

New OpenSource Tech for IoT Products

UNIKERNELS FTW!

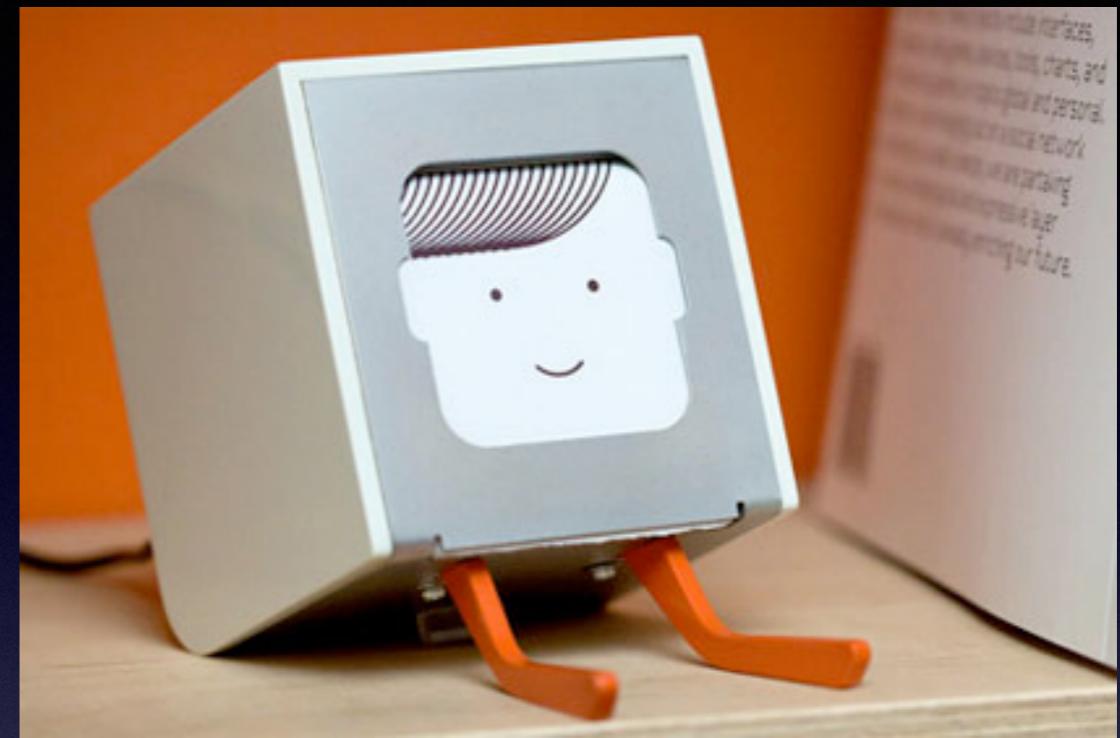
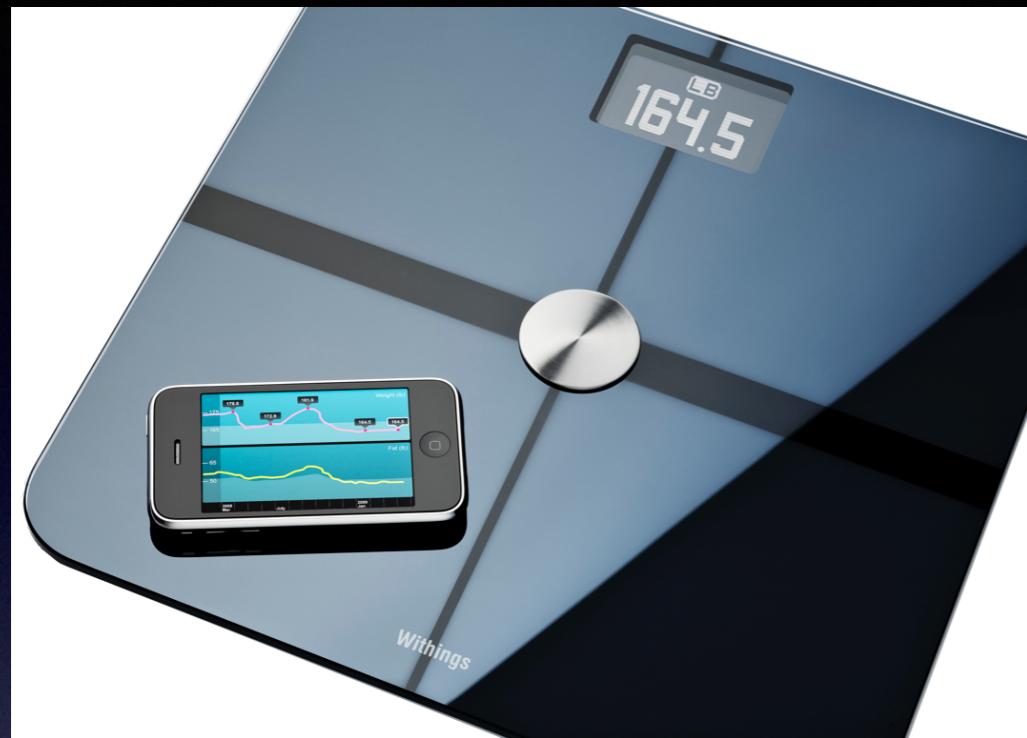
Amir Chaudhry - @amirmc
amc@cantab.net

Product Camp London
March 2015

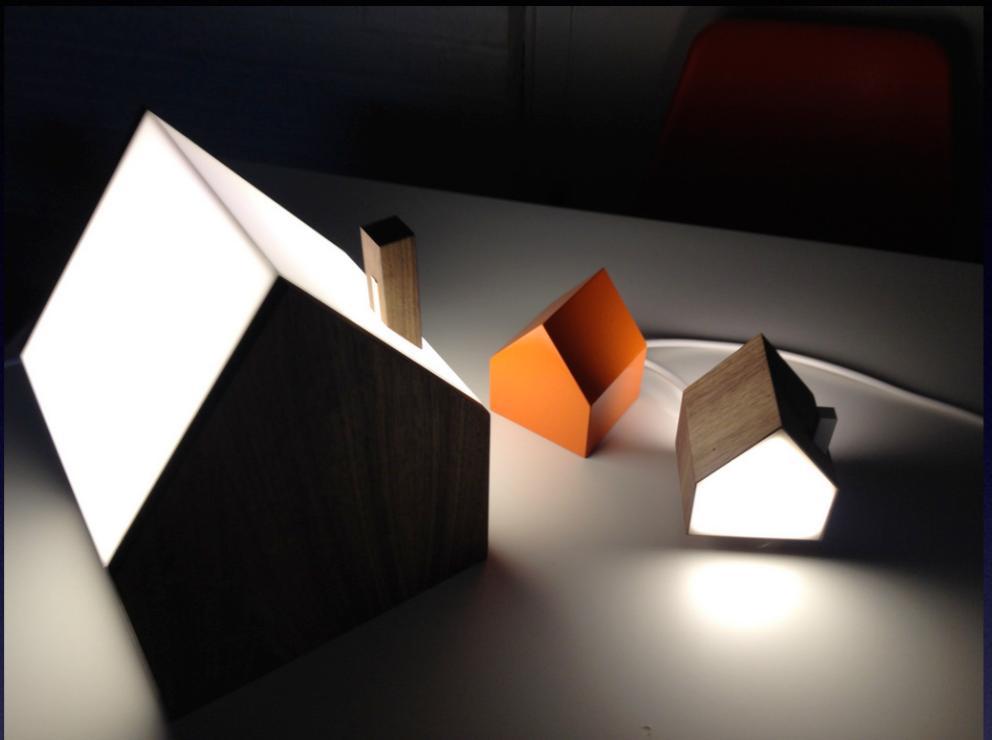


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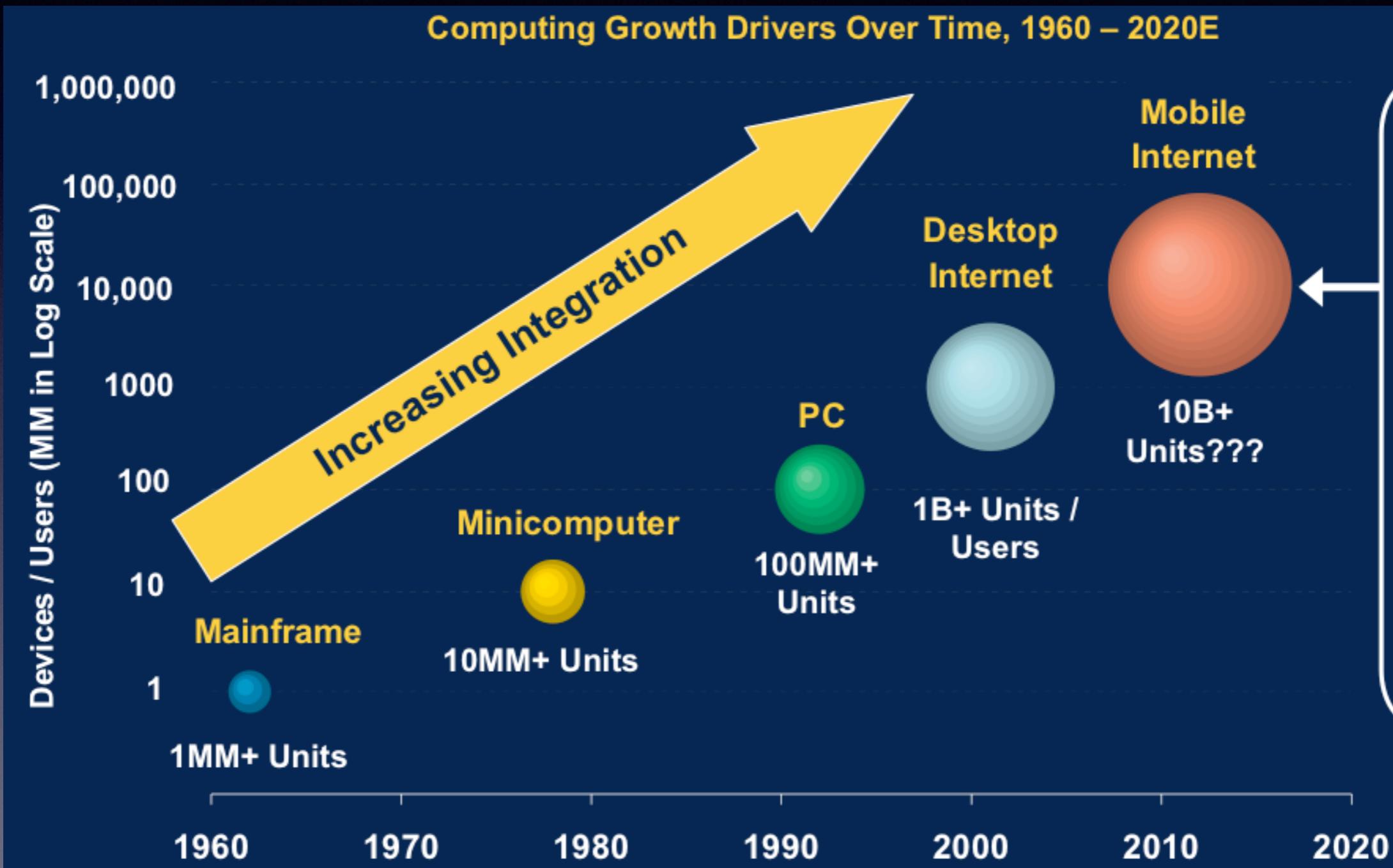
Wave of appcessories



Wave of accessories



Billions of devices...

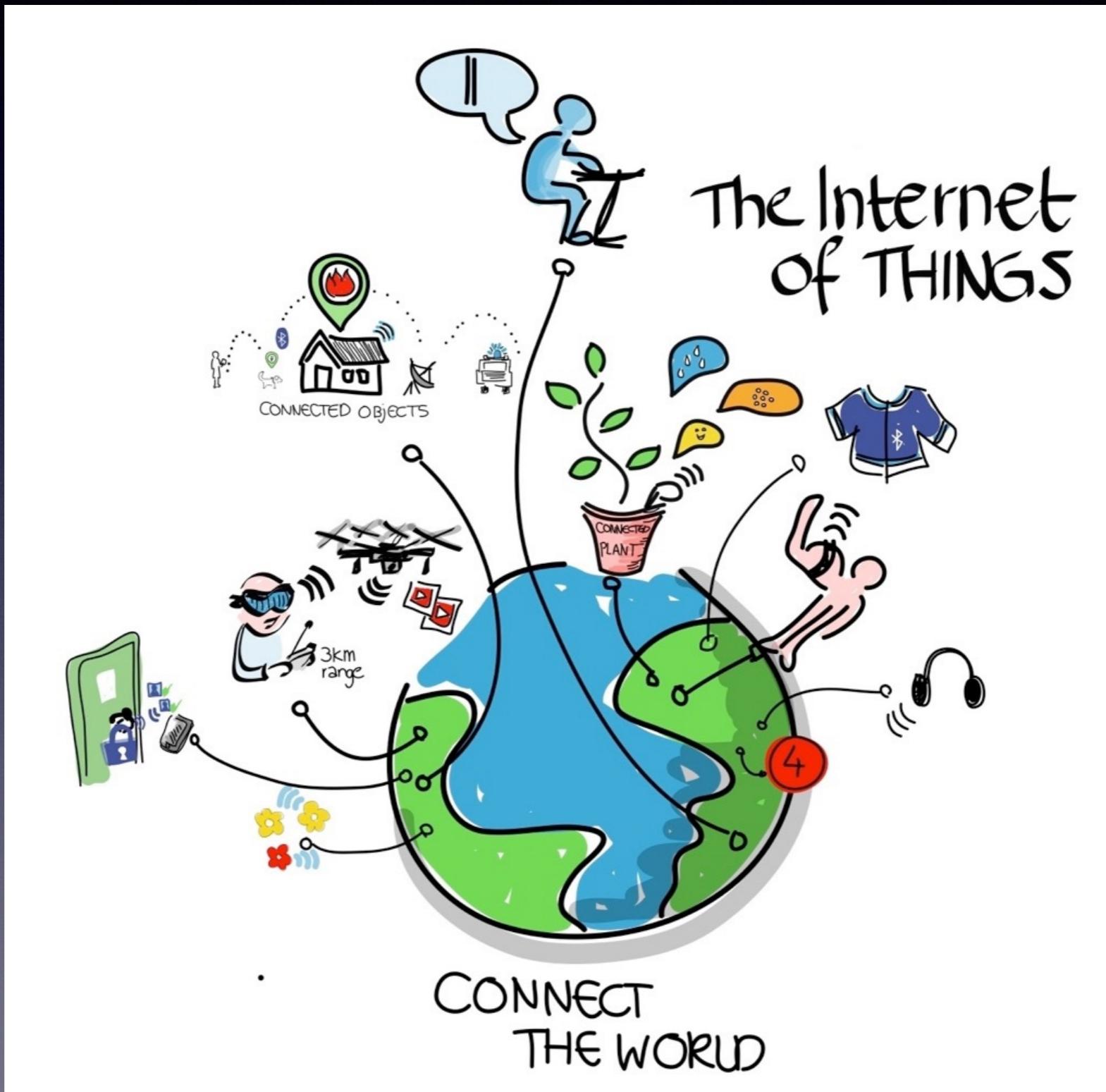


Billions of devices...

“One Hundred Billion Devices!”



Billions of devices... ... and BUZZWORDS!



How to make Products?

Interesting tech questions

What will devices be running?

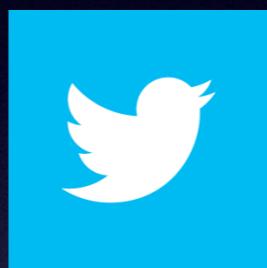
What are the threat models for security?

What about latency and availability?

How do we do it currently?

Cloud Computing!

Google

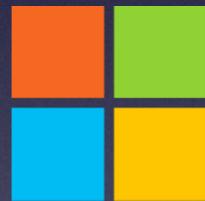


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SAMSUNG



YAHOO!

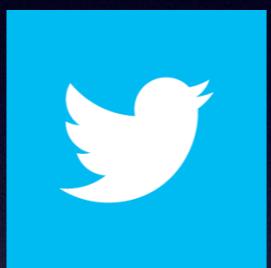


Microsoft

amazon.com®

Cloud Feudal Computing!

Google

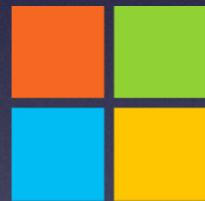


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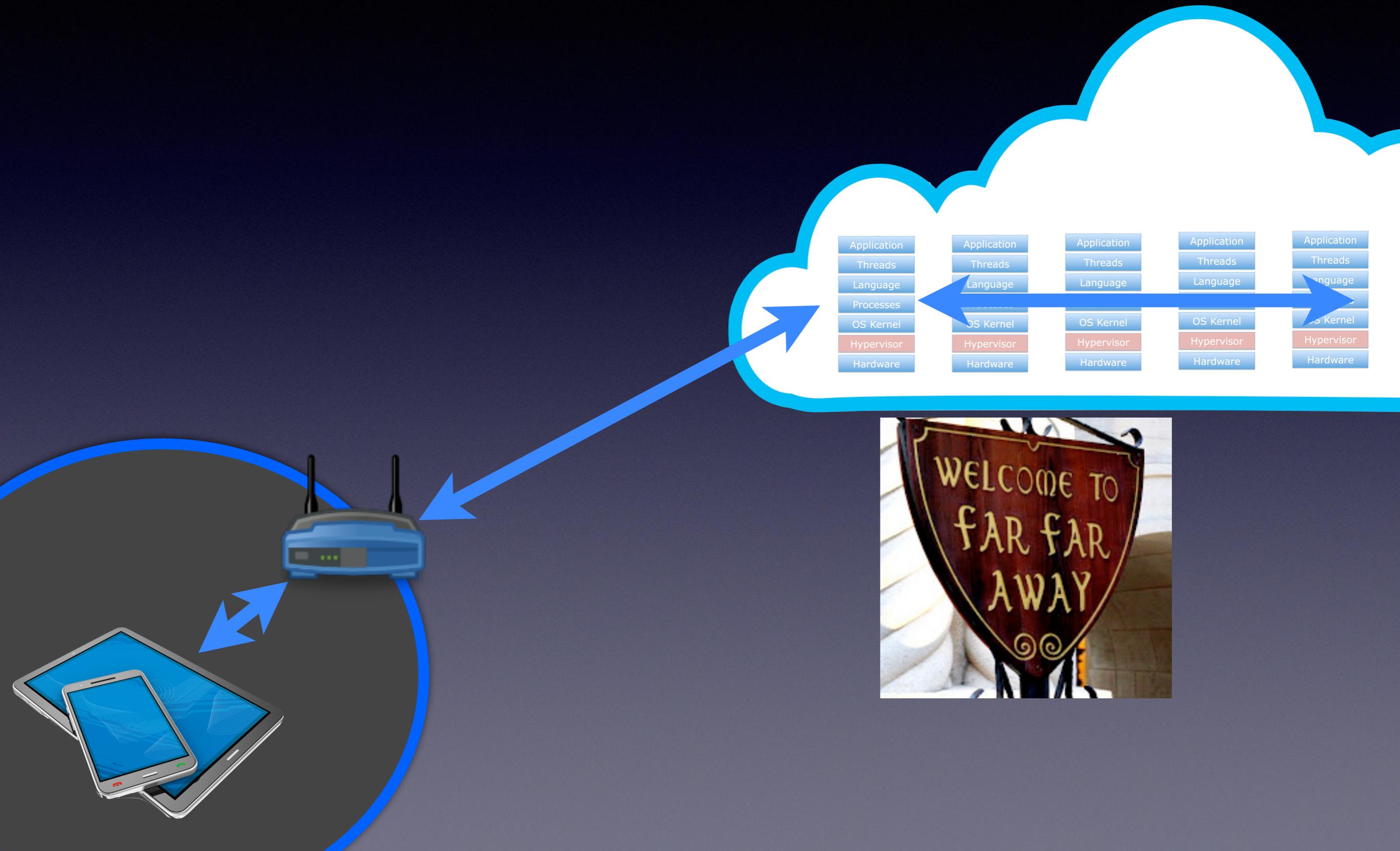
YAHOO!



Microsoft

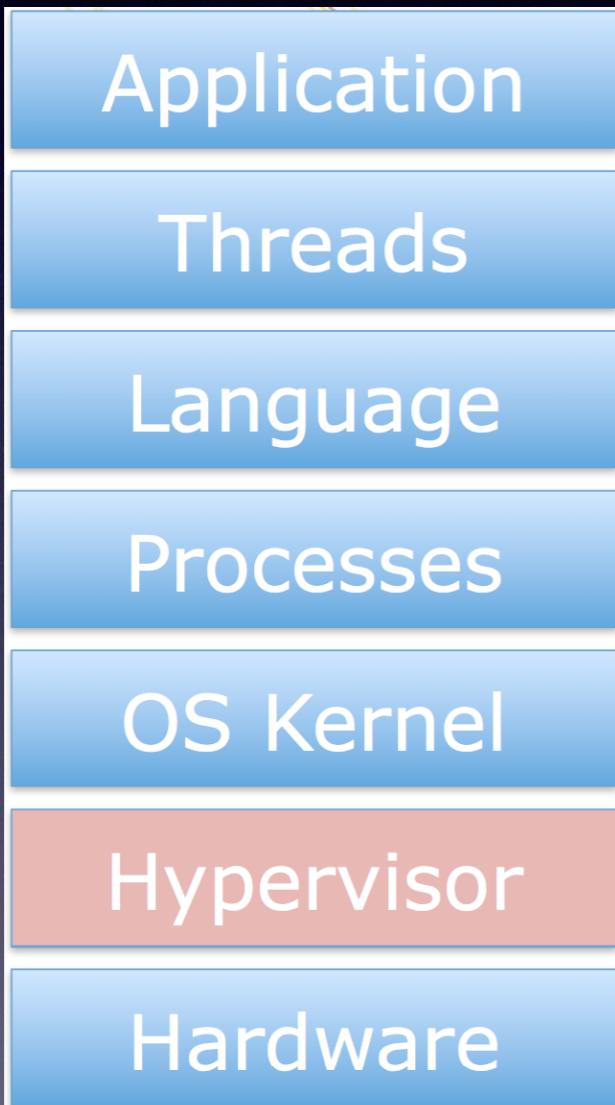
amazon.com®

The Cloud



The Cloud

Monolithic OS



Millions of lines of code

Inefficient at scale

Insecure & leaky layering

Complex to reason about

*Why did we build for clouds
as we do for desktops?*

The Cloud

Complexity leads to security issues

Heartbleed: 17% of all Internet secure web servers vulnerable to a single bug.

ShellShock: CGI, Web, DHCP all vulnerable to code execution.

Breaches: e.g. JP Morgan and Target

The Cloud

People thinking of alternatives

Advertising? - Pitiful opt-out experience

Multiple services? - Too many passwords

Surveillance? - Who's watching you?

The Cloud

We already know the answer

- Decentralised services that run near users
- Reduce remote data transmission
- Better security and isolation of edge nodes

Take the cloud to the edge

New Technology

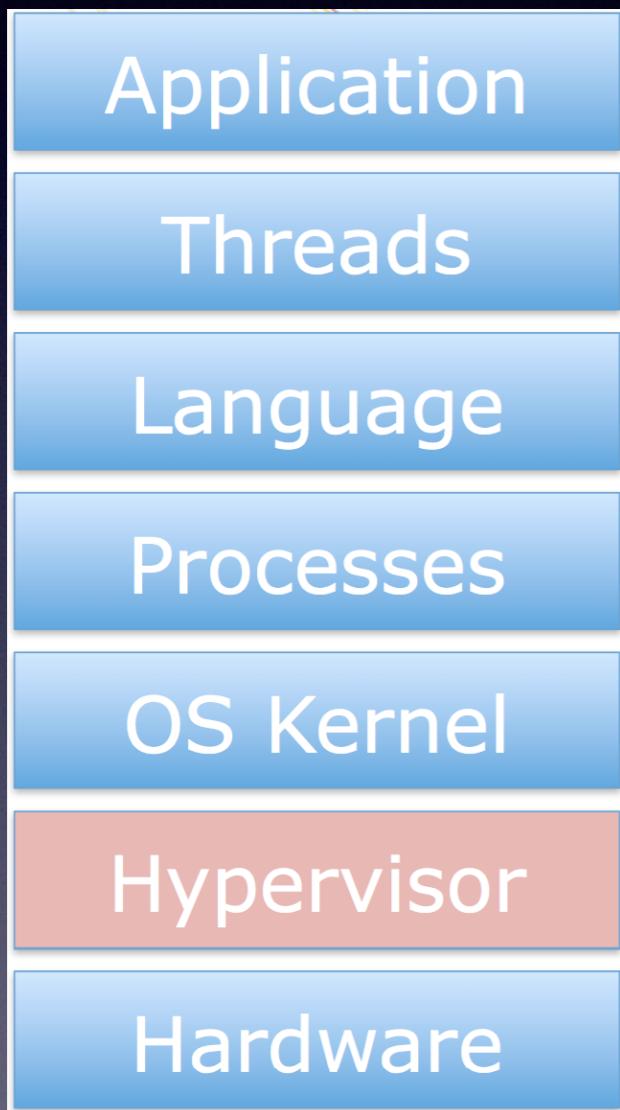
Clean-slate approach

- **Mirage OS** - produces *unikernels* for cloud and edge devices
- IoT is a Distributed Systems problem

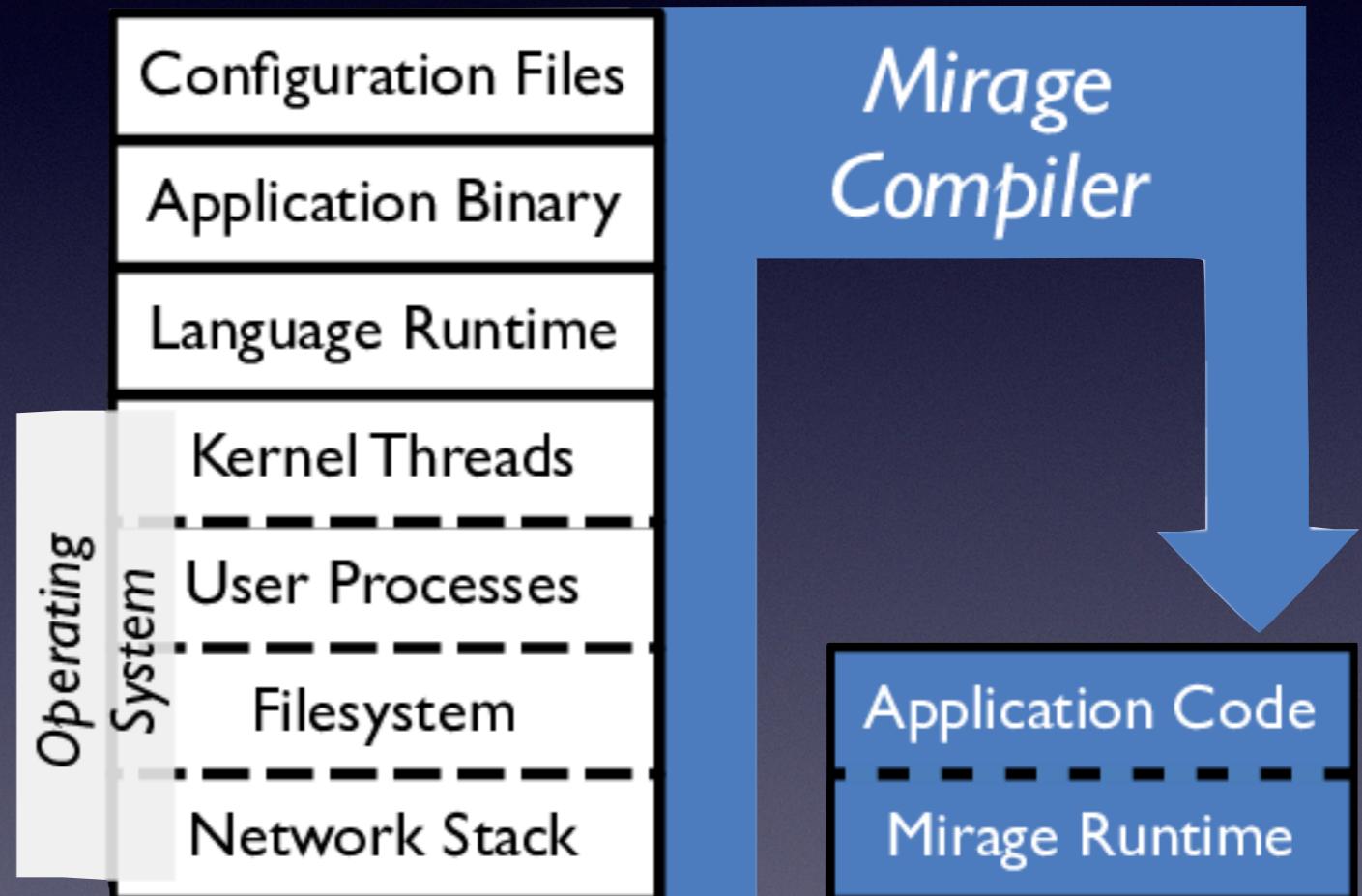
Build new kinds of products!

MirageOS

The Old Way



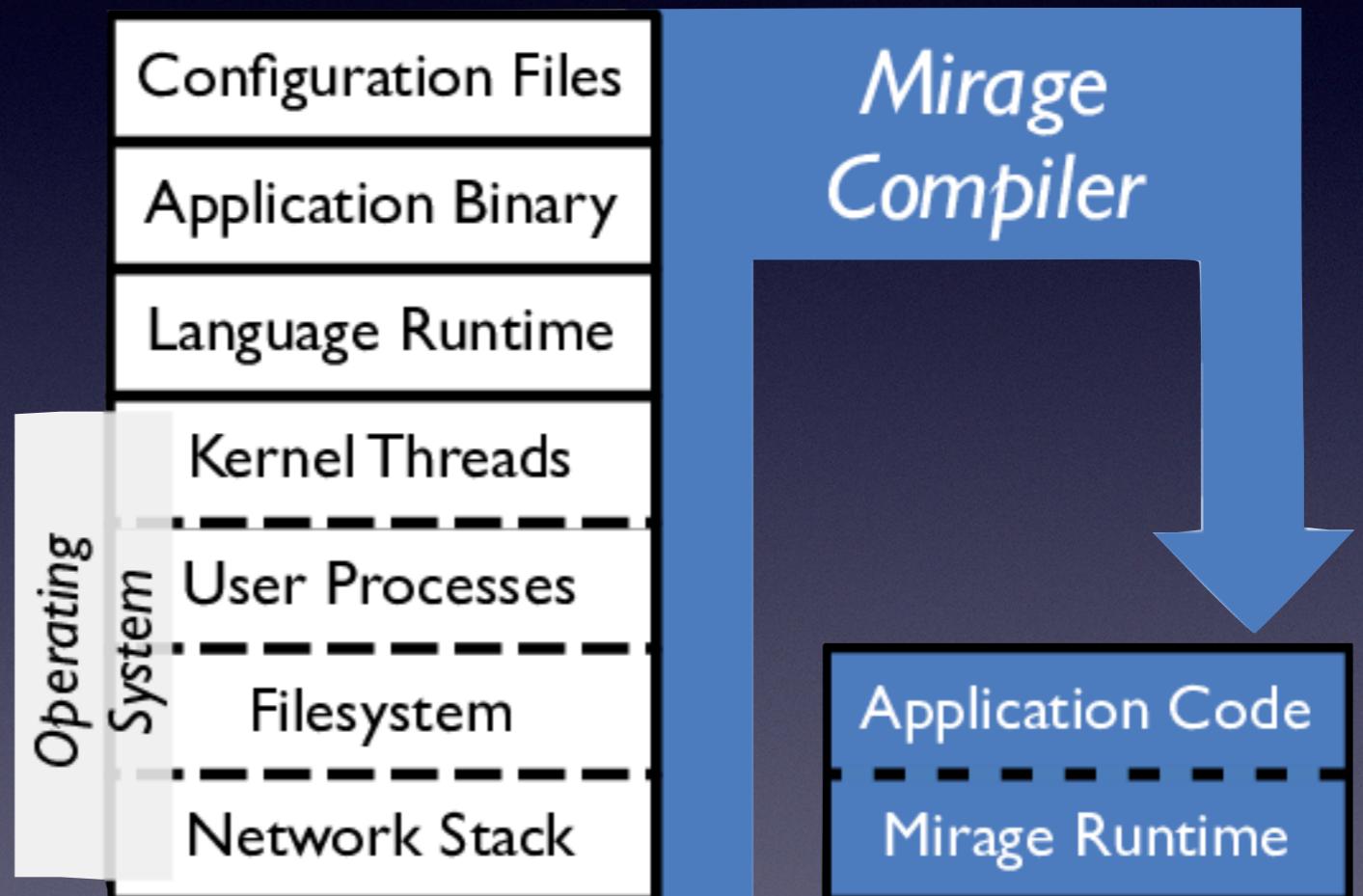
The Unikernel Way



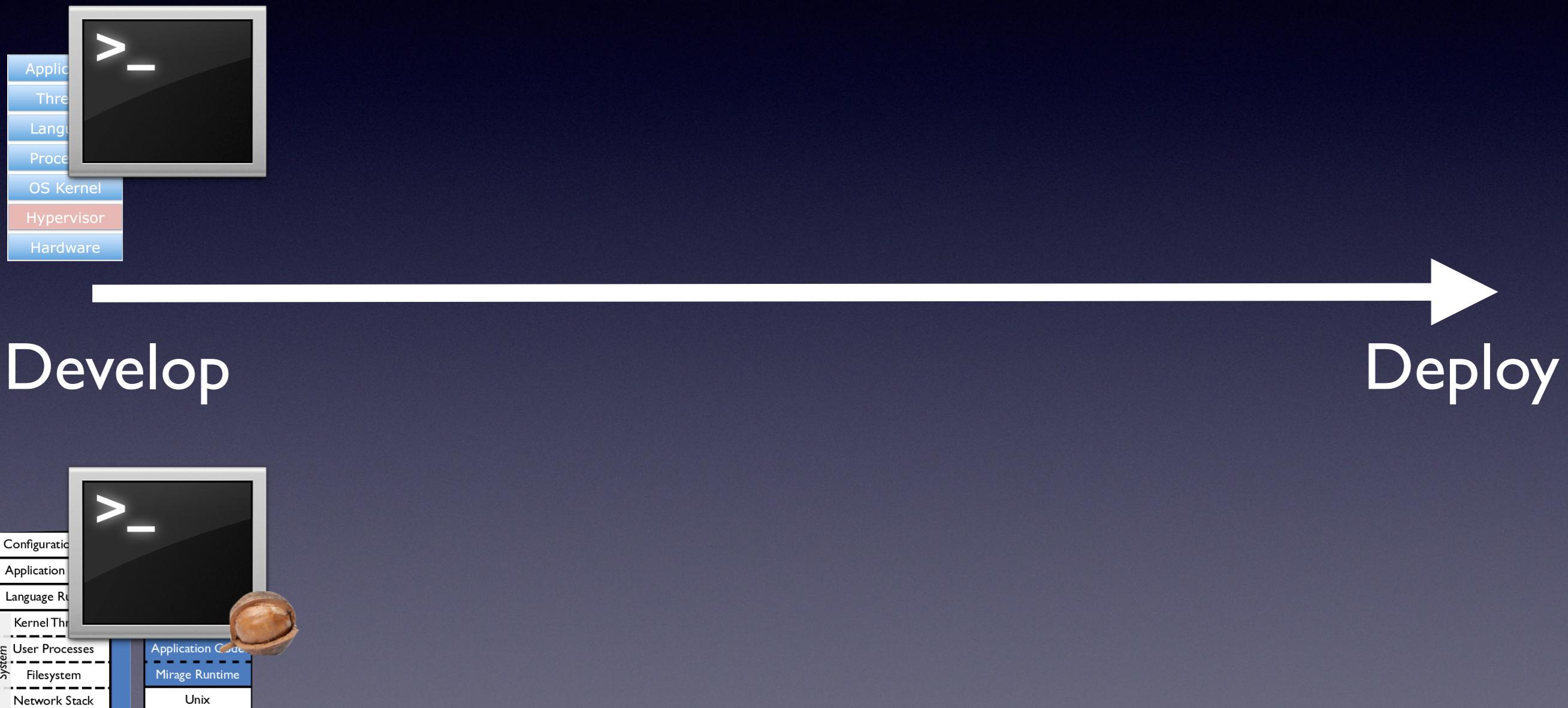
MirageOS

The Unikernel Way

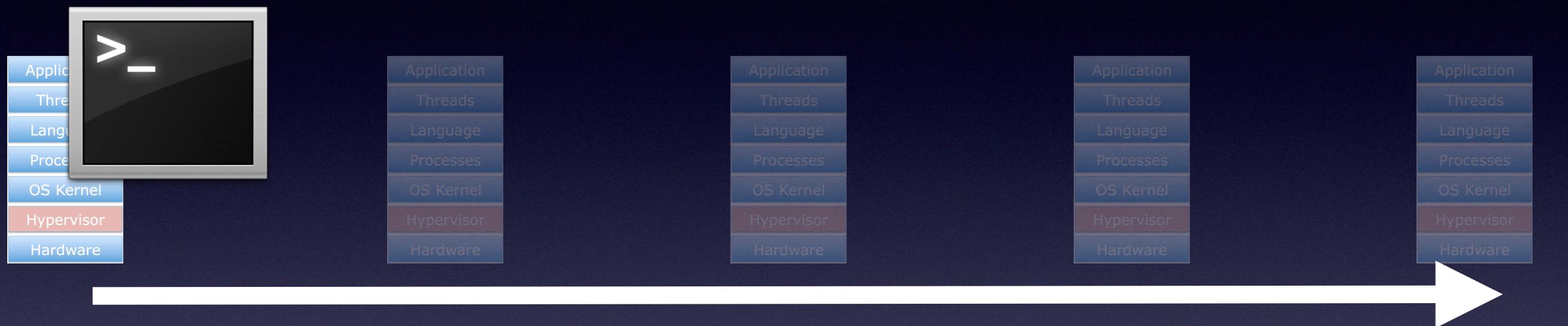
Unikernels are specialised virtual machine images compiled from the full stack of application code, system libraries and config



MirageOS

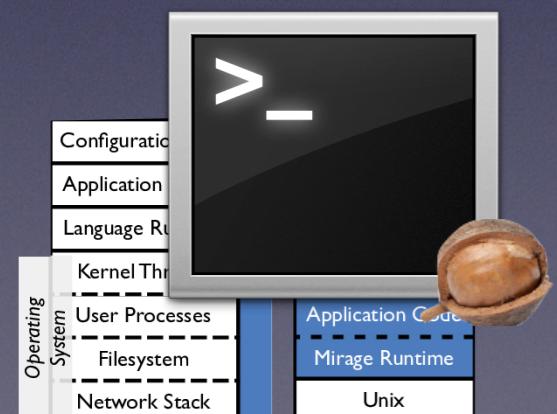


MirageOS



Develop

Deploy

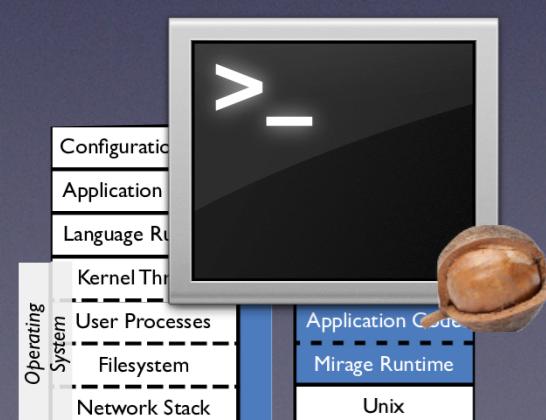


MirageOS



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Deploy

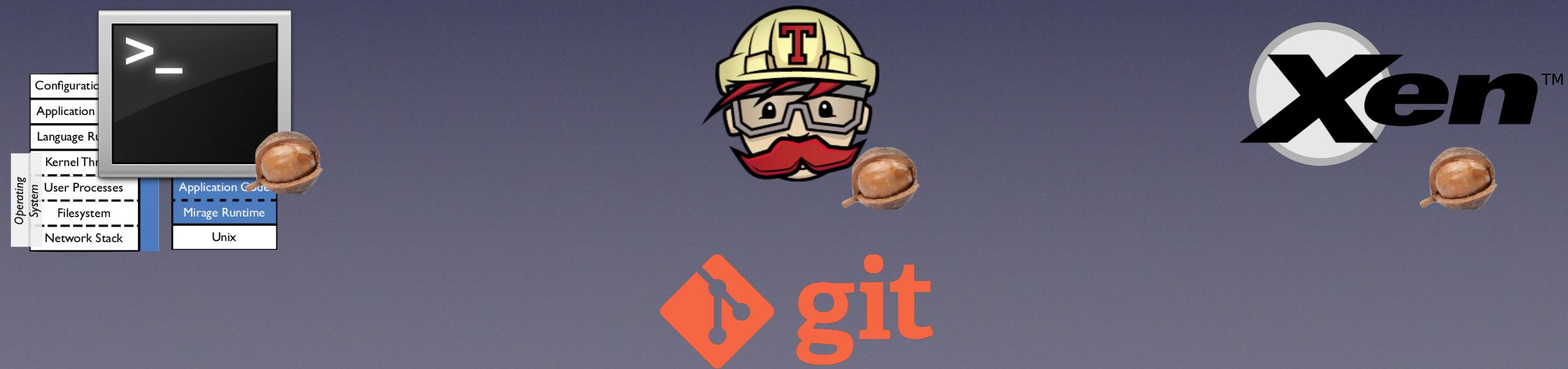


MirageOS



Develop

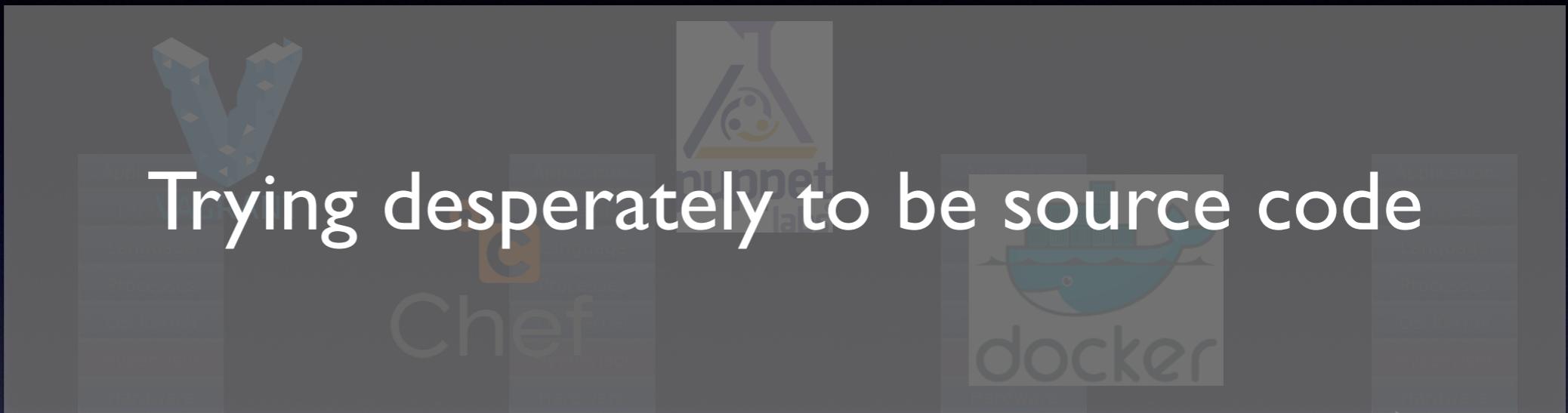
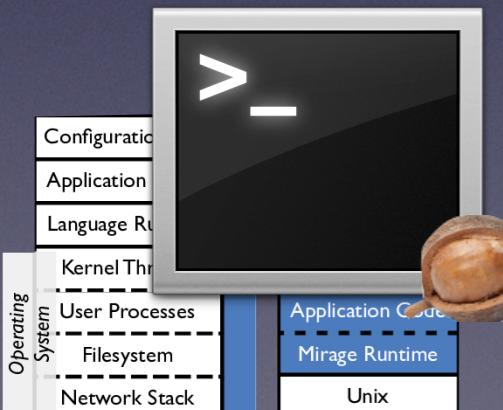
Deploy



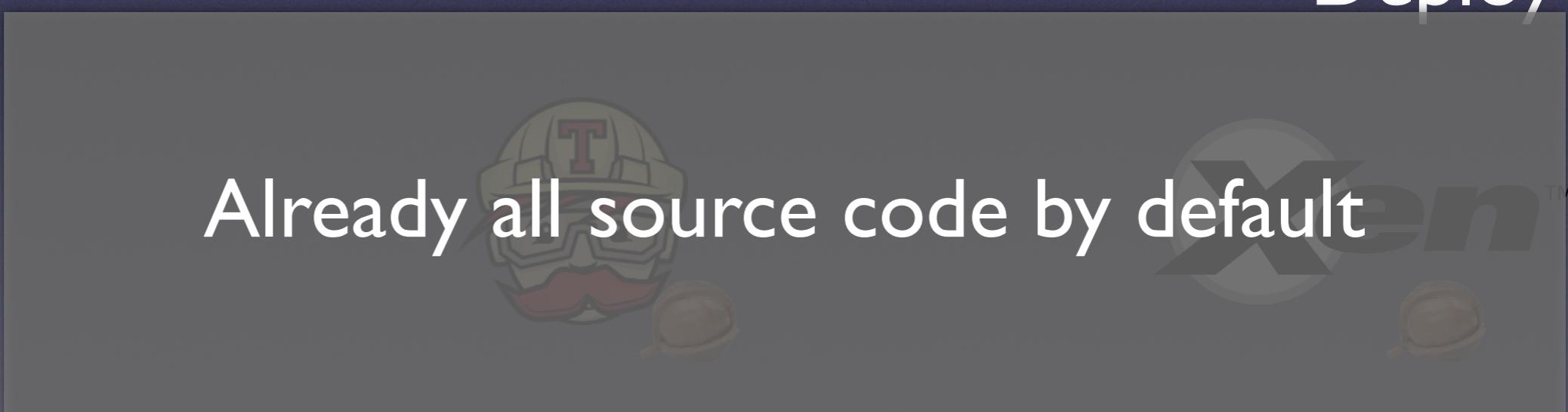
MirageOS



Develop



Deploy



Effect on products?

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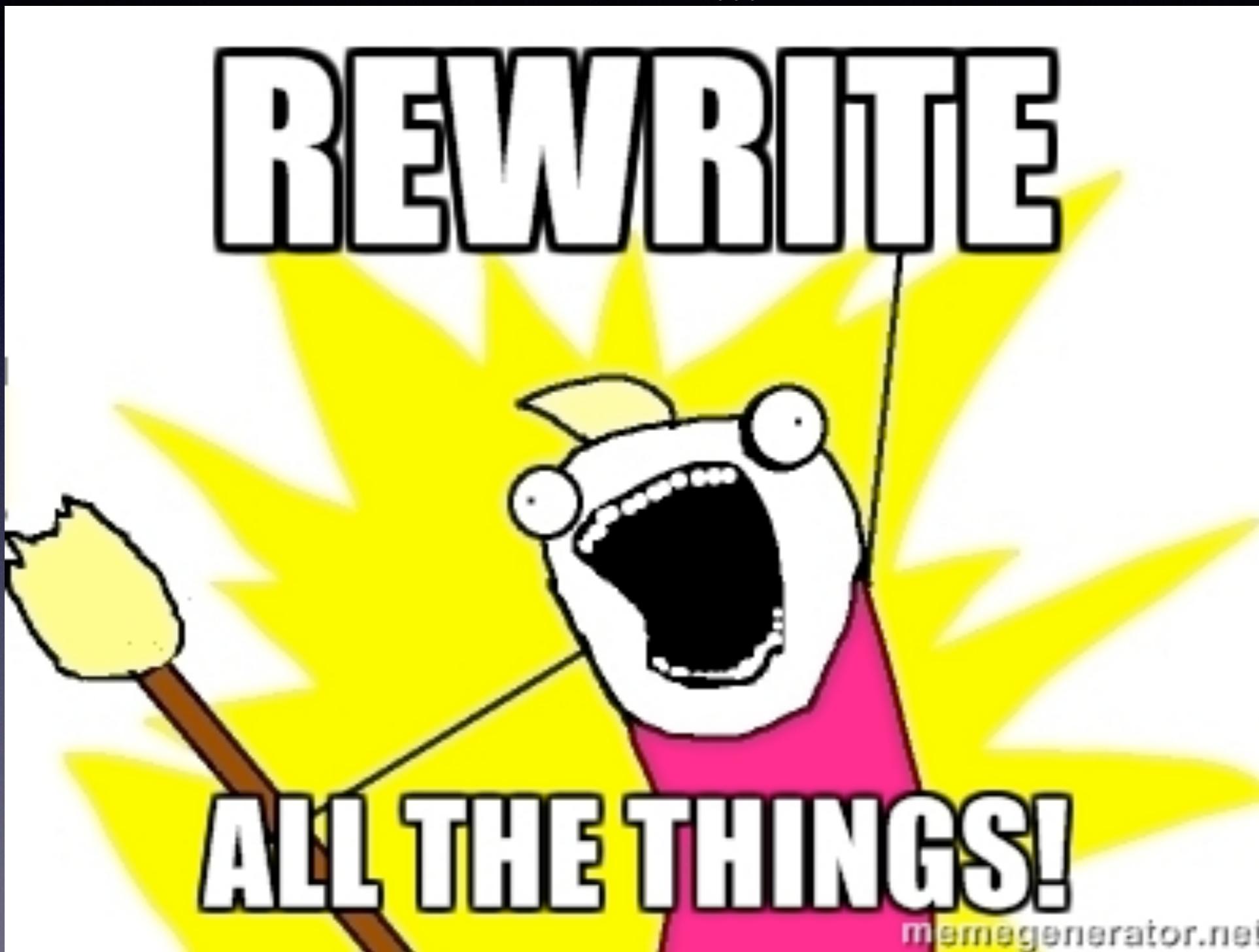
- Less need for centralised services
- Different business models!
- Write better software/services

Effect on products?

...

- New mechanisms for feedback
- Change of mindset/approach
- Rewrite all the things!

Effect on products?



When?

...

Several years away

- More info at openmirage.org
(and nymote.org)
- Reach me at @amimc