

- ✓ Extensive experience in enterprise automation
- ✓ Compliance with INDUSTRY 4.0 requirements
- ✓ Open source multi-cloud platform
- ✓ Exclusively industrial solutions



# INDUSTRY 4.0 IIOT PLATFORM



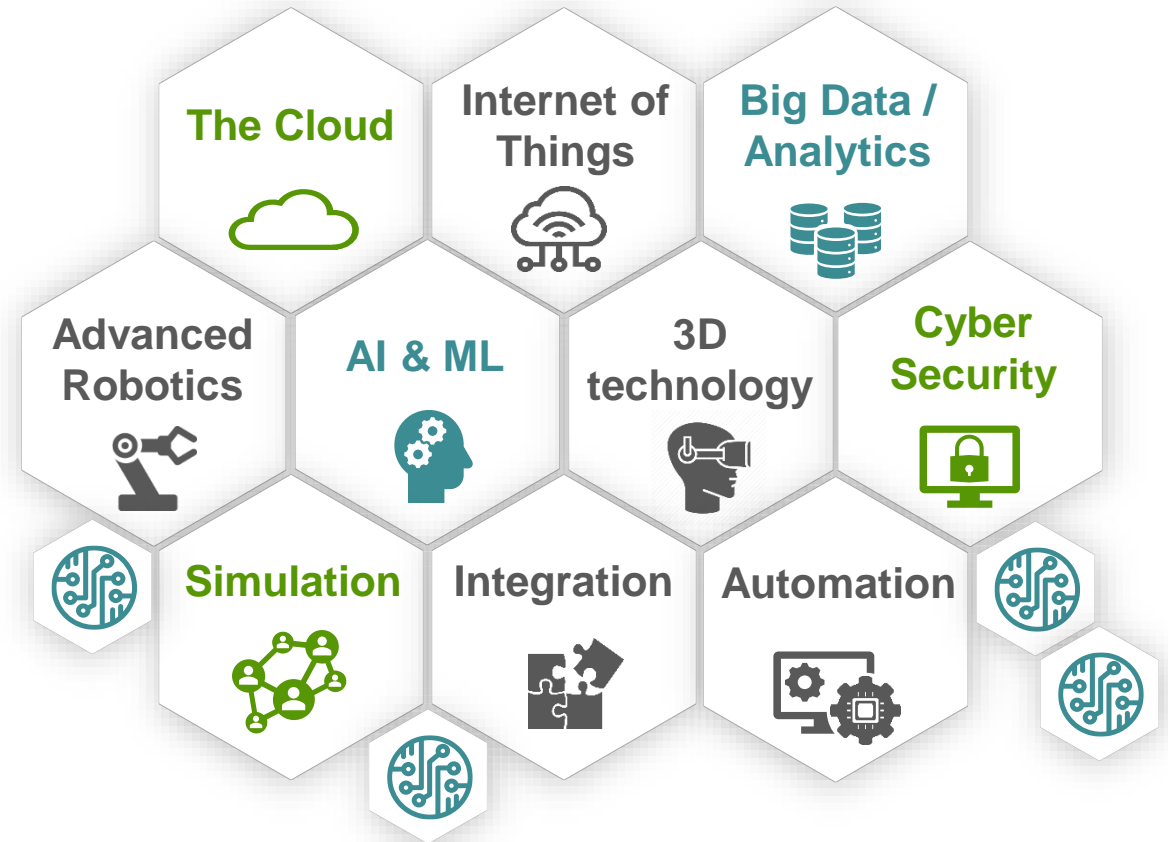
**SAKURA-IIOT**

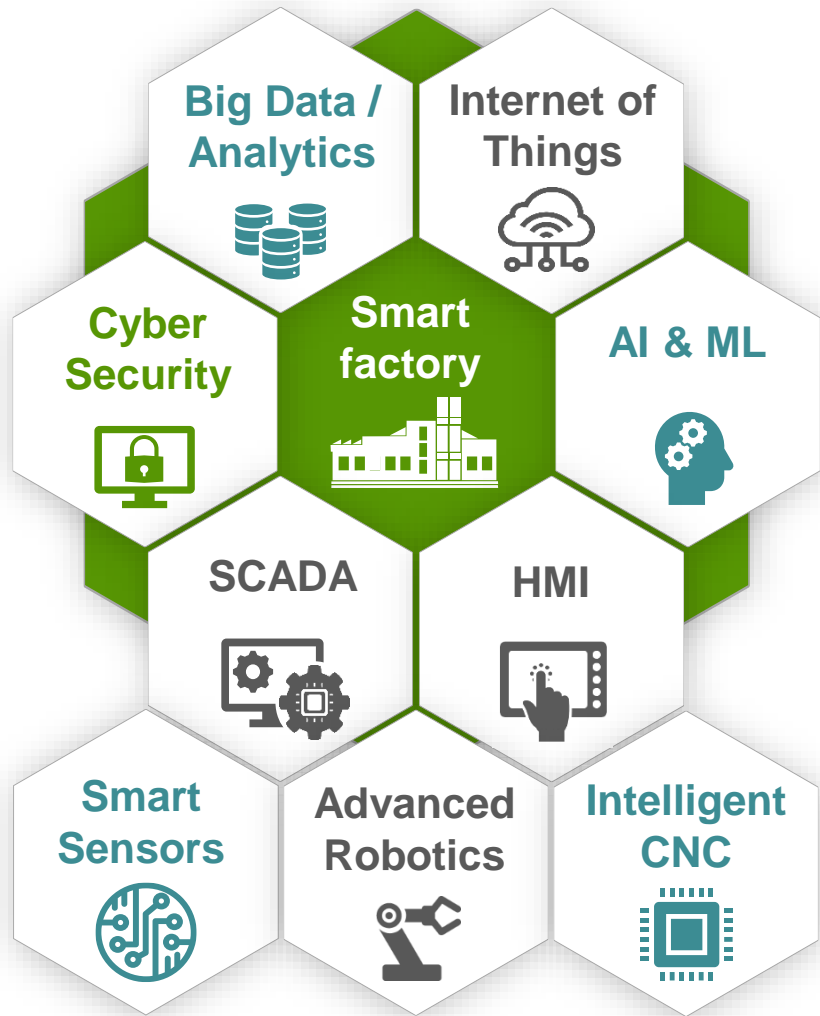


- ✓ Industry 4.0 is an urgent need of today, which guarantees financial success, development of technologies, real growth of production
- ✓ Industry 4.0 provides development and combination of automated production, data exchange and production technologies into a single self-regulatory system with minimal human intervention in production processes

### Main directions of development:

- ✓ Implementation of the Digital Double of the product creation
- ✓ Horizontal integration of productions and suppliers into a single information space
- ✓ Vertical integration of production systems





Industry 4.0 is transforming businesses and should be part of the CEO's daily agenda

- ✓ A new level of organization and control of production processes at all stages of product creation
- ✓ Products (from semi-finished product to finished product) contain all information about the technology of its production
- ✓ Manufacturing of products is carried out by a network of cyber-physical systems, based on data extracted from a semi-finished product



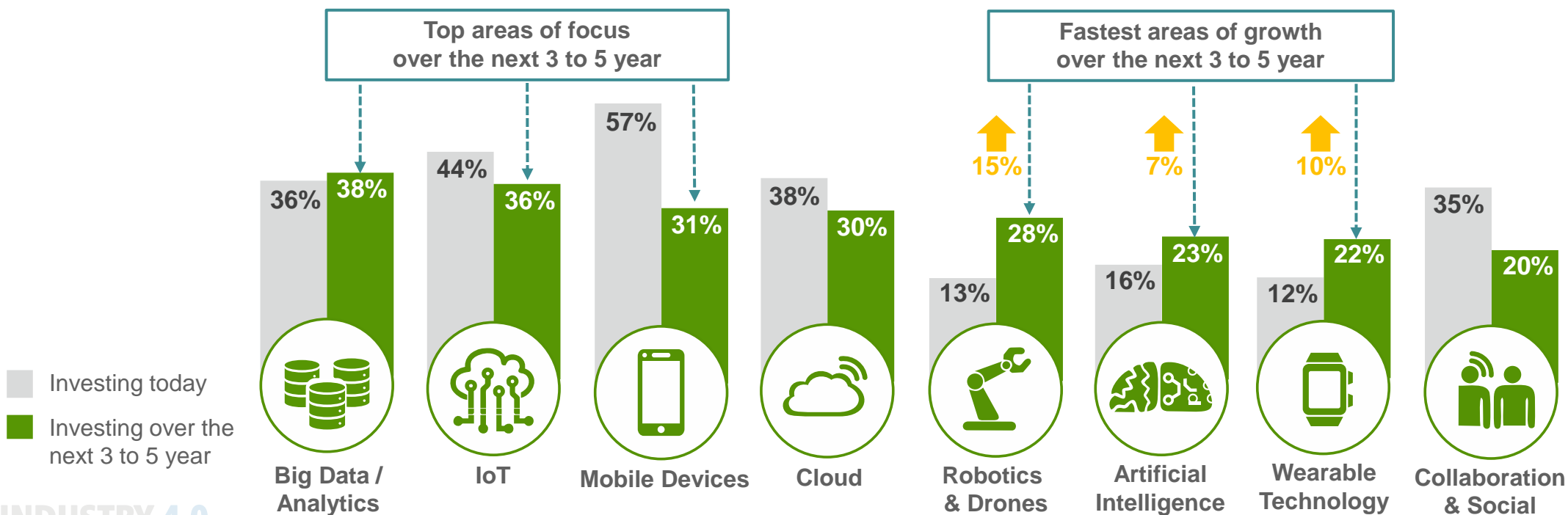
The results of research network of companies in the field of consulting and auditing PriceWaterhouseCooper (PWC):

Until 2025, European industry will invest around € 140 billion in Industry 4.0 annually

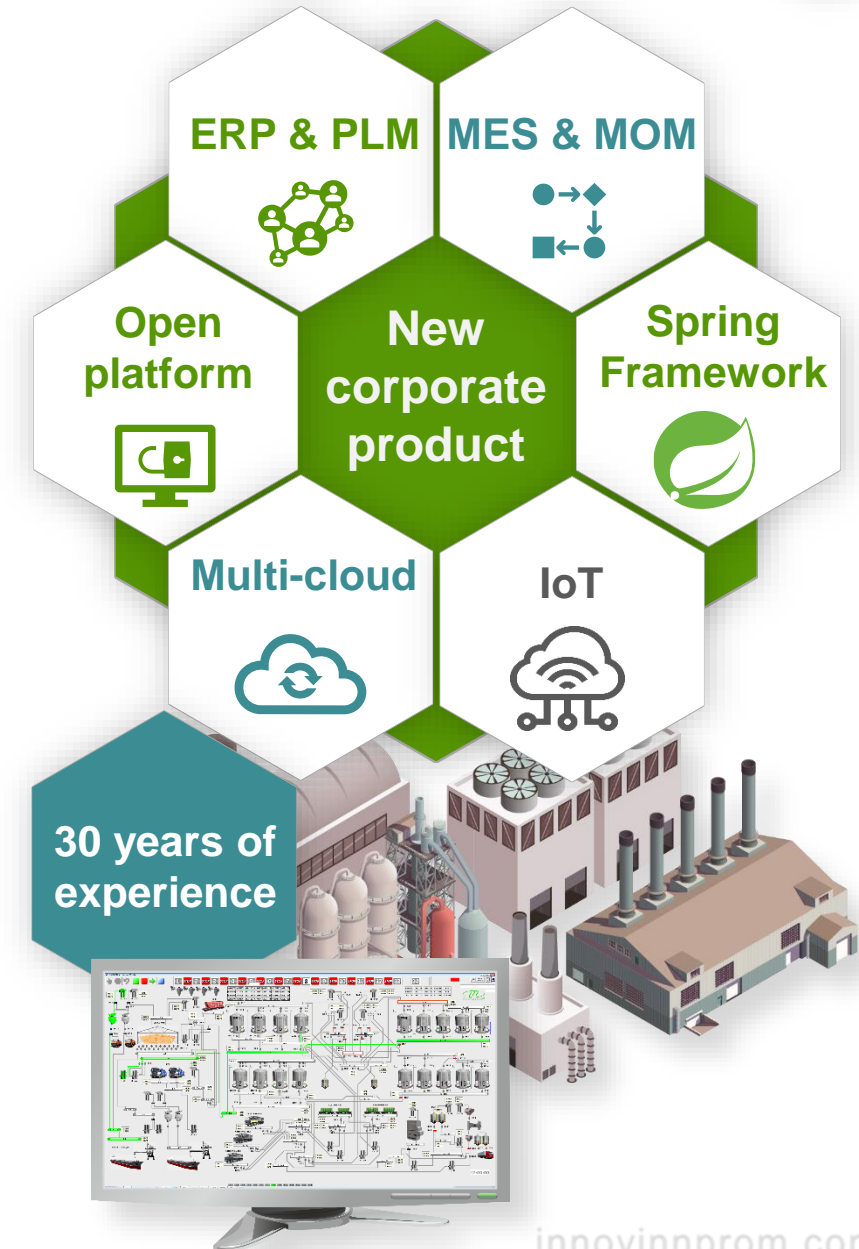
More than **80%** of enterprises, within 5 years, will digitize the entire product chain, including suppliers

By 2025, an **18%** increase in labor productivity is expected due to the introduction of the Industry 4.0 concept

Digital products and services generate around **€ 110 billion** in additional revenue for European industry annually

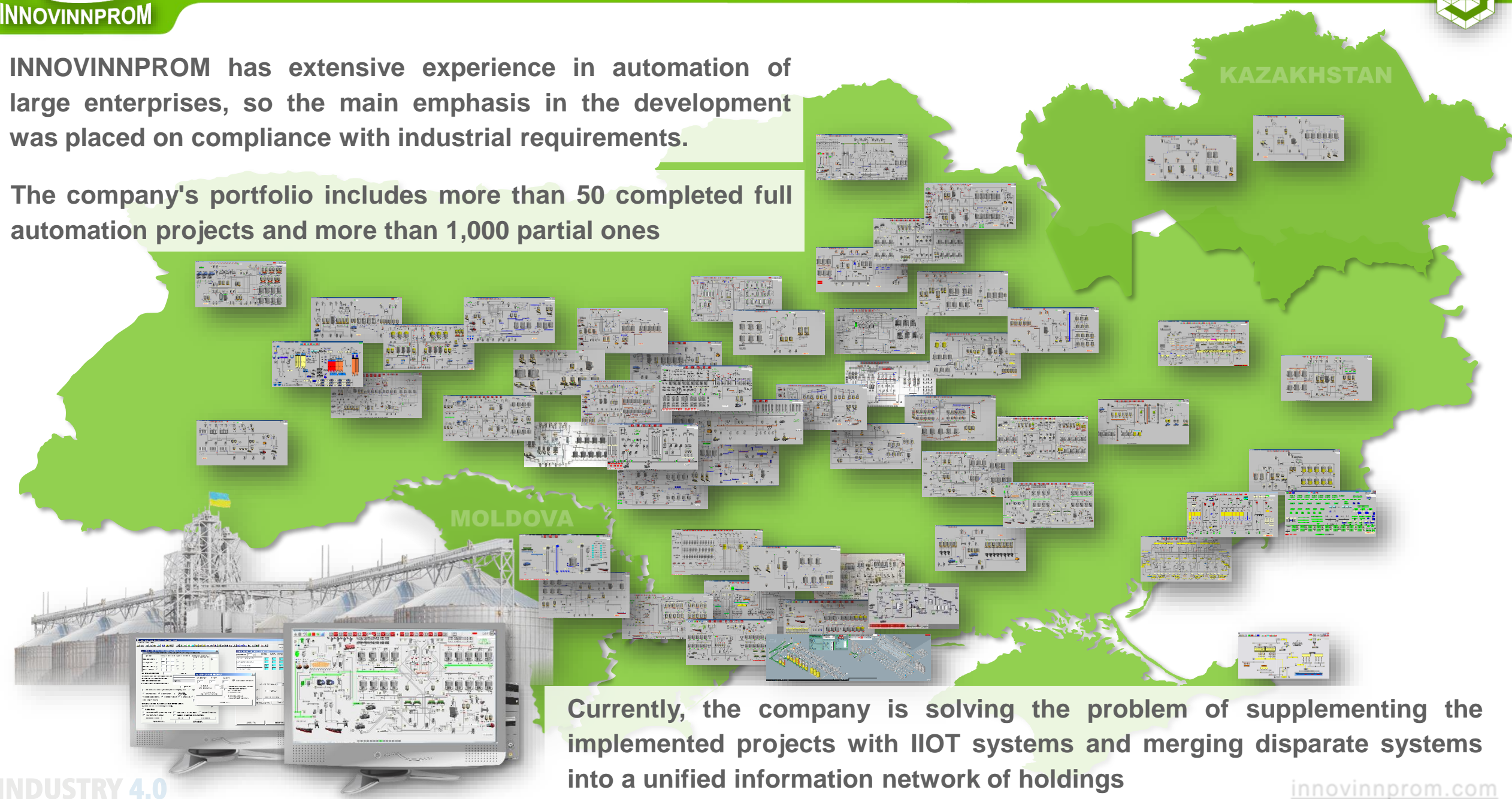


- 1** **Creating an alternative open source IIOT system**  
 that does not require licensing, works freely with a variety of databases, has a sufficient number of ready-made tabular and graphical forms for quick configuration of projects to customer needs
  
- 2** **Transfer of 30 years of experience of INNOVINNPROM LTD**  
 in creating information and analytical ERP and PLM systems and experience in integrated enterprise automation to a modern software base, the use of the most modern databases, computing and cloud solutions
  
- 3** **Combining data sets of MES and MOM systems with data sets of ERP and PLM systems**  
 into a single information space for the formation of analytical information that will provide a qualitative calculation of productivity and energy efficiency of production
  
- 4** **Ability to quickly create corporate projects**  
 by configuring ready-made computing software modules, visualization modules and databases without the involvement and training of highly specialized professionals and programmers



INNOVINNPROM has extensive experience in automation of large enterprises, so the main emphasis in the development was placed on compliance with industrial requirements.

The company's portfolio includes more than 50 completed full automation projects and more than 1,000 partial ones



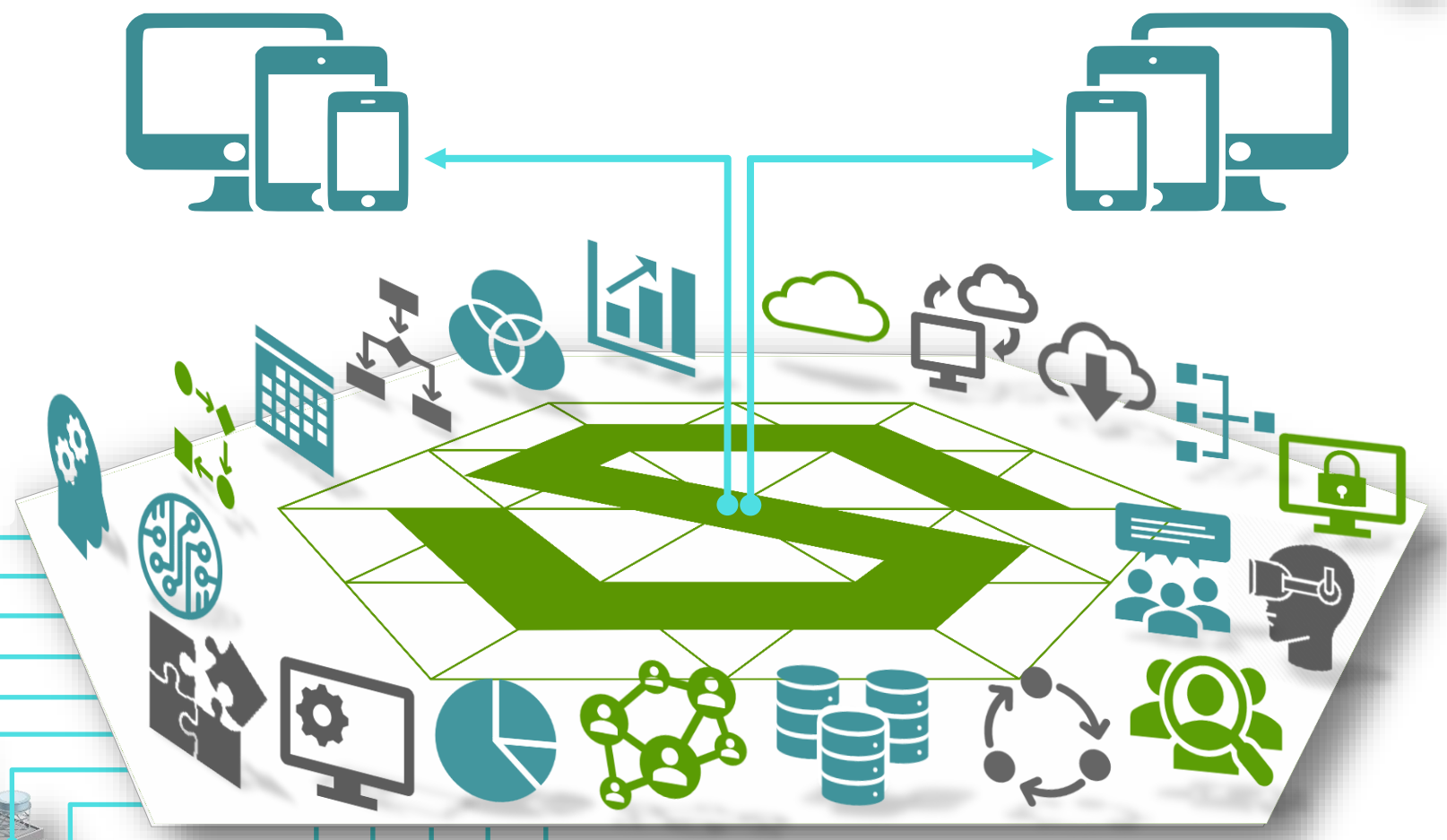
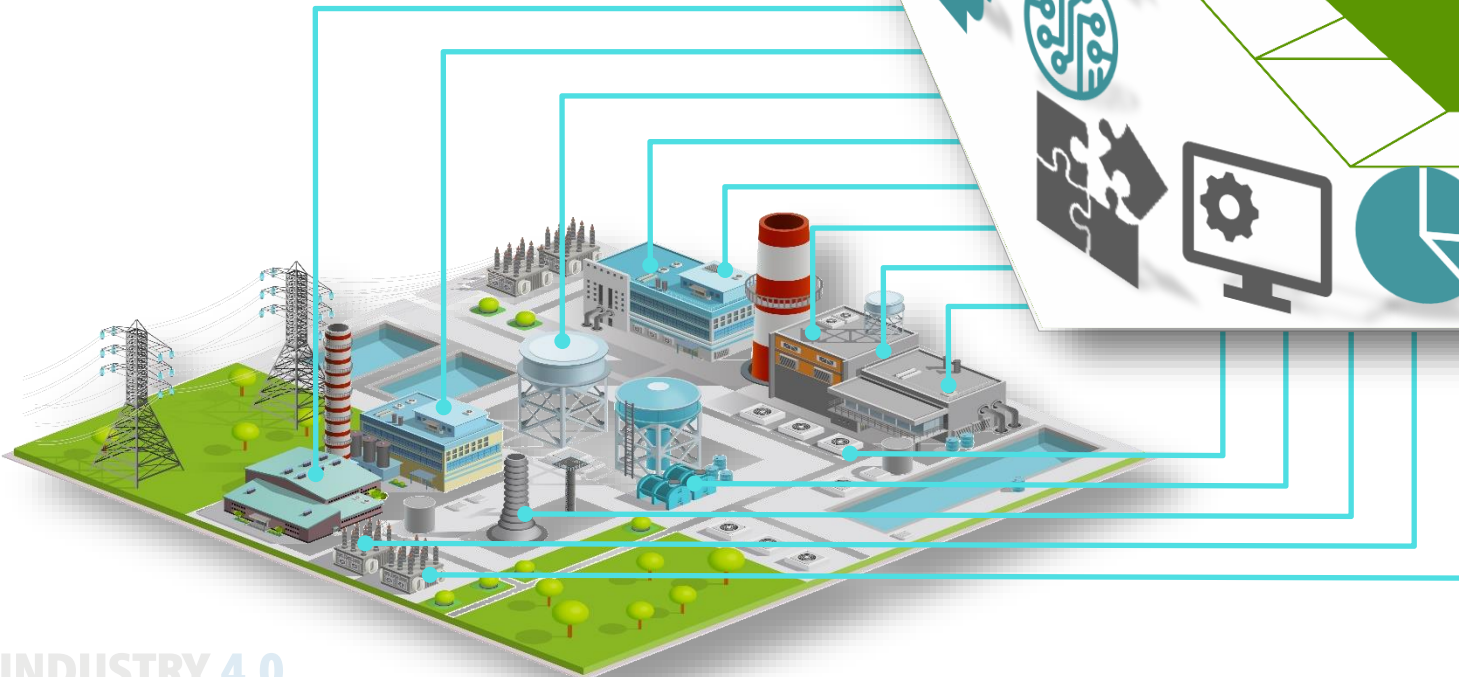
Currently, the company is solving the problem of supplementing the implemented projects with IIOT systems and merging disparate systems into a unified information network of holdings

To implement the task of merging existing SKADA into a single information network of holdings, INNOVINNPROM has developed the IIOT platform **SAKURA-IIOT** and deployed on its basis MES, ERP, PLM systems at several enterprises. The main purpose of the systems implemented on the **SAKURA-IIOT platform** is to increase the productivity of enterprises.



**S-IIOT** is a modern multi-cloud platform, that provides collection, analysis and visualization of the full range of data on the operation of each unit of equipment and the enterprise as a whole.

The main task of SAKURA-IIOT is to control production and increase its productivity.



The main principles of **SAKURA-IIOT** - strict adherence to industrial rules and regulations and compliance with Industry 4.0



**S-IIOT** compiles mainstream JVM technologies into a powerful environment, responding to modern development standards and common requirements of business applications.

## MODULAR

The unique architecture allows any SAKURA-IIOT application to be embedded into another SAKURA-IIOT application.

This makes modularization practically trivial - split your task into a number of loosely coupled parts, develop them separately and assemble together into one comprehensive system.

## SCALABLE

The framework is designed to be scalable both vertically and horizontally.

It provides multiple deployment options depending on the planned application load and permitted downtime.

## COMPATIBLE

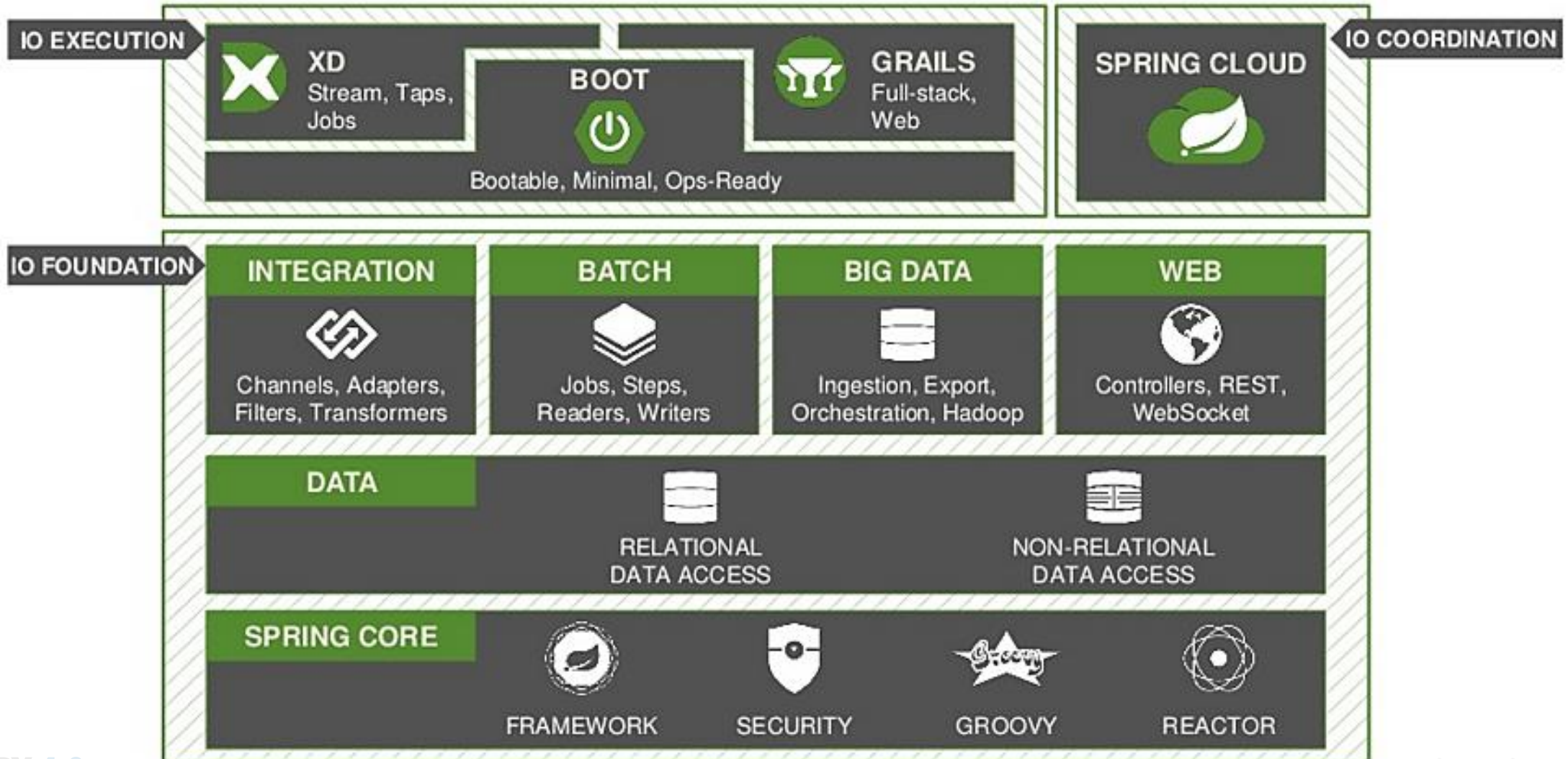
SAKURA-IIOT applications are compatible with most popular RDBMS and run in any Java servlet container.

They can be distributed as WAR, Docker image, UberJar or deployed to the clouds.





**S-IIOT** naturally adopts most features of Spring Framework, so you can rely on its wide ecosystem and apply your expertise gained before. Based on Spring Framework

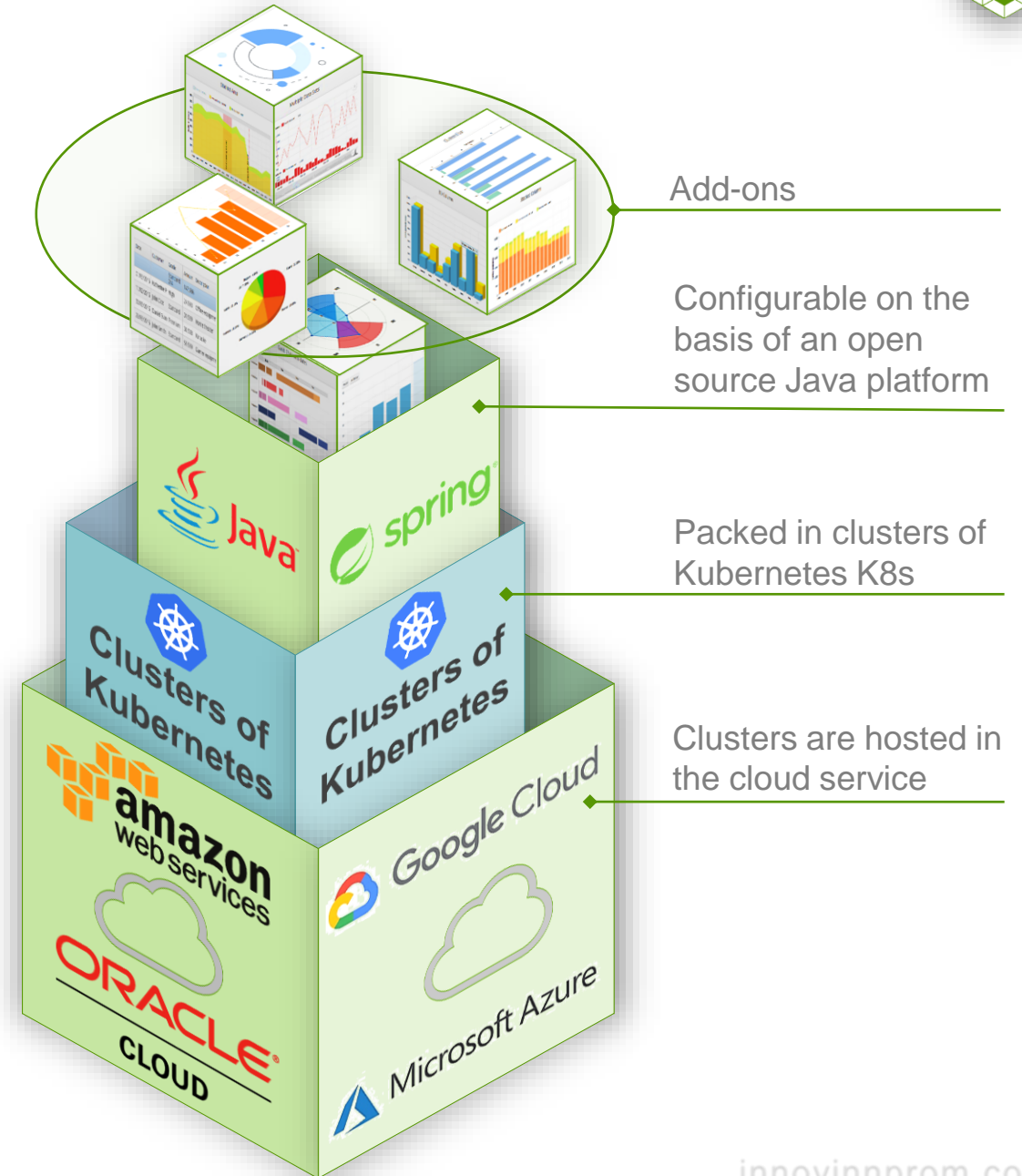


**S-IIOT** is implemented on the basis of a high-level open source Java platform for creating corporate information systems, as well as the server part of portals and mobile applications


SAKURA-IIOT has a scalable modular architecture based on popular frameworks, designed to work in any environment

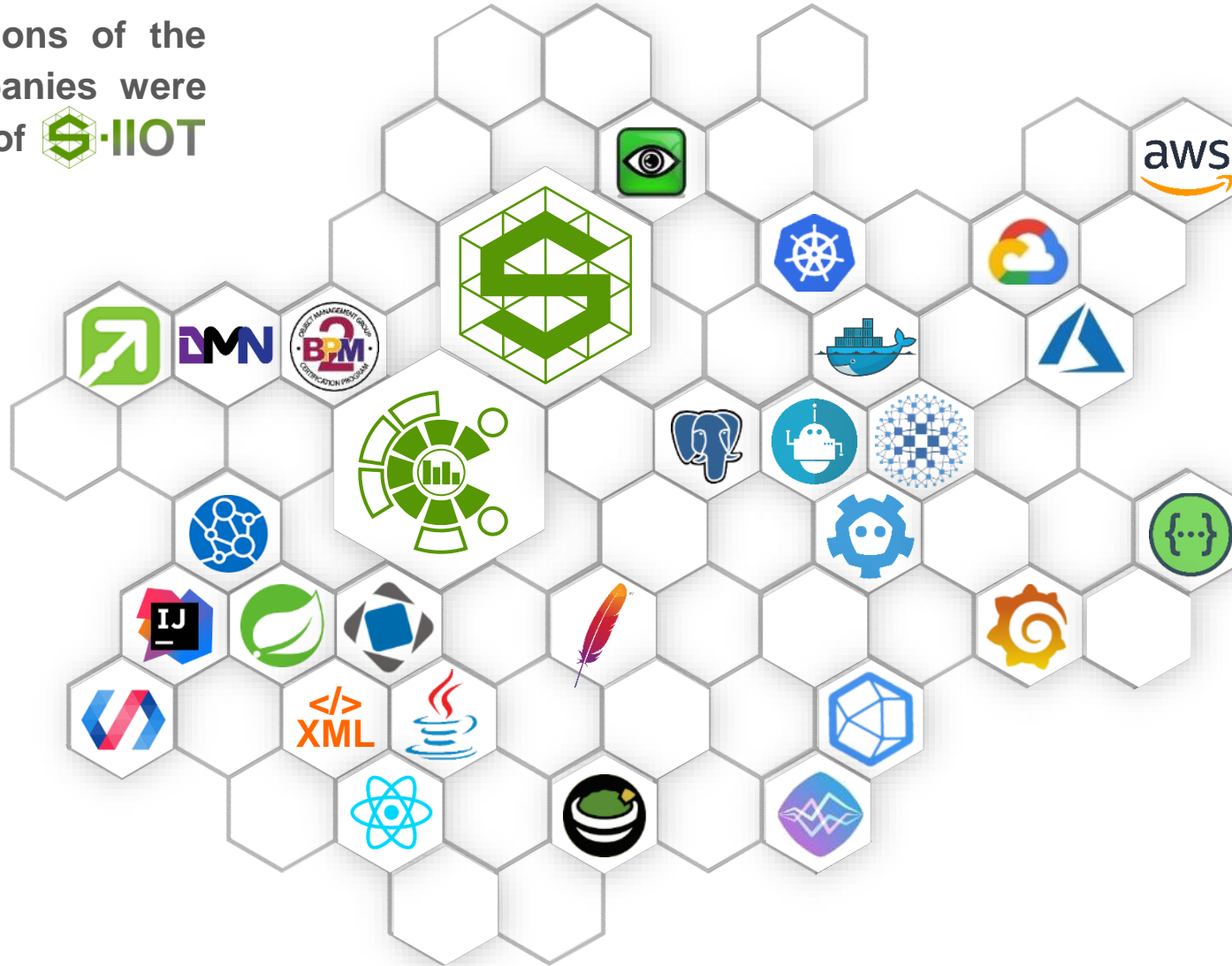
In addition, SAKURA-IIOT modules such as databases and application databases are arranged in Kubernetes (K8s) clusters

The SAKURA-IIOT architecture can be integrated into the cloud services of the world's leading providers selected by the customer and effectively use the storage, backup protection, data processing and computing capabilities guaranteed by these services



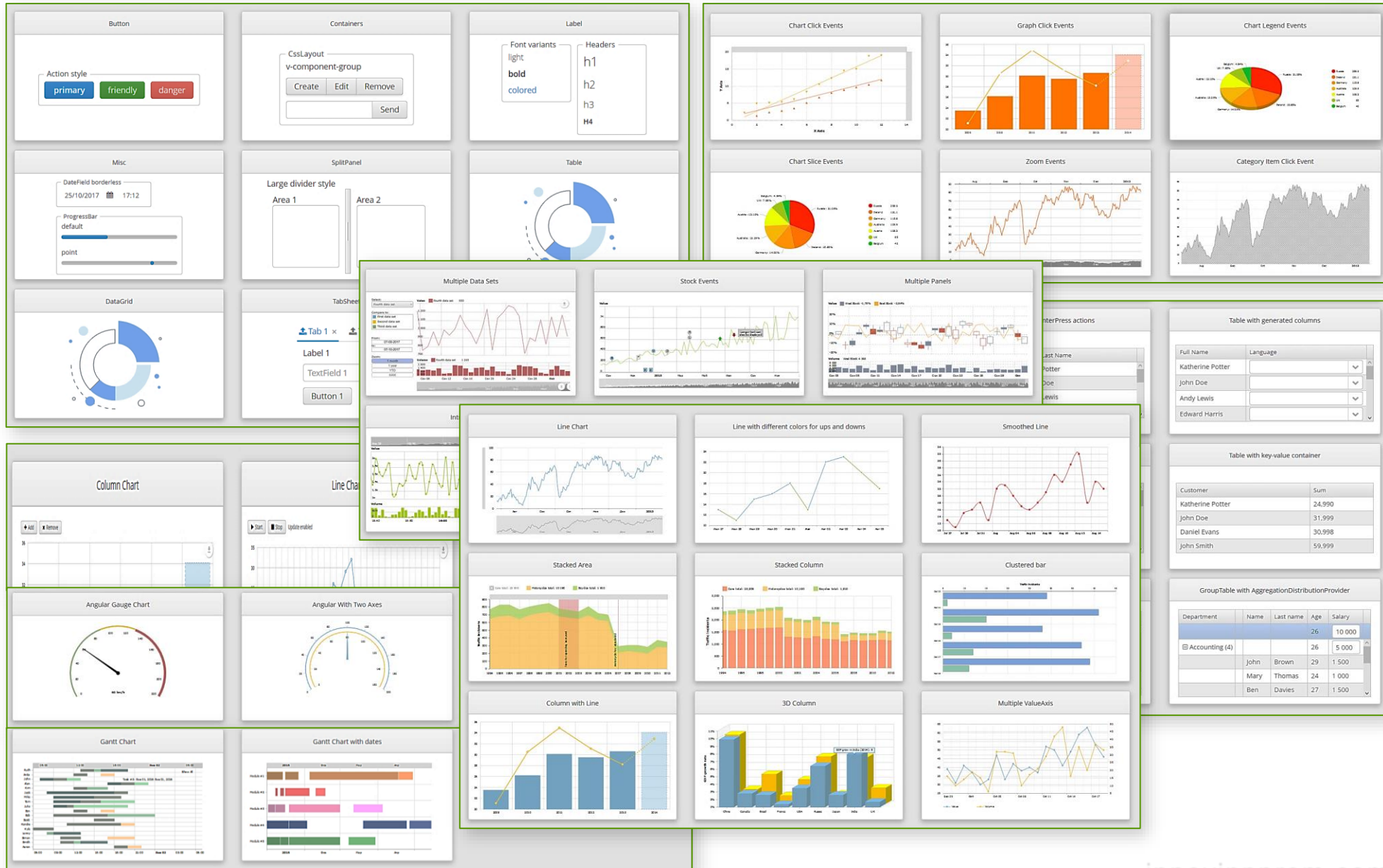


The most modern solutions of the world's leading IT companies were used in the development of  IIOT



-  Google Cloud
-  Microsoft Azure
-  amazon web services
-  kubernetes
-  docker
-  HAULMONT
-  spring
-  Flowable
-  BPMN
-  DMN
-  IntelliJ IDEA
-  Java
-  Polymer
-  React
-  Swagger.
-  influxdb
-  chronograf
-  Grafana Labs
-  PostgreSQL
-  HAProxy
-  PATRON
-  APACHE HTTP SERVER PROJECT
-  Apache Guacamole™
-  UltraVNC

**S-IIOT** marketplace contains a rich collection of ready-to-use add-ons that cover all typical requirements for business applications and can be enabled with a mouse click – components, containers, dialogs and notifications, charts, pivot tables, maps, predefined styles



The collage displays a wide variety of UI components and data visualization tools:

- Buttons:** Action style buttons (primary, friendly, danger).
- Containers:** CSSLayout v-component-group with Create, Edit, Remove, and Send buttons.
- Labels:** Font variants (light, bold, colored) and Headers (h1, h2, h3, H4).
- Misc:** DateField borderless (25/10/2017, 17:12), ProgressBar (default, point).
- SplitPanel:** Large divider style with Area 1 and Area 2.
- Table:** A circular progress indicator.
- Charts:** Multiple Data Sets, Stock Events, Multiple Panels, Line Chart, Line with different colors for ups and downs, Smoothed Line, Stacked Area, Stacked Column, Clustered bar, Column with Line, 3D Column, Multiple ValueAxis, Column Chart, Line Chart, Angular Gauge Chart, Angular With Two Axes, Gantt Chart, Gantt Chart with dates.
- Tables:** Table with generated columns (Full Name, Language), Table with key-value container (Customer, Sum), GroupTable with AggregationDistributionProvider (Department, Name, Last name, Age, Salary).
- Other:** TabSheet (Tab 1, Label 1, TextField 1, Button 1), DataGrid, Table with generated columns, Table with key-value container, GroupTable with AggregationDistributionProvider.

The Business Process Engine Written allows to describe business process steps right in the application using the integrated BPMN 2.0 modeler. It enables seamless integration with the runtime application parts and visual process customizing.

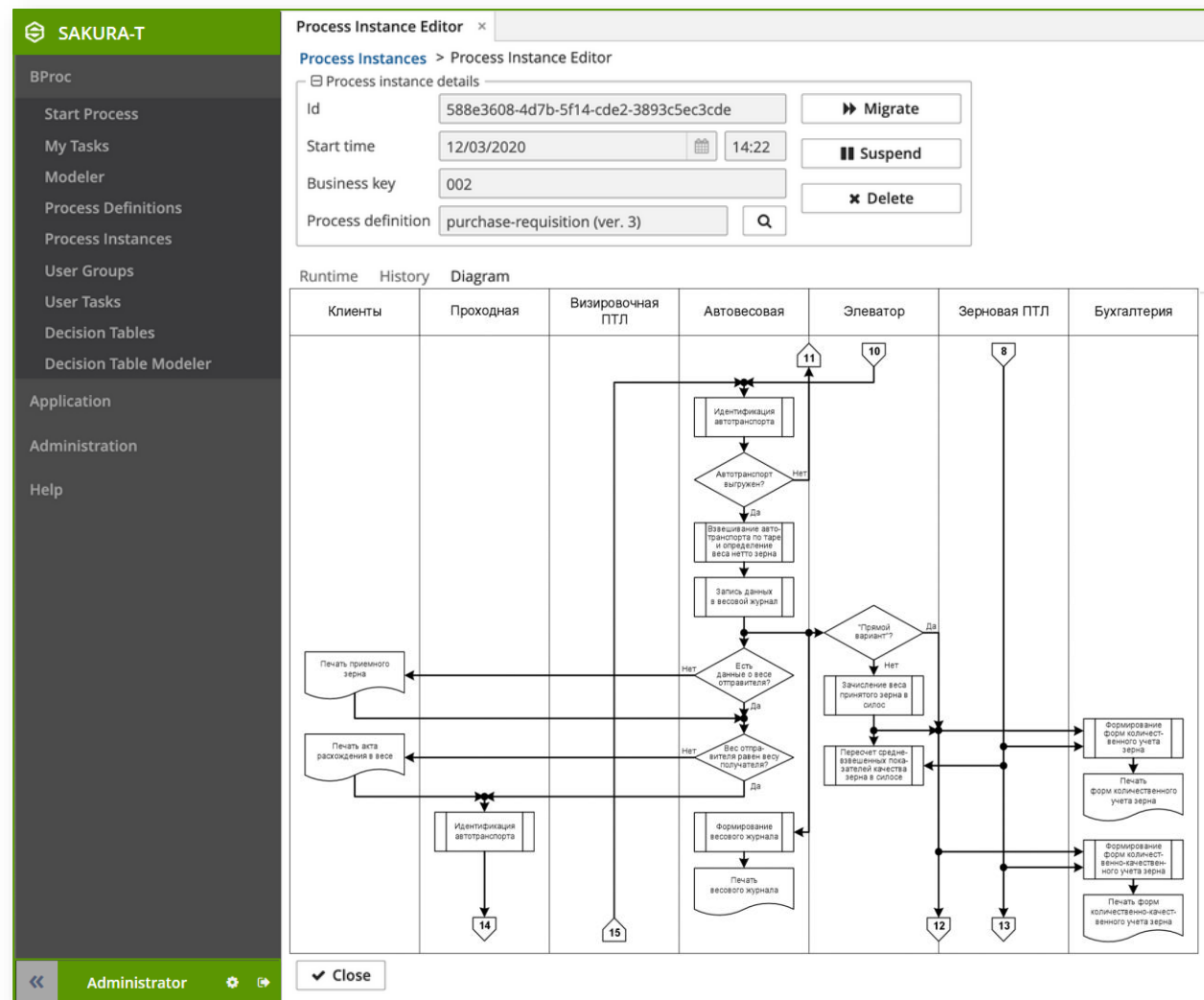
## The business process engine written contains:

- The embedded light-weight Flowable runtime engine
- BPMN 2.0 visual designer based on bpmn-js framework
- DMN 1.1 decision table designer for complex decision logic

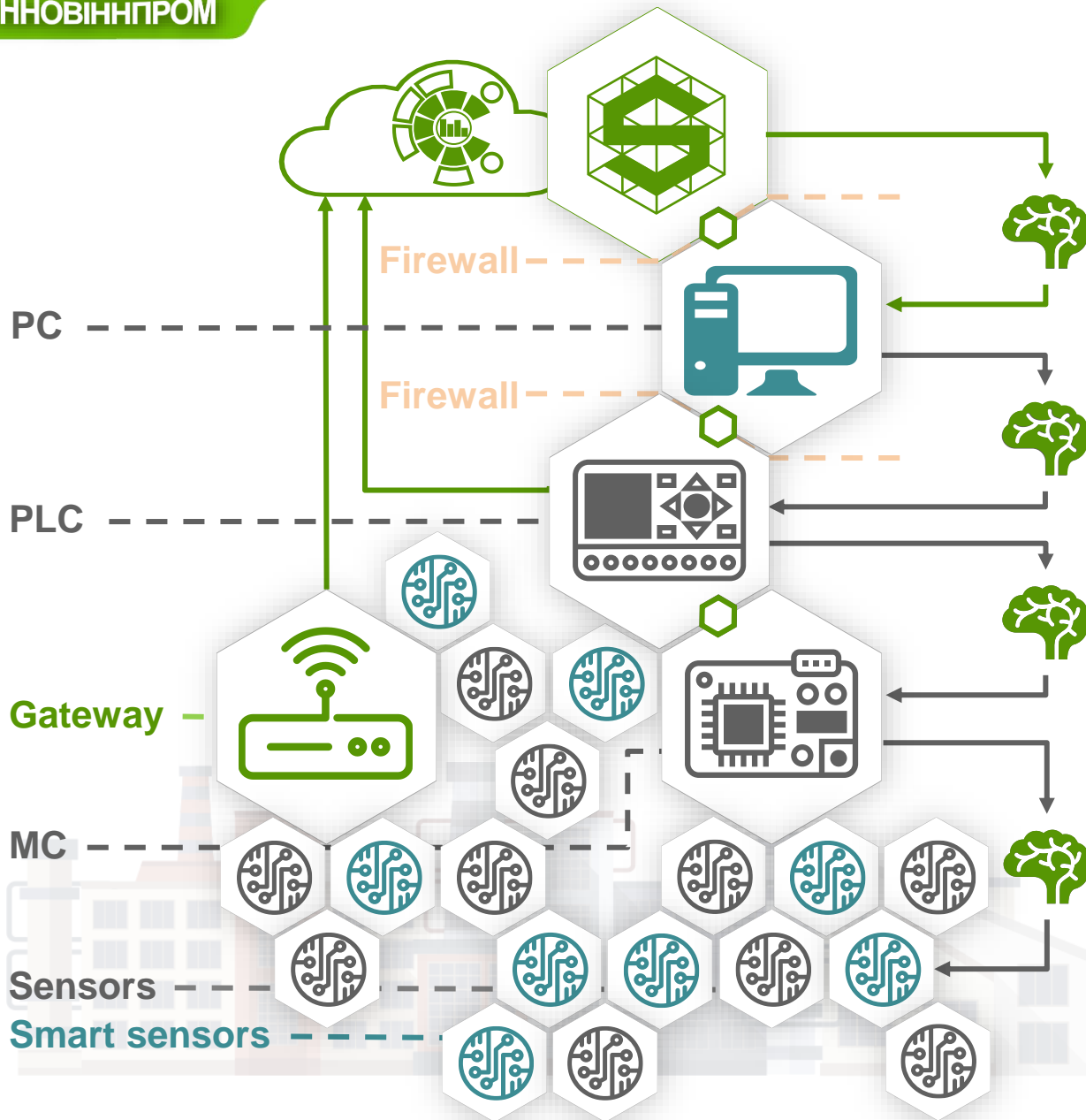
**Flowable** is a light-weight business process engine written in Java. The Flowable process engine allows you to deploy BPMN 2.0 process definitions, creating process instances of those process definitions, running queries, accessing active or historical process instances and related data, plus much more.

**DMN** is a modeling language and notation for the precise specification of business decisions and business rules. DMN is easily readable by the different types of people involved in decision management.

These include: business people who specify the rules and monitor their application; business analysts.



The screenshot displays the 'Process Instance Editor' for 'SAKURA-T'. The interface includes a sidebar with navigation options like 'Start Process', 'My Tasks', 'Modeler', and 'Process Definitions'. The main area shows details for a process instance with ID '588e3608-4d7b-5f14-cde2-3893c5ec3cde', started on '12/03/2020' at '14:22', with a business key of '002'. Below this is a BPMN diagram for a grain purchase process, divided into lanes for 'Клиенты', 'Проходная', 'Визировочная ПТЛ', 'Автотранспортная', 'Элеватор', 'Зерновая ПТЛ', and 'Бухгалтерия'. The diagram includes tasks like 'Идентификация автотранспорта', 'Взвешивание авто-транспорта', and 'Формирование весового журнала', along with decision diamonds and flow connectors.



**S-IIOT** supports Artificial Intelligence and Machine Learning technologies.

**S-IIOT** adjustment principles are based on strict adherence to SCADA's multi-level industrial architecture:

1. Hardware microcontrollers and built-in sensor microcontrollers are responsible for adapting and configuring intelligent sensors;
2. Control and management of equipment microcontrollers is performed by programmable logic controllers (PLC);
3. Control and management of PLC is carried out by SCADA
4. SAKURA-IIOT on the basis of data array processing makes general adjustments at each level of management

Additional sensors and gateways are installed to obtain the most complete information about the system operation. They provide data transfer directly to SAKURA-IIOT cloud services.

**S-IIOT** works in any customer-friendly browser on any operating system. To enter SAKURA-IIOT, simply enter the Internet address in the corresponding browser menu. Access to SAKURA-IIOT is provided on the basis of login and password.



The configuration of SAKURA-IIOT windows and pages, access rights, staff roles are determined at the stages of terms of reference and system configuration, but staff are given the opportunity to adapt the display of data in a convenient form for personal perception.

Thanks to the integration of SAKURA-IIOT into cloud services of the world's leading cloud service providers has virtually unlimited resources for storage, processing, analysis and visualization of large amounts of data.







## SAKURA-IIOT



Licensing not required



Open programming platform



Open source code



Popular programming languages



Works with any cloud service



No need for installation



The need for high-cost licenses



Proprietary programming platform



Closed source code



Specific programming languages



Payment for the imposed cloud service



The need to setup installation packages

## Alternative systems

**S-IIOT** receives data from the equipment (PC, PLC, MC) and / or software available at the facility, without interfering with the technological process

Additional IoT gateways are installed to provide maximum data directly to cloud services

**SAKURA-IIOT** supports most industrial interfaces and data protocols

The greater the volume and completeness of the data received by **SAKURA-IIOT**, the better the control and calculation of productivity and process efficiency





**Real-time control** of technological processes in production in any industry.

Based on the analysis of large amounts of data, optimization of technological settings and delays in the formation of recommendations for improving production productivity.



**Calculation and analysis of energy efficiency** of equipment, technological operations and production in general, the formation of summary and comparative graphs and tables of energy efficiency for selected periods of time and in different modes of operation.



**Control** of personnel work, blocking and prevention of mistakes and emergency situations.

Planning production changes and controlling the placement of personnel in accordance with the level of training. Control and analysis of personnel productivity separately, in shifts.



**Planning and control of maintenance and repair of equipment.**

Accounting for operating and consumption of energy resources by equipment.

Accounting and planning the use of spare parts and materials during maintenance and repairs.



The workspace of information business systems based on the **SAKURA IIOT platform** covers all stages of the holding's production and business processes. In accordance with the access rights, the consumer receives the necessary technological, financial, analytical information designed specifically for him.

Control and analysis of the enterprise

Analysis of productivity and energy efficiency

Business process analytics

Control and comparison of holding enterprises

Control and analysis of equipment operation

Equipment maintenance and repair planning

Business systems developed by INNOVINNPROM based on the **SAKURA-IIOT platform** have built-in elements of artificial intelligence and perform self-regulatory functions to optimize the financial costs of the enterprise by optimizing interconnected production and technological processes and reducing the role of the human factor.

Currently, INNOVINNPROM is deploying the following industrial analytical systems for control and management of all production and technological processes at industrial enterprises:



## MES/ERP/PLM system SAKURA-P

SAKURA-P provides horizontal integration of production and suppliers into a single information network and is responsible for obtaining information about the work of enterprise, planning, operational control and management of production and material resources.

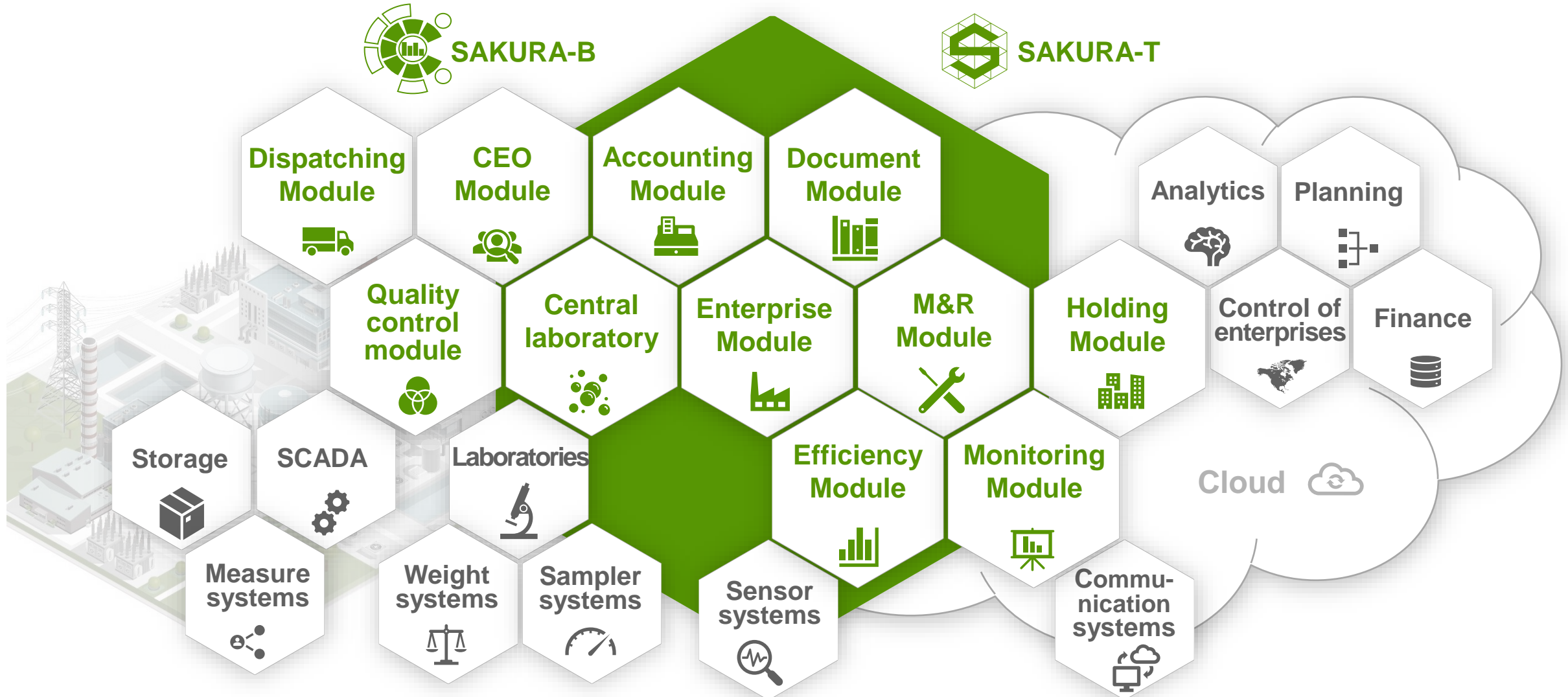


## Information-analytical IIOT system SAKURA-T

SAKURA-T provides vertical integration of production systems and is responsible for control of technological processes at the enterprises (enterprise), control and analysis of energy consumption, control and analysis of efficiency of the equipment use by the enterprises and control of production processes' productivity.



SAKURA-P and SAKURA-T systems have a modular structure. The customer receives the basic modules and modules that he needs. When applied to system architecture, changes can be made to suit today's needs.



**EMI**  
Enterprise  
Manufacturing  
Intelligence

**PLM**  
Product  
Lifecycle  
Management

**ERP**  
Enterprise  
Resource  
Planning

**MES**  
Manufacturing  
Execution  
System

**Cloud**

**MOM**  
Manufacturing  
Operations  
Management

**TIA**  
Totally  
Integrated  
Automation

## SAKURA-T



Control of enterprises



Analytics



Planning



Maintenance



Energy  
efficiency



Energy control



IIoT gateways

**APS**  
Advanced  
Planning &  
Scheduling



Analytics



Planning

## SAKURA-B



Registration



Raw materials  
laboratory



Technological  
laboratory



Central  
laboratory



Silo board



Quantitative &  
accounting



Accounting



Dispatching  
department



Automobile  
weight



Railway  
weights



Samplers



Raw materials  
storage



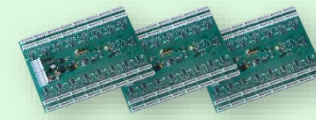
Finished  
products storage

## SCADA



PLC

## Measurement



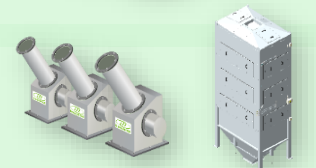
Controllers & Sensors

## Sampler systems



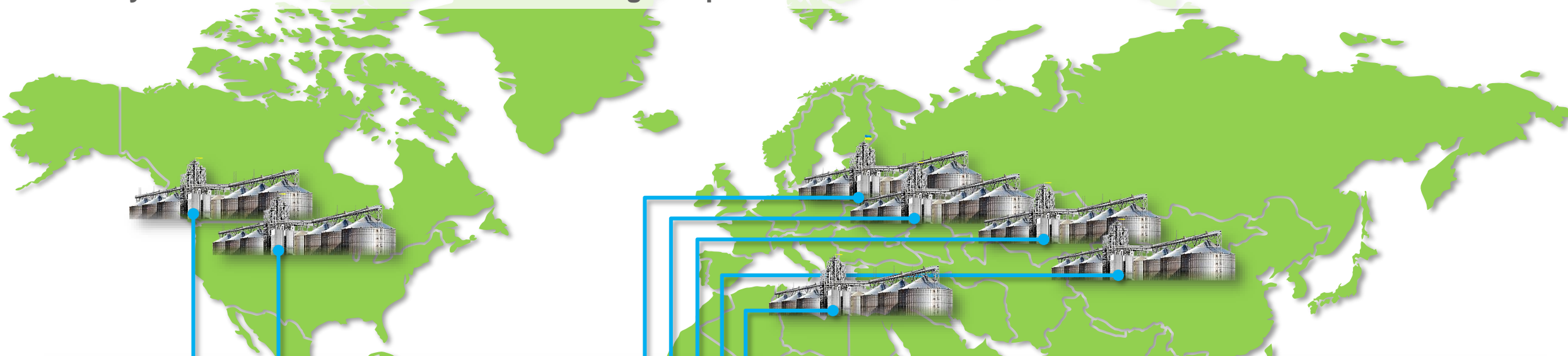
Samplers

## Weight systems



Weights

The Holding module provides collection, analysis and display of generalized, comparative, concretized and analytical information received from holding companies



SAKURA-T

Типи обладнання × Обладнання × Підприємства × Туре Grain Crop × Entry Inspector × Маршрути історія × Історія обладнання × Силова дошка × Equipment Dashboard × Лутовинівка Screen ×

Application

Тип обладнання  
Обладнання  
Підприємства  
Довідник культур  
Енергія  
Енергообладнання  
Дашборд обладнання  
Supervisor  
Lutovynivka Screen  
Технологія  
Маршрути історія  
Історія обладнання  
Силова дошка  
ТОР

Витівці	Красилів	Лутовинівка	Семенівка
Споживання електроенергії 4536,25 кВт	Споживання електроенергії 1846,3 кВт	Споживання електроенергії 968,17 кВт	Споживання електроенергії 1536,25 кВт
Споживання газу 451,5 м3/год	Споживання газу 200,25 м3/год	Споживання газу 0 м3/год	Споживання газу 400,17 м3/год
Енергоефективність 0,84	Енергоефективність 0,78	Енергоефективність 0,69	Енергоефективність 0,82

Скороходово	Хмільник	Яреськи	Вінниця
Споживання електроенергії 1521,8 кВт	Споживання електроенергії 2431,64 кВт	Споживання електроенергії 968,85 кВт	Споживання електроенергії 1221,37 кВт
Споживання газу 120,25 м3/год	Споживання газу 136,12 м3/год	Споживання газу 0 м3/год	Споживання газу 350,16 м3/год
Енергоефективність 0,67	Енергоефективність 0,74	Енергоефективність 0,68	Енергоефективність 0,73

Ma	Var	Із	До	Запуск	Трив	Зупинка	Трив	Час р	Операція	Культура	Вага	WP	WQ	WS	Енергоефективність	Детальна Інфор
2	2	АВТОПРИЄМ №2	БункерВУ 2.1	20/11/2020 10:54	0:04	20/11/2020 11:07	0:58	0:12		Невизначено	0	3,343	10,549	13,433	0,0	More info
1	2	АВТОПРИЄМ №1	БункерВУ 3.6	20/11/2020 10:42	1:8	20/11/2020 11:07	0:44	0:24		Невизначено	0	7,564	22,193	24,344	0,0	More info
7	4	БункерВУ 2.1	БункерВУ 2.4	20/11/2020 06:20	2:9	20/11/2020 10:09	1:19	3:49		Невизначено	0	165,904	370,382	379,568	0,0	More info
1	2	АВТОПРИЄМ №1	БункерВУ 3.6	19/11/2020 17:30	1:8	19/11/2020 18:20	0:44	0:50		Невизначено	17,050	32,640	47,693	60,513	0,02	More info
1	2	АВТОПРИЄМ №1	БункерВУ 3.6	19/11/2020 13:40	0:04	19/11/2020 13:55	0:44	0:15		Невизначено	4,500	5,850	13,524	15,350	0,0	More info

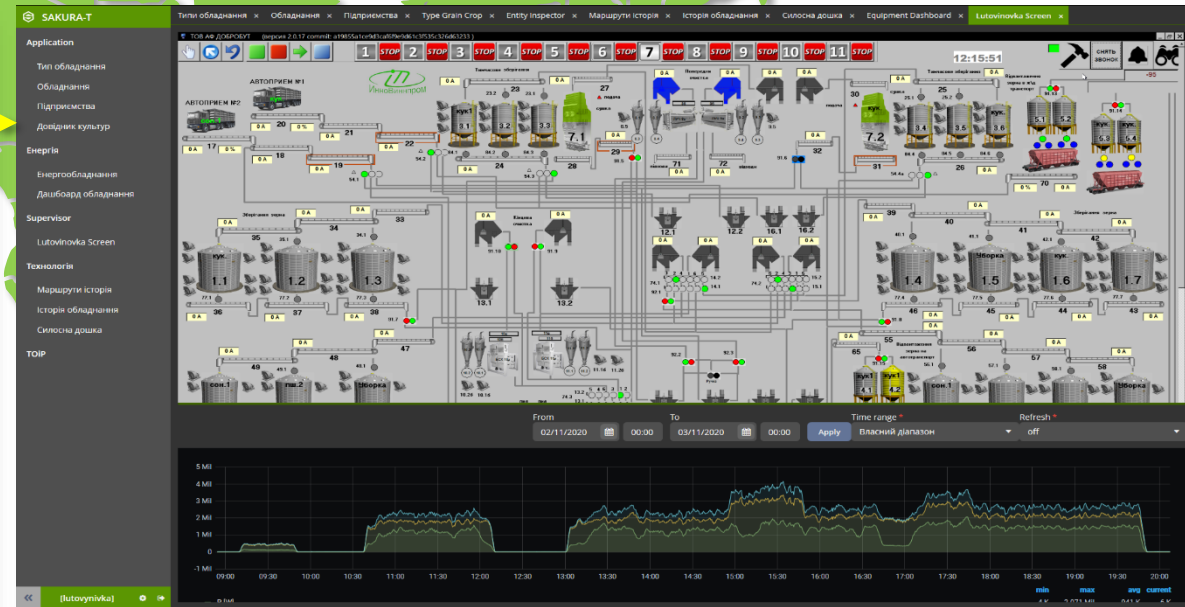
Refresh Excel Переказувати енергію

SAKURA-T

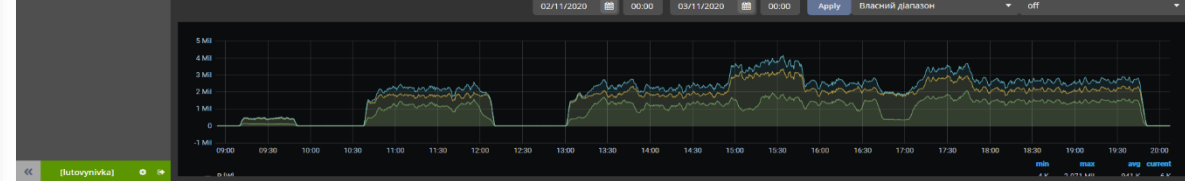
Типи обладнання × Обладнання × Підприємства × Туре Grain Crop × Entry Inspector × Маршрути історія × Історія обладнання × Силова дошка × Equipment Dashboard × Lutovynivka Screen ×

Application

Тип обладнання  
Обладнання  
Підприємства  
Довідник культур  
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Енергообладнання  
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Lutovynivka Screen  
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Маршрути історія  
Історія обладнання  
Силова дошка  
ТОР

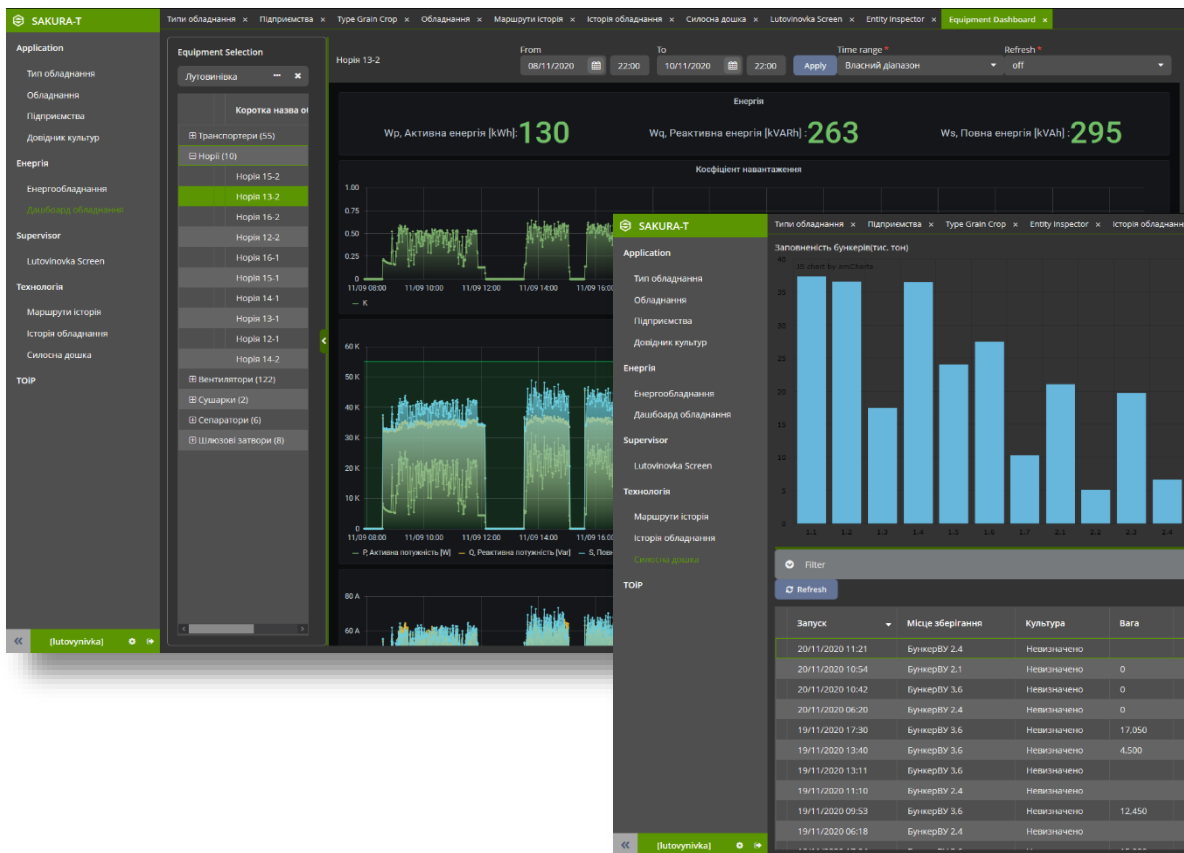


From 02/11/2020 00:00 To 03/11/2020 00:00 Apply Власний діагност Refresh off



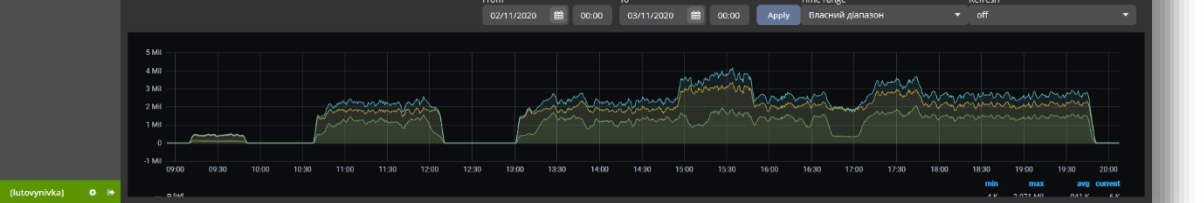
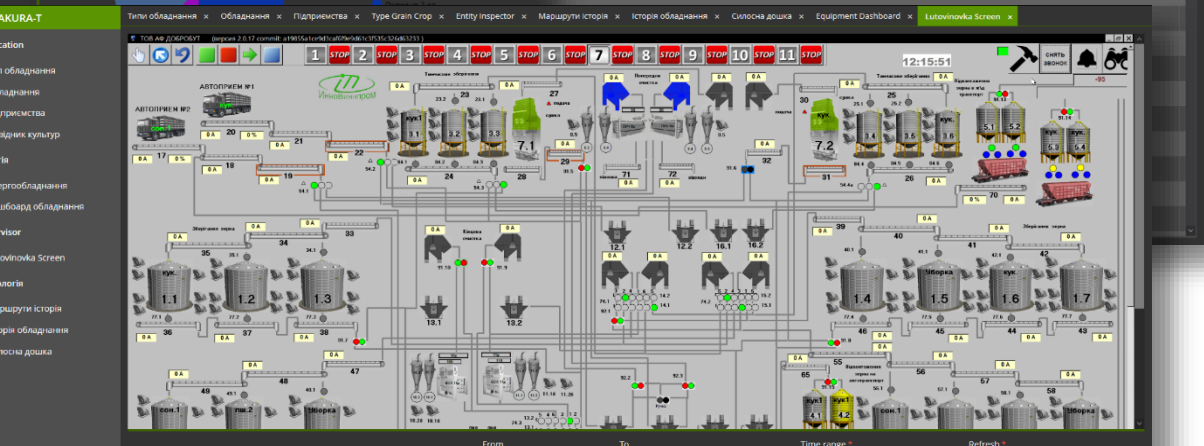


The Enterprise solutions provides the collection and display of generalized, comparative, specific and analytical information in the enterprise. The module analyzes the productivity of technological processes and forms commands for its optimization.

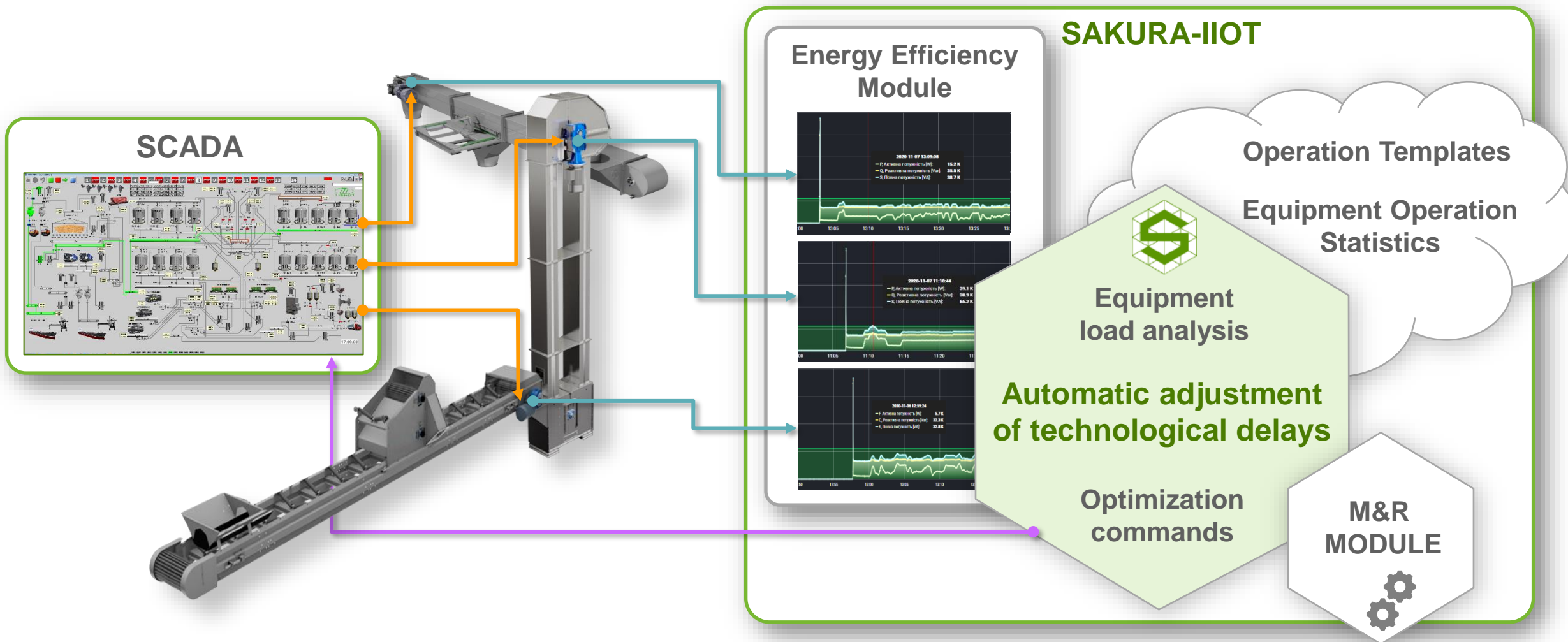


**Table: Energy Consumption Data**

Ma	Var	Iz	Do	Запуск	Трива	Зупинка	Трива	Час р	Операції	Культура	Вага	WP	WQ	WS	Енергоефективність
2	2	АВТОПРИЕМ №2	БункерВУ 2.1	20/11/2020 10:54	1:1	20/11/2020 11:07	0:58	0:12		Невизначено	0	3,343	10,549	13,433	0.0
1	2	АВТОПРИЕМ №1	БункерВУ 3.6	20/11/2020 10:42	1:3	20/11/2020 11:07	0:44	0:24		Невизначено	0	7,564	22,193	24,344	0.0



**S-IIOT** monitors the equipment load and automatically optimizes technological operations based on an array of statistics. It provides an increase in energy efficiency and productivity.



The Energy Efficiency Module provides measured and analytical information on the consumption of basic energy sources by equipment, technological group, enterprise as a whole and generates data on the efficiency of technological operations

The module provides measurement and analysis of active, reactive and total values of current, voltage, power and energy

The module calculates and analyzes the energy efficiency of technological operations and informs about reaching the limit values

The energy efficiency factor is the amount of energy used to manufacturing and processing a ton of product



The Maintenance and Repair (M&R) Module provides planning and control of equipment maintenance and repairs. The main types of information are information on the operation of equipment, its energy consumption, use of spare parts and materials during maintenance and repairs

The basis of the module is a schedule of maintenance and repairs, which reflects the planned activities and the results of their implementation

The module operates with equipment cards, which carry information about the assembly and condition of the equipment

The M&R module receives information on the operation of the equipment and its modes of operation from the Energy Efficiency module



The screenshot displays the SAKURA-T software interface with several data views:

- Register Defects browser:** A table with columns: Id document, Toir equipment, Registered task, Unit crash, Detection date, Initiator worker, Contact worker, Unit performer, Toir equipment crash, Type problem, Type criticality, Type cause defect, Description defect, List works. It shows two rows of defect records.
- RegisterOrder browser:** A table with columns: Id equipment, Name equipment type, Mark equipment, Factory number, Factory producer, Short name enterprise, Technological number, Put in operation, Counter total, Counter type, Condition equipment. It shows one row for equipment ID 1.
- Parent equipment info:** A table with columns: Id equipment, Technological number, Factory number, Counter total, Counter type, Condition equipment, Factory producer. It shows one row for equipment ID 1.
- Technical documentation:** A table with columns: Id, Name technical documentation, Versior, Date create technical documentation, downloadTechnicalDocumentation. It shows two rows for installation and operating instructions.
- Energy Consumption Chart:** A line chart showing power consumption (W) over time from 08:00 to 17:00. The Y-axis ranges from 0 to 70K. It includes a legend for 'Активная мощность [W]', 'Реактивная мощность [Var]', and 'Полная мощность [VA]'.
- Equipment 3D Model:** A 3D rendering of a lathe machine.
- Defect Log Table:** A table showing defect events with columns for date, time, and numerical values. It lists multiple events from 20/11/2020 to 17/11/2020.
- Summary Table:** A table with columns: Id document, Periodicity, months, Periodicity, hours, Duration, hours, Amount worker, Defect description, Summary works.

Since in most cases energy monitoring equipment must be installed in existing cabinets, INNOVINNPROM specialists have developed a specialized energy measurement equipment set.

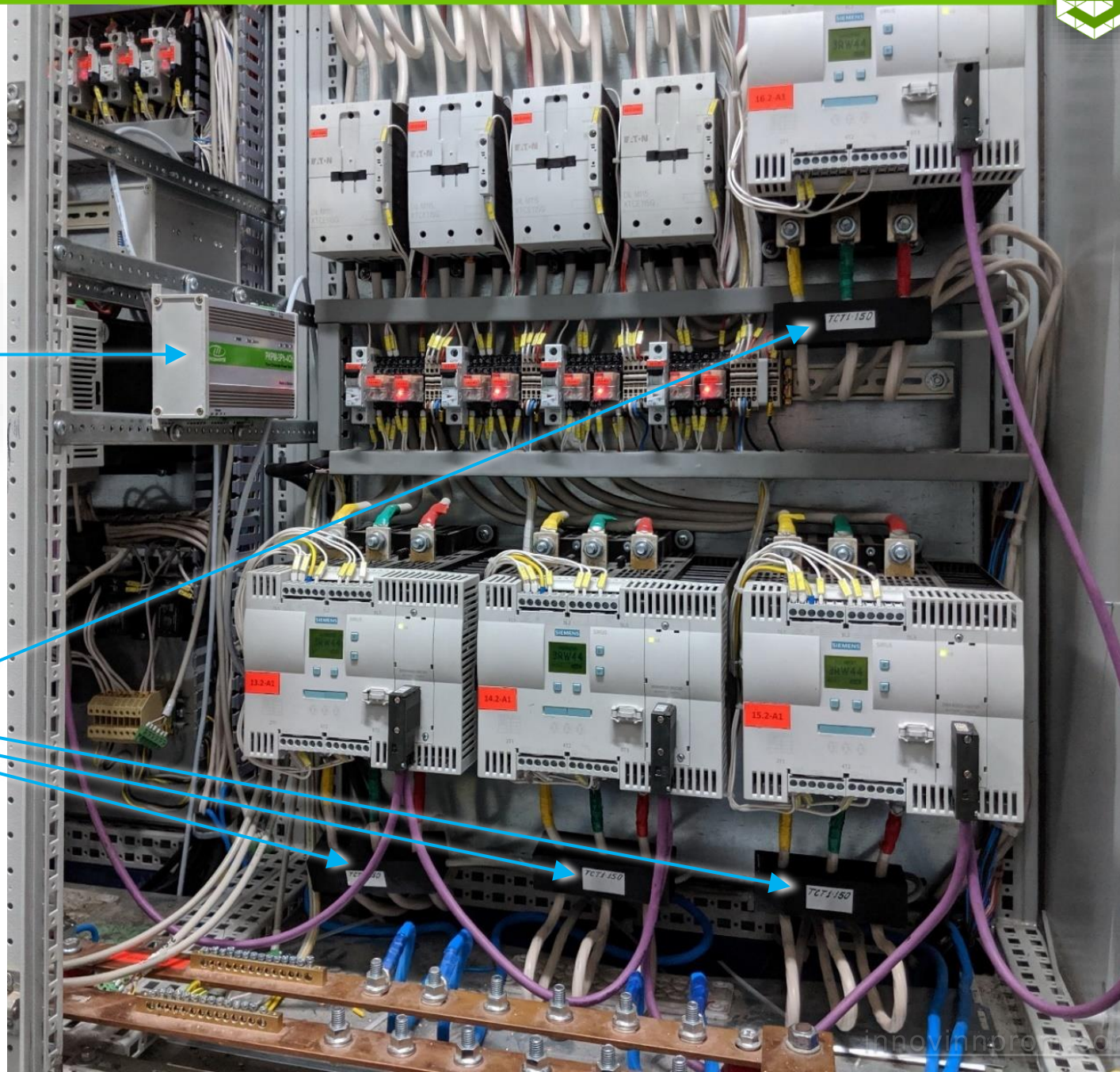
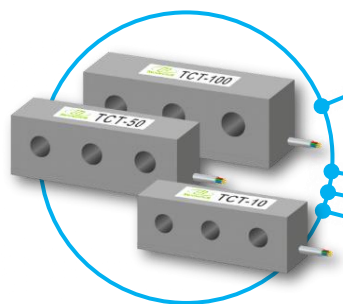
This set includes a compact four-channel energy meter of three-phase power supply and a series of compact three-phase current transformers.

This set carries measurement of active, reactive and full values of current, voltage, power, power coefficient and energy in three phases of four energy using equipment and sending of data to the IoT gateway.

Three-phase power supply four-channel energy meter PKZM-3F-4Ch



Compact three-phase current transformers



Control of machine tools and planning of their maintenance by the manufacturer



SAKURA-T Register/Order browser - Tool/Equipment browser

Equipment info

ID equipment	Name equipment type	Mark equipment	Factory number	Factory producer	Short name enterprise	Technological number	Put in operation	Counter total	Counter type	Condition equipment
1	Noria	FUT	456	Snele	Agro-PP	123	07/10/2020	450	hour	OK

Maintenance and operation

Date	Time	Value	Unit
20/11/2020	06:20	2.9	h
19/11/2020	17:30	1.9	h
19/11/2020	13:40	0.9	h
19/11/2020	09:53	1.9	h
19/11/2020	13:11	1.9	h
19/11/2020	11:10	2.10	h
19/11/2020	06:18	2.9	h
18/11/2020	17:04	1.9	h
18/11/2020	14:25	1.9	h
18/11/2020	11:36	2.9	h
18/11/2020	06:18	2.9	h
18/11/2020	17:04	1.9	h
18/11/2020	14:25	1.9	h
18/11/2020	11:36	2.9	h
18/11/2020	10:17	0.9	h
18/11/2020	09:48	1.9	h
18/11/2020	06:18	2.9	h
17/11/2020	17:17	1.9	h
17/11/2020	14:38	0.9	h
17/11/2020	14:28	0.9	h
18/11/2020	06:18	2.9	h
17/11/2020	17:17	1.9	h
17/11/2020	14:38	0.9	h
17/11/2020	14:28	0.9	h

SAKURA-T Register/Order browser - Tool/Equipment browser

Equipment info

ID equipment	Name equipment type	Mark equipment	Factory number	Factory producer	Short name enterprise	Technological number	Put in operation	Counter total	Counter type	Condition equipment
1	Noria	FUT	456	Snele	Agro-PP	123	07/10/2020	450	hour	OK

Parent equipment info

ID equipment	Technological number	Factory number	Counter total	Counter type	Condition equipment	Factory producer	Mc
19/11/2020	11:10		2.10				
19/11/2020	09:53		1.9				
19/11/2020	06:18		2.9				

Technical documentation

ID	Name technical documentation	Version	Date create technical documentation	downloadTechnicalDocumentation
23	Installation instructions	1	27/10/2020	Download
55	Operating instructions	1	13/10/2020	Download

Graphical data visualization showing a waveform plot over time.

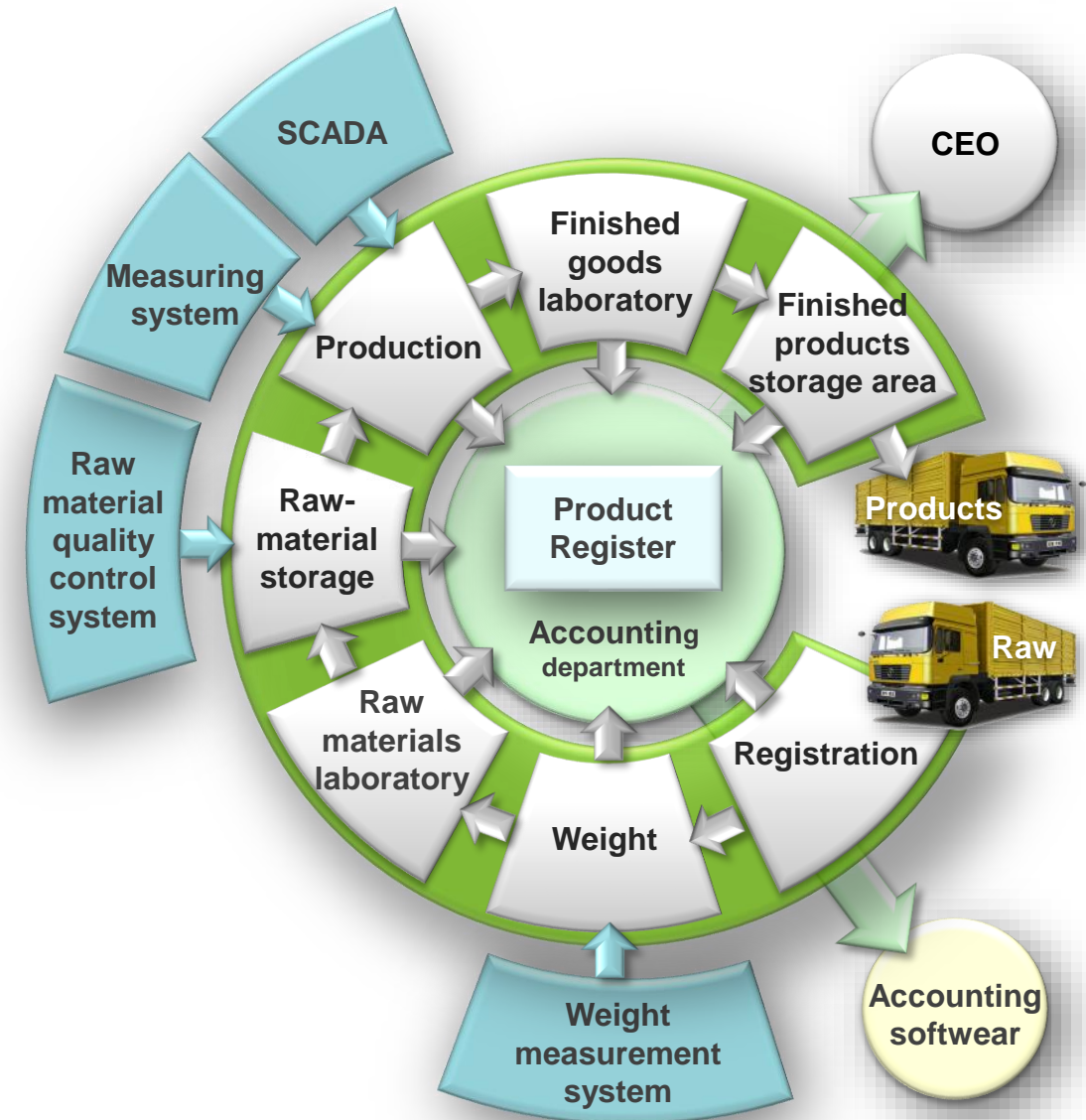
ID document	Periodicity, months	Periodicity, hours	Duration, hours	Amount worker	Defect description	Summary works

SAKURA-B is an integrated MES / ERP / PLM system.

SAKURA-B is designed for full automation of enterprise management processes.

### The main functions of SAKURA-B:

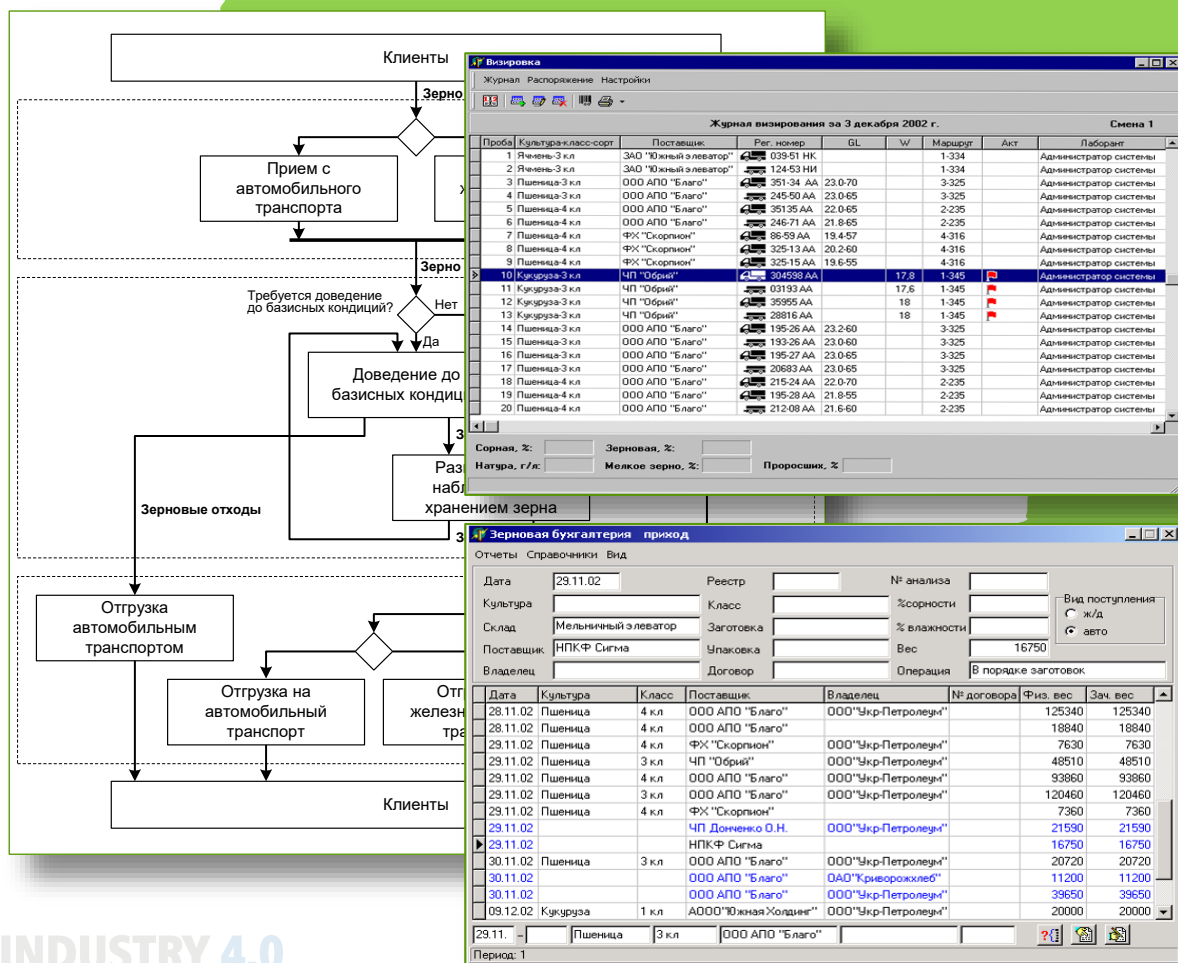
- ✓ Obtaining and analyzing information about the work of the enterprise
- ✓ Formation and control of processed plans based on the analysis of data on available resources
- ✓ Operational control and material resources management
- ✓ Production management
- ✓ Product life cycle management
- ✓ Reducing the impact of the human factor on production processes
- ✓ Improving production productivity
- ✓ Analysis of the enterprise results and formation of the optimal labor organization and production processes
- ✓ Increasing labor productivity through the redistribution of functions, rights and responsibilities of working staff and administration





For each enterprise, the installation package is determined based on the scale of the enterprise and the tasks it performs. As a rule, the following modules are installed:

- Manufacturing Execution Modules
- Product Lifecycle Management Modules
- Enterprise Resource Planning Modules

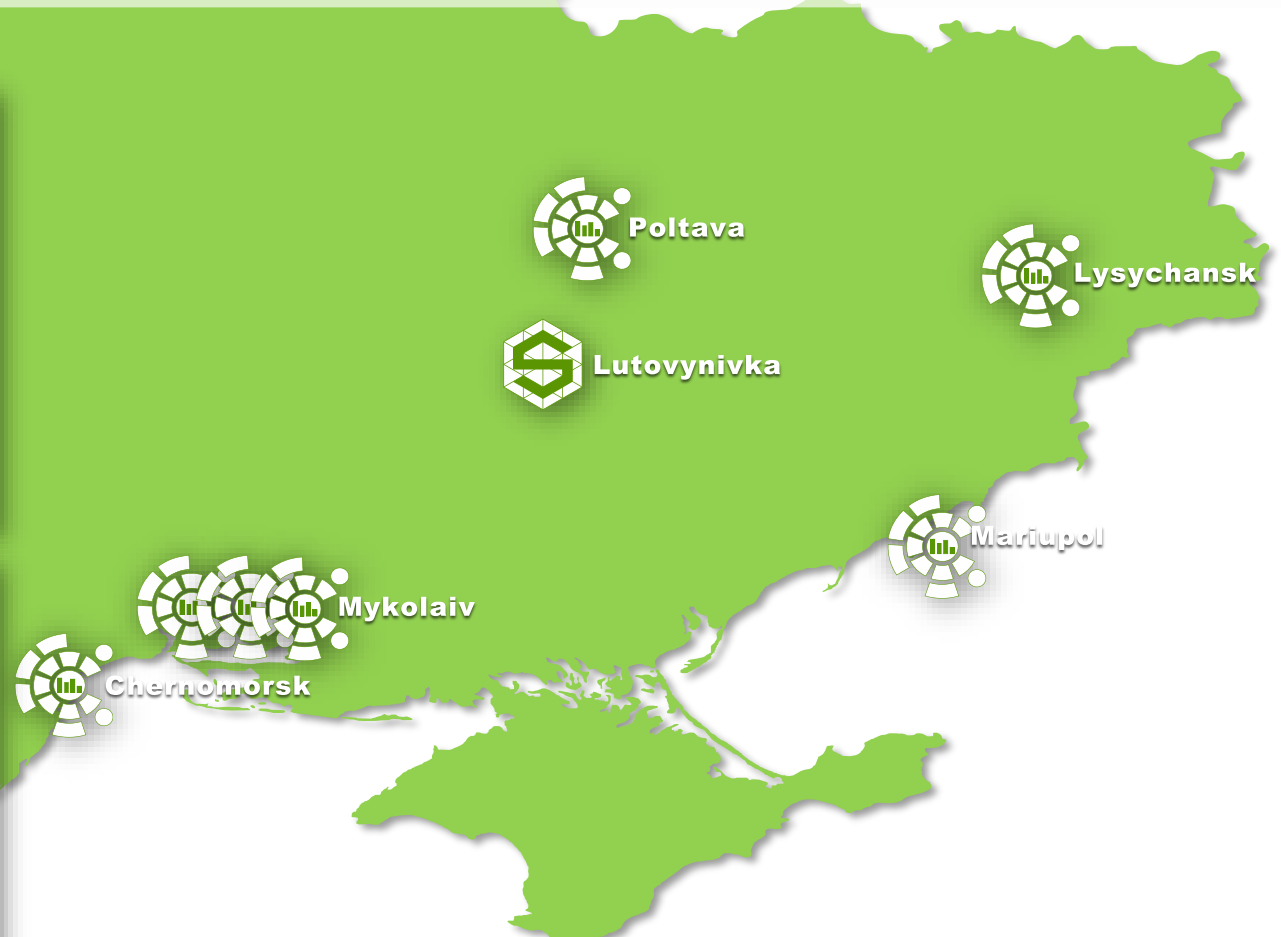


Журнал взвешивания за 3 декабря 2002 г.

Проба	Культура-класс-сорт	Поставщик	Рег. номер	GL	W	Маршрут	Акт	Лаборант
1	Пшеница-3 кл	ЗАО "Южная элеватор"	039-51 НК				1-334	Администратор системы
2	Пшеница-3 кл	ЗАО "Южная элеватор"	124-53 НИ				1-334	Администратор системы
3	Пшеница-3 кл	ООО АПО "Благо"	351-34 AA	23.0-70			3-325	Администратор системы
4	Пшеница-3 кл	ООО АПО "Благо"	245-50 AA	23.0-65			3-325	Администратор системы
5	Пшеница-4 кл	ООО АПО "Благо"	351-35 AA	22.0-65			2-235	Администратор системы
6	Пшеница-4 кл	ООО АПО "Благо"	246-71 AA	21.8-65			2-235	Администратор системы
7	Пшеница-4 кл	ФХ "Скорпион"	55-55 AA	19.4-57			4-316	Администратор системы
8	Пшеница-4 кл	ФХ "Скорпион"	325-13 AA	20.2-60			4-316	Администратор системы
9	Пшеница-4 кл	ФХ "Скорпион"	325-15 AA	19.6-55			4-316	Администратор системы
10	Кукуруза-3 кл	ЧП "Обрий"	304588 AA		17.8	1-345		Администратор системы
11	Кукуруза-3 кл	ЧП "Обрий"	03193 AA		17.6	1-345		Администратор системы
12	Кукуруза-3 кл	ЧП "Обрий"	35955 AA		18	1-345		Администратор системы
13	Кукуруза-3 кл	ЧП "Обрий"	28916 AA		18	1-345		Администратор системы
14	Пшеница-3 кл	ООО АПО "Благо"	195-26 AA	23.2-60			3-325	Администратор системы
15	Пшеница-3 кл	ООО АПО "Благо"	193-26 AA	23.0-60			3-325	Администратор системы
16	Пшеница-3 кл	ООО АПО "Благо"	195-27 AA	23.0-65			3-325	Администратор системы
17	Пшеница-3 кл	ООО АПО "Благо"	20693 AA	23.0-65			3-325	Администратор системы
18	Пшеница-4 кл	ООО АПО "Благо"	215-24 AA	22.0-70			2-235	Администратор системы
19	Пшеница-4 кл	ООО АПО "Благо"	195-28 AA	21.9-55			2-235	Администратор системы
20	Пшеница-4 кл	ООО АПО "Благо"	212-08 AA	21.6-60			2-235	Администратор системы

Зерновая бухгалтерия приход

Дата	Культура	Класс	Поставщик	Владелец	№ договора	Физ. вес	Зач. вес
28.11.02	Пшеница	4 кл	ООО АПО "Благо"	ООО "Укр-Петролеум"		125340	125340
28.11.02	Пшеница	4 кл	ООО АПО "Благо"	ООО "Укр-Петролеум"		18840	18840
29.11.02	Пшеница	4 кл	ФХ "Скорпион"	ООО "Укр-Петролеум"		7630	7630
29.11.02	Пшеница	3 кл	ЧП "Обрий"	ООО "Укр-Петролеум"		48510	48510
29.11.02	Пшеница	4 кл	ООО АПО "Благо"	ООО "Укр-Петролеум"		93860	93860
29.11.02	Пшеница	3 кл	ООО АПО "Благо"	ООО "Укр-Петролеум"		120460	120460
29.11.02	Пшеница	4 кл	ФХ "Скорпион"	ООО "Укр-Петролеум"		7360	7360
29.11.02	Пшеница	4 кл	ЧП Довженко О.Н.	ООО "Укр-Петролеум"		21590	21590
29.11.02	Пшеница	4 кл	НПКФ Сигма	ООО "Укр-Петролеум"		16750	16750
30.11.02	Пшеница	3 кл	ООО АПО "Благо"	ООО "Укр-Петролеум"		20720	20720
30.11.02	Пшеница	4 кл	ООО АПО "Благо"	ОАО "Криворожжелез"		11200	11200
30.11.02	Пшеница	4 кл	ООО АПО "Благо"	ООО "Укр-Петролеум"		39650	39650
09.12.02	Кукуруза	1 кл	АООО "Южная Холдинг"	ООО "Укр-Петролеум"		20000	20000







## Reduction of energy consumption of technological equipment - up to 10%

Achieved by selecting and controlling the most energy-efficient modes of operation of the equipment and optimization of technological delays



## Reduction of technological losses - up to 15%

Achieved by preventing violations of established algorithms and standards at all stages of production, continuous monitoring of technological operations and personnel actions



## Improving energy efficiency of production - up to 20%

Achieved through continuous monitoring and analysis of energy efficiency of production, control of accuracy and timeliness of completing technological tasks



## Increase of the equipment service life - up to 25%

Achieved by planning and monitoring the maintenance and repair of equipment, quality control of spare parts from different manufacturers





INNOVINNPROM

Industry 4.0