Adding value with PI at Umicore

Bart De Cooman – Umicore

Luc Clabout - Promatic

Agenda

PROMATIC-GROUP
Industrial automation

umicore
materials for a better life

- Umicore
  - Umicore Precious Metals Refining
- Promatic
- Introduction of PI at UPMR
- PI Today
- PI Future

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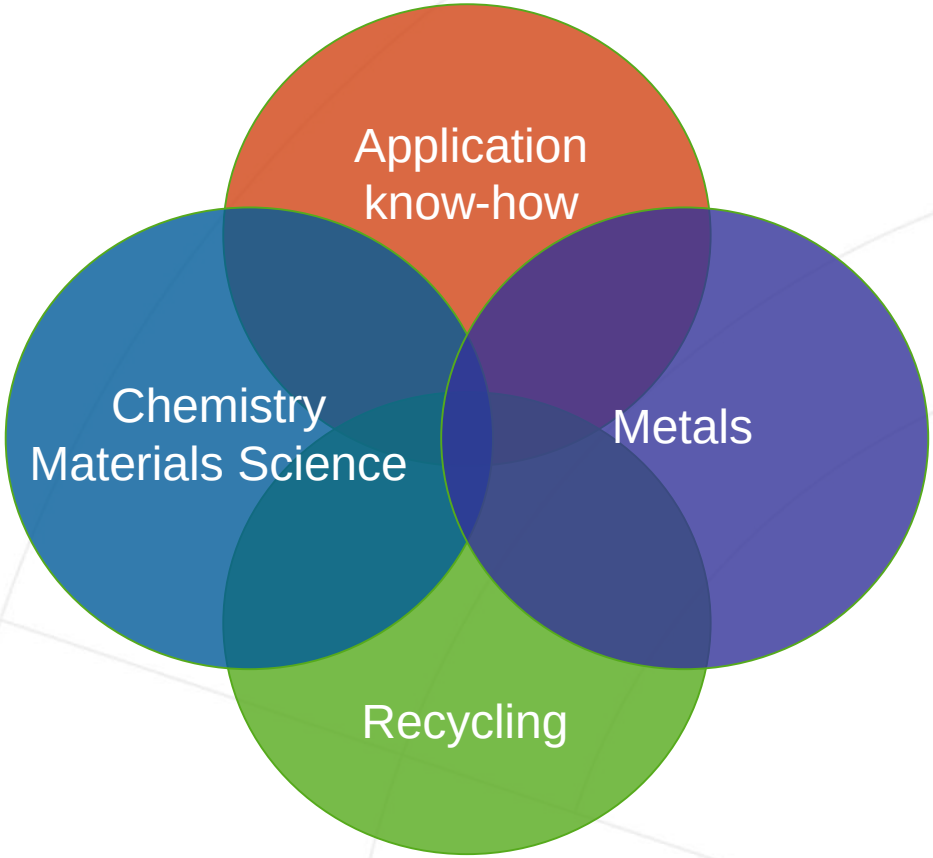
Umicore: a specialty materials company



Committed to sustainable development

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A history of transformation

1906: Union Minière du Haut Katanga:
Copper and Cobalt mining (nationalised in 1967)

1989: Union Minière merger with Metallurgie Hoboken and Vieille Montagne
Base metals refining and some specialty materials

2001: Name changed to Umicore
Focus on building specialty materials business

2003: Acquisition of former Degussa precious metals products and catalyst business (PMG)

2005: Umicore spins off Cumerio

Specialty Materials Copper

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Today, our company provides…

- the automotive catalysts for one in four cars produced in the world
- key materials for the rechargeable batteries for more than 40% of all cell phones and laptops sold this year
- the semiconductor substrates for more than 50% of all satellite solar cells in the last two years
- recycling services for more than 20 metals to customers on every continent

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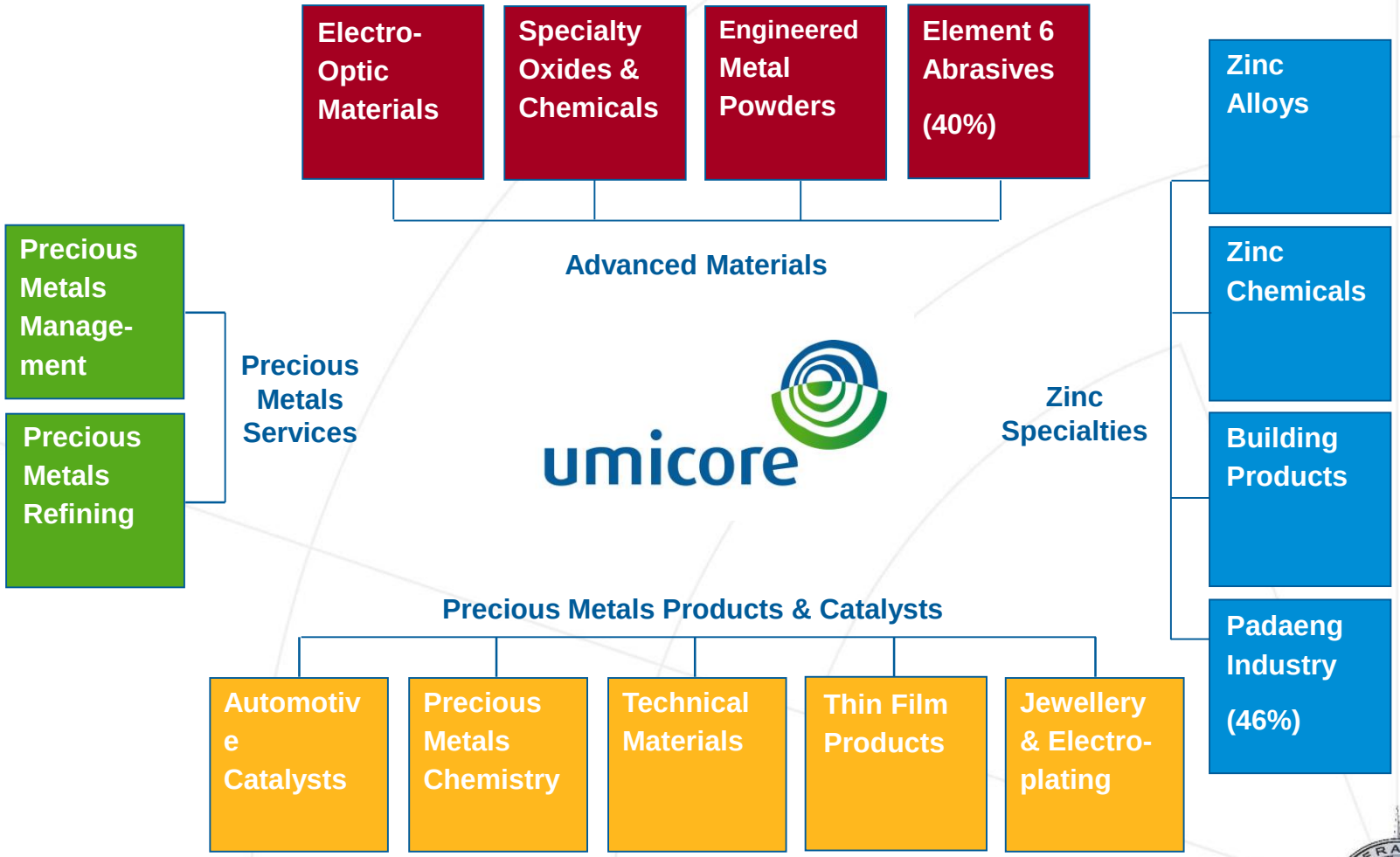
A decentralized, customer-focused organisation



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14,000 people in more than 100 industrial locations around the world

Key figures* (financials in € million)

	2003	2004	2005** First Half
Revenue (excl. metal)	1,358	1,902	861.1
EBITDA	277.1	485.8	209.7
Recurring EBIT	145.1	301.8	127.7
Net Profit (r)	97.8	192.1	56.1
EPS adjusted	4.28	7.56	3.35

* 2003 contains PMG entities for 5 months only

** 2005 figures are post-demerger of the Copper business (Cumerio)

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Precious Metals Refining

Strategic positioning

World's largest recycler of precious metals

EU's leading refiner of silver, platinum, palladium and rhodium

Main products

Recovery of a range of metals including gold, silver, platinum, palladium, rhodium, tellurium, selenium, lead and bismuth

Main markets

Recycling services for base metals smelters, photographic and petro-chemical industry

Original equipment manufacturers

Collectors of used auto catalysts and electronic scrap

Spent catalysts

Shredded electronic scrap

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Umicore Precious Metals Refining

Umicore Precious Metals Refining

masters a unique innovative technology

to flexibly process for an international customer basis

a wide range of complex precious metals bearing materials

applying world class environmental standards

recovering 17 different metals

whilst generating minimal waste.

The sustainability of our result is driven by the profitability of our supply, more than by the growth of our market shares.

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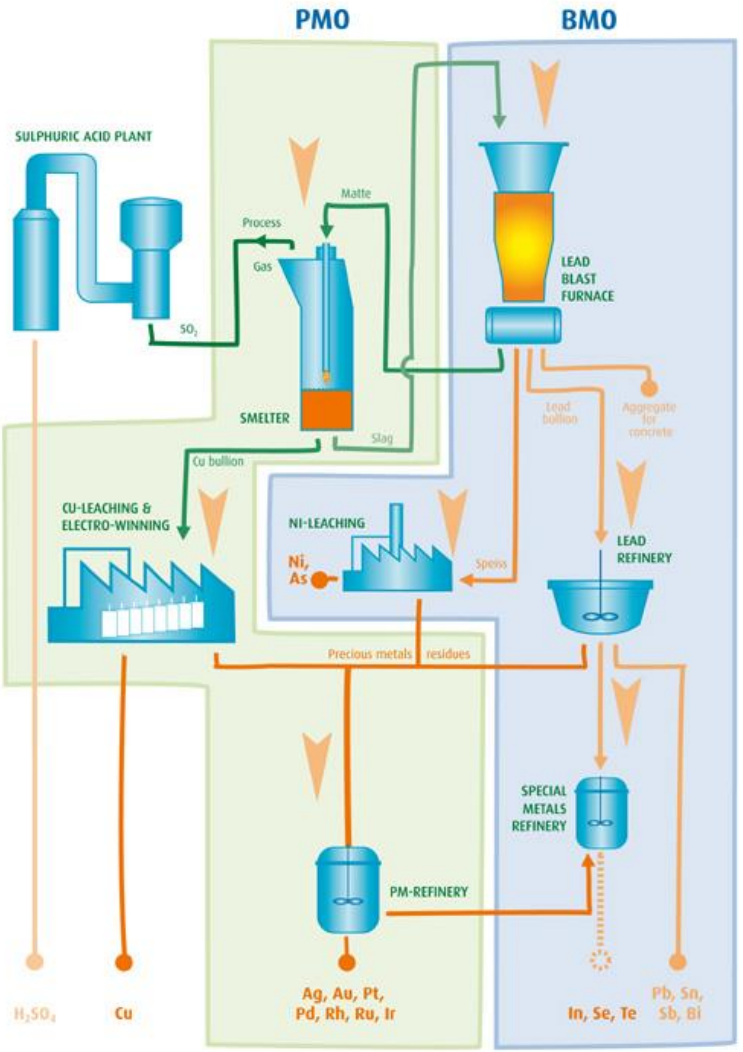
INPUT

250,000 tpy

- By-products from smelters and refiners
- Industrial and consumer recyclable products



OUTPUT

- Precious Metals
- Base Metals
- Special Metals
- Chemicals
- Aggregate for concrete

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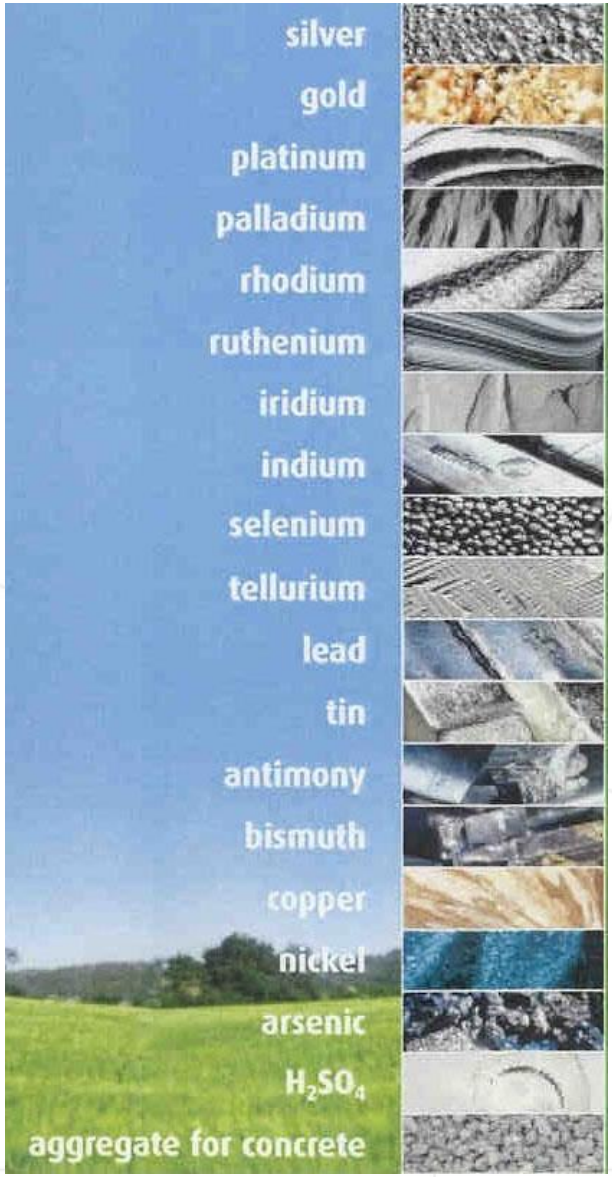
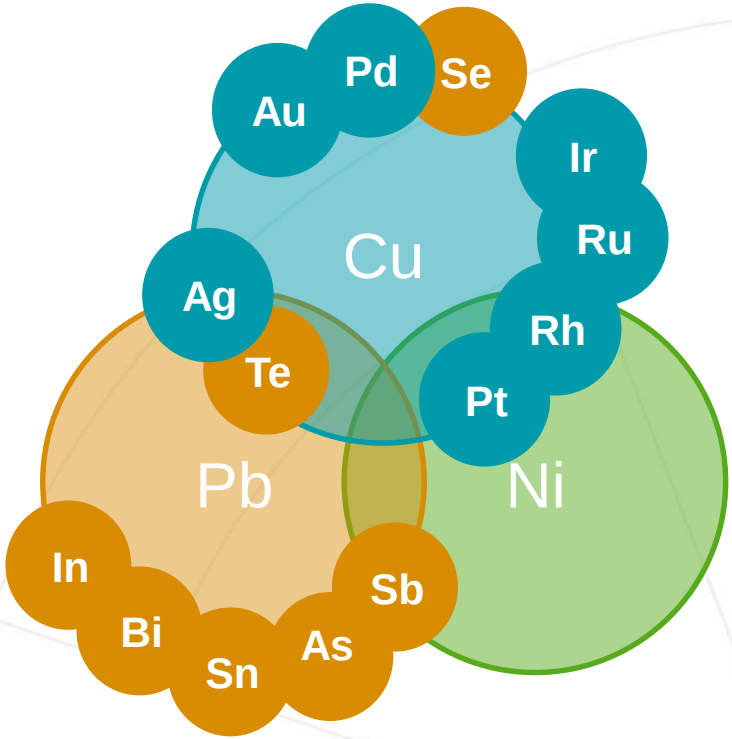


Pb, Cu & Ni are the base metals that drive our recycling process



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ACTIVITIES >>

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Figures

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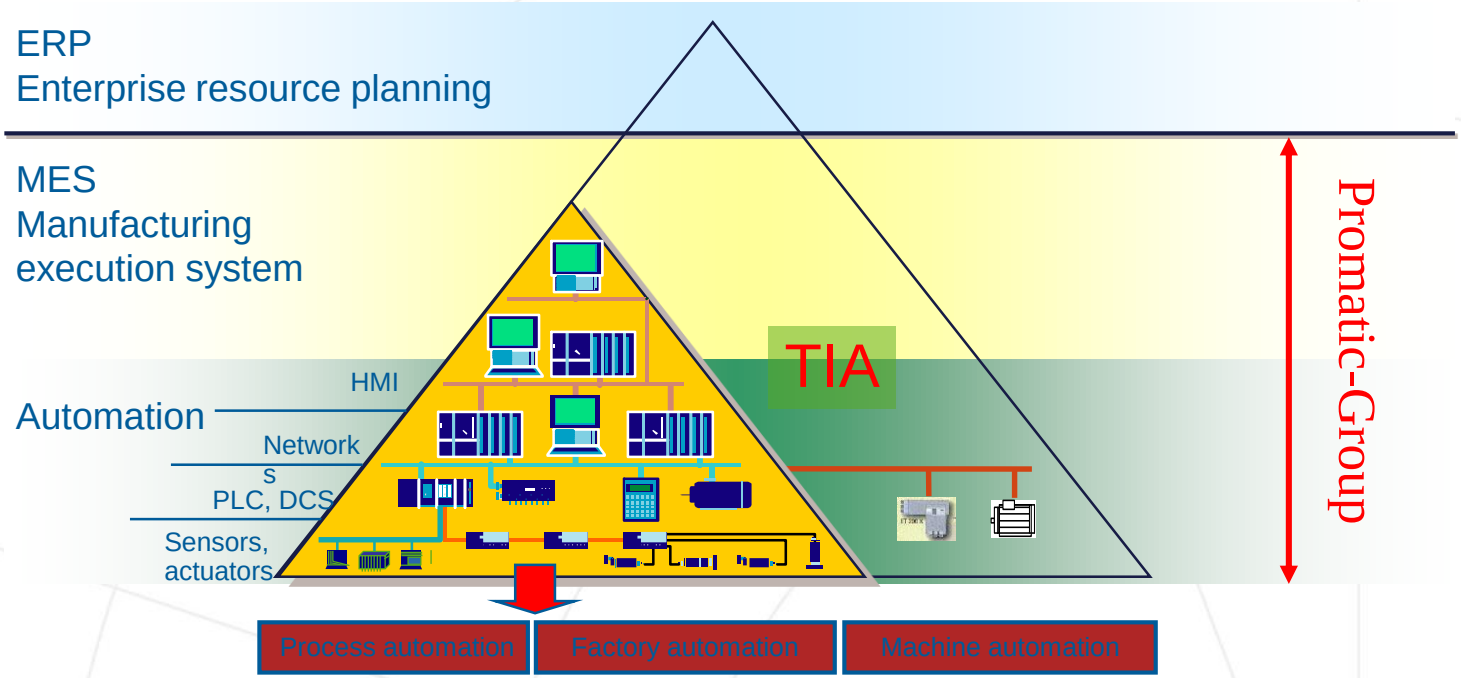

Promatic-Group

Projects | Products | Training | Panel Construction | Industrial Electricity

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Figures

References

ACTIVITIES · PRODUCTS >>

Distribution of automation products, drives and ICT components

Added Value ...

» Our technological know-how thanks to our large project experience
» Infosessions concerning new products
» Helpdesk
» Advice and support for preparing your offers

ACTIVITIES · TRAINING >>

Specialized training in industrial automation:

» In-company or at our locations
» Standard or customized training, project/product related
» Professional teachers with a large technical background
» Seminars, workshops
» Great flexibility towards planning

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Figures

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ACTIVITIES · PROJECTS >>

1. **Electrical engineering & wiring**

2. **PLC/SCADA - DCS**

3. **BATCH**
   - » S88 standards
   - » Standard Batch packages

4. **Manufacturing Execution Systems**
   - » MES-consultancy, following S95
   - » Global MES-solutions based on market leaders
   - » Single component MES-implementations
   - » Historian

Important fields of interest within the Promatic-Group:
- » S95-standards
- » Master rules, typical for a particular sector eg. GMP/GAMP, traceability, HACCP

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High service level through local offices close to the customer:

- » Belgium
- » Southerly part of the Netherlands
- » Northerly part of France

- » 130 high qualified employees

Activities

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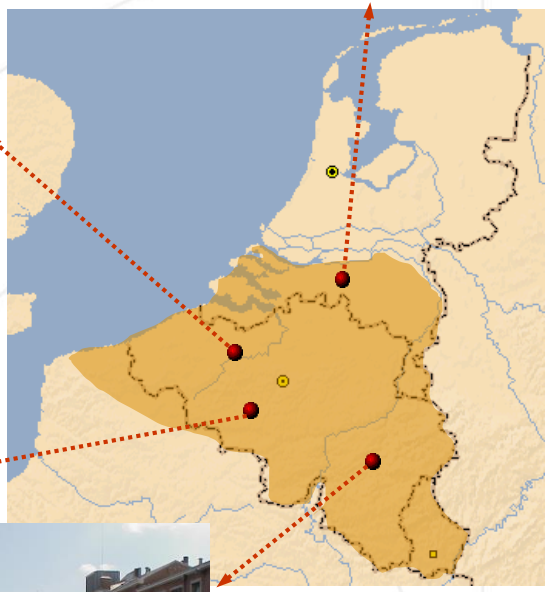
Figures

References

Oirschot
Promatic-N

Aalter
Promatic-B



Ath
Promatic-W

Liège
Promatic-W

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Figures

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Extending territorial activities to foreign countries for key-accounts:

- » up to 2000: Brazil, Argentina, South Carolina, Trinidad, Spain, France, UK, Germany,...
- » 2001: Brazil, Korea, China, Iran, Turkey
- » 2002: Korea, China, Turkey, Slovakia, India
- » 2003 - 2005: Korea, China, Czech Republic, USA, Chili, Spain, UK, Germany, Russia, South-Africa

Cooperation with local integrators

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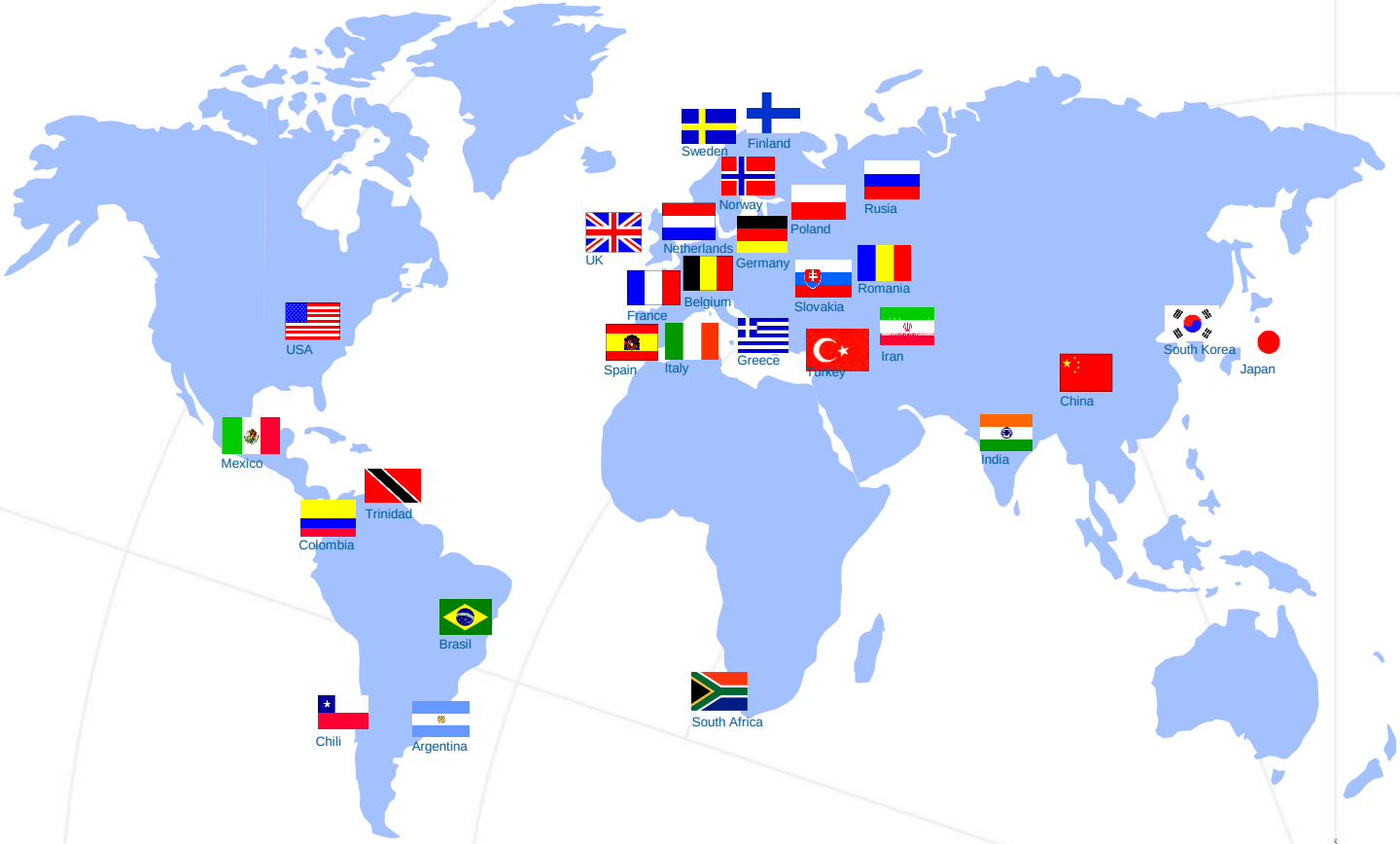

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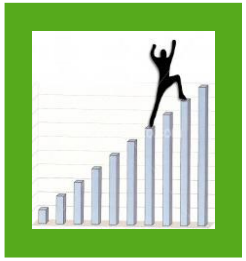

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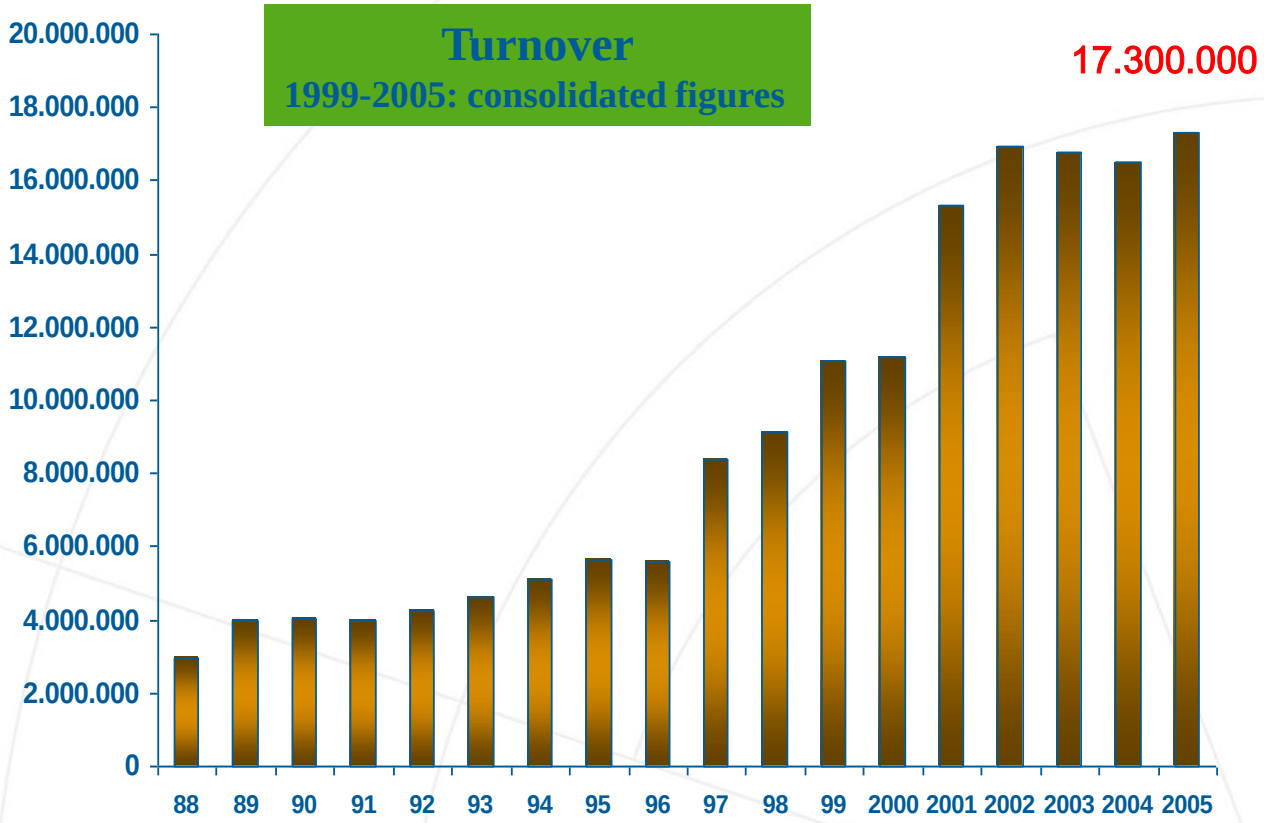
- Organisation
- Figures
- References

Turnover
1999-2005: consolidated figures



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CHEMISTRY	PHARMACY	FOOD	PLASTICS	TEXTILE
3M	AstraZeneca	Alpro	Alkor Draka	Assoc. Weavers
Agfa	Baxter	Bel Fromageries	Dumo	Balta
Atofina	GSK	Belgomilk	Klöckn. Pentaplast	Beaulieu
Bayer	Janssen Pharm.	Campina	Latexco	Domo
Citrique Belge	Pfizer	Choc. Jacques	Recticel	Fabelta
Dow Corning	Schering Plough	Corman	Solvay	UCO Sportswear
Exxon	UCB	Danone	Schulman Plastics	…
Genencor	…	Fuji Oil	Trespa	
Kronos		Kraft	…	
Polyone		Lotus Bakeries		
Sopura		Robertet		
Sun Chemical		Soubry		
Uniquema		Vandemoortele		
Zuid-chemie		Unilever		
…		…		

METAL/STEEL	ENVIRONMENT	MACHINERY	OTHERS	OTHERS
Arcelor	Aquafin	Atlas Copco	Axima	Ontex
Circuit Foil	Bosman	Nedcar	Bleijko	Philip Morris
Corus Aluminium	Electrabel	Pattyn	Berry Floor	SCA Hygiene
Drever	Fluxys	Sadef	Carr. De Hainaut	Seghers Keppel
Hoogovens	Org. Waste	Spiromatic	Compactors	Soliver
Profilarbed	Systems	Vitalo	Dumo	Stora Enso
Sidmar	…	Vyncke	De Smet	Tetra Pak
Trefilarbed		…	Glaverbel	Unilin
Umicore			Molnlycke	Vopak
Vesuvius			Mettler-Toledo	…
…				

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Activities

Organisation

Figures

References

References with PI

Metal:	Umicore
Pharma:	Janssen Pharmaceutica Schering Plough Pfizer
Food:	Cargill Cerestar Fuji Oil
Textile:	Uco Sportswear
Chemicals:	Petroplus

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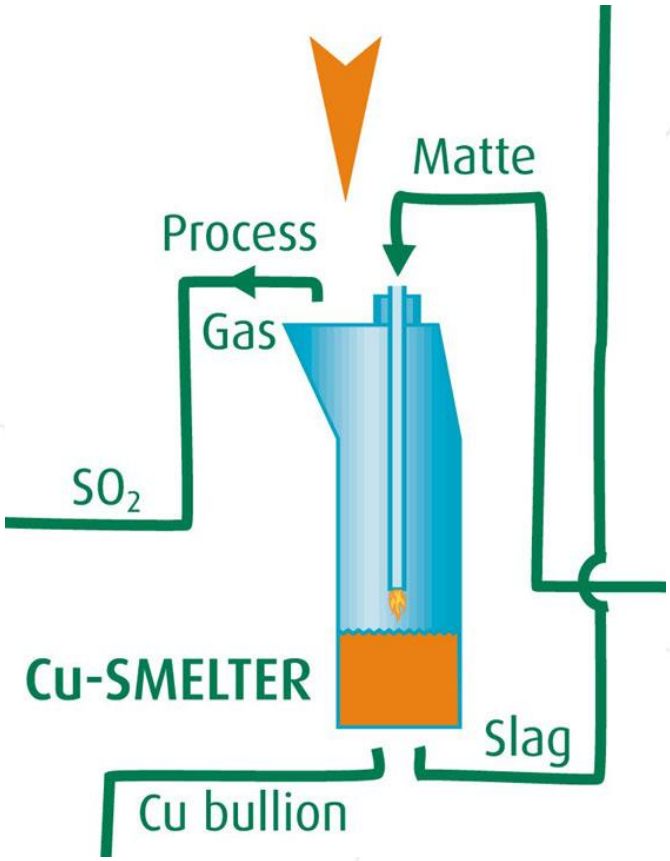
Introduction of PI at UPMR



Major process change by introducing the smelter (2000):

- R&D pilote project
- Building production facility (x10)
- Automation: Promatic - B
- Take-over of the project by the production department after acceptance

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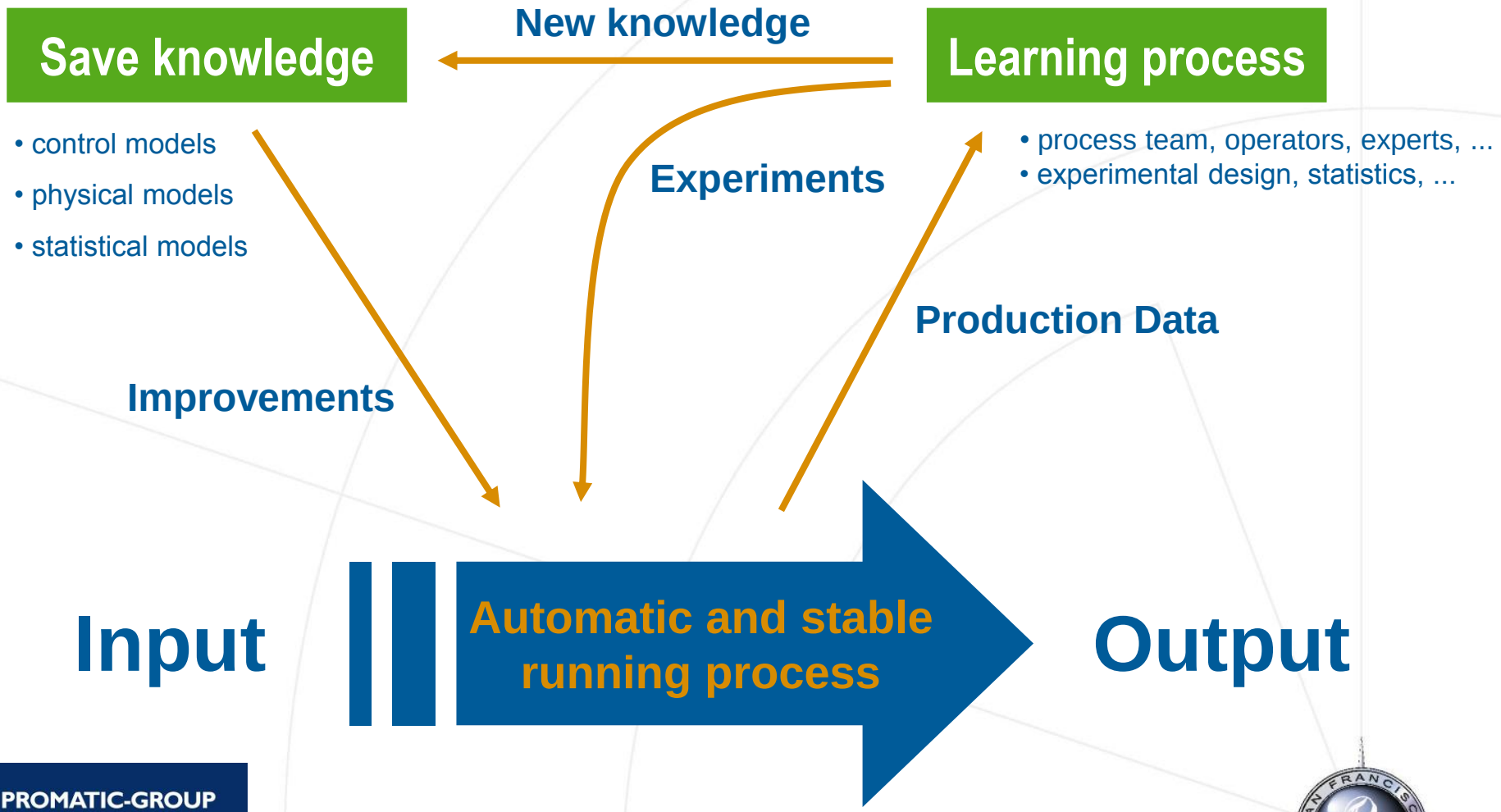
Introduction of PI at UPMR



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PI support of the learning cycle

Improvement of the signal/rustle relationship

- Everybody works with the same data

Acceleration of the cycle time of information

- Access to industrial data historian through the company network
- Integration platform with other databases
- Use of Microsoft office tools, VBA

Increase of the reliability

- Use of industrial data

Offering data to a larger group.

- More people who learn = quicker learning

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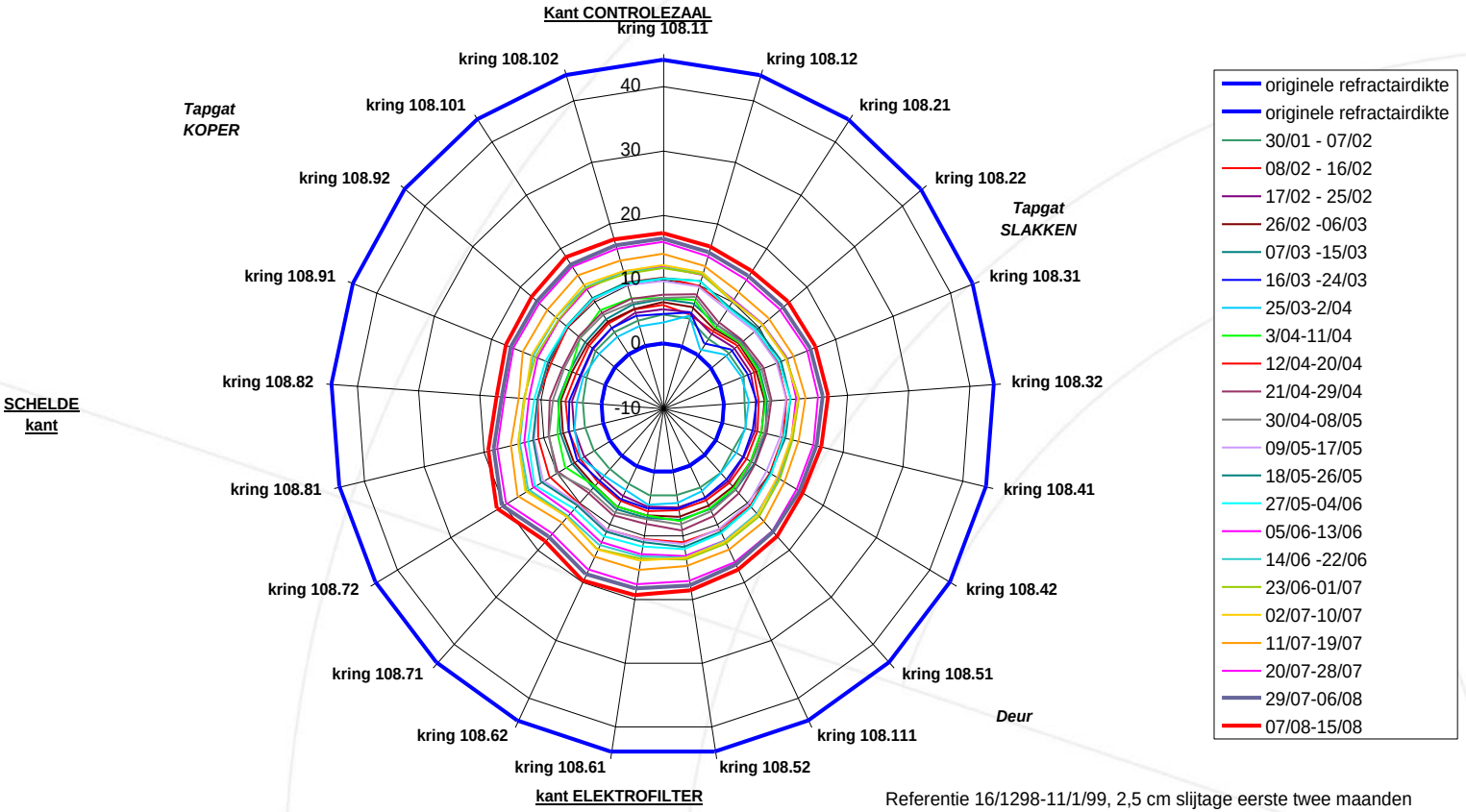
PI support of the learning cycle



Referentie 16/1298-11/1/99, 2,5 cm slijtage eerste twee maanden

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PI support of the learning cycle

Realizations:

- ✓ Tuning of blow machine (increase of efficiency)
- ✓ Optimization of the process
- ✓ Defining collapse smelter

⇒ …

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PI support of the learning cycle

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ROI after 8 weeks

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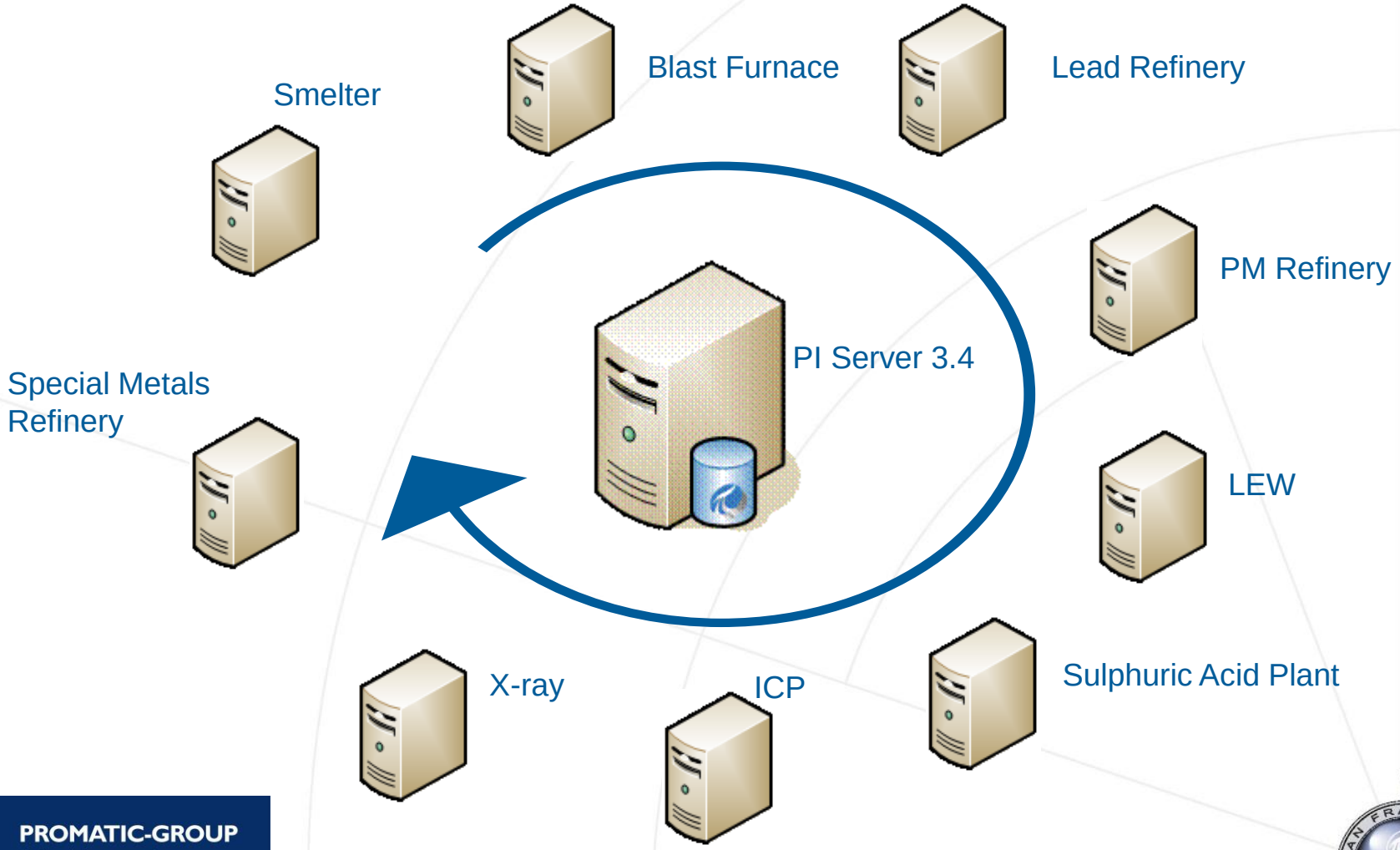
Evolution of PI at UPMR



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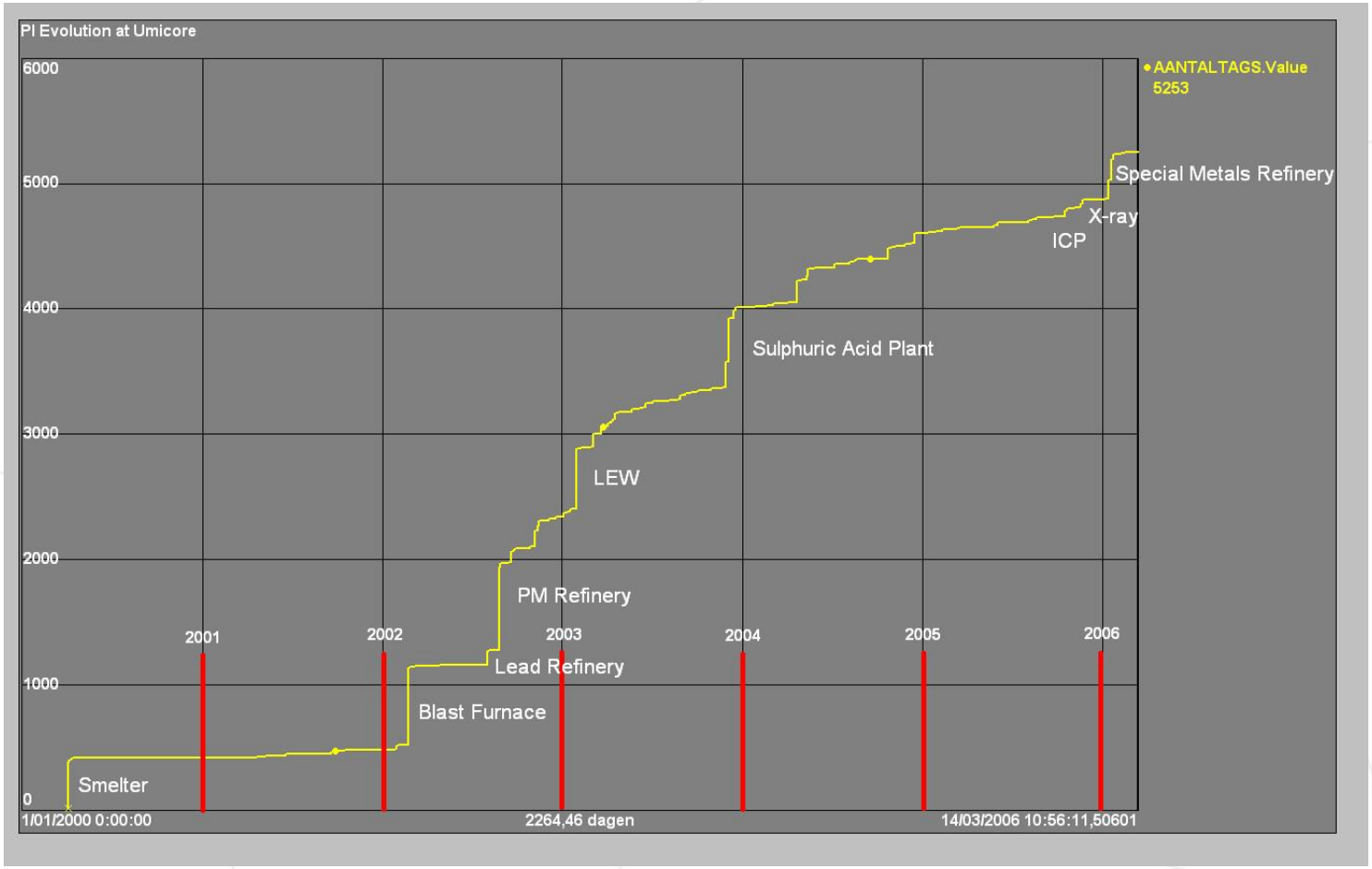

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Infrastructure

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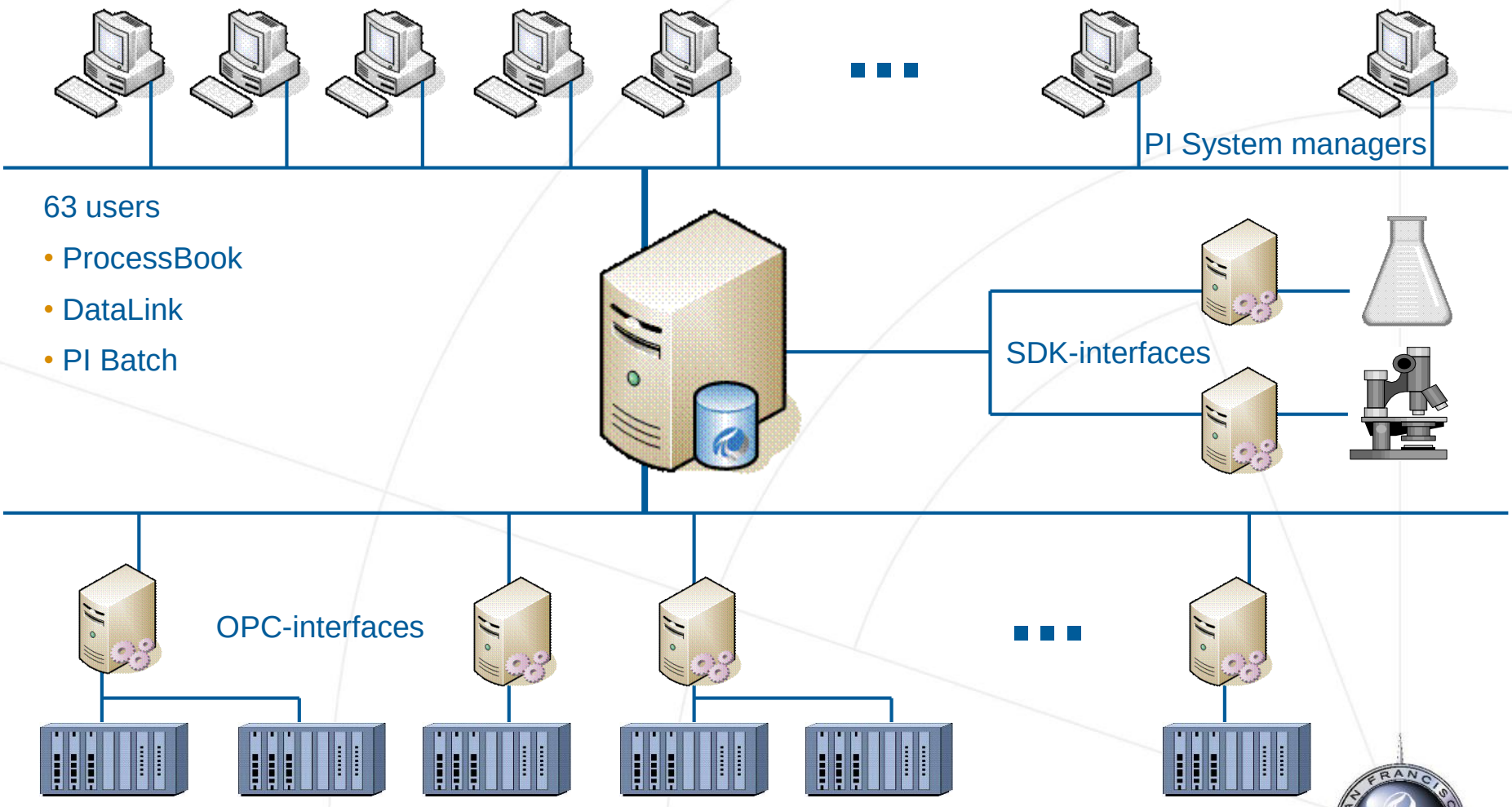

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PI today

Approach

Create maximum flexibility for our end-users incorporating standard office tools.

Complex applications are managed by Process IT and created by Promatic-B.

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Flexibility end-users

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- **Operators create there own visualisation of the process**
  - Independent of SCADA => increase the flexibility
  - Creates commitment
  - Reduces shift handover incidents
- **Production Managers for reporting and planning**
  - Always the right data at the right time !!!
- **Maintenance for verifying equipment**
  - Repairing breakdowns => preventive maintenance

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Flexibility end-users

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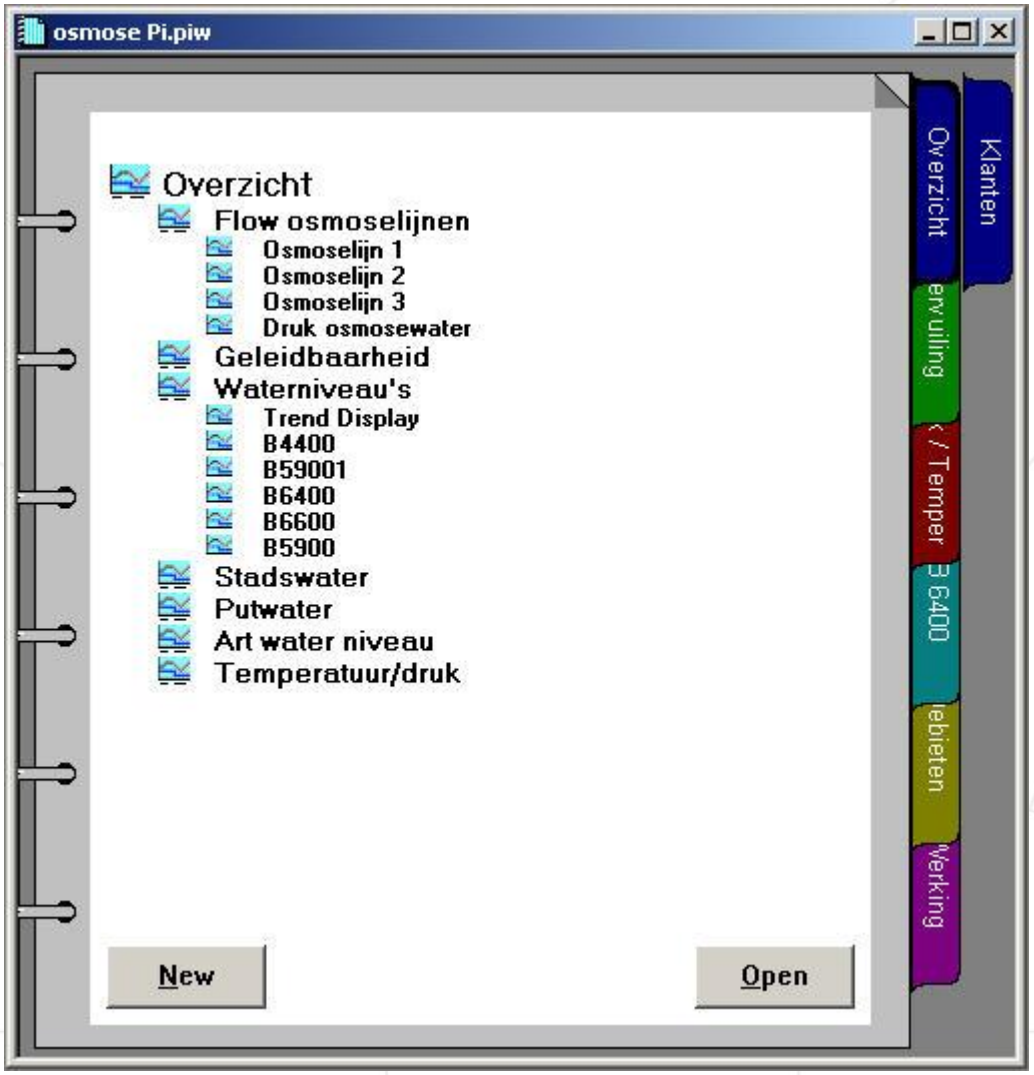

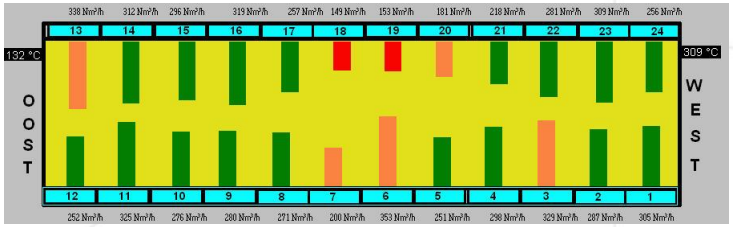

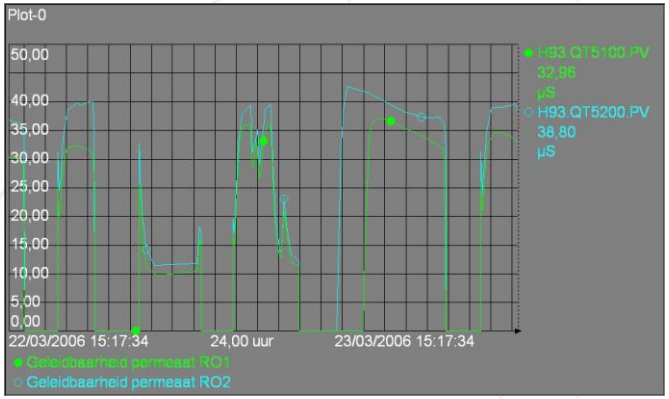

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Flexibility end-users

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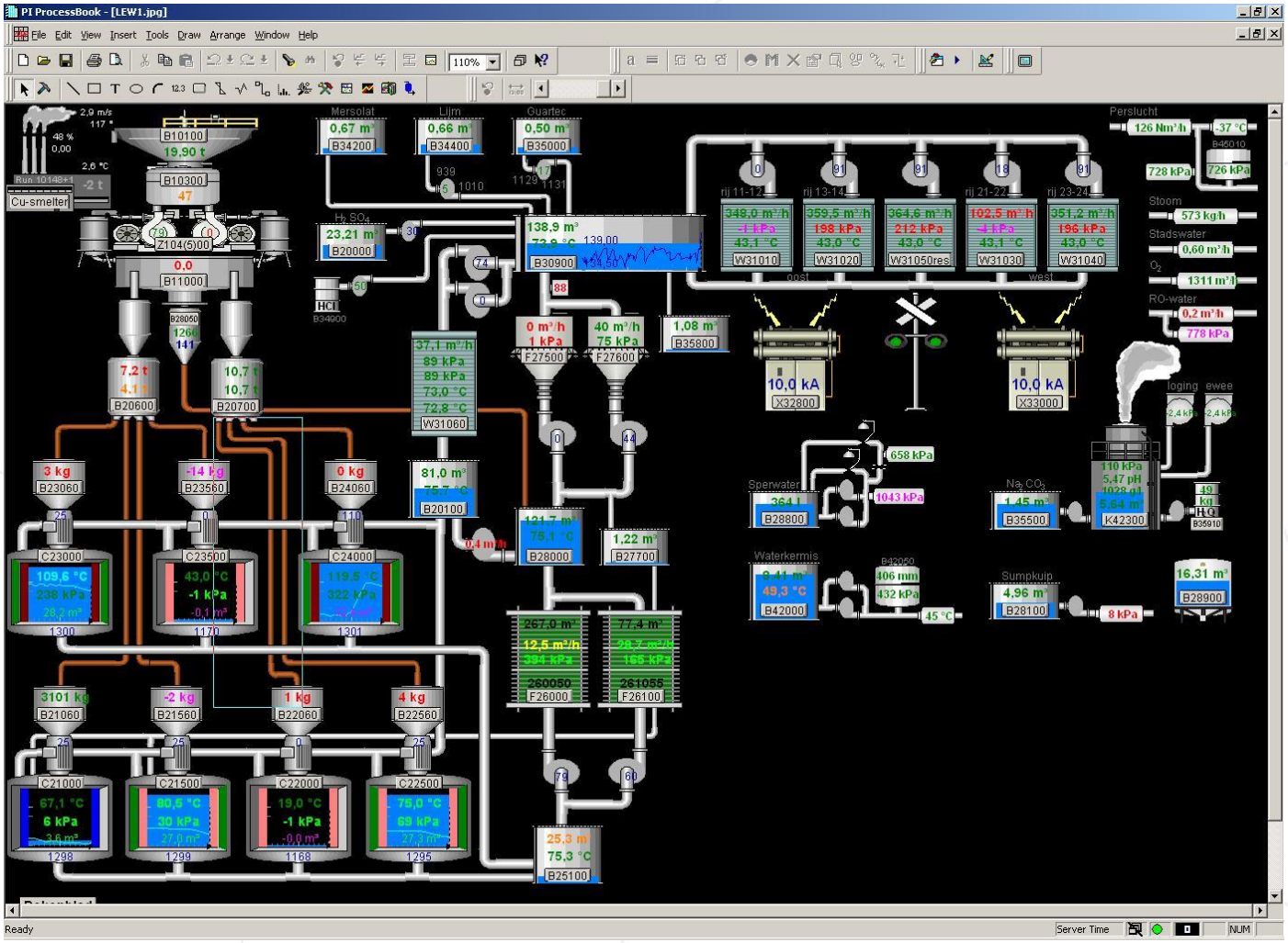

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Reporting tools

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DataLink

- PI-data combined with external databases
- Statistic calculations with standard Excel-functions

PI Batch

- Standard ProcessBook visibility
- Easily compare differences between batches

⇒ **Powerful tools for production managers**

- Quick overview of current & past production data
- Automatic reporting to senior management

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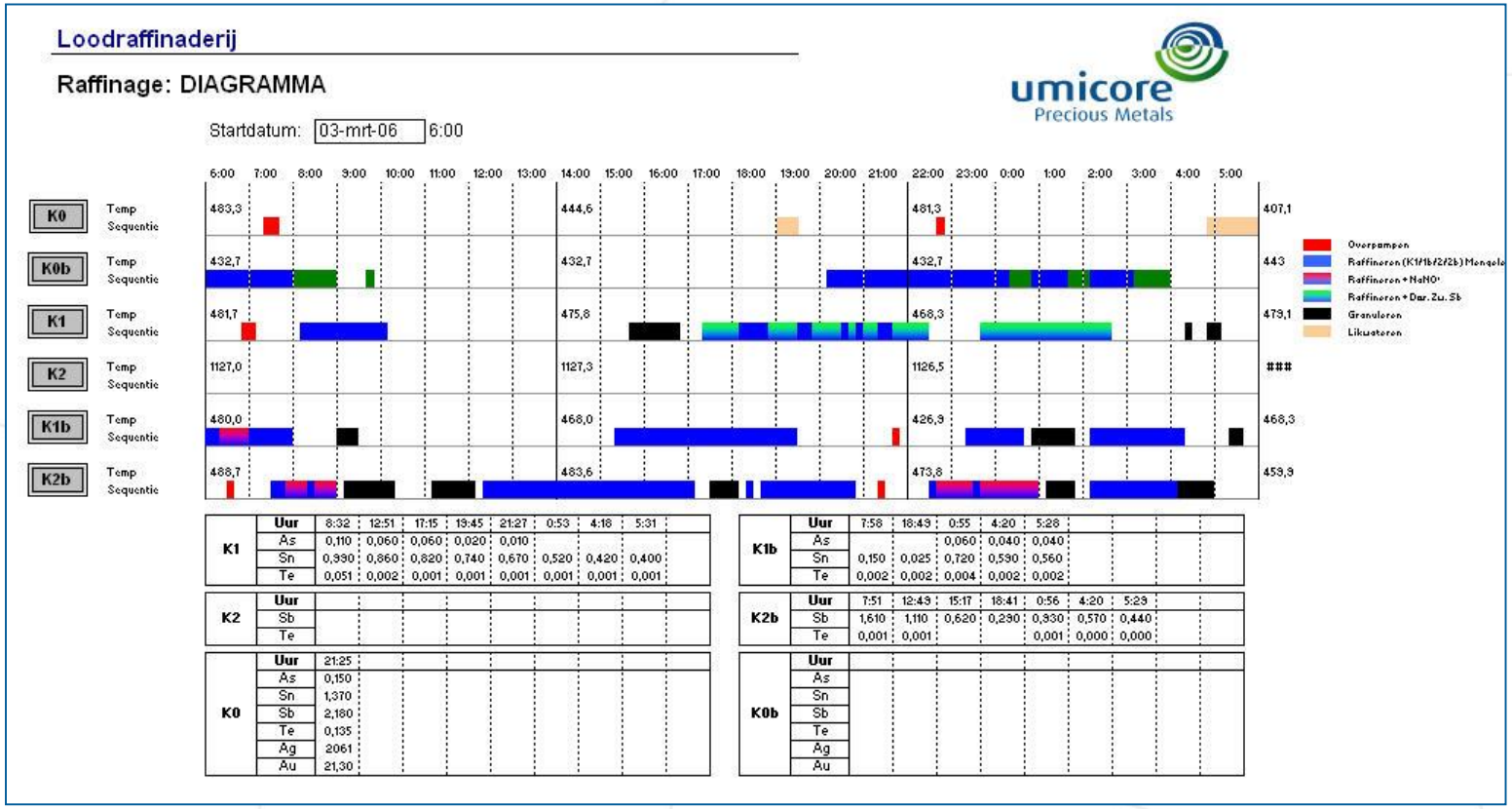
Reporting tools



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RtPM for maintenance

Preventive Maintenance ⟷ Reactive Maintenance

Condition Based ⟷ Calender Based

DataLink

- Running hours calculation of equipment
- Monitoring the quality of measurements

E-mail Notification Manager

- Automatically creates warnings & alarms

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RtPM for maintenance

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overschrijding	waarde	K0	K0b	K1	K1b	K2	K2b	K3	K4	K4b	K5	K6	K6b	K7	K8-1-1	K8-1-2	K8-1-3	K8-2-1	K8-2-2	K8-2-3	K8-3-1	K8-3-2	K8-3-3	K8-4-1	K8-4-2	K8-4-3	K9	K10	K11	VDKA	VDKB	VDKC	VDKD	VDKE	VDKF
17-dec-04 00:55:58	21,08595	13		14					16	12							3	9	9	9	4	4	4	4	4		17	2		1			17		15
17-dec-04 00:56:28	13,15069	14		15					17	13	1						4	10	10	10	5	5	5	5	5		18	3		2			18		16
17-dec-04 01:35:08	26,14223	6	1	7						5	4	3															8		2				8		
17-dec-04 01:53:38	12,81794	12	7	13						11	10	9					1	3	3	3							14		8		6		14		2
17-dec-04 01:56:28	11,37122	12	7	13						11	10	9					1	3	3	3							14		8		6		14		2
17-dec-04 01:56:58	12,7239	12	7	13						11	10	9					1	3	3	3							14		8		6		14		2
17-dec-04 01:57:58	11,99331	11	7	12						10		9					1	3	3	3							13		8		6		13		2
17-dec-04 01:58:38	11,78354	11	7	12						10		9					1	3	3	3							13		8		6		13		2
17-dec-04 01:59:18	14,74931	11	7	12						10		9					1	3	3	3							13		8		6				2
17-dec-04 01:59:48	11,76907	11	7	12						10		9					1	3	3	3							13		8		6				2
17-dec-04 02:00:48	11,8414	11	7	12						10		9					1	3	3	3							13		8		6				2
17-dec-04 02:07:58	11,33505	8	4	9					1	7		6															10		5		3				2
17-dec-04 02:09:38	11,7329	8	4	9					1	7		6															10		5		3				2
17-dec-04 02:09:58	12,70944	7	4	8					1	6		5															9				3				2
17-dec-04 02:12:08	11,23378	8	5	9					2	7		6															1				4				3
17-dec-04 02:16:48	11,53759	8	5	9					2	7		6															1				4				3
17-dec-04 02:23:38	17,43298	8	6	9				2		7																	3			1	6				4
17-dec-04 03:39:48	11,52312	7								6	2																4		1		5		3		
17-dec-04 03:52:58	15,50884	7						2		6																	4			1	5		3		
17-dec-04 04:44:58	11,50142	8							3	7	2		1														5				6		4		
17-dec-04 04:46:18	12,02224	8							3	7	2		1														5				6		4		
17-dec-04 04:47:18	12,27542	8							3	7	2		1														5				6		4		
17-dec-04 04:48:18	11,33505	8							3	7	2		1														5				6		4		
17-dec-04 04:50:38	23,27773	8							3	7	2		1														5				6		4		
17-dec-04 05:12:18	14,71314	8							4	7	3		2														6		1				5		
17-dec-04 05:21:38	23,12582	9						2	6		5		4														8		8	1			7		
17-dec-04 05:38:48	14,4672	7							4		3		2														6			1			5		
17-dec-04 05:45:58	11,55206	7							4				3														6			2	1		5		
17-dec-04 05:46:18	11,08911	7							4				3														6			2	1		5		
17-dec-04 05:53:08	11,69673	7							4				3														6			2	1		5		
17-dec-04 06:52:48	16,65175	6							4		2		3														5		1						
17-dec-04 08:49:38	15,2629	4	5		3		2	7	9		5		10														10		8	1					
17-dec-04 08:51:48	22,85094	9	10	5	8		7	12	14	3	10	2	15														15		13	6	3	1			
17-dec-04 08:56:08	34,05579	11	12	7	10		9	14	16	5	12	4	17														17	1	15	8	5	3	2		
17-dec-04 09:17:28	13,83788	12	13	8	11		10	15	16	6	13	5	17														17	2		9	6	4	3		1
17-dec-04 09:17:58	14,25019	12	13	8	11		10	15	16	6	13	5	17														17	2		9	6	4	3		1
17-dec-04 09:18:38	11,8631	12	13	8	11		10	15	16	6	13	5	17														17	2		9	6	4	3		1

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E-mail notification manager

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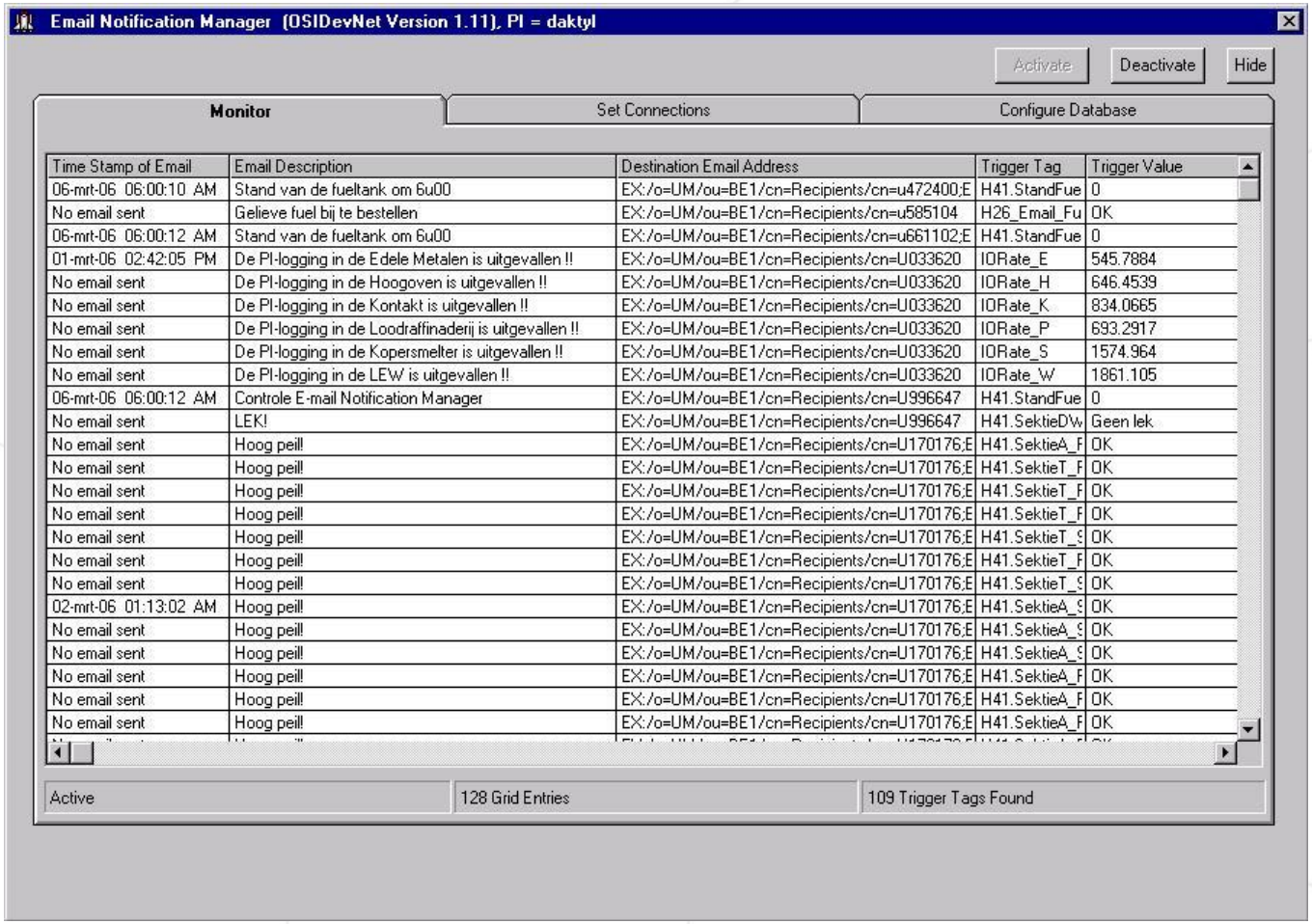

Time Stamp of Email	Email Description	Destination Email Address	Trigger Tag	Trigger Value
06-mrt-06 06:00:10 AM	Stand van de fueltank om 6u00	EX:/o=UM/ou=BE1/cn=Recipients/cn=u472400;E	H41.StandFue	0
No email sent	Gelieve fuel bij te bestellen	EX:/o=UM/ou=BE1/cn=Recipients/cn=u585104	H26_Email_Fu	OK
06-mrt-06 06:00:12 AM	Stand van de fueltank om 6u00	EX:/o=UM/ou=BE1/cn=Recipients/cn=u661102;E	H41.StandFue	0
01-mrt-06 02:42:05 PM	De PI-logging in de Edele Metalen is uitgevallen !!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U033620	IORate_E	545.7884
No email sent	De PI-logging in de Hoogoven is uitgevallen !!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U033620	IORate_H	646.4539
No email sent	De PI-logging in de Kontakt is uitgevallen !!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U033620	IORate_K	834.0665
No email sent	De PI-logging in de Loodraffinaderij is uitgevallen !!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U033620	IORate_P	693.2917
No email sent	De PI-logging in de Kopersmelter is uitgevallen !!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U033620	IORate_S	1574.964
No email sent	De PI-logging in de LEW is uitgevallen !!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U033620	IORate_W	1861.105
06-mrt-06 06:00:12 AM	Controle E-mail Notification Manager	EX:/o=UM/ou=BE1/cn=Recipients/cn=U996647	H41.StandFue	0
No email sent	LEK!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U996647	H41.SektieDW	Geen lek
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieA_F	OK
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieT_F	OK
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieT_F	OK
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieT_F	OK
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02-mrt-06 01:13:02 AM	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieA_S	OK
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieA_S	OK
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieA_S	OK
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieA_F	OK
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieA_F	OK
No email sent	Hoog peil!	EX:/o=UM/ou=BE1/cn=Recipients/cn=U170176;E	H41.SektieA_F	OK

Active | 128 Grid Entries | 109 Trigger Tags Found

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Gather Data & Events

To be able to achieve operational Excellence we have to gather data and assign context to it.

PI SDK

- Easy way to connect specialised equipment (XRF, ICP, …)
- Possibility to:
  - ✓ validate data
  - ✓ input of operator comments

⇒ **Transforms data into meaningful information**

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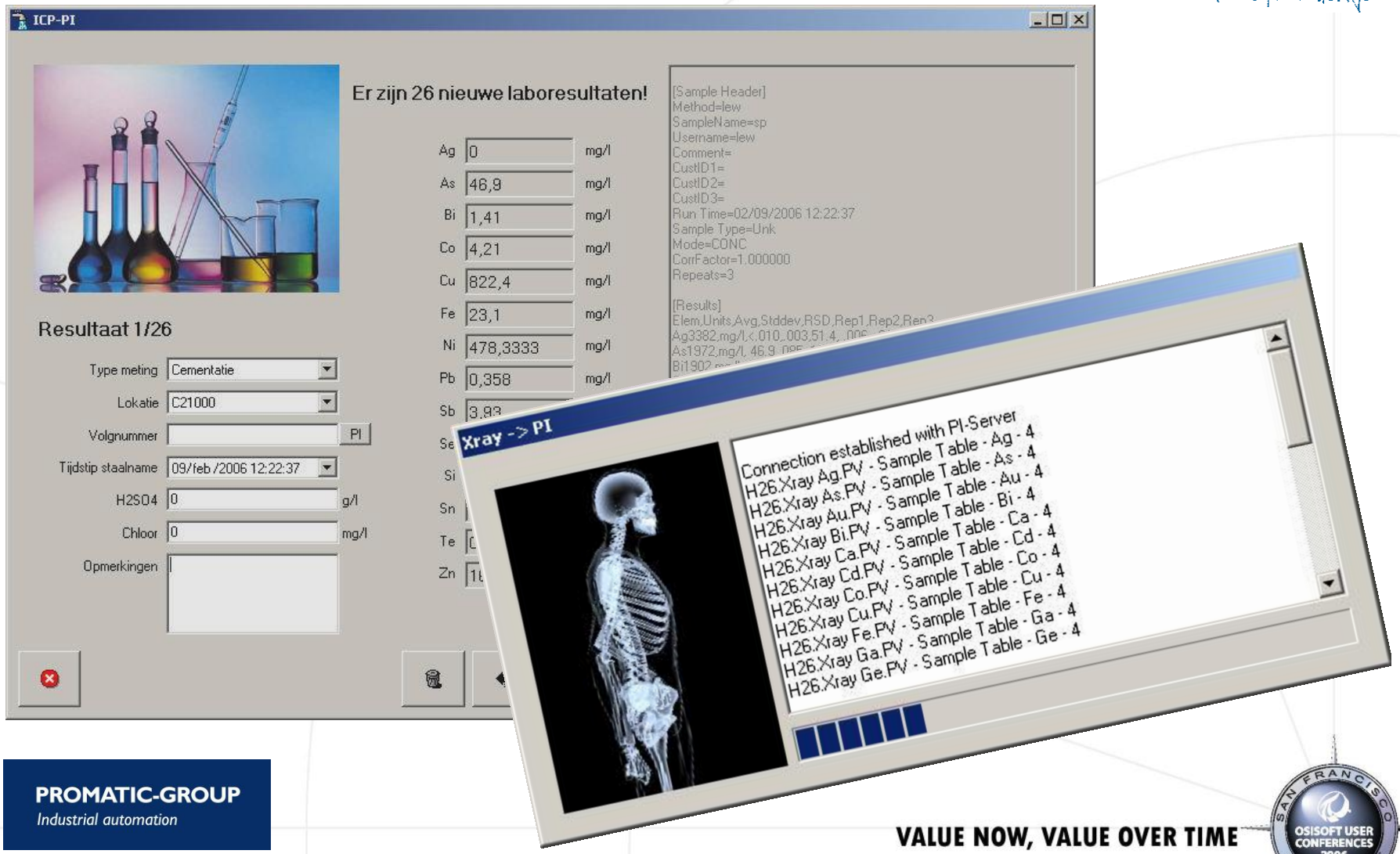
Gather Data & Events



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From Historian to RtPM

- Introducing OEE
- Stocks project => to determine Work In Progress automatically
- Daily Report on the intranet
- CSense => artificial intelligence (neural networks) to learn from the existing processes and to be able to adjust
- …

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Questions ?

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