Applifier and Node.JS

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Agenda

1. What Applifier does?
2. Our Delivery Platform
3. Tips for Node.JS
4. Questions

What does Applifier do?

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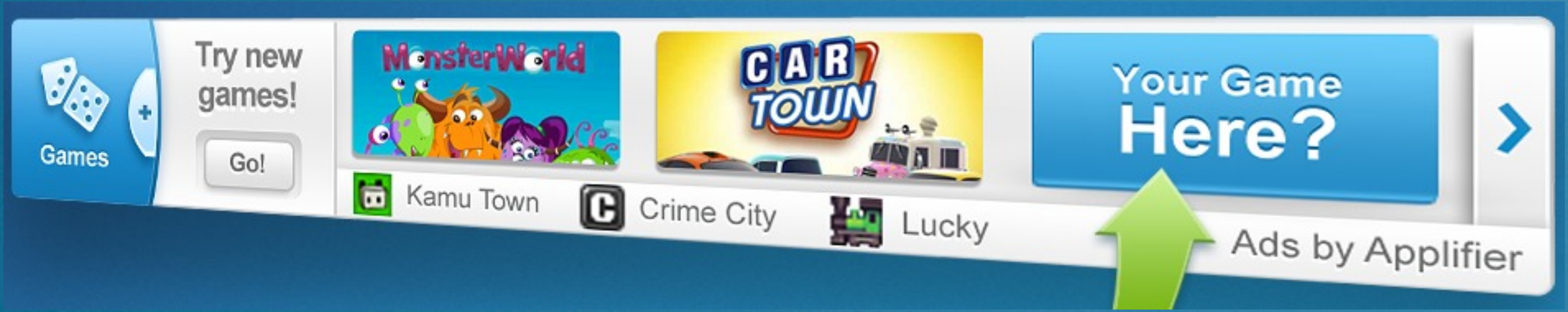
Cross-promo network



- Key product is a cross-promotion network for games.
- Operates mostly inside Facebook
- Helps game publishers to get more traffic

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Cross-promo network

- About 1000-1200 requests per second.
- 700M ads served per day
- Content delivery network delivers 6TB of data per day. Peaks at 1 Gbps

Our Delivery Platform

Using Javascript as a platform

- It's possible to write entire application stack with Javascript
- From browser all the way to the datastore
- Imagine that you can send a JS object from the browser to the backend, store it to the database and retrieve it later without any unnecessary transformations.

Why Javascript

- Fast development cycle
- Easy data transformations as the storage and delivery is always JSON
- It’s possible to share code between browser and the backend

Our stack

- Javascript client library running inside users browser
- Uses HTTP to request JSON from the delivery backend
- Delivery backend implemented with Javascript on top of Node.JS
- MongoDB JSON document storage as db

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Why Node.JS

- Perfect for low latency, high IO applications
  - Load balancing, API backend, comet / longpoll servers, streaming...
- It's easy to process the request, close the client socket and continue some tasks after the request has been processed.
- It's easy to cache data between requests

Where Node isn’t good

- Harder to code (than say PHP).
- Need to take perfect care of all resources to avoid leaks.
- Less libraries and bindings because everything must be asynchronous and non-blocking.

Our Node.js backend

- Uses *express* and *connect* middlewares for HTTP server handling.
- node-mongodb-native for MongoDB database connection. Except that we don't use the native part from it due to bugs.
- Few native extensions like geoip library
- 2/3 of the lines are actual code, 1/3 are tests

Why MongoDB

- Document oriented database
- Stores JSON documents which can be indexed on arbitrary keys inside documents.
- Fast and scales well
- Good drivers for Node.JS
- All operations (queries, scripts etc) are in JS

MongoDB example

```
> var doc = { name : "Garo", company : "Applifier" };

> db.test.save(doc);

> db.test.find({name : "Garo"});
{ "_id" : ObjectId("4dca539f422946adf7afe034"),
"name" : "Garo", "company" : "Applifier" }
```

Tips for Node.JS

What have we learned?

Buy a mac

- We can run our entire development environment in our mac laptops.
  - node
  - mongodb
  - apache, php (if you wish...)

Watch out for leaks

- The node server stays intact between requests.
- Thus resources, memory and database connections can easily leak.
- Db connection leaks are most common.
    - Our testing framework and database api helps detecting and avoiding them

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Detect socket leaks

- You can use “netstat -np” to display socket connections to the node process.
  - Run a bunch of requests to the node and then look if the database connections are closed correctly.

Detect resource leaks

- Leaked sockets, database connections or objects stored into scopes might leak memory.
- Run node with "--expose-gc --trace_gc" to get memory consumption data.
  - Beware, the GC makes this hard to read
    - Run 100000 queries and see that the memory consumption is still about the same.

Clustering

- Node is single threaded
- Using multiple cores needs additional effort. There are two good options
  - Spawn multiple instances, one for each core and use load balancer to drive traffic into them. "Forever" makes this easy. https://github.com/indexzero/forever

Clustering

- Another option: Use Node Cluster (http://learnboost.github.com/cluster/) to fork worker threads.

Test Driven Development

- The nature of Javascript makes it easy to write mock objects
- Because your code is split into short callback functions, it's easy to test them individually with a unit testing framework.
- We use https://github.com/caolan/nodeunit

Avoid try..catch blocks

- As node is event driven, you use a lot of callbacks.
- try..catch blocks doesn’t behave well with callbacks and they’re slow.
- Stick with the node callback notation where you pass error as first parameter and handle errors this way.

Use async.js library

- Makes easier to write asynchronous code and makes it look prettier.
- Helps avoiding nesting callbacks
- https://github.com/caolan/async

Where to get modules?

- npm stands for “node package manager”
    - It’s your apt-get / CPAN / yum for all your node module needs. Learn it.
- Github. Full of node related modules.

Avoind anonymous functions

- Give all your functions a name so that you can get better stacktraces.
- fs.rename(p1, p2, function **rename_cb**() {
  // callback name is rename_cb
  // instantly better stacktrace upon error
  }

Log everything

- Log all your data and store it somewhere when you can query it.
- Use some form of metrics system to trace counters and to get history graphs out of them.
- All this helps debugging, performance tuning and diagnostics.

Log everything

- We use Scribe to feed performance and log data from our machines into a hadoop cluster. https://github.com/facebook/scribe
  - Hadoop is used to crunch the data into usable metrics.
- There's also tools for getting realtime statistics into usable graphs.
  - Zabbix, statsd / graphite

Questions?

Questions?

ps. we are hiring

http://careers.applifier.com

Web developers, frontend developers, Javascript gurus...