



# Writing A New Erlang/OTP Module for Beginners

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Erlang and Elixir Factory SF Bay 2017

San Francisco, CA, USA

@jj1bdx

- Erlang Factory SF Bay 2010-2016  
speaker for seven times, and...
- Erlang and Elixir Factory SF Bay  
2017 speaker (8th year!)
- Erlang rand module co-creator



# **what I did for OTP**

**Wrote Erlang PRNG code  
Tested and published the results  
Put the code into OTP**

# This talk is not about

## Algorithms

## Random numbers

## Other implementation details

**This talk is about**  
**Development for Erlang/OTP**  
**Working with OTP Team**  
**Gaining support for your code**

# Development for Erlang/OTP

# **WARNING**

**Don't try committing code only for  
nurturing your ego or just for  
your own fame, please**

# **why new code?**

**Bugfix/security  
New features**

**"Fix what I don't like"**

**Do you have to  
change OTP?**

**OTP is for *all* Erlang users  
Who needs new code?**

**Once committed, removal is hard**

# Rationale for rand module

- random module period is too short and exploitable within <10 hours with a modern desktop computer, so it's basically a security fix
- Fixing API: eliminating the need for initialization
- New features: selecting multiple algorithms, normal distribution generator, jump functions from OTP 20

**Prototyping**  
**Independent repository**  
**Common Test and Dialyzer**  
**Learn erl\_docgen**

# erl\_docgen document example

```
<func>
  <name name="jump" arity="0"/>
  <fsummary>Return the seed after performing jump calculation
    to the state in the process dictionary.</fsummary>
  <desc><marker id="jump-0" />
    <p>Returns the state
      after performing jump calculation
      to the state in the process dictionary.</p>
    <p>This function generates a <c>not_implemented</c> error exception
      when the jump function is not implemented for
      the algorithm specified in the state
      in the process dictionary.</p>
  </desc>
</func>
```

< > C Home file:///Users/kenji/txt/writing-otp-modules/draft/source/\_static/rand.html ▾ ▾ Search Google

ERL

ALANG

PDF Top +

Reference Manual Version 0.9.2

Expand All Contract All

Table of Contents

`export_state()`

Algorithm-dependent state that can be printed or saved to file.

## EXPORTS

`export_seed() -> undefined | export_state()`

Returns the random number state in an external format. To be used with `seed/1`.

`export_seed_s(X1 :: state()) -> export_state()`

Returns the random number generator state in an external format. To be used with `seed/1`.

`jump() -> NewS :: state()`

Returns the state after performing jump calculation to the state in the process dictionary.

This function generates a `not_implemented` error exception when the jump function is not implemented for the algorithm specified in the state in the process dictionary.

`jump(State :: state()) -> NewS :: state()`

Returns the state after performing jump calculation to the given state.

This function generates a `not_implemented` error exception when the jump function is not implemented for the algorithm specified in the state.

`normal() -> float()`

Returns a standard normal deviate float (that is, the mean is 0 and the standard deviation is 1) and updates the state in the process dictionary.

`normal_s(State0 :: state()) -> {float(), NewS :: state()}`

Returns, for a specified state, a standard normal deviate float (that is, the mean is 0 and the standard deviation is 1) and a new state.

seed(AlgorithmState :: state() | export\_state()) -> state()

# Working with OTP Team

**Let me show you  
some excellent  
tweets from the  
author of Cowboy  
HTTP server**

## Tweet from Loïc Hoguin (@lhoguin at Twitter)



**Loïc Hoguin**  
@lhoguin

[!\[\]\(81312b19ca3202a7c3e2f42667ac19f0\_img.jpg\) Follow](#)

How not to get changes merged:

- Send big patch without previous discussion
- Get patch rejected with request for changes
- Not doing those

5:55 AM - 24 Feb 2017

← 1 ↗ 2

## Tweet from Loïc Hoguin (@lhoguin at Twitter)



**Loïc Hoguin**  
@lhoguin

[!\[\]\(f9640f02d06b604c50c1e3a558a31388\_img.jpg\) Follow](#)

**How to get changes merged:**

- Discuss big picture with maintainer
- Write the changes one small step at a time
- Submit them in small chunks

5:56 AM - 24 Feb 2017

↳ 1 ❤

## Tweet from Loïc Hoguin (@lhoguin at Twitter)



**Loïc Hoguin**  
@lhoguin

**The key is the constant discussion around the changes.**

5:57 AM - 24 Feb 2017

1 2

[Follow](#)

A screenshot of a tweet from Loïc Hoguin (@lhoguin) on Twitter. The tweet contains the text "The key is the constant discussion around the changes." It was posted at 5:57 AM on February 24, 2017. The tweet has received 1 reply and 2 likes. A "Follow" button is visible on the right side of the tweet card.

# What to include in a GitHub PR

- **What you are going to do with the PR**
- **How the PR changes the behavior of the code**
- **What and how the changes will and *will not* affect the other modules and applications**
- **Common Test cases** and **type specifications**
- **Documentation**

# What to do when issue a PR

- Report the bug before submitting a bugfix PR
- Choose the right branch
- Separate commits for separate changes
- Make sure that each commit can be compiled
- Make sure that each commit works
- Use git rebase so that OTP Team can git bisect

# Communication with OTP Team

- Choose the GitHub Issues and private email wisely
- OTP Team are working in Central European Time Zone
- In Europe, DST is different from USA/Canada
- OTP Team have their weekends, holidays, and vacations
- Don't expect a prompt reply during non-working hours
- OTP Team members have to handle multiple modules

# How to gain community support for your code

# Promote your code

- Publish ready-to-use modules on GitHub and elsewhere
  - rand module have six related modules released
- Give talks and publish papers on conferences
- Write a PoC and show what the problem is

# Code maintenance and support

- When your code is in OTP you are responsible as the same as the OTP maintainers for the part of the code
- You are expected to contribute a further enhancement or a new feature when they are available
- Old code may be deprecated and removed
- Adding new features should be done *very carefully*

# Licenses for Erlang/OTP

- Erlang/OTP: Apache License 2 (APLv2)
- APLv2: *incompatible* with GPLv2 and GPLv3
- MIT and BSD License code can be easily incorporated
- Your code may need to be relicensed to OTP Team
  - The copyright notice is limited in simple manners

A collage of three men playing guitars. On the left, a man wearing sunglasses and a cap plays an acoustic guitar. In the center, a man with a tattooed arm and a cap plays a banjo. On the right, a man wearing a cap and a dark shirt plays a double bass. The background is dark and textured.

**OTP needs your help  
Your contribution is always welcome**

# References

- My WIP document: Writing OTP Modules
- Source of Writing OTP Modules

**Support for this presentation is provided by**



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# Acknowledgment

- Dan Gudmundsson - rand module principal developer
- Sebastiano Vigna - Xorshift\*/+ inventor
- Erlang Solutions



thank you  
questions?

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