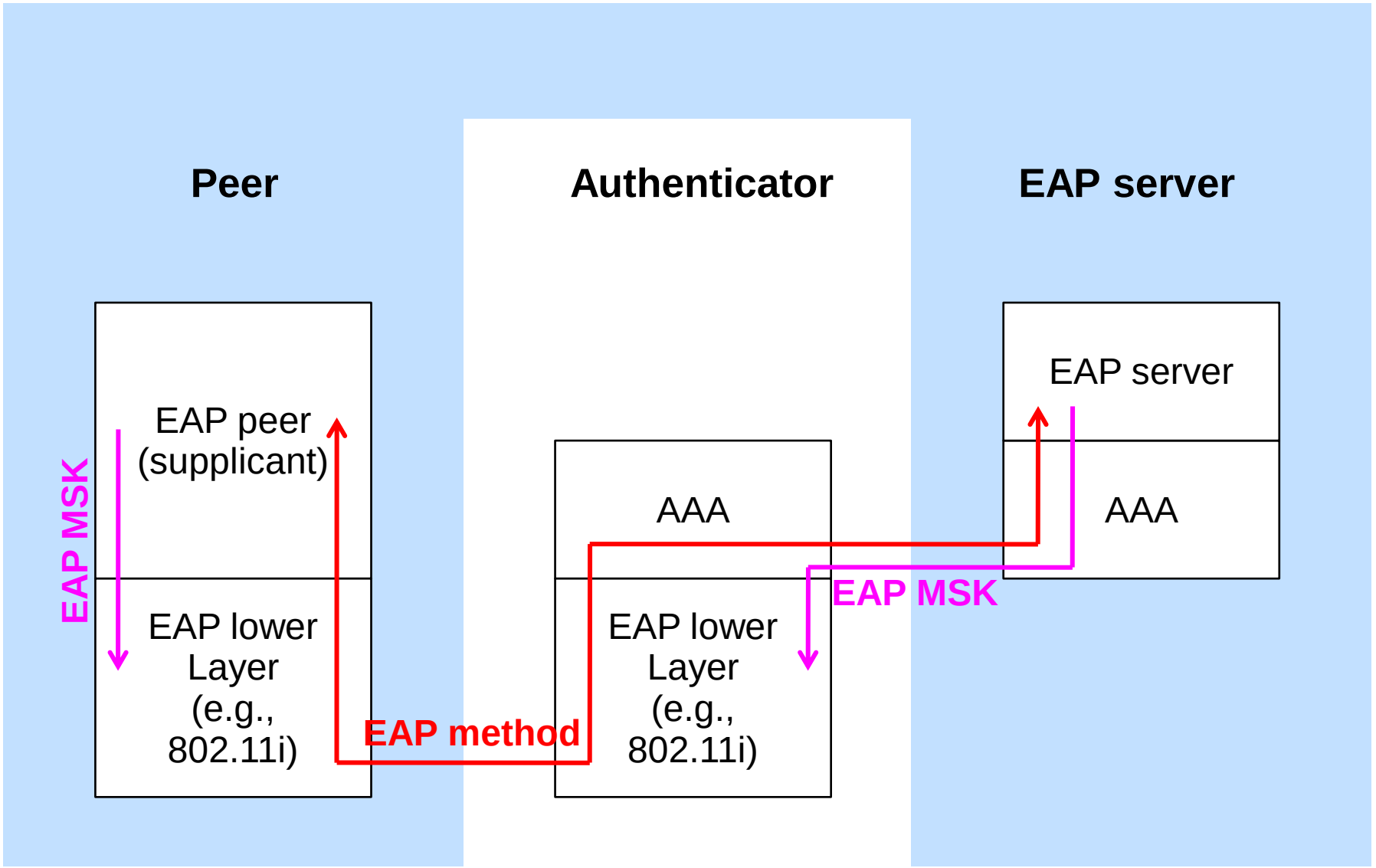
Learning from SAML federation

- In federating new applications, avoid problems already discovered with SAML federation today (and fix them).
- As a federation grows in size:
  - Users are presented with an ever-growing list of identity providers (“IdP discovery problem”).
- As a federation grows in scope:
  - Users may acquire more than one identity provider (“multiple affiliations problem”).

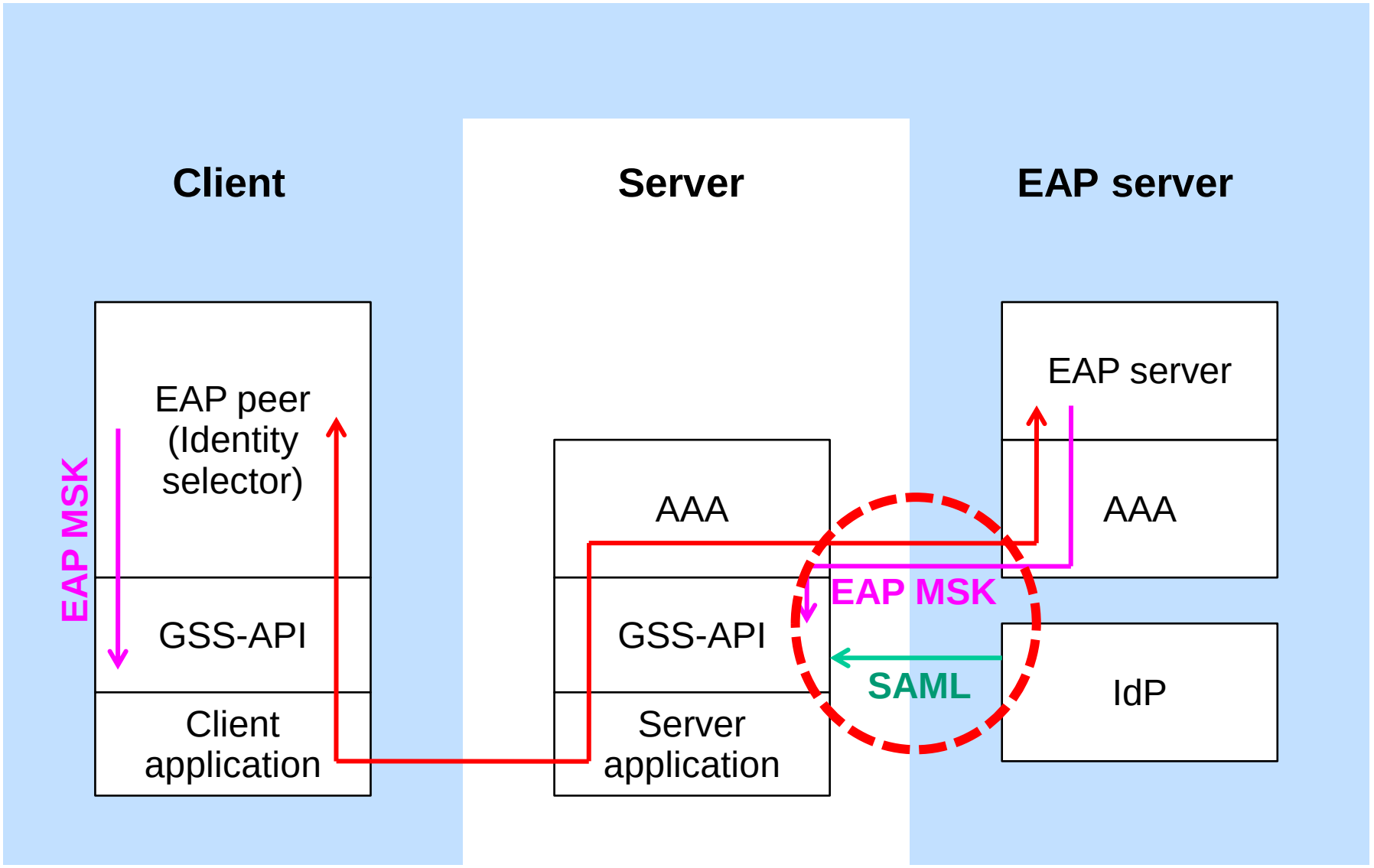
Technology choices

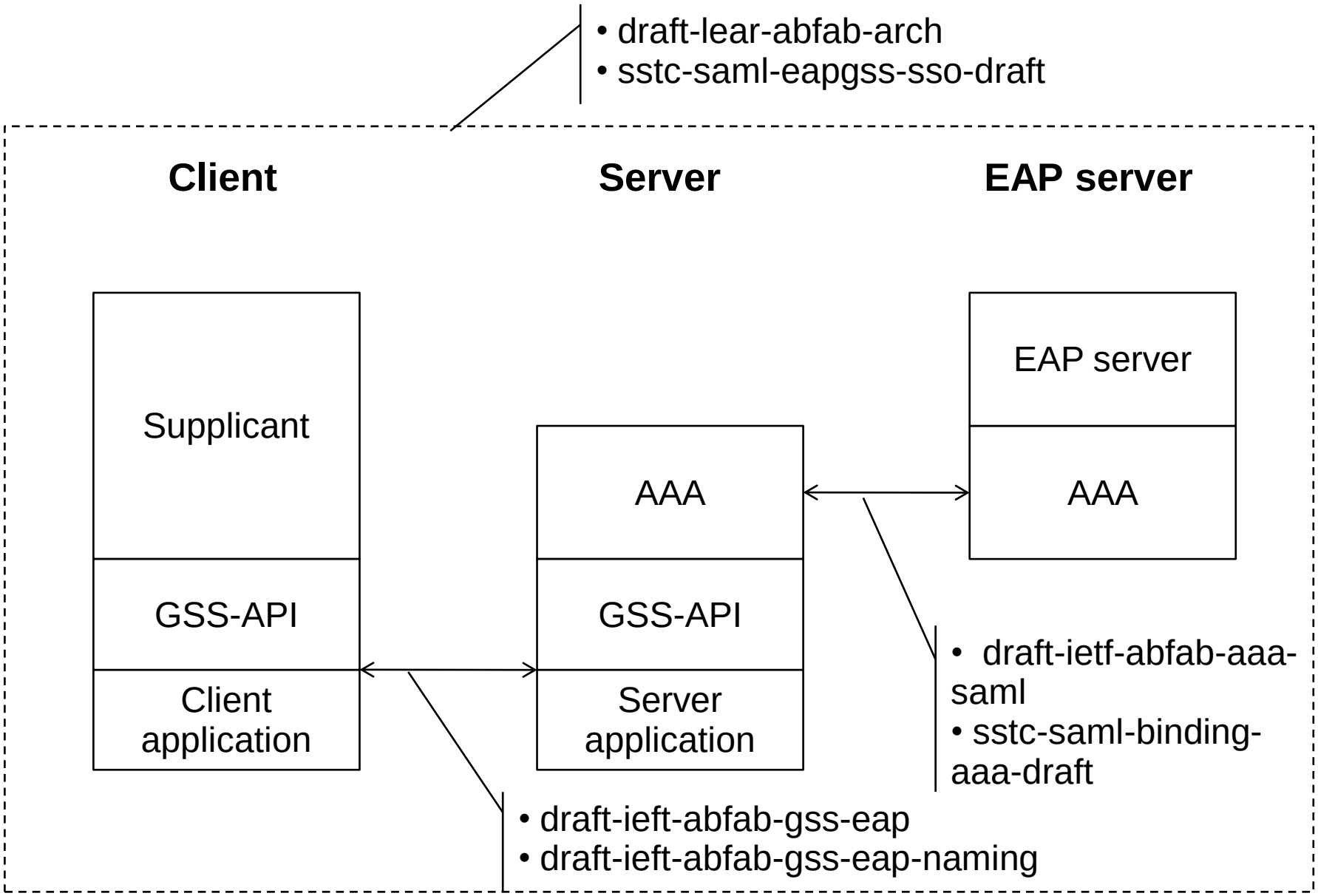
- SAML provides authorisation and attributes.
- GSS-API mechanism for application integration.
- EAP authentication encapsulated in GSS-API to gain existing credential support.
- RADIUS transport provides federation.

Background: EAP for network access



Moonshot


Client
Server
EAP server
EAP peer (Identity selector)
GSS-API
Client application
AAA
GSS-API
Server application
EAP server
AAA
IdP
EAP MSK
EAP MSK
SAML


• draft-lear-abfab-arch
• sstc-saml-eapgss-sso-draft
Client
Server
EAP server
Supplicant
GSS-API
Client application
AAA
GSS-API
Server application
EAP server
AAA
• draft-ietf-abfab-aaa-saml
• sstc-saml-binding-aaa-draft
• draft-ieft-abfab-gss-eap
• draft-ieft-abfab-gss-eap-naming

Goals

- To deliver
  - A standardised architecture.
  - A production-quality open-source implementation.
  - Packaged and shipped with Debian Linux.
  - A test-bed for interoperability testing.
  - High quality documentation.
  - An active community of users and developers.
- To enable
  - Third-party implementations by vendors and other communities.
  - Available for all computing platforms.

Software development

- GSS EAP library supporting MIT Kerberos & Heimdal
- SASL support through Cyrus GS2 plugin.
- Apache: implement a new mod_auth_gss.
- Firefox: update the Negotiate implementation.
- Shibboleth SP: extend to permit use for SAML processing in the non-Web case.
- FreeRADIUS: extend to support EAP channel bindings.
- libradsec: library for RadSec clients (i.e. the GSS EAP acceptor) and servers.
- Extend Open1x and wpa_supplicant to support application authentication (“identity selector”) and EAP channel bindings.

What have we achieved so far?

- Phases 1-3 (January 2010 → April 2010)
  - Feasibility Analysis & draft specifications.
  - Bar BOF @ IETF 77.
- Phase 4 (April 2010 → June 2010)
  - Use-case development
  - Started development of draft project plan.
  - Started development of IETF Working Group charter.
- Phase 5 (June 2010 → August 2010)
  - IETF 78 “FedAuth” BoF: consensus to form a working group (ABFAB).
  - Project plan completed
    - See http://www.project-moonshot.org/plan

Current & planned activities

- Phase 6 (August 2010 → January 2011)
  - First project meeting (September, Copenhagen)
  - Advance specifications through IETF and OASIS.
  - Implement the core technologies
  - Proof of concept demonstration.

- Phase 7 (February 2011 → July 2011)
  - Second project meeting (East coast US, Jan/Feb)
  - Develop remaining technologies.
  - Implement test-bed.

Current limitations

- EAP takes lots of round trips
- No support for n-tier applications
- No resource domain concept

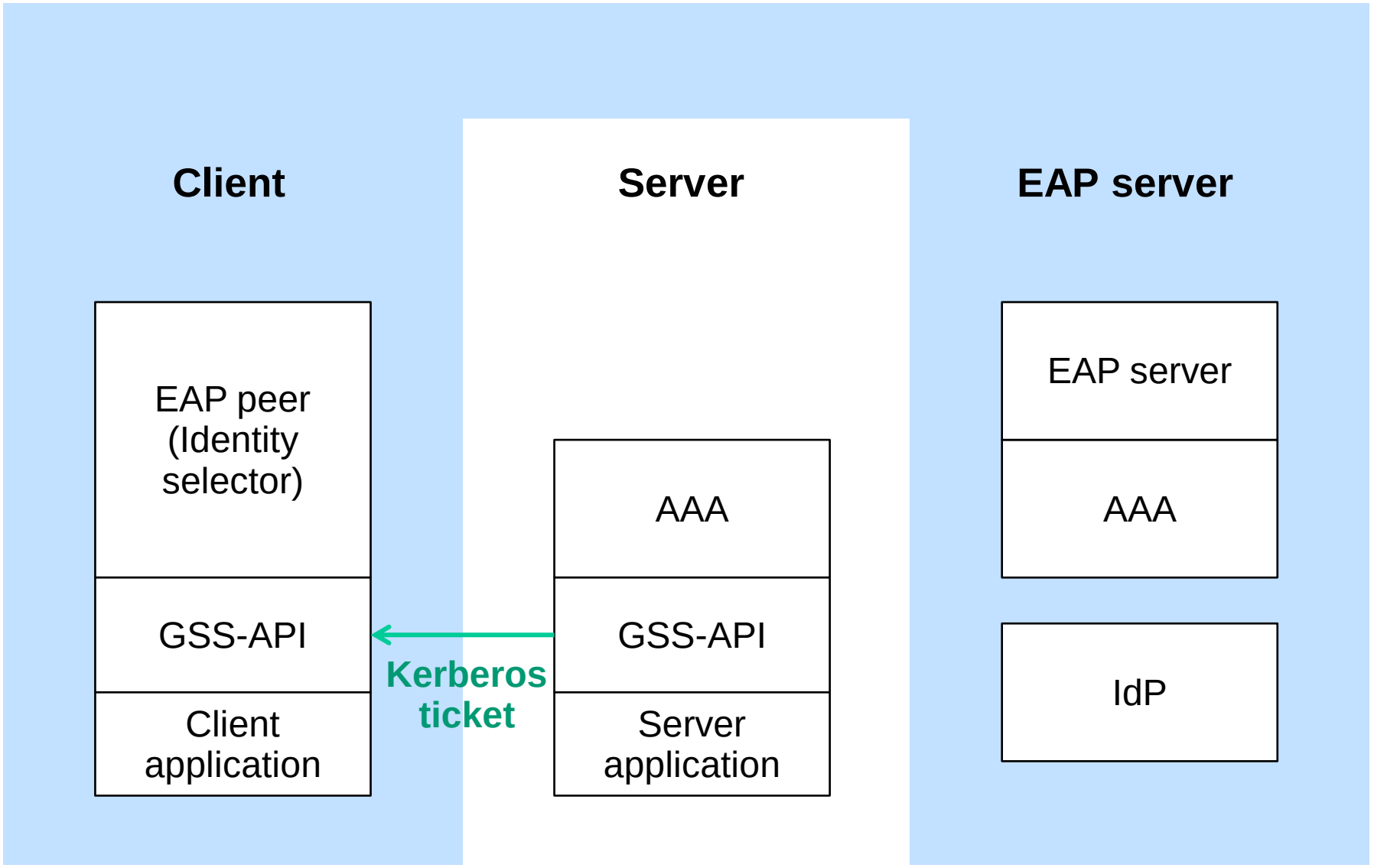
Borrowing from Kerberos

- Kerberos with a ticket is one round-trip
- Kerberos provides authorisation mapping within a domain.
- Kerberos has good n-tier support.

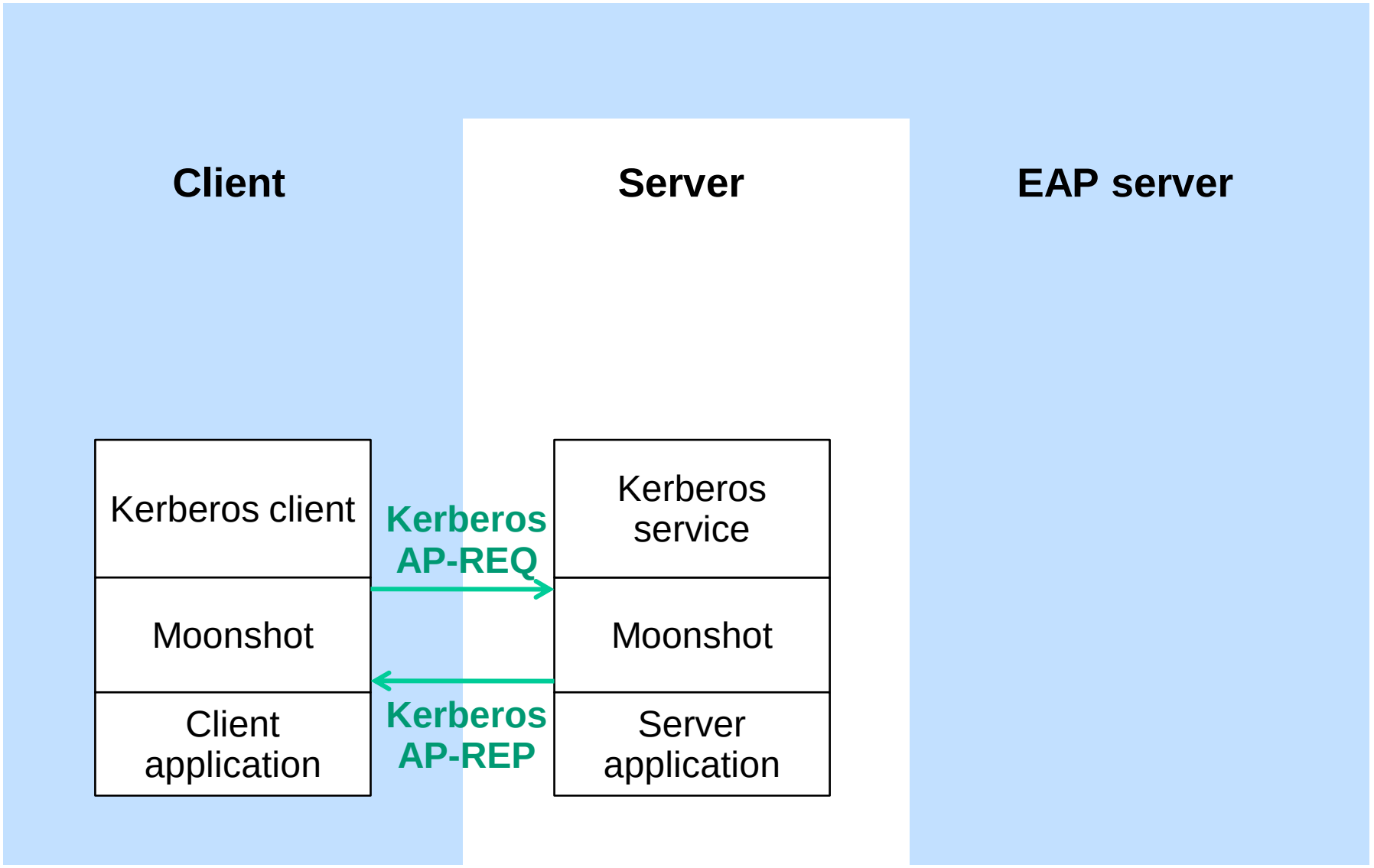
Extending Moonshot with Kerberos

- Optionally return ticket from acceptor to initiator.
- Future round-trips use ticket as optimisation.
- Service ticket or TGT.
- Operation with or without a KDC.

Moonshot initial Kerberos



Moonshot same server



Moonshot with a KDC

- KDC sits between server and RADIUS within the resource domain.
- EAP over Kerberos FAST, then over RADIUS.
- KDC issues service ticket to service and TGT to client.
- Key hierarchy protects TGT from service.

Get involved!

- Your opinions and ideas.
- Use-cases, use-cases, use-cases.
- Join the Project Moonshot mailing list.
- Join the IETF ABFAB mailing list.
- Participate in the test-bed.


http://www.project-moonshot.org
Project partners
JANET(UK) (http://www.ja.net)
GÉANT (http://www.geant.net)