Scaling Erlang Web Applications

100 to 100K users at one web server

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Inaka Labs

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INAKA NETWORKS

presents . . .

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presents ...

El Brujo Halcón

in . . .

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in . . .

SCALING ERLANG

Based on a true story

SCALING ERLANG

Based on a true story

A *not so* long time ago

A *not so* long time ago

in a country far far away…

A Friend

Hey! Let's watch the *superclásico*!!!

Brujo

I can't, I'm at *the office*

A Friend

...

Brujo

We need an app for that!

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BRUJO

Let's call it MATCHSTREAM

A FRIEND

Ok, then. . . We know there will be hundreds of thousands of users, right?
We need the system to **scale**

BRUJO

Of course! We should use Erlang!

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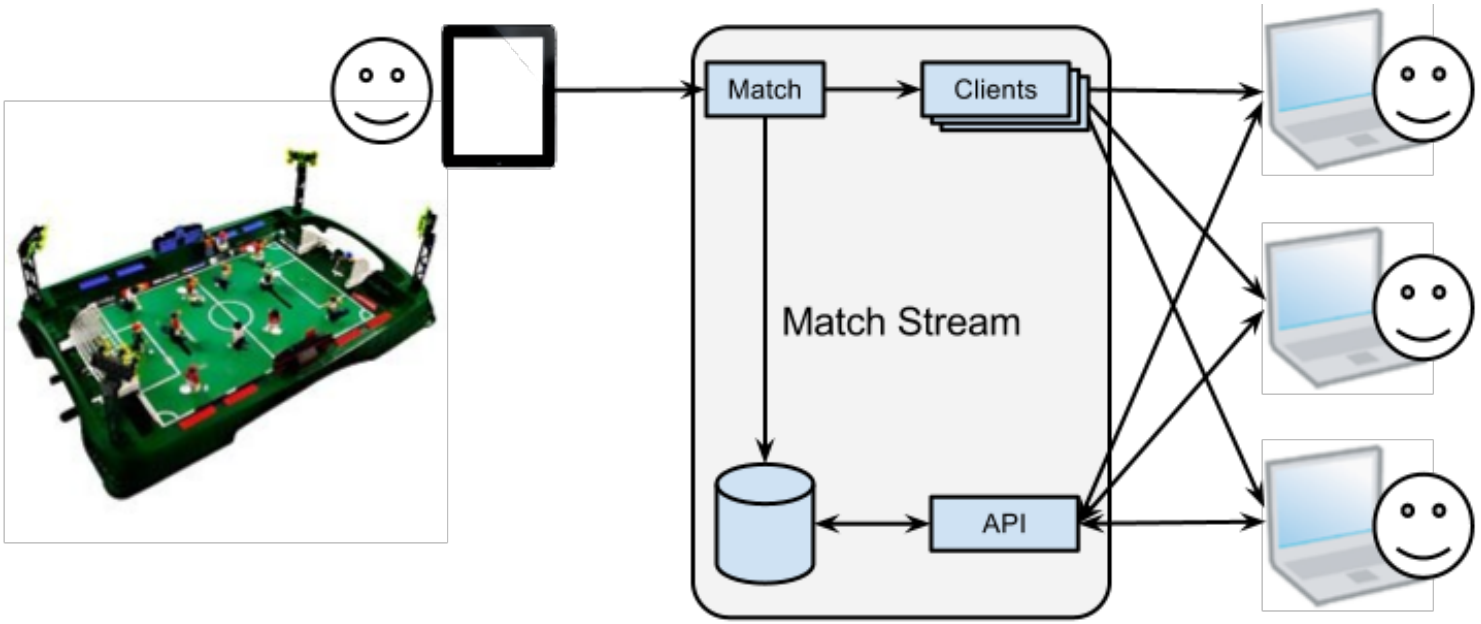
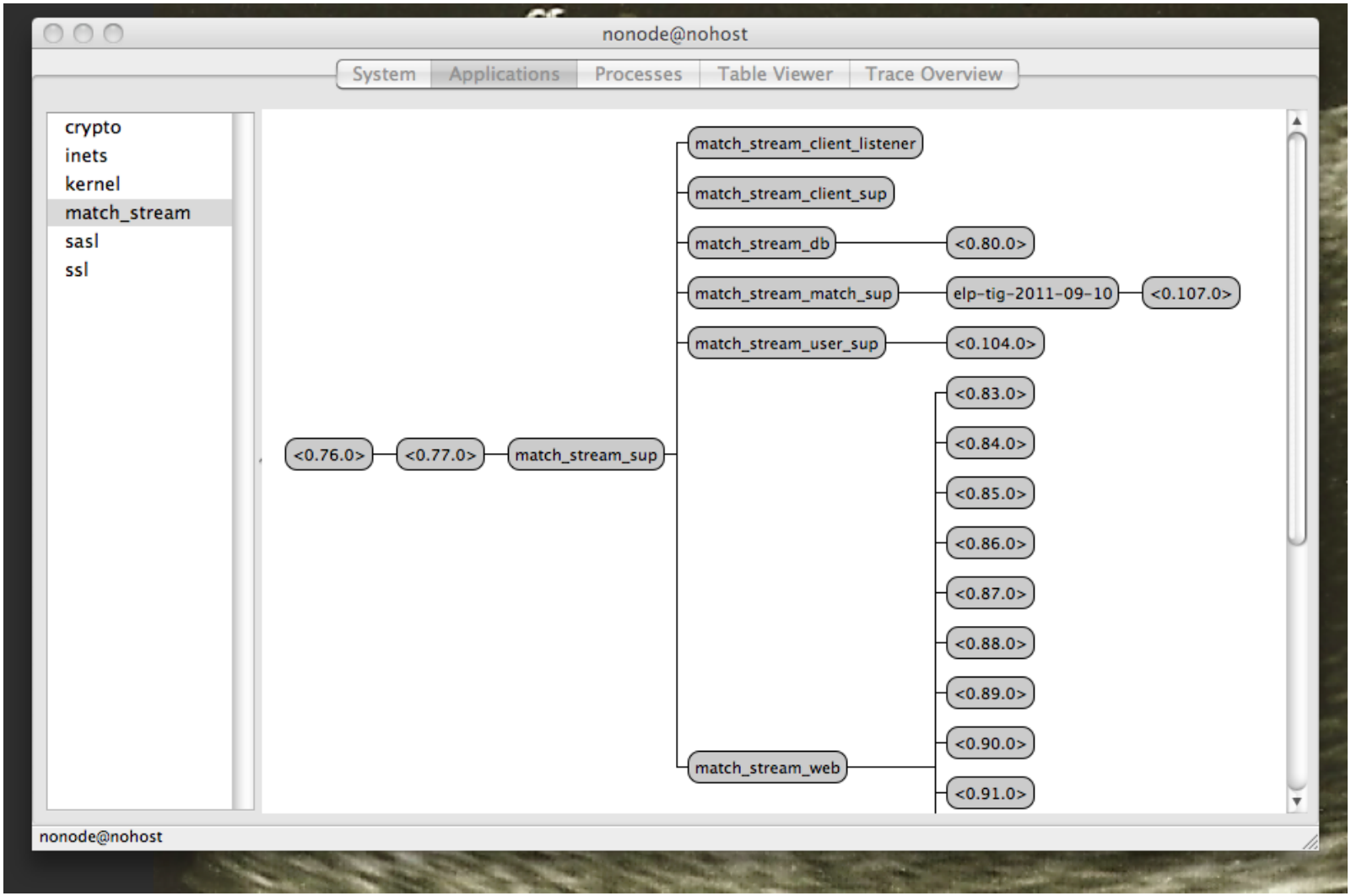
A while later...


Match
Clients
Match Stream
API



TODO: Take this picture with client(s) connected

Brujo

Boca plays again today, let's try our system out with this game!
What can **possibly** go wrong?

User 1

Wow! MatchStream is awesome!

...

User 100

Hey! this system is a total crap! It doesn't even let me connect to it!

Brujo

WTF?! The system doesn't scale!!

A Friend

Didn't you use Erlang?

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Lesson Learned

Just using Erlang is not enough to make your system scale

So, we made it scale. . .

Step 1

We made sure the system was working.

- We built a simulator
- We improved the logging mechanisms
- We tested the system

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1024 users / 4 at a time

Step 2

The system is fine, let's tune up the server where it's installed

So, we checked the kernel variables and system limits for

- Concurrent TCP connections
- Open files limit
- TCP backlog size
- TCP memory allocation
- Erlang VM process limit

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4096 users / 4 at a time

Step 3

I've got a friend that may help us, he has a bag with several tips and tricks for us... MacGyver

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Backlog

- Allow more concurrent connections
- Remember HTTP *runs on* TCP

Connections

- Don't use just one of them
- Check inbound and outbound connections

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TODO users / TODO at a time

sup_handler

- Don't use it
- Monitor the processes instead

Long Delivery Queues

- Use *repeaters*

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- Monitor the processes instead

Long Delivery Queues

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TODO users / TODO at a time

Call Timeouts

Remember `gen_server:reply/2`

Memory Footprint

Remember `hibernate`

Long init/1

Use 0 timeout

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Memory Footprint

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Long init/1

Use 0 timeout

TODO users / TODO at a time

- Sometimes `simple_one_for_one` supervisors get overburdened because they have too many children
- Try a supervisor hierarchy with several managers below the main supervisor
- Turn `supervisor:start_child/2` calls into something like

```
supervisor:start_child(
  list_to_atom("module-name_" ++
                          integer_to_list(random:uniform(#ofSupervisors))).
```

TODO users / TODO at a time

Timers

- Don't use the `timer` module
- Use `erlang:send_after`

Logging

- Don't log too much
- Use a good logging system

Registration

- Sometimes it's better to register processes instead of keeping track of their pids manually
- You can always register processes both locally and globally

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64000 users / 8000 at a time

TODO: Img of what the system looks like at this point

Step 4

Well, let's add some nodes to it!

Again, it's not as easy as just starting the app in another Erlang node We needed to find the best topology, we considered using:

- connected nodes
- independent nodes

We had to decide which processes needed to communicate and how and of course, test the whole system again

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25000 users per node / 8000 per computer at a time with 4 nodes on the same computer... 100K users / 8000 at a time

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