

*Building search app
for public mailing lists in*

15 *minutes
with Elasticsearch*

Agenda

- 1. Who & Why*
- 2. Searching mailing lists*
- 3. How to do it*
- 4. Implementation details*
- 5. Challenges*
- 6. Give aways (free stuff inside!)*

Who am I?

Lukáš Vlček

*Senior Software Engineer
JBoss Community team
Red Hat, Czech Republic*



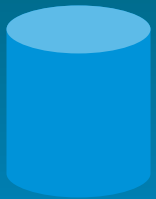
Why I am here?

*My mission is to **improve search**
for JBoss.org content.*

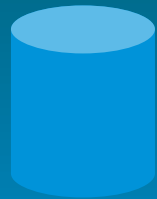
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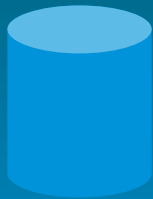
JBoss Community



Mailing lists



Blogs



Documentation



Forums



Project pages



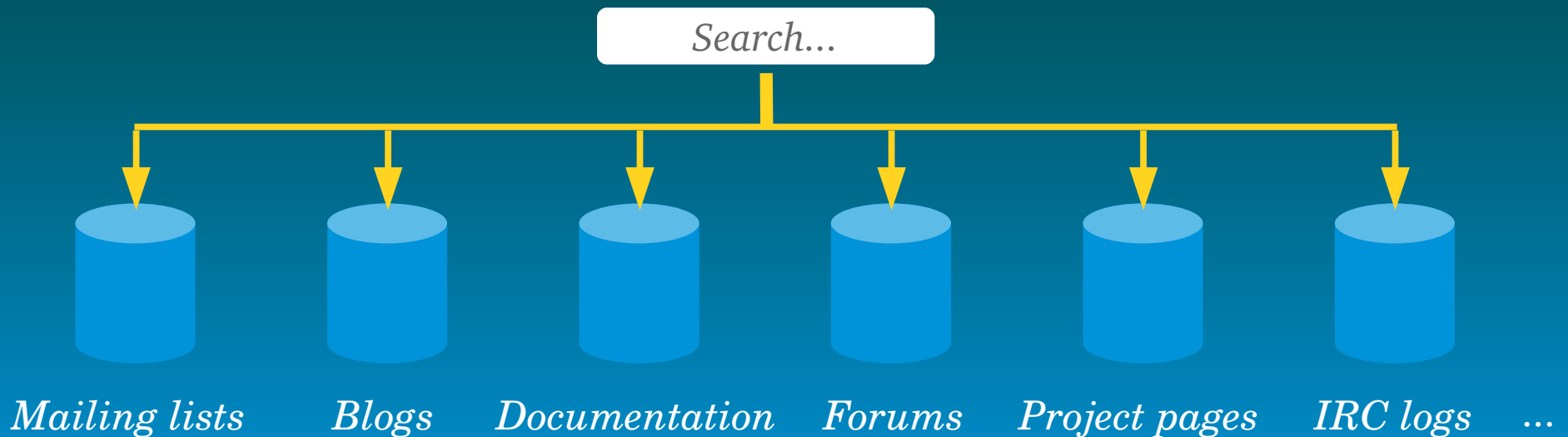
IRC logs

...

Why I am here?

*My mission is to **improve search** for JBoss.org content (and make it really rock!).*

JBoss Community



And we are starting with...



mailing lists
of JBoss community projects (†)

(†) <https://lists.jboss.org/mailman/listinfo/>

It is show time!

Searching mailing lists

Starring:

Front end side:

jQuery

Sammy.js & {{ mustache }}

Highcharts

Isotope

Back end side:

Elastic Search

▼ Projects

Sort results by: **Relevancy**

Instant Search

Order by: name | frequency

<input type="checkbox"/> Rules (1968)	<input type="checkbox"/> Gatein (361)	<input type="checkbox"/> DNA (100)	<input type="checkbox"/> JBoss OSGI (18)	<input type="checkbox"/> JBoss I10n (1)
<input type="checkbox"/> Infinispan (1139)	<input type="checkbox"/> Netty (311)	<input type="checkbox"/> ESB (63)	<input type="checkbox"/> JSFUnit (11)	<input type="checkbox"/> Guvnor (0)
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<input type="checkbox"/> JBoss Cache (419)	<input type="checkbox"/> Teiid designer (107)	<input type="checkbox"/> Errai (19)	<input type="checkbox"/> HornetQ (1)	

Mailing List

- Dev (5494)
- Users (2783)
- Announce (19)
- N/A (1)

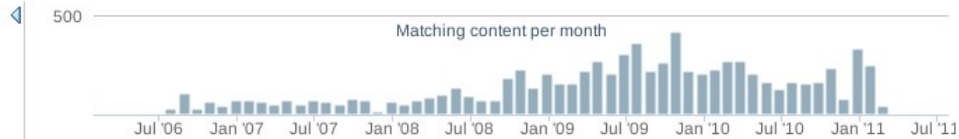
Top Authors

- Manik Surtani (527)
- Pete Muir (209)
- Mark Proctor (186)
- Emmanuel Bernard (178)
- Mircea Markus (166)
- Brian Stansberry (154)
- Dan Allen (153)
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- Galder Zamarreno (72)

Time Frame

Quick time selection:

Last [week](#), [month](#), [quarter](#) or [year](#).



Total hits: 8297 for query **transaction manager** (took 49ms)

Page 1 of 830

[Drools Transaction Manager](#)

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[rules](#) > [users](#) | 2011-01-31 13:07:56 | ramram <ramram858(at)gmail.com>

[Transaction Not Allowed](#)

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[jbossws](#) > [users](#) | 2007-10-04 05:47:59 | oskar.carlstedt <do-not-reply(at)jboss.com>

[Drools Flow Persistence : How can I use Geronimo Transaction Manager Instead of Bitronix Transaction Manager.](#)

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[jbossws](#) > [users](#) | 2007-10-12 20:01:33 | ptenn10 <do-not-reply(at)jboss.com>

Note: the web UI can be different once we go into production.

transaction manager

Search

Projects

Sort results by: Relevancy

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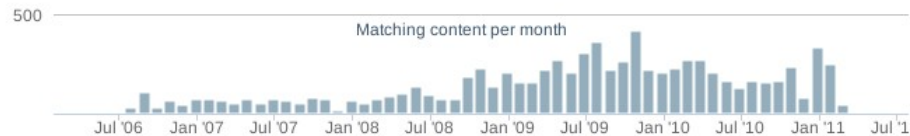
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Time frame selection fields

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Facets →

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← Facets

Note: the web UI can be different once we go into production.

Search query in detail

```
{  
  from : 0,  
  query : { ... },  
  fields : [ ... ],  
  highlight : { ... },  
  facets : { ... }  
}
```

Full example: <https://gist.github.com/1012051>

query : {...}

query_string : { query : "jboss server" }

Full example: <https://gist.github.com/1012051>

query : {...}

```
filtered : {  
  query : { query_string : { query : "jboss server" } },  
  filter: {  
    and : [  
      { range : { date : { from : "2007-07-25", to : "2010-12-16" } } },  
      { terms : { _index : ["weld"] } },  
      { terms : { mail_list : ["dev"] } },  
      { terms : { from.not_analyzed : [  
        "Galder Zamarreno <galder.zamarreno@redhat.com>",  
        "Pete Muir <pmuir@redhat.com>" ] } }  
    ] }  
  }  
}
```

Full example: <https://gist.github.com/1012051>

fields : [...]

"date", "document_url", "from", "mail_list",
"message_id", "message_snippet", "subject",
"subject_original", "to", "in_reply_to", "references"

Full example: <https://gist.github.com/1012051>

highlight : {...}

```
pre_tags : ["<span class='hlt'>"],
post_tags : ["</span>"],
fields : {
  first_text_message : { number_of_fragments : 3 },
  first_html_message : { number_of_fragments : 3 },
  message_attachments : { number_of_fragments : 3 },
  subject : { number_of_fragments : 0 }
}
```

Full example: <https://gist.github.com/1012051>

facets : {...}

histogram : {...},
projects : {...},
listType : {...},
author : {...},
author_filter : {...}

Full example: <https://gist.github.com/1012051>

facets.histogram : {...}

date_histogram : { field : "date", interval : "month" }

Full example: <https://gist.github.com/1012051>

facets.author : {...}

```
terms : { field : "from.not_analyzed", size : 15 },
facet_filter : {
  and : [
    { query : { query_string : { query : "jboss server" } } },
    { range : { date : { from : "2007-07-25", to : "2010-12-16" } } },
    { terms : { _index : ["weld"] } },
    { terms : { mail_list : ["dev"] } }
  ]
},
global : true
```

Full example: <https://gist.github.com/1012051>

facets.author_filter : {...}

```
terms : { field : "from.not_analyzed", size : 15 },
facet_filter : {
  and : [
    { query : { query_string : { query : "jboss server" } } },
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Document Detail Preview

The screenshot shows a 'Document preview' window with a 'Conversation thread' section. The thread contains several entries, each with a 'dna>dev' header and a subject line: 'Non-XA compliant resource participation in distributed transactions by [author] on [date]'. The email headers are highlighted in yellow and include:

Subject: Re: [dna-dev] Non-XA compliant resource participation in distributed transactions
Date: 2008-05-15 13:21:56
From: Randall Hauch <rhauch(at)redhat.com>
Project: dna>dev

The message body contains the following text:

Right. Now I guess I have a question, tho, regarding the implementation of federation connectors to systems (e.g., file systems in particular) that don't have any natural support for transactions. Is implementing the connector as if it is XA-compliant a bad thing to do?

On May 15, 2008, at 3:59 AM, Mark Little wrote:

- > As I said in an earlier email, there are significant differences
- > between compensating transactions and ACID transactions (of which XA
- > is just one possible implementation). You shouldn't offer
- > compensating transactions opaquely to users if they register
- > multiple 1PC-aware resources because the semantics are different.
- > Using them without understanding the implications can be a PITA at
- > best and cause significant data inconsistencies at worse
- > (compensations can fail or take an arbitrary amount of time to
- > resolve). ACID transactions are a pretty good default. If users have
- > multiple 1PC-aware resources then it may be in their best interests
- > to convert them to 2PC rather than be lulled into some false sense
- > of security that somehow a compensating transaction will give them
- > the same quarantees.

A 'Close' button is visible at the bottom right of the preview window.

Search query in detail

```
{  
  fields : [ ... ],  
  query : { ... },  
  filter : { ... },  
  highlight : { ... }  
}
```

Full example: <https://gist.github.com/1012096>

query : {...} & *filter* : {...}

```
query : {  
  bool : {  
    should : [{  
      query_string : { query : _userQuery_ }  
    }],  
    must : { term : { message_id : _documentId_ } }  
  }  
},  
filter : { ids : { type : "mail", values : [ _documentId_ ] } }
```

Full example: <https://gist.github.com/1012096>

highlight : {...}

```
highlight : {  
  pre_tags : [ "<span class='phlt'>" ],  
  post_tags : [ "</span>" ],  
  number_of_fragments : 0,  
  fields : {  
    subject_original : { },  
    first_text_message : { },  
    first_html_message : { },  
    message_attachments : { number_of_fragments : 3 }  
  }  
}
```

Full example: <https://gist.github.com/1012096>

Document Detail Preview

Document preview

Conversation thread: Header references only from dna>dev

dna>dev Non-XA compliant resource participation in distributed transactions by John P. A. Verhaeg on 2008-05-15 13:21:56
dna>dev Non-XA compliant resource participation in distributed transactions by Randall Hauch on 2008-05-15 13:21:56
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Close

Do you mean federated within the same VM or across VMs? Mark. On 15 May 2008, at 14:21, Randall Ha

← *Threads*

```
{from : 0, size : __count__,
  fields : [ ... ],
  script_fields : { millis : { script : "doc['date'].date.millis" }
},
query : {
  constant_score : {
    filter : {
      or : {
        filters : [
          { terms : { references : __references__ } },
          { terms : { message_id_original : __references__ } }
        ]
      }
    }
  }
}
```

Full example: <https://gist.github.com/1012115>

Challenges

Parsing and Indexing emails

Mail Subject normalization

Mail conversations

Quoted content

Author identification

...

Challenges

1) Parsing and indexing emails

Emails can have very complex hierarchical structure with different content types in it. They can be even malformed (typically SPAM emails).

Apache **Mime4J** and **jsoup** can do a very good job.

ES mapping example: <https://gist.github.com/1011913>

Challenges

2) Mail subject normalization

Emails in public mailing lists contain specific patterns in subject that should be handled carefully. Probably you do not want to index them as a part of the mail subject at all.

Challenges

2) Mail subject normalization

Typically something like the following:

- [\[infinispan-dev\]](#) Feedback on Infinispan patch
- [Re: \[infinispan-dev\]](#) Feedback on Infinispan patch
- [Re: \[hibernate-dev\] \[infinispan-dev\]](#) Feedback on Infi...

Challenges

2) Mail subject normalization

But it can be very funny too:

[jbossws-users] [JBossWS] – Re:
[jbossws-users] [JBossWS] - "
[rules-dev] ;

Challenges

2) Mail subject normalization

Or quite complex:

[infinispan-dev] [Fwd: [Fwd: Sometimes TCP responses not getting through on localhost]]

[hibernate-dev] [Fwd: [redhat.com #1341720] [Fwd: Re: Unable to checkout core/trunk/core]]

Challenges

3) Identification of conversation threads

Probably the two biggest challenges are **Thread hijacking** and **Non-linear threads**.

Probably the two most straightforward approaches are using mail headers (<in-reply-to>,<references>) and mail subjects.

Challenges

4) Quoted content

Should the quoted content be included?

(I think it should be included...)

Challenges

5) *Author identification*

Email value is not always enough.

```
" 이희승 (Trustin Lee)" <trustin@gmail.com>  
    Trustin Lee <tlee@redhat.com>  
"Trustin Lee ( 이희승 )" <trustin@gmail.com>  
Trustin Lee ( 이희승 ) <trustin@gmail.com>  
    Trustin Lee <trustin@gmail.com>  
Trustin Lee <trustin@gleamynode.net>  
    이희승 <trustin@gmail.com>
```

Want to try yourself?

You are welcome!

Some parts of the search application to be soon available on GitHub for anybody to index and search mbox files.

And one more thing...

Don't go home emptyhanded.

BigDesk

A tiny monitoring tool for Elastic Search.

<https://github.com/lukas-vlcek/bigdesk>

Thank you!

lvlcek@redhat.com
lukas.vlcek@gmail.com