MySQL Cluster
Practical demo
using Red Hat Cluster Suite
Clustering

• Achieving:
  High Availability (HA) & Load Balancing (LB)

• Availability:
  99 % - 87 hours outage a year
  99.9 % - 8.7 hours outage a year
  99.99 % - 52 minutes a year
  99.99 % - 5 minutes a year
Do I need a cluster?

• Can I afford being offline for 8.7 hours a year?
• Can I afford being offline for 5 minutes a year?

or

• What is my loss if I am offline for 8.7 hours a year?

vs.

• What does the cluster cost?
Clustering is about...

Eliminating any SPOF

SPOF – Single Point Of Failure. Any component in the cluster must be doubled!
Our Cluster demo

Network infrastructure (redundant)

Ethernet bonding

Cluster node 1

Ethernet bonding

Cluster node 2

Fencing devices (2)

create and share your own diagrams at gliffy.com
Our Cluster demo

Cluster node N

Cluster node 1

Cluster node 2

Network infrastructure (redundant)

Ethernet bonding

Ethernet bonding

Fencing devices (2)

create and share your own diagrams at gliffy.com
How it works

• Basically: sending heartbeats to other nodes and determining if they are alive and OK
• Taking care of nodes (fencing) and services (failover) if there is a failure
Fencing

• Sorry? Fenc...what?

• Scenario:
  1) \(N\) nodes cluster, shared storage between them (SAN, NAS)
  2) One goes faulty for unknown reason (communication issue!)
  3) What happens?
Fencing

- STONITH – Shoot The Other Node In The Head
  = Ensuring your data stays OK

- Using power switch (power strip + Ethernet with HTTP interface)
- Power off the faulty node
Fencing

• **Essential!** Not only for data, also virtual IPs
• Fencing device = SPOF => You need 2!

• Best devices: APC/WTI switches, example: APC7920

• iLO, DRAC, IBM RSAII, etc. suitable for fencing also
• However, special caveats!

create and share your own diagrams at gliffy.com
Networking

- Network = SPOF => Make it redundant
- Always use Ethernet bonding for your network connection
Cluster nodes

- Server = SPOF => at least 2 (this makes it a cluster!)
- Better to have at least 3, there is a voting system
  2 from 3 means a majority
- Qdisk (Google: qdisk)
- Running services
Hardware

• Desktop PCs: NO
• HW: Any x86/PowerPC/Itanium 32/64bit hardware
• Power supply = SPOF => have 2

• Major brands: Dell, HP, IBM, Sun Microsystems, SuperMicro
Software

• Using Red Hat Enterprise Linux + Red Hat Cluster Suite

• Red Hat Enterprise Linux – commercially supported Linux
• Red Hat Cluster Suite – Open Source solution for HA/LB commercially supported
Software

• Operating system – Red Hat Enterprise Linux

• Do I have to buy RHEL for this cluster?  
  Well...no, but this is HA right?

• Cluster software – Red Hat Cluster Suite

• Do I have to buy Cluster suite for this cluster? …

• OK, you can use CentOS, Debian, Gentoo, Fedora

• Almost every Linux distribution
Our Cluster demo

Network infrastructure (redundant)

Ethernet bonding

Cluster node 1

Cluster node 2

Fencing devices (2)

create and share your own diagrams at gliffy.com
Simple budget

- This is just a hardware list, no work included
- This is a lowcost variant
- Rough: many things to be considered

<table>
<thead>
<tr>
<th>Item</th>
<th>Count</th>
<th>Price / pcs</th>
<th>Price</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell PowerEdge 1950</td>
<td>2</td>
<td>$1,600</td>
<td></td>
<td>$3,200</td>
</tr>
<tr>
<td>APC 7920</td>
<td>2</td>
<td>$650</td>
<td></td>
<td>$1,300</td>
</tr>
<tr>
<td>RHEL OS</td>
<td>2</td>
<td>$400</td>
<td></td>
<td>$800</td>
</tr>
<tr>
<td>RHEL Cluster</td>
<td>2</td>
<td>$500</td>
<td></td>
<td>$1,000</td>
</tr>
</tbody>
</table>

**Sum**                    **$6,300**
Demonstration

- MySQL Master/Slave replication cluster
- 2 IBM servers, fencing, network (simple)
END

Questions?

Jakub Suchý

e-mail: jakub.suchy@drupal.cz

http://www.drupal.cz