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CASE STUDY

Digital Signage Content Management Platform for Public Transportation

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PROJECT OVERVIEW

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Luvina partnered with a leading Japanese transportation solution provider to develop a **centralized Digital Signage Content Management Platform** for public transportation systems, including trains, buses, stations, and waiting areas.

The platform enables **real-time, flexible, and centralized control** of content displayed on digital signage devices (such as schedules, routes, nearby location information, weather updates, news, and advertisements.)

Successfully deployed across Japan, the solution helps transportation operators **improve passenger experience** while **streamlining daily operations and content management** at scale.

Location: Japan
Industry: Transportation
Focus Area: Digital Signage Content Management
Duration: 09/2019 – Present
Project Size: 84 MM (3.5 MM – ODC)
Services: Product Development, System Maintenance
Key Technologies: Microservices, PostgreSQL, Java Spring Boot, Angular

PROJECT OVERVIEW

Client & Objectives

The client is a Japan-based company delivering advanced solutions for public transportation systems, including buses, railways, and energy management platforms.

As traditional audio announcements and static signage became insufficient for modern passenger needs, the client aimed to build a **centralized digital signage platform** capable of delivering **timely, accurate, and dynamic information** across multiple locations and devices.

The objective was to enhance passenger communication while improving operational efficiency through **automated and flexible content delivery**.

CHALLENGES

- Difficulty in **updating content across advertising devices in real time**, leading to outdated information being displayed
- **Inconsistencies between content previews and actual displays** due to different management and device platforms
- Limited flexibility in **designing dynamic layouts** for diverse signage devices and locations

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LUVINA'S SOLUTION

Luvina designed and implemented a **scalable, cloud-based digital signage management architecture** that enables seamless content updates and device control:

- Centralized content storage using **AWS S3**
- Device management and update orchestration via **AWS IoT**
- Automated content update jobs triggered immediately upon administrator changes
- Cross-platform synchronization leveraging Luvina's expertise in **Windows and Ubuntu environments**
- Flexible management interfaces allowing operators to:
  - Design display layouts using text, images, and video components
  - Register, update, merge, and manage multimedia content independently
  - Control and monitor content delivery during live operations

PROJECT OVERVIEW

Achievements

Centralized Content Management

Manage and update digital signage content across **trains, buses, stations, and waiting areas** from a single platform.

→ Faster updates
→ No outdated information on screens
→ Reduced manual operations

Operational & User Experience Improvement

Designed with operators and end users in mind, enabling intuitive content creation and management.

→ Higher productivity for operators
→ Better passenger information delivery
→ Clear differentiation from traditional signage systems

Enterprise-Grade Quality & Reliability

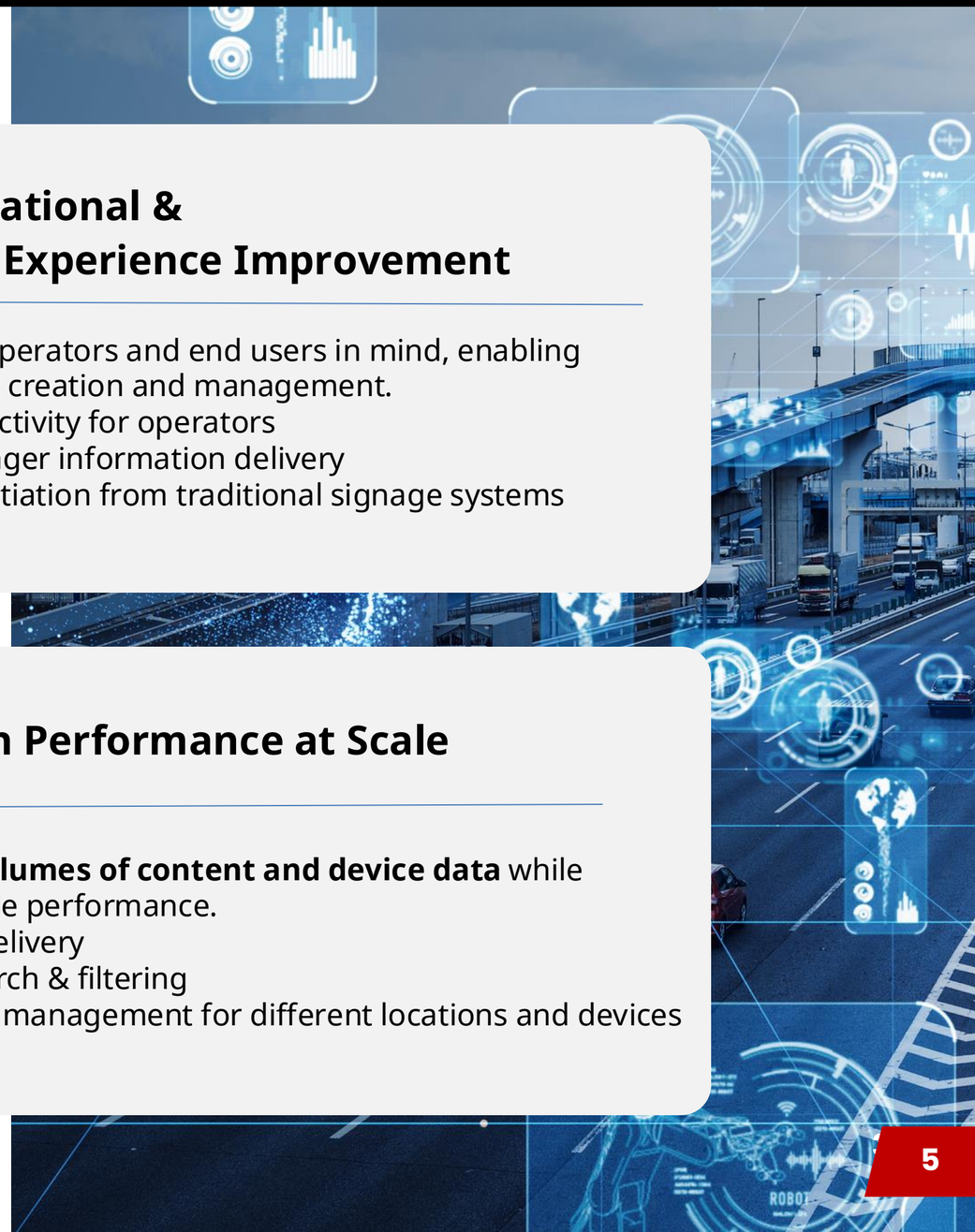
Developed under strict quality standards to ensure **stable, continuous operation** in mission-critical public transportation environments.

→ High system availability
→ Reduced operational risk
→ Consistent passenger experience

High Performance at Scale

Handles **large volumes of content and device data** while maintaining stable performance.

→ Fast content delivery
→ Optimized search & filtering
→ Flexible layout management for different locations and devices



PROJECT OVERVIEW

Achievements

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BEFORE

— Issues with using paper-based timetables.

- Difficulty in communicating delay or service suspension information.
- Poor display visibility.

— Labor shortages.

- The burden of replacing timetables.
- Handling operations in remote areas.

— Operational cost challenges.

- High costs of system deployment.
- Reduced advertising revenue.

AFTER

✓ Improve bus information with digital timetables.

- Ability to deliver real-time operational status.
- Eye-catching and vivid display design.

✓ Increase efficiency with cloud-based data.

- Advance delivery with calendar functionality.
- Easy handling during maintenance or repairs.

✓ Reduce costs with digital data and advertising.

- “Information” and “Advertising” combined into a single screen.
- Increase revenue by adding more advertising opportunities.

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FEATURES & USE CASES

USER NEEDS & PAIN POINTS

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Who Uses the System?	Public transport passengers	Transportation Company Staff	
		Managers	**Operational employees**
What Do They Need?	• View arrival times, routes, and stops • Access useful ads and public information • Receive emergency notifications	• Review and approve content quickly • Optimize costs for creating and updating display content	• Reduce paperwork and manual operations • Manage train and bus schedules efficiently • Update content remotely and in real time

	🖥️ **Content & Device Management**	🎨 **Display & Template Management**	📅 **Schedule Management**	🎬 **Content Creation**
Key Features	• Send data to devices and update displayed content remotely • Manage devices, displayed data, and emergency notifications	• Create display templates for devices • Preview displays based on templates and schedule data	• Create and manage train and bus schedules • Automatically reflect schedule updates on devices	Create and manage display content (images, videos)

Clear, timely information for passengers.
Efficient, low-cost operations for transportation providers.

TECHNICAL DETAILS - OVERVIEW

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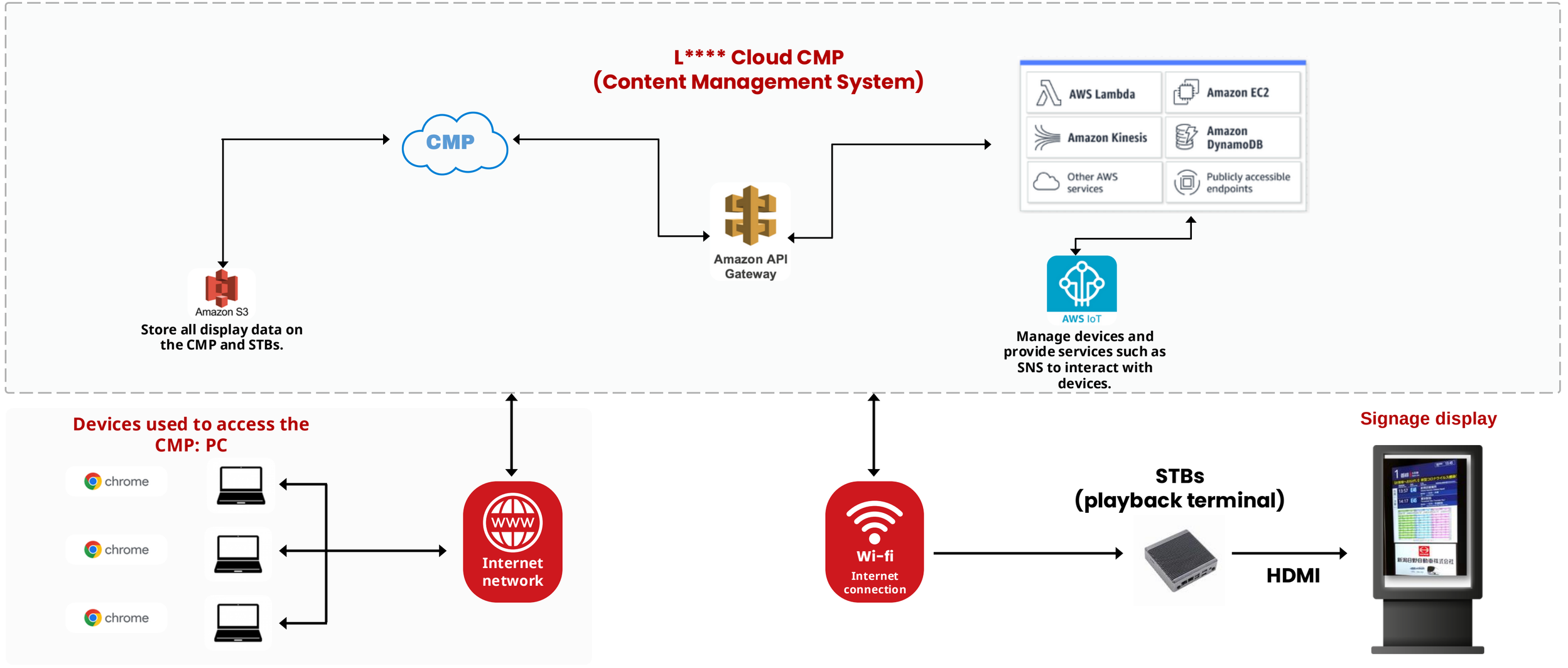

TECHNICAL DETAILS - TECHSTACKS

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Name	Description
AWS API GateWay	Route requests to Lambda functions
AWS S3	Store text, image, and video data
AWS EC2	○ Set up the system server where the core application code runs ○ Set up the PostgreSQL database server
Java Spring boost	Handle logic for accessing data from the database and S3
Angular	Handle the user interface
AWS Lambda	Python 3.11 code to process APIs that interact with devices and external systems

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PROJECT EXECUTION OVERVIEW

IMPLEMENTATION- TIMELINE

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[9,2020] - [4,2021] [System Development]	[5,2021] - [7,2022] [System Development]	[10,2022] – [2,2023] [System Maintenance]	[3,2023] – Nay [System Maintenance]
Build the system architecture: Microservices with Java Spring + Angular, API Gateway, Lambda, S3, AWS IoT. Develop base screens.	Develop screens based on SI requirements to support template creation, display data on devices, and push data to devices for the train station system.	Develop and maintain screens based on SI requirements to support creating display data on devices by region and route, pushing data to devices, and monitoring operations for the bus stop system.	Develop and maintain screens based on SI requirements to support ticket layout creation and a ticket sales system directly via advertising displays using QR codes.

IMPLEMENTATION TEAM STRUCTURE

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Project	What we do		Output	Duration	Resource
System Architecture Design (9/2020 – 4/2021)	◦Propose system architecture and operating costs for the customer ◦Build the architecture after finalizing the solution ◦Develop base screens	Product Development	◦System architecture documentation and processing flows of system components. Included operating costs for paid services. ◦Functions for login, authorization, device registration, template creation, and flexible management of video, image, text, and image content. ◦Management of all image and video data on AWS S3. ◦Management of remaining data on PostgreSQL.	8 months	1 Solution Architech 2 Developer 1 Tester
Develop UI screens based on SI requirements (5/2021 - 7/2022)	◦Develop screens based on SI requirements for end users who are railway operators	Product Development	◦Functions for creating templates and timetables, generating videos from images and videos, previewing templates on devices with timetable data, videos, text, and images dynamically. ◦Function to deliver data to devices. ◦Management of all image, video, and device-delivered data on AWS S3. ◦Management of remaining data on PostgreSQL.	14 months	2 Developer 1 Tester
Develop UI screens based on SI requirements (10/2022 - 2/2023)	◦Develop screens based on SI requirements for end users who are bus operators	System Maintenance	◦Functions for creating schedules, merging schedules, and monitoring actual operational data on devices.	5 months	2 Developer 1 Tester
Develop UI screens based on SI requirements 10/2022 – 2/2023	◦Develop screens based on SI requirements for end users who are travel ticket sellers	System Maintenance	◦Functions for creating ticket layouts, single tickets, and combo tickets; managing sold and unsold tickets; and exporting sales data.		2 Developer 1 Tester

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EXTRA POINTS

EXTRA PR POINTS - SECURITY

Architecture and programming languages

Mobilize a team of software development experts to design the initial system architecture and define the technology direction, including selecting appropriate programming languages and frameworks, in order to ensure the ability to address technical challenges and the complex requirements of the project.

Development

Leverage top developers in the selected programming languages, combined with detailed checklists and experience distilled from the company's internal knowledge base, to deliver the highest-quality product.

Testing

Equip the testing process with advertising devices that are commonly available on the market, ensuring maximum accuracy and compatibility during real-world deployment.

Devices

Equip the testing process with advertising devices commonly available on the market, ensuring maximum accuracy and compatibility during real-world deployment.

EXTRA PR POINTS – SECURITY

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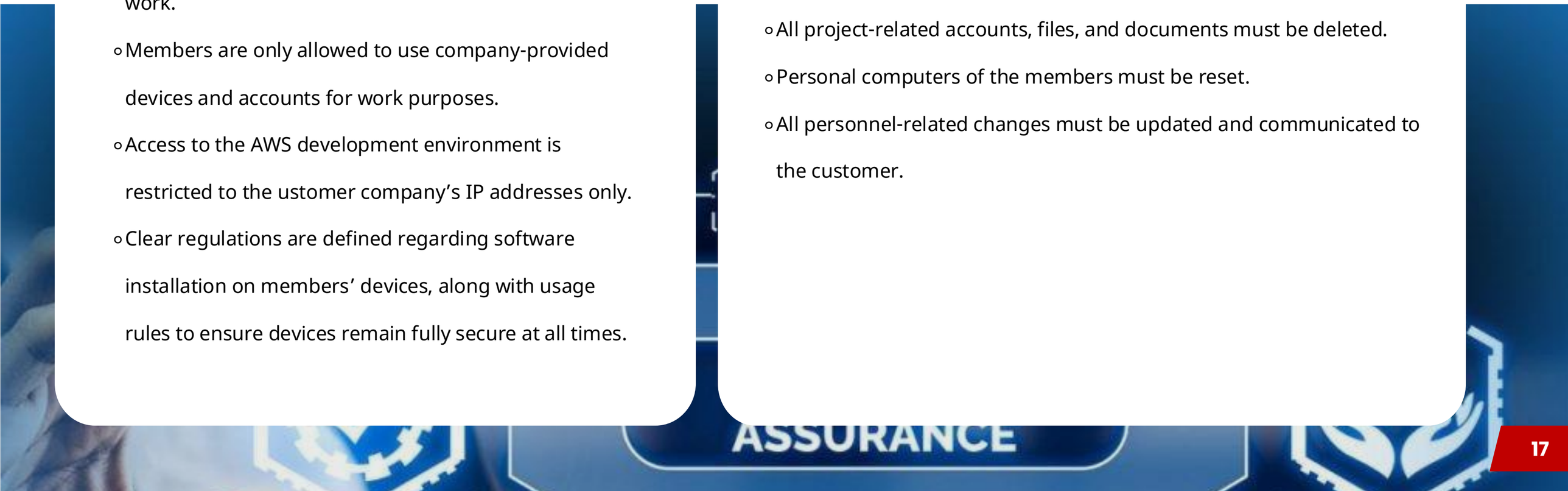
Strict security policies for project members

- Each memberis provided with a dedicated account, with permissions strictly limited to their assigned scope of work.
- Members are only allowed to use company-provided devices and accounts for work purposes.
- Access to the AWS development environment is restricted to the ustomer company’s IP addresses only.
- Clear regulations are defined regarding software installation on members’ devices, along with usage rules to ensure devices remain fully secure at all times.

Strict security policies for members leaving the project

- When a member leaves the project, all devices and accounts must be handed over to the project manager.
- All project-related accounts, files, and documents must be deleted.
- Personal computers of the members must be reset.
- All personnel-related changes must be updated and communicated to the customer.



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