

Teaching Old Dogs New Tricks

Open Source in Traditional
Industries

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OSW Erfurt, Deutsche Bahn

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Open Source in Traditional Industries

Open Source Software is often seen as a hobby for nerds (positive) or the training-ground for would be hackers (negative.) In the traditional engineering product oriented industries few - maybe too few - executives have understood that open source does stand for a new business approach. Many of these executives are still dealing with the repercussions that software, their own proprietary software, caused in their organisation when it "infected" their products. Most of these executives are not aware that open source maybe just what they need to tame the resource hungry software development in their own organisation. There is hope, however. Even in automotive, one of the more conservative industries, key players begin to see that not all is threat, but that there is opportunity.



A large, dense pile of scrap metal, primarily car engines and parts, is shown. The pile is composed of various engine components, including cylinders, pistons, belts, and hoses, all in various states of disrepair and rust. The background is a dark, textured surface, possibly a pile of scrap metal. The text "Who are these 'Old Dogs'?" is overlaid in the top left corner in a light blue font. The text "'traditional' industries" is overlaid in the center in a large, bold, yellow font.

Who are these "Old Dogs"?

**"traditional"
industries**

"traditional" industries



pre-software

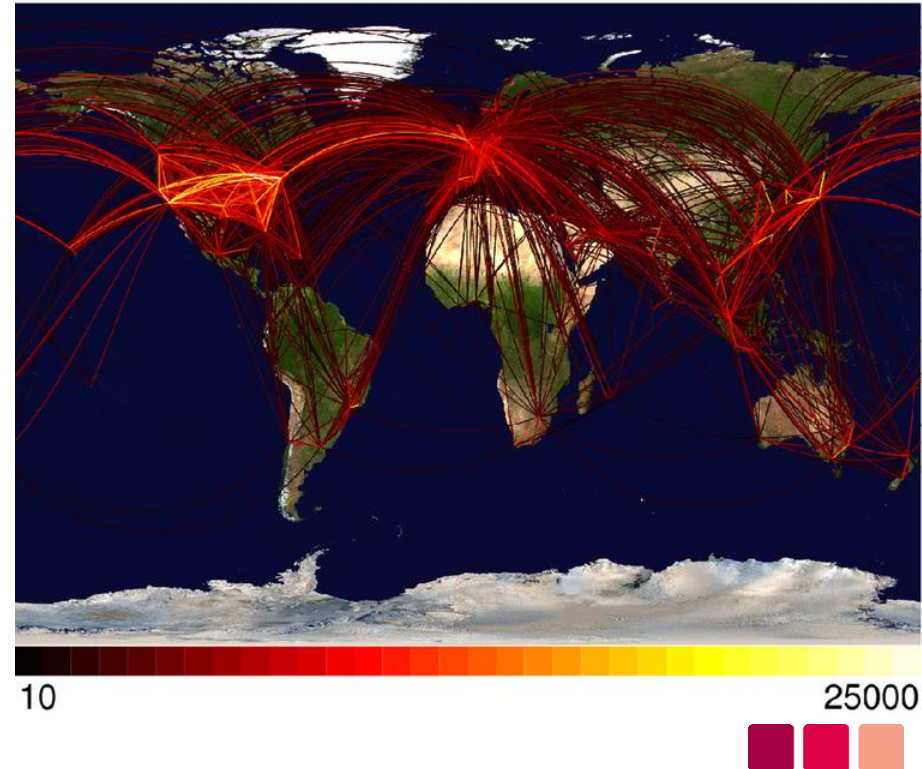
Software – ein sehr spezieller „Werkstoff“



- kein Gewicht - keine Oberfläche
- nicht direkt sichtbar - Fata Morgana der Einfachheit und Eleganz

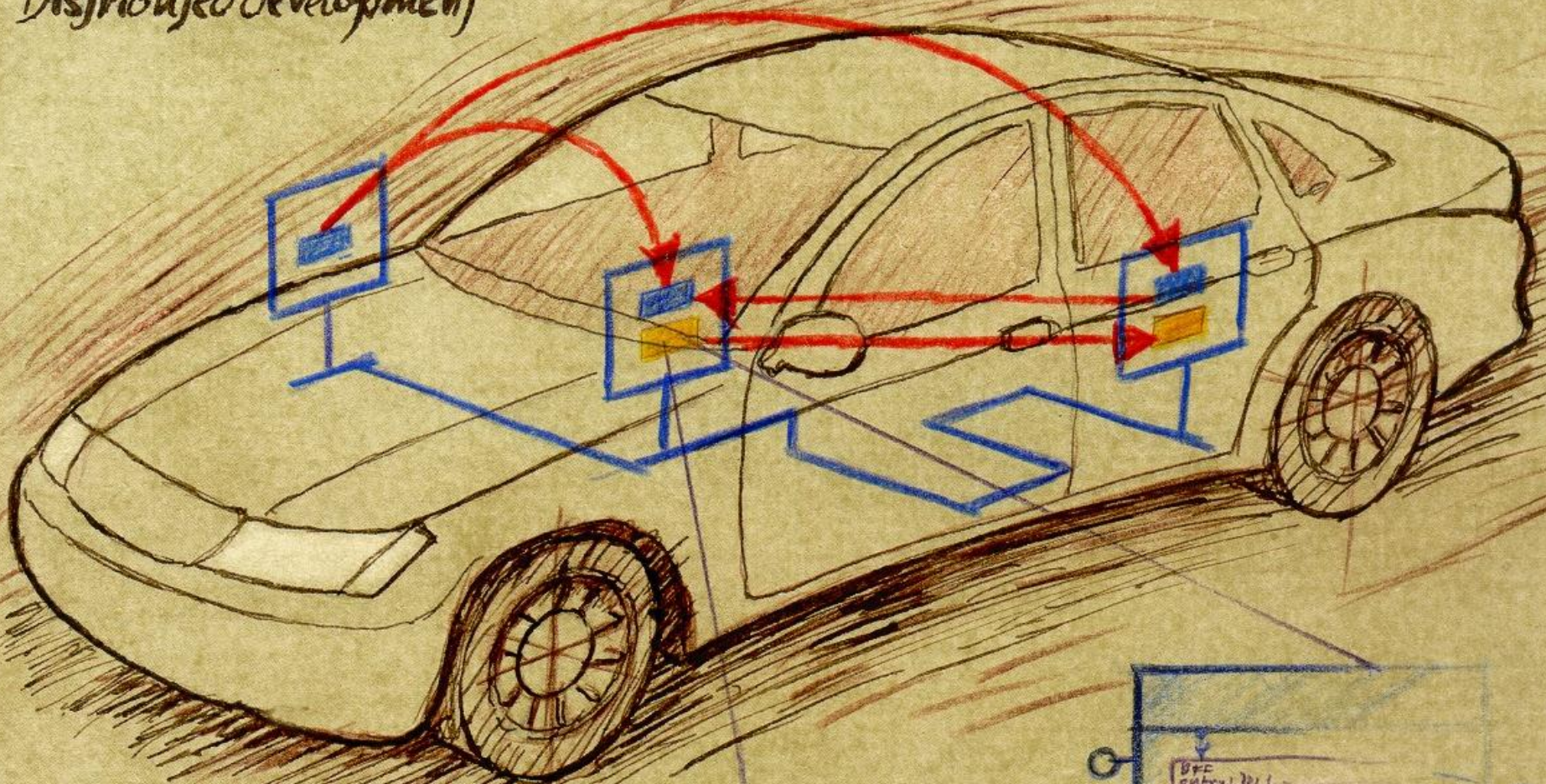
- jeder kennt Software (glaubt sie zu kennen – „... hab ich doch zuhause ...“)
- keiner beherrscht sie

- ist „ansteckend“ – epidemische Proportionen



Structured software design
Reusable functionality
Integration environment
Test support with CANoe
Configuration management
Iterative development
Distributed development

90% of Innovations are software determined



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**... still dealing ... software ...
"infected" their products**

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Paradigms of the industrial Revolution

Efficiency = Control

Fast = Central

Bigger = Better

Hierarchy = Fast



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traditional engineering product oriented industries few - maybe too few - executives have turned to open source as a new business approach. Many of these executives are still dealing with the repercussions that software, their own proprietary software, caused in their organisation when it "infected" their products. Most of these executives are not aware that open source maybe just what they need to tame the resource hungry software development in their own organisation. There is hope, however. Even in automotive, one of the more conservative industries, key players begin to see that not all is threat, but that there is opportunity.



“Sociology beats Technology”?

- ICSE 2007 panel
 - Tim Lister (co-author of Peopleware”)
- “The major problems of our work are not so much technological as sociological in nature.”
- Focus less on new ASE tools and more on management / sociological factors
- E.g. More important than “software tools”
 - Any one of 1,2,3,4,5,6,7,8
 - Any two of 10,11,12,...,22
- So, is there a business case for automated software engineering?

id	features	relative weight
1	Personnel/team capability	3.53
2	Product complexity	2.38
3	Time constraint	1.63
4	Required software reliability	1.54
5	Multi-site development	1.53
6	Doc. match to life cycle	1.52
7	Personnel continuity	1.51
8	Applications experience	1.51
9	Use of software tools	1.50
10	Platform volatility	1.49
11	Storage constraint	1.46
12	Process maturity	1.43
13	Language & tools experience	1.43
14	Required dev. schedule	1.43
15	Data base size	1.42
16	Platform experience	1.40
17	Arch. & risk resolution	1.39
18	Precedentedness	1.33
19	Developed for reuse	1.31
20	Team cohesion	1.29
21	Development mode	1.32
22	Development flexibility	1.26

Relative impact on development effort.
Regression analysis of 161 projects.
Boehm e.tal. 2000

Paradigms of the industrial Revolution

Efficiency = Control

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... and then ...



RDTN was set up in 72 hours
from concept to launch

RDTN crowdsources radiation levels across Japan

By Mark Brown | 22 March 11

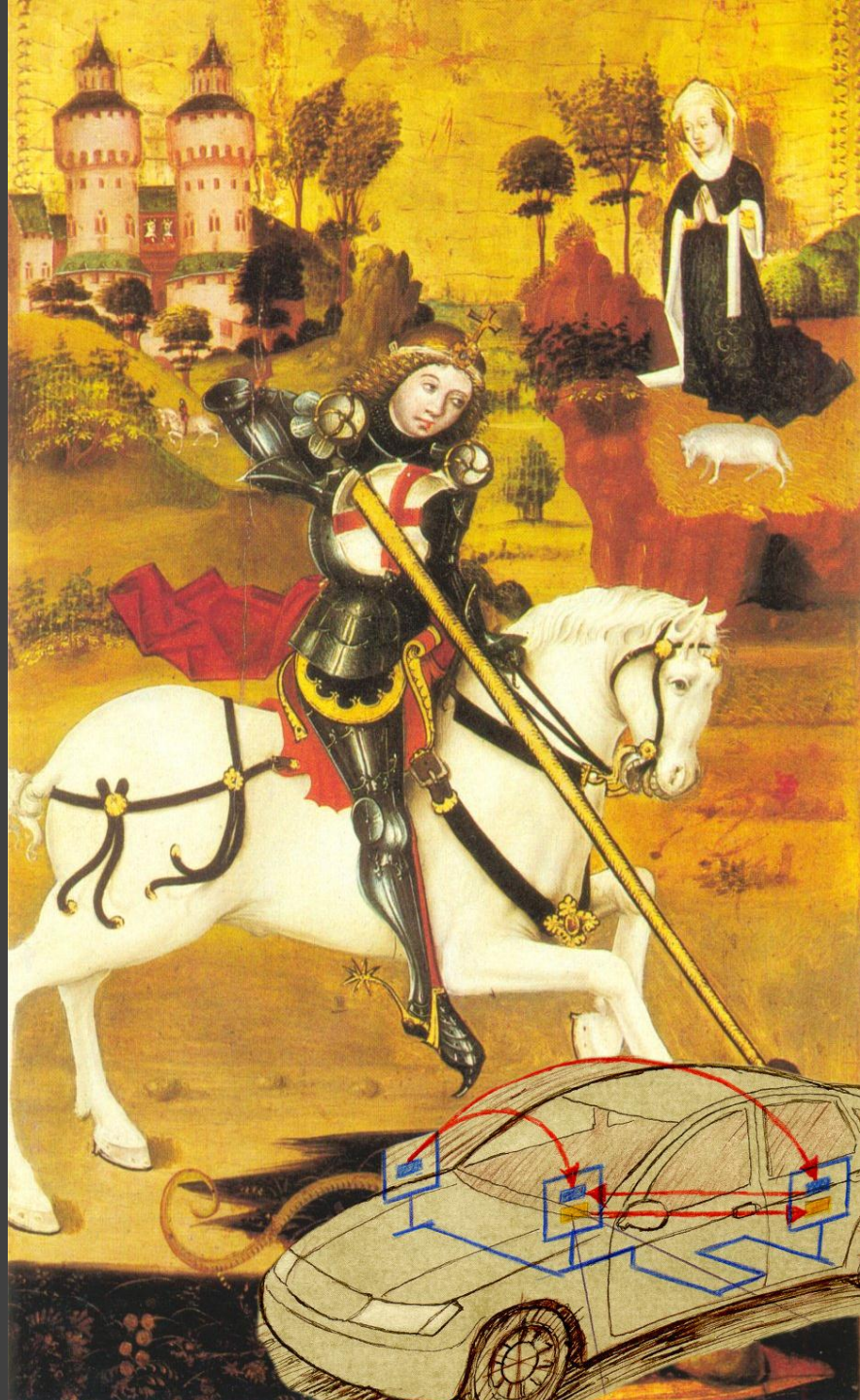


Is "traditional" and "new" that different?

market	ecosystem
push	pull
product	platform
competition	coopetition
private interfaces	open interfaces/source
protect IP	co-innovate
cost of ownership	value creation
OP (linear)	purposeful systems (living systems)
central	networked
hierarchy	flat
vertical authority	meritocracy
external control	internal purpose
selfish	emphatic







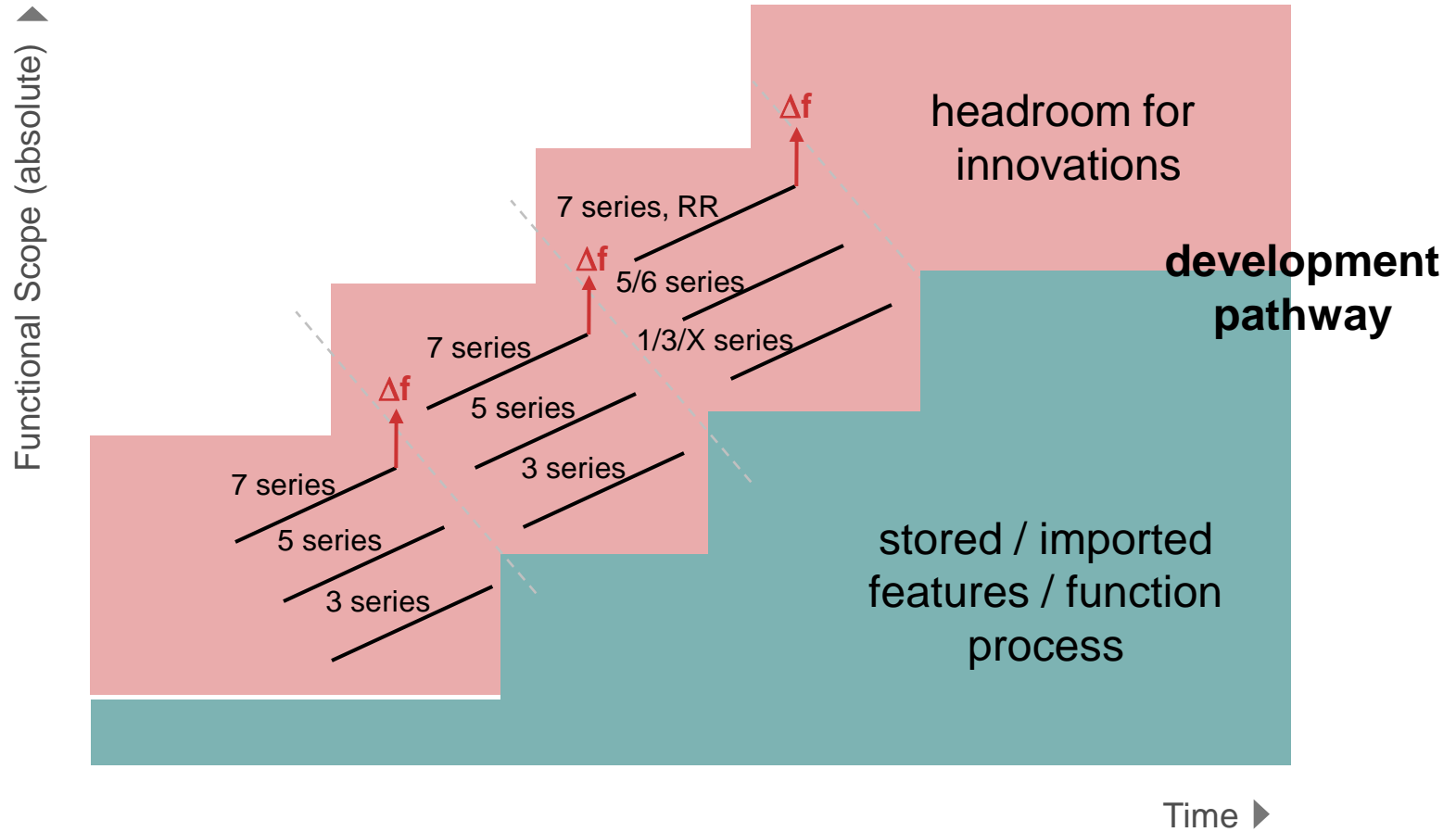


Community based Development as enabler to cope with innovation extent and speed.



Managing Complexity.

Reuse of Base Knowledge to Enable Innovation.

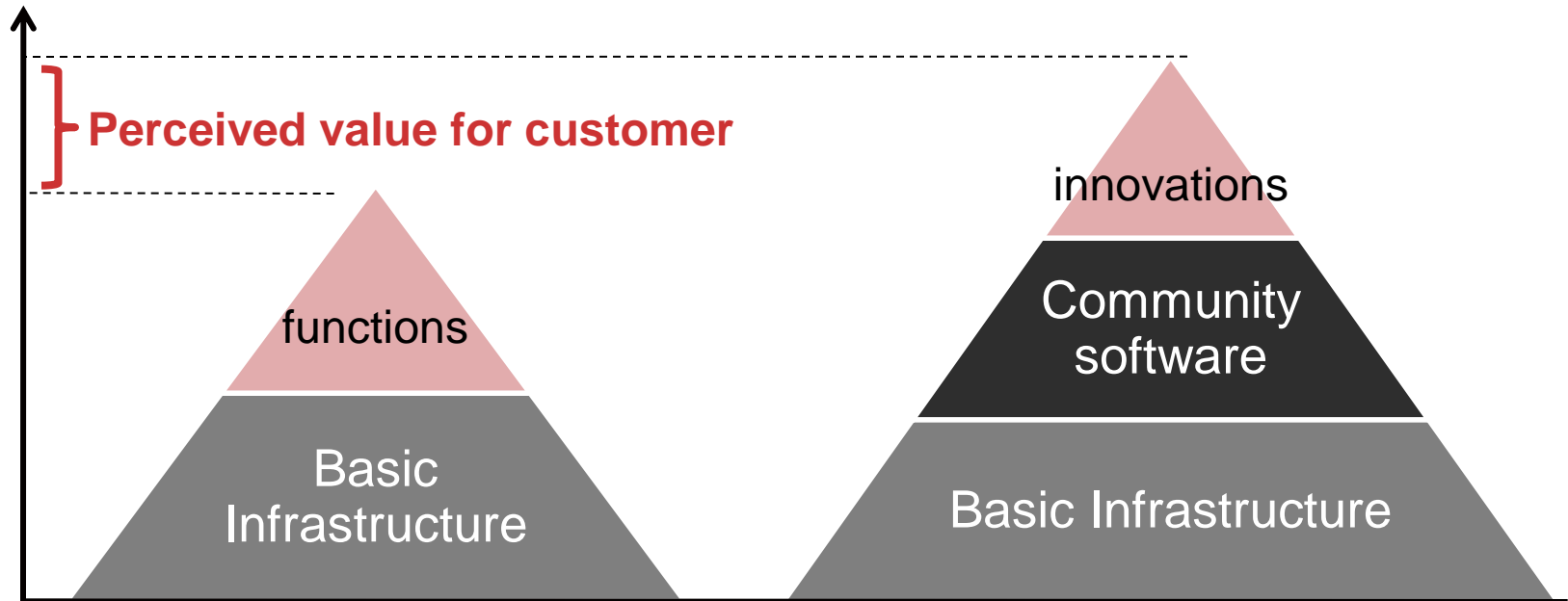


1. Store / Import Process and Development achievements
2. Concentrate on innovations

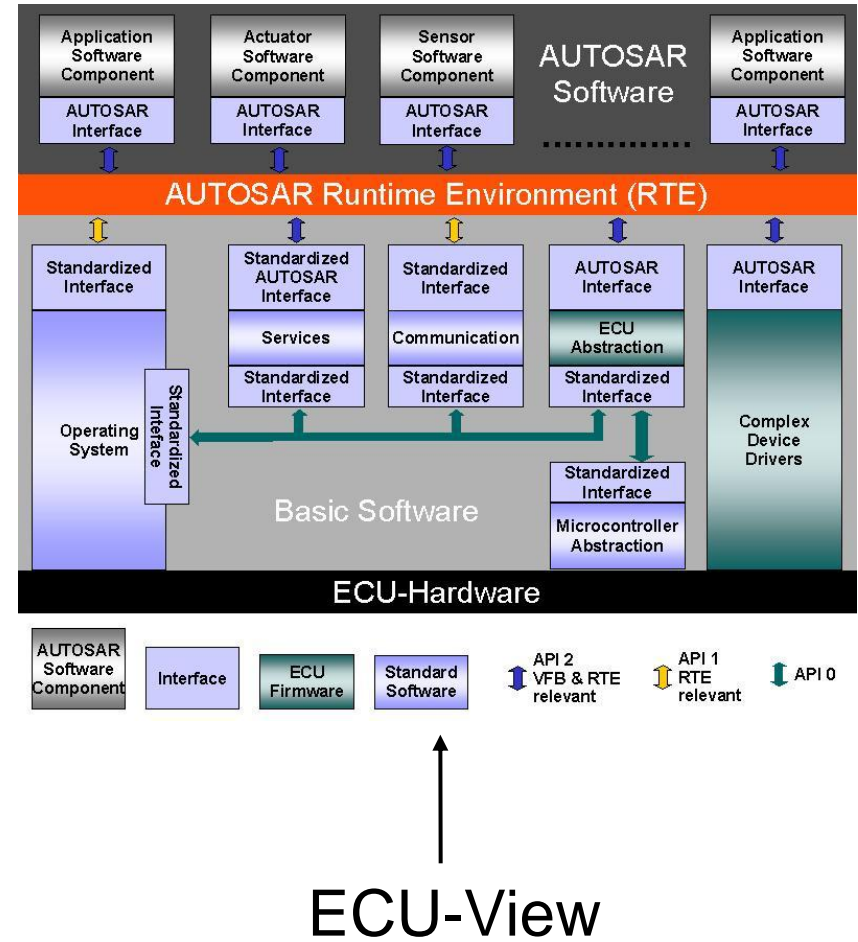
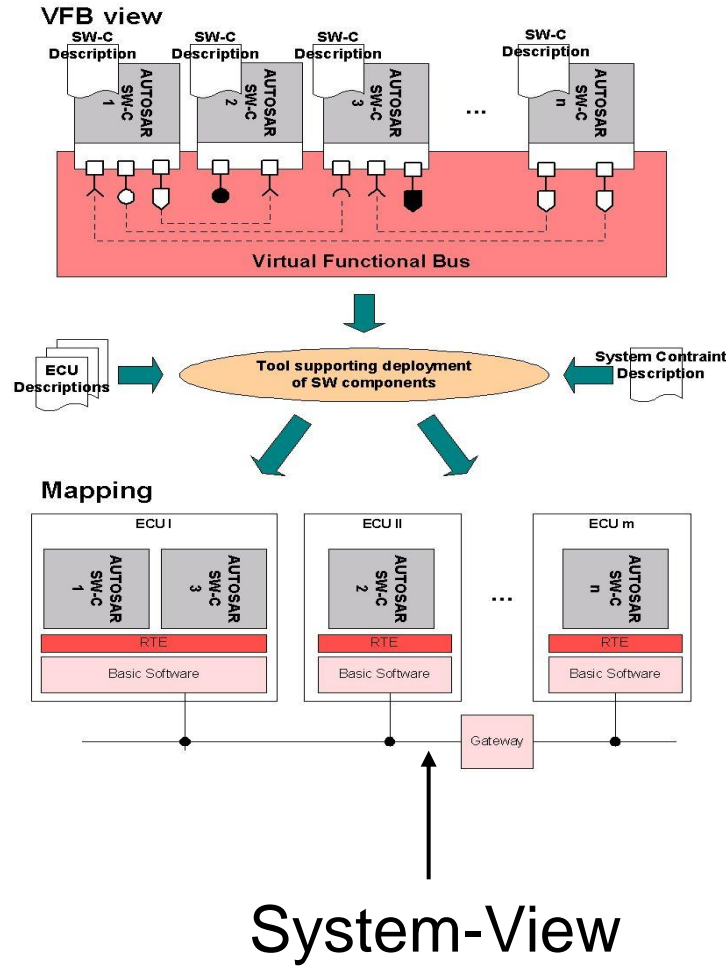
Community enables teams to concentrate on real innovations.

Exploit the **community approaches**:

→ Ecosystem for application development!



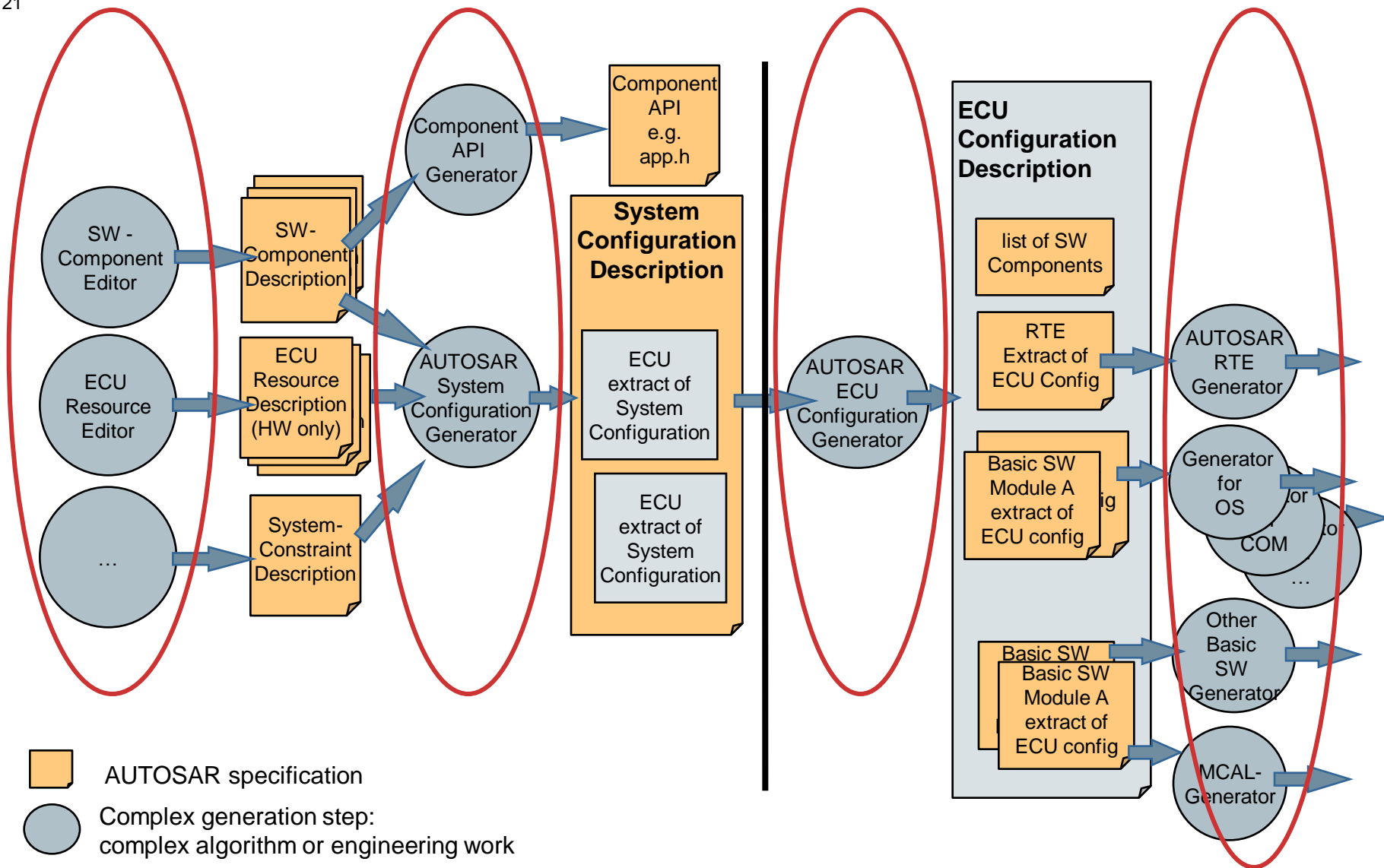
AUTOSAR fact 1. An Overview.



AUTOSAR fact 2 - Methodology and Tooling areas.

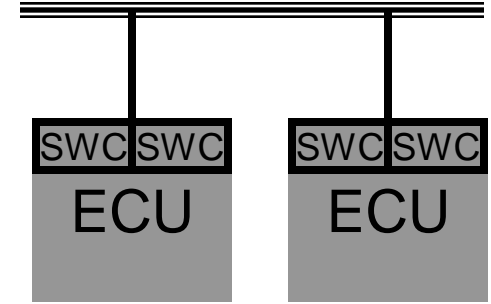
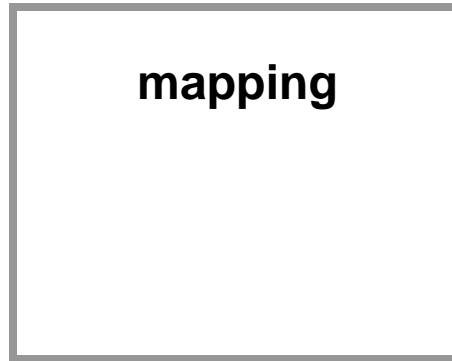
System view and ECU view.

BMW Car IT GmbH
Slide 21



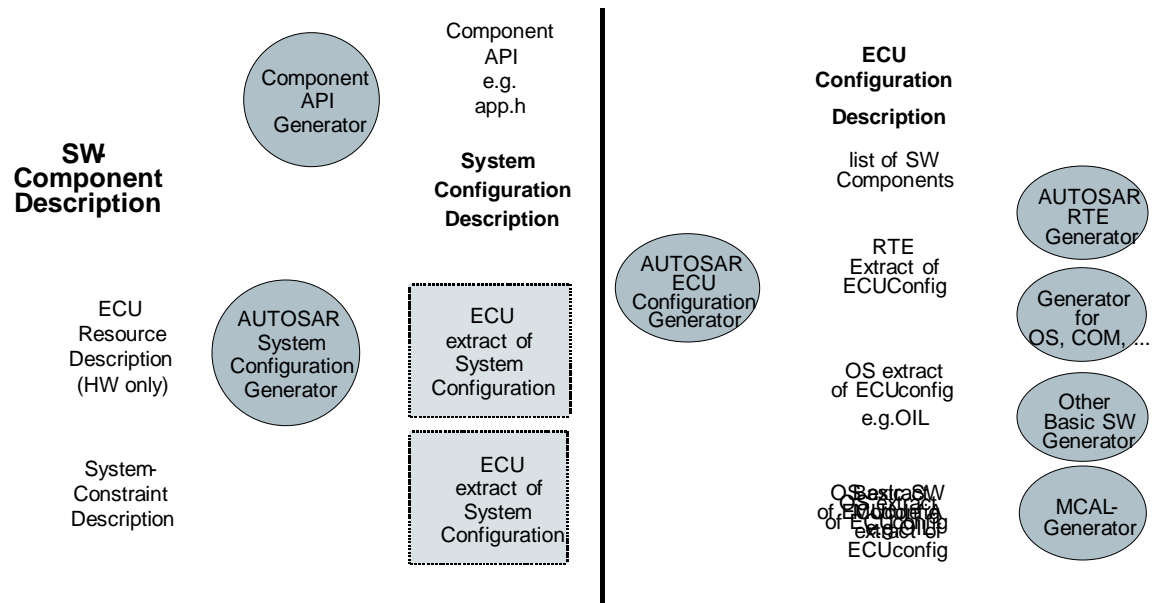
AUTOSAR development process.

Intrinsic feature of Methodology_enabler to handle reusable designed and developed SWC.



AUTOSAR-Methodology

Infrastructural Requirements



Open Source means Open Review.

Continuous open enhancements lead to high quality.

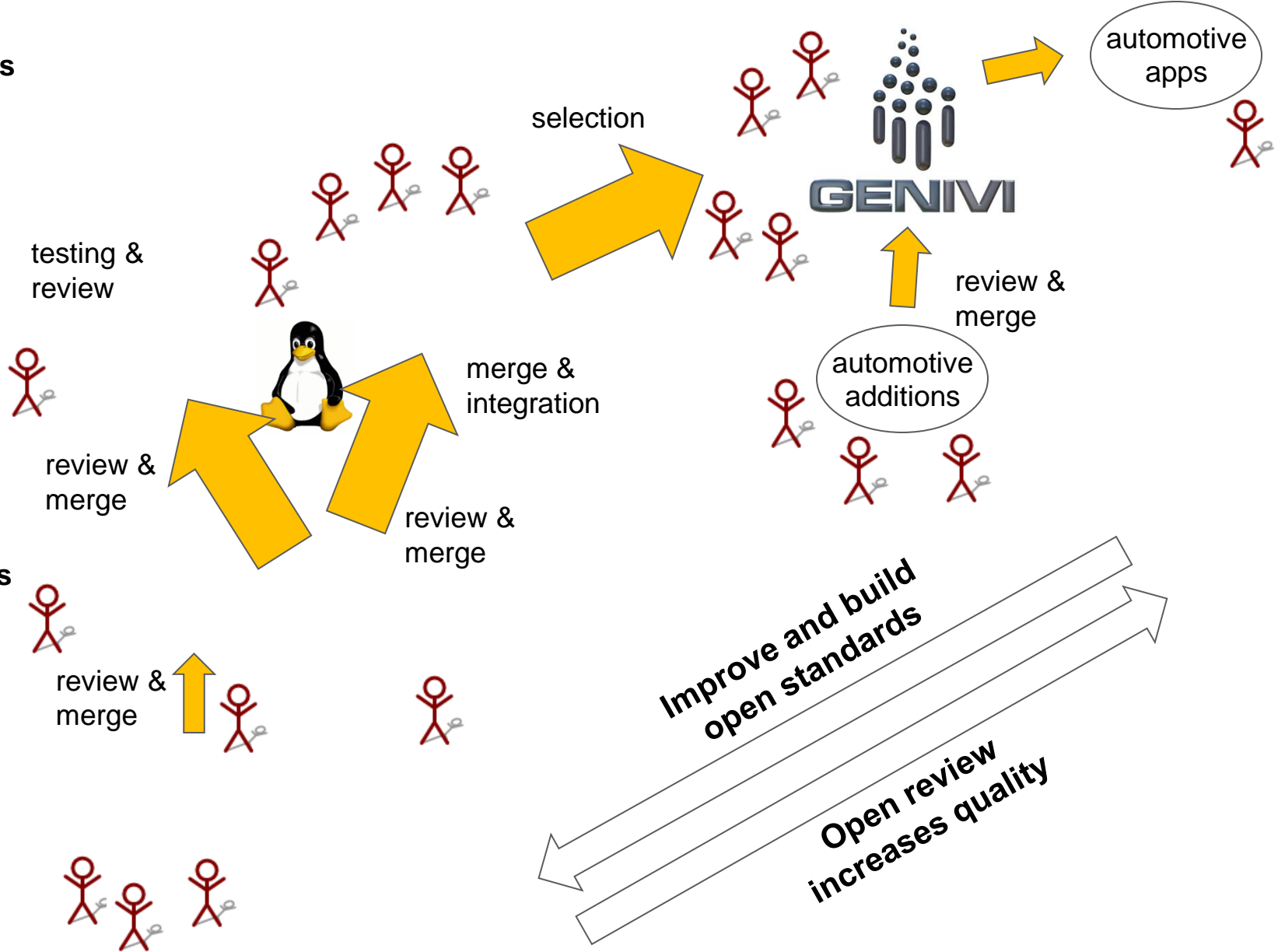
Applications

Platforms

Operating System

Subsystems

Drivers



Innovation Development and Community Sources.

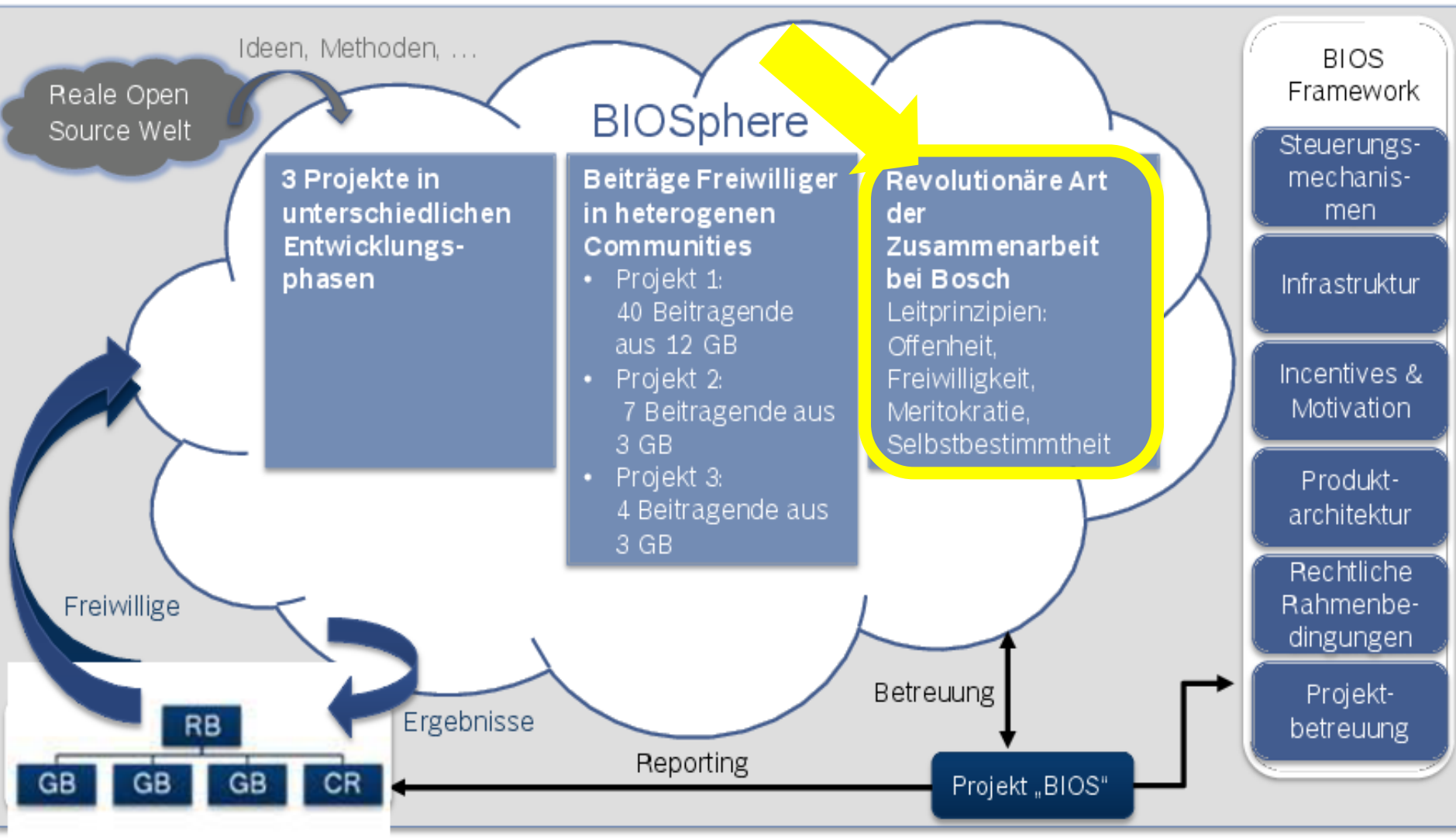
The survival strategy.

New procedures will open up new business.



Open Source Software in Old Industry

Wikinomics bei Bosch: Bosch Internal Open Source - BIOS



BOSCH

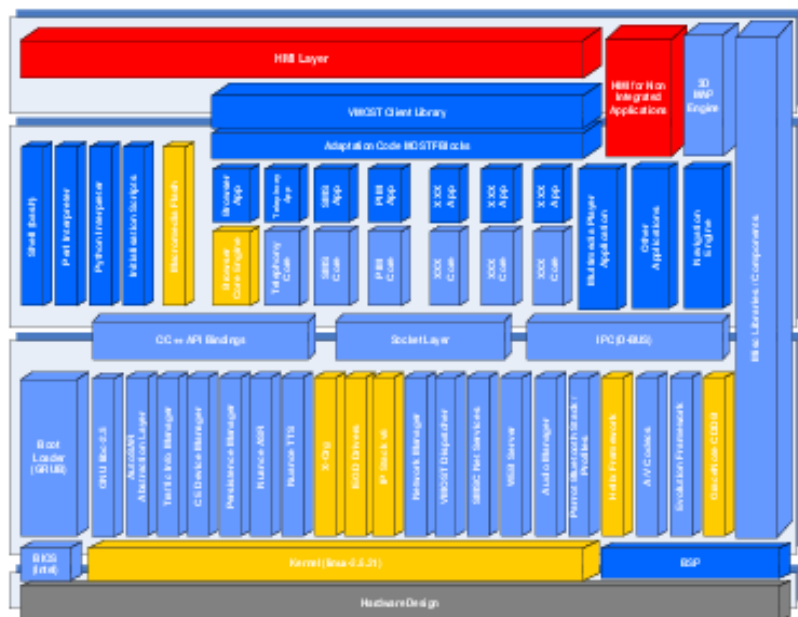
GENIVI Alliance Mission

- GENIVI is a non-profit industry alliance committed to driving the broad adoption of an In-Vehicle Infotainment (IVI) reference platform.
- GENIVI will accomplish this by aligning requirements, delivering reference implementations, offering certification programs and fostering a vibrant open source IVI community



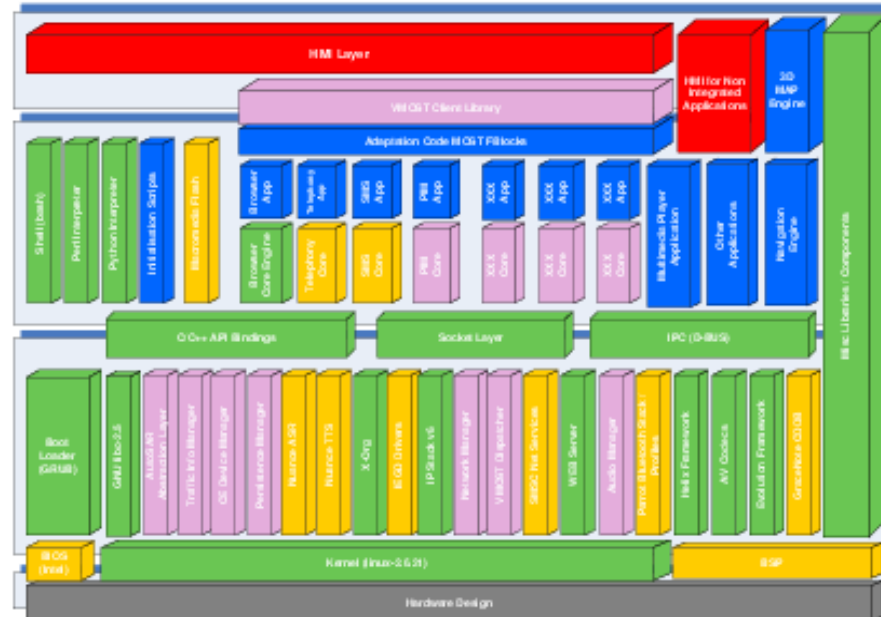
Open Source Software in Old Industry

Situation in Automotive Infotainment



Classic/Proprietary

- Code created by the 1st tier.
- Licensed code from eco-system partners pre-integrated in the platform

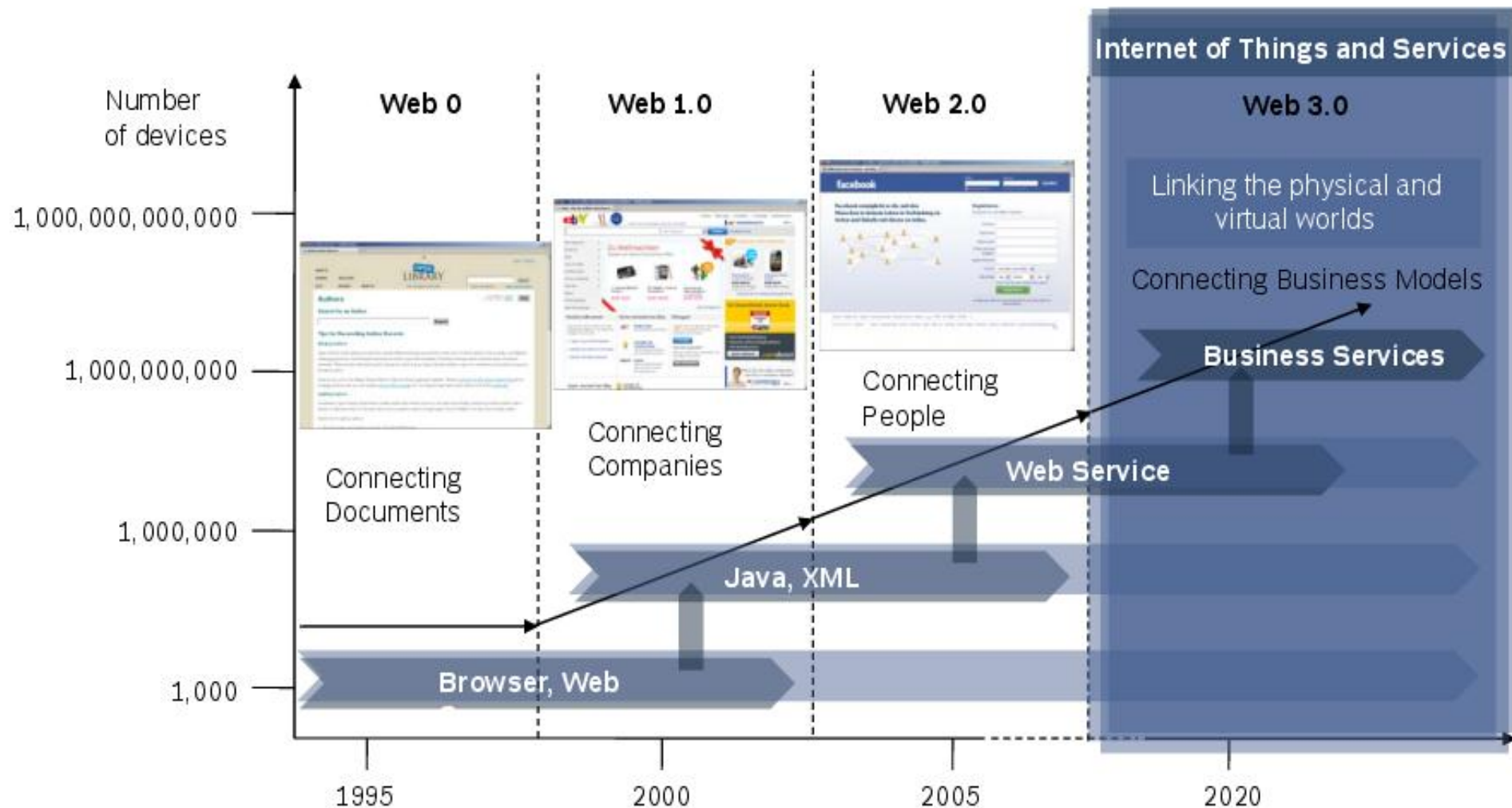


GENIVI/Open Source

- Open Source Kernel / Open Source Packages
- Code created for automotive compliancy
- User interface logic and graphics



Internet – The Driver of Change





Volkmar Denner

Volkmar Denner has been chairman of the board of management of Robert Bosch GmbH and a limited partner of Robert Bosch Industrietreuhand KG since July 1, 2012. His responsibilities include Corporate Strategy, Corporate Communications including Brand Management and Sustainability, Senior Executives, and Real Estate and Facilities. He has corporate responsibility for Research and Advance Engineering, Engineering Coordination, and User Experience.

We want to connect the virtual and the physical world



Throughout its 126-year history, the one thing that Robert Bosch GmbH has always done is make things. We produce injection systems and sensors, semiconductors, refrigerators, hammer drills, and much more. As a supplier of technology and services, Bosch primarily manufactures technical

products and provides traditional services to go with them – and we will continue to do so. However, we realize that our **business models are confronted with fundamental change.** Networking over the internet is one of the most powerful global trends, but it is one that many companies still vastly underestimate. **We must all come to terms with the fact that we stand before a paradigm shift and that the internet of things and services will bring root and branch changes to the world of business. While this presents huge opportunities, it also poses substantial challenges – and not just for Bosch.**



TOPCASED project – initial members

Industries



SMEs



School/Universities



Laboratories

„Mil-

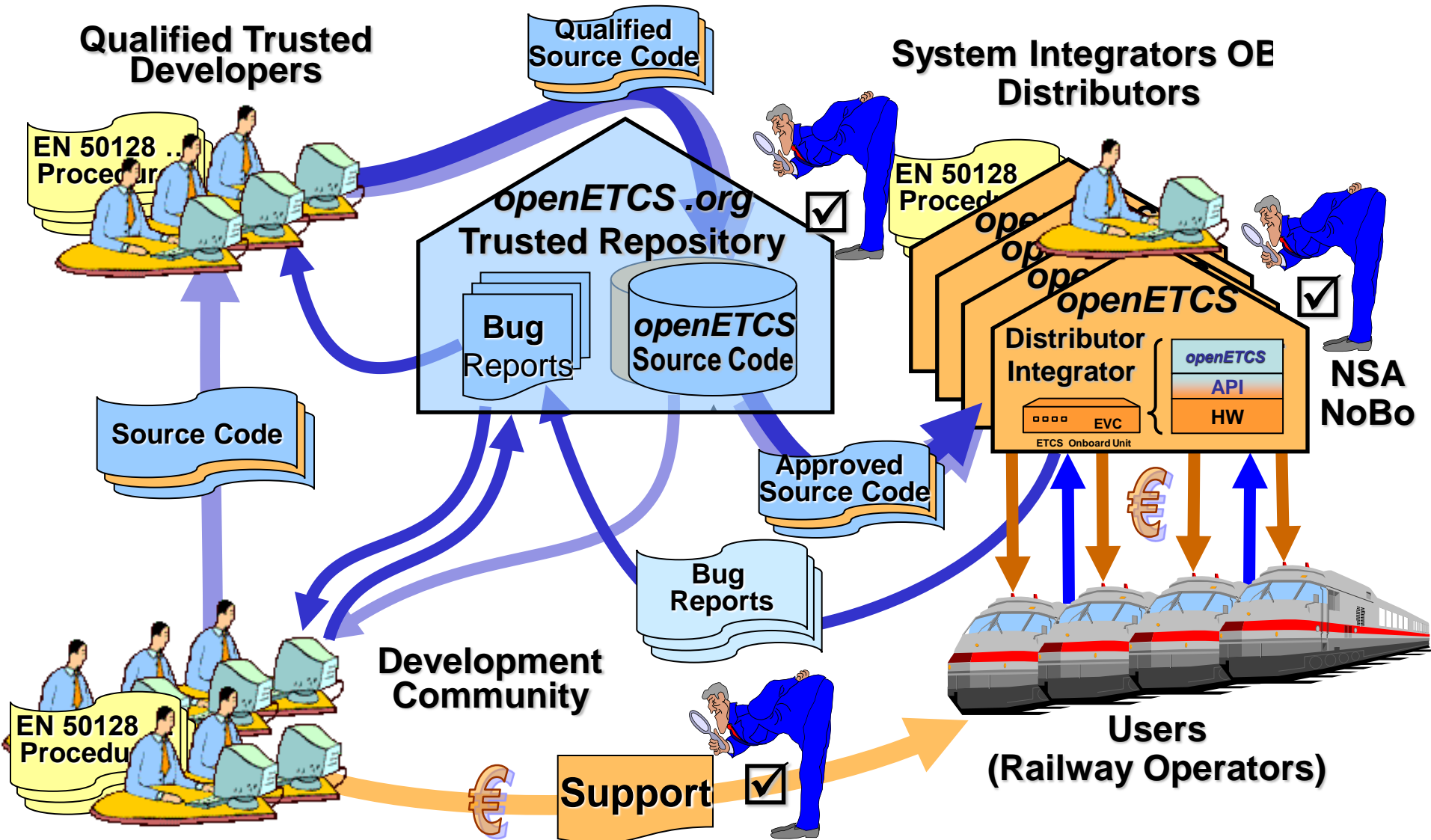
OSS“

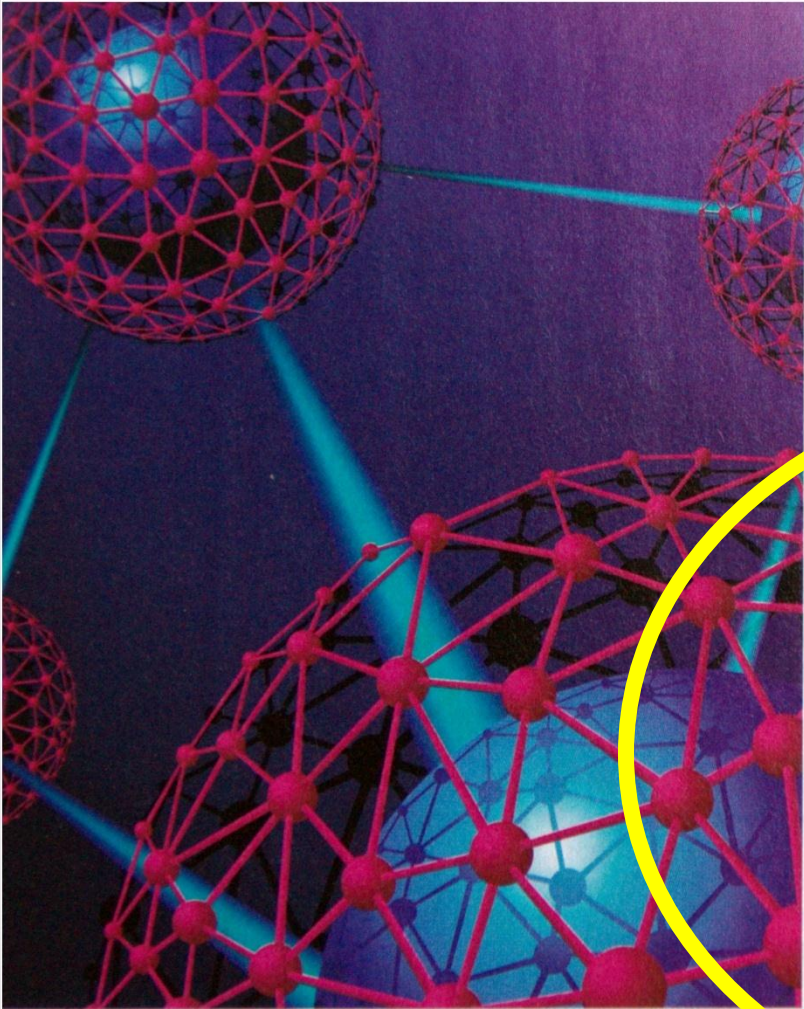
Military Open Source Community Growing

By Kane F. L. L., PRTRC Technology Research Corporation

- Information Assurance & Security: One of the biggest values of open source development is enabling wider community access to software source. In this manner all bugs become shallow and more easily found. Wider access to software source code also is key for forming and maintaining a software security posture from being able to review software source code to seeing what is actually present within that software.

Creating an “openETCS Ecosystem”





GUEST EDITORS' INTRODUCTION: EVOLVING CRITICAL SYSTEMS

Lorcan Coyle, Mike Hinchey, and Bashar Nuseibeh, *Lero—the Irish Software Engineering Research Centre*
José Luiz Fiadeiro, *University of Leicester*





Kontrolle ist gut,
Vertrauen ist besser.

Lenin⁻¹



***Danke für Ihre
Aufmerksamkeit.***

Fragen? Anregungen?

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