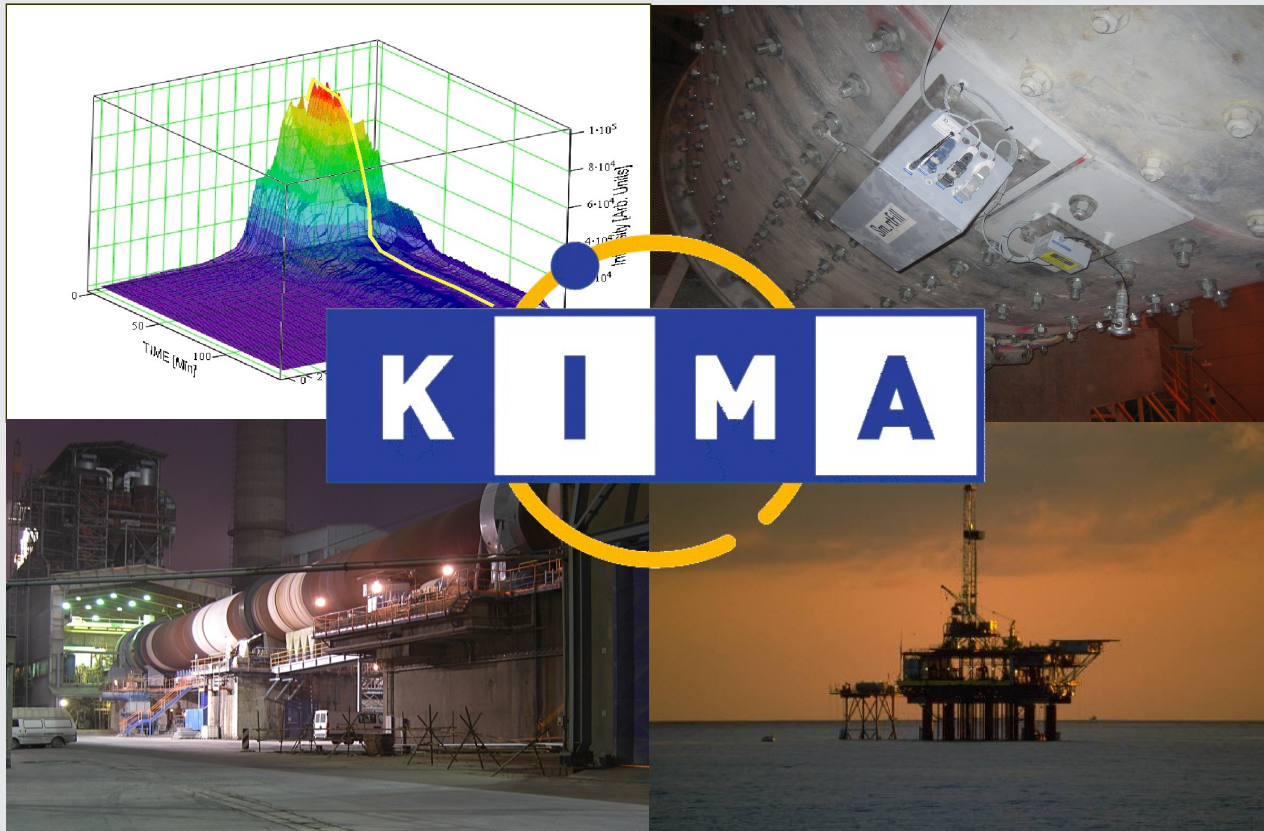
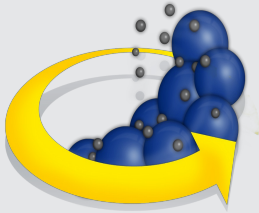


# Smart Technology for Leading Industries



## KIMA Products

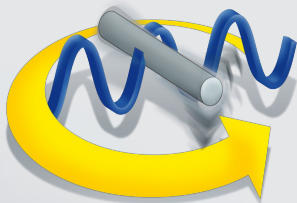
### Smart Technology for Leading Industries



- **SmartFill:**  
Fill level measurement for ball mills.



- **MillMaster:**  
Intelligent Closed-Loop Control for grinding facilities.

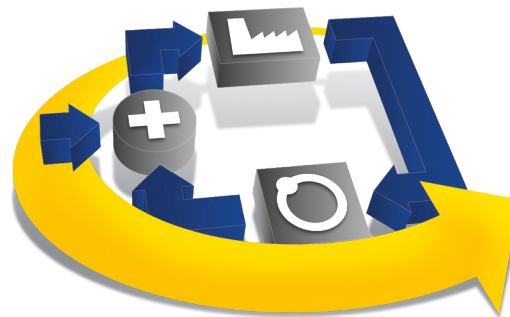


- **V-Sens:**  
Precise vibration velocity sensor.

## Products Part 2

# MillMaster (SmartMill Control)

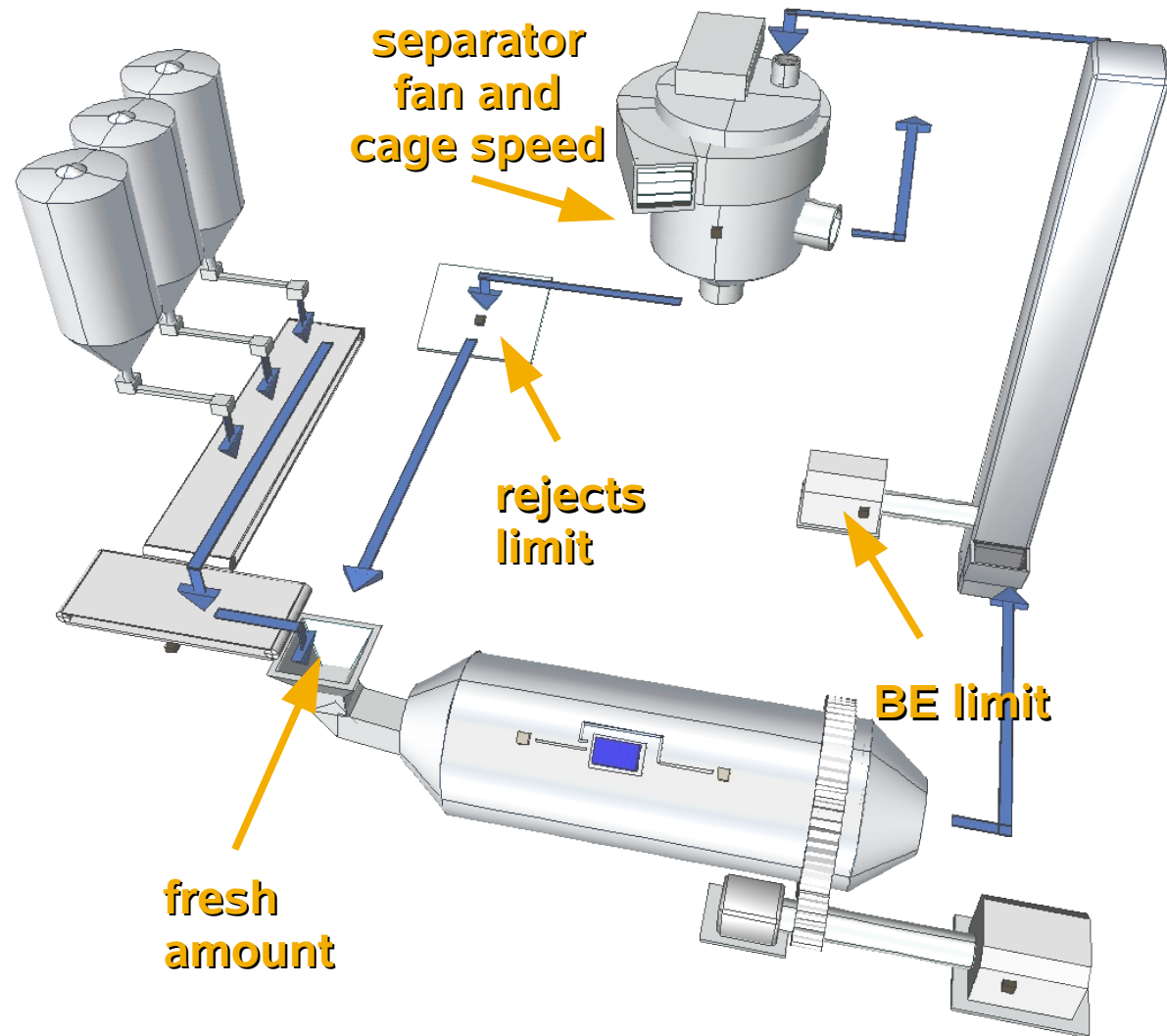
**Expert-Fuzzy Control for Grinding Facilities**



# MillMaster

## Key Features

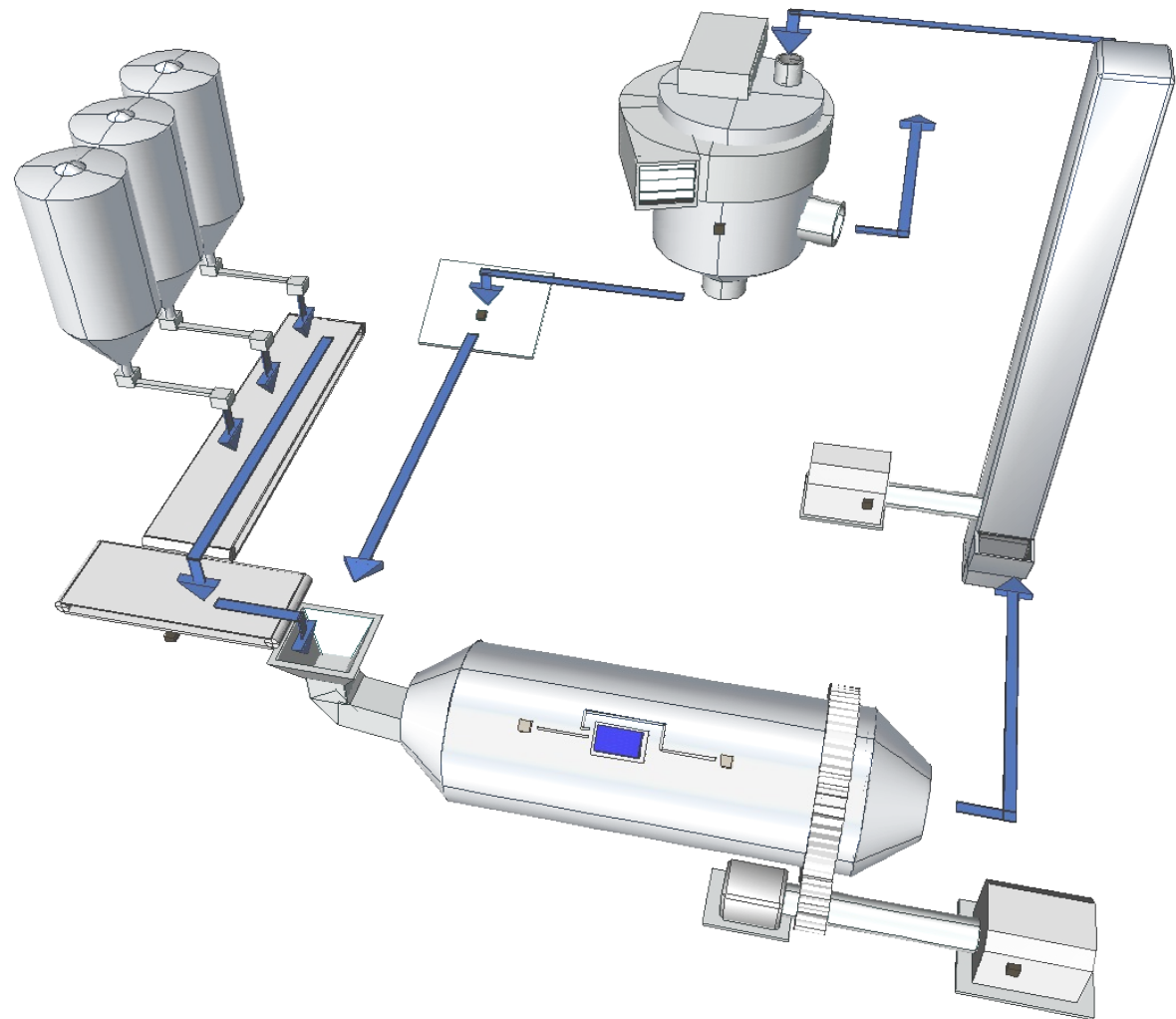
- ✓ varies in- and outputs
- ✓ easily extendable
- ✓ powerful Fuzzy-Engine
- ✓ modular design
- ✓ quick commissioning (within 3 weeks)



# MillMaster

## Technology Modules

- ✓ Ball Mill
- ✓ Separator
- ✓ Vertical Roller Mill
- ✓ Roller Press
- ✓ Hot Gas Generator
- ✓ Water Injection
- ✓ Mill Air Flow

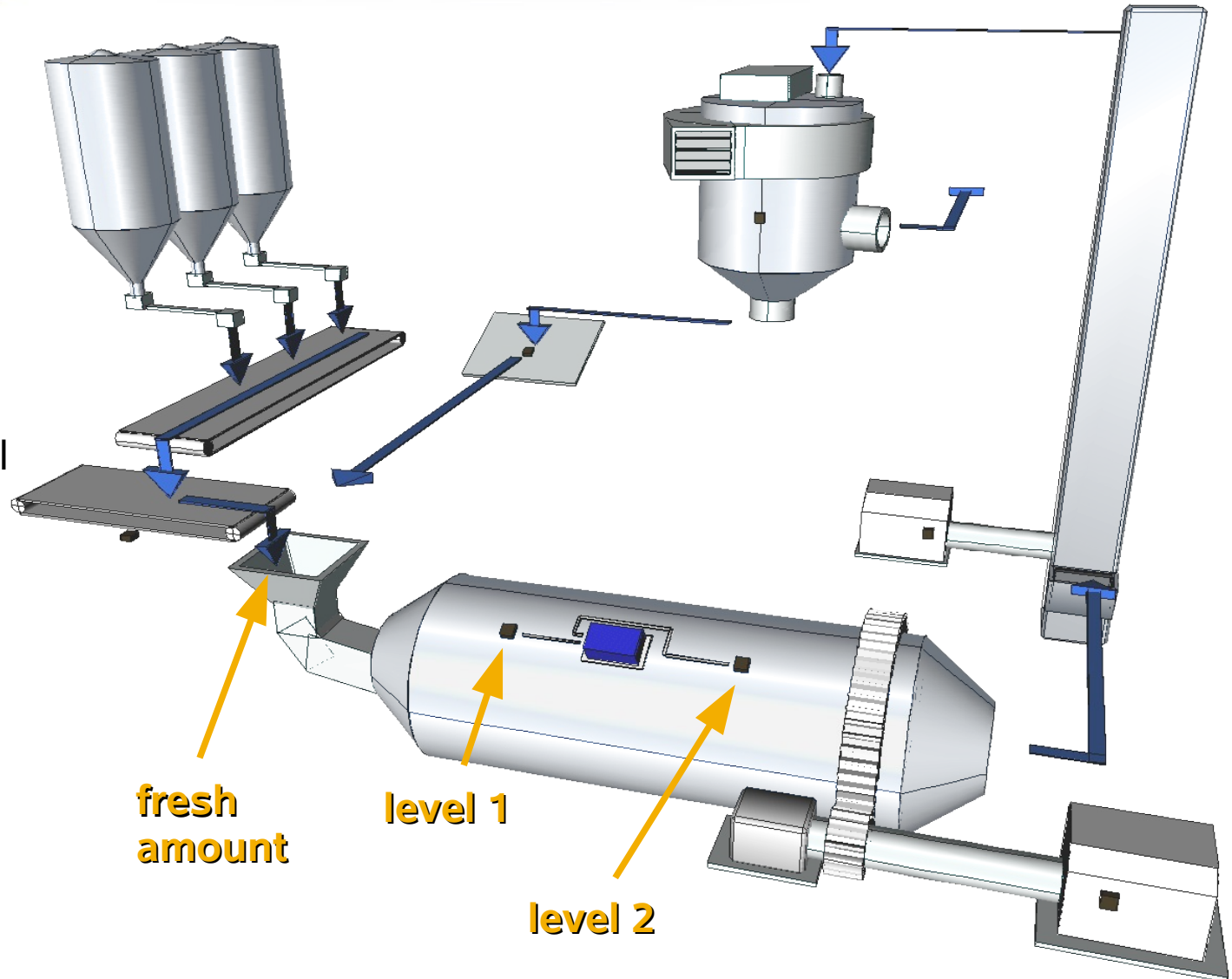




# MillMaster

## Strategy

- ✓ change fresh according to fill level targets
- ✓ keep levels stable at setpoint
- ✓ obey quality
- ✓ obey process limits



# MillMaster

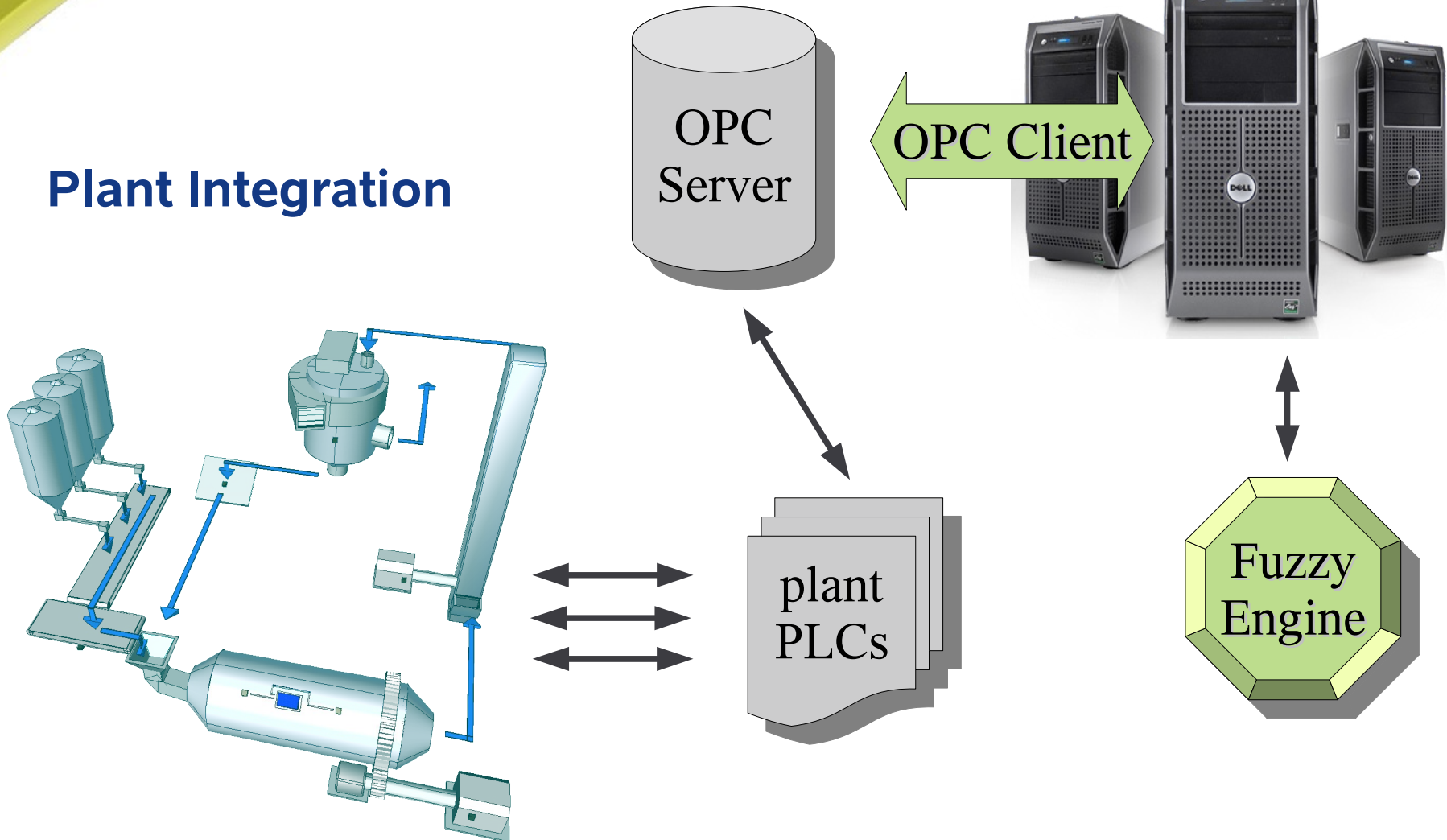
## Benefits

- ✓ 5 % production increase guaranteed!
- ✓ quick mill start-up and type change
- ✓ stable operation
- ✓ automatic and reliable mill operation
- ✓ up to 4 mills with one server hardware



# MillMaster

## Plant Integration





# MillMaster

## Plant Integration

### PLC adjustments

- connection check (MillMaster <-> PLC)
- switching logic (manual mode to automatic mode)


### SCADA adjustments

- setpoints per recipe (cement type)
- new switch for MillMaster mode

# MillMaster

## Scada Changes

- Actual level measurements
- Level setpoints for each cement type
- MillMaster Start/Stop button
- MillMaster Activity Indicators
- MillMaster Error Messages



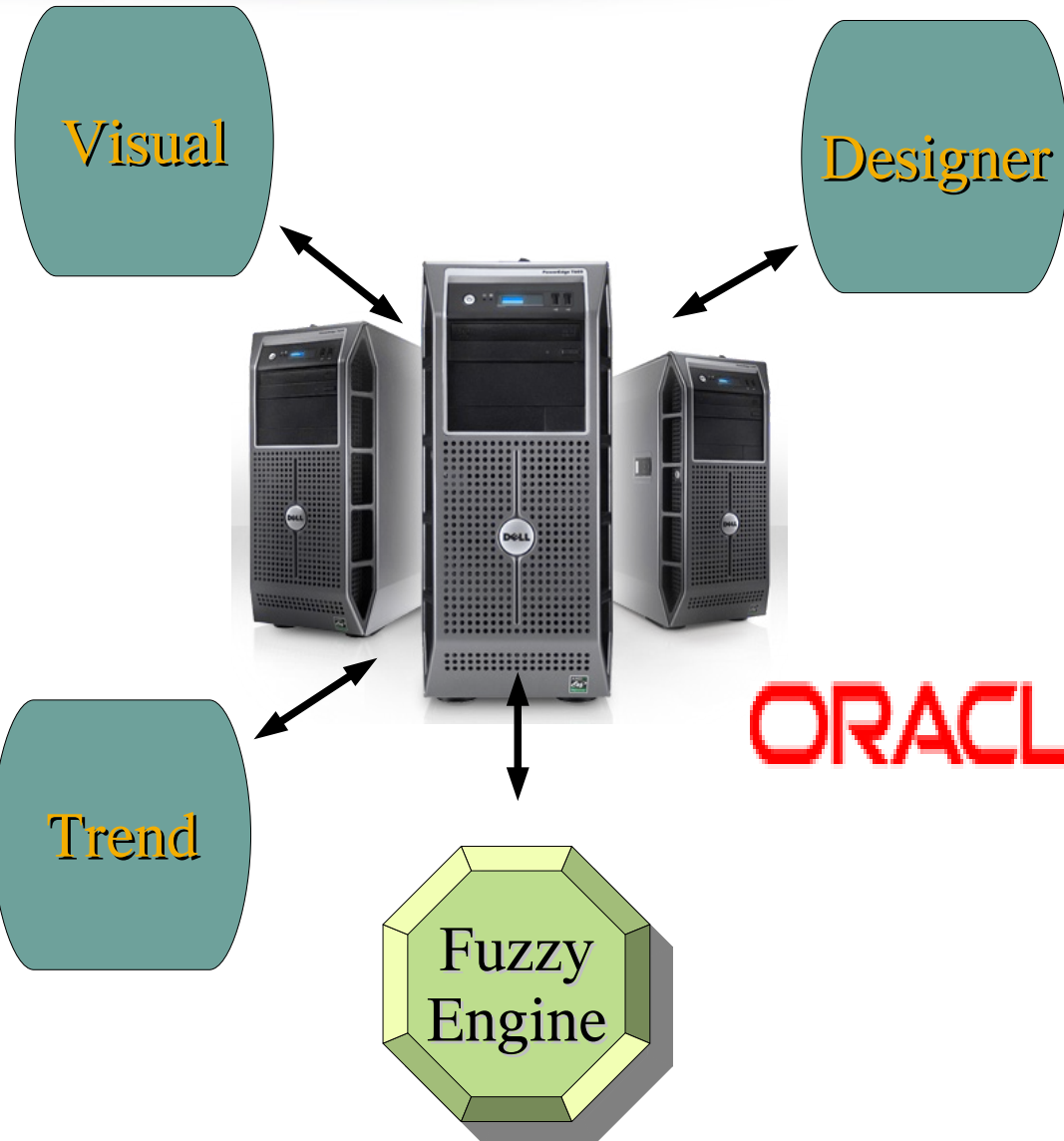
The screenshot shows two Scada screens. The left screen, 'Mill Setpoint Manual', displays a setpoint of 81,0 t/h. The right screen, 'Mill Setpoint SMC', displays a setpoint of 80,4 t/h, a 'Stop' button, and a 'Ready' indicator. Below the screens are two tables: 'Setpoints' and 'Recipies'.

Setpoints	Manual SP [t/h]	80,00	81,00	60,00
	L1 SP [%]	90,00	95,00	90,00
	L2 SP [%]	90,00	95,00	90,00
	Fineness SP [%]	12,20	4,50	2,50
	SMC SP [t/h]	80,00	80,00	78,00

Recipies		M32.5	M42.5	M52.5
	Clinker total [%]	59,50	70,70	90,30
	Clinker 1 WF4 [%]	50,00	30,00	0,00
	Clinker 2 WF5 [%]	50,00	70,00	100,00
	Gypsum WF3 [%]	5,40	5,80	6,40
	Slag WF1 [%]	8,00	6,50	0,00
	Limestone WF2 [%]	26,10	17,00	3,30
	Fly Ash FM1 [%]	0,00	0,00	0,00
	Kiln Dust FM2 [%]	1,00	0,00	0,00
	Total [%]	100,00	100,00	100,00

# MillMaster



**ORACLE**

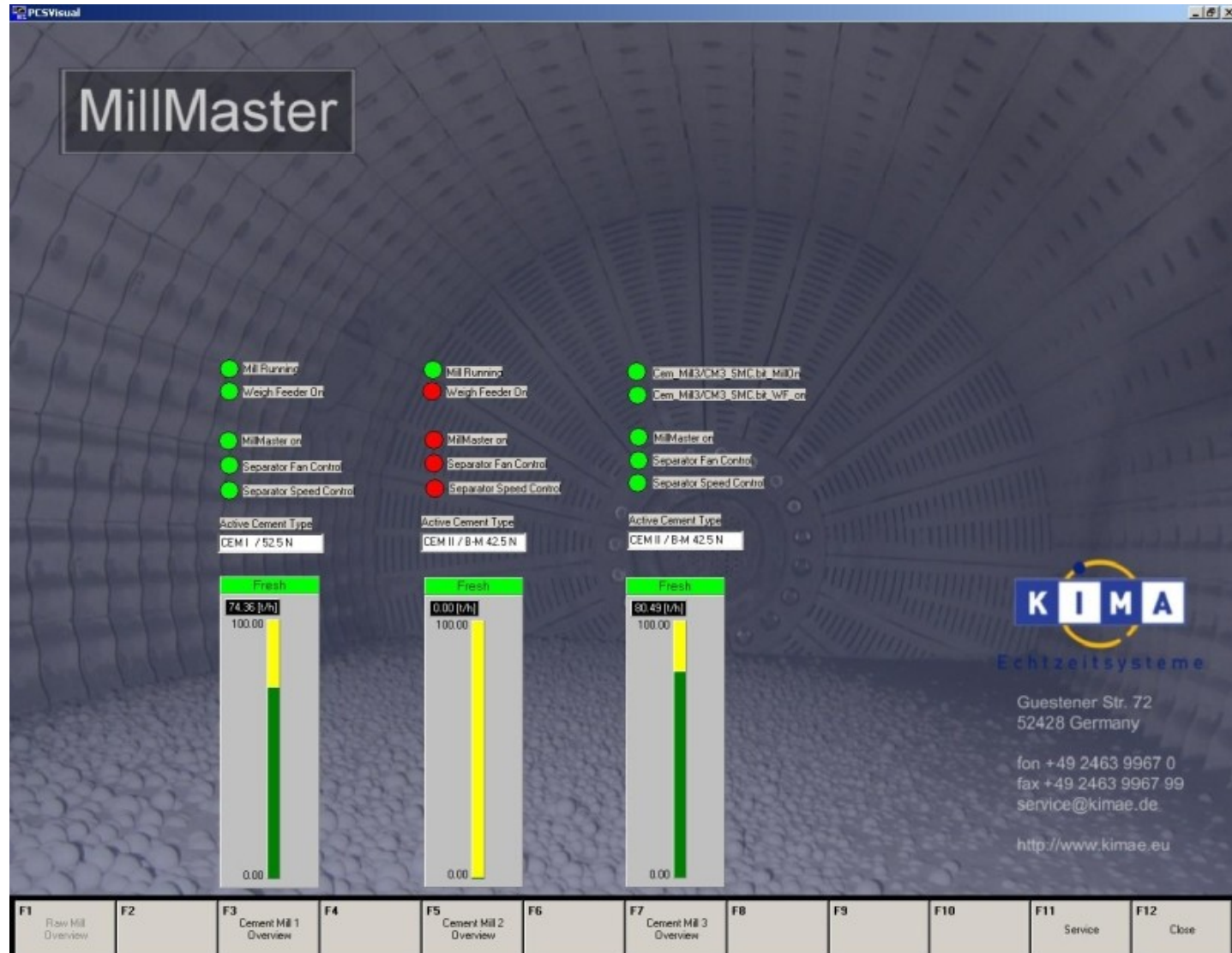
## Technology

- Oracle Database and Fuzzy Engine build the intelligence and storage
- applications are for setup and maintenance
- Intel Dual Core Server, 2 GB Ram, 1TB Raid System

# MillMaster

## Visual

Screenshot of the program **Visual**, the User Interface to check mill and controller operation

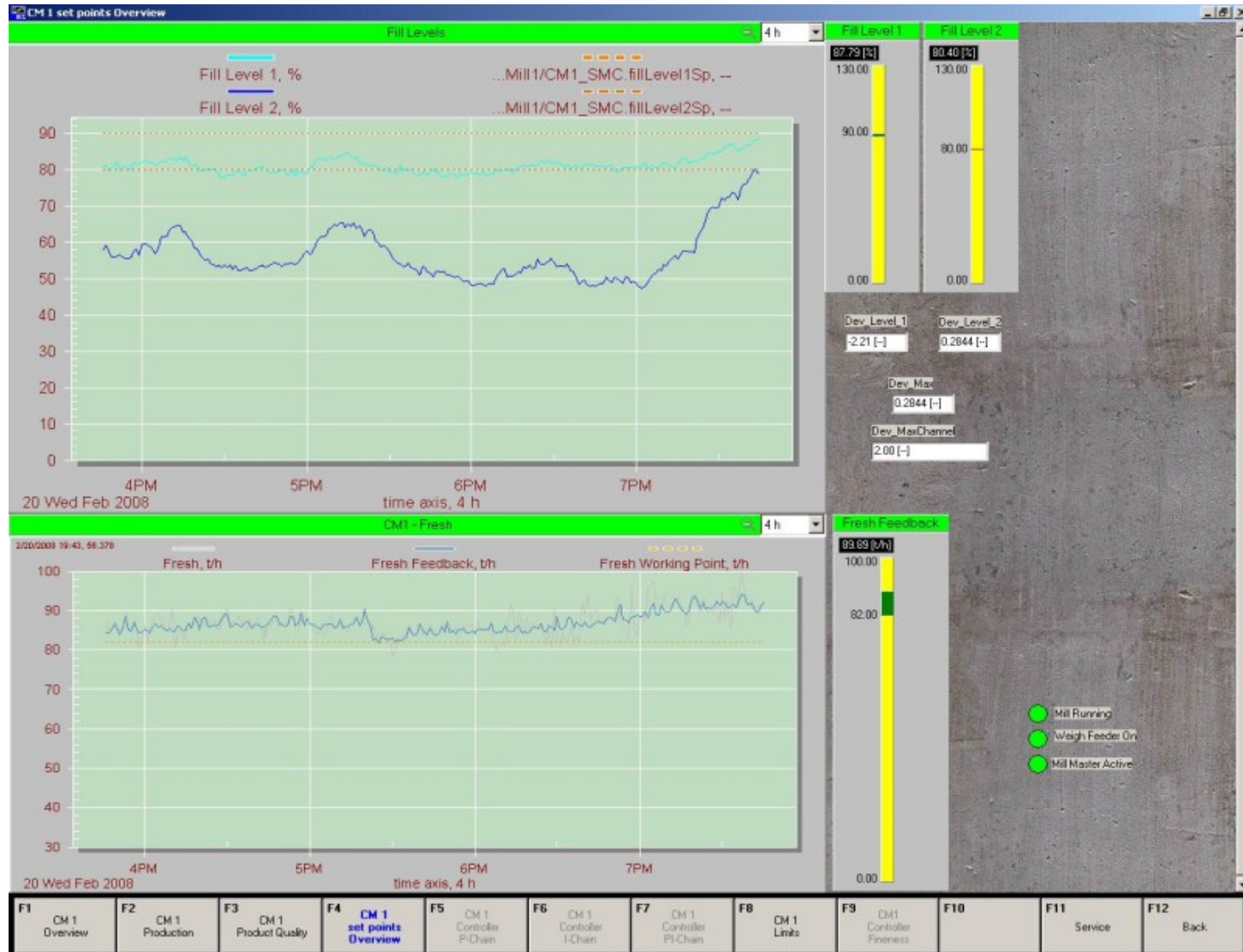




# MillMaster

## Visual

Another screenshot, showing the performance of the controller





# MillMaster

## Trend

Screenshot of the program trend:

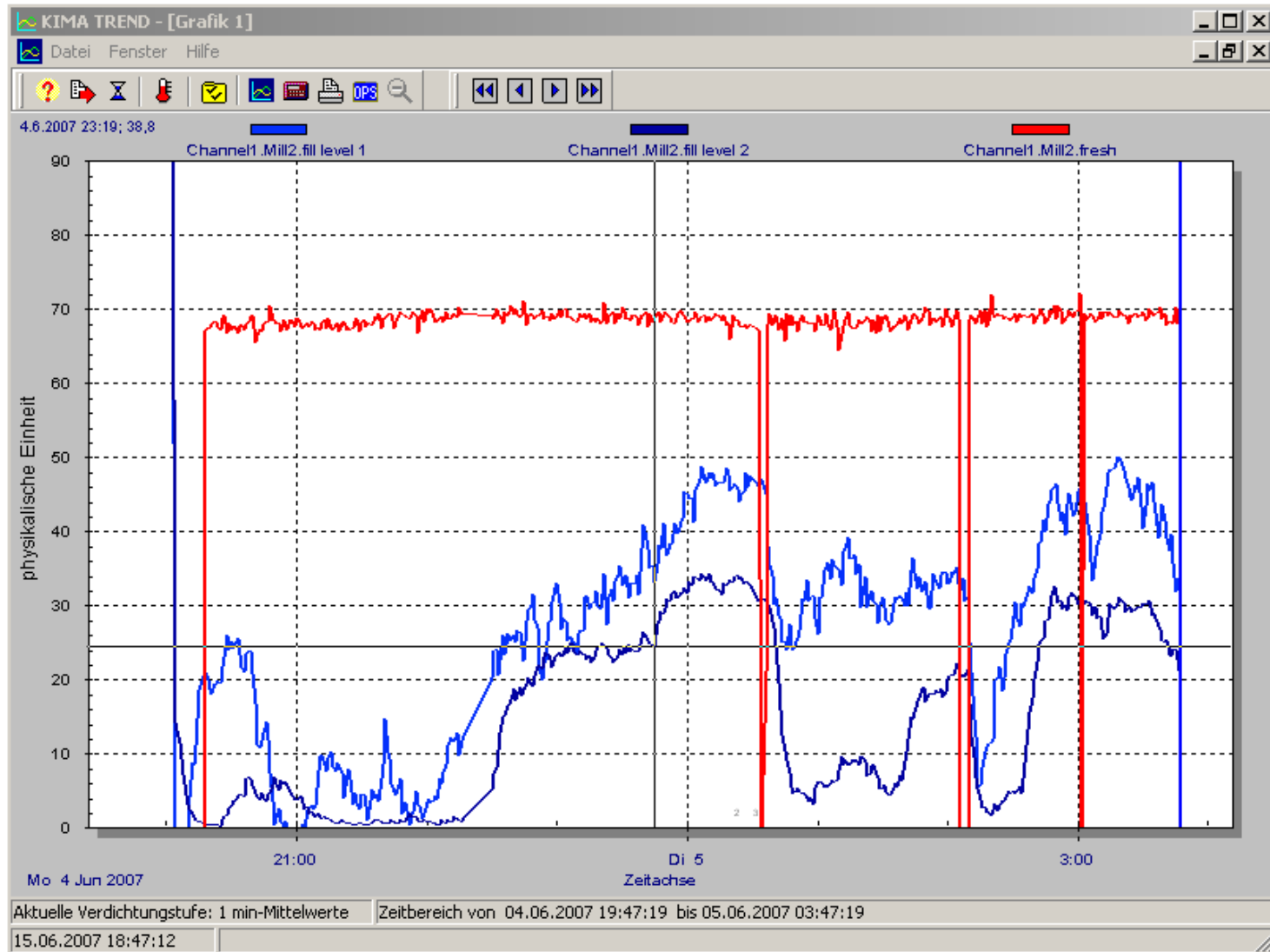
- visualizes archived data
- shows average values, correlations and custom calculations



# MillMaster

## Without MillMaster

- fresh = const.
- levels do heavily vary
- inhomogen quality
- whole process unstable



# MillMaster

## MillMaster enabled

- levels = const.
- high grinding efficiency
- less wearout
- homogen quality
- stable overall process

