



# Unikernels: Another step beyond containers

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## Unikernels: Another step beyond containers

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### CONTAINERS



- ✓ Lightweight
- ✗ Iffy isolation



### HYPERVISORS



- ✓ Strong isolation
- ✗ Heavy weight

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CONTAINERS



HYPERVERSORS



Can we break the myth of VMs  
being heavy weight?

**Yes, with Unikernels!**

✘ Iffy isolation

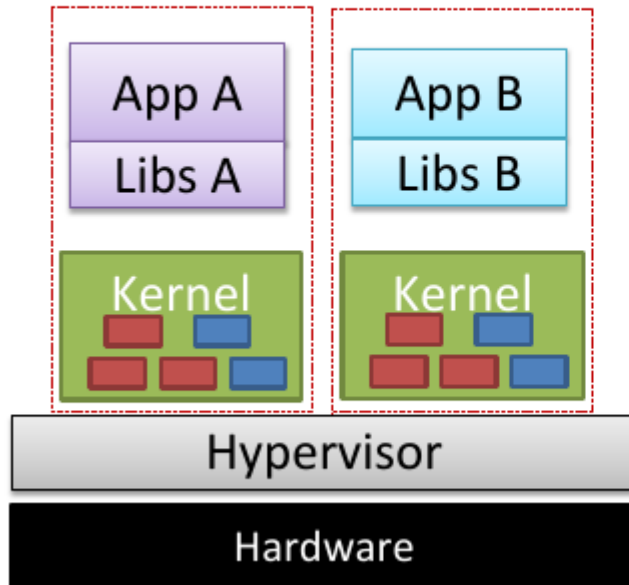
✘ Heavy weight ?

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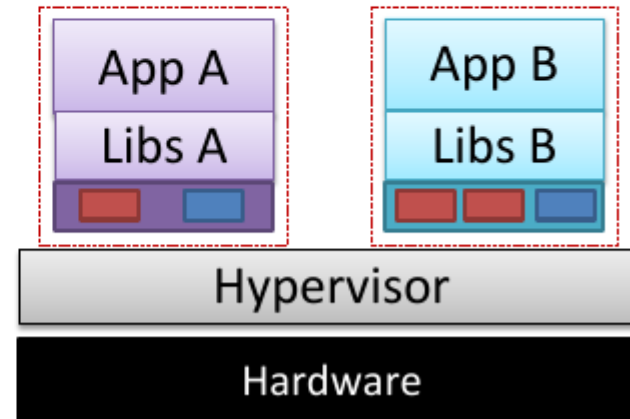
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*Traditional VMs*



*Unikernels*



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### Fast instantiation, destruction and migration time

- 10s of milliseconds  
(*LigthVM [Manco SOSP 2017], Jitsu [Madhvapeddy, NSDI 2015]*)



### Low memory footprint

- Few MB of RAM (*ClickOS [Martins NSDI 2014]*)



### High density

- 10k guests on a single server node (*LigthVM [Manco SOSP 2017]*)



### High Performance

- 10-40Gbit/s throughput with a single guest CPU  
(*ClickOS [Martins NSDI 2014], Elastic CDNs [Kuenzer VEE 2017]*)

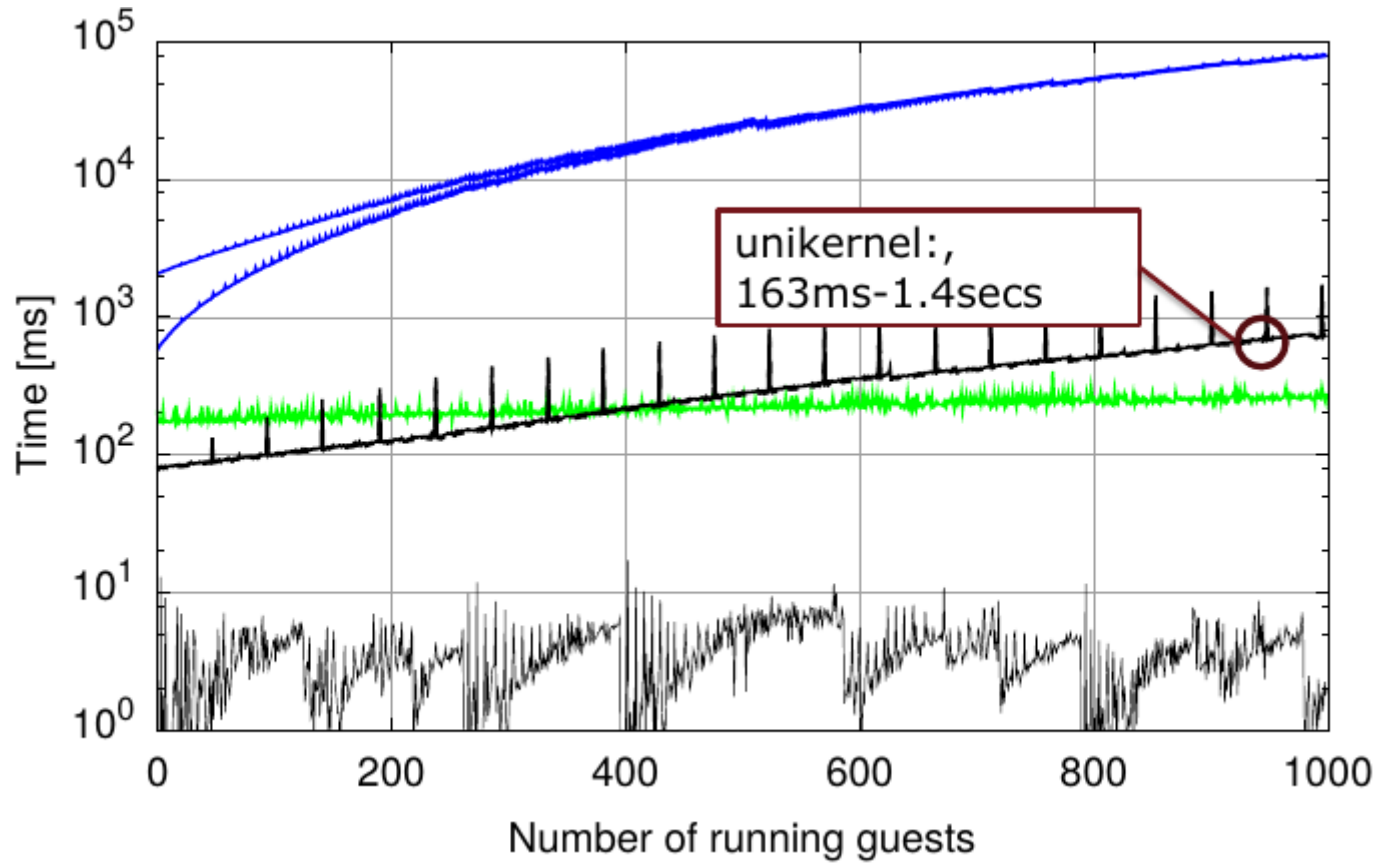


### Reduced attack surface

- Less components exist in Unikernel
- Strong isolation by hypervisor

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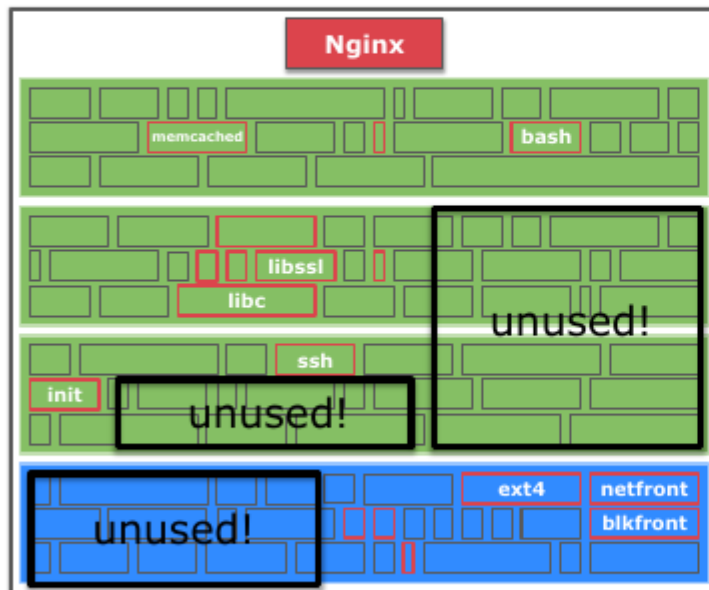


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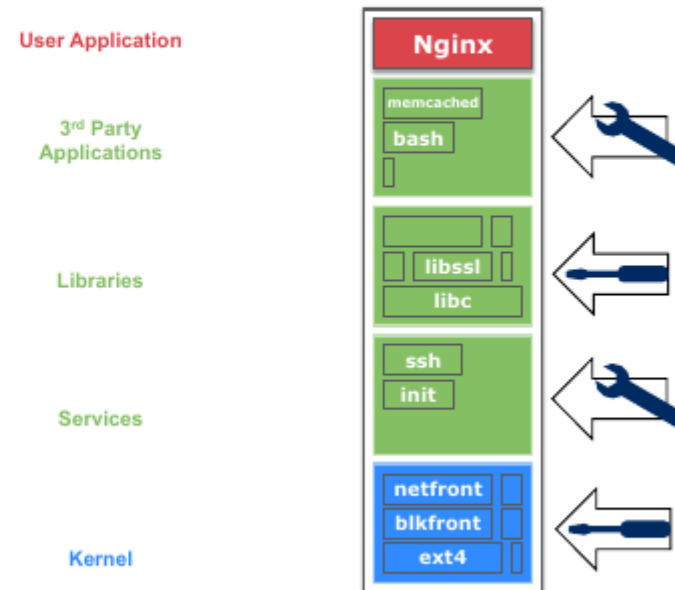
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Standard OS/VM/container:  
**lots** of unnecessary code  
= **lots** of overhead!

Unikernel: only what's needed is  
there **but lots** of development  
time!



General Purpose OS



Unikernel

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## Motivation

- Core principle: Support everyone's use case!
- Simplify building and optimizing
- Concentrate efforts of each Unikernel project to a single base

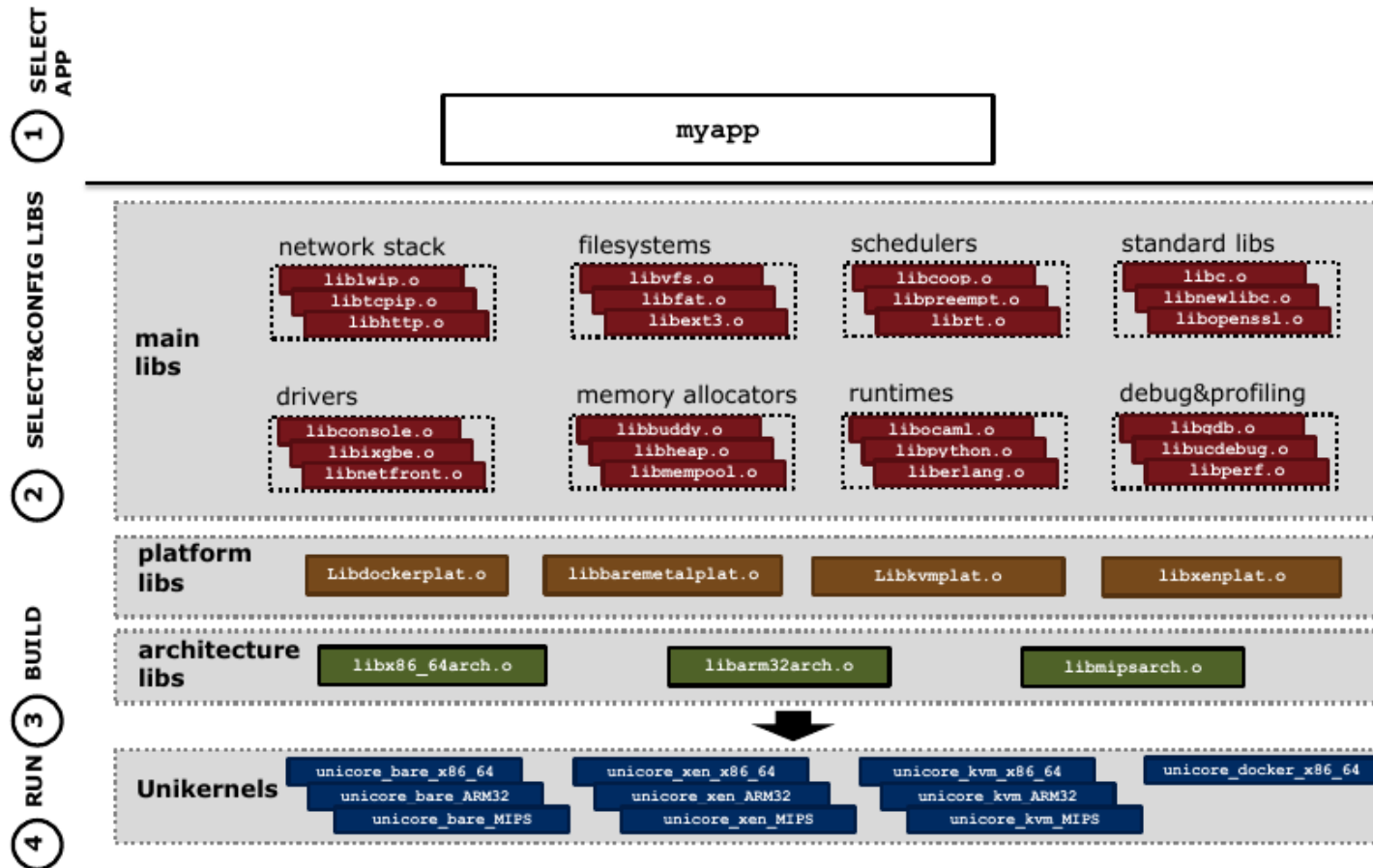


## Our Approach

- Concept: “Everything is a library”
- Decomposed OS functionality as libraries
- Unikraft’s 2 components:
  - Library Pool
  - Build Tool

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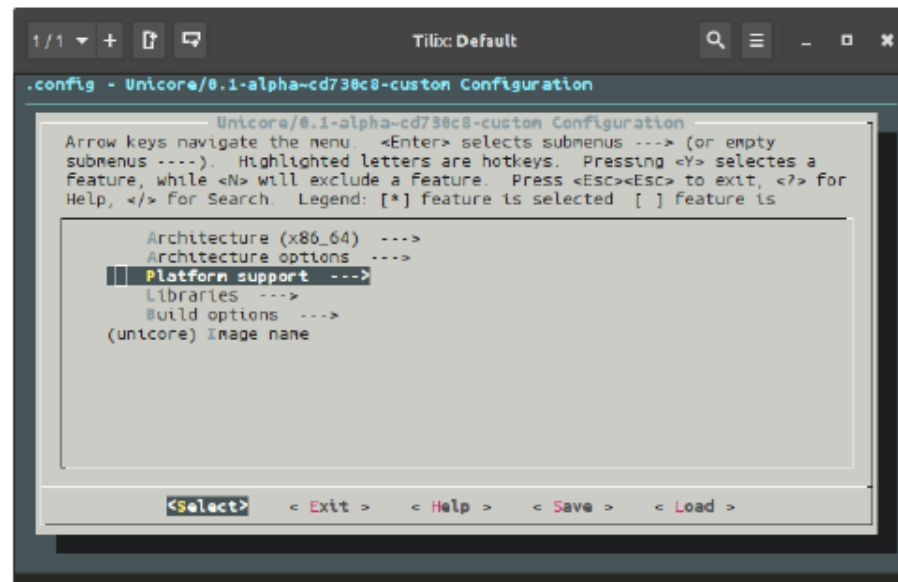
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## Unikernels: Another step beyond containers

- | KConfig based and Makefile "Magic"
- | Type "make menuconfig"
- | Choose options in the menu that you want for your application
- | Choose your target platform(s)
  - Xen, KVM, bare-metal, Linux
- | Save your config and type "make"



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**Gracias**

Ejecuta tu primer Unikernel  
<http://tiny.cc/l4vw5y>

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