Concepts of Programming Languages SS 2018/2019

Parallel Programming: Go vs Erlang

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Erlang

- Origin of the Name
  - Danish mathematician Agner Krarup Erlang
  - Ericsson language

- Invented 1986

- By Joe Armstrong, Robert Virding and Mike Williams

Erlang

- Proprietary language until 1998

- Shipped with the OTP

- Running in the Erlang VM Beam

- Functional, dynamically typed

- Using immutable data and pattern matching

Erlang VM Beam

- Has its own
  - Schedulars
  - Processes
  - Memory Management
  - Message Passing
  - Mulit-Core Management

Erlang VM Beam

- Provides
  - Interface to Ports
  - NIFs
  - BIFs
  - 4 different memory types

Erlang VM Beam

- Memory Types
  - Process heaps
  - ETS
  - Atom table
  - Large binary space

The Actor Model

- Mathematical theory of computation

- First proposed by Carl Hewitt in 1973

- Improved by Gul Agha and many others

- Theory to solve problems caudes by threading and locking

The Actor Model

- Each object is an actor

- An actor has a mailbox

- Actors create other actors for new behavior

- Actors send messages to other actors

The Actor Model

- Communications happen by messages

- No shared state between actors

- Ways to receive adresses of other actors
  - During creation
  - Receiving by Communication

Erlang in a Nutshell

- **spwan**
  - To create processes

- **!**
  - To send message to other processes

- **receive**
  - To wait for message and receive them

Demo

Now let's have a look at some code with a little example programm!!