![Luvina Software Logo]

OVER 10 YEARS
OF MAINTAINING THE GRANDIT ERP SYSTEM

PROJECT OVERVIEW

DESCRIPTION: GRANDIT is a Web-based ERP software tailored to meet the specific cultural and operational needs of Japanese enterprises.

COUNTRY: Japan

INDUSTRY: ERP

DURATION: 10/2012 ~ Present
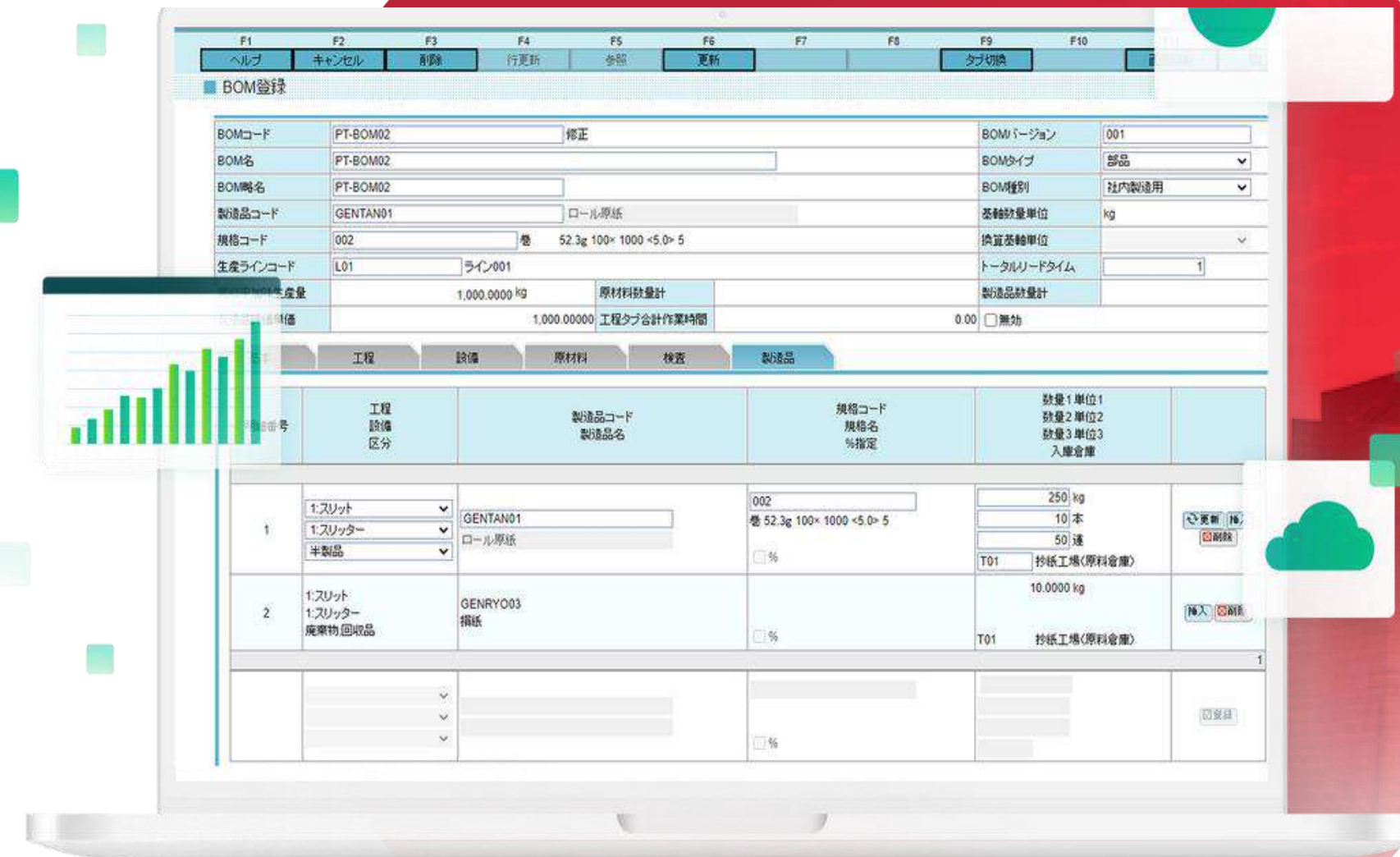
SCALE: 1900MM

PEAK PERIOD: 6/2023 ~ 9/2023, averaging 40MM

SERVICES:
- System maintenance
- Version upgrades (Database migration + UI updates)
- Migration (UI adjustments)
- New feature development
- Source code standardization

TECHNOLOGY:
- Framework: GRANDIT
- Backend: C# - SQL Server
- Frontend: Asp.Net

PROJECT OVERVIEW

OUR SERVICES

	Maintenance	Add-on development	Version-up	Migration	Source code standardized
Sale management	✅	✅	✅	✅	✅
Inventory management	✅	✅	✅	✅	✅
Accountant	✅	✅	✅	✅	✅
Production management	✅		✅	✅	
Workforce & payroll management			✅	✅	

PROJECT OVERVIEW

Service	Detail	Target customers
Maintenance	• Conducted in-depth investigations and implemented targeted solutions for end-user reported bugs in the GRANDIT system. • Performed comprehensive analysis and optimization to address processing delays, significantly improving system responsiveness based on client feedback. • Developed and integrated select additional features to align with specific end-user requirements and enhance system functionality.	Enterprises using GRANDIT
Add-on development	• Designed and implemented customizations of standard features or added new add-on functionalities to meet the client's specific business needs. • At Luvina, our development process typically includes detailed design, coding, and Unit Testing (involving test case creation, testing, and evidence gathering) to ensure robust and reliable solutions.	Enterprises need customizations or additional add-on features of GRANDIT
Version-up	• Due to the phasing out of Internet Explorer, GRANDIT has updated to Version 3, now supporting multiple browsers (whereas versions 2 and earlier were IE-only). • Tasks list: ▪ **Data Migration**: Transferring data from the legacy system to the new system. ▪ **Source Code Merge**: Integrating customized and add-on features from the old version into the new version. ▪ **UI Adjustments**: Modifying the UI according to GRANDIT's multi-browser compatibility guidelines for any customized and add-on areas after merging. ▪ **Quality Assurance**: Conducting simplified testing, aligned with predefined customer requirements, to ensure quality and functionality across supported browsers.	Enterprises using GRANDIT

PROJECT OVERVIEW

Service	Detail	Target customers
Migration	• With the end of Internet Explorer support, GRANDIT introduced Version 3 to enable multi-browser functionality (whereas earlier versions were limited to IE). However, some companies may prefer not to undertake a costly full version upgrade and instead request modifications to make their existing system browser-compatible. • Tasks list: ▪ **UI Modifications**: Adjusting the user interface for the entire system or select user functions according to GRANDIT's cross-browser compatibility guidelines. ▪ **Quality Assurance**: Performing streamlined testing based on agreed customer requirements to ensure reliable functionality and consistent quality across supported browsers.	Budget-conscious GRANDIT users who need compatibility for Edge and Chrome without a full version upgrade.
Source code standardized	• When developing new systems, many companies directly add customized or addon source code into the standard GRANDIT source, complicating source code management. • Tasks list: ▪ **Separate the current source code** into two versions: one for the standard GRANDIT source and another for customized/addon files. ▪ **Conduct NUnit testing** to ensure functionality and maintain original logic post-separation.	**Target Customers**: Large companies and corporations using GRANDIT that require structured source code management.

PROJECT OVERVIEW – MILESTONES

2023
Increase expansion & complexity

Main tasks:
+ Solved about 100 maintenance tickets.
+ Modified invoice edition and UT testing for about 20 users.
+ Version up system to version 3.2 for 2 users.
+ Code standardization and NUnit testing for big user.
Team size: 30 people
Scale: 370MM in total

2018
First version-up project

Main tasks: Merging source from Version 1.6 to Version 3.0 and performing UI adjustments.
Team size: 15 people
Scale: 64MM

2015
First large-scale development project (>20MM)

Main tasks: Develop new features for users
Team size: 8 people
Scale: 22MM

2013
First new feature development

Main tasks: Develop new features for users
Team size: 4 people
Scale: 6MM

10/2012
Start the project

Main tasks:
Investigation and bug fixes
Team size: 3 people

01

MAINTENANCE SERVICE

01. **MAINTENANCE** SERVICE – OVERVIEW

ABOUT CUSTOMER AND OBJECTIVES

- During the use of the ERP GRANDIT system, end users may encounter business logic errors. Additionally, there may be a need to add features to meet new business requirements.

- Furthermore, after a period of use, as the volume of data increases, the system may experience slow processing speeds and reduced efficiency, requiring improvement.

CHALLENGES

End users typically do not have an IT team, or their IT team may lack the experience and technical expertise to handle emerging errors or modify existing functionalities.

LUVINA'S SOLUTIONS

Provide personnel with technical experience as well as an understanding of the ERP-GRANDIT system's business processes, capable of handling complex technical tasks such as tuning SQL to improve performance or addressing requests that require a deep understanding of the system's business logic.

01. MAINTENANCE SERVICE – OVERVIEW

ACHIEVEMENT

Investigation and detection of potential errors in standards

Conduct investigations and detect standard errors during system upgrades, tax changes, and report them to GRANDIT.
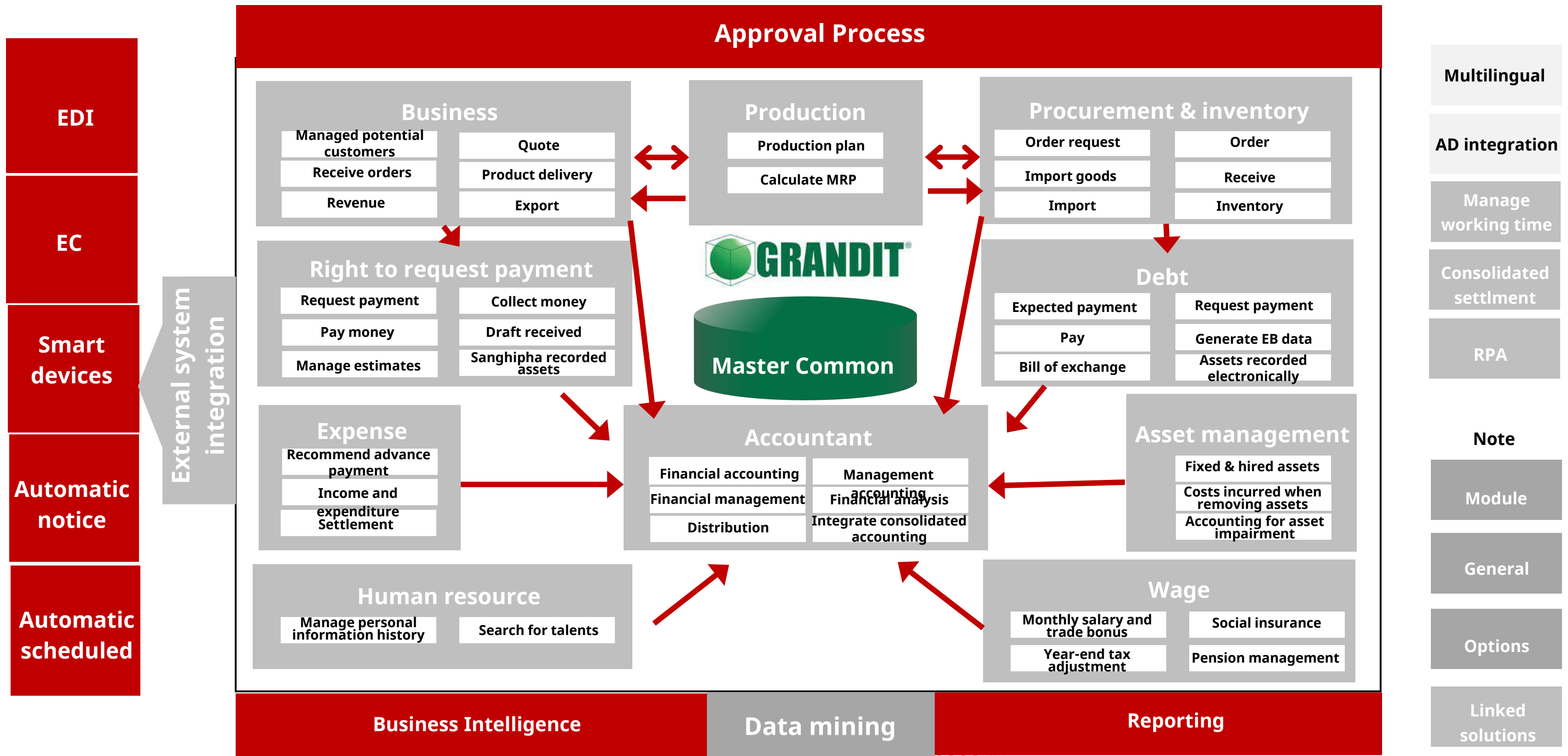
External system integration

- Successfully investigate and resolve integration issues with external systems like Paples.

- Customize the system to enable the use of its functions on mobile web platforms.

Performance improvement

- Improve the time for generating payment request forms for BO* customers from over 3 hours to under 10 seconds.

- Make adjustments so that TM* customers can generate payment request forms for over 100 processes simultaneously within 5 minutes, a task that previously took nearly 2 hours.

Approval Process

Business
- Managed potential customers
- Receive orders
- Revenue
- Quote
- Product delivery
- Export

Production
- Production plan
- Calculate MRP

Procurement & inventory
- Order request
- Import goods
- Import
- Order
- Receive
- Inventory

Right to request payment
- Request payment
- Pay money
- Manage estimates
- Collect money
- Draft received
- Sanghipha recorded assets

GRANDIT

Master Common

Debt
- Expected payment
- Pay
- Bill of exchange
- Request payment
- Generate EB data
- Assets recorded electronically

Expense
- Recommend advance payment
- Income and expenditure Settlement

Accountant
- Financial accounting
- Financial management
- Distribution
- Management accounting
- Financial analysis
- Integrate consolidated accounting

Asset management
- Fixed & hired assets
- Costs incurred when removing assets
- Accounting for asset impairment

Human resource
- Manage personal information history
- Search for talents

Wage
- Monthly salary and trade bonus
- Year-end tax adjustment
- Social insurance
- Pension management

Business Intelligence

Data mining

Reporting

External system integration

- EDI
- EC
- Smart devices
- Automatic notice
- Automatic scheduled

- Multilingual
- AD integration
- Manage working time
- Consolidated settlment
- RPA

Note

- Module
- General
- Options
- Linked solutions

10

01. MAINTENANCE SERVICE – HIGHLIGHT FEATURES

Modules	Investigated & developed features
Master Common	Workflow, Preset Exchange Rates, EDI, General Data Export, Trading Partners, Customers, Suppliers, Credit Lines,…
Sale	Quotation Management, Order Management, Delivery, Revenue, Sales Closing, Payment Request, Payment Schedule, Debt Collection, Invoice Received,…
Procurement & inventory	Adjustment Reason, Inventory Allocation, Warehouse Move, Inventory Adjustment, Inventory Lookup, Order, Import, Purchase, Payment Request, Payment Schedule, Payment, Payment Invoice,…
Accountant	Automatically send journal entries, Enter journal entries, Directive to post journal entries, Register account categories, Process monthly closing, Directive to reverse journal entries, Directive to export journal entries, General ledger,…
Production	Production Plan, Production Order, Production Report,…

01. MAINTENANCE SERVICE – TOP USERS

Domains
Providing IT services for schools, hospitals, etc.
Selling LED products, electronic products
Production and trading of mechanical parts and electrical tools
Textile products manufacturing
Development, production and trading of communication equipment, environmental and energy related equipment

01. MAINTENANCE SERVICE – TECHSTACKS

NAME	Description	Version	Licenses
OS	Windows Server	2008 ~ 2022	
C#-Asp.Net			
SQL Server	SQL Database	2008~2022	
Active Report	Design Report	Version 3, 6, 9, 14	Mescius
SSRS (SQL Server Reporting Services)	Create reports about data	2012 ~ 2019	

02 DEVELOPMENT SERVICE

02. **DEVELOPMENT** SERVICE – OVERVIEW

ABOUT CUSTOMER AND OBJECTIVES

- For each end user, to meet the operational needs of the business as well as the specific business requirements of each industry or sector, in addition to using the system's standard features, there is always a need for customization or the addition of addon features.

- To meet the specific business needs of the end user, it may sometimes be necessary to explore and integrate technologies that are not part of the system's core.

CHALLENGES

- End users typically do not have a development team with enough experience to implement and develop additional features.
- The understanding of ERP-GRANDIT system standards is not deep enough to develop features that integrate into the standard system.
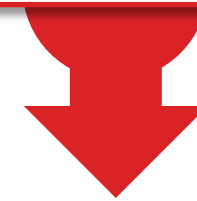
LUVINA'S SOLUTIONS

- Assign a member with experience working as a BA to meet with the customer, gather their requirements, and create a definition of the requirements, building functional requirements that can integrate with the standard ERP-GRANDIT system.
- Assign personnel who understand the business processes of the ERP-GRANDIT system and have experience in tasks ranging from design to UT testing and IT to carry out development.

02. **DEVELOPMENT** SERVICE – OVERVIEW

ACHIEVEMENT

Develop many new features to meet the needs of various businesses.

- Develop a transaction feature for users to allow the creation of 4 forms (Order, Purchase Order, Purchase, Sales) on the same screen simultaneously.
- Develop the Quotation and Request for Quotation (RFQ) features for JPC users to allow supplier selection based on various business criteria.
- Develop an additional feature for creating supplementary costs for multiple Purchase forms to minimize the time spent on creating supplementary costs when purchasing goods from overseas.

Use technologies outside of the standard technology to develop new features.

- Use SVF to develop report features (Invoice forms, Profit forms, etc.) for KBK users.
- Use EDI XML Translator to convert data from XML to CSV and perform import into the system.

02. **DEVELOPMENT** SERVICE – KEY FEATURES

Module	Investigated & developed features
Master Common	Search for supplier responsible person, Search for customer responsible person, Enter credit request data, Automatic classification (assets & liabilities), Create automatic classification data (assets), Create automatic classification data (liabilities),...
Sale	List of Request for Quotation (RFQ) data, Register RFQ data, Register customs clearance, shipment, purchase data, Delivery list,...
Procurement & inventory	Search inventory status by warehouse, Register supplier conversion master, Detailed inventory information, List of warehouse transfer requests,...
Accountant	AA label and delivery slip, Register anticipated receivables, Create EB (international) data, Enter EB money transfer data, EB money transfer checklist,...

02. DEVELOPMENT SERVICE – TOP USERS

DOMAIN
Provide services and products in various fields, including: lifestyle, information solutions, food, agriculture, forestry products, chemicals, metals, energy, electricity, infrastructure projects, aviation, maritime, finance, leasing, real estate, construction machinery, industrial machinery, mobile, next-generation business development, next-generation company development, and other areas. In addition to import and export activities (including international transactions), the company is also involved in service activities, domestic and international business investments, as well as resource development.
Carry out manufacturing, import, export, and distribution activities for various industrial chemicals and related products such as chemicals, cleaning materials, synthetic plastics, electronic materials, minerals, and industrial materials.
Engage in the domestic trading and import/export of raw materials, products, and items related to synthetic plastics; buying, selling, leasing, and managing logistics-related materials such as pallets, containers, shelves, and equipment; and trading supplies and goods domestically for retailers such as convenience stores.

02. **DEVELOPMENT** SERVICE – TOP USERS

Domain	Key features	Timeline	Total headcount
Import and export business of chemical products, industrial materials,...	Register exchange rate for international money transfers, Request for international money transfer, Enter EB money transfer data, etc.	4/2016 ~ 8/2016	26MM
Foreign trade, manufacturing, and repair of electrical machinery and equipment related to aviation, shipping, automobiles, and railways.	Register RFQ data, Register INQUIRY data, Register customs clearance/shipment/purchase data, Process creation of EDI quotation information for aircraft, etc.	12/2020 ~ 4/2021	36.2MM
Business of construction materials	Receive and enter credit limit master data, Receive and enter accounting account master data, Create and send payment data, Create and send payment request data.	07/2021 ~ 11/2021	24MM
Business of chemical products	Create payment forecast, Closing date invoice, Payment notification, Enter classification data file, Automatically deduct foreign currency asset receipt.	03/2022 ~ 9/2022	34.5MM
Business, import and export domestically of raw materials, products, and items related to synthetic plastics; buying, selling, leasing, and managing logistics-related materials such as pallets, containers, shelves, and equipment.	General storage - Paples (accounting finalization book), Accounting - BI_Send accounting closure data, Accounting - BI_Send classification details, Accounting account summary table, Sub-account summary table.	10/2023 ~ 03/2024	10.5MM

02. DEVELOPMENT SERVICE – TECHSTACK

NAME	Description	Version	Licenses
OS	Windows Server	2008 ~ 2022	
C#-Asp.Net			
SQL Server	SQL Database	2008~2022	
Active Report	Design Report	Version 3, 6, 9, 14	Mescius
SSRS (SQL Server Reporting Services)	Create reports about data	2012 ~ 2019	

02. DEVELOPMENT SERVICE – TIMELINE

	10/2021 – 11/2021 **Merge source of the old system**	12/2021 – 4/2022 **Develop additional features**	4/2022 – 10/2022 Handle CR
Phase 1	Merge source of the old system and test		
Phase 2		Execute development: Detailed design, code, FT testing	Handle Change Require

02. DEVELOPMENT SERVICE – PHASES

Phase	Project	What we do		Output	Duration	Resource
1	Merge source of the old system 10/2021 ~ 11/2021	Product Development	Merger source customize of old version to source version 3.1.0 STD	Merge & Function Test	2 month	
2	Develop additional features 12/2021 – 04/2022	Detailed design	Design detailed new functions.	Detailed design documentation.	1 month	4 DEV
		Product Development	Develop new features.	Develop & Function Test	4 month	1 PM 8 DEV
			Customize the standard features of the system.			
	Handle Change Request 5/2022 – 10/2022	Handle Change Request	Process changes and add small features to previously developed screens.	Develop & Function Test	6 month	1 PM 4 DEV

03

VERSION UP
SERVICE

03 . **VERSIONUP** SERVICE – OVERVIEW

ABOUT CUSTOMER AND OBJECTIVES

- Due to the discontinuation of the Internet Explorer browser, GRANDIT has upgraded to a new version to ensure the program can be used on multiple browsers.

- Companies using GRANDIT version 1 and version 2 will need to upgrade to the latest version if they wish to continue receiving support from GRANDIT.

CHALLENGES

- End users typically do not have a development team with sufficient experience to implement the upgrade according to the rules provided by GRANDIT.

- In addition to upgrading the source code according to the provided rules, there are no guidelines for handling the database migration.

LUVINA'S SOLUTIONS

Assign experienced members to study the rules provided by GRANDIT and organize them into categories to make the upgrade process easier and more accurate.

03 . VERSIONUP SERVICE – OVERVIEW

Successfully created the DB migration tool.

Successfully developed a DB migration tool that ensures data accuracy and integrity.

Based on the provided UI modification guide, the tool was created to identify the positions for editing.
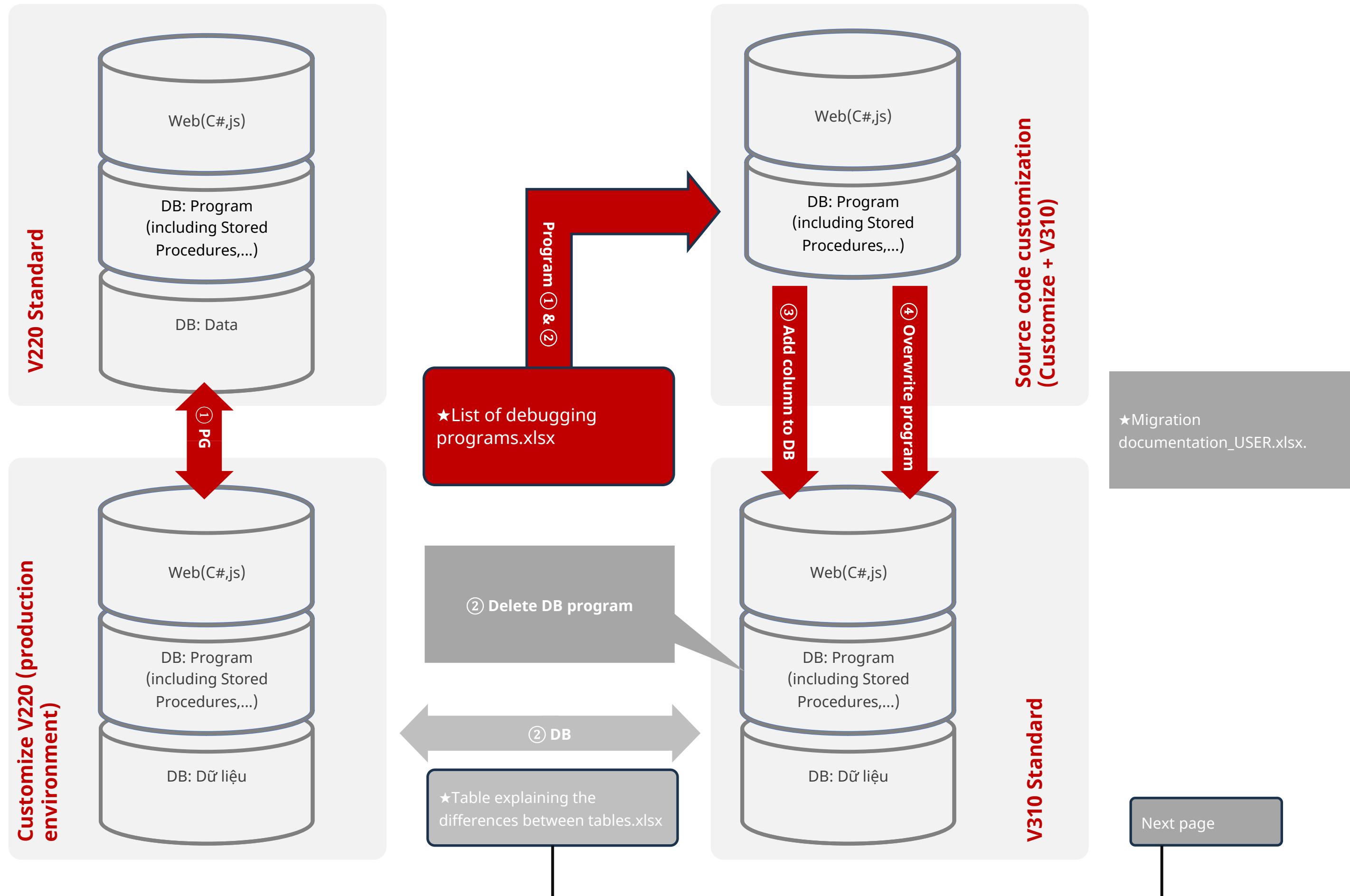
Successfully created a tool to identify the positions that need modification, ensuring that no rules are overlooked in the Addon and Customize screens.
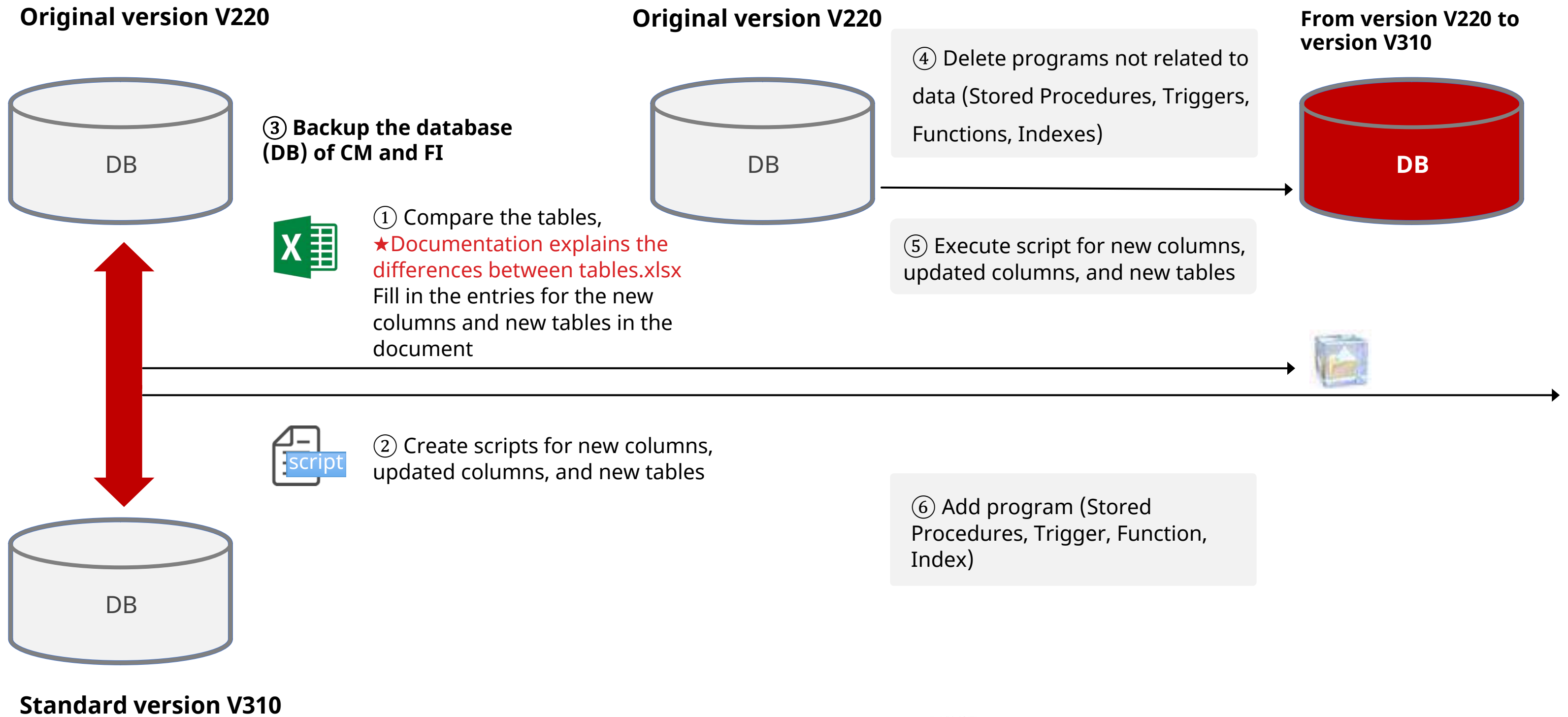
Developed a testing framework to ensure quality.

After completing the first Trailer project, LUVINA proposed a set of criteria to verify the accuracy of the modifications.

03 . **VERSIONUP** SERVICE – METHOD OF MIGRATION

V220 Standard

Web(C#,js)

DB: Program (including Stored Procedures,...)

DB: Data

① **PG**

Customize V220 (production environment)

Web(C#,js)

DB: Program (including Stored Procedures,...)

DB: Dữ liệu

Program ① & ②

★List of debugging programs.xlsx

Source code customization (Customize + V310)

Web(C#,js)

DB: Program (including Stored Procedures,...)

③ **Add column to DB**

④ **Overwrite program**

② **Delete DB program**

② **DB**

★Table explaining the differences between tables.xlsx

Web(C#,js)

DB: Program (including Stored Procedures,...)

DB: Dữ liệu

V310 Standard

★Migration documentation_USER.xlsx.

Next page

03 . **VERSIONUP** SERVICE – METHOD OF MIGRATION DB

Original version V220

Original version V220

From version V220 to version V310

DB

③ **Backup the database (DB) of CM and FI**

④ Delete programs not related to data (Stored Procedures, Triggers, Functions, Indexes)

DB

DB

① Compare the tables,
★Documentation explains the differences between tables.xlsx
Fill in the entries for the new columns and new tables in the document

⑤ Execute script for new columns, updated columns, and new tables

② Create scripts for new columns, updated columns, and new tables

⑥ Add program (Stored Procedures, Trigger, Function, Index)

DB

Standard version V310

03 . **VERSIONUP** SERVICE – HIGHLIGHT TICKETS

Old version	New version	Duration
V1.6.0	V3.0.0	7 months
V2.0.0	V3.1.0	6 months
V2.2.0	V3.1.0	5 months
V1.6.0	V3.1.0	3 months
V2.2.0	V3.2.0	4 months
V2.2.0	V3.2.0	4 months

03 . VERSIONUP SERVICE – PHASES

	1/2021 – 2/2021 Project Initialization	2/2021 – 6/2022 Upgrade the version	7/2022 Fix bug UAT
Prepare	Create the Basic Plan (KHDA) Set up the environment Generate a list of source discrepancies		
Develop		• Create a list of database discrepancies. • Migrate the database and master data. • Execute migration scripts. • Merge source, adjust UI, and handle Change Requests (CR). • Perform simple tests and test CR contents	
Fix bug UAT			Fix bug UAT

03 . **VERSIONUP** SERVICE – HIGHLIGHT TICKETS

Project	What we do		Output	Duration	Resource
Version-Up From V2.0 To V3.1 An-ken AJS **Duration : 01/2021 – 7/2021** **Total size : 182MM**	Data Preparation Input : • Database Version 2.0 AJS: Includes customer-specific structure and data. • Database Version 3.1 STD: Includes standard common structure and data.	Data investigation	• Categorize and analyze data to ensure consistency, eliminate errors and duplicates. • Standardize and clean data format, preparing it for migration.	1 month	4 DEVs
		Data Migration	• Migrate data from Version 2.0 to Version 3.1. • Test and verify data accuracy post-migration.	1 month	4 DEVs

	Product Development	Merger source customize and Addon of version 2.0 AJS To source version 3.1 STD	• Develop
			  ○ Merge customized and addon source from Version 2.0 AJS to Version 3.1 STD.
			  ○ Adjust UI after source merge.
			• Test Simple
			  • Conduct simple tests and resolve bugs.
				4 months	1 PM
					2 Sub PMs
					6 TLs
					24 DEVs
					10 Testers

	UAT	Fix bugs identified during customer integration testing.	• Receive and resolve UAT feedback.	1 month	1 PM 6 DEVs

04

MIGRATION
SERVICES

04 . **MIGRATION** SERVICE – OVERVIEW

ABOUT CUSTOMER AND OBJECTIVES

- Due to the discontinuation of Internet Explorer, GRANDIT has been upgraded to a new version to enable the program to operate on multiple browsers.

- Companies that do not require the new features of version 3 and face budget constraints still wish to continue using the GRANDIT system.

CHALLENGES

End users typically do not have a development team with sufficient experience to implement the Upgrade according to the rules provided by GRANDIT.

LUVINA'S SOLUTIONS

Select and implement UI modifications based on the mandatory rules provided by GRANDIT, without the need to migrate the database.

04 . **MIGRATION** SERVICE – OVERVIEW

Modify the system to run on multiple browsers

Update the UI to ensure the system operates on browsers other than IE without requiring a version upgrade to GRANDIT version 3.

Cost savings for End-Users

Compared to upgrading to GRANDIT version 3, the cost of performing the migration is reduced by 50%.

04 . **MIGRATION** SERVICE – TYPICAL PROJECT IMPLEMENTATION

	1/12/2022 – 15/2022 **Project Initialization**	**19/12/2022 – 28/2/2023** **Upgrade the version**
Prepare	Study documentation, source code, and migration methods	
Develop		• Modify common source files • Convert DTSX code • Adjust user interface (UI) Perform basic testing of 998 functions

05

STANDARDIZATION SOURCE CODE SERVICE

05. **STANDARDIZATION SOURCE CODE** SERVICE – OVERVIEW

ABOUT CUSTOMER AND OBJECTIVES

When large corporations complete the development and deployment of the GRANDIT system for one subsidiary, they often hope that other subsidiaries developed later can leverage the shared common components of the system. However, with the current method of directly modifying the standard source code, this is not achievable.

CHALLENGES

End users may have an IT team, but their limited manpower and lack of solutions make it challenging to address the issue.

LUVINA'S SOLUTIONS

- It is proposed to the customer to separate the current source code into two sets: one containing Addon Customize processing and the other equivalent to the standard source code.

- After the customization processing is separated, the customer wishes to conduct NUnit testing to ensure that the source code separation is error-free.

05. **STANDARDIZATION SOURCE CODE** SERVICE – OVERVIEW

ACHIEVEMENT

Successfully separated the customized source, enabling easier source code management.

The user's development source was successfully divided into two sets: one containing the GRANDIT standard source and another with the Customize source. This separation facilitates the application of GRANDIT's standard patches and simplifies the development of new features.

The amount of reusable functionality is 30%.

The number of reusable common features exceeds 30%.

The smoke test duration during development was reduced by 80%.

The amount of reusable NUnit code reached 80%, thereby reducing the smoke test time to only 20% of the time required for testing the first company.

	07/2023 **Merge Legacy Source Code**	8/2023 – 2/2024 **Official Development**
Phase 1	Conducted trials to establish implementation methodologies and provide estimates.	
Phase 2		Executed development tasks including: • Standardized coding practices. • NUnit testing.

05. STANDARDIZATION SOURCE CODE SERVICE – PHASE

Phase	Project	What we do	Output	Duration	Resource
1	Trailer	Product Development	Implemented source code standardization and established a structured development approach.	• Development methodology and estimation	1 month	4 DEV
2	Development	Product Development	standardizing the source code	• Source Code Standardization	7 month	1 PM 1TL 9 DEV
			Test Nunit	• Source code Nunit		

EXTRA PR POINTS - CHALLENGES & LESSONS

CHALLENGES

Maintaining a project over a long period requires ensuring a stable team to handle both technical and business aspects effectively. The project must continuously update its technical and business knowledge to accommodate changes in new versions, ensuring it meets the evolving requirements of the work.

LESSONS

To address the requirements mentioned, the project has implemented several strategies to maintain stability and scale up when new development projects arise, including rapid Version-Up:

- **Training Documentation**: The project has created a comprehensive training manual to reduce the training time for new members, from 3 months at the beginning of the project to just 1 month now.
- **Knowledge Repository (Knowhow)**: A central repository of documentation has been established to help new members quickly and effectively get up to speed:
    - Technical articles used in the project.
    - Overview articles on the business processes within the project.
    - Knowledge-sharing articles from experienced team members to provide insights and practical guidance.

These efforts ensure that the team remains stable, skilled, and prepared to handle new projects efficiently.