LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Marius Rusu, Julia Sommer

Windows Subsystem for Linux

Proseminar Virtualisierte Systeme
Aufgabensteller: Prof. Dr. Dieter Kranzlmüller
Betreuer: Daniel Kolb
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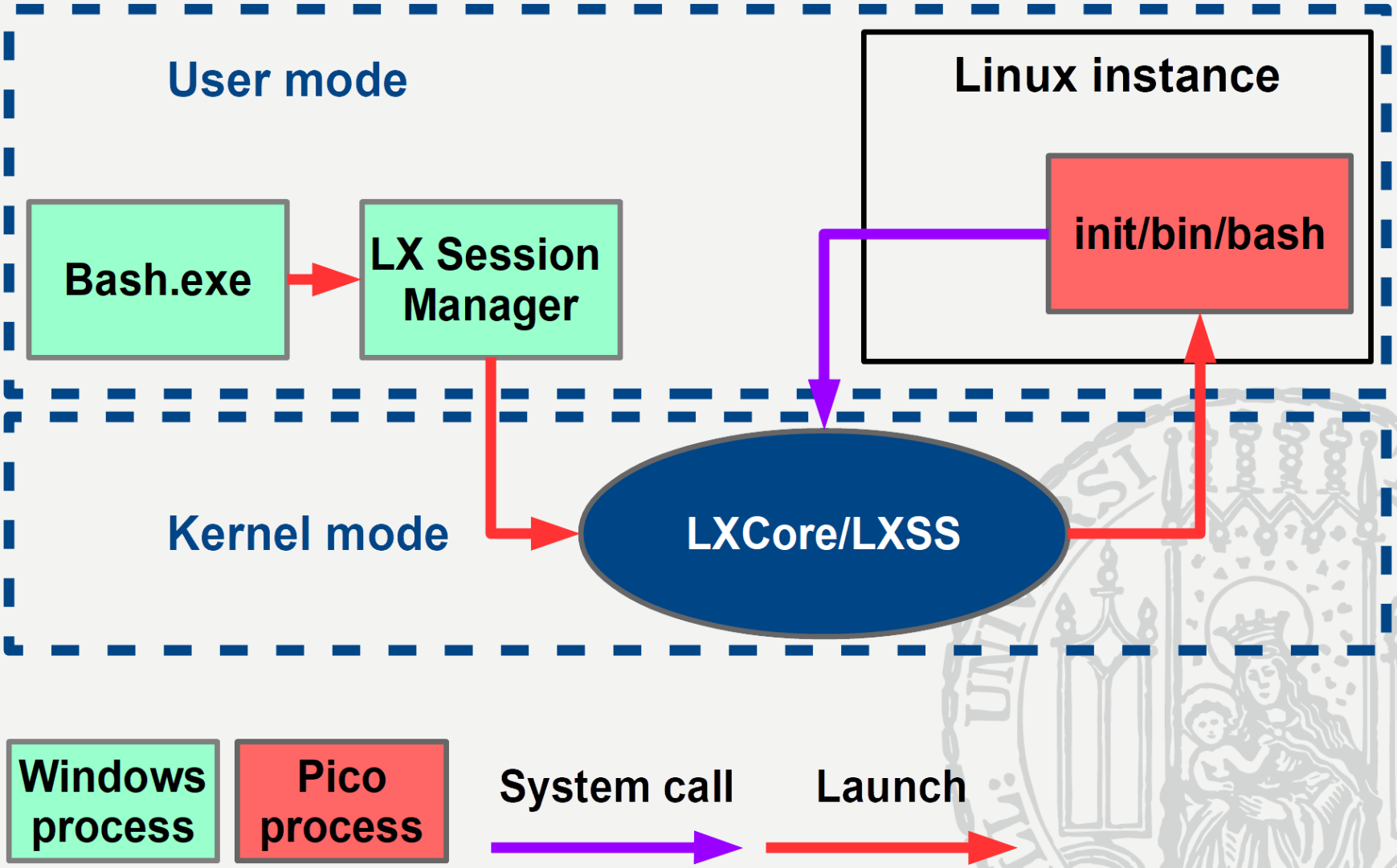
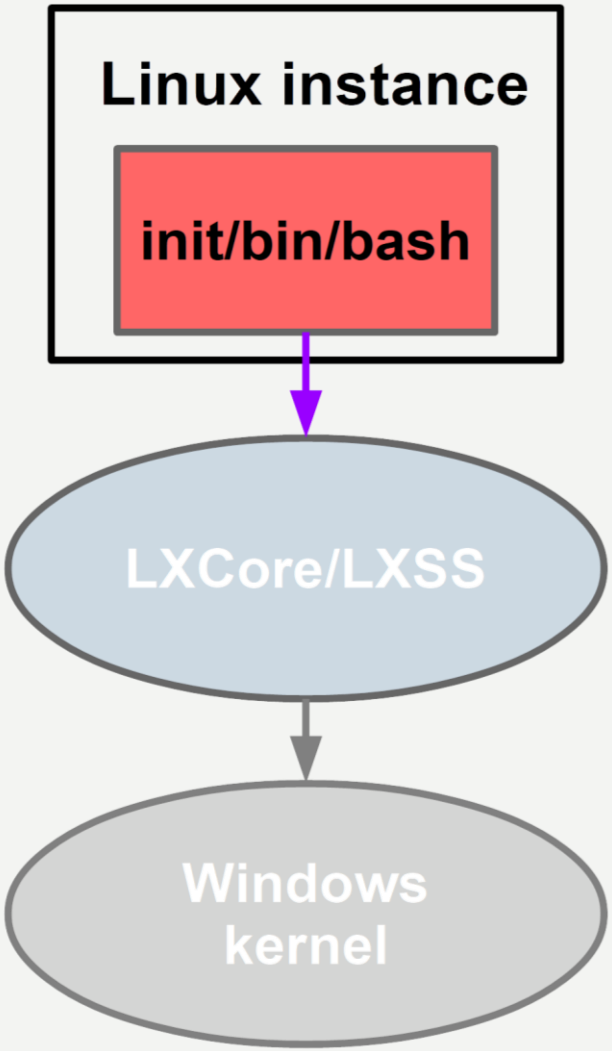
Basic Architecture [1]



Implementation [1,2]



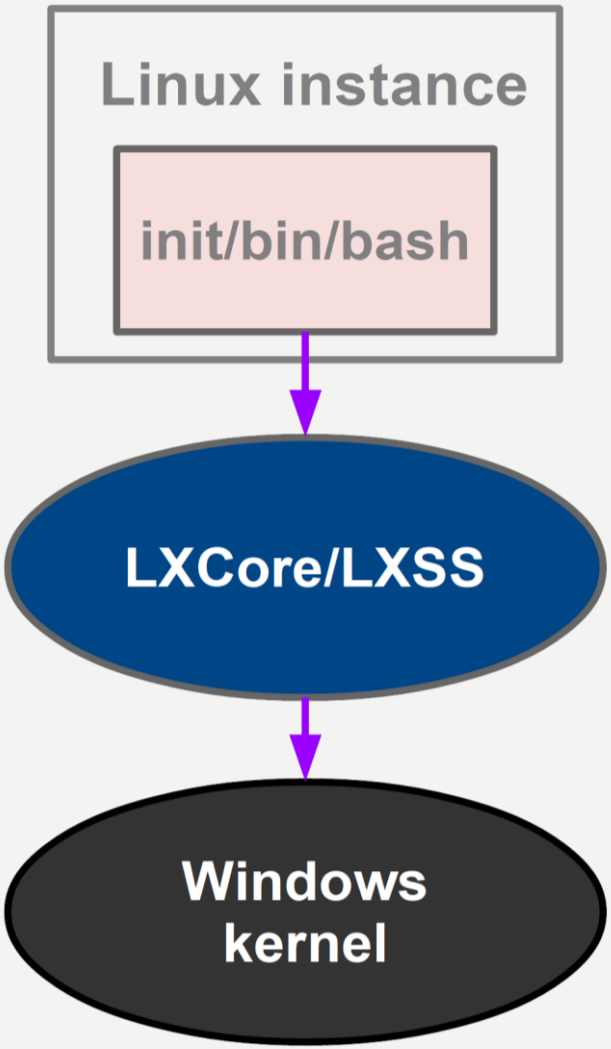
Linux instance

- Unique per user
- Standard Linux shell
- Wrapped in Pico processes

Pico process

- Windows process address space
- OS services removed
- System calls served by LXCore/LXSS

Implementation [1,2]



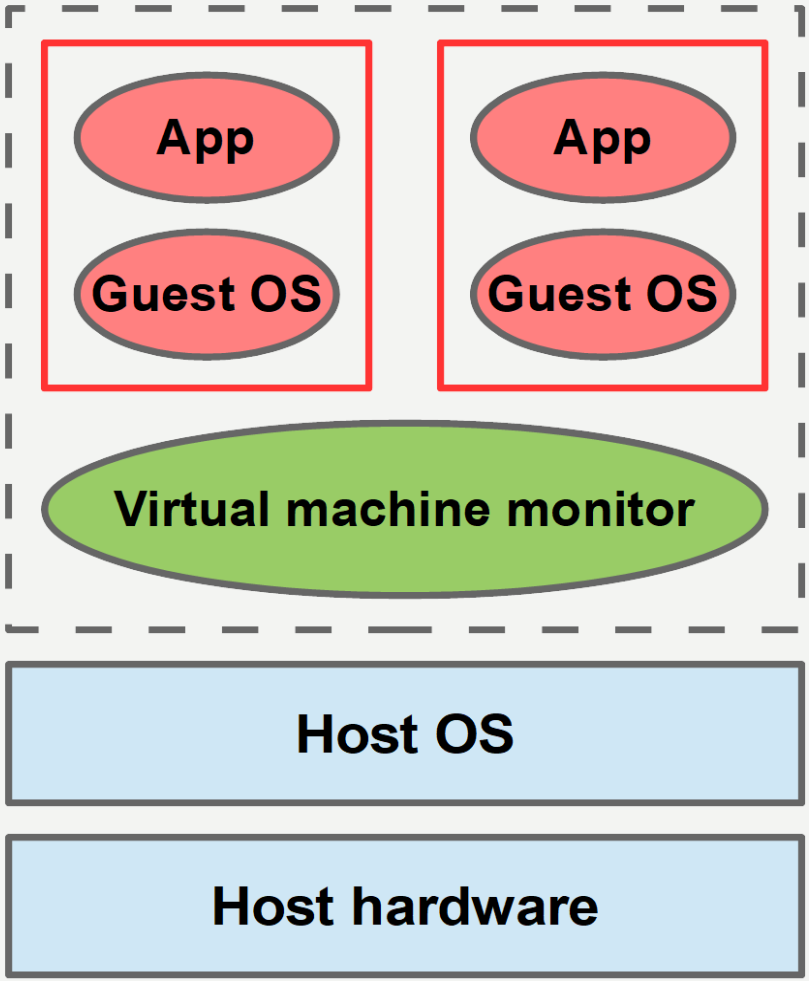
LXCore/LXSS

- Linux-compatible kernel interface
- No implemented Linux kernel code
- Translation from Linux system calls to Windows system calls

Windows Kernel

- Optimized for Linux system calls e.g. fork
- Execution of Linux operations

Virtual Machine [4]



Virtual Machine

- Running different guest OS
- Fully isolated from host OS
- Hypervisor: VMM

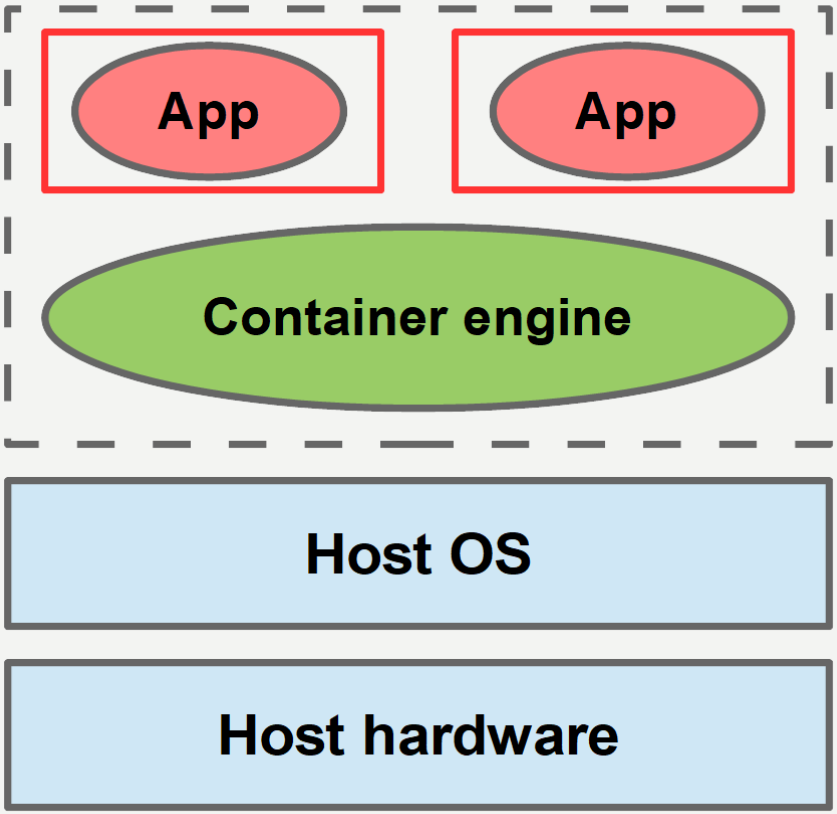
Virtual machine monitor (VMM)

- Hosting virtual machines
- Coordinating hardware access
- Handling traps

Traps

- Privileged operations
- Emulated by VMM

Container [4]



Container

- Running different applications
- Sharing host OS kernel
- Key component: Container engine

Container engine

- Deploying containerized applications
- Allocating cores and memory
- Ensuring isolation and security

Comparison [3]

	WSL	VM	Container
Key Component	LXCore/LXSS	VMM	Container engine
Range of virtualization	Linux bash	Any guest OS	Any guest process
Isolation from Host OS	Not isolated, cooperation	Isolated	Isolated
Parallel running units	Only one Linux instance	Multiple	Multiple
Isolation between running units	-	Isolated	Isolated, but sharing kernel
Sharing file sytem	Sharing with host OS	Not sharing with host OS	Not sharing with host OS or units
I/O Speed	Very slow	Fast	Very fast
Use of hardware resources	Very low	Very high	Low

References

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[2] Microsoft: Drawbridge, https://www.microsoft.com/en-us/research/project/drawbridge/?from=http%3A%2F%2Fresearch.microsoft.com%2Fen-us%2Fproject%20s%2Fdrawbridge%2F, Online, accessed 30-April-2018; 19.38 Uhr, Sept. 2011

[3] Larabel, M.: Windows 10 WSL vs. Linux Performance For Early 2018, https://www.phoronix.com/scan.php?page=article&item=wsl-february-2018&num=2, Online, accessed 30-April-2018; 20.14 Uhr, Feb. 2018

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