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Morello Linux

Technical Introduction

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Morello Linux Agenda

- “Our Motto”
- Status of Morello Linux
- Morello Linux kernel overview (Kevin)
- Integration Drop 1.8.1
- Morello Linux Demo
- Our Community

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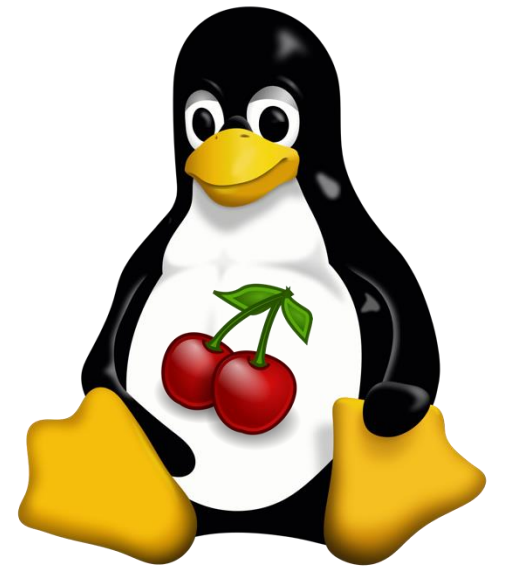
Morello Linux

“Our Motto”

Morello Linux – “Our Motto”

Let Linux developers focus on their capability based usecase.

Meaning: Enable Linux [developers](#) to develop/port their Linux applications on the Morello architecture and [researchers](#) to target security and performance investigations in userspace.

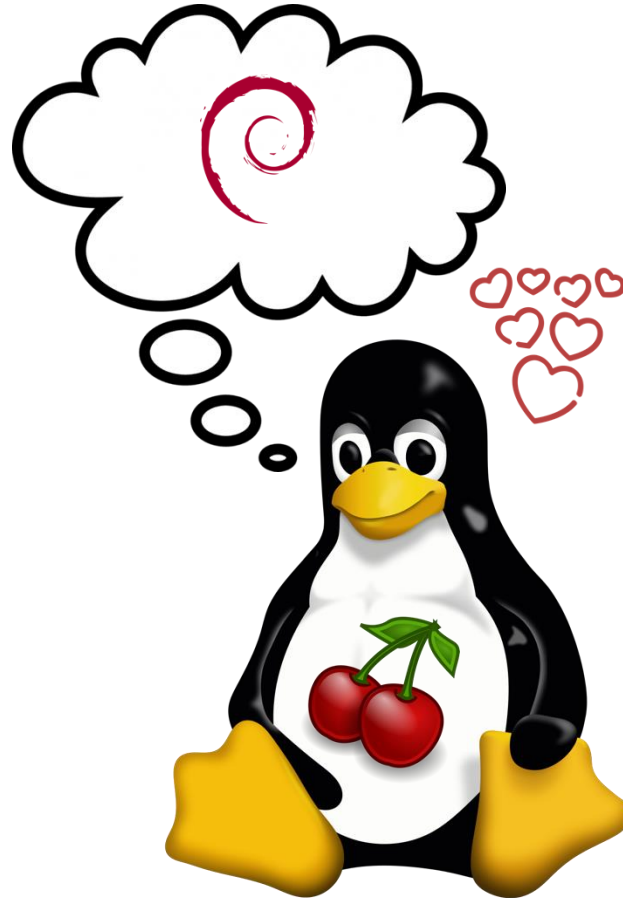


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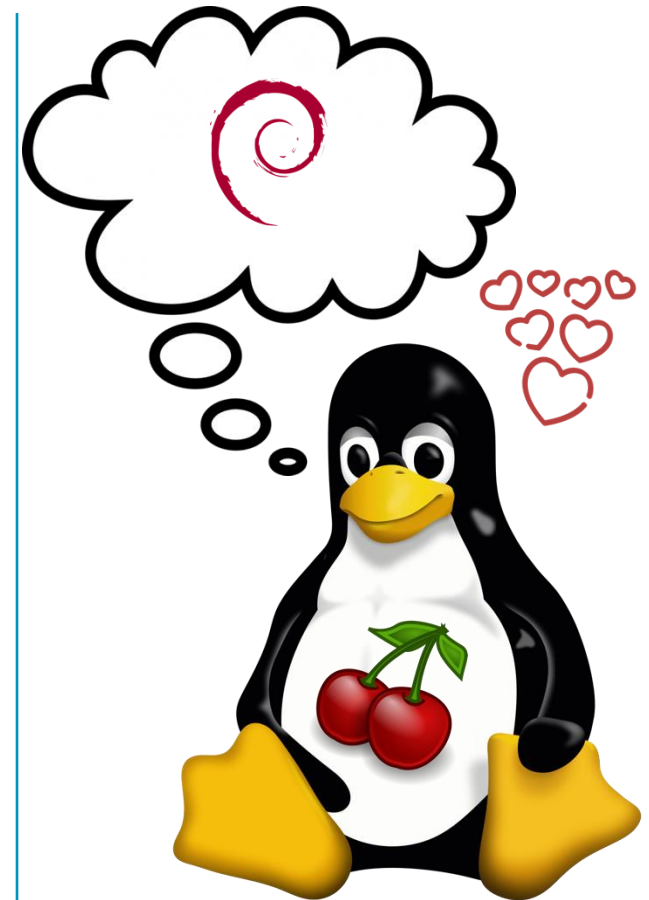
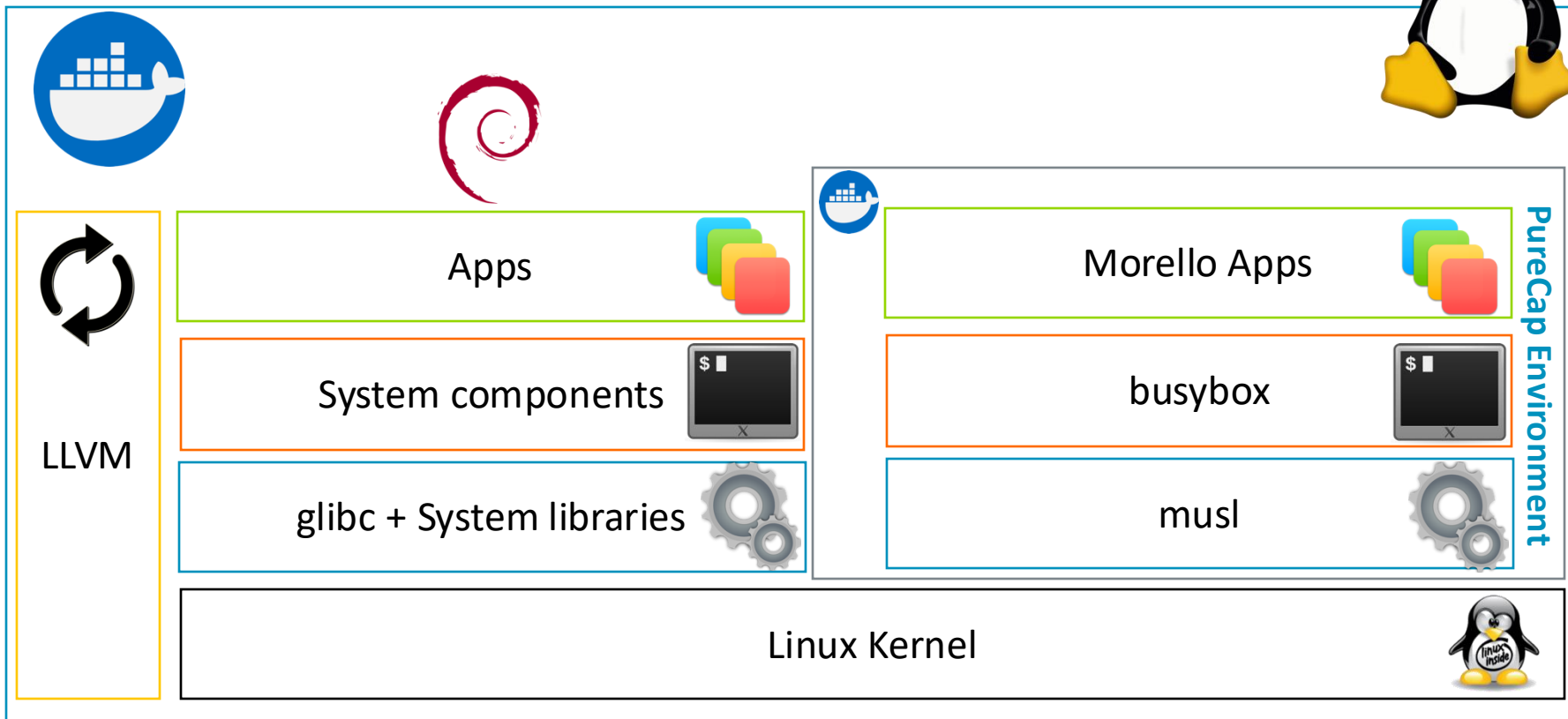
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Status of Morello Linux

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Morello Linux – Hybrid Software Stack



Morello Linux – Initial Release in April 2023

Morello SDK

In less than 10 minutes you should be able to setup a docker container with everything you need to build an application for Morello.

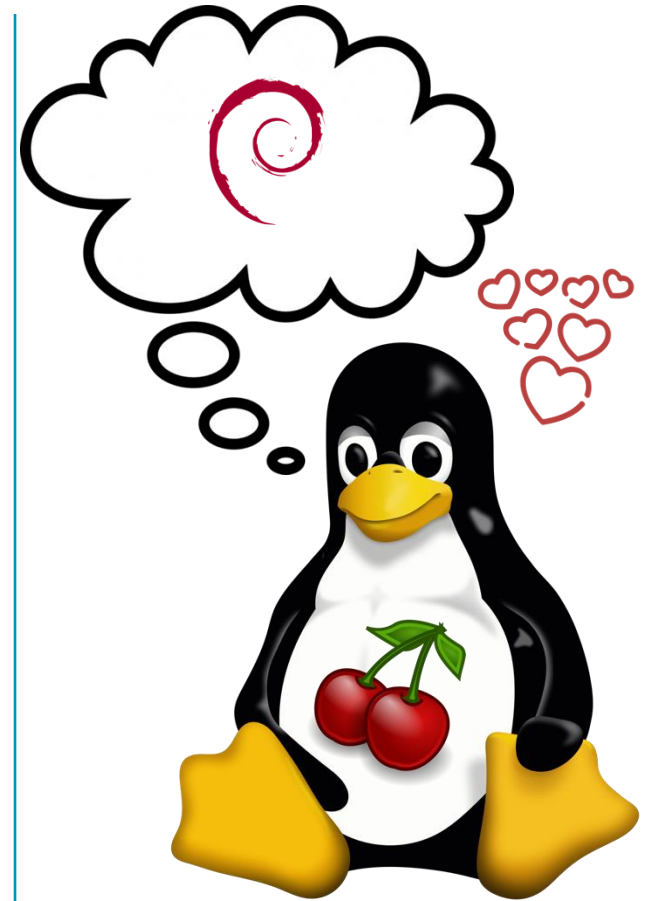
- Documentation: <https://sdk.morello-project.org/>
- Code repository: <https://git.morello-project.org/morello/morello-sdk>

Morello Linux

In less than 10 minutes you should be able to setup a docker container with everything you need to build and boot into a Morello Debian environment.

- Documentation: <https://linux.morello-project.org/>
- Code repository: <https://git.morello-project.org/morello/morello-linux>

Note: The documentation covers the instructions for Linux but if you know what you are doing and are familiar with docker no one stops you from running our solution on Windows or Mac.





Morello Linux kernel overview (Kevin)

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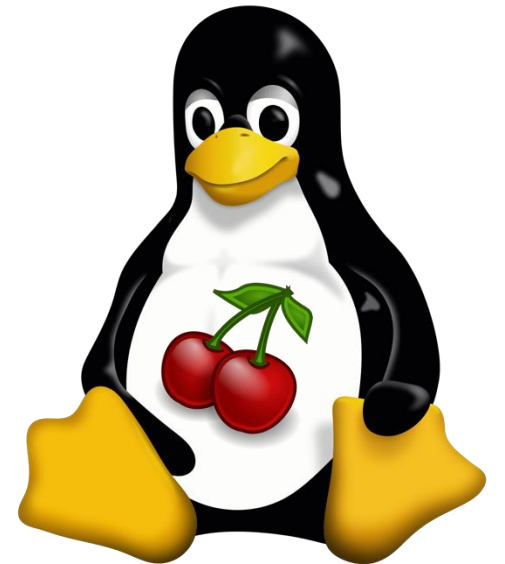
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Integration Drop 1.8.1

Morello Linux – Release 1.8.1

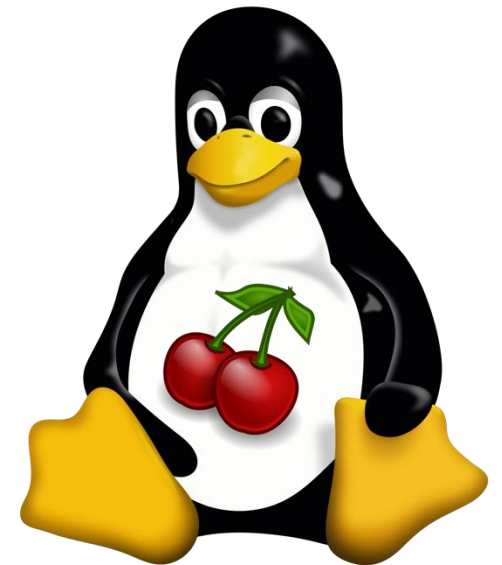
Highlights:

- Updated Linux Kernel ABI.
- More frequent Linux Kernel Binary Updates.
- mcli tool to install more conveniently the Morello SDK.
- New version for musl and LLVM with bug fixes and new features.
- Improved coverage of the LTP test environment.



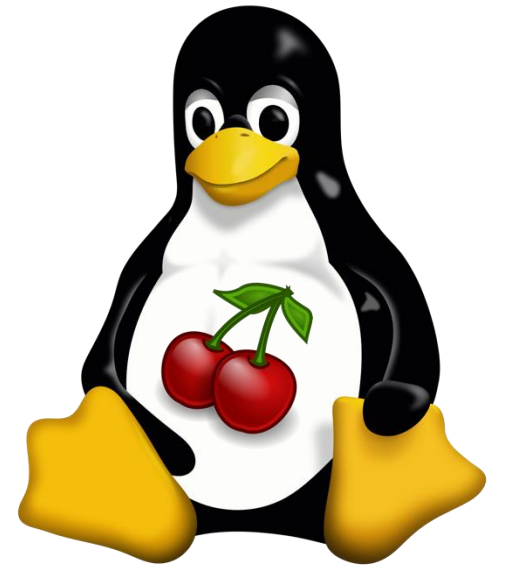
Morello Linux – Updates of Linux Kernel ABI

- Restrict most of the **initial capabilities** provided by the kernel.
- Implement PCuABI **address space management** and **reservations**.
- **Hardening (sandboxing)** of eBPF to mitigate verifier bypass vulnerabilities that result in arbitrary kernel read/writes
 - Running JIT'd eBPF in a hybrid compartment using Restricted/Executive mode for domain transitions.
 - Exploits resulting in arbitrary kernel read/write instead become kernel Oops due to capability fault accessing out of bounds memory.
- **Support KVM for Morello**: basic enablement, targeting at adding support for Morello at EL2:
 - Add support for HW attributes, accessing, saving and restoring capability registers.
 - Introduce compat for KVM to allow running aarch64 guests, no official support for purecap guests.



Morello Linux – Updates of Linux Kernel ABI

- [DRM compat](#) arm64 fully works.
- [DRM purecap](#) ABI partially implemented and tested.
- Userspace graphics stack built up to kmscube.
- Fix various issues (kernel, LTP, Musl).
- Update [Morello LTP](#) fork to 20230929 upstream tag.

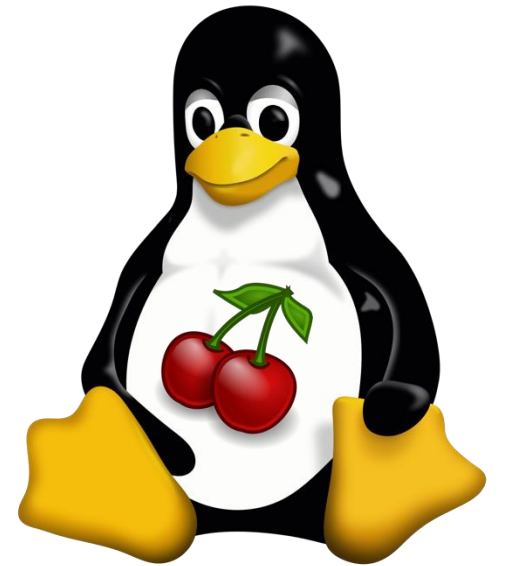


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Morello Linux - Demo

Morello Linux – Demo

- Install the morello-sdk environment.
- Bootstrap Morello Linux on the fvp.
- Connect to a Morello board running Morello Linux.
- Build a basic application with morello-sdk.
- Run the same application on both the board and the fvp.



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Morello Linux

Our Community

Morello Linux – Mailing List

- The mailing list is considered as the center of the community life.
- Linux Kernel Mailing List: linux-morello@op-lists.linaro.org
- Morello-flavored Linux Test Project (LTP) discussions: linux-morello-ltp@op-lists.linaro.org
- Morello Linux Kernel CI Reports: linux-morello-ci@op-lists.linaro.org
- Morello Linux Distro Discussions: linux-morello-distros@op-lists.linaro.org



Morello Linux – Thank you!



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Thank You

Danke

Merci

谢谢

ありがとう

Gracias

Kiitos

감사합니다

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