

Report 3: Challenges Facing Open Source Software in the Automotive Ecosystem

Insights From a Survey of 300 Global Automotive Decision Makers & Software Professionals





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Introduction

Welcome to "*Challenges Facing Open Source Software in the Automotive Ecosystem,*" the final instalment in our three-part report series based on our 2024 Automotive Software Professional Survey. Conducted in Q1 2024, this survey represents the industry's first comprehensive, data-driven look at the role and adoption of open source software (OSS) in software-defined vehicles (SDVs) — and how it's shaping the future of automotive technology.

The 2024 survey, developed with input from the Eclipse SDV community along with our expert team, explores key trends, challenges, and expectations among automotive software professionals. Insights from 300 industry experts across North America, APAC, and Europe highlight OSS as a pivotal force driving innovation and addressing the technological challenges faced by the automotive industry.

We invite you to explore these findings and the findings from previous reports:

<u>Report 1: Driving Innovation & Building Safer Cars with Open Source Software (September 2024)</u>
 <u>Report 2: The Business Value of Open Source Software in the Automotive Industry (December</u> 2024)





Executive Summary

The use of open source software (OSS) in software-defined vehicle (SDV) development delivers significant advantages — and it also comes with its share of challenges.

- For Automakers: The flexibility and performance benefits of OSS are clear, but they can come at the cost of added maintenance, integration complexity, and operational overhead.
- For Developers: Managing integration, ongoing maintenance, and ensuring real-time scalability—especially critical in an AI-first landscape—pose significant technical hurdles.

While these challenges are not new, they are manageable. This report outlines the key obstacles automotive companies and technology professionals encounter when adopting OSS for SDV development, and where they turn to foundations for support:

- **Project Support:** Foundations provide essential infrastructure, security reviews, and development resources to keep OSS projects robust and secure.
- **Community Cultivation:** Through mentorship, standardized documentation, and contributor incentives, foundations help foster healthy, sustainable OSS communities.
- **Stability and Credibility:** Foundations offer governance, funding channels, and industry reputation—building trust and ensuring long-term viability.



Interpreting This Data:

- Questions posed to participants are displayed in small font at the bottom of each slide.
- For some questions, participants were allowed to select multiple choices. For those cases, it is indicated on the relevant slides.
- Numerical data presented in this survey indicates % of respondents selecting.
- **Demographics & Methodology** are described at the end of the presentation.



KEY FINDINGS

For Decision Makers, the True Value of OSS Is Reflected in Improved Performance, Better Security, and Greater Flexibility Through Customisability



Q. Which of the following benefits of open source for software defined vehicles is most important to your company?



Decision Makers View Standardisation, Interoperability, and Advanced & Innovative Technology Integration as Essential Requirements



Q. How important are the following statements for open source software in software-defined vehicles?

The Benefits Are Also Challenges – Performance and Integration Aren't Free. **Companies Must Invest Resources to Fully Realise the Value of OSS**



Software Professionals

Q. What are the technical blockers to using open source technologies for software-defined vehicles?



Simplifying the Integration Process is Crucial for Software Professionals



Software Professionals

Q. What, if anything, would you add or change to improve open source software within software-defined vehicles?

Decision Makers



Software Professionals Want OSS To Be Not Just Viable, but the Easier Choice – Without Compromising on Core Requirements

Software Professionals



Decision Makers

Q. From the following list, what are the TOP THREE criteria you use to evaluate whether or not to use open source projects for software-defined vehicles?



Decision Makers and Practitioners See the Value of OSS, but Remain Mindful of Its Management Demands and Unpredictability

22 Dependency management 27 22 Difficult to comply with license obligations 23 15 Cost-benefit analysis 23 19 20 Lack of long-term release planning 19 Automotive industry expertise 19 19 Compliance with automotive regulations 19 15 Automotive safety and security concerns 19 15 Too much bureaucracy to get company approval 19 No one responsible or liable for issues 14 16 13 Costs 15 15 Functional safety certification 14 Intellectual property and patent risks 13 21 19 Poor documentation 11 17 No on-call support Supply chain and vendor dependence 16

Decision Makers

Software Professionals

Q. What are the business blockers to using open source technologies for software-defined vehicles?



Cost Savings Drive Business Value, While Standardisation and Interoperability Drive Practical Value

Decision Makers

Extremely important

[COST SAVINGS] Open source reduces overall costs by avoiding proprietary licenses and enabling cost-effective development	15%	68%
[STANDARDISATION] Open source links software development with automotive challenges and supports standardization and interoperability	20%	60%
[ADVANCED TECH] Open source software drives advanced tech integration (AI, IoT) to vehicles	18%	59%
[INNOVATION] Open source for software-defined vehicles is a testbed for new ideas and provides an open platform for experimenting with new concepts	12%	59%
[QUALITY] Open source ensures robust, secure, high-quality software and enhances transparency and trust	18%	59%
[OLD MINDSET] Open source is important because traditional OEMs have an old mindset, are stuck, and are out of new ideas	17%	57%
[SUSTAINABILITY] Open source promotes sustainable, scalable, and environmentally-friendly development for vehicles	16%	53%

Q. How important are the following statements for open source software in software-defined vehicles. Rank each statement on a scale from 0 to 5 where 0 means not at all important and 5 means extremely important.

Cost Savings and Quality Messages Alleviate Key Blockers to Using OSS

Software Professionals	Extremely important	Very important
[COST SAVINGS] Open source reduces overall costs by avoiding proprietary licenses and enabling cost-effective development	20%	57%
[STANDARDISATION] Open source links software development with automotive challenges and supports standardisation and interoperability	17%	53%
[ADVANCED TECH] Open source software drives advanced tech integration (AI, IoT) to vehicles	14%	58%
[INNOVATION] Open source for software-defined vehicles is a testbed for new ideas and provides an open platform for experimenting with new concepts	15%	59%
[QUALITY] Open source ensures robust, secure, high-quality software and enhances transparency and trust	19%	58%
[OLD MINDSET] Open source is important because traditional OEMs have an old mindset, are stuck, and are out of new ideas	15%	62%
[SUSTAINABILITY] Open source promotes sustainable, scalable, and environmentally-friendly development for vehicles	19%	54%

Q. How important are the following statements for open source software in software-defined vehicles. Rank each statement on a scale from 0 to 5 where 0 means not at all important and 5 means extremely important.
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Maintenance and Licensing Are Also Linked to the Issue of Cost Savings

Decision makers are very firmly focused on maintenance and licensing costs

Cost Savings

Reduce Total Cost of Operations (TCO)



(Left side) Q. People say open source software within software-defined vehicles has helped or would help achieve cost savings. By approximately what reduction in operational expenditure? (Right side) Q. People say open source software within software-defined vehicles has helped or would help reduce TCO. How?



Foundation Support Strengthens Trust and Confidence in OSS Projects

Decision Makers

Software Professionals



Q. Which of the following would be the most helpful to you from foundations as you learn, use, or work with open source software for software-defined vehicles?



Recommendations

For Business Leaders

- **Invest Strategically in OSS Integration:** Recognise that while OSS offers efficiency, security, and flexibility, these benefits require upfront investment in integration, maintenance, and management resources.
- **Prioritise Governance & Stability:** Leverage foundation-backed OSS projects to reduce unpredictability and ensure long-term stability.
- **Balance Customisability with Core Requirements:** Embrace OSS for its flexibility, but ensure your teams don't compromise on essential performance and security standards.

For Software Developers

- Advocate for Streamlined Integration: Push for tooling, documentation, and processes that make OSS integration easier and reduce friction in daily workflows.
- Engage with Foundations & Communities: Participate in OSS communities and foundations to access technical support, contribute improvements, and ensure long-term project viability.
 Balance Custom Solutions with Core Requirements: Ensure customisability doesn't compromise on critical needs like performance, scalability, and security.



Recommendations

For Policymakers



- **Support Foundation-Led OSS Initiatives:** Encourage policies that strengthen OSS foundations' roles in fostering stability, security audits, and governance.
- **Promote Standards for Integration & Security:** Develop guidelines to simplify OSS adoption while ensuring it meets rigorous safety and performance standards, especially for critical industries like automotive.
- **Fund Programs That Lower OSS Barriers:** Invest in initiatives that reduce integration complexity and management overhead for companies adopting OSS in SDV and beyond.



DEMOGRAPHICS & METHODOLOGY



Participant Roles

n=300 divided evenly between:

- Decision Makers, MoE ~8% (executives, line of business, and other decision makers at OEMs and those who service OEMs)
- Software professionals, MoE ~8% (developers, tech leads, architects, drops, and operators at OEMs and those who service OEMs)

Geographies

Prioritising major OEM markets evenly across 3 regions (~n=100)

- North America (CA, MX, US)
- APAC (IN, JP, ROK)
- Europe (CZ, DE, FR, IT, PL, UK)





Participant Roles: Decision Makers

What best describes your role?

Automotive Industry Profile

% of respondents

Tier-1 auto

Other

10

supplier or OEM







Participant Roles: Software Professionals

What best describes your role?

Software Professional Role



Application/Service Role

% of respondents

74



Participants by Region







Other Participant Information

 Organisation Size
 Yea

 10,000 or more
 24

 1,000-9,999
 43

 1-999
 33

Years in the Industry



% of respondents





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