tango

Supports your business intelligence with real time validated data

Centralised key performance indicators aggregated and integrated from IoT devices, data sources, protocols and software systems

Control, monitoring and analysis in one transparent and reliable solution

We chose the word **TANGO**...

The etymology of the word TANGO seems fascinating, diverse and surprising. Just like our information system. Sometimes it doesn't even have much to do with what it means for us.

The Latin dictionary provides a questionable etymology of the word 'tangir', meaning 'playing the instruments' and taking it even further, where the word **TANGO** means '**to play**'. Our information system enables you to play with many aspects of your core business.

According to another theory, the word 'TANGO' comes from the Kikongo language where it literally means '**moving in time to defeat**'. Our Information system will enable you to move and act faster, as it includes many predictive analytics capabilities paired with pure business intelligence that allows you to act in time to defeat all possible business obstacles.

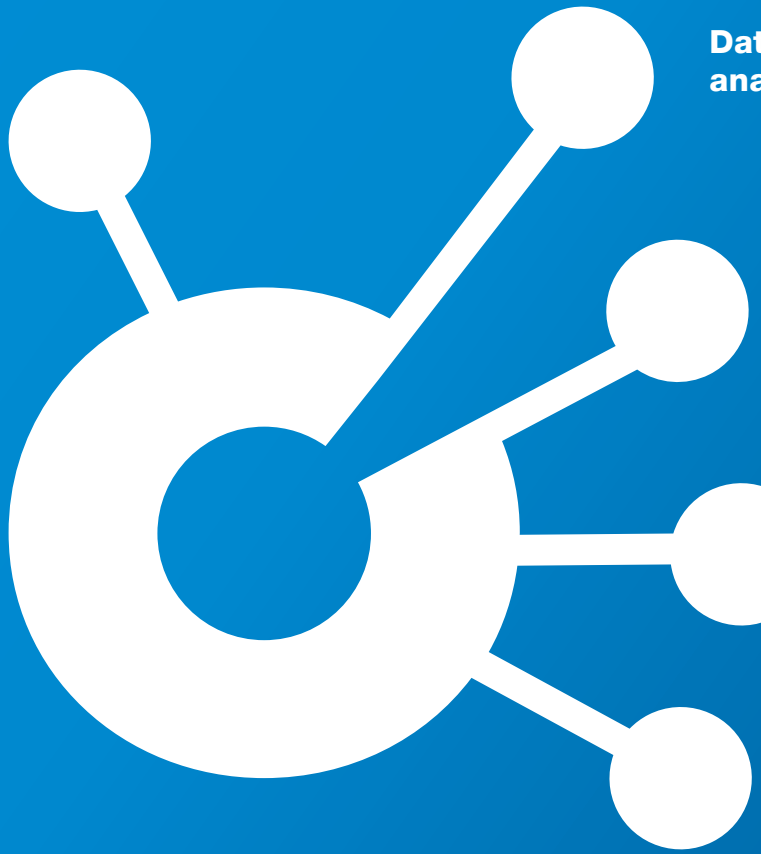
The 1914 edition of the Argentinian dictionary says that the words 'tangir' or 'tangere' mean 'open' or 'touch'. Our Information system is designed to be open for all devices and business information systems, as well as further needs and development.

TANGO is most widely connected to the Argentinian dance… our TANGO is a fine and extraordinary coordinated **dance of user needs followed by IT that understands it**…

TANGO is powered by

PETROL SmartIS PAMETNI INFORMACIJSKI SISTEMI

Connecting devices, data sources, software and people



Data collection, integrations, analysis, data lake

Visualisation, simulation, reporting

Feasible intelligence

Decisions, actions, savings

Recent IoT studies have confirmed that the number of connected devices (through different protocols) has grown by more than 285% since 2015 and will reach 40 billion in 2020. This represents a huge amount of data processed for various purposes. While the IoT area is most known in the field of Smart Home, business users and public services (commerce, agriculture, industry, smart grids, infrastructure systems, Smart Cities) are the ones that use the largest number of devices.

According to the findings of the Juniper research in the IoT field, »The Internet of Things« is a combination of devices and software systems connected via the Internet, which generates, receives and analyses data. These systems should aim at surpassing traditional ecosystems of electronic information in order to improve quality of life, efficiency, create added value and reduce costs. (The Internet of Transformation 2018, https://wwwjuniperresearch.com/resources/).

TANGO is an open aggregation platform that addresses challenges of modern business and enables digital transformation regardless of the activity or size of the user. TANGO is based on latest technologies that enable easy data acquisition, high availability of information and data in real time. That enables users to understand how their system works and make smart and pragmatic decisions.

TANGO can answer questions about business intelligence using technologically advanced architecture with unlimited capabilities and easily adaptable user functions and friendly visualisations.

CHALLENGES

- The number of connected devices is increasing
- Various data transfer protocols
- Control and management of a business require a fair number of IT business tools or business software programmes
- Dependence on various inflexible technologies for the collection and processing of data and information
- Information is stored in separate databases connected with different SW solutions
- Long work processes due to internal or external reporting and the aggregation of data and information from different data sources
- False or incorrect data is manually replaced and it takes a long time to validate the real and acceptable value of missing data or information
- To get an overview of the system and find key performance indicators, complex data mining needs to be used
- Complex visualisation of key business indicators through various tools
- Optimisation process (unit commitment, costs, energy usage, etc.) is computationally expensive and involves a large ensemble of mathematical tools and algorithms
- The use of both strucured and unstructured input data results in a long workflow process

TANGO

- TANGO is built on latest technologies, that enable simple collection and processing of large amounts of data
- Open platform with data transfer capability from IOT devices, SCADA systems through OPC protocols, relational databases - SQL, web services and structured files
- Integration with other information systems (CRM, ERP, asset management, other expert systems)
- Relevant business information of technical nature is collected in one place in a single database (one truth data - every data element is stored exactly once) and accessible to all users who have the appropriate rights
- All collected data is checked and verified before being stored to a data lake
- With the help of adjustable formulas, data can be converted or modified
- The missing data can be added by the user with a manual entry, however TANGO allows even more advanced solutions - data can be automatically added or replaced with the use of rules, interpolation, or with other advanced AI functions (Data Intelligence)
- Based on data patterns TANGO can determine future trends
- Simple visualization of key business information in dashboards that can be arranged in multiple levels, using KPIs, graphs, visualisations, reports, and other visualisation elements (Google Maps, GIS, etc.)
- Built-in functionality for asset management to display key information about devices, such as: pumps, heating substations, etc.
- Alarming and reporting of unwanted business situations
- Automation of reporting
- Display of collected and calculated data on an integrated GIS viewer
- Working processes which are important for decision-making (management, maintenance, decision-making) are simplified and faster
- Information can be easily used
- Large amount of data enables us to developnew business models and business intelligence

DATA

Source data
Data at rest

UNRELIABLE DATA

Doubtful data
Data in motion

Data check
Data calculation
Virtual data

RELIABLE DATA

Checked data
Trustworthy data
One truth data

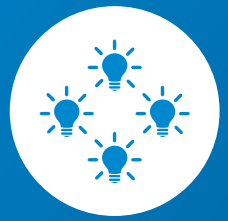
Data in
many forms

INFORMATION

KPIs, Graphs,
Visualizations

Management and
monitoring

KNOWLEDGE AND INSIGHT



Prediction and
optimization

Foundation for
faster and better
decision-making

Data collection → Data processing → Data storage → Dashboards, Visualisations, GIS Viewer, Reporting → Asset management, Energy management → Data intelligence

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Automatic real-time optimisation and system optimisation

DATA COLLECTION

- A stable TANGO client operates without user intervention even in events of network failures, power outage, computer restarts, etc.
- Collects data from IOT devices directly or uses various protocols or connections to gather data from different sources (SCADA systems, relational databases, web services, structured files)
- Flexible data capture from OPC Classic, OPC UA, DA and HDA
- Data acquisition from MS SQL, MySQL, MariaDB (real time, history, batch)
- Data gathering from integrated data sources is adjusted for each service separately
- Data acquisition from REST and SOAP services via second instance, which allows development of additional functionalities
- Automatic TANGO client update
- End user can manage data gathering with simple flows

DATA PROCESSING

- All data have specific meaning with enabled data semantics, which enables various use cases
- Easy data management enables various data manipulationds and conversions (automatic calculations, virtual data points, data schedules, replacing missing data manually or with rules, etc.)
- Reliable validation and correction of data in streams before storage
- Mapping rules are applied to prevent storage of false information (e.g. error in data reading) using linear interpolation, polynomial equations, or with other advanced AI functions
- Data can be calculated using multiple data points into virtual data points using mathematical functions, which enables an automated database that results in faster work processes (further use in analytics, reporting, graphs)
- The system of alarming is set on this level – content or communication alarms are defined to be recorded and are triggered based on a set of rules or boundary conditions, which enables further description and visualisation of unwanted events on the visualisation level of TANGO

DATA LAKE

- Hadoop technology enables a large amount of fast data storage (large amount in short time intervals)
- Flexible solution enables storage of unstructured data in various forms and formats (sensor data, video, sound)
- Data and information is easily integrated and stored from different external data sources (e.g. weather data, data from other platforms, other business SW solutions)
- Unstructured data can be stored for further unpredicted or undefined use without additional costs of software development
- All data and information in a data lake can be easily used for broader functionalities in the future (that are not yet defined today)
- Easily and unlimitedly expandable database storage

VISUALISATION

- TANGO portal enables many user friendly functionalities on the visualisation level
- All visualisations are adapted to different users
- Visualisations support a display of various data using pictures or different custom-made components and structured in a user friendly manner
- Data is visualised in different forms – KPIs, graphs, CUSUM, special widget for weather data, asset management data, Google Maps, GIS viewer, etc.
- Different views can be adapted and allowed for types of different users (user management) or authorisations (user rights)

USER ORIENTED VISUALISATIONS

support the operational part of your business

ALARMS

Simple and transparent overview of the whole system's functioning, reduced time of operational processes and increased maintenance effectiveness. Alarms are set and triggered on the basis of user rules, furthermore the user can define standard operating procedures to handle alarms. In addition, criticality definitions and response times can be set, and in case of an alarm a responsible person is informed via SMS or e-mail.

Standardized response is enabled and SOP for further actions are defined and set for all.

KPIs

Key Performance Indicators evaluate actual performance against strategic objectives. They are aggregates from different measurements, data points, virtual data points and can also use dynamic attributes. Aggregations are calculated for different time windows - hour, day, week, year or individually set period. Different functions are supported (sum, average, minimum, etc.). KPIs can be connected to rules that trigger alarms (e.g. exceeded daily consumption of gas, machine reaching service in 100 hours).

CUSUMs

Cusum (cumulative sum) as a sequential analysis is a powerful and easy-to-implement control chart, appropriate for monitoring the counts of nonconformities in a unit from a repetitive production process. It can be used, for example, to show the sum of differences between planned and actual use of electricity.

Control chart performances are used under the assumption of known in-control process parameters or estimated reference samples.

GRAPHS

Easy to build and intuitive graphs can show various data or measurements, using different graph types (column, line, scattergram, stacked bar, etc.) with easy to slide time interval selection (from – to). Time intervals on the graph can be set to display data on a fixed or user defined time window (zoom-in functionality), or the complete data history.

Graphs can be easily equipped with legends, units, titles, etc. Chosen KPIs can also be displayed in graphs.

Building and designing is easy and simple.

GIS VIEWER

GIS viewer can be set according to user needs, using different layers and many visualisation settings.

Added value for users is the ability to merge static GIS data with dynamic measurements and KPIs, which enables them to see live snapshots of their system oriented in space.

GIS viewer can display information of different origins in order to enable users simple but advanced system visualisations:

- Geoinformation from GIS
- Data and information from TANGO
- Information from other integrated systems e.g. asset management

Metadata, measurements and KPIs can be pinched to Geoinformation database. Live elements enable users to colour, mark or emphasize GIS elements and thus create advanced process visualisations.

Automatic queries enable other parts of TANGO to use GIS information (e.g. pipe length, number of users, maximum pipe age), that are easily used easily used in further analysis or KPIs (e.g. sold water per pipe length, sold water per user etc.).

Business area of TANGO enables control, easier decisions and optimisation

REPORTING

TANGO provides a flexible solution for creating and viewing reports within the web browser, which allows a user quickly build reports and easily customise and modify them - with the help of report designer and viewer.

Reports are distributed in a simple way according to specifically defined flows (internal or external recipients) and time intervals (daily, monthly, quarterly, yearly).

This allows a user to simplify working processes and be sure that data is always true and validated. Business and regulatory reporting is made easy and quick.

Reports can include various kinds of visualisations, graphs, tables, pictures, composed from data in TANGO.

DASHBOARDS

Dashboards as forefront of process or infrastructure monitoring in real time, can change and empower a user increase efficiency. You can minimise process disruptions and facilitate previously unattainable accuracy and response times. Instant visibility of an ongoing process is always there and therefore decisions can be made timely.

Dashboards are user friendly with open design options – user can easily combine all wished information on a single screen using display widgets. Widgets can also show as many levels of data as you need by simply clicking in depth to recover wished information or data.

With help of widgets all important data is in one place – from alarms, weather data, graphs, analysis, Cusum, images to KPIs and energy accounting.

Flexible and unlimited use of dashboards enable users to:

- Add widgets to a dashboard, which can later be rearranged, replaced to alter the overall look. Multiple widgets are enabled.
- User can create different dashboards, that can be linked together and accessed via widgets
- User can set automatic refreshment of dashboards in wanted time intervals
- Multiple dashboards can be set up to a playlist, which especially enhances display on big screens

Platform to platform business integration enables display and use of data, which is not aggregated by TANGO platform – input graphical user interface is able to link information from CRM, ERP systems to further enrich and connect valuable information needed for precise decision making (e.g. data on gas consumption is linked to information about caloric value of gas).

ENERGY MANAGEMENT

Energy management is a module that connects functionalities of energy management and energy accounting.

Input graphical user interfaces are flexible and can be built according to needs by user.

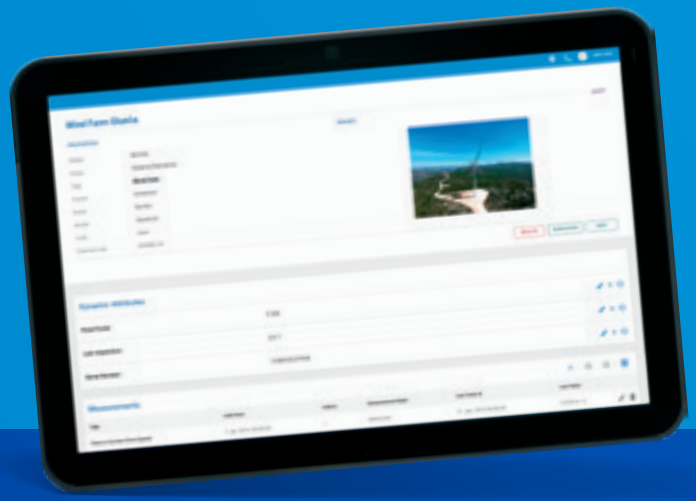
When implemented, ready-made prepared analyses of energy usage are included, users can further configure and adapt them according to their needs.

Data is easily compared between the level of energy accounting (actual e-bills for energy can be automatically imported) and real measurements and readings (data part of TANGO). This enables control and correction measures.

Energy accounting is intended to manage costs of energy consumption, such as electricity, water, utilities costs, heating, etc.

Analytical level is dedicated to analyse process of use of different energy source consumption and analytics of data series:

- Price lists tied to user and supplier can be defined and changed when needed
- Manual input of bills can be quicker, if price lists are defined
- Automatic import of e-bills is enabled
- Data on reference values of consumed energy and values or different coefficients for CO, CO_2, NO_x dust parts can be used to enhance functionalities and added value of analysis



ASSET MANAGEMENT

Pragmatic use of this module is intended to enhance simple asset data storage, connecting it to real time data to extend your maintenance process capabilities.

Utilisation of data from IoT sensors or measurements from devices (as integral part of your assets), allows you to actively track specific information about your assets without any human involvement.

Data can be used to monitor and manage lifecycle property, industry or system equipment assets.

Combination of asset information, rules and data collection and aggregation, supports preventive maintenance, better asset utilisation, remote monitoring and real time analytics on device or asset level.

Users can easily predict asset and equipment failures before they happen, and minimize the risk of unplanned downtime in production.

DATA INTELLIGENCE (DI)

TANGO as a platform supports your data intelligence. Created to improve operational efficiency through access and use of large amount of data in real time, users can work more efficientlly, smarter and quicker. As data is stored in one place, validated, aggregated, TANGO represents a holistic source of single truth in business data.

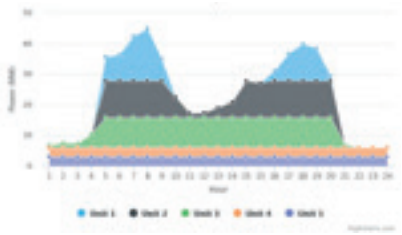
That allows users to execute informed decision making, pinpoint problems easily and correctly, and act precisely. Without overall use of historical data from multiple sources, that would not be possible.

TANGO supports business intelligence with advanced data warehousing capabilities, broad and flexible management of enterprise information, exact and validated management of performance, and flexible and user integrated analytic applications, governance of business processes, risk and compliance control using different rules and KPIs.

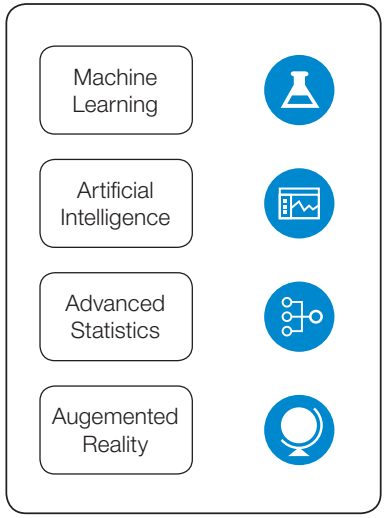
Machine Learning

Optimisation

Unit Commitment



DATA INTELLIGENCE



Data Analytics enables exploration of unstructured data (historical, multiple source) through statistical analysis, quantitative analysis, data mining and predictive modelling using artificial intelligence on data warehouse level. Structured and unstructured data can be used in different user defined business or optimisation models with the aim to create different options to develop your business or predict future developments of business conditions with highest degree of probability.

TANGO enables a reliable overview of performance for different industries and users, but most importantly, gives a clear insight on measures that have to be implemented, to act more efficientlly tomorrow.

What is my carbon footprint?

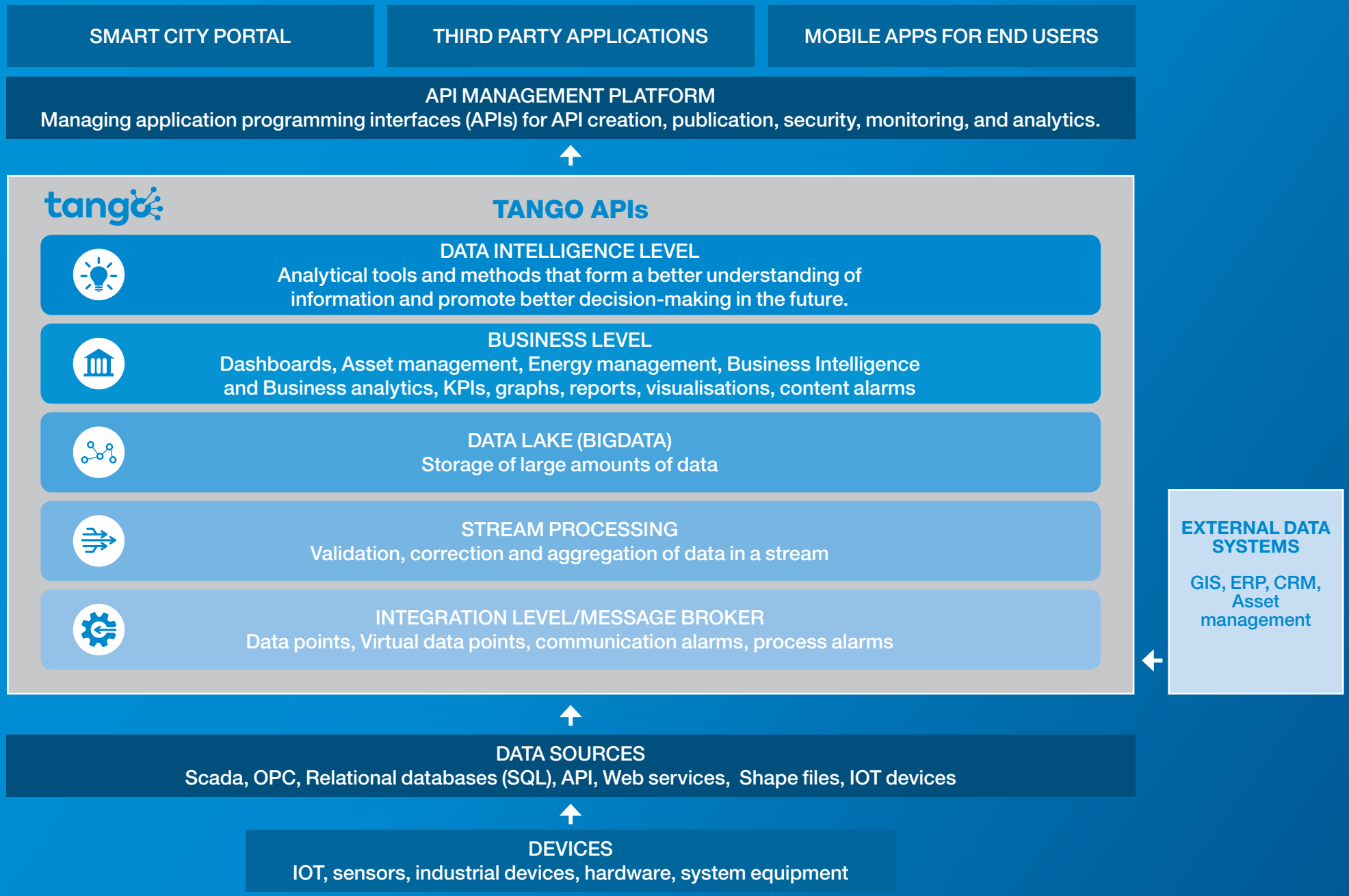
Is all performance data from my infrastructure in one place and is it reliable?

How much energy am I using and how can I use less?

Can I automate my processes and reporting?

Can I see how different parts of my system are performing in one place?

- WATER SYSTEMS
- DISTRICHT HEATING
- WASTE WATER TREATEMENT
- PUBLIC LIGHTNING
- SMART INDUSTRY
- SMART CITY
- SMART BUILDINGS
- SMART HOME
- ENERGY DISTRIBUTION SYSTEMS


SMART CITY PORTAL
THIRD PARTY APPLICATIONS
MOBILE APPS FOR END USERS
API MANAGEMENT PLATFORM
Managing application programming interfaces (APIs) for API creation, publication, security, monitoring, and analytics.
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TANGO APIs
DATA INTELLIGENCE LEVEL
Analytical tools and methods that form a better understanding of information and promote better decision-making in the future.
BUSINESS LEVEL
Dashboards, Asset management, Energy management, Business Intelligence and Business analytics, KPIs, graphs, reports, visualisations, content alarms
DATA LAKE (BIGDATA)
Storage of large amounts of data
STREAM PROCESSING
Validation, correction and aggregation of data in a stream
INTEGRATION LEVEL/MESSAGE BROKER
Data points, Virtual data points, communication alarms, process alarms
EXTERNAL DATA SYSTEMS
GIS, ERP, CRM, Asset management
DATA SOURCES
Scada, OPC, Relational databases (SQL), API, Web services, Shape files, IOT devices
DEVICES
IOT, sensors, industrial devices, hardware, system equipment

- TANGO is a platform and a system that is technologically ready for tomorrow
- TANGO successfully passed a security check of the entire system executed by international certification institution, including vulnerability to external attacks
- Organisations can manage their processes in accordance with ISO 50001 standard easier - TANGO has obtained a certificate, that demonstrates its ability to support the ISO 50001 execution in those points, that are applicable to the management and use of data and the use of information systems for process management
- TANGO is a solution independent of operating systems
- It has a responsive design - the content itself adjusts to the device that uses TANGO (computer, tablet PC, phone)
- Works without plug-ins
- The latest guidelines for the development and display of content are used - Google material

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