
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

AUT101-L

Automotive reinvention

Wendy Bauer

General Manager, Automotive
Amazon Web Services

Tara Vatcher

SVP, Software Architecture & Development - Platform
Stellantis

Marc Solsona-Palomar

General Manager, Automotive Technology
Amazon Web Services

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“If you can dream it, you can do it”

— Enzo Ferrari

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We‘ve come a long way…

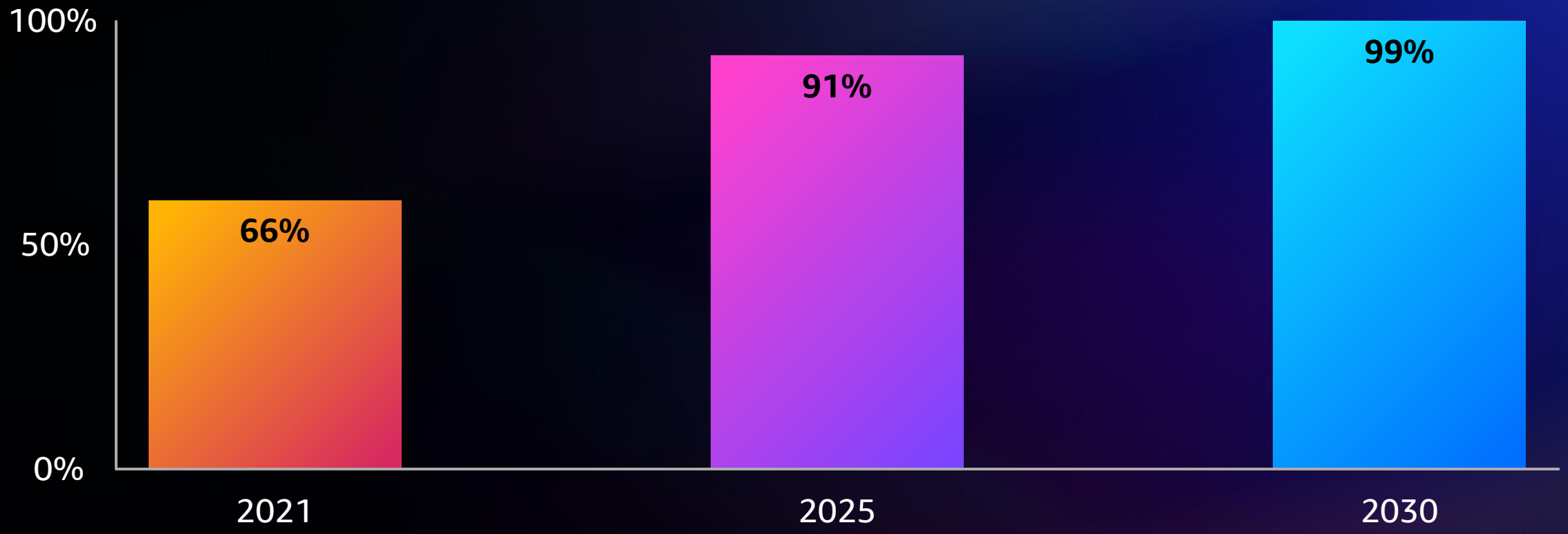




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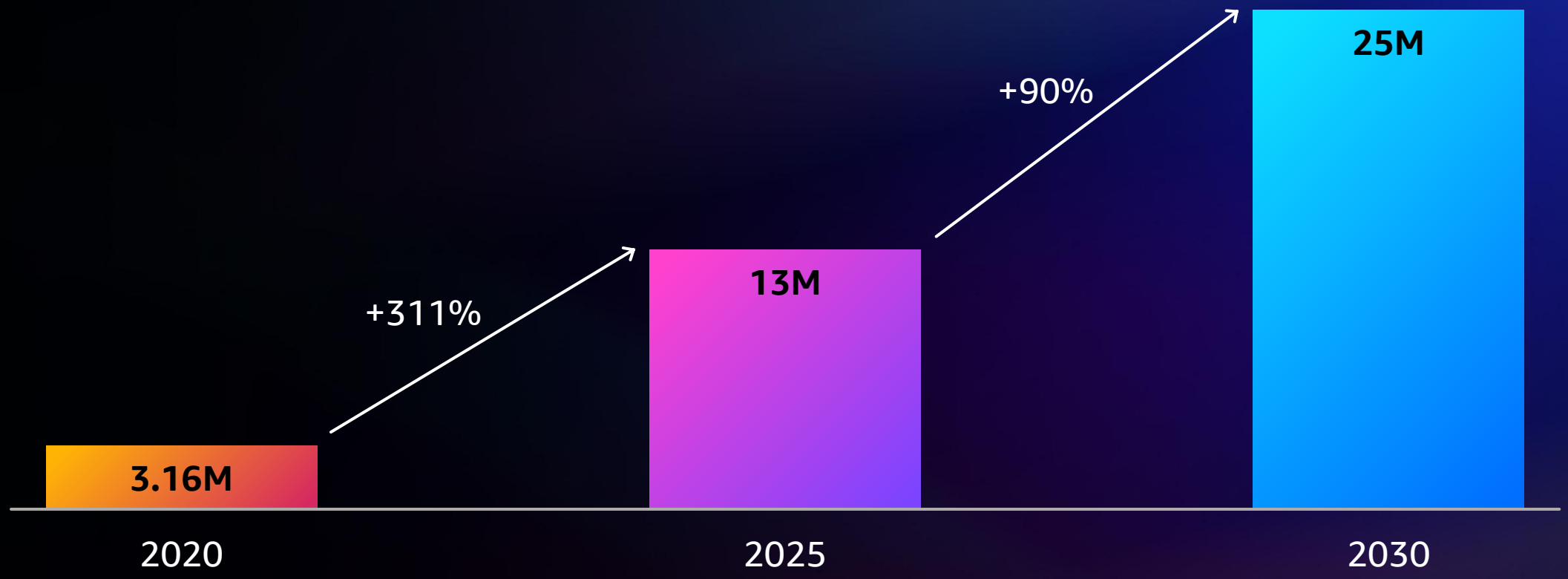
Reinventing automotive
Global % of connected vehicles are growing



Source SBD Automotive

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Reinventing sustainable mobility
Global EV sales are growing



IEA 2022; Global EV sales by scenario, 2020-2030, [https://www.iea.org/data-and-statistics/charts/global-ev-sales-by-scenario-2020-2030], License: CC BY 4.0

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Trends driving automotive reinvention

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Sustainability

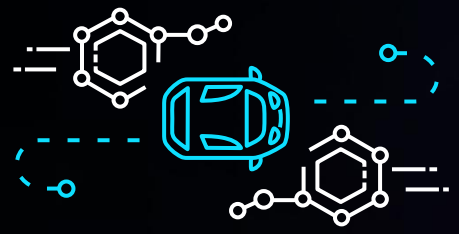



Technology
Connected
Autonomous
Shared
Electrification



Customer experience and personalization

AWS Automotive



The future

Helping develop and enable our customer's vision is a core pillar of AWS's value



Faster

Accelerating innovation with the deepest and broadest cloud platform and purpose-built services and solutions



Together

Transforming better through powerful collaboration

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The future

Customer vision

Exciting possibilities

Collaboration



“Stellantis selects AWS as its preferred cloud provider for vehicle platforms to deliver on its long-term, software-focused vision”

BMW GROUP

“AWS and the BMW Group will jointly develop innovative cloud-enabled solutions and upskill up to 5,000 software engineers in cloud technologies”

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Faster

Getting ahead

Enabling transformation

Accelerating innovation

RIVIAN

“Rivian selects AWS as it’s Preferred Cloud Provider to Drive Efficiency, Performance, and Refinement of Electric Vehicles”

Aurora

“Aurora Accelerates Development of the Aurora Driver with AWS”

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Together

Trusted Partner

Collaboration

Customer success

TOYOTA

“Toyota and Amazon Web Services Collaborate on Toyota’s Mobility Services Platform”

BlackBerry®

“AWS and BlackBerry Join Forces to Accelerate Innovation with New Intelligent Vehicle Data Platform”

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The journey to software defined vehicles

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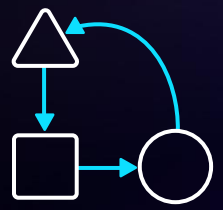
The promise of software defined vehicles



Better customer experiences



Vehicles that get better with time



New services and business models



Data-driven discipline



Intelligent decision making



Increased performance

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How Stellantis is collaborating with AWS to transform its business

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Stellantis

Tara Vatcher

SVP, Software Architecture & Development - Platform
Stellantis



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Digital vision

TODAY

~10 years
Connected services experience

~12M
Monetizable[1], connected vehicles globally

~400K
Subscribing customers

~€0.4B
Software-enabled revenues

TOMORROW

Services and subscriptions	Features on demand	Data as a Service and fleet services	Vehicle pricing and resale value	Conquests, service retention, and cross-selling

SOFTWARE-DEFINED VEHICLES WILL DRIVE FEATURE CONTENT

[1]Based on 5 year rolling car parc

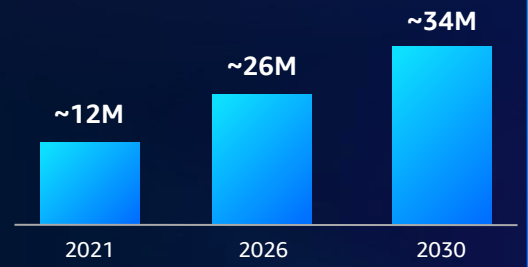
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Software defined vehicles

- Services and subscriptions
- Features on demand
- Data as a Service and fleet services
- Vehicle pricing and resale value
- Conquests, service retention, and cross-selling

×

Connected vehicle
5 year monetizable car parc



+

14 iconic brands

ABARTH, Alfa Romeo, Chrysler, Citroën, Dodge, DS Automobiles, Fiat, Jeep, Lancia, Maserati, Opel, Peugeot, RAM, Vauxhall

=

Exponential value for the customer

~€20B

Revenues for Stellantis by 2030

Global scale

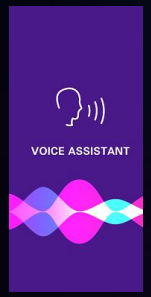
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New experiences

NEW EXPERIENCES

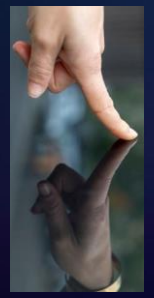


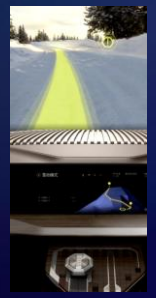
DISPLAYS



SOUND


LIGHTING


HAPTIC


PROJECTION


THERMO ELEMENTS


SMART SURFACE

PLATFORM DEVELOPMENT

3 KEY TECHNOLOGY PLATFORMS


STLA SMART COCKPIT



STLA BRAIN


STLA AUTODRIVE

STELLANTIS | aws VIRTUAL ENGINEERING WORKBENCH

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Developing vehicle software is complex



Portability

Fragmented and manual build and validation pipelines throughout the supplier chain cause churn and reduce the frequency, scope, and quality of releases



Availability

Lack of available automotive hardware for developers to validate their software artifacts leads to delivery delays and potentially untested releases



Security

Automotive software needs to meet strict sercurity and quality standards



Testing at Scale

During ECU development, proprietary software is distributed through code repositories, USBs, and PC clients with non-centralized and non-traceable access

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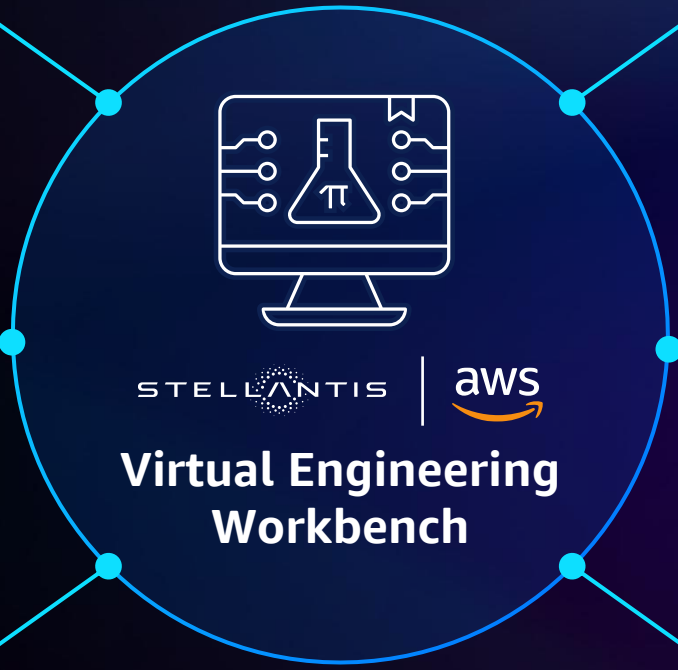
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Workbench capabitilies

Self-service platform for thousands of engineers globally

End-to-end developer experience

Standardized automotive toolchains ready-to-use



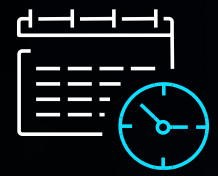
Customizable and scalable environment on development and organizational level

SDV enablement through hardware dependency reduction

Faster time-to-market (automation and integration)

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What we have achieved so far



Increase agility and speed

Reduce onboarding time for Stellantis' developers and external partners from weeks to minutes



Enable scalability and security

Provide secure automotive hardware and software development environment that can be scaled on demand in minutes



Foster collaboration

Enable hundreds of automotive hardware and software developers across Stellantis in 5+ R&D centers worldwide

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Accelerating automotive software development

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Accelerating automotive software development

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Vehicle code complexity is growing

Today's vehicles



Number of ECUs

>100



Lines of code

100–150M

Fully software-defined vehicles



Number of ECUs

Decreasing

with centralized compute architectures in new vehicle platforms



Lines of code

Increasing

due to new functionality, highly automated and autonomous driving

Software-defined vehicles journey

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Breaking down SDV



Hardware abstraction

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



SW lifecycle management

Auto DevOps Platform to increase SW quality, developer productivity, and provide better security and governance



Vehicle data management

Enabling automotive customers to unlock enterprise-wide value from connected car data

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But we are not doing it alone

Modernizing connected vehicle backend and services

Data ingestion, storage, and analytics



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Seamless Dev and Deploy, new passenger experiences, and ML

Software defined vehicle

Continental

BlackBerry QNX

arm

Elektrobit

DXC TECHNOLOGY

NXP

Capgemini

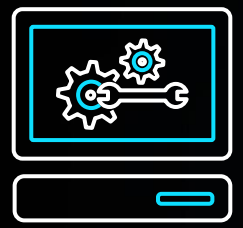
BOSCH

HARMAN A SAMSUNG COMPANY

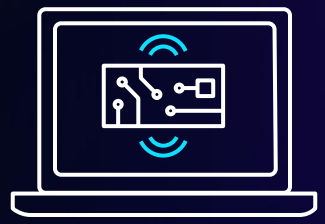
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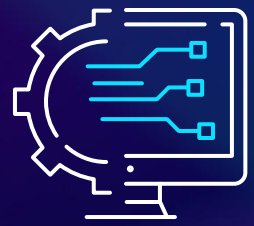
How cloud can help



Virtual workbenches



Virtual Electronic Control Units (V-ECUs)



Native Amazon Machine Images (AMIs)

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Environmental parity with AWS Cloud and ARM



- Run SW in the cloud
- Perform V&V activities in the cloud at scale
- Deploy bit-perfectly equal binaries, using ISA parity

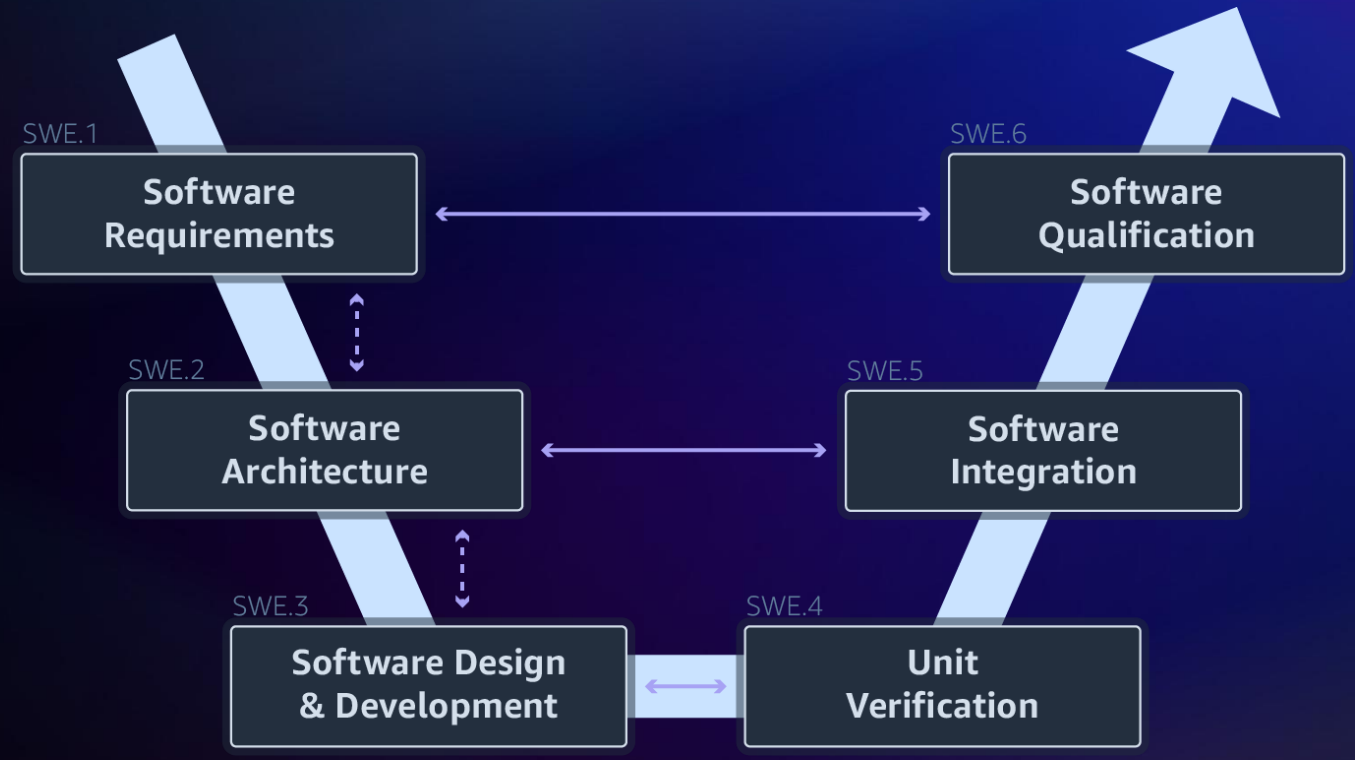
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Accelerating the V-model approach for software-defined vehicles

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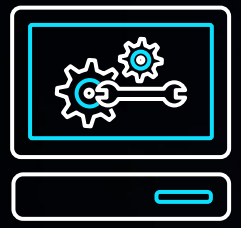
Accelerating validation and verification

The left side of the V contains design and development activities, which are matched to testing and validation on the right

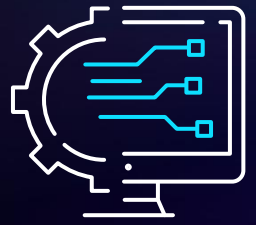


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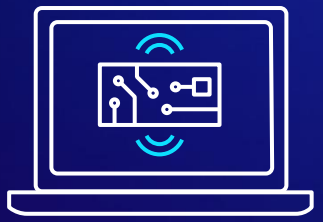
Blackberry QNX on AWS



Enable cloud-native development of embedded software



Reducing hardware dependency



Integration into existing cloud-based workflows

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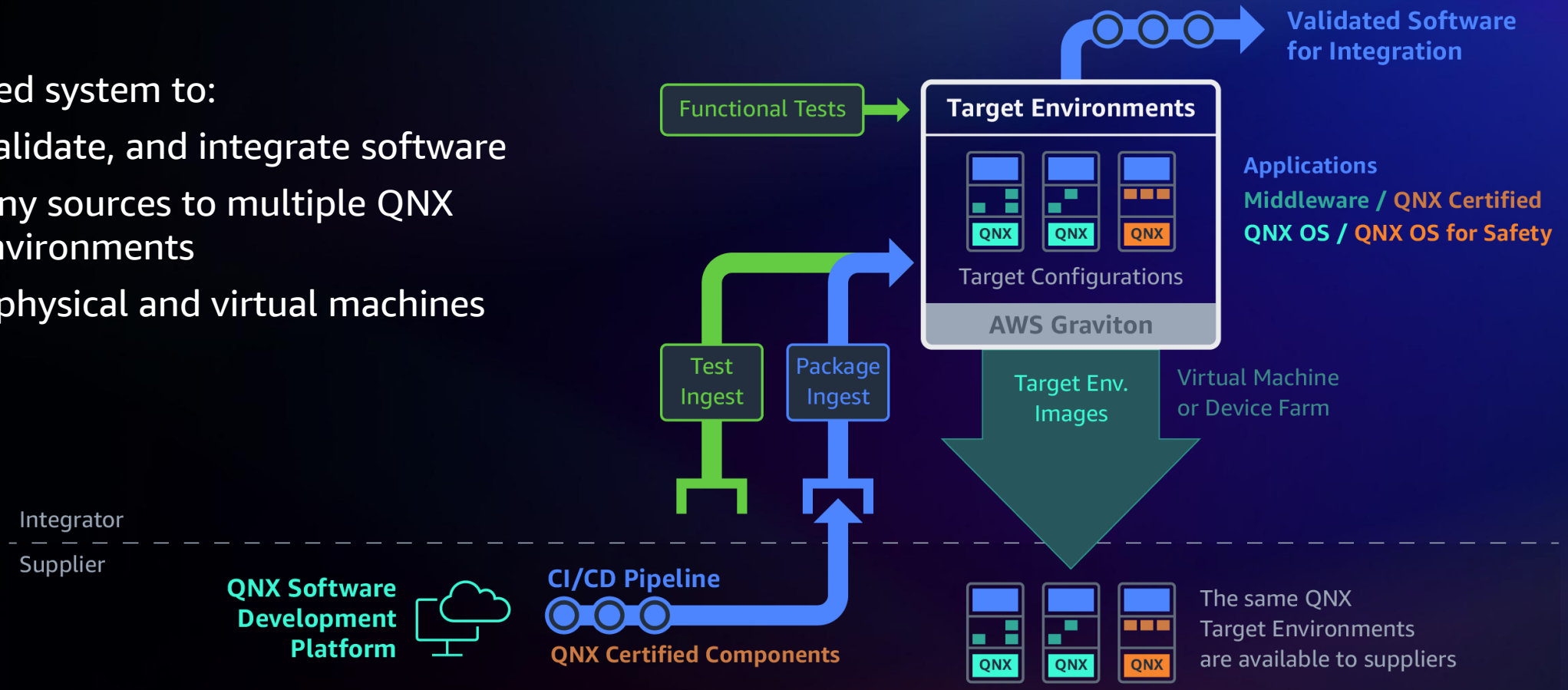
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Virtual validation workflow

TEST AUTOMATION USING QNX AMI

A cloud-based system to:

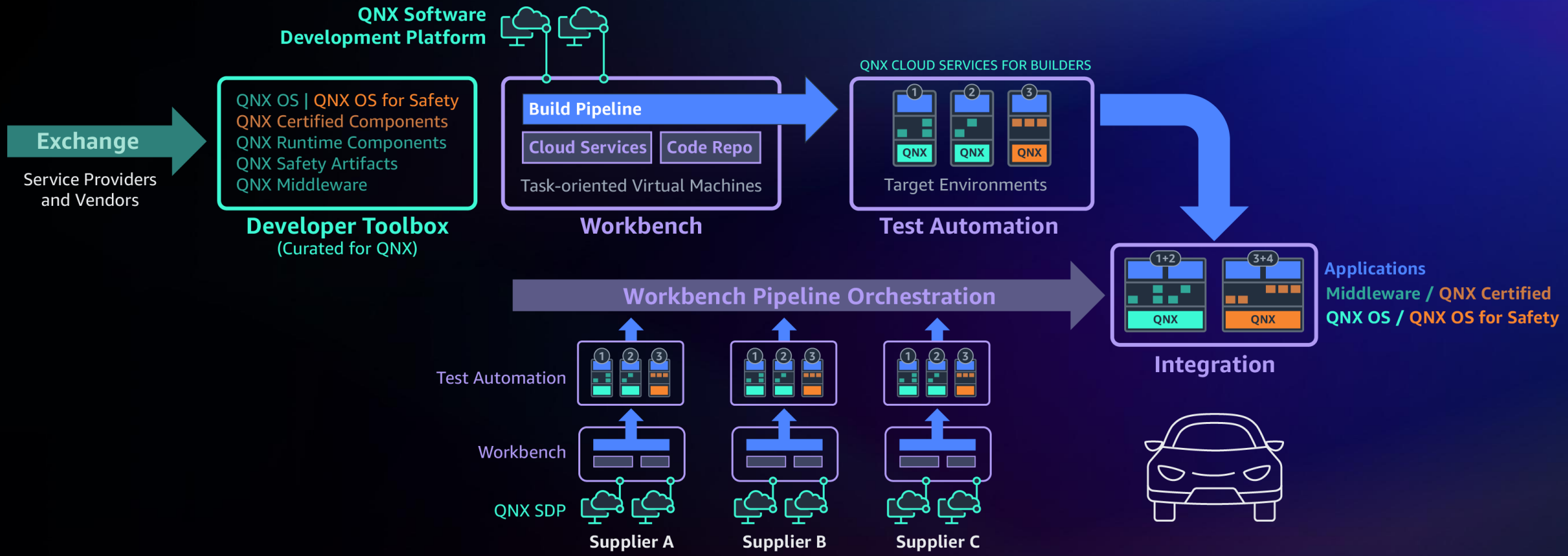
- ingest, validate, and integrate software
- from many sources to multiple QNX target environments
- on both physical and virtual machines



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Automotive cloud development

BlackBerry | QNX



The same QNX certified components, OS, and middleware are available to all parties.

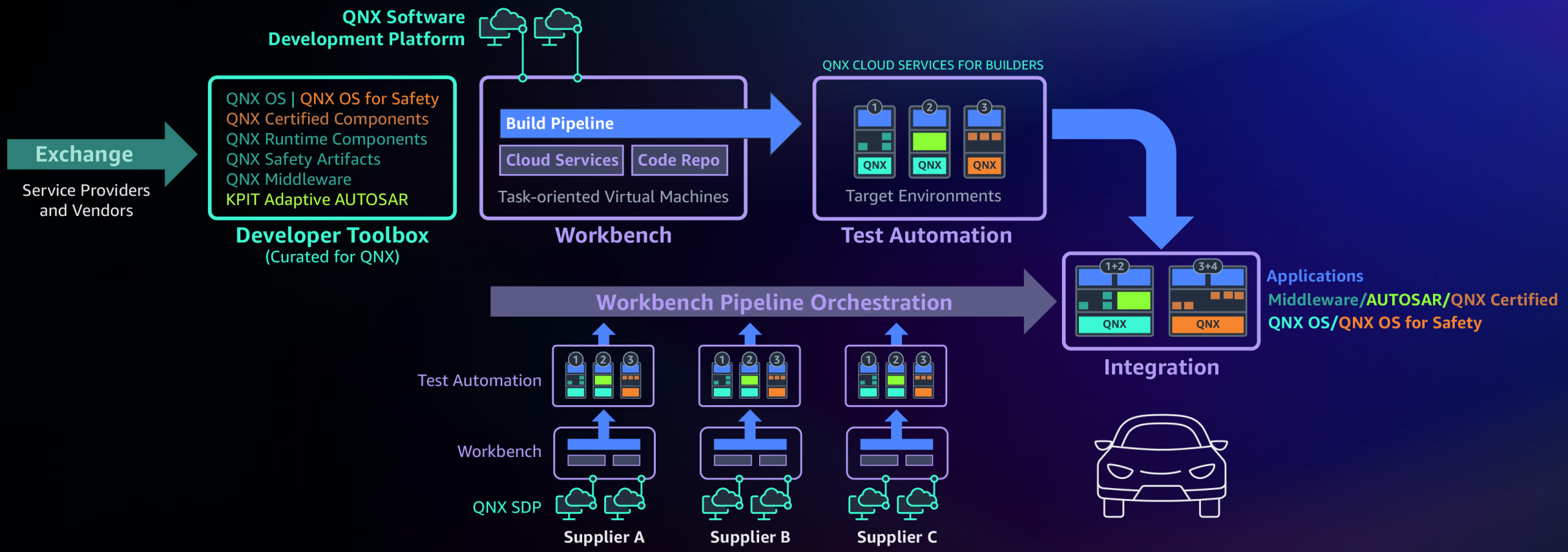
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Automotive cloud development

ENABLING MIDDLEWARE DEVELOPMENT

BlackBerry | QNX



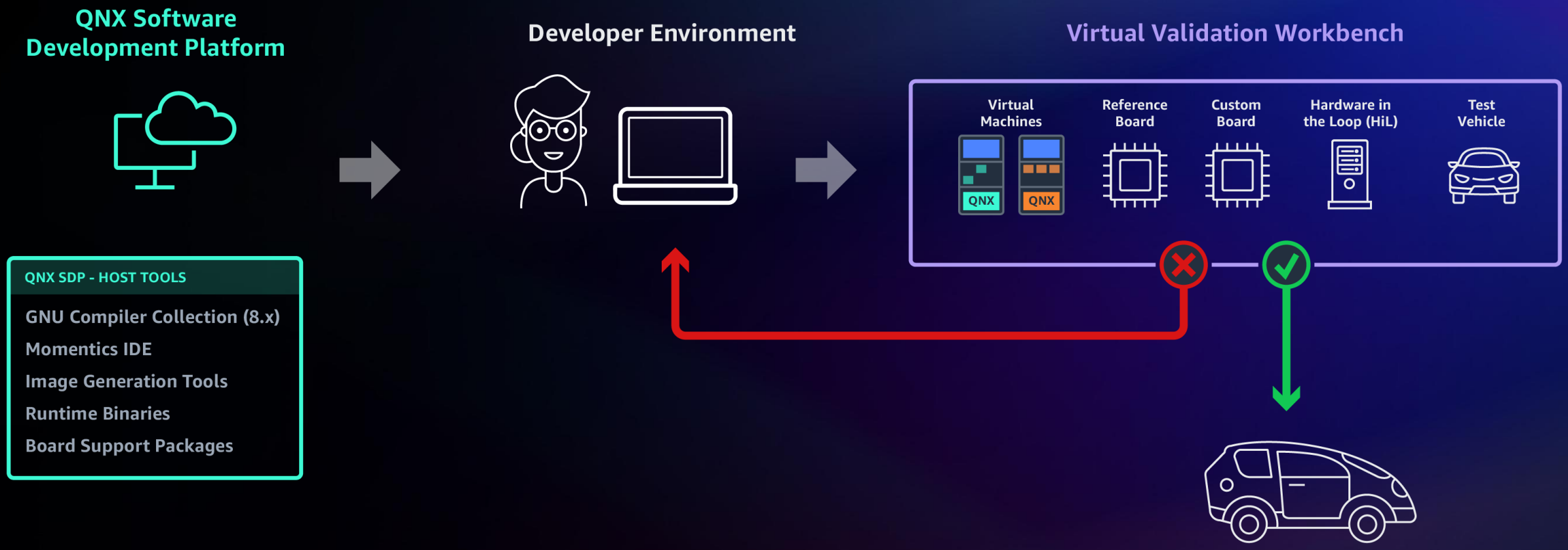
The same QNX certified components, OS, and middleware are available to all parties.

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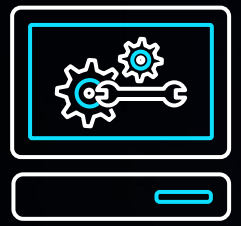
Cloud enabled developer experience

A SINGLE BUILD PIPELINE FOR MULTIPLE-TARGET ENVIRONMENTS

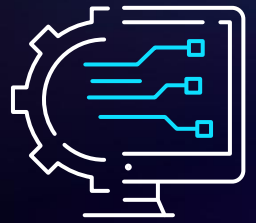


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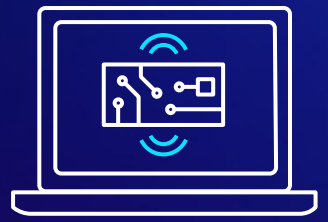
Cloud-first automotive software development



Internal and external team collaboration



Reducing hardware dependency



Higher software quality before integration

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The road ahead

Thank you!



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