

The logo for AWS re:Invent 2023. It features the text 'AWS re:Invent' in a white, sans-serif font. 'AWS' is in a smaller font size and positioned above 're:'. 're:' is in a smaller font size and positioned to the left of 'Invent'. The background is a dark blue gradient with large, overlapping, curved shapes in shades of purple, pink, and orange on the right side.

AWS re:Invent

NOV. 27 – DEC. 1, 2023 | LAS VEGAS, NV

AUT301

Automotive software development: The Virtual Engineering Workbench

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Agenda

- Introduction to the **Virtual Engineering Workbench (VEW)**
 - Industry challenges around automotive software development
 - VEW for software-defined vehicle use cases
- Workshop onboarding
- Hands-on VEW
- Build an adaptive AUTOSAR application and run it on a virtual target
 - Build an infotainment app and run it on a QNX virtual target
 - Modify and publish a new workbench version
- Wrap-up

The Virtual Engineering Workbench (VEW)

WORKSHOP SUMMARY AND OUTCOMES

Workshop delivery

- Work in AWS-provided workshop accounts
- Use your own laptops
- Work through instructor-led labs
- Engage with your instructor – Time is short

Goals

- Get **hands-on experience** with the VEW concepts
- Develop two sample automotive applications for **QNX and AUTOSAR on AWS**
- Take the role of a platform contributor and **extend the workbench catalog with your own products**

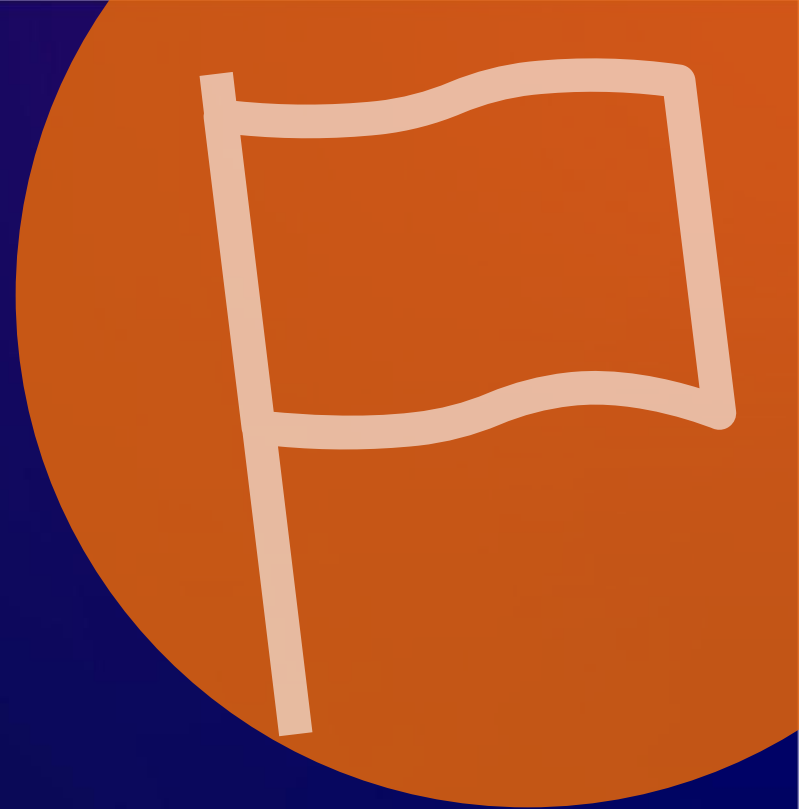
Introduction to the VEW



VEW

AUTOMOTIVE SOFTWARE DEVELOPMENT

Today's customers are expecting **faster time to market**, but meanwhile **software complexity** is growing



5 exemplary issues reported by our customers

1
Missing consistency in **development environments**

2
Slow and complex setup process (6-8 weeks)

3
Long **feedback** loops, weeks to **multiple months** until you get validation feedback

4
50+ tools for every developer with dependencies on licensing, configuration, and **target hardware**

5
Hardware-**dependent development is cost-intensive and slow**, with multi-month waits for availability

Understanding the project

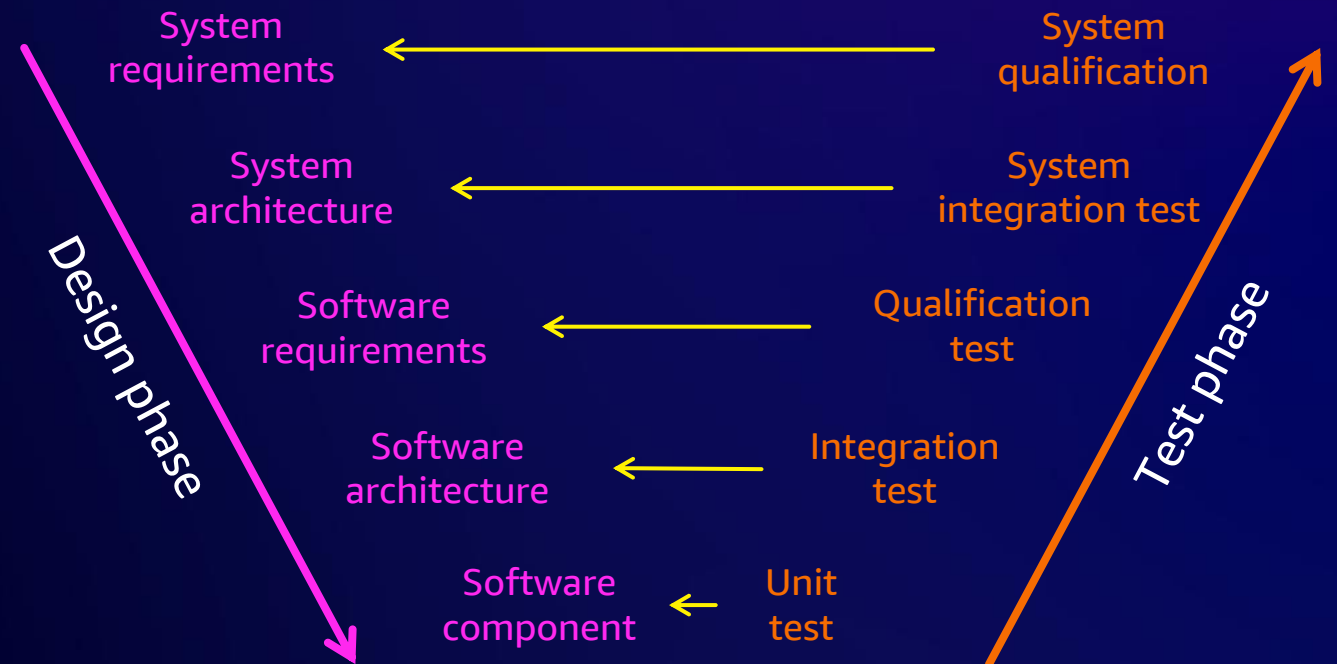
TECH CHALLENGE

The **development process** for the automotive industry is highly regulated.

The flow outlined **illustrates the V-model approach** for automotive software development. After the software design phases, a developer starts in the third from the top.

In order to **get feedback about a change**, the developer **needs to wait for all the other steps** to be completed and all environments need to fit together.

Today, this spans **months** until a change is fully validated.



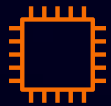
Understanding VEW

VIRTUAL ENGINEERING WORKBENCH (VEW)

The VEW consists of three main pillars: tools, targets, and environments. We manage that on the VEW platform, and the interface to the user is a self-service portal empowering them to do things in a fully automated manner.



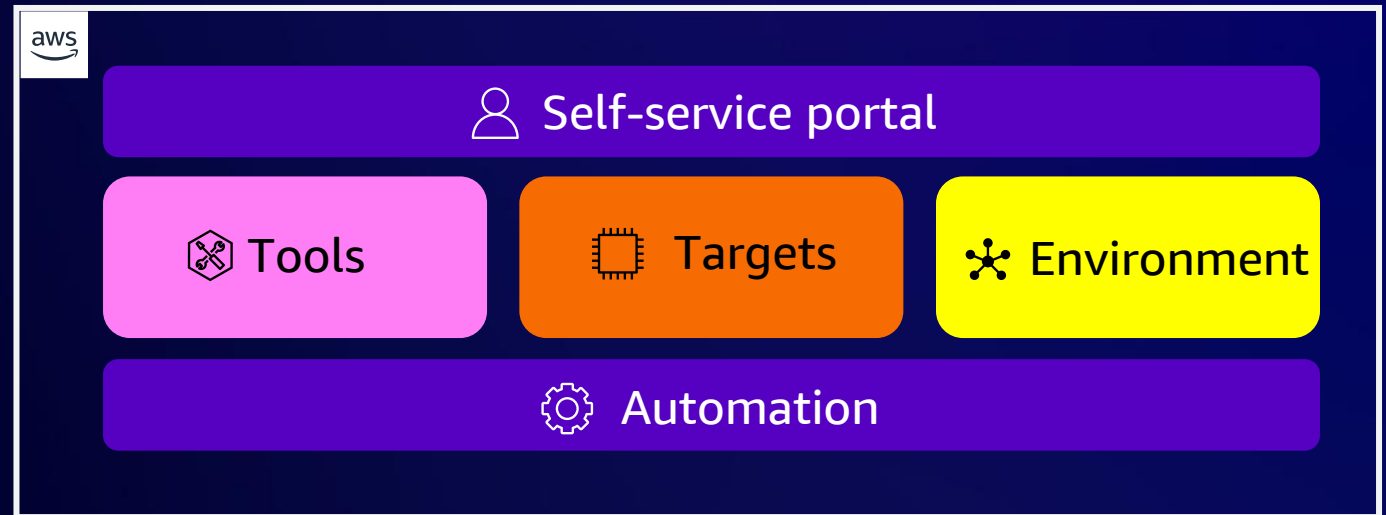
Predefined use case-specific environments with all of the **tools**, IDEs, and licensing – everything that helps a user to get started on a use case



Various levels of abstractions of the **target** platform for which the user builds



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



VEW: Accelerating software development

Efficiency



Ramp-up time of new developers or on new projects reduced by 95%¹



Research indicates shift left enables cost savings of up to 90%²

Development consistency and collaboration



Feedback cycles down to minutes



Same environments all over the world, over whole LC with no delay and with all partners

Support, security, and other benefits



Persist past versions of environments

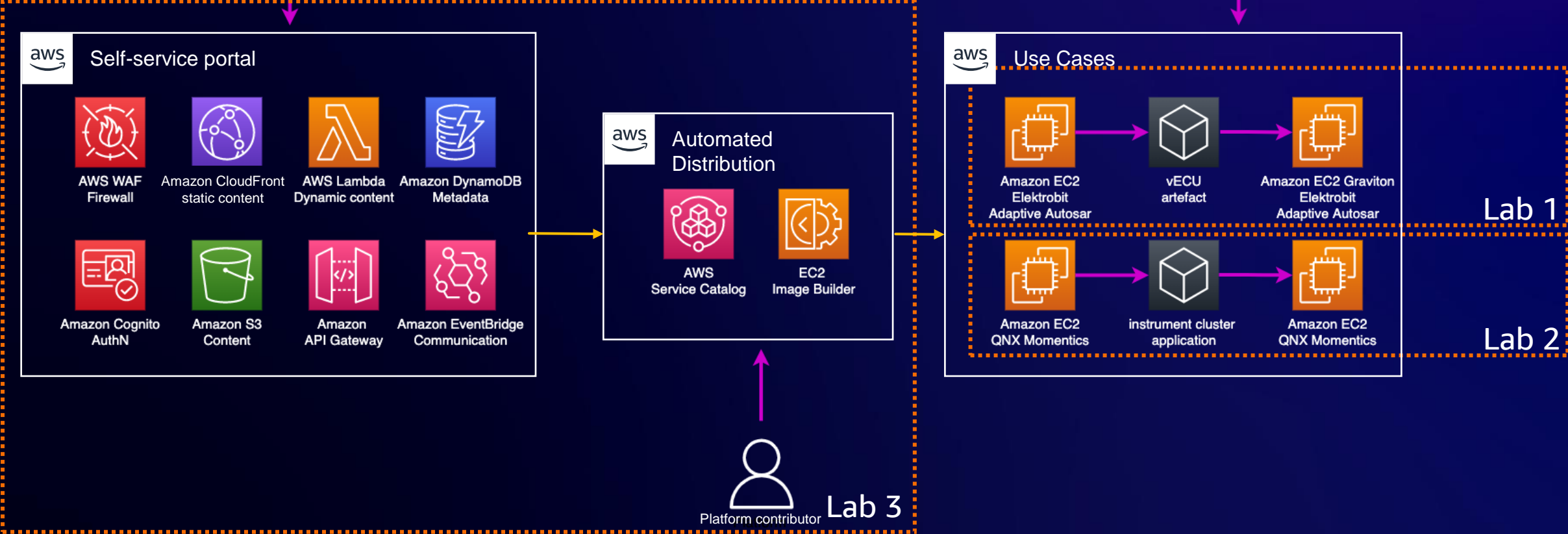


For-the-job security dev environment and overall



Software, package, and license management

VEW high-level architecture



Workshop onboarding



Getting started with this workshop



You have access to an AWS account with any optional pre-provisioned infrastructure and IAM policies needed to complete this workshop.



The AWS account is only available for the duration of this workshop. **You will lose access to the account once the workshop is complete.**

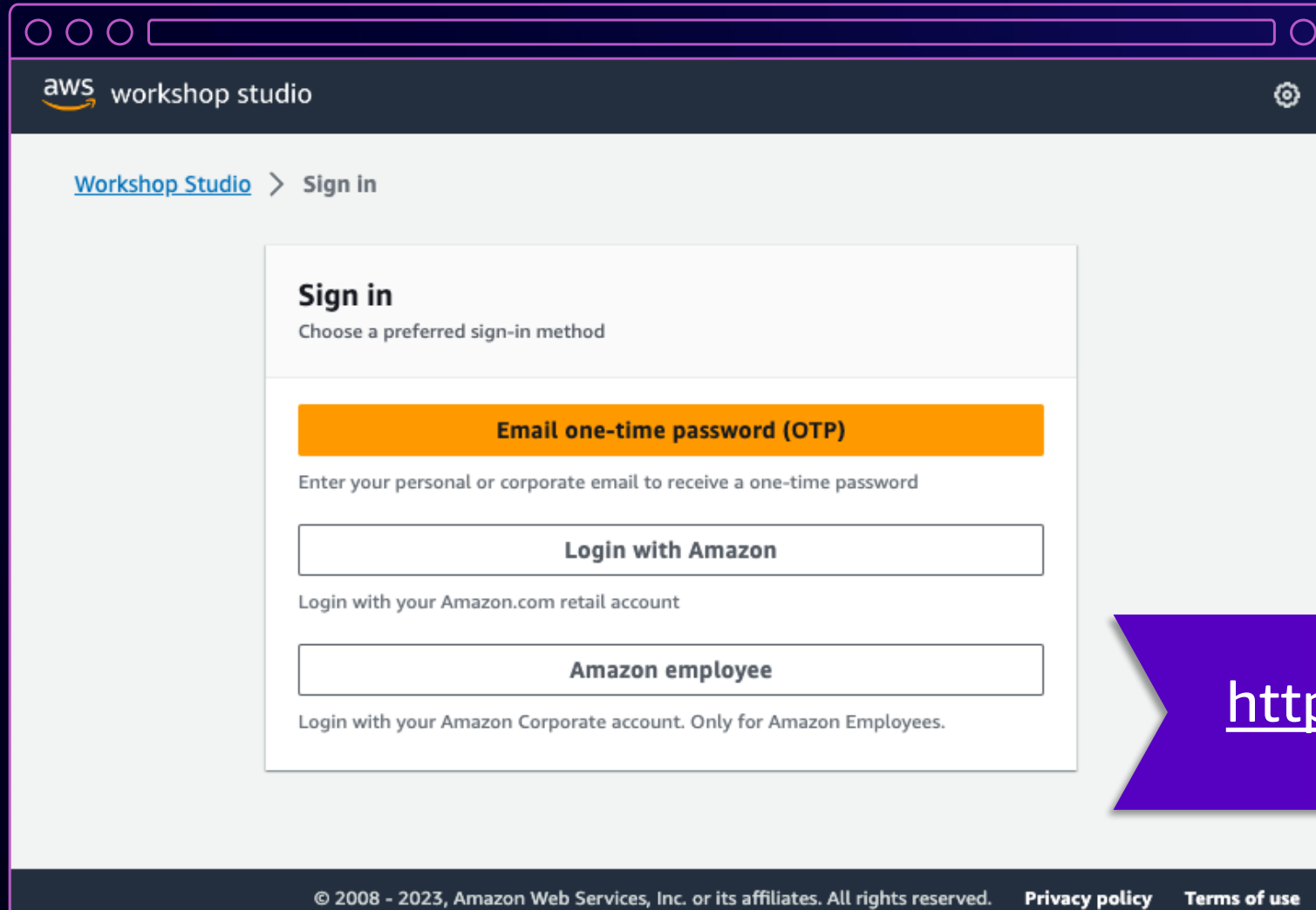


Any optional pre-provisioned infrastructure is deployed to a specific AWS Region. Make sure that you are working in this Region; other Regions are blocked.



Review the terms and conditions of the event. **Do not upload any personal or confidential information to the account.**

Step 1: Sign in using your preferred method



aws workshop studio

[Workshop Studio](#) > Sign in

Sign in

Choose a preferred sign-in method

Email one-time password (OTP)

Enter your personal or corporate email to receive a one-time password

Login with Amazon

Login with your Amazon.com retail account

Amazon employee

Login with your Amazon Corporate account. Only for Amazon Employees.

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<https://catalog.workshops.aws/join>

Step 2: Enter the event access code

aws workshop studio

Workshop Studio > Join event

Step 1
Enter event access code

Step 2
Review and join

Enter event access code

Event access code

Event access code
A 12 digit code that was given to you for this event

abcd-012345-ef

Cancel Next

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Each session has a unique code

Step 3: Review terms and join event

The screenshot shows the 'Review and join' page in the AWS Workshop Studio interface. The page is divided into several sections:

- Event details:** A table with columns for Name, Start time, Duration, and Level. The event is 'reinvent 2023 Workshop' starting on 8/28/2023 at 10:59 AM, lasting 12 hours, with a level of 100.
- Description:** 'Workshop at re:Invent 2023'.
- Terms and Conditions:** A section titled 'Read and accept before joining the event' containing 11 numbered terms and conditions. A checkbox at the bottom is checked, indicating agreement with the terms.
- Navigation:** Buttons for 'Cancel', 'Previous', and 'Join event' are located at the bottom right.

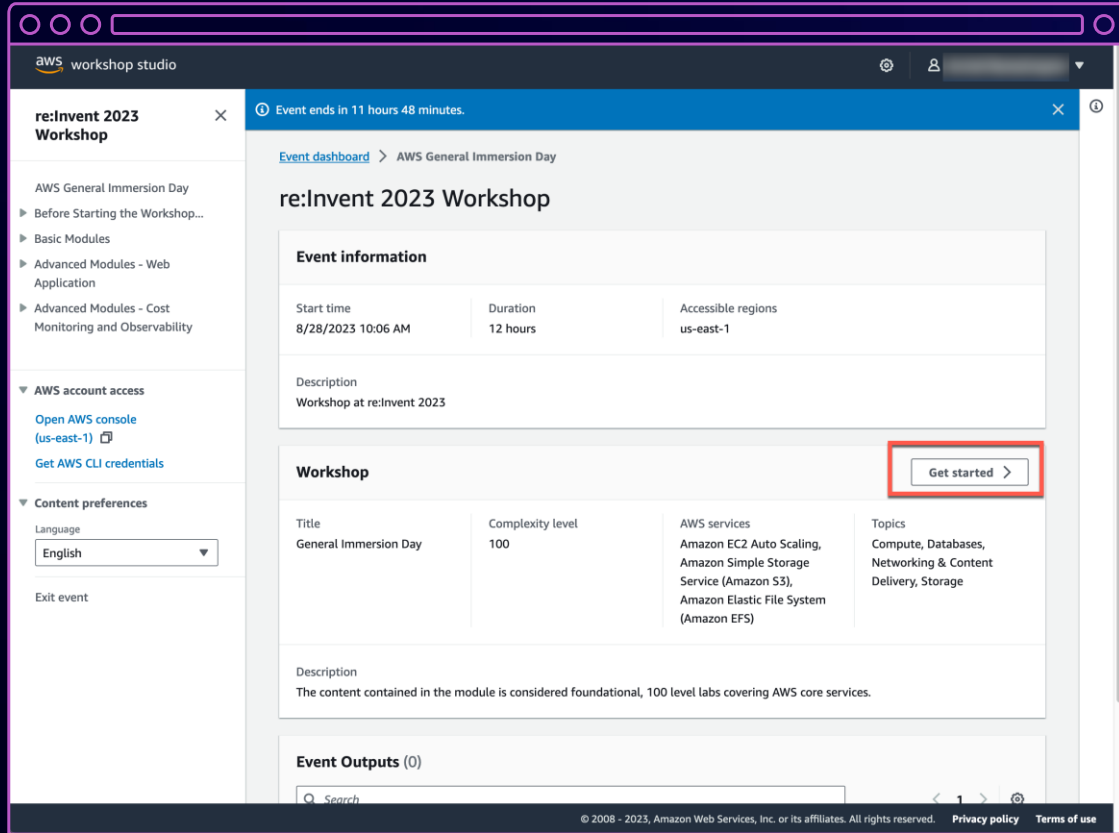
Name	Start time	Duration	Level
reinvent 2023 Workshop	8/28/2023 10:59 AM	12 hours	100

Country or region	Minimum age
All countries or regions not listed below (including United States, Brazil, UK, and India)	13
China, Republic of Korea (South Korea)	14
Australia	15
Japan, Switzerland, Vietnam, and countries in the European Economic Area	16
Azerbaijan, Bolivia, Colombia, Dominican Republic, Indonesia, Lebanon, Malaysia, Mexico, Montenegro, Nepal, Philippines, Thailand, Turkey, and countries in Africa	18

I agree with the Terms and Conditions



Step 4: Get started with the workshop



The screenshot shows the AWS Workshop Studio interface for the 're:Invent 2023 Workshop'. The page is titled 're:Invent 2023 Workshop' and includes a navigation sidebar on the left. The main content area displays 'Event information' and 'Workshop' details. A red box highlights the 'Get started >' button in the 'Workshop' section.

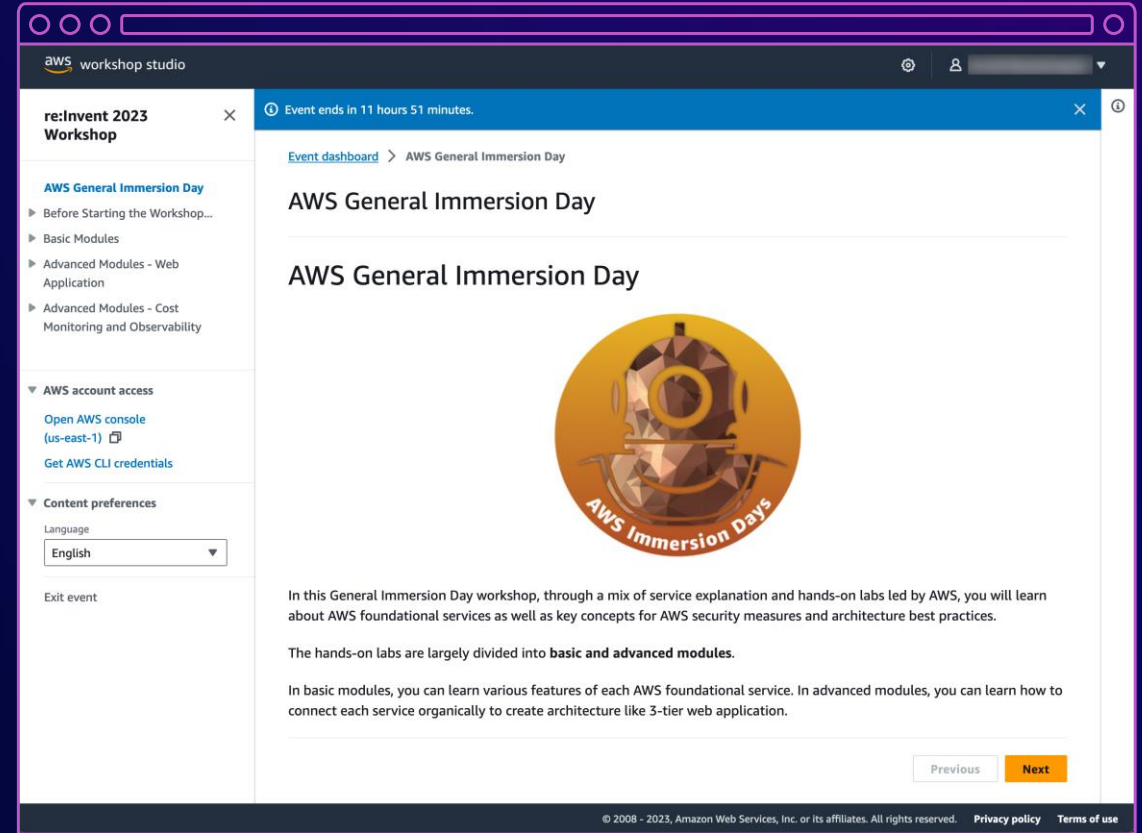
Event information

Start time	Duration	Accessible regions
8/28/2023 10:06 AM	12 hours	us-east-1

Workshop

Title	Complexity level	AWS services	Topics
General Immersion Day	100	Amazon EC2 Auto Scaling, Amazon Simple Storage Service (Amazon S3), Amazon Elastic File System (Amazon EFS)	Compute, Databases, Networking & Content Delivery, Storage


Event Outputs (0)



The screenshot shows the AWS Workshop Studio interface for the 'AWS General Immersion Day' workshop. The page is titled 'AWS General Immersion Day' and includes a navigation sidebar on the left. The main content area displays a large circular graphic with a gear and the text 'AWS Immersion Days'. Below the graphic, there is a description of the workshop and a 'Next' button.

AWS General Immersion Day

AWS General Immersion Day



In this General Immersion Day workshop, through a mix of service explanation and hands-on labs led by AWS, you will learn about AWS foundational services as well as key concepts for AWS security measures and architecture best practices.

The hands-on labs are largely divided into **basic and advanced modules**.

In basic modules, you can learn various features of each AWS foundational service. In advanced modules, you can learn how to connect each service organically to create architecture like 3-tier web application.

[Previous](#) [Next](#)

Step 5: Access AWS account

aws workshop studio

re:Invent 2023 Workshop

AWS General Immersion Day

Event dashboard > AWS General Immersion Day

AWS General Immersion Day

AWS General Immersion Day

Before Starting the Workshop...

Basic Modules

Advanced Modules - Web Application

Advanced Modules - Cost Monitoring and Observability

AWS account access

Open AWS console (us-east-1)

Get AWS CLI credentials

Content preferences

Language: English

Exit event

AWS Immersion Days

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Previous Next



aws Services Search [Option+S] N. Virginia

Console Home info

Reset to default layout + Add widgets

Recently visited info

CloudWatch

Service Quotas

AWS Organizations

Athena

CloudFormation

AWS Health Dashboard

Resource Groups & Tag Editor

Amazon EventBridge

AWS Cost Explorer

S3

EC2

Lambda

CodeCommit

Amazon Redshift

View all services

Welcome to AWS

Getting started with AWS

Learn the fundamentals and find valuable information to get the most out of AWS.

Training and certification

Learn from AWS experts and advance your skills and knowledge.

What's new with AWS?

Discover new AWS services, features, and Regions.

AWS Health info

Open issues: 0 Past 7 days

Scheduled changes: 0 Upcoming and past 7 days

Other notifications: 0 Past 7 days

Cost and usage info

Current month costs: \$0.00

Forecasted month end costs: -

Last month costs: \$0.00

Top costs for current month

No top cost breakdowns. Cost breakdowns show when you use services.

CloudShell Feedback Language © 2023, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Access the AWS Management Console or generate AWS CLI credentials as needed



**Event access code
please wait for your assignment 😊**

Left side of the room – facing the stage:

<https://bit.ly/aut301-left>

Right side of the room – facing the stage:

<https://bit.ly/aut301-right>

Hands-on VEW: Adaptive AUTOSAR and virtual targets

Hands-on VEW

ADAPTIVE AUTOSAR WORKBENCH AND VIRTUAL TARGETS

Summary

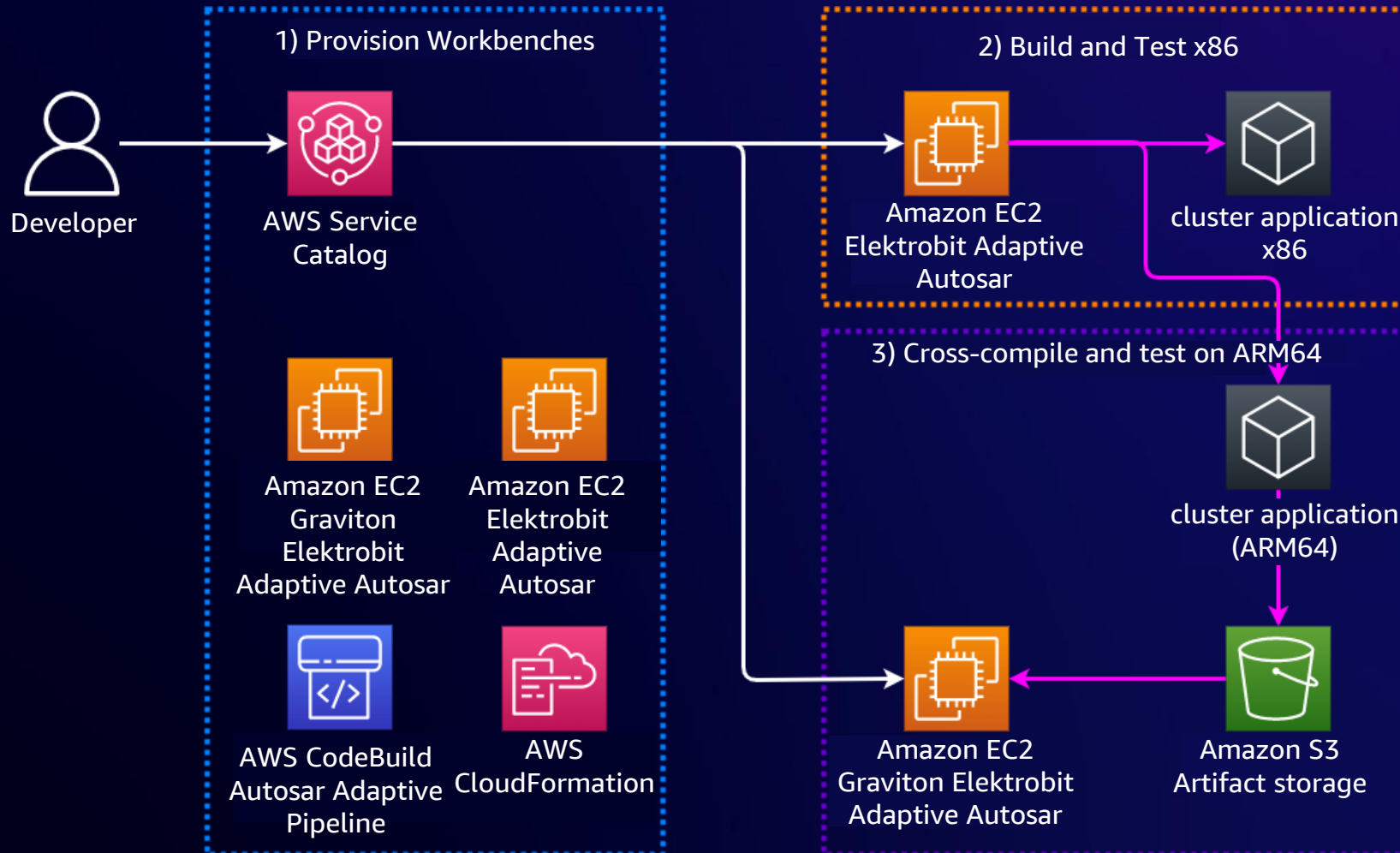
- Spin up two AMIs
- Create and build example application
- Cross-compile application for ARM64 architecture
- Run application on virtual target

Objectives for participants

- Provision and use **Elektrobit Adaptive AUTOSAR**
- Artifact exchange between environments using **Amazon S3**
- Integration of virtualized environments on **Amazon EC2 Graviton**

Hands-on VEW

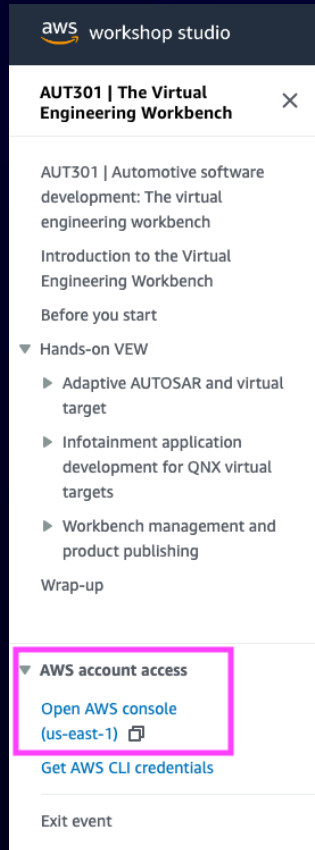
ADAPTIVE AUTOSAR WORKBENCH AND VIRTUAL TARGETS



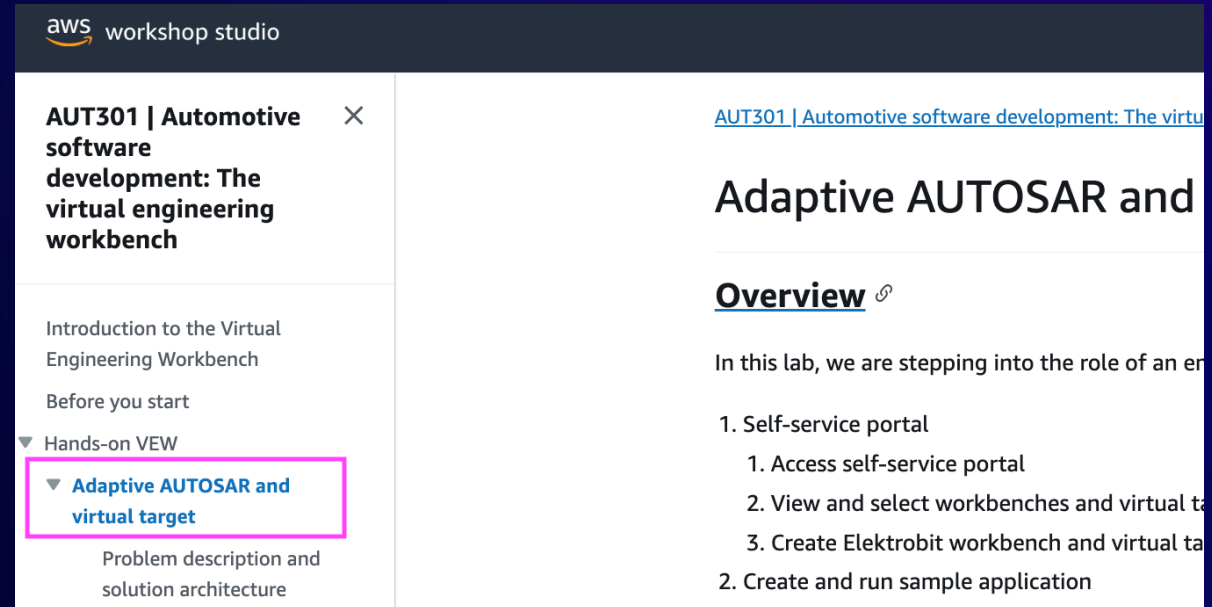
Hands-on VEW

HOW TO GET STARTED

1. Log in to the AWS console



2. Navigate to lab



Now go build!

Hands-on VEW: Infotainment application development for QNX virtual targets

Hands-on VEW

INFOTAINMENT APPLICATION DEVELOPMENT FOR QNX VIRTUAL TARGETS

Summary

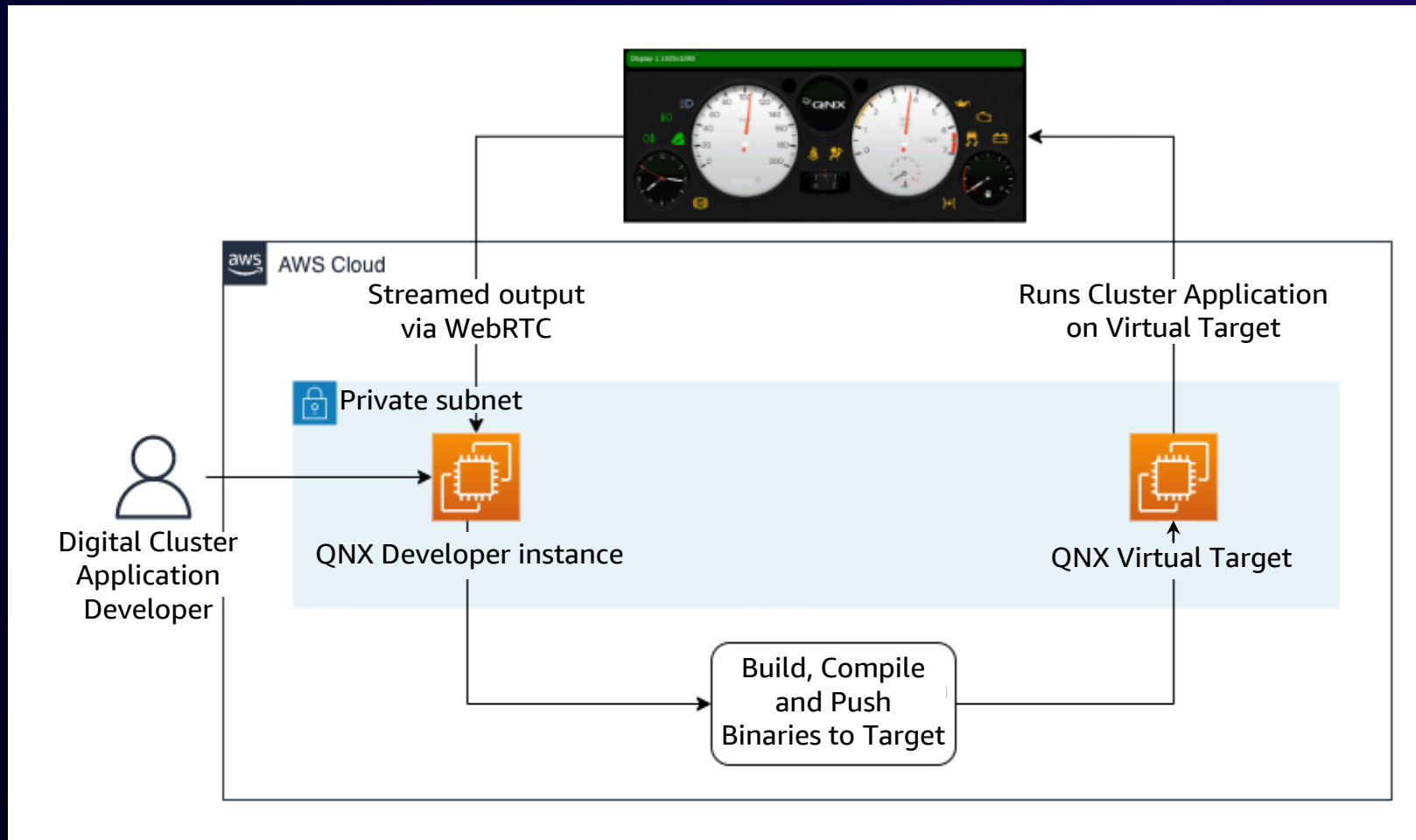
- Spin up QNX developer workbench
- Spin up QNX virtual target
- Run application on virtual target
- Modify and compile application
- Rerun and visualize on virtual target

Objectives for participants

- Provision and use **QNX Momentics IDE**
- Artifact exchange between environments using **Amazon S3**
- Integration of virtualized environments on **QNX RTOS**
- Get hands-on experience with development workflow

Hands-on VEW

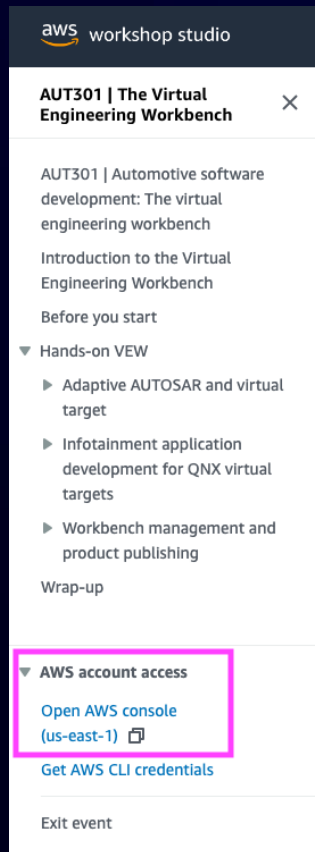
INFOTAINMENT APPLICATION DEVELOPMENT FOR QNX VIRTUAL TARGETS



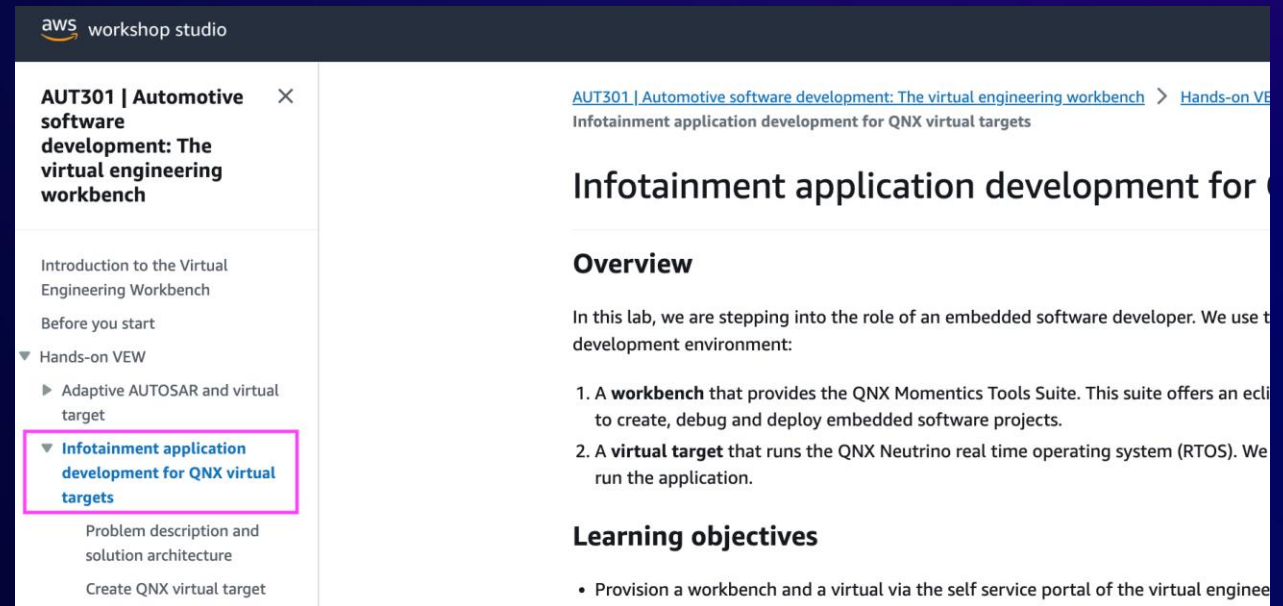
Hands-on VEW

HOW TO GET STARTED

1. Log in to the AWS console



2. Navigate to lab



Now go build!

Hands-on VEW: Workbench management and product publishing

Hands-on VEW

INFOTAINMENT APPLICATION DEVELOPMENT FOR QNX VIRTUAL TARGETS

Summary

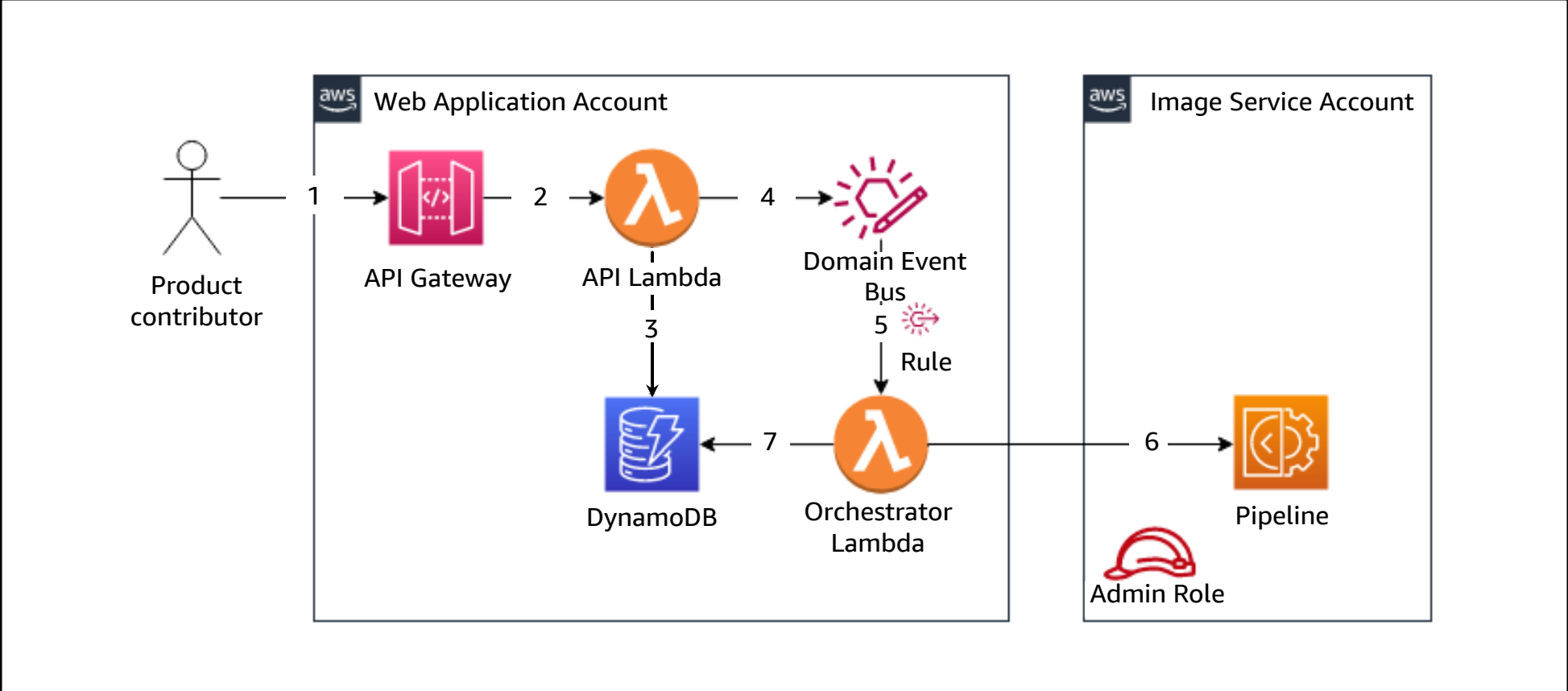
- Start Ubuntu workbench
- Identify connection options for workbench
- Update product with an improved AMI
- Instantiate updated AMI with a workbench
- Successful NICE DCV connection

Objectives for participants

- Learn **workbench product lifecycle**
- **Customization** of existing workbench product
- Share **new product version** with developers **in minutes**
- Get hands-on experience with **product contribution workflow**

Hands-on VEW

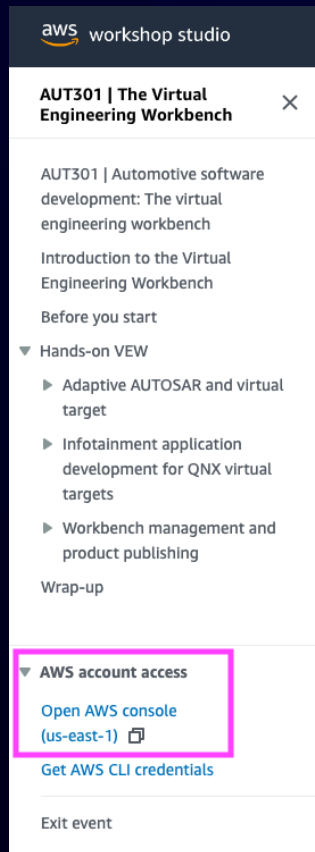
WORKBENCH MANAGEMENT AND PRODUCT PUBLISHING



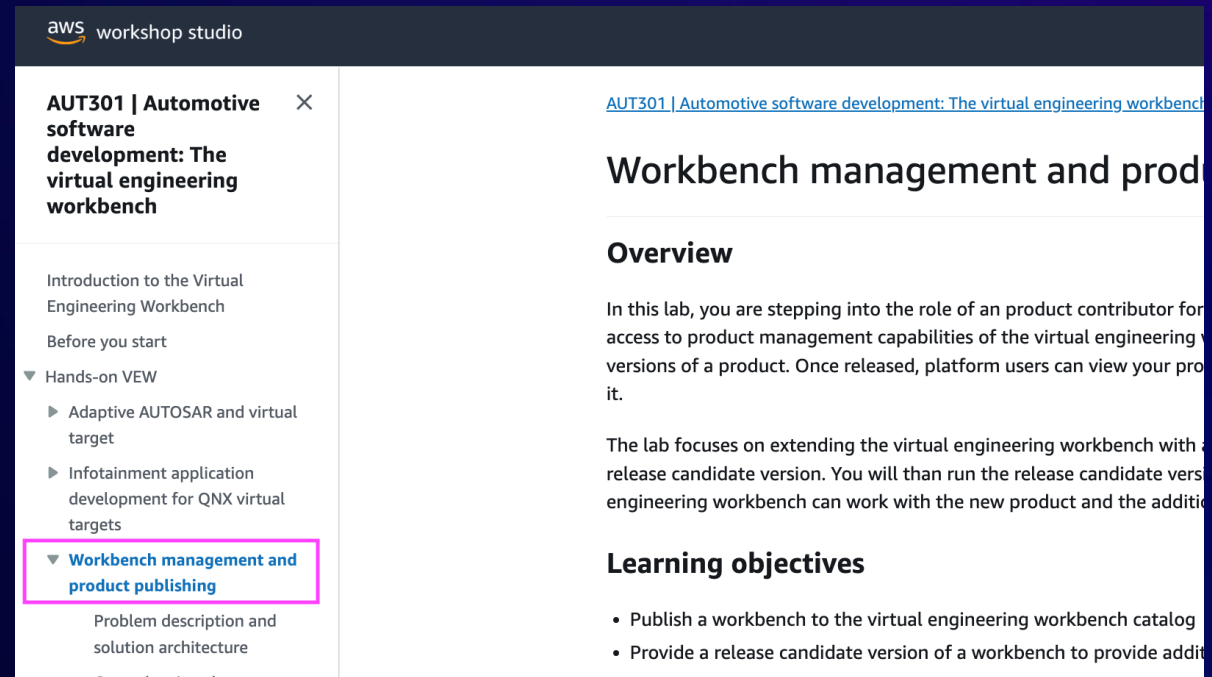
Hands-on VEW

HOW TO GET STARTED

1. Log in to the AWS console



2. Navigate to lab



Now go build!

Wrap-up



What did we achieve?

Lab 1

ECU SW developer



We built an Elektrobit Adaptive AUTOSAR application on AWS within the VEW and ran it on Amazon EC2 Graviton (ARM64) virtual target

Lab 2

Infotainment developer



Adjusted and ran a QNX-based instrument cluster application fully virtual on an Amazon EC2 Graviton (ARM64), simulating an infotainment developer user scenario

Lab 3

Platform contributor



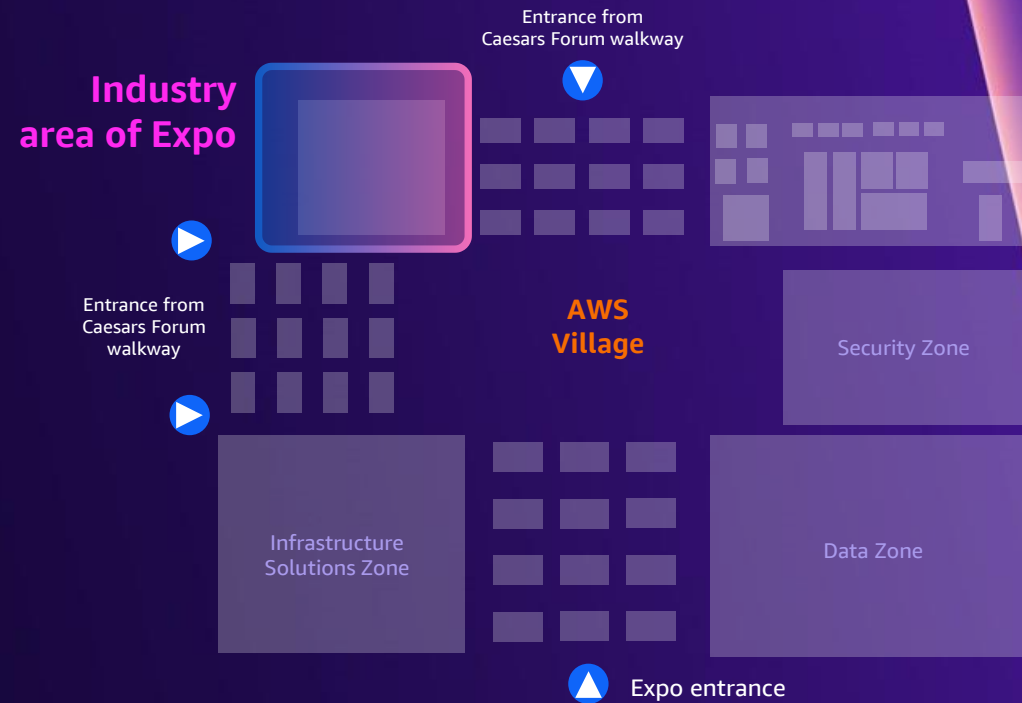
Built and published a new product to the VEW catalog so that others can use it for software development, showcasing long-term extension of VEW in your organization

References and learning

- For more info, visit AWS for Automotive Software-Defined Vehicle at: aws.amazon.com/automotive/software-defined-vehicle
 - Related blog: [User-centric design for VEW](#)
 - Related blog: [Developing an SDV platform with Continental](#)
- Interested in learning more? Reach out to your AWS account manager and ask about Virtual Engineering Workbench

Engage with our experts the Expo

- See how the AWS cloud-native **software developer Workbench** will help scale, and accelerate, vehicle software development in the SDV era
- Discover how to develop **highly automated driving** features in the cloud with AWS services for data ingest, data preprocessing, scene generation, scene search, and large scale resimulation
- Find out how AWS Connected Mobility Solutions 2.0 can help develop, deploy, and manage **connected mobility** infrastructure
- Learn how to harness and analyze vehicle data faster to help unlock substantial business value using AWS **vehicle data management** solutions
- Learn how AWS services are used by customers to help them build highly scalable, low-latency **OCP EV charging** CPO solutions
- From call centers to predictive maintenance, discover how generative AI is powering the **digital customer experience**
- Find out how AWS helps drive transparency and authenticity among stakeholders within a **battery circular economy**
- Optimize battery performance, extend battery life, and improve the efficiency of EVs using **battery digital twins**



Expo hours

Monday, November 27 (welcome reception)	4:00 PM – 7:00 PM
Tuesday, November 28	10:00 AM – 6:00 PM
Wednesday, November 29	10:00 AM – 6:00 PM
Thursday, November 30	10:00 AM – 4:00 PM

Thank you!



Please complete the session survey in the mobile app

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