FACEPLATE

OPTIMIZATION AND IMPROVING YOUR BUSINESS EFFICIENCY IS OUR JOB

Remote Process Control

faceplate.io

FACEPLATE

FACEPLATE'S MISSION

Provide the ability to remotely control production through connecting equipment to the cloud or premises, collecting and storing information, visualizing, analyzing efficiency through the use of machine learning algorithms, predictive diagnostics and detection of anomalies in the operation

ISSUES ARISING FOR BUSINESS LEADERS

— Operating costs increase as process equipment becomes more complex

— Traditional operator failure service models are not efficient

— Regular scheduled maintenance is often inefficient

— Errors and failures in the production chain lead to unscheduled downtime

— Unscheduled maintenance is expensive, as there is no idea of the real status of production assets

SOLUTIONS WE OFFER

▲ A comprehensive platform for analyzing the performance through IIoT technologies

▲ Continuous monitoring of the assets in real time, as the result prevention of unscheduled and emergency downtime

▲ Machine learning to create mathematical models for predicting potential failures

▲ Customizable monitoring dashboards to track equipment operation, KPIs, and overall equipment efficiency (OEE)

▲ Faceplate features allow users to simultaneously: monitor production and track equipment operation in real time, receive customized dashboards, analyze and forecast the anomalies, and plan and forsee the equipment maintenance

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FOR WHOM FACEPLATE?

OIL AND GAS

The weekly, monthly, quarterly and a half-yearly specific performance indicators of oil pumping units, pumps can be displayed

Number of start-ups and shut-downs, operating hours for each type of equipment on a time range

Costs of electricity and other resources

Predictive diagnostics, analysis of key parameters to identify deviations from nominal values

Data collecting, processing and analyzing brings great opportunities to improve the efficiency of the enterprise

MINING

Mining and steel companies only use a fraction of the data they collect

To comply with strict environmental regulations, an artificial intelligence system can be used to reduce the negative impact of harmful processes

KPI performance calculations for equipment operation. Equipment operation anomaly detection through time series analysis

Operational display of various technological processes such as crushing, transportation, enrichment, pyro or hydrometallurgy. With obtained data technologists can analyze and adjust the process when calculating material flows

SMART CITY

The platform provides the opportunity to create application cases to solve tasks such as collecting and processing data on analysis of air pollution

Intelligent control of lighting, heating, ventilation, and air conditioning systems in cities. Urban product management, waste separate storage and recycling

These technologies improve the quality of life of urban residents
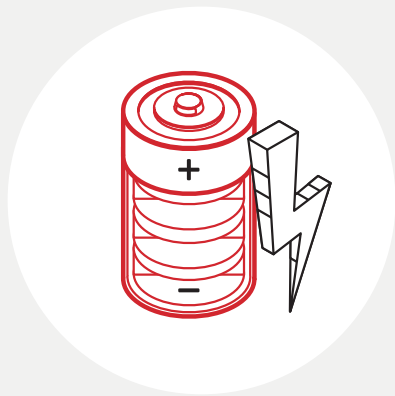
ENERGY

Analytics at the generation stage, combined with an understanding of the demand for energy produced, allows you to plan the optimal production of electricity

The platform can monitor the status of equipment and send real-time critical alerts about faults, failures or anomalies

Predictive maintenance provides significant economic benefits, and also extends the life of the equipment

Solving the problem of optimizing transportation time and reducing transportation costs
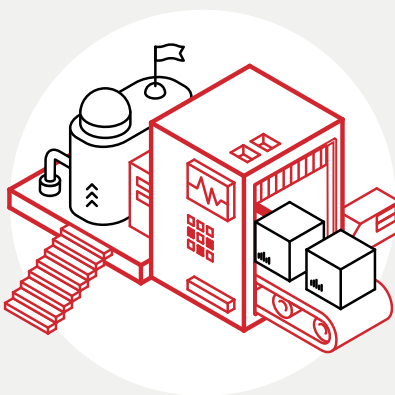
DISCRETE MANUFACTURING

Continuous monitoring of events, conditions, and assessing the efficiency the production

Equipment's KPI: during each shift is recorded the efficiency of the equipment, the causes of downtime. Loss analysis in a manufacturing plant, the number of defective and quality products with the definition of the defect cause. Analysis of the effectiveness of staff by shift

Registration and accounting of manufactured products at the enterprise

Collected information structured in real-time dashboards and visualizations which keep your team and management informed

TRANSPORTATION

Analytics at the generation stage, combined with an understanding of the demand for energy produced, allows you to plan the optimal production of electricity

The platform can monitor the status of equipment and send real-time critical alerts about faults, accidents or anomalies

Predictive maintenance provides significant economic benefits, and also extends the life of the equipment

Solving the problem of optimizing transportation time and reducing transportation costs

FMCG

Improving production efficiency by increasing productivity and quality of products, reducing energy consumption

Increasing overall equipment effectiveness, reduction of defect and food safety risks, reduction of energy costs per unit of production

Determine the total number of produced units, water and electricity consumption, defect rate. Provide operational active data and historical technological data regarding the status of the technological process

Provide manufacturing performance indicators for the selected period of time to the dispatching and administrative personnel of the plant

Create and calculate KPI of the dependency on electricity consumption and production output data

FACEPLATE FUNCTIONALITY

▲ Improving overall asset availability, reliability and life

▲ Optimization of maintenance costs by reducing operating and capital costs

▲ Increasing overall equipment efficiency (OEE)

▲ Reducing downtime of production assets

▲ Improving equipment safety

▲ Ensuring operational visibility of equipment status

▲ Reducing a human factor in all chain of production

THE MOST COMMON EXAMPLES OF MACHINE LEARNING

▲ increasing process efficiency by selecting the optimal operating modes of the equipment

▲ improving product quality by identifying critical factors in the manufacturing that affect the end product

▲ optimization of maintenance and repair of expensive process equipment, analysis of equipment efficiency, and its predictive diagnostics through calculation of scenarios by machine learning

▲ dynamic supply chain management through optimization and forecasting of the entire processes

▲ identification of hidden factors that negatively affect industrial processes at any link of its chain

▲ search and calculation of optimal equipment performance through modeling the operation of equipment using digital technologies

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FACEPLATE SOFTWARE PACKAGE

Faceplate includes a development environment and a runtime environment:

The development environment — provides a full software system for the design of a human-machine interface, development of control algorithms, configuration of archives, reports, message systems and other functions.
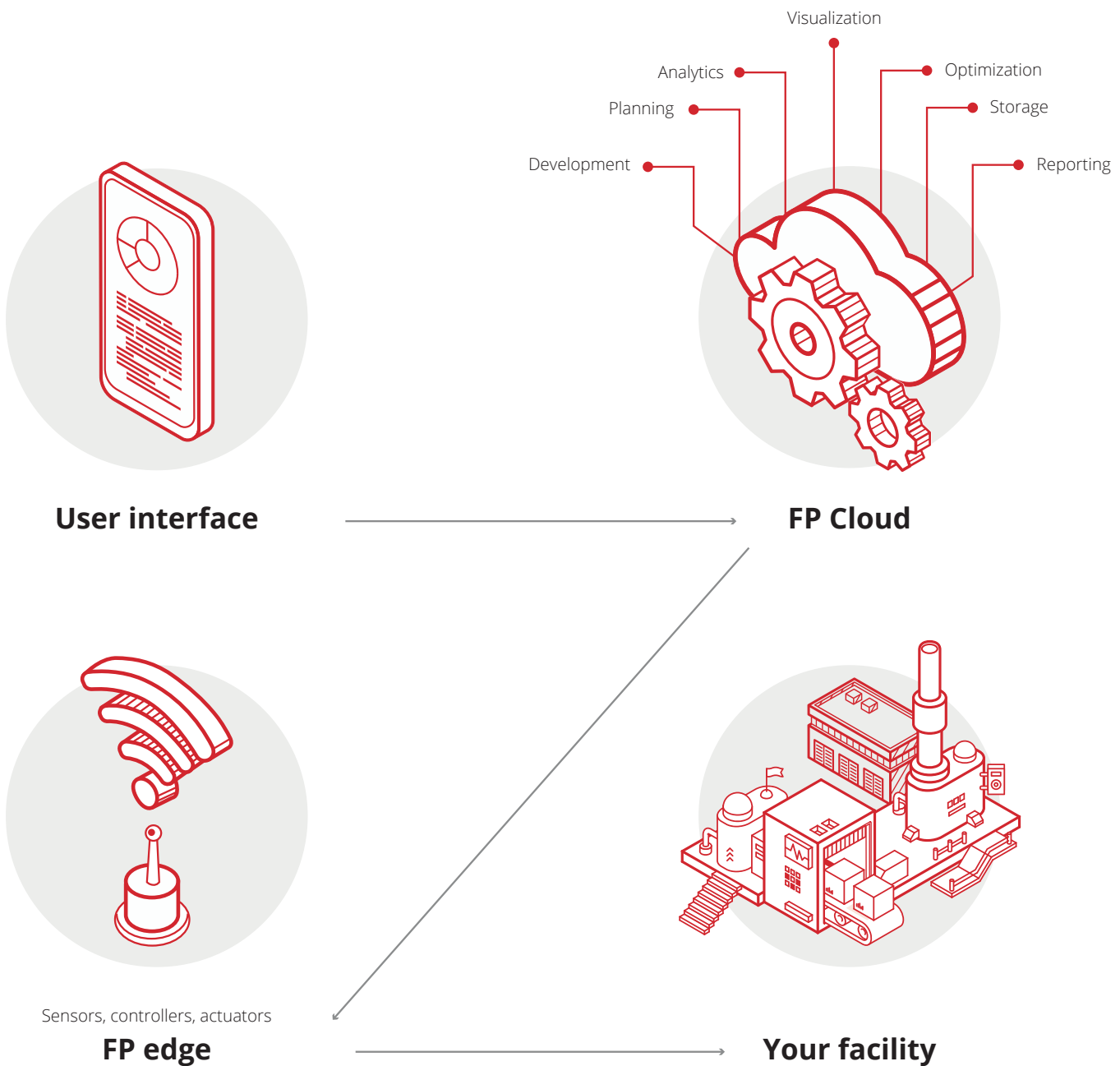
The runtime environment — provides the real-time execution of the functions of an automated control system. It includes:

▲ Collecting and processing information from measuring devices and other equipment, etc.

▲ Displaying information on any monitor screen in a convenient form with the ability to control equipment

▲ Equipment control according to the built-in algorithms

▲ Archiving of monitored parameters and event logging

▲ Alarms and alarm control

▲ Generating summary reports on the status of the controlled process

▲ Providing interaction with external software products (ERP, accounting systems, etc.)

▲ Integration with CCTV systems

THE KEY PERFORMANCE INDICATORS OFFERED BY FACEPLATE

OEE	Overall equipment efficiency
CoE	Coefficient of efficiency
AF	Availability factor
QI	Quality index
A	Availability
SER	Share of emergency repairs
QSM	Quality of scheduled maintenance
TD	Downtime for technical reasons
UPTIME	Operating time
MTBF	Mean time between failures
MTTR	Mean time to repair

HOW DOES FACEPLATE WORK

FACEPLATE

Visualization

Analytics

Planning

Development

Optimization

Storage

Reporting

User interface

FP Cloud

Sensors, controllers, actuators

FP edge

Your facility

FACEPLATE

FACEPLATE ADVANTAGES OVER ITS ANALOGUES ON THE MARKET TODAY

▲ 3-level fault tolerance system, a comprehensive approach to improving reliability of the supervisory system through process control model, Erlang, hot redundancy by various schemes , and many other factors

▲ High degree of scalability, adding new servers on the fly without shutting down the system or individual nodes

▲ Wide range of supported hardware

▲ Low entry threshold. Interfaces are designed to maximize automation and simplify the developer's actions. Default values, recommendations, and examples are always offered to developer

▲ Powerful tools for automating developer actions: templating, component creation/binding/ re-binding wizards, export/import mechanisms, etc.

▲ High speed of data handling and data indexing. Modern, effective mechanisms for handling large amounts of archived data and messages. Retrieval algorithms

OTHER COMPANIES (NOT A DIGITAL COMPANY)

DIGITAL COMPANY

FACEPLATE
KEY FEATURES

▲ **SUPPORTED OS**

Server - MS Windows from XP, Mac OSX, Linux (Ubuntu, OpenSUSE, CentOS, compatibility with other Linux distributions has not been tested). Client - browser with HTML5 support, zero setting.

▲ **MNEMONIC DIAGRAMS**

Graphic editor with a set of primitives (lines, pipes, 3D shapes, buttons, drop-down lists, etc.). Built-in component library, mechanisms for templating visual elements, element binding / re-binding wizard. Auxiliary dashboard editor. JavaScript script support. HTML / CSS / JavaScript availability.

▲ **REPORTS**

Built-in report editor with HTML / CSS / JavaScript availability. JavaScript user library connectivity. Built-in facilities for binding report markup to archived data. Functionality to create dynamic reports, cell drop down feature, etc.

▲ **ALARMS**

Built-in alarm configuration editor with group messages support, integration with visualization elements. Background sound, notification by email and SMS. Message archives, analysis and archive search mechanisms.

▲ **SCRIPTS**

Erlang programming language. Full support for libraries built into the language, API for working with the project infrastructure, managing tags, archives, and alarms. Calling scripts by event or at specified intervals.

▲ **WEB CLIENT**

Key visualization environment. Zero client setup, full functionality, access to the development environment. Mobile device support (tablet, smartphone)

▲ **TRENDS**

Online trend, archived trend, setting, ruler call, zooming, scale switching, start-stop, scrolling

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FACEPLATE
KEY FEATURES

▲ **MACHINE LEARNING**

Faceplate makes it easy to work with machine learning based models, pre-process data for trained models, and call and process data from models. Faceplate has the functionality for predicting equipment performance and providing information on required maintenance based on data collected from controllers

▲ **FAULT TOLERANCE**

Erlang / OTP supervisory process control model. Hot redundancy, triple redundancy, 2x2 redundancy. Automatic client switch. Connecting new servers, transferring the load on the fly without the need to shut down nodes

▲ **DRIVERS**

Extensive driver database. OPC, Modbus TCP/RTU/ASCII, SNMP, Simatic S7, Schneider Electric, Allen Bradley, OWEN, IGLA, Mercury, etc. Software interface for connecting additional drivers

▲ **SCALABILITY**

Minimum configuration - minibox PC, Linux, 512 RAM, 10GB HDD/ SSD. Maximum configuration - distributed multi-cluster up to 65535 nodes (servers), unlimited number of tags, clients, industrial cloud. Connecting new nodes, transferring the load on the fly without the need to shut down nodes. Client - device with a browser that supports HTML5

▲ **LANGUAGES**

Built-in packages: English, Russian
Ability to connect additional language packages through the localization editor

▲ **EXPORT / IMPORT MECHANISMS**

Built-in mechanisms for export / import of individual components: tags, messages, connections, etc. to .CSV files. Export / import of project settings and archived data to .CSV, .XML files

▲ **CLOUD SERVICE**

Remote access to the controllable object via the cloud service. Secure connection, technologies similar to those that ensure the security of banking transactions. Ability to deploy developer stations to the cloud

▲ **CYBERSECURITY**

The built-in user rights management model and support for secure connections through Secure WebSocket allow you to securely work with data directly from the browser. A decentralized distributed system consisting of one or more clusters minimizes the vulnerability of Faceplate

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TECHNOLOGY INDEXES

BROWSER VISUALIZATION

One of the main functions of the IIoT system is to provide the operator with information on the current state of the process in a human-friendly form. Faceplate allows working at all levels through the use of a web browser. The modern web browser is a powerful, rapidly developing environment for visualizing and animating information. Modern technologies (Ajax, WebSocket, Secure WebSocket) allow organizing a secure real-time exchange of browser information with the server. The obvious advantages is zero client setup and cross-platform compatibility.

Faceplate Graphics Editor

SCADA PACKAGES TRADITIONALLY USE UNIVERSAL THIRD-PARTY DBMSS (MICROSOFT SQL SERVER, ORACLE, ETC.) TO MANAGE THE DATA COLLECTION.

Such DBMSs are complex and expensive software systems designed to solve the problem of storing large volumes of complex structured information, but they are not intended for organizing information flows in real time and storing time series. As a result, the main power of an expensive software product included in the cost of a SCADA package remains simply unused.

FACEPLATE

TECHNOLOGY INDEXES

INCREASE SYSTEM RELIABILITY BY USING A FAULT-TOLERANT ARCHITECTURE AND THE ABILITY OF HOT REDUNDANCY OF STATIONS.

For SCADA systems, the most common approach to improving reliability is to provide hot redundancy of stations. The solution involves duplicating server stations, synchronizing their information content in real time, and automatically switching the load to the backup station in the event of a failure of the main one. Algorithms responsible for data synchronization between servers and their recovery after a failure are quite complex software solutions. Therefore, hot redundancy in the products on the market is a rather expensive option.

In Faceplate, hot redundancy is based on data replication mechanisms built into the Mnesia DBMS. An important advantage of this solution is the ability to reconfigure the system on the fly without the need to shut down stations, which is a very important requirement for managing continuous processes. Along with the redundancy, Faceplate uses a supervisory process control model based on the Erlang / OTP platform. The Erlang/OTP platform was developed by Ericsson specifically for use in distributed, fault- tolerant, parallel real-time systems. Erlang is often given the credit for the legendary reliability of the AXD301 ATM switch in the British Telecom network. According to Ericsson, since the installation in January 2002, only one minor fault has occurred in a few years, based on which the reliability of the system was 99.9999999%. Using this technology can significantly improve the reliability of the system, both with and without hot redundancy. Using technology of supervisory process control
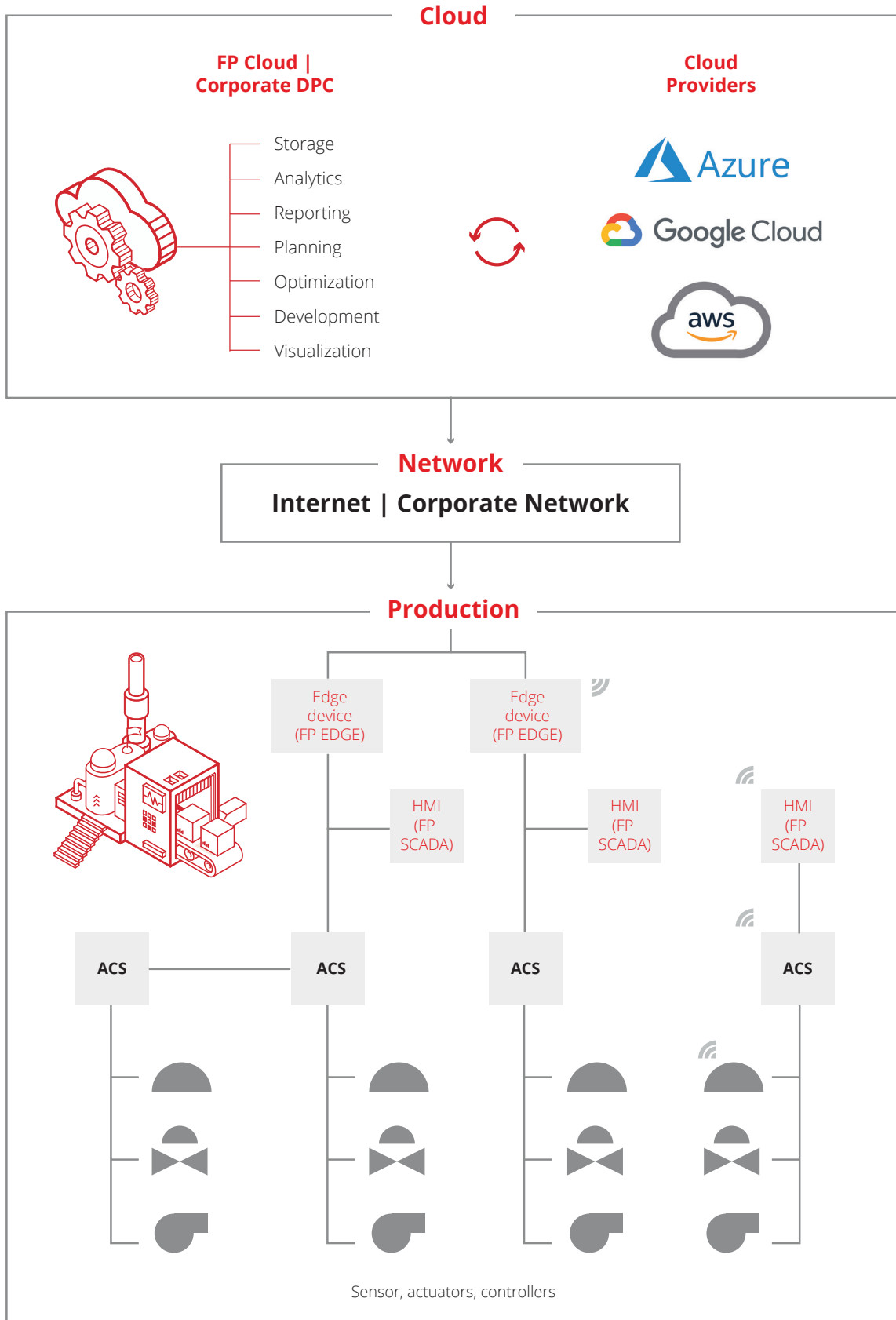

Operator monitor for your production
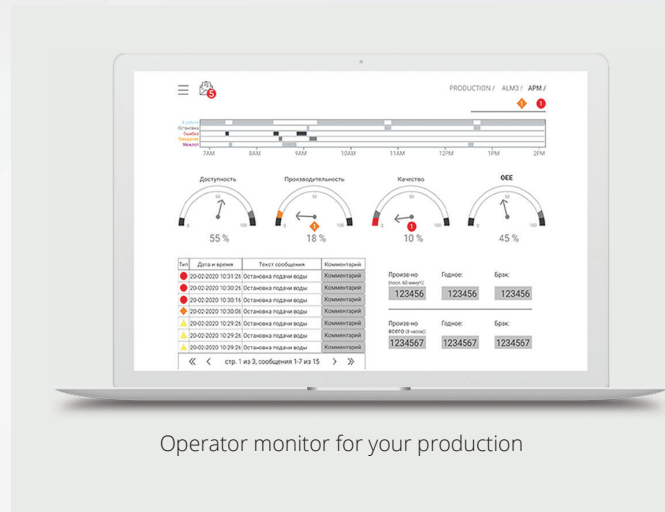
in combination with data replication tools of the Mnesia DBMS allows getting a practically «unsinkable» system.

THE «LOOSELY-COUPLED» STRATEGY

The solution provides the least connectiveness between the Edge device software and the cloud. Changes in the Edge device do not result in the need to adapt the cloud, and vice versa. For a cloud perspective, an Edge device is a data provider that sends data (and / or receives commands) in a specific format. In addition to the data exchange format, the cloud does not need to know anything about the Edge device software or its version.
Thus, the Faceplate cloud and Faceplate Edge device can be integrated with various devices and cloud infrastructures, such as AWS, AZURE, and Google Cloud. An Edge device can be either a simple sensor or a complex information system based on Faceplate or other software product.

ARCHITECTURE FACEPLATE (FP)

Cloud

FP Cloud | Corporate DPC

- Storage
- Analytics
- Reporting
- Planning
- Optimization
- Development
- Visualization

Cloud Providers

Azure

Google Cloud

aws

Network

Internet | Corporate Network

Production

Edge device (FP EDGE)

Edge device (FP EDGE)

HMI (FP SCADA)

HMI (FP SCADA)

HMI (FP SCADA)

ACS   ACS   ACS   ACS

Sensor, actuators, controllers

FACEPLATE

- ▲ **Connect hardware to the cloud**

- ▲ **Remote process control**

- ▲ **Fault-tolerant architecture**

- ▲ **Machine learning algorithms**

- ▲ **Hot redundancy of stations**

- ▲ **Predictive diagnostics in the operation**

- ▲ **Collect and store information**

- ▲ **Visualization of the production process**