LUVINA SOFTWARE

SELF POS

SEAMLESS CHECKOUT, NO CASHIERS – LUVINA SOFTWARE'S SOLUTION FOR RETAIL BUSINESSES

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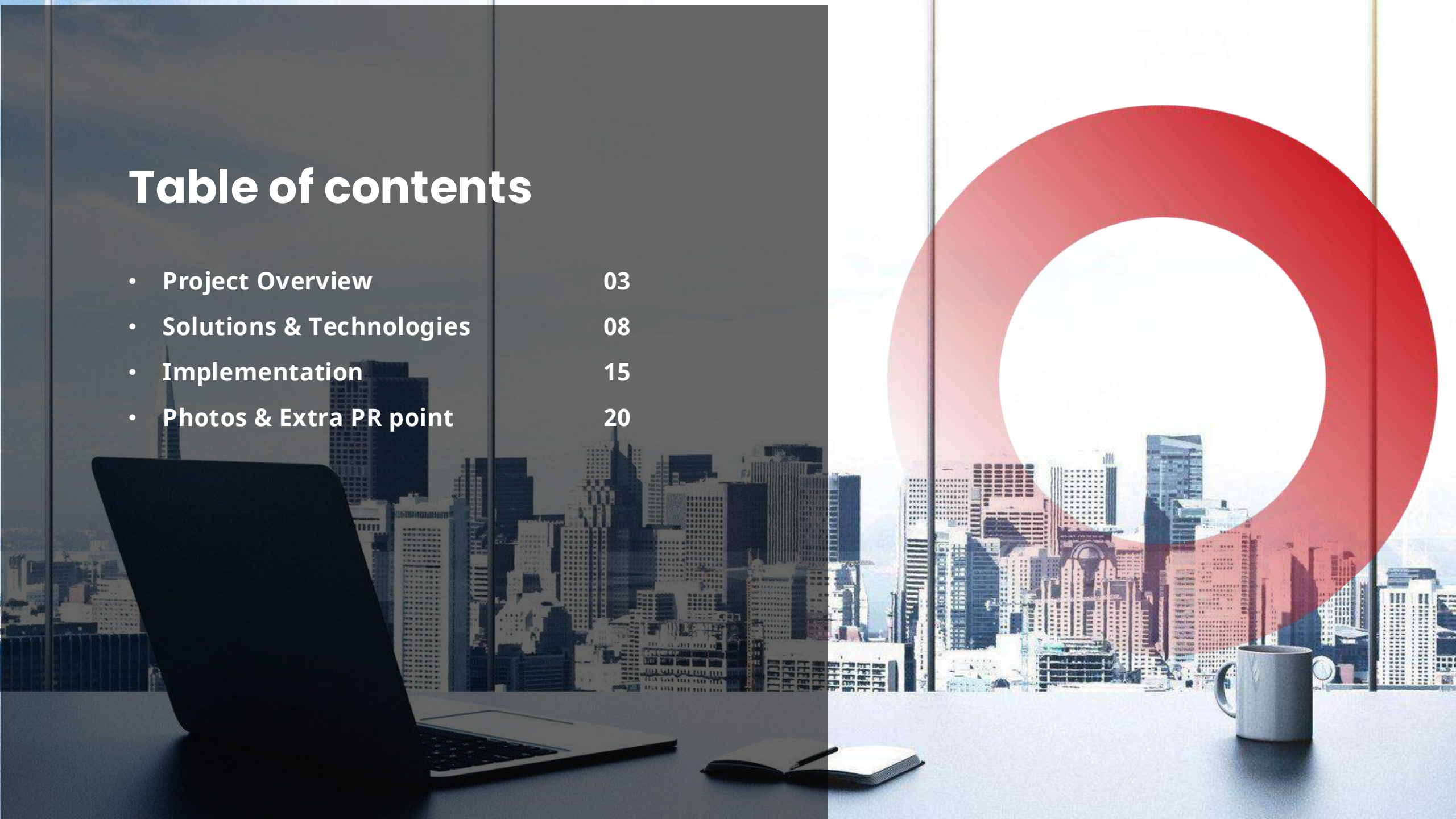

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PROJECT OVERVIEW

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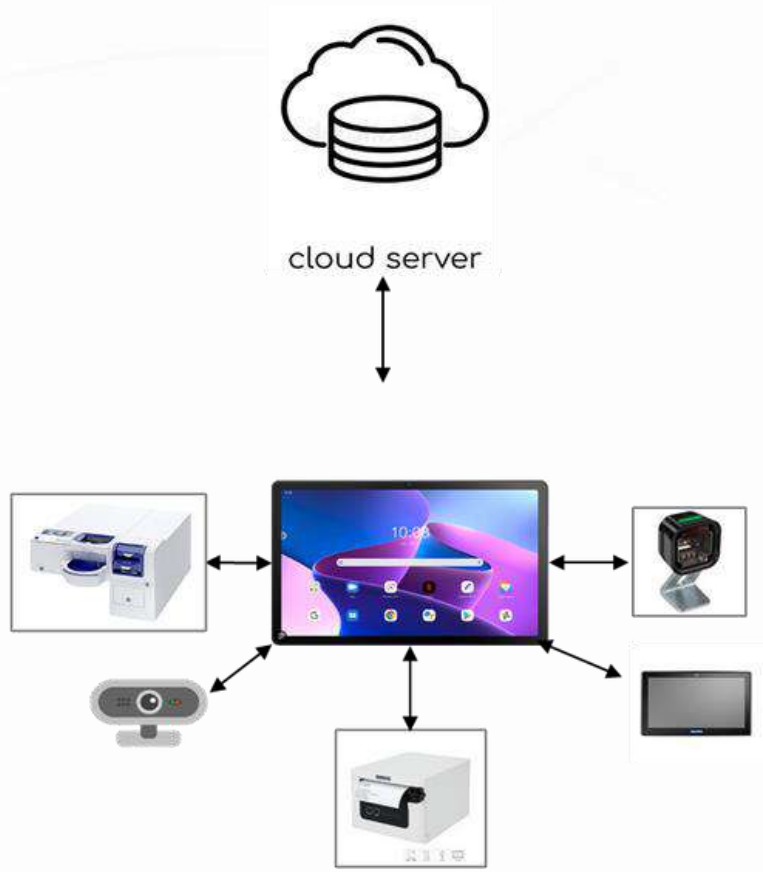
PROJECT OVERVIEW

Location: Japan
Industry: Supermarket
Duration: From January 2022 – Present
Size: 500 MM
Services:

- POS Android Development: from design to Go-Live
- POS Windows Development: from design to Go-Live
- POS Server Development: from design to Go-Live

Key Technologies: Scan&Go, RAD-380, ECS-777, Kotlin, C++, C#, React, Java SpringBoot, AWS

The customer is a member of one of Japan's leading retail groups. The **SELF POS** solution helps reduce the number of cashiers in supermarkets, while enabling consumers to enjoy a seamless shopping experience, from selecting products to making self-checkout payments at the POS terminal.



PROJECT OVERVIEW

OUR CUSTOMER AND GOALS

Context

Japan's population is rapidly aging, leading to a labor shortage in supermarkets. Retail chains are looking for technology solutions to reduce reliance on cashiers.

Challenges

With rising labor costs, a shrinking workforce, and growing customer demand for faster and smoother checkout experiences, synchronization across multiple vendors' systems has also become a major challenge.

Goals

The customer partnered with **Luvina** to research and develop a **Self-POS system** running on both Android and Windows platforms. The solution supports multiple payment methods, ensures seamless operations, and reduces costs and dependency on human resources.

Expected results

The successful pilot deployment of Self-POS in several supermarkets has proven its effectiveness in cutting labor costs, optimizing operations, and enhancing the shopping experience for customers.

PROJECT OVERVIEW

CUSTOMERS AND GOALS

- The end customer operates in the supermarket sector.
- Their key requirement is to reduce supermarket labor costs, thereby lowering overall company expenses.
- **Luvina's role** was to participate in the development of the **Self-POS system**, collaborating with several other SI companies and taking responsibility for the POS applications on both **Android and Windows platforms**.

CHALLENGES

- The cash recycling devices did not yet have compatible drivers for Android systems.
- Some ideas were implemented very slowly by the SI companies responsible for server development.
- The customer needed to deploy the system across multiple companies, but since each company had its own system, this led to a lack of synchronization and significant delays in handling changes.

LUVINA'S SOLUTIONS

The **Self-POS system** has been deployed in retail stores across Japan, enabling cashier-less checkout and running on both Android and Windows platforms.

It supports a wide range of payment methods:

- QR Code
- Credit Card
- Product Barcode (Scan Code)
- Cash
- Voucher
- Scan & Go
- Membership Card & Loyalty Points

The system is optimized for the Japanese market, where **accuracy, security, and speed** are top priorities in delivering a seamless user experience.

PROJECT OVERVIEW

Automatically calculating sales prices based on current policies (promotional pricing, member pricing, time-based pricing, etc.). With these functions, the system ensures that the checkout process is **flexible, accurate, and user-friendly**—well-suited to the practical needs of retail stores in Japan, where service quality and customer experience are held to the highest standards.

Supporting diverse payment operations – providing flexibility for a wide range of customers.
The system goes beyond simple scanning and basic payment functions, and is designed to handle the full spectrum of complex retail operations, including:

Applying multiple discount types:

- Direct discount
- Quantity-based discount
- Product group-based discount

Accepting vouchers/ coupons:

- Pre-printed vouchers or electronic codes
- Scannable and automatically deducted from the invoice

Membership Card Integration – Points Management & Usage:

- Automatic points accumulation after each transaction
- Support for adding points and redeeming points for payment
- Real-time points balance inquiry directly at the POS terminal

Hold Order (Temporary Order Suspension):

- Enables users to pause a transaction and resume later without any data loss
- Useful in cases where customers return to add more items or encounter payment errors

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SOLUTIONS & TECHNOLOGIES

SOLUTIONS – KEY FEATURES & OBJECTIVES

Key features	Objectives
Flexible Peripheral Device Connectivity (RS232/USB)	Optimizes operations, enabling easy integration and expansion of hardware devices based on store requirements.
Support for multiple payment methods (QR, card, cash, voucher, etc.)	Enhances customers experience, adapt to diverse payment habits, and reduce waiting time.
Automatic Price, Promotion, Voucher & Loyalty Points Application	Ensures accuracy in sales operations, improves the effectiveness of promotions and loyalty programs.
Membership Card Integration – Points Accumulation, Redemption & Management	Strengthen customer retention strategies and support personalized marketing.
Temporary Order Hold (Hold Order)	Provides flexibility for real-life checkout scenarios, reduces errors, and improves service efficiency.
User friendly UX UI design, optimized for Japanese and international customers	Speed up operations, reduce mistakes, and align with Japan's high retail standards.
Camera integration & Scan & Go monitoring	Increase system reliability, reduce fraud, and enhance product control.
Management system	A management system suitable for multi-company operations with user friendly interfaces
Compatible with customer's master data systems.	Allow reuse and conversion of customer data into new systems without disrupting business operation.

SOLUTIONS – KEY FEATURES

SOLUTIONS – KEY FEATURES

POS App – User definition and use case

Users		Needs
Store staff	*Staff at the counter*	*Process payments using multiple methods, adjust product prices based on specific days and more.*

KEY FEATURES

- Support for multiple payment methods (QR, card, cash, voucher, etc.)
- Automatic calculation of prices, promotions, voucher application & loyalty points
- Integration with **Scan & Go**
- Camera integration and monitoring of the Scan & Go process
- Hold Order functionality to temporarily save transactions

SOLUTIONS – KEY FEATURES

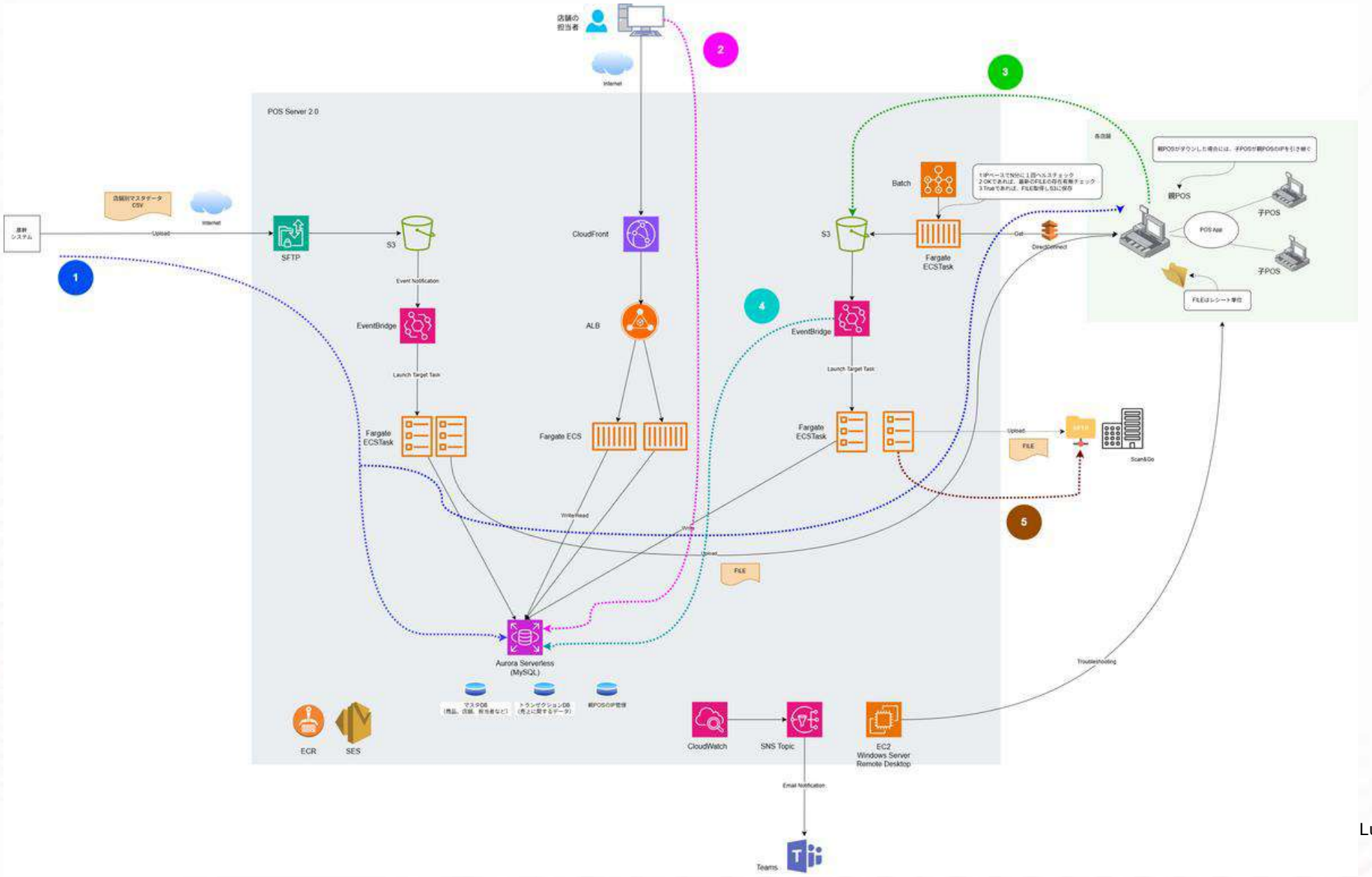
POS App – User definition and use case

Users			Needs
Management Group	System Admin / Headquarters	Highest-level authority – manage and decide system configurations	Decisions related to the system: POS terminals, stores, assets, etc.
Management Group	*Headquater*	Management rights over assigned stores	Similar to Admin but limited to store-level operations
Store user Group	*Store staff*	Authorized to perform fixed operational functions	• *Decide store-level pricing and promotions* • *View selected daily revenue reports*

KEY FEATURES

- **Price Management:** Decisions related to product pricing, discount programs, promotions, combos, etc.
- **Revenue Management:** Generating revenue reports and transaction history.
- **User Management:** Managing user lists and access permissions.
- **POS Management:** Configuring display settings, system configurations, and monitoring POS device status.
- **Master Data Synchronization:** Retrieving master data from the data center and distributing it to workstations.

TECHNICAL OVERVIEW



TECHNICAL OVERVIEW– TECH STACKS

Team	Name	Description	Version
POS Server	Spring Boot	Java framework for rapid application development	3.3.0
	Java	Program language	17
	Apache Tomcat	Lightweight, reliable web server and servlet container	10.1
	React Type script	Frontend web application framework.	18.3.1
	MySQL	SQL Database	8.0.36
	AWS	Services used: EC2, ECS, Lamda function, Step function, S3, CloudFront, CloudWatch, VPC, ALB, ...	
POS App	Kotlin, Java	Used in Android applications	
	C# (.NET)	Used in Windows applications	
	C	Used for peripheral device communication (USB/RS232)	
	C++	Used for peripheral device communication (USB/RS232)	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PROJECT
IMPLEMENTATION
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IMPLEMENTATION – PHASES

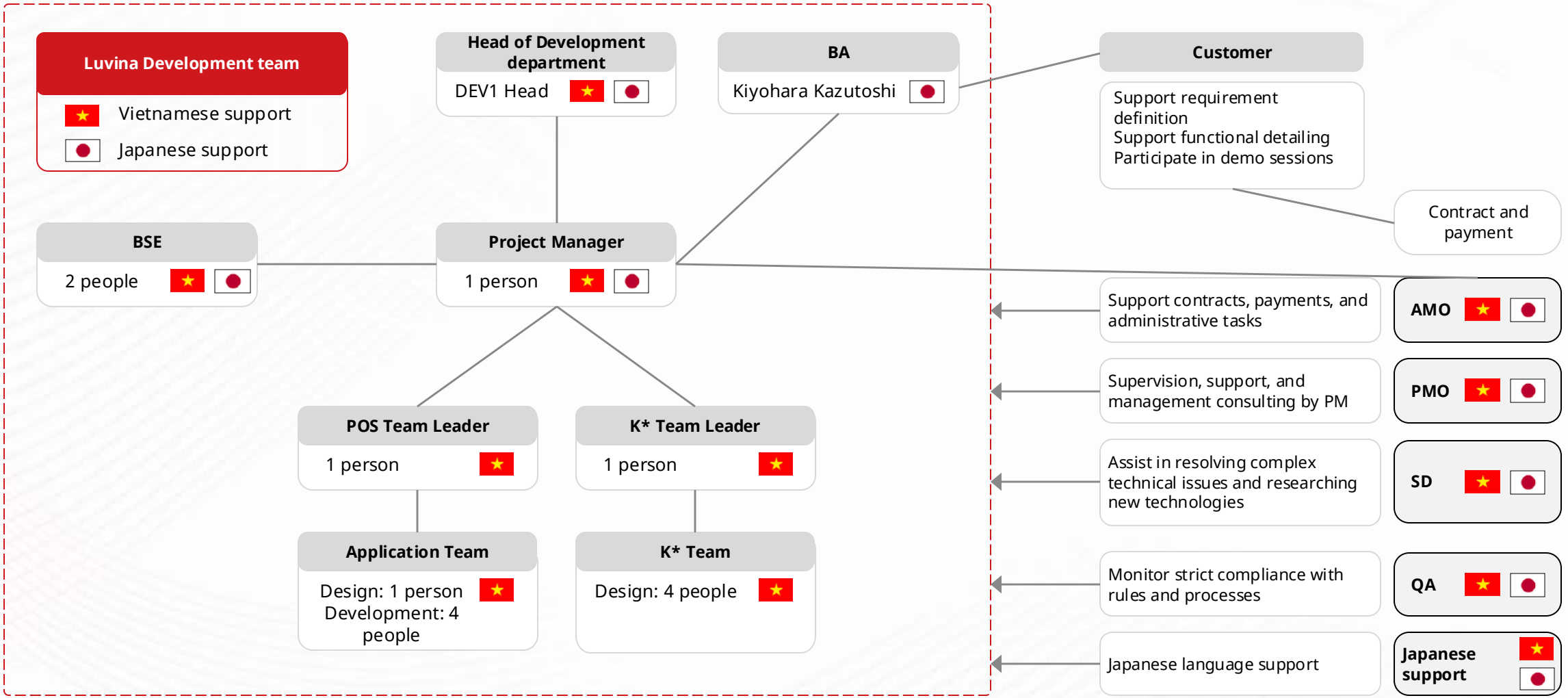
Project	Tasks	Results	Time	Resource (MM)
POS App	Phase 1: Requirement Definition	Develop designs, create POC	6 months 1/2022 - 6/2022	*14*
	Phase 2: Implementation for M*V**** company	Implement management functions for staff and payment functions for customers	*6* months *7/2022 – 12/2022*	*30*
	Phase 3: Expansion	Extend functions for M**V****company; develop new solutions for K*s*m* and M*r**t** company	*12* months *1/2023 – 12/2023*	*16*
	Phase 4: Multi-Platform Payments	Maintenance for M**V**** company Develop for POS-Windows Develop POS-Android application for top-up	*16* months *1/2024 – 4/2025*	*16*

IMPLEMENTATION – PHASES

Project	Tasks	Results	Timeline	Resources
POS Server	Requirement Definition	• Basic design document • Clarify requirements for each function and administrator management screen	*2 months* *5/2024 – 6/2024*	*4 SE* *1 BSE*
	Development of Management Function Group	• Web Application for Admin group: product management, pricing, transaction history, reporting • Document of basic design, details and DB • Source code • Test results	*8 months* *7/2024 – 2/2025*	*2 SE* *1 BSE* *9 DEV* *3 Tester*
	Development of Master Data Synchronization Function Group	• Batch system for synchronizing master data from data center • System for distributing master data to POS client machines • Detailed design documents • Source code • Test results	*4 months* *3/2025 – 6/2025*	*2 SE* *2 BSE* *17 DEV* *5 Tester* *2 DevOps*
	Development of Transaction Linkage Function Group	• Transaction data collection system • Design documents • Detailed design documents	*Ongoing* *6/2025 - present*	*1 SE* *2 BSE* *13 DEV* *2 Tester* *2 DevOps*

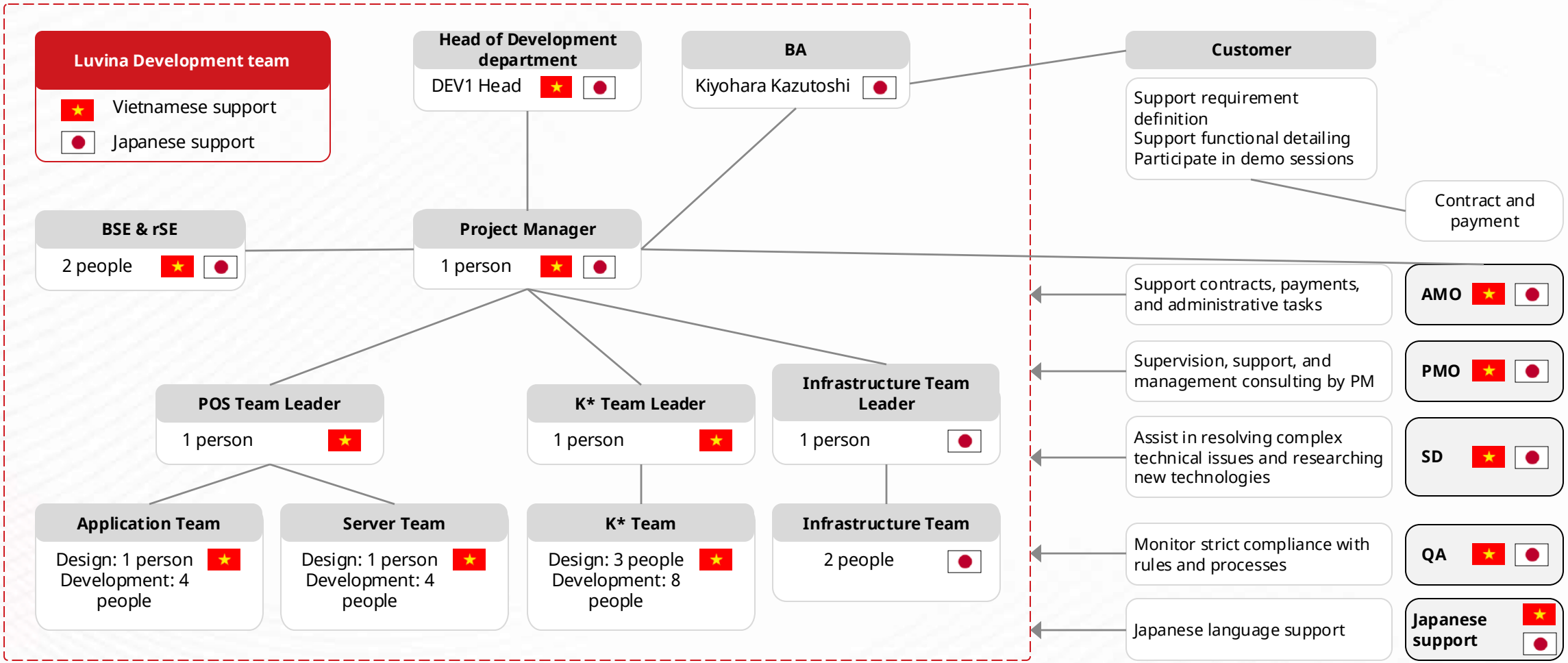
IMPLEMENTATION – TEAM STRUCTURE

POS Server – Requirements definition phrase



IMPLEMENTATION – TEAM STRUCTURE

POS Server - Requirements definition phase



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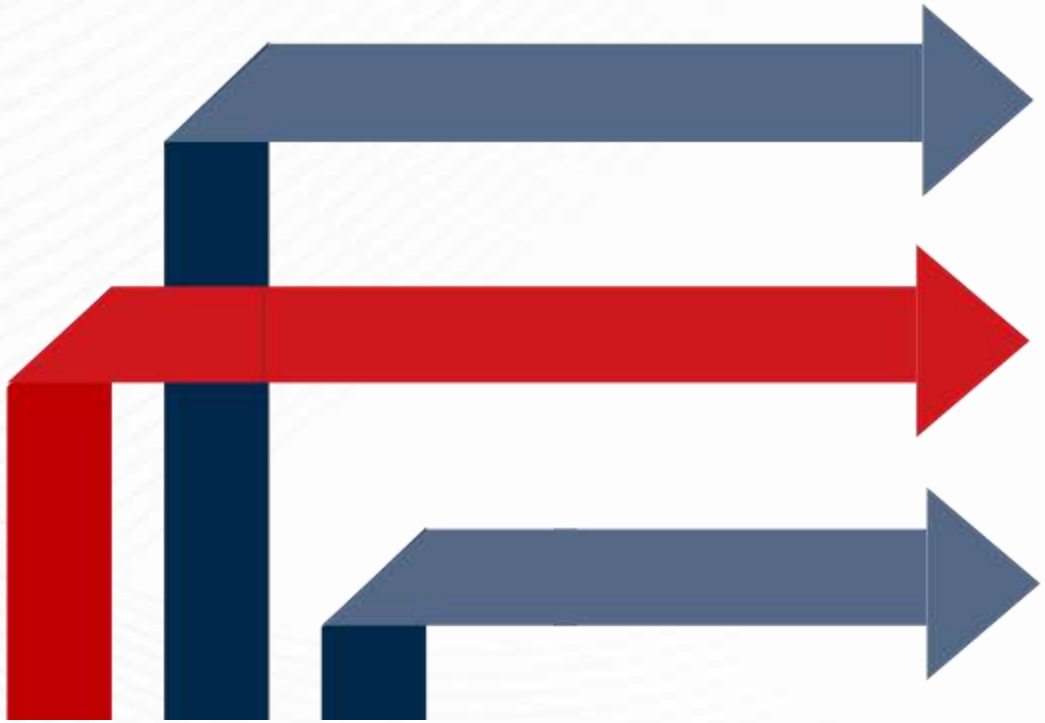
OTHER EXTRA POINTS

EXTRA POINTS
QUALITY ASSURANCE

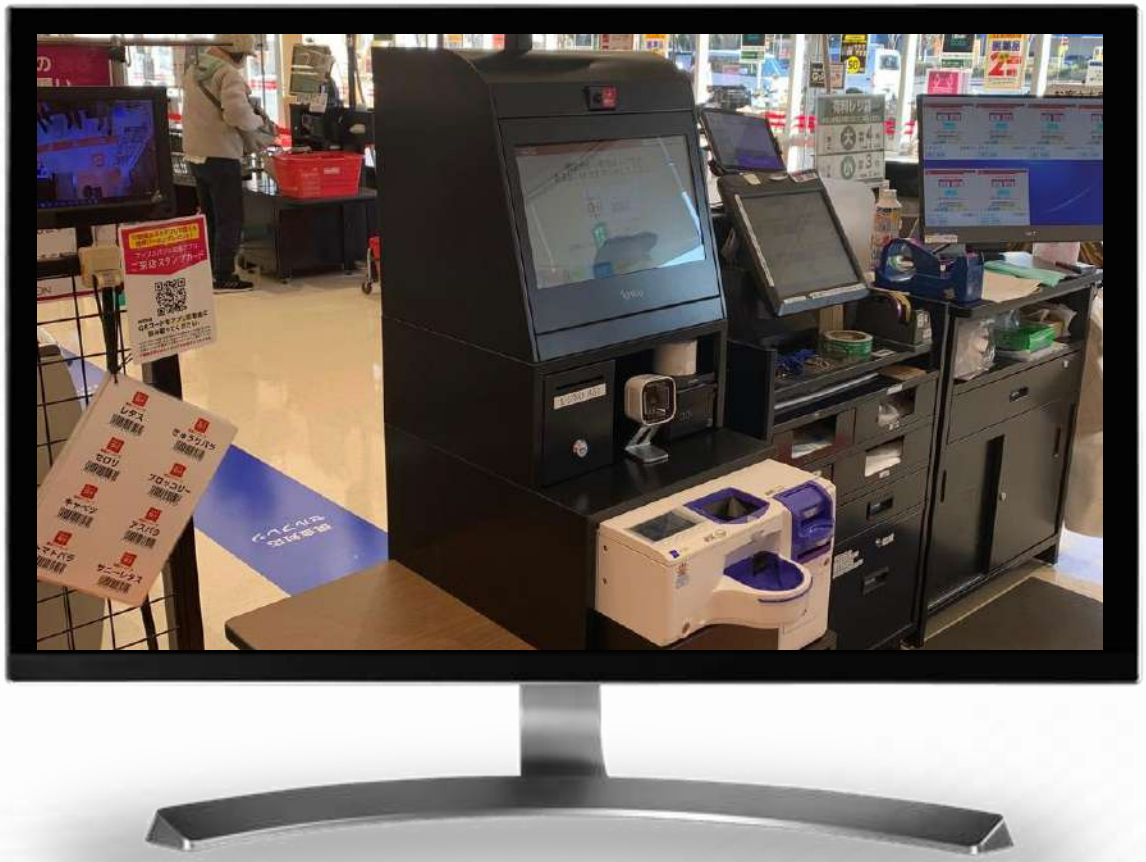


01 Applying **unit test coverage at C1 level – over 90%**

02 Implementing **organizational-level quality management under CMMI Level 3**

03 Adopting an **Agile development process** to continuously improve quality and productivity

POS IN REAL LIFE



POS IN REAL LIFE

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