



School of Computer Science & Engineering
Trustworthy Systems Group

LionsOS

Fast – Secure – Adaptable



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<https://microkerneldude.org/>



Why LionsOS?

seL4's assurance and power are (still!) unrivalled

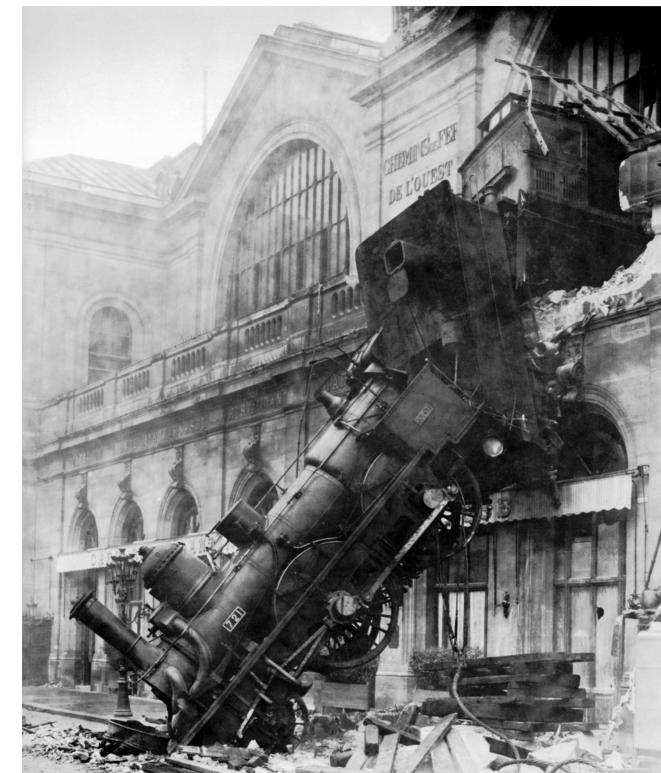
TS contributed some poor designs too!

... but good design on seL4 requires deep expertise

Rare beyond TS and ex-TSers

The seL4 community needs an OS that is:

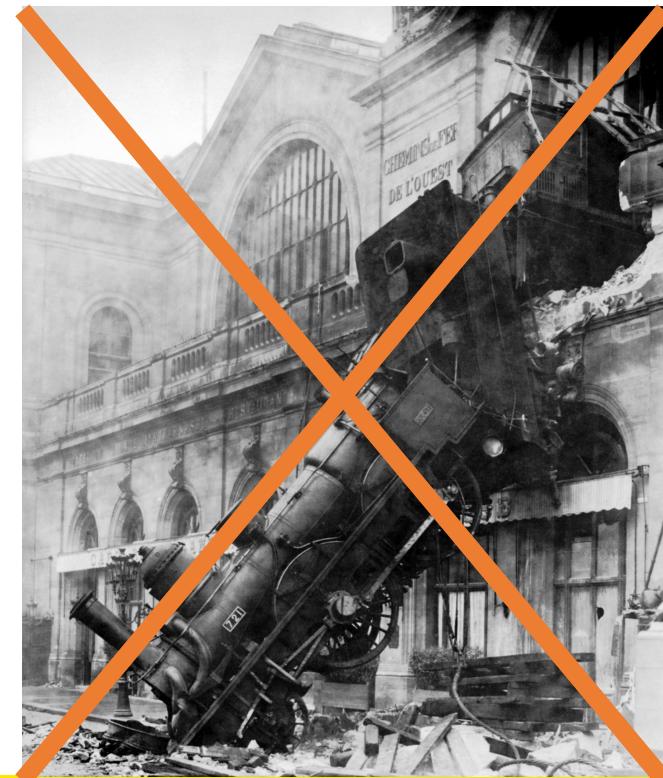
- well designed
- easy to use
- open source



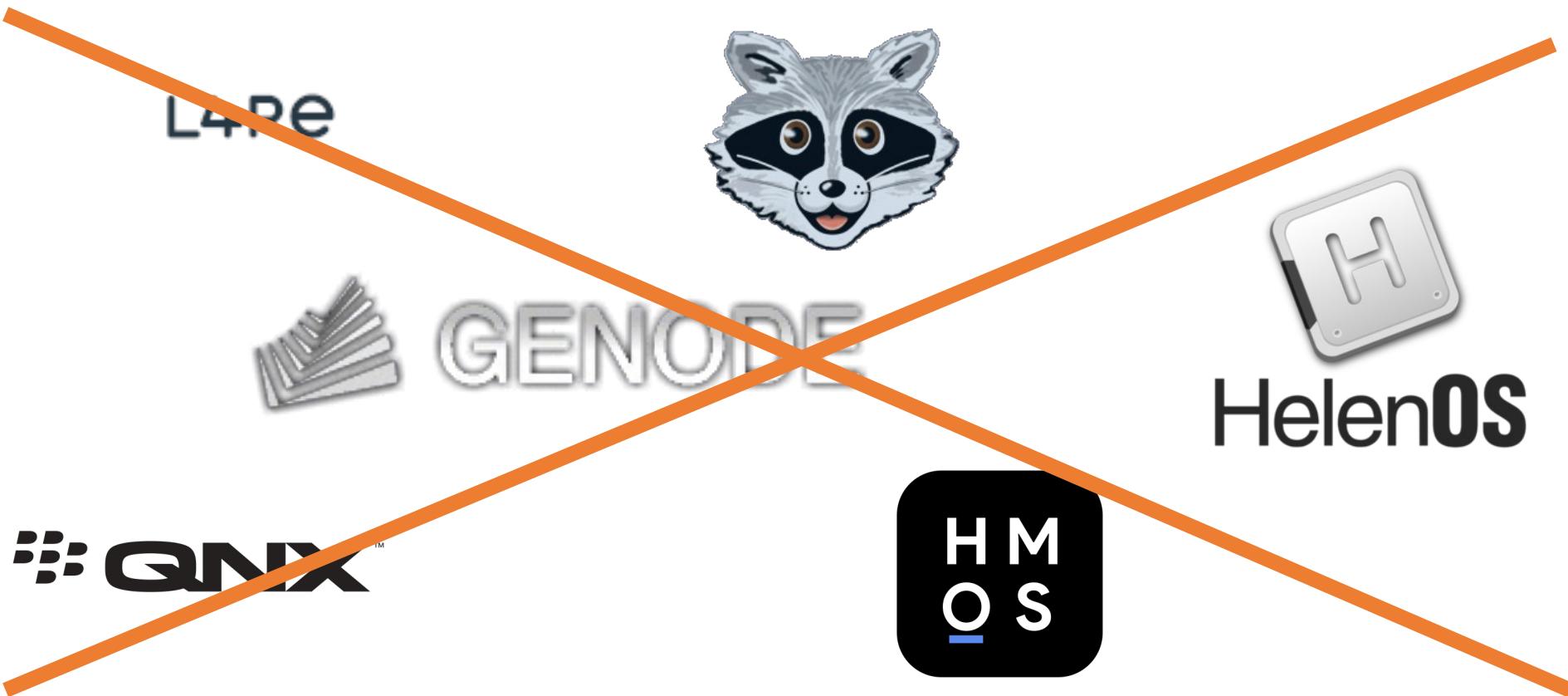


LionsOS

Stop The Train Wrecks!



Re-Inventing Unix (Again)?





LionsOS Aims



Aim 1: Practical, easy-to-use, open-source OS for wide range of embedded/IoT/cyberphysical use cases

Must be well designed!

Aim 2: Best-performing microkernel-based OS ever

Can use static architecture

Aim 3: Most secure OS ever

Must be verified!



Overarching Design Principle: KISS!



Helps development
and verification!

LionsOS is what
Posix/Unix isn't!

... but we'll
have Posix-like
I/O wrappers

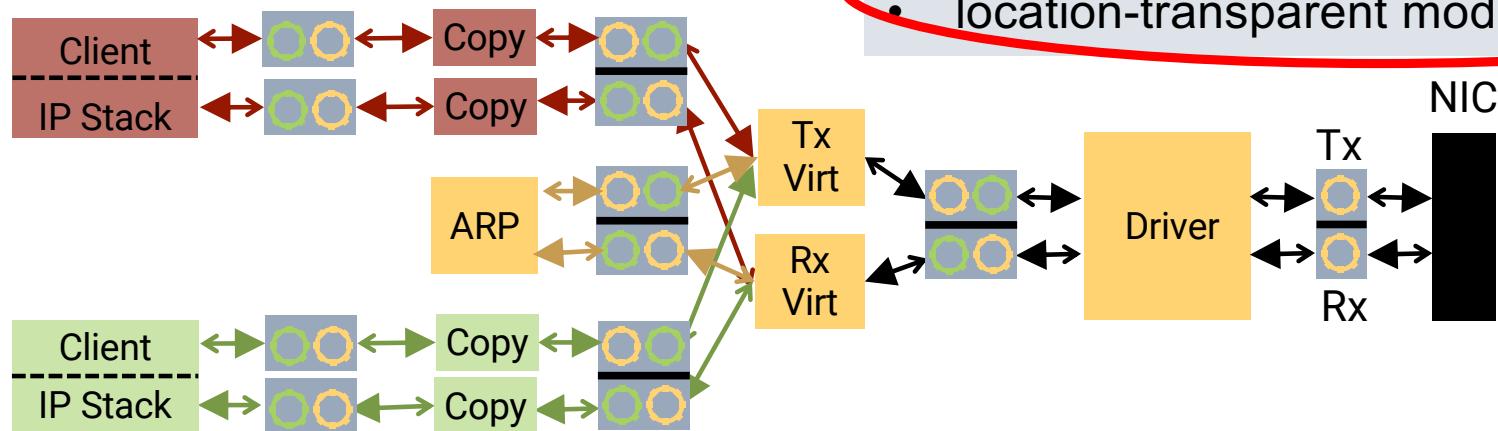
Radical simplicity:

- fine-grained modularity,
strict separation of concerns
- event-driven programming model
- use-case-specific policies

Use-case diversity by
replacing components



Successfully Trialled With sDDF

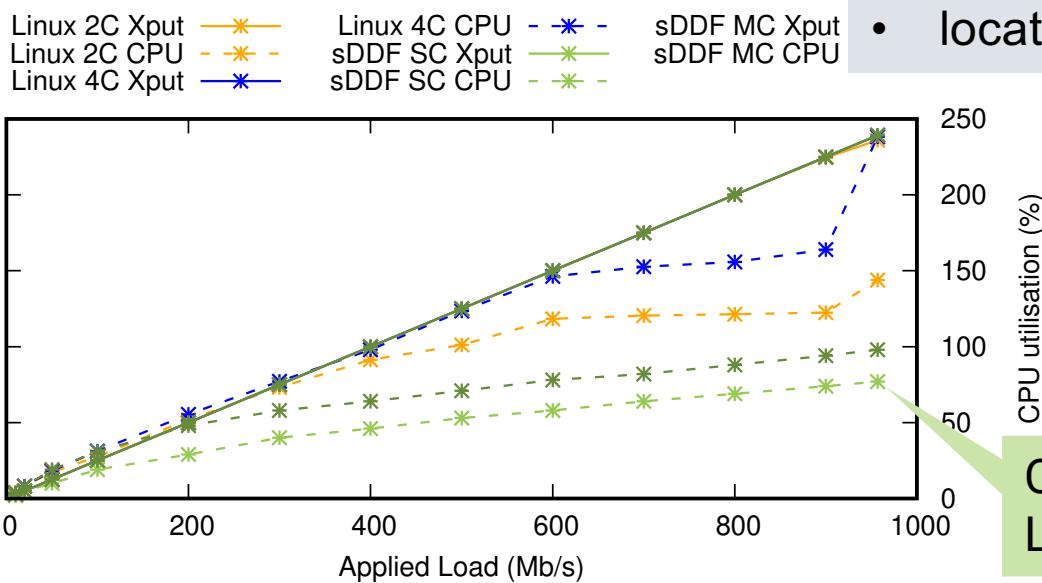


seL4 Device Driver Framework:

- fine-grained modularity
- event-driven programming model (Microkit)
- use-case-specific policies
- asynchronous, zero-copy communication
- location-transparent modules



Successfully Trialled With sDDF



seL4 Device Driver Framework:

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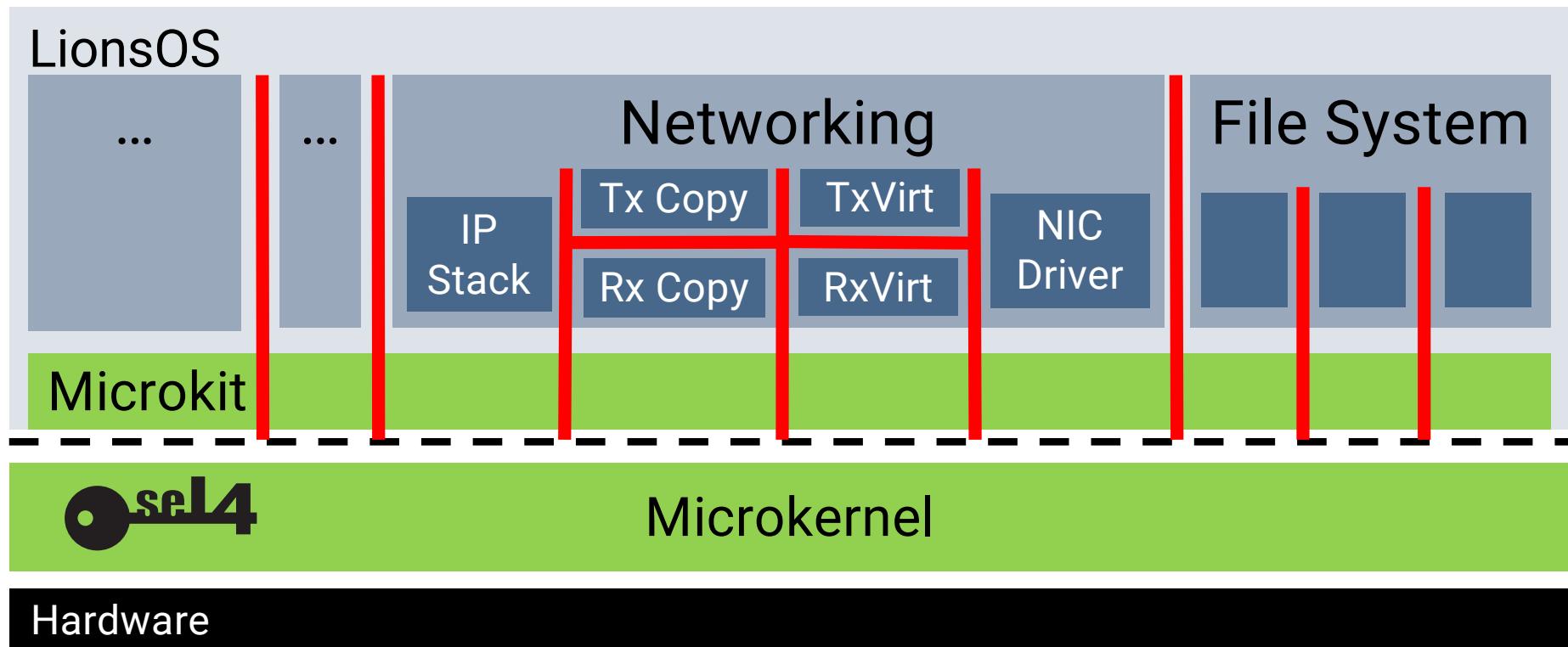
Outperforms
Linux!



LionsOS: Based on Microkit + sDDF

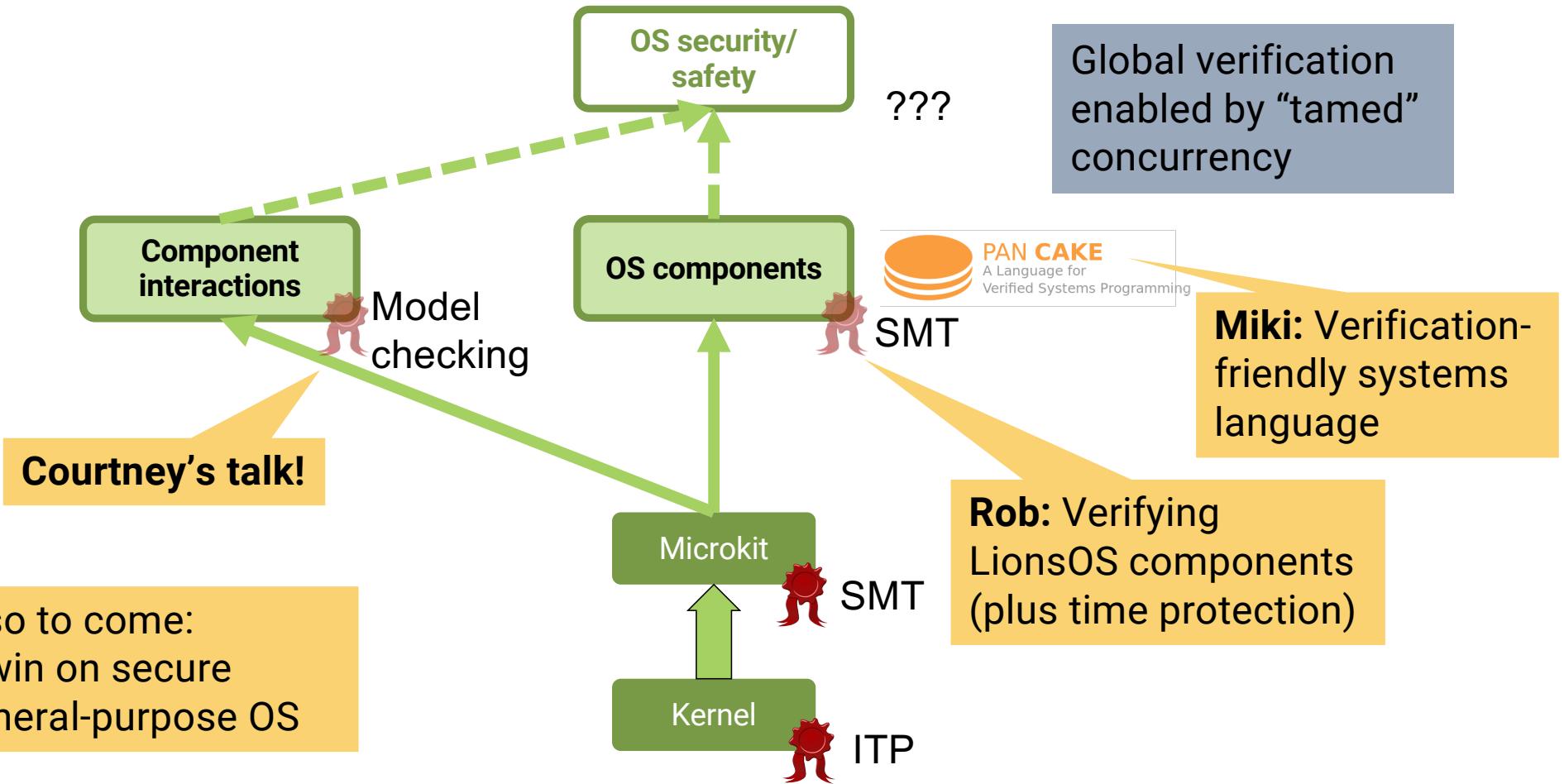


Details in Ivan's talk!





Verifying Lions OS





What's In a Name?



- https://en.wikipedia.org/wiki/John_Lions

John Lions

Article Talk

From Wikipedia, the free encyclopedia

"After 20 years, this is still the best exposition of the workings of a 'real' operating system." — Ken Thompson

Lions' Commentary on UNIX® 6th Edition with Source Code by John Lions, Foreword by Dennis Ritchie. Published in December 1998.

Ken Thompson's lead section notes that he considered expanding the book. (February 2024)

In December 1998, when the *Lions' Commentary on UNIX 6th Edition* was published, it was the first book to cover all important aspects of the UNIX operating system.

John Lions



Security is no excuse
for bad performance!



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