

## Technical Benefits

- USE provides a highly visual/interactive interface for
- the engineer, when creating, debugging, analysing and maintaining hypothesis and scenarios
  - the operator, when monitoring, analysing, tracking and interacting with live or logged events and alarms received, detected or generated by USE.

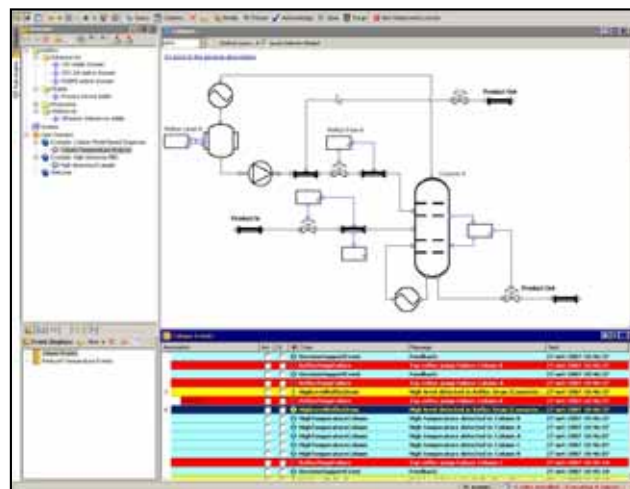
USE enables fast development of graphical user interfaces, quick deployment by connection to OPC servers and RDBMS databases, web access through its Webextension, smart configuration of user dialogs and much more.

## Business Benefits

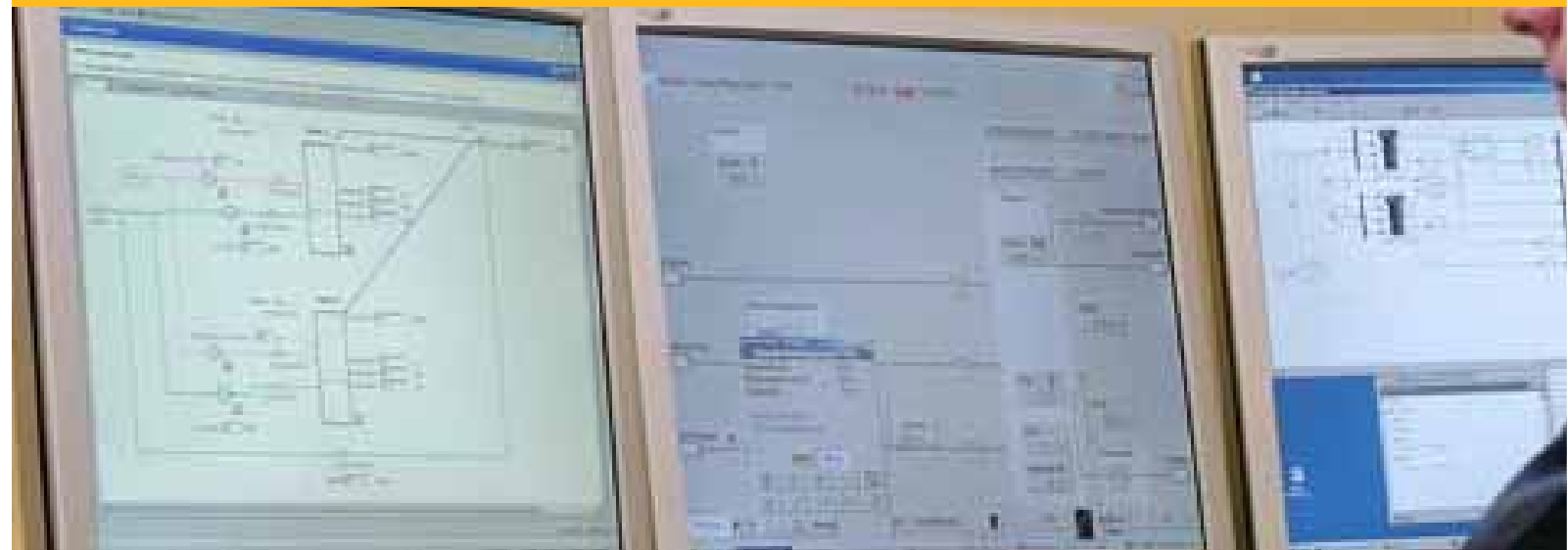
Applications built with USE™ help the organisation to

- Solve problems faster (reduce MTTR)
- have all known possible causes evaluated all the time (avoid overlooking what is learned)
- store and capture valuable insights in process and equipment diagnosis
- optimise plant & maintenance operations
- increase safety and reduce hazardous events
- export the solution to similar plants or units
- share the reasoning with equipment suppliers and external service and maintenance engineers.

USE assists OEM, VAR and System Integrators in reducing the development and deployment efforts. Consulting organisations can benefit from the tool for rapid prototyping, playback and simulation.



Example of a topological model (top) and Event List (bottom)



# USE

## REAL-TIME REASONING & DETECTION

Providing real-time diagnosis of abnormal events and running multiple hypothesis and scenarios in parallel on live data.

# UReason

Achieving Operational Excellence

UReason Holding BV, Pompoenweg 9, 2321 DK Leiden, the Netherlands  
telephone +31 71 518 27 00, info@UReason.com, UReason.com

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## The Challenge

With the increase of automated systems, a wealth of real-time data is available. Many applications have been developed to review historical data or even learn from past conditions. However, such tools can only assist in understanding of previous situations; they can not proactively push key information during, or better still, before situations arise.

One of the aspects of human intelligence is the capability to reason over hypothetical situations, for which no historical data exist, or only occurred once resulting in no statistical evidence. Many professionals are looking for ways to be informed of potential problems, opportunities or specific sequences of events in real-time. Here is where UReason comes to help.

## The USE Solution

UReason's Solution Environment is a proactive tool that delivers out-of-the-box functionality enabling you to automate your own criteria, map data into your hypotheses, procedures, simulations and calculations and have this reasoning executed 24 hours a day, 7 days a week.

USE works with both real-time data from different sources and historical or transactional data. This data is mapped to objects and these objects are interconnected in a so-called topological model. A topological model enables you to reason in terms of upstream and downstream. You can express your reasoning in rules of different types.

USE contains off-the-shelf configurable rule items like real-time cause-effect diagrams, state transition diagrams, topology agents, decision support agents, event reduction diagrams and much more. These rules

report events, which can trigger other rules or can be reviewed in very advanced and clever event browsers, also accessible using UReason's Webextension. According to the actions you configured, the solution developed with USE will alert you on opportunities, problems or sequences of events that need your or any other assigned person's attention in real-time.

### Solutions built with USE will help to React to abnormal situations

- Ascertain their associations with other events
- inform a dedicated resource by e-mail, SMS, built-in event browsers or web-pages.

### Investigate the sources of a problem

- In cases where the apparent source may not be the cause
- when the source is somehow related to the cause of the problem
- if further information (feedback) must be gathered from the operator.

### Evaluate your hypothesis and scenarios

Have multiple rules, regarding a certain production issue for example, run with different configurations (settings) evaluating the root causes of problems.

### Capture expertise & reuse it

- Unlocking expertise or discovering new knowledge
- where traditional in-house IT development is too costly
- if developing software is not the core-expertise or goal.

### Collaborate

- Capture rules and models and share it with other engineers
- gather heterogeneous information from different legacy systems and business tiers.

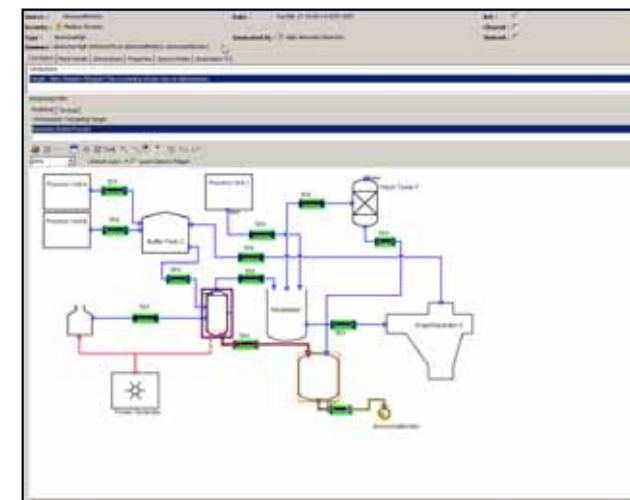
## Applications built with USE

Siemens I&S has created an application called APSS to continuously monitor a chemical plant in Germany. This application runs a number of scenarios to detect potential gas leaks. The information from gas sensors, camera images and microphones are combined to assess a potential leak. This application emulates a human being inspecting the plant 24 hours by 7, in a consistent and comprehensible way.

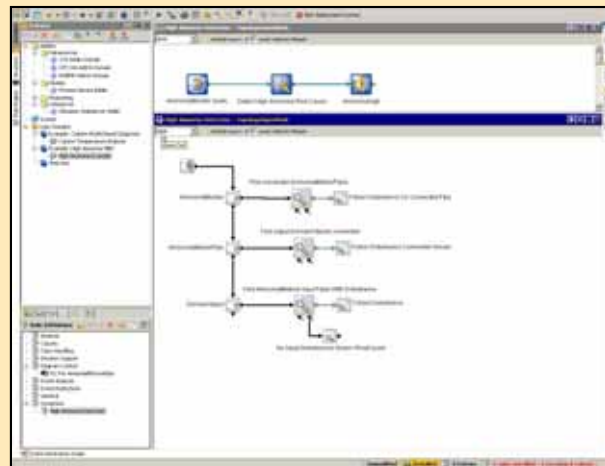
Another customer is forwarding alarm messages by SMS to remote operators during unmanned shifts, according a shift schedule and including an escalation mechanism.

USE forms the heart of a generic simulator for drinking water production. You can find more information on this project at: [www.waterspot.nl](http://www.waterspot.nl)

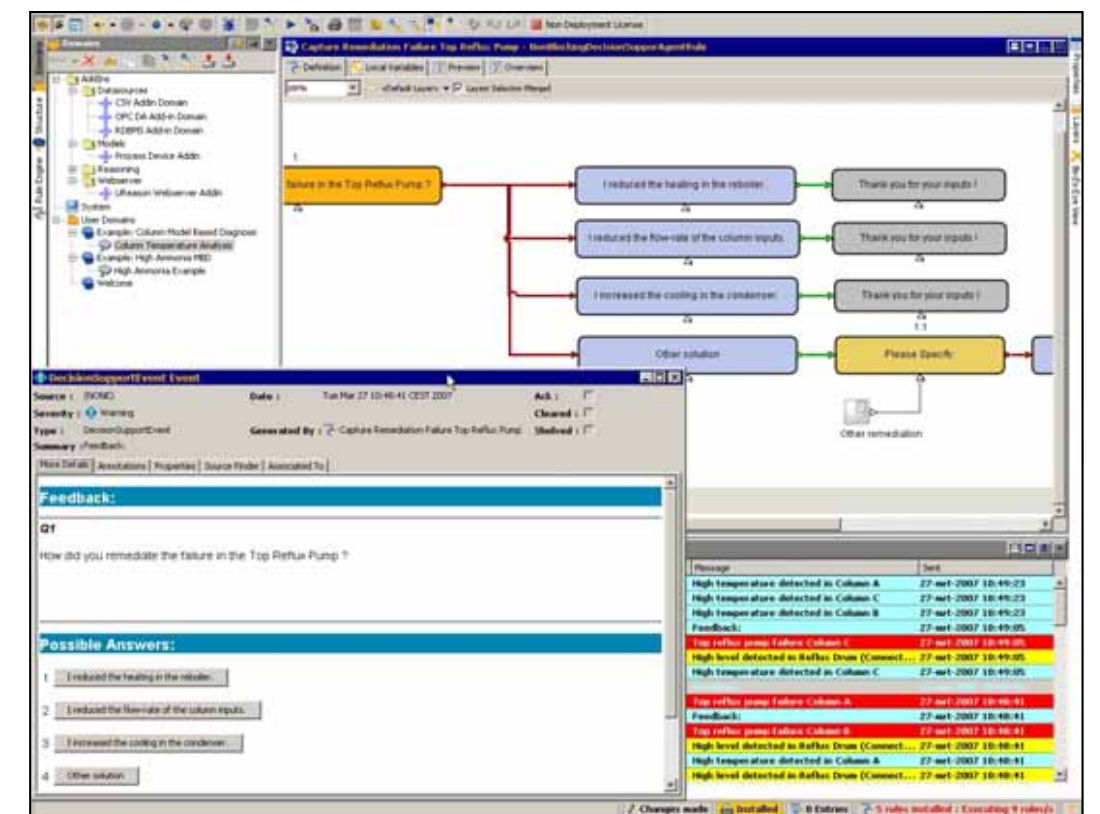
Siemens PG selected USE as the expert system for vibration monitoring of a gas turbine. A petrochemical manufacturer applied USE to assist in the start-up procedure of an extruder.



Example of a Topology Diagnosis



Example of a Topology Agent Definition



Example of a Decision Tree (top) and the result in html