Identity 2.0 and User-Centric Identity

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Presentation Goals

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- This presentation discusses new concepts, patterns and technologies emerging around the notions of “Identity 2.0” and “User-Centric Identity”:
  - It emphasizes their relationship with directory systems (Identity 2.0 = *Directory 2.0*?)
  - It presents a vendor’s view upon these initiatives
  - It not meant to be a product marketing presentation

Agenda

- **Identity 2.0**
  What Is Changing and Why?
- **Web Services**
  How Do They Change the Landscape?
- **User-Centric Identity**
  How Does It Work?
- **Example: eFA**
  How Does It Classify?
- **Conclusions**

Assets and Liabilities

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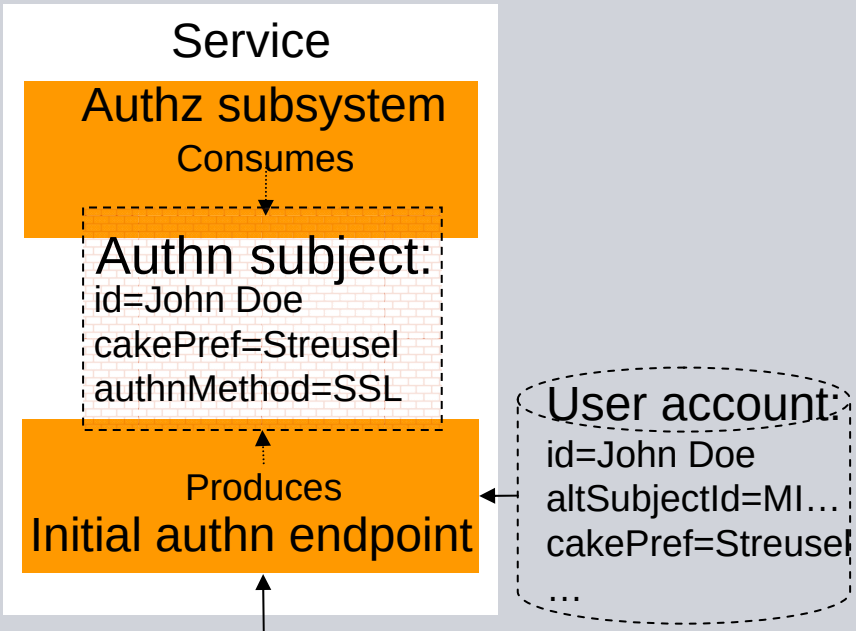
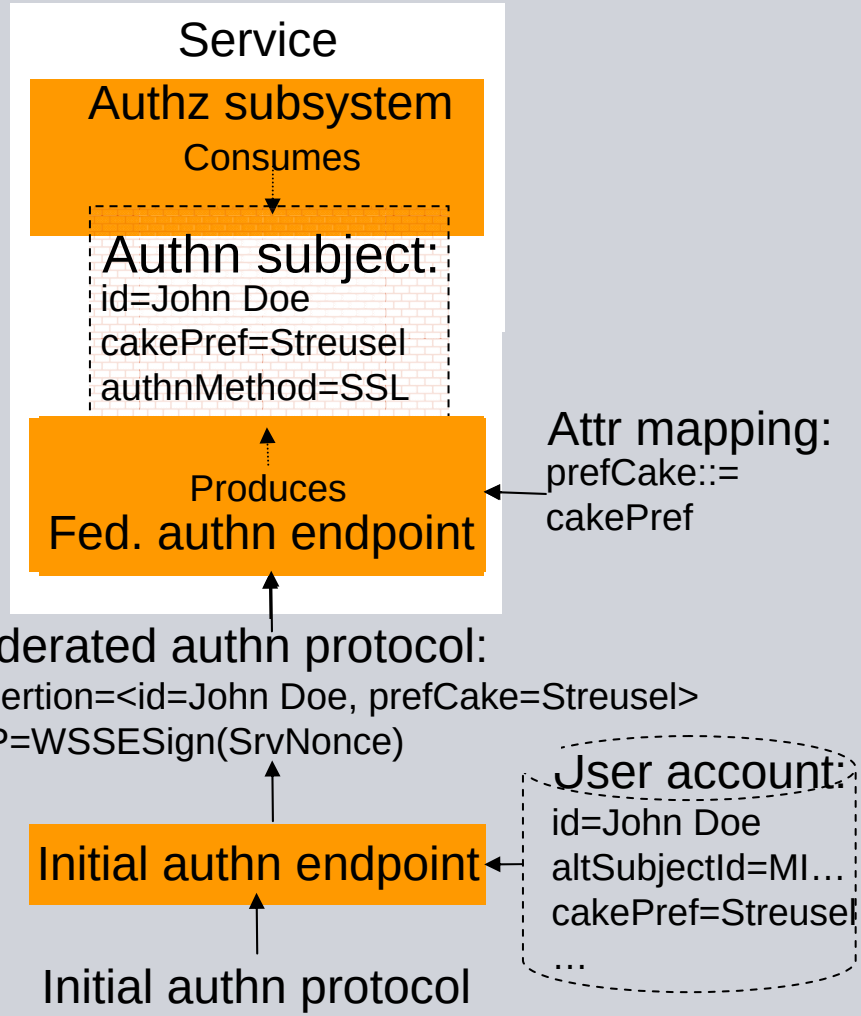
Traditional approach: *piggybacked*



☹Causes identity enclaves
☹Mandates RPs to be IdPs
☹…

Federated approach: *split work*



The Missing Link: Beaming Authentication

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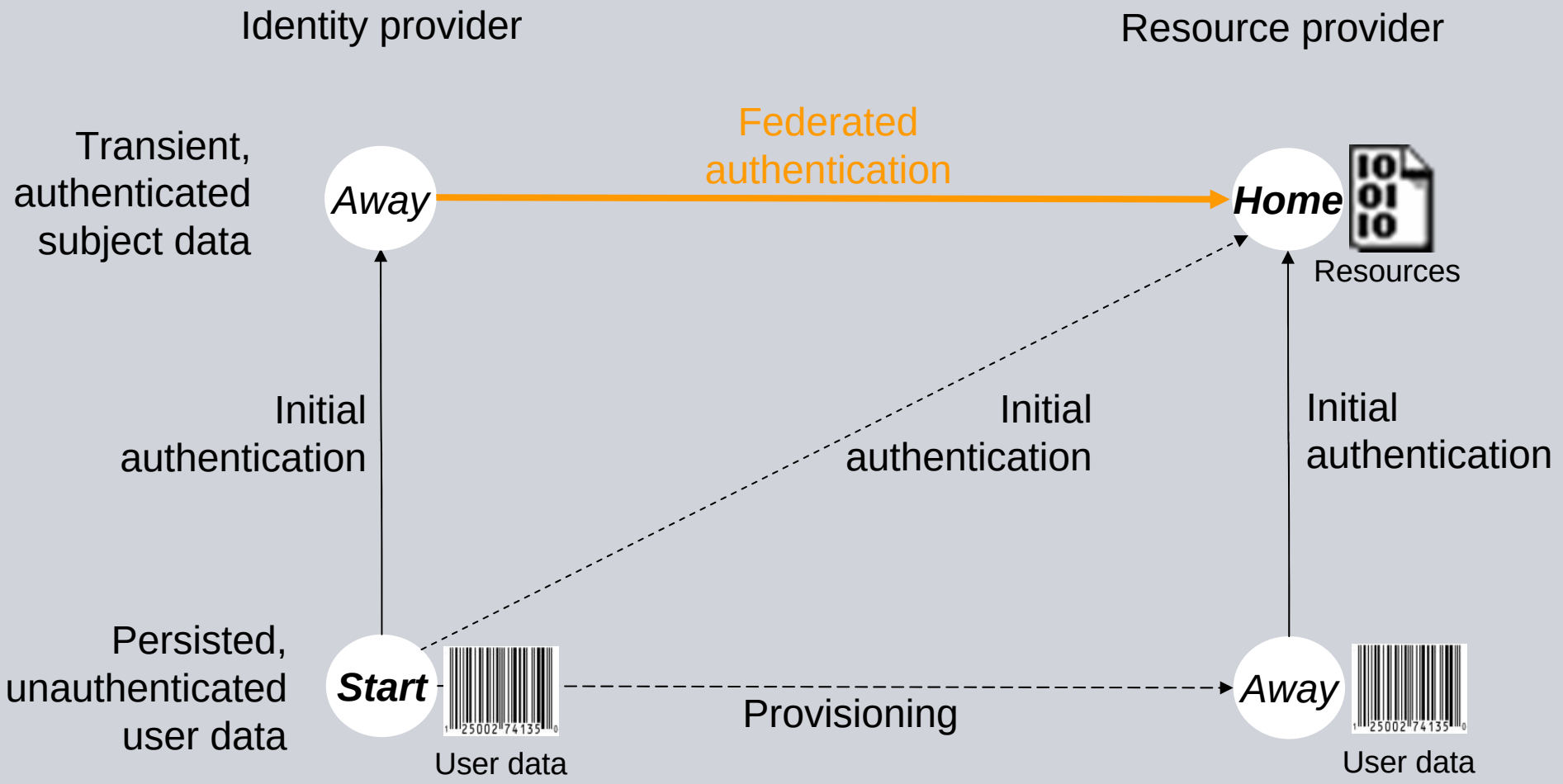
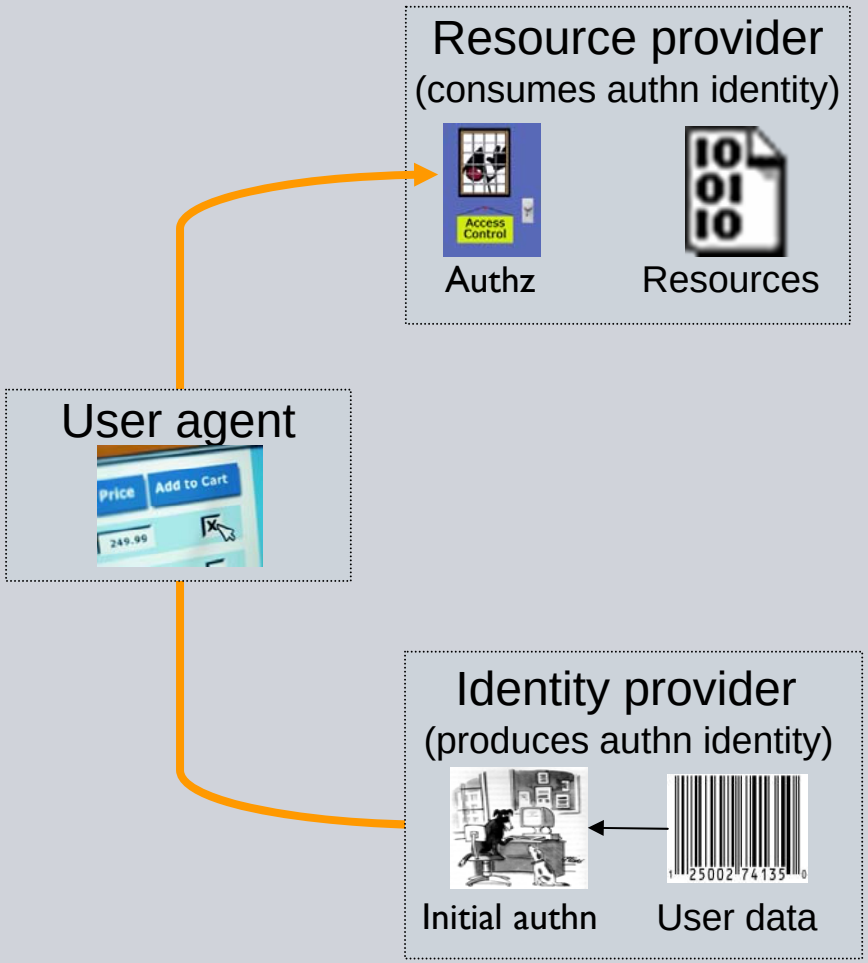


…Is Being Resolved Now



- Use case: want to authorize resource access requests
  - without being obliged to maintain user accounts for everybody in the user population i.e.
  - without being able to initially authenticate every user
- Requirements:
  - Maximal resource and identity provider decoupling
  - User and privacy-friendliness: ease-of-use, user empowerment, self-determination…
  - Security

Identity 2.0

Pattern Update Animated

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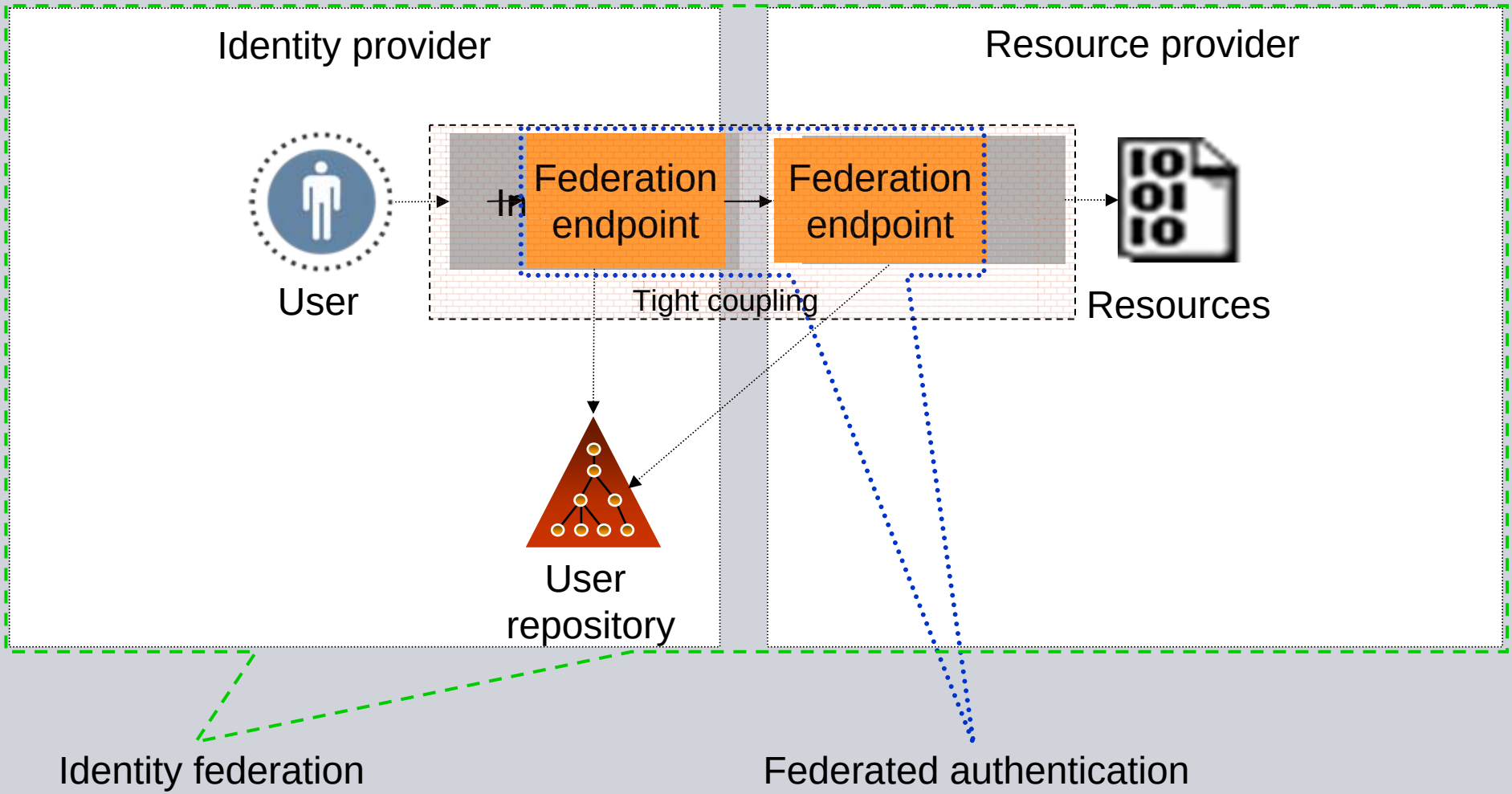

Identity 2.0

On the Evolution of Identity

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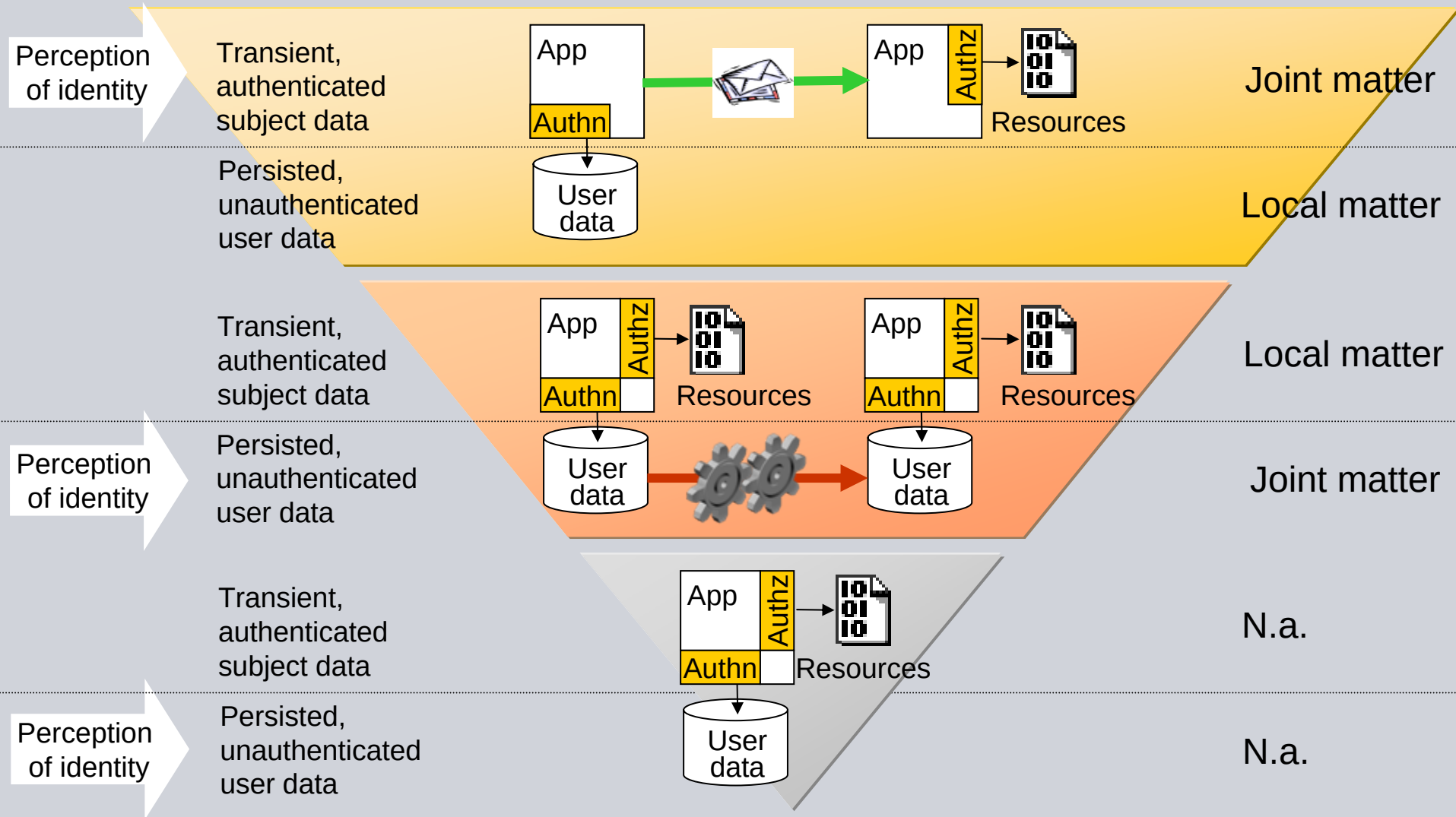

Needs Shared With Web Applications

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- Traditional Web application environments (HTTP/HTML) and Web services (HTTP/SOAP) share needs regarding an Identity 2.0 support:
  - Express authenticated subject information and related meta-data
  - Support multiple concepts for identifier abstractions
  - Support arbitrary subject attributes (to decouple consumers from a need to perform look-ups)
  - Support a variety of authentication schemes (to obtain a statement on authenticated subject identity, to protect such statements and bind them to subjects)
- SAML assertions provide the best-practice approach to address these shared needs. They are used in Identity 2.0-enabling traditional Web application environments as well as Web services.

Deviations from Web Applications

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- The tricky part is the acquisition and exchange of SAML assertions:
  - How to tell that there is a need to present a SAML assertion
  - How to express expectations on SAML assertion issuer and contained information
- Traditional Web application environments and Web services differ significantly:
  - Web applications:
    - Tedious to design and realize the piggybacking of SAML assertions and their acquisition/exchange protocol with HTTP/HTML-based communications
    - Several approaches emerged over time:
      - First generation:
        - First wave (2001-2003): SAML 1.x, Shibboleth, Liberty-Alliance
        - Second wave (2004-2005): SAML 2.0, WS-Federation (for passive requestors)
      - Second generation (2006):
        - Microsoft CardSpace (for passive requestors), OpenID
  - Web services:
    - Simple to design and realize the piggybacking of SAML assertions and their acquisition/exchange protocol with HTTP/SOAP-based communications

Architectural Abstractions

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- Following standard Web services concepts and components support the Identity 2.0-enabling of Web services:
  - Request SAML assertions
    - Require e.g. ProtectionToken in WS-SecurityPolicy section in WSDL. This also allows to specify the expected properties (attributes, claims) of SAML assertions which need to be presented and the protection scheme for them (PoP)
    - ➢ There is no equivalent concept for traditional Web application environments (requires specifically designed vocabulary transferred with HTTP messages)
  - Issue SAML assertions
    - Addressed by WS-Trust STSs as a dedicated service for SAML assertion issuance (notes: SAML assertions can also be issued by non-STSs; STSs can also issue non-SAML assertions)
    - ➢ There is no equivalent concept for traditional Web application environments
  - Transfer SAML assertions
    - Addressed by the SAML token profile in WSSE
    - ➢ There is no equivalent concept for traditional Web application environments (embedding of SAML assertions is outside HTTP headers)

About WS-Trust

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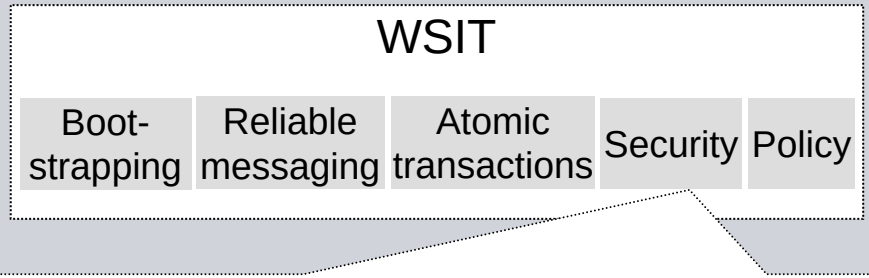

- WS-Trust is a key concept in WS-security that deals with authentication diversity:
  - Different systems have different authentication needs and prefer different techniques to prove or verify claimed identity
  - Using the same credential for everything is not secure and not practical.
- Abstracts from specific means of authentication by introducing security tokens as an umbrella concept for artifacts that are ubiquitous in authentication systems
  - Security token examples: X.509 certificates, Kerberos tickets, SAML assertions…
- Defines a framework for processing security tokens (issuance, renewal, cancellation, validation, negotiation)
  - A WS-Trust STS (Security Token Service) is a Web service that processes security tokens

Types of Identity 2.0 Solutions

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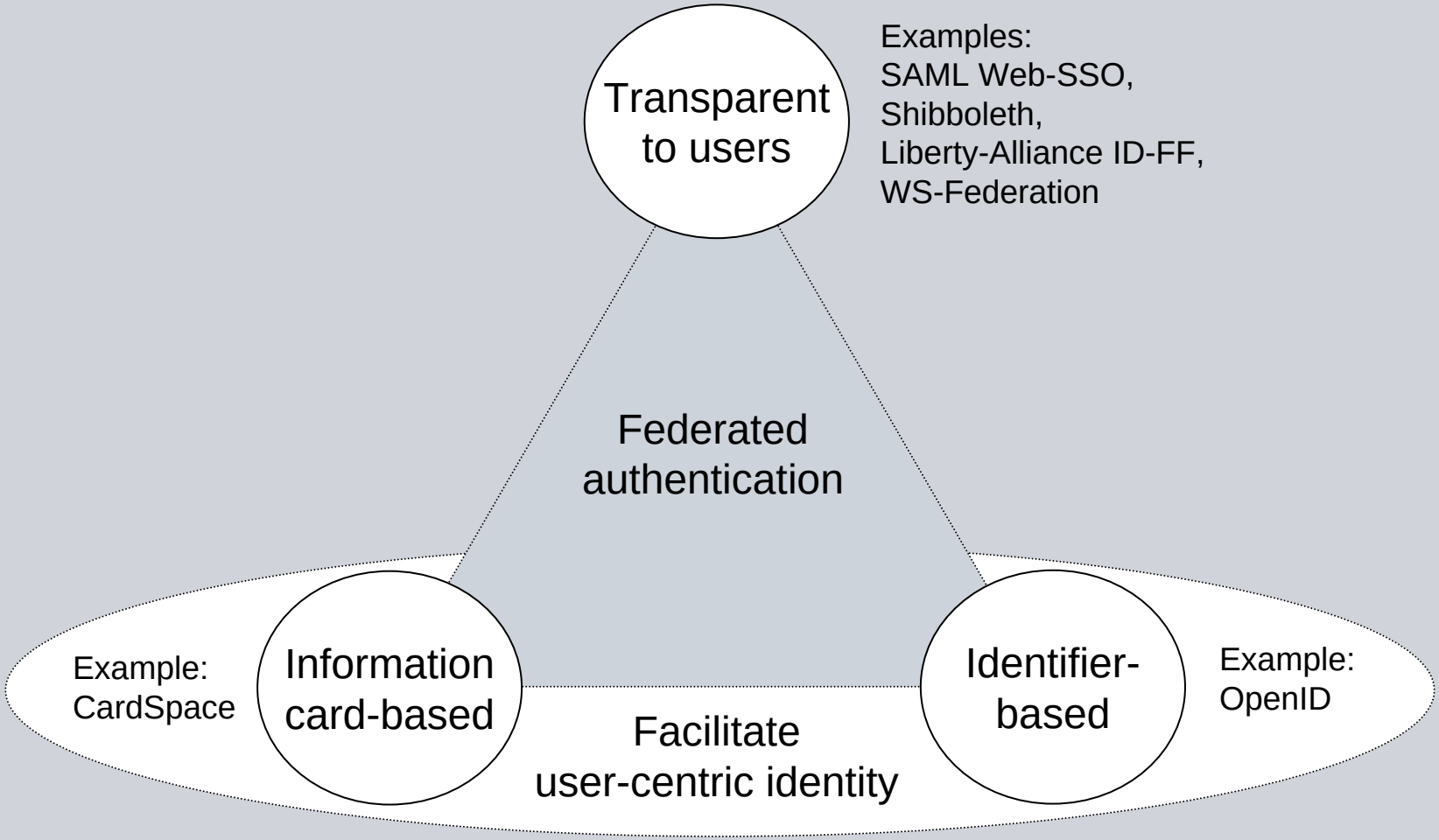

What Is OpenID?

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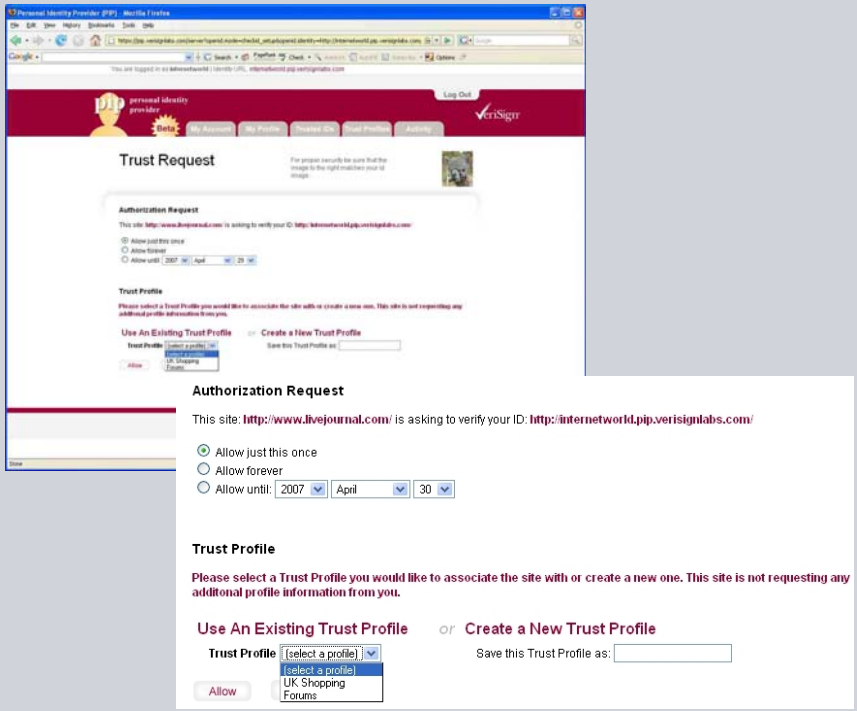

- OpenID is a decentralized, open-source framework for user-centric digital identity
  - Identity perception: transient, authenticated subject data
- Based on following concept:
  - Users have network authentication services dedicated to them individually (e.g. *johndoe.myopenid.com*)
  - URLs of these authentication services serve to claim an identity (*I am johndoe.myopenid.com*)
  - Transfer of authenticated information to RP from IdP is subject to user approval
- More information: http://openid.net/

Brief OpenID Assessment

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- What's new – one thing is cool in OpenID:
  - OpenID introduces network authentication services that are dedicated to individuals
    - Lifts the joint identity perception from persisted, unauthenticated user data to transient, authenticated subject information
    - Provides means for individuals to control the sharing of personal information and establishment of relationships with other parties at the authentication service
- What strikes – several things are over-simplified in OpenID:
  - From a structural perspective, OpenID resembles a SAML post profile exchange but OpenID replaces structured data that is expressed in XML in traditional federation protocols by ad-hoc encodings directly transferred as keyword/string value–pairs
  - Keying association establishment avoids PKI concepts and uses anonymous Diffie-Hellman for an ad-hoc association establishment. This exposes OpenID systems to impersonation and man-in-the-middle attacks.

What Is Windows CardSpace?

- CardSpace is a Microsoft client application helping users to manage and use their digital identities.
  - Identity perception: transient, authenticated subject data
- Provides a part of novel user authentication and identity federation systems; represents their identity selector artifact.
- Is a milestone towards an identity metasystem:
  - An identity metasystem integrates islands of identity with their “local” identity technologies
  - *Analogy: IP provides a communication metasystem for integrating islands of LANs with their “local” communication technologies.*
  - Allows arbitrary parties to become resource and identity providers
  - Is standards-based

Windows CardSpace: Fundamental to Differentiate

- Identity metadata: templates for identity data plus references to identity providers
  - *E.g. Authenticated subjects will be represented by RFC 822 name, organizational affiliation and role values; actual data can be obtained at these endpoints…*
  - Consists of attributes without their values e.g. **name**, **affiliation**, **roles**
  - Represented as long-lived objects called information cards in CardSpace
  - Sample: 
    XML Document
- Identity data: concrete information about authenticated subjects
  - *E.g. This is 'John Doe', an employee of 'Acme' with the role 'manager'*
  - Consists of attributes with their authenticated values e.g. **name**=john.doe@acme.example, **affiliation**=Acme, **roles**=Manager
  - Represented as short-lived objects called security tokens in CardSpace (aka: transient, authenticated subject data)
  - Sample: 
    XML Document

CardSpace High-Level Architecture

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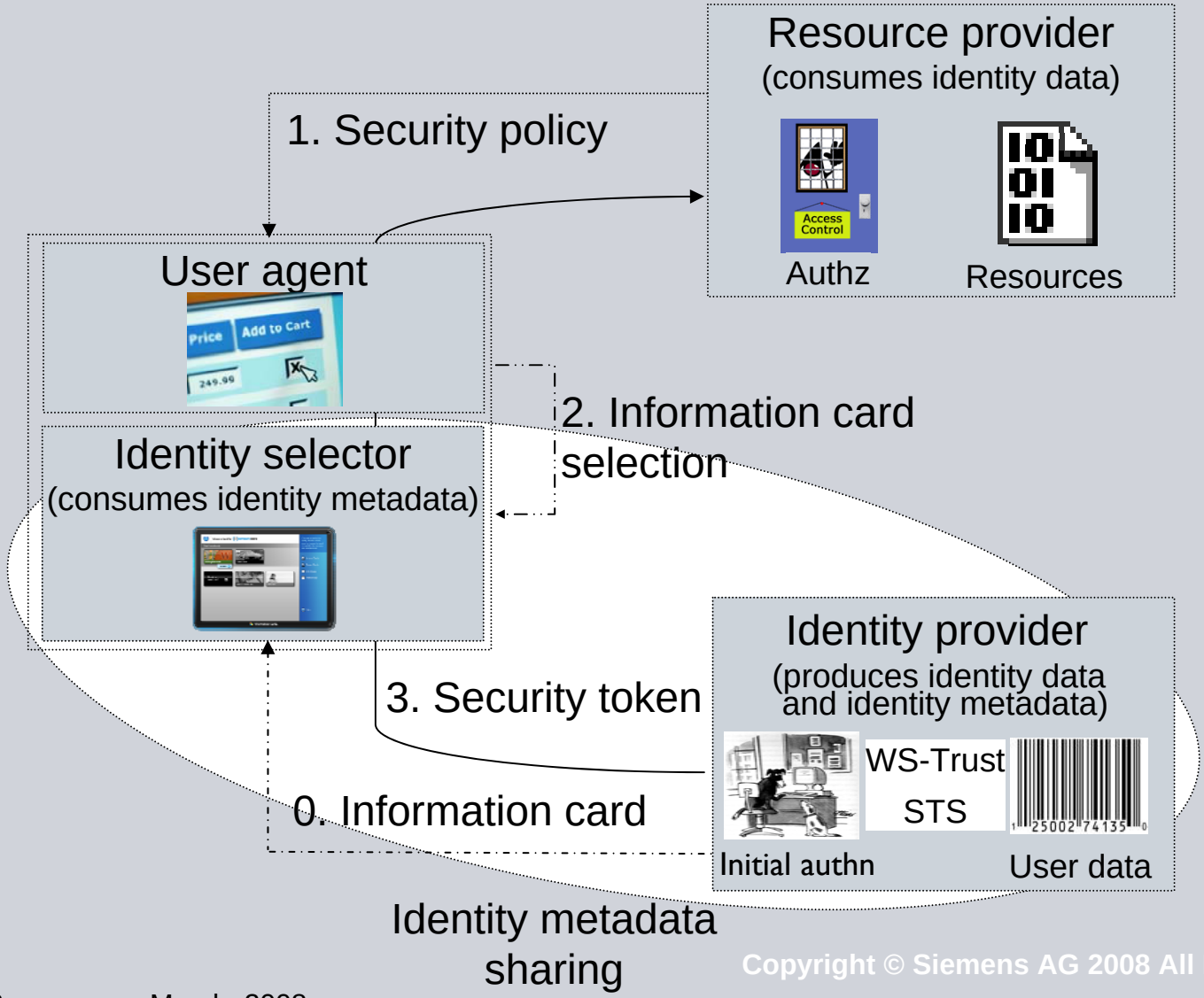

CardSpace Highlights

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- Not “Passport 2.0”
- Not limited to deployments in federated environments. CardSpace can also be used for user authentication within an enterprise.
- Resembles design elements of traditional identity federation approaches:
  - Structured data is represented in standard XML representations (SAML, WS-*)
  - Keying associations are based on PKI concepts
- But provides several advances over them:
  - Identity metadata sharing between identity providers and users
    - Improves identity and resource provider decoupling
    - Facilitates user-centric identity and supports users in controlling the proliferation of personal information
    - Improves user guidance through login procedures
  - Process isolation for the identity selector lifts host-security to a new level (anti-malware / phishing / pharming features)
  - Web services security employment resolves HTTP/HTML security restrictions
- Note that CardSpace is part of a larger identity metasystem initiative (cf. www.identityblog.com) at Microsoft.

Project Characteristics

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- A national project to introduce federation in accessing patients' MDOs
  - According medical cases
  - Across health providers
- Project goal: specify and pilot a solution architecture
- Project participants:
  - German hospitals (project owner, solution users) incl. Rhön Klinikum AG
  - Suppliers of IT solutions (technical realization) incl. Siemens Med
  - Fraunhofer ISST (specification lead)
- Piloting will done between pairs of recognized hospitals which each have an industry partner for the technical realization. In case of Siemens Med:
  - Universitätsklinikum Giessen (www.uniklinikum-giessen.de) belonging to Rhön Klinikum AG with the industry partner Siemens Med
  - Kreiskrankenhaus Lich (www.asklepios.com/Lich) belonging to Asklepius with the industry partner Microsoft
- More information: www.fallakte.de

Electronic Case Records

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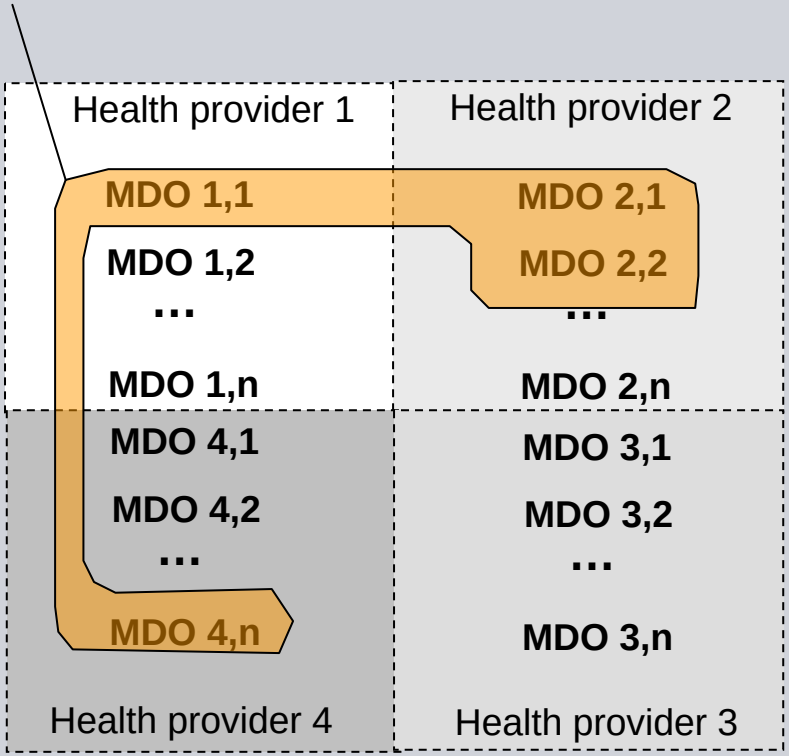
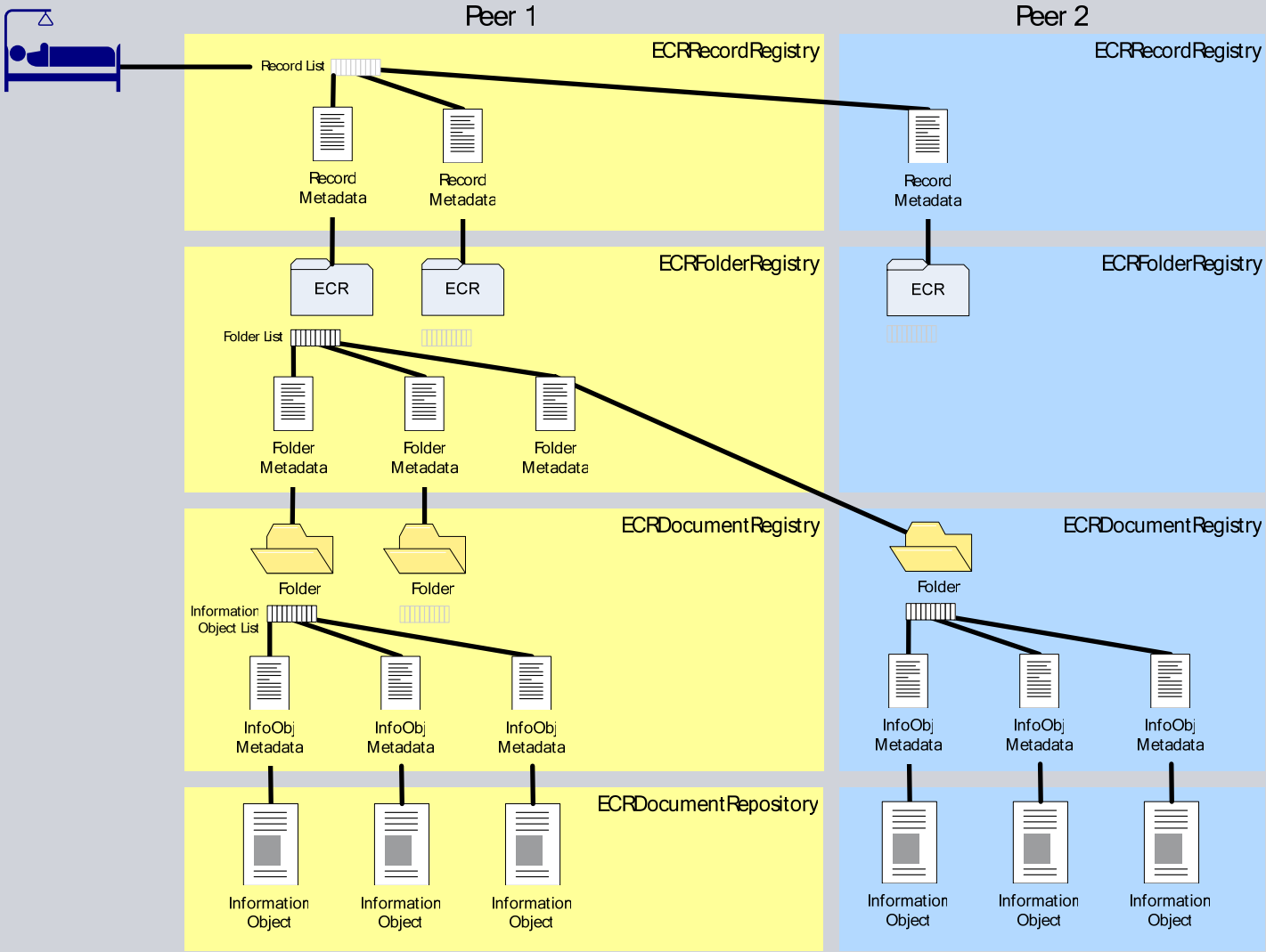
Case: John Doe's malaria



- ECRs (Electronic Case Records) provide structured and integrated views of MDOs related to a single medical case:
  - They contain MDOs by reference
  - Location of contained MDOs can span across various health providers
- They represent a physician's tool for cooperation with other physicians in order to treat diseases.
- They aim at adding value beyond individual MDOs, not at interfering or reinventing MDOs

ECR Object Model and Distribution



Source: Fraunhofer ISST

Architectural Approach (v0.16 WSDLs/XSDs)

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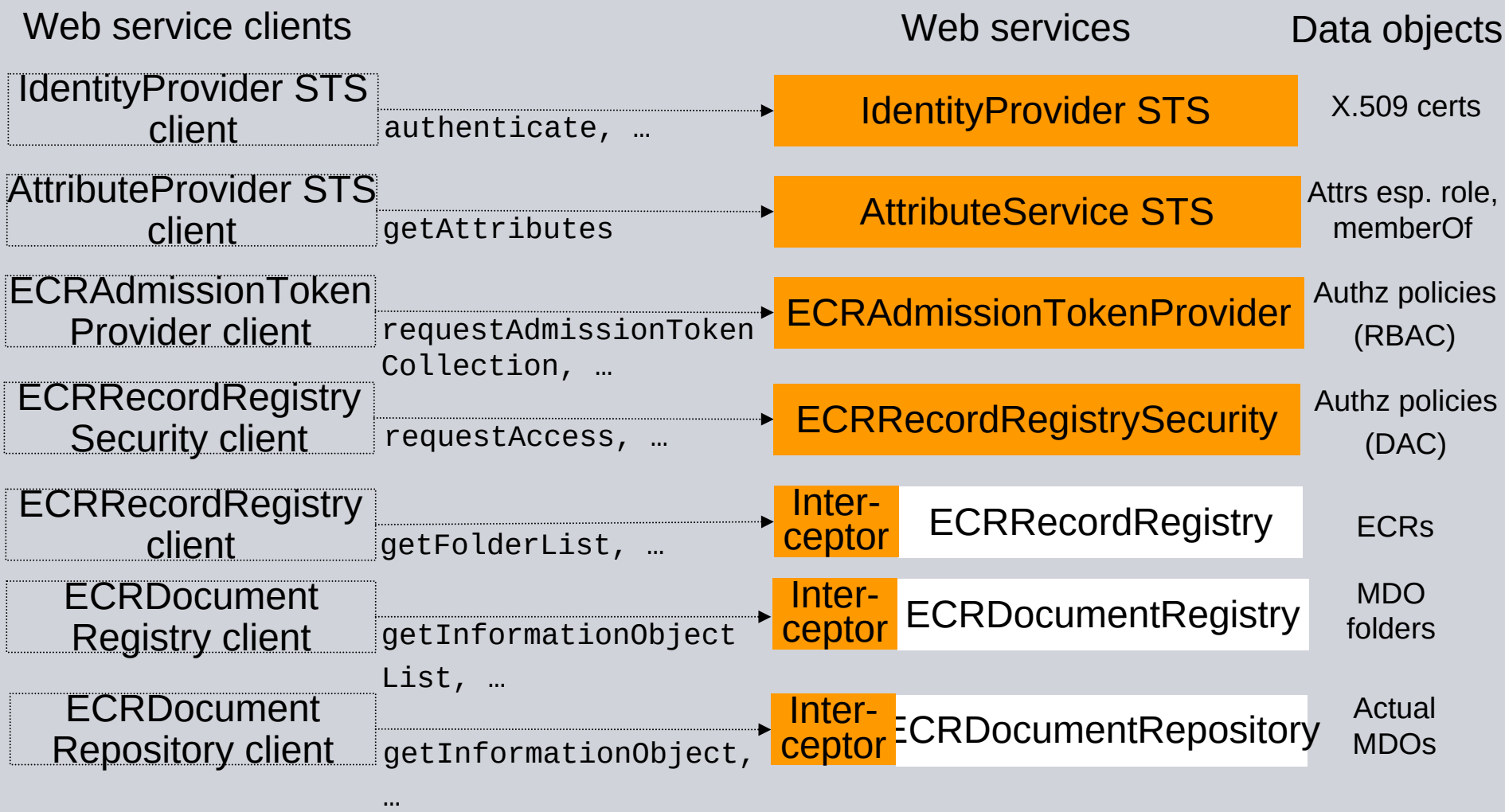

Conclusions

- Identity 2.0 and user-centric identity will change the identity management agenda:
  - Identity 2.0 shifts the perception of user identity from persisted, unauthenticated data to transient, authenticated information. It is a reaction for limitations of traditional security architectures with their rigid coupling between authorization and authentication
  - User-centric identity puts self-determination of individual users into the identity management focus. It is a re-percussion to Web 2.0 approaches around user participation.
- Web services change the technology landscape. They especially simplify federation. Federation solutions for traditional Web application environments and Web services should be regarded as different generations.
- A short taxonomy of federation solutions with the dimensions of Web services / Identity 2.0 / user-centric identity:

Initiative	Identity 2.0	User-centric	Web service-aware
SAML Web-SSO, Shibboleth, Liberty-Alliance ID-FF	Yes	No	No
OpenID	Yes	Yes	No
CardSpace	Yes	Yes	Yes
eFA	Yes	No	Yes

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Backup

Laws of Identity

(Source: Kim Cameron, Microsoft)

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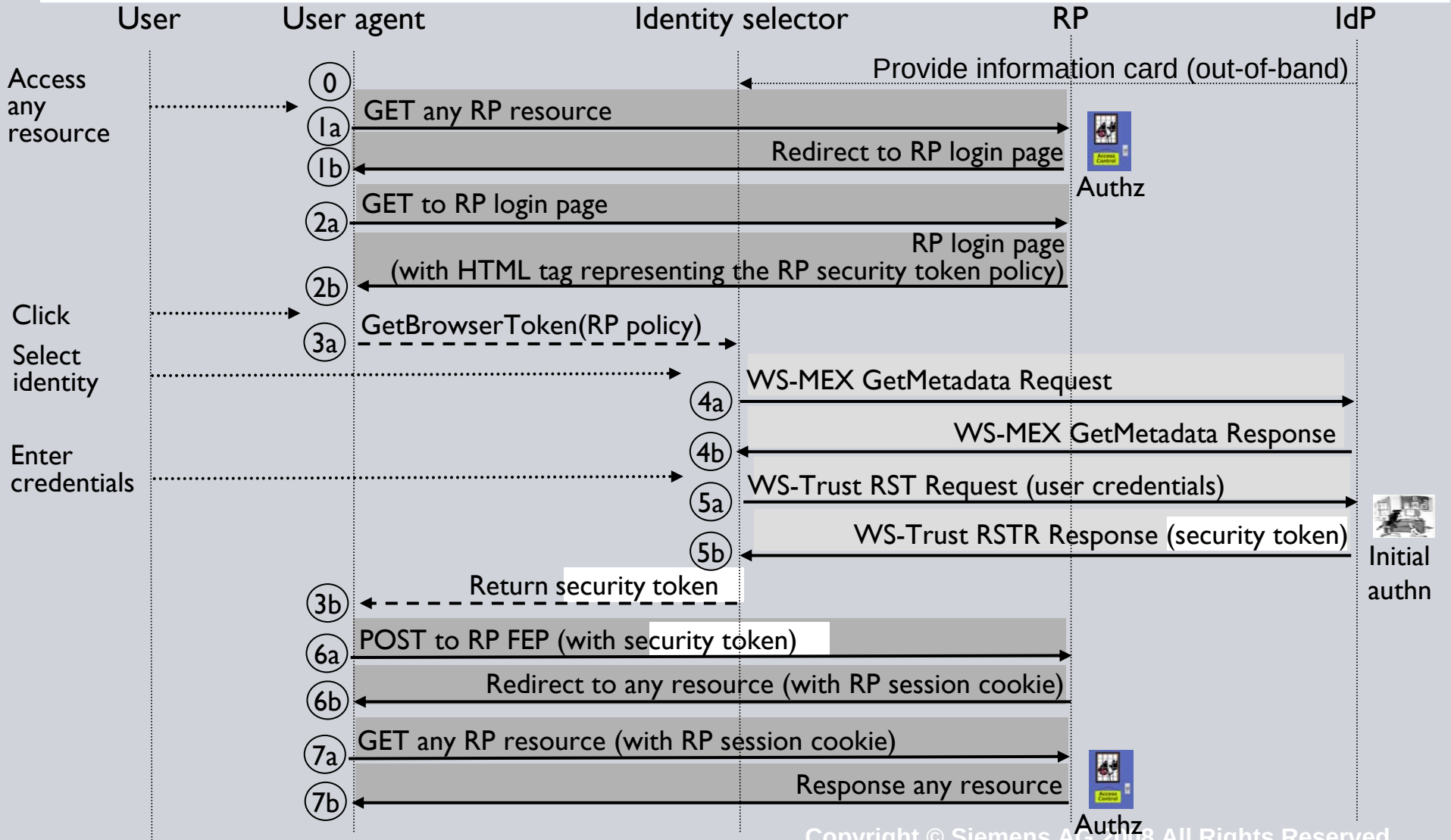
- User control and consent
- Minimal disclosure for a defined use
- Justifiable parties
- Directional identity
- Pluralism of operators and technologies
- Human integration
- Consistent experience across contexts

Join the discussion at www.identityblog.com

CardSpace Sequence Diagram (for Web Browsers)



The Traditional System Architecture Pattern

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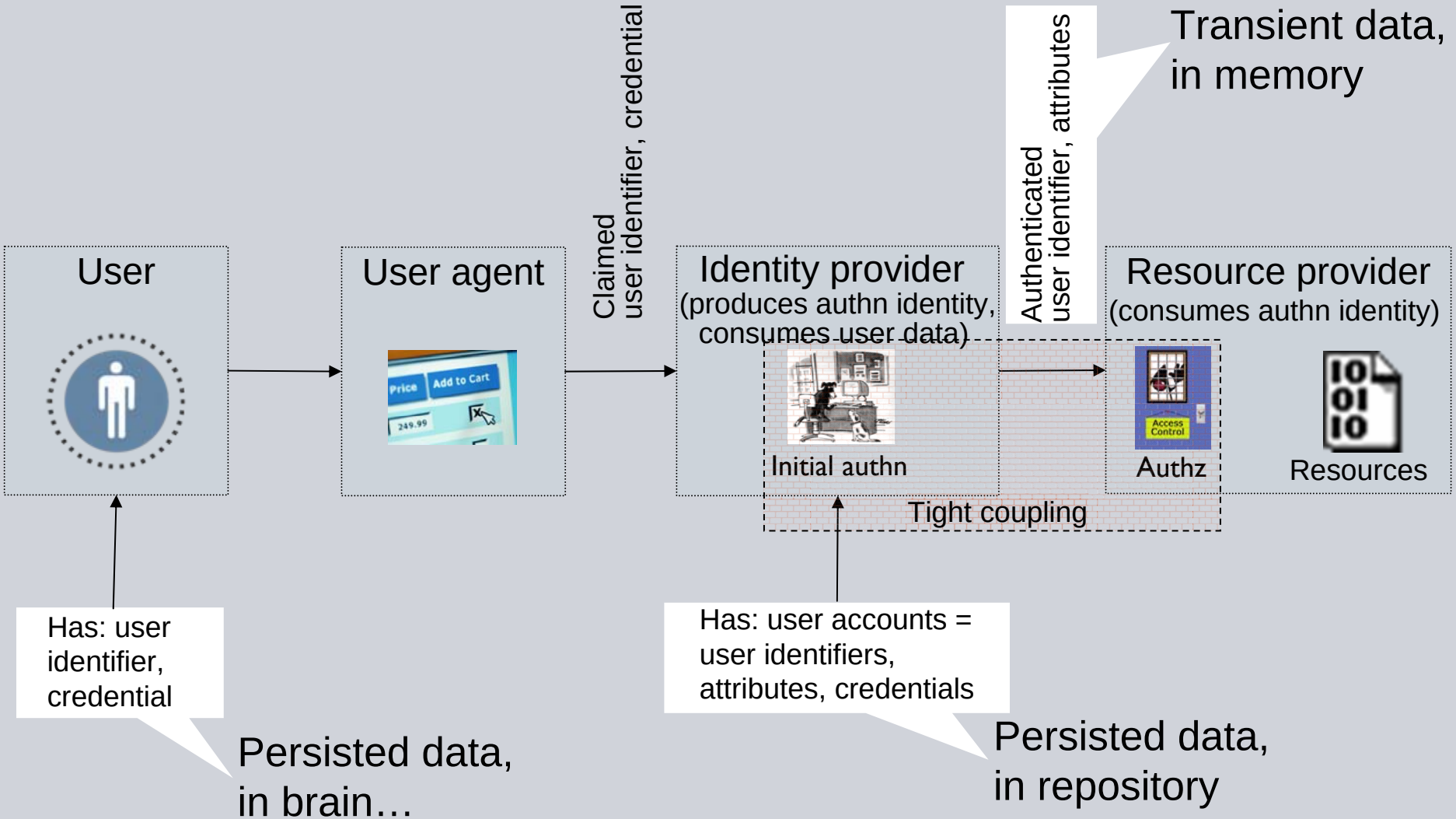

Identity 2.0

…Is Limited

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- Characteristics:
  - Bundles authorization and initial authentication through a tight coupling
  - Produces authenticated subjects from persisted data only – via own initial authentication
  - Supports externalization on a persistence level only
- Limitations:
  - Lacking separation of concerns:
    - Mandates resource providers (short: RP) to accommodate identity provider (short: IdP) tasks
  - Missing wide-area capabilities of identity:
    - Authenticated subject identity can not be transferred
    - Remedies within the traditional pattern ... don’t solve the problem:
      - Transfer persisted user data:
        - Requires to re-do initial authentication again and again – the SSO problem
        - Violates the “better refer than copy” principle in IT
      - Refer to persisted user data from external sources:
        - Requires to re-do initial authentication again and again – the SSO problem