Writing a social application in PHP/MySQL 
and what happens when a million people show up on opening day

Duleepa “Dups” Wijayawardhana 
MySQL Community Team
Who the hell am I?
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- Also run the Annual St. Patricks Day Drunk Dial (http://www.stpatsdrunkdial.com)
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• Insanity...
What are we going to cover?
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• A History of Disaster
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• Pain Points of an Application
A History of Disaster
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• ... and perhaps slightly masochistic :)
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• Power outage in the building
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• The toilet explodes and floods.

• Someone connects the storm drain to the kitchen sink. Oops.
A History of Disaster
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- Someone pours water on the electric mainboard and explodes your main electrical supply the day before a release. Big Oops.
A History of Disaster
Imagine running through one amazingly crazy blizzard, drunk as you watch transformers explode and the sweeping cone of darkness spread across the city.... You have the presence of mind to do a sequenced shut down but you can’t see straight to bring anything back up so you sleep on the server room floor to sober up.
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• Developing and Launching a social application has special “challenges”
Neverwinter Nights Community...
A primer for launching a social application...
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4. Be smart, launch softly.
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4. Be smart, launch softly.

5. Be even smarter, don’t launch on a Friday evening.
Before the launch

• All cocky and sure of myself
• What could go wrong?
After the launch

• A picture is worth a thousand words
What we did (Don’t do at home!)
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• Site contained a function to send an alert if database was down, when site went down, it triggered 5,000+ emails in a few mins and took down the mail server.
What we did (Don’t do at home!)

- Launched on a Friday afternoon, idea was to have less traffic.

- Site contained a function to send an alert if database was down, when site went down, it triggered 5,000+ emails in a few mins and took down the mail server.

- Not enough slaves to allow the site to function. Ripped apart desktop computers to create functional DB slaves.
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• Be prepared to scale every part of your application.
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- Figure out the “pain” points of an application
- Be prepared to scale every part of your application.
- Be prepared to sacrifice performance for availability, chances are good you won’t be doing the other way around
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• Identify Single Points of Failure (SPoF)...

Key to Success

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• Identify Single Points of Failure (SPoF)...
• If you have an SPoF... guaranteed it will fail
SPoFs and how to get yourself fired :)
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SPoFs and how to get yourself fired :)

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  - external dependencies (isp etc.)
  - physical infrastructure: power.
  - people
  - servers (db, web, load, firewall, dns...)
  - application hooks/CRONs
Pain Point #1: The Web and File Servers
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• Centralized file server or pushed file system?

• Centralized file server can be a bottleneck, pushed file system limits some programming options.
Pain Point #2: The Database

- How will you configure the database.
- Master/Slave?
Pain Point #2: The Database

- Sharding? More common amongst newer social applications.
Pain Point #2: The Database

• Perhaps MySQL Proxy?

• We ran MySQL Proxy as a test on MySQL.com, it’s getting there!

• [http://forge.mysql.com/wiki/MySQL_Proxy](http://forge.mysql.com/wiki/MySQL_Proxy)
Pain Point #2: The Database

• Perhaps look at Cloud options such as AWS.

• Allows growth at the least cost and lets someone else handle the problem of scaling for traffic!
Pain Point #3: The Mail Server
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• What happens when your SMTP server gives up the ghost? Do you run SMTP servers on your web servers? Isolate the SMTP Servers?
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- Most social applications depend on vast quantities of emails to be sent out.
- What happens when your SMTP server gives up the ghost? Do you run SMTP servers on your web servers? Isolate the SMTP Servers?
- We dumped mail into a MySQL Db and sent with custom daemon.
Pain Point #4: Controlling Master/Slave Writes

- Almost every application of this kind obviously splits out reads to read slaves and writes to masters.

- Use some sort of DNS based load balancing on your DB servers to send queries?
Pain Point #5: Data Caching

- Replicated setups == Replication Lag.
- Replicated Forum software particularly vulnerable with increased traffic, missing posts etc.
- Slave dependent queries for IDs etc. may cause issues with data integrity.
Pain Point #5: Data Caching
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• Memcached!!! When you write to the database you write to your memcached server, read from memcached before reading from the database again.
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• Are you going to the database too much? Counts of Users, Activity etc.?
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• Are you going to the database too much? Counts of Users, Activity etc.?

• Before memcached, we used filesystem files written by system processes.
Pain Point #6: The PHP Code
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• XDebug. If you aren’t using it. Download it, learn it. Use it. Improve performance of your application. (http://www.xdebug.org)
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- Profile your application.
Pain Point #6: The PHP Code

• XDebug. If you aren’t using it. Download it, learn it. Use it. Improve performance of your application. (http://www.xdebug.org)

• Profile your application.

• Take a lesson from a high visibility site: Wikipedia, run a fraction of your requests through xdebug and profile.
Pain Point #6: The PHP Code

A profile of mysql.com in April 2008
Pain Point #6: Monitoring
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- If a person falls in the forest do you hear the PHP Fatal Error?
Pain Point #6: Monitoring

• If a person falls in the forest do you hear the PHP Fatal Error?

• Be omniscient in your applications. If something goes wrong do not wait for someone to tell you.
Pain Point #6: Monitoring

• If a person falls in the forest do you hear the PHP Fatal Error?

• Be omniscient in your applications. If something goes wrong do not wait for someone to tell you.

• Build monitoring into the application, but do you want High Performance?
Pain Point #6: Monitoring
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- Capture your errors and logging into log files which are then monitored.
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- Establish a good monitoring tool which monitors not only the Servers but your Application.
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• Establish a good monitoring tool which monitors not only the Servers but your Application.

• Shameless plug for both MySQL Enterprise Monitoring and my own open source BigDaddy (bigdaddymonitor.org) which grew out of all these pain points
Pain Point #7: Your SQL Queries
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• Make sure that you have good indexes on your tables. EXPLAIN always.

• Make sure that you have query caching turned on go examine your slow query log.
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- Queries do not always scale!
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• Use some sort of query analyzer, custom or third party.
Pain Point #7: Your SQL Queries

• Queries do not always scale!
• Use some sort of query analyzer, custom or third party.
• When you develop, try to test expensive queries against a proper data set size.
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- App performance is what the client sees, not what the server/server-op sees.
- DB Setup tuned for “Web 2.0” apps? Ajax applications tend to be less read heavy and more write heavy.
- InnoDB versus MyISAM for primary key lookups.
Pain Point #8: Ajax, Javascript

Client tuning is essential as much as server tuning. YSlow is one option:
Pain Point #9: All the other things
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- We ended up creating a sharded db system with a simple perl script to dump web logs into a MySQL database.
Pain Point #9: All the other things

- Over the years pain points have come in all shapes and sizes, including our apache logs :)
- We ended up creating a sharded db system with a simple perl script to dump web logs into a MySQL database.
- Oddly worked as well if not better than a file system.
Final thought...
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  - NFS Crash
  - File system corrupt
  - DB Crash, Table corrupted
Final thought...

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- Backup corrupted by another sequence of events.
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  ★ NFS Crash
  
  ★ File system corrupt
  
  ★ DB Crash, Table corrupted
  
  ★ Backup corrupted by another sequence of events.
  
  ★ I was on holiday
The moral of this sordid tale
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• Murphy Loves Web Application Developers.
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• Everything goes wrong at some point
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• Everything goes wrong at some point
• Just be prepared
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• Murphy Loves Web Application Developers.
• Everything goes wrong at some point
• Just be prepared
• Eliminate every SPoF (Single Point of Failure) in your system.