

adaptTo()

APACHE SLING & FRIENDS TECH MEETUP
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Scaling Search in Oak with Solr

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A look back ...

- Following up last year's "Oak / Solr integration" session



Looking at last year's agenda

- **What we have:**
 - Search Oak content with Solr independently
 - Oak running with a Solr index
 - Embedded
 - Remote
- **What we miss:**
 - Solr based MicroKernel

Apache Jackrabbit Oak

- Scalable content repository
- JCR compatibility (to some degree)
- Performance especially for concurrent access
- Scalability for huge repositories (> 100M nodes)
- Support managed environments (e.g. OSGi)
- Cloud deployments



- Enterprise search platform
- Based on Apache Lucene
- Full text, faceting, highlighting, etc.
- Dynamic cluster architecture
- HTTP API
- Latest release 4.4.0



Why Apache Solr

- Distributed, fault tolerant indexing / searching
- Highly configurable
 - without touching the repository
- Customizable

How it works ...

IndexEditor API

- an Editor receives info about changes to the content tree
- the Editor evaluates the status before and after a specific Oak commit
- can reject or accept the changes (by even modifying the tree itself)
- an Editor is executed right before an Oak commit is persisted
- the SolrIndexHook maps changes between statuses in the content tree to Solr documents and sends them to the Solr instance(s)

IndexEditor API – creating content

- `NodeState before = builder.getNodeState();`
- `builder.child("newnode").setProperty("prop", "val");`
- `NodeState after = builder.getNodeState();`
- `EditorHook hook = new EditorHook(new SolrIndexEditorProvider(...));`
- `NodeState indexed = hook.processCommit(before, after);`

QueryIndex API

- evaluate the query (Filter) cost for each available index to find the “best”
- execute the query (Filter) against a specific revision and root node state
 - internally the Filter is usually mapped to the underlying implementation counterpart
 - improved support for full text queries in Oak
- eventually view the query “plan”

- **mapping Filter restrictions:**
 - **Property restrictions:**
 - Each property is mapped as a field
 - Can use term queries for simple value matching or range queries for “first to last”
 - **Path restrictions**
 - indexed as strings and with special fields for parent / children / descendant matching
 - **Full text expressions**
 - use (E)DisMax query parser and/or fallback fields
 - **NodeType restrictions TBD**

- create an index configuration under
 - `/oak:index/solrIdx`
 - `jcr:primaryType = oak:queryIndexDefinition`
 - `type = solr`
 - plus some mandatory props (e.g. `reindex`)
 - Additional properties if want to run an embedded Solr server (more on this later)

Configuring the Solr index in Oak

- **Pluggable Solr server providers and configuration**
 - to allow different deployment scenarios
 - to allow custom configuration

Oak Solr core bundle

- provides basic API and implementation to index and search Oak content on Solr
 - Solr implementation of IndexEditor
 - Solr implementation of QueryIndex
- allows configurable mapping between
 - property types and fields
 - e.g. all *binaries* should be indexed in specific field
 - filter restrictions and fields
 - e.g. path restrictions for *children* should hit a certain field

Oak Solr Embedded bundle

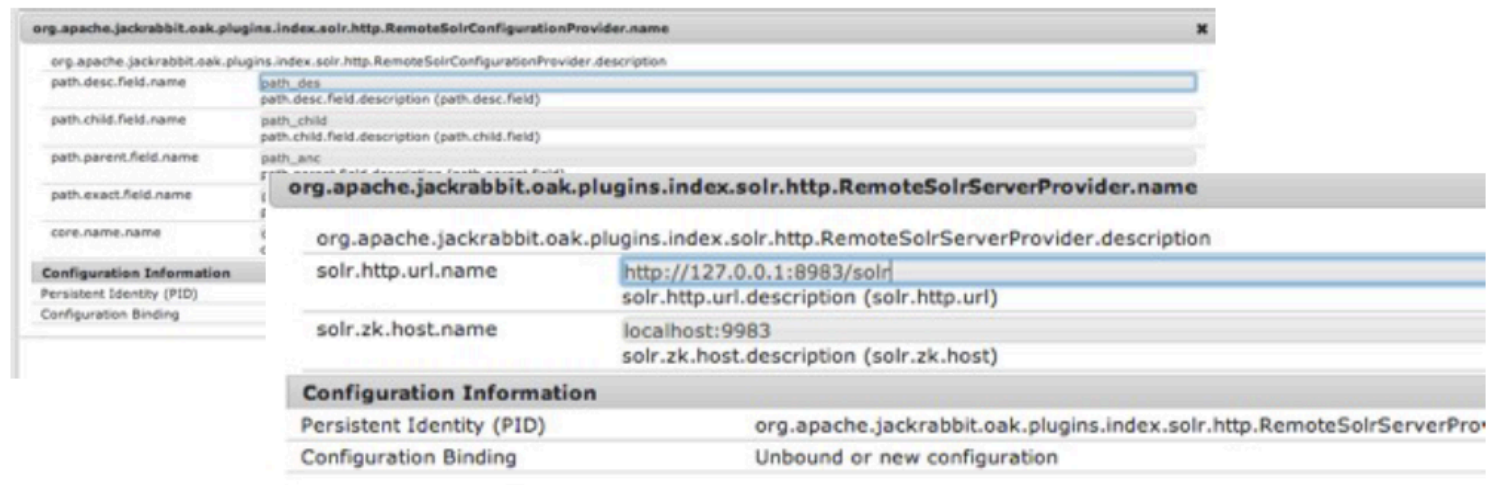
- provides support for indexing and searching on an embedded Solr instance
 - running inside the Oak repository
 - configuration can be done
 - via the repository
 - stored in the index definition node
 - via OSGi

Oak Solr Remote bundle

- provides support for indexing and searching on remote Solr instances
 - single Solr instance
 - distributed / replicated Solr cluster
 - SolrCloud deployments
 - configuration is done via OSGi

OSGi platform running on Oak with Solr

- Star instance with Oak repository
- Add a bunch of bundles for Solr
 - oak-solr-core, oak-solr-remote, zookeeper, servicemix.bundles.solr-solrj, etc.
- Configure the Solr instance
- Configure oak-solr-remote providers via OSGi



The screenshot shows the configuration for the bundle `org.apache.jackrabbit.oak.plugins.index.solr.http.RemoteSolrServerProvider`. The configuration is as follows:

Configuration Information	
Persistent Identity (PID)	org.apache.jackrabbit.oak.plugins.index.solr.http.RemoteSolrServerProvider
Configuration Binding	Unbound or new configuration

org.apache.jackrabbit.oak.plugins.index.solr.http.RemoteSolrServerProvider.name	
org.apache.jackrabbit.oak.plugins.index.solr.http.RemoteSolrServerProvider.description	
solr.http.url.name	http://127.0.0.1:8983/solr
solr.http.url.description (solr.http.url)	
solr.zk.host.name	localhost:9983
solr.zk.host.description (solr.zk.host)	

See it in action ...

Solr index populated with Oak content



- Dashboard
- Logging
- Core Admin
- Java Properties
- Thread Dump
- oak**
- Ping
- Query
- Schema
- Config
- Replication
- Analysis
- Schema Browser
- Plugins / Stats
- Dataimport

Request-Handler (qt)

/select

— common —

q
path_des:\/etc

fq

sort

start, rows
0 10

fl
path_exact

df

Raw Query Parameters
key1=val1&key2=val2

wt
json

indent

debugQuery

dismax

http://localhost:8983/solr/oak/select?q=path_des%3A%5C%2Fetc&fl=path_exact&wt=json&indent=1

```
{
  "responseHeader": {
    "status": 0,
    "QTime": 2,
    "params": {
      "fl": "path_exact",
      "indent": "true",
      "q": "path_des:\/etc",
      "wt": "json"
    }
  },
  "response": {
    "numFound": 1958,
    "start": 0,
    "docs": [
      {
        "path_exact": "/etc"
      },
      {
        "path_exact": "/etc/clientlibs"
      },
      {
        "path_exact": "/etc/crxde"
      },
      {
        "path_exact": "/etc/designs"
      },
      {
        "path_exact": "/etc/key"
      }
    ]
  }
}
```

What needs to be done

- Easy OSGi deployment
- Move common configuration stuff in oak-solr-core
- Leverage new full text expression API
- Solr MK?