Apache httpd 2.4
The Web Server for the Cloud

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Red Hat
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About me

- Mladen Turk
  - ASF Member, Tomcat PMC chair
  - Contributor from 20\textsuperscript{th} century
  - Principal Software Engineer with Red Hat
What we will cover

- What's new in 2.4
  - General improvements
  - Proxy module improvements
- Cloud and the Web
Apache httpd 2.4

• Currently in 2.4.1 (in vote)
• Significant improvements
  • Performance
  • New features
  • Cloud ready
    • Sort of...
Apache httpd 2.4

- Async I/O
  - Event mpm as default
  - Further “modularization”
    - Loadable MPMs
- High performance APR
Apache httpd 2.4

• More advanced logging
  • new log levels

  [mpm_event:trace6] ... event.c(1372): connections: 0 ...

• per module/per directory
• <If> supports per-requests conditions
• Generic shared memory provider
Apache httpd 2.4

- Standard bandwidth control
  - mod_ratelimit
- Security enhancements
  - mod_reqtimeout
- I/O buffering control
  - mod_buffer
- Support for LUA
  - You guess ... mod_lua
Reverse proxy

- Cloud is all about horizontal scalability
- Apache httpd still the most frequently used front-end
- Proxy must be cloud friendly
  - mod_slotmem_shm
    - originates from mod_cluster
  - we just scratch the surface
Reverse proxy features

- Generic reverse proxy implementation
- Supports various protocols
  - HTTP, HTTPS, CONNECT, FTP
  - AJP, FastGCI, SCGI
  - FDPASS
- Clustering and failover
- Load balancing
- Performance
Reverse proxy: What's new in httpd 2.4

- Supports FastCGI and SCGI in balancer
- mod_proxy_express
  - OpenShift
- mod_proxy_html
- mod_fcgid
- Support for dynamic configuration
- Runtime change of clusters w/o restarts
  - we still need descent persistence layer
mod_proxy_balancer

- Loadable strategy modules
  - mod_lbmethod_heartbeat
  - requests
  - traffic
  - busyness
  - custom
- Goal is to catch up with mod_jk
  - Improve AJP
  - Support comet with AJP?
Reverse proxy

- Connection pooling
- Available for named workers
  - ProxyPass ...
- Reusable connection to origin
  - For threaded MPMs
  - Prefork always use single connection
Load Balancer

• Cluster sets with failover
• Group your backend servers
  • lower to higher sets first
  • auto switch back
• Hot standby
Balancer manager

- Monitor the status at run time
- Edit capabilities
- CLI usage
- XML or HTML
Load Balancer Manager for localhost

Server Version: Apache/2.4.2-dev (Unix)
Server Built: Feb 14 2012 16:47:05

**Load Balancer Status for** **Balancer://mycluster**

<table>
<thead>
<tr>
<th>MaxMembers</th>
<th>StickySession</th>
<th>DisableFailover</th>
<th>Timeout</th>
<th>FailoverAttempts</th>
<th>Method</th>
<th>Path</th>
<th>Active</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 [4 Used]</td>
<td>(None)</td>
<td>Off</td>
<td>0</td>
<td>3</td>
<td>bytraffic</td>
<td>/apps</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Worker URL</th>
<th>Route</th>
<th>RouteRedir</th>
<th>Factor</th>
<th>Set</th>
<th>Status</th>
<th>Elected</th>
<th>Busy</th>
<th>Load To</th>
<th>From</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://servera:8008">http://servera:8008</a></td>
<td>1</td>
<td>0</td>
<td>Init Ok.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><a href="http://serverb:8008">http://serverb:8008</a></td>
<td>1</td>
<td>0</td>
<td>Init Ok.</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td><a href="http://serverc:8008">http://serverc:8008</a></td>
<td>1</td>
<td>0</td>
<td>Init Ok.</td>
<td>0</td>
<td>0</td>
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**Edit balancer settings for** **Balancer://mycluster**

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<td>3</td>
</tr>
<tr>
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<td>On</td>
</tr>
<tr>
<td>Sticky Session:</td>
<td>Off</td>
</tr>
</tbody>
</table>

(Use "-" to delete)

Submit
Balancer manager

<Proxy balancer://mycluster>
  BalancerMember http://localhost:8080
  BalancerMember http://localhost:8081
  BalancerMember http://localhost:8082 status=+h
  BalancerMember http://localhost:8083 lbset=1
  ProxySet lbmethod=bytraffic
  ProxySet growth=10
</Proxy>
ProxyPass /apps/ balancer://mycluster
ProxyPassReverse /apps/ balancer://mycluster
Load Balancer Manager for localhost

Server Version: Apache/2.4.2-dev (Unix)
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Load Balancer Status for balancer://mycluster

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<td>0</td>
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<td></td>
<td>Stby Ok</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td><a href="http://localhost:8083">http://localhost:8083</a></td>
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<td>1</td>
<td></td>
<td></td>
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<th>Add New Worker:</th>
<th>Submit</th>
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Are you sure?
Cloud and Web Servers

- Horizontal scalability solved
- Minimized concurrency
- Density still matters
- Transaction time is now important
  - Low latency
  - Fast request/response turnover
Conclusion ...

- httpd 2.4 has painless transition
- Performance is still relevant
- A lot of room for improvement (both for cloud and not)
Thank you.