Managing Primo on a Large Scale

Stefan Lohrum, KOBV

IGELU conference Berlin 2013
Managing Primo on a Large Scale

- KOBV Primo Consortium
- Primo Infrastructure
- Disaster Recovery System
- Monitoring
ZIB & KOBV

- Mathematics & Computer Science Research
  `Fast Algorithms - Fast Computer`
- North-German Supercomputing Alliance
- Berlin Scientific Network
- Data Storage & Archiving

- Regional Library Consortium
  (250+ Libraries)
- Public Services
  (Search Engine, ILL, Library Registry)
- Hosting Services
  (Primo, SFX, Metalib, Verde, OPUS, …)

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Primo Consortium – Audience

Universität Paderborn
Technische Universität Berlin
Freie Universität Berlin
Humboldt-Universität zu Berlin
Universitäts- und Landesbibliothek Düsseldorf
UB Trier

7 Universities
150.000+ Students
10.000+ FTE
100.000+ Sessions/Day

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Expectations

- 7 x 24 operation
- Cost savings
- Ease of operation
- Learning from the consortial partners
Working together

Open policy (``everybody can see everything``), …

... but partners work very carefully

BO tables become more and more confusing, …

... but this may be a reminder from earlier versions

Pipe coordination required …

... libraries seem to reload their catalogues every 3 months

Still deficits in multitenancy and robustness …

... issues in one instance may have impact to others

Processes take long …

... e.g. migration Primo 3 to Primo 4 took 7 month
=> No contact to user or patron, delayed error messages
=> Error fixing may require service provider or other 3rd party
=> Communication infrastructure required
Systems & Sizing

- **Production system**
  2 FE, 4 SE, 1 BE/DB + 1 LB (each 8 cores / 32 GB RAM)

- **Staging system (t.b.d.)**
  2 FE, 4 SE, 1 BE/DB + 1 LB (12 cores / 144 GB RAM)

- **Disaster Recovery System**
  2 FE, 4 SE, 1 BE/DB + 1 LB (each 6 cores / 32 GB RAM)
Disaster Recovery System

- Hardware defects (-)
- Data damage (-)
- Planned outages, migrations (+++)

=>> Business requirements

=>> Cost-Benefit Analysis

=>> Don’t forget maintenance
Disaster Recovery System

ExLibris recommendations:

(a) - Have two separate Primo installations
   - Run all pipes on both systems
   - Use DP to copy user generated data from Prod to failover system

(b) - Have two separate Primo installations
   - Synchronize a set of directories (e.g. index file, SE conf. files)
   - Use Data Guard to synchronize the Oracle database

If you don‘t want to synchronize back the user generated data, have a CSS hiding e-Shelf and other functionality

If failover system is off site, global load balancing is required
KOBV Disaster Recovery System

- Model (a)

- On demand clone database (backup / recovery)

- Performed successful for 2 migrations

BUT:

- Have to be very careful with configuration

- Don’t forget load testing !!!!
Primo Front End Infrastructure

- PDS
- Primo Central
- Metalib
- RTA
- SFX
- OvP
- Mashups
Architecture, Components & Interfaces

- **PDS & IDS (Identity Management System)**
- **Third Node Retrieval** (e.g. Primo Central),
- **Federated Search** (e.g. Metalib)
- **RTA** („Run Time Availability“)
- **OvP** („OPAC via Primo“)
- **Linking Service SFX**
- **Front End Enrichments** (i.e. Google Books/Synectics covers)

=> Fault tolerance on outage of components?

=> How to find the error?
System Weaknesses

In general:

**Required Resources** > **Given Resources** =>

Resource Limitations

- **Hardware**: #Cores, RAM, IO, disk,
- **JBoss infrastructure**: # Threads

Keep in mind

- Load increases by usage
- DOS attacks generate HUGE load

=> **Evaluating sizing is an ongoing process**

**Baselines required**
Logfiles

There are lots of ...

FE: library_server.log, localhost_access_log, lockedThread.log, maxThread.log, ...
SE: agent_9501.log, slice_1.log, ...
BE: publish_server.log, PrimoProcessExecutor.log, DeployAll.log, ...

Ever looked inside?

2013-09-13 07:31:16,394 ERROR [t-http-0.0.0-1701-269] [c-includeStaticHTML] - staticHTML () failed to load. (0 ms)org.apache.taglibs.
standard.tag.common.core.nullAttributeException: The "url" attribute illegally evaluated to "null" or "" in &lt;import&gt;
at org.apache.taglibs.standard.tag.common.core.ImportSupport.doStartTag(ImportSupport.java:133)
at org.apache.jsp.tiles.headerTile_jsp._jspx_meth_c_005fimport_005f0(headerTile_jsp.java:5765)
at org.apache.jsp.tiles.headerTile_jsp._jspx_meth_c_005fcatch_005f1(headerTile_jsp.java:5730)
at org.apache.jsp.tiles.headerTile_jsp._jspx_jspService(headerTile_jsp.java:709)
at org.apache.jasper.runtime.HttpJspBase.service(HttpJspBase.java:70)
at javax.servlet.http.HttpServlet.service(HttpServlet.java:717)
at org.apache.jasper.servlet.JspServletWrapper.serviceJspFile(JspServletWrapper.java:369)
at org.apache.jasper.servlet.JspServlet.serviceJspFile(JspServlet.java:322)

=> There are many, mostly undocumented
=> Very unclean, mugged with stack traces
=> Essential information missing, e.g. IP if behind a load balancer
Monitoring

Audience

not only IT or Primo management

Alerts to all devices

Workstations, PCs, Tablets, Smartphones, …

Monitoring of the whole infrastukture

Primo is NOT only Primo software

Active Information in case of problems

Escalation strategy

Who?

How?

What?
Monitoring

- Error Tracking Support
- Support of an iterative process
  - Learning from errors…
- Proactive Information
  - … and error detection ahead of problems
- „End to End“ Monitoring
  - … the user’s view on the system
- Documentation of the availability

=> Monitoring is part of a process
Monitoring in Primo Backoffice

Most important parameters

- Pipes
- Processes (Indexing, Hotswapping, DYM)
- Search Performance
- Tablespaces
  - Disk Free
  - CPU Load
Monitoring in Primo Backoffice

- **Most important parameters**
- **System components**

- **Monitor Primo Status**
- **Pipe Monitoring**
  Monitor the pipe processes and view errors
- **Tools Monitoring**
  Monitor the tools processes and view errors
- **Process Monitoring**
  Monitor the processes and view errors
- **Job Monitoring**
  Monitor all the jobs running on the system
- **Deploy Monitoring**
  Monitor Deploy Jobs
- **Search Engine Monitoring**
  Monitor and manage search servers and indexing
- **Watchdog Monitoring**
  Monitor and manage Primo Watchdog
Monitoring in Primo Backoffice

- **Most important parameters**
- **System components**

<table>
<thead>
<tr>
<th>Process Name</th>
<th>Process Status</th>
<th>Execution Date</th>
<th>Execution Time</th>
<th>Records Succeeded</th>
<th>Records Failed</th>
<th>More</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotswapping</td>
<td>Completed</td>
<td>09.01.2013 13:09:04</td>
<td>00:41:20</td>
<td>0</td>
<td>0</td>
<td>History Clean up Execute</td>
</tr>
<tr>
<td>Indexing</td>
<td>Completed</td>
<td>09.01.2013 09:45:59</td>
<td>00:56:44</td>
<td>177301</td>
<td>0</td>
<td>History Clean up Execute</td>
</tr>
<tr>
<td>Indexing_and_Hotswapping</td>
<td>Stopped</td>
<td>26.02.2013 23:00:00</td>
<td>00:02:11</td>
<td>7000</td>
<td>0</td>
<td>History Clean up Execute</td>
</tr>
<tr>
<td>Dismean</td>
<td>Completed</td>
<td>16.06.2012 12:55:05</td>
<td>00:33:14</td>
<td>0</td>
<td>0</td>
<td>History Clean up Execute</td>
</tr>
<tr>
<td>Indexing_and_Dismean_and_Hotswapping</td>
<td>Completed</td>
<td>16.02.2013 23:00:00</td>
<td>02:07:01</td>
<td>97558</td>
<td>0</td>
<td>History Clean up Execute</td>
</tr>
</tbody>
</table>

**Tabelle: M_P_PROCESS_CONTEXT**

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Monitoring in Primo Backoffice

- Most important parameters
- System components
- But sometimes plugins required
### Monitoring in Primo Backoffice

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most important parameters</td>
<td>✔</td>
</tr>
<tr>
<td>Local system components</td>
<td>✔</td>
</tr>
<tr>
<td>Primo is logging in ORACLE database</td>
<td>+/-</td>
</tr>
<tr>
<td>No monitoring of external components</td>
<td>✗</td>
</tr>
<tr>
<td>No &quot;End to End&quot; monitoring</td>
<td>✗</td>
</tr>
<tr>
<td>Browser based solution, partly plugin required</td>
<td>✗</td>
</tr>
<tr>
<td>Login in Backoffice required</td>
<td>✗</td>
</tr>
</tbody>
</table>

**=>>>> Monitoring with Primo Backoffice is LIMITED!**

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NAGIOS Excercise

- Full-blown, server based monitoring system
- Sensors for all system parameters
- Public domain, package
- Schedules
- Service hierarchies, views
- Escalation schemas
- Protocol, trends etc.
- Browser interface, Android and IOS Apps
- Plugin interface
NAGIOS Excursus - Plugin Interface

- SSH Access to external target systems (using a certificate)
- Shell script evaluates performance data („sensor“)
- Protocolling on Nagios Server (MySQL database)
- Oracle plugin can run SQL commands
- Screen scraping using perl library „mechanize“

```bash
#!/sbin/sh
# check if aleph-union-process is running
# Aleph20 0 | OK | if online
# 1 | WARNING | if disabled
# 1 | WARNING | if maintenance
# 2 | CRITICAL | if offline
# 3 | UNKNOWN  | if not available
if [ $# -lt 2 ]
then    echo "usage: `basename $0` <host> <user>"
        exit 3
fi

HOSTNAME=$1
USR=$2
USR_CMD="ps -f -u $USR | egrep 'b_union|p_union'"
CMD=/usr/bin/ssh
TEMPFILE=/usr/local/icinga/var/temp_sshproc.$$

( $CMD icinga@$HOSTNAME $USR_CMD > $TEMPFILE ) &
pid=$!
wait $pid

cnt=`cat $TEMPFILE | wc -l`
if [ $cnt -gt 0 ]
then    stat=0
        echo "$stat - OK: (b_union p_union) x $cnt instances are running"
else
    stat=1
    echo "$stat - Warning: (b_union p_union) is NOT running"
fi
rm -f $TEMPFILE
exit $stat
```
Sensors for Primo

- Standard sensors for CPU load, IO wait, uptime, disk usage, free memory
- Process status, search status
- Logfile monitoring for typical error messages (e.g. „PDS not reachable“, „Timeout after 30000ms“, …)
- PDS response times
- Penetration („End to End“) of Front End, internal and external (Pingdom)
- Additional sensors (e.g. garbage collection) as necessary
Primo Monitoring with Nagios

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End to End Monitoring

- User experience with Primo
- Search local repository (e.g. „berlin“)
  Check no. of hits (should be > 10)
- Error on timeout or not enough
- External provider (pingdom.com)
- Integrated statistics

Dashboard

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Summary

- Primo multitenancy is still limited, robustness
- Primo monitoring using Backoffice is not sufficient
- NAGIOS and specific plugins for Primo allow monitoring, also in a hosted environment
- Monitoring is part of an „integrated“ process

@ExLibris:

- Have APIs for monitoring
- Cleanup logiles, document them, consider load balancer
Questions?

Contact:

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