



Embedded Software Strategy & Development

Presented By

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System Software & SoC Solutions – Product and Technical Marketing



If Microsoft ever does applications for Linux it means I've won.

-Linus Torvalds, 1998



Installation guidance for SQL Server on Linux

APPLIES TO: SQL Server

This article provides

Tip

This guide covers the quickstarts:

- RHEL quickstart
- SLES quickstart
- Ubuntu quickstart
- Docker quickstart

For answers to frequently asked questions, see the [FAQ](#).

Supported Platforms

- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- Ubuntu
- Docker Engine

Install the Windows Subsystem for Linux

Before installing any Linux distribution for Microsoft Linux, you must ensure that the "Windows Subsystem for Linux" optional feature is enabled.

- Open PowerShell as Administrator
- Restart your computer

Install your Linux distribution

To download and install your Linux distribution, follow these instructions:

- Download and install the Windows Subsystem for Linux
- Download and install the Linux distribution
- Download and install the application

Why Microsoft chose Linux for Azure Sphere

Apr 19, 2018 — by Eric Brown — 3642 views

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Why did Microsoft choose to launch an Arm/Linux SoC design with device-to-cloud security? A VDC analyst suggests that Azure Sphere is all about competing with Amazon FreeRTOS.

The punchline: Microsoft just unveiled a mostly open source, embedded Arm SoC design with a custom Linux kernel.

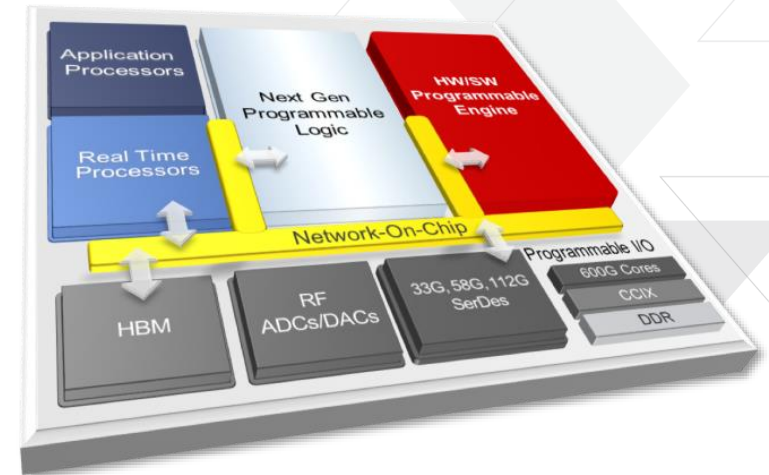
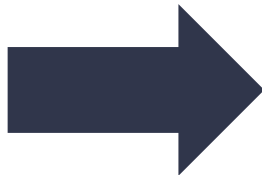
The correct response?

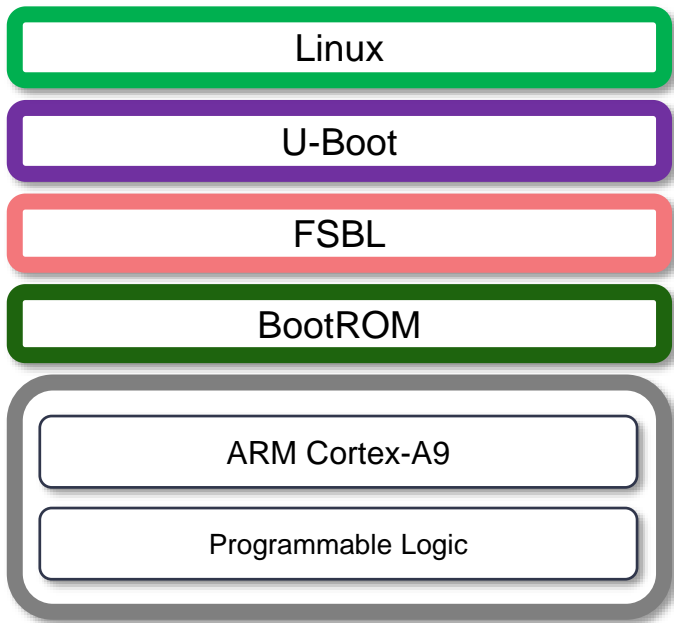
- Ha! Ha! Ha! Ha! You're killing me!
- Good one, dude, but April 1st was weeks ago.
- Hallelujah! Linux and open source have finally beaten the evil empire. Can Apple be next?
- We're doomed! After Redmond gets its greedy hands on it, Linux will never be the same.
- Smart strategic move — let's see if they can manage not to screw it up like they did with Windows RT.

Microsoft's Azure Sphere announcement was surprising on many levels. This crossover Cortex-A/Cortex-M SoC architecture for IoT offers silicon-level security, as well as an Azure Sphere OS based on a secure custom Linux kernel. There's also a turnkey cloud service for secure device-to-device and device-to-cloud communication.

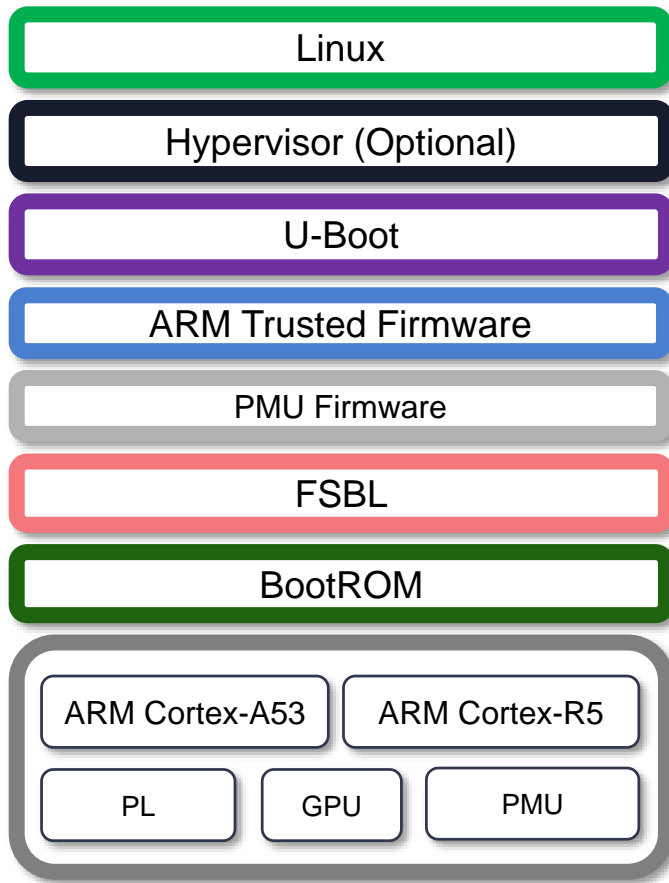
When software developers drive hardware design it means adaptable SoC's have won.

-Xilinx, 2018

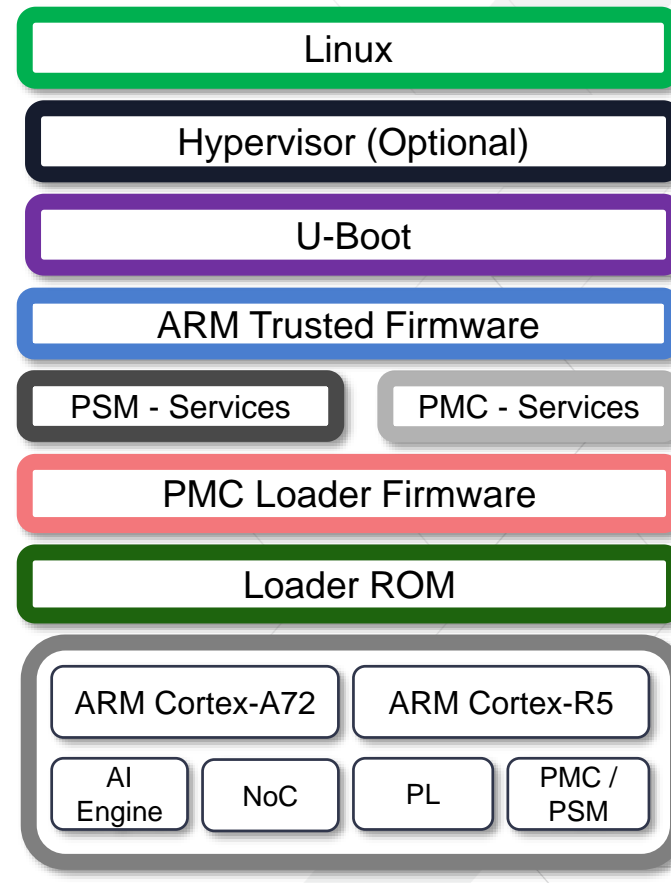




ZYNQ™



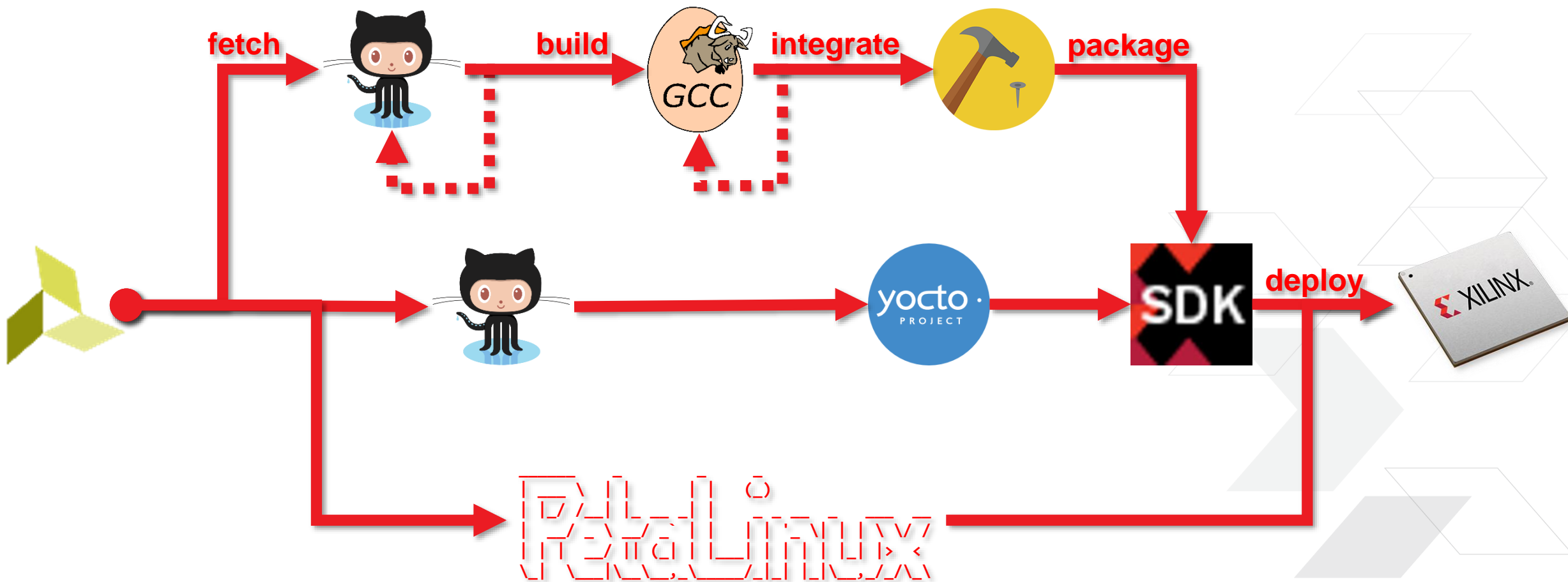
ZYNQ™
UltraSCALE+



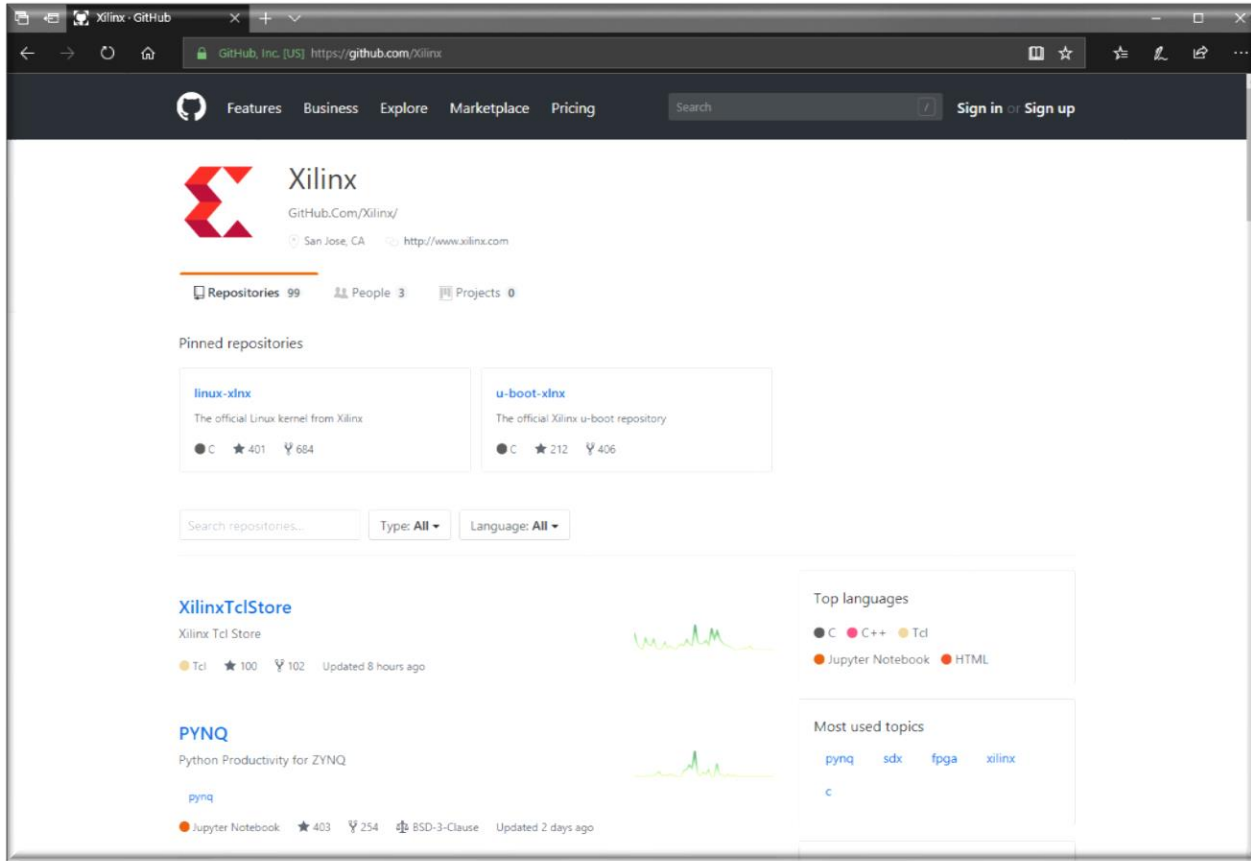
XILINX
VERSAL™



How Do You Want to Do This?



Open and Public Code



> **GitHub.com/Xilinx**

> **Nearly 100 repositories**

> **All of our embedded software stack**

> **All of our Yocto recipes**

> **Scripts for Vivado**

> **Tutorials and Examples**

Staying Up-to-Date

arm

ATF v1.6

denx

v2019.01

yocto

PROJECT

v2.6 (Thud)

Xen

v4.11



v4.19

The same for every device family!

Rebase Kernel Tree

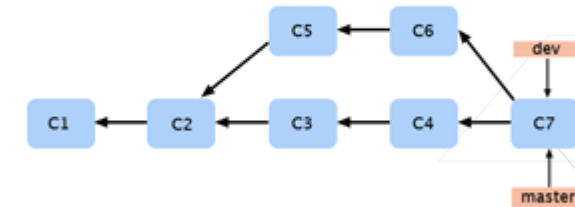
> Merge-Tree

- >> Merges two separate branches into a single new branch going forward
- >> Lose the history of what was different between the branches

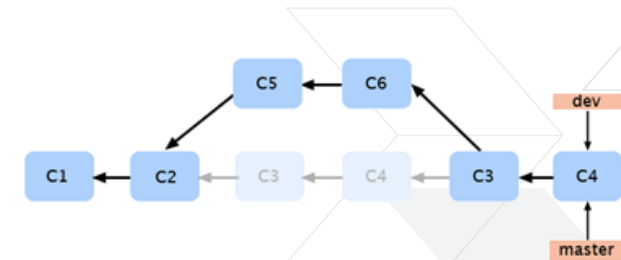
> Rebase Tree

- >> Creates a series of patches that can be applied cleanly to the HEAD node
- >> Maintain history of development in the separate development paths

git merge



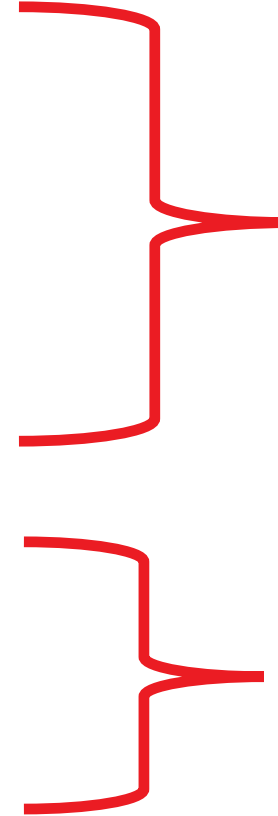
git rebase



- > **Single upstream kernel version per year**
- > **Rebase patchsets with Vivado releases**
- > **Rolling merge tree**

Compilers and Toolchains

- > AArch32 – ARMv7 – Zynq-7000
- > AArch64 – ARMv8 – Zynq UltraScale+, Versal
- > Cortex-R5 – ARMv7 – Zynq UltraScale+, Versal
- > MicroBlaze – MMU / Linux Configuration
- > MicroBlaze – Microcontroller Configuration



Linaro **GCC 7.3.1**



crosstool-NG **GCC 7.3.1**



GCC 8 Support in 2019

Enabling Yocto

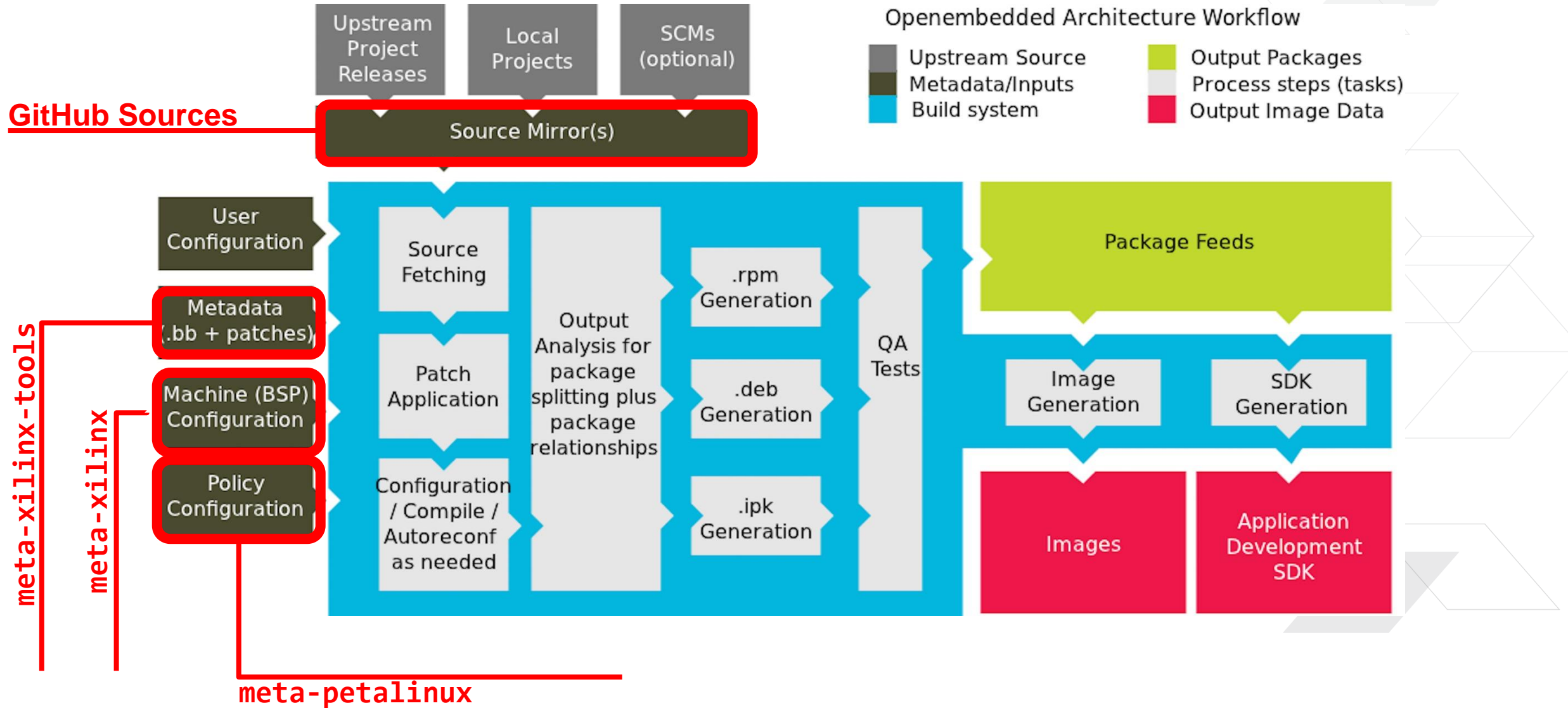
> **meta-xilinx** – BSP support for Xilinx device families

> **meta-xilinx-tools** – Yocto infrastructure to interface with Xilinx tools

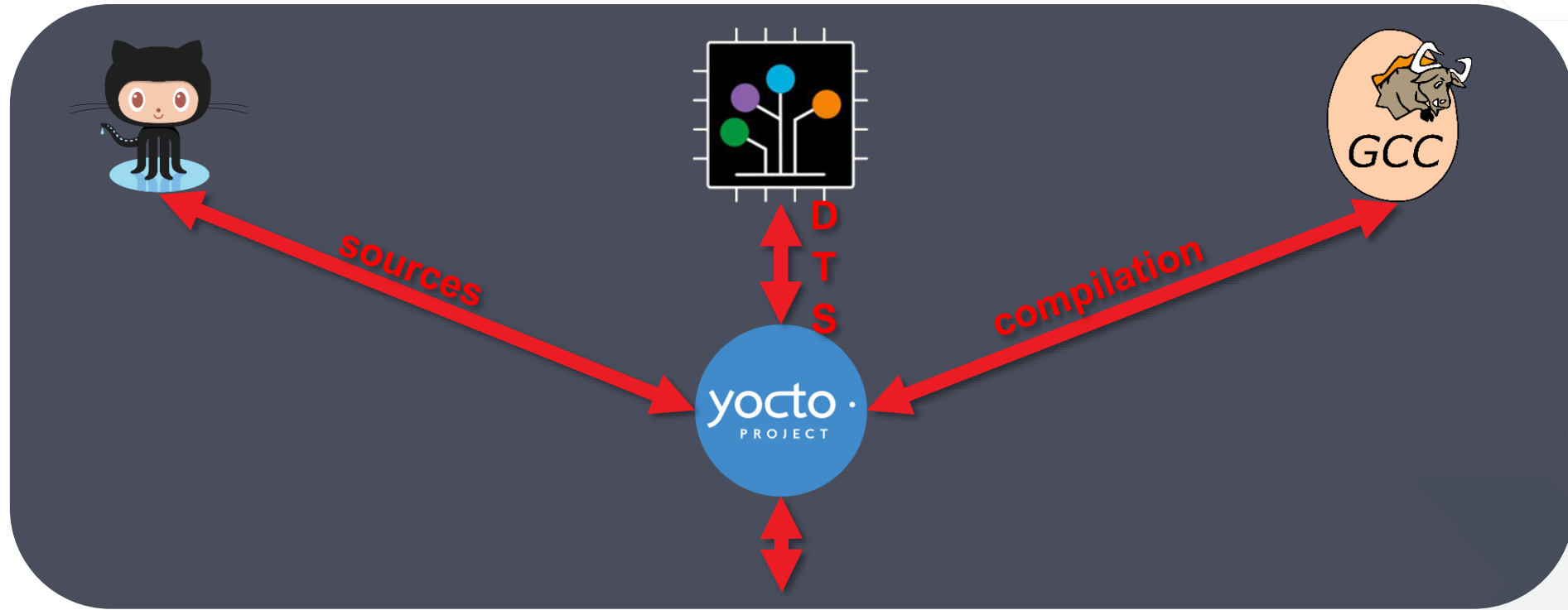
> **meta-petalinux** – Infrastructure to replicate the default PetaLinux root filesystem



Integrating with Yocto



Abstracting Yocto



export

RealLinux

deploy



Multiprocessing with Xen



> Reducing code Size



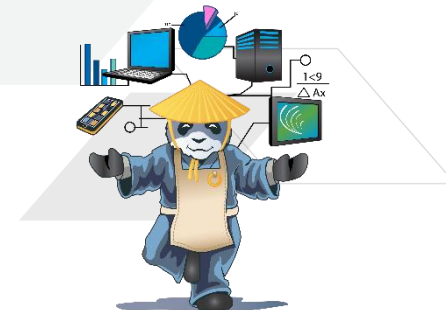
> Working toward certifiability



> Dom0-less boot

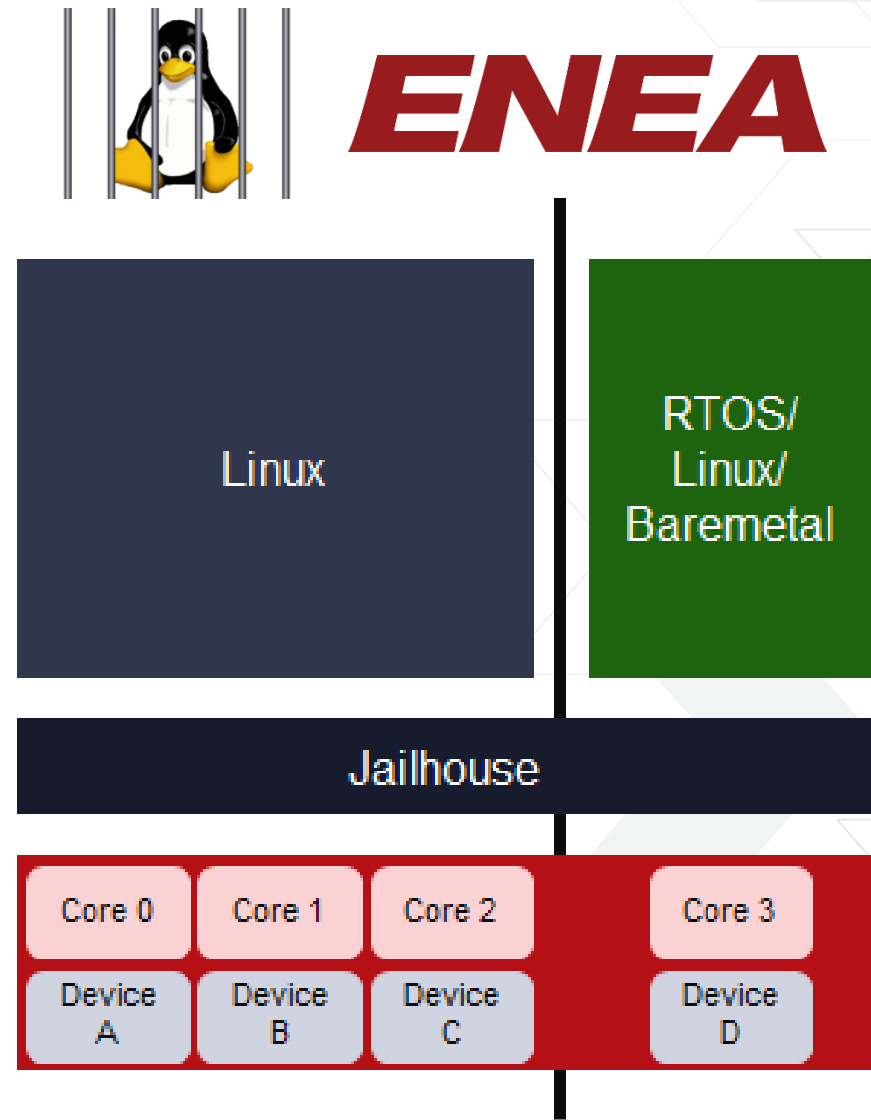


> Automatic static partitioning

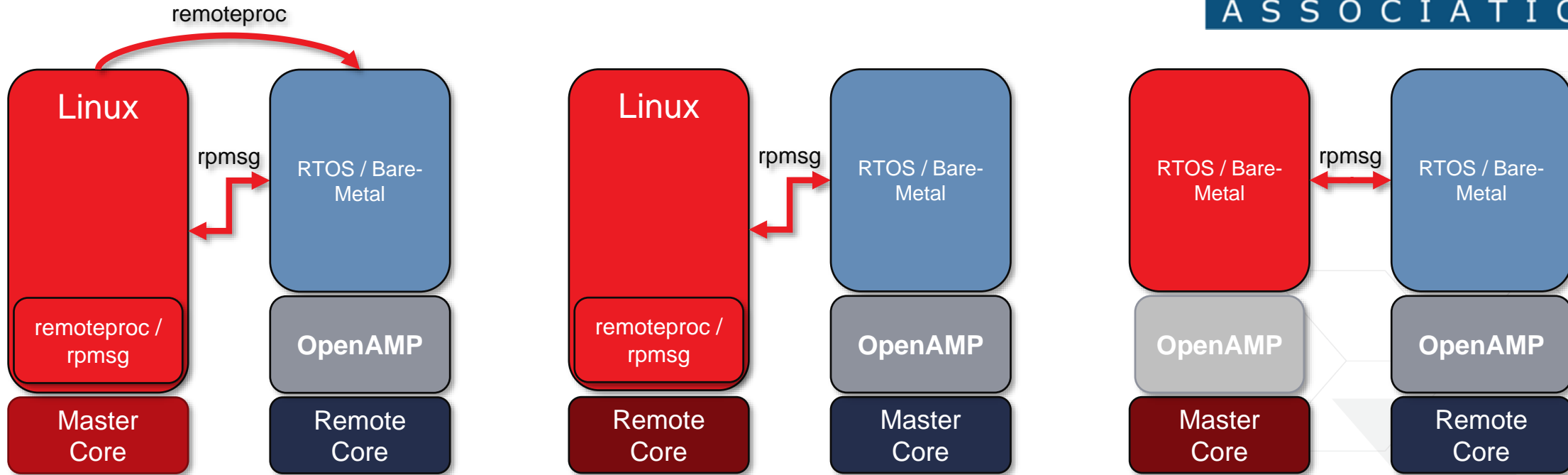


Jailhouse on Zynq UltraScale+ MPSoC

- > Done by Xilinx partner ENEA
- > Runs on standard SMP Linux without PREEMPT_RT
- > Small and fast (<10k LoC)
- > Simplifies running bare-metal code on Linux systems



OpenAMP and Interprocessor Comms



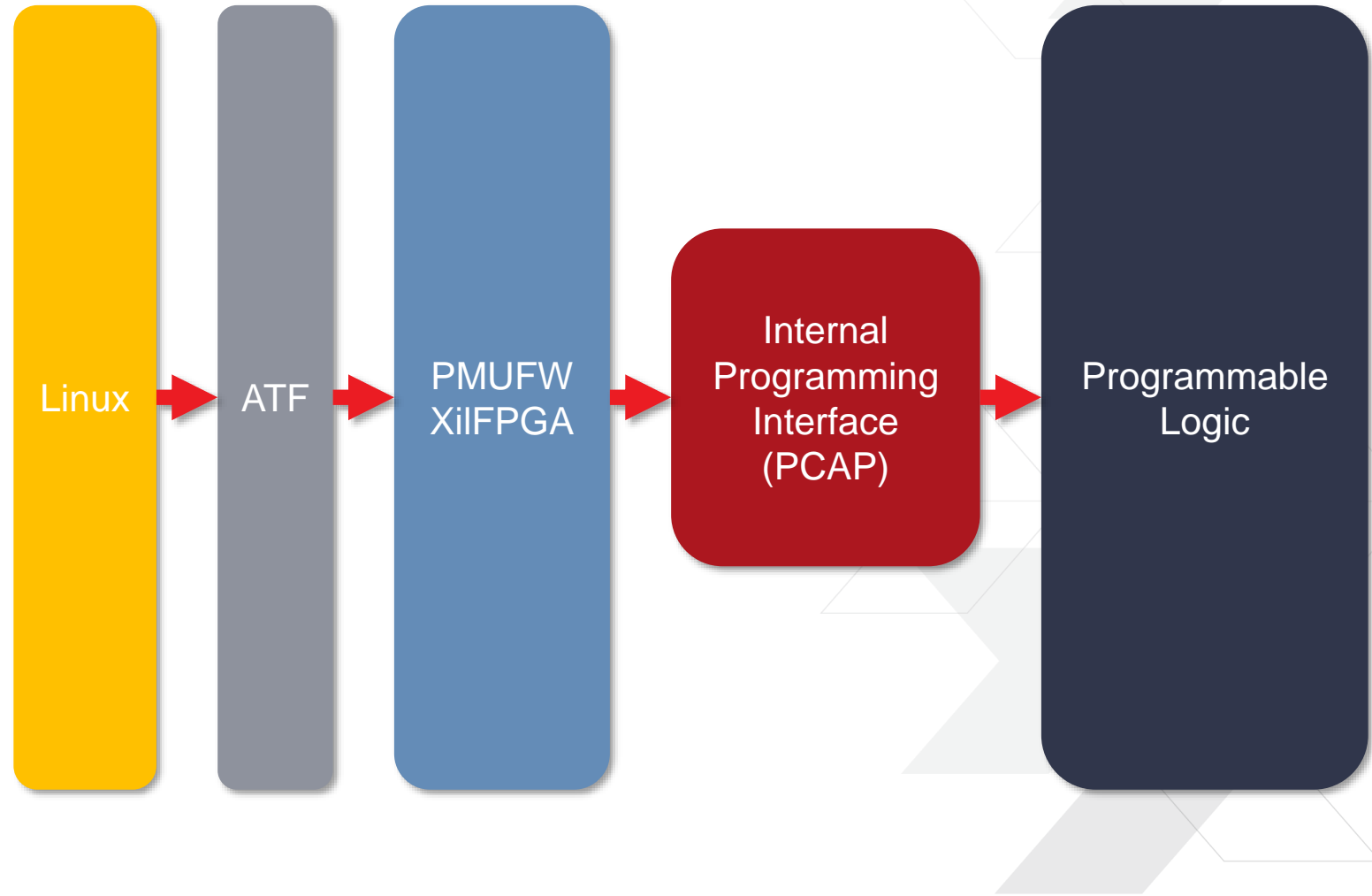
> Built on standard `remoteproc` and `rpmsg` infrastructure

> Open and public on [GitHub.com/OpenAMP](https://github.com/OpenAMP)

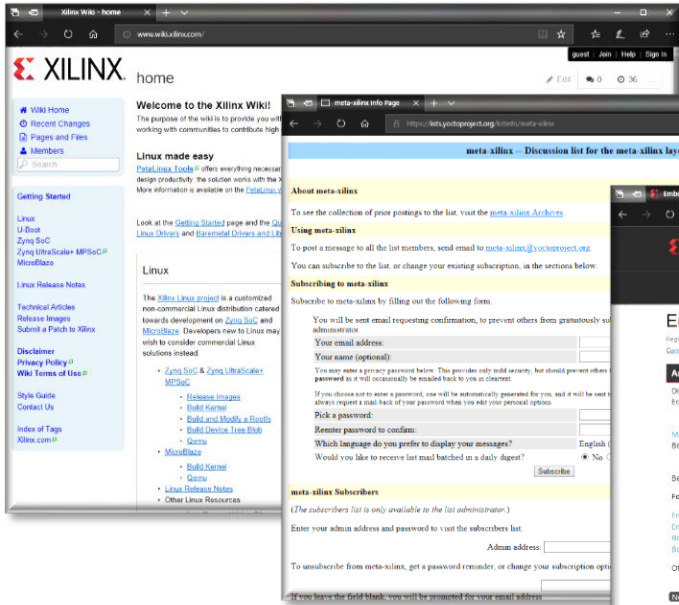
FPGA Manager

```
-#- FPGA Configuration Framework
<*> FPGA Region
< > Lattice iCE40 SPI
< > Altera Arria-V/Cyclone-V/Stratix-V CvP FPGA Manager
< > Altera FPGA Passive Serial over SPI
< > Xilinx Configuration over Slave Serial (SPI)
<*> FPGA Bridge Framework
< > Altera Partial Reconfiguration IP Core
< > Xilinx LogiCORE PR Decoupler
```

```
$ /sys/class/fpga_manager/fpga0/
```



Open Support



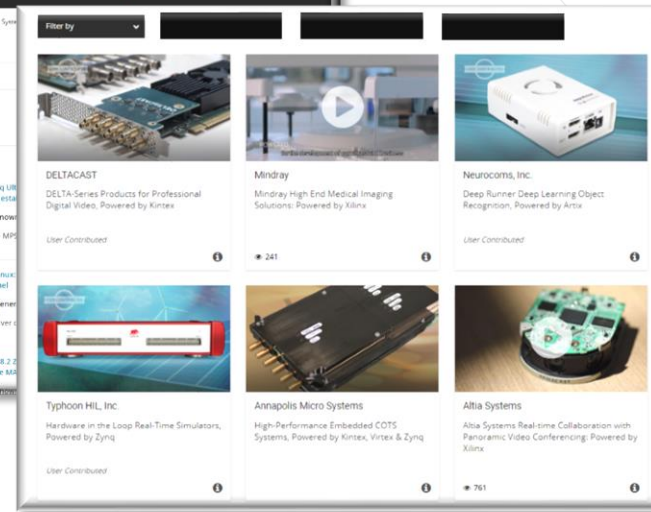
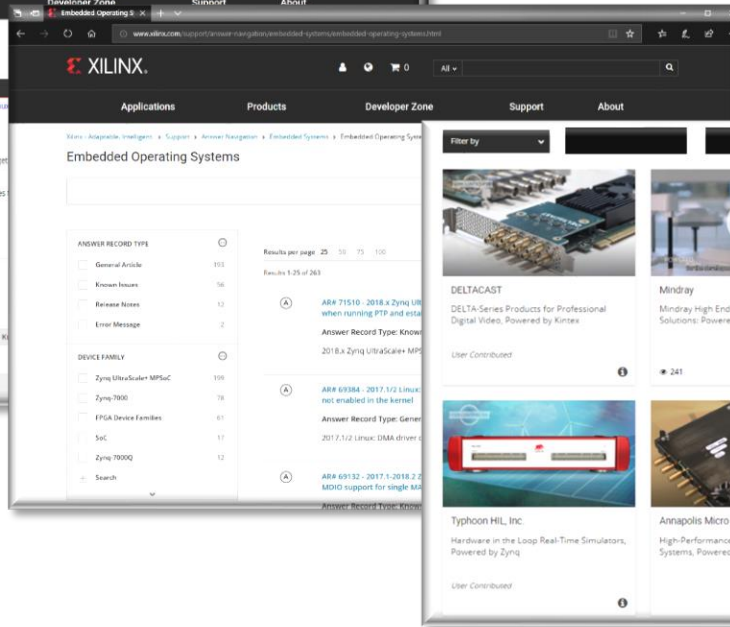
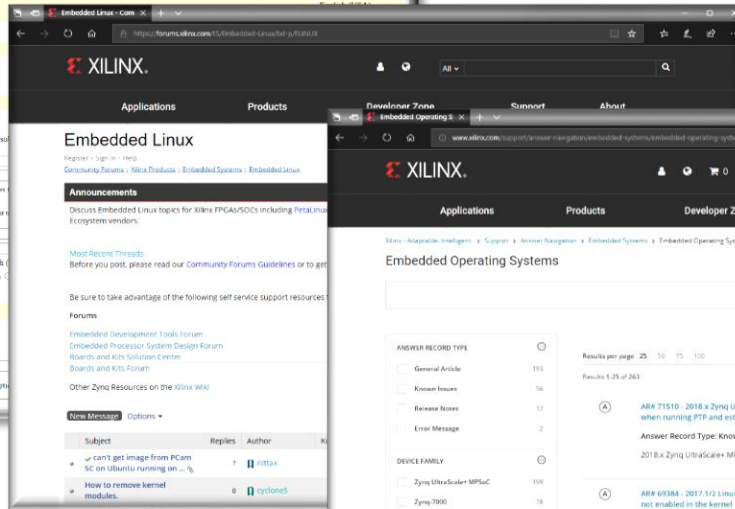
Xilinx Wiki

Mailing Lists

Xilinx Forums

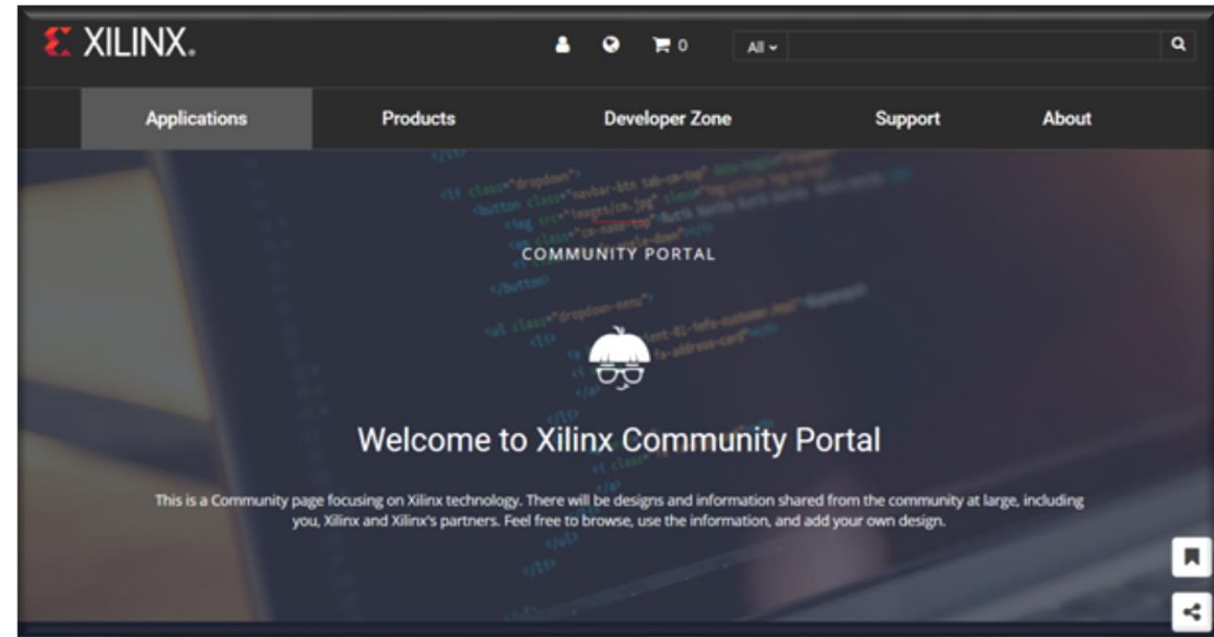
Xilinx KB

Community Portal



New Community Portal

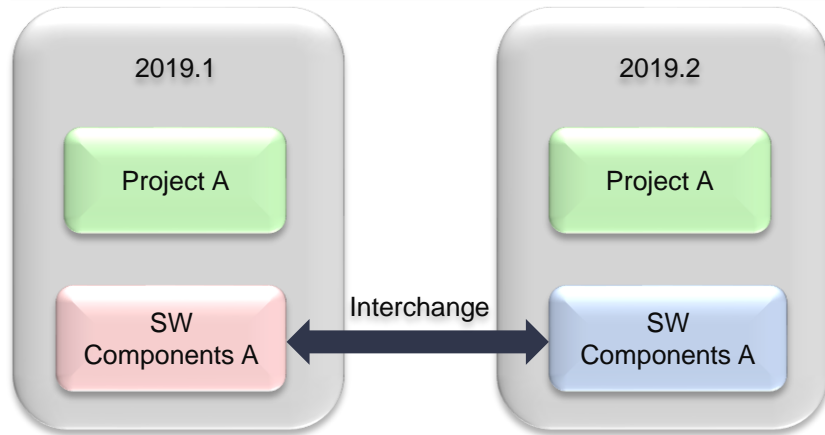
- > **Xilinx.com/community**
- > **Centralized Clearinghouse**
 - >> References other resources, doesn't replace them
- > **Increasing number of developers use Open Source Content**
 - >> Converge content and make navigation to desired location easier
- > **Xilinx has lots of Open Source content to filter**
 - >> GitHub, AWS, Wiki, Ultra96



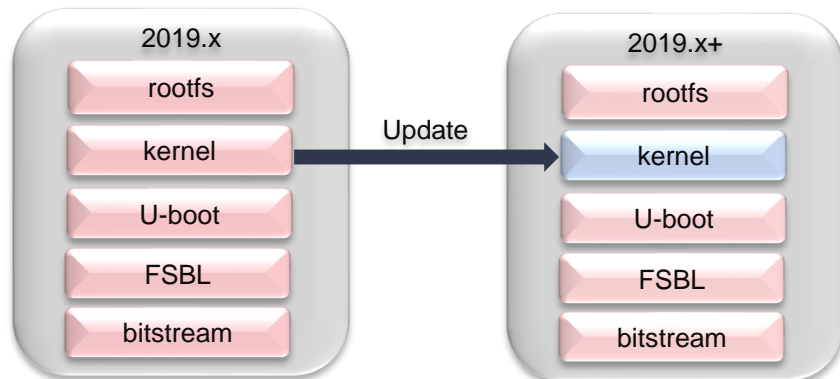
One more thing...



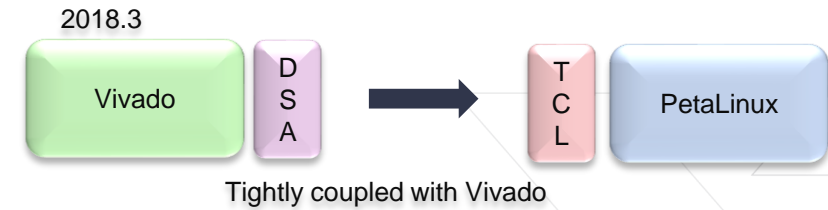
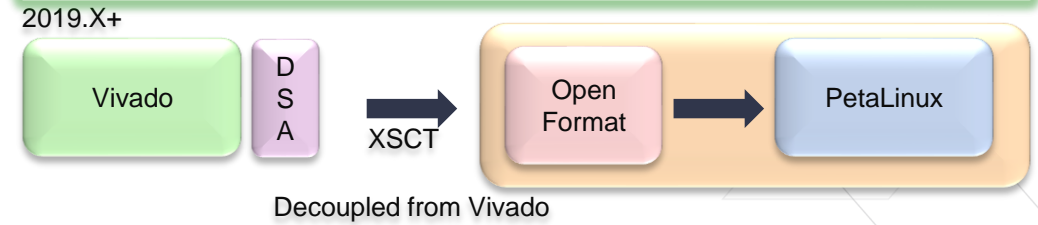
Decoupling PetaLinux Projects



Decoupling Runtime Components



Decoupling Linux from Vivado



Decoupling Packages from Each Other



The logo consists of a red chevron pointing right, followed by the letters 'XDF' in a white, bold, sans-serif font.

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DEVELOPER
FORUM

