

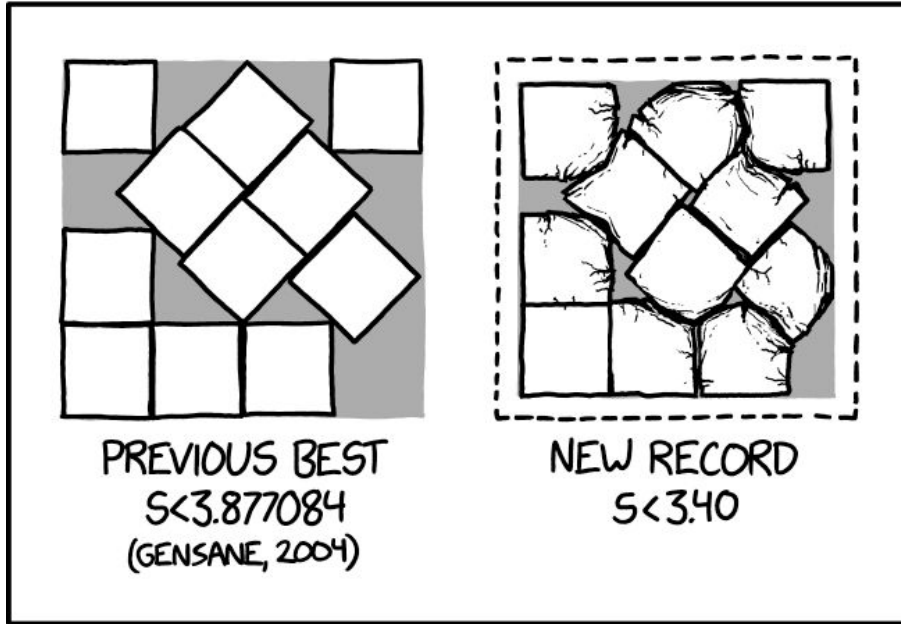
Lua in Kernel

Lourival Vieira Neto



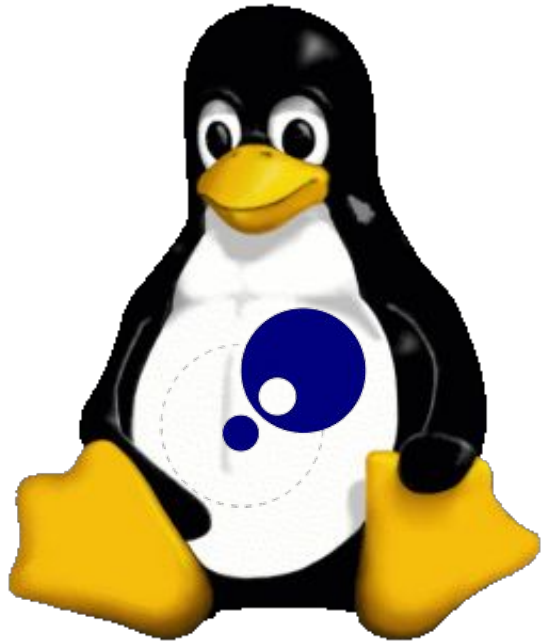
lourival.neto@gmail.com
github.com/luainkernel





I'VE SIGNIFICANTLY IMPROVED ON THE SOLUTION TO THE $N=11$ SQUARE PACKING PROBLEM BY USING A HYDRAULIC PRESS.

Scriptable Operating System :=
Extensible Operating System
+
Scripting Language



Lunatik

- Framework for Scripting the Linux kernel with Lua
- github.com/luainkernel
- matrix.to/#/#lunatik:matrix.org

```
-- /lib/modules/luapasswd.lua
--
-- implements /dev/passwd for generate passwords
-- usage: $ sudo lunatik run passwd
--         $ head -c <width> /dev/passwd

local device = require("device")
local linux  = require("linux")

local function nop() end -- do nothing

local s = linux.stat
local driver = {name = "passwd", open = nop, release = nop, mode = s.IRUGO}

function driver:read() -- read(2) callback
    -- generate random ASCII printable characters
    return string.char(linux.random(32, 126))
end

-- creates a new character device
device.new(driver)
```



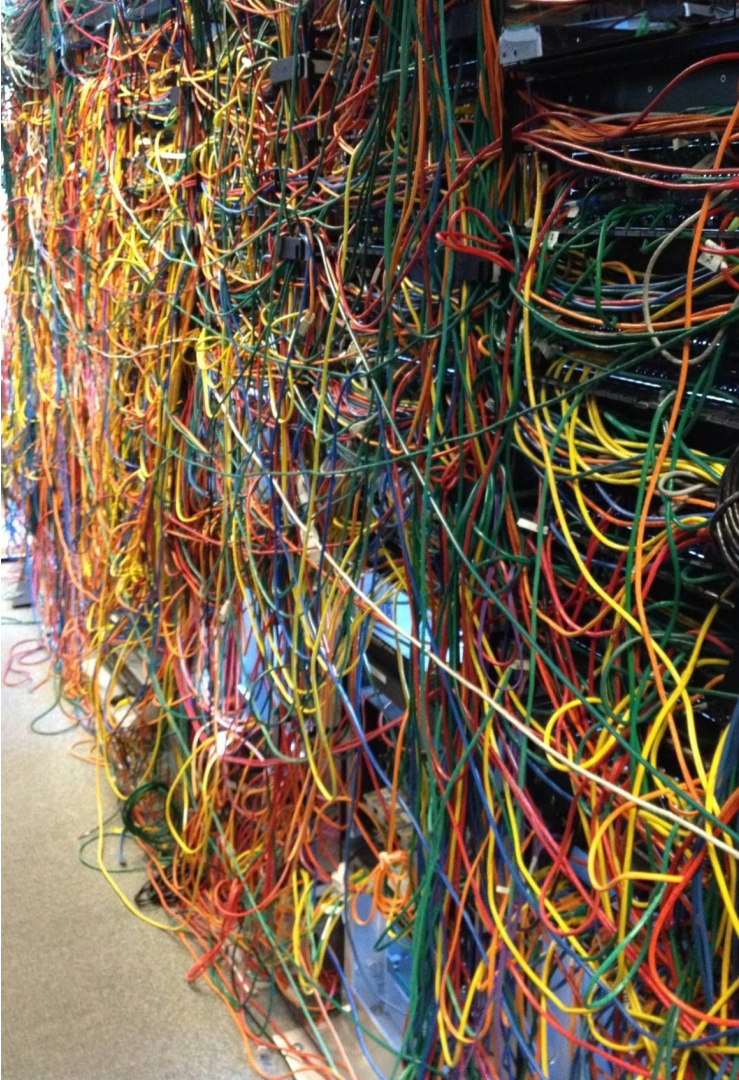
lua(4)

- Device Driver for Scripting the NetBSD kernel with Lua
- NetBSD.org
- Google Summer of Code (GSoC)
 - 2010



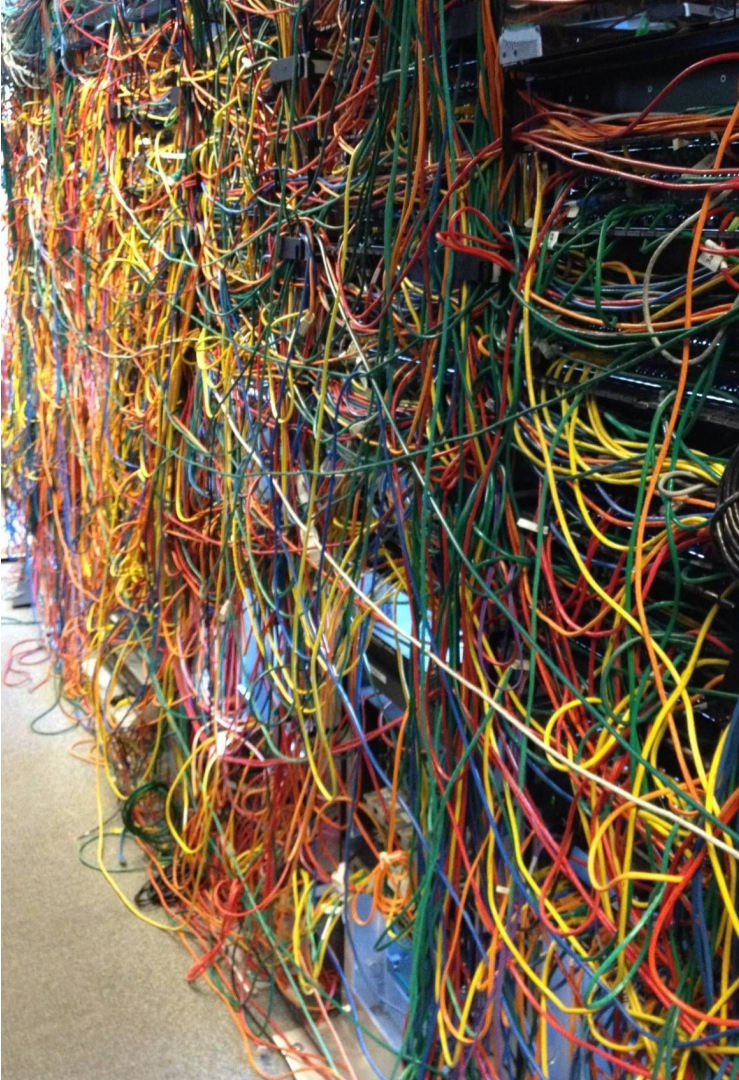
Why Lua?

- Small (250 KB) and fast scripting language
- Portable and Embeddable
 - C89 library
- Extensible extension language
- Widely used for scripting network monitoring and security tools
 - e.g., Wireshark, Nmap, Snort



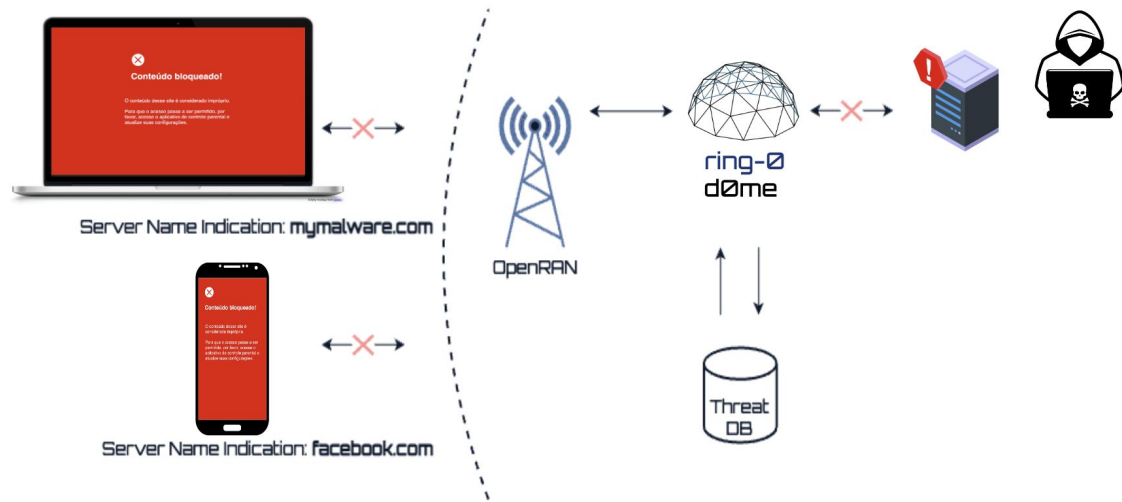
Networking

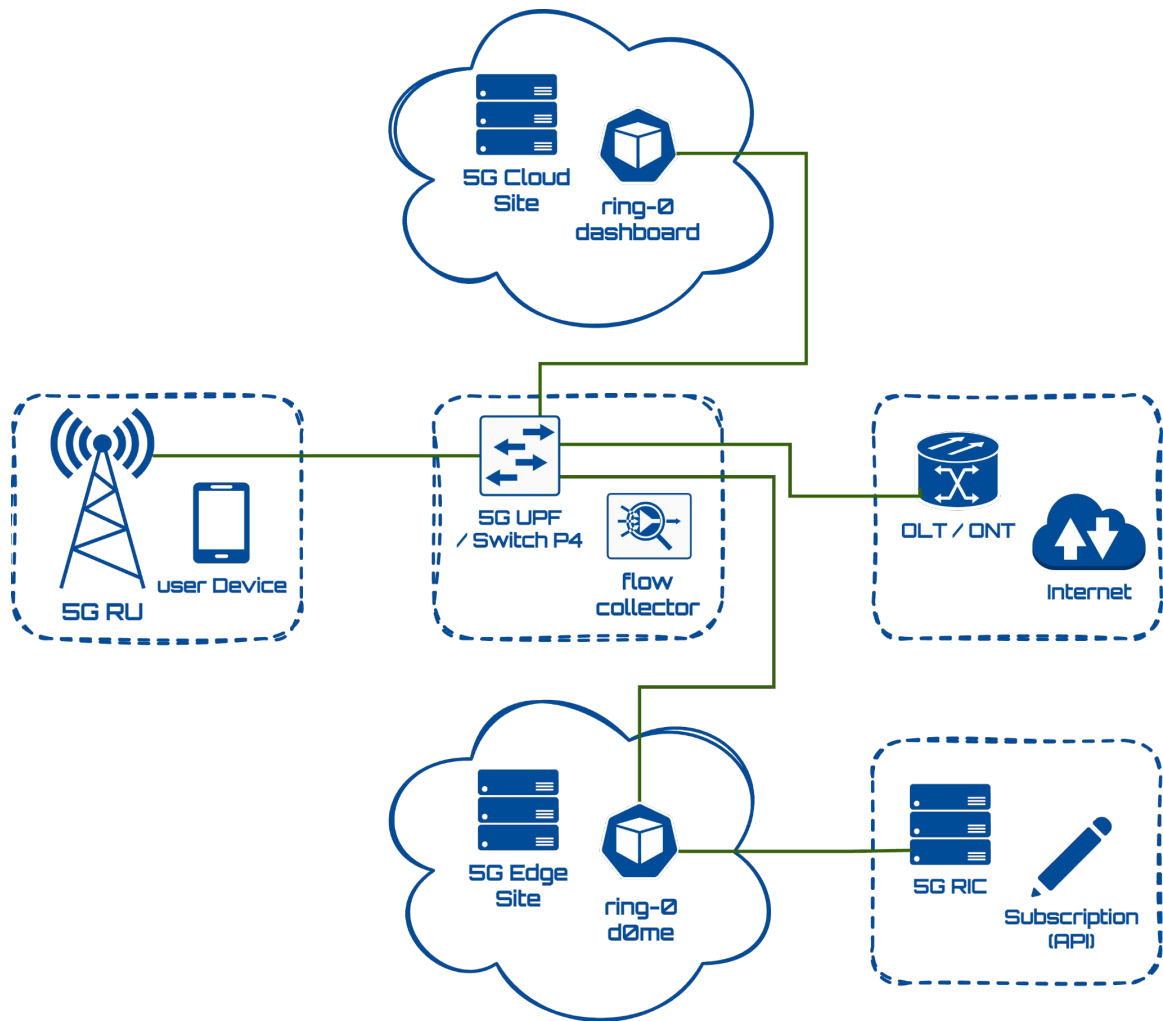
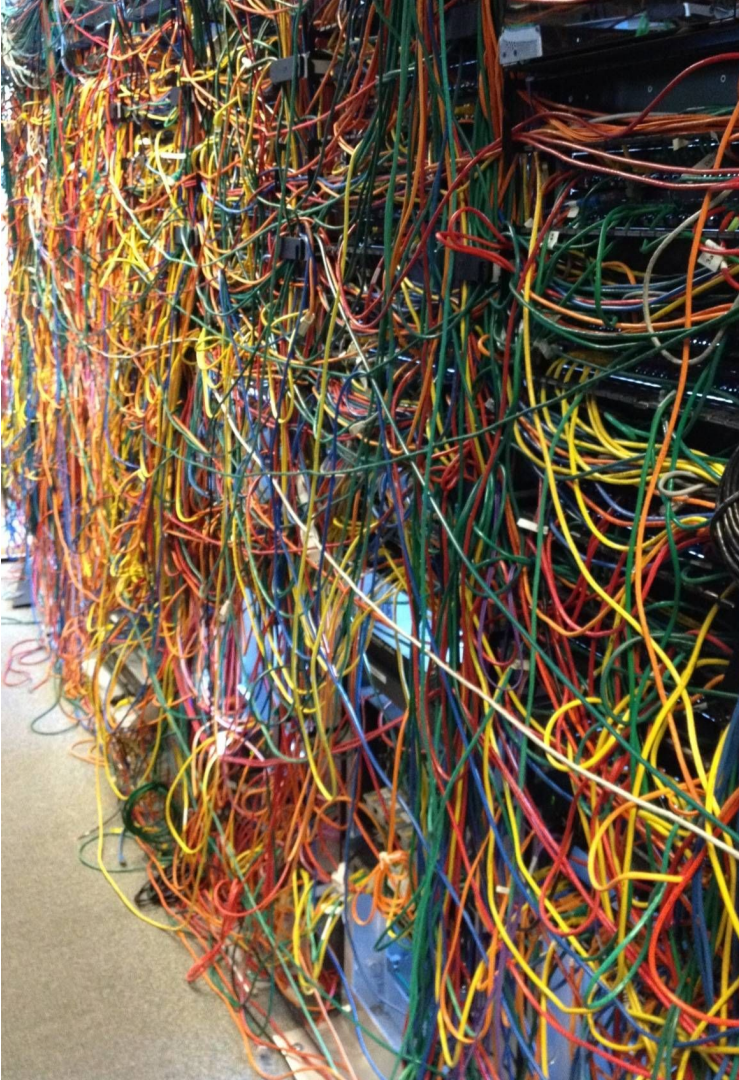
- NPFLua
 - [EuroBSD 2014](#)
 - [EuroBSD 2018](#)
- PacketScript
- NFLua
- XDPLua (GSoC)
 - [NetDev 0x14](#)
- LuaNotifier
- [ring-Ø dØme](#)
 - SWG for 5G (OpenRAN)
- ULP-Lua
- kTLS (GSoC)
- Socket (GSoC)
- LuaFIB
 - [NetDev 0x17](#)
- LuaXtables and LuaNetfilter (GSoC)
- [Snihook](#) (Moonscript)



ring-Ø dØme

- Secure Web Gateway for OpenRAN







CPU Frequency Scaling

- Linux's CPUFreq
 - DLS 2014



Debugger

- NetBSD's DDB
 - [BSDCan 2015](#)



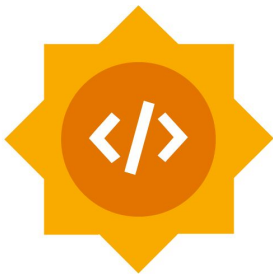
Application Sandboxing

- NetBSD's kauth
 - [BSDCan 2017](#)



Storage

- pNFS
 - [PDSW 2012](#)
- Memcached
 - [PLOS 2015](#)
- ZFS
 - 2018



Google
Summer of Code

- Port Lua Test Suite to NetBSD Kernel
 - Guilherme Salazar (2015)
- RCU Binding for Lua tables
 - Caio Luiz Messias (2018)
- XDPLua
 - Victor Nogueira (2019)
- Lua Hook on kTLS
 - Xinzhe Wang (2020)
- Lua states management for Lunatik
 - Matheus Silva Rodrigues (2020)
- Lunatik binding for Netfilter
 - Mohammad Shehar Yaar Tausif (2024)



Please Send Pull Requests =)

- github.com/luainkernel/lunatik

Join our Community

- matrix.to/#/#lunatik:matrix.org

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