An Introduction to SCIM: System for Cross-Domain Identity Management

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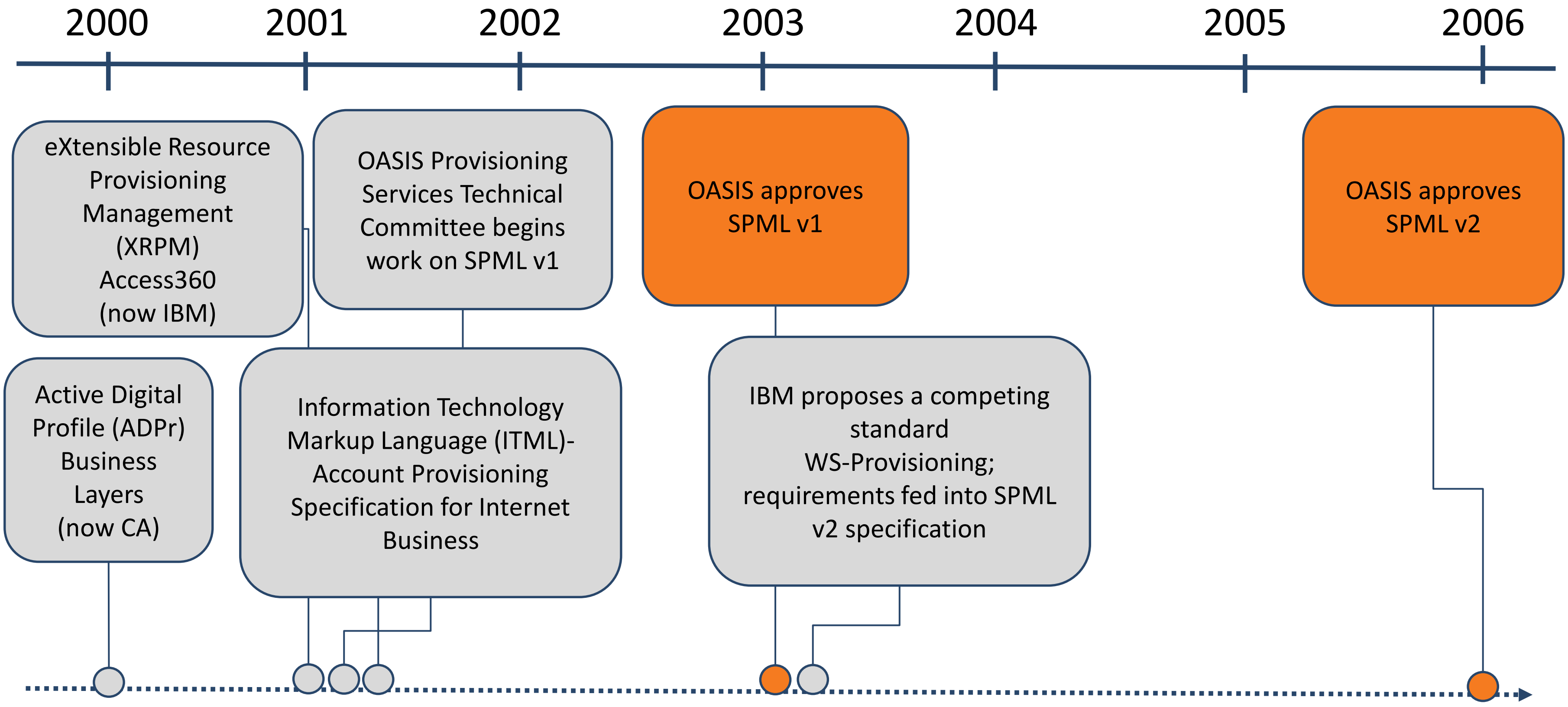
Agenda

- Why Standards-Based Provisioning?
- History of Standards-Based Provisioning
- SCIM Overview

Why Standards-Based Provisioning?

- Need a standard way to create, read, update, and delete users (accounts) for both enterprise and consumer based digital identities
  - In the enterprise, password management and compliance were big drivers
- Interoperability is the hardest part
  - Different protocols and user schemas
- Provisioning connections are difficult to maintain and are fragile
  - Application revisions can require engineering effort

History of Standards-Based Provisioning



2000 2001 2002 2003 2004 2005 2006

eXtensible Resource Provisioning Management (XRPM) Access360 (now IBM)

OASIS Provisioning Services Technical Committee begins work on SPML v1

OASIS approves SPML v1

OASIS approves SPML v2

Active Digital Profile (ADPr) Business Layers (now CA)

Information Technology Markup Language (ITML)-Account Provisioning Specification for Internet Business

IBM proposes a competing standard WS-Provisioning; requirements fed into SPML v2 specification

SPML Adoption

- Adoption by application developers was low
- Implemented in most of the provisioning systems, but not one system is SPML conformant
  - Application developers must build SPML-specific interfaces for each of the provisioning systems
  - Support was more a "checkbox" item
- Few applications support SPML
- Not supported by popular SaaS applications
- Since the 2006 approval of SPML v2, activity in the OASIS PSTC was non-existent
  - That is, until May of 2010

Genesis of SCIM

- Evolved from the Cloud Directory ("LDAP in the cloud") WG spawned at the 2010 Cloud Identity Summit
- Founding participants include some of the largest SaaS providers:

Google™

CISCO™

salesforce

SOFTWARE

Genesis of SCIM

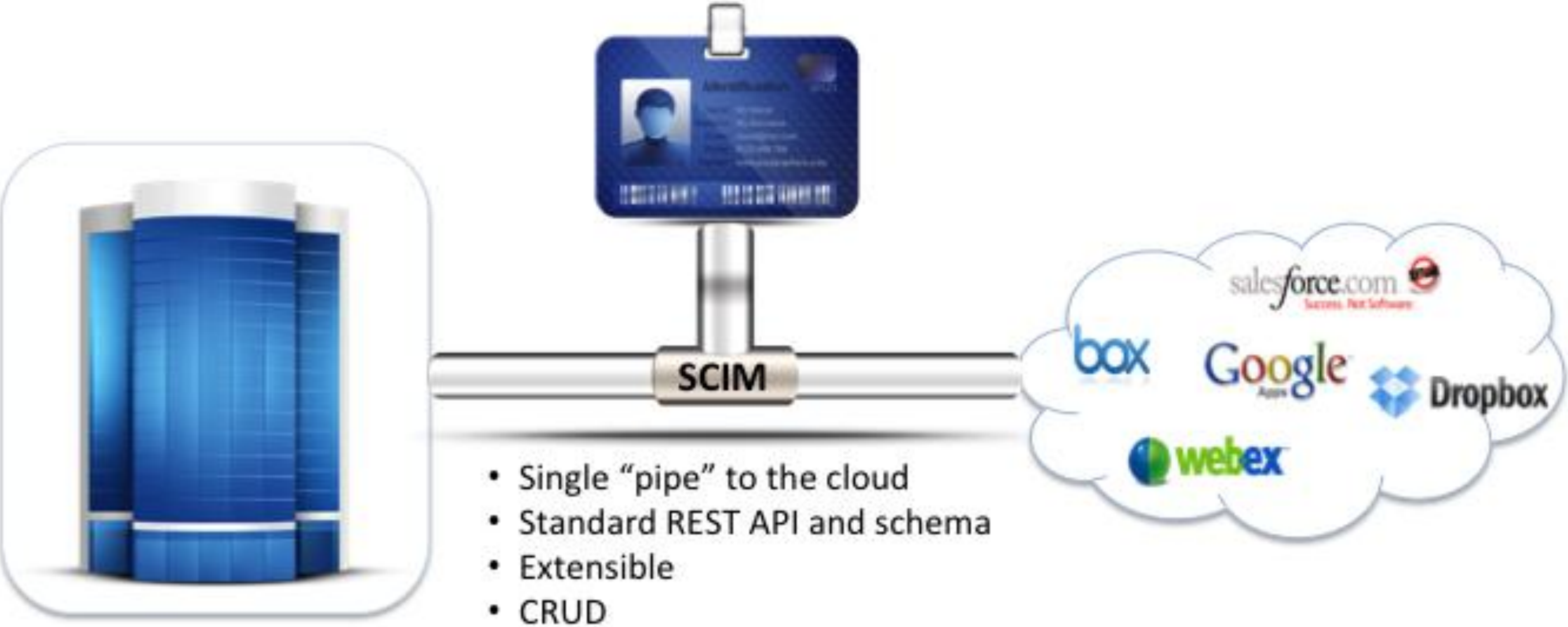
- Cloud Service Providers (SaaS, etc.) are all feeling the user provisioning pain:
  - “How do I provision a user account for service X?”
  - “How do I de-provision a user account from service X?”
  - “How do I update an existing account for service X?”
  - “How do I keep my organization’s users in sync with service X?”
  - “How do I manage groups?
- How is it done today?
  - Manual (UI)
  - Bulk (CSV upload)
  - API
  - SAML Just-In-Time provisioning

SCIM

THE ENTERPRISE

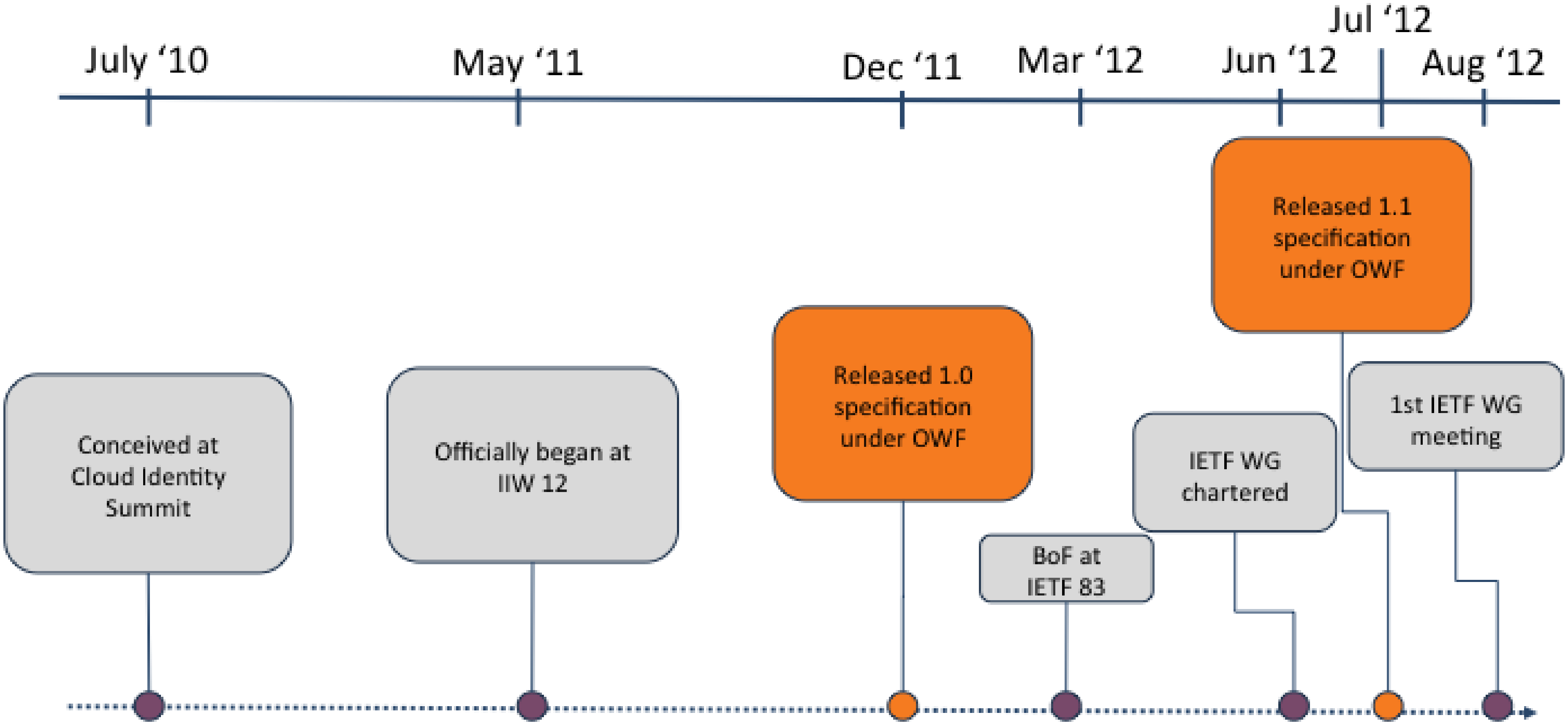
YOUR IDENTITY

CLOUD PROVIDERS

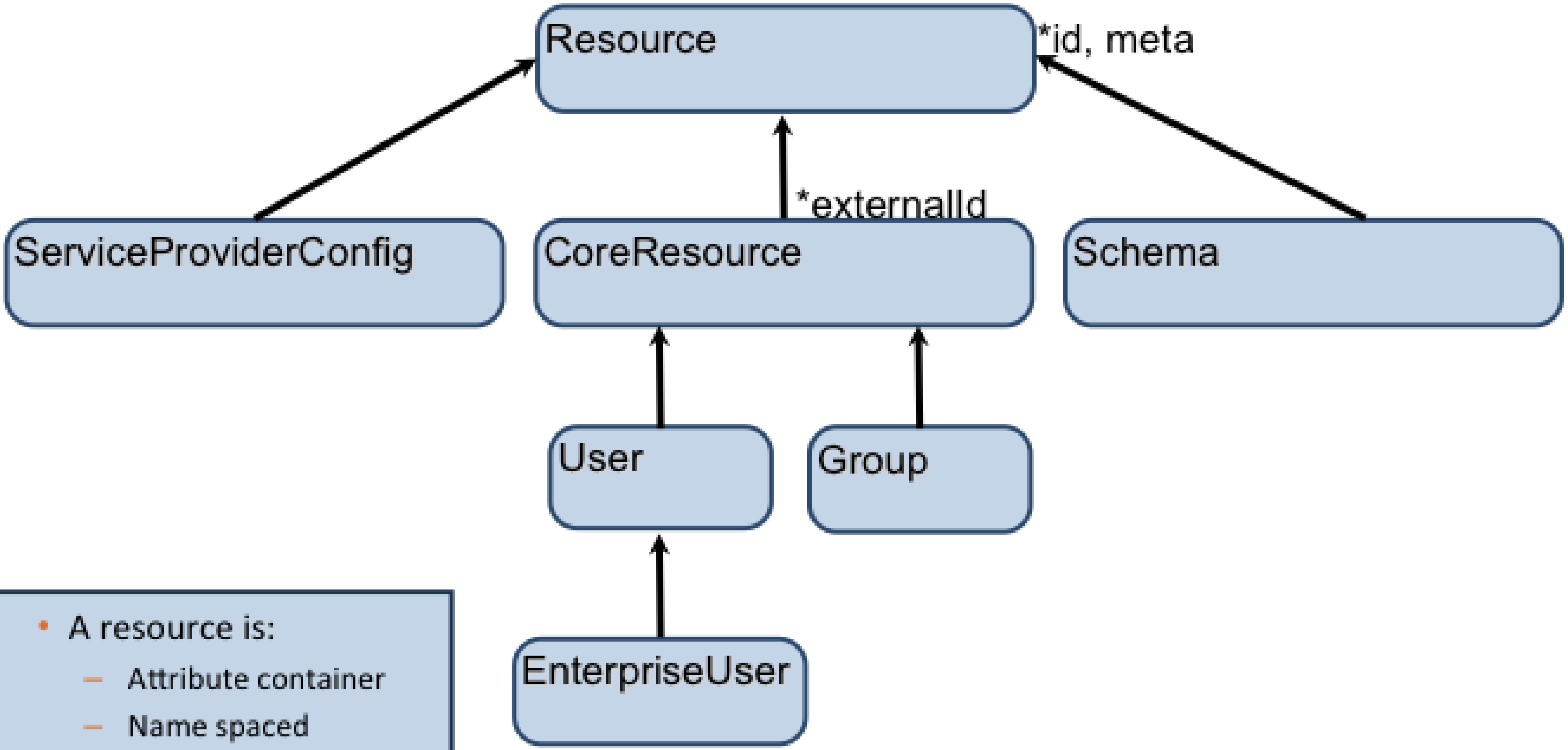


- Single “pipe” to the cloud
- Standard REST API and schema
- Extensible
- CRUD

History of SCIM


July '10
May '11
Dec '11
Mar '12
Jun '12
Jul '12
Aug '12
Conceived at Cloud Identity Summit
Officially began at IIW 12
Released 1.0 specification under OWF
BoF at IETF 83
IETF WG chartered
Released 1.1 specification under OWF
1st IETF WG meeting

A Resource-Centric Model

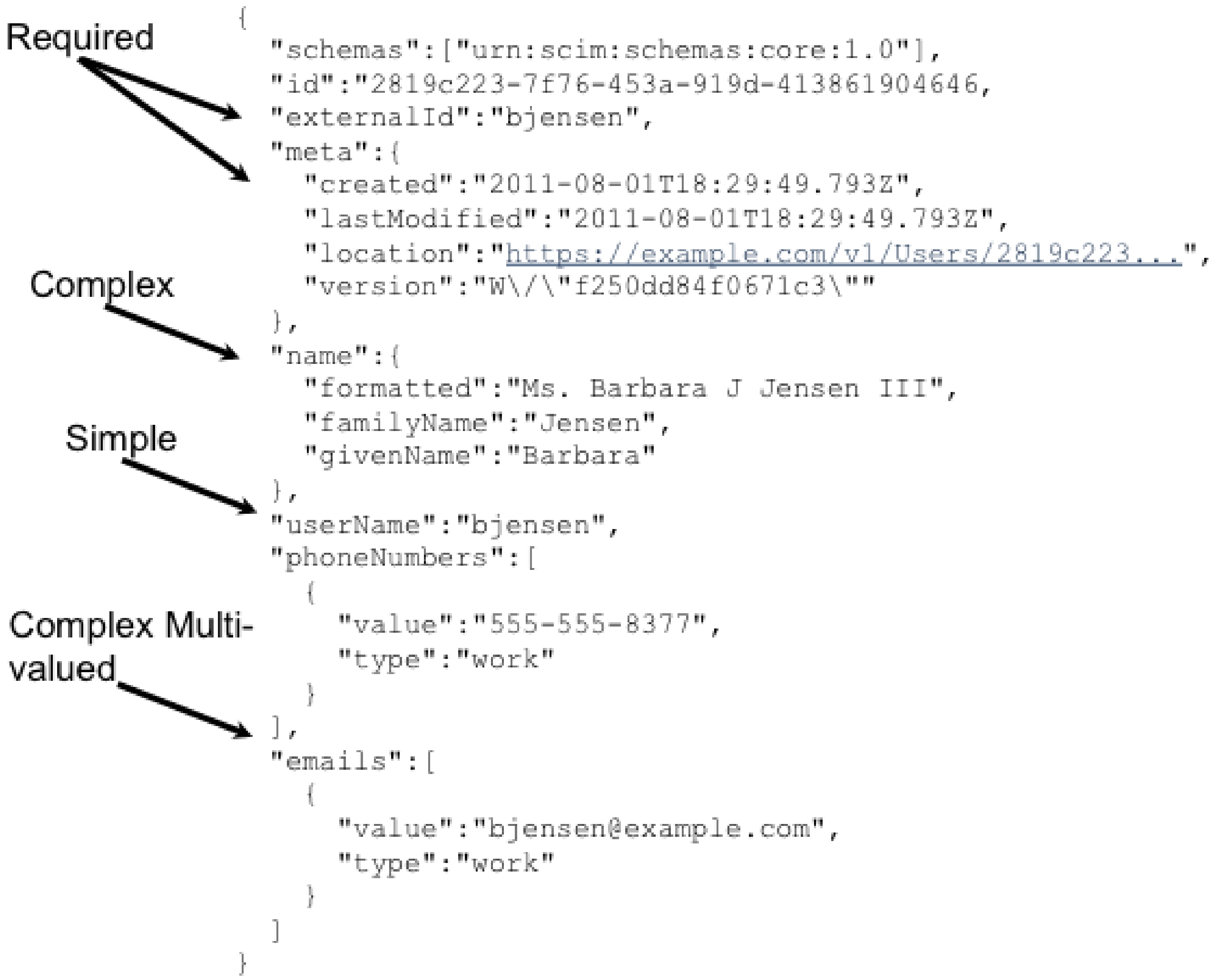


- A resource is:
  - Attribute container
  - Name spaced
- An attribute is:
  - Simple or Complex
  - Single or Multi-valued
  - Typed

Schema

- Origins in Portable Contacts (http://portablecontacts.net/)
- Rich Information Model
- XML and JSON data models
- Concrete artifacts (User and Group)
- Usage language (MTI and recommended)
- Extensibility: Inheritance and mix-in
- http://tools.ietf.org/html/draft-scim-core-schema-00.html

Example: User



Required

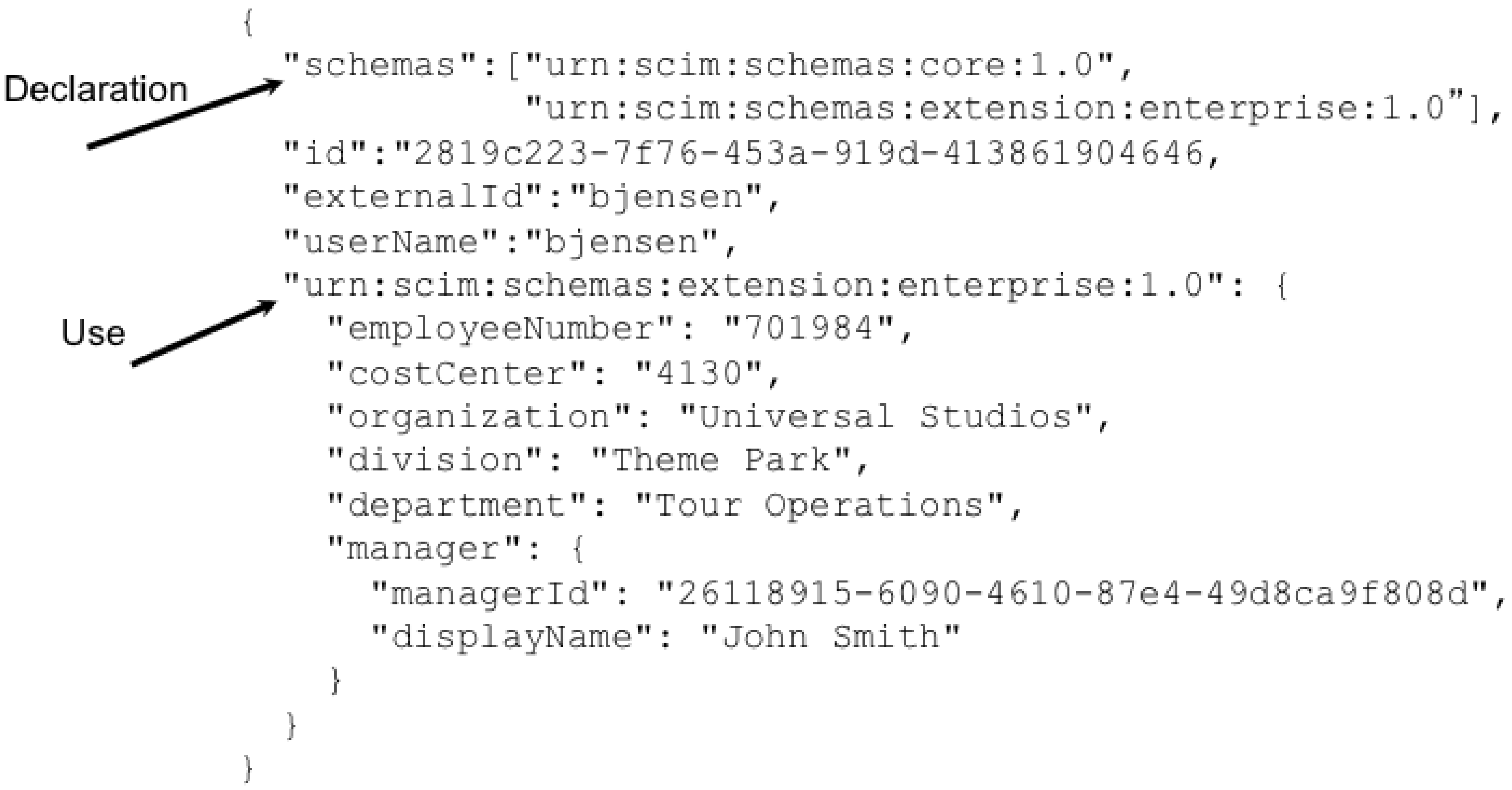
Complex

Simple

Complex Multi-valued

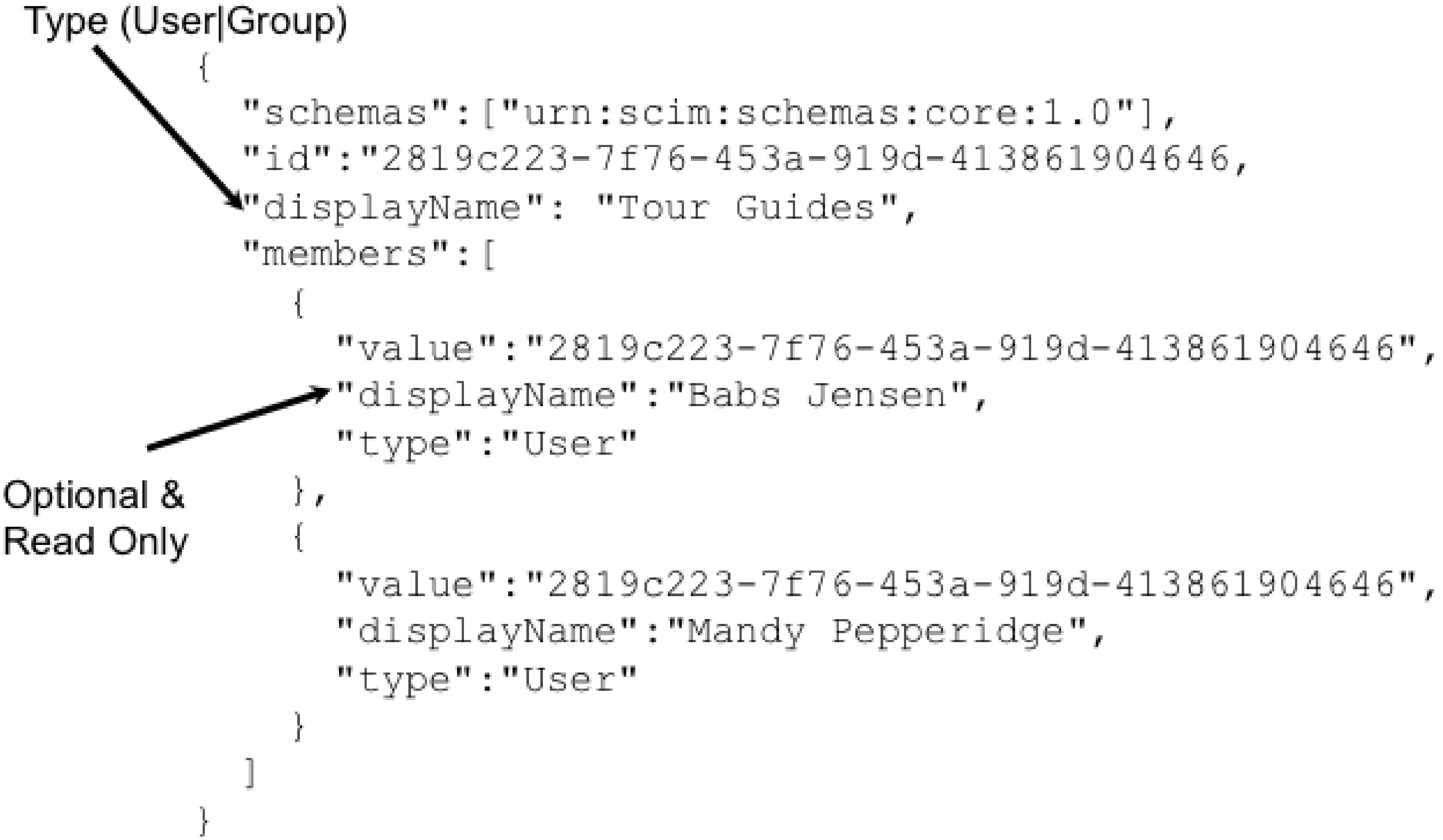
```
{
  "schemas":["urn:scim:schemas:core:1.0"],
  "id":"2819c223-7f76-453a-919d-413861904646,
  "externalId":"bjensen",
  "meta":{
    "created":"2011-08-01T18:29:49.793Z",
    "lastModified":"2011-08-01T18:29:49.793Z",
    "location":"https://example.com/v1/Users/2819c223...",
    "version":"W\/\"f250dd84f0671c3\""
  },
  "name":{
    "formatted":"Ms. Barbara J Jensen III",
    "familyName":"Jensen",
    "givenName":"Barbara"
  },
  "userName":"bjensen",
  "phoneNumbers":[
    {
      "value":"555-555-8377",
      "type":"work"
    }
  ],
  "emails":[
    {
      "value":"bjensen@example.com",
      "type":"work"
    }
  ]
}
```

Example: Ext User


Declaration
Use

```
{
  "schemas":["urn:scim:schemas:core:1.0",
             "urn:scim:schemas:extension:enterprise:1.0"],
  "id":"2819c223-7f76-453a-919d-413861904646,
  "externalId":"bjensen",
  "userName":"bjensen",
  "urn:scim:schemas:extension:enterprise:1.0": {
    "employeeNumber": "701984",
    "costCenter": "4130",
    "organization": "Universal Studios",
    "division": "Theme Park",
    "department": "Tour Operations",
    "manager": {
      "managerId": "26118915-6090-4610-87e4-49d8ca9f808d",
      "displayName": "John Smith"
    }
  }
}
```

Example: Group



Type (User|Group)

Optional & Read Only

```
{
  "schemas":["urn:scim:schemas:core:1.0"],
  "id":"2819c223-7f76-453a-919d-413861904646,
  "displayName": "Tour Guides",
  "members":[
    {
      "value":"2819c223-7f76-453a-919d-413861904646",
      "displayName":"Babs Jensen",
      "type":"User"
    },
    {
      "value":"2819c223-7f76-453a-919d-413861904646",
      "displayName":"Mandy Pepperidge",
      "type":"User"
    }
  ]
}
```

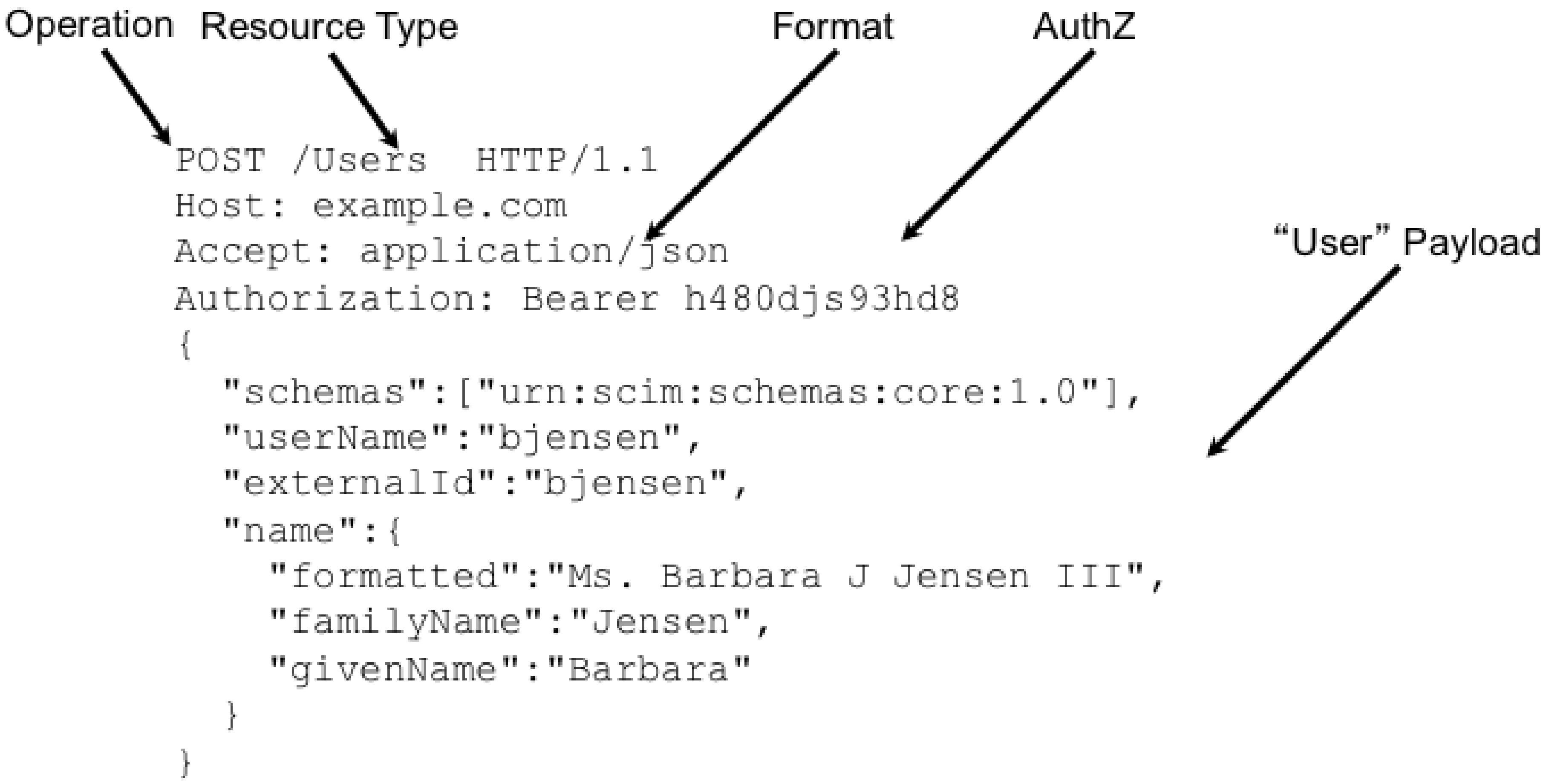
Protocol

- Synchronous, HTTP, ReST
- CRUD + Search* + Discovery + Bulk*
- Simple MTI, Complex optional
- Extensible*, Versioned
- “cURL” friendly
- http://tools.ietf.org/id/draft-scim-api-00.html

Operations

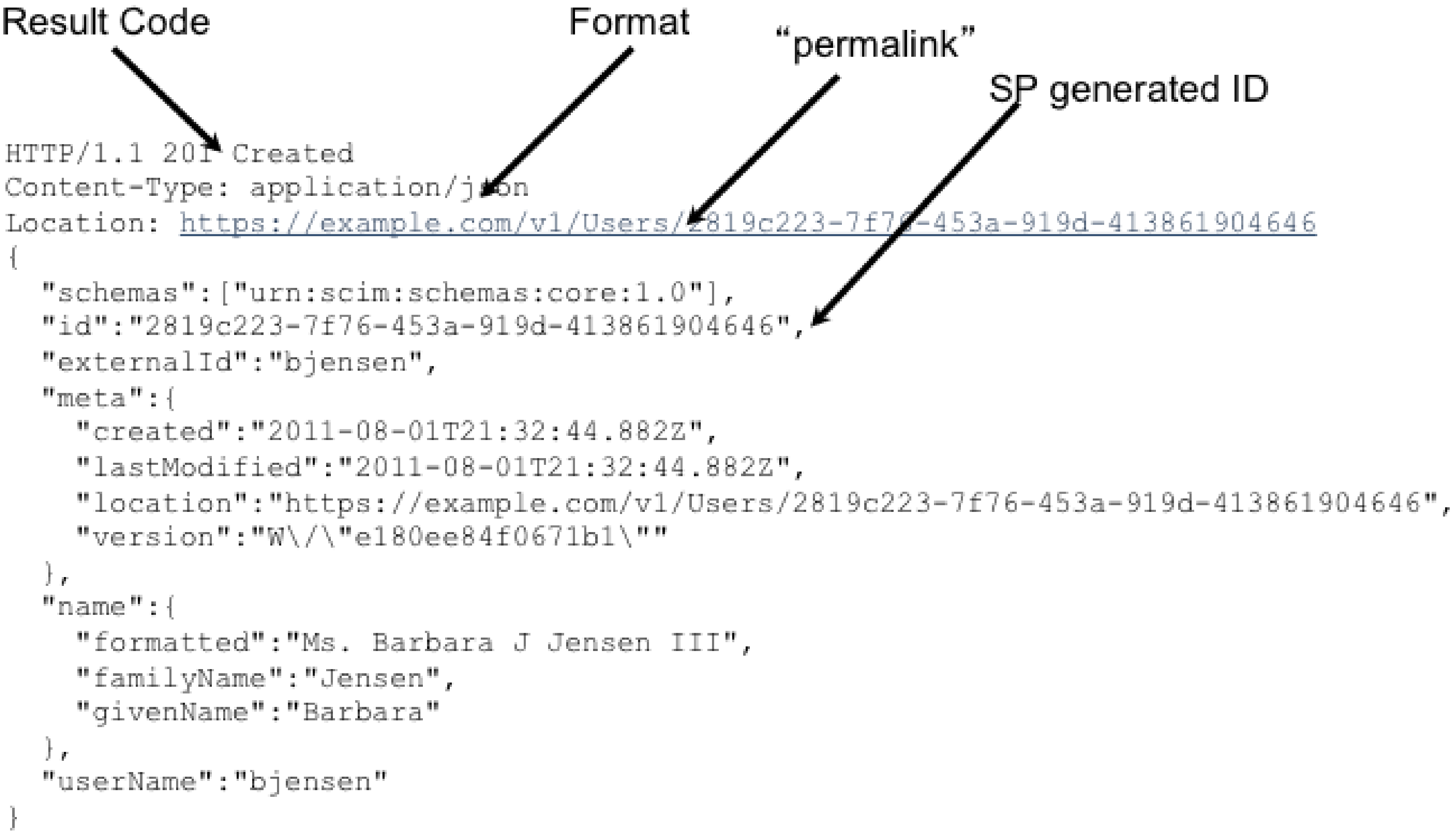
- Create = POST https://example.com/{v}/{resource}
- Read = GET https://example.com/{v}/{resource}/{id}
- Update = PUT https://example.com/{v}/{resource}/{id}
- Delete = DELETE https://example.com/{v}/{resource}/{id}
- *Update = PATCH https://example.com/{v}/{resource}/{id}
- *Search = https://example.com/{v}/{resource}?filter={attribute} {op} {value} & sortBy={attributeName} & sortOrder={ascending|descending}
- *Bulk

Create Request



```
POST /Users  HTTP/1.1
Host: example.com
Accept: application/json
Authorization: Bearer h480djs93hd8
{
  "schemas":["urn:scim:schemas:core:1.0"],
  "userName":"bjensen",
  "externalId":"bjensen",
  "name":{
    "formatted":"Ms. Barbara J Jensen III",
    "familyName":"Jensen",
    "givenName":"Barbara"
  }
}
```

Create Response



Result Code

Format

"permalink"

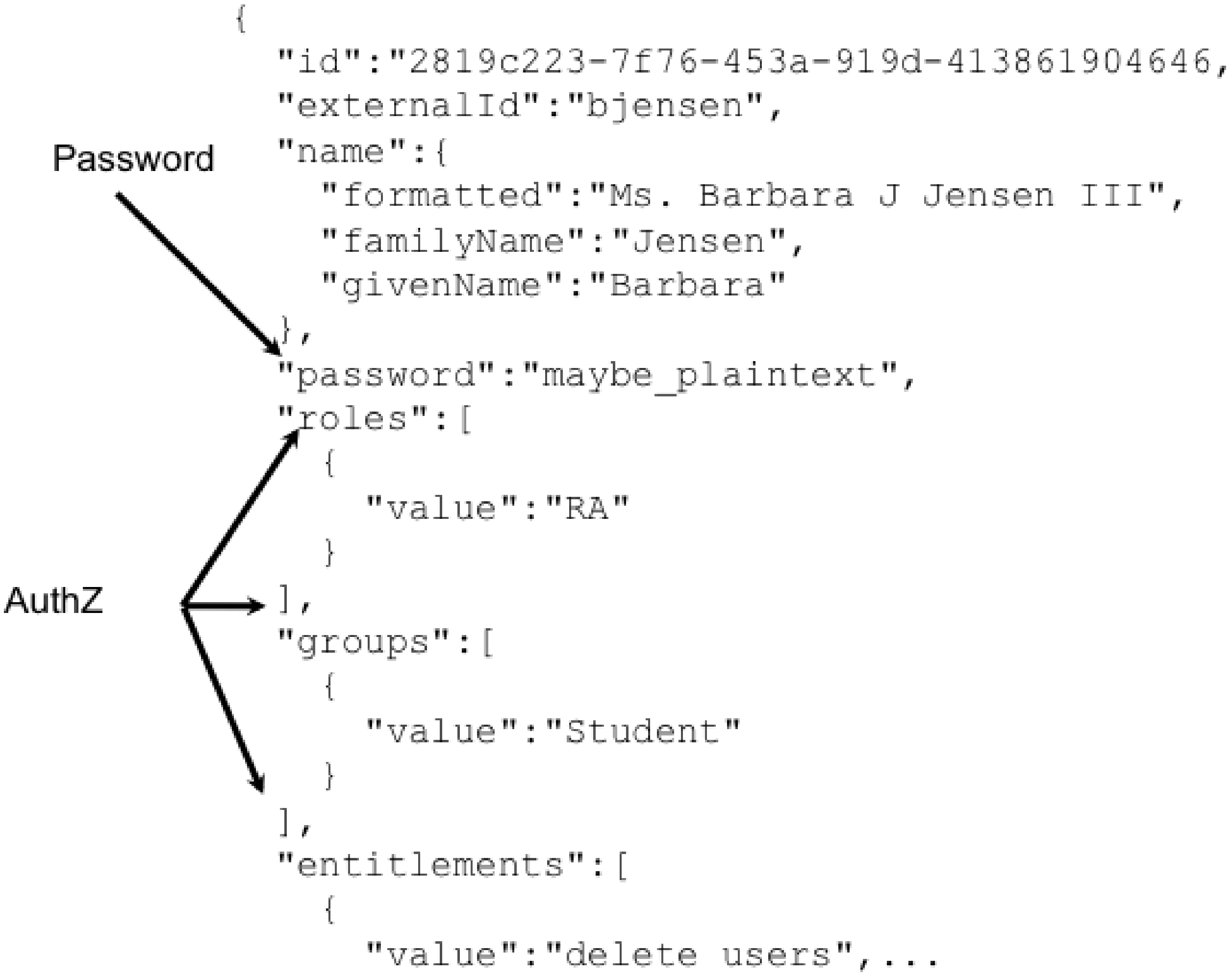
SP generated ID

```
HTTP/1.1 201 Created
Content-Type: application/json
Location: https://example.com/v1/Users/2819c223-7f76-453a-919d-413861904646
{
  "schemas":["urn:scim:schemas:core:1.0"],
  "id":"2819c223-7f76-453a-919d-413861904646",
  "externalId":"bjensen",
  "meta":{
    "created":"2011-08-01T21:32:44.882Z",
    "lastModified":"2011-08-01T21:32:44.882Z",
    "location":"https://example.com/v1/Users/2819c223-7f76-453a-919d-413861904646",
    "version":"W\/\"e180ee84f0671b1\""
  },
  "name":{
    "formatted":"Ms. Barbara J Jensen III",
    "familyName":"Jensen",
    "givenName":"Barbara"
  },
  "userName":"bjensen"
}
```

Security: Protocol

- Service provider
  - Server-side SSL to authenticate to the consumer
  - Also sets up session encryption
- Consumer
  - Basic authentication (username and password) – OK for testing
  - OAuth – higher identity assurance, at the expense of additional complexity
  - X.509 (mutually-authenticated SSL) – provides higher assurance, at the expense of additional complexity
    - When tied to hardware, X.509 provides the highest identity assurance

Security: User



```
{
  "id":"2819c223-7f76-453a-919d-413861904646,
  "externalId":"bjensen",
  "name":{
    "formatted":"Ms. Barbara J Jensen III",
    "familyName":"Jensen",
    "givenName":"Barbara"
  },
  "password":"maybe_plaintext",
  "roles":[
    {
      "value":"RA"
    }
  ],
  "groups":[
    {
      "value":"Student"
    }
  ],
  "entitlements":[
    {
      "value":"delete users",...
```

Within Scope

- CRUD operations for
  - Users
  - Groups
  - Possibly other identity related objects (e.g. Devices)
- Bulk operations
- Protocol Binding for SAML, LDAP
- Extension semantics (schema & protocol)

Out of Scope

- Defining new authentication/authorization frameworks or mechanisms
- Defining access control mechanism or semantics
- Managing non-identity related resources

Current SCIM Topics

- Targeting
  - Enables the same SCIM service to provision to multiple repositories
  - Similar to the SPML provisioning service point and provisioning target
  - Introduces additional complexity, particularly if the targets wish to share resource attributes
- externalid
  - Make it optional
    - Some customers may be looking at the service provider's ID attribute as the permanent user identifier

Applying SCIM - What it Means for You

- Check out the draft specification on the IETF website and the open source implementations that are available today
    - http://datatracker.ietf.org/wg/scim/
- Evaluate how you are currently provisioning to cloud-based services
- Determine your current provisioning vendor’s plan for supporting SCIM – if any