

May 2024

Why Automakers Have Struggled to Deliver the SDV



What to Expect

- **1HR run-time**
 - **Welcome/Panelist Introductions** _____ **5min**
 - **Summary** _____ **5min**
 - **Panel Questions** _____ **10min**
 - **QC Presentation** _____ **15min**
 - **AWS Presentation** _____ **15min**
 - **Q & A** _____ **10min**

Webinar recording will be sent to all registrants

Your Panelists

Your Moderator



Girish Shirasat

Senior Director,
Product Management

Qualcomm



Stefano Marzani

Worldwide Tech Leader for SDV



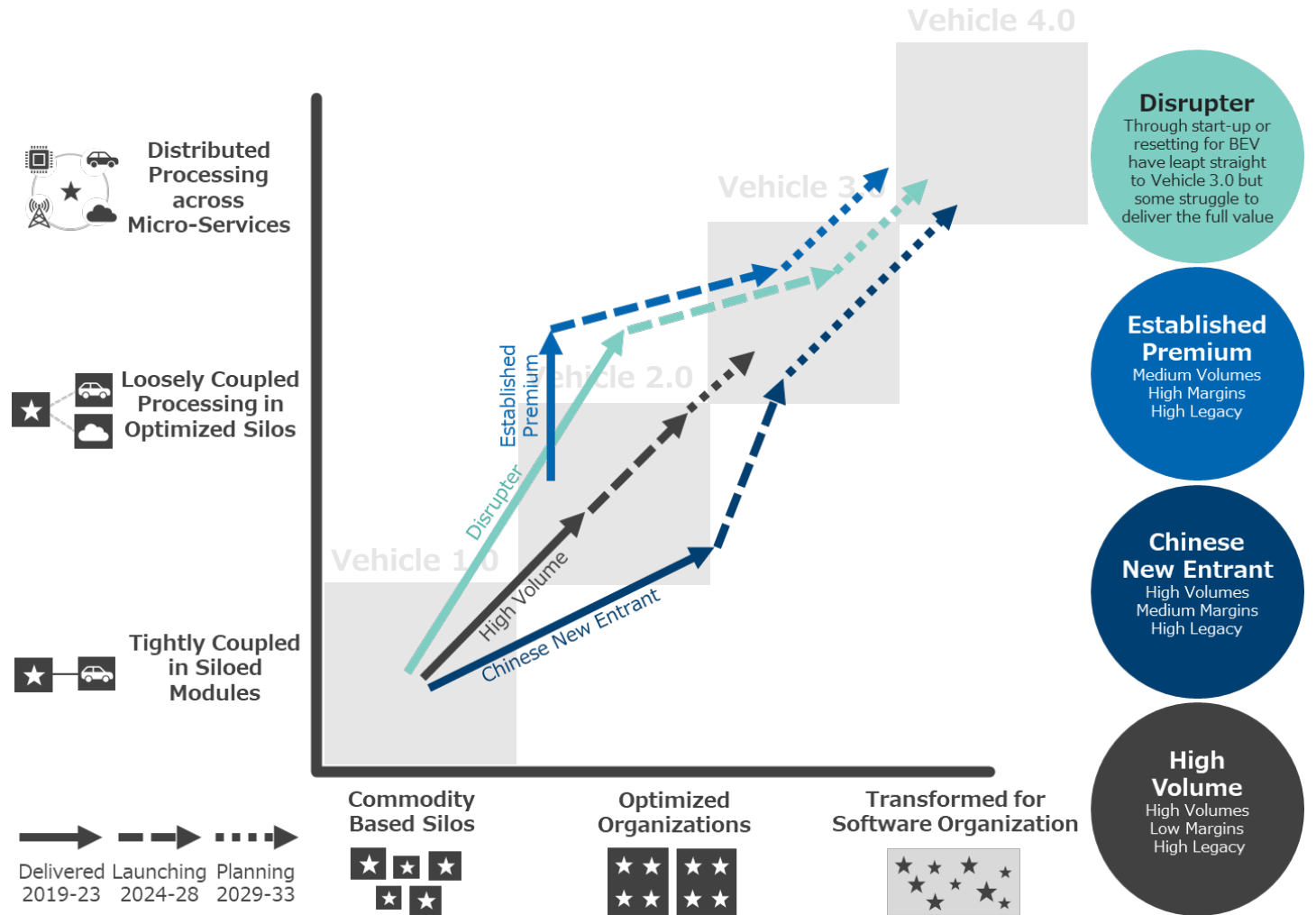
Jason France

Consulting Manager



Evolution of SDV Development

Future Outlook of SDV Strategy



Source: SBD Report 402: Software-Defined Vehicle Forecast

Automakers Ranked by OTA and Software Updates

OTA Capabilities Across the Industry

High competition zone
(score between 9-12)

SBD OTA rank	OEM	X.0	Score
#1	Ford	3.0	15
#2	Rivian	2.0	15
	Tesla		15
#4	Lincoln		14
#5	Jaguar	1.0	12
#6	BMW		11
#7	Lucid		12
	Polestar		12
#9	Land Rover		11
	Volvo		11
#11	Genesis		10
	Mercedes-Benz		10
#13	Cadillac		9
	Chevrolet		9
	GMC	9	
	Honda	9	
	Nissan	9	
#18	Acura	8	
	Buick	8	
#20	Alfa Romeo	6	
	Hyundai	6	
	Porsche	6	
#23	Audi	5	
	Infiniti	5	
	Karma Automotive	5	
	Kia	5	
	Lexus	5	
	RAM	5	
	Subaru	5	
	Toyota	5	
	VinFast	5	
#32	Chrysler	4	
	Dodge	4	
	Fiat	4	
	Jeep	4	
	Mazda	4	
	Mitsubishi	4	
	Volkswagen	4	

To be here



Lincoln can join Ford in the Vehicle 3.0 group and jump two places if they can extend the OTA capability for passenger safety and powertrain

To be here



Installing features to OTA category while driving in the existing offerings can push Volvo to Vehicle 3.0 in line with other premium competitors

To be here



Nissan can become the potential OTA leader among all Vehicle 2.0 brands if they can increase the activity of OTA update

To be here



Audi can improve their overall score by adding more OTA-updateable domain which at present is only limited to digital cockpit/ADAS



LUCID



Being a new entrant, it has quickly achieved the top rank among all Vehicle 1.0 brands as it offers OTA updates for all the categories via cellular connectivity



~100% model-level implementation of OTA updates coupled with multiple domain capability and connectivity channels (Bluetooth, cellular)

Why Automakers Have Struggled to Deliver the Software-Defined Vehicle

Four key hypotheses:

1. Expecting too much too soon
2. Goals are not defined properly
3. Too much short-term thinking
4. Technology focus opposed to outcome focus

What does success look like?

Embracing Flexible solutions:
Qualcomm's Digital Chassis

Panel Questions

1. What do you see as common blockers for OEMs throughout SDV development?

2. What are some key opportunities that you see on the horizon for companies to recognize the agility that SDVs can offer?



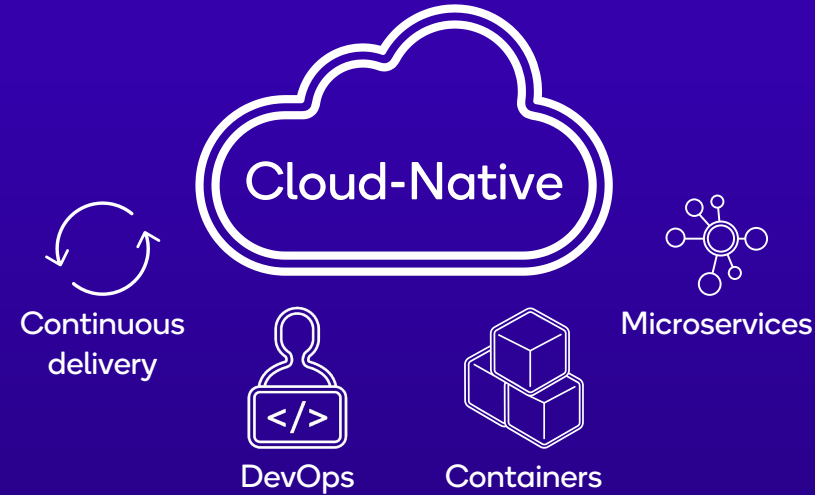
Cloud-Native Platforms for Software-Defined Vehicles

Girish Shirasat

Senior Director, Product Management, Qualcomm Technologies, Inc.

Simplifying Software Complexity with Cloud-Native Design

Cloud-native design demonstrates efficiency and addresses software complexity, supported by a robust development ecosystem



Infrastructure Requirements

Decoupled software from hardware

Cloud-to-Edge environmental parity for software development

Workload orchestration framework

Challenges

Non-Standard Software: Automotive stack faces portability challenges due to non-standards based software

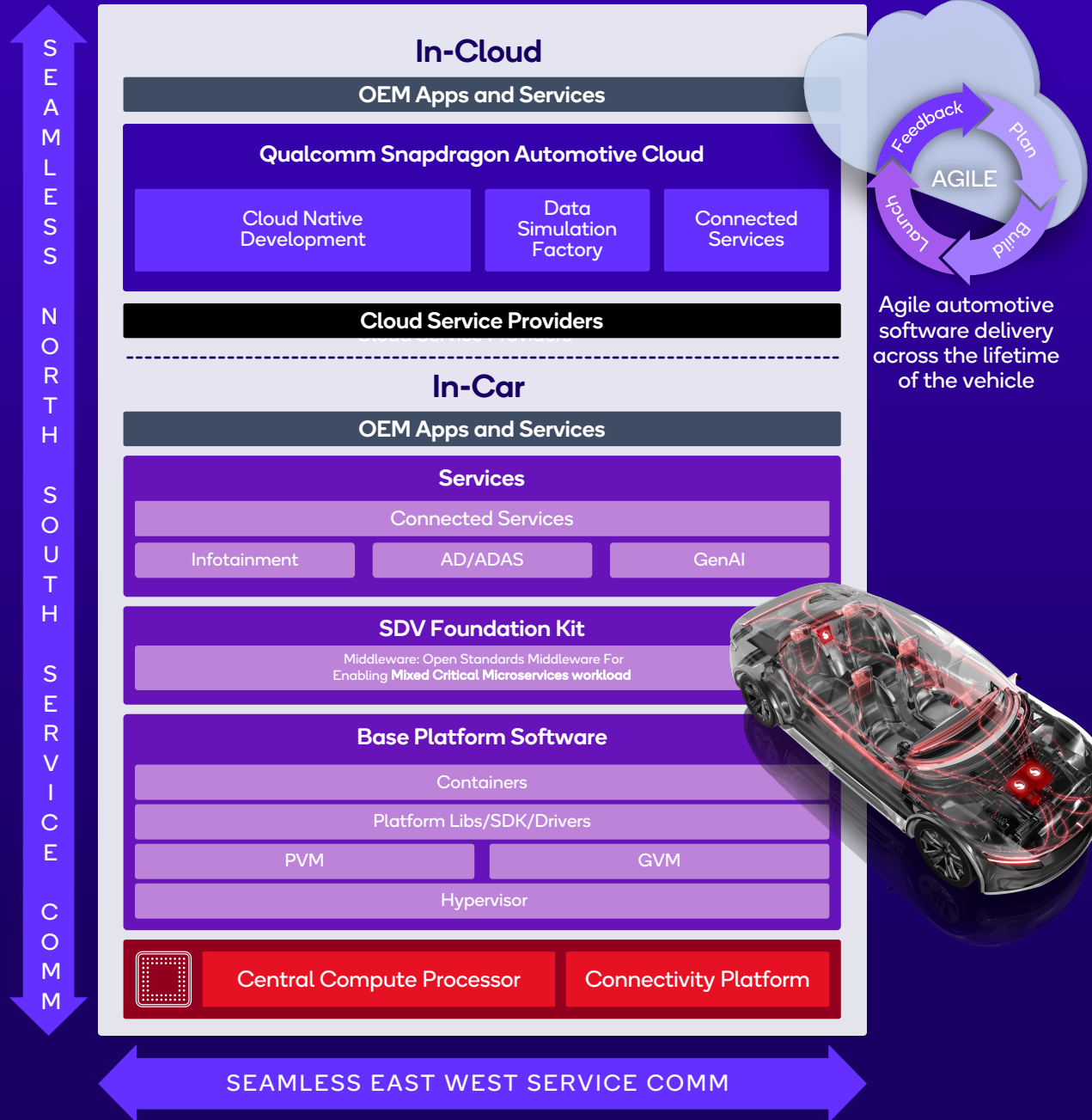
Heterogeneous Architectures: Complex system architectures hinder achieving environmental parity

Scaling Challenges: Cloud-native infrastructure not optimized for mixed critical workloads

Shortage of Developers: Automotive industry lacks cloud-native developers

Qualcomm SDV Vision

“ Deliver **Car to Cloud infrastructure** for developing and deploying cloud-native automotive application based on Snapdragon Digital Chassis accelerating OEM TTM to building SDV solutions ”



Qualcomm is adopting **“Developer First” strategy** across the company

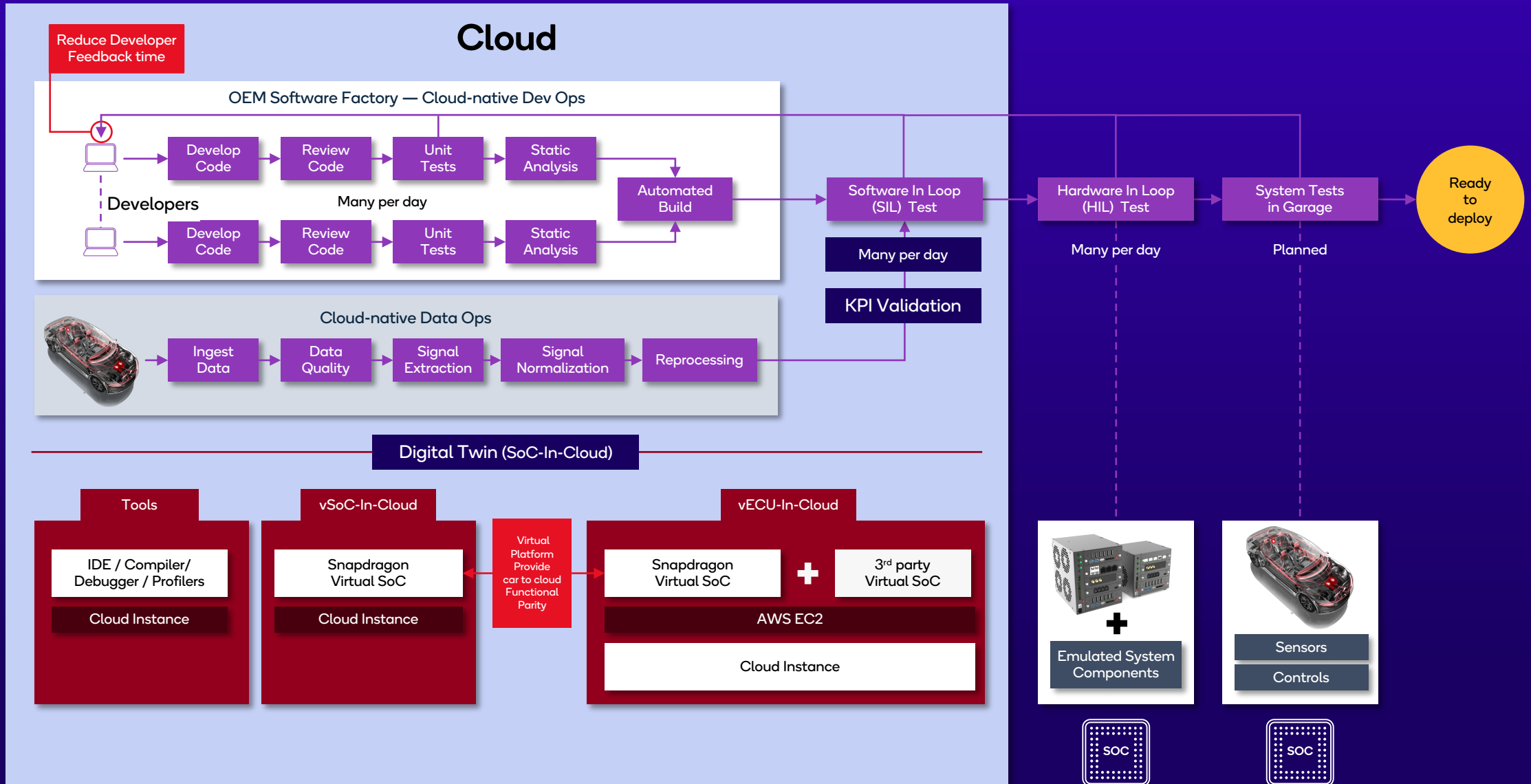
Qualcomm Automotive leading the way using **open standards** across the stack

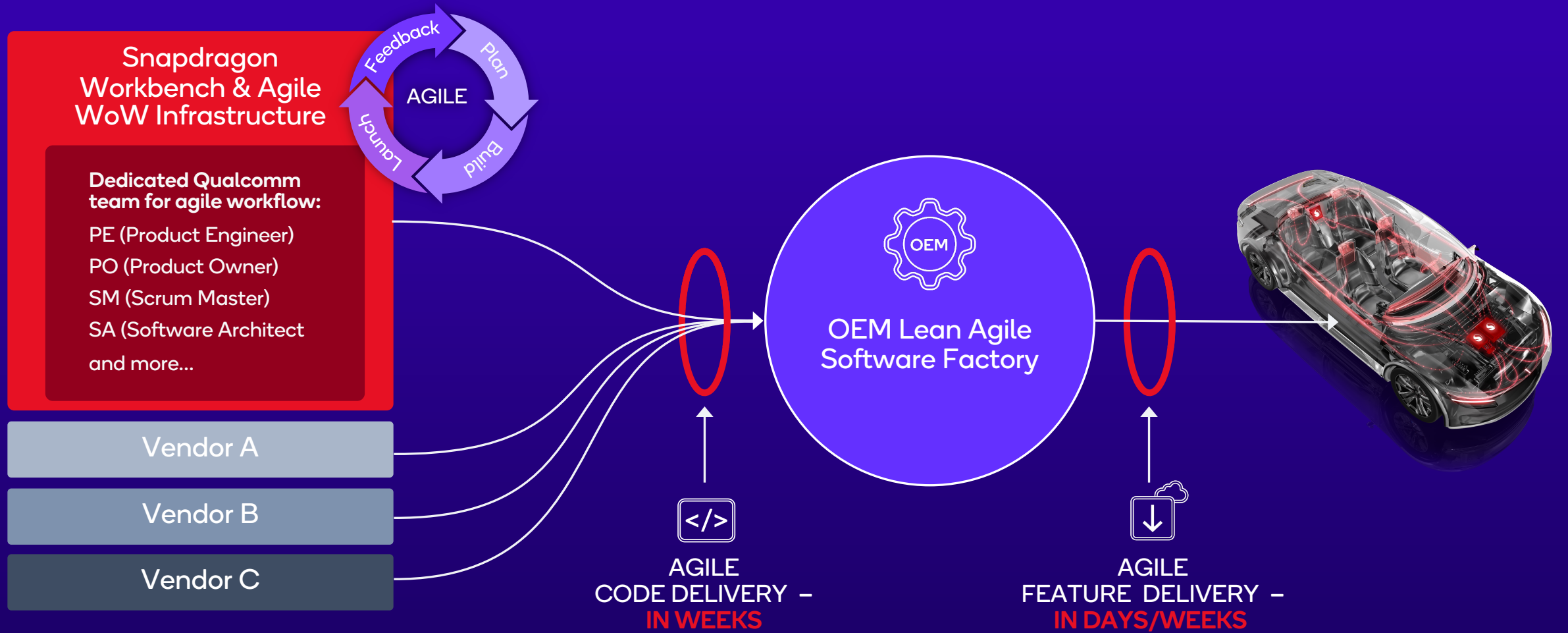
Qualcomm **joins Eclipse SDV** and **SOAFEE** to contribute SDV enabling technologies and build ecosystem

Qualcomm continues to invest in Android ecosystem including supporting Google’s **AAOS-SDV** infrastructure

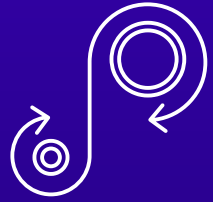


Cloud-native Maximize Developer Efficiencies





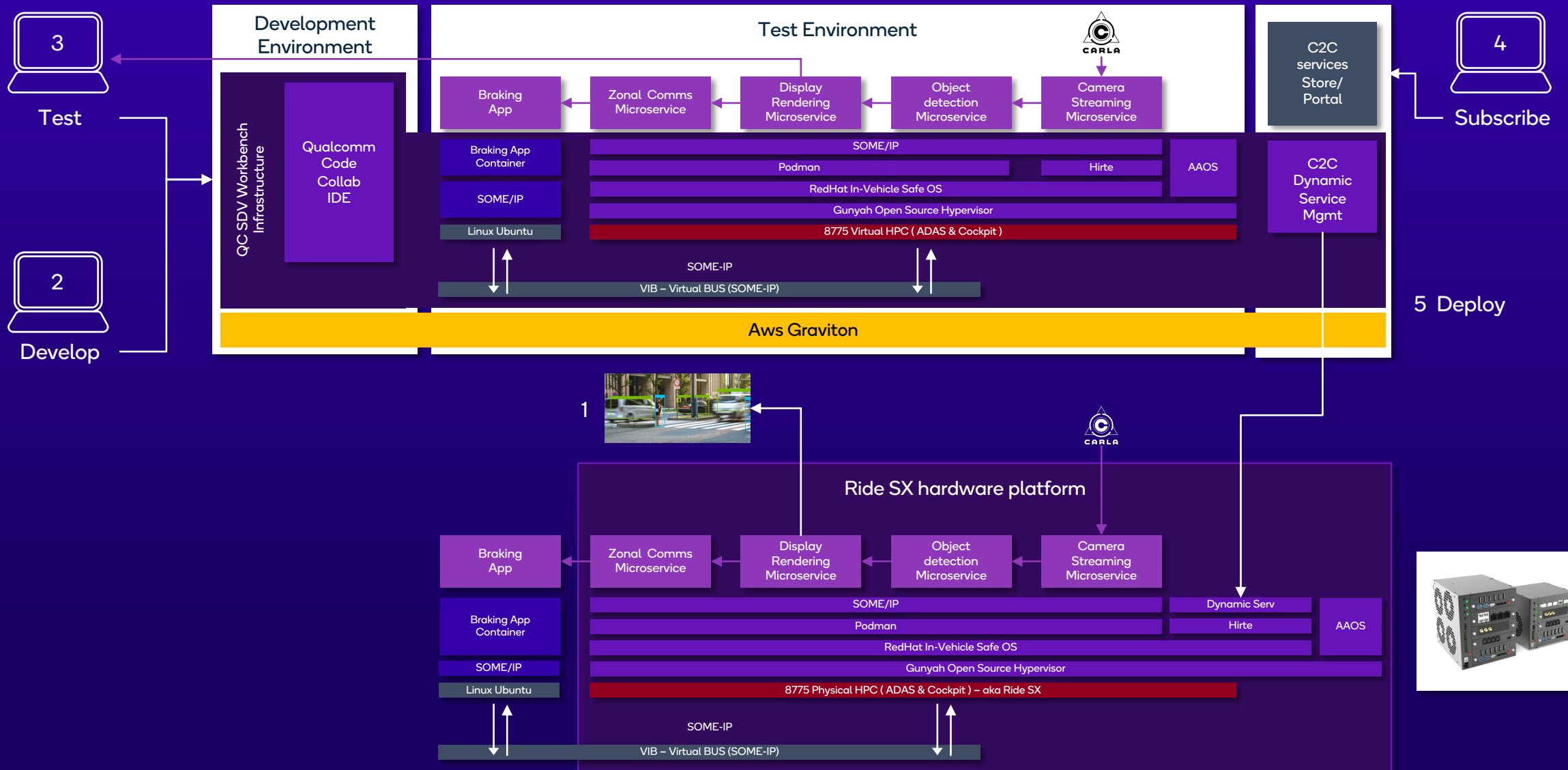
Qualcomm Participates into OEM Agile WoW



Putting it
all together

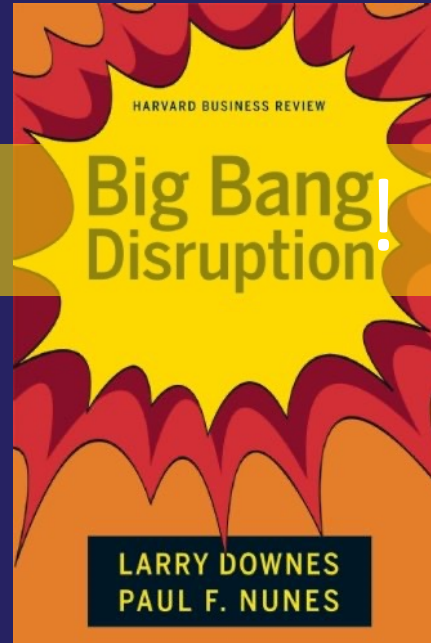
Snapdragon Digital Chassis Enabled Cloud-native Development

Demo Configuration





Automotive:



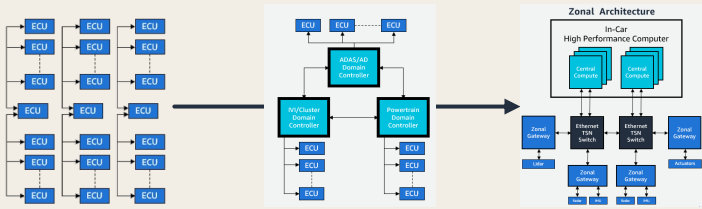
Stefano Marzani

WW Tech Leader, Software-Defined Vehicles

v1.0

SDV Trends

ECU Consolidation



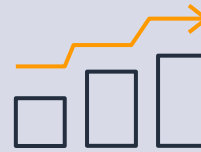
Number of ECUs
>100

Number of ECUs
Decreasing
with centralized compute
architectures in new
vehicle platforms

Software Volume & Complexity Grows

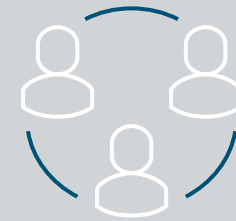


Lines of code
100–150M



Lines of code
Increasing
due to new functionality,
highly automated and
autonomous driving

Value Chain Collaboration



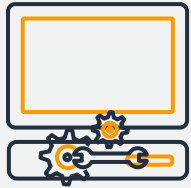
New vehicle-software value chains
emerging

How cloud can help



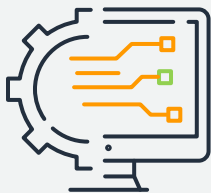
Virtual Electronic Control Units (V-ECUs) and Targets

Enabling a seamless experience between a developer's local environment, the cloud, and the vehicle



Virtual workbenches

Enabling developer efficiency through platform engineering concepts focused on providing self-service, global use and security, reduction in Hardware dependency, consistent reproducible SW artifacts and toolchains



Cloud-Native Automotive Software

Rearchitecting automotive software stacks and tools to facilitate software modularity, portability, and integration

Customer implementation @ IAA Munich 2023



Android OS in vehicle



Same Android OS image running on Graviton, bi-directional UI streamed in browser through WebRTC

Marelli Digimate vECU



Marelli press release: bit.ly/3qVCTNB

“By combining the strengths of Marelli and AWS services, we can deliver the driving experience consumers want while ensuring security and reliability. Marelli’s digital twin empowers software engineers to **reduce development time by up to 70% and realize cost savings on prototypes up to 30%**, delivering software evolutions more efficiently and cost-effectively.”

Yannick Hoyau

VP and Head of Engineering & Innovation,
Marelli Electronic Systems



Panasonic vSkipGen is delivered through AWS marketplace

The screenshot shows the AWS Marketplace interface for the product Panasonic vSkipGen. At the top, there is a navigation bar with the AWS Marketplace logo, a search bar, and the user's name 'admin-kazukaji'. Below the navigation bar, the product name 'Panasonic vSkipGen' is displayed next to the Panasonic Automotive logo. A description states that the product allows software teams to develop target code without hardware. An orange 'Continue' button is visible in the top right. The 'Overview' section explains that vSkipGen decouples software development from hardware. A table lists the seller as Panasonic Automotive Systems Co., Ltd., categories as Automotive, Managed Services, and Business Intelligence & Advanced Analytics, and the fulfillment method as Professional Services. A 'Highlights' box lists three key features: high-level environmental parity, optimized developer costs, and validation test parallelization.

aws marketplace Hello, admin-kazukaji

About Categories Delivery Methods Solutions AWS IQ Resources Your Saved List

Become a Channel Partner Sell in AWS Marketplace Amazon Web Services Home Help

Panasonic
AUTOMOTIVE

Panasonic vSkipGen

By: [Panasonic Automotive Systems Co., Ltd.](#)

Panasonic vSkipGen is a product which allows software teams to develop target code without the hardware, further strengthening the value chain and bar raising the automaker's target quality for the end customer.

[Continue](#)

Overview

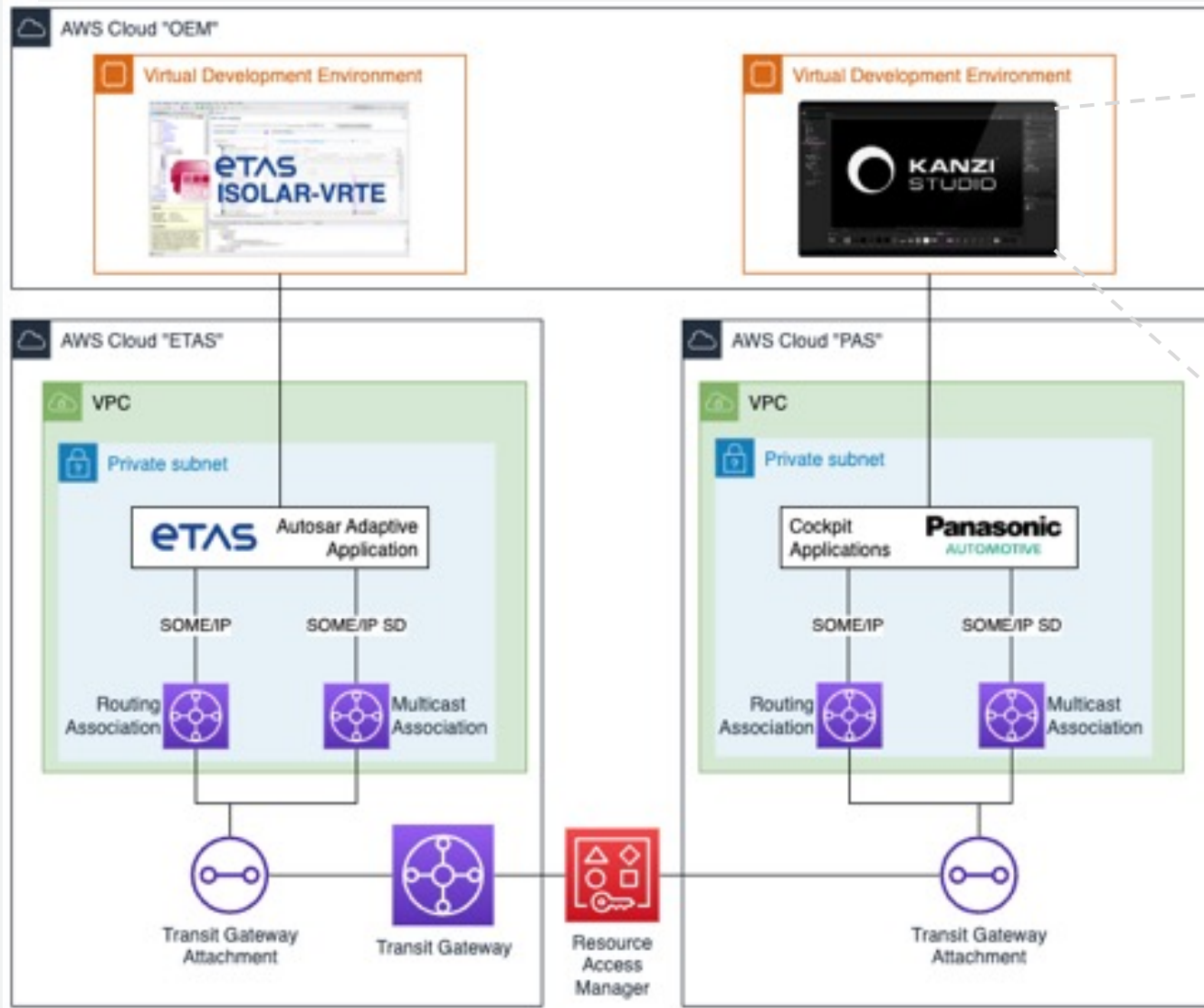
vSkipGen allows automakers to decouple the software development from the hardware, reduce time to market, and improve software quality.

Sold by	Panasonic Automotive Systems Co., Ltd.
Categories	Automotive Managed Services Business Intelligence & Advanced Analytics
Fulfillment method	Professional Services

Highlights

- Achieves High-level Environmental Parity
- Optimizes Developer Costs for Virtual Environments
- Validation Test Parallelization and Automation at Scale

Panasonic vSkipGen + ETAS Autosar + Rightware Kanzi



Instrument Cluster on vSkipGen: AGL + Kanzi One

Panasonic vSkipGen & Qt

Qt and Panasonic Automotive Partner to Enable the Software Defined Vehicle

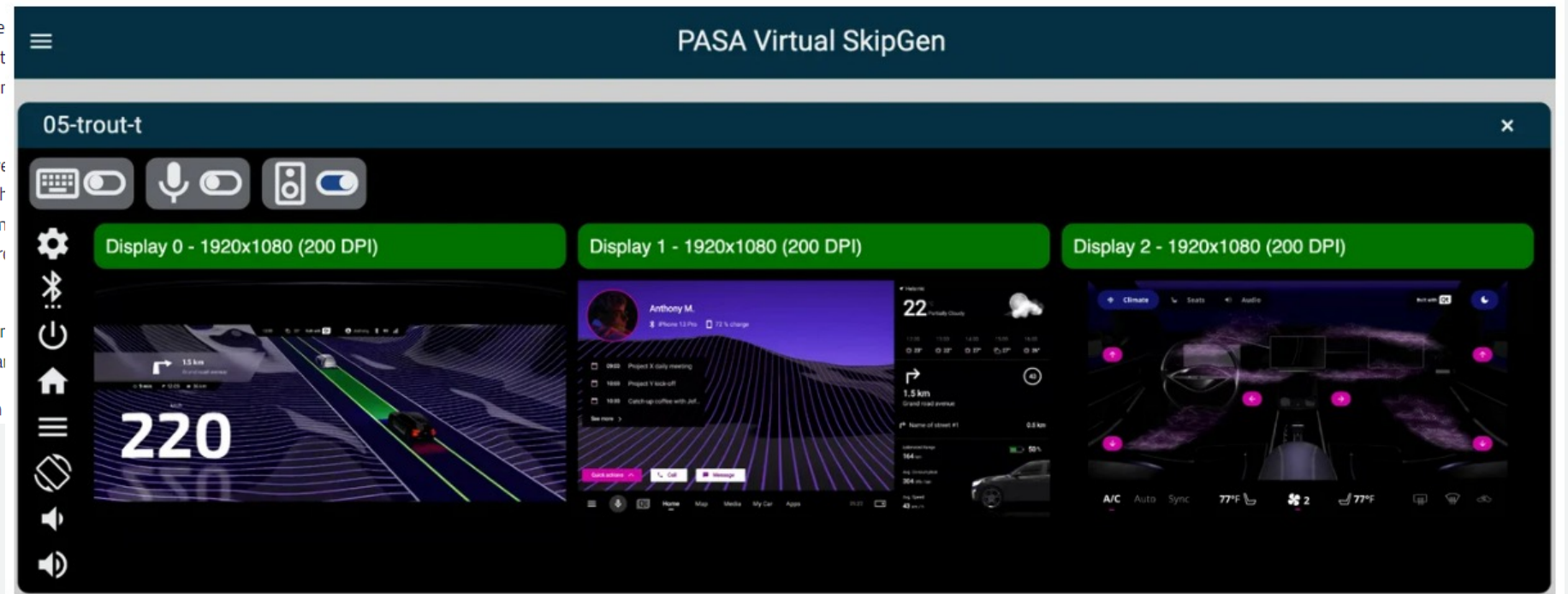
February 27, 2024 by [Taylor Fouts](#) | [Comments](#)

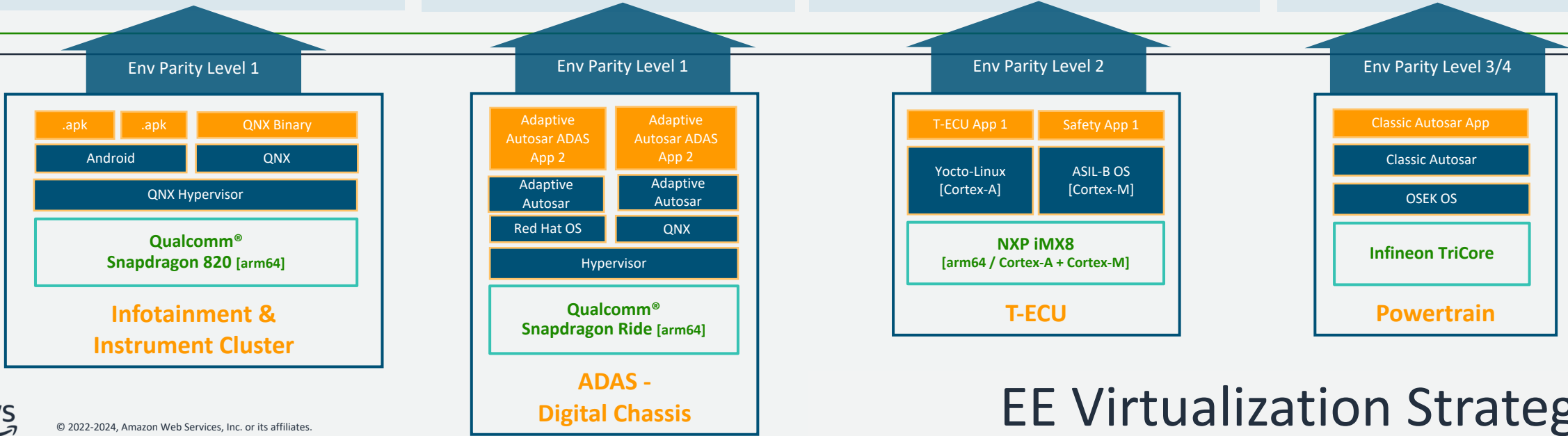
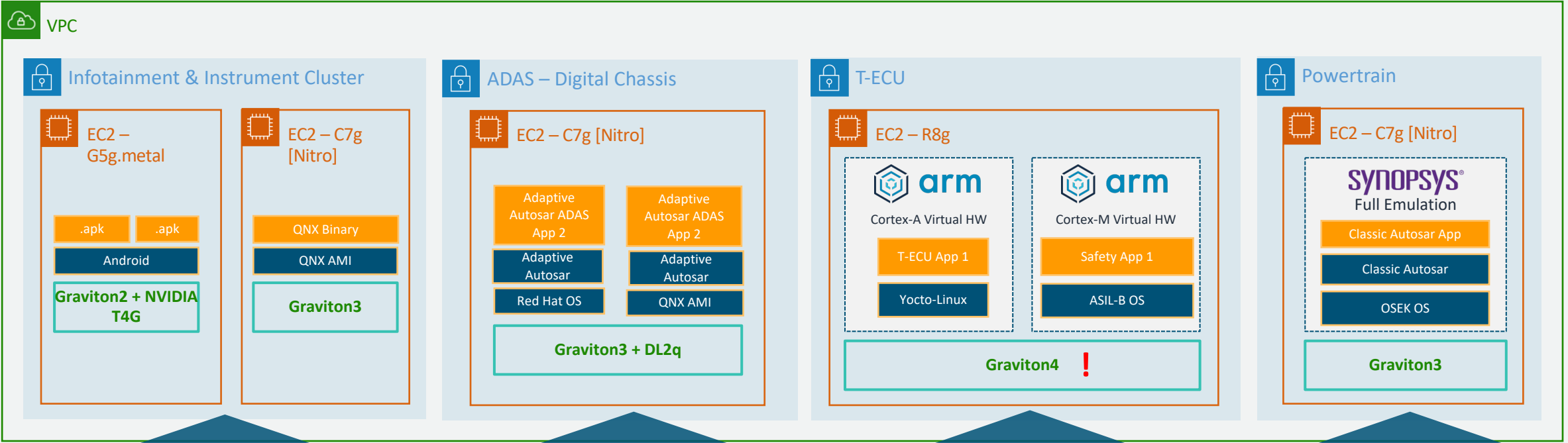
Panasonic Automotive Systems Company of America released a digital twin of their 3rd generation digital cockpit solution with fully optimized support for Android Automotive OS for its various domains.

"The Virtual SkipGen revolutionizes the automotive development process by seamlessly integrating cutting edge software-defined vehicle (SDV) technology. As a Virtual SkipGen Officer, Panasonic Automotive Systems Company of America sets a new standard for HMI creation by minimizing hardware dependencies and maximizing scalability in the cloud."

Virtual SkipGen also includes support for common automotive end-to-end testing without the prerequisite of physical hardware.

Qt also announced at CES 2024 a new partnership with





EE Virtualization Strategy

Virtualized Targets



Cloud-Native Tool Collaborations



Virtualized Targets



Engineering Workbench

References



Partners



Cloud-Native Tool Collaborations





Virtualized Targets




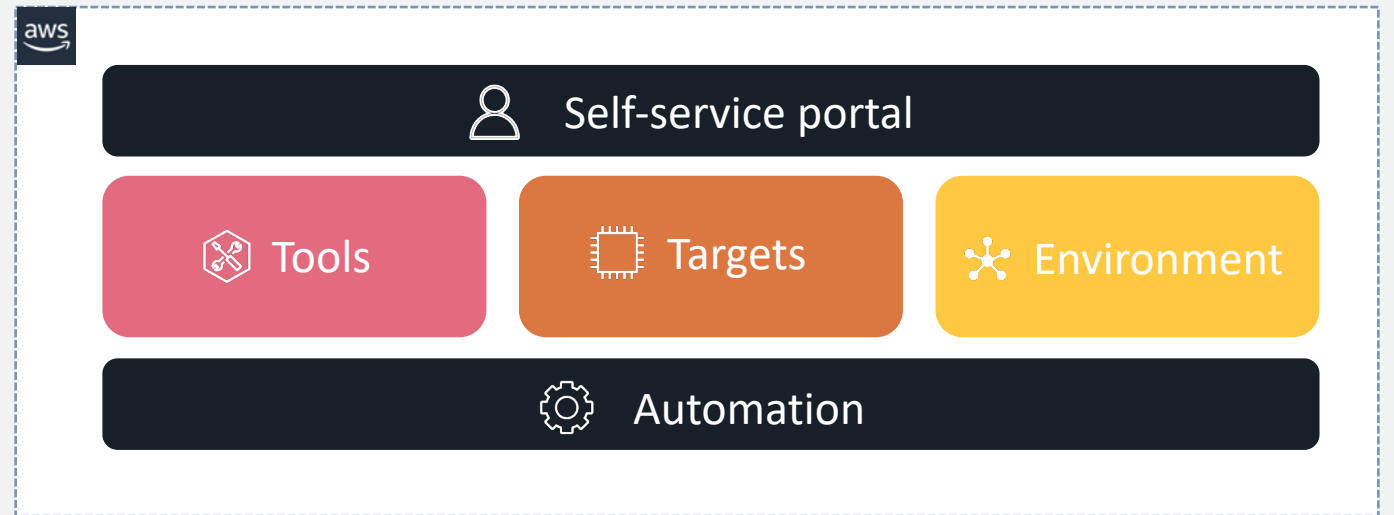
Stellantis' Virtual Engineering Workbench / Example

Stellantis Virtual Engineering Workbench consists of three main pillars: tools, targets and environment. The interface to the user is a self-service web-based portal.

 Predefined use case specific environments with all of the **tools**, IDE's, licensing – everything that enables a user to get started on a use case.


 Various levels of abstractions of the **target** platform that the user builds for.

 The **environment** is the input, in different levels of abstraction or fidelity, that we give to the workload on the targets to verify their function.




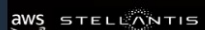
Reference: [Stellantis Breakout Session @ re:Invent 2022](#)

Some Datapoints from Customers



Achievements & Outlook – Update since AWS Reinvent, Nov 2022

Deployed features	Upcoming features
<ul style="list-style-type: none">Integration of virtual workbench development suppliers & partners100's of developers globally onboardedInitial workbench catalogue & self-service web-frontend deployedFirst development, test, and integration use cases deployed (AutoSar-Classic, AutoSar-Adaptive, XIL)Delivered hybrid Use-Cases towards virtual vehicle<ul style="list-style-type: none">vECU's paired with real ECU'sphysical test environment paired with virtual test environment (i.e.Integration of hybrid HIL, vHIL, smart-devices)	<ul style="list-style-type: none">Scale platform to 10000+ developersDynamic Cost Management & ReportingMore to come..... Stay tuned




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January 9, 2024

Stellantis, BlackBerry QNX and AWS Launch Virtual Cockpit, Transforming In-Vehicle Software Engineering

- Stellantis introduces the first-of-its-kind virtual cockpit as a key component of the Stellantis **Virtual Engineering Workbench (VEW)**
- Industry-first innovation accelerates Stellantis development cycles up to 100 times, speeding up delivery of infotainment tech to customers**
- BlackBerry QNX announces early access launch of QNX Hypervisor in the cloud on AWS Marketplace for mixed criticality and multi-OS embedded application development



All Things **Automotive**
Big Bang Disruption

**BMW'S SOFTWARE-DEFINED VEHICLES:
DR. CHRISTOPH GROTE ON BMW GROUP'S CLOUD-FIRST
APPROACH IN AUTOMOTIVE SOFTWARE DEVELOPMENT**



All Things **Automotive**
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**A DEVELOPERS' DEEP DIVE INTO BMW OPERATING SYSTEM 9:
THE POWER OF ECU VIRTUALIZATION IN THE CLOUD**



Questions

Ask us now





Qualcomm



Thank you for Joining!

Don't Forget: —————> *Webinar recording will be available in the coming days*