Rust on FreeBSD

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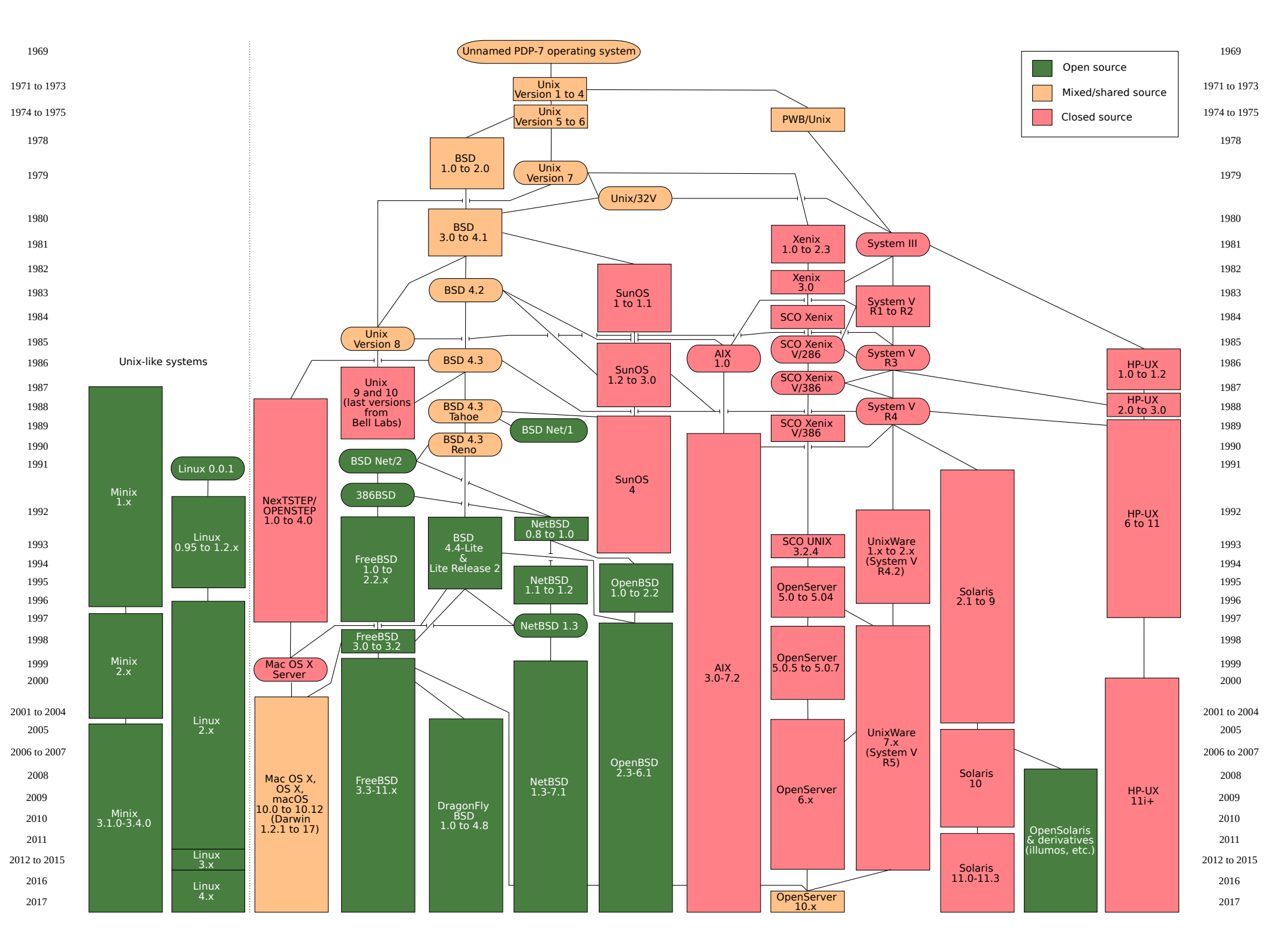
Rust on FreeBSD

- **whoami(1)**
  - Luca Pizzamiglio
  - FreeBSD user since 2009
  - FreeBSD contributor since 2011
  - FreeBSD port committer since 2017
- **The program of today:**
  - FreeBSD: what is this?
  - Rust on FreeBSD: state of the art
  - How to build a FreeBSD package for a Rust project


Open source
Mixed/shared source
Closed source
Unix-like systems
1969
1971 to 1973
1974 to 1975
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001 to 2004
2005
2006 to 2007
2008
2009
2010
2011
2012 to 2015
2016
2017
Unnamed PDP-7 operating system
Unix Version 1 to 4
Unix Version 5 to 6
PWB/Unix
BSD 1.0 to 2.0
Unix Version 7
Unix/32V
BSD 3.0 to 4.1
Xenix 1.0 to 2.3
System III
Xenix 3.0
BSD 4.2
SunOS 1 to 1.1
System V R1 to R2
SCO Xenix
Unix Version 8
SCO Xenix V/286
AIX 1.0
System V R3
BSD 4.3
SunOS 1.2 to 3.0
HP-UX 1.0 to 1.2
Unix 9 and 10 (last versions from Bell Labs)
SCO Xenix V/386
HP-UX 2.0 to 3.0
BSD 4.3 Tahoe
BSD Net/1
System V R4
BSD 4.3 Reno
SCO Xenix V/386
Minix 1.x
Linux 0.0.1
BSD Net/2
NexTSTEP/ OPENSTEP 1.0 to 4.0
SunOS 4
386BSD
HP-UX 6 to 11
Linux 0.95 to 1.2.x
NetBSD 0.8 to 1.0
SCO UNIX 3.2.4
UnixWare 1.x to 2.x (System V R4.2)
Solaris 2.1 to 9
FreeBSD 1.0 to 2.2.x
BSD 4.4-Lite & Lite Release 2
NetBSD 1.1 to 1.2
OpenBSD 1.0 to 2.2
OpenServer 5.0 to 5.04
Minix 2.x
NetBSD 1.3
FreeBSD 3.0 to 3.2
OpenServer 5.0.5 to 5.0.7
Mac OS X Server
Linux 2.x
AIX 3.0-7.2
UnixWare 7.x (System V R5)
Mac OS X, OS X, macOS 10.0 to 10.12 (Darwin 1.2.1 to 17)
FreeBSD 3.3-11.x
DragonFly BSD 1.0 to 4.8
NetBSD 1.3-7.1
OpenBSD 2.3-6.1
OpenServer 6.x
Solaris 10
OpenSolaris & derivatives (illumos, etc.)
HP-UX 11i+
Minix 3.1.0-3.4.0
Linux 3.x
Solaris 11.0-11.3
Linux 4.x
OpenServer 10.x

FreeBSD: what is this?

FreeBSD

Kernel + boot loader
World
- System libraries
- Toolchain (C,C++)
- Services and utilities
- Installer

Ports (packages)
- Web servers
- Other languages/toolchains
- X11 and graphics
- Databases

Linux

Kernel

Installer
Packages
- System libraries
- Toolchain (C,C++)
- Services and utilities
- Web servers
- Other languages/toolchains
- X11 and graphics
- Databases

Rust on FreBSD: status

- **lang/rust: rust stable, available as package**
  - Everything you need: rustc, cargo, standard library
  - Useful to build other Rust packages
- **Rustup support for FreeBSD**
  - Everything is available
    - Clippy-preview
    - rustfmt-preview
- **Editor/IDE**
  - No official support for electron (a long story), so no atom or VSCode
  - I use vim+rust.vim+YouCompleteMe+syntastic

FreeBSD package: ports?

- **FreeBSD Package: the binary blob that you just install**
- **FreeBSD Port: the recipe to install the software and/or build the package**
- **The Port Collection counts ~29K ports**
- **The Port Collection build system is Makefile based**
  - Meta build specification to support every language/build mechanism
    - Autotools, cmake, ninja, maven
    - C, C++, Java, go, Rust, python, perl, R, Haskell...
  - One structure to build ‘em all

FreeBSD Port

autotools

```
./configure
make
make install
```

ports(7)

```
make fetch
---------------------
make checksum
make extract
make patch
make configure
make build
make stage
make install/package
```

FreeBSD ports & cargo

ports(7)

```
make fetch          => fetch crates
make checksum       => checksum on crates
make extract        => tells cargo to use the
make patch             downloaded crates
make configure
make build          => use cargo to build
make stage          => use cargo to install
make install
```

FreeBSD ports & cargo: cargo.mk

- **USES= cargo**
  - make cargo-crates
    - An additional target to help maintainer to get the list of crates that has to be added in the Makefile
  - make makesum
    - A target to automatically compute the source's checksum
    - It takes care of crates as well
  - "Hard-to-build" crates are pre-configured
  - The ports collection prefers shared library

FreeBSD ports & cargo

Real example and code:

- Easy example: sysutils/potnet
- Where the magic happens: Mk/Uses/cargo.mk
- FreeBSD philosophy at work: devel/sccache

THANKS

Questions?

Rust on FreeBSD

Further questions?

Email me at pizzamig@FreeBSD.org

Image credits:

https://commons.wikimedia.org/wiki/File:Unix_history-simple.svg

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Source: Levenez Unix History Diagram, Information on the history of IBM's AIX on ibm.com

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