



ERLANG RUNTIME SYSTEM (Deep Dive)



presented by
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Firefly Logic



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Booyah!

be

***The Erlang Runtime
System!***

Good question,
Bryan!



Why?



“Erlang is a programming
language used to build
massively scalable
soft real-time systems
with requirements on **high**
availability”

-from www.erlang.org



Joe



Mike

ERICSSON 


ERLANG

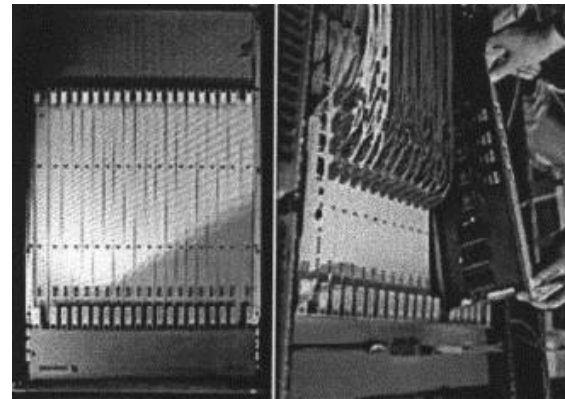
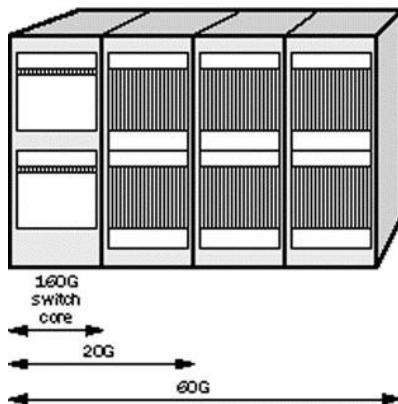
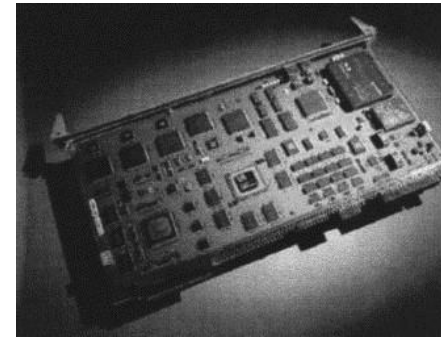
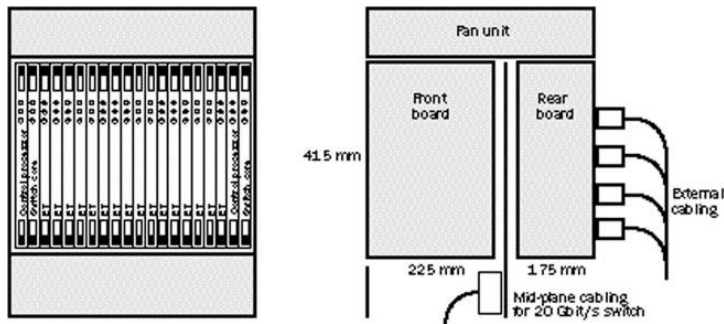


Robert



Erlang Runtime System

ERICSSON



amazon.com



yammer
The Enterprise Social Network



T-Mobile



YAHOO!



ERICSSON

MOTOROLA

RabbitMQ
Open Source Enterprise Messaging



boundary

github
SOCIAL CODING

riak

OPSCODE

Erlang is proven

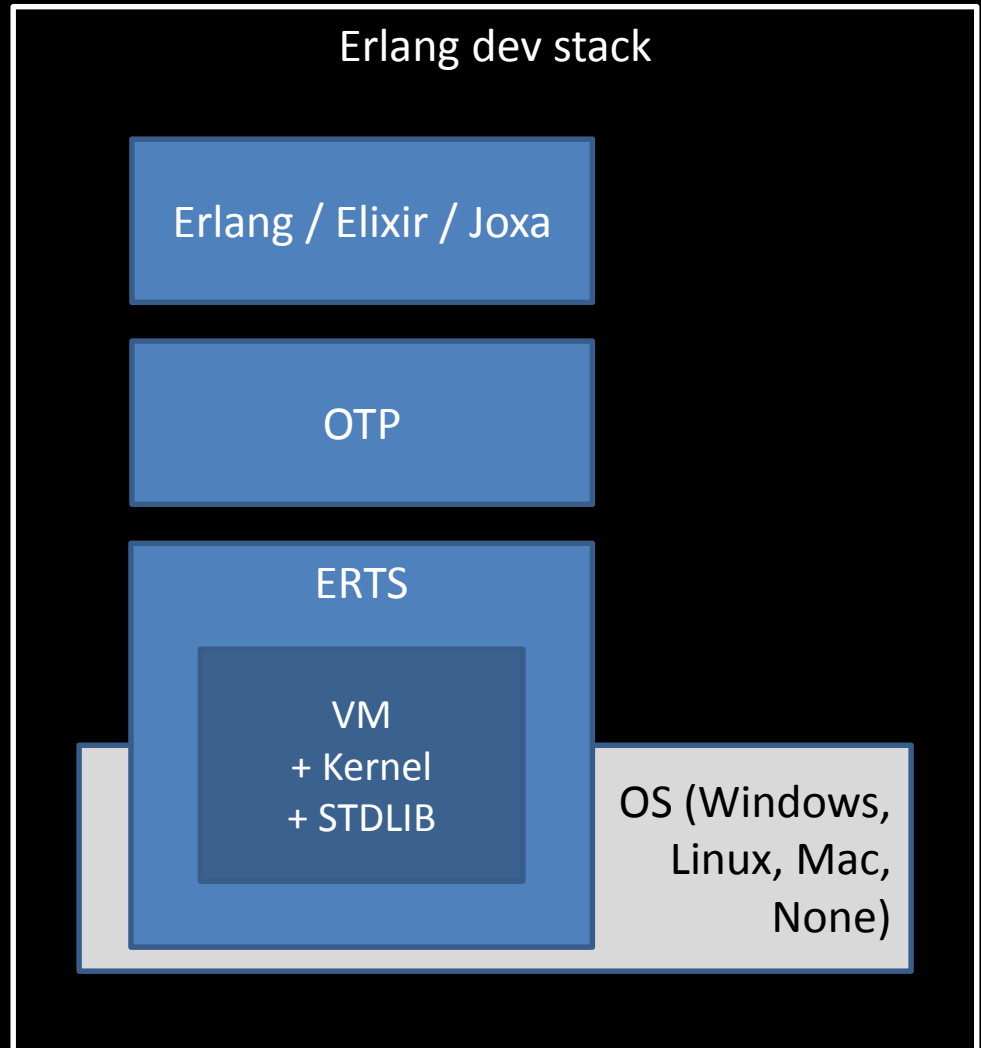
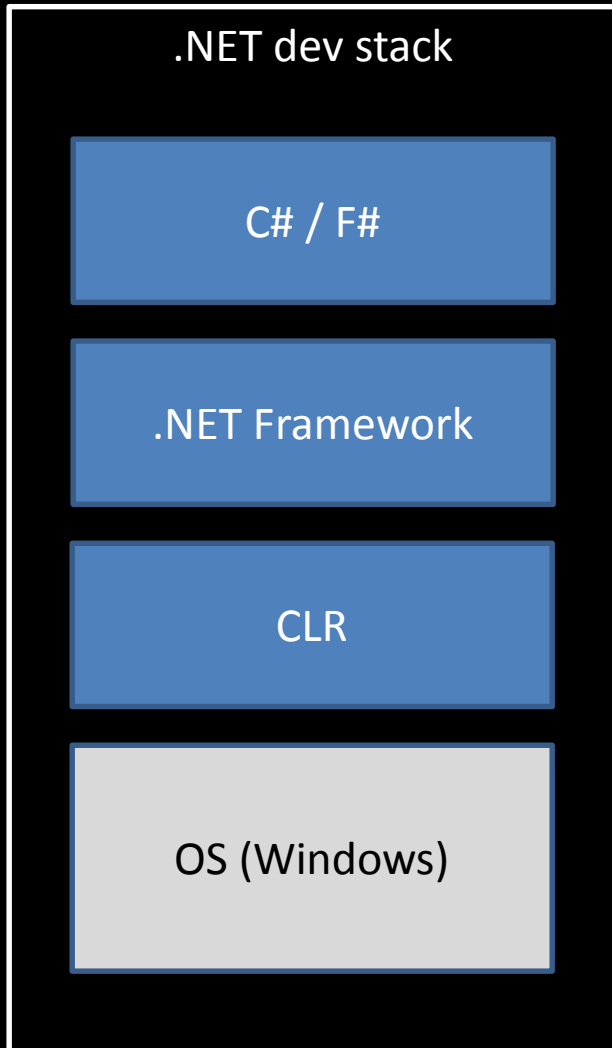
The Erlang Runtime System

is a special-purpose
operating system

built for

**fault-tolerance,
concurrency,
and distribution**

Erlang Runtime System *(in-context)*



The ERTS

(VM + Kernel + standard library)

provides the following support...

“a consistent operating system
interface on all platforms”

“light-weight concurrency and
support for millions of
simultaneous tasks”

“memory allocation and real-time
garbage collection”

“transparent co-operation
between all computers in the
system”

“location and encapsulation of
run-time errors”

“supervision of run-time code as it loads, when it is replaced, and while it is linked.”

Erlang

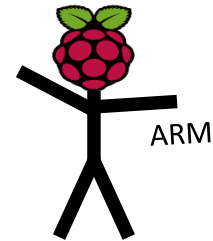
Erlang

Erlang



Erlang

Erlang



> Consistent Operating System Interface on all Platforms

The kernel

- The first application to be started.
- It provides low-level services needed
 - to start the ERTS,
 - to participate in a distributed system,
 - to handle errors,
 - and to perform IO operations.

Two thing to remember about

Concurrency

1) Shared memory concurrency is hard

2) Message passing concurrency is easy

“The performance
of a concurrent language
is predicated by three things:
the context switching time,
The message passing time,
and the time to create a process.”

–Mike Williams

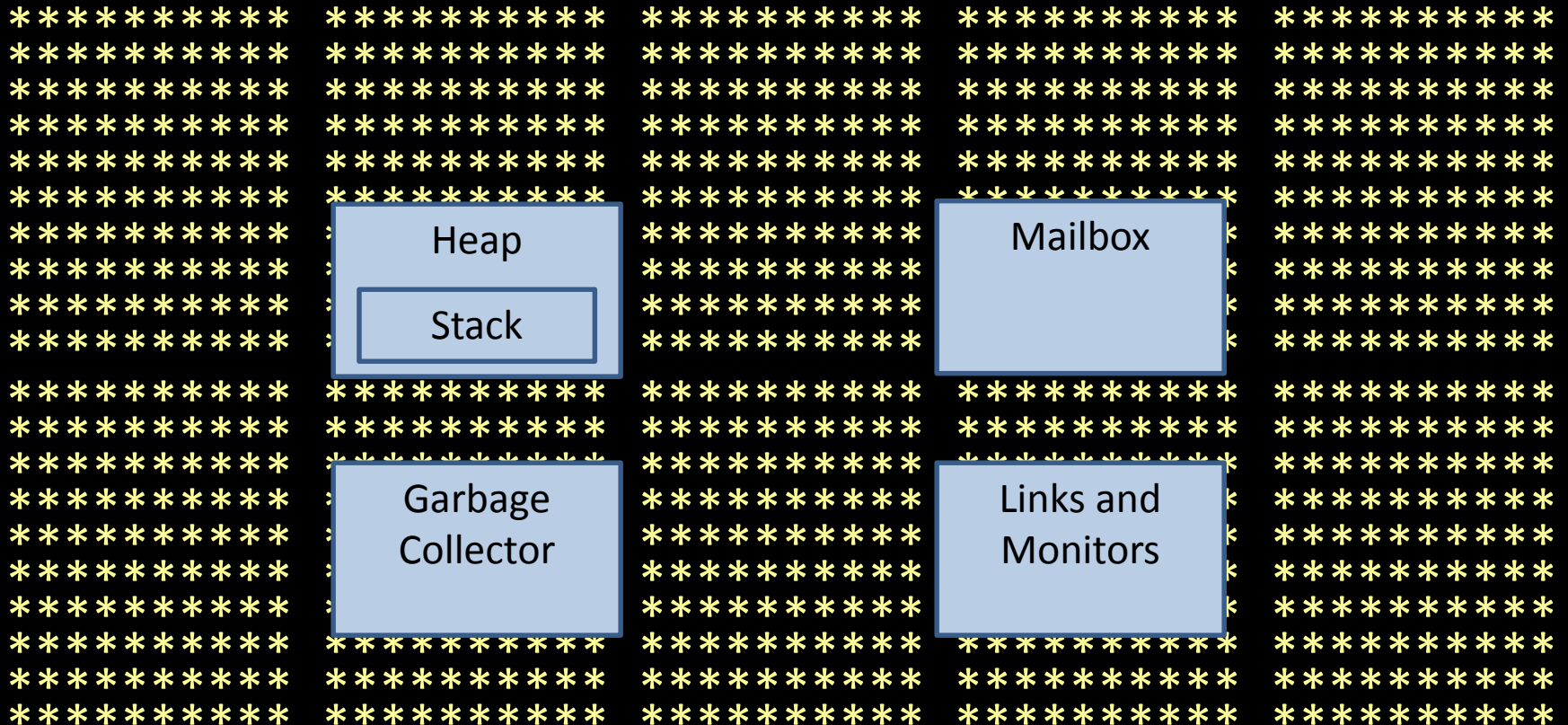
Erlang Processes

are *not* Winows/Linux processes

They are the unit of concurrency

You structure your programs
around these units of concurrency.

One .NET 4.0 Thread (allocates one megabyte)



One Erlang Process (allocates one kilobyte)



> light-weight concurrency

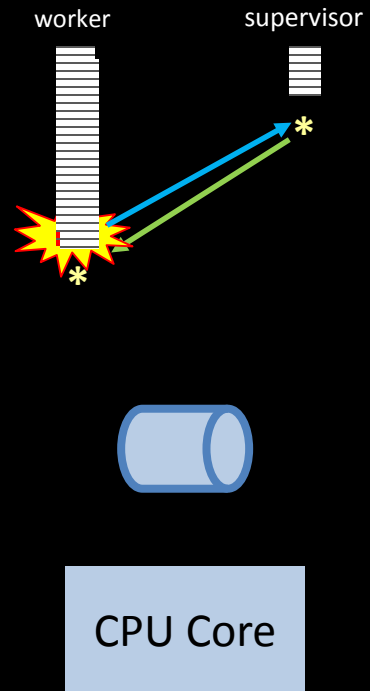


CPU Core

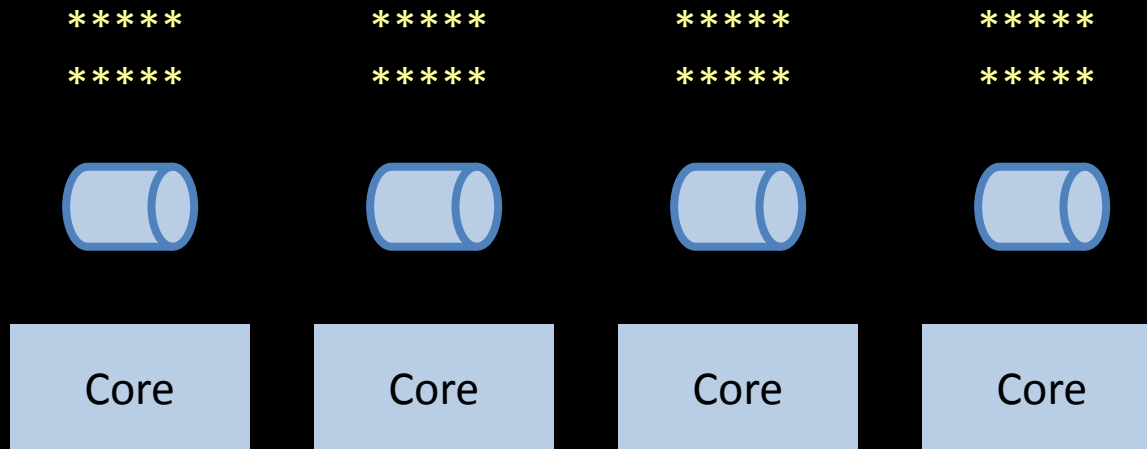
Reductions

- Do 2,000 operations
 - reduction1
 - reduction3
 - .
 - Reduction2000
- Move to the next guy
- Repeat

> Near-zero context switching cost. Non-blocking.

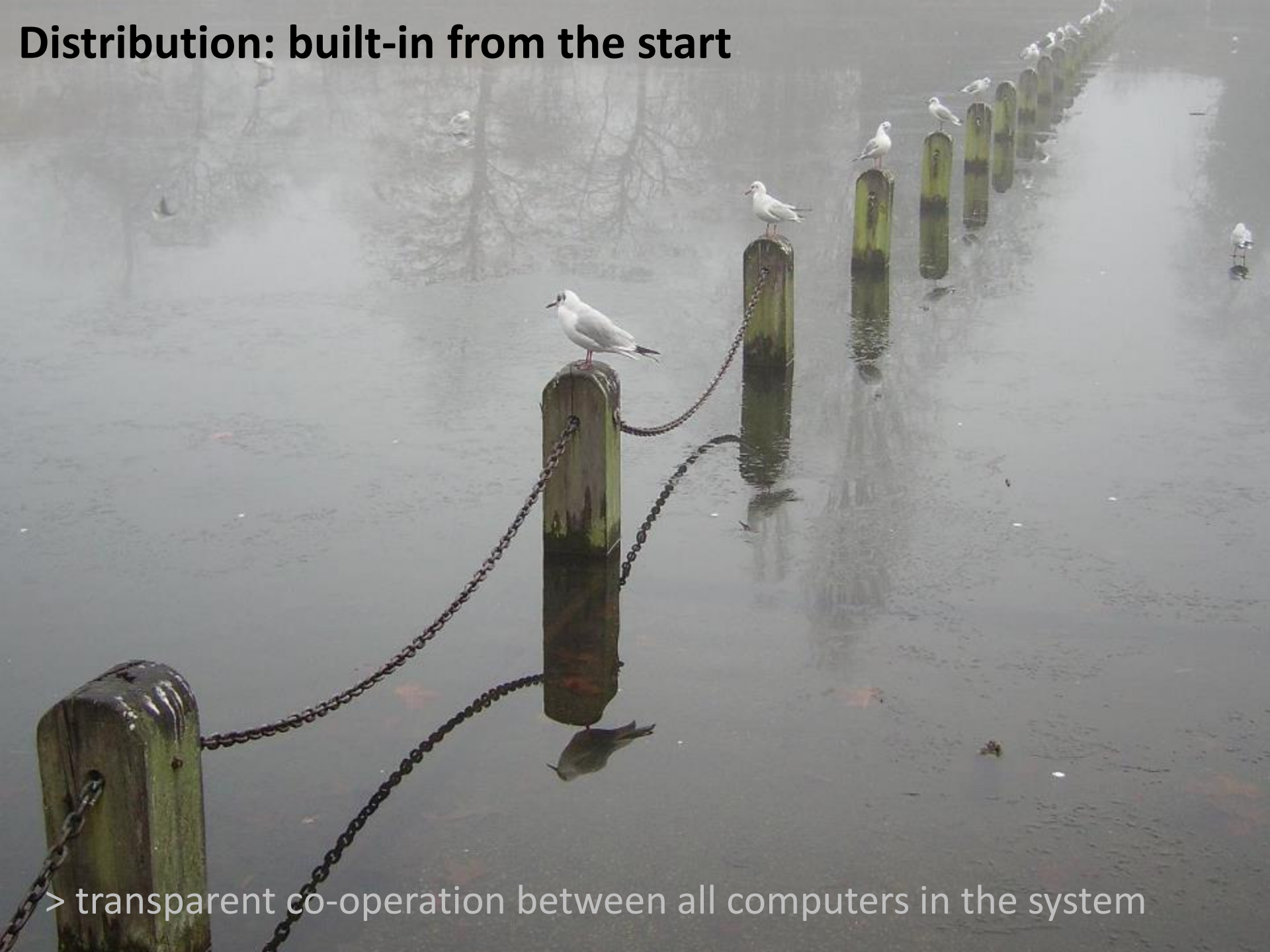


> Supervision



> load balancing, linear scaling, real-time GC, load “unbalancing”

Distribution: built-in from the start



> transparent co-operation between all computers in the system

Distribution and Nodes

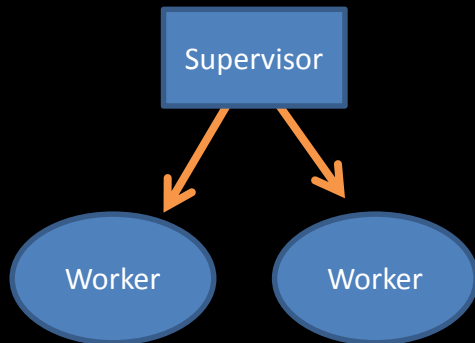
- A “node” is an instance of the ERTS
- `net_adm:ping` forms a cluster
- Connections are transitive (by default)

Erlang Port Mapper Daemon

- Started at every host where an Erlang node is started.
- Responsible for mapping the symbolic node names to machine addresses.



Nines	Uptime	Annual Downtime
9	99.9999999%	30 milliseconds
8	99.9999990%	300 milliseconds
7	99.9999900%	3 seconds
6	99.9999000%	32 seconds
5	99.9990000%	5 minutes
4	99.9900000%	53 minutes
3	99.9000000%	8 hours, 46 minutes
2	99.0000000%	3 days, 15 hours, 36 minutes

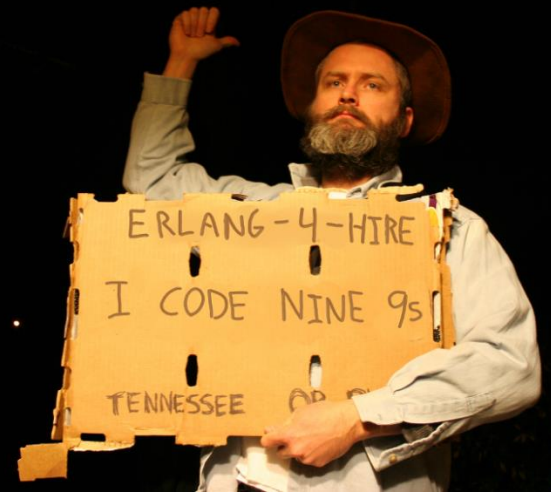


Links and
monitors

No masters

Hot code
loading

simple distribution, safe concurrency



[insert awe-inspiring demo here]

What should Microsoft® be **Researching?**

*Psst...don't forget to show
them my PDF*



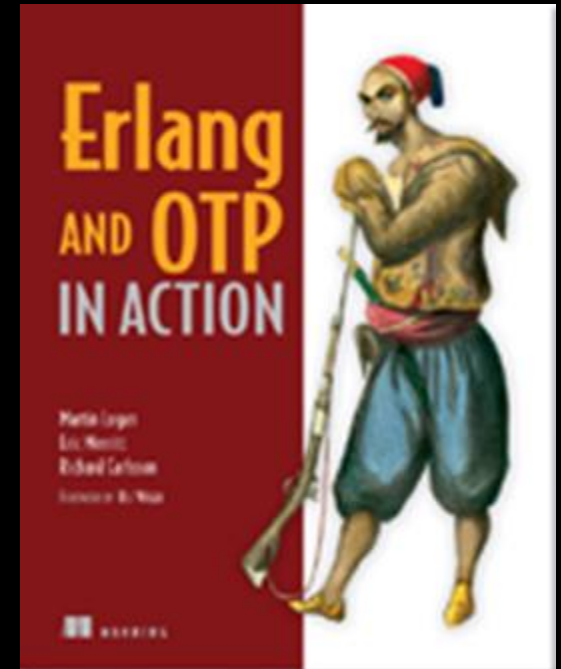
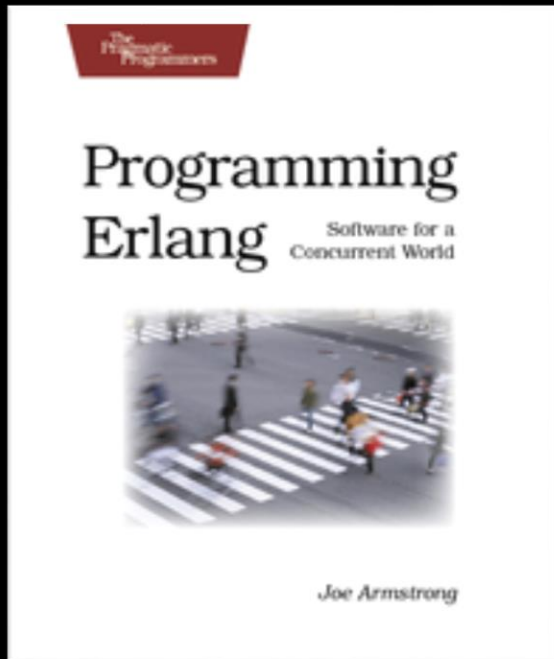
“Learn You Some Erlang for Great Good!”

<http://learnyousomeerlang.com/>



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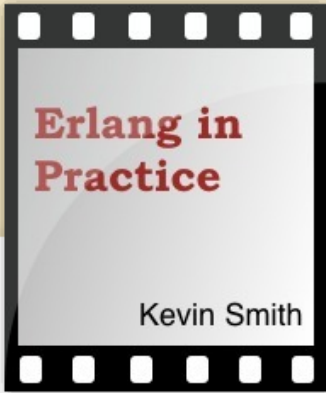
Erlang in Practice

screencasts with Kevin Smith

Learn how to write Erlang programs by sitting next to an experienced Erlang programmer as he builds a full-featured application from the ground up!

In these screencasts, Kevin Smith incrementally builds a distributed chat system using Erlang. You'll learn first-hand how each aspect of the Erlang language fits together into a real-world application, starting with Erlang primitives and ending with an OTP application.

 Watch the preview highlighting the Erlang chat system Kevin



Erlang in Practice

Kevin Smith

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“Throughout the series, I felt as if I were peer programming on my first day at the job with a seasoned veteran.”

—[Mike Riley](#)

“These screencasts are a great companion to Joe Armstrong’s book. I highly recommend both to anyone investigating Erlang or looking to round out their Erlang skill-set.”

—[Mike O'Donoghue](#)

How -> code alongside Kevin Smith for eight screencasts



My blog:

<http://freshbrewedcode.com/bryanhunter/>

How -> visit my blog

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62

votes

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erlang and erlang OTP

A course covering the functional language erlang and erlang OTP would be interesting.



[Mike Coolin](#) shared this idea · May 8, 2012 · [Flag idea as inappropriate...](#)

UNDER REVIEW · Nov 14, 2012

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Two Continents, Two ErlangCamps

We have had such great response from past ErlangCamps that this year we are putting on two. One will be in Europe and the other in the USA. We are happy to make access to great info on Erlang easier this year.



Click For Amsterdam '13

Learn pro-strength Erlang in the Netherlands Aug 30-31, 2013



Click For Nashville '13

Learn pro-strength Erlang in Music City, USA Oct 11-12, 2013

<http://erlangcamp.com>

How -> Come to Nashville in October!



<http://nashfp.org>

How -> Better yet; pack up and move to Nashville!

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How -> keep in touch