ACCELERATING ADAS WITH OPEN SOURCE

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INTRODUCTION

- Mikko Hurskainen - ミッコ フルスカイネン
- Technical leadership positions in Nokia, Notava, Nomovok, Suunto, Link Motion
- Now Technologist in Link Motion. Looking on future technologies.
- Mission: making connected cars safe & secure

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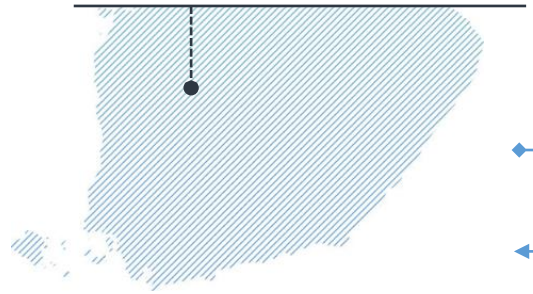
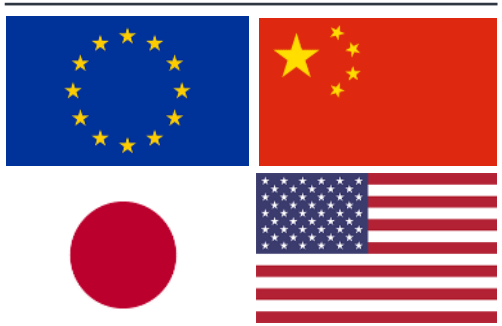
Our HQ is in Finland





We make CONNECTED CAR COMPUTERS with HARDWARE - OS - APPLICATIONS

10 years & 200+
Automotive software projects delivered

Focus on SECURITY with cost efficient performance

NOKIA

maemo™

MeeGo

DENSO

TOYOTA

RENESAS

AISIN
Geared up for the future

Pioneer

2002 2004 2006 2008

2015 2013 2011 2009

LAMBORGHINI

RENAULT

MTA

HUAWEI

Clarion
CAR AUDIO

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WHAT'S ADAS ?

Level 0 No Automation	Level 1 Driver Assistance	Level 2 Partial Automation	Level 3 Conditional Automation	Level 4 High Automation	Level 5 Full Automation
Applications: • Manually driven car		Applications: • Lane assist • Adaptive Cruise control • Collision avoidance		Applications: • Commuter • Efficient transport • Local concierge	
Applications: • Reverse camera • Cruise control • Visualization		Applications: • Automated parking • Highway cruiser • Platooning		Applications: • Taxi service • Moving office space • “Ultimate IoT machine”	

Classification: SAE

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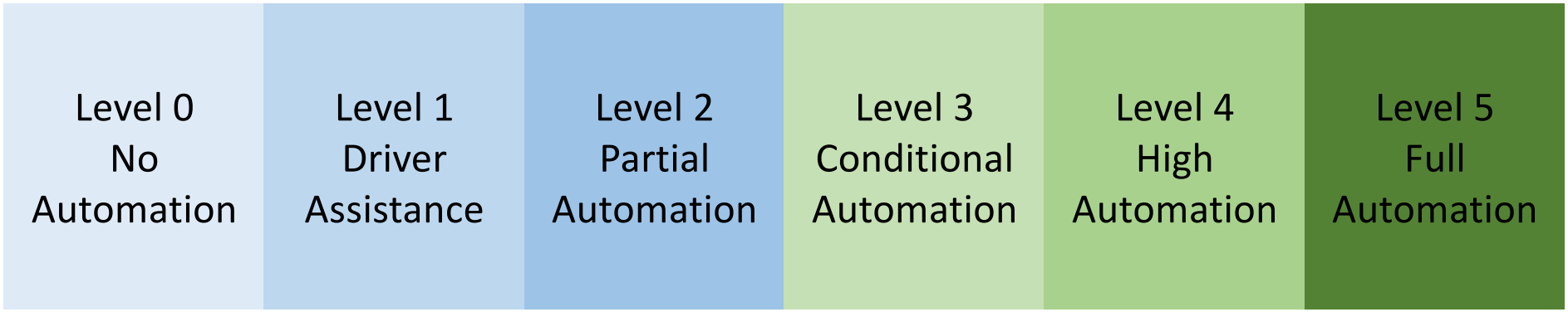
TRENDS & ROLE OF OSS

ADAS becoming mainstream

Enablement of functionality with OSS



Platformisation of ADAS systems & cost-efficiency

Need for openness

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LINUX FOR ADAS – WHY ?

- Few years ago instrument cluster running Linux was thought not to be possible, now reality
- ADAS becoming more complex – deeply embedded designs do not offer structure & re-use that well structured platforms, like Linux, can offer.
- Developers prefer desktop platforms.
- Linux is evolving into direction that it can be used for safety critical applications. Examples: NXP Linux, OSADL
- Linux is POSIX compliant, possible to transfer results to other POSIX platforms. Also hybrid designs possible.

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AUTONOMOUS DRIVING

Biggest challenge: how to ensure car behaves correctly in ALL situations ?

Answer is Open Source: by making algorithms open those can be tested by large community

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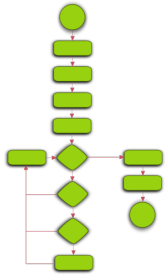
OSS TOOLBOX FOR ADAS

Algorithms



OSS SW / communities

Automotive Platforms

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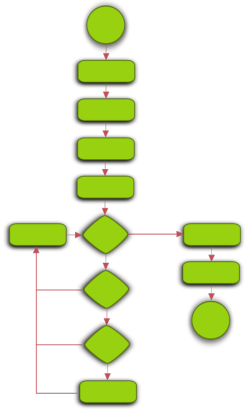
OSS ADAS Platform

Tools, testbench, drivers, platform, architecture, process, community

New components



Products

Lower cost & faster time-to-market

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ISO 26262

Safety based view of the system

ASIL Levels

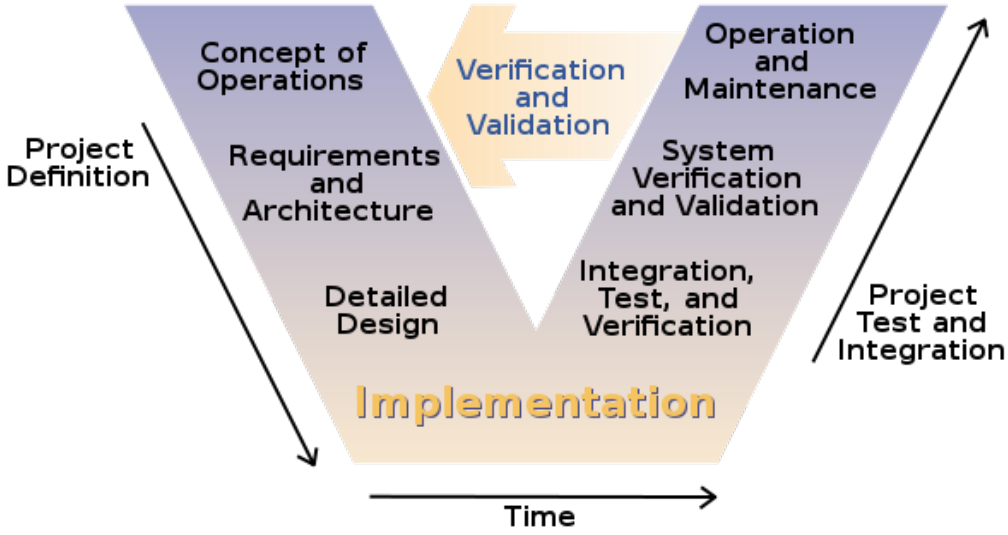
A

B

C

D

ASIL = Severity x (Exposure x Controllability)



ASIL = Automotive Safety Integrity Level (ISO 26262)

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PROCESS COMPLIANCY

Open Source vs ISO 26262 process

- Rigorous reviews
- Adherence to good coding conventions
- Well structured software
- External reviews
- Known-to-work designs

- No controlled process
- No responsible persons
- Lack of testing coverage
- Lack of design documentation

Need to also take account cyber security (eg SAE J3061)

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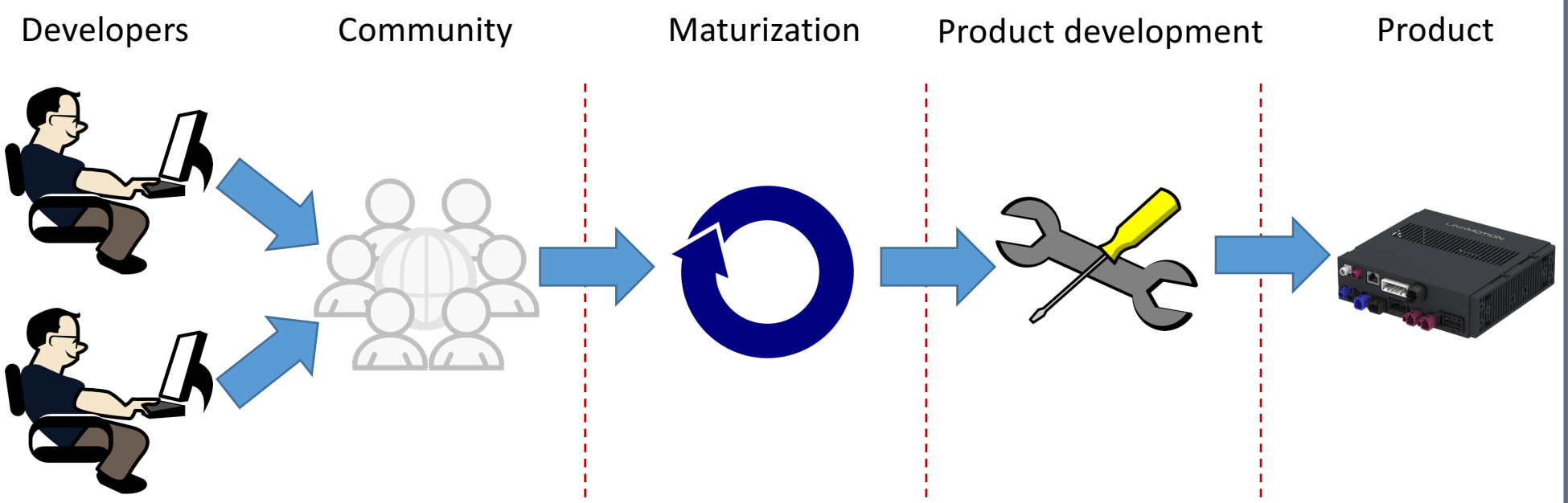
OSS ASIL MATURIZATION



Examples: RHEL, OSADL

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TECHNOLOGIES

ofono
open source telephony

gstreamer

GENIVI®

OSADL 10YEARS
Open Source Automation Development Lab eG

BlueZ

AUTOMOTIVE GRADE LINUX

MQTT.ORG

sel4
Security. Performance. Proof.

Need more:

- Sensing
- Connectivity
- Fusion
- ADAS components
- Testbenches
- Simulation
- Auditing
- Security

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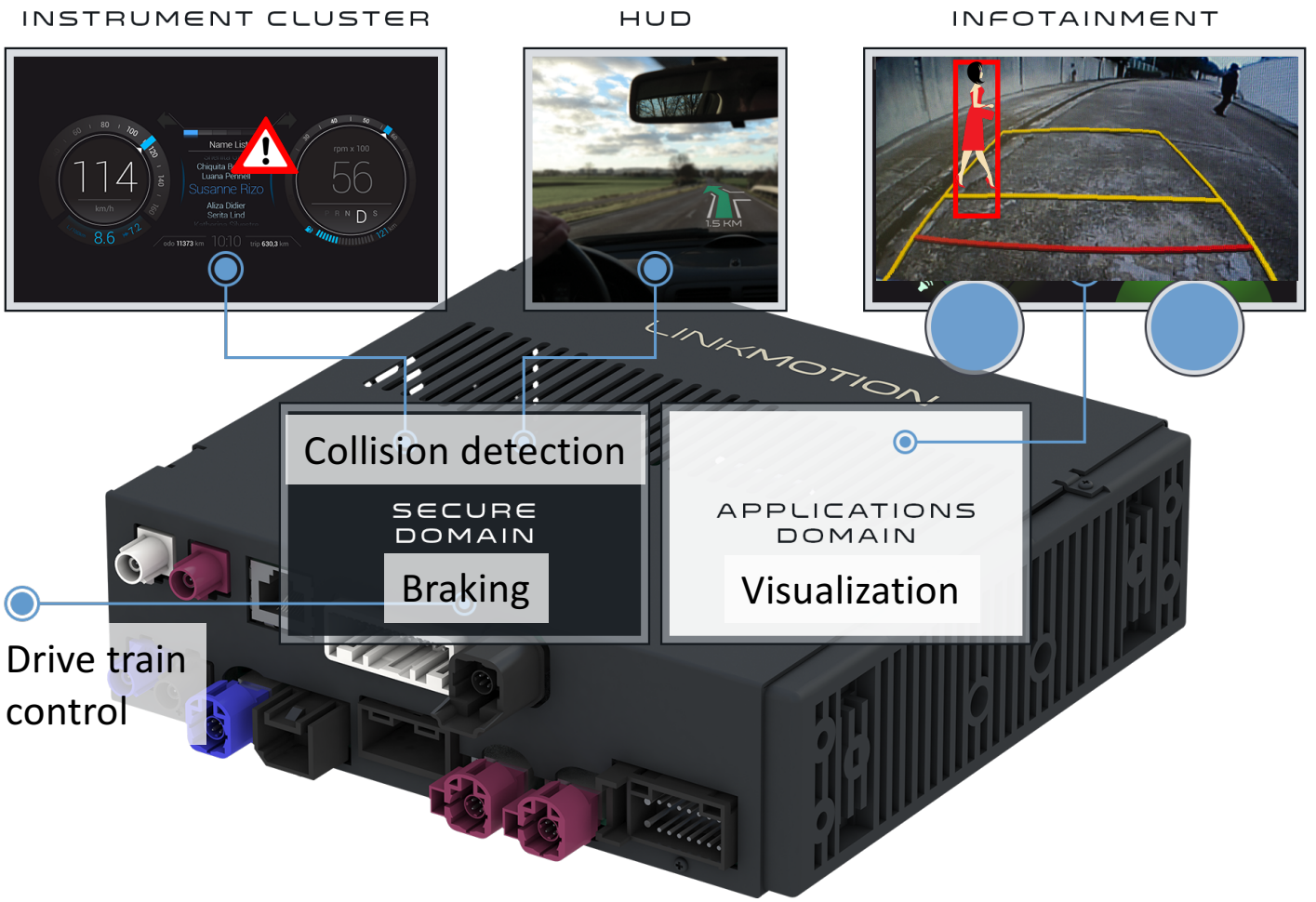
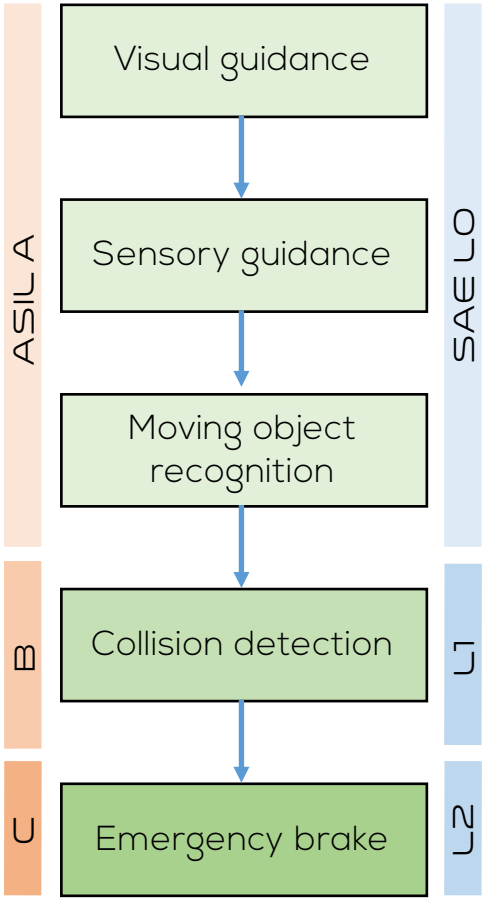
EVOLUTIONARY: OSS REAR VISION CAMERA

https://github.com/openautocam





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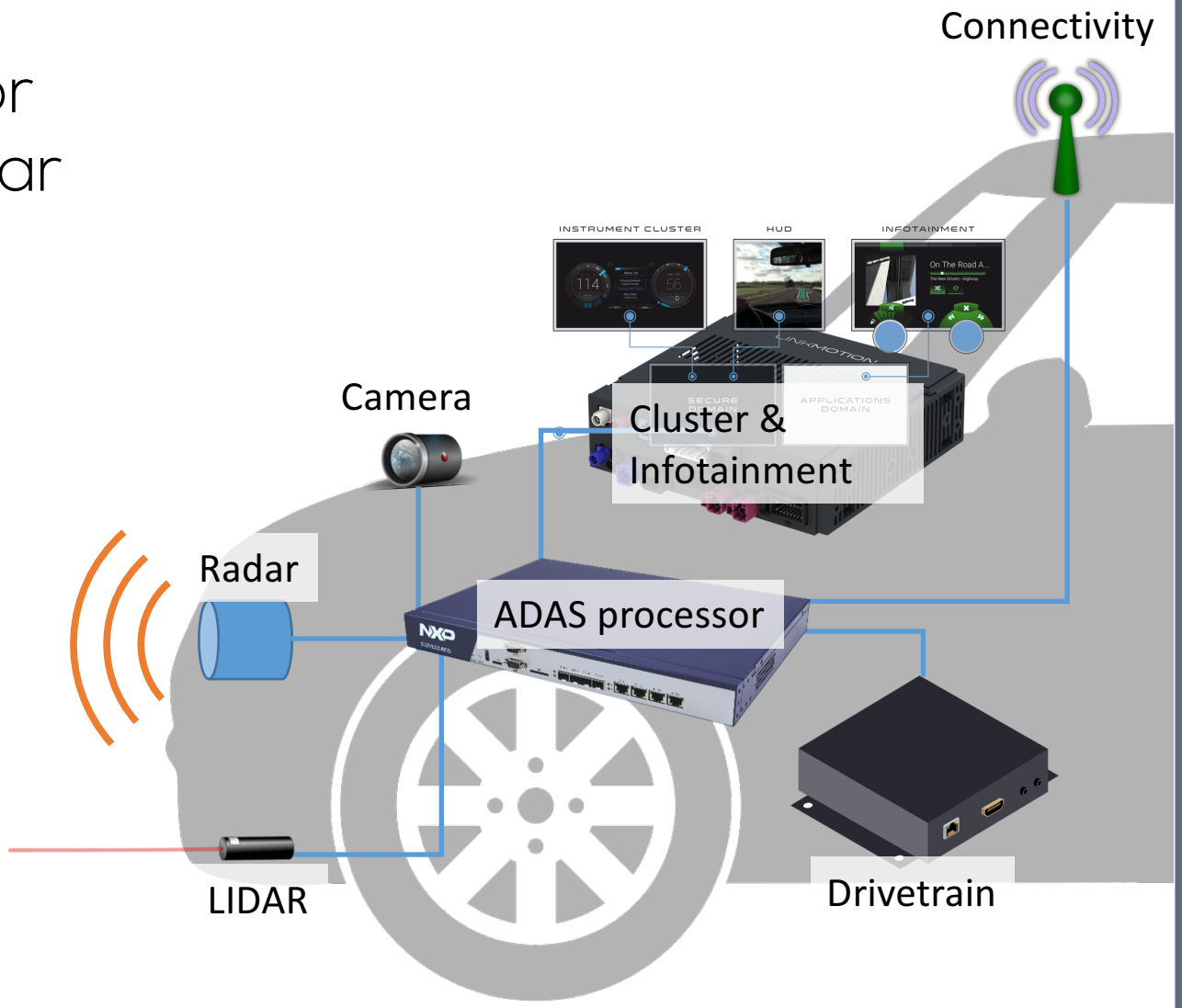
REVOLUTIONARY: ADAS PROCESSOR

- ADAS processor as brains of a car
- Connected to vision, sensors, connectivity, actuators
- Linux as a base instead of embedded system



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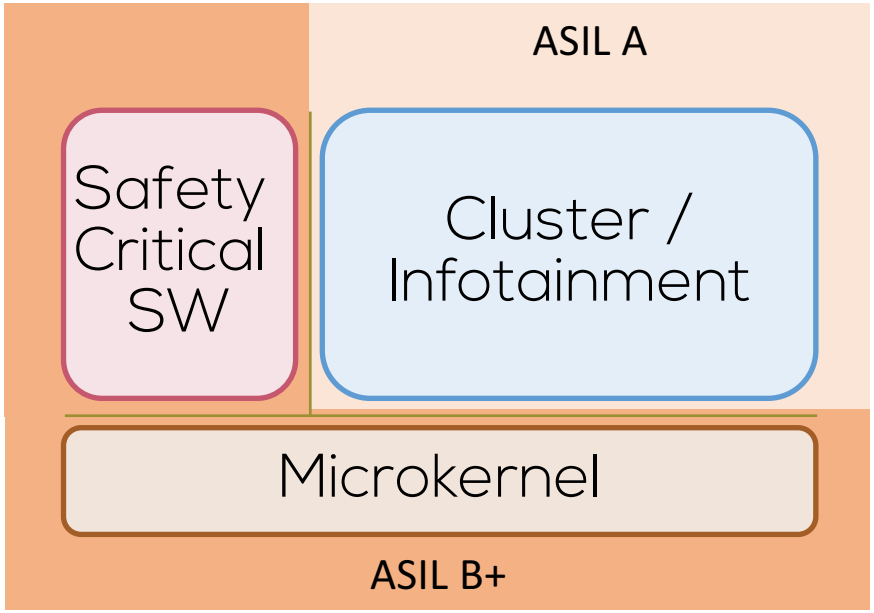
HYBRID DESIGNS



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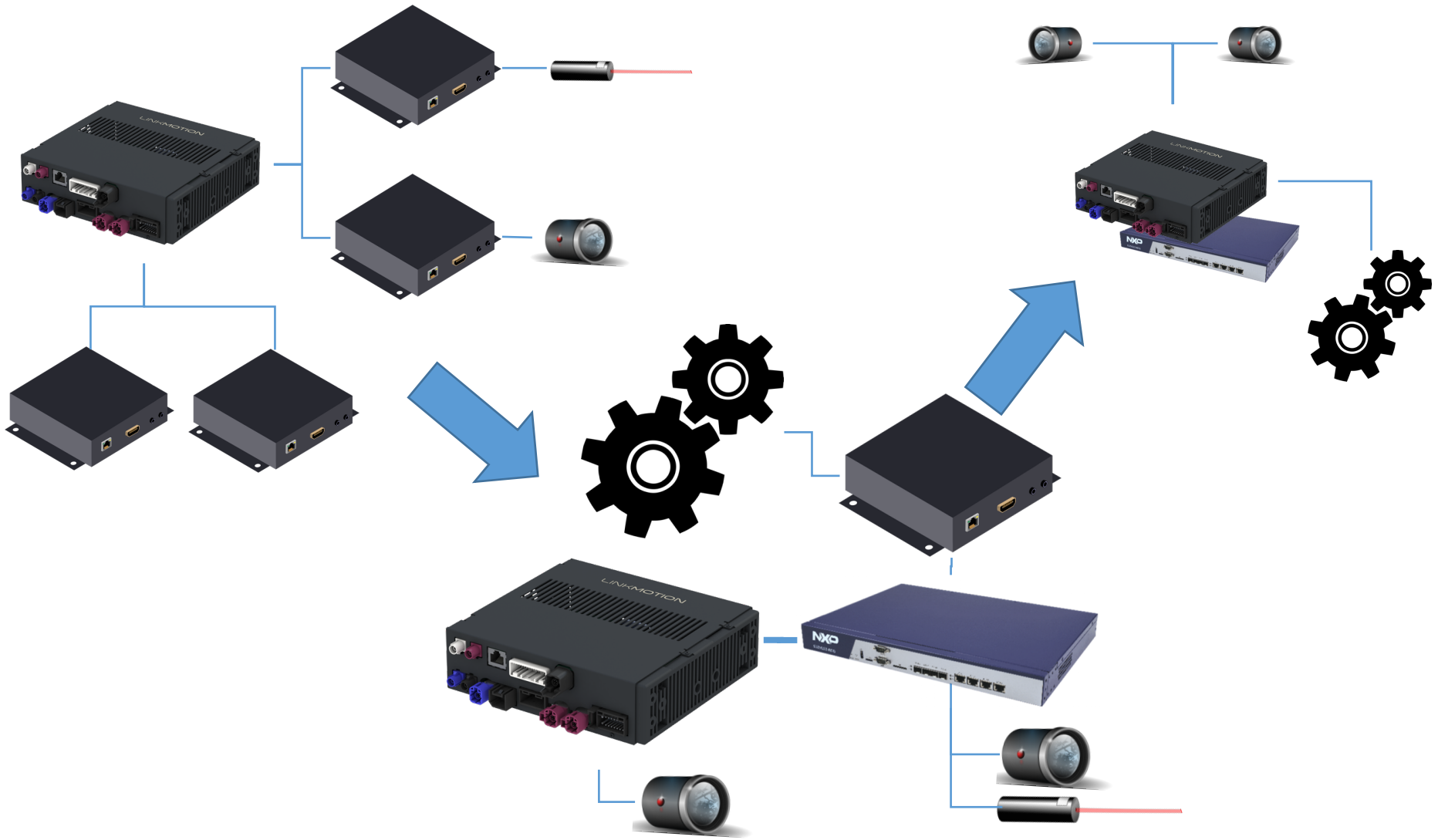
LESS, BUT MORE POWERFUL COMPUTERS



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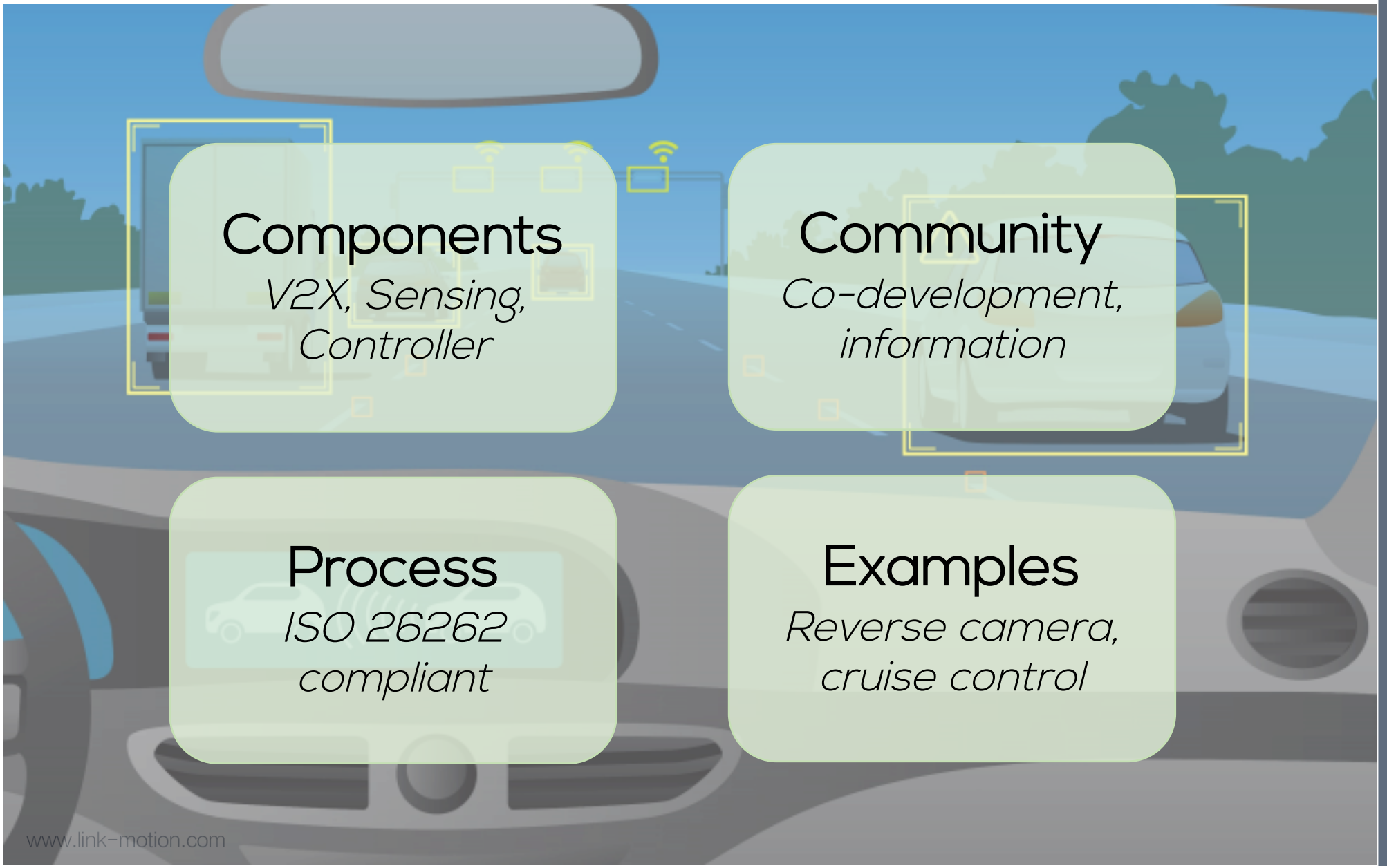
WHAT'S NEEDED ?



Components

V2X, Sensing, Controller

Community

Co-development, information

Process

ISO 26262 compliant

Examples

Reverse camera, cruise control

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Thank you !
ありがとうございます