



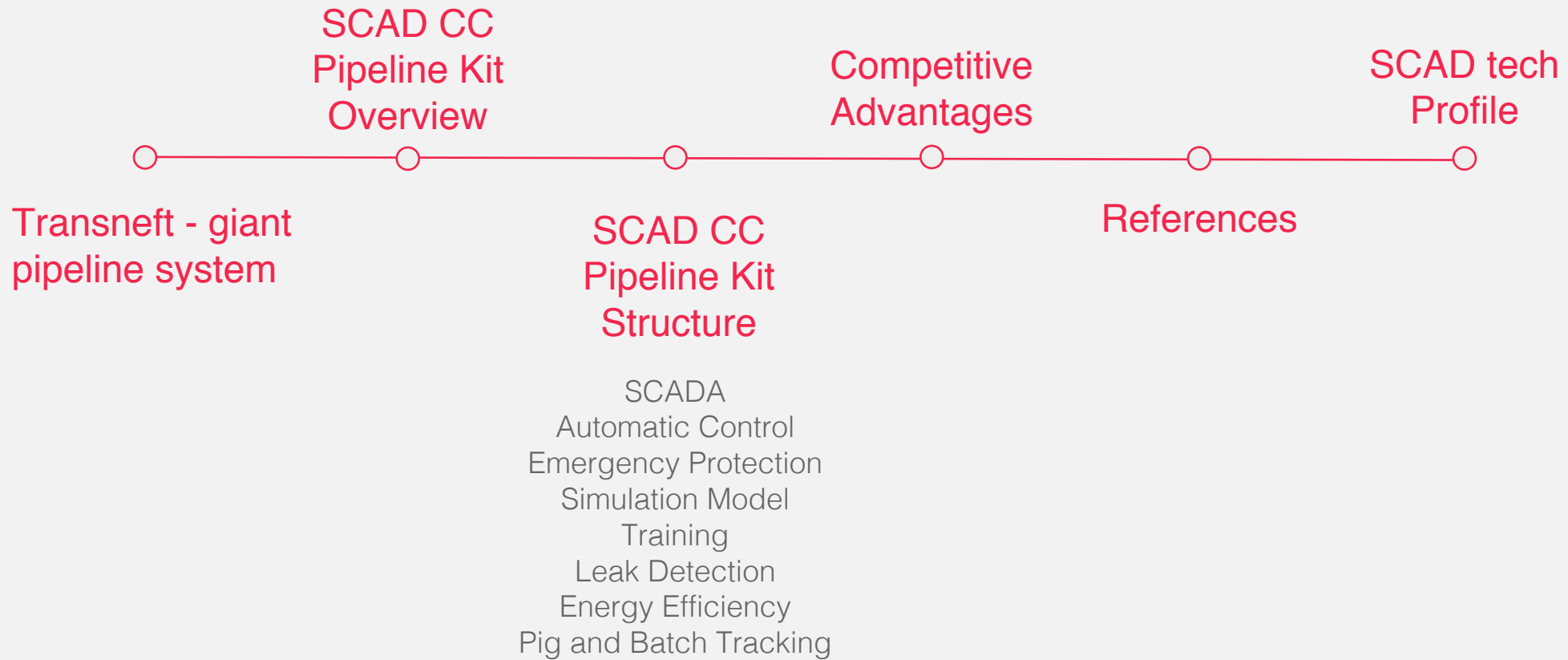
SCADTECH



SCAD CC Pipeline Kit



Integrated solution for Pipeline Control and Monitoring



Transneft – Giant pipeline system

SCADTECH

“Transneft” transports more than 85% of Russian oil and is the largest pipeline system in Russia



69 000 km
is the total length of pipelines.

516 million tons
are transported every year

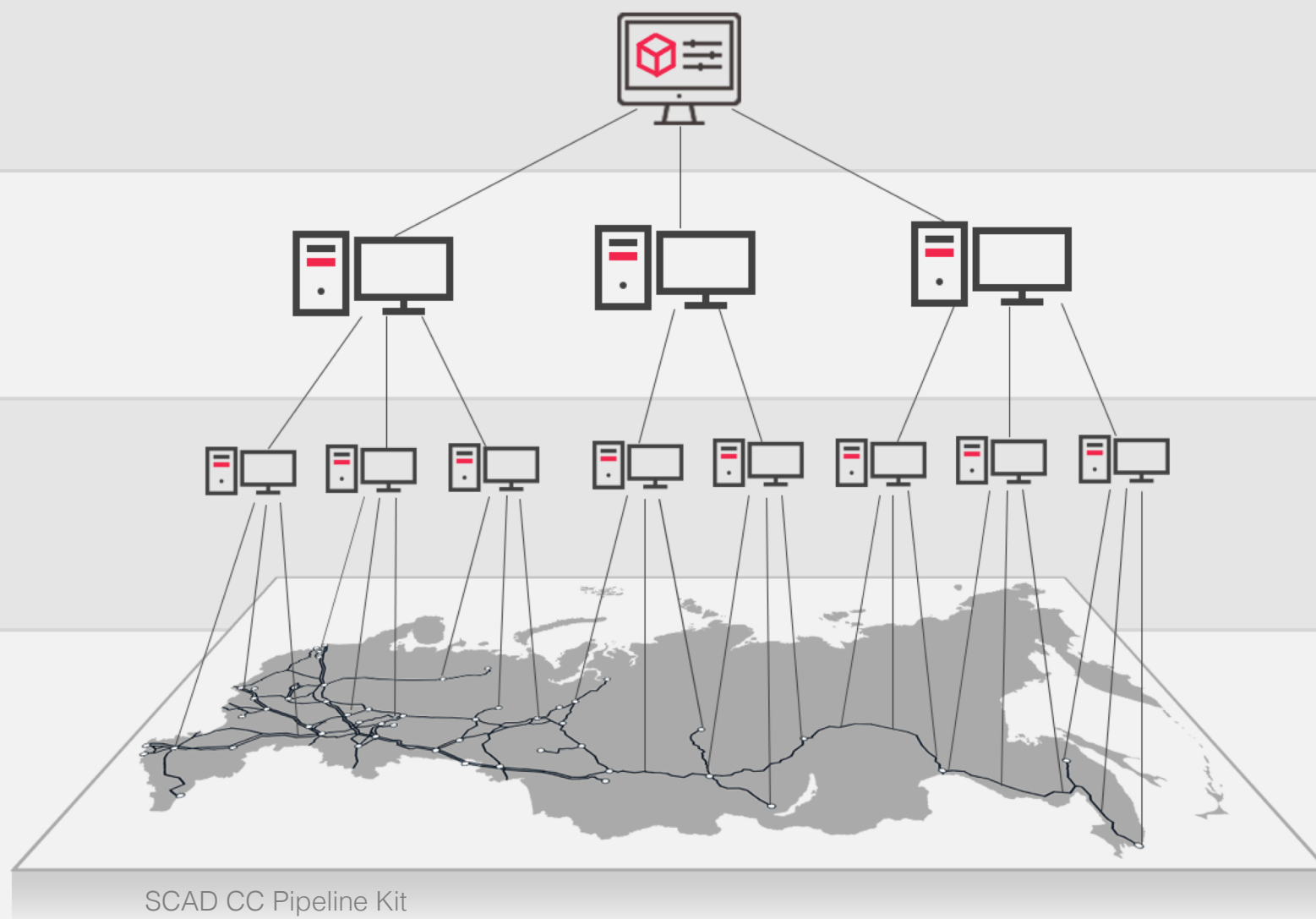
500 pump
stations
provide transportation

23 million m³
of tank capacities

4 marine terminals

Transneft Unified Control System

SCADTECH

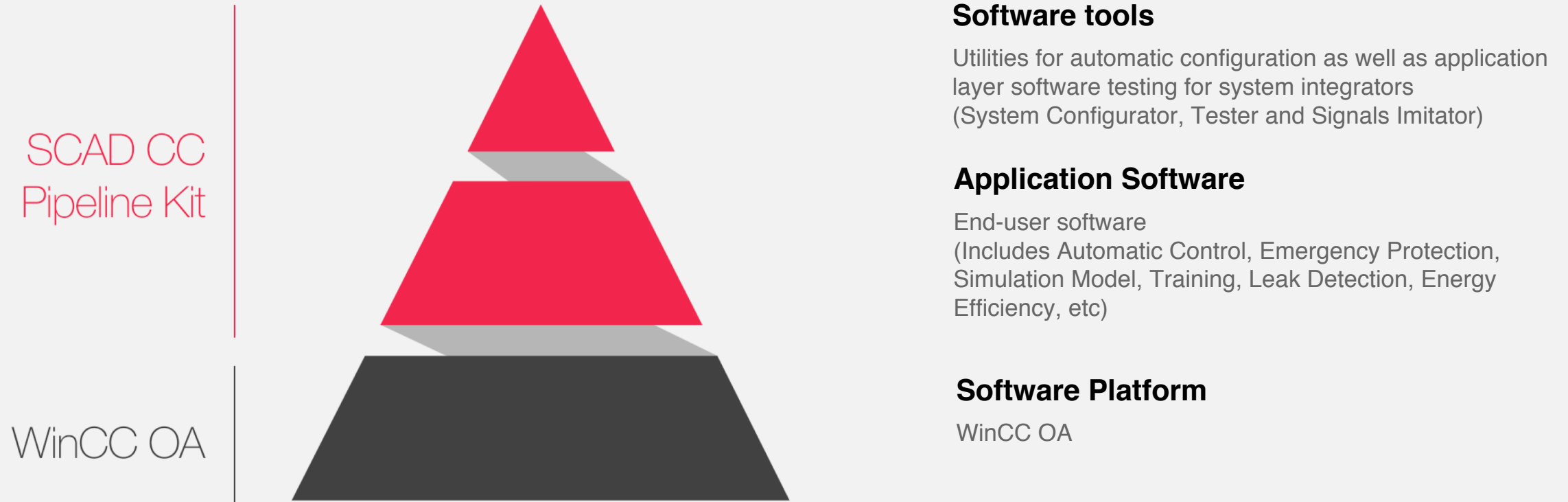


1 main
OCC

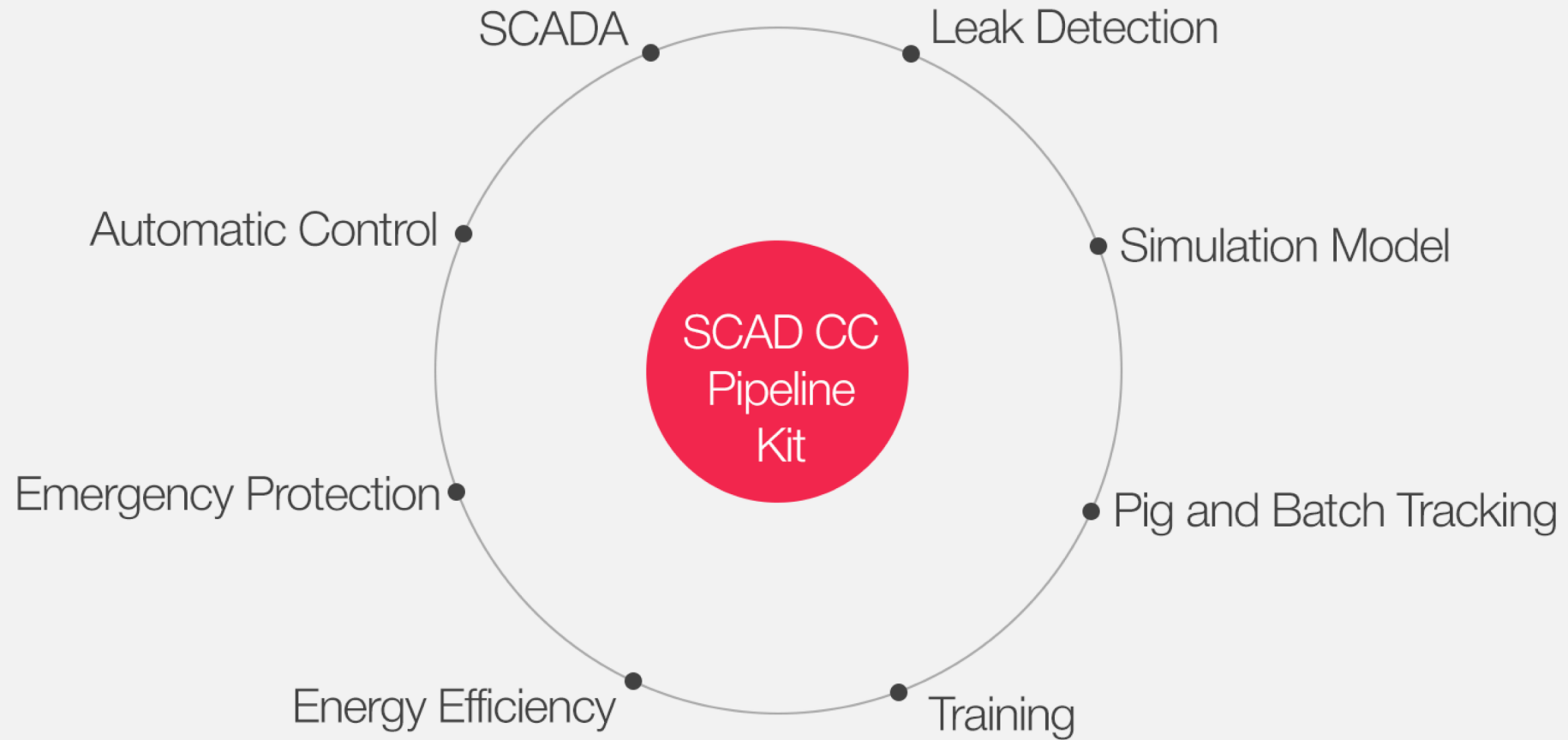
13 cluster
OCC

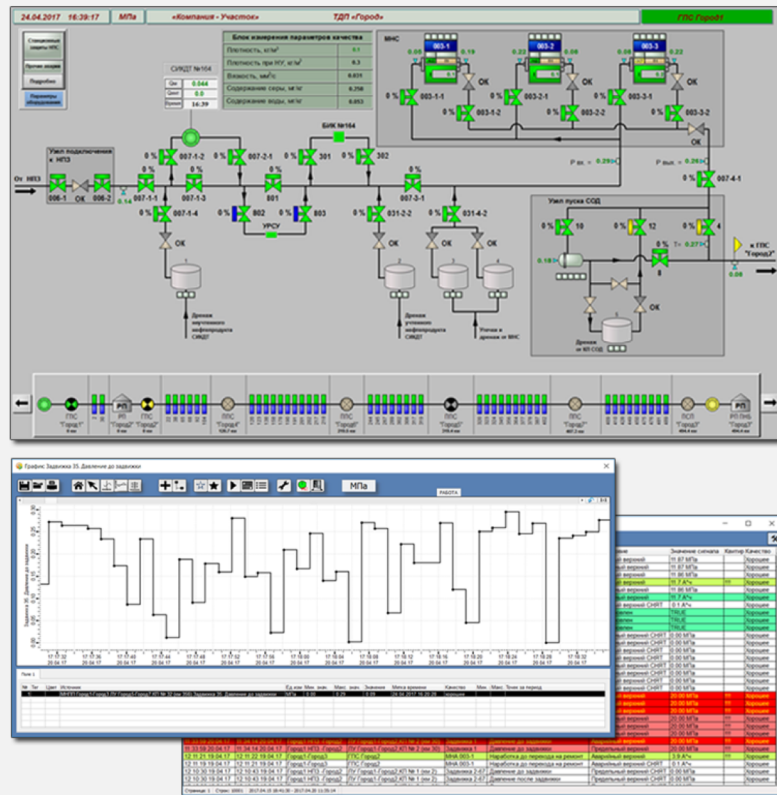
65 regional
OCC

* OCC - Operation Control
Center

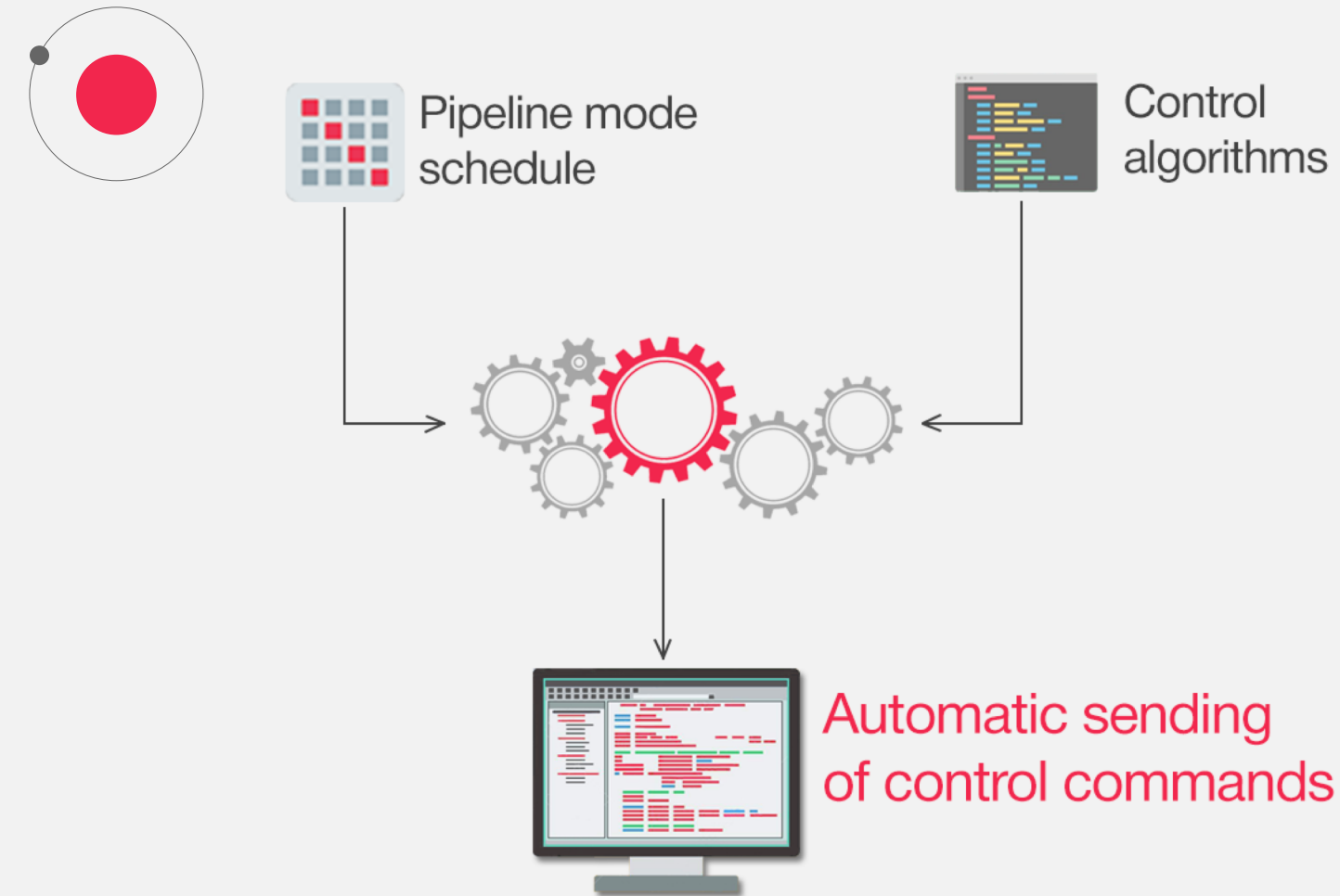


SCAD CC Pipeline Kit – is a unique software package, combining more than one system for dispatchers and engineering staff: dispatcher monitoring and control system, emergency protection system, leak detection and intensity system, staff training system, simulation system and etc. These and many others useful utilities can significantly speed up implementation of systems.





- Automation of any process regardless of the production (oil / gas / water/ electricity / transport)
- Great scalability: from single plant to distributed high-level system with disaster-proof redundancy (2x2)
- Rapid gathering of the information for pipeline system management with built-in powerful report-generation tool
- History mode with the ability to view entire event history
- Completely safe work of the dispatcher
- Permanent monitoring process is guaranteed by using a mobile application



Fully automatic control

Start, stop, transition to the selected mode automatically, without operator's involvement

Emergency stop in automatic mode

In case of an accident

Transfer to safe mode

In case of equipment failure

Risk reduction

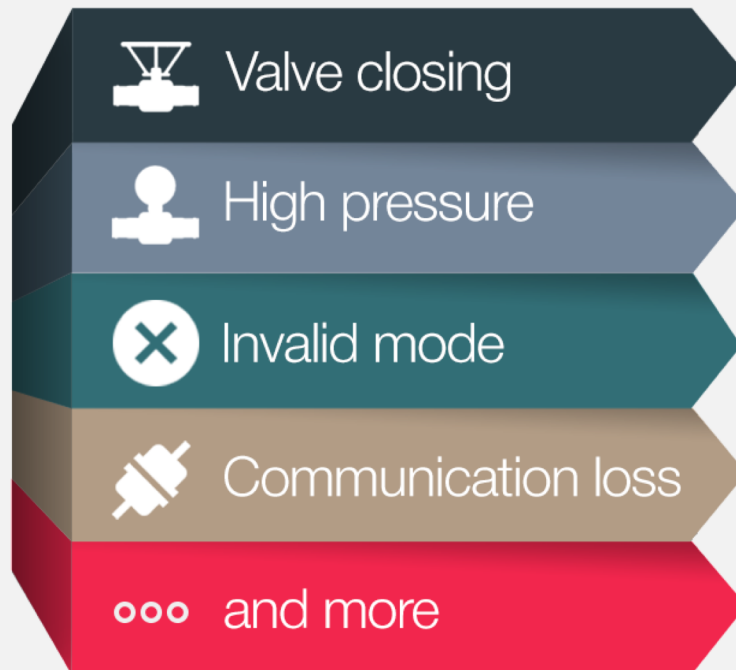
Automatic control eliminates the risk of operator failure

Fault-tolerant system 24/7

Provides redundant and continuous operation in case of communication channel failure



List of Emergencies



Recognize emergency conditions

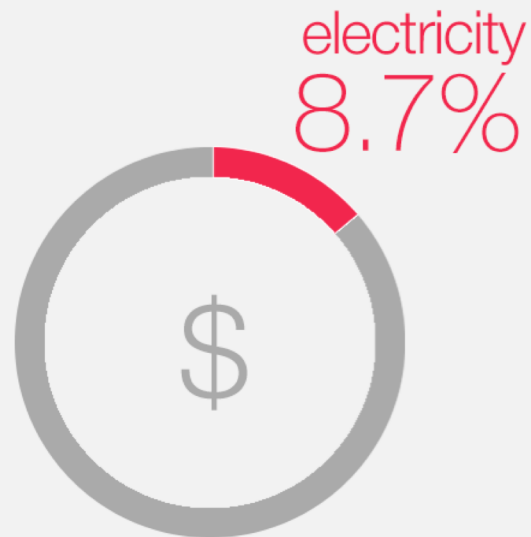
The emergency protection system identifies the conditions of possible accidents or receives a signal from the leak.

Notify the operator

The operator receives an alert about a possible accident and an offer to stop the pipeline immediately.

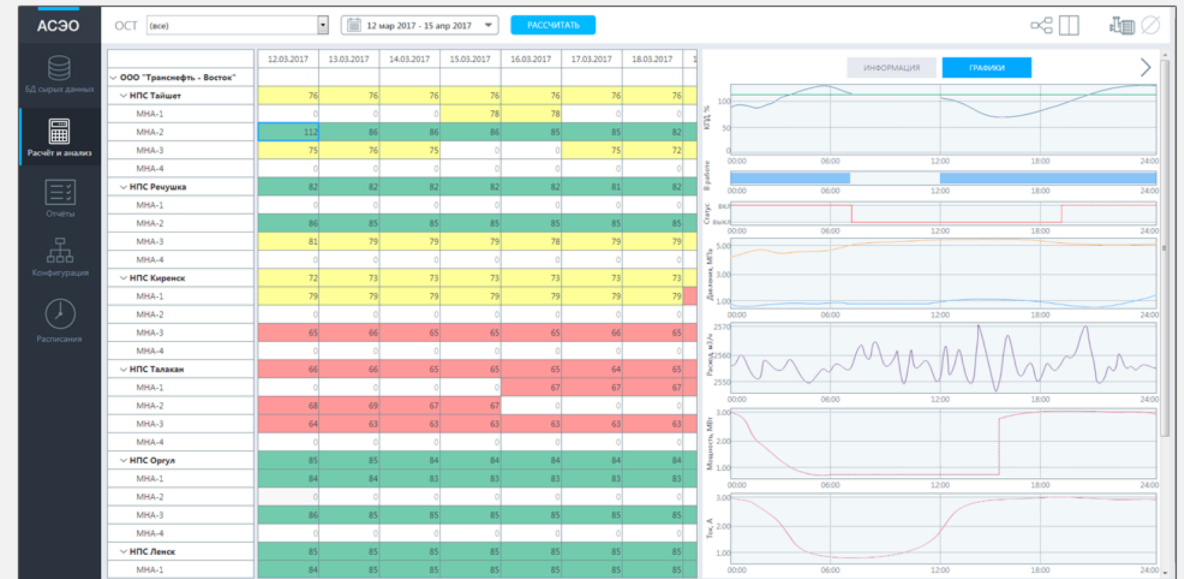
Automatically shutdown of the pipeline

At the command of the operator or after a short time the pipeline is stopped according to the pre-programmed algorithms in automatic mode.



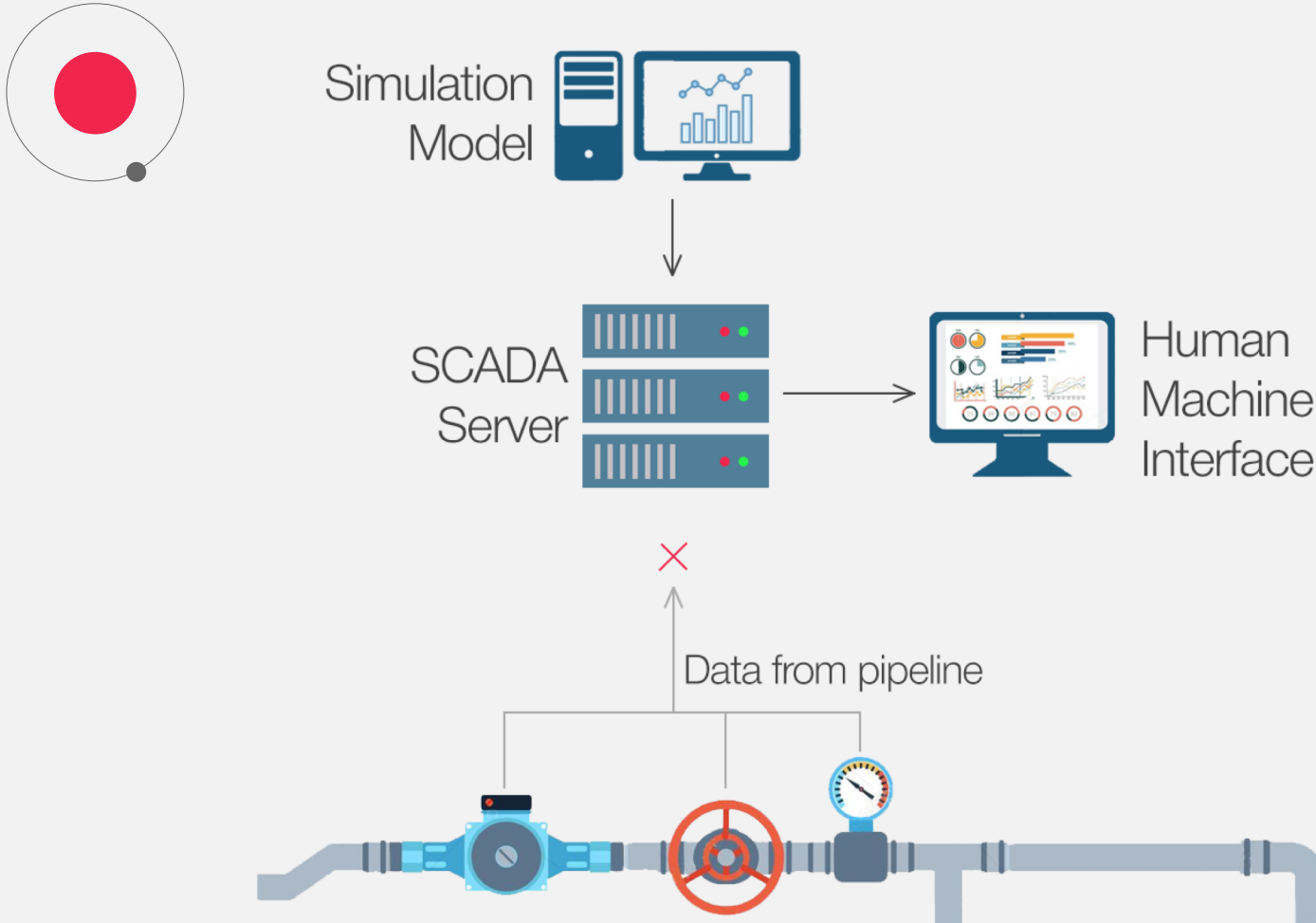
\$ 670 million

Transneft spends on electricity every year.
This is 8.7% of the company's total costs.



Efficiency estimation software

We implemented a software for estimation of the consumption and energy efficiency of equipment (pumps and regulators) for the entire company Transneft.



- **Fully simulates real pipeline control**
- **Training of operator's skills in the handling of emergencies**
- **Allows to train operator to control a pipeline which has not yet been built**
- **Can be used to test the knowledge and experience of the operator**

— Pig and Batch Tracking System

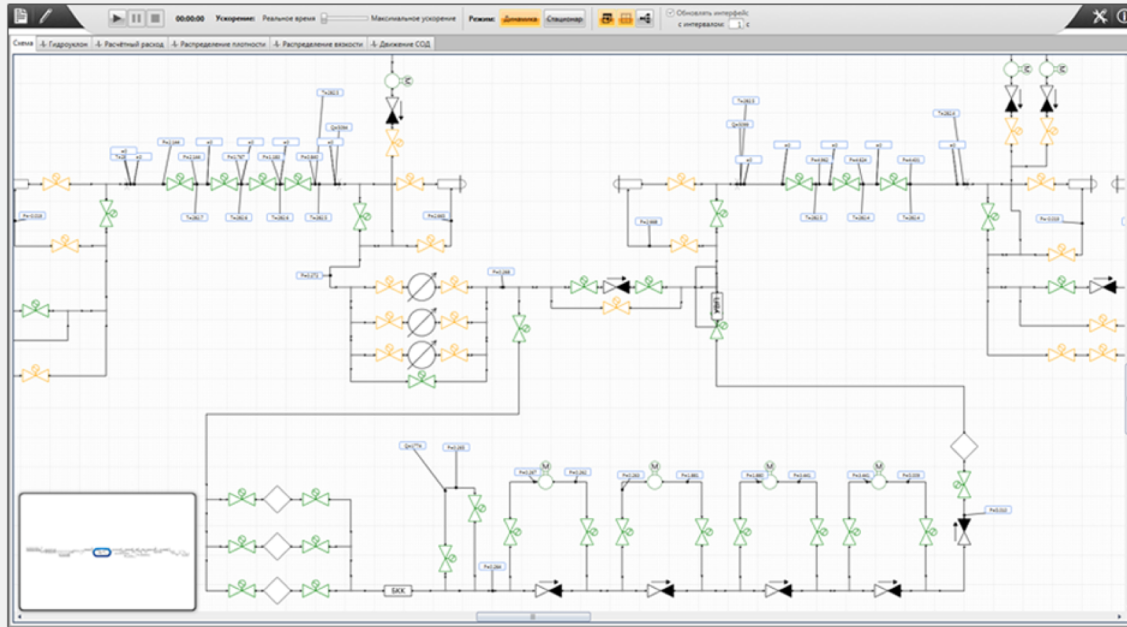
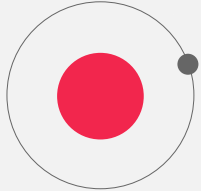


Pig and batch tracking system

Special pigs (scrappers) are used to clean and diagnose the pipeline. The operator must track the movement.



We have implemented the **tracking system** for monitoring and prediction of scrappers' and batch boundaries movement.



Stationary/transient
simulation



Non-isothermal
flow simulation



DRA effects
simulation

Real-Time simulation

Used to monitor flow conditions and leak detection

Offline simulation

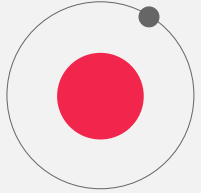
Replacing the pipeline data with the modelled one in Training System

Pipeline design

Optimization of operation conditions while designing the pipeline

Development of algorithms for pipeline control

Modelling of start/ stop/ transient process and what-if modelling



As a solution for an Early Warning



Diagnostics 24/7

The System receives data from the SCADA and determines the presence of a leak.



Leak Detection and Location

The System determines fact, coordinate and amount of leakage.



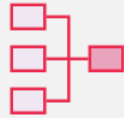
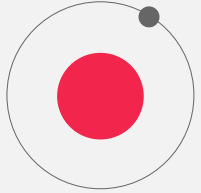
Stopping and Cutting the Pipeline

The pipeline is stopped and dissected with valves closest to the point of leak.



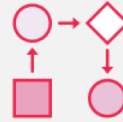
Departure to the Place of Incident

A team of specialists is sent to the site of the leak.



Set of Algorithms

The results of various leak detecting algorithms, based on different physical principles, serve as the basis for the final solution.



Pipeline Model Inside

The mathematical model allows to distinguish the hydraulic disturbances caused by technological events and those in case of leakage.



Self-Diagnostics

Based on the analysis of the input data, the LDS determines its own serviceability.



Self-Adaptation

LDS is automatically adjusted after installation on the pipeline, using machine learning.



Under Any Conditions

The system functions in any of the pipeline operating modes: stationary, transient or shut-in.



Integration Capability

The LDS is able to work with various data sources (OPC, SCADA), and can also be integrated into WinCC OA.

Advantages:

- Implemented on a large number of pipelines
 - with various pumping technologies (variable speed drives, drag reducing agents, etc.);
 - in different climatic conditions (from the far north to the Black Sea);
- Applicable for petroleum, petroleum products, water, liquefied gas;
- Scalable and extensible solution;
- Integrated with the WinCC OA platform (certified ETM partner).

What Pipeline Kit offers for pipeline operating companies:

- Reduction of the product loss, which results in decreasing of costs of pollution clean up (ca 10%);
- Protection against misappropriation of the product by third parties (ca 50%);
- Minimizes risk of operator's mistake;
- Reduction of costs for pump, block valve and other equipment's failures.

For the last 5 years we have manufactured and commissioned:

- More than 30% of Transneft pipeline system is equipped with Leak Detection System
- Energy efficiency calculation is done for the entire Transneft (500 stations)
- More than 3 000 km of pipeline are fitted with own-produced line telemetry system



The SCAD tech Group – is an expert in the development and the implantation of complex solutions in the sphere of process control.

9

branch offices

3

manufacturing
locations

200

mln EURO
- sales 2017

>1000

employees

900 of which are
engineers and
technicians

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