

# SoftSensors in Water Quality Monitoring online cloudbased SoftSensor-related Monitoring

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# **Solution Architecture for Monitoring Systems**





# **Functionality of a SoftSensor**



Sensor Input	Simulation	Referencing	Output
<ul> <li>diverse parameters</li> </ul>	model building	legal provisions	monitor
<ul> <li>spread sensor locations</li> </ul>	algorithmic processing	historical data	understand
different process steps	pot. artificial intelligence	spezific targets	improve



## **Business Case Surface Water Monitoring**



- The basis is represented by the 2000/60/EC EU Water Framework Directive
- Goal: commit EU member states to achieve good ecological and chemical water status until 2027
- Challenges in surface water monitoring:
  - lab analyses are done on a monthly basis. This is time consuming (sampling done manually) and costly (transport cooling, lab equipment, reagents)
  - current sensors cannot measure online as many parameters as lab measurements
  - current measurements also require expert interpretation to classify water status (e.g. water biology)
- Solution
  - continuous monitoring of water bodies through installation of a system of online monitoring stations including transparent vizulisation
  - SoftSensor applied to indirectly measure parameters and improve transparency



#### **Online Sensor Technology (UV-Vis-Spectometry)**

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# Monitoring via a Water Quality Index (WQI)



- The Water Quality Index includes specific parameters selected and weighted according to local conditions and gives an overall indication of the water quality.
- $WQI = \sum_{i=1}^{n} q_i w_i$
- Where: WQI Water quality index, qi parameter subindex, wi parameter weight
- Result is a number used to rank water quality in 5 levels

Rank	WQI	
Excellent	100-90	
Good	90-70	
Fair	70-50	
Marginal	50-25	
Poor	25-0	

## **Vision of Cross-Network Water Quality Monitoring**



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## **Pilot of a Cloudbased Online Monitoring Station**





## **Visualization of Data in MindSphere**





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- data visualized by using MindSphere Apps
   "Performance Insight"
- line-charts, value widgets and gantt diagrams
- dashboards can be configured individually without programming knowledge

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