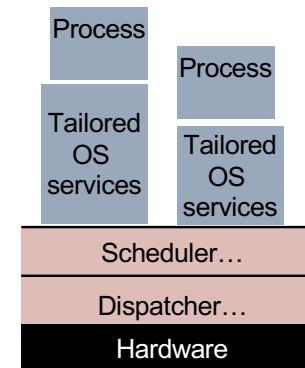


2025 T2 Week 02

Process Abstractions II: Library OS

Gernot Heiser



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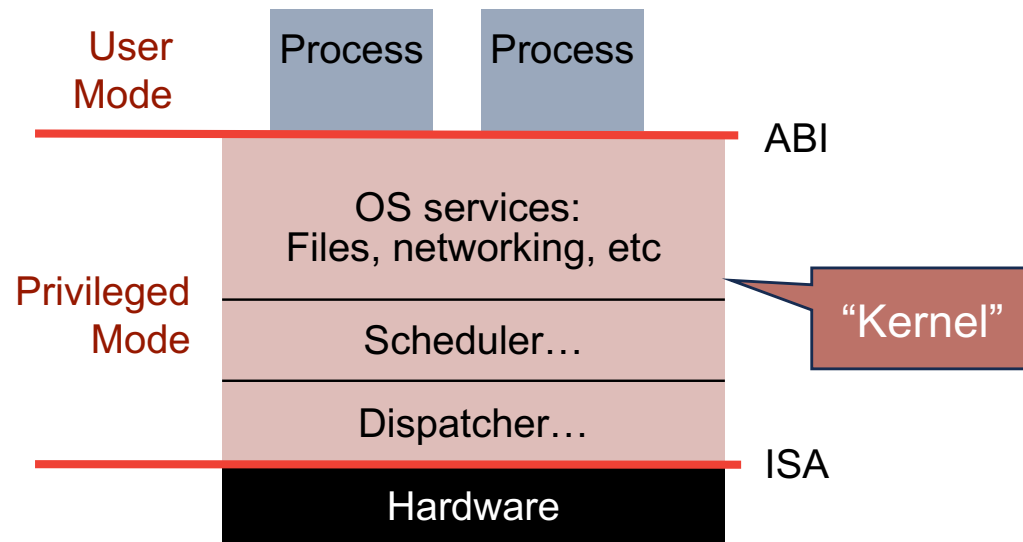
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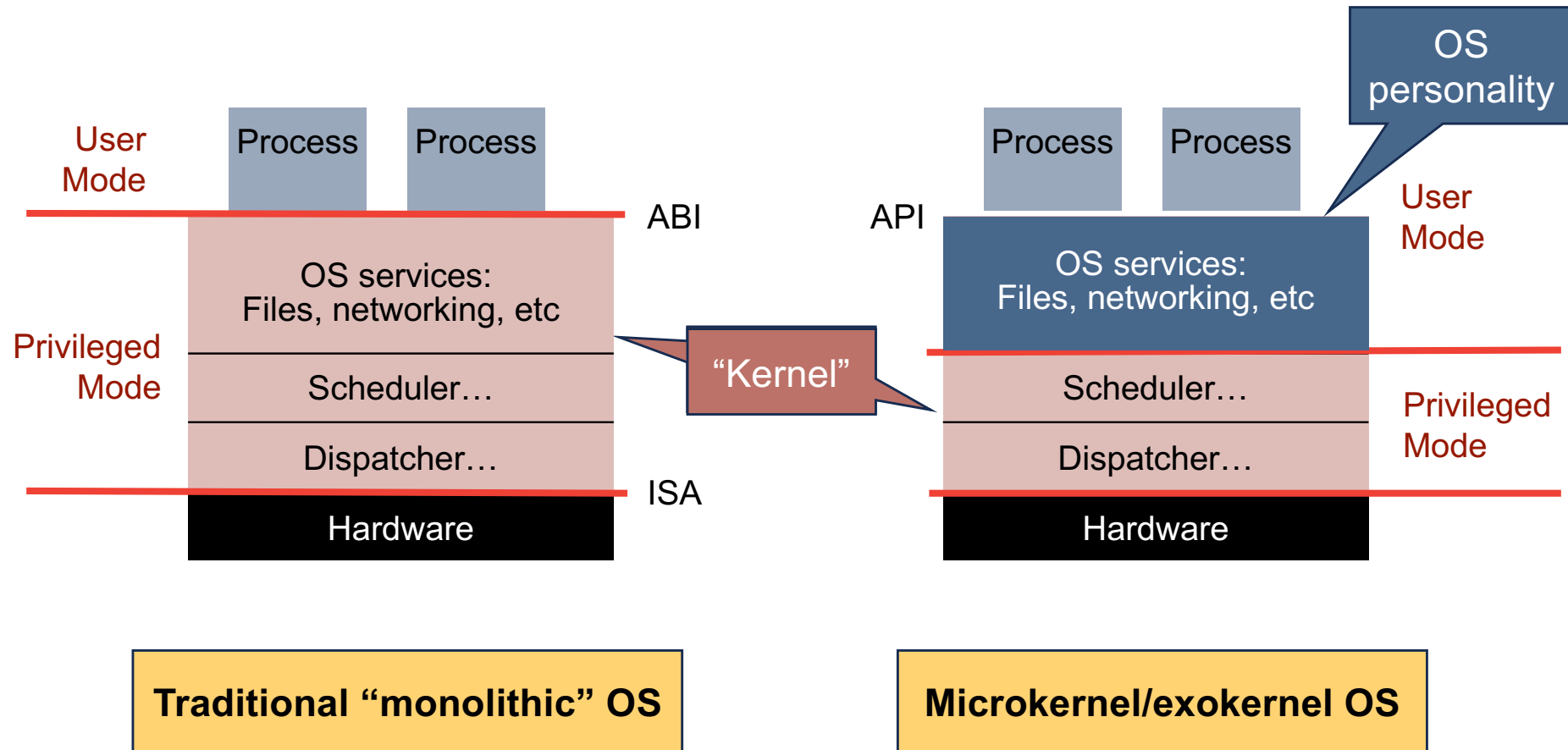
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What's a Library OS?

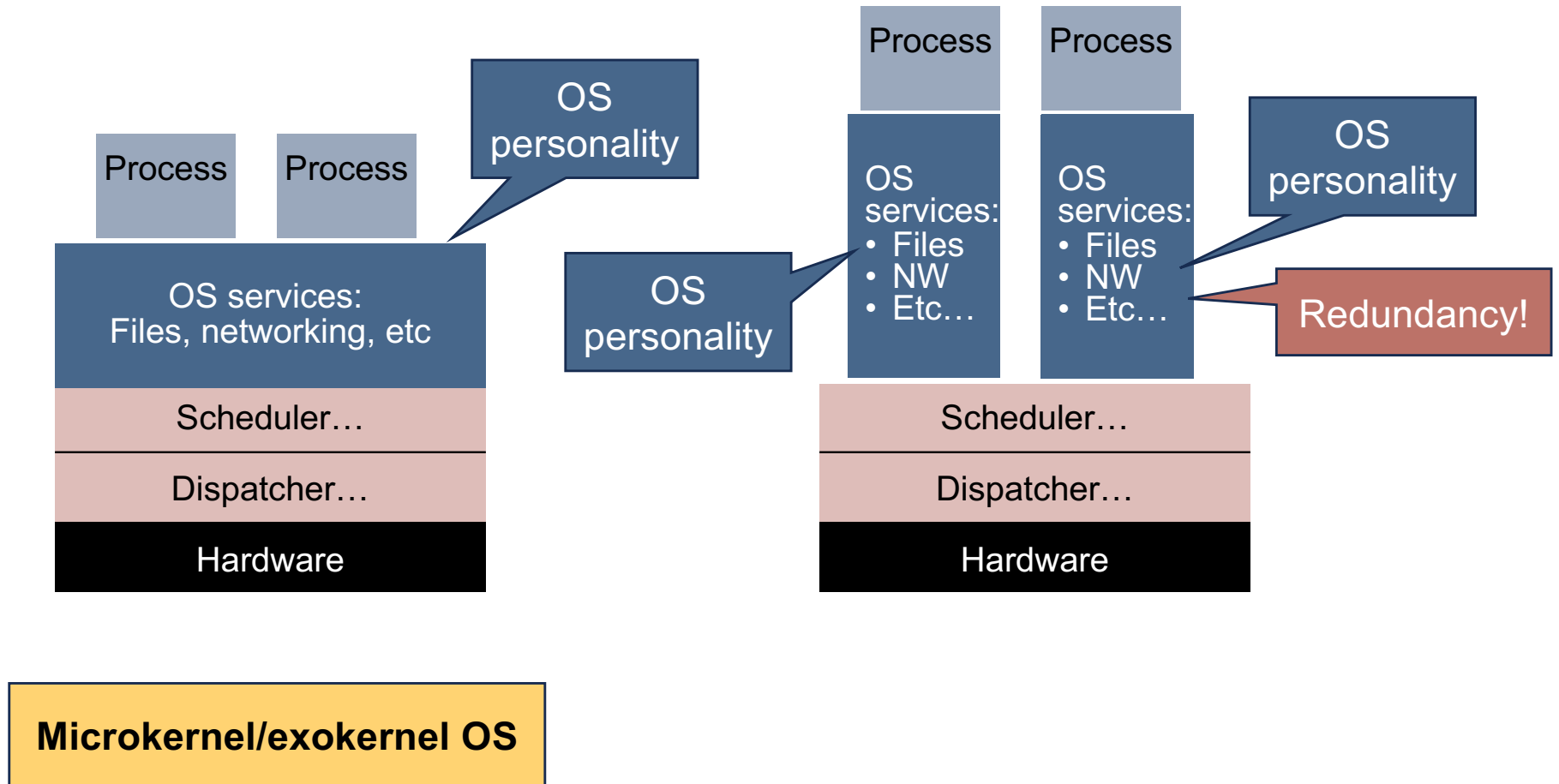


Traditional "monolithic" OS

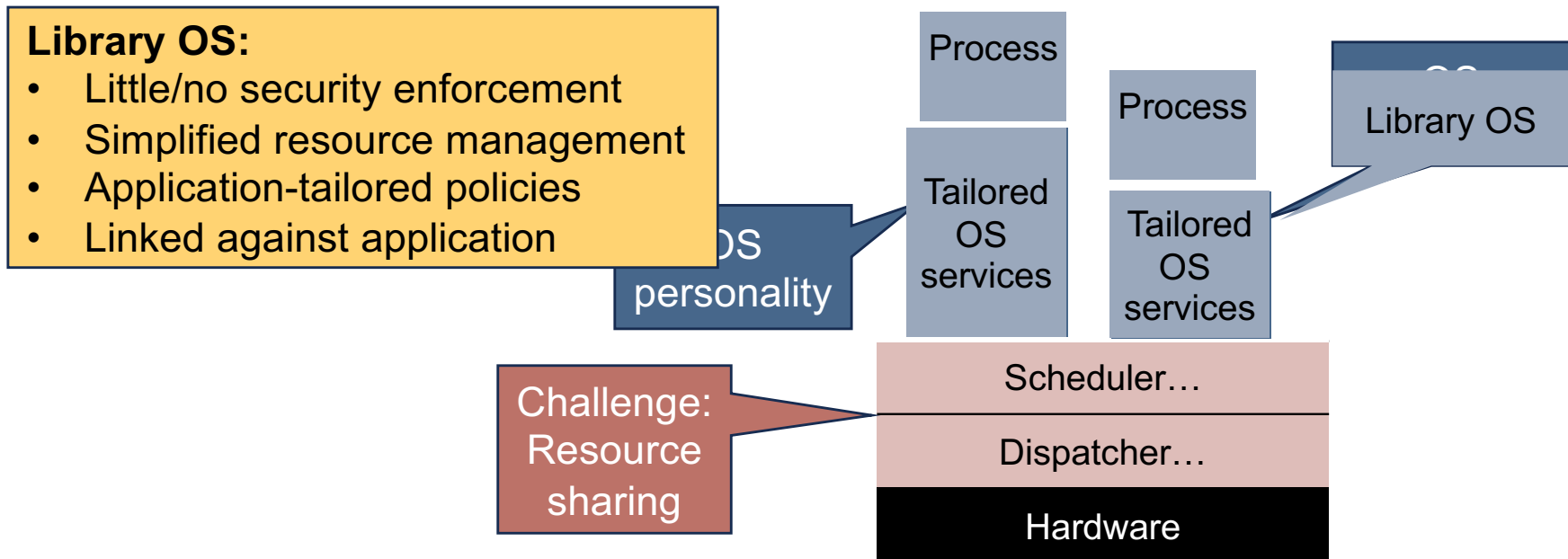
What's a Library OS?



What's a Library OS?



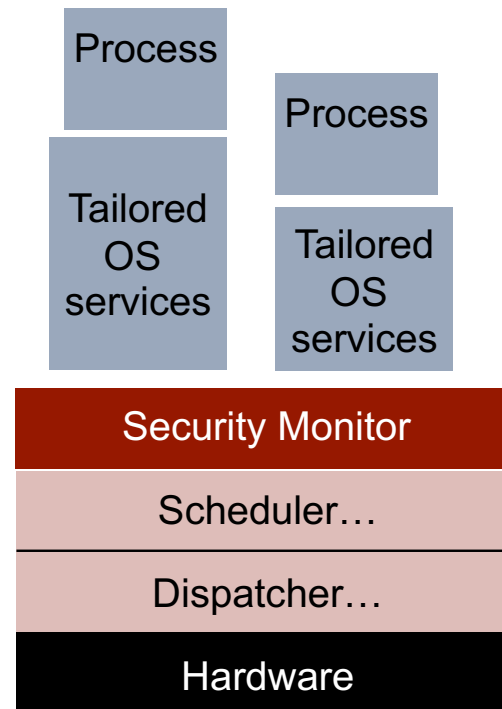
What's a Library OS?



What's a Library OS?

Library OS:

- Little/no security enforcement
- Simplified resource management
- Application-tailored policies
- Linked against application



Drawbridge

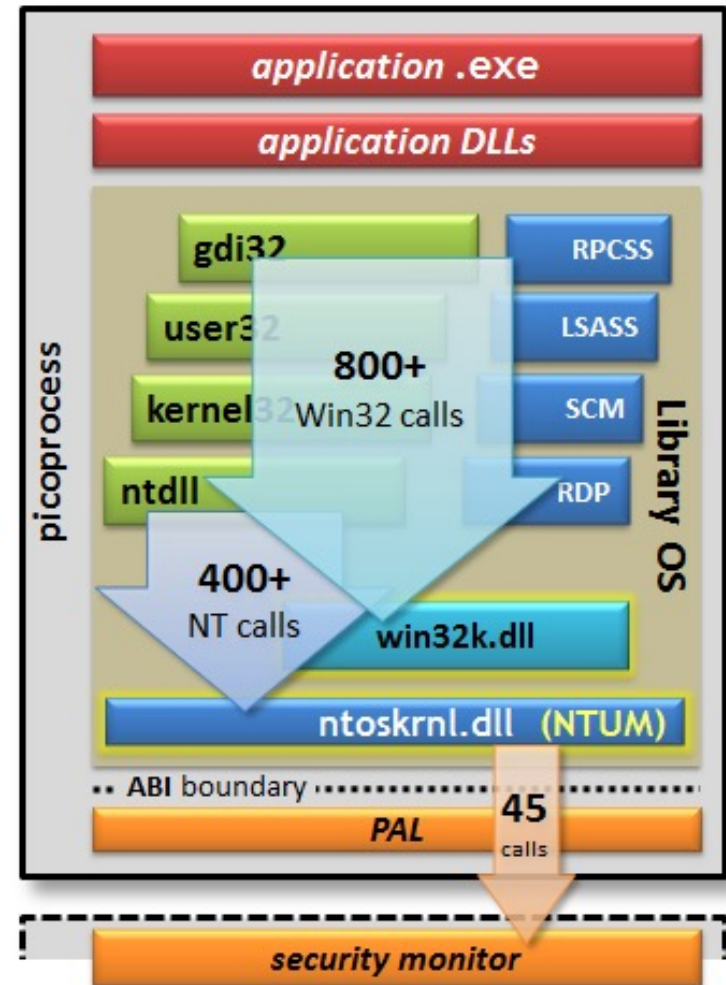
Donald E. Porter, Silas Boyd-Wickizer, Jon Howell, Reuben Olinsky, and Galen C. Hunt. 2011.

Rethinking the library OS from the top down.

In Proceedings of the sixteenth international conference on Architectural support for programming languages and operating systems (ASPLOS XVI).

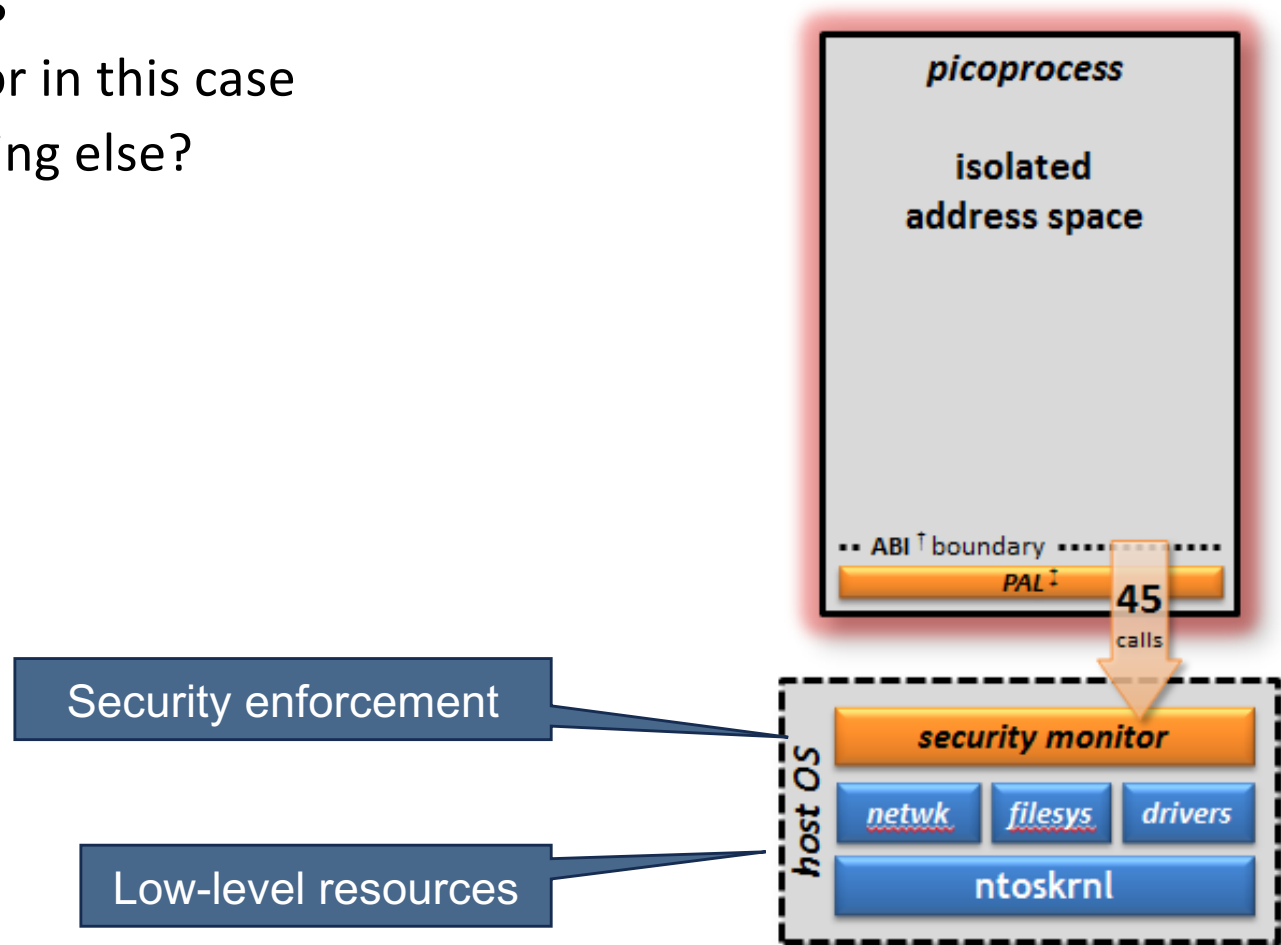
Drawbridge Library OS

- Traditional library OS changes API
 - loss of portability
- Idea: refactor OS:
 - (mostly) API-compatible OS services in library
 - uses small subset of host OS (kernel) services
- The underlying OS API is smaller
 - Easier to get correct
 - Easier to make secure

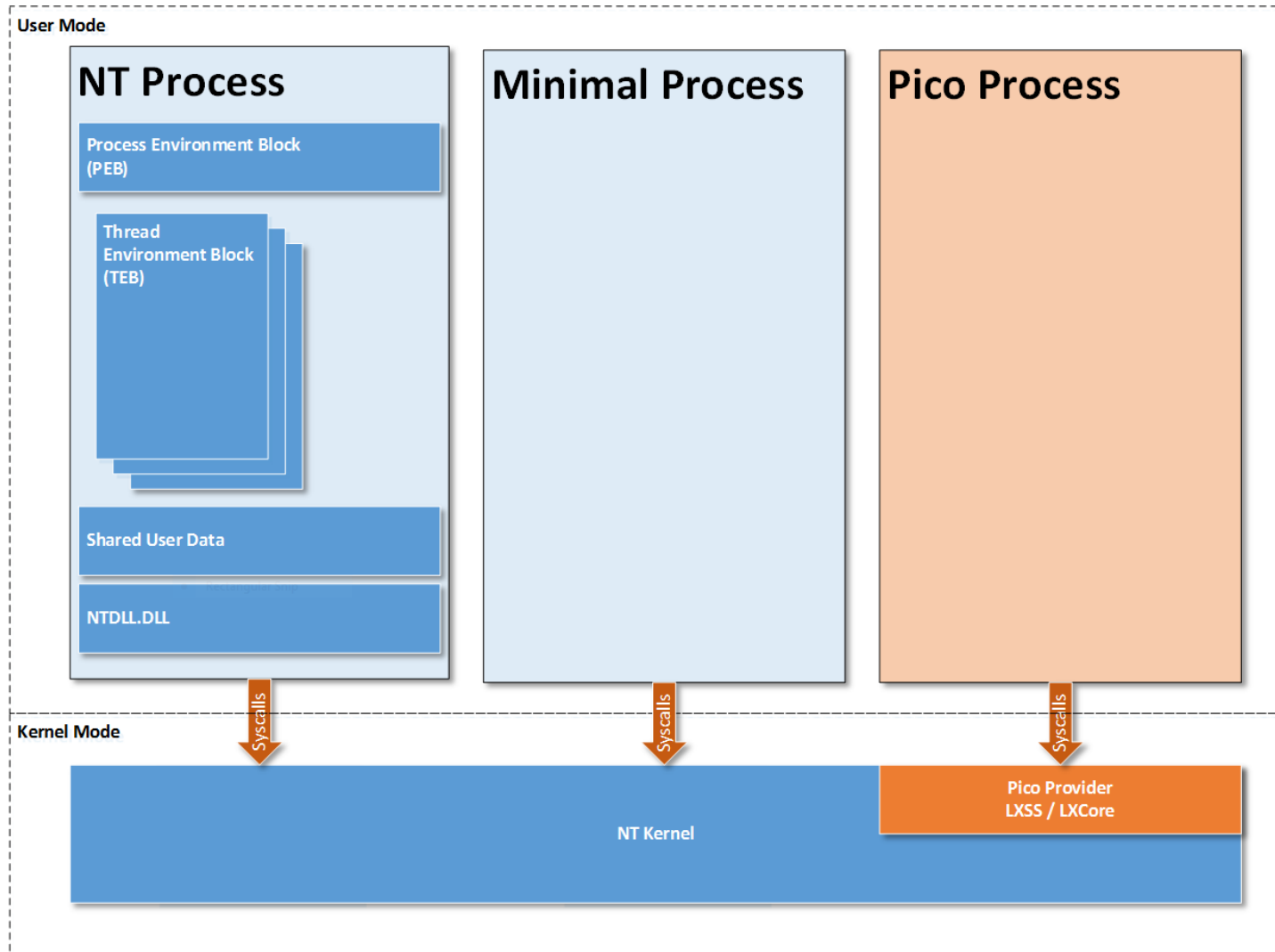


“Pico Process”

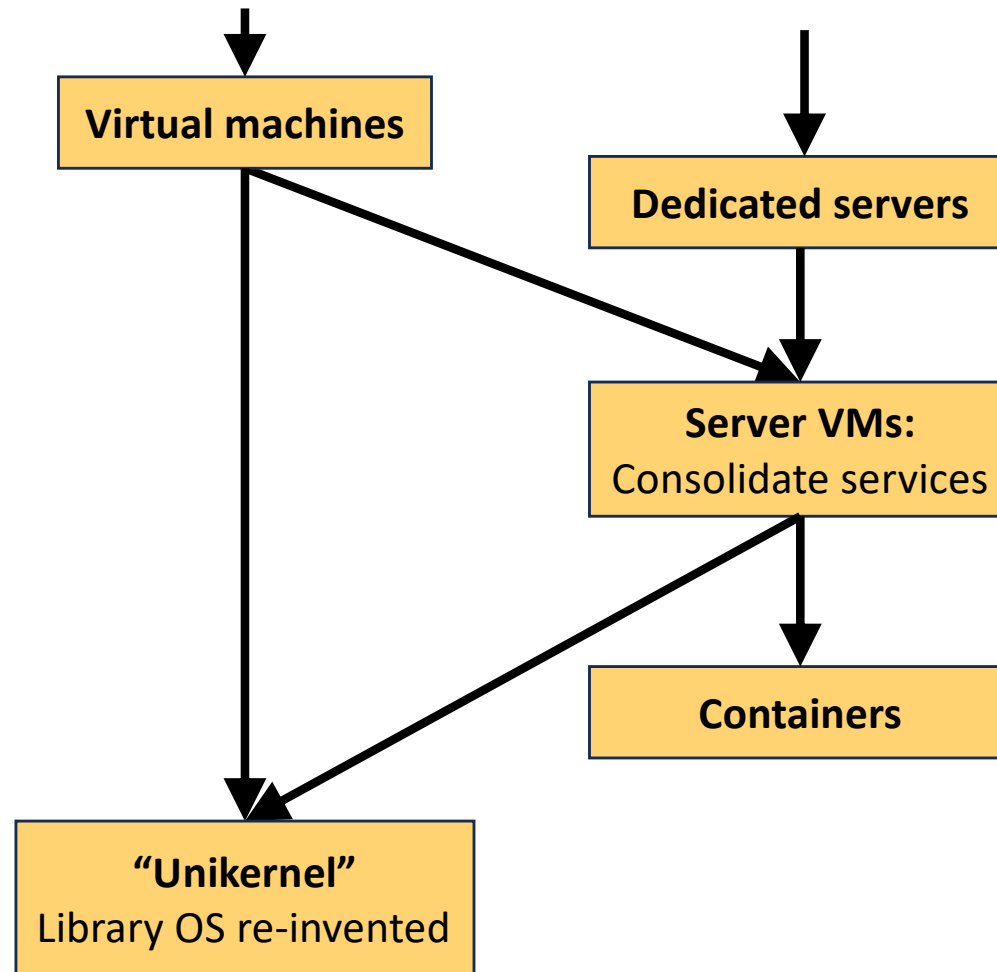
- An isolated process with different system call interface to normal processes
 - A security monitor in this case
 - Could be something else?



Windows Subsystem for Linux



The Return of the Virtual Machines



Unikernel

Unikernel:

- A library OS running in a VM
- Also “rump kernel” etc...

