OpenID Connect Overview

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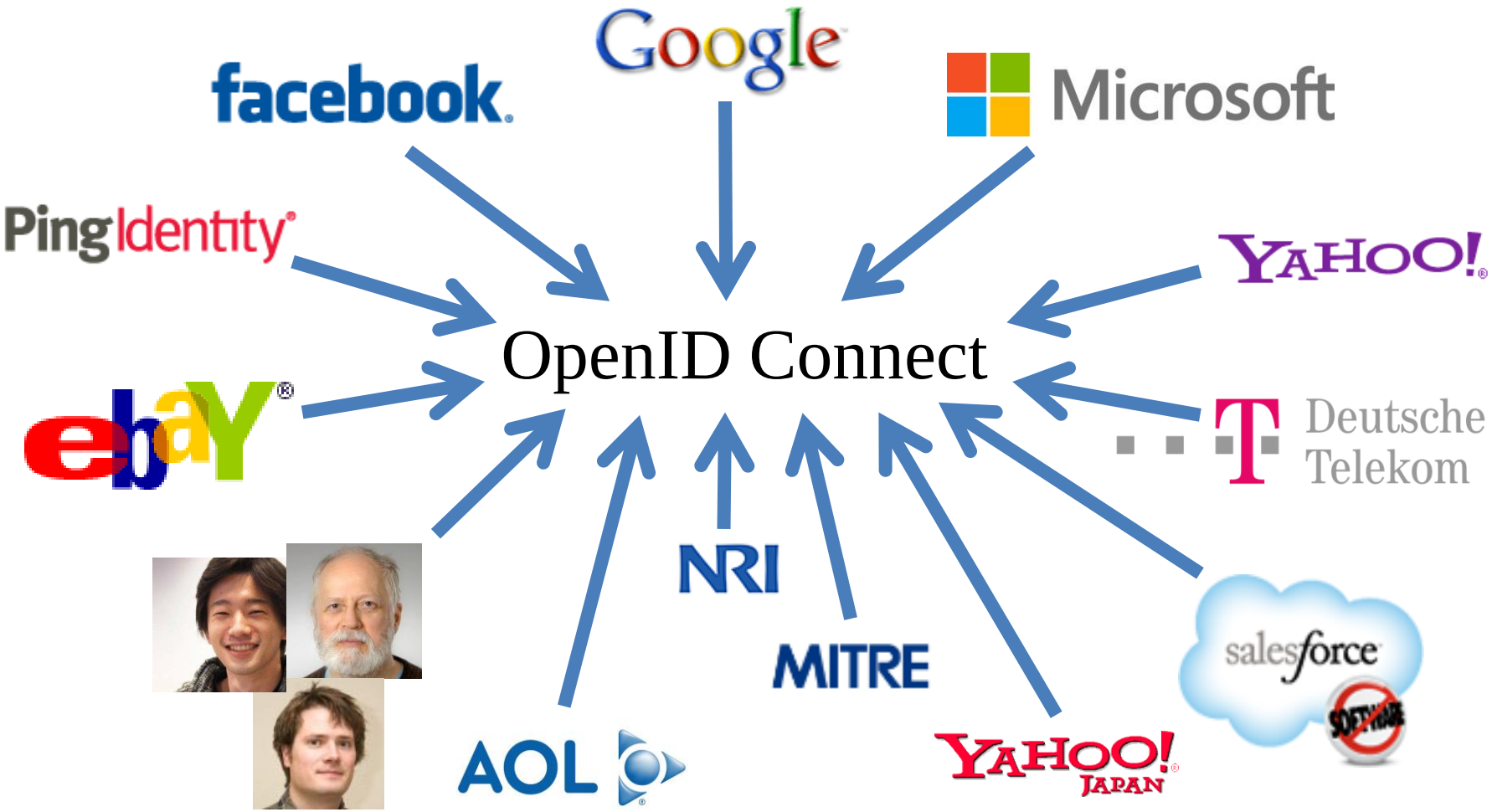
Working Together



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
- Next Steps
- 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

- Fifth round of interop testing in progress
- Interop data at http://osis.idcommons.net/
- By the numbers:
  - 20 implementations participating
  - 110 feature tests defined
  - 147 members of interop mailing list

Deployment Status

- Production deployments by:
  - Google
  - Microsoft
  - Deutsche Telekom
  - Ping Identity
  - AOL
  - Salesforce
  - Yahoo! Japan
  - Softbank
  - mixi
- Many more under way

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
```

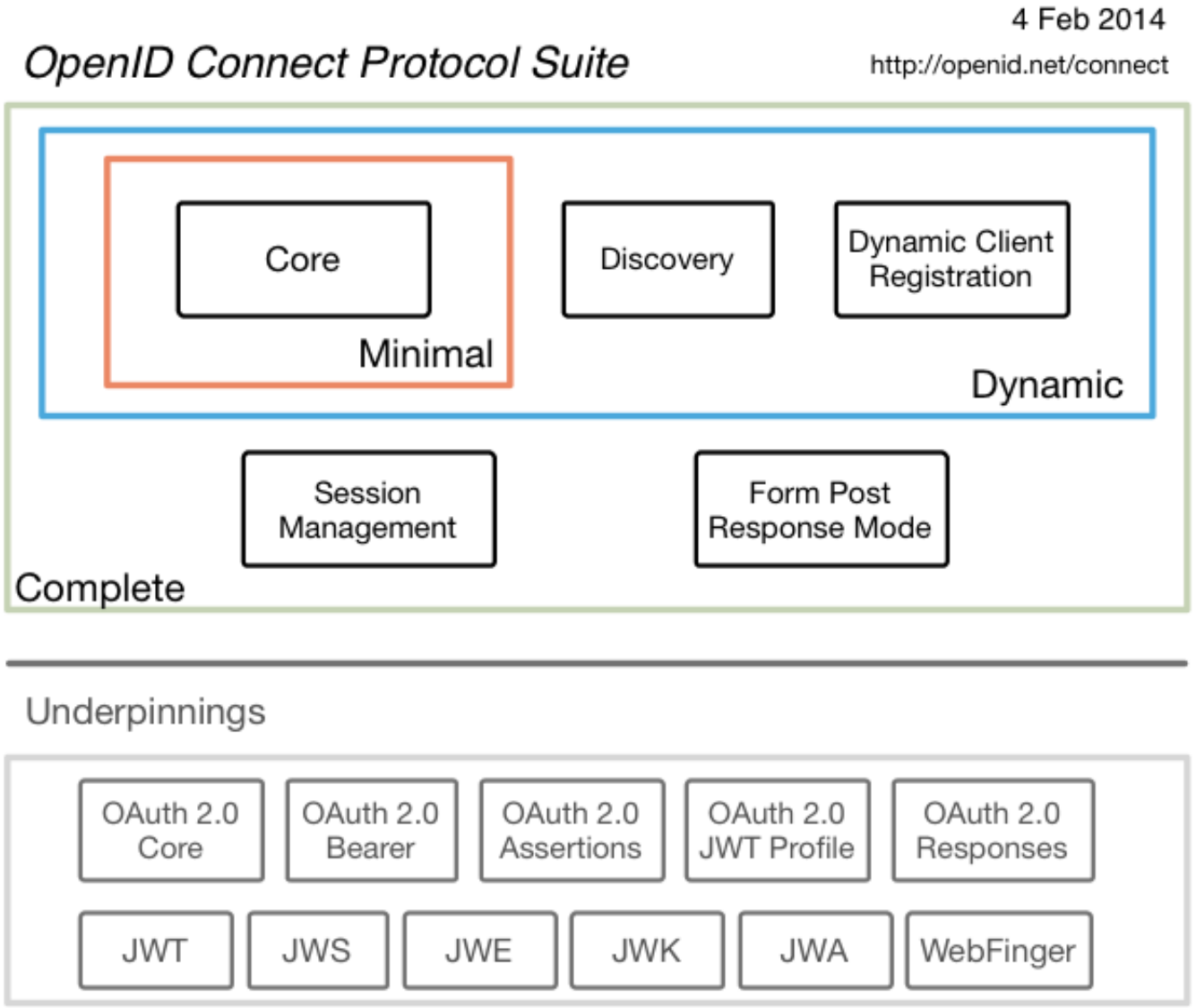
Authorization Response Example

```
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

- 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
- Second Implementers Drafts published, June 2013
- 5th interop testing round began, June 2013
- Final specifications approved, February 2014

Next Steps

- Continued deployment
- Continued interop testing
- Transition from OpenID 2.0 to OpenID Connect
  - Google, Yahoo!, etc. ending OpenID 2.0 support
- Finish session management, form post specs
- Self-certification program being developed

OpenID Self-Certification Program

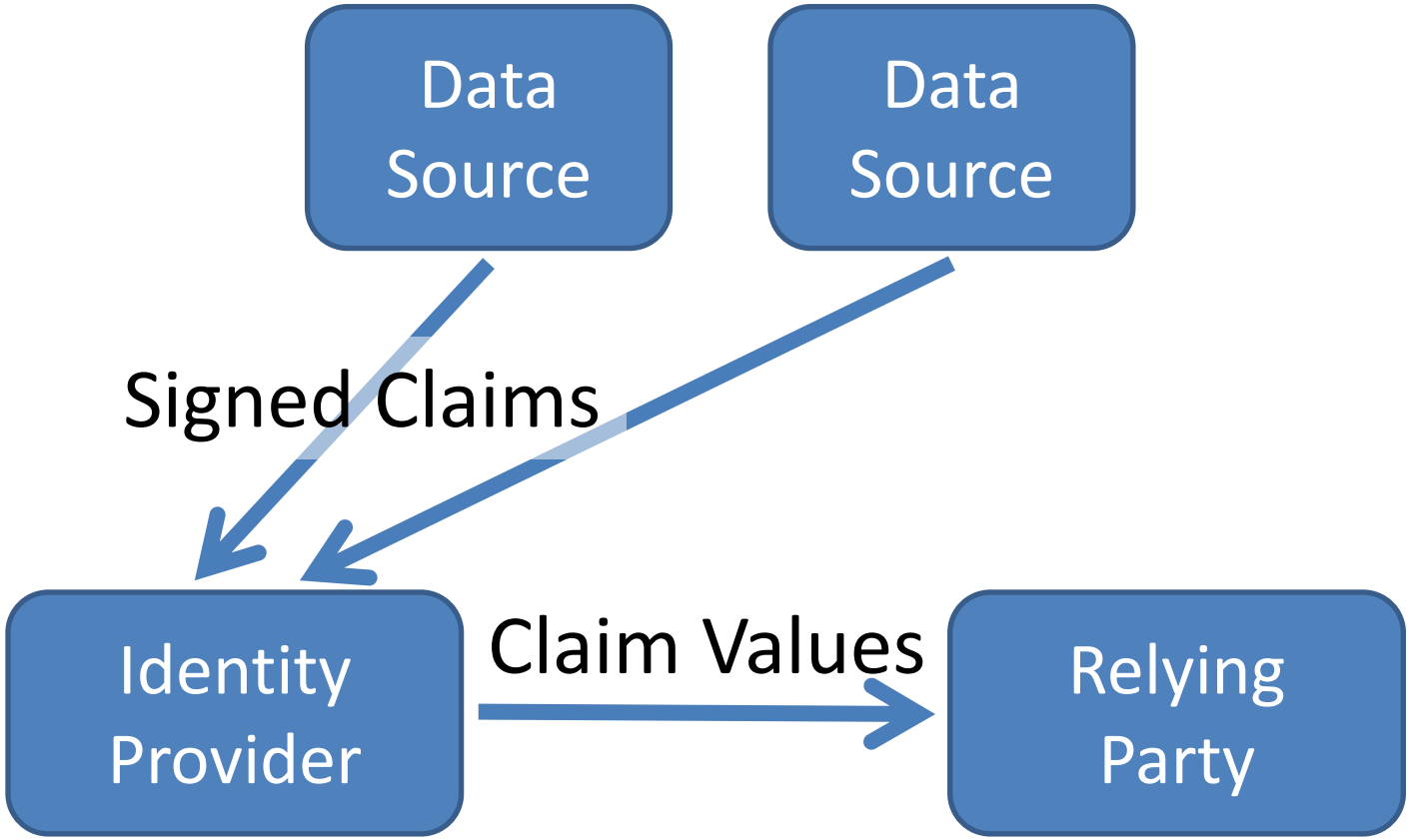
- Goal to enable implementations to certify that they meet criteria defined by WG, OIDF
- Certification work will be done by party seeking certification – not 3rd party
- Plan is to develop certification test suite based on Roland Hedberg's interop testing software
- Price TBD but will be low – intended to cover administrative costs – not be a profit center

Resources

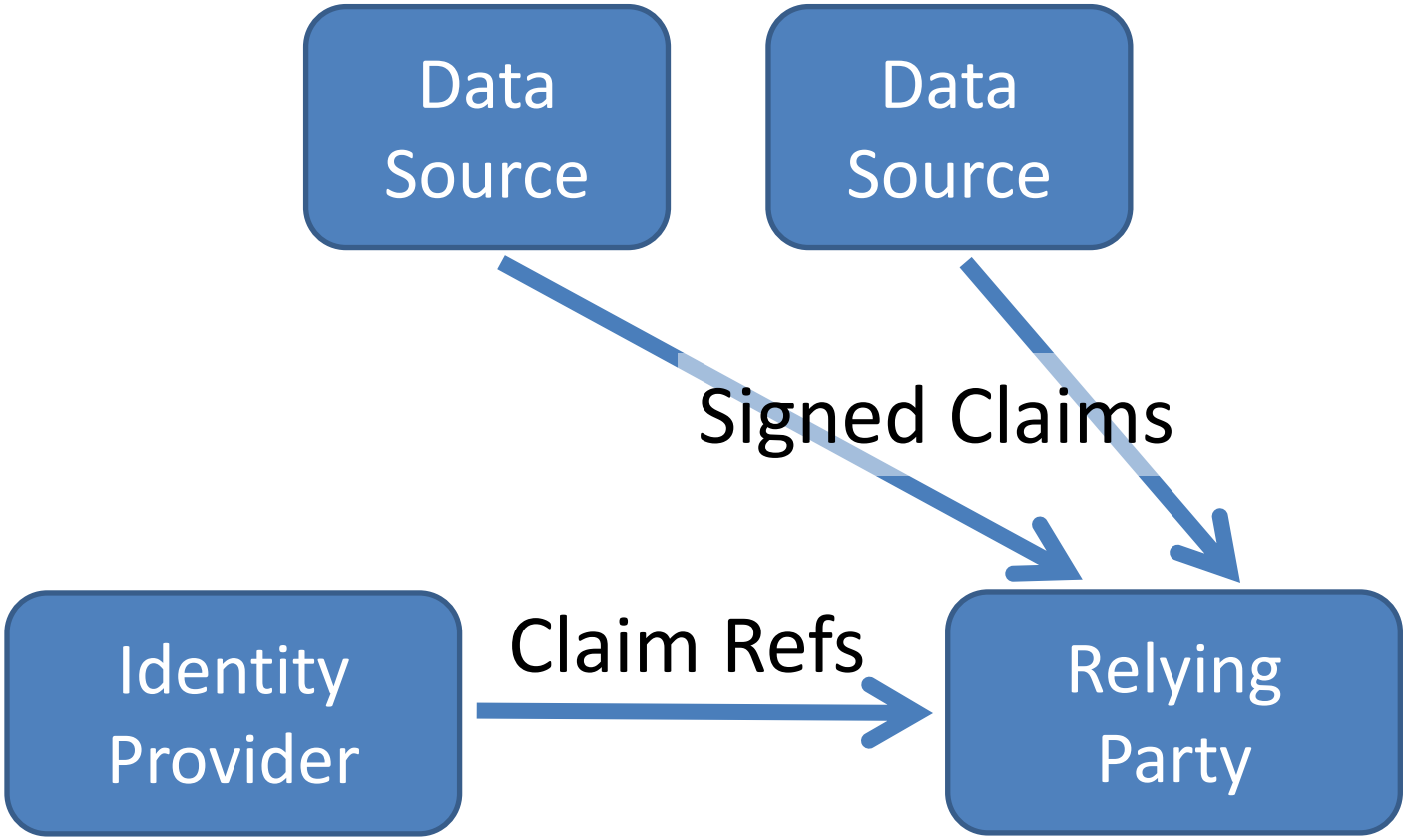
- OpenID Connect
  - http://openid.net/connect/
- Frequently Asked Questions
  - http://openid.net/connect/faq/
- Working Group Mailing List
  - http://lists.openid.net/mailman/listinfo/openid-specs-ab
- Interop Wiki
  - http://osis.idcommons.net/
- Interop Mailing List
  - http://groups.google.com/group/openid-connect-interop
- 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

Form Post Response Mode

- Defines how to return OAuth 2.0 Authorization Response parameters using HTML form values auto-submitted by User Agent using HTTP POST
- http://openid.net/specs/oauth-v2-form-post-response-mode-1_0.html