

COFFEEBEAM

A BEAM VM FOR ANDROID

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Erlang

SOLUTIONS

QUESTIONS TO BE ANSWERED

What is possible?

What do you need to make it happen?

How do the parts fit together?

How can the VM interact with your phone?

ANDROID APP WITH ERLANG?

This seems

POSSIBLE

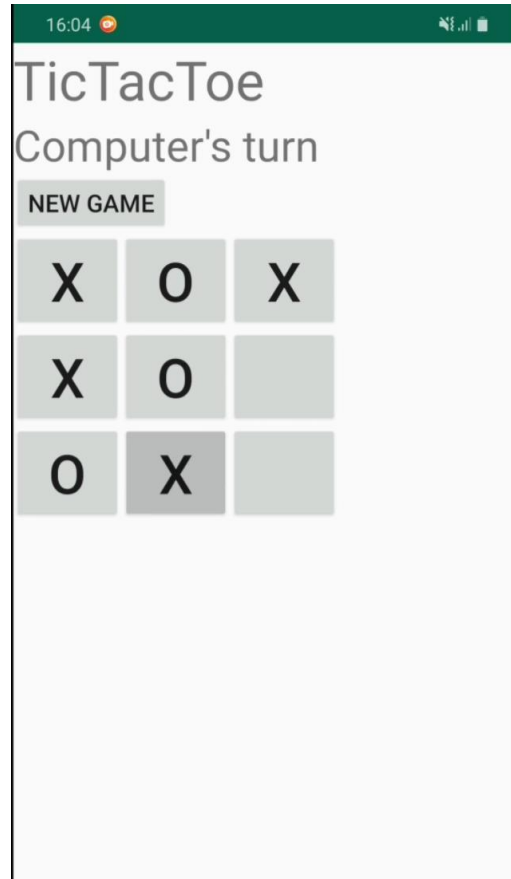
but

DIFFERENT

Using Erlang to build **Android** applications that are

- ▶ Robust OK
- ▶ Concurrent OK
- ▶ Scalable well...
- ▶ Soft real-time hmm...

IS THIS POSSIBLE?



WHAT YOU NEED

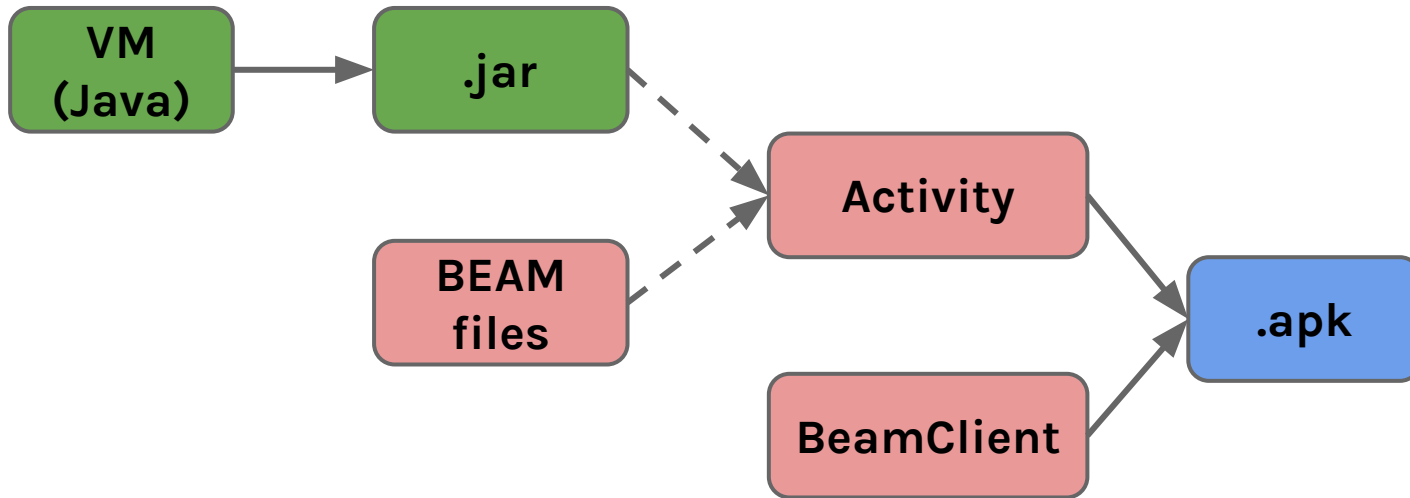
- ▶ Make Android understand BEAM
- ▶ Load BEAM in Android way
- ▶ Create a VM that executes the BEAM
- ▶ Make the VM interact with Android

Android requires a different approach

Build a VM with high-level structures

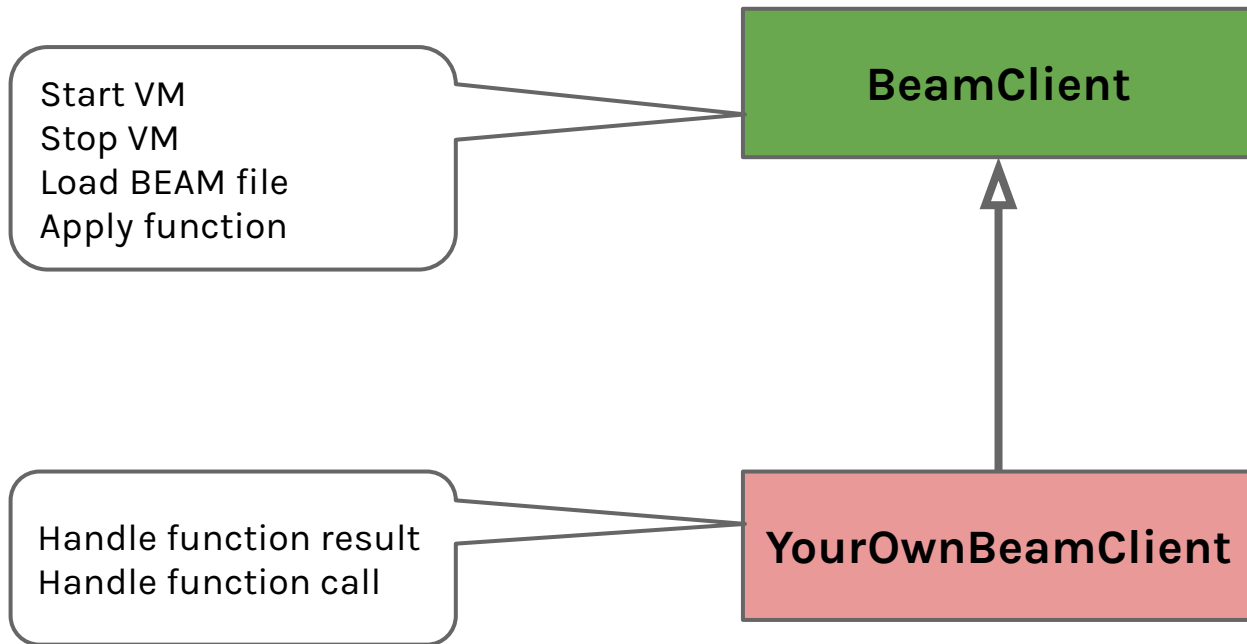
Low CPU, high memory usage

HOW THE PARTS FIT TOGETHER



How to build your Android application with Erlang VM and modules

INTERACTION BETWEEN BEAM AND PHONE



COMMUNICATION

Android

CoffeeBeam VM

Start activity -> apply(m, f, a)

handleResult(GamePid)

New Game button -> apply(m, f, a)

handleCall(update,
{new_game, Board})

Click (x, y) -> apply(m, f, a)

handleCall(update,
{put_player, Board})

handleCall(update,
{put_computer, Board})

handleCall(update, {draw, Board})

tictactoe:start() -> GamePid

tictactoe:new_game(GamePid)

beamclient:update({new_game,
Board})

tictactoe:put(GamePid, X, Y)

beamclient:update({put_player,
Board})

beamclient:update({put_computer,
Board})

beamclient:update({draw,
Board})

CONTRIBUTION

- ▶ Public project:
<https://github.com/vikger/coffeebeam>
- ▶ Future plans
 - ▷ IO
 - ▷ Network support
 - ▷ Node management
 - ▷ Advanced number handling
 - ▷ Lots of BIFs

USEFUL READING

- ▶ The BEAM Book:
<https://blog.stenmans.org/theBeamBook>
- ▶ BEAM VM Wisdoms:
<http://beam-wisdoms.clau.se/>
- ▶ External term format:
http://erlang.org/doc/apps/erts/erl_ext_dist.html

THANK YOU

Q&A

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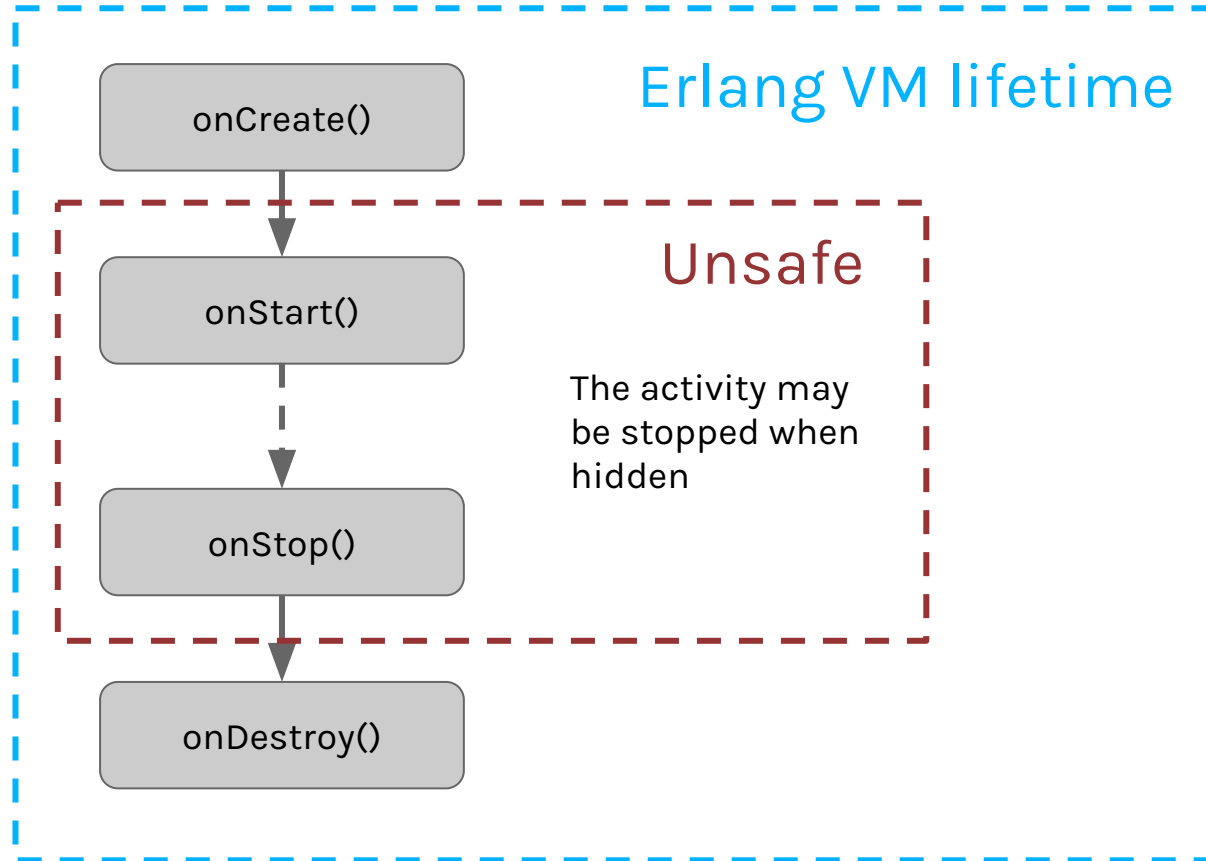
Erlang

SOLUTIONS

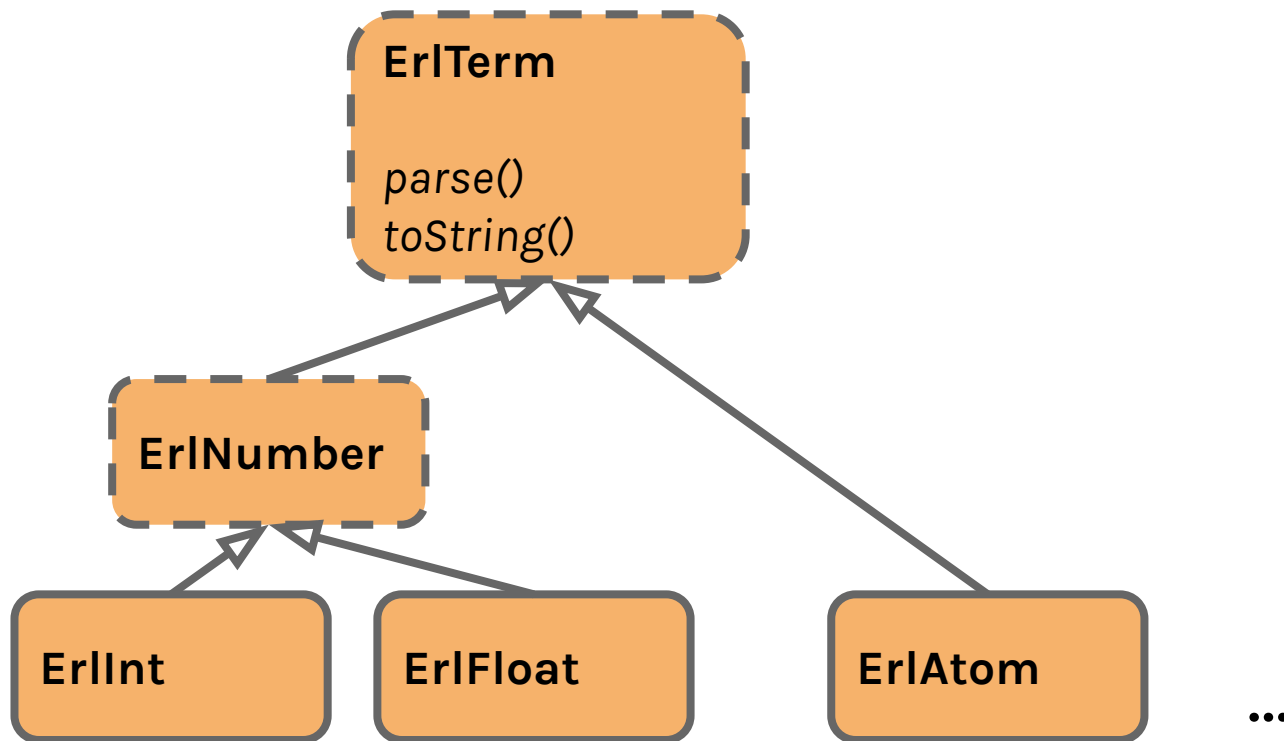
STUDY OF EXISTING SOLUTIONS

- ▶ Building Erlang for Android
 - ▷ <https://bluishcoder.co.nz/2015/06/21/building-erlang-for-android.html>
 - ▷ Complicated configuration and installation for non-rooted devices
- ▶ Erlang4Android
 - ▷ <https://code.google.com/archive/p/erlang4android/>
 - ▷ Depends on Scripting Layer for Android (SL4A)
 - ▷ May not be suitable for custom Android apps
- ▶ Erjang
 - ▷ <https://github.com/trifork/erjang/issues/63>
 - ▷ Involves code recompilation differently from Android way
 - ▷ Android application not on horizon

THE VM IN AN ANDROID ACTIVITY



TYPES MATTER!



THE VM STRUCTURE

- ▶ Track loaded modules
- ▶ One scheduler for each VM
- ▶ Logger
- ▶ Registered processes
- ▶ Provide interface to scheduler
 - ▷ Spawn new process
 - ▷ Send
 - ▷ Timeouts