An overview of the Drupal infrastructure and plans for future growth

prepared by Kieran Lal, Gerhard Killesreiter, and Drupal infrastructure team
for the Drupal Association and the Drupal community

Recommendations

Hire OSUOSL system administration intern(s)
24GB Database RAM growth
36GB+ Web server RAM growth
Virtualization may support more dedicated services
Create a high performance tuning team

Drupal.org 2006 infrastructure services

Problems:
Web servers not efficiently used
Database Bottleneck
Performance, failures cause downtime, availability problems

Network
Round Robin DNS
Virtual IP alternates requests between D1 & D2

Network uses round robin division of load. Does not check if web server died. Not efficient use of web serving capacity.

Drupal 1
Apache Web Server
PHP 4.4
APC PHP Cache
NFS client files dir
Rsync php drupal.org,.be

Drupal 2
Apache Web Server
PHP 4.4
APC PHP Cache
NFS client files dir
Rsync php drupal.org,.be
groups.d.o, scratch.d.o

Drupal 3
CVS
Mail
PHP 5.2.2

Load is not evenly distributed across servers. Not using maximum RAM capacity of servers.

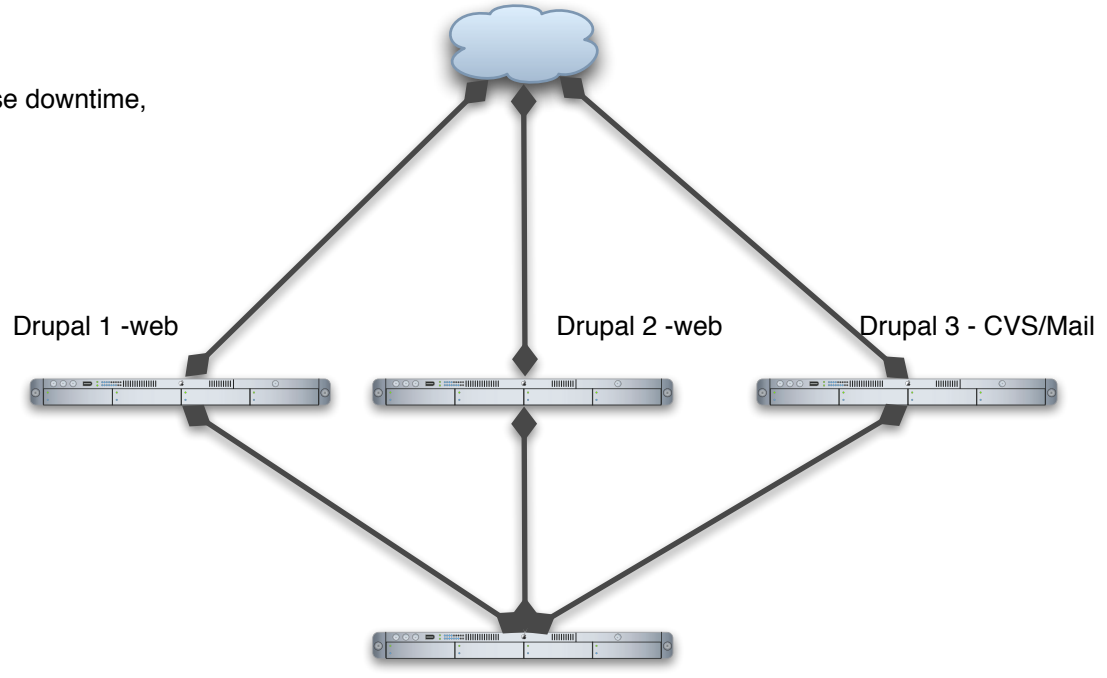
Drupal DB
MySQL 4.0.x
Network File System (NFS)

Database is bottleneck in architecture. Need more RAM for MySQL. Could use second db slave for back-ups, high availability failover.

OSUOSL
FTP

Drupal.org 2006 Infrastructure

Problems:
Web servers not efficiently used
RAM upgrades needed
Database Bottleneck
Will not scale 250% /year
Performance, failures cause downtime, availability problems



Firewall uses round robin division of load. Does not check if web server died. Not efficient use of web serving capacity.

Load is not evenly distributed across servers. Not using maximum RAM capacity of servers.

Database is bottleneck in architecture. Need more RAM for MySQL. Could use second db slave for back-ups, high availability failover.

Drupal.org 2006 Infrastructure Hardware

Drupal 1
Dell Poweredge 1850
RAM: 2 x 1 GB DDR-2 400 (6 slots total)
Storage: 2 x 73 GB U230 SCSI drives (RAID1)
Processor: 2 x Intel Xeon
Motherboard:
Dual power supplies

Drupal 2
Dell Poweredge 1850
RAM: 2 x 1 GB DDR-2 400 (6 slots total)
Storage: 2 x 73 GB U230 SCSI drives (RAID1)
Processor: 2 x Intel Xeon
Motherboard:
Dual power supplies

Drupal 3
Dell Poweredge 1850
RAM: 2 x 1 GB DDR-2 400 (6 slots total)
Storage: 2 x 73 GB U230 SCSI drives (RAID1)
Processor: 2 x Intel Xeon
Motherboard:
Dual power supplies

http://www.dell.com/content/products/productdetails.aspx/pedge_1850

Dell's purchased in fundraising drive
http://drupal.org/node/26707

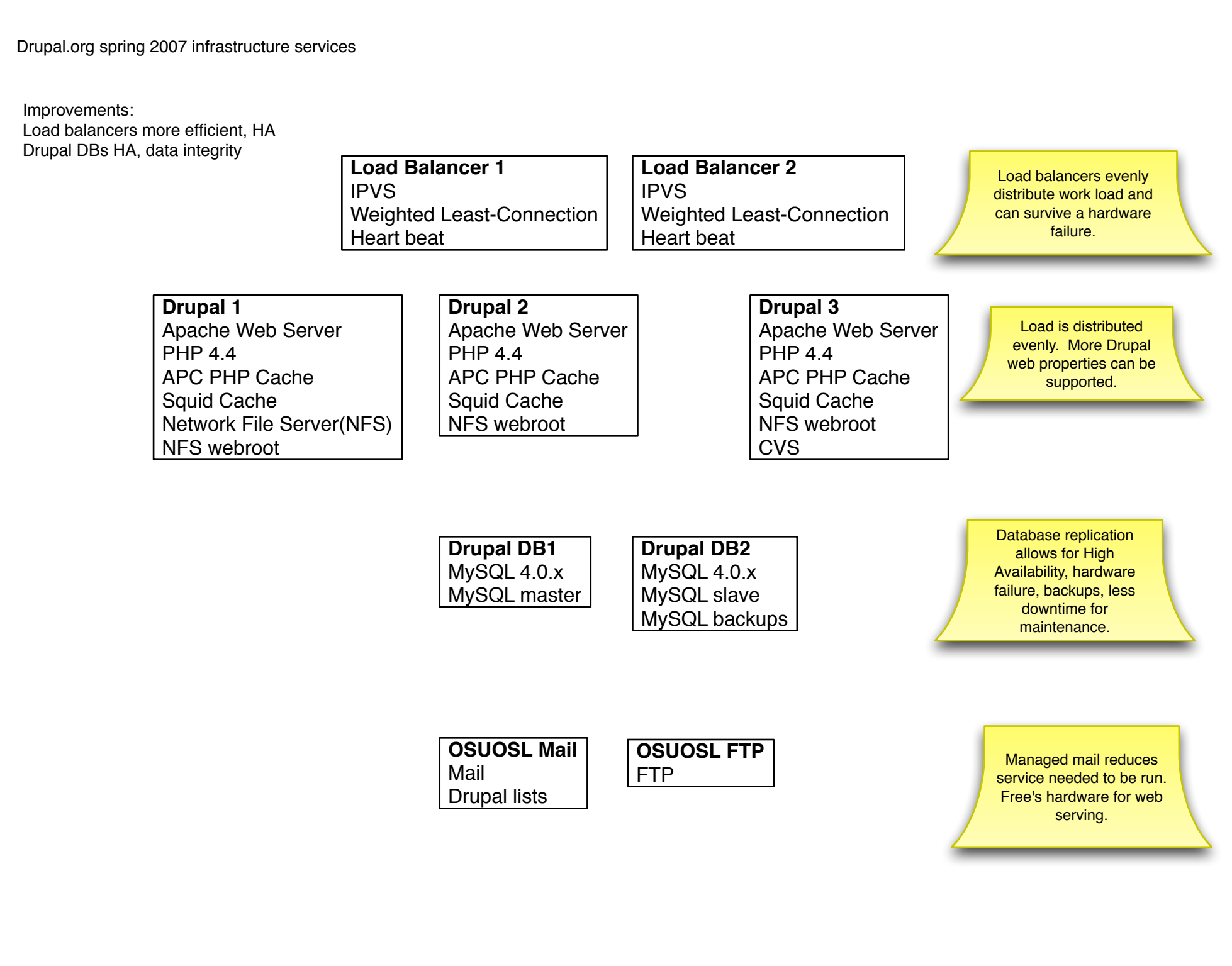
Drupal Database
SUN FIRE V20Z
RAM: 4 x 1 GB DDR-2 400 RAM
Storage: 2 x 73 GB U230 SCSI drives (RAID1)
Processor: 2 x AMD Opteron
Motherboard:

Donated by Sun Microsystems

http://www.sun.com/servers/entry/v20z/specs.jsp

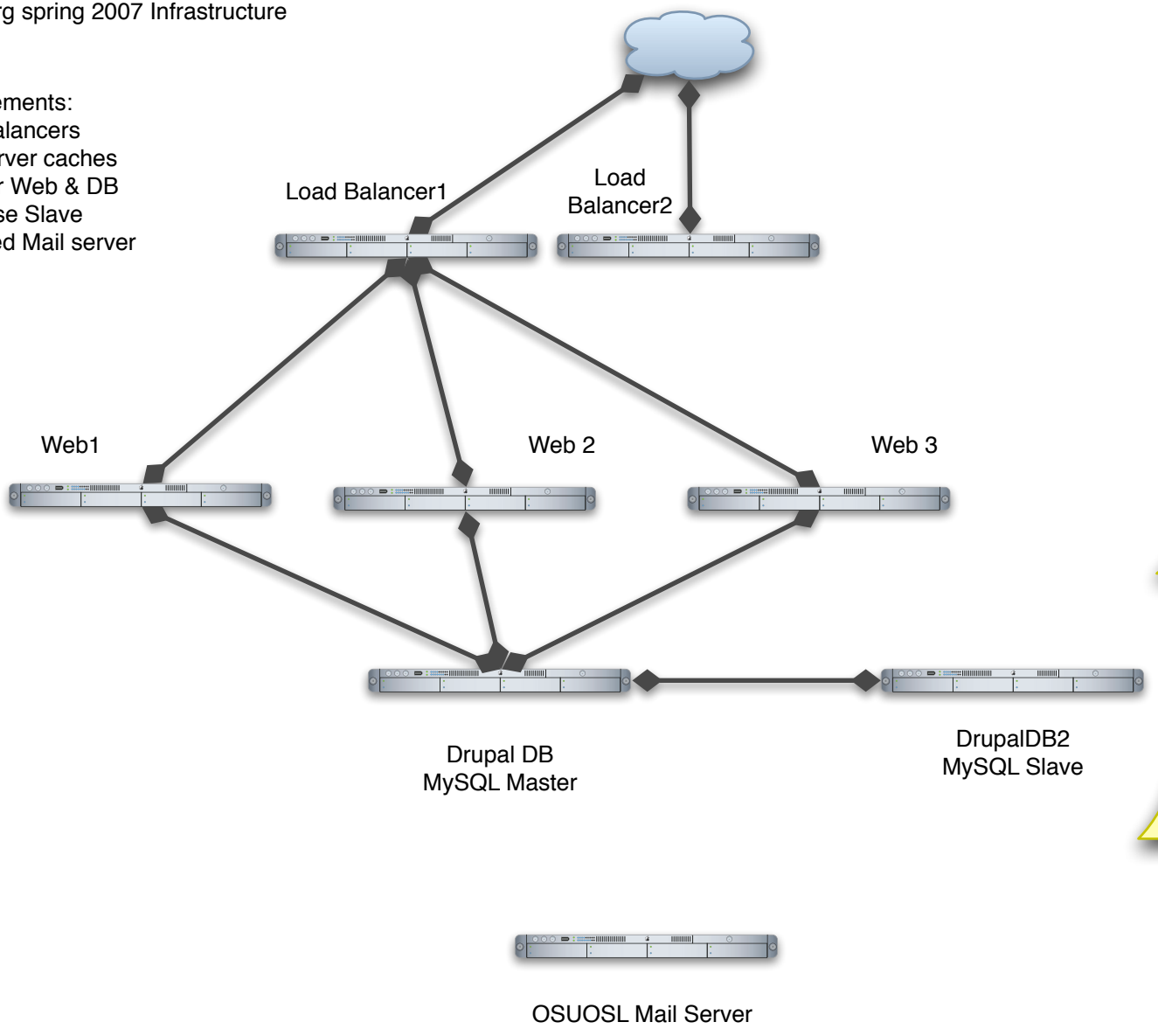
Drupal.org spring 2007 infrastructure services

Improvements:
Load balancers more efficient, HA
Drupal DBs HA, data integrity



Drupal.org spring 2007 Infrastructure

Improvements:
Load Balancers
Web server caches
RAM for Web & DB
Database Slave
Managed Mail server



Load balancers provide higher availability and more efficient use of hardware, hardware growth.

Three web nodes allow for more web page serving capacity, more memory sharing, re-use of old DB server

More powerful DB server allows for more data growth, faster searching. Master-slave allows for higher availability if we have a hardware failure. Read only database could help scale.

Managed mail server reduces volunteer admin overhead, frees up server resources

Drupal.org spring 2007 infrastructure hardware

Load Balancer 1
Proliant DL140
RAM:
Storage:
Processor:
Motherboard:

Load Balancer 2
Proliant DL140
RAM:
Storage:
Processor:
Motherboard:

Load balancers donated by OSUOSL

Drupal 1
Dell Poweredge 1850
RAM: 4 x 1 GB DDR-2 400 (6 slots total)
Storage: 2 x 73 GB U230 SCSI drives (RAID1)
Processor: 2 x Intel Xeon
Motherboard:
Dual power supplies

Drupal 2
Dell Poweredge 1850
RAM: 4 x 1 GB DDR-2 400 (6 slots total)
Storage: 2 x 73 GB U230 SCSI drives (RAID1)
Processor: 2 x Intel Xeon
Motherboard:
Dual power supplies

Drupal 3
Dell Poweredge 1850
RAM: 4 x 1 GB DDR-2 400 (6 slots total)
Storage: 2 x 73 GB U230 SCSI drives (RAID1)
Processor: 2 x Intel Xeon
Motherboard:
Dual power supplies

Dell's purchased in fundraising drive
http://drupal.org/node/26707

http://www.dell.com/content/products/productdetails.aspx/pedge_1850

Drupal Database Master
SUN FIRE V20Z
RAM: 8 GB DDR-2 400 RAM
Storage: 2 x 73 GB U230 SCSI drives (RAID1)
Processor: 2 x AMD Opteron
Motherboard:

Donated by Sun Microsystems

Drupal Database Slave
Proliant DL145 G2
RAM:
Storage:
Processor:
Motherboard:

Loaned by OSUOSL

http://www.sun.com/servers/entry/v20z/specs.jsp

Mail services to be donated by OSUOSL

Drupal.org future infrastructure services

Improvements:
Load balancers more efficient, HA
Drupal DBs HA, data integrity

Load Balancer 1
IPVS
Weighted Least-Connection
Heart beat

Load Balancer 2
IPVS
Weighted Least-Connection
Heart beat
CVS

Load balancers evenly distribute work load and can survive a hardware failure.

Drupal 1
Apache Web Server
PHP 4.4
APC PHP Cache
Squid Cache
NFS server
NFS web root
MemCache Pool*

Drupal 2
Apache Web Server
PHP 4.4
APC PHP Cache
Squid Cache
NFS web root
MemCache Pool*

Drupal 3
Apache Web Server
PHP 4.4
APC PHP Cache
Squid Cache
NFS web root
MemCache Pool*

Drupal N
Apache Web Server
PHP 4.4
APC PHP Cache
Squid Cache
NFS client web root
MemCache Pool*

Load is distributed evenly. More Drupal web properties can be supported.

Drupal DB1
MySQL 5.0.x
MySQL master

Drupal DB2
MySQL 5.0.x
MySQL slave
MySQL backups

Drupal DB3
MySQL 5.0.x
MySQL slave
MySQL read only*

Drupal DBN
MySQL 5.0.x
MySQL slave
MySQL read only*

Database replication allows for High Availability, hardware failure, backups, less downtime for maintenance.

Tesing
Unit tests
Patch tests

Drupal Development
Virtual DLAMP instances
Unit Testing
Performance Testing
Security devel services
Logging/Analytics

Drupal CVS
NFS web root
Drupal Distributions
Drupal Tools

OSUOSL Mail
Mail
Drupal lists

Dedicated servers for unit, developer, security, performance testing. CVS server free's D3 for web serving.

*In order to scale databases horizontally with read only nodes, authenticated sessions must be moved to MemCache

Drupal.org future infrastructure

Improvements:
Memory Cache
Read Only DBs
CVS Server
Development Server

Load Balancer1

Load Balancer2

High Availability and efficient web serving

Load to Web Network

Web1

Web 2

Web 3

Web N

Web N +1

Load balancers allow horizontal web server scaling to alive web servers. Cache may reduced load on web servers serving pages from memory. Memcache allows memory pooling so more content can be served from memory.

Web to DB Network

Drupal DB
Dual Quad processor
16GB RAM
MySQL Master

DrupalDB2
SunFire VZ40
8GB RAM
MySQL Slave

DrupalDB N
MySQL Slave

DrupalDB N+1
MySQL Slave

Most web requests just want information and don't need to update* or delete information. By directing read only requests to read only databases we can scale databases horizontally.

DB replication Network

CVS & Tools Server

Development Server

OSUOSL Mail Server

Testing

* Authenticated users require a session update which could be moved to memory with memcache

Drupal infrastructure future hardware

Web Servers
Support up to 16GB RAM each

Additional Web Servers

Drupal Association fundraising is necessary and coordination with OSUOSL

Database master
Support up to 32GB RAM
Went live October 2007

MySQL database slave
Additional slaves servers

Dedicated CVS Server

Dedicated development Server
Dedicated testing server - In development now: http://testing.drupal.org

Software development, software solutions, and virtualization services may make future hardware growth unnecessary