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

AUT203

Automotive Development Tool Chains

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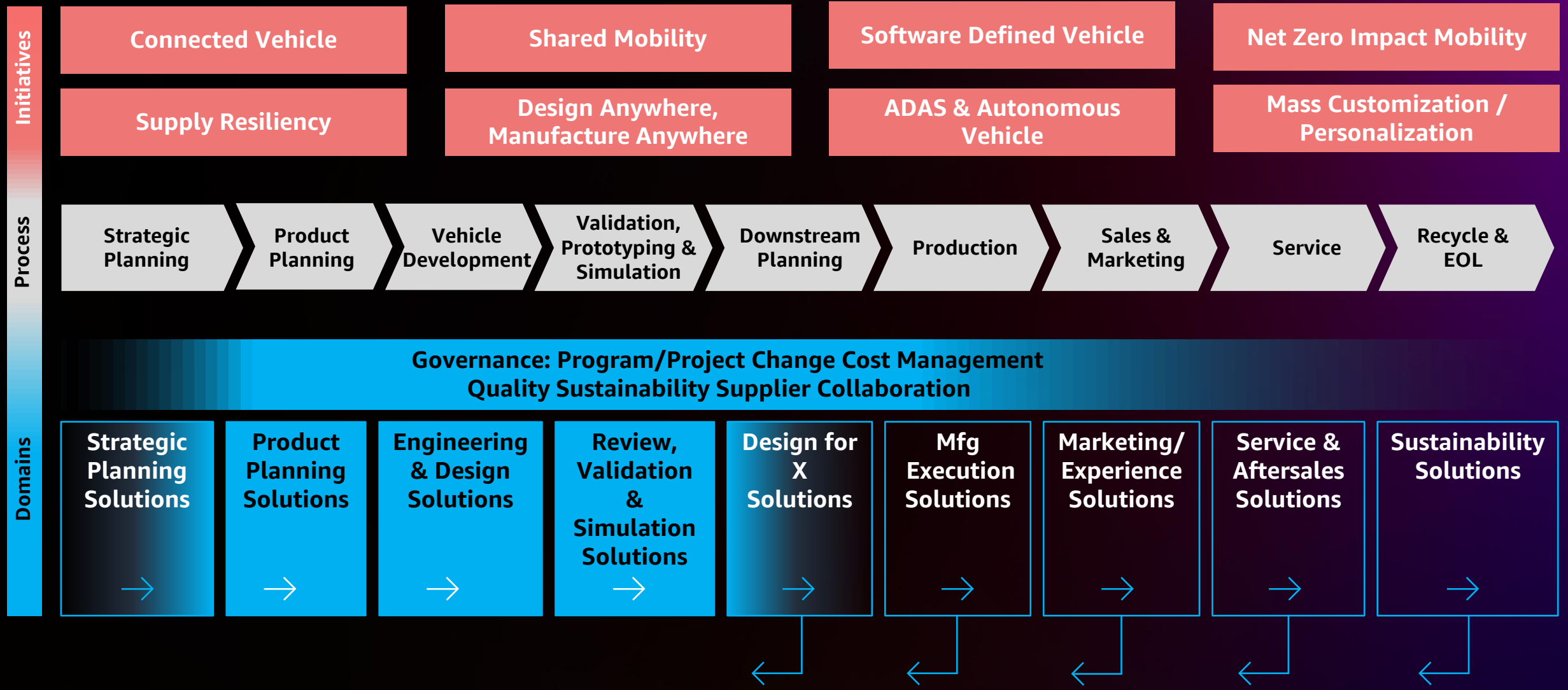
Agenda

01 | Product Engineering/R&D Overview	10 min	Sanjeev Kulkarni/AWS
02 | Engineering Workbench at Stellantis	30 min	Tara Vatcher/Stellantis
		Henrik Schoeneberg/AWS
03 | Product Engineering: Path forward	10 min	Kevin Baughey/AWS
04 | Q & A	10 min	All

Automotive R&D / Product Engineering



Product Engineering / R&D Solution Principles

Digital Product Twin

On-board automotive Best-In-Class ISV solutions to AWS Cloud while adding AWS services to increase performance and unlock additional capabilities

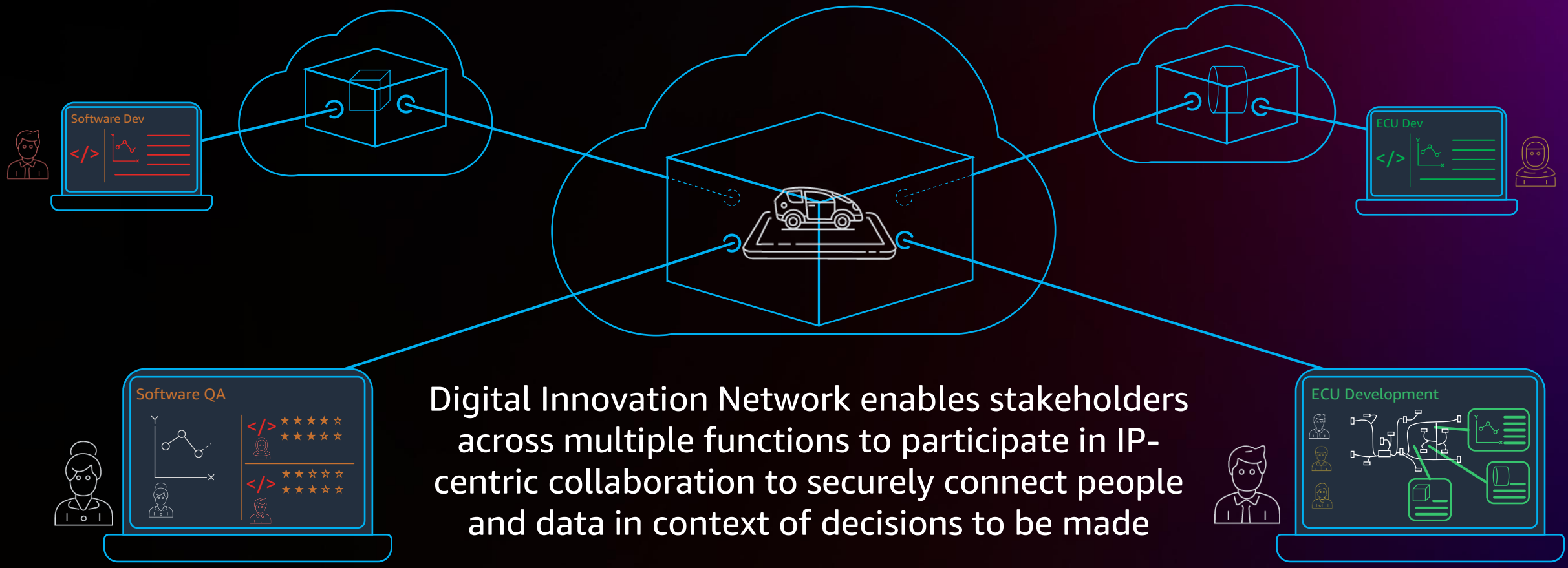
Digital Development Thread

Connect ISV solutions and AWS services together to solve difficult automotive product engineering challenges that drive significant business value

Digital Innovation Network

Connect stakeholders and data throughout the supply network to accelerate collaboration and business decision support

Facilitate effective collaboration through Digital Innovation Network



Digital Innovation Network enables stakeholders across multiple functions to participate in IP-centric collaboration to securely connect people and data in context of decisions to be made

Stellantis Engineering Workbench

Tara Vatcher

SVP, Software Architecture & Development – Platform
Stellantis

Hendrik Schoeneberg

Principal Data Architect
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STELLANTIS

14 ICONIC BRANDS

WIRED FOR THE THRILL

ENHANCED SPORTINESS, HUMAN DRIVEN

TRANSFORMING CONNECTED & CLEAN MOBILITY

SOFTWARE UPGRADES THE CITROËN WELL-BEING

SOFTWARE BUILDS MUSCLE

A NEW WORLD OF SERVICES AT YOUR FINGERTIPS

WE PLUG, YOU PLAY

FREEDOM, CONNECTED

EFFORTLESS FUTURE

PURE MASERATI

DETOX TO THE MAX

AMPLIFIED CONNECTED PLEASURE

BUILT TO SERVE A CONNECTED FUTURE

Powered By Our Diversity, We Lead The Way The World Moves

Stellantis | Amazon Collaboration

Partnership Scope

1 **Amazon Last Mile**
1st Commercial Customer
for RAM ProMaster Battery Electric Vehicle

2 **Amazon Devices**
Development of new Digital Cabin Platform

Focus of this Session

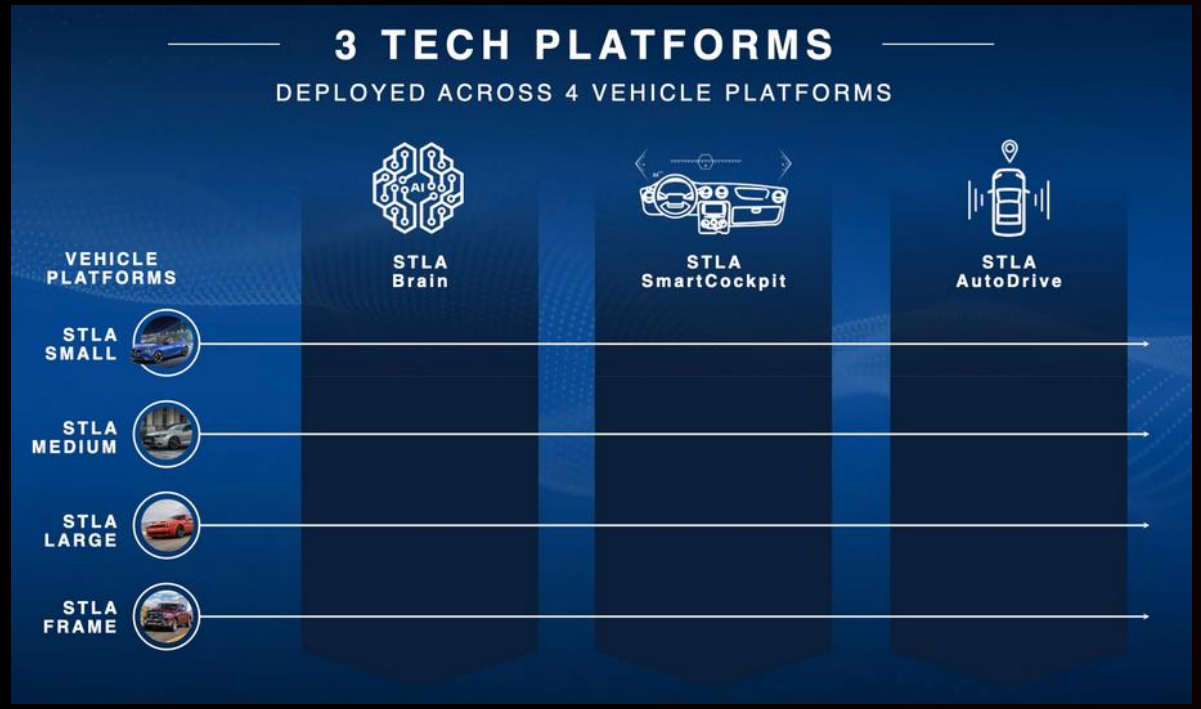
3 **Amazon Web Services (AWS)**
Preferred Cloud Provider to move automotive HW and SW development to the cloud

Solutions

- Develop and provide RAM ProMaster BEV for Amazon Last Mile delivery fleet
- Develop automotive infotainment system for STLA SmartCockpit platform
- Cloud based development, integration, test environment for E2E automotive SW & electronic solutions
- Data infrastructure to support development environment and other use cases

What: Our Goals & Challenges

Our Goals



Our Challenges

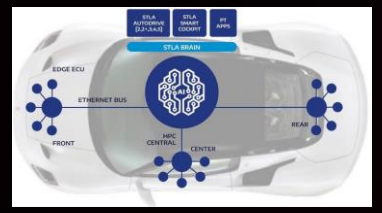
1. Growing complexity due to increase of software & electronic driven features
2. Faster time to market expectation due to “tech product” life cycles
3. Fast enablement of 1000s of developers
4. Consistency of HW/SW engineering processes, methods and tools

How: Collaborative Team Approach

Stellantis

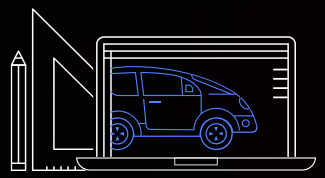
- **Automotive Domain Knowledge**

Vehicle Technology Platforms



In-Vehicle Architectures

- **SW Development Workflow**



Automotive Tools & Toolchains

xIL Environments

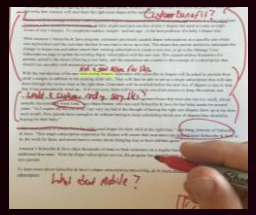
AWS

- **Cloud Technology & Frameworks**

Services and Technology

AWS Partner Network

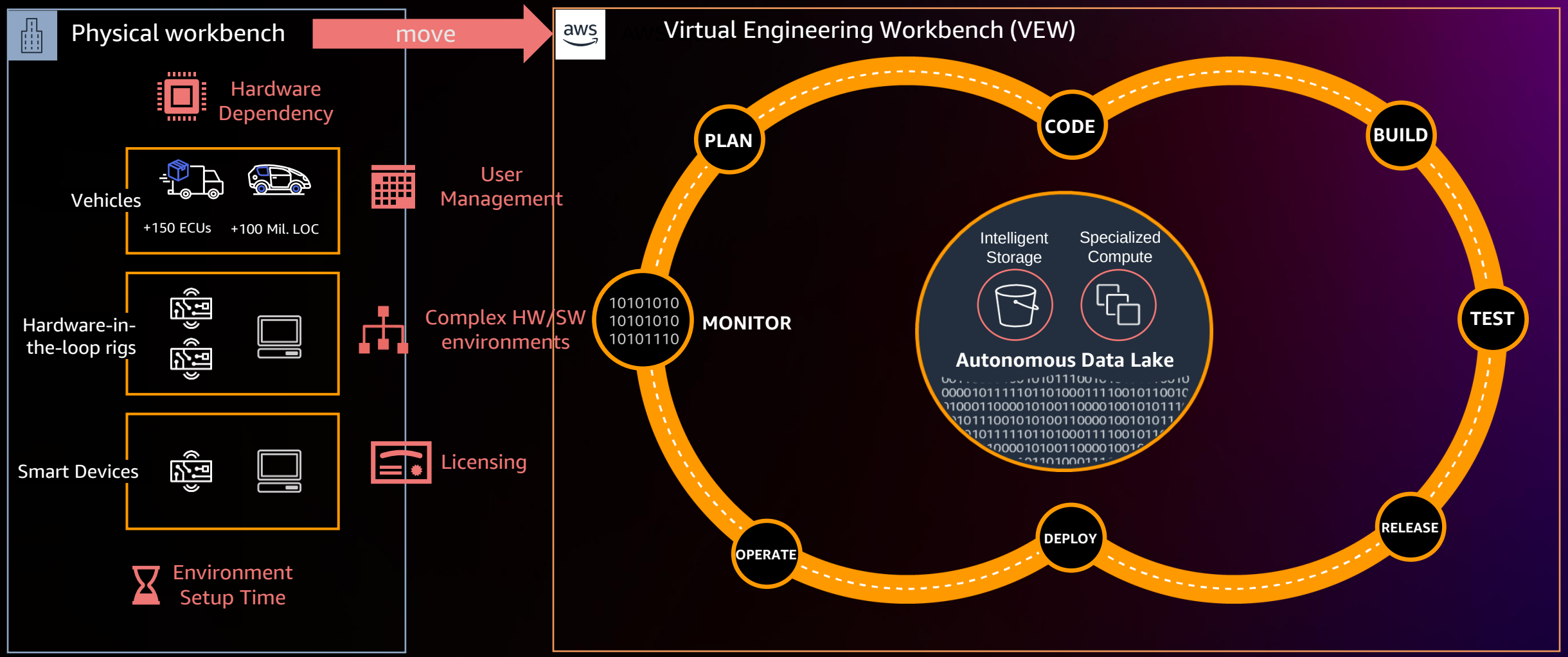
- **Amazon Culture of Innovation**



Working Backwards & PRFAQ

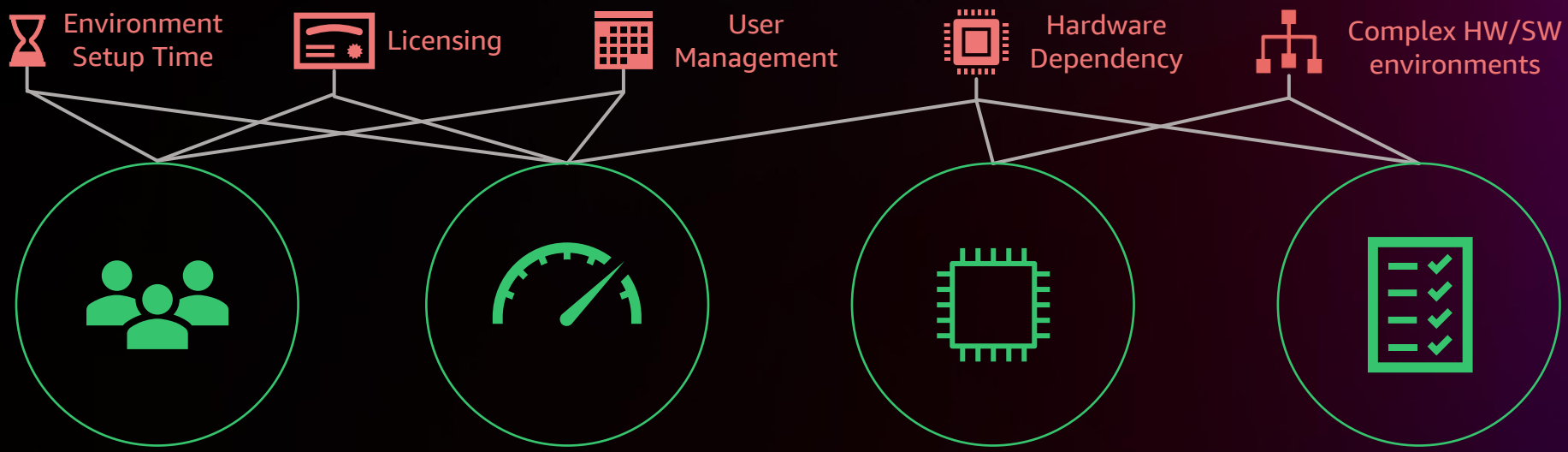
Design Sprints & Hackathons

Automotive SW Engineering challenges



Key Challenges

Solution Tenets



Self-Service across the entire engineering chain

Designed for global scale and usage

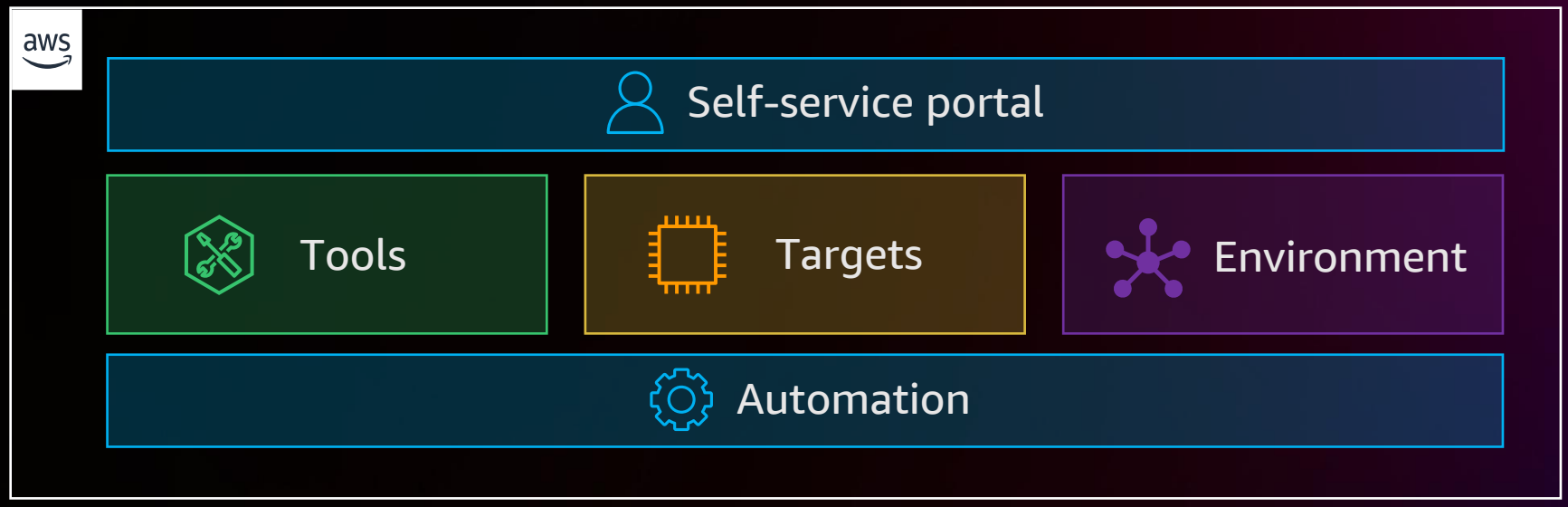
Reduce hardware dependency with virtualization

Consistent, reproducible SW artifacts

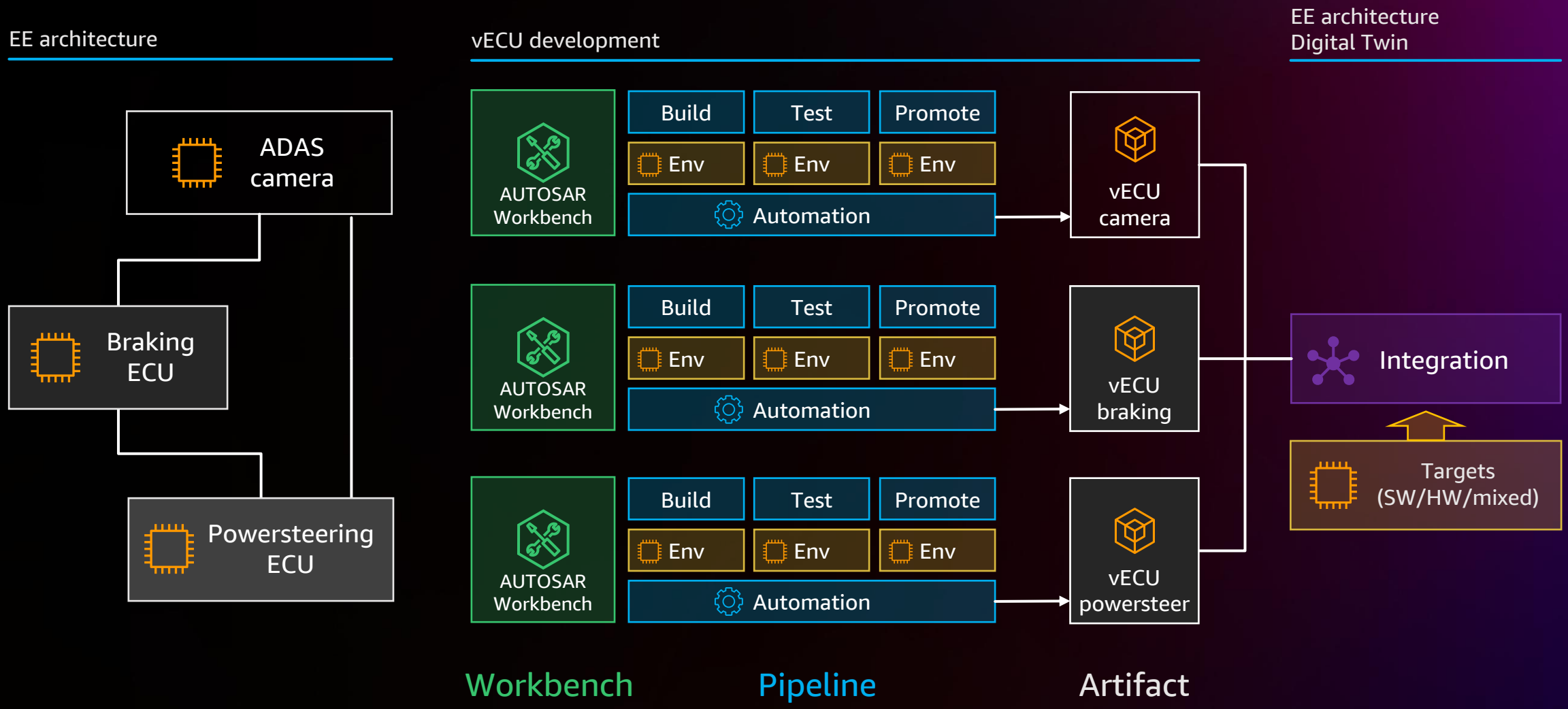
Stellantis Virtual Engineering Workbench (VEW)

Examples:

AUTOSAR Classic Development Environment	ADAS camera	ADAS simulation Synthetic scene data
QNX Development Environment	Entertainment system	User input simulation



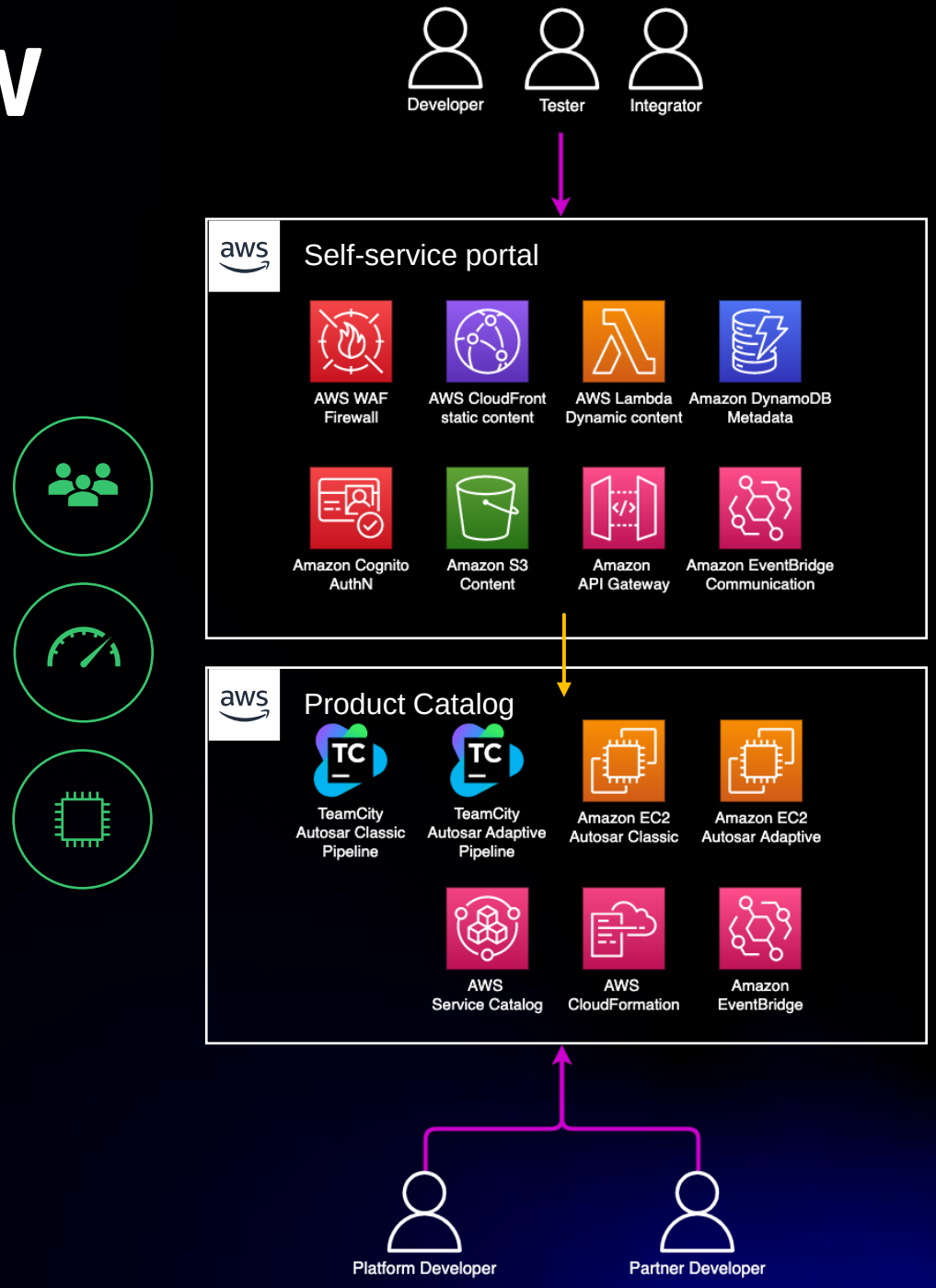
VEW – example EE integration in Digital Twin Emergency Brake Assist



Self-service portal of VEW

Solution

- AWS ServiceCatalog portfolio of pre-configured workbenches
- Pre-configured, automated use case pipelines for reproducible, high-quality artifacts
- Secure self-service portal access with AWS WAF and Lambda @Edge



Workbench example: vECU development on AWS

VEW Contributor

Tools

Pipelines

SW/HW Targets

VEW Components

VEW User

Self-service portal

Workbenches & pipelines, product catalog, deployed resources

Roll-out

VEW Product Catalog
Self Service / pre-licensed / role-based access

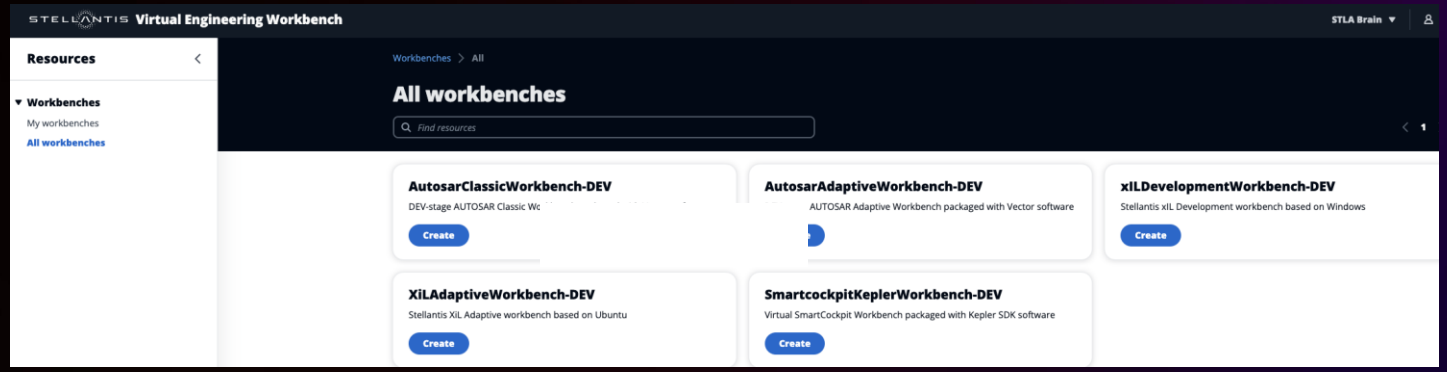
AUTOSAR Classic Dev
Pre-configured runtime environment / AD integration / deployed in minutes

Code / Artifact submission

Displays

Provision & Access

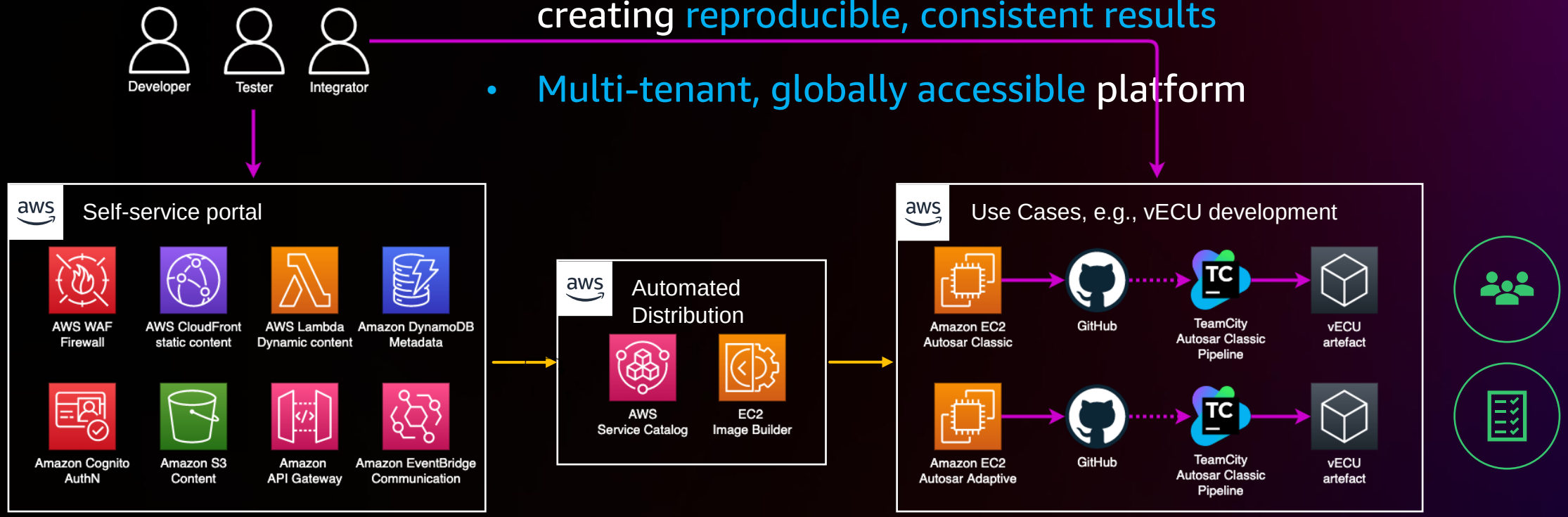
Perform



Product lifecycle management of VEW

Key tenets

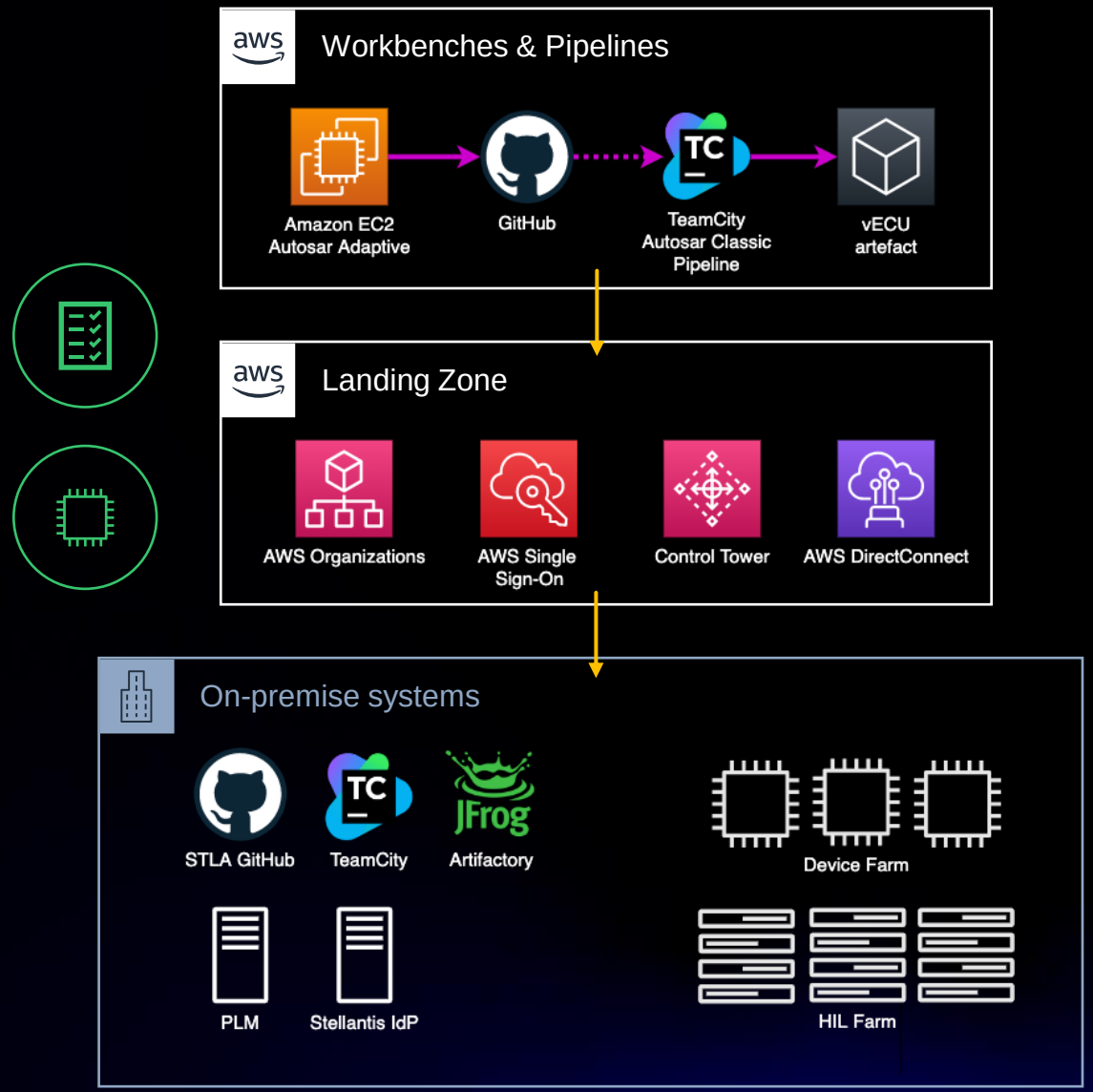
- Fully automated product lifecycle management and distribution using AWS Service Catalog and Amazon EC2 Image Builder
- Automated pipelines integrating virtual and physical targets, creating reproducible, consistent results
- Multi-tenant, globally accessible platform



Physical device integration & orchestration

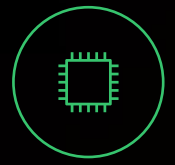
Key tenets

- Integration and remote orchestration of Stellantis' on-premises systems with AWS DirectConnect (e.g., license servers, device fleets or HIL simulators)
- Global, secure access to workbenches from and to corporate networks using AWS Single Sign-On and AWS Control Tower
- Unified access for contributors from Stellantis, partners and suppliers



Virtual Engineering Workbench Benefits

Managing complexity



The Stellantis workbench enables integration of virtual and physical targets, pre-defined toolchains and automation

Fast enablement of 1000s of developers

A global user base of developers, partners and suppliers can onboard the platform and become productive in minutes

Faster time to market

Fully automated use case pipelines including test and integrate on virtual targets to provide quick & early feedback

Consistency & Compliance

Full automation of product lifecycles and SW development, testing and integration ensure consistent and compliant SW artifacts

Achievements & Outlook

Deployed features

- Integration of virtual workbench development suppliers & partners
- 100s of developers globally onboarded
- Initial workbench catalog & self service UI deployed
- First development, test and integration use cases deployed (AR-Classic, AR-Adaptive, XIL)

Upcoming features

- Hybrid Use – Cases
  - vECUs paired with real ECUs
  - physical test environment paired with virtual test environment (i.e., Integration of hybrid HIL, vHIL, smart-devices)
- Scale platform to 10,000+ developers
- Dynamic Cost Management & Reporting
- More to come…

AWS for Product Engineering - Path Forward

Sanjeev Kulkarni

Business Strategy Lead, Product Engineering and R&D

Amazon AWS

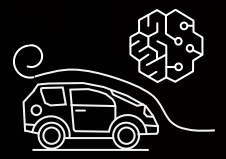
Kevin Baughey

Business Strategy Lead, Product Engineering and R&D

Amazon AWS

AWS Product Engineering / R&D Focus Areas

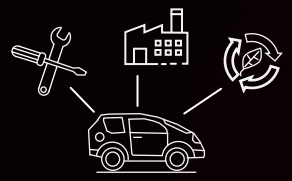
Digital Product Twins



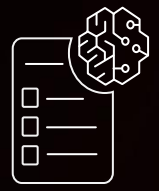
Smart Simulation & Validation

Engineering Modernization

Digital Development Thread



Design for X



Intelligent Requirements

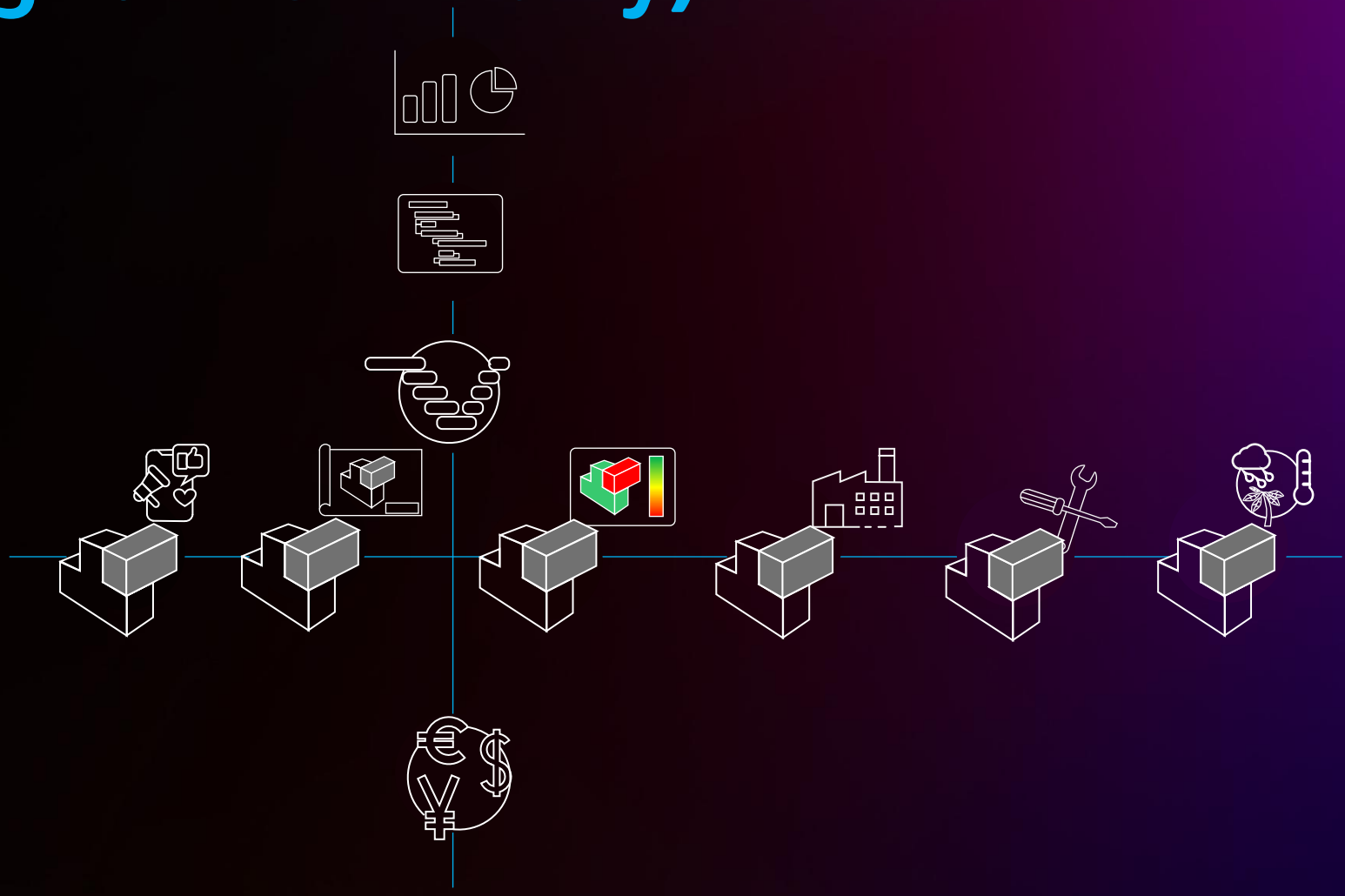
Digital Innovation Network

Engineering Release

Innovation Network & Marketplace

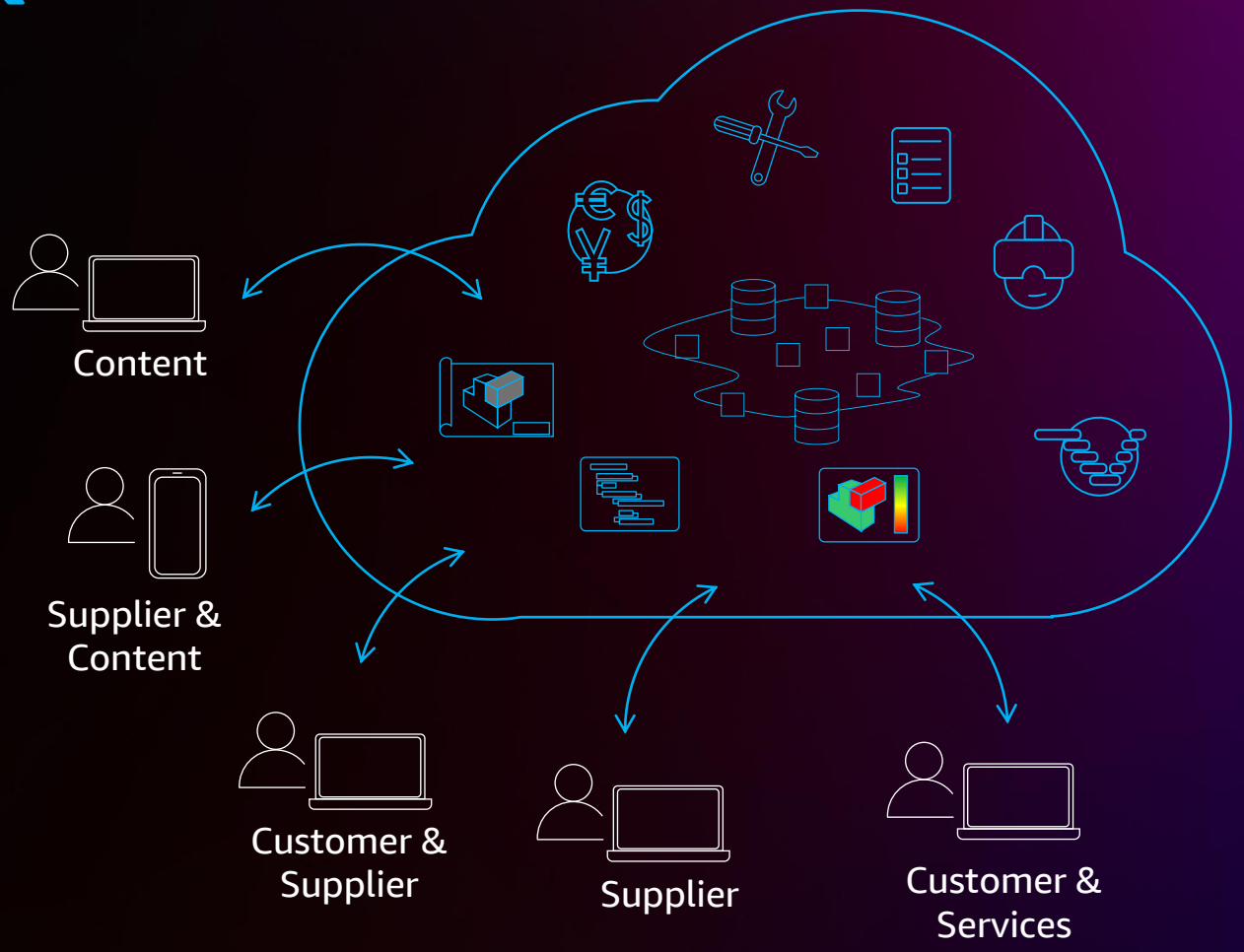
Product Engineering / R&D Focus Areas:
Design for X (Digital Continuity)

Utilize engineering data for downstream functions to streamline communication, reduce errors & accelerate innovations to market



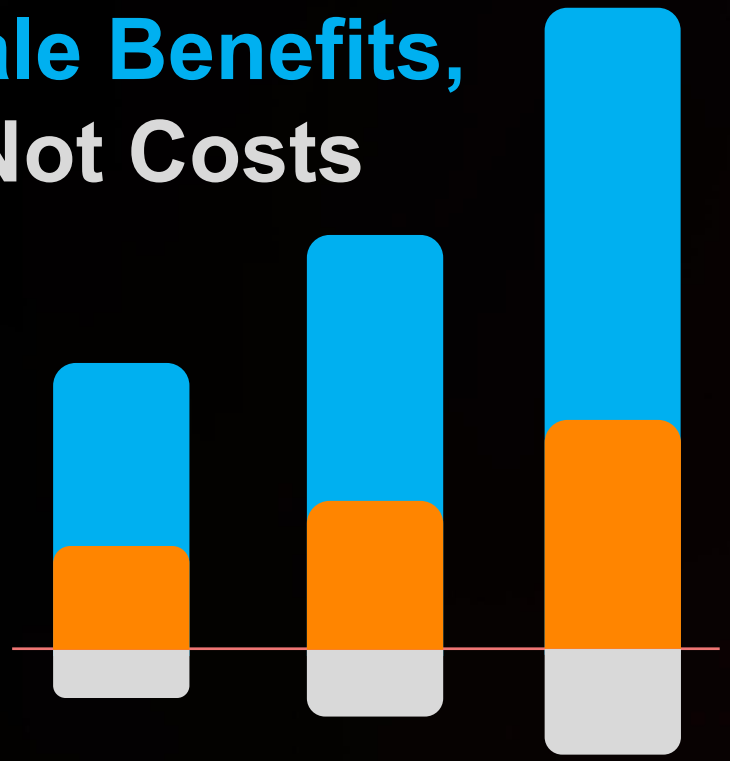
Product Engineering / R&D Focus Areas: Innovation Network

Secure, governed environment to facilitate collaboration across value-network of OEMs, suppliers, content providers and individual service providers…



AWS Accelerating Product Engineering / R&D Benefits

Accelerate & Scale Benefits, Not Costs

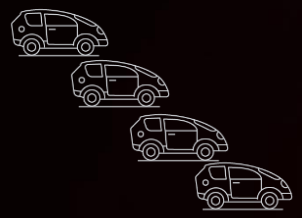


Time to Release

Reduce time to market through effective digital thread throughout value-chain and across enterprises

Innovation Pipeline

Increased ability to **iterate on alternatives** through efficient digitization and smart digital validation



Product Engineering / R&D Capacity

Improved PD throughput through collaborative engineering, knowledge reuse, effective digital thread

Quality, Iteration & Rework

Reduce design iterations through cross-functional collaboration, and **enable right first time** through knowledge capture/reuse

Thank you!

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