

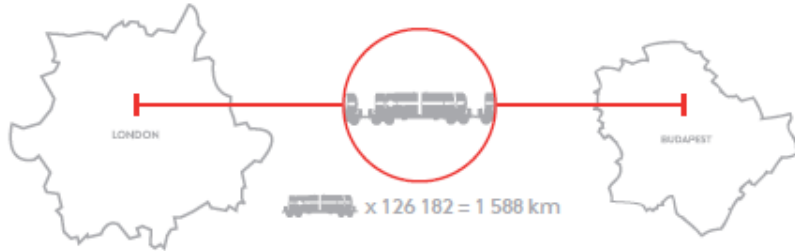
Value Now – Value Over Time

Presented by **Tibor Komróczki MOL Plc**



MOL Group in numbers

50 million barrels
of oil-equivalent hydrocarbons
produced annually



FORTUNE GLOBAL 500

- [410] McDONALD'S
- [411] DANONE
- [412] MOL
- [445] BRITISH AMERICAN TOBACCO
- [467] HEINEKEN

32 000 employees
employed worldwide
could be seated on
145 Boeing 787 Dreamliners.



1 million
retail customer transactions/day.
Every year, we serve the equivalent
of the entire population
of South America.

MOL Group Downstream

6 production units

23.5 mtpa refining capacity

2.1 mtpa petrochemicals capacity

>1,700 filling stations

under 8 brands in 11 CEE

370 000 PI Tag capacity



DOMESTIC AND CORE MARKETS



REFINERY



PETROCHEMICAL PLANT



PRODUCT DEPOT

OIL PIPELINE

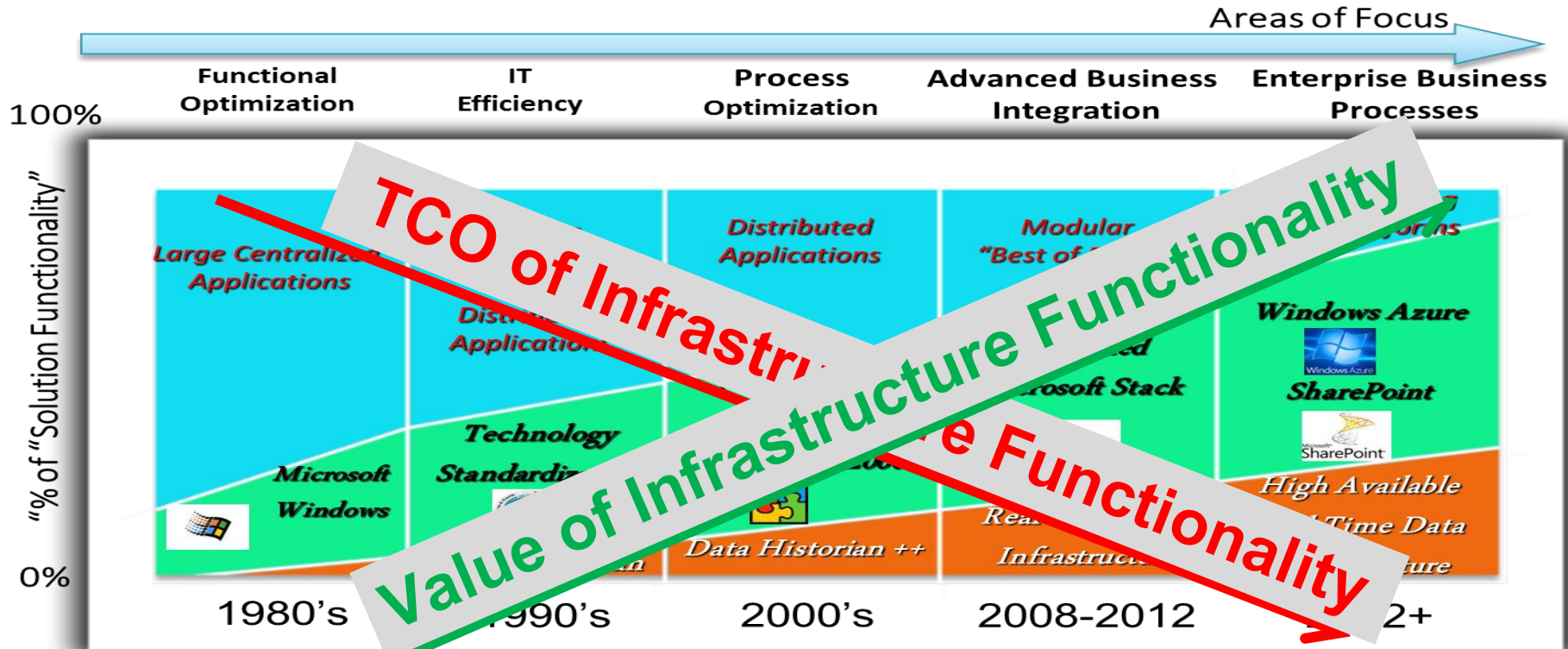
PETCHEM PIPELINE

ETHYLENE PIPELINE



MOL GROUP PI PORTFOLIO & HISTORY

Evolution of the Real-Time Infrastructure



Evolution of the Real-Time Infrastructure

PI portfolio in MOL 2014



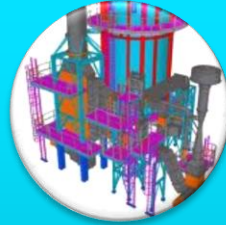
Clients

Publish data via
PI ProcessBook
PI DataLink
PI Coresight
PI WebParts



PI SDK PI API

Developed
applications to
support refinery
functions



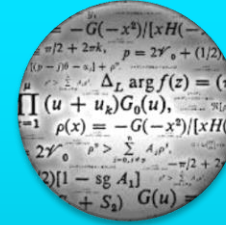
PI Asset Framework

Collect data from the
field and create
unified asset
hierarchy



PI Notifications

Alerting platform
based upon the PI
System AF
architecture

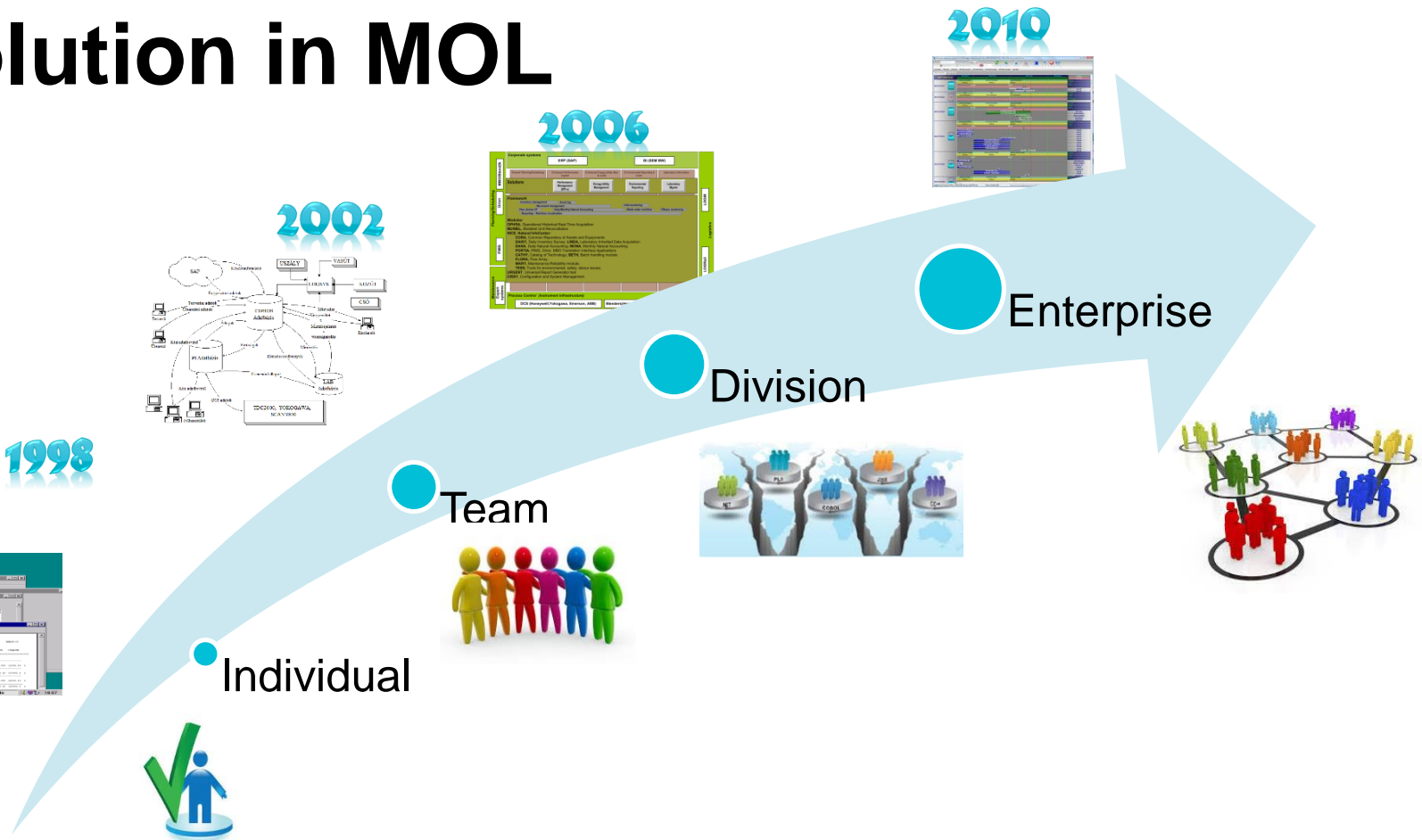


PI ACE

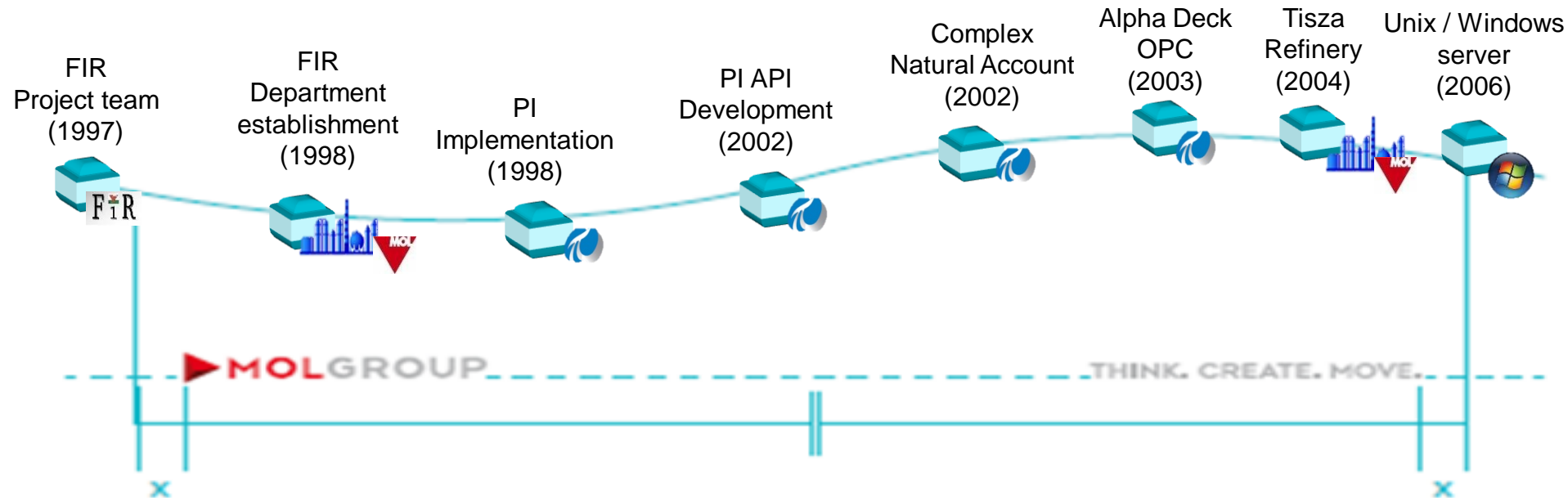
Write complex
equations, which are
reusable for similar
data sets



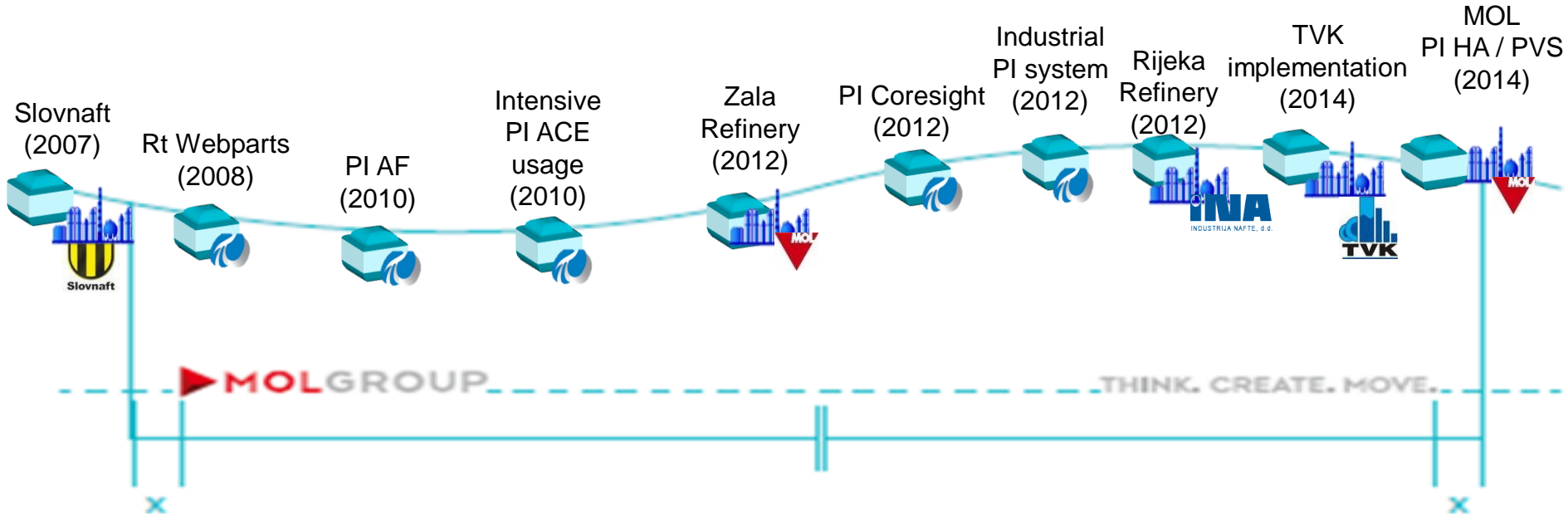
PI Evolution in MOL



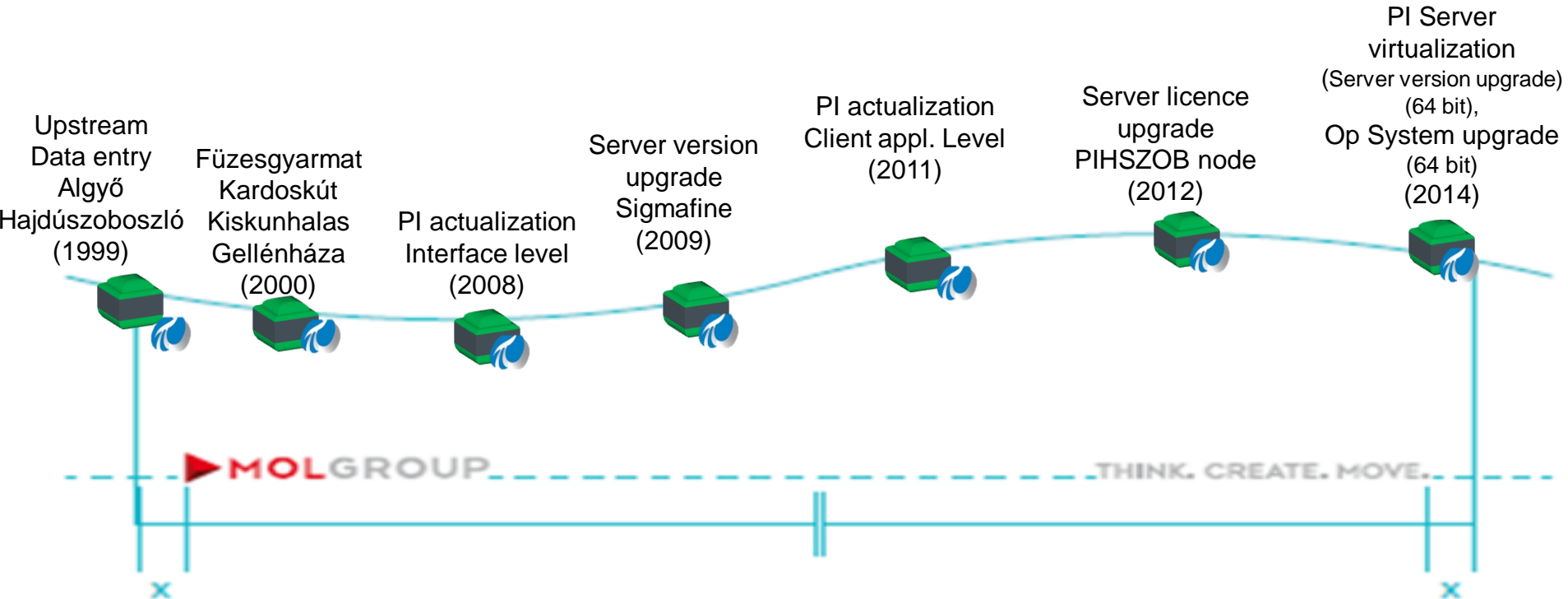
MOL Downstream / History I.



MOL Downstream / History II.

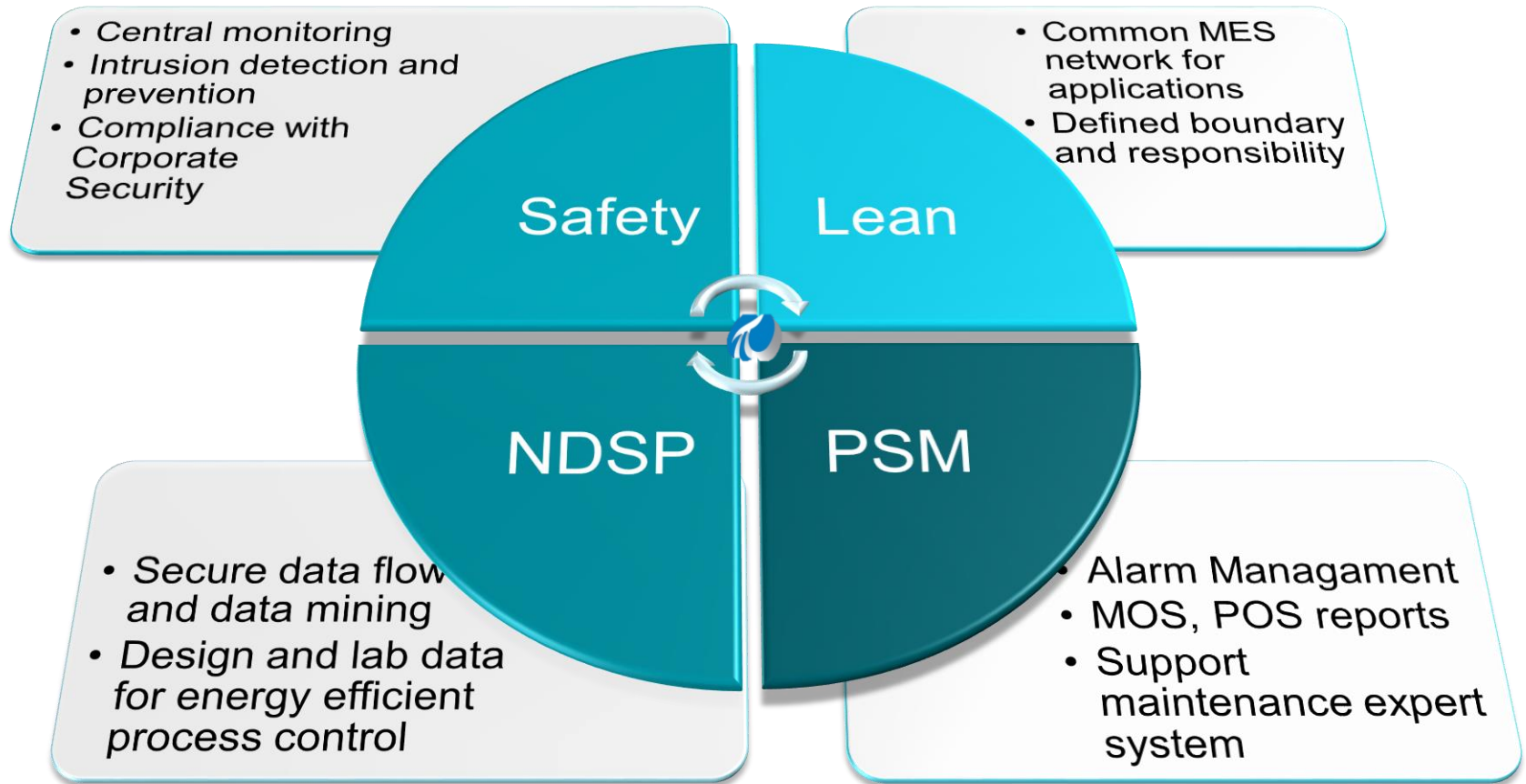


MOL Upstream / History

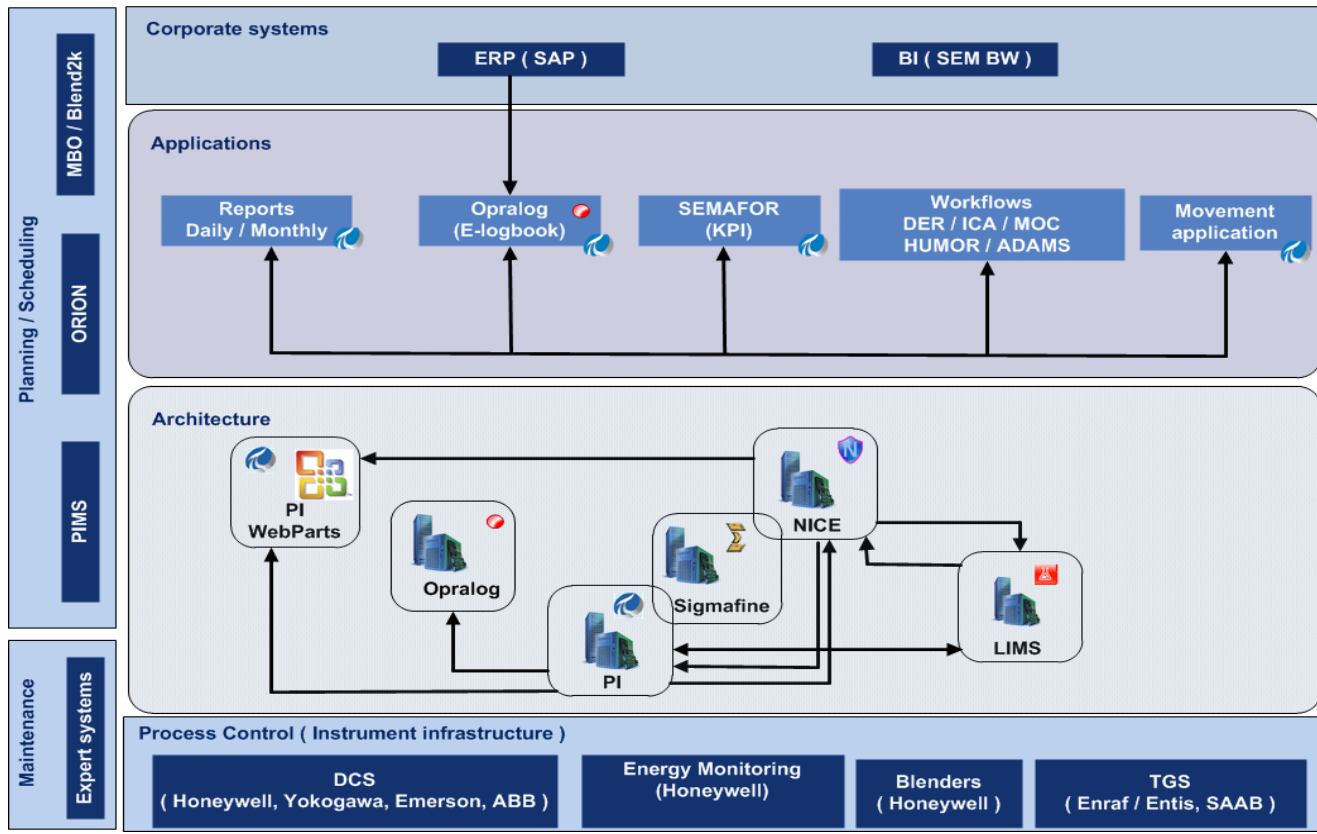




MOL GROUP STRATEGY SUPPORTED BY PI



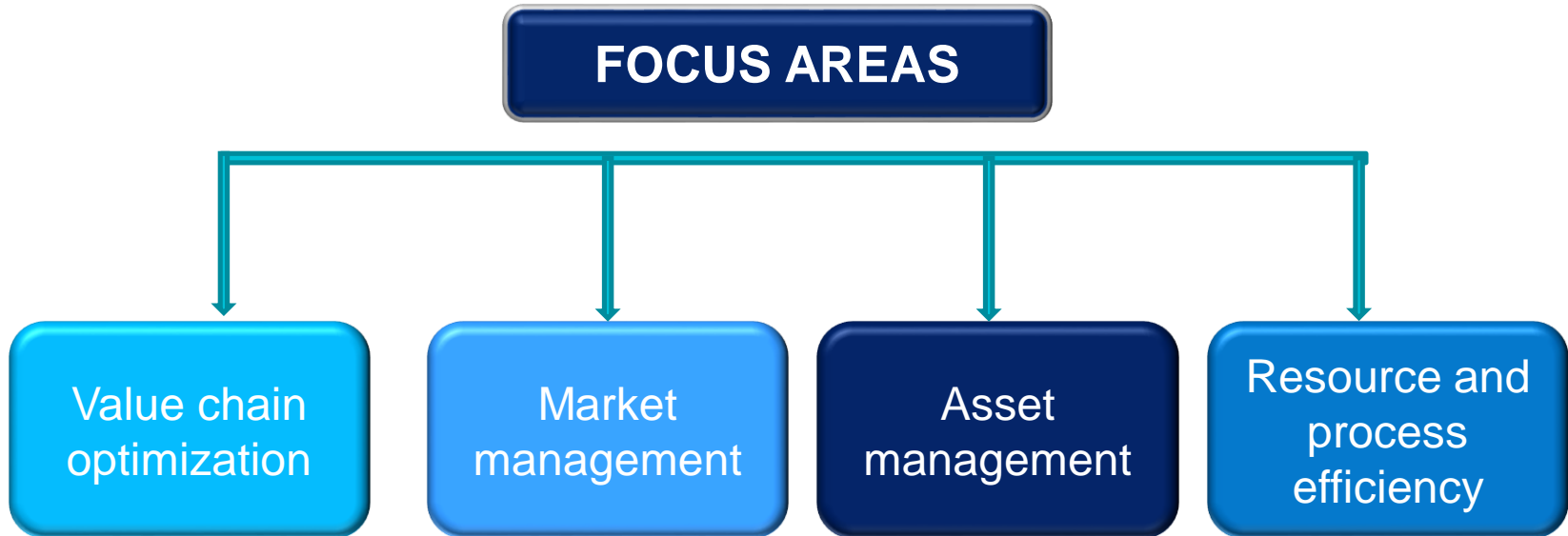
Framework





NEW DOWNSTREAM PROGRAM

New Down Stream Program (NDSP)



To give an effective response to the current unfavorable global economic and Downstream industry environment, with restoring MOL Plc. top position in efficiency and profitability in Europe, utilizing all synergies of the integrated Downstream operation.

Support to reduce quality give-away

Modifying the lab-PI interface to filter out off-spec qualities automatically based on registered specifications and collecting off-specs automatically

„Flask coloring” happened automatically

good -> green ,
off-spec -> red ,
laboratory limit -> yellow

The screenshot shows a software application window titled "Movement application [version: 1.4.1.300]". The main area displays a process flow chart for "DAV2" with various units and their associated processes. The chart is color-coded: green for good quality, red for off-spec, and yellow for laboratory limits. The "Edit Values" dialog box is open, showing the following details:

- Unit: DBK2 (Naphtha Hydrotreating-2 Unit)
- Sample Point: DBK2KMKB_M (Sulphurfree Naphta)
- Standard result: VEGFORRPONT (FINAL BOILING POINT)
- Valid from: 2013.10.15
- Selected Date: 2013.10.16 0:00:00
- Default min: 110, Default max: 190
- Minimum: [input field], Maximum: [input field]
- Close scheduling on selected date:

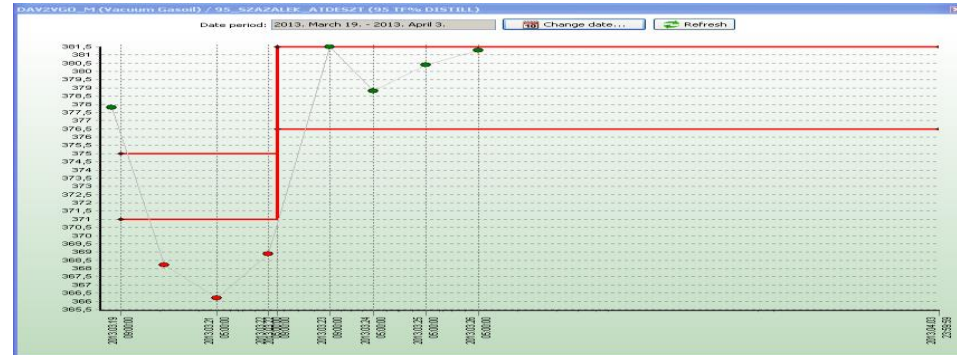
Reduce quality give-away

Lab results and product's specifications can be found in the PI database

All matched data were gathered in Asset Framework for easier examination

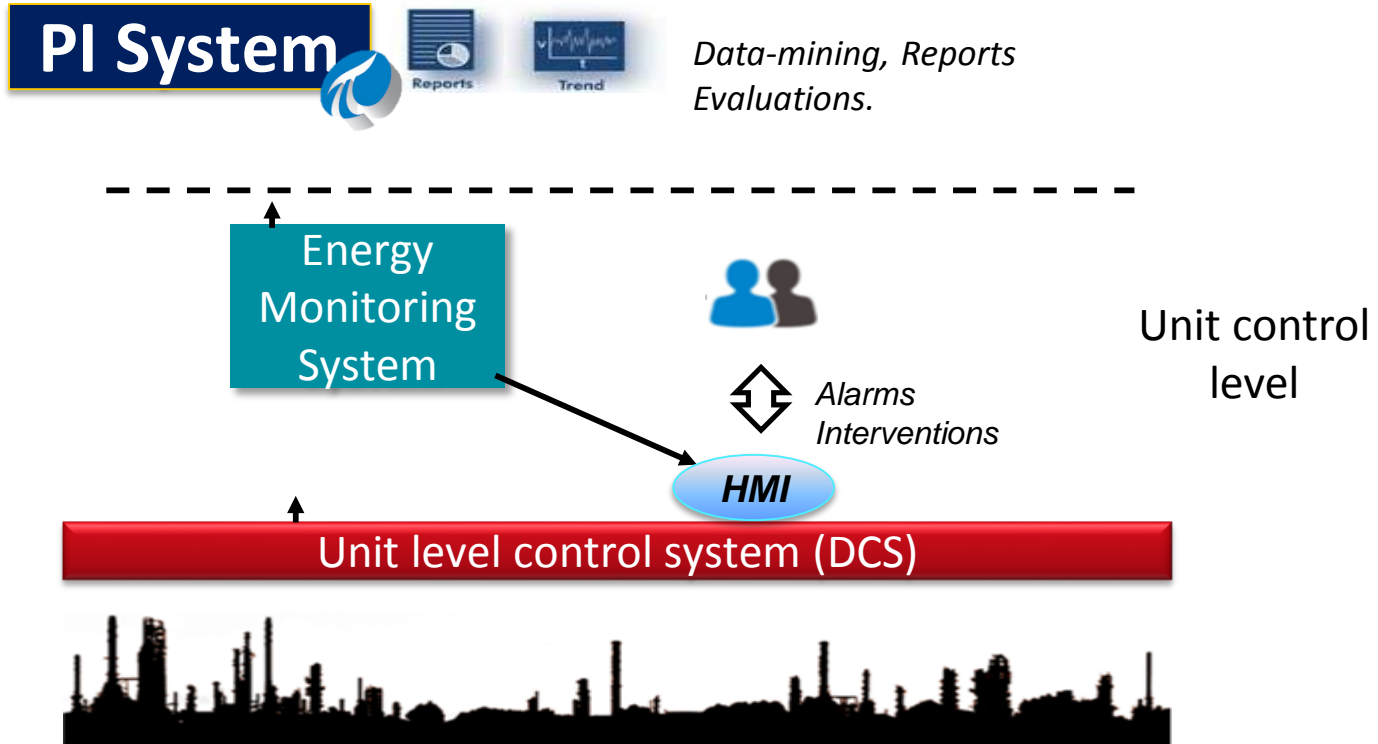
- lab result
- WPP minimum specification
- WPP maximum specification
- APC calculation (if exists)
- on-line analyzer value (if exists)

PI Coresight visualizes the measured quality regarding quality specifications



Energy Monitoring

On-line, **open loop** model based control system. Detects excess energy consumption, and advises corrective interventions to the operators.





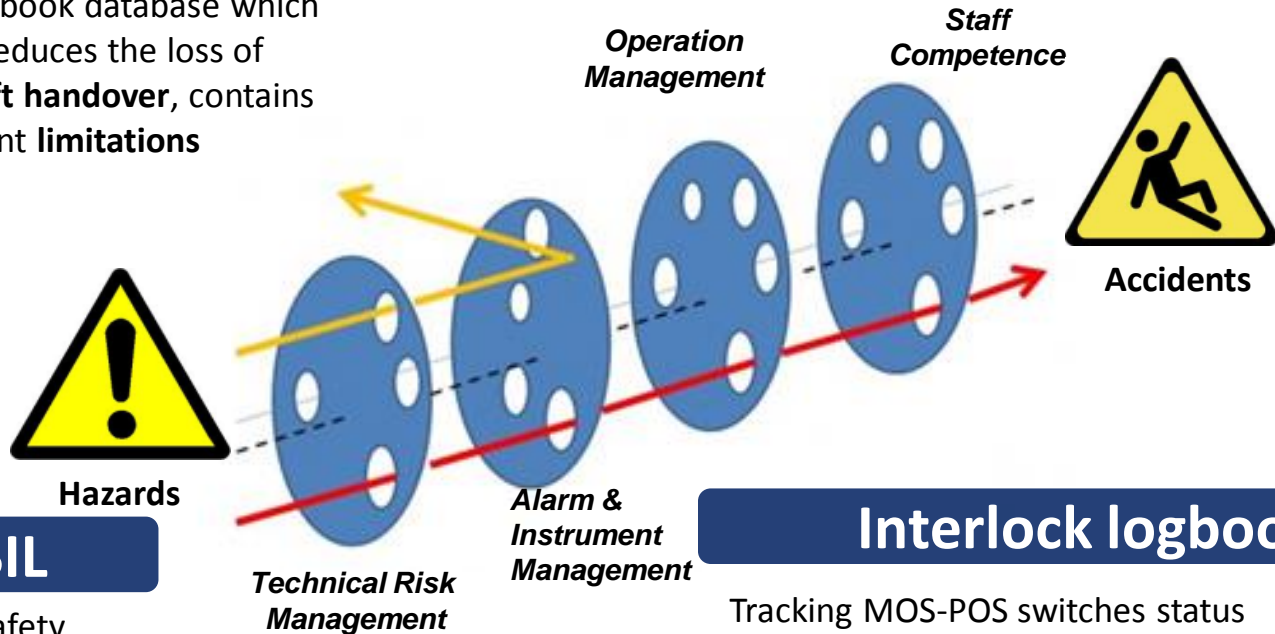
SAFETY SOLUTION

Training

Regular & ad-hoc trainings for engineers, shift leaders, operators etc.

Electronic Shift Logbook

Refinery wide central logbook database which is easily accessible, and reduces the loss of information. Handles **shift handover**, contains **condition checks** and plant **limitations**



Interlock logbook

Tracking MOS-POS switches status

EN 61511 SIL

Implementation of SIL safety standard, based on the Seveso II directive.

Industrial Network

Increase the safety and security of Danube Refinery Process Control Systems

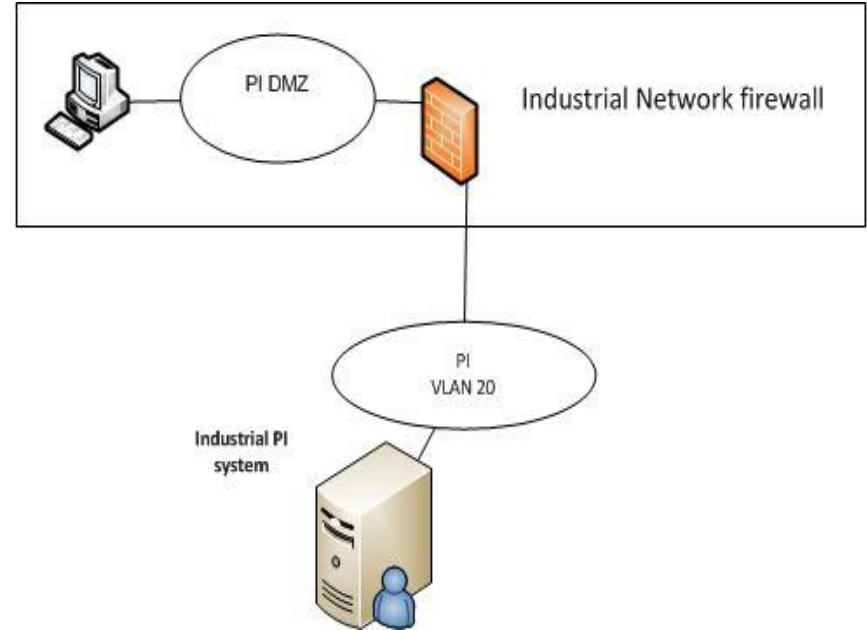
Separate Process Control Network and MOL Business Network

Implement an "independent Industrial Network"

Central supervision – network intrusion and virus attack detection and prevention

Redundant servers

Industrial PI server





PSM SUPPORT

Electronic Shift Logbook

The screenshot displays the 'opralog' software interface. The main window shows a table of shift logs with columns for 'Fejezet neve', 'Fejezet kezdete', 'Fejezet vége', 'Lezáró/felelős', 'Lezárás/felelős ideje', 'Nyugtázó', and 'Nyugtázás ideje'. Below the table, there is a detailed view of a specific event, showing the date and time (2013.07.10 14:00) and the user (AR, Egyebek, belső információk). The interface also includes a sidebar with a tree view of shift logs and a search bar.

Fejezet neve	Fejezet kezdete	Fejezet vége	Lezáró/felelős	Lezárás/felelős ideje	Nyugtázó	Nyugtázás ideje
2013. Júl. 10-Délután	2013.07.10 06:00	2013.07.10 14:00	Fejezet automatika	2013.07.10 14:04		
2013. Júl. 10-Reggel	2013.07.09 22:00	2013.07.10 06:00	Fejezet automatika	2013.07.10 06:03		
2013. Júl. 09-Eszaka	2013.07.09 14:00	2013.07.09 22:00	Fejezet automatika	2013.07.09 22:06		
2013. Júl. 09-Délután	2013.07.09 06:00	2013.07.09 14:00	Fejezet automatika	2013.07.09 14:04		
2013. Júl. 08-Eszaka	2013.07.08 22:00	2013.07.09 06:00	Fejezet automatika	2013.07.09 06:03		
2013. Júl. 08-Délután	2013.07.08 14:00	2013.07.08 22:00	Fejezet automatika	2013.07.08 22:05		
2013. Júl. 08-Reggel	2013.07.08 06:00	2013.07.08 14:00	Fejezet automatika	2013.07.08 14:03		
2013. Júl. 07-Eszaka	2013.07.07 22:00	2013.07.08 06:00	Fejezet automatika	2013.07.08 06:03		
2013. Júl. 07-Délután	2013.07.07 14:00	2013.07.07 22:00	Fejezet automatika	2013.07.07 22:03		
2013. Júl. 07-Reggel	2013.07.07 06:00	2013.07.07 14:00	Fejezet automatika	2013.07.07 14:04		
2013. Júl. 06-Eszaka	2013.07.06 22:00	2013.07.07 06:00	Fejezet automatika	2013.07.07 06:02		
2013. Júl. 06-Délután	2013.07.06 14:00	2013.07.06 22:00	Fejezet automatika	2013.07.06 22:04		
2013. Júl. 06-Reggel	2013.07.06 06:00	2013.07.06 14:00	Fejezet automatika	2013.07.06 14:04		

Consequent, event based logging

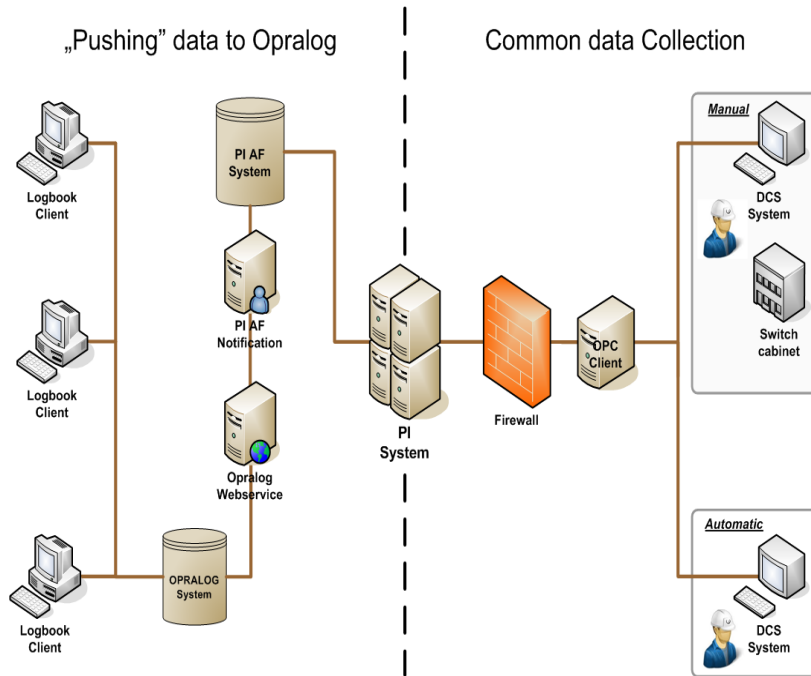
Information Sharing

Support audits
(PSM, Behavior, IIR, etc.)

Easier incident investigation

Highlights problematic fields

Interlock Logbook Migration into Opralog



Information about the switch (name, description)

Information about the status (new state, event time)

Who turned on/off?

Who permitted?

What was the reason?

E-Flare report



Goal

- Aim of the project to reduce the losses by 5-10 % supported by a full PDCA cycle establishment

Root causes

- ~22 kt gas was burned by the flares in 2013

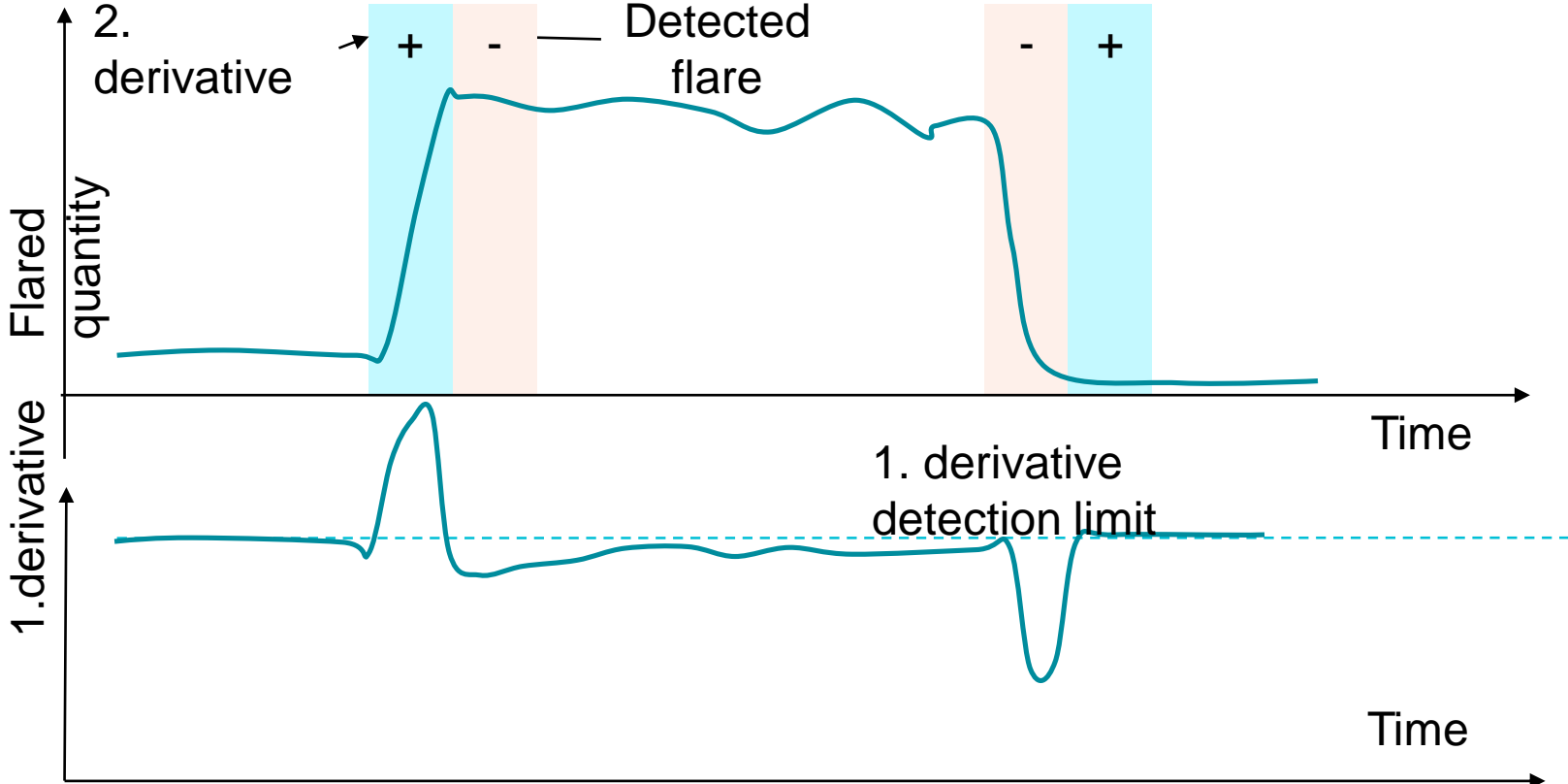
Cost effect

- ~1.4 thousand million HUF

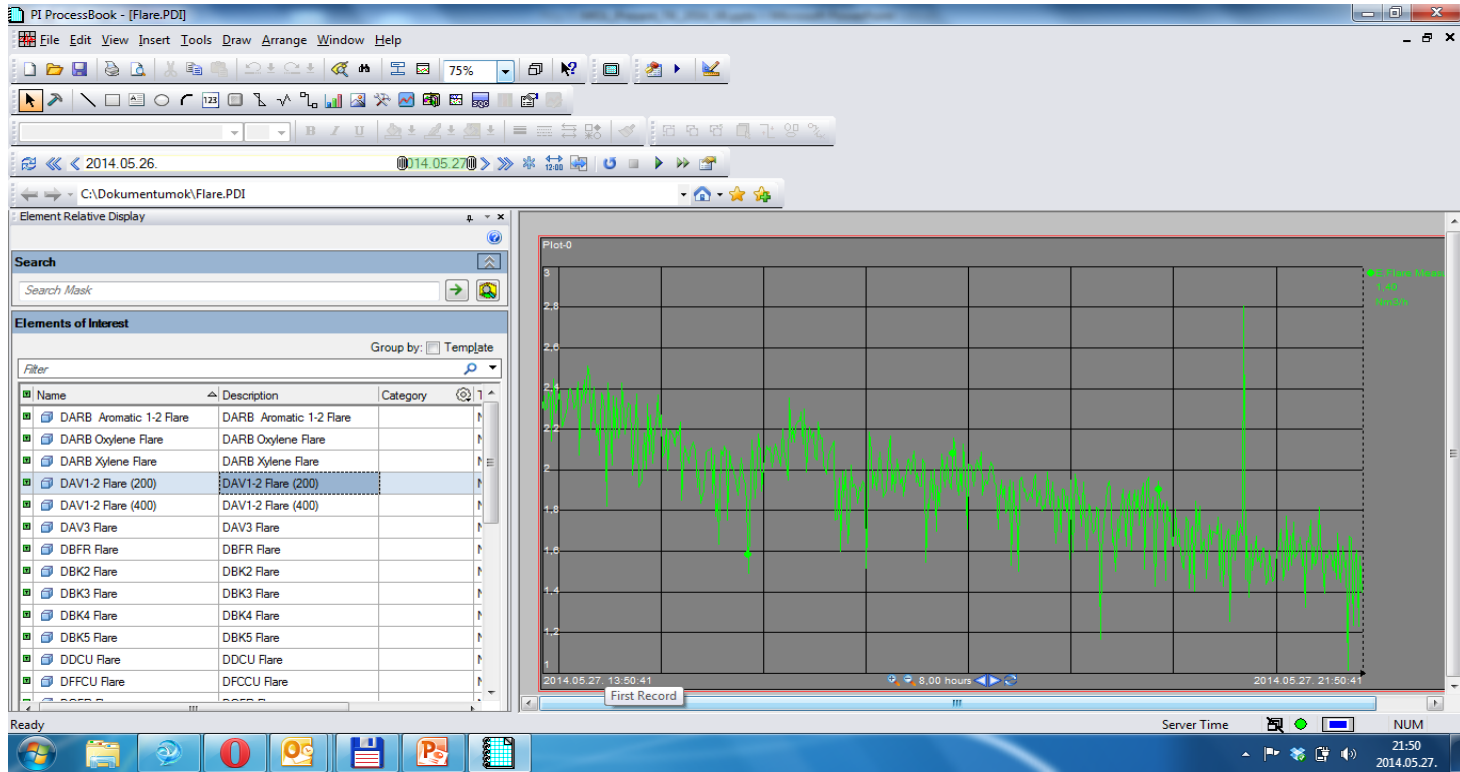
Other

- HSE obligation

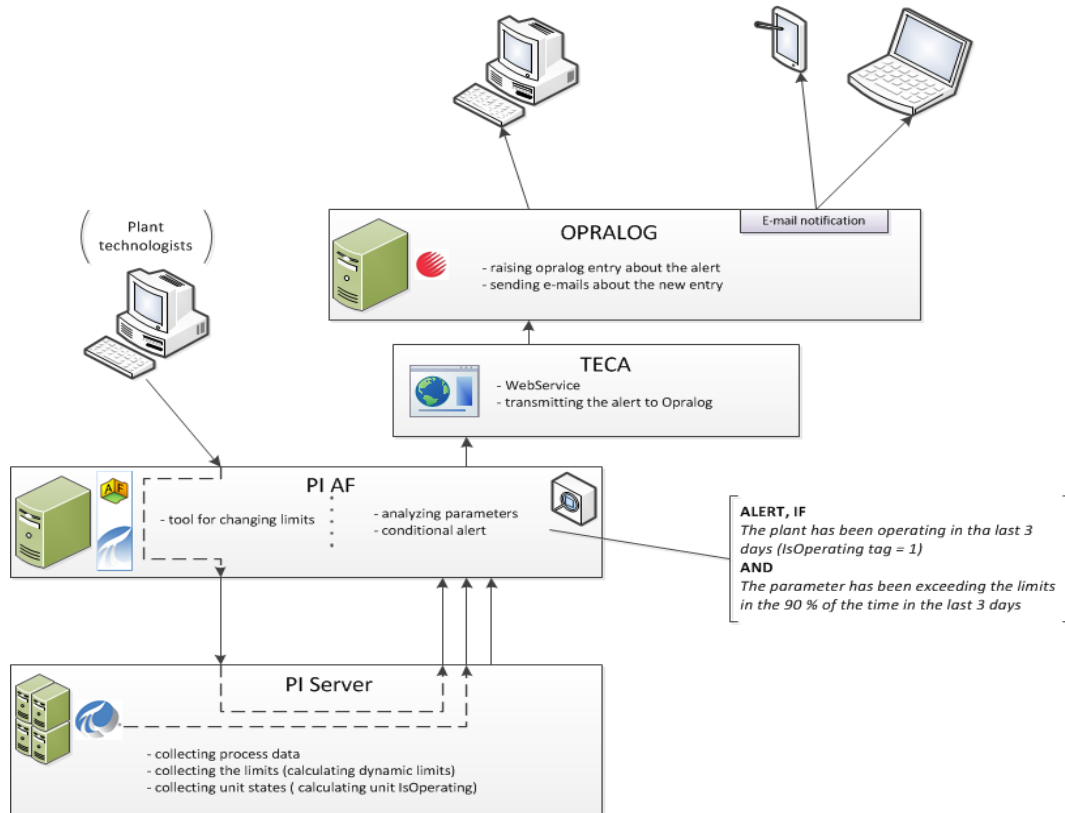
Detection principles



PI ProcessBook elements relative display



Technological card / PI AF connection



Technological card parameter definition in PI AF level

Data storage in PI server level

PI AF Technological card limit data evaluation

PI AF & Opralog connection via Web service

Opralog notification about Technological cards' entries

Technological card / PI AF

1/106 j. kolonna belépő mennyiség

General Child Elements Attributes Ports Version

Name	Value
Category: <None>	
Current	36,486663818359375
Desc	1/106 j. kolonna belépő mennyiség
HI Limit	60
Is operating	1
LO Limit	-100000000
Name	DARBRFC012.PVA
Napló_AZON	ARB_TK
Type	mennyiség

Current, actual value of the parameters

Description: Equipment name in Opralog (E.g.Column 1/106)

HI / LO Limits

Name: PI tag (E.g.DAV2CFN1308)

Logbook_ID : Opralog shift logbook identifier

Parameter type (E.g. :Quantity)

Is operating - value is 1 in case of normal operation of the unit

PI AF & Opralog Notifications

opralog - Felhasználó: FIRU technikai user - [Logbook: DFCC blokk - 10 Fejezet megtekintése (Mar 27, 2014 18:00-tól -ig)]

Fájl Szerkesztés Nézet Sorok Eszközök Műveletek Riportkészítés Adminisztráció Ablak Súgó

Naplóesemények

			Időpont	Naplóbejegyzés	Megjegyzés	További információ
			2014.03.31 07:00	BEA, BEK5, Technológia, Technológiai kártya túllépése	-460-V09 j. Stabilizáló kolonna fejnymása új állapota: Túllépés	
			2014.03.31 06:00	BEA, BEK5, Technológia, Technológiai kártya túllépése	Pirolízis benzin alanyanyag mennyisége (872.9 kg/m3, 10C) új állapota: Túllépés	
			2014.03.31 06:00	BEA, BEK5, Technológia, Technológiai kártya túllépése	Krakkbenzin alanyanyag mennyisége (705.4 kg/h, 50C) új állapota: Túllépés	
			2014.03.29 14:00	BEA, BEK5, Technológia, Technológiai kártya túllépése	-460-H50 Hóközoolaj melegítő kilepo hofbka új állapota: Túllépés	
			2014.03.28 17:04	BEA, BEK5, Technológia, Technológiai kontroll	-460H50 oxigén felesleg nem csökkenthető 6% alá RFC5002A OP Low limit 11% miatt.	

További információ Csatolmányok Diagram

Technológia kártya paraméter túllépés

Paraméter techn. jele	DBK5RFC3004.DACA.PI
Paraméter leírása	Pirolízis benzin alanyanyag mennyisége (872.9 kg/m3, 10C)
Típus	mennyiség
Állapot	Túllépés
Esemény időpontja	31-Mar-2014 06:00
Indoklás	Utasításra

Szűrő kikapcsolása **A SZŰRŐ AKTÍV**

46 nvtott naoló feladat (3 leíart)

Dokumentációs könyvtár Bejegyzések keresése

<< Előző 10 fejezet Következő 10 fejezet >> Összes fejezet

Frissítés 9 perc 16 másodperc múlva

Kész



LEAN SUPPORT

PI AF Notification

Notification on
control room
temperature

SMS

Fast reaction

Reporting of
outages

Interlock
events to
Opralog

Webservice

System to
system

Problem with
escalation

Analyze
technology

Technology
card

Statistical
methods

Other
algorithms

PI AF – Integration and Data Abstraction

Email, SMS, Webservice



Easier, Quicker Appl.
Development



Real-time data



Benchmarking

Cloud

New solutions

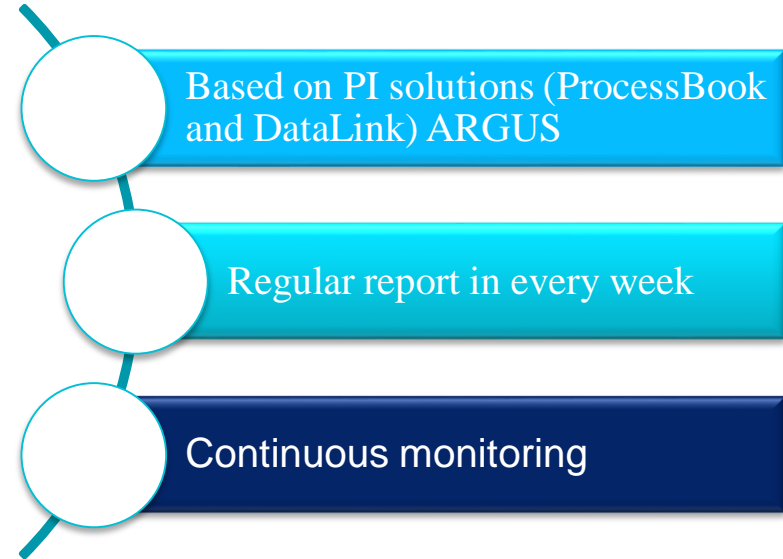
Maintenance
of PI

Asset
management

Learning

Analysers Validity Report

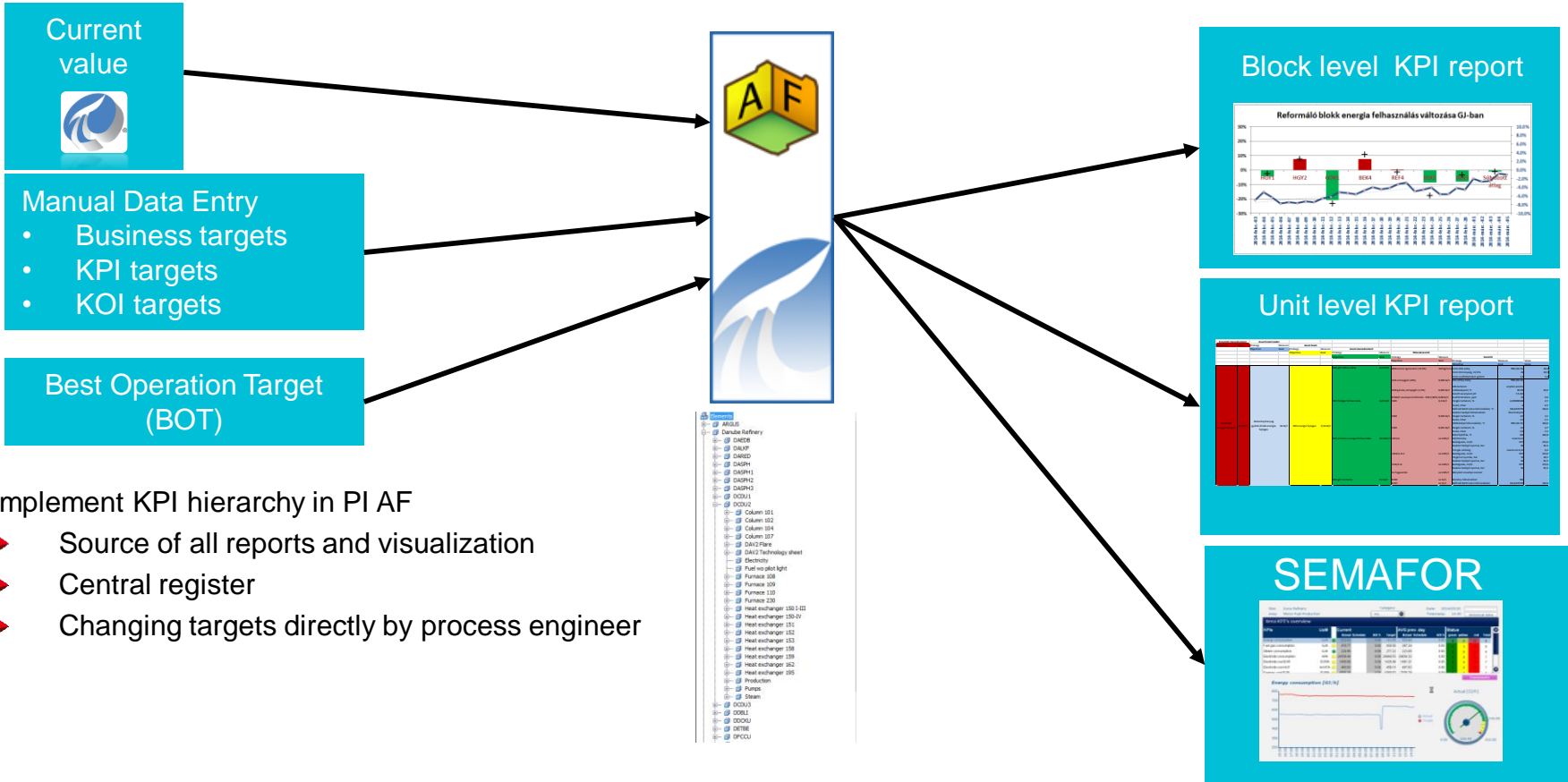
Unit	Sample Point	Analysis	2013.02.28	2013.04.25	2013.05.02	2013.05.13
DARB	1D1FJKI	Benzene	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	1D1FJKI	Non aromatic	Valid	Precise, but not Accurate	Not enough data	Valid
DARB	1D1FJKI	Toluene	Valid	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	OXILOLKI	C9	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	OXILOLKI	Cumene	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	OXILOLKI	Meta-xylene	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	OXILOLKI	Non aromatic	Valid	Valid	Valid	Valid
DARB	OXILOLKI	Ortho-xylene	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	TOLUOLKI	Benzene	Precise, but not Accurate	Precise, but not Accurate	Valid	Valid
DARB	TOLUOLKI	Non aromatic	Valid	Precise, but not Accurate	Valid	Precise, but not Accurate
DARB	TOLUOLKI	Toluene	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	XILOLKI	Etil-benzoal	Valid	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	XILOLKI	Meta-xylene	Precise, but not Accurate	Valid	Valid	Valid
DARB	XILOLKI	Non aromatic	Valid	Precise, but not Accurate	Precise, but not Accurate	Precise, but not Accurate
DARB	XILOLKI	Ortho-xylene	Valid	Not Valid	Not Valid	Valid
DARB	XILOLKI	Para-xylene	Precise, but not Accurate	Valid	Precise, but not Accurate	Precise, but not Accurate
DARB	XILOLKI	Toluol	PI Created	Not enough data	Valid	Precise, but not Accurate
DBK5	COMBPROD	Sulphur content	Out of operation	Out of operation	Out of operation	Valid
DBTK	MOTBEN	Vapour pressure	Valid	Valid	Valid	Valid



Comment:


DNHT5: sulphur analyser could have helped to recognise product contamination

Common datasource PI AF for KPI visualization



Implement KPI hierarchy in PI AF

- ▶ Source of all reports and visualization
- ▶ Central register
- ▶ Changing targets directly by process engineer



„Knowledge is of no value unless you put it into practice”

A. Chekhov



Business Challenge

- Providing real-time information for tighter control
- Closing the gap between process control and daily operation
- Fulfill strategic objectives

Solution

- Implement , use PI System portfolio elements in MOL Group wide
- Continuous monitoring of operation data and reporting information to users
- US - Server migration, HA infrastructure, web clients, auto report subsystem

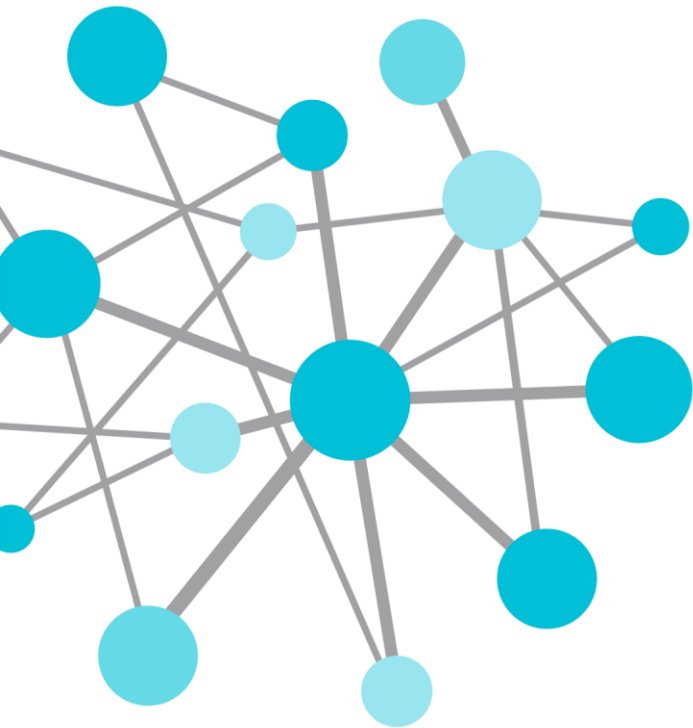
Results and Benefits

- Visible and controllable operations
- Operation awareness, reduced downtime
- Improved information flow between different organizations

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- Head of Process Information & Automation
- MOL, PLC





THANK
YOU

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