



SimBASE

Intelligent Business Automation

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Contents

1. Introduction	4
2. SimBASE® Functional overview	5
2.1. 4 th generation Intelligent Business Automation platform	5
2.2. Non-code BPA solution	6
2.3. Configuration without Developer Intervention.....	6
2.4. Integrations.....	6
2.5. Interfaces	7
2.6. Process Diagrams and Technical Maps.....	8
2.7. Monitoring and Control	8
2.8. Information Security	9
2.9. Templates, Import/Export.....	10
2.10. Surveys	11
2.11. Notifications.....	12
2.12. Reporting System	13
2.13. Approvals, Substitutes	14
2.14. Performance Metrics	15
3. Logical Architecture	17
3.1. General Information	17
3.2. System Units	17
3.3. The Core	18
3.3.1. Interactive handler.....	18
3.3.2. System Core levels.....	19
3.3.3. Robots	22
3.3.4. The User Interface Unit	22
3.3.5. The User Interface Unit (UIU)	23
3.3.6. User Interface Types	24
3.3.7. The levels of the user interface unit.....	26
3.4. SimBASIC.....	27
4. System Architecture.....	28
4.1. Architecture.....	28
4.1.1. Technological stack.....	28
4.1.2. Minimum requirements	28

4.1.3. External interfaces and integrations29

4.1.4. Implementation option29

5. Continuous development.....33

1. Introduction

SimBASE® is the new generation Business Process Management System (BPMS) that allows automating the activities of companies having various types and specializations. The most modern principles of corporate management and motivation are put in the basis of the system business logic, while the technical side is completely based on web technologies.

The **no-code philosophy**, which underlies the system, refers to a movement in software development that aims to enable users to create applications and automate workflows without having to write traditional code. This approach allows people with no programming experience to create functional software solutions using visual interfaces, drag-and-drop components, and customization rather than coding.

The core of the system is the business processes designer that allows changing the logic of work according to the current needs of the organization at any time and virtually from anywhere in the world. Business logic level is completely separated from the technical one, allowing both managers and analysts independently control the system behaviour without the help of programmers and developers.

Applying principles of a "virtual conveyor" can significantly reduce the time and improve the work quality of all company members by eliminating the need for managers to monitor all the current tasks and assignments, providing them with the relevant information only when the decision needs to be made or a specific action must be taken.

System ensures close monitoring of execution for every single business process, immediately informing about any deviation from the regulations, automatically starting problem escalation procedure or emergency recovery scenario

2. SimBASE® Functional overview

Business Process Automation solution: powered by the SimBASE® 4 Platform, a technology framework with a track record of success and experience in delivering modern BPA solutions. By harnessing the power of SimBASE® 4, we enable organizations to achieve greater operational efficiency, reduced costs, and improved agility in responding to changing market dynamics.

Our solutions centre around the automation of **Business Enterprise**, **Financial institution** and **Government Services** core processes, leveraging the robust capabilities of the SimBASE® 4 platform.

2.1. 4th generation Intelligent Business Automation platform

SimBASE® is a mature 4th generation software platform for Intelligent Business Automation, created by SIMOURG® – one of the recognised leading experts in business process management, reengineering and automation. SimBASE® has evolved through multiple generations, building upon its market-proven experience since 2003, up to the present day.



Each successive generation represents a significant advancement in Business Process Automation (BPA) rooted in customer experience, region-specific considerations, technological enhancements, compliance and regulation adaptations, and heightened security requirements.

SimBASE® 4 platform core function in automating a wide range of business processes, from routine tasks to complex workflows. This streamlines operations, reduces manual effort, and enhances efficiency. This represents the latest evolution in Business Process Automation (BPA) solutions. It signifies a departure from traditional automation methods to a more advanced, sophisticated approach. In the 4th generation, BPA solutions have transcended basic task automation and have become intelligent, adaptable, and highly efficient systems. The SimBASE® 4 Platform is the cornerstone of this next-generation automation. It's a state-of-the-art technology framework designed for robust automation, offering a range of benefits:

- **Scalability:** SimBASE® 4 is highly scalable, capable of handling automation needs from small-scale processes to enterprise-level workflows.
- **Flexibility:** It's designed to be adaptable, allowing for rapid adjustments and customization to cater to specific business requirements.
- **Integration:** SimBASE® 4 seamlessly integrates with existing IT ecosystems, ensuring that automation complements and enhances your current systems.
- **Data-Driven:** It leverages data analytics to make informed decisions, optimize processes, and drive efficiency.
- **Security:** Security is a top priority, and SimBASE® 4 is equipped with robust security features to protect sensitive data and systems.

What makes SimBASE® truly exceptional is its foundation in real-world experience. Over the years, it has been meticulously refined, battle-tested, and fine-tuned through countless

successful implementations across diverse industries. This proven track record ensures that SimBASE® is not just a software solution; it's a practical, reliable, and effective tool for achieving and measuring automation goals.

2.2. Non-code BPA solution

SimBASE® stands as a modern exemplar of Business Process Automation, underpinned by years of experience and innovation. What truly sets SimBASE® apart is its non-code nature. Unlike traditional BPA solutions that require extensive coding and development expertise, SimBASE® offers a revolutionary approach that does not rely on coding, making it accessible to a broader audience, from business users to IT professionals.

This non-code approach to automation signifies a departure from the complexities of traditional coding-based solutions. SimBASE® empowers organizations to automate their processes using intuitive, visual interfaces, reducing the barriers to entry for those without extensive programming knowledge. This democratization of automation puts the power of process enhancement directly into the hands of those who understand the workflows best. SimBASE® represents the cutting edge of Business Process Automation, offering a modern and proven-by-experience approach that requires no coding. Its ease of use, accessibility, and reliability are a testament to its evolution and adaptation to the unique needs of organizations in today's fast-paced and dynamic business environment.

2.3. Configuration without Developer Intervention

This feature signifies that users or administrators can customize and configure the system without requiring the direct involvement of developers or IT experts. It empowers non-technical users to adapt the system to their specific needs and preferences. This capability is crucial for agility and responsiveness, as it reduces dependency on specialized personnel and accelerates the implementation of changes.

This aspect highlights the user-friendliness and flexibility of the system. Users can make real-time adjustments and configurations to the system without the need for extensive re-training or reinstalling software components. It ensures that the learning curve is minimal and that users can adapt to system changes seamlessly, thus maximizing productivity and efficiency. These features reflect the system's commitment to user empowerment and ease of use. They enable organizations to swiftly respond to evolving requirements, all while minimizing the reliance on technical expertise and ensuring a smooth user experience.

2.4. Integrations

This feature lies at the core of our system, providing a versatile and interconnected experience. It encompasses the following aspects:

- **Integration with External Services:** Our system seamlessly integrates with external services, allowing users to connect with a wide array of third-party platforms, cloud-based applications, and external tools. This integration ensures that our system can leverage the capabilities of external services, enabling data exchange, collaboration, and enhanced functionality.

- **File Exchange:** Our system facilitates efficient file exchange, making it effortless for users to share, receive, and synchronize files and documents with others. Whether it's collaborating on projects, sharing important resources, or managing documents, our file exchange capabilities streamline these processes, fostering productivity and teamwork.
- **Access to Databases:** Our system's integration extends to database access, enabling users to interact with data stored in various databases. This functionality empowers data-driven decision-making by providing access to critical information from multiple sources. It unifies data management, allowing users to retrieve, update, and analyse data effectively.
- **API (Application Programming Interface):** The inclusion of a robust API ensures that our system is extensible and interoperable. Developers can harness the power of our API to create custom applications, automate processes, and integrate our system seamlessly with their existing tools and systems. This opens up a world of possibilities for customization and adaptability.

Integration within our system is a multifaceted feature designed to provide users with a comprehensive and connected experience. It empowers users to collaborate with external services, streamline file management, access diverse databases, and customize the system to suit their specific needs. This integration feature enhances the versatility, efficiency, and adaptability of our system, making it a valuable asset for organizations across various industries.

2.5. Interfaces

Our system places a strong emphasis on providing users with a versatile and user-friendly interface. This feature includes several key features:

Multilingual Interface: Our system supports multiple languages, ensuring that users from diverse linguistic backgrounds can interact with the system comfortably. This feature promotes inclusivity and ease of use for global users and teams.

Localization Capability: Localization goes beyond language support. It allows users to adapt the system to their local preferences and requirements. This includes customizing date formats, currency symbols, and other regional settings. Users can feel at home with a system that aligns with their local norms and conventions.

Screen Form Builder: Our system offers a powerful screen form builder, enabling users to design and customize user interfaces according to their specific needs. This feature empowers users to create tailored interfaces that optimize their workflow and enhance productivity. It's a tool for flexibility and efficiency.

SimBASIC Scripting Language: The inclusion of the SimBASIC scripting language provides advanced customization capabilities. Users can automate tasks, define complex logic, and create custom functions to extend the system's functionality. SimBASIC is a versatile tool that allows users to adapt the system to unique business processes and requirements.

2.6. Process Diagrams and Technical Maps

This feature is instrumental in helping organizations visualize and manage their processes efficiently. It encompasses the following aspects:

Technical Maps: Our system allows users to create detailed technical maps that represent the intricacies of their processes. These maps serve as blueprints, outlining the various steps, activities, and resources involved in a process. Users can define roles, responsibilities, dependencies, and critical paths, providing a comprehensive view of how processes operate.

Process Diagrams: Users can design process diagrams that visually represent workflows, procedures, and business processes. These diagrams adhere to the BPMN 2.0.2 standard, ensuring consistency and compatibility with industry best practices. The use of standardized symbols and notations simplifies process modelling and enhances communication across teams and stakeholders.

Compliance with BPMN 2.0.2 Standard: Our system adheres to the BPMN 2.0.2 standard, which is a globally recognized notation for modelling business processes. This compliance ensures that users can create diagrams and maps that are both industry-standard and compatible with other BPMN-compliant tools and systems.

Visual Representation: Process diagrams and technical maps provide a visual representation of how processes function. This visual clarity makes it easier for users to understand, analyse, and optimize their workflows. It also aids in identifying bottlenecks, inefficiencies, and areas for improvement.

Process Documentation: These diagrams and maps serve as valuable documentation for an organization's processes. They become essential references for onboarding new employees, conducting audits, and ensuring compliance with industry regulations and standards.

Collaboration: Our system supports collaborative process modelling, allowing multiple users to work on the same diagrams simultaneously. This fosters teamwork and ensures that process documentation is always up to date.

Process Improvement: By providing a visual representation of processes, users can identify areas for optimization and continuous improvement. This feature is crucial for organizations striving to enhance their operational efficiency and effectiveness.

2.7. Monitoring and Control

This integral feature of our system focuses on enhancing control, visibility, and performance measurement within an organization. It encompasses several critical components:

Monitoring of Internal Corporate Processes: Our system provides real-time monitoring of internal corporate processes. This means that organizations can track the progress and status of key activities, workflows, and tasks within their operations. This monitoring capability fosters transparency, accountability, and the ability to identify potential bottlenecks or issues in a timely manner.

Measurement of Performance Metrics: Our system allows organizations to define and measure performance metrics relevant to their specific goals and objectives. These metrics can include

key performance indicators (KPIs) related to efficiency, productivity, customer satisfaction, and compliance. By tracking and analysing these metrics, organizations can make data-driven decisions and continuously improve their processes.

Virtual Office: The concept of a virtual office refers to a centralized digital workspace within our system. It serves as a hub for employees to access relevant documents, collaborate on tasks, and stay connected with colleagues. This virtual office ensures that teams can work efficiently, even in remote or distributed work environments.

Control and Oversight: With our control system, organizations have greater control and oversight of their operations. They can set access permissions, define approval workflows, and establish governance rules to ensure that processes adhere to regulatory requirements and company policies.

Alerts and Notifications: The system can generate alerts and notifications to inform stakeholders of critical events, milestones, or issues. This proactive communication ensures that the right people are alerted to take timely action when needed.

Historical Data and Reporting: Our control system maintains a historical record of process data and performance metrics. This data can be used for reporting, trend analysis, and compliance audits. It provides valuable insights into process evolution over time.

Compliance and Quality Assurance: Organizations can use the control system to enforce compliance with industry standards, regulations, and quality assurance protocols. This is crucial for industries with strict compliance requirements, such as healthcare or finance.

Process Optimization: By continuously monitoring and measuring internal processes, organizations can identify areas for improvement. This leads to process optimization, increased efficiency, and the ability to adapt to changing business conditions.

Control System feature empowers organizations to maintain control, measure performance, and enhance visibility within their corporate processes. It fosters an environment of continuous improvement, data-driven decision-making, and efficient collaboration, ultimately contributing to the organization's overall success and competitiveness.

2.8. Information Security

This feature is dedicated to safeguarding sensitive data and ensuring the integrity, confidentiality, and availability of information within our system. It encompasses several essential components:

User Identification and Authentication: Our system implements robust user identification and authentication mechanisms. This ensures that only authorized individuals gain access to the system. Users may be required to provide secure credentials, such as usernames and passwords, or employ multi-factor authentication for enhanced security.

Logging System: Comprehensive logging is a critical aspect of our information security system. It records and tracks all system activities, user actions, and security-related events. These logs

serve as a trail of evidence for auditing, monitoring, and investigating security incidents or compliance violations.

Centralized Data Storage and Processing: To maintain data security and integrity, our system centralizes data storage and processing. This approach ensures that data is stored securely and consistently. Centralization also facilitates efficient data backup, disaster recovery, and access control.

Access Control: The information security system provides granular access control, allowing organizations to define user permissions and restrict access to specific data or functionalities. Access control is crucial for preventing unauthorized data access or data breaches.

Encryption: Data encryption mechanisms are employed to protect data both in transit and at rest. This includes encrypting data transfers over networks and encrypting data stored in databases. Encryption adds an additional layer of security, rendering data unreadable to unauthorized parties.

Audit Trails: The system maintains detailed audit trails that capture every user action, data modification, or system event. These audit trails can be reviewed for compliance auditing, security monitoring, and forensic investigations.

Security Policies: Organizations can establish and enforce security policies within the system. These policies dictate password complexity rules, session timeouts, and other security-related settings. Adhering to security policies helps maintain a secure environment.

Security Monitoring: The information security system continuously monitors system activities and user behaviour for suspicious or anomalous patterns. This proactive monitoring allows for early detection of potential security threats.

Data Backup and Recovery: Regular data backups and a robust recovery plan are integral parts of our information security system. This ensures that data can be restored in the event of data loss, system failures, or security incidents.

Compliance: The system supports compliance with industry-specific regulations and standards by implementing security controls and features tailored to meet compliance requirements.

2.9. Templates, Import/Export

This feature is dedicated to simplifying document creation, distribution, and data interchange within our system. It comprises several key components:

Template Layout and Document Distribution: Our system provides a user-friendly template design and layout editor. Users can create custom templates for various types of documents, such as invoices, reports, contracts, and forms. These templates can be tailored to match an organization's branding and specific requirements.

Document Automation: Users can populate templates with dynamic data fields that pull information from the system's database. This streamlines the document creation process and minimizes manual data entry.

Document Distribution: Once documents are generated based on templates, the system offers options for distribution. Users can send documents via email, generate PDFs for download, or even automate document delivery based on predefined workflows.

Data Import/Export: Our system supports seamless data import and export capabilities to enhance data interoperability. Key aspects include: **Data Import:** Users can import data from external sources, such as spreadsheets (CSV, XLSX). This simplifies the process of migrating existing data into the system. **Data Export:** Data stored within the system can be exported in various formats, including PDF, CSV, XLSX, DOCX, ODT, HTML, and XML. This flexibility allows organizations to extract and use data for reporting, analysis, or sharing with external stakeholders.

Scheduled Exports: The system can automate scheduled data exports, ensuring that relevant data is consistently delivered to designated recipients.

Document Version Control: The system provides version control for templates and documents. This ensures that users are always working with the most up-to-date versions of templates and that historical versions can be accessed when needed.

Customization and Personalization: Templates can be customized to include dynamic placeholders for data fields, ensuring that documents are personalized and contain accurate information.

Data Mapping: During data import and export processes, users can map fields to ensure that data is correctly aligned with the system's database structure.

Templates Library: The system typically includes a library of pre-designed templates for common business documents, saving users time and effort in creating their own templates from scratch.

2.10. Surveys

This feature is designed to facilitate the creation and administration of surveys, questionnaires, and tests within our system. It offers a comprehensive set of tools for conducting data collection and analysis. Key components of this feature include:

Survey Administration System: Our system provides a user-friendly interface for designing and managing surveys. Users can create surveys from scratch or choose from a library of predefined survey templates. Key functionalities include:

- *Question Types:* The system supports a variety of question types, including multiple-choice, open-ended, rating scales, and more. This flexibility allows survey creators to tailor questions to their specific needs.
- *Conditional Logic:* Surveys can incorporate conditional logic, enabling dynamic question branching based on respondents' previous answers. This ensures a personalized and relevant survey experience.
- *Survey Flow:* Survey creators can define the flow of questions, including skip patterns and branching logic, to guide respondents through the survey in a logical sequence.

- *Scoring and Grading:* For tests and assessments, the system can automatically calculate scores and grades based on respondents' answers.

Reusable Surveys: Surveys can be saved as templates for future use. This allows organizations to create standard surveys for various purposes and reuse them with minimal effort.

Automated Distribution: Surveys can be distributed to respondents through automated email invitations, links, or integrated messaging systems. Reminders can also be scheduled to encourage participation.

Anonymous or Identified Responses: Depending on the survey's objectives, respondents can choose to provide anonymous feedback or identify themselves. This flexibility ensures that surveys can be used for various purposes, including employee feedback, customer satisfaction, or market research.

Data Collection and Analysis: The system collects responses in real-time and provides robust data analysis tools. Users can generate reports, charts, and graphs to visualize survey results, identify trends, and gain insights.

Survey Security: To protect sensitive survey data, the system typically includes security measures such as access controls, encryption, and compliance with data protection regulations.

Survey Templates: Organizations often have access to a library of pre-designed survey templates for common survey types. This accelerates the survey creation process.

Integration: Survey data can be integrated with other modules of the system, allowing organizations to combine survey responses with other data sources for a comprehensive view of performance and feedback.

Feedback Loops: Survey results can trigger automated workflows for follow-up actions or issue resolution based on predefined criteria.

2.11. Notifications

Our system allows organizations to configure and automate various types of notifications based on predefined events, triggers, or conditions. These notifications can be sent to users, administrators, or stakeholders. Common examples include:

Workflow Notifications: Users receive notifications when tasks are assigned to them, deadlines are approaching, or workflow milestones are reached.

Event-Based Alerts: Notifications can be triggered by specific events, such as the submission of a form, changes in data status, or the occurrence of critical incidents.

System Updates: Users can be informed about system updates, maintenance schedules, or new features.

Internal Messaging: The system typically includes an internal messaging system that allows users to send messages to each other within the platform. This fosters collaboration, enhances communication, and reduces the need for external email exchanges.

SMS: Organizations can configure SMS notifications to reach users and stakeholders instantly. SMS notifications are useful for urgent alerts, reminders, and time-sensitive communications.

Email: The system supports automated email notifications and communication. Users can receive email notifications for various system events and updates. Organizations can also send bulk email communications to specific user segments or stakeholders.

Personalization: Notifications, whether through SMS or email, can often be personalized with recipient names, relevant details, and dynamic content. This enhances the user experience and engagement.

Notification Templates: The system typically provides predefined notification templates that organizations can customize for their specific needs. This accelerates the notification setup process.

Notification History: Users can review their notification history to track past messages, reminders, or alerts, ensuring that no important information is missed.

Notification Scheduling: Organizations can schedule notifications to be sent at specific times or on specific dates to optimize the timing of communications.

Notification Tracking: The system often includes features for tracking the delivery and read status of notifications, ensuring that messages reach their intended recipients.

Notification based actions: Notifications can be integrated with other modules of the system, allowing automated actions based on notification responses or events.

2.12. Reporting System

This feature is a powerful tool for organizations to extract valuable insights, monitor performance, and make data-driven decisions. It encompasses a range of functionalities for report generation, data selection, filtering, and data summarization. Key components of this feature include:

Report Generation: Our system provides a user-friendly interface for designing and generating reports. Users can create custom reports tailored to their specific needs and objectives.

Common features of this functionality include:

- *Flexible and powerful Report Builder:* This intuitive interface simplifies the report design process.
- *Template Reports:* Organizations often have access to a library of predefined report for common business scenarios.
- *Reports library:* Users can schedule the generation and delivery of reports at specified intervals (e.g., daily, weekly, monthly). This ensures that stakeholders receive timely updates.

Data Selection: The reporting system allows users to select specific datasets or data sources for their reports. This ensures that reports focus on relevant information. Key aspects include:

- *Data Source Integration:* Our system can integrate with various data sources, databases, and external systems to access a wide range of data for reporting purposes.
- *Data Filters:* Users can apply filters to refine the data included in their reports. Filters can be based on date ranges, specific criteria, or user-defined parameters.

Data Filtering: Organizations can filter data to narrow down the scope of their reports and analyse specific subsets of information. This enhances report relevance and usability.

Data Summarization: The reporting system typically supports data summarization techniques such as aggregation, grouping, and calculations. Users can create summary reports that provide insights into trends, totals, averages, and more.

Visualizations: Reports often include a variety of visualization options, including charts, graphs and tables. Visual representations of data make it easier for users to grasp complex information at a glance.

Export Options: Users can export reports in various formats, including PDF, CSV, XLSX, DOCX, ODT, HTML, XML, and more. This enables sharing and distribution of reports with stakeholders.

Report History: The system typically maintains a history of generated reports, allowing users to access and reference past reports when needed.

Security and Access Controls: Access to reports and sensitive data can be controlled through role-based permissions and encryption to ensure data security and compliance.

Customization: Users can often customize the look and feel of reports, including fonts, colours, headers, and footers, to match their organization's branding and style.

Integration: The reporting system can integrate with other modules of the system, allowing organizations to combine report data with other data sources for comprehensive analysis.

2.13. Approvals, Substitutes

This feature is designed to streamline decision-making processes, enable workflow approvals, and provide mechanisms for delegating responsibilities when needed. It encompasses a range of functionalities related to voting, approvals, reviews, and substitutions. Key components of this feature include:

Voting System: Our system offers a built-in voting system that allows users to participate in decision-making processes. Key aspects of this functionality include:

- **Voting Workflows:** Users can initiate voting workflows for a wide range of purposes, such as approving proposals, selecting options, or making collective decisions.
- **Custom Voting Rules:** Organizations can define custom voting rules, including quorum requirements, voting thresholds, and decision criteria.
- **Notification of Voting Events:** Users receive notifications when voting events are initiated, ensuring that they are aware of pending decisions.

Approvals: This feature facilitates the approval of various types of requests, documents, or processes within the organization. Common elements of approvals include:

- **Workflow Integration:** Approval processes can be seamlessly integrated into workflows, ensuring that approvals are obtained at relevant stages of a process.
- **Multi-Level Approvals:** Organizations can configure multi-level approval hierarchies to accommodate complex decision-making structures.
- **Automated Routing:** Approval requests are automatically routed to the designated approvers based on predefined rules and criteria.

- **Approval History:** The system typically maintains an audit trail of approval actions, providing transparency and accountability.

Reviews: Users can use this functionality to notify others about documents, policies, or information that require review and acknowledgment. Key features include:

- **Review Requests:** Users can send review requests to individuals or groups, ensuring that the necessary parties acknowledge and confirm their understanding.
- **Document Versioning:** Organizations can track versions of documents and ensure that users are reviewing the most current versions.
- **Confirmation Tracking:** The system records confirmations, creating a history of acknowledgments for compliance and audit purposes.

Substitutions: This feature enables users to designate substitutes who can act on their behalf during their absence or unavailability. Substitution functionality includes:

- **Substitute Assignment:** Users can specify individuals or roles that are authorized to act as substitutes.
- **Temporary Permissions:** Substitutes are granted temporary permissions and responsibilities, allowing them to perform tasks, make decisions, or approve requests on behalf of others.
- **Notification of Substitution:** Both the user and their substitute are typically notified when a substitution is activated, ensuring awareness and continuity of responsibilities.

Workflow Integration: Approval, review, and substitution processes can be seamlessly integrated into various workflow scenarios, ensuring that these actions are aligned with broader organizational processes.

Tracking and Audit: The system often provides tracking and audit capabilities for approvals, reviews, and substitutions, allowing organizations to maintain records and ensure compliance.

Security and Access Control: Access to approval and substitution features can be controlled through role-based permissions to protect sensitive decisions and actions.

Integration: These features can be integrated with other modules of the system as system Config, allowing organizations to incorporate approvals, reviews, and substitutions into larger business processes and workflows.

2.14. Performance Metrics

This feature is designed to help organizations measure, track, and analyse key performance indicators (KPIs) and other relevant metrics to assess their efficiency and effectiveness. It plays a critical role in monitoring progress, making informed decisions, and driving continuous improvement. Key components of this feature include:

KPIs and Metrics: Our system allows organizations to define and configure a wide range of metrics and KPIs that align with their strategic goals and objectives. These metrics can cover various aspects of business performance, such as financial, operational, customer, and employee-related indicators.

Custom Metric Definition: Organizations can create custom metrics tailored to their specific needs. These metrics may include quantitative and qualitative measures, numerical targets, and performance benchmarks.

Data Integration: The system can integrate with data sources, databases, and other systems to automatically collect and update performance data. This ensures that metrics and KPIs are based on real-time or near-real-time information.

Dashboard and Reporting: Performance metrics are typically presented in visually appealing dashboards and reports. Users can access these dashboards to view performance trends, compare actual results to targets, and identify areas that require attention.

Alerts and Notifications: Users can set up alerts and notifications to receive timely updates when specific metrics or KPIs deviate from predefined thresholds or targets. This proactive monitoring enables swift responses to performance issues.

Historical Data Analysis: The system maintains a historical record of performance data, allowing users to analyse trends over time, identify patterns, and assess the impact of past decisions and actions.

Benchmarking: Organizations can compare their performance metrics to industry benchmarks or best practices to gain insights into their competitiveness and areas for improvement.

Goal Setting and Tracking: Users can set performance goals and track progress toward achieving them. The system often provides tools for goal management, including goal creation, alignment with KPIs, and progress tracking.

Performance Scorecards: Scorecards provide a comprehensive view of performance across various metrics and KPIs. They offer a holistic perspective of an organization's effectiveness and allow stakeholders to evaluate overall performance.

Data Visualization: Performance data is often presented using various data visualization techniques, such as charts, graphs and tables. Visual representations make it easier for users to interpret complex data.

Data Drill-Down: Users can drill down into performance data to explore details and identify root causes of performance issues. This feature supports data-driven decision-making.

Access Control: Access to performance metrics and KPIs can be controlled through role-based permissions to ensure that sensitive information is accessible only to authorized users.

3. Logical Architecture

3.1. General Information

The SimBASE system has an open modular structure consisting of separate independent units. Units can be implemented on different platforms, written in different programming languages, and use various databases, either hosted on a single server (in which case a standardized file structure is used) or on different servers.

3.2. System Units

A system unit is a software complex capable of connecting to the system core and using its functions. The system can have an arbitrary number of units, as well as an arbitrary number of running instances of one unit (with the exception of the core: working with multiple cores of the system is not implemented yet). The central unit is the system core, which provides the execution of storage and information processing functions, while other units are referred to as extension units. Extension units interact with the system core through coupling interfaces, and extension units cannot interact with each other directly.

Units of the system are divided into the following types:

Type of system units	Purpose and description
Core	Central unit of the system, providing storage and processing of information, security, and access management. It does not have its own user interface; interaction with users is carried out through the user interface unit (UIU) or interfaces of external systems (SIU). The core provides a set of basic services, combining which various functionality can be created.
User Interface Unit, UIU	Extension Unit, which enables users to interact with the system. It is a separate software complex that implements a certain variant of user interaction (for example, through a web interface) and has an interface to the system core. It may provide additional functionality not implemented by the core; however, it cannot store user accounts and associated user information.
System Interoperability Unit, SIU	Extension Unit that provides the interaction of the SimBASE system with other systems (for example, by providing APIs or web services). A notable feature of the provided SIU services is that they can implement any additional processing of incoming and outgoing data, if necessary, by sending and processing multiple requests to the core while servicing a single incoming request from an external system. Additionally, when providing

	public access, SIUs act as security screens, prohibiting direct access to the core (which may be located on another server and in a different network segment).
Automated Data Processing Unit, APU	Extension Unit that provides automatic execution of information processing functions not implemented in the core. It is a separate software complex that implements certain additional functionality and has an interface to the system core through which data exchange is carried out.

3.3. The Core

The Core is the central unit of the system, responsible for the functioning of the entire business logic and providing its functionalities to extension units. The core is divided into two parts: an interactive handler and robots - automatic processes that perform scheduled actions (see diagram). Both parts, if necessary, can utilize various system resources, such as information stored in the database, stored procedures, file utilities, and external services. Software modules, robots, utilities, and uploaded data files are stored in the SimBASE file system, while stored procedures, user data, and settings are stored in its database.

3.3.1. Interactive handler

The Interactive Handler performs actions only upon external requests received through one of the core's external interfaces. It has a six-level structure to meet the following mandatory requirements:

- Working with Different Databases: This is facilitated by employing a Database Interface Module (DBI) that abstracts the interactions with various databases. By replacing only the DBI module, the system can seamlessly switch between different database systems without requiring changes to the application code.
- Working with Various File Storages and File System Structures: Similarly, the system employs a File Storage Interface Module (UFSI) to abstract the interactions with different file storage systems and file system structures. By replacing only the UFSI module, the system can adapt to different storage configurations without code modifications.
- Offloading Resource-Intensive Operations to External Utilities: The system identifies resource-intensive operations and delegates their execution to external utilities. This capability helps optimize system performance and resource utilization.
- Placement of Utilities on Arbitrary Servers and Transfer without Code Changes: External utilities are interfaced through a dedicated External Utility

Interface Module (UFI). By replacing or reconfiguring only the UFI module, utilities can be hosted on different servers and transferred between them without requiring modifications to the application code.

- Maximization of Code Reuse and Elimination of Duplication: The architecture of the system is designed to maximize code reuse and eliminate duplication of technical functions across different parts of the core. This ensures efficient development and maintenance of the system.

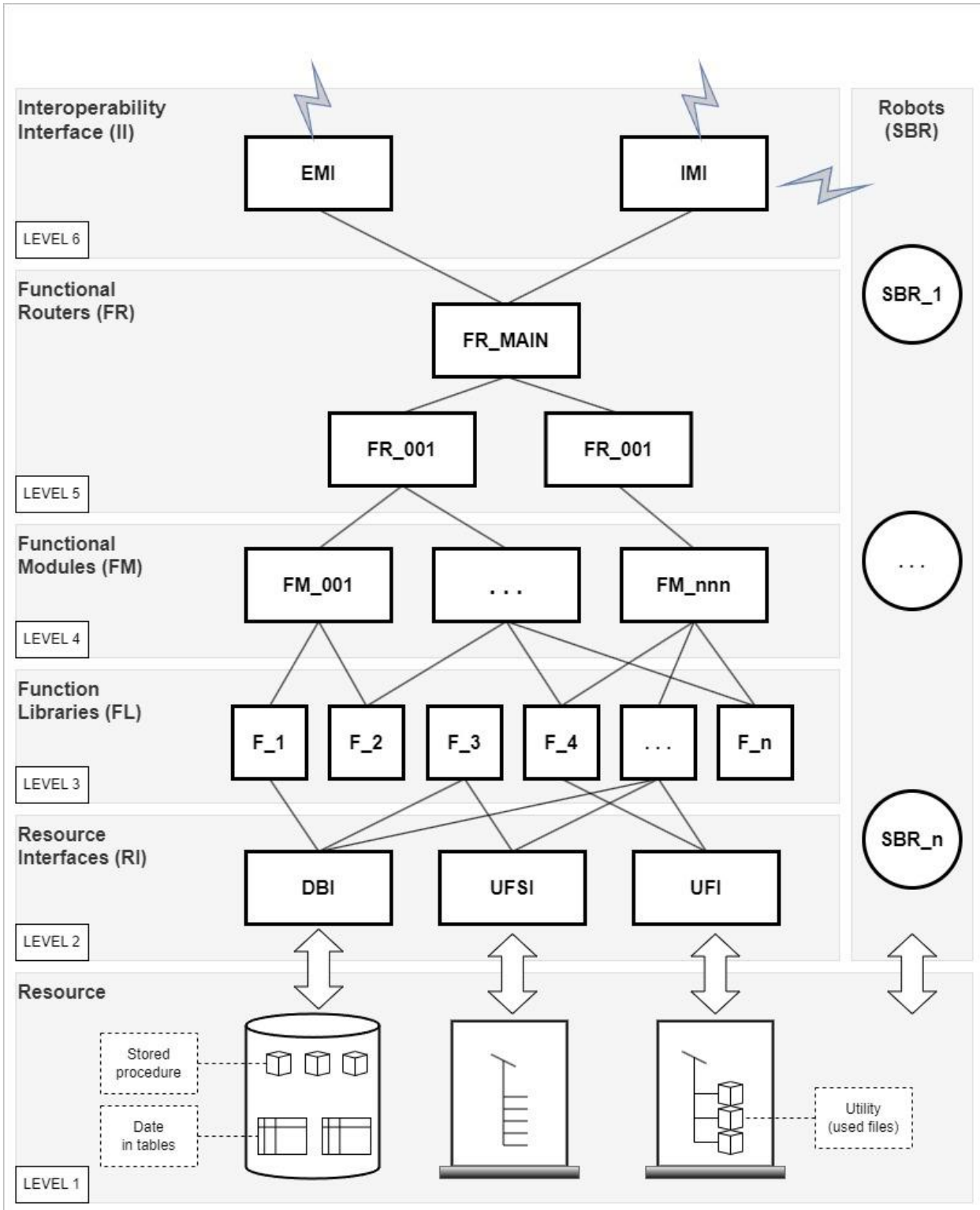
Interactive processor software modules are subject to the following rules:

- Replacement of Modules without Changes in Interacting Modules: The system allows for the replacement of any module without necessitating changes in the modules that interact with it, provided that the replacement module maintains the same functionality. This flexibility facilitates system upgrades, optimizations, and customizations without disrupting the existing functionality.
- Limited Interaction: Any module can interact exclusively with modules of the same and adjacent levels. Interaction with modules of other levels is prohibited.
- Hierarchical Module Invocation: A module of any level, except level 3, can only be called from a neighboring higher-level module. It can itself call only other modules of the next lower level. Level 3 modules (FL function libraries) additionally can call other level 3 modules.
- External Access Restriction: External access to the system core is only possible through the coupling interface modules (II). Access to any other modules is prohibited.
- Prohibition of Resource Access Bypass: Accessing resources (databases, utilities, etc.) bypassing the resource interface modules (RI) is prohibited.

3.3.2. System Core levels

Level	Name	Functions
Level 6	Interoperability interface	The topmost level of the hierarchy, responsible for establishing communication between the core and all other units of the system, is represented by two types of modules: IMI and EMI. IMI (Internal Module Interface) and EMI (External Module Interface) modules facilitate the integration

		and communication between the core and other system units. IMI modules handle internal communications within the system, while EMI modules manage external communications with entities outside the system. These interfaces play a crucial role in ensuring seamless interaction between the core and other components, facilitating the exchange of data and commands
Level 5	Functional Routers	This provides the definition of the logical function to be executed and the transmission to the appropriate functional modules for control and data. Technically, it consists of a main router that determines the message class and an executor router that ensures the invocation of the required type of message processing module.
Level 4	Functional Modules	These provide the logic for processing messages within the core of the system. Each type of message is handled by a separate functional module.
Level 3	Function Libraries	This provides the execution of technical functions for receiving, processing, storing, or deleting data. Library functions can be utilized by any number of functional modules and operate independently of which module invoked them.
Level 2	Resource Interfaces	This provides the interaction of library functions with the resources of the system, such as external handlers, files and user or system data, database stored procedures, and similar resources.
Level 1	Resources	Resources refer to data external to the core modules (such as files, records in a database) and data handlers (such as stored procedures in a database, file utilities, external web services).



3.3.3. Robots

The Robot is an autonomous process designed to automatically perform certain actions without user intervention. Robots are part of the system core and can interact directly with all system resources (both through an interactive handler and by accessing the database and invoking other utilities directly). The main purpose of robots is to carry out automatic actions without human involvement, such as initiating processes on a schedule, automatically receiving and sending messages, cleaning up garbage and removing unnecessary archival information, managing user states (including their merging and unmerging), and other similar functions. Robot control can be done either from the command line or through the system's administrative interface. Some robot parameters are read once from the robot configuration file at the time of their launch and cannot be changed through the interface during operation (a restart of the robot may be required to make changes). Robots operate autonomously in the core, and their work is independent of the presence or absence of users and other robots in the system (except for the dispatcher robot, necessary for managing robots through the administrative interface). The results of the robots' work are recorded in the system log, while debugging technical information is stored in a file log.
 Robot examples:

Robot	Description
SimBASE Robot Dispatcher	Providing starting and stopping of other robot systems.
Email Processing Manager	Responsible for receiving and processing incoming email
Task List Manager	For all users, the system periodically calculates the “task list” and decides whether it is necessary to notify the user about changes.
User State Manager	Provides management of the states of existing system users: automatic disconnection of users after timeouts, uniting of accounts during long periods of inactivity, and unlocking after a waiting period when the wrong password is repeatedly entered.
Performance Statistics Manager	Collects statistical data on server load. Uses ZABBIX utility
Log Export Manager	Provides uploading of system log records to a file or external database.

3.3.4. The User Interface Unit

The User Interface Unit (UIU) is an extension unit of the system responsible for enabling users to interact with the system. It is a separate software complex that implements various user

interaction methods (such as through a web interface) and interfaces with the system core. It may provide additional functionality not implemented by the core but cannot store user accounts or related user information. The User Interface Unit is divided into two parts: the Visualizer (UIV) and the Handler (UIP). The Visualizer is responsible for the graphical design of the interface, while the Handler processes interactions such as button clicks.

3.3.5. The User Interface Unit (UIU)

The user interface unit is designed to work with the SimBASE system through a graphical interface. It has a five-level structure to meet the following mandatory requirements:

- The ability to ensure operation with different databases without modifying the program code, by replacing only one Database Interface Module (DBI).
- The ability to transfer the execution of the most resource-intensive operations to external utilities.
- The ability to place utilities on arbitrary servers and transfer them from server to server without modifying the program code, by replacing or reconfiguring only one External Utility Interface Module (UFI).
- Maximization of code reuse, absence of duplication of the same technical functions in different parts of the system core (SCI).
- The ability to replace any modules without changes in the interacting modules, if the module retains the same functionality.

The software modules of the user interface unit adhere to the following mandatory rules:

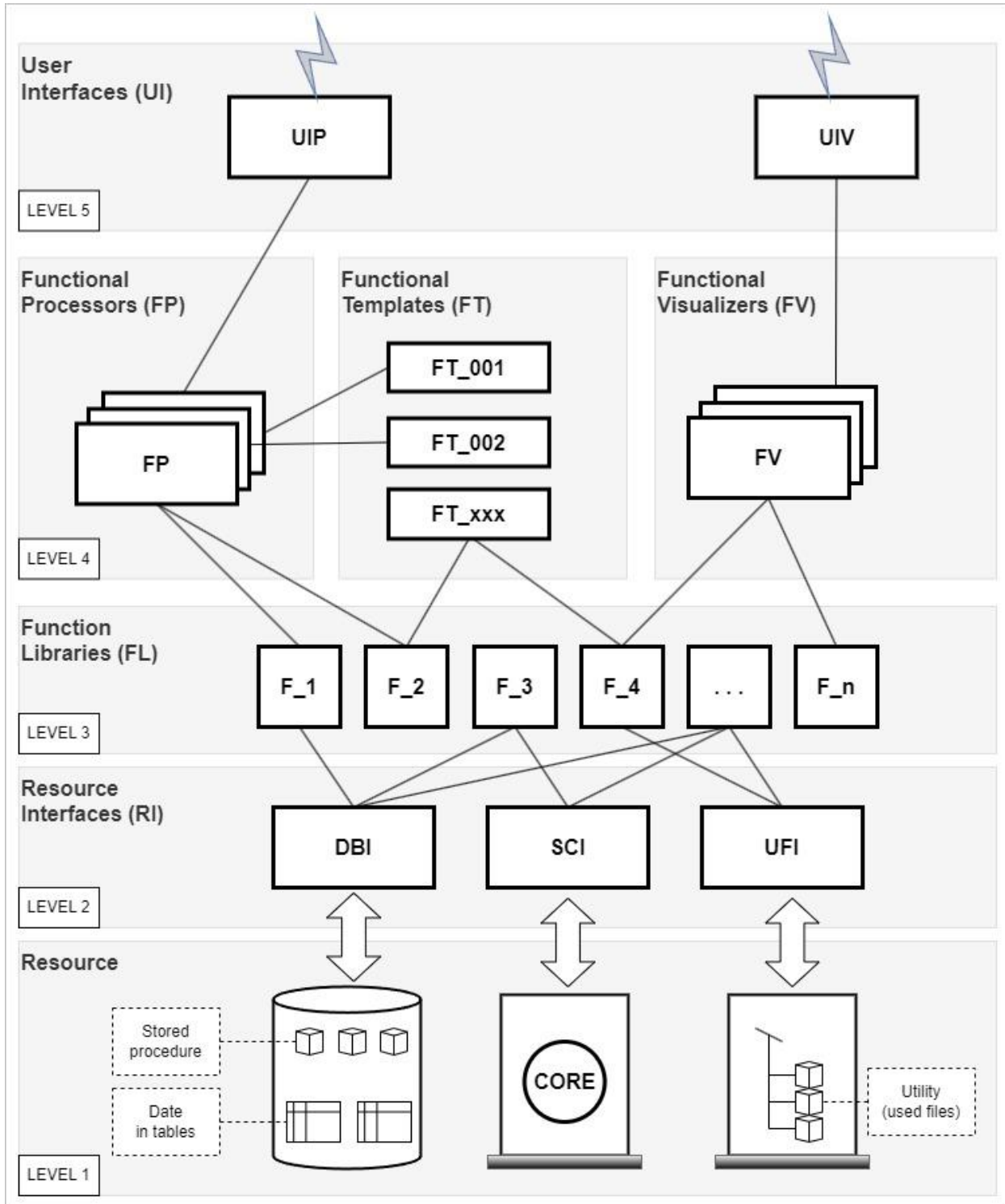
- Any module can interact exclusively with modules of the same and adjacent levels; interaction with modules of other levels is prohibited.
- A module of any level, except levels 2 and 3, can only be called from a neighbouring higher-level module. It can itself call only other modules of the next lower level. Functional processors (FP) and functional visualizers (FV) at level 4 additionally can call functional templates (FT), which are modules of the same level. Level 3 modules (function libraries FL) additionally can call other level 3 modules.

- Accessing resources (system core, databases, utilities, etc.) bypassing resource interface modules (RI) is prohibited.

3.3.6. User Interface Types

The type of interface affects how it is displayed. Interface types can be following:

UI type	Description
STD (Standard user interface)	A standard user interface of a system refers to the default or typical interface that users interact with when using that system. It encompasses the layout, design, and functionality that users expect to encounter when accessing and navigating the system. It is provided out of the box.
CUI (Custom user interface)	A special interface can be developed to create a unique user experience that best meets the needs of a specific audience or target group. A mobile interface is a specific example of such a special interface. It is optimized for use on mobile devices such as smartphones or tablets, taking into account their unique characteristics such as small screens, touchscreen controls, the ability to be used anywhere, etc. Interaction between a specially designed user interface and the core of the system occurs through an embedded API (Application Programming Interface). This API provides a set of software interfaces, methods, and protocols that enable the user interface to interact with the system core or other software components. Through the embedded API, the user interface can perform actions such as data queries, sending commands, and receiving updates from the system core.



3.3.7. The levels of the user interface unit

The levels of the user interface unit of the system have the following purpose (see table):

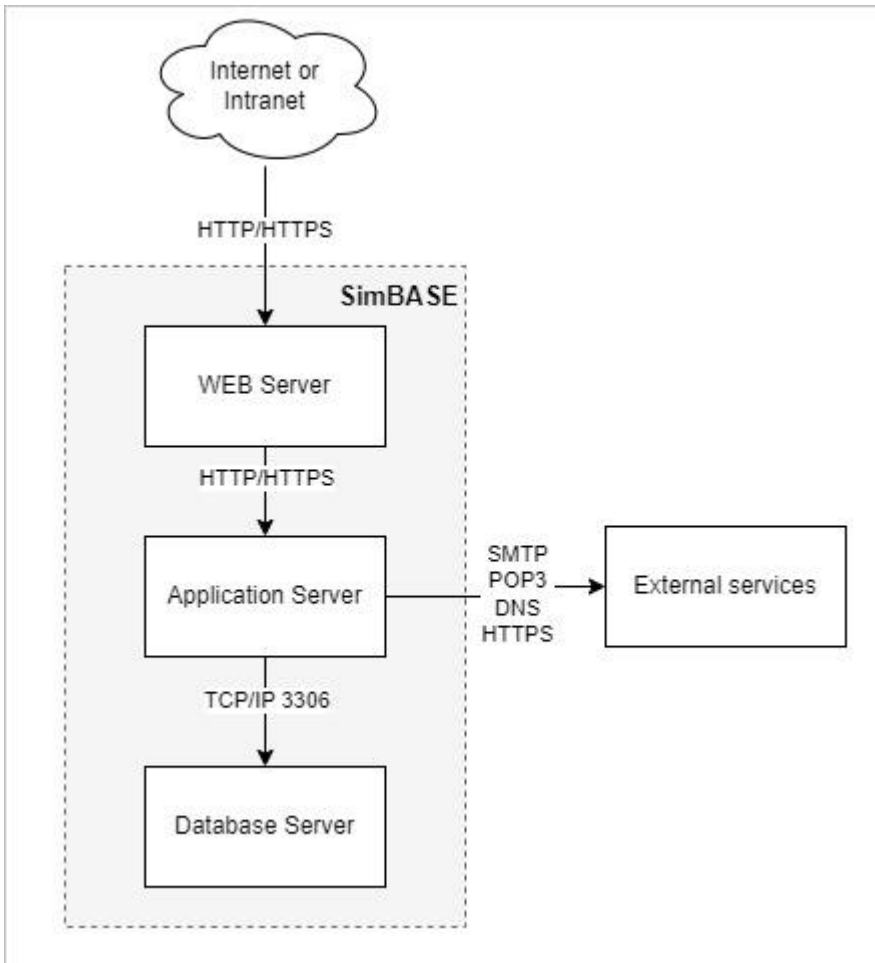
Level	Name	Functions
Level 5	User interfaces	The highest level of the hierarchy provides the connection between the end-user and the system.
Level 4	Functional Modules	They provide the logic for rendering pages or handling button clicks. Rendering the page at this level only affects the layout of elements on the page; the rendering functions of the elements themselves are located at a lower level. Each individual button press is processed by its own handler.
Level 3	Function Libraries	This provides the execution of technical functions for receiving, processing, saving, or deleting data, as well as rendering individual elements of the graphical interface. Library functions can be used by any number of functional modules and operate independently of which module invoked them
Level 2	Resource Interfaces	This module ensures the interaction of library functions with the resources of the system, such as the system core, external handlers, files and user or system data, database stored procedures, and similar resources.
Level 1	Resources	Resources in this context refer to external data (such as files, records in a database) and data handlers (such as the system core, stored procedures in a database, file utilities, external web services) relative to the modules of the user interface unit.

3.4. SimBASIC

SimBASIC is the SimBASE application scripting language built into the system for creating scripts, which provides the ability to perform mathematical, logical, textual and graphical operations with data stored in the system. SimBASIC is a scripting language, consists of symbolic commands (commands) that are constantly executed by the SimBASIC interpreter. The language does not impose any restrictions on large programs and numerical strings; the script can save one line with a check of an arithmetic operation or an entire unit of report layout. For convenient work with SimBASIC scripts, the special SimBASIC editor is provided. The SimBASE system provides the ability to execute scripting language at almost all points where the logic of the system's operation is configured, providing the ability to save and provide various information "on the fly" to the right places.

4. System Architecture

4.1. Architecture



4.1.1. Technological stack

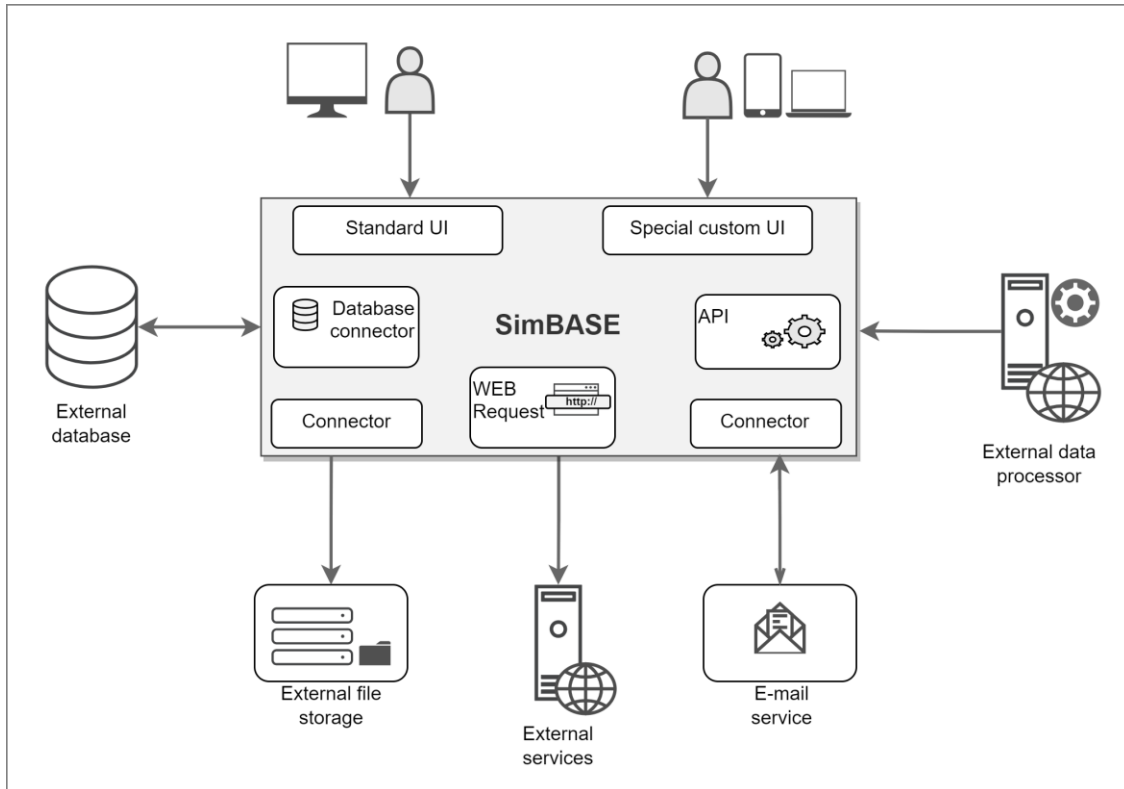
COMPONENT	SOFTWARE
WEB (Applications) server, Main system (Core)	Nginx or Apache 2.4, PHP 7.4 or higher
Database server	MySQL 8.0
Operational system	Oracle Linux 8 64-bit or Ubuntu Server 22.04 64-bit or Debian 11 64-bit

4.1.2. Minimum requirements

CPU	Number of cores: 2
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Memory	RAM 4GB
Storage	HDD 128 GB
Network controller	100Mbps

4.1.3. External interfaces and integrations

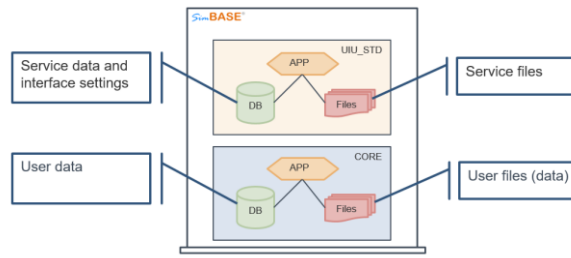


4.1.4. Implementation option

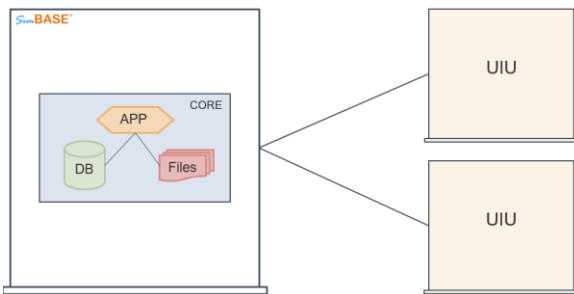
In addition to simple (basic) single-server system implementation, it may be useful to use more complex architectures to solve the following problems:

- Increasing the productivity (load balancing)
- Increased safety
- Increasing fault tolerance
- Creating distributed solutions
- Creation of autonomous interacting solutions (Service-Oriented Architecture (SOA)).

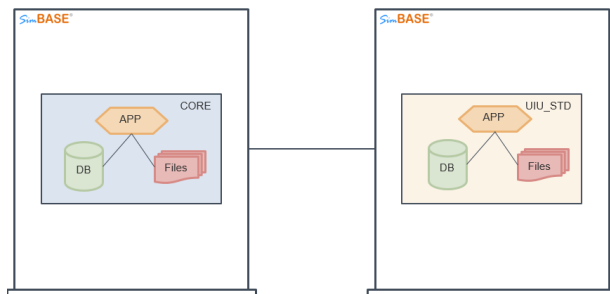
The simplest (basic) design option: the entire system is located on one server.



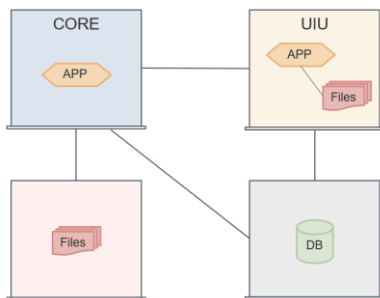
One core – several user interfaces (including identical ones, for example, distributed across a branch network).



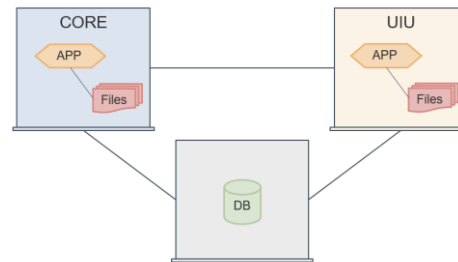
Separating the user interface unit from the core: each part is located at an appropriate distance (possibly in different network segments).



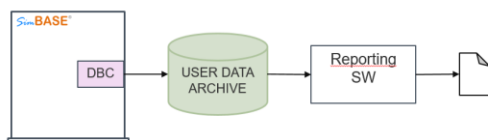
Using a specialized storage system for user kernel files (for example, SAN).



End-to-end processes across multiple SimBASE installations using an external database: combined online/offline mode with reactive or background synchronization is possible. Allocation of a single specialized database server while maintaining separation of servers for the core and user interfaces

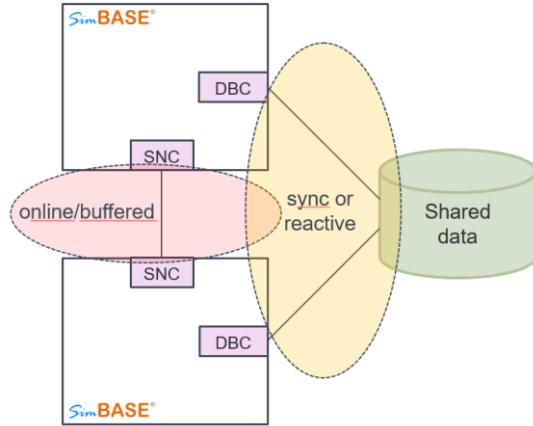
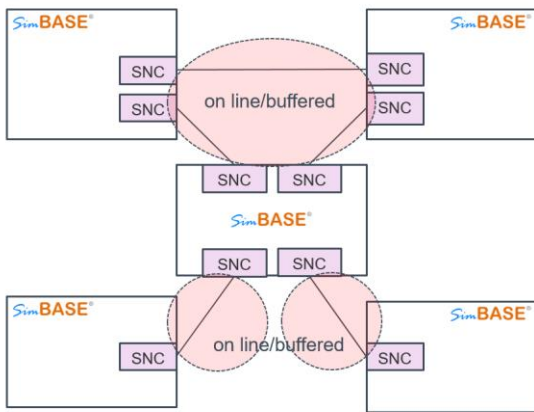


Uploading archived data to external storage. In addition to storing archives, it can be used, for example, for analytics and reports.



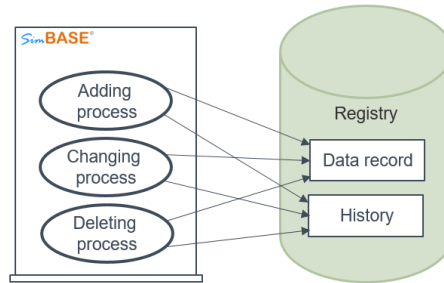
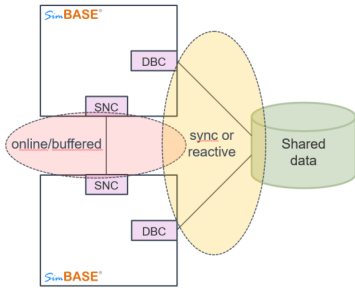
To improve performance, it is possible to use a clustered database on several physical servers

<p>Storing operational information in an external database and using a second SimBASE installation to build a gateway to external systems.</p>	<p>Separation of processes by roles on several installations with integration through a database (some systems may have no users).</p>
<p>Using SimBASE processes to manipulate external registry data: the processes themselves can be deleted upon completion</p>	<p>Integration with external systems through a common database and the use of separate databases for processing and archiving.</p>
<p>End-to-end processes based on multiple SimBASE installations: a process starts in one system, continues in another, and so on.</p>	<p>End-to-end processes across multiple SimBASE installations using an external database: combined online/offline mode with reactive or background synchronization is possible.</p>



End-to-end processes across multiple SimBASE installations using an external database: combined online/offline mode with reactive or background synchronization is possible

End-to-end processes based on multiple SimBASE installations: a process starts in one system, continues in another, and so on.



5. Continuous development

Clearly established processes for continuous integration (CI) and continuous delivery (CD) of changes allow us to regularly expand the functionality of SimBASE, while ensuring the highest quality of each release.

