adaptTo()

APACHE SLING & FRIENDS TECH MEETUP
BERLIN, 26-28 SEPTEMBER 2016

Can we run the whole Web on Apache Sling?

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Adobe

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Rebuild haproxy config on changes
etcd -> config
4
Sling
default pool
fileserver pool
Sling instances announce themselves to etcd:
-IP address
-Port
-Role
Pools are actually haproxy "backends"
1
processor selector
REDDR - Resource Driven
Sling resource/script resolution

Are you guys crazy?

(yes, but not that much)

The Whole Web ??

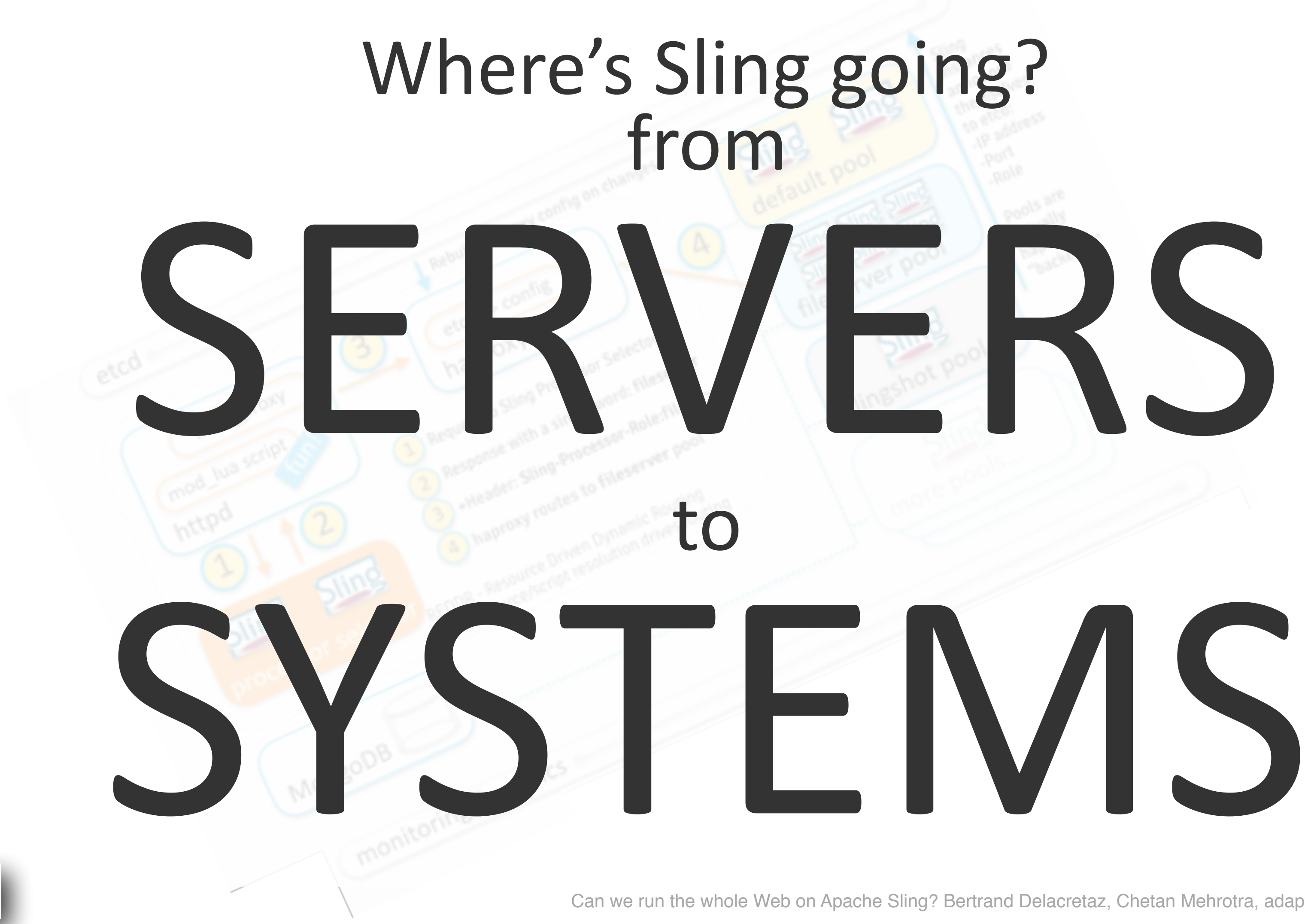
Where's Sling going?

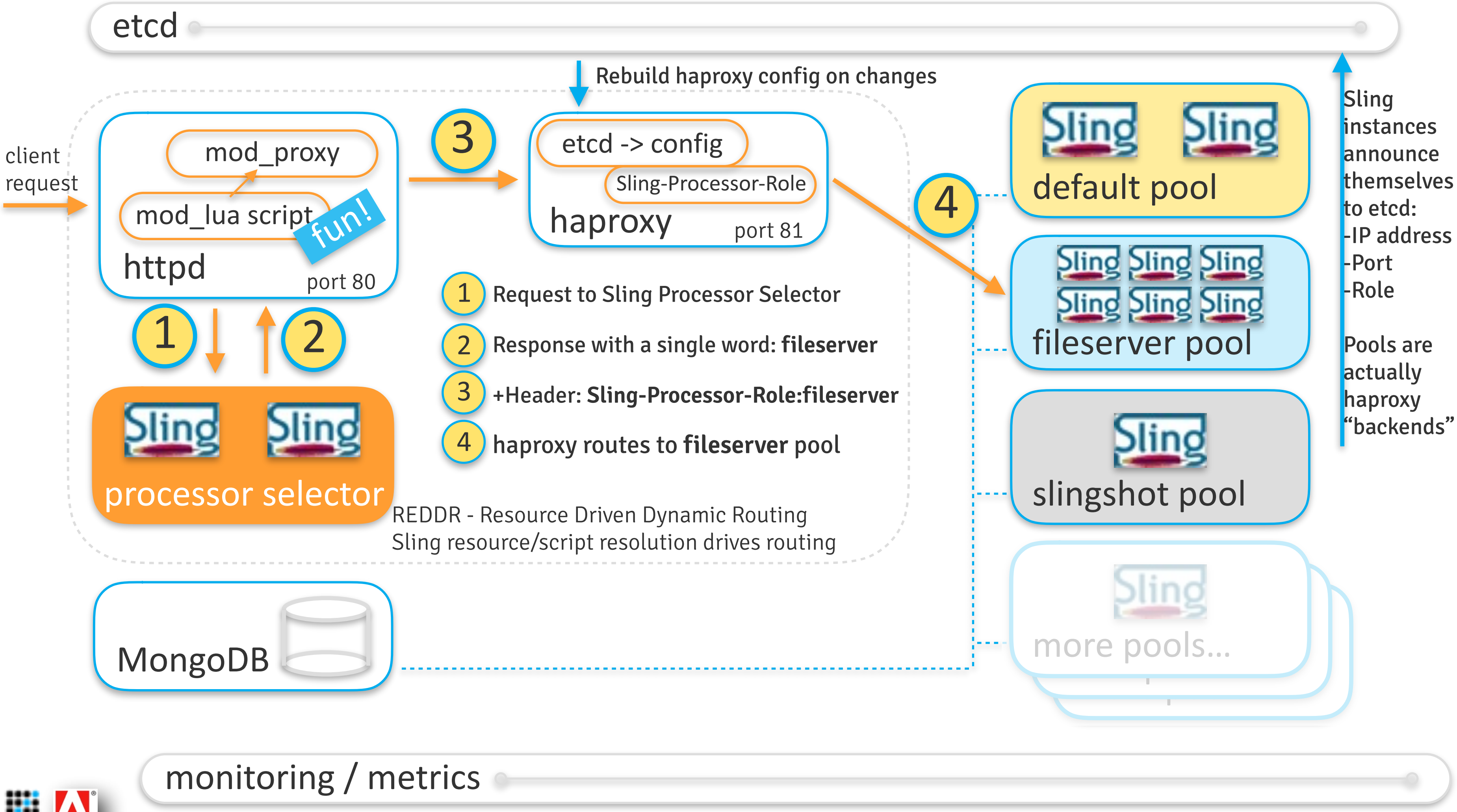
from

SERVERS

to

SYSTEMS


etcd
httpd
mod_lua script
1
2
3
4
default pool
fileserver pool
more pools...
MongoDB
monitoring
Sling
-IP address
-Port
-Role
Response with a single word: fileserver
haproxy routes to fileserver pool
RDDR - Resource Driven Dynamic Routing



1 Request to Sling Processor Selector

2 Response with a single word: **fileserver**

3 +Header: **Sling-Processor-Role:fileserver**

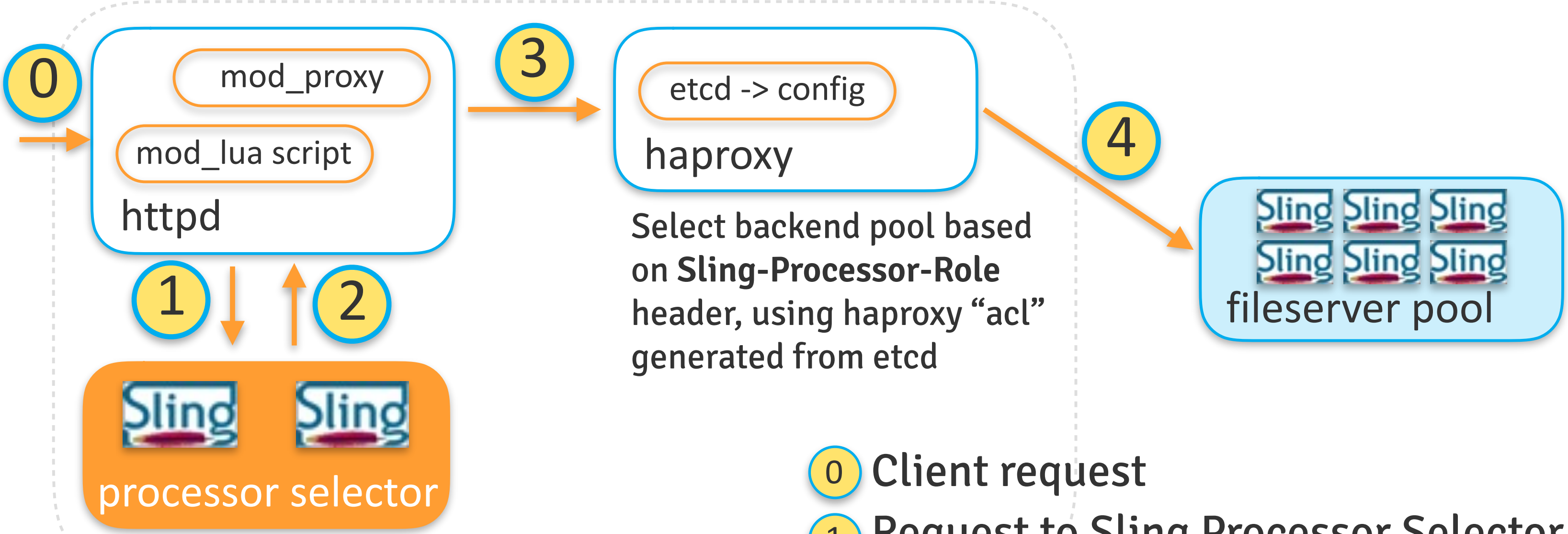
4 haproxy routes to **fileserver** pool

REDDR - Resource Driven Dynamic Routing
Sling resource/script resolution drives routing

REDDR

REsource-Driven Dynamic Routing

REDDR routing to fileserver instances pool



Select backend pool based on **Sling-Processor-Role** header, using haproxy “acl” generated from etcd

.routing script engine + select based on resource type and parent types. Default servlets and scripts disabled.

0 Client request

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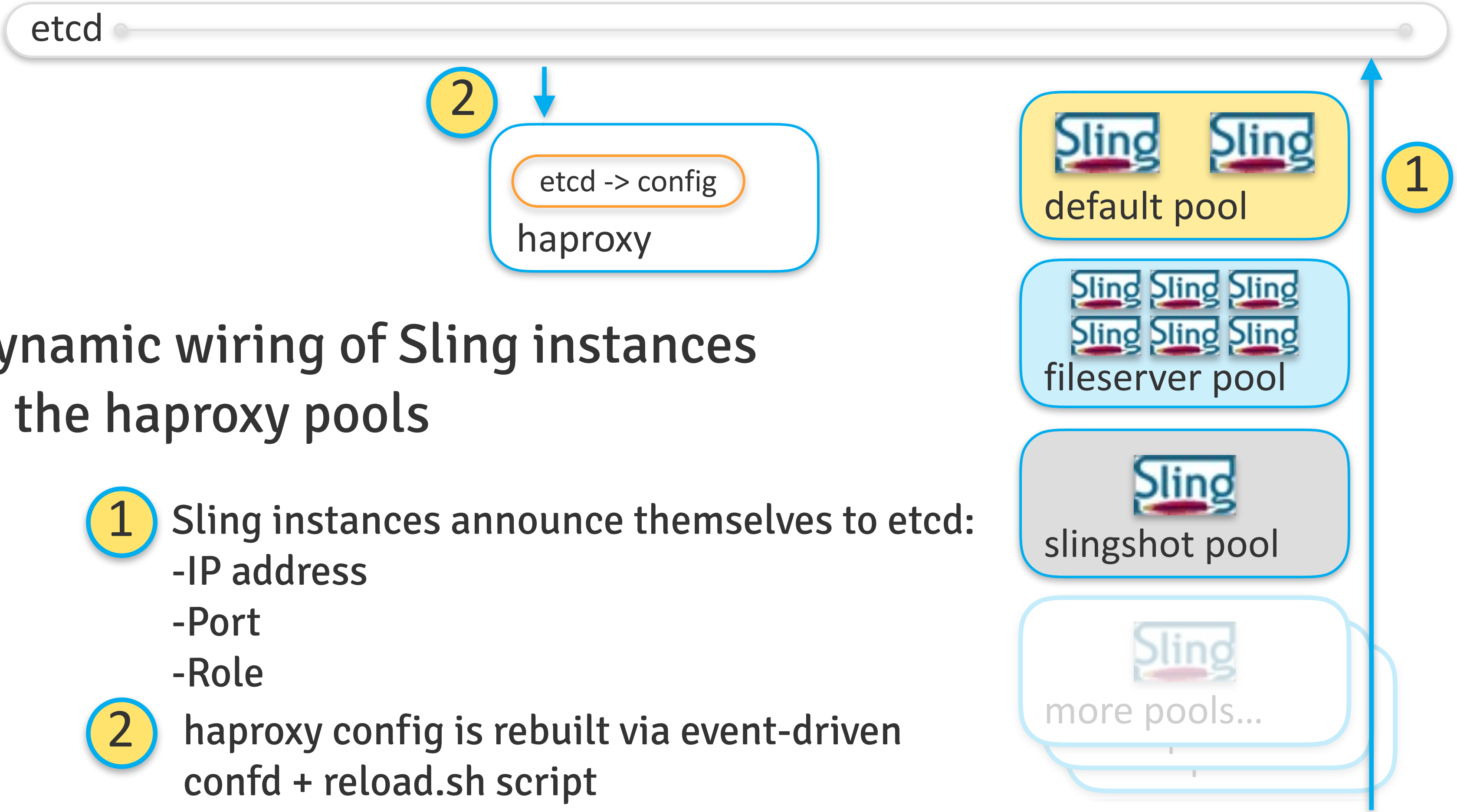
Dynamic Registration of Sling Instances

regenerate haproxy config based on etc data



Dynamic wiring of Sling instances in the haproxy pools

1 Sling instances announce themselves to etcd:
-IP address
-Port
-Role

2 haproxy config is rebuilt via event-driven confd + reload.sh script

Building customised Sling Docker images

with just a provisioning model + trivial Dockerfile

Base and default-processor images

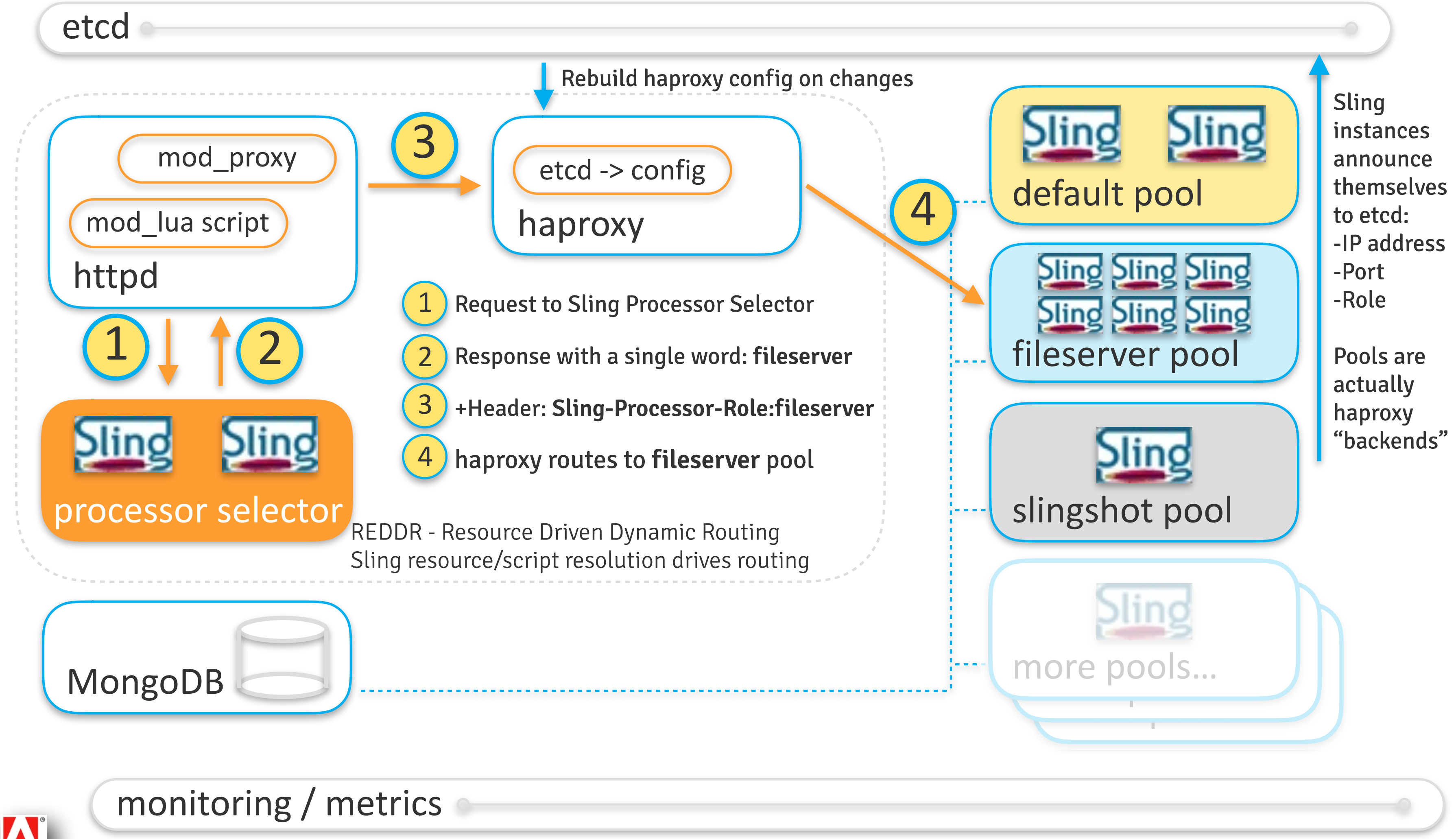
```
base/pom.xml
base/src/main/docker/Dockerfile
base/src/main/docker/slingroot/announce.sh
base/src/main/docker/slingroot/start.sh
base/src/main/docker/slingroot/wait-for-it.sh

default-processor/pom.xml
default-processor/src/main/docker/Dockerfile
default-processor/src/main/provisioning/composum-browser.txt
default-processor/src/main/provisioning/default-processor.txt
default-processor/src/main/provisioning/launchpad.txt
default-processor/src/main/provisioning/…
```

Dockerfile for default-processor

```
FROM ch.x42.at16.base
COPY ${project.build.finalName}.jar /opt/sling/launchpad.jar
```

DYNAMIC CLUSTER DEMO

A Big Sling Cluster…on my laptop



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Sling instances announce themselves to etcd:
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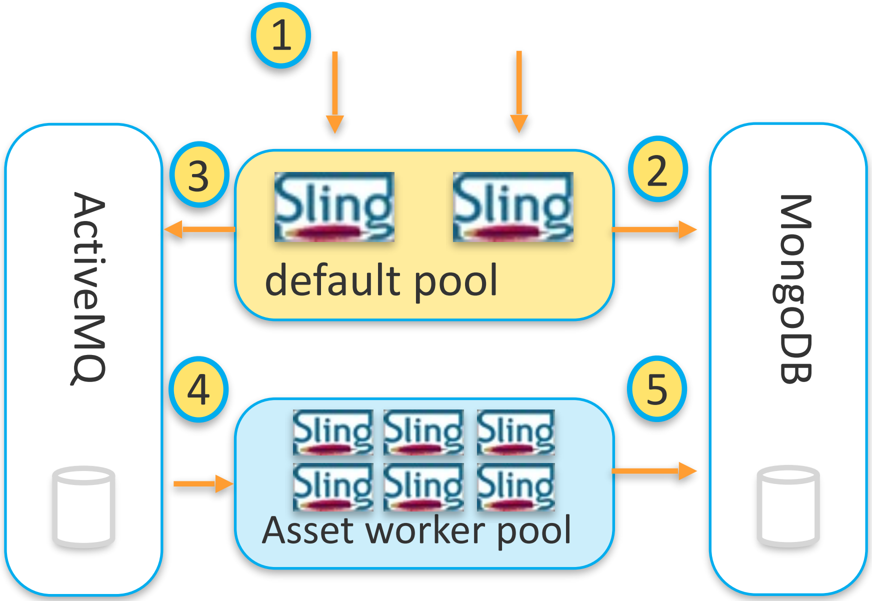
Pools are actually haproxy “backends”

“Background Worker” Sling instance

minimal, disposable, focused

Worker Profile

- Tailor made Sling instance
- Min required bundles
- Low footprint
- JCR API used mostly for CRUD
- No observation
- Disposable
- Take post processing load off frontend servers



1 Request to Sling Frontend server

2 Write to NodeStore

3 Add job to message queue

4 Pick up of job by one of the worker

5 Write back of Job result

Repository Etiquette

be precise while talking to repository and thou shall not be troubled!

Choose the right nodetype

Avoid `nt:unstructured`

- Orderable children
- Limits writes

✗

```
+ dashboard (nt:unstructured)
  - role_observer - projects-outdoors
  - role_editor - projects-editor
  + gadgets (nt:unstructured)
   + team
   + asset
```

Prefer `oak:Unstructured`

✓

```
+ dashboard (oak:Unstructured)
  - role_observer - projects-outdoors
  - role_editor - projects-editor
  + gadgets (oak:Unstructured)
   + team
   + asset
```

OAK-657

Choose the right nodetype

Avoid `nt:resource` with `nt:file`

- Referenceable
- 1 nt:resource = 1 entry in uuid index
- 1M Files = 1M entry in uuid index

✗

```
+ book.jpg (nt:file)
 - jcr:createdBy - admin
 + jcr:content (nt:resource)
   - jcr:lastModifiedBy - admin
   - jcr:mimeType - image/jpeg
   - jcr:uuid - "dafe0c9c-1872-4397"
```

Prefer `oak:Resource`

✓

```
+ book.jpg (nt:file)
 - jcr:createdBy - admin
 + jcr:content (oak:Resource)
   - jcr:lastModifiedBy - admin
   - jcr:mimeType - image/jpeg
```

OAK-4567

Query Precisely

- Use specific nodetype
- Relativize property names wrt root of micro tree
- Include path restrictions
- Use union if nodetypes differ

✗

```
SELECT *
FROM [nt:base] AS a
    WHERE
    a.[type] = 'image'
```

✓

```
SELECT *
FROM [dam:Asset] AS a
    WHERE ISDESCENDANTNODE([/content/dam])
    AND a.[jcr:content/metadata/type] = 'image'
```

Observe Precisely

- Observation costs resources
- Use JackrabbitEventFilter to filter on
  - Multiple paths
  - Nodetypes
- In works* filtering based on
  - Property names
  - Node names

```
JackrabbitEventFilter eventFilter
= new JackrabbitEventFilter()
.setAbsPath(paths[0])
.setNodeTypes(new String[]{"dam:Asset"})
.setEventTypes(Event.NODE_ADDED)
.setIsDeep(true);

eventFilter.setAdditionalPaths("/content/en");
JackrabbitObservationManager om =
(JackrabbitObservationManager)session.getWorkspace()
.getObservationManager();
om.addEventListener(this, eventFilter);
```

*OAK-4796

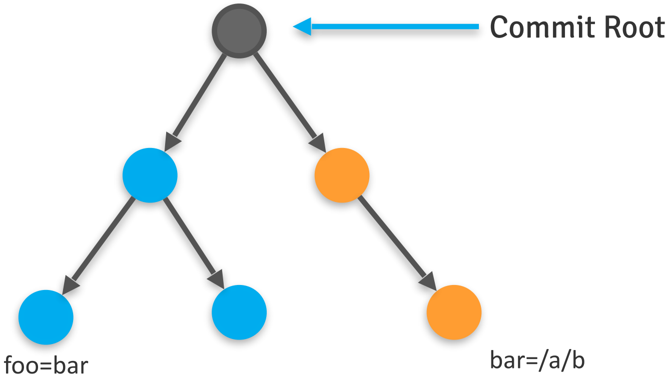
Define your own types

- Nodetype/mixin are content annotation
- Repository uses them to
  - Enforce structure
  - Determine index rules
  - Filter observation events
  - Bundle Nodes* (new stuff!)

*OAK-1312

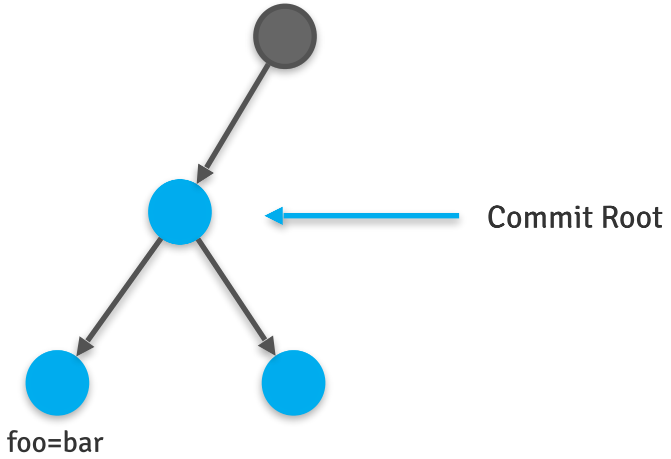
Prefer Lucene Property Indexes

- Property Indexes
  - Cause conflict in index data
  - Causes commit root to be ‘/’
  - Stored as nodes
  - Good for sparse and full sync case



Prefer Lucene Property Indexes …

- Lucene Property Indexes
  - Async indexing
  - No impact on commit root
  - Compact storage
  - Multi restriction evaluation
- Are not they async?
  - In works near real time indexing*



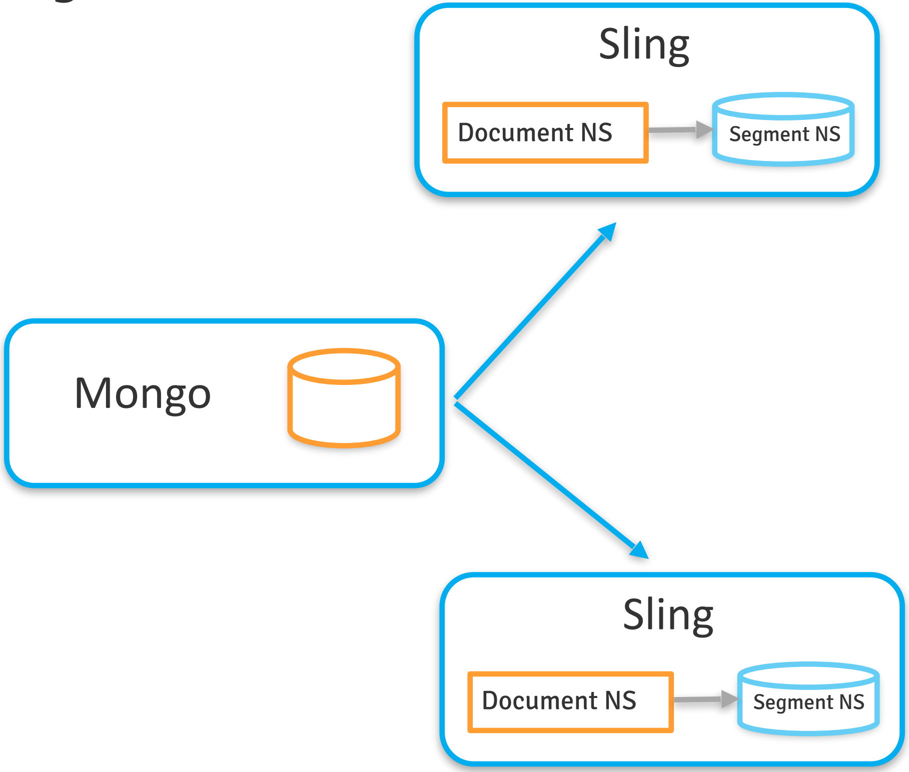
*OAK-4412

FUTURE PERFORMANCE-RELATED Oak FEATURES

work in progress!

Segment NS as Local Secondary Store

- Segment NS act a local copy of remote repository like a local git repo
- Updated via Observation
- Handles read call for “not so recently modified” Nodes
- Reduces read latency
- Configured to store certain path. Defaults to ‘/’



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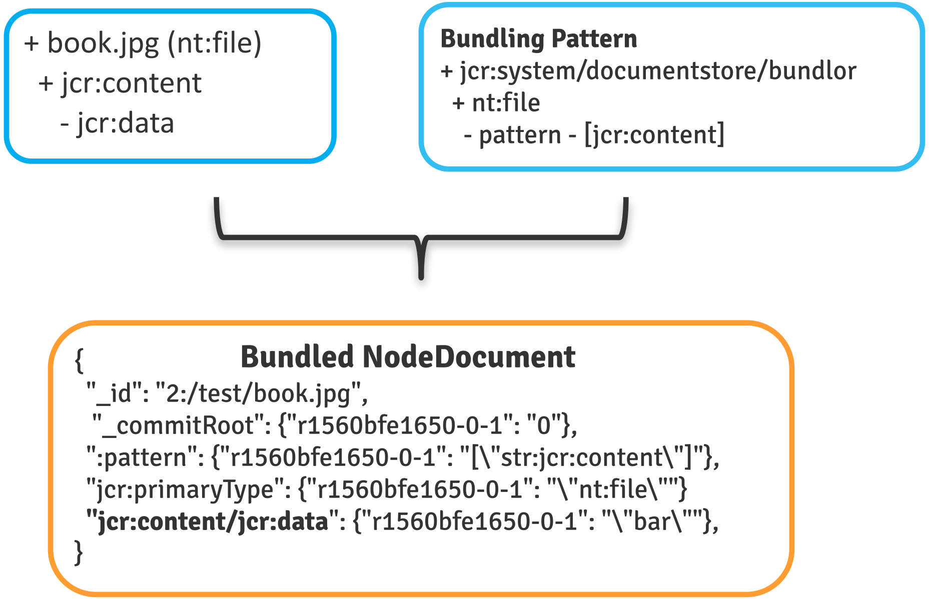
Bundle Multiple JCR Node in one Document

- Store subtree aggregates of specific nodes in same NodeDocument
- JCR Node to Mongo mapping
  - 1 JCR Node = 1 Mongo Doc
  - 1 dam:Asset ~ 20 JCR Node
  - 1M Assets = 20M Mongo Doc
- Nodetype as content annotation hint to optimize storage
- Benefits
  - Lower size of _id index
  - Less number of queries to read the micro tree



```
+ book.jpg (nt:file)
  + jcr:content
    - jcr:data
```

Bundling Pattern

```
+ jcr:system/documentstore/bundlor
  + nt:file
    - pattern - [jcr:content]
```

Bundled NodeDocument

```
{
  "_id": "2:/test/book.jpg",
   "_commitRoot": {"r1560bfe1650-0-1": "0"},
  ":pattern": {"r1560bfe1650-0-1": "[\"str:jcr:content\"]"},
  "jcr:primaryType": {"r1560bfe1650-0-1": "\"nt:file\""}
  "jcr:content/jcr:data": {"r1560bfe1650-0-1": "\"bar\""},
}
```

*OAK-1312

CODA

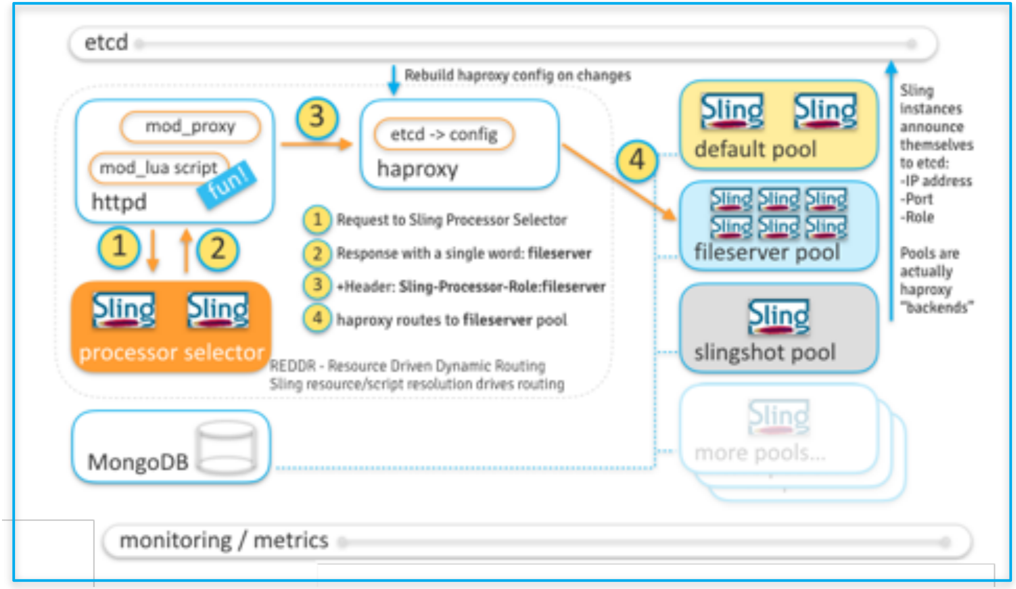
The Whole Web, really?

CODA

REDDR enables (extreme) scaling driven by Sling resource/script resolution.

Building customized Sling instances is easy: provisioning model + trivial Dockerfile.

From servers to systems!



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Pools are actually haproxy "backends"

Precise and focused repository types and operations improve performance.

Thank you for attending!
Chetan Mehrotra (@chetanmeh)
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