

# Spiro Digital Twin

## Meeting the needs of process plant operators

### Overview

Process plant operators face a range of daily challenges:

- Operating Objectives
  - ✓ Maintain safe and reliable operation
  - ✓ Minimize environmental emissions and flaring
  - ✓ Meet production targets
  - ✓ Reduce losses
  - ✓ Maintain product quality and yields
  - ✓ Optimise energy and resource use efficiency
- Daily Challenges
  - ✓ Changing feedstock availability and price
  - ✓ Changing consumer demand due to planned or unplanned outages
  - ✓ Changing process equipment condition
  - ✓ Limited availability of equipment due to maintenance or reliability

### **Spiro Digital Twin helps process operators, planners and supervisors to make accurate and consistent decisions**

- Automates the decision-making process.
- Provides an accurate model that reflects real process conditions and molecular components.
- Uses real time data to ensure that decisions reflect the current process state and latest planning information.
- Ensures that all plant constraints and operating objectives are accounted for.
- Provides what-if tools to evaluate future operating scenarios and to audit past events for improved understanding and knowledge.
- Allows users to save and share what-if cases.
- Provides dashboards to monitor and benchmark current performance.
- Provides time series trends to evaluate past scenarios.
- A simple tool that is accessible to all stake holders for improved decision making.

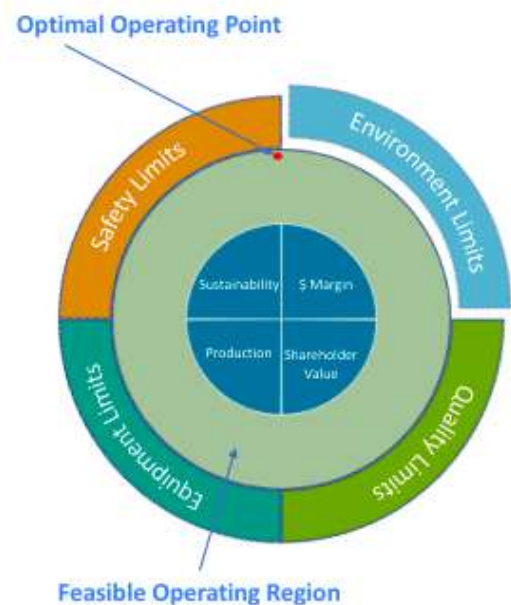
## Use Case

- A shift manager on a petrochemical process uses a digital twin to make timely and correct decisions to **manage production** and **maximize profits**.
- On starting a new shift, she needs to make a **rapid assessment**, not just of how her plant is operating but also of the state of any connected processes and storage facilities.
- The digital twin can anticipate the impact of impending feedstock or inventory changes and **advise on optimal adjustments** that need to be made during the shift. Even the weather forecast might influence these decisions and need to be included in the model.
- By checking dashboards that use derived and validated data from the digital twin she can assess overall process operation by checking **key performance indicators** such as intrinsic energy consumption and net carbon emissions. Data analysis can be used to anticipate planned equipment outages, and to update maintenance plans.



## Process Optimisation

- Process constraints are the boundaries that limit a production process and must always be respected. Constraints include safety limits, physical equipment limits, product quality requirements and environmental limits on plant emissions and waste materials.
- Core operating values drive the process towards these boundaries. These core values include gross operating margin, industrial sustainability, reliability, production and shareholder values.
- The feasible operating region is the region between the core values and plant boundaries. The plant can operate safely anywhere within this feasible region, but the role of the optimiser is to identify the optimal operating point that maximizes core values while respecting all constraints.



## Closing the Opportunity Gap

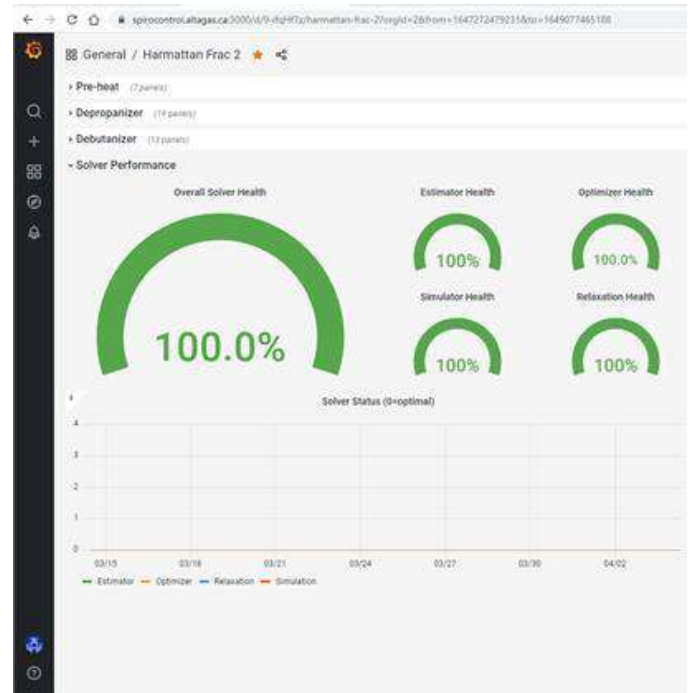
The opportunity gap is the difference between the current plant operation and the optimal operation. It is usually expressed in monetary units or tones of product.

The digital twin tracks the opportunity gap at the individual constraint, unit operation or plant wide level.

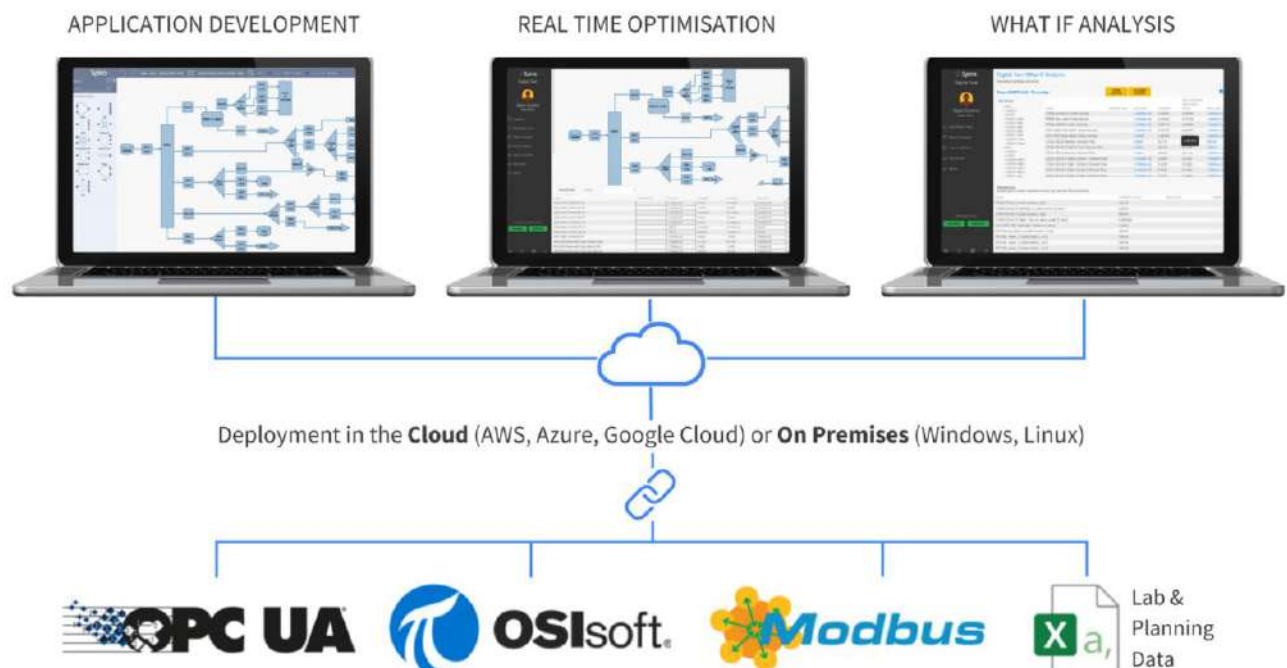
Dashboards provide a simple and intuitive way to monitor these KPI's. The digital twin also indicates the changes that need to be made to process setpoints in order to close the gap.

The solution is frequently updated to reflect changing plant conditions and feed availability. The digital twin model is designed for robustness so that the tool is available to users when they need it.

The models are highly scalable so optimisation problems can be solved across an entire process plant or value chain.



## Deploying a Digital Twin



## Contact Us



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