

# Developing Erlang At Yahoo

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# Old Friends

Lisp, Scheme, Erlang, etc

# Lots of “Official” Languages

- C/C++
- Java
- PHP
- Perl

# Unofficial Languages

- Ruby
- Objective-C
- ... Erlang!

Not the first to go  
down this path.

Delicious

# 2.0 Launch is Huge

- Out on July 31st -- Over a year in the making
- Complete rewrite, front to back

Uses Erlang!

- Mostly C++ (is OO, I know)
- Ties to several subsystems to delegate large tasks, aka spam, search, algo, etc
- Several subsystems built in Erlang

# Use Case #1

## Data Migrations

- Rewrites are hard.
- More than just a row-to-row data copy.

Not just one.

2.0 involved simultaneous front-end and back-end development

There were several migrations of the entire system done over the course of development

# First Attempt

- Written in Perl
  - Multiple threading modules used
- No throttling or scaling of work in real-time
- Hard to debug
- Start/Stop was a nightmare

# Second Attempt

- Rewritten into Erlang services
- Crazy-fast
- System was introspective and self-monitoring
  - Dynamic scaling/throttling
  - Live migration status updates

# Compute, Store & Write

- Created large snapshots of the entire d1 system for processing
- Phase 1 -- Compute diffs and store
  - Fragmented Mnesia stores around ~50 gigs a piece, up to 6 “cells”
- Phase 2 -- Write data into d2 system

Concurrency saved  
migrations

Erlang/OTP

Mnesia

Yeah, that's it.

# Ports!

- Several systems required interfaces to Perl scripts or C/C++ libraries
- Leveraged data auditing tool in Perl
- Could recycle non-Erlang code to really maximize efficiency
- Included Yahoo! specific functions, string/language encoding and detection.

# Use Case #2

## Algorithmics

# Before

- Perl on top of cron jobs
- Perl can be difficult to manage
- Jobs can be very database intensive

# After

- Rewritten into a number of small, independent systems
- Systems can be tweaked while live and running in production
- No cron, all running in real time
- Self-monitoring recursive operations

Erlang/OTP

Mnesia

Sound familiar?

# Concurrency

- Could leverage 600-700% of the CPU
- Algorithms were made friendly to parallel processing
- Introspection facilities let us scale up and down load to run at peak throughput

# Use Case #3

## Spam Demographics

# Before

- Was a collection of several (3-6) Perl scripts
- Was very ad-hoc
- Worked pretty well

# After

- Rewritten into a very small Erlang module
- Systems can be tweaked while live and running in production

# Use Case #4

## Rolling Migrations

# There was no before

This entire system was written in Erlang from scratch to bring the entire d2 system up to date to the hour.

# Architecture

- d1 Reader loop -- Monitors changes in the d1 system
- d1 Processing loop -- Would act on the changes and prepare them for d2 input

# Delicious Complications

There's more!

“If we knew what we  
were doing, it wouldn't  
be called research,  
would it?”

-- Albert Einstein

- Erlang is foreign.
- Engineers are usually stubborn.
- It's very easy to get distracted with lots of design meetings for new technologies.
- Tension was already high, adding a new language into the mix added uncertainty.

MyBlogLog

# Use Case #5

## Distributed Hash Table

- Huge memory store for simple data structures
- Needed to be fault tolerant
- Data source must be multi-master
- Thrift interface

Erlang/OTP

Mnesia + Tokyo Cabinet

Memcached

# Use Case #6

## Auto-Tagging Engine

- Extends algorithmic functionality to the DHT
- In staging environments, processes over a million tags a day at 50% capacity.

Bumps along the way

# Using Erlang At Yahoo

# Strengths

- Extremely good at fault-tolerant distributed applications.
- Ideal for messaging, communications and logging.
- Distributed algorithms
- Long running jobs with heavy monitoring requirements.
- Agile development process
- Web services

# Weaknesses

- There are documentation gaps.
- Hasn't achieved critical mass yet.
- The community is thin.

# What We Did

- Internal packages and builds for multiple platforms.
- Created a simple build process based on a single Erlang install path.
- Standardized start/stop processes.

# Proving your case

- Ignore the nay-sayers.
- Spend a small amount of time prototyping and creating a proof of concept and immediately test it.
- Use every resource available to you.

# Thanks

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