OpenID Connect Update

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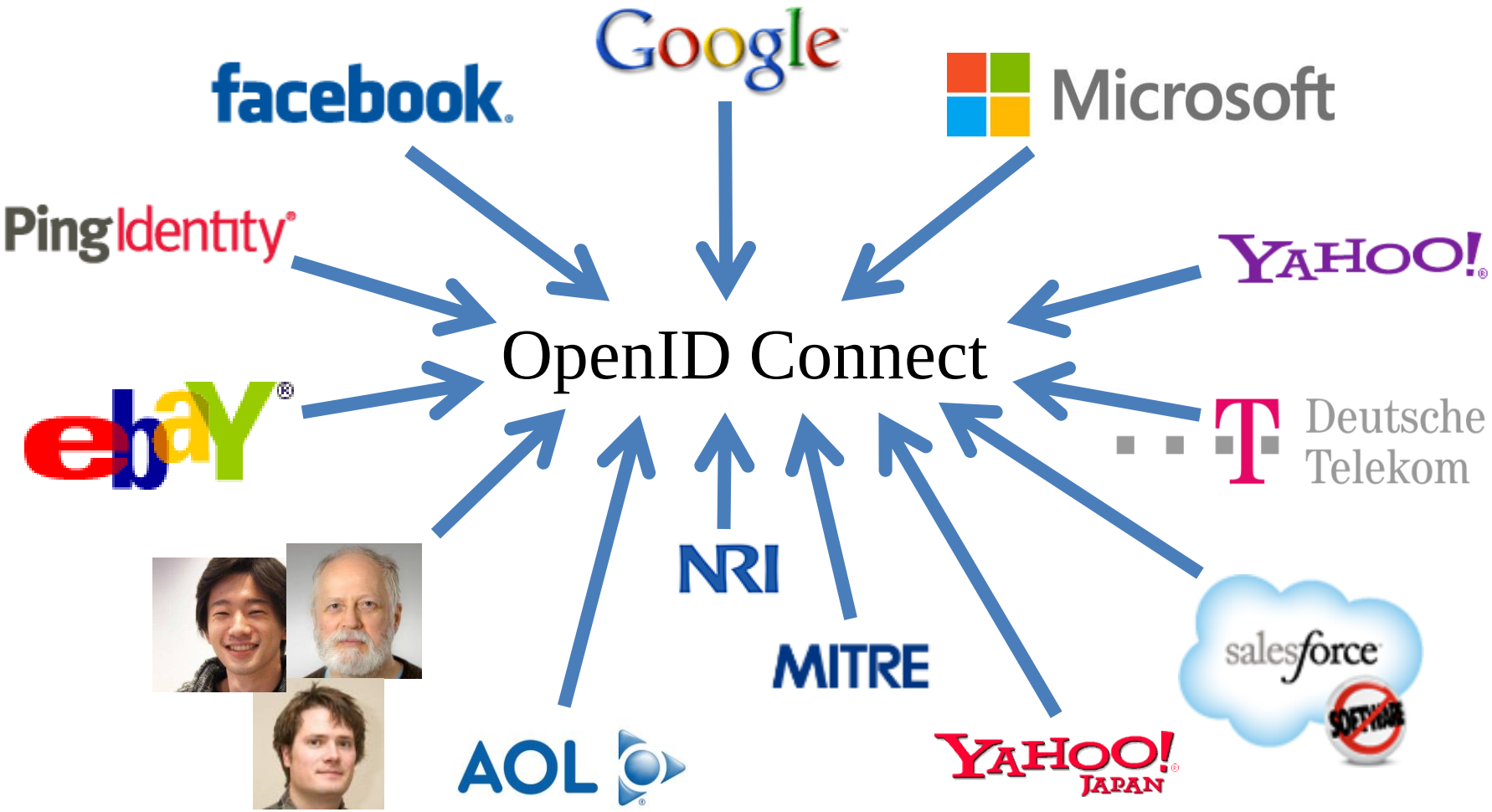
Working Together



OpenID Working Group Members

- Key working group participants:
  - Nat Sakimura – Nomura Research Institute – Japan
  - John Bradley – Ping Identity – Chile
  - Breno de Medeiros – Google – US
  - Axel Nennker – Deutsche Telekom – Germany
  - Torsten Lodderstedt – Deutsche Telekom – Germany
  - Roland Hedberg – Umeå University – Sweden
  - Andreas Åkre Solberg – UNINETT – Norway
  - Chuck Mortimore – Salesforce – US
  - Brian Campbell – Ping Identity – US
  - George Fletcher – AOL – US
  - Justin Richer – Mitre – US
  - Nov Matake – Independent – Japan
  - Mike Jones – Microsoft – US
- *By no means an exhaustive list!*

OpenID Connect Intro

- Simple identity layer on top of OAuth 2.0
- Enables clients to verify identity of end-user
- Enables clients to obtain basic profile info
- REST/JSON interfaces → low barrier to entry

OpenID Connect Range

- Spans use cases, scenarios
  - Internet, Enterprise, Mobile, Cloud
- Spans security & privacy requirements
  - From non-sensitive information to highly secure
- Spans sophistication of claims usage
  - From basic default claims to specific requested claims to aggregated and distributed claims
- Maximizes simplicity of implementations
  - Uses existing IETF specs: OAuth 2.0, JWT, etc.
  - Lets you build only the pieces you need

Presentation Overview

- Introduction
- Design Philosophy
- A Look Under the Covers
- Overview of Connect Specs
- Timeline and Next Steps
- Related IETF Specs
- Resources

Design Philosophy

Simple Things Simple

Complex Things Possible

Simple Things Simple

UserInfo endpoint for simple claims about user

Designed to work well on mobile phones

How We Make It Simple

- Build on OAuth 2.0
- Use JavaScript Object Notation (JSON)
- Build only the pieces that you need

- *Goal: Easy implementation on all modern development platforms*

Complex Things Possible

- Encrypted Claims
- Aggregated Claims
- Distributed Claims

Key Diffs from OpenID 2.0

- Support for native client applications
- Identifiers using e-mail address format
- UserInfo endpoint for simple claims about user
- Designed to work well on mobile phones
- Uses JSON/REST, rather than XML
- Support for encryption and higher LOAs
- Support for distributed and aggregated claims
- Support for session management, including logout
- Support for self-issued identity providers

OpenID Connect Interop Status

- Recently began 5th round of interop testing
- Interop data at http://osis.idcommons.net/
- By the numbers:
  - 12 implementations participating
  - 110 feature tests defined
  - 107 members of interop mailing list
- In-person interop testing session held here this morning

A Look Under the Covers

- ID Token
- Claims Requests
- UserInfo Claims
- Example Protocol Messages

ID Token

- JWT representing logged-in session
- Claims:
  - `iss` – Issuer
  - `sub` – Identifier for subject (user)
  - `aud` – Audience for ID Token
  - `iat` – Time token was issued
  - `exp` – Expiration time
  - `nonce` – Mitigates replay attacks

ID Token Claims Example

```
{
 "iss": "https://server.example.com",
 "sub": "248289761001",
 "aud": "0acf77d4-b486-4c99-bd76-074ed6a64ddf",
 "iat": 1311280970,
 "exp": 1311281970,
 "nonce": "n-0S6_WzA2Mj"
}
```

Claims Requests

- Basic requests made using OAuth scopes:
  - `openid` – Declares request is for OpenID Connect
  - `profile` – Requests default profile info
  - `email` – Requests email address & verification status
  - `address` – Requests postal address
  - `phone` – Requests phone number & verification status
  - `offline_access` – Requests Refresh Token issuance
- Requests for individual claims can be made using JSON “claims” request parameter

UserInfo Claims

- sub
- name
- given_name
- family_name
- middle_name
- nickname
- preferred_username
- profile
- picture
- website
- gender
- birthdate
- locale
- zoneinfo
- updated_at
- email
- email_verified
- phone_number
- phone_number_verified
- address

UserInfo Claims Example

```
{
 "sub": "248289761001",
 "name": "Jane Doe",
 "given_name": "Jane",
 "family_name": "Doe",
 "email": "janedoe@example.com",
 "email_verified": true,
 "picture": "http://example.com/janedoe/me.jpg"
}
```

Authorization Request Example

```
https://server.example.com/authorize
 ?response_type=token%20id_token
 &client_id=0acf77d4-b486-4c99-bd76-074ed6a64ddf
 &redirect_uri=https%3A%2F%2Fclient.example.com%2Fcb
 &scope=openid%20profile
 &state=af0ifjsldkj
 &nonce=n-0S6_WzA2Mj
```

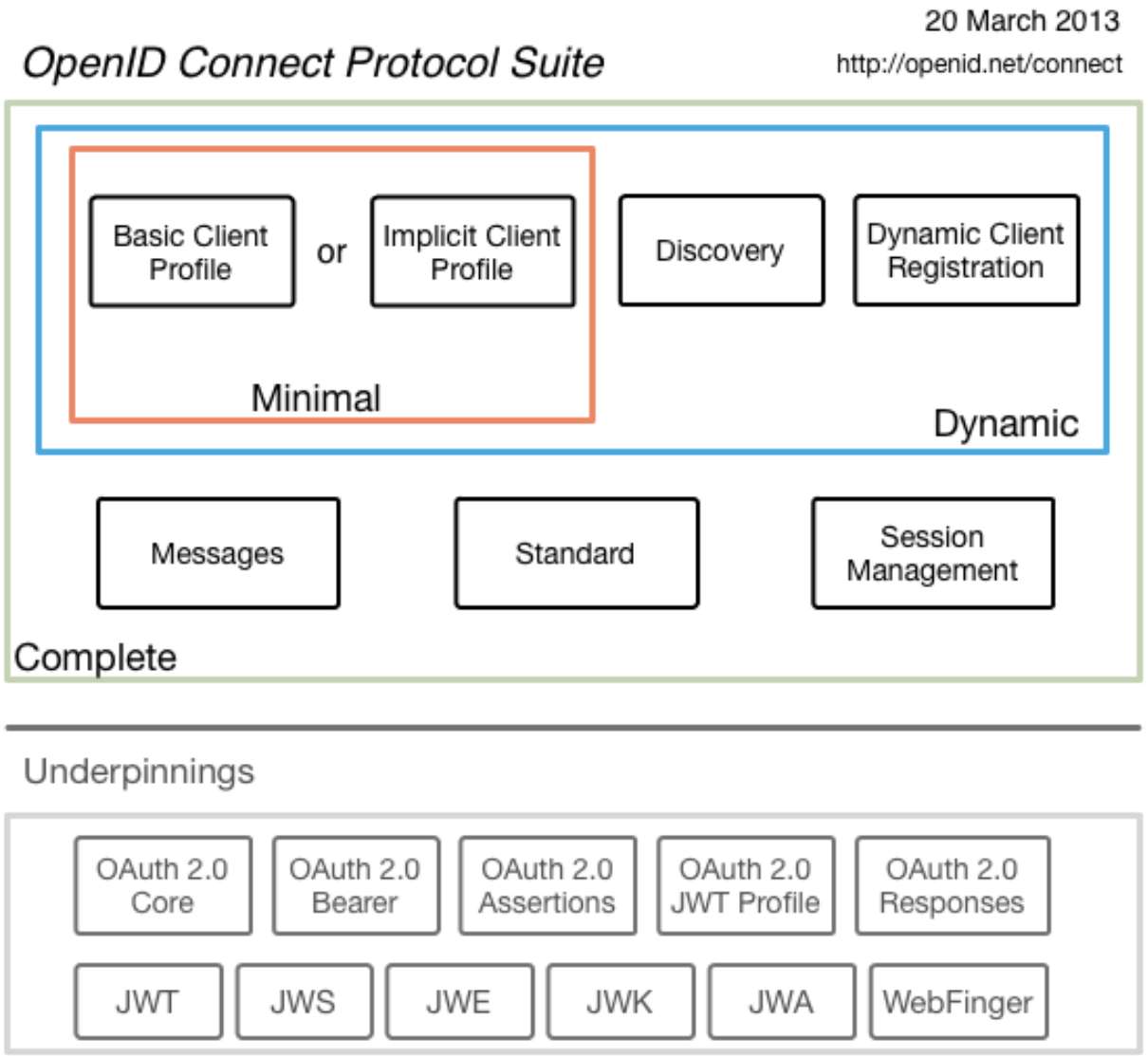
Authorization Response Example

```
HTTP/1.1 302 Found
Location: https://client.example.com/cb
 #access_token=mF_9.B5f-4.1JqM
 &token_type=bearer
 &id_token=eyJhbGzI1NiJ9.eyJz9Glnw9J.F9-V4IvQ0Z
 &expires_in=3600
 &state=af0ifjsldkj
```

UserInfo Request Example

```
GET /userinfo?schema=openid HTTP/1.1
Host: server.example.com
Authorization: Bearer mF_9.B5f-4.1JqM
```

OpenID Connect Specs Overview



Timeline to Date

- Artifact Binding working group formed, Mar 2010
- Major design issues closed at IIW, May 2011
  - Result branded “OpenID Connect”, May 2011
- Functionally complete specs, Jul 2011
- 2nd interop testing round, Sep-Nov 2011
- Simpler specs incorporating dev feedback, Oct 2011
- Published First Implementer’s Drafts, Dec 2011
- 3rd interop testing round, Feb 2012 to May 2012
- OpenID Connect won Best Innovation/New Standard award at EIC, April 2012
- Revised specs incorporating more feedback, June 2012
- 4th interop testing round, June 2012 to June 2013
- Proposed Second Implementer’s Drafts published, June 2013
- 5th interop testing round began, June 2013
- Vote to approve Implementer’s Drafts occurring now

Next Steps

- Membership vote to approve second Implementer's Drafts
  - Happening now
- Continue stabilizing, completing related IETF specs
- Interop testing based upon these drafts
- ***Continued deployment and feedback***
- Make determination that IETF dependencies are stable enough to publish final specifications
- Publish final specification drafts
  - Intent is to do so later this year
  - Membership vote to approve final specifications

Related IETF Specs

- OAuth 2.0 family of specs
  - OAuth 2.0 Core – RFC 6749
  - OAuth 2.0 Bearer – RFC 6750
  - OAuth 2.0 Assertions
  - OAuth 2.0 JWT Assertions Profile
- JWT and JOSE family of specs
  - JSON Web Token (JWT)
  - JSON Web Signature (JWS)
  - JSON Web Encryption (JWE)
  - JSON Web Algorithms (JWA)
  - JSON Web Key (JWK)
- Apps Area specs
  - WebFinger discovery
  - Acct URI

OpenID Connect OAuth Specs

- draft-ietf-oauth-v2
  - Now RFC 6749
- draft-ietf-oauth-v2-bearer
  - Now RFC 6750
- draft-ietf-oauth-urn-sub-ns
  - Now RFC 6755
- draft-ietf-oauth-v2-threatmodel
  - Now RFC 6819
- draft-ietf-oauth-assertions
  - Ready for WGLC
- draft-ietf-oauth-json-web-token
  - Ready for WGLC, but dependency on JOSE specs
- draft-ietf-oauth-oauth-jwt-bearer
  - Ready for WGLC, but dependency on JOSE specs
- draft-ietf-oauth-dyn-reg
  - In WGLC

OpenID Connect JOSE Specs

- draft-ietf-jose-json-web-signature
  - Ready for WGLC
- draft-ietf-jose-json-web-encryption
  - Ready for WGLC
- draft-ietf-jose-json-web-algorithms
  - Ready for WGLC
- draft-ietf-jose-json-web-key
  - Ready for WGLC

OpenID Connect Apps Area Specs

- draft-ietf-appsawg-webfinger
  - In IESG review
- draft-ietf-appsawg-acct-uri
  - In IESG review

Risks to Timely Completion

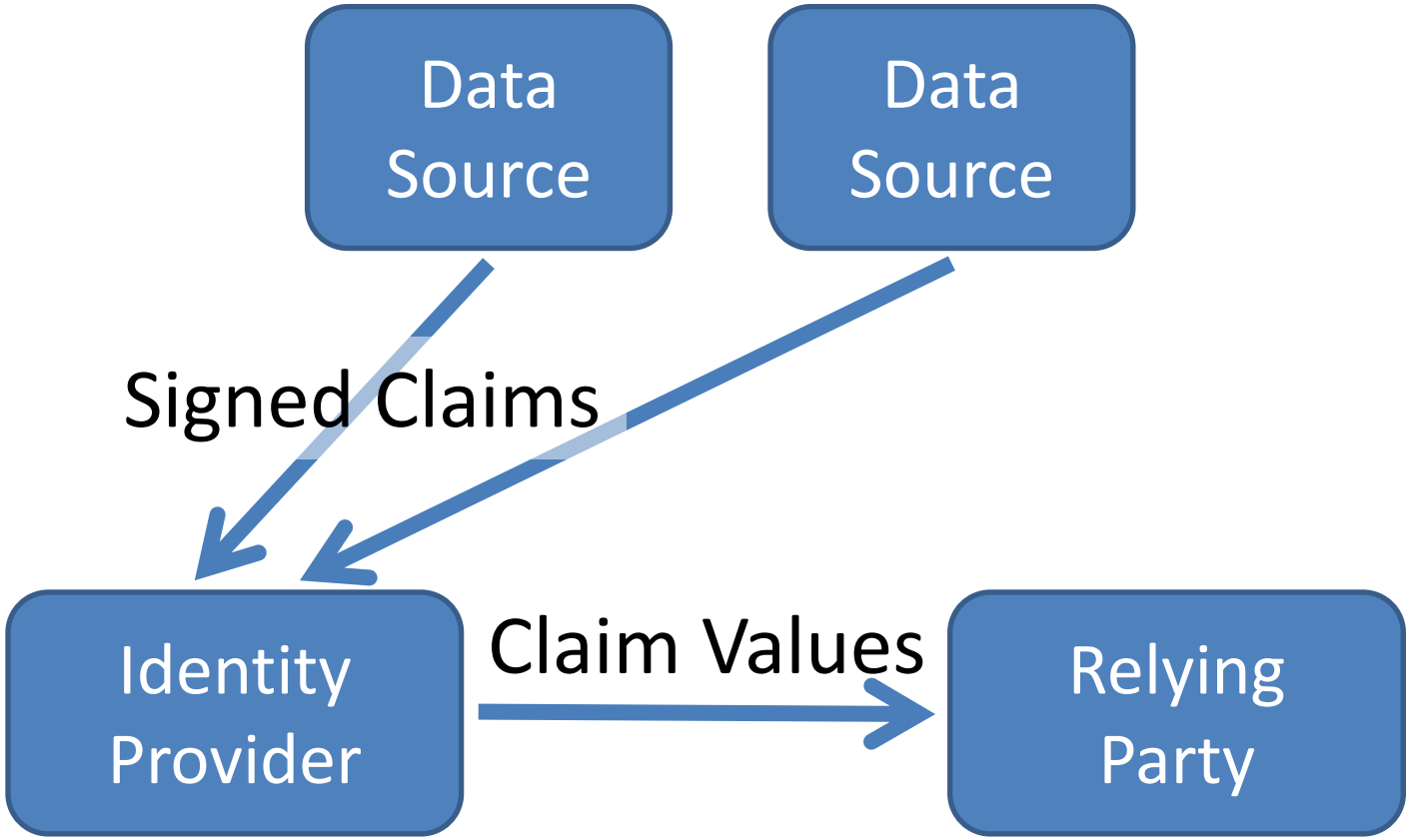
- Dependencies on IETF specs/processes
  - OAuth specifications:
    - JWT, OAuth Assertions, OAuth JWT Assertions, OAuth Dynamic Registration
  - JOSE specifications:
    - JWS, JWE, JWA, JWK
  - Discovery-related specifications:
    - WebFinger, Acct URI
- IETF could change/delay any of these

Resources

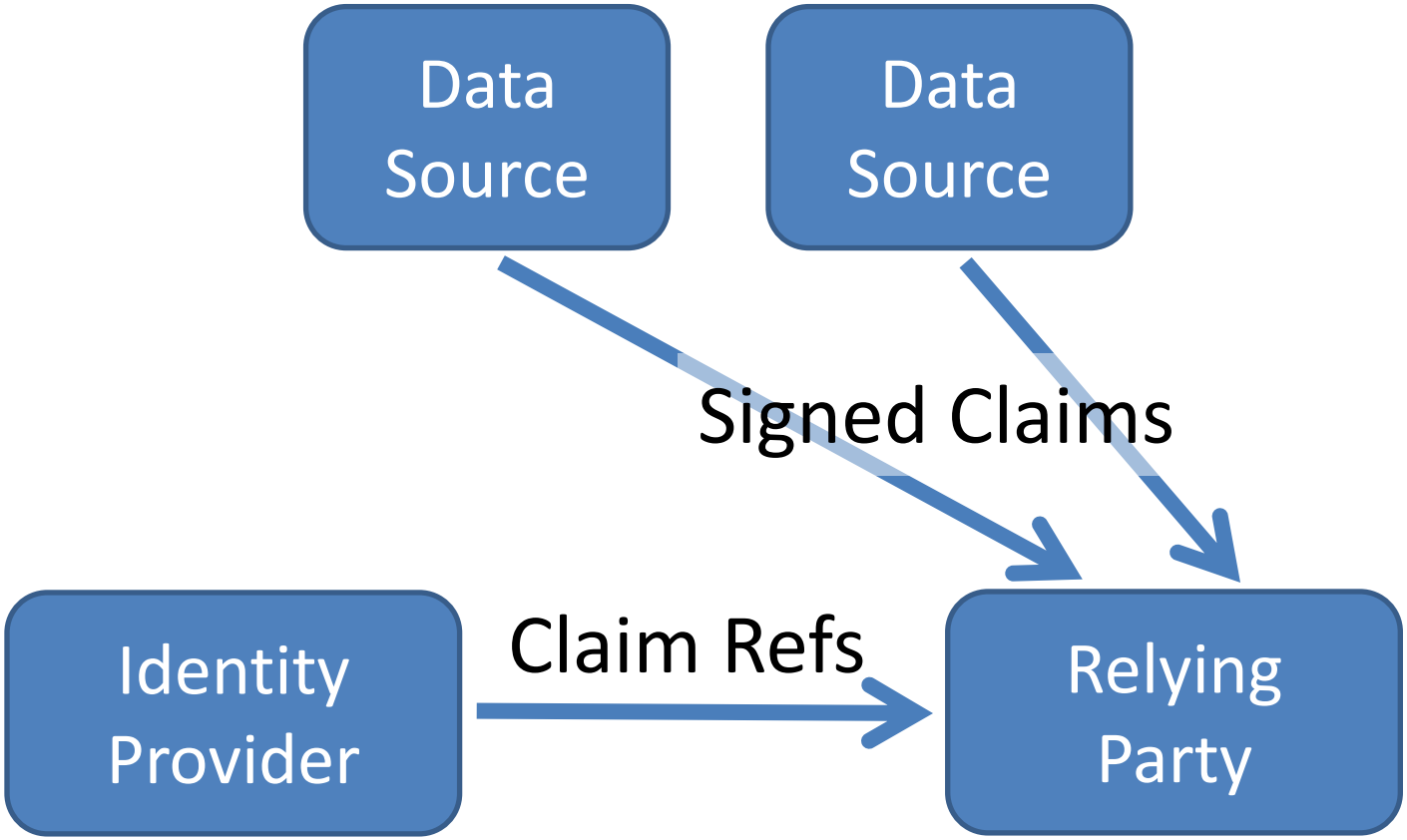
- OpenID Connect
  - http://openid.net/connect/
- OpenID Connect Working Group Mailing List
  - http://lists.openid.net/mailman/listinfo/openid-specs-ab
- OpenID Connect Interop Wiki
  - http://osis.idcommons.net/
- OpenID Connect Interop Mailing List
  - http://groups.google.com/group/openid-connect-interop
- Mike Jones' Blog
  - http://self-issued.info/
- Nat Sakimura's Blog
  - http://nat.sakimura.org/
- John Bradley's Blog
  - http://www.thread-safe.com/

BACKUP SLIDES

Aggregated Claims



Distributed Claims



Basic Client Profile

- Single, simple, self-contained Web client spec
  - For clients using OAuth “code” flow
- All you need for Web server-based RP
  - Using pre-configured set of OPs

- http://openid.net/specs/openid-connect-basic-1_0.html

Implicit Client Profile

- Single, simple, self-contained Web client spec
  - For clients using OAuth “implicit” flow
- All you need for user agent-based RPs
  - Using pre-configured set of OPs

- http://openid.net/specs/openid-connect-implicit-1_0.html

Discovery & Registration

- Enables dynamic configurations in which sets of OPs and RPs are not pre-configured
  - Necessary for ***open*** deployments
- Discovery enables RPs to learn about OP endpoints
- Dynamic registration enables RPs to use OPs they don't have pre-existing relationships with

- http://openid.net/specs/openid-connect-discovery-1_0.html
- http://openid.net/specs/openid-connect-registration-1_0.html

Messages & Standard

- Messages spec defines data formats exchanged in OpenID Connect messages
- Standard spec is HTTP binding for Messages
  - (Basic and Implicit are profiles of Messages and Standard)
- Needed for OPs, native client apps, and RPs needing functionality not in Basic
  - E.g., requesting claims not in default UserInfo set

- http://openid.net/specs/openid-connect-messages-1_0.html
- http://openid.net/specs/openid-connect-standard-1_0.html

Session Management

- For OPs and RPs needing session management capabilities
  - Enables logout functionality
  - Enables account switching

- http://openid.net/specs/openid-connect-session-1_0.html

OAuth Response Types

- Defines and registers additional OAuth response types:
  - `id_token`
  - `none`
- And also defines and registers combinations of `code`, `token`, and `id_token` response types

- http://openid.net/specs/oauth-v2-multiple-response-types-1_0.html

Developer Feedback Incorporated

- Ask: Simpler, more modular specs
  - Created Basic Client Profile and Implicit Client Profile
- Ask: Enable single-sign-on without using UserInfo
  - Can now receive just an ID Token, if desired
- Ask: Self-issued identity providers
  - Self-issued OP mechanisms defined
- Ask: Logout
  - Session management specification
- Ask: Third-party initiated login
  - Added ability to request an RP to log in at an OP
- *Not a comprehensive list of feedback incorporated*