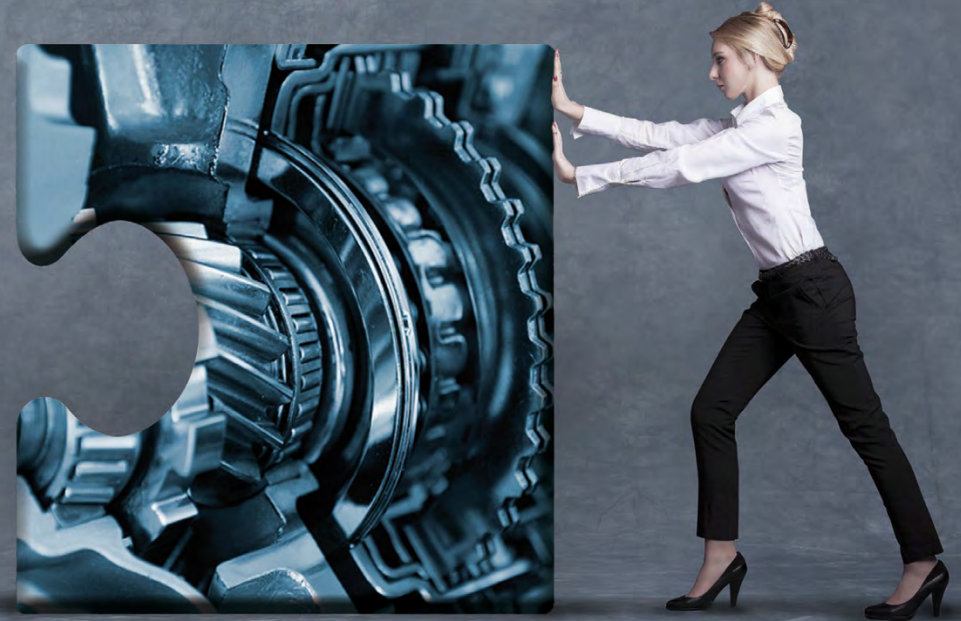
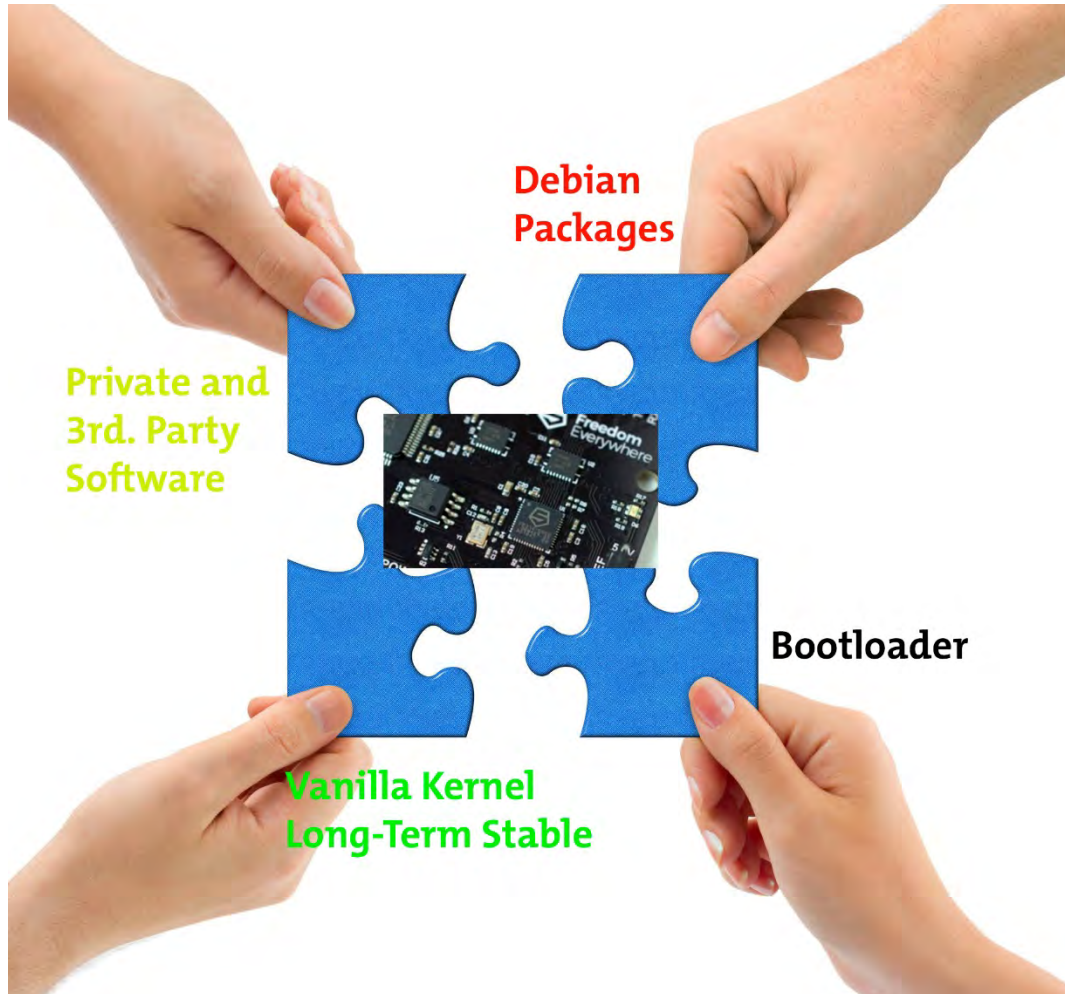




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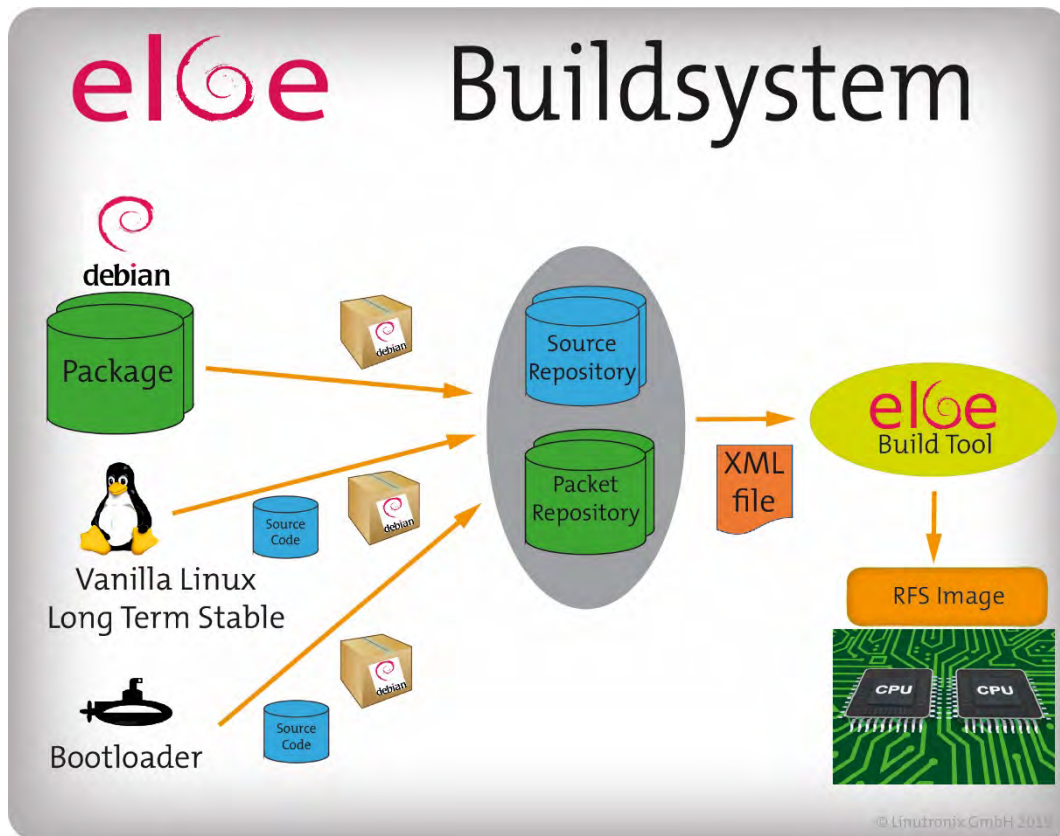
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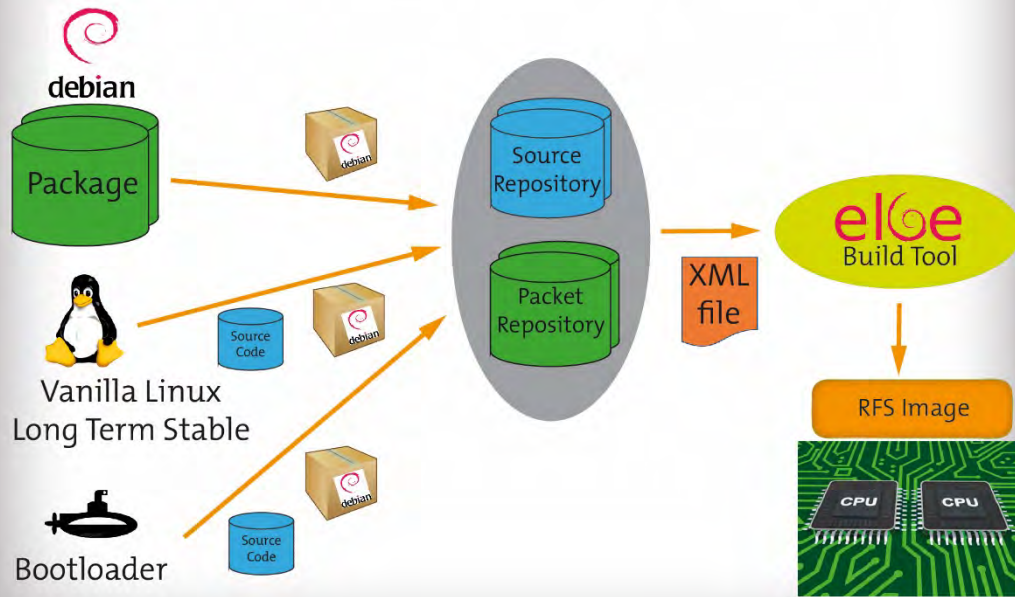
## ❏ Today's challenge for low level development:

- ❏ Bring bootloader, kernel, RFS and 3<sup>rd</sup>. party software to the HW
- ❏ Reproducible
- ❏ Maintainable
- ❏ Avoid hurt with cross compiling



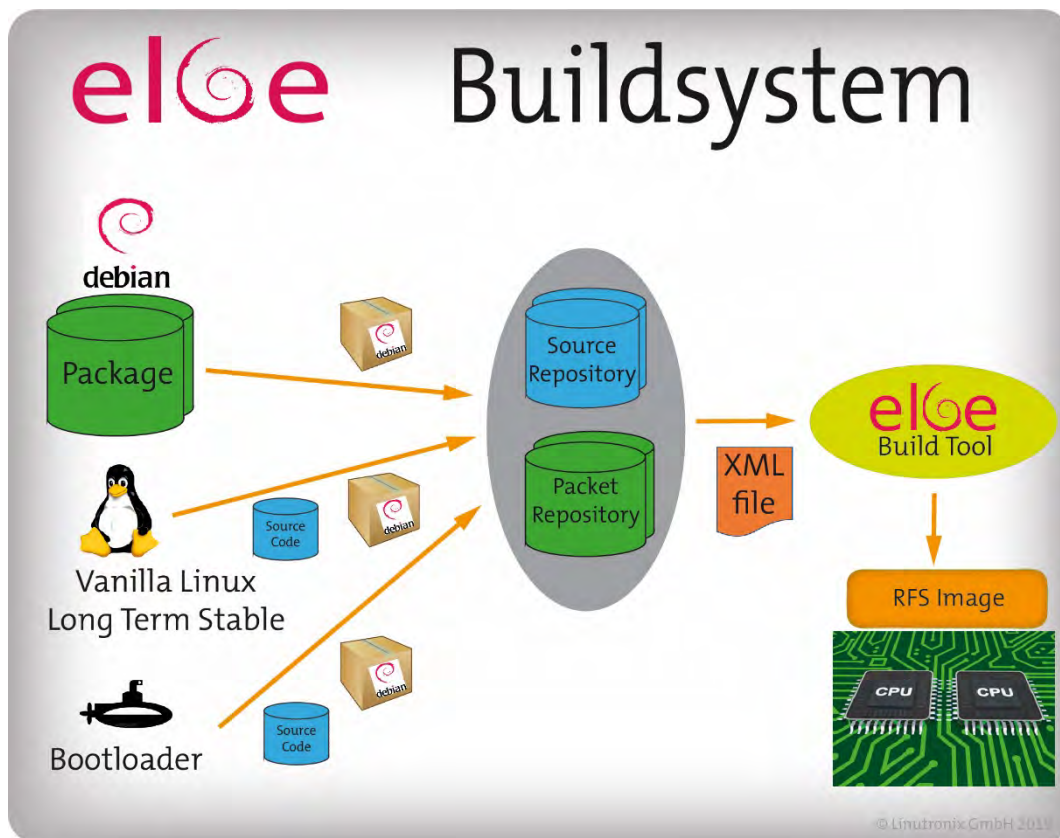
- ❏ E.L.B.E. is the answer. It delivers:
  - ❏ Reproducibility
  - ❏ Maintainability
  - ❏ Avoid hurt with cross compiling
  - ❏ Add flexibility (variants)
  - ❏ Covers version management
  - ❏ Source code and licence information
  - ❏ Optional: signed packages, signed image

# eLoe Buildsystem

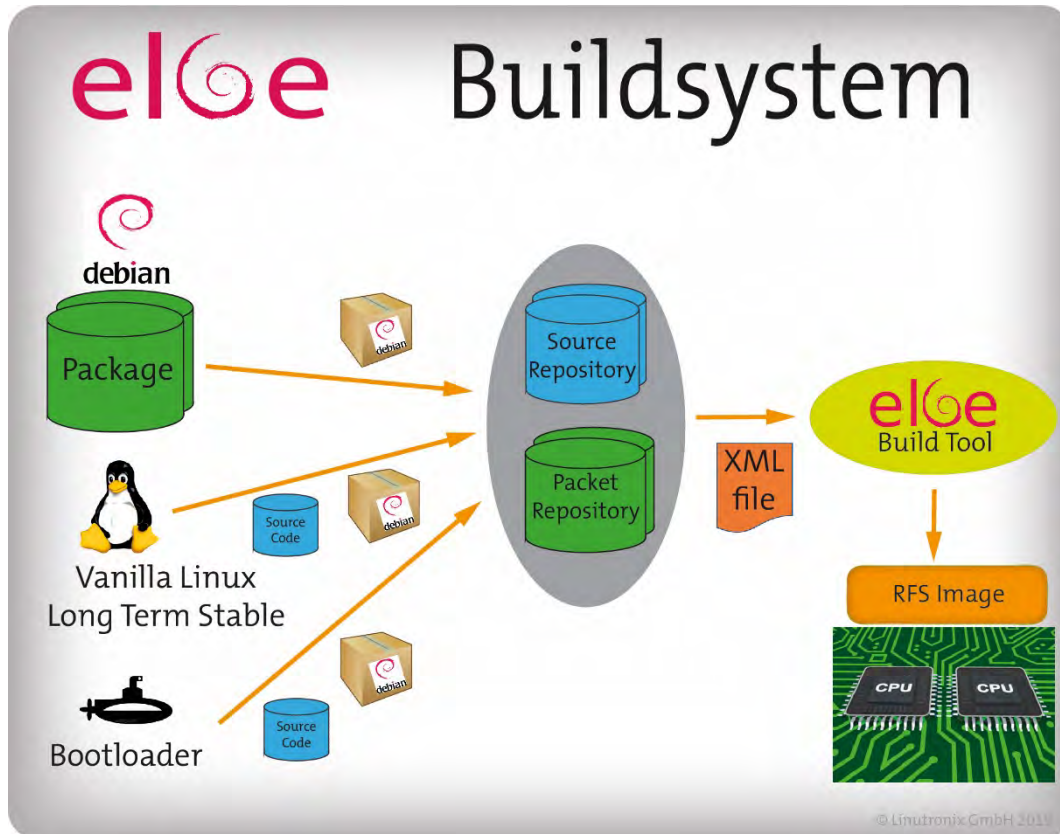


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- ❑ E.L.B.E. allows you to use the best components
- ❑ Bootloader of your choice
- ❑ Vanilla Linux Kernel
  - ❑ Mainline
  - ❑ Long-Term Stable version
  - ❑ Free of vendor lock-in

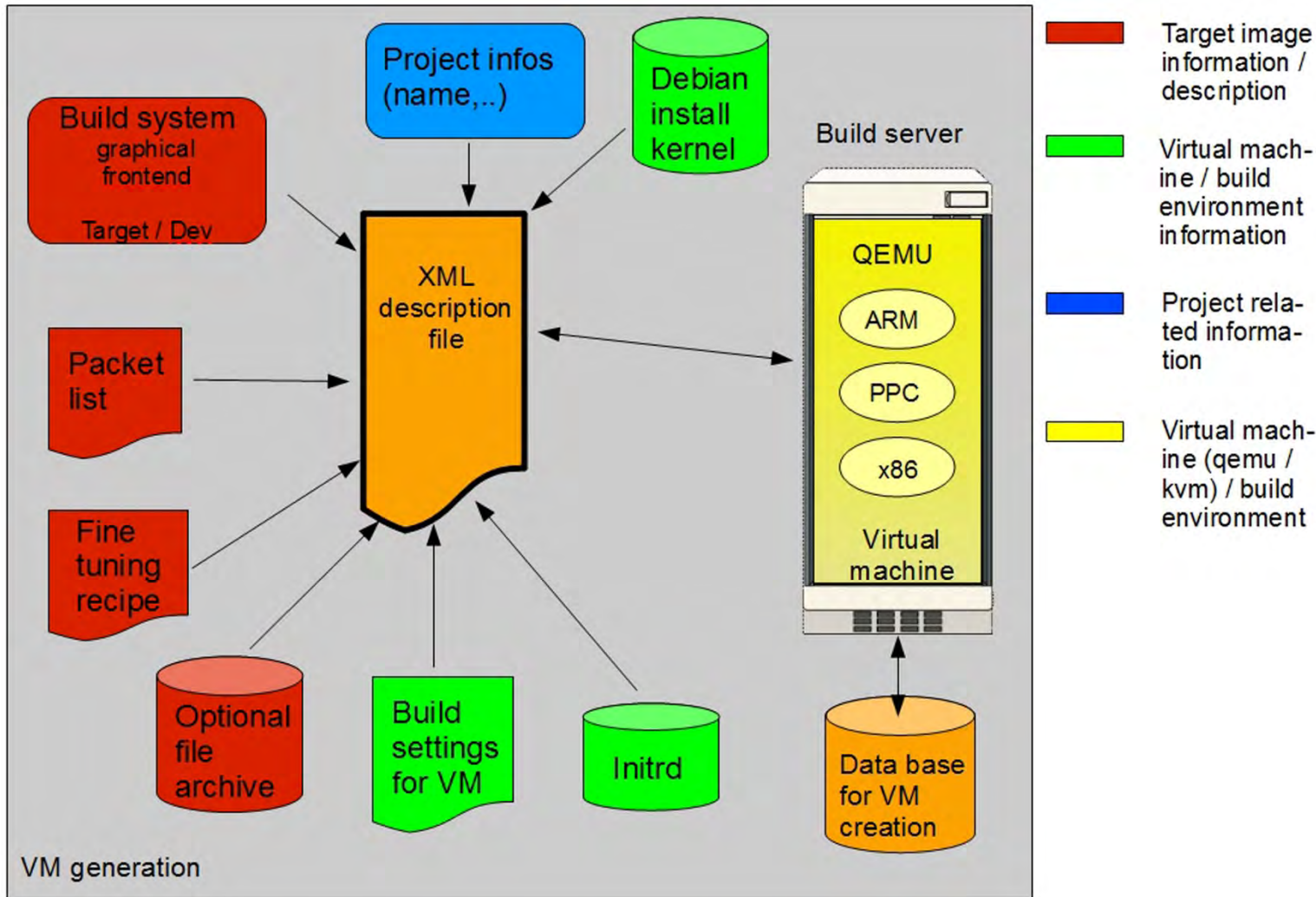


- ❑ Use stable, maintained distribution for RFS – Debian
  - ❑ Binary package(s) preferred
- ❑ Re-compilation (with your own optimizations) supported
- ❑ What is a distribution providing?
  - ❑ SW packages
  - ❑ Security & bug tracking
  - ❑ Tools



## Output – optimized for Embedded System

- Flash, eMMC, SDcard ...
- Memory layout freely selectable
- Small footprint  
(~4 .. 6 Mbyte min)



- Build virtual machine of target architecture
- Build native in VM
- Avoid dependencies to host machine therefore

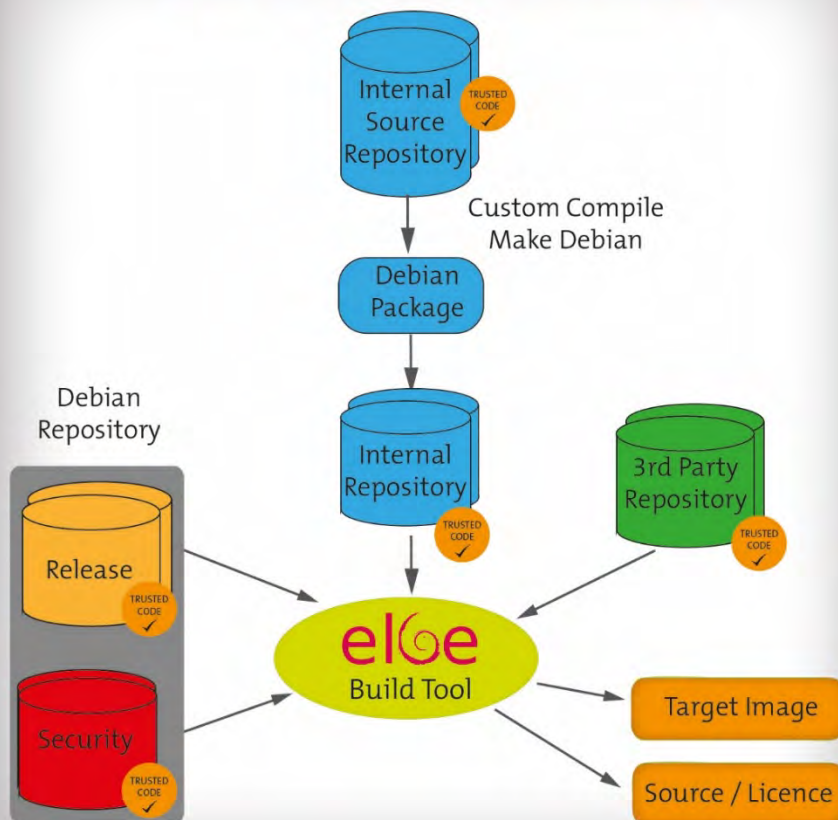


```
<project>
<name>beaglebone-black</name>
<buildtype>armhf</buildtype>
<mirror>
<primary_host>ftp.de.debian.org</primary_host>
<primary_path>/debian</primary_path>
<primary_proto>http</primary_proto>
<!-- kernel -->
<url-list><url><binary>
http://debian.linutronix.de/elbe stretch main
</binary></url></url-list>
</mirror>
<noauth />
<suite>wheezy</suite>
</project>
```

- ❏ Controls the whole process
  - ❏ Generates the virtual machine
  - ❏ Start build process
  - ❏ If necessary build \*.deb packages
  - ❏ Handle the variant management
  - ❏ Rules for optimization (fine tuning)
  - ❏ Specifies the image format (memory layout)



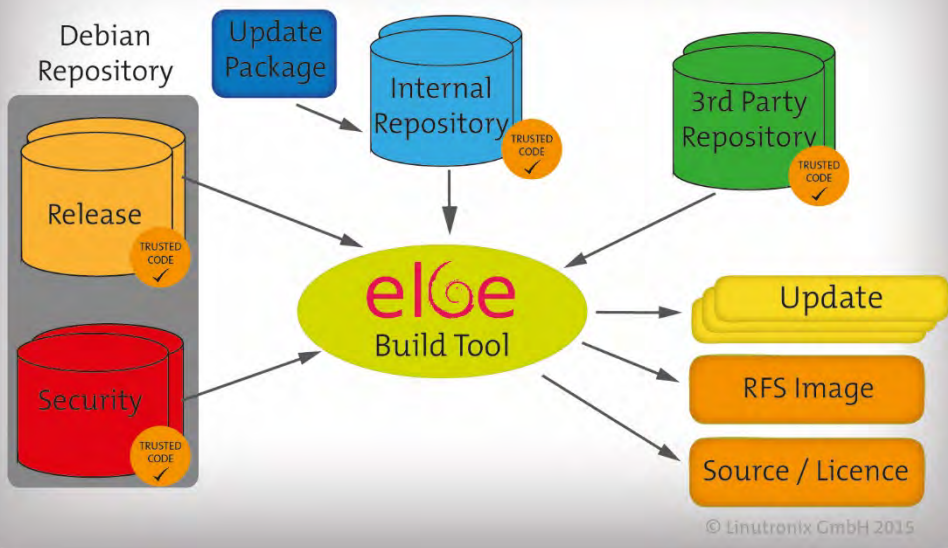
## ELBE - Custom System Image



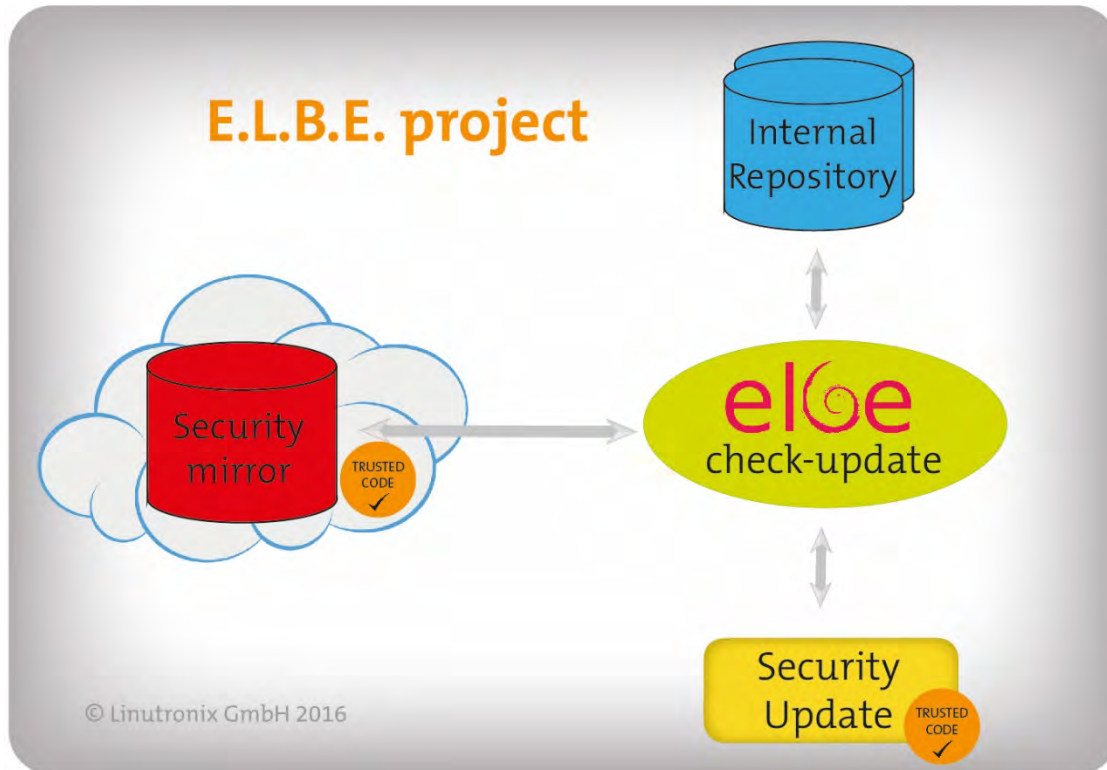
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- ❏ Add your own software (or 3<sup>rd</sup>. party)
- ❏ Compile & generate a \*.deb package inside the VM
- ❏ Store packages inside a Debian repository
- ❏ If necessary generate a new image

## ELBE - System Image



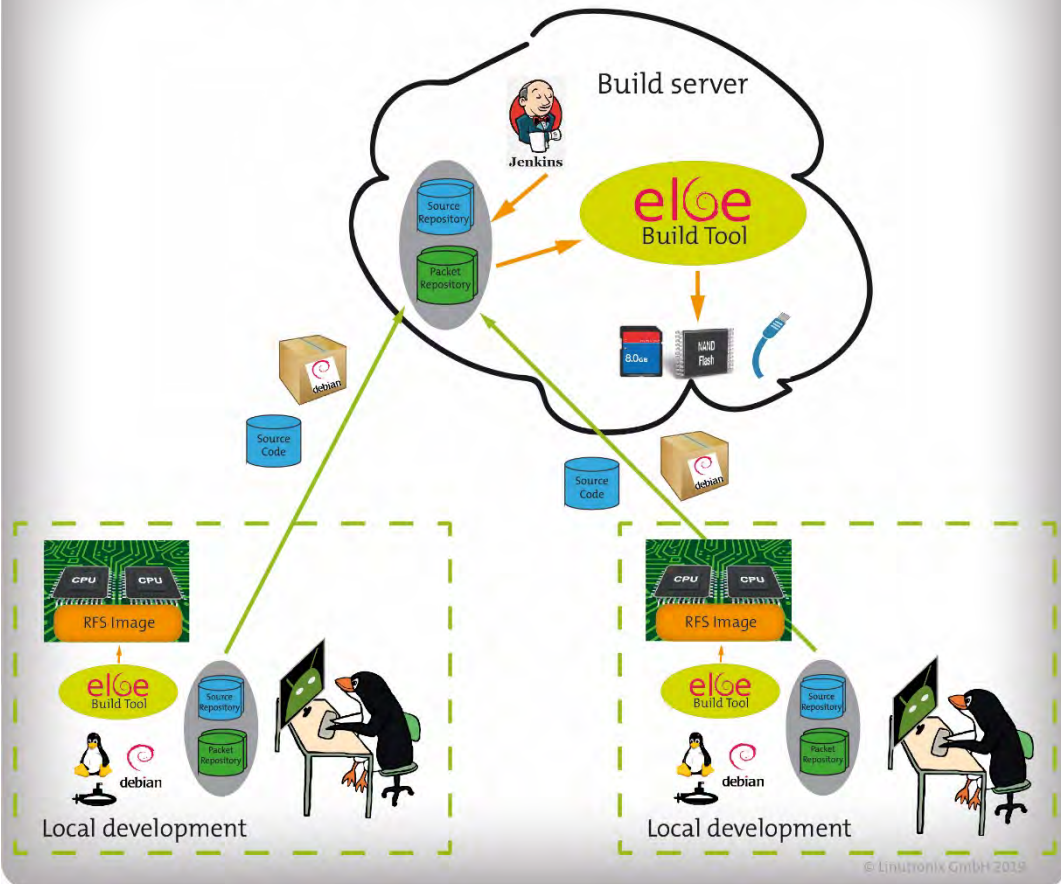
- Update process supported
  - Update via package mechanism
  - Update via complete image
  - Update via a combination of both
- Secure update via signed image / package



## Security Tracking

- Via Debian as Debian tracks security issues
- E.L.B.E. shows packages with a need for update
- For your own software: it's up to you to track security issues

Board Support Package Development Team



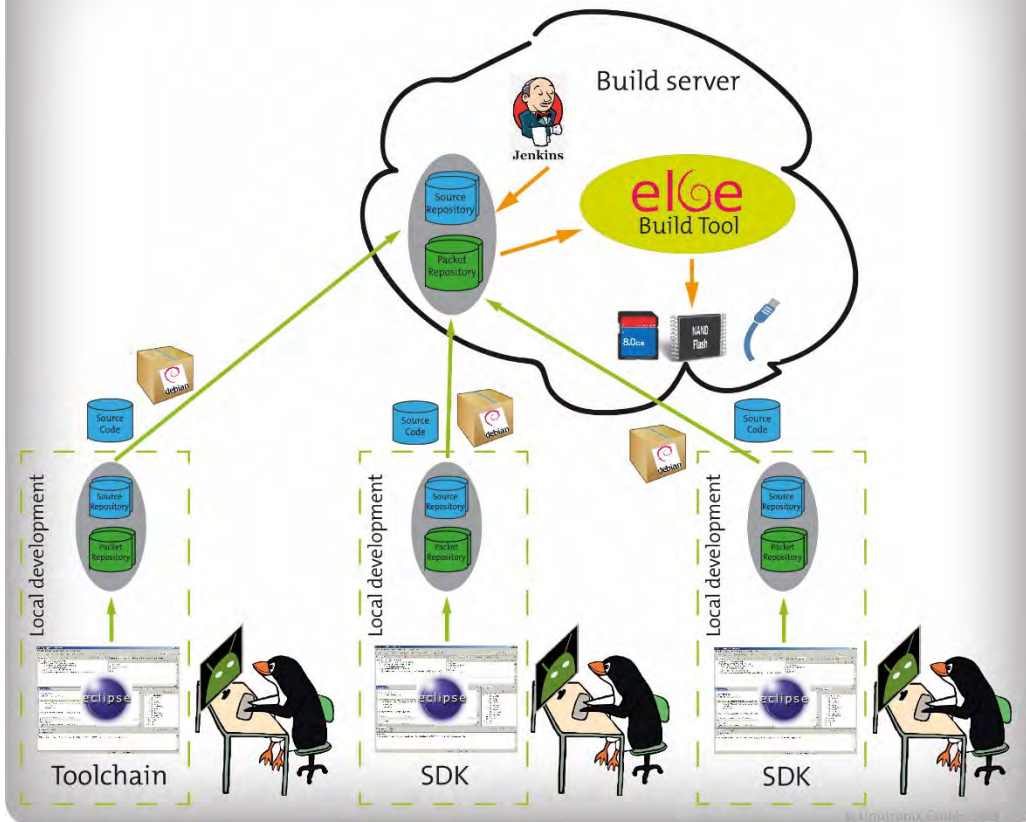
Scalable

- Local use
- Use on centralized server
- Cloud stored

Multi-user capable

- Develop and test locally
- Common repository for all
- Automated built process for complete image

Application Development Team Use (via Cloud)



## Application development (SDK)

- Application development (SDK)
  - SDK with toolchain
  - Integration in Eclipse / Visual Studio possible
  - Scalable
    - Local use
    - Use on centralized server
    - Cloud stored
  - Multi-User capable



Elbe is not affiliated with Debian ([www.debian.org](http://www.debian.org));  
Debian is a registered trademark owned by SPI ([www.spi-inc.org](http://www.spi-inc.org))

- ❏ ELBE allows you to create your own distribution based on
  - ❏ community supported boot-loader, kernel, toolchain ...
  - ❏ robust, user friendly, enterprise proven software, based on Debian
- ❏ Supports and ease the use across embedded devices much more efficient



Elbe is not affiliated with Debian ([www.debian.org](http://www.debian.org));  
Debian is a registered trademark owned by SPI ([www.spi-inc.org](http://www.spi-inc.org))

- ❏ ELBE results in an optimized solution for the embedded world:
  - ❏ Small footprint
  - ❏ Real-time capable
  - ❏ Secure (adaptable)
  - ❏ Updatable
  - ❏ Optimized toolchain incl. tools for debug and optimization (performance, memory)
  - ❏ Easily expandable with graphic support, MP support ...

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**Thanks for your attention**

**Any questions ?**

