Kerberos on the Web

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Kerberos Today

- Enterprise, B2B, B2C
- Kerberos & Identity Infrastructure

Intra-Enterprise Kerberos

- Large presence of Kerberos in Enterprise space
  - AD, "AD-Clones", MIT code base, Intel AMT
- Desire to re-use Kerberos infra for web security
  - Increase security of web logins
    - Address authentication in Web-SSO
  - Simplification of security management
- Require Kerberos integration into web systems
  - Web-services typically already a separate infrastructure
  - Kerberos administration must also be integrated into web systems
  - Unified management of infrastructures

Kerberos for B2C & B2E Security

- Forms/SSL primary authentication method:
  - Passwords, HTML Forms, no client certs
  - HTTP-Negotiate underutilized
    - Limitations to current version of HTTP-Nego/SPNEGO
- B2E Web-SSO needs strong access control:
  - Intra-network services & business access only
    - Locally-scoped identities
  - HTTP-Negotiate deployed in many Enterprises
- B2C Web-SSO a harder problem:
  - Need standard interfaces
  - Part of Identity Management & Federation problem
  - HTTP-Negotiate limitations (today)

Kerberos in Identity Management

- Largely absent from SAML based Identity stacks
  - Liberty, Shibboleth, etc
- WS Security:
    - Oasis WS-S Kerberos Token Profile (AP_REQ)
    - CardSpace/InfoCard, Geneva (Microsoft)
- Kerberos and Providers:
  - Authentication to IdP still using Pwd/Forms/SSL
  - Providers (IdP/SP/OP) have limited Kerberos large-scale operational experience

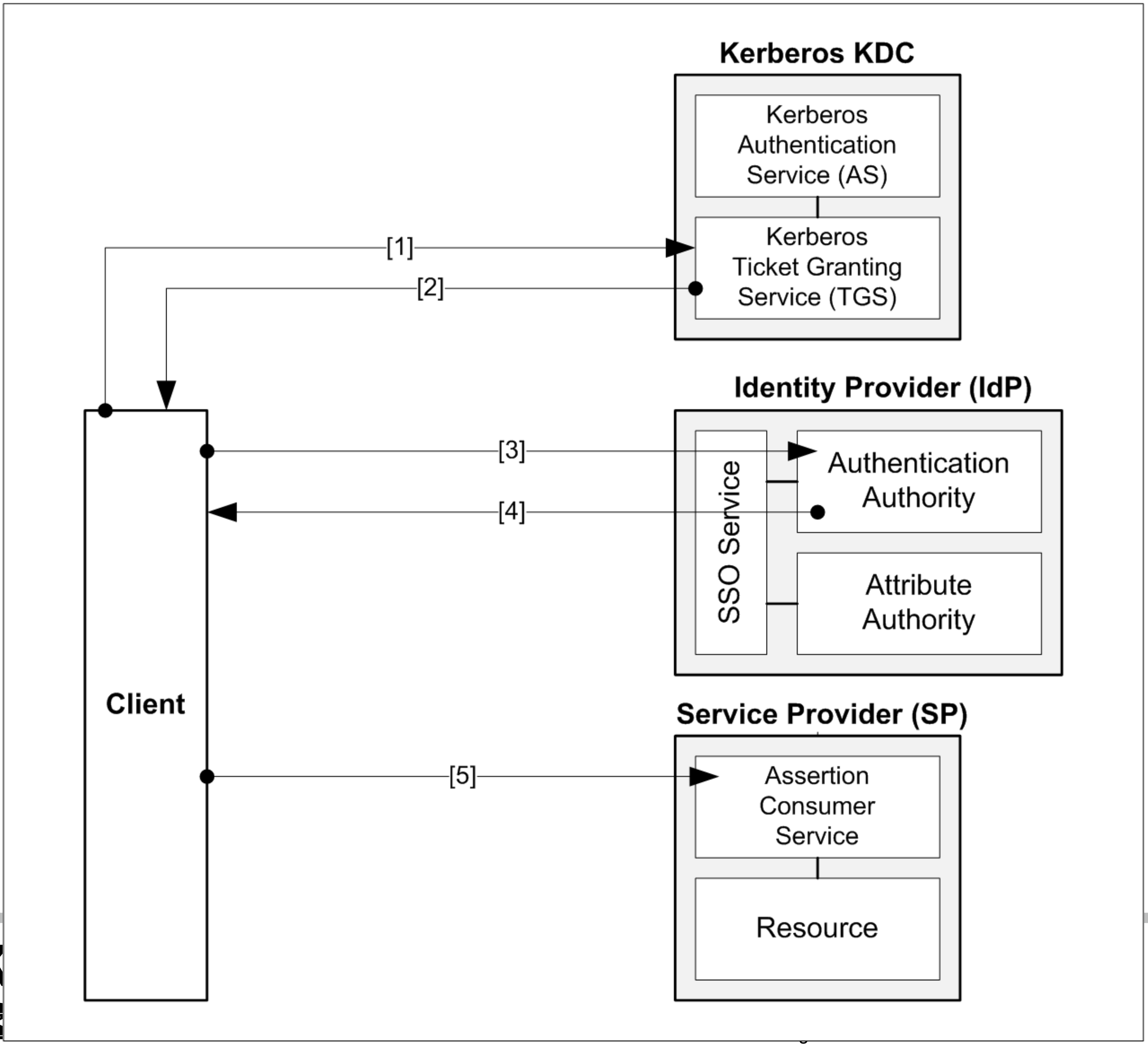
Current Efforts

- Interoperability with SAML
- Web back-end security

Kerberos Interoperability with SAML

- Kerberos support in SAML (2.0) Systems:
  - Profiles: Web-SSO & Web Services
  - Subject Confirmation method:
    - Confirm the SAML attesting entity using Kerberos (Holder of Key)
  - Collaboration with Josh Howlett
- Authentication to Kerberized Web Service:
  - Delegation of Kerberos credential to a web-application to access Kerberized service
  - Authentication using S4U Extensions (constrained delegation)

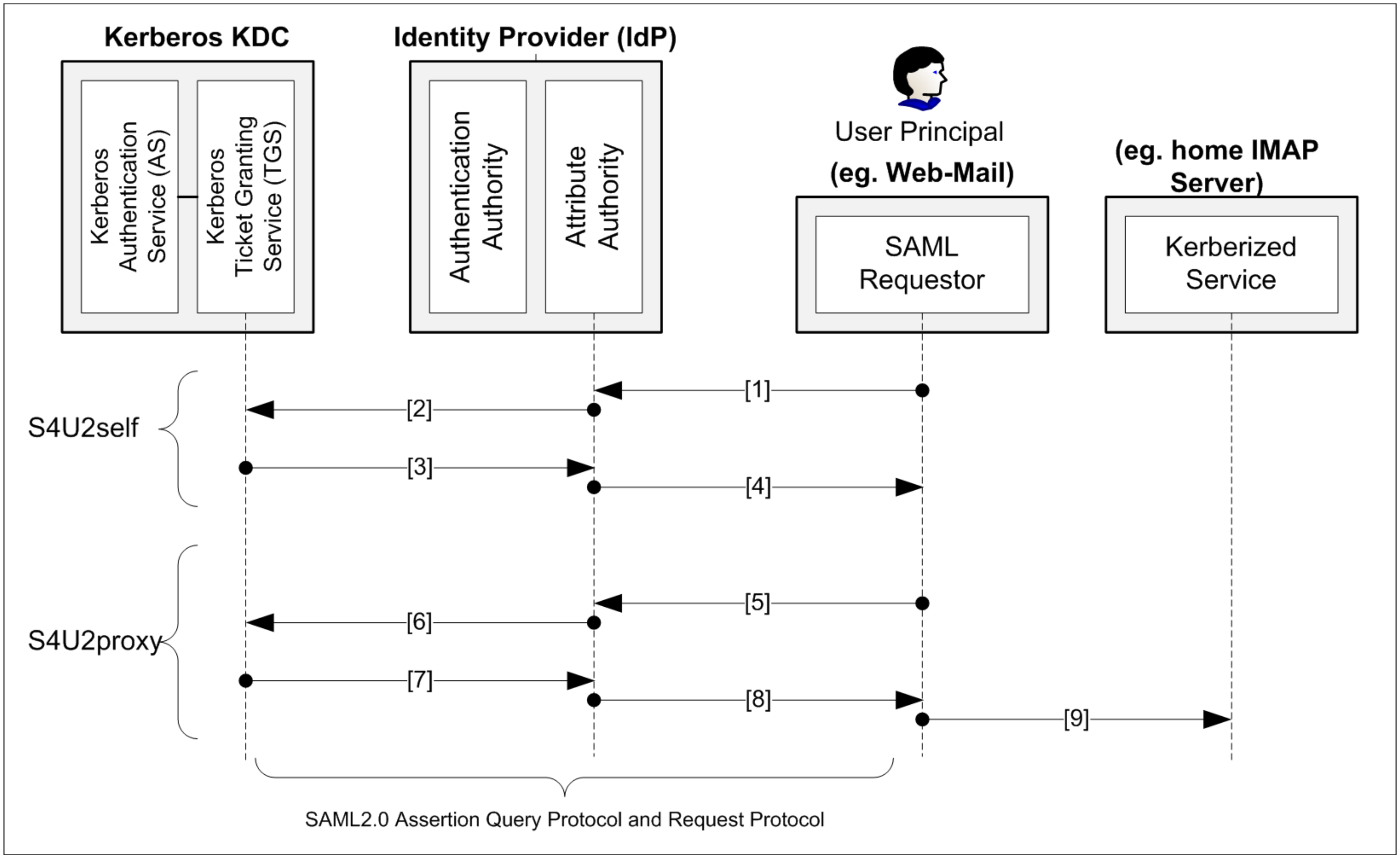
Confirming SAML Attesting Entity



Authentication to Kerberized Web Service

- Use-Case:
  - – SAML system entity requires access (via a Web-Service) to a local/remote Kerberized Service on a behalf of a Client (user) Principal.
  - – SAML Requestor may not be able to request a service-ticket directly from the KDC since it is an entity that is not recognized by the KDC
- Possible Solution:
  - – Use of the SAML2.0 Assertion Query Protocol and Request Protocol
  - – Combined use of S4U2self and S4U2proxy
    - See next slides

Authentication to Kerberized Web-Service



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Kerberized Web Service: S4U2self

- Goal: IdP asks authorization from the KDC (for the user) to access itself (the IdP)
  - IdP requests the TGS for a service-ticket to itself on behalf of the user (Client Principal).
  - IdP assumed already a Kerberized entity
- SAML Requestor send <AttributeQuery> msg to IdP:
  - Identifying the Client Principal (ie. the user) and target Kerberized Service
- TGS returns a service-ticket to the IdP
  - As if the ticket had been requested from the user using her own TGT

Kerberized Web Service: S4U2proxy

- Goal: IdP seeks authorization to request access to other services (eg. IMAP server) on the user's behalf
  - – Requestor sends query to IdP
  - – IdP uses client name & realm from S4U2self
  - – IdP requests service ticket from KDC/TGS to access service (eg. IMAP server)
  - – TGS issues a fowardable service-ticket, placing the Client Principal’s name (instead of the IdP name) within the service-ticket.

Kerb-Web: Other Related Work

- HTTP-Negotiate (SPNEGO):
  - – GSS-API handshake with HTTP Server
    - RFC4559 & RFC4178
  - – Active Directory environments
  - – "Open Internet" deployment unproven
- Some open/related issues:
  - – Lack of protection of HTTP request
  - – Support for multi round-trips of GSS-API mechanisms over TLS
  - – State management at end-points

Related Work (cont)

- Future work at MIT-KC:
  - Kerberos interoperability in WS-Federation systems
    - Oasis WS-Federation architecture
  - Kerberos to secure back-end web infrastructure
- MashSSL (startup):
  - Based on MIT Kerberos
  - Promising “open-internet” deployment solution
  - Go to: www.safemashups.com
- MIT-KC Whitepaper:
  - *Towards Kerberizing Web Identity and Services*
    - http://www.kerberos.org/software/kerbweb.pdf

Thank You & Questions

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