

# Getting FLOSS into the car: war stories from the automotive industry



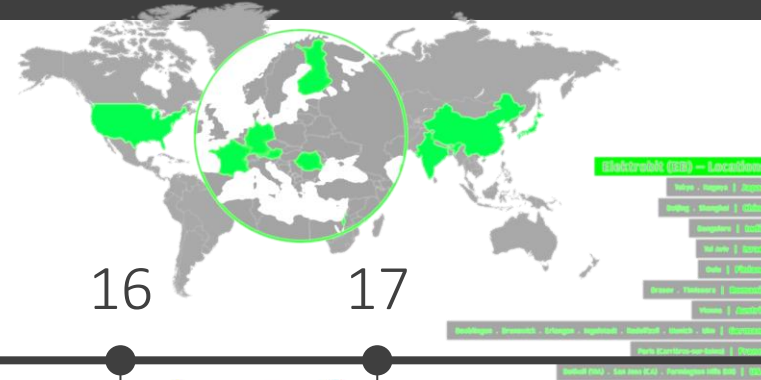
Elektrobit

Stefan Potyra  
Susanne Oberhauser-Hirschhoff





# Automotive software from Elektrobit:



03



Providing navigation for the **first fully connected solution** (Daimler A-class and smart)

04



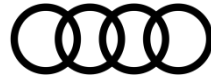
Pioneering the separation of HMI software from the rest of the vehicle (Audi A6)

07



EB started as **global software integrator** for Ford SYNC

08



e.solutions is formed, a **joint venture between EB, and Audi Electronics Venture GmbH (AEV)**

10



Strategic partnership of Daimler and EB centered around **driver assistance software development**

12



EB, the **first company to take AUTOSAR 4.0 to the road** across the globe (all BMW carline)

14



**Expanded global reach:**  
Connected navigation for China and Japan

16



EB powers **first driverless bus** on public roads



EB collaborates with NVIDIA to deliver **first-of-its-kind automated driving platform**

17

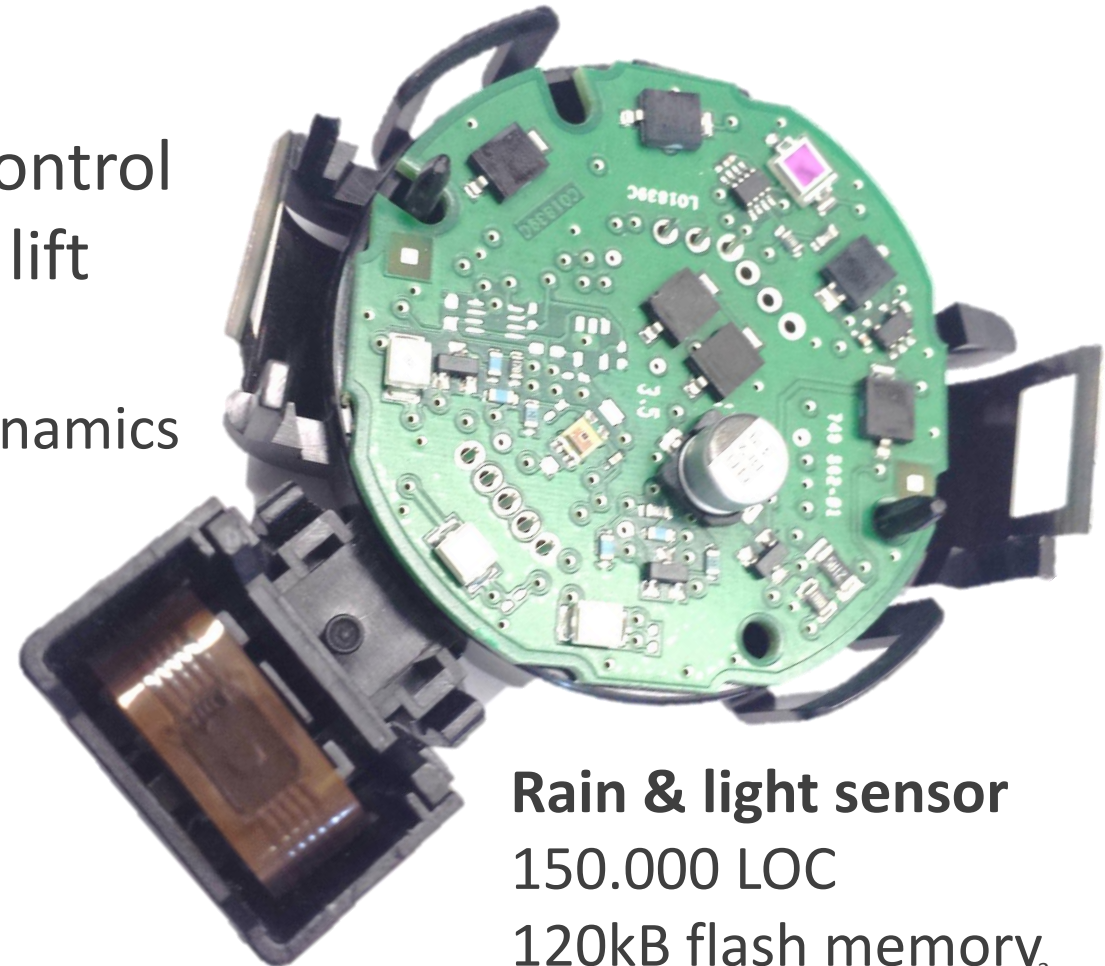


EB integrates **Argus** an automotive cyber security pioneer

# Automotive: original mindset

- “ECU”
- Know each bit
- Dependability
- Mass Production
- Updates in garage

Brakes  
Engine control  
Window lift  
Airbag  
Driving dynamics

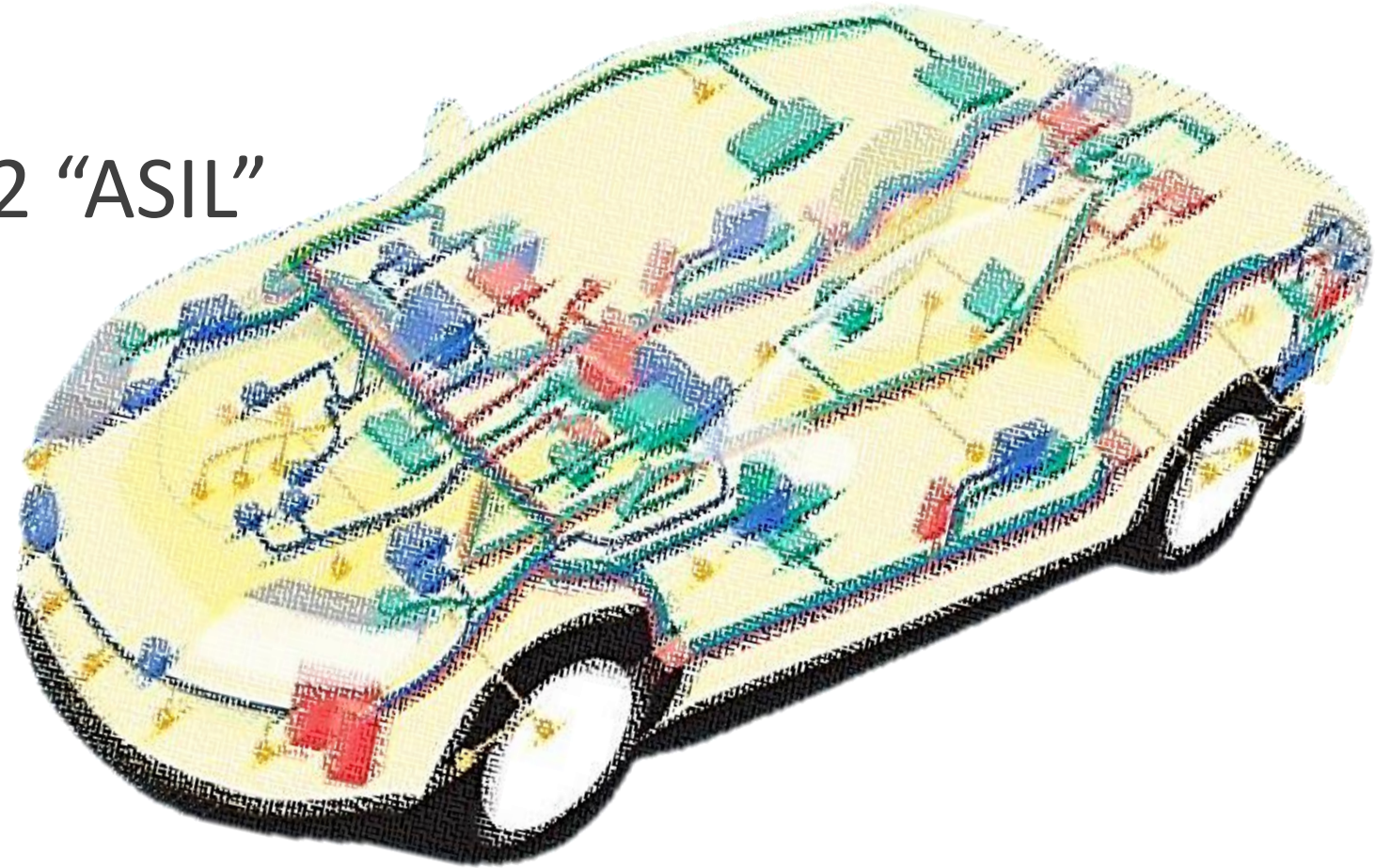


Rain & light sensor  
150.000 LOC  
120kB flash memory<sub>3</sub>

# Automotive evolution: networked systems

## Supplier playbooks

- SPICE, MISRA, ISO 26262 “ASIL”
- AUTOSAR
- UDS



- know each bit
- no unused code
- rare and extensively tested updates (“homologation”)



# Automotive and Open Source?



Elektrobit



# FLOSS as new supplier?

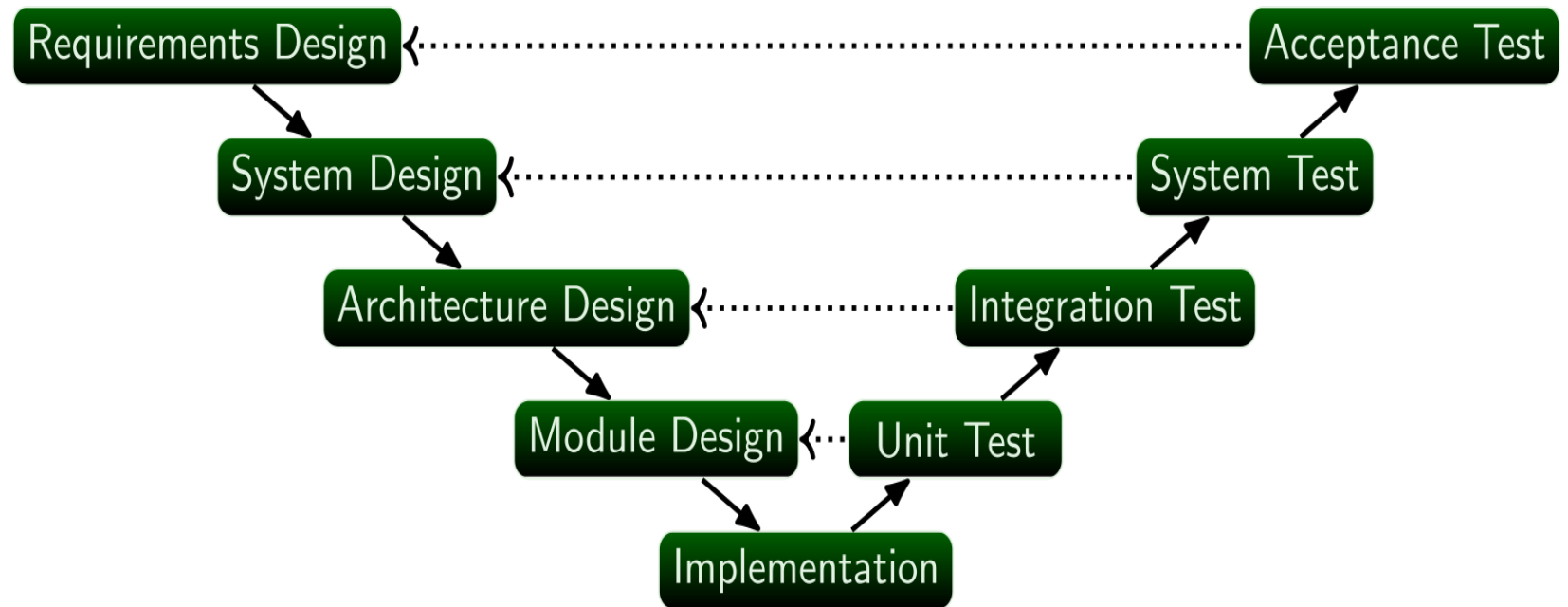
## “MISRA”

```
static ssize_t bin_string(struct file *file,
    void __user *oldval, size_t oldlen, void __user *newval, size_t newlen)
{
    ssize_t result, copied = 0;
    if (oldval && oldlen) {
        char __user *lastp;
        loff_t pos = 0;
        int ch;
        result = vfs_read(file, oldval, oldlen, &pos);
        if (result < 0)
            goto out;
        copied = result;
        lastp = oldval + copied - 1;
        result = -EFAULT;
        if (get_user(ch, lastp))
            goto out;
        /* Trim off the trailing newline */
        if (ch == '\n') {
            result = -EFAULT;
            if (put_user('\0', lastp))
                goto out;
            copied -= 1;
        }
    }
    if (newval && newlen) {
        loff_t pos = 0;
        result = vfs_write(file, newval, newlen, &pos);
        if (result < 0)
            goto out;
    }
    result = copied;
out:
    return result;
}
```



# FLOSS as new supplier?

“SPICE”



# FLOSS as new supplier?

“§§§”

IANAL

- safety, homologation, responsibility, untampered systems:  
**secure boot and “Tivoization”**
- “intellectual property” & CLA
- Attribution (BSD, GPL, ...)



# Automotive and Open Source!



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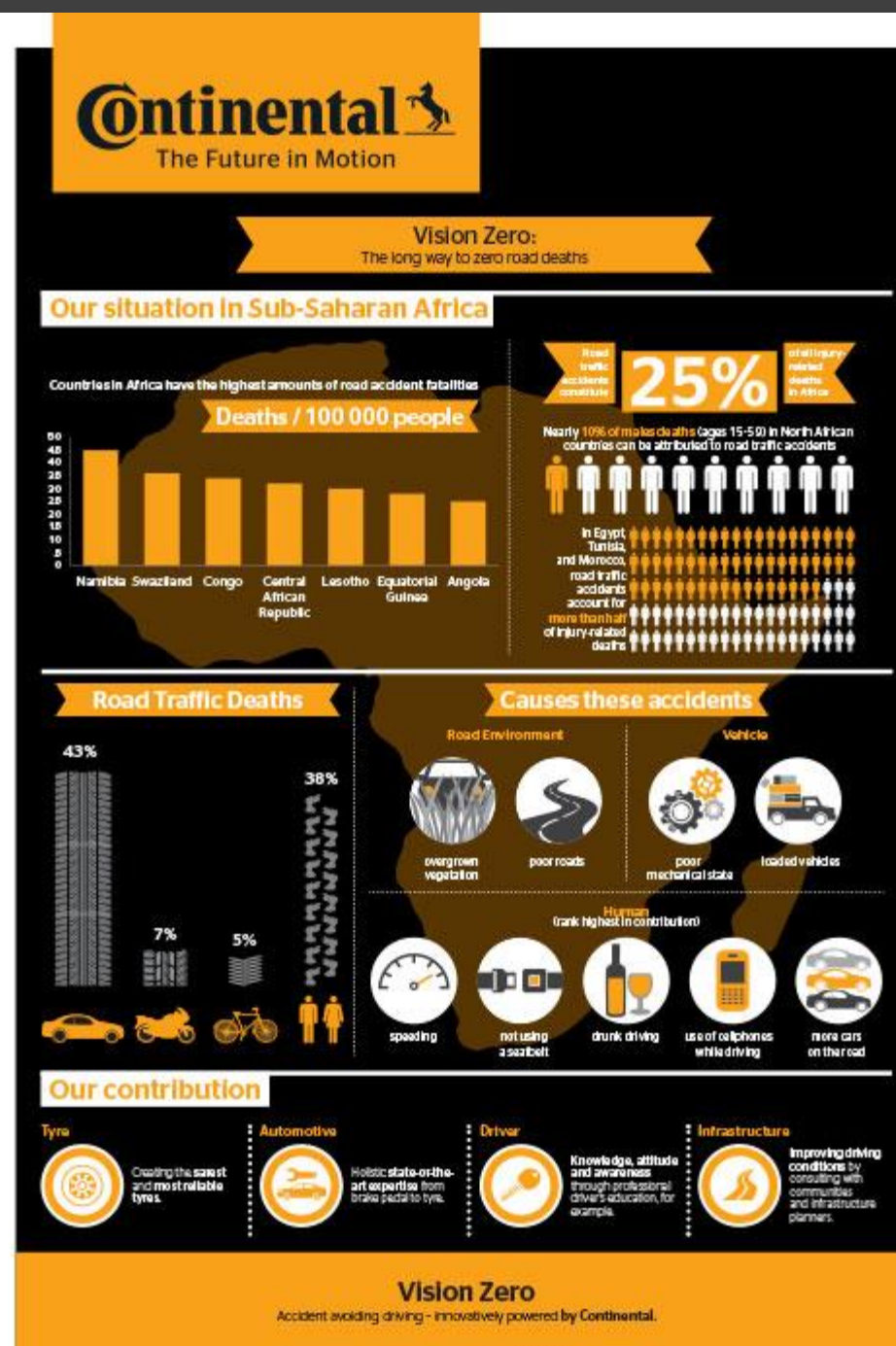


# Cars shall not kill people





“Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. First implemented in Sweden in the 1990s, Vision Zero has proved successful across Europe — and now it’s gaining momentum in major American cities.”



# Automotive needs opens source

More brainpower hits the road

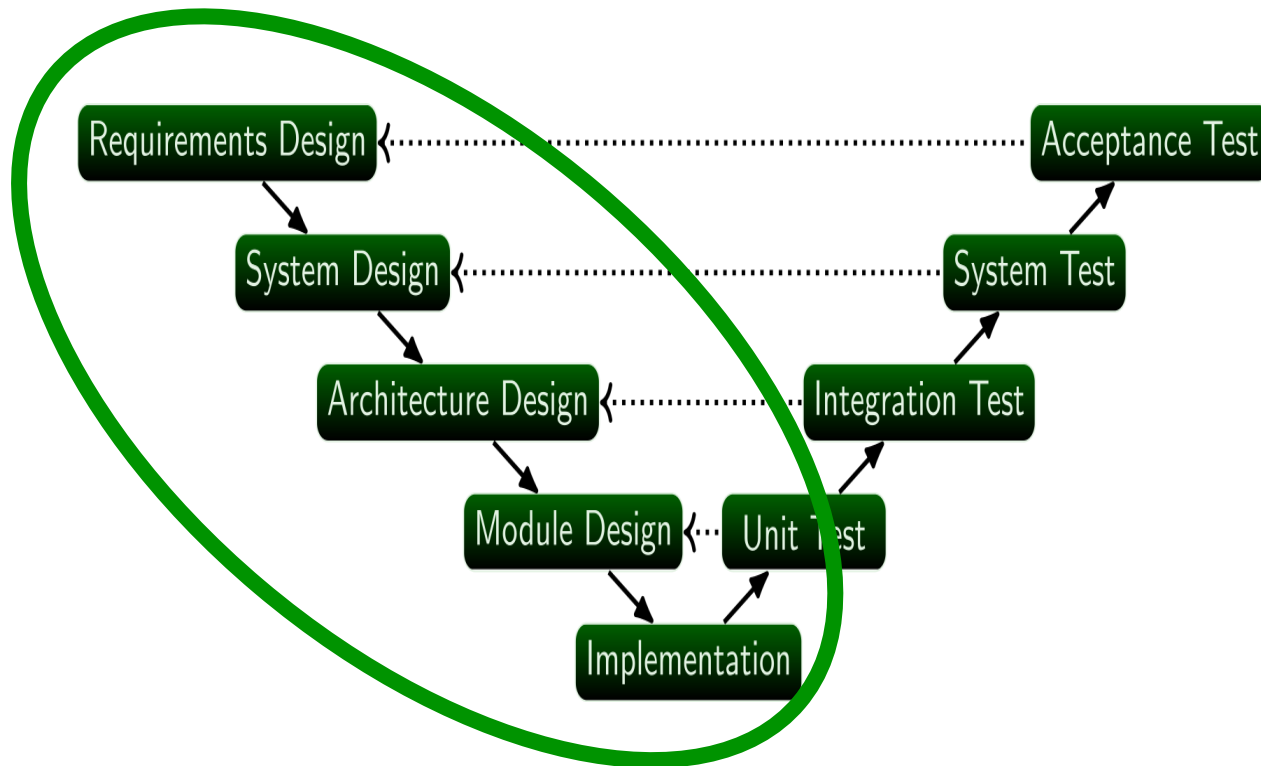
- head unit
- From drive assist to automated drive





# OSADL Kernel process review 😊

Matching spice... ..to ./Documentation/process



## 2. How the development process works

- [2.1. The big picture](#)
- [2.2. The lifecycle of a patch](#)
- [2.3. How patches get into the Kernel](#)
- [2.4. Next trees](#)
- [2.5. Staging trees](#)
- [2.6. Tools](#)
- [2.7. Mailing lists](#)
- [2.8. Getting started with Kernel development](#)

## 3. Early-stage planning

- [3.1. Specifying the problem](#)
- [3.2. Early discussion](#)
- [3.3. Who do you talk to?](#)
- [3.4. When to post?](#)
- [3.5. Getting official buy-in](#)

## 4. Getting the code right

- [4.1. Pitfalls](#)
- [4.2. Code checking tools](#)
- [4.3. Documentation](#)
- [4.4. Internal API changes](#)

## 5. Posting patches

- [5.1. When to post](#)
- [5.2. Before creating patches](#)
- [5.3. Patch preparation](#)
- [5.4. Patch formatting and changelogs](#)
- [5.5. Sending the patch](#)

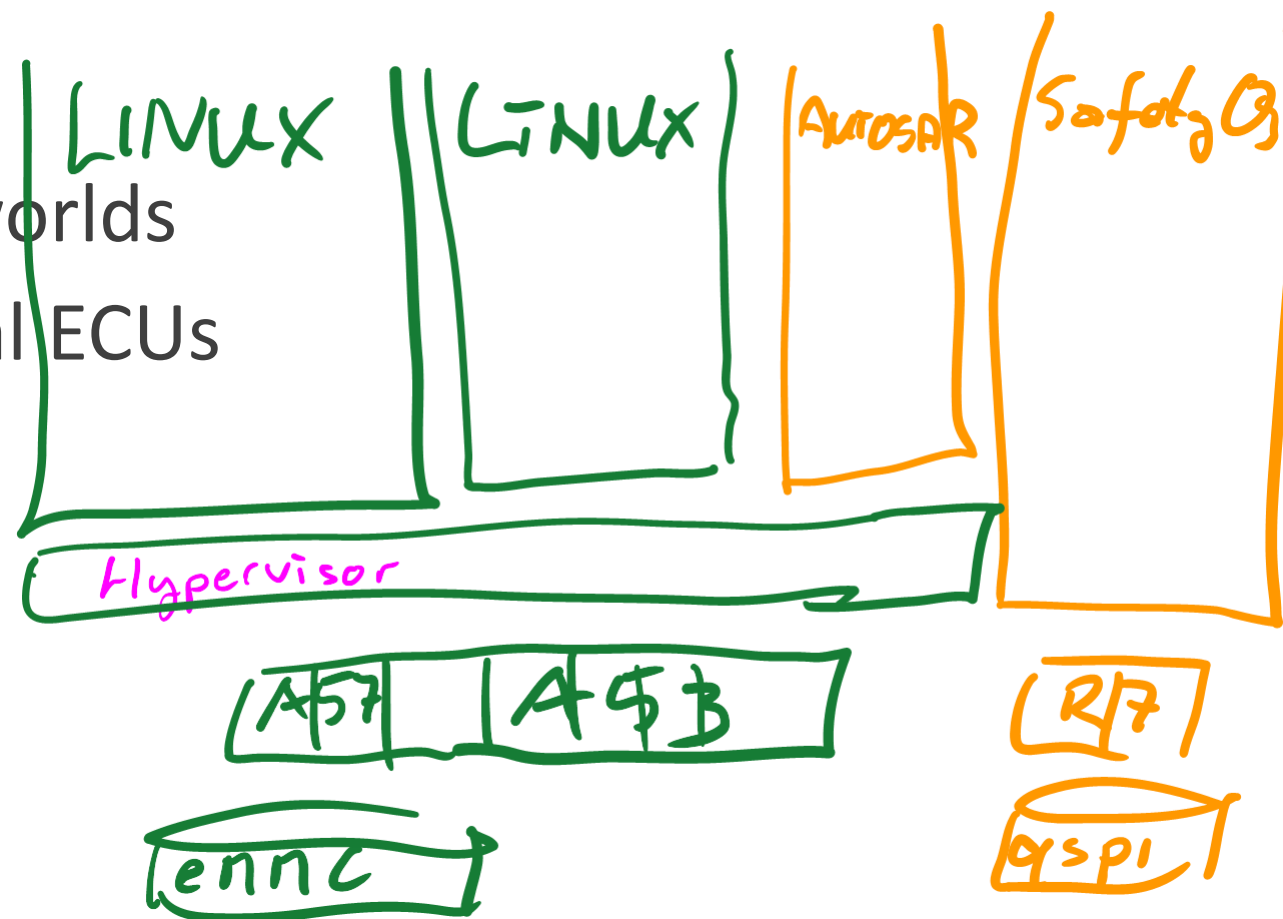
## 6. Followthrough

- [6.1. Working with reviewers](#)
- [6.2. What happens next](#)
- [6.3. Other things that can happen](#)

# “High performance computing”

## virtualization

- Combine ‘old’ and ‘new’ worlds
- Dramatically fewer physical ECUs

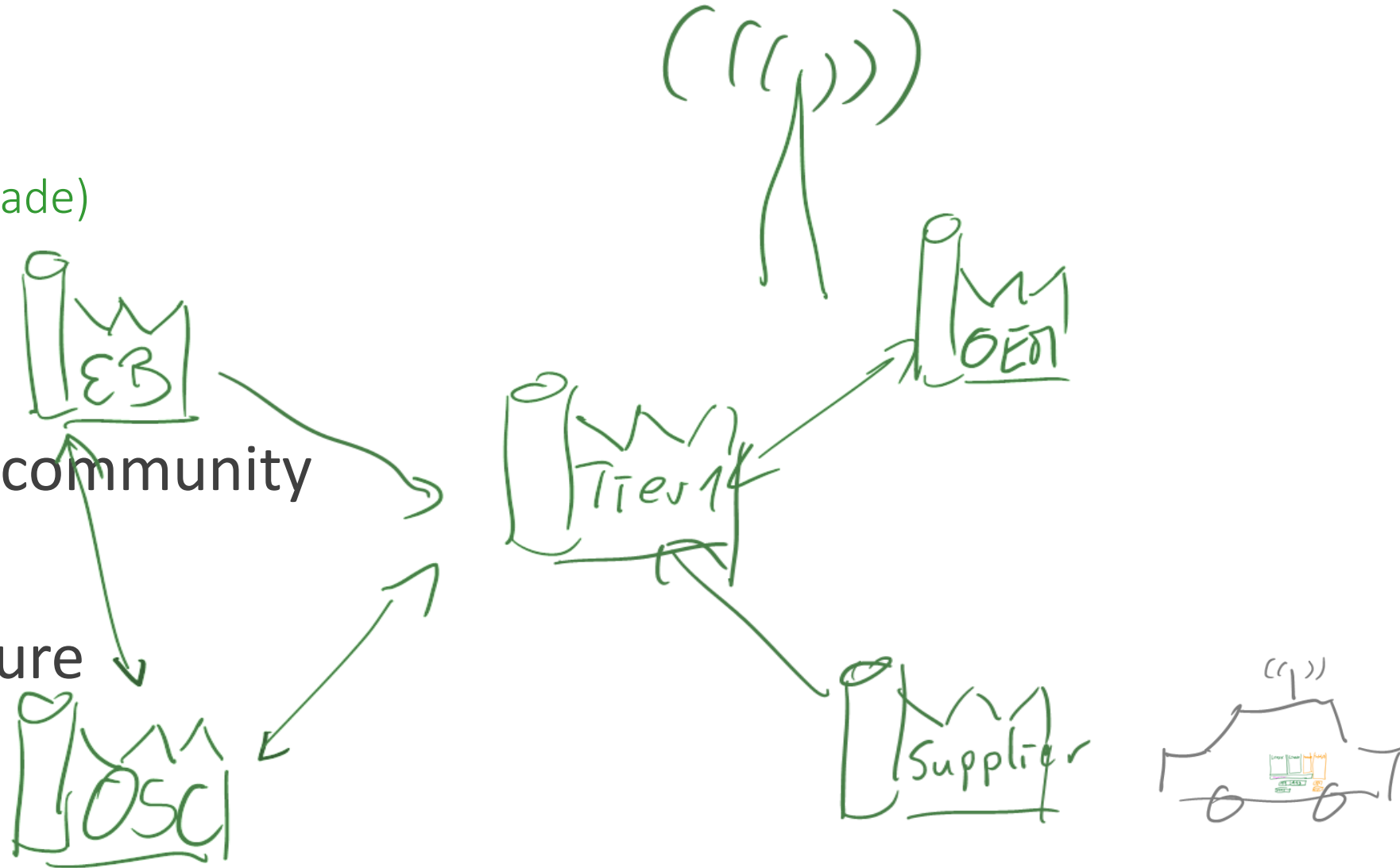




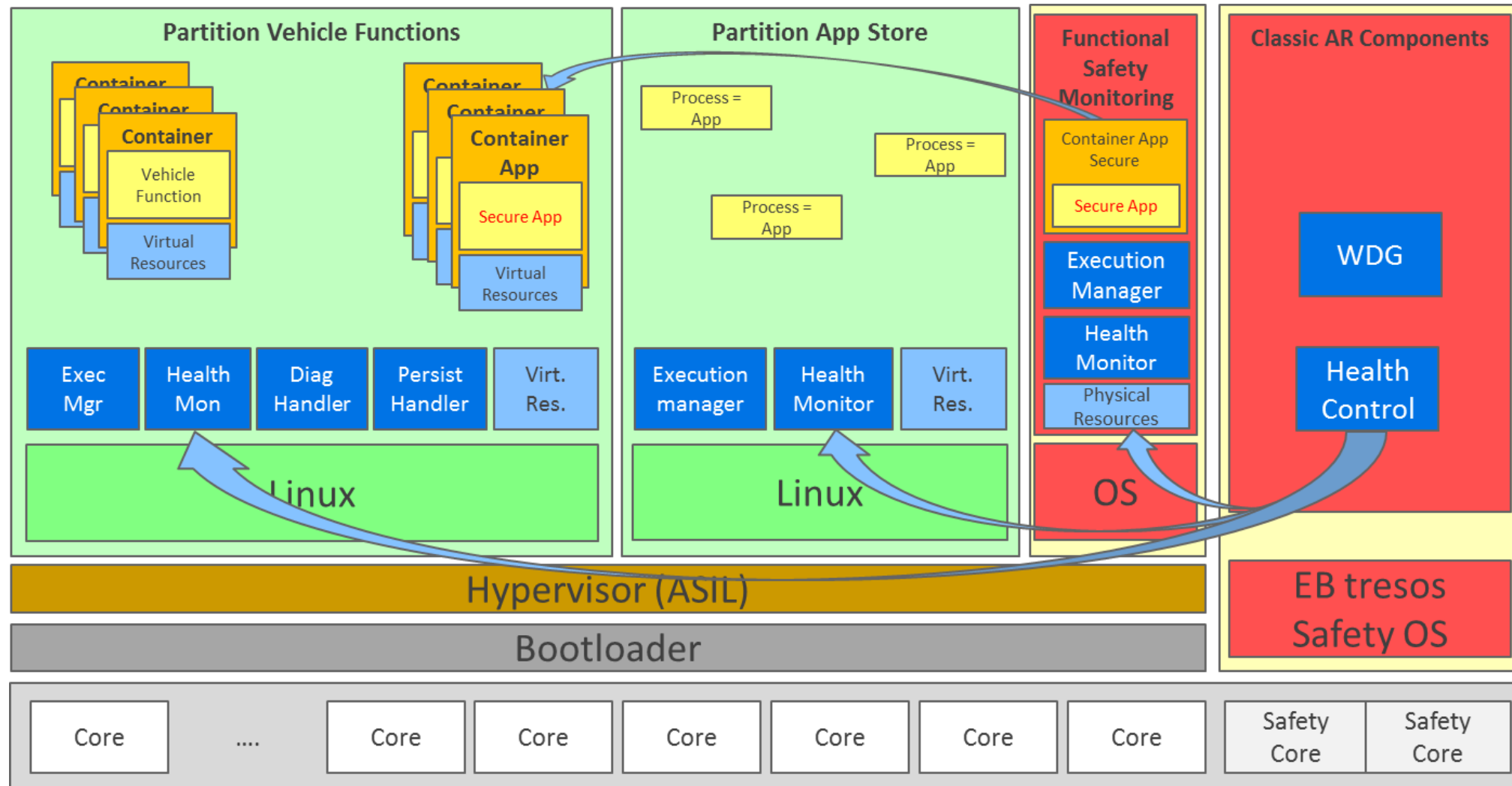
# “Over the air”

.oO(zypper dup / apt upgrade)

- Security updates
- New features
- Learn from FLOSS community
- Test automation
- Shared infrastructure

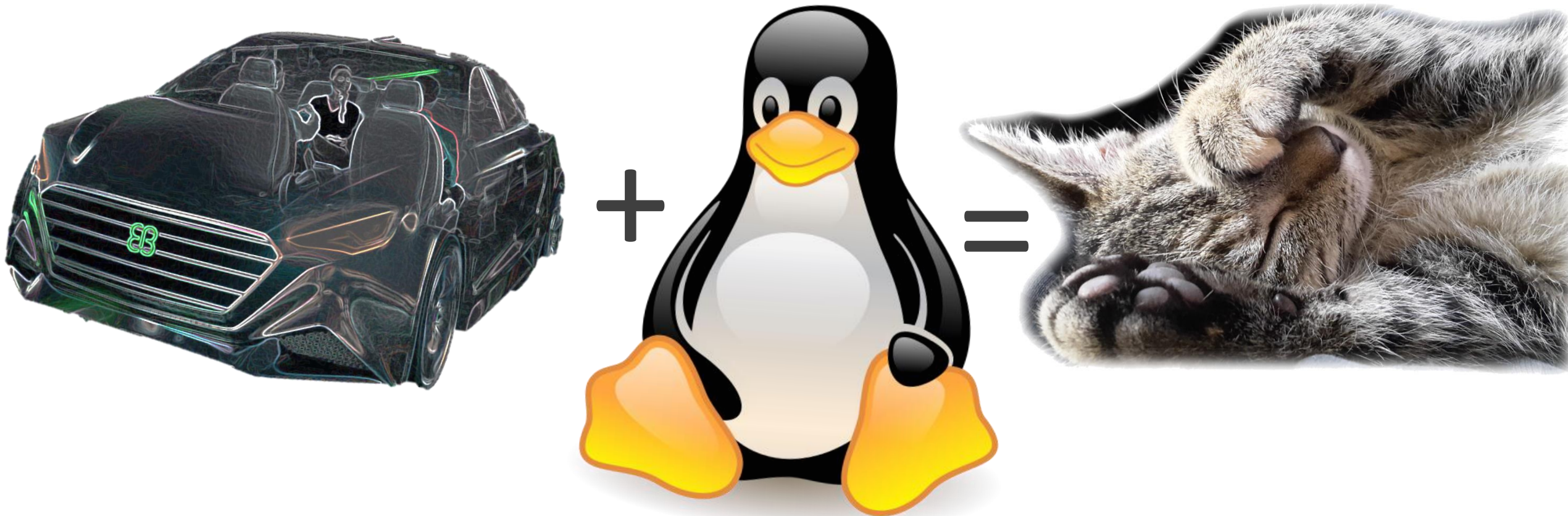


# Automotive: huge chip consumer going SoC





Automotive + Open Source = happiness 😊





# Get in touch!



Elektrobit

[jobs@elektrobit.com](mailto:jobs@elektrobit.com)  
[jobs.elektrobit.com](https://jobs.elektrobit.com)

