Customizing and extending Evergreen: a guide for geeks

OLA Preconference

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February 24, 2010

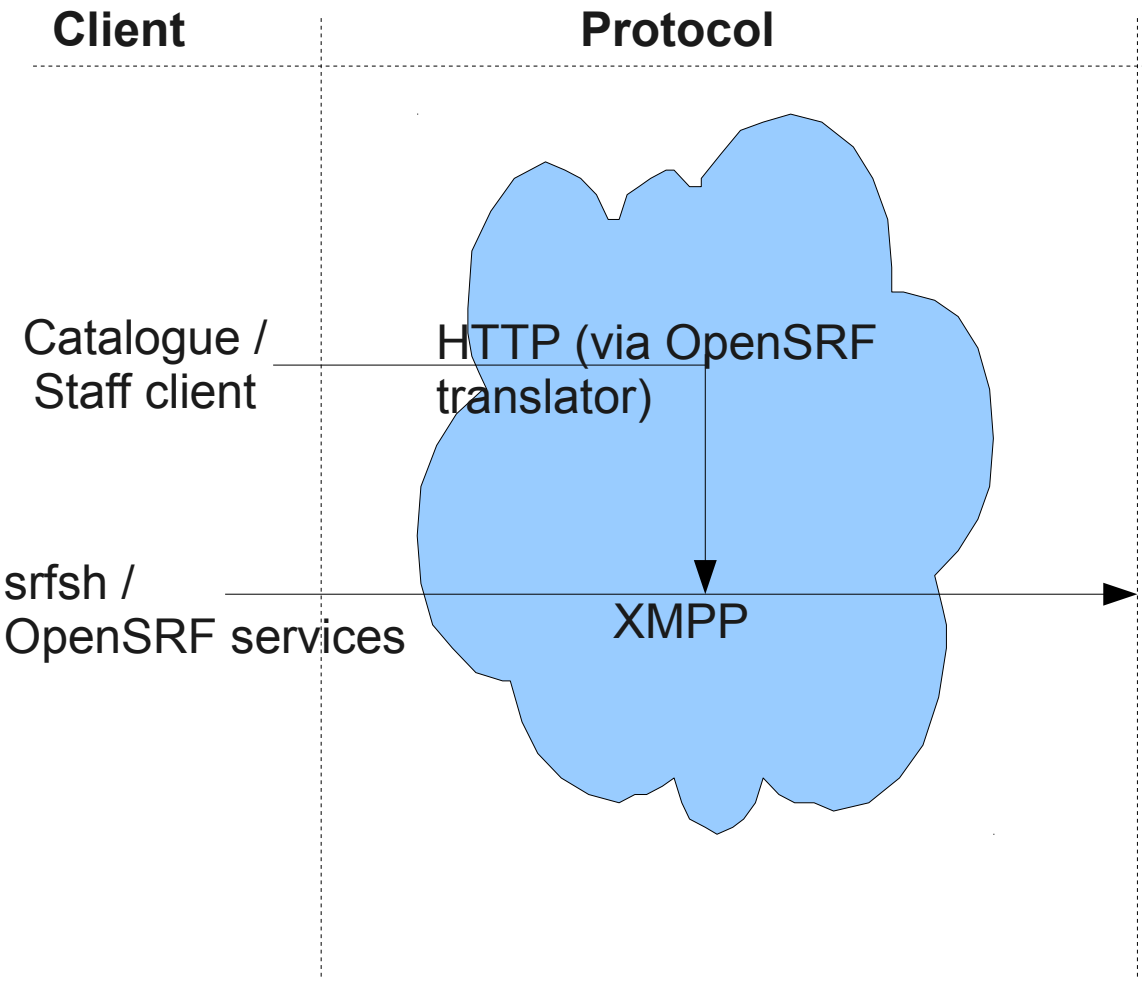
Agenda

- Let's be honest, 3 hours isn't much, but...
  - 1:00 – 1:45 – OpenSRF intro
  - 1:45 – 2:00 – Client exercises
  - 2:00 – 2:30 – OpenSRF services
  - 2:30 – 3:00 – Service exercises
  - 3:00 – 3:30 – Evergreen IDL and storage
  - 3:30 – 3:45 – Storage exercises
  - 3:45 – 4:00 – Dojo widgets

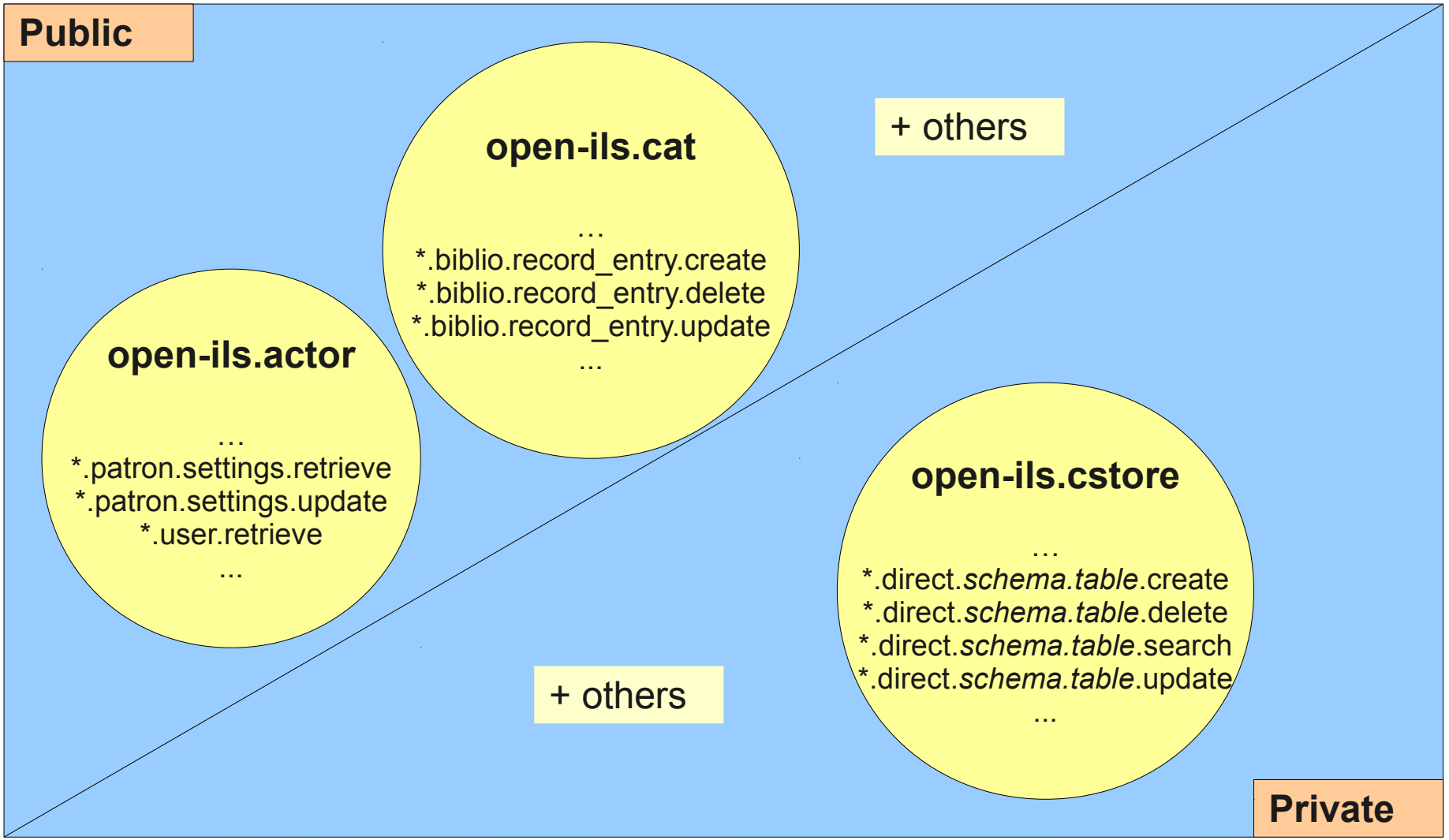
Workshop materials

- There are a number of CDs floating around with the following materials:
  - Virtual image – should run in recent versions of VMWare or VirtualBox, given 1 GB of RAM or more
  - This presentation (OpenOffice.org and PDF)
  - Developer reference material (HTML and PDF)

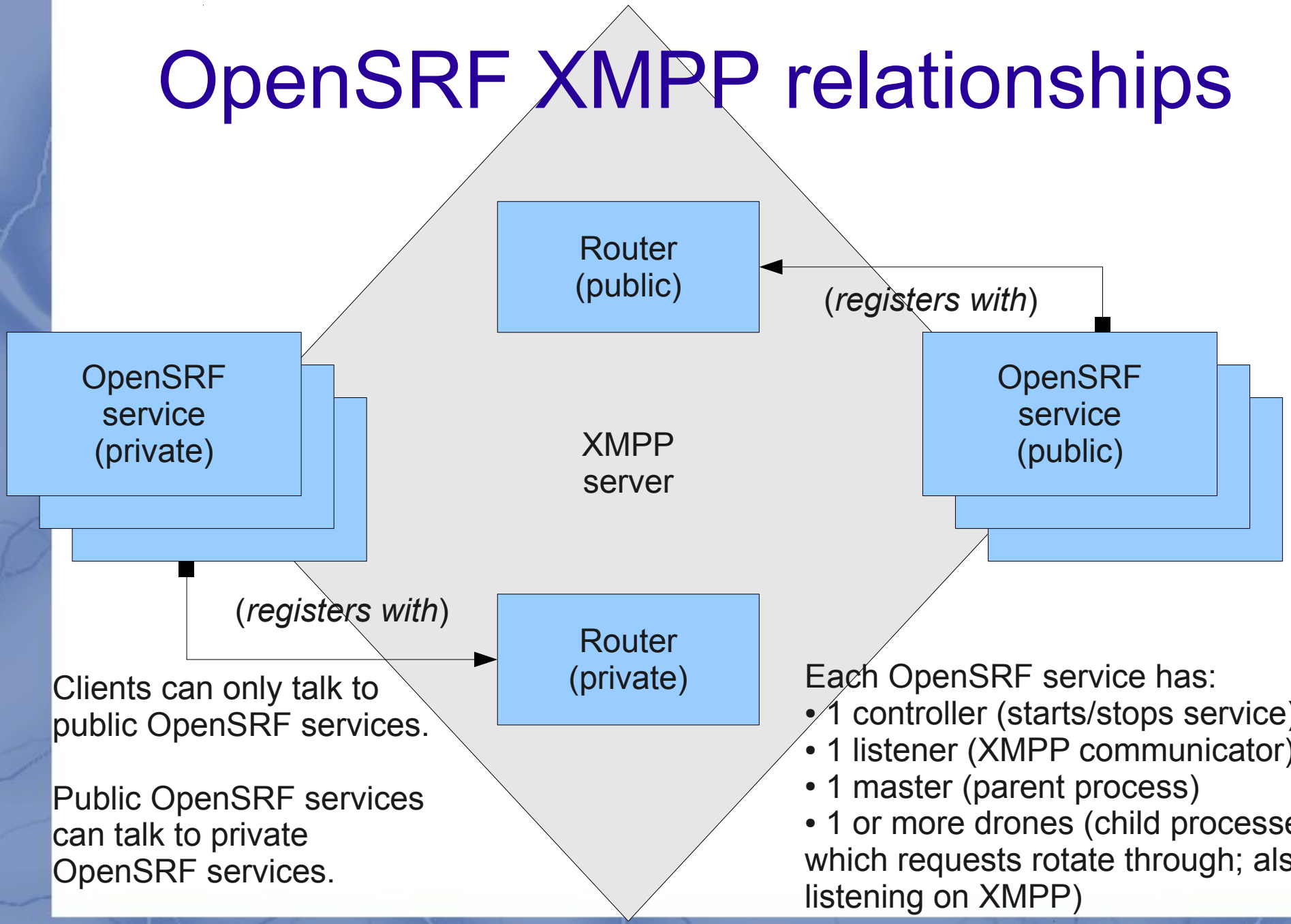
Basic Evergreen architecture



Evergreen: OpenSRF services



OpenSRF XMPP relationships



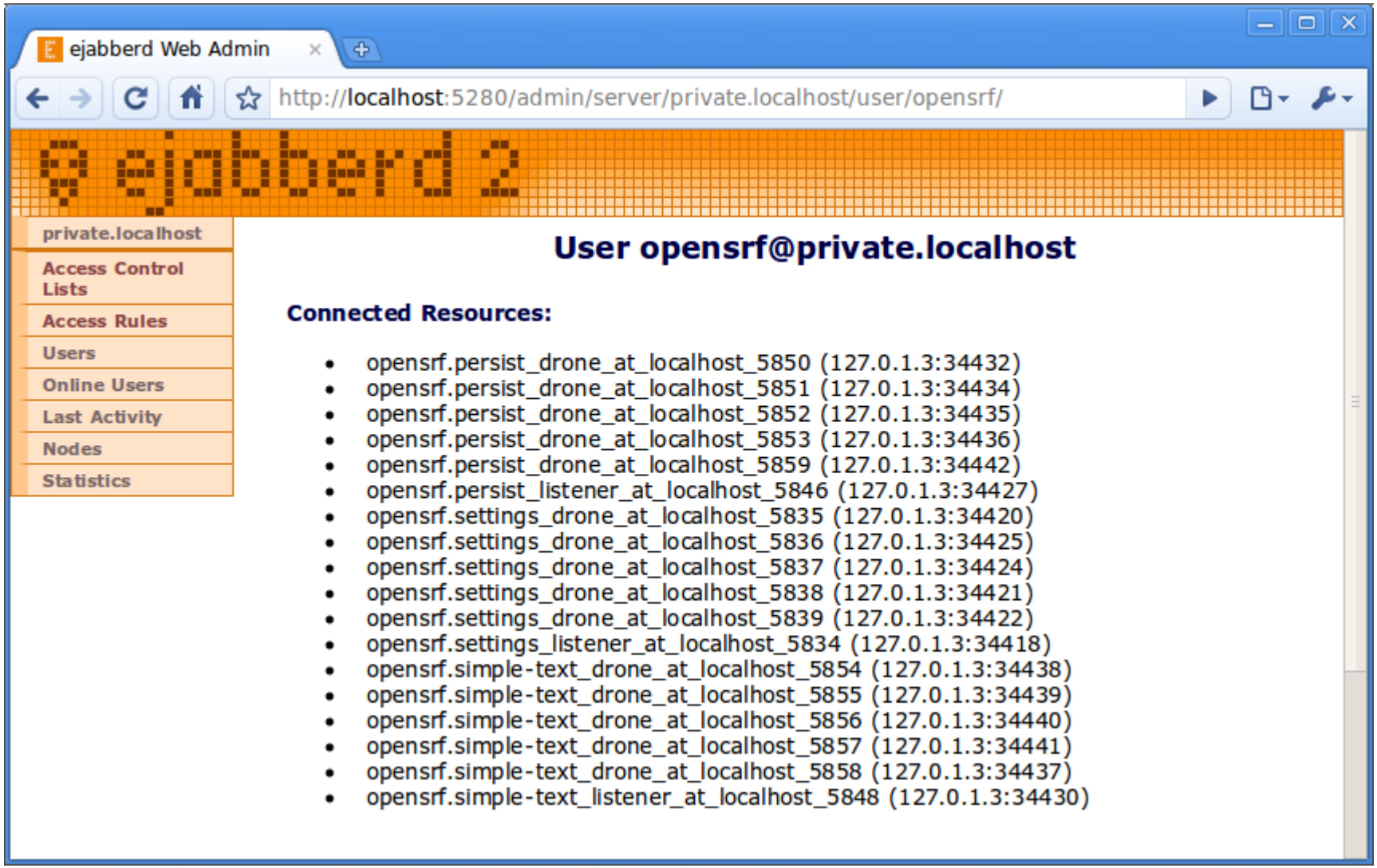
Clients can only talk to public OpenSRF services.

Public OpenSRF services can talk to private OpenSRF services.

Each OpenSRF service has:

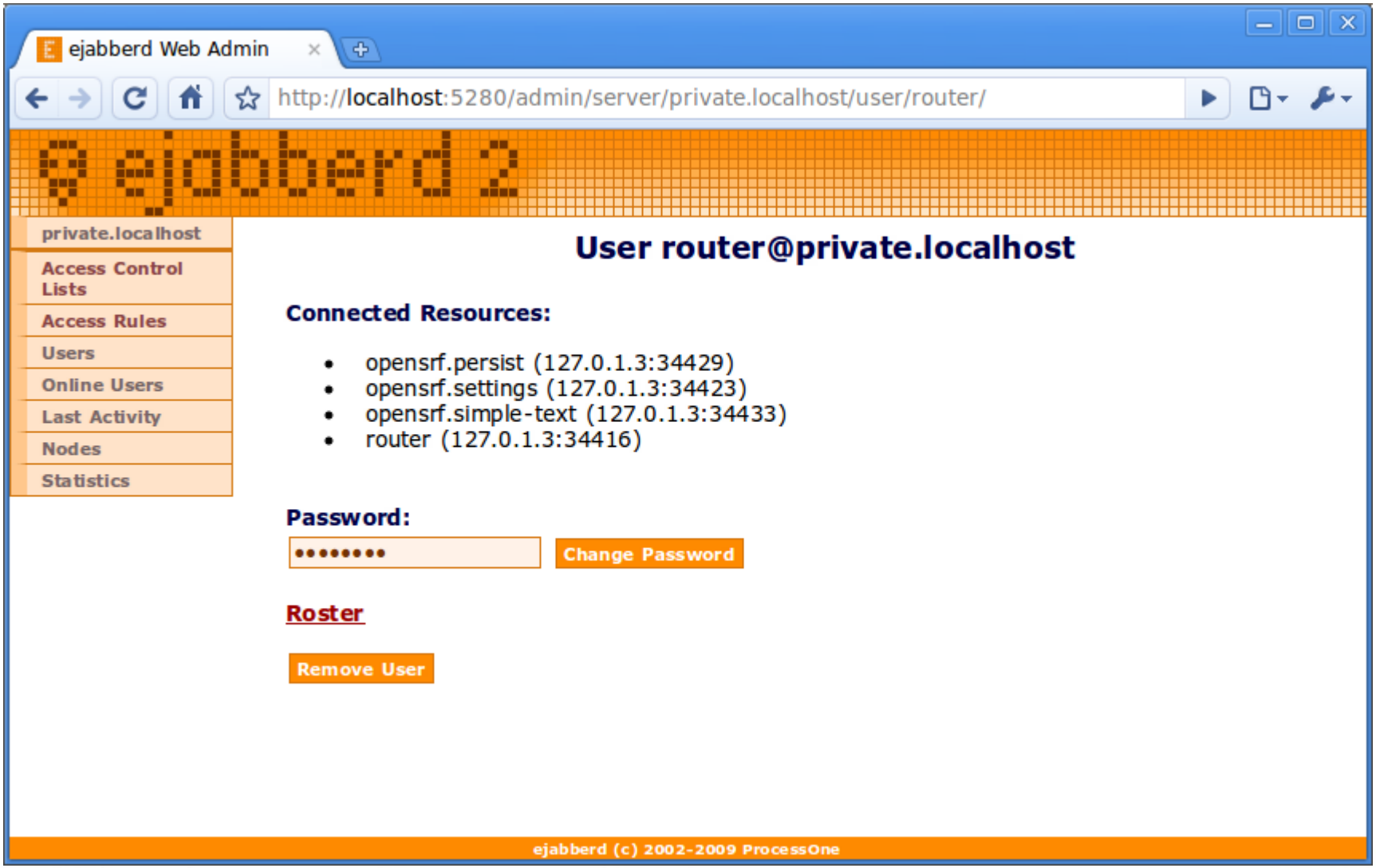
- 1 controller (starts/stops service)
- 1 listener (XMPP communicator)
- 1 master (parent process)
- 1 or more drones (child processes which requests rotate through; also listening on XMPP)

Private **opensrf** resources



Public **router** resources

Private **router** resources



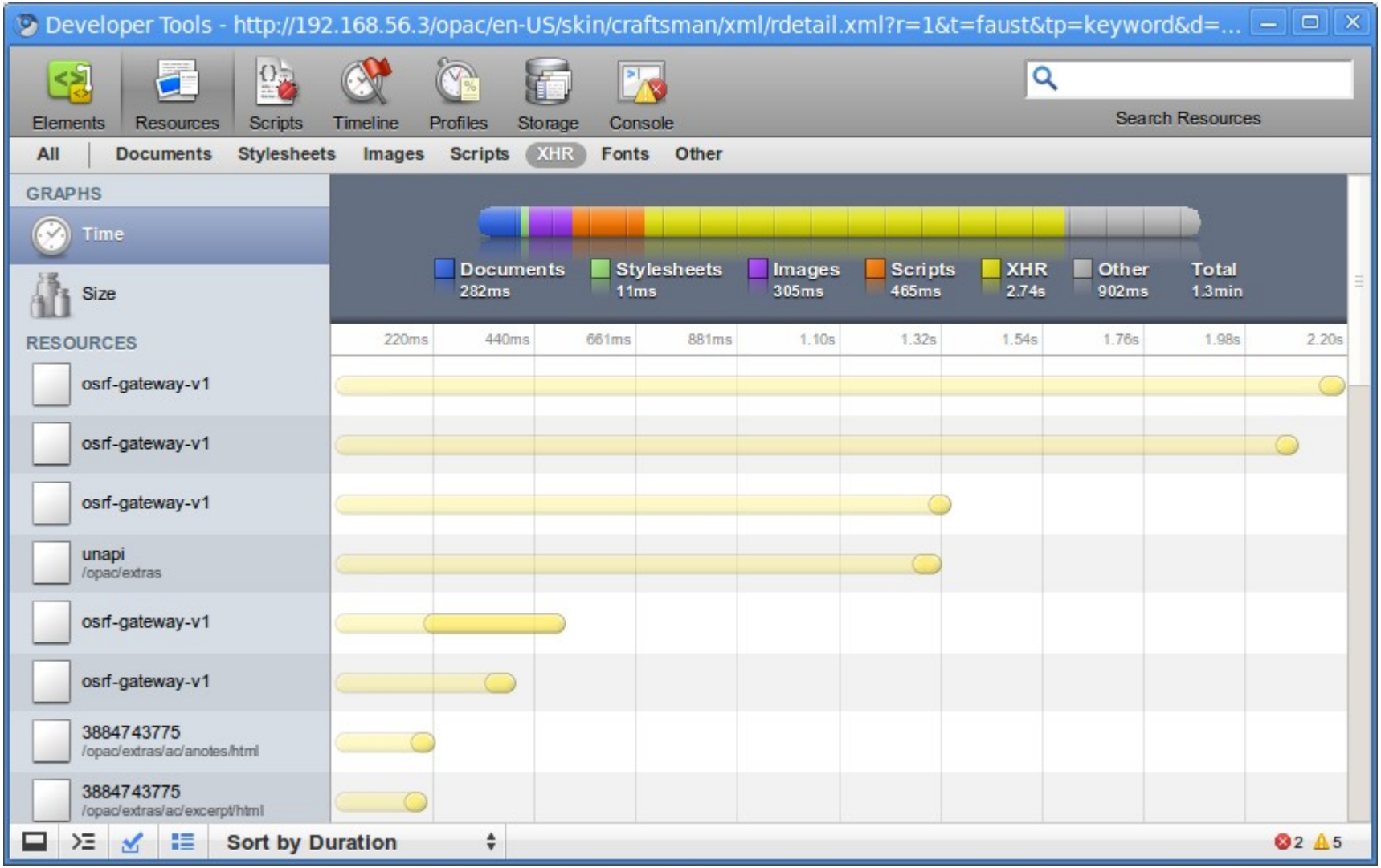
A raw OpenSRF request (XMPP)

```
<message from='router@private.localhost/opensrf.simple-text'
  to='opensrf@private.localhost/
    opensrf.simple-text_listener_at_localhost_6275'
  router_from='opensrf@private.localhost/_karmic_126678.3719_6288'
  router_to='' router_class='' router_command='' osrf_xid=''
>
  <thread>1266781414.366573.12667814146288</thread>
  <body>
[
  {"__c":"osrfMessage","__p":
    {"threadTrace":"1","locale":"en-US","type":"REQUEST","payload":
      {"__c":"osrfMethod","__p":
        {"method":"opensrf.simple-text.reverse","params":["foobar"]}
      }
    }
  }
]
  </body>
</message>
```

A raw OpenSRF response

```
<message from='opensrf@private.localhost/
    opensrf.simple-text_drone_at_localhost_6285'
  to='opensrf@private.localhost/_karmic_126678.3719_6288'
  router_command='' router_class='' osrf_xid=''
>
  <thread>1266781414.366573.12667814146288</thread>
  <body>
[
  {"__c":"osrfMessage","__p":
    {"threadTrace":"1","payload":
      {"__c":"osrfResult","__p":
        {"status":"OK","content":"raboof","statusCode":200}
      } ,"type":"RESULT","locale":"en-US"}
  },
  {"__c":"osrfMessage","__p":
    {"threadTrace":"1","payload":
      {"__c":"osrfConnectStatus","__p":
        {"status":"Request Complete","statusCode":205}
      },"type":"STATUS","locale":"en-US"}
  }
]
  </body>
</message>
```

Seeing what's going on



Making client requests

- In the OpenSRF source directory, see:
  - math_bench.pl (Perl)
  - math_client.py (Python)
  - math_client_curl.sh (via HTTP translator)
- Via srfsh:

```
srfsh# introspect opensrf.simple-text
# lists methods

srfsh# request opensrf.simple-text opensrf.simple-text.reverse
“foobar”
“raboof”
```

Simple Perl client

```
#!/usr/bin/perl
use strict;
use warnings;

use OpenSRF::System;

# Bootstrap the system
OpenSRF::System->bootstrap_client('/openils/conf/opensrf_core.xml');

my $session = OpenSRF::AppSession->create("opensrf.simple-text");

my $response = $session->request(
        "opensrf.simple-text.reverse",
        "foobar"
)->gather();

$session->disconnect();

print "$response\n";
```

Review: client exercises

- Get comfortable with srfsh, cURL, and Perl
  1. List the methods for opensrf.simple-text
  2. Call each of the methods for opensrf.simple-text via srfsh
  3. Try calling several of the methods via cURL and Perl

* Sadly, Python's pyDNS requires a local DNS resolver that makes it a complete pain to deal with in a localhost environment.

Writing OpenSRF services

- Basic structure of an OpenSRF service:
  - initialize() - occurs once, for the master; good for setting up global variables
  - child_init() - invoked every time a new child process is spawned
  - *method1*(), *method2*() - implementations of OpenSRF methods
  - registration – registers the method
  - child_exit() - cleans up child resources
  - destroy() - cleans up global resources

Creating and configuring

Let's look at the recently-added-to-trunk OpenSRF::Application::Demo::SimpleText.pm

(in /usr/local/share/perl/5.10.0/)

Then we'll look at opensrf.xml and opensrf_core.xml to see how the service is defined

OpenSRF server exercises

1. Add another method to SimpleText.pm and test it out (remember to restart the Perl services!)
2. Create an entirely new service:
    1. Copy and paste SimpleText.pm and change its file name & package name (at a minimum)
    2. Add the appropriate entries to opensrf_core.xml and opensrf.xml
    3. Restart the Perl services and test it out

Evergreen: accessing ILS data

- There are a number of different services that offer access to Evergreen data:
  - open-ils.storage
  - open-ils.cstore (+ CStoreEditor wrapper)
  - open-ils.reporter-store
  - open-ils.permacrud
  - open-ils.pcrud
  - openils.PermaCrud (JavaScript)

Evergreen IDL

- Interface Definition Language
- IDL + fieldmapper = object-database persistence
- IDL → JavaScript: occurs via autogen.sh
- Bonus: automatic addition of *isnew / isdeleted / ischanged* setter methods as of Evergreen 1.6

IDL sample class

```
<class id="clm" controller="open-ils.cstore open-ils.pcrud"
        oils_obj:fieldmapper="config::language_map"
        oils_persist:tablename="config.language_map"
        reporter:label="Language Map" oils_persist:field_safe="true">
    <fields oils_persist:primary="code" oils_persist:sequence="">
        <field reporter:label="Language Code" name="code"
            reporter:selector="value" reporter:datatype="text"/>
        <field reporter:label="Language" name="value"
            reporter:datatype="text" oils_persist:i18n="true"/>
    </fields>
    <links/>
    <permacrud xmlns="http://open-ils.org/spec/opensrf/IDL/permacrud/v1">
        <actions>
            <create global_required="true" permission="CREATE_MARC_CODE">
            <retrieve global_required="true"
                permission="CREATE_MARC_CODE UPDATE_MARC_CODE
                            DELETE_MARC_CODE">
            <update global_required="true" permission="UPDATE_MARC_CODE">
            <delete global_required="true" permission="DELETE_MARC_CODE">
        </actions>
    </permacrud>
</class>
```

CStore - open-ils.cstore

- Automatically generated object interfaces

```
open-ils.cstore.direct.config.language_map.id_list
   {"code" { "like": "e%" } }

open-ils.cstore.direct.config.language_map.retrieve "eng"

open-ils.cstore.direct.config.language_map.search
   {"code" : "eng"}

open-ils.cstore.direct.config.language_map.create <object>

open-ils.cstore.direct.config.language_map.update <object>

open-ils.cstore.direct.config.language_map.delete "eng"
```

CStoreEditor

- Provides a friendly Perl interface to Cstore
  - *CRUD_fieldmap*($obj)
  - batch_retrieve_*fieldmap*($id_listref)
  - retrieve_all_fieldmap()
  - search_*fieldmap*({search_hash})

```
require OpenILS::Utils::CStoreEditor;
my $e = OpenILS::Utils::CStoreEditor->new(xact => 1);

my $user = $e->search_actor_user(
      { family_name => { “ilike” => “green” }}
);

$e->rollback;
```

pcrud - open-ils.cstore

- Automatically generated *permission-aware* object interfaces

```
open-ils.pcrud.id_list.clm <authtoken>,
   { "code": { "like": "e%" } }

open-ils.pcrud.retrieve.clm <authtoken>, "eng"

open-ils.pcrud.search.clm <authtoken>, { "code": "eng" }

open-ils.pcrud.create.clm <authtoken>, <object>

open-ils.pcrud.update.clm <authtoken>, <object>

open-ils.pcrud.delete.clm <authtoken>, "eng"
```

JavaScript: openils.PermaCrud

```
// limited to objects controlled by open-ils.pcrud!
dojo.require('openils.PermaCrud');

var pcrud = new openils.PermaCrud();

var recs = pcrud.retrieveAll(classHint, opts);
var rec = pcrud.retrieve(classHint, ID, opts);
var result = pcrud.create/update/eliminate/apply(list, opts);
var recs = pcrud.search(classHint, jsonQuery, opts);

Where opts includes:
    async: boolean
    timeout: int
    streaming: boolean
    oncomplete / onresponse: callback
    select / order_by / limit / offset: jsonQuery clauses
```

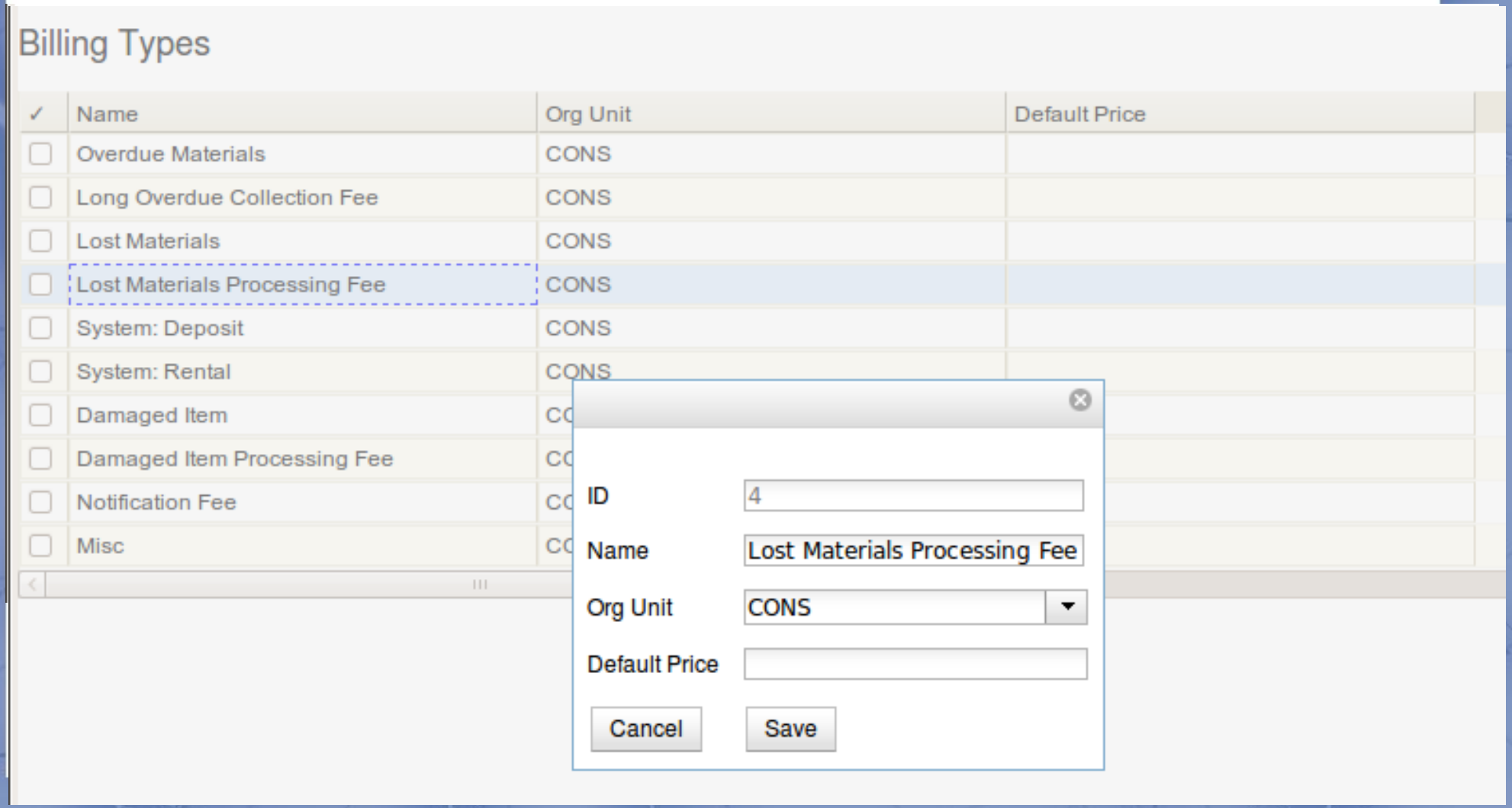
Data exercises

- Base examples and guides:
  - test_cstore_editor.pl: Perl (CStoreEditor)
  - bibs.tt2: JavaScript (openils.PermaCrud)
  - json_tutorial.html: JSON query guide
- Find all copies in the system and display their barcodes
- Change the call number for the book authored by “Faust” to “FAUSTCALL”

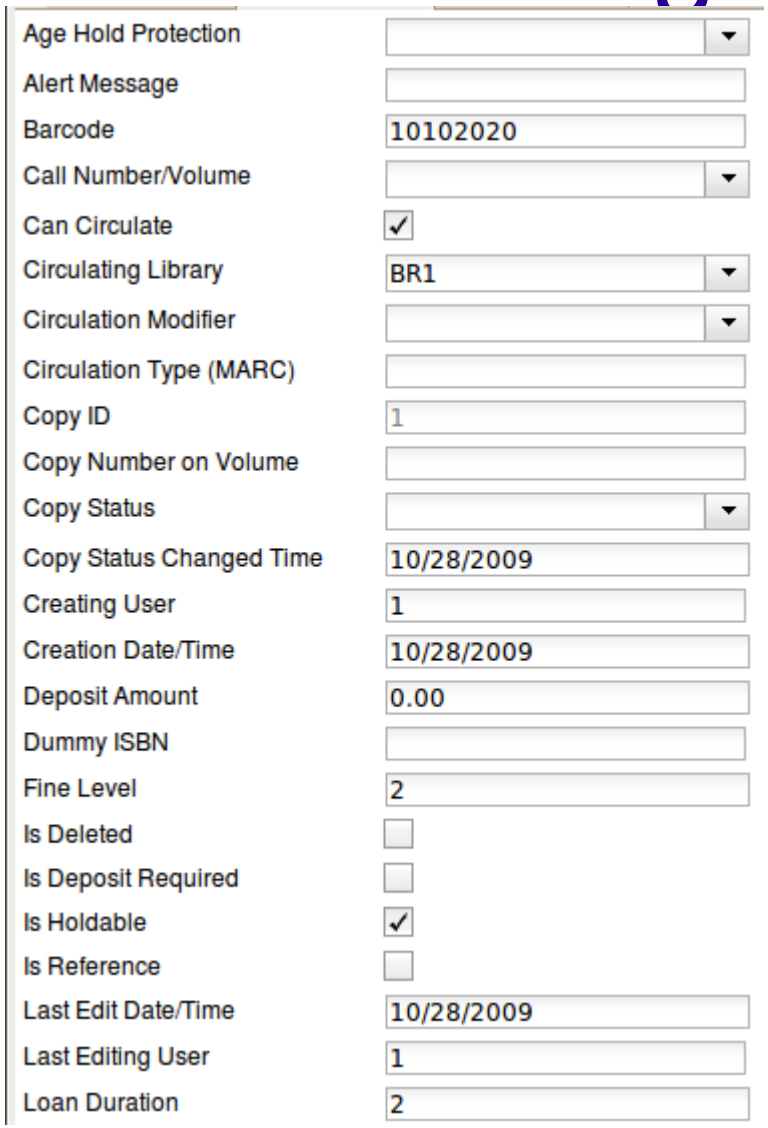
State of the art

- For the best examples from Bill Erickson, check out `/openils/var/web/templates/`
  - `./default/actor/user/register.tt2` maps to `http://localhost/eg/actor/user/register`
- Build on Template Toolkit, so the source .tt2 files look a bit odd – but “View source” works quite nicely

AutoGrid + EditPane



AutoFieldWidget



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