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# Upstream First

## Success Stories with Board Support Packages

# Reusable Standard Platform

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Hardware Selection Requirements

- Selected depending on the available support-coverage in the current mainline components (Linux, U-Boot and user-space).
- Give priority to community-known and proven hardware parts

Best practice example:
If there are 2 similar Real Time Clock (RTC) suitable for usage, choose that one which is already integrated into the RTC driver subsystems of the Mainline Kernel Space software such as U-Boot or Linux

Software Requirements

The supplier has to provide the devices with a working Linux Operating System with all necessary drivers (e.g.  watchdog)

In case the Kernel source has been adapted, the patch set needs to be:

- Minimal
- In a mainline commit ready shape

# Reasoning

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Issues *without* back merge from vendor or feature branches:

- No back merge from CPU vendor to upstream kernel source tree
- No code reviews for CPU specific code by experts
- No long term maintenance => on shot releases
- Version lock-in => no simple choice for specific kernel features
- Security patches for the Linux kernel cannot be applied smoothly
- Huge effort if other Linux kernel related software is used (e.g. PREEMPT_RT, Android)

Benefits with back merged code

- Quality Improvement due to code reviews by committers
- The software concepts and interfaces are aligned with the projects philosophy
- Maintenance cost is significantly reduced
- Security patches can easily be applied
- Easy migration to newer version (e.g. need another file system)
- Simple adoption and customization within a project

# Summary

*“We do not need a board support package from a vendor; we need the support of the vendor’s CPU in the upstream Linux kernel source.*

*We introduced QA checks on several open source projects with e.g. travis, see https://travis-ci.org/u-boot/u-boot and have our boards upstream. This saves a lot of money when we decide to use a more recent version with additional features”*

# IOT2000

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- Project started based on the Intel Galileo BSP
- Galileo BSP adds additional kernel APIs
- Upstream gained a different API
- User space tools (Arduino support) supports only BSP APIs
- Upstreaming Galileo BSP not completed yet
- Forward porting was necessary
- Siemens working on upstreaming

# Civil Infrastructure Project

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Goal: maintaining a given kernel version super long

- Enough work just to monitor upstream changes and back porting them
- Longer period increases the probability rendering vendor patches incompatible
- RHEL: support a few architectures (x86_64) and one configuration and still has to back port 1000s of patches.
- SLES: updates kernel version if needed
- AF_DBUS, kdbus never made it upstream, who maintains it now?