Vodéna

Nature modeled

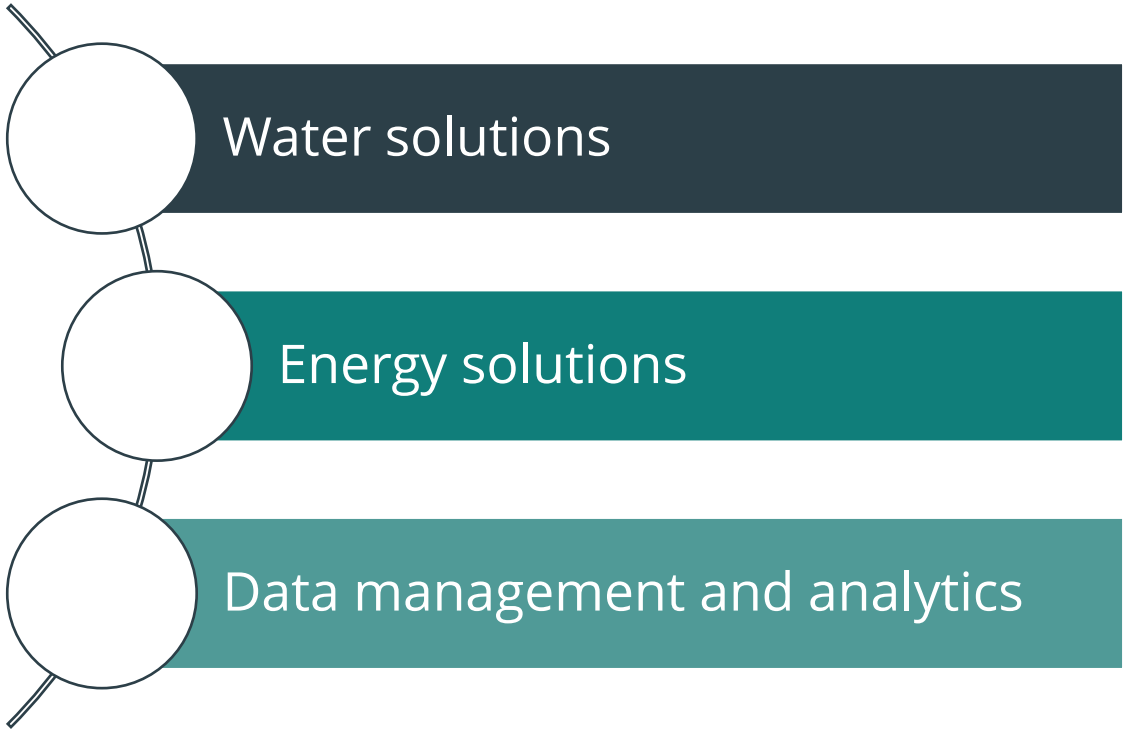
Vodéna is an innovative IT company established as a research spin-off from the Faculty of Science, University of Kragujevac.

It was founded in 2014 by Boban Stojanovic, PhD, the university professor with 20 years of experience in computer modeling, optimization, and software development for commercial and academic use.

Vodéna

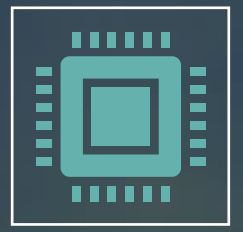
Nature modeled

Our enterprise offers university-strength research, data analysis, computer modeling, and optimization, all integrated through flexible and efficient software applications.



Our solutions are tailored to fit the customer business philosophy and include...

Data acquisition and integration



Physically based and/or data-driven models

Simulation of a system behavior under a given conditions

Optimization of products and processes

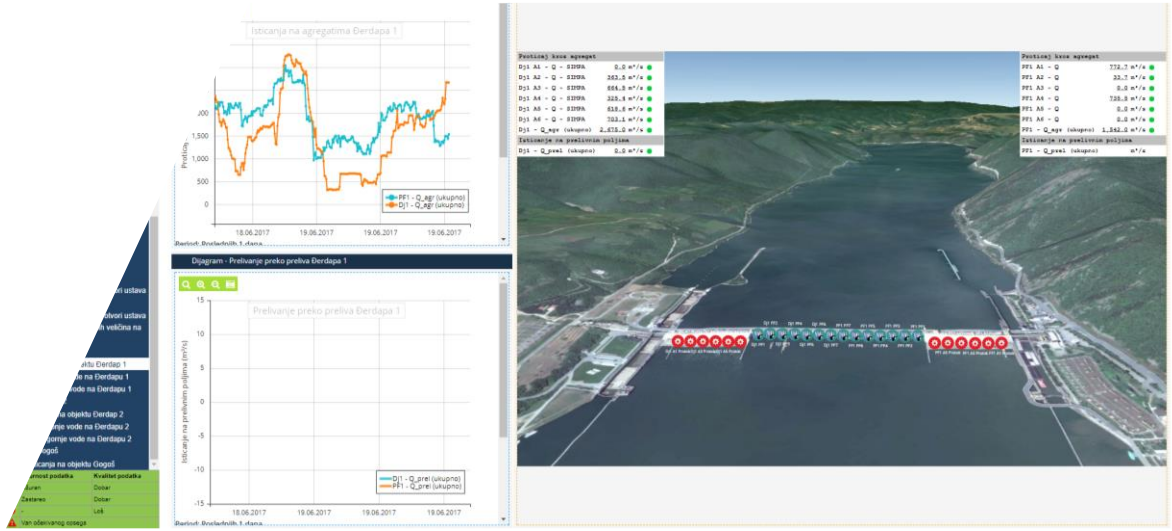
Our portfolio

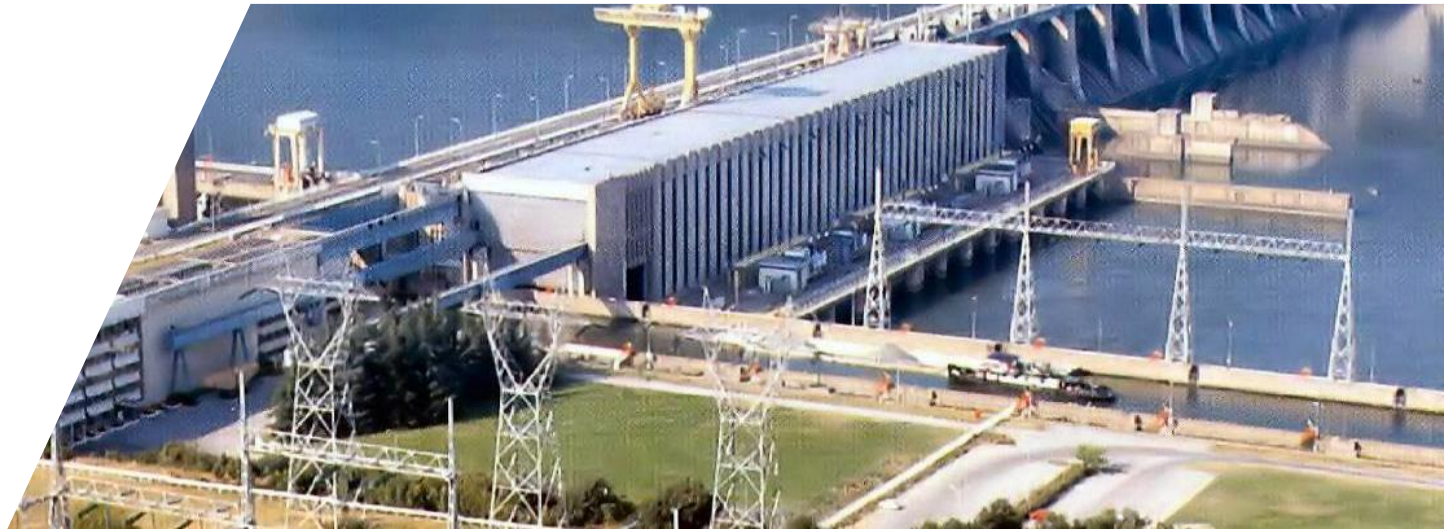
Hydropower production optimization

Based on the data collected from a powerplant monitoring system, hydrological forecast and the expected energy prices, our solution optimizes power production under the given physical, ecological, and legal constraints.

> Accurate prediction and optimization of the hydropower system operations relies on tightly coupled hydraulic model of water flow through the riverbed and the hydropower production model.

This comprehensive data analysis and optimization solution is **employed at the Iron Gate, one of the largest European hydropower plants**.

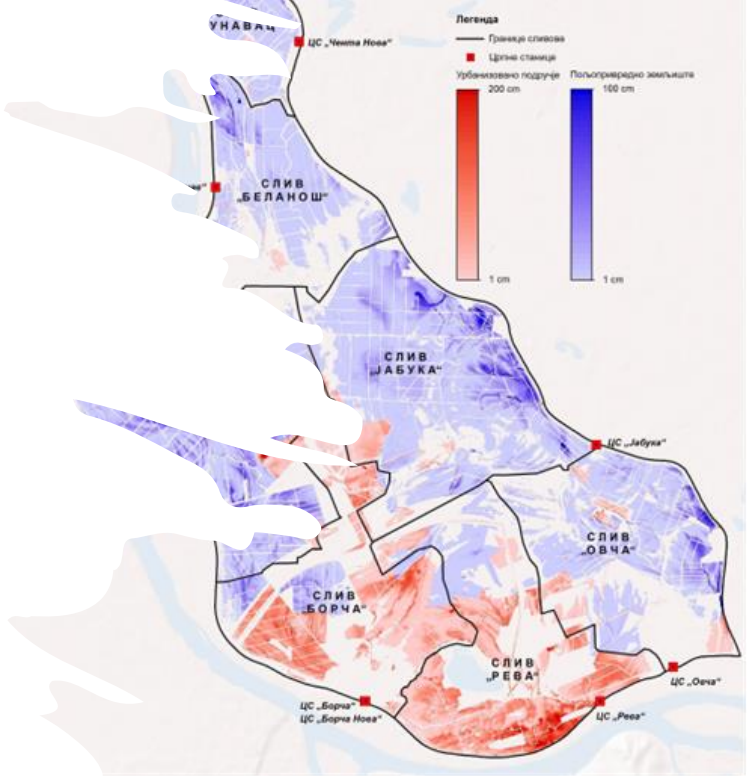




Our portfolio

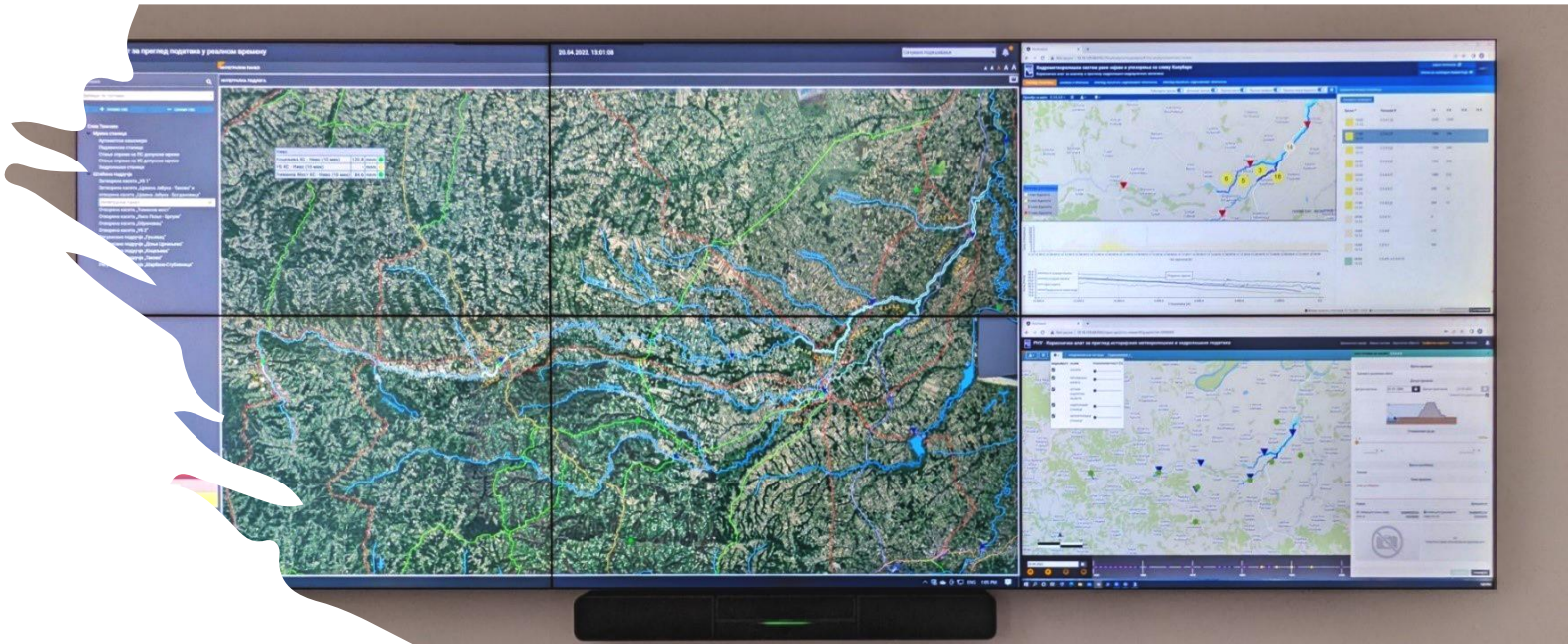
Management of large drainage systems

To help operators of the “Pančevački rit“ drainage system (Belgrade, Serbia) to adopt the right management practices, we have developed software platform that provides detailed insight into the complex natural conditions and enables modeling and analysis of hypothetic scenarios, design and operation optimization for economic efficiency, and risk-based decision making.



Flood early warning

Early warning system in the Kolubara River basin (Serbia) is a software platform that integrates data management software, coupled hydrological-hydraulics mathematical models, computation services, as well as user applications for monitoring, analysis and forecasting hydrological situation.



Our portfolio

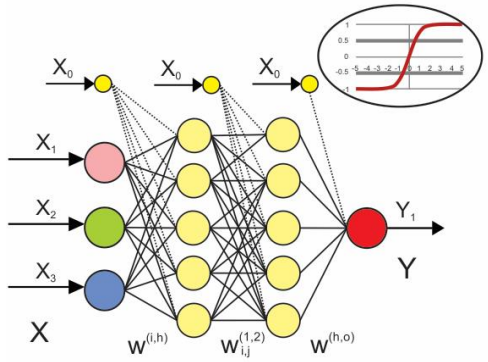
Dam remediation decision support system

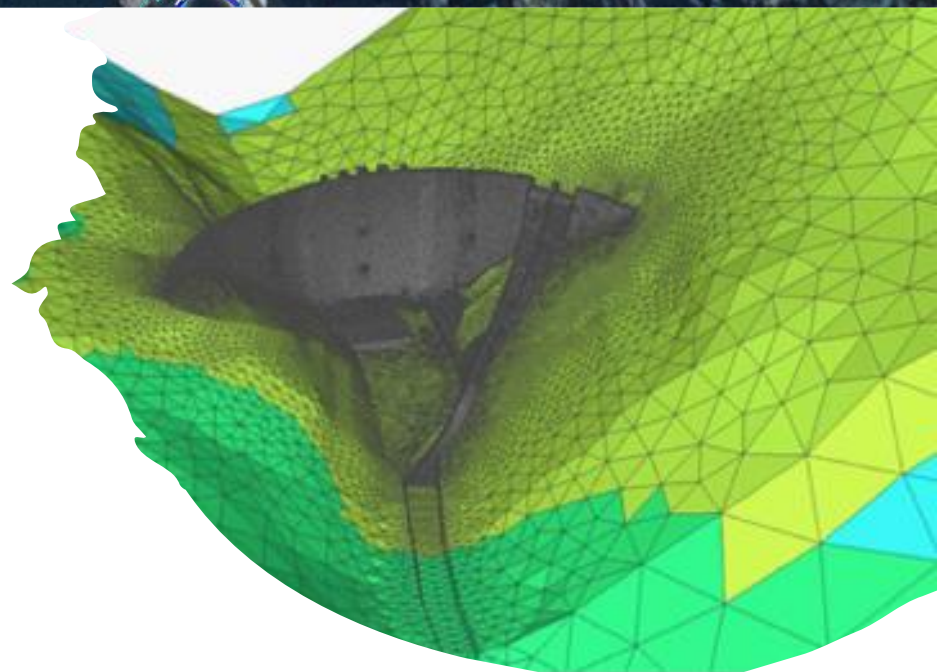
Water leakage through the karst terrain under the Višegrad dam on the Drina river was observed already in the first years of its exploitation. To support the design phase of the remediation project, we have developed a software platform able to estimate the configuration of underground network of fissures based on various in-situ measurements, providing decision-makers with a powerful tool for planning future activities.

Dam health monitoring

Our dam health assessment solutions rely on detailed physically based numerical models, providing dam operators with powerful tools for thermal, seepage and structural analyses.

Since the computationally demanding and time-consuming numerical models are inappropriate in daily operational tasks, we have enriched our dam safety solutions with surrogate models, based on statistical and artificial intelligence methods.





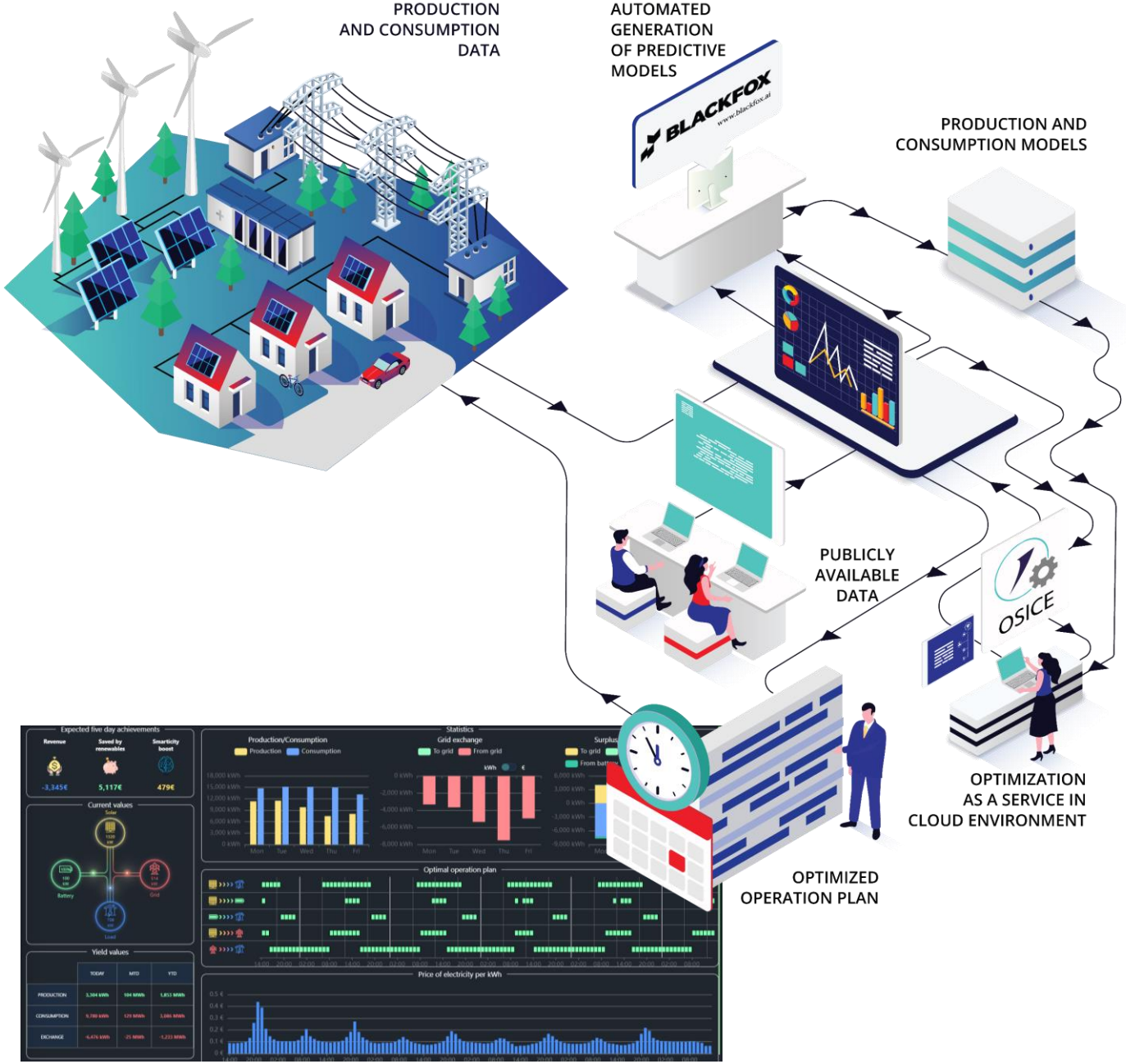
Our portfolio

Smarticity
THE WAY OF POWER

Software platform for optimal management of renewable energy systems

Smarticity is a comprehensive energy management tool that completely automates the finding of an optimal pattern in energy consumption and production.

Based on the data acquired during the energy system exploitation, Smarticity automatically creates the most adequate predictive models of energy production and consumption, which enable the simulation of any hypothetic operation plan. The results obtained from the simulations, along with all other grid features and external factors, are subjected to an optimization process in order to find the optimal energy management pattern.



Awards

DEVONNA

DEVONNA is our robust artificial intelligence software solution for near real-time dam health monitoring based on artificial neural networks, capable of operating in circumstances of permanent structural changes and occasional failures of measuring equipment. It performs genetic algorithm optimization of all elements of the network with the aim of generating a model that best describes structural dam behavior under given conditions.

- Second place at **VERBUND Innovation Challenge 2017** organized by largest Austrian electricity provider
- **Horizon 2020 Seal of Excellence** certified by European Commission.

SEAL OF EXCELLENCE

European Commission

Certificate delivered by the European Commission,
as the institution managing Horizon 2020,
the EU Framework Programme for Research and Innovation 2014-2020

The project proposal **808797, DEVONNA**

Dam health assessment based on evolving artificial neural networks - DEVONNA

Submitted under the Horizon 2020's **SME instrument phase 1**
call **H2020-SMEInst-2016-2017 (H2020-SMEINST-1-2016-2017)** of **9 November 2017**
in the area of **SMEInst-13-2016-2017**

Engaging SMEs in security research and development
by
Vodena doo Kragujevac
Prvoslava Stojanovica 2/10
Kragujevac
Serbia

following evaluation by an international panel of independent experts

WAS SCORED AS A HIGH-QUALITY PROJECT PROPOSAL
IN A HIGHLY COMPETITIVE EVALUATION PROCESS*

This proposal is recommended for funding by other sources since Horizon 2020 resources available for this specific Call were already allocated following a competitive ranking.

* This means passing all stringent Horizon 2020 assessment thresholds for the 3 award criteria (excellence, impact, quality and efficiency of implementation) required to receive funding from the EU budget Horizon 2020.

Corina Cretu,
Commissioner for
Regional Policy

Carlos Moedas
Commissioner for Research
Science and Innovation

Brussels, 20/12/2017

Under the hood

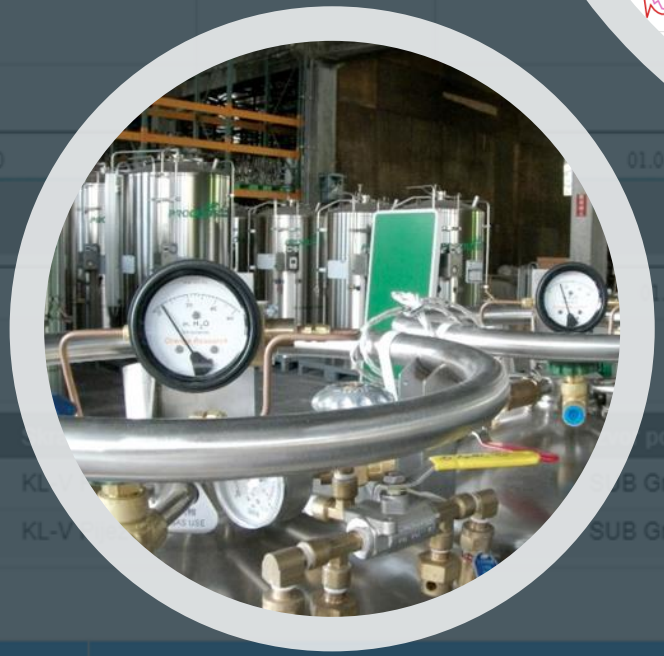
Data management and analytics

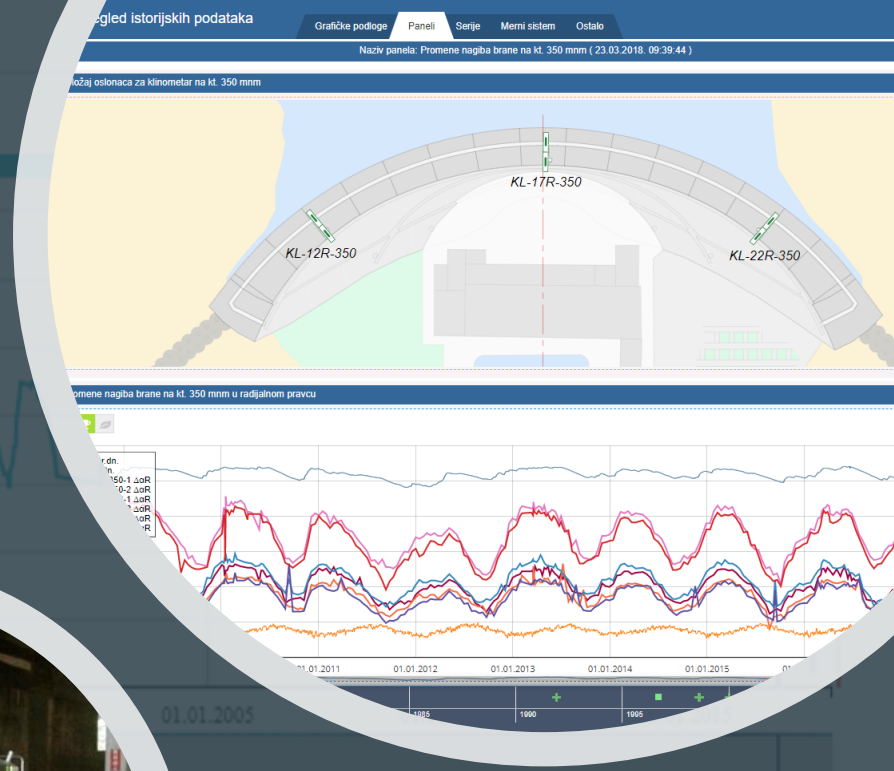
Our Data integration suite offers a bundle of software components for visualization, management and analysis of measured data acquired from various data sources.

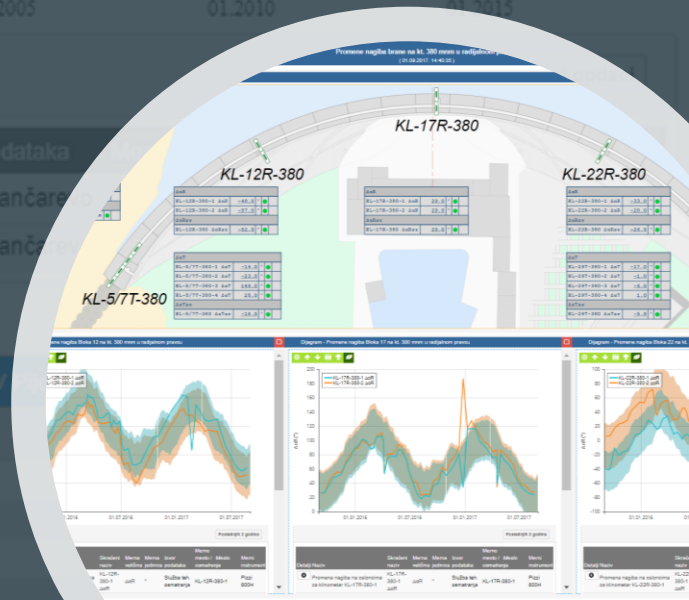
Tailored for complex monitoring systems, the system stores all important data and metadata about objects of interest, monitoring instruments and monitoring sites.

The data acquired from sensors are assessed using sophisticated data science and artificial intelligence methods.

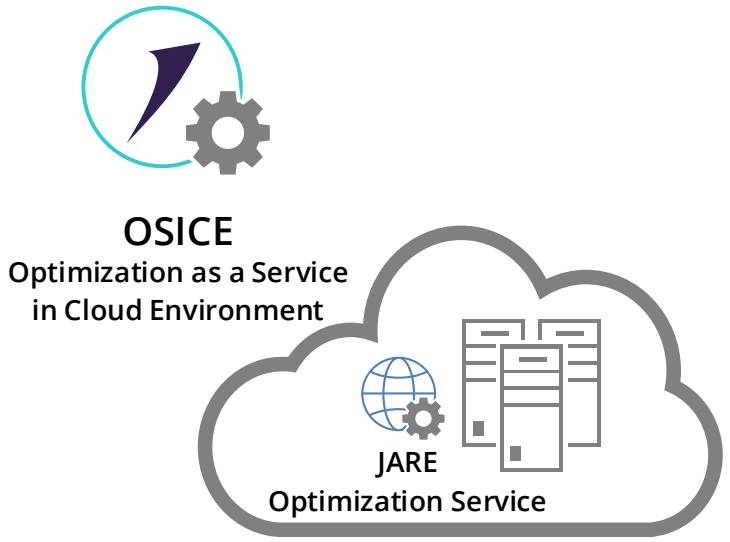
Real-time data monitoring tools provide a setting where users can observe time-series dynamics, inspect the evaluated data quality, compare data with control values, and receive warnings with custom level of sensitivity.







Under the hood



OSICE

OSICE is a cloud service intended for solving complex optimization problems in the distributed computing environment.

> Solving real-world optimization problems is a privilege of large companies and research institutions, which can afford specialized expert teams and necessary computing infrastructure. OSICE simplifies optimization process and make it available to wide range of users, regardless of their financial, technological or knowledge level.

OSICE is an innovative, cloud-based optimization service that enable SMEs to implement optimization in their specific business and engineering problems, and to offer large companies a cost-effective alternative to their present optimization solutions.

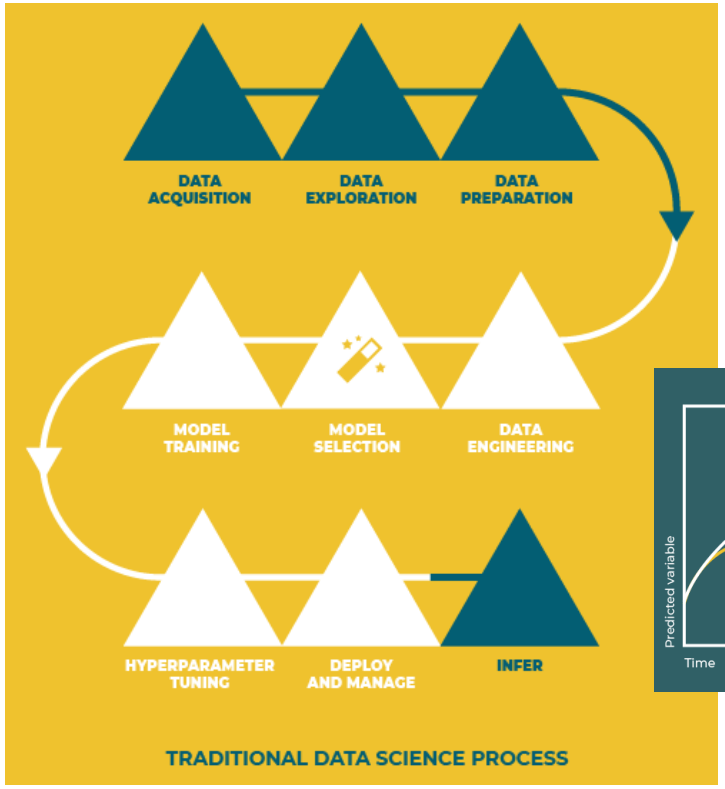
Under the hood

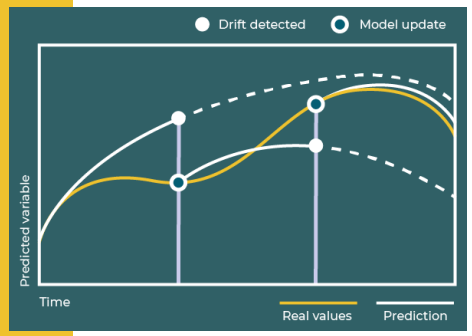
BLACKFOX

Blackfox is a Cloud software solution for automated generation of most adequate predictive model for a given data, based on evolving artificial neural networks.

> It is an original combination of machine learning, artificial intelligence and high-performance computing methods, that provides the ability to automatically obtain optimal parameters of a neural network within a reasonable time.

Blackfox service enables both experts and enthusiasts in artificial intelligence to quickly obtain accurate machine learning models with a minimal effort.





Always keep innovating

2017

Dam health assessment based on evolving artificial neural networks

2019

Cloudification of production engineering for predictive digital manufacturing

2020

Finalist of 3rd round of European Data Incubator

2021

HUBCAP

Collaborative platform for cyber-physical systems

2022

AI based renewable energy management system

Artificial neural networks in energy sector