Liberty Ostrava Automation via PI system

Presented by : Radim Lužný

LIBERTY Ostrava

Automation

Czech republic

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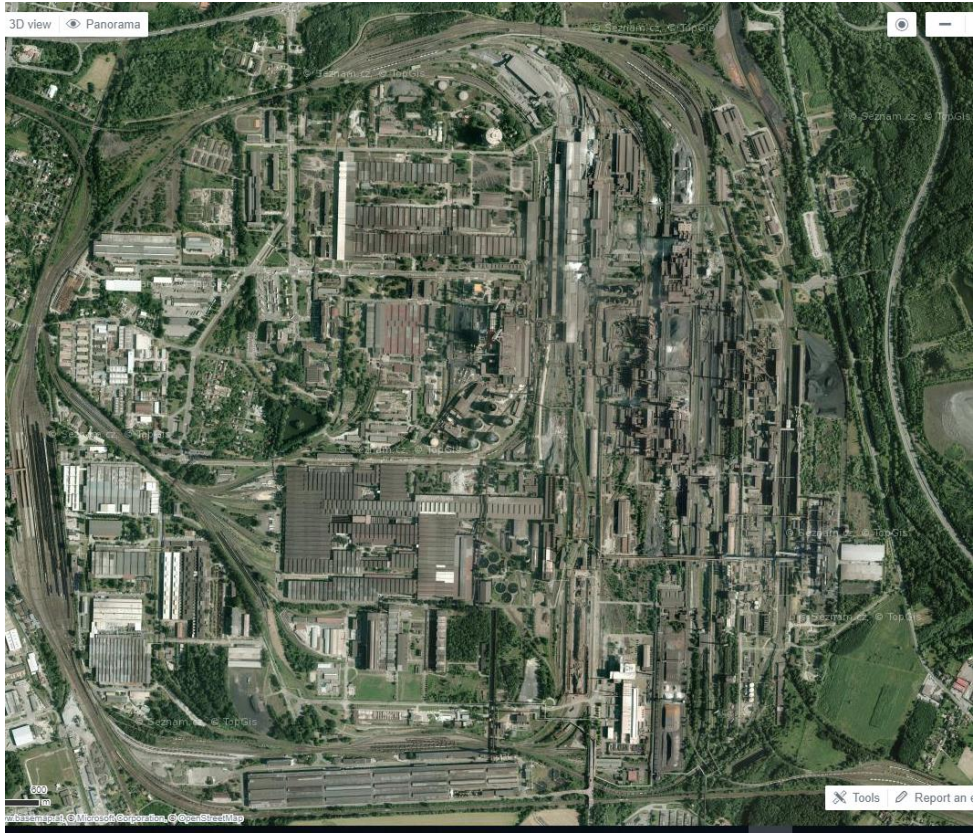
LIBERTY Ostrava introduction



PI system 1995

- Nová kuť Klementa Gottwalda (1950-1989)
- Nová huť (1989-2003)
- Ispat Nová huť (2003 -2005)
- Mittal Steel Ostrava (2005-2007)
- ArcelorMittal Ostrava (2007-2019)
- Liberty Ostrava (2019)

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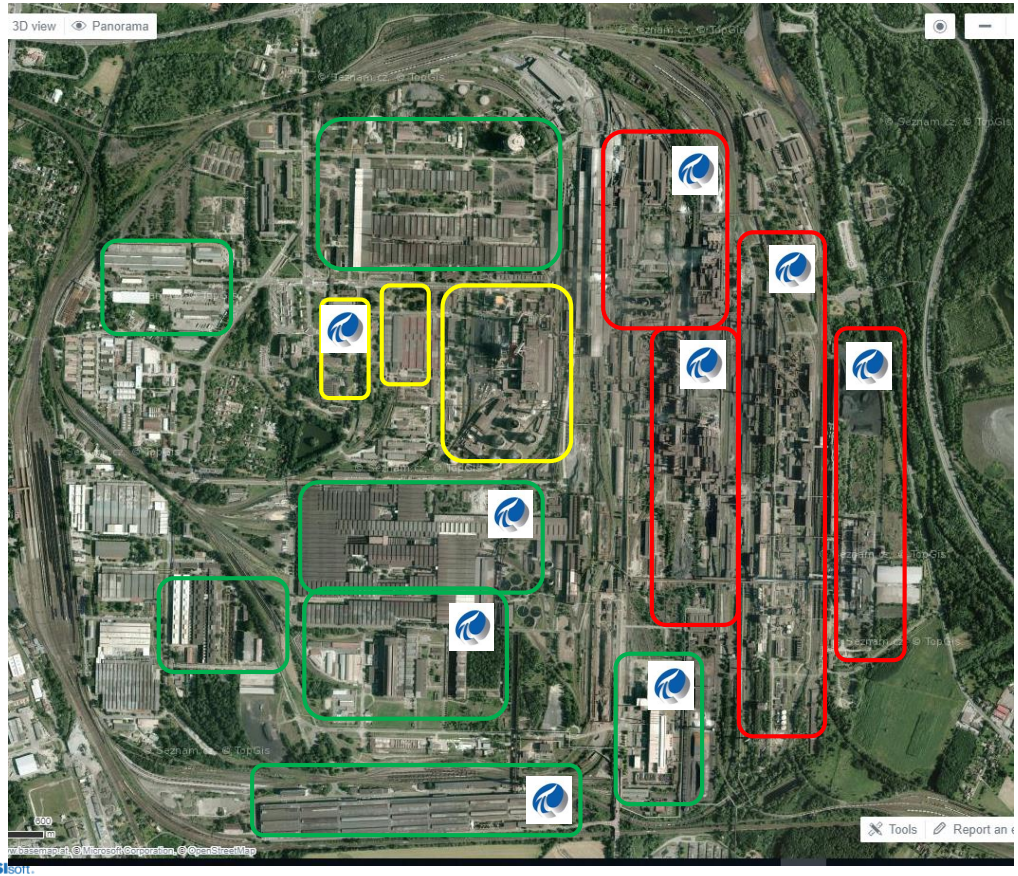
LIBERTY Ostrava – complex metallurgical process



Primary

- Coke plant
- Blast furnaces
- Steel plant

Services

- Power station
- Engineering products
- Labs

Secondary

- WR and HCC mill
- Middle section mill
- Flat products mill
- Cutting lines
- Tubulars
- Foundry
- Road barriers

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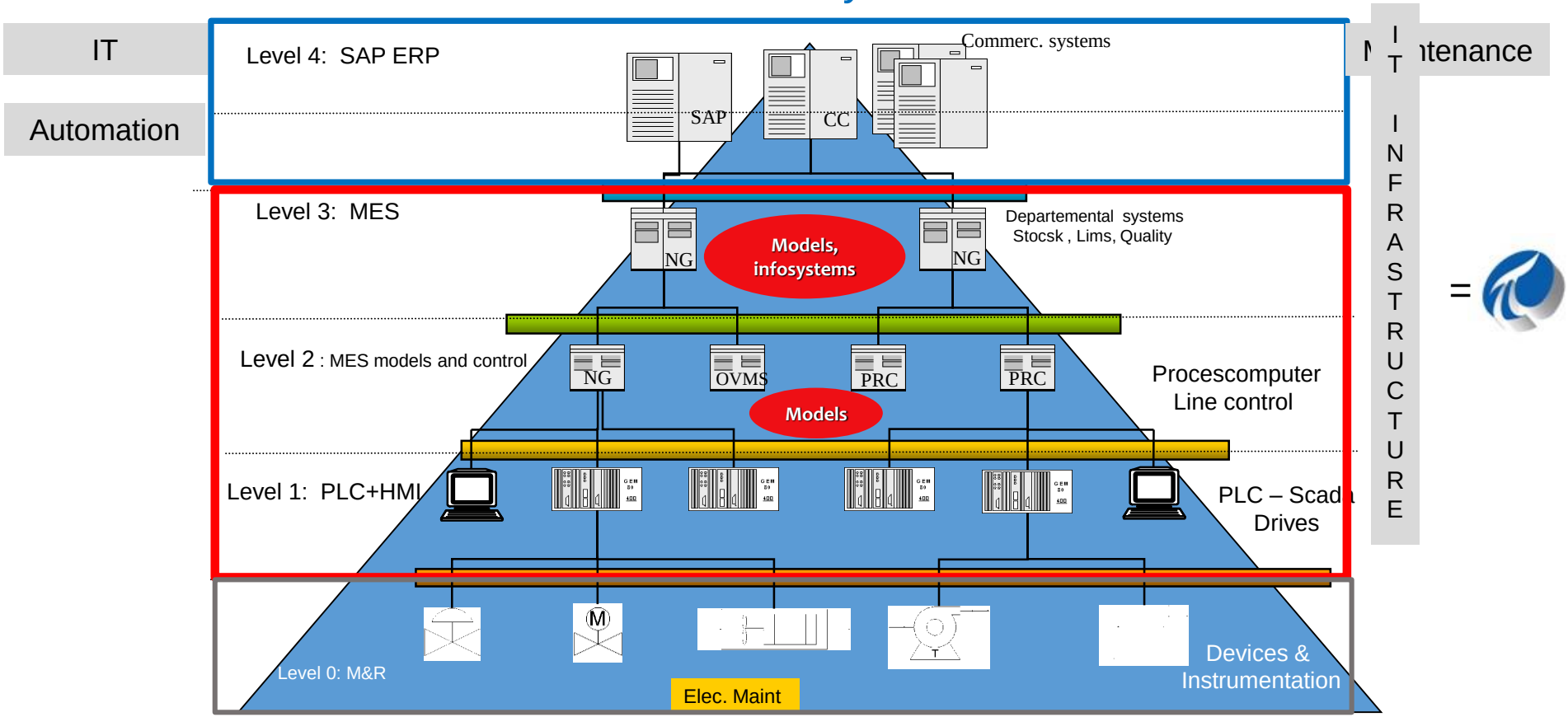
LIBERTY Ostrava information system's structure



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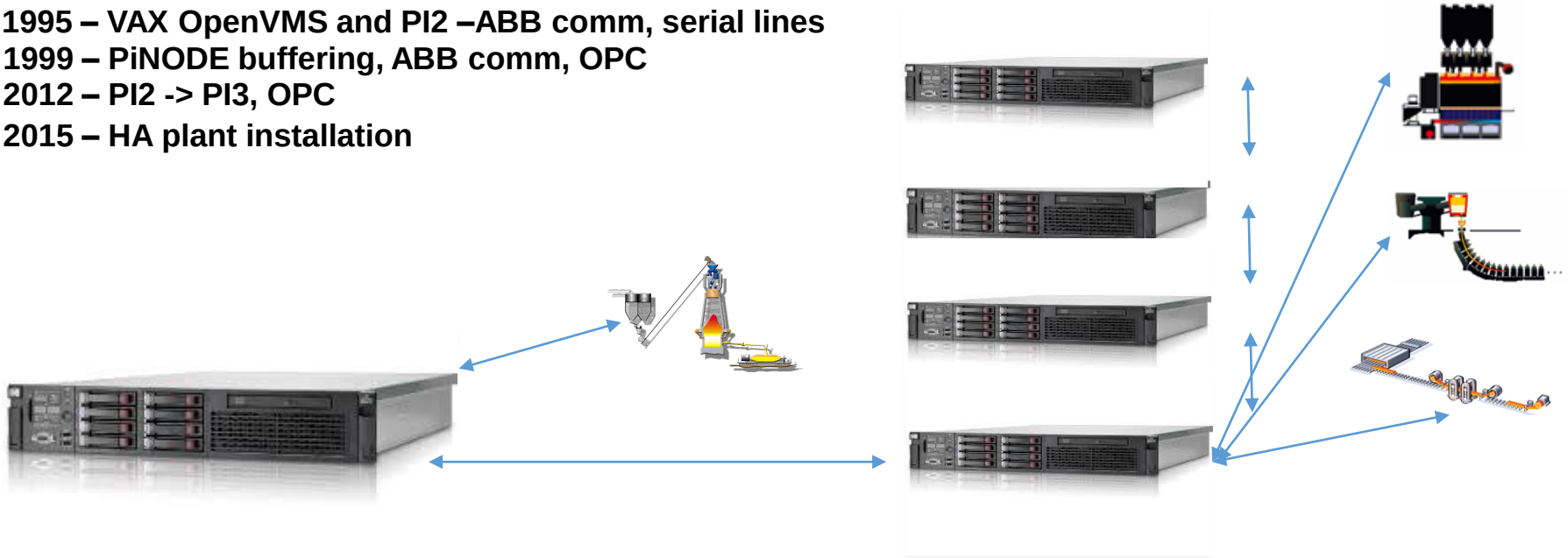
Ostrava‘s PI system history

1995 – VAX OpenVMS and PI2 –ABB comm, serial lines
1999 – PiNODE buffering, ABB comm, OPC
2012 – PI2 -> PI3, OPC
2015 – HA plant installation



The communications with others systems (labs, environmental systems) followed described changes

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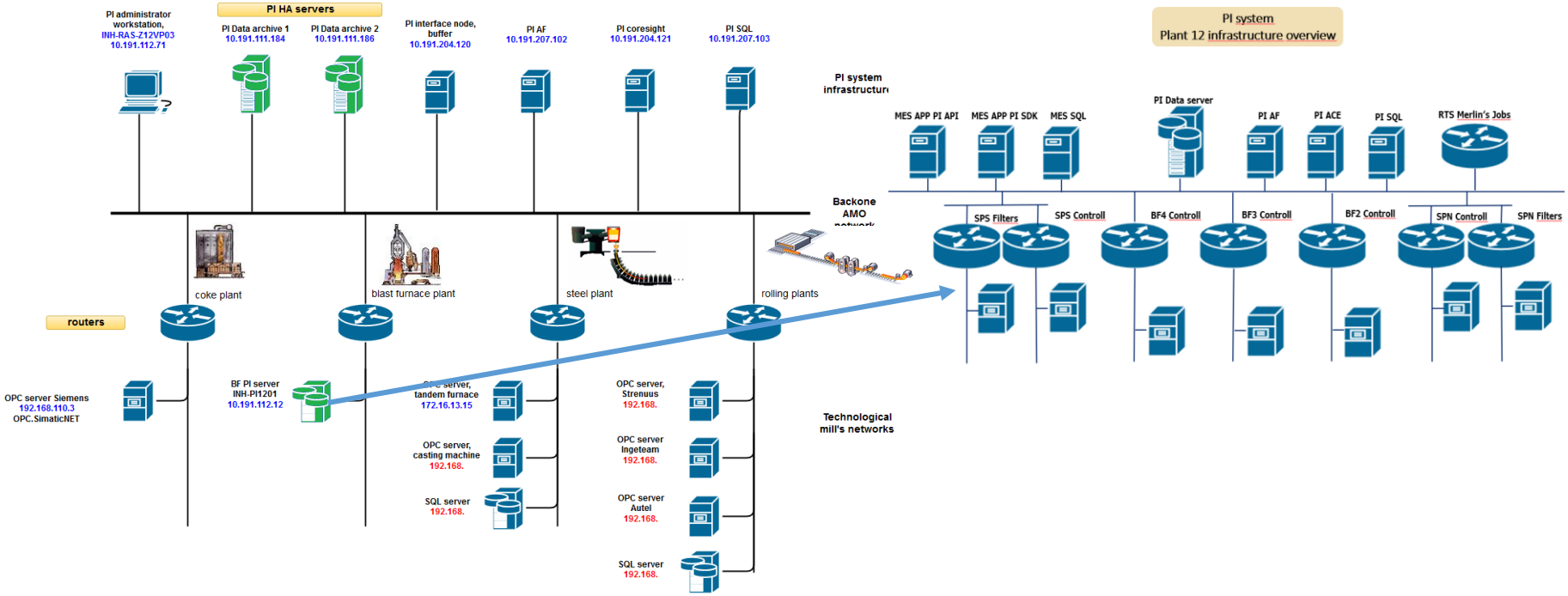
Current PI infrastructure

PI system infrastructure overview



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PI and Blast Furnaces

General overview

- On-line information of root process parameters

Production

- Taps information
- Pig iron circulation to Steelwork

Quality

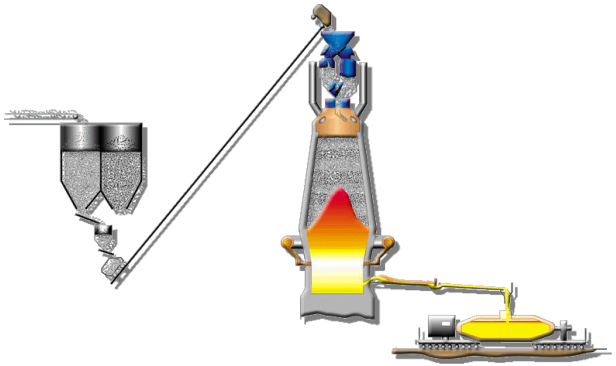
- Analyses communication
- Burden calculation – after on-line data exchange and archive for benchmarking the quality increase about 15 %

Consumption

- Data of materials and their consumption

Technological data

- The PI archive was used for insurance company to explain insured accident – saving about 4 M€
- Sources for BF models



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PI and Blast Furnaces

CUSTOMER STORY

CHALLENGES

- **Real time information not only on L1 platform**
  - **Data and communication**
- **Data sources for 3th party application**
  - **Automation of processes**

SOLUTION

- **PI infrastructure, PC and mobile application**
- **PI system**
- **Internal develop using PI infrastructure**
- **Internal application based on PI system**

BENEFITS

- **Full control and easy decisions of changes in production**
- **Best evidence in problematic cases (f.e. insurance cases), FG quality increasing about 15%**
- **Cost saving**
- **Cost and FTE saving**

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PI and Blast Furnaces general overview

The basic overview of BF blowing and gas parameters

Consumption information from SQL database

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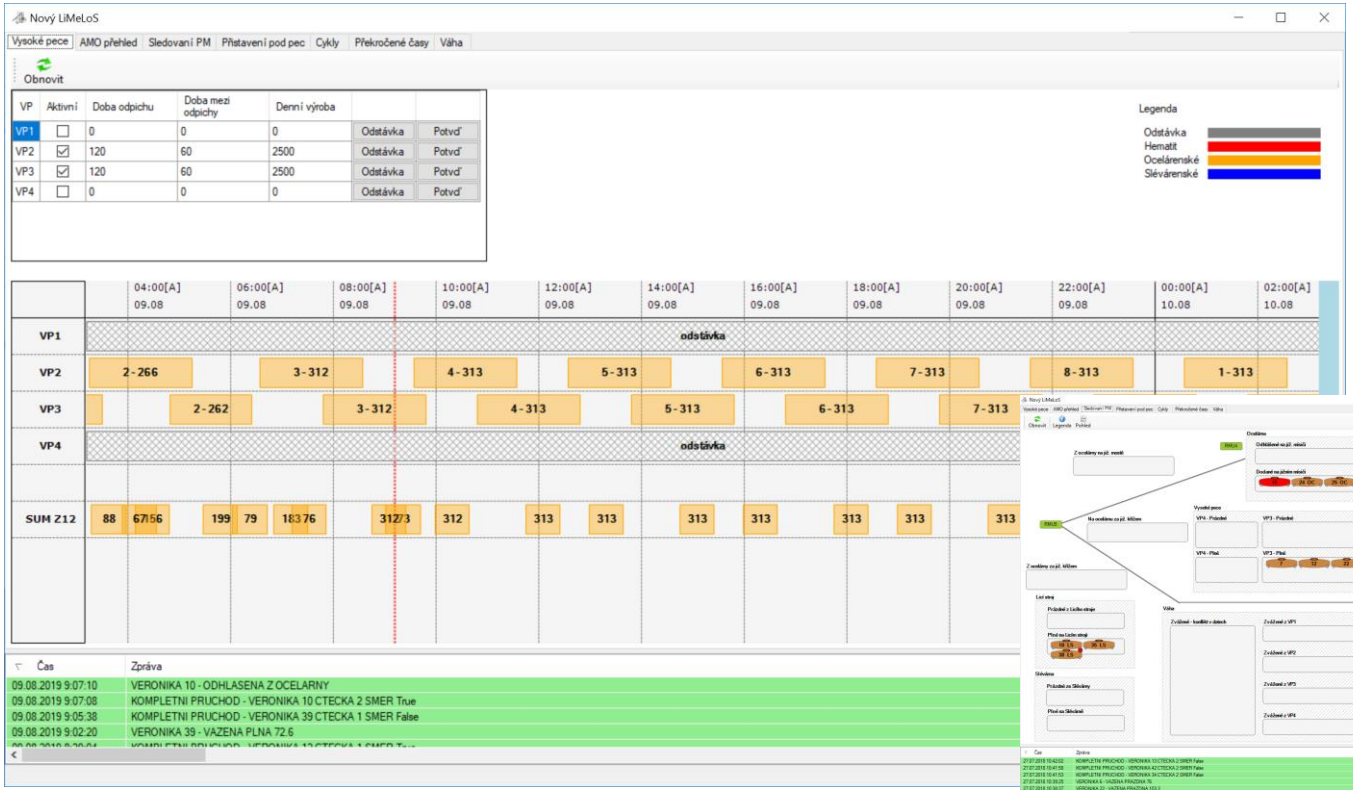
PI and Blast Furnaces - Production



Taps calculation
model based on PI information of taps and production

Torpedo monitoring system LiMeLoS

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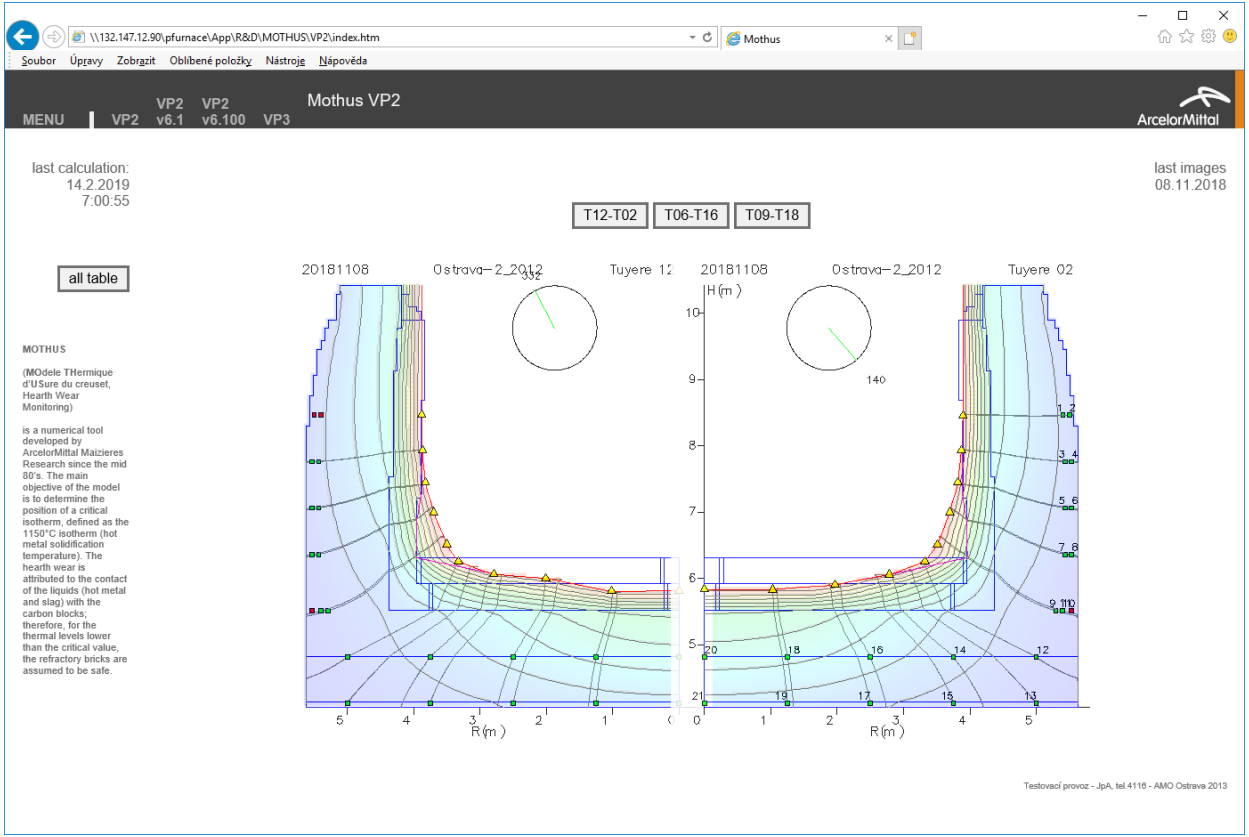
PI and Blast Furnaces - models



Hearth status calculation – model Mothus – based on PI temperature data

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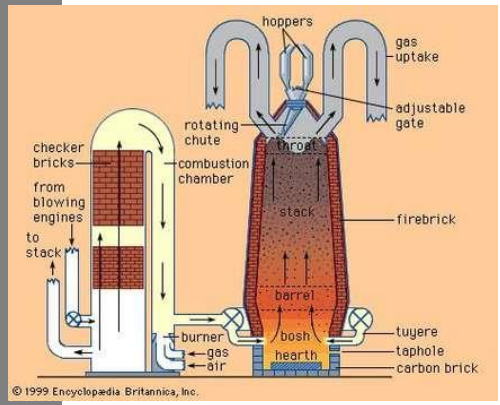
PI and Blast Furnaces - models

Stoves efficiency calculation



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PI and Maintenance

General idea – preventive and predictive maintenance

Preventive maintenance systems - CbM

- Lubrication of devices
  - Evaluation of necessity of lubrication
  - The logic is implemented directly in PI

Predictive maintenance

- Vibra-diagnostic systems

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PI and Maintenance

CUSTOMER STORY

CHALLENGES	SOLUTION	BENEFITS
▪ Automatic decision system for CbM	▪ **Internal app develop based on PI system**	▪ **FTE saving, avoid mistakes in process, H&S increasing**
▪ Event and alarm system for preventive maintenance	▪ **PI system data and triggers to application**	▪ **Avoid loses in production approx 10%**
▪ Predictive maintenance	▪ **Predicative system based on PI**	▪ **Just in progress**

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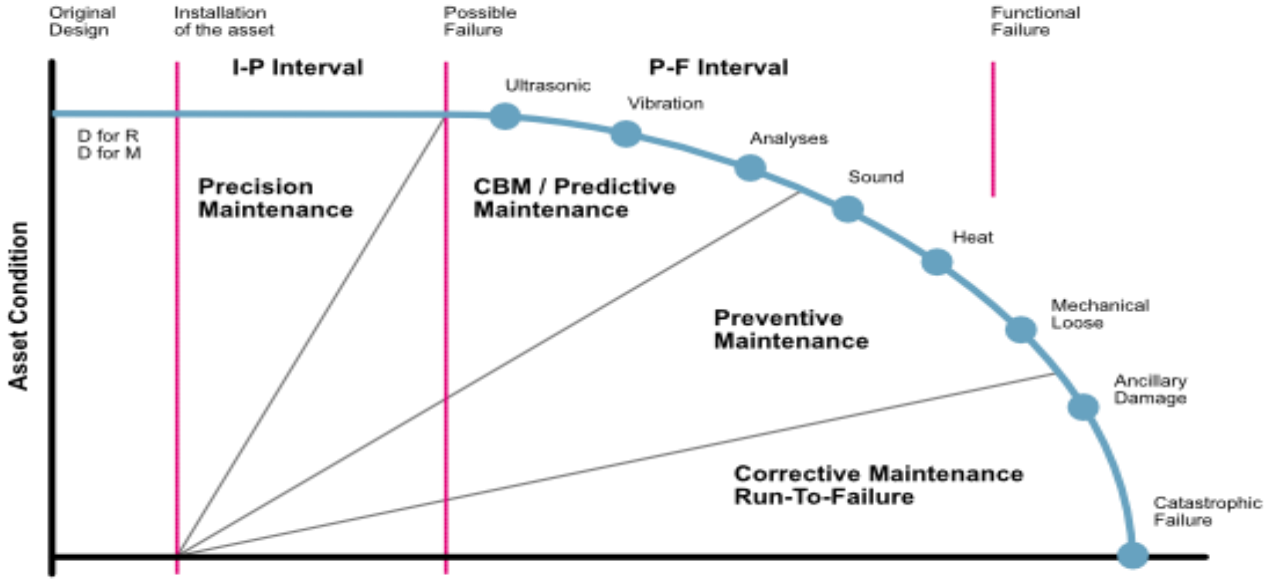
PI and Maintenance – general maintenance overview



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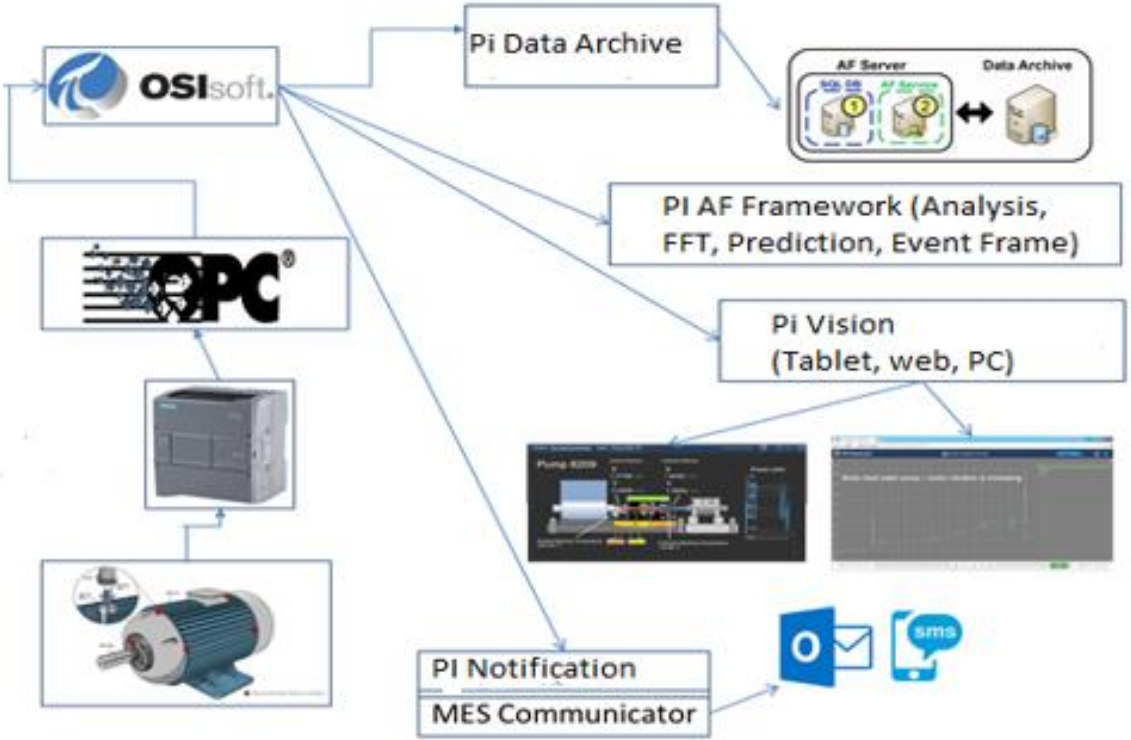
PI and Maintenance – CbM - Lubrication of devices



Realisation of data flow

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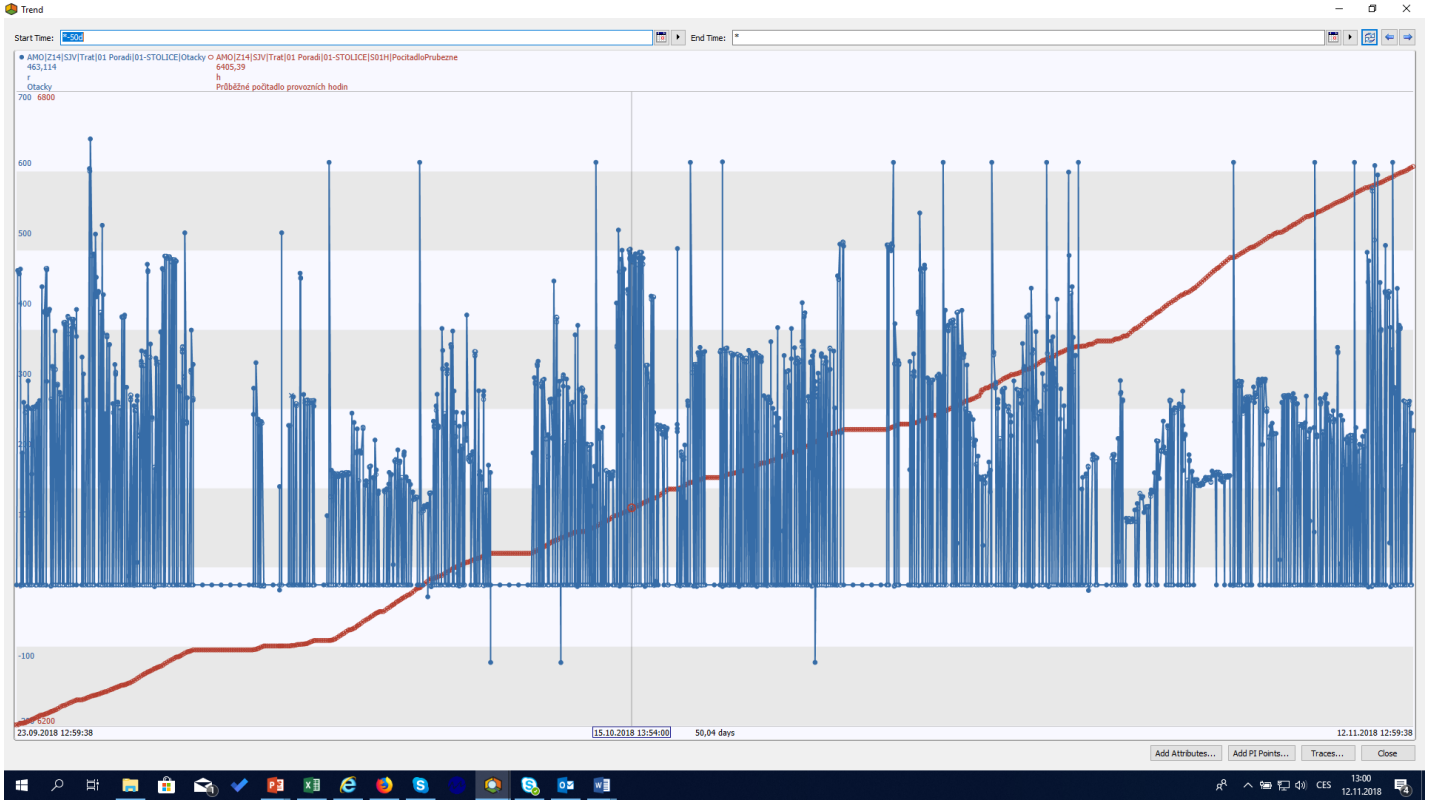
PI and Maintenance – CbM - Lubrication of devices



Working time calculation

Based of electric current or engine spin the working time is calculated (red line)

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PI and Maintenance – CbM - Lubrication of devices

Base data

Working time between lubrication

Total working time

Reset after lubrication

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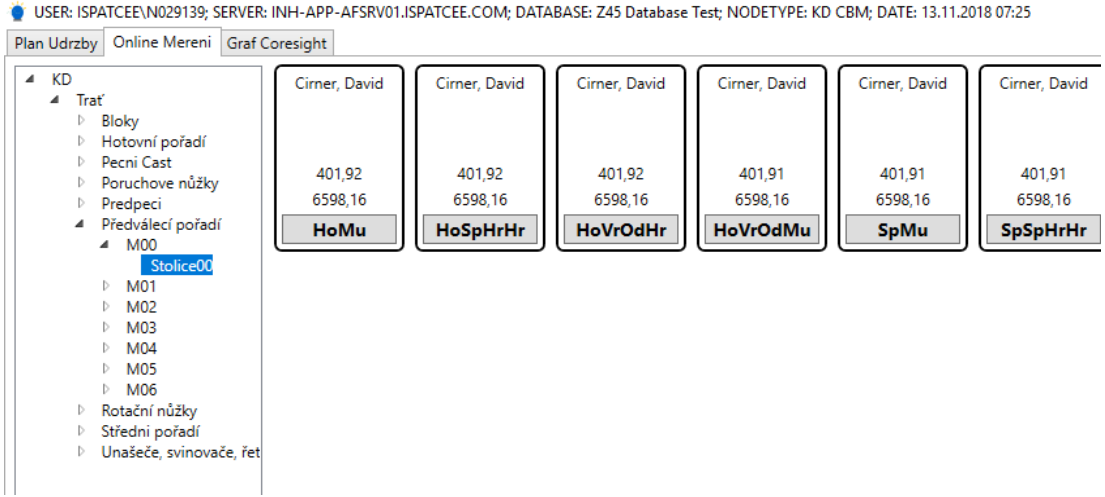
PI and Maintenance – CbM – application for WR mill

USER: ISPATCEE\N029139; SERVER: INH-APP-AFSRV01.ISPATCEE.COM; DATABASE: Z45 Database Test; NODETYPE: KD CBM; DATE: 13.11.2018 07:25

Plan Udrzby | Online Mereni | Graf Coresight

Zařízení	Kód zařízení	Popis zařízení	Interval údržby	Čas do údržby/hod	Status
Stolice08	ZuSpPr	Zubová spojka prostřední	2000	-236.86	NUTNE NAMAZAT
Stolice09	ZuSpPr	Zubová spojka prostřední	2000	-236.86	NUTNE NAMAZAT
Stolice08	ZuSpRo	Zubová spojka rozvodovka	2000	-236.86	NUTNE NAMAZAT
Stolice09	ZuSpRo	Zubová spojka rozvodovka	2000	-236.86	NUTNE NAMAZAT
Stolice12	ZuSpPr	Zubová spojka prostřední	2000	-236.15	NUTNE NAMAZAT
Stolice10	ZuSpPr	Zubová spojka prostřední	2000	-236.15	NUTNE NAMAZAT
Stolice11	ZuSpPr	Zubová spojka prostřední	2000	-236.15	NUTNE NAMAZAT
Stolice13	ZuSpPr	Zubová spojka prostřední	2000	-236.15	NUTNE NAMAZAT
Stolice12	ZuSpRo	Zubová spojka rozvodovka	2000	-236.15	NUTNE NAMAZAT
Stolice10	ZuSpRo	Zubová spojka rozvodovka	2000	-236.15	NUTNE NAMAZAT
Stolice11	ZuSpRo	Zubová spojka rozvodovka	2000	-236.15	NUTNE NAMAZAT
Stolice13	ZuSpRo	Zubová spojka rozvodovka	2000	-236.15	NUTNE NAMAZAT
KorytoVytlacky	KorVal	Koryto válečky	168	-52.47	NUTNE NAMAZAT
Pohon	SpoBrzVal	Spojky brzdových válečků	168	-52.39	NUTNE NAMAZAT



TrhaciNuzkyZilaA - Ložiska nožové hlavy

INFORMACE

Čas celkový/Čas od údržby :	1951,18 hod	142,38 hod
Kód údržby/Time Stamp :	1	24.10.2018 10:04
Poslední údržbu zadal/Time Stamp :	Cirner, David	24.10.2018 10:04

VLOZENI

Zadej inspekční data: Peterek, Tomas | 13.11.2018 | 07 : 35 | ULOŽ

HISTORIE

Čas mezi údržbou

Začátek	Konec	Č. inspekce	Insp. zadal
24.10.2018 10:04		1	Cirner, David
24.10.2018 10:04		1	Cirner, David
13.06.2018 11:08	19.06.2018 08:15	0	Janouch, Marek
13.06.2018 11:08	19.06.2018 08:15	0	Peterek, Tomas
16.05.2018 09:41	13.06.2018 11:08	3	Cannot convert 'Peterek, Tomas' to type D

Čekání na údržbu

Začátek	Konec	Č. inspekce
14.05.2018 20:50	15.05.2018 09:44	0

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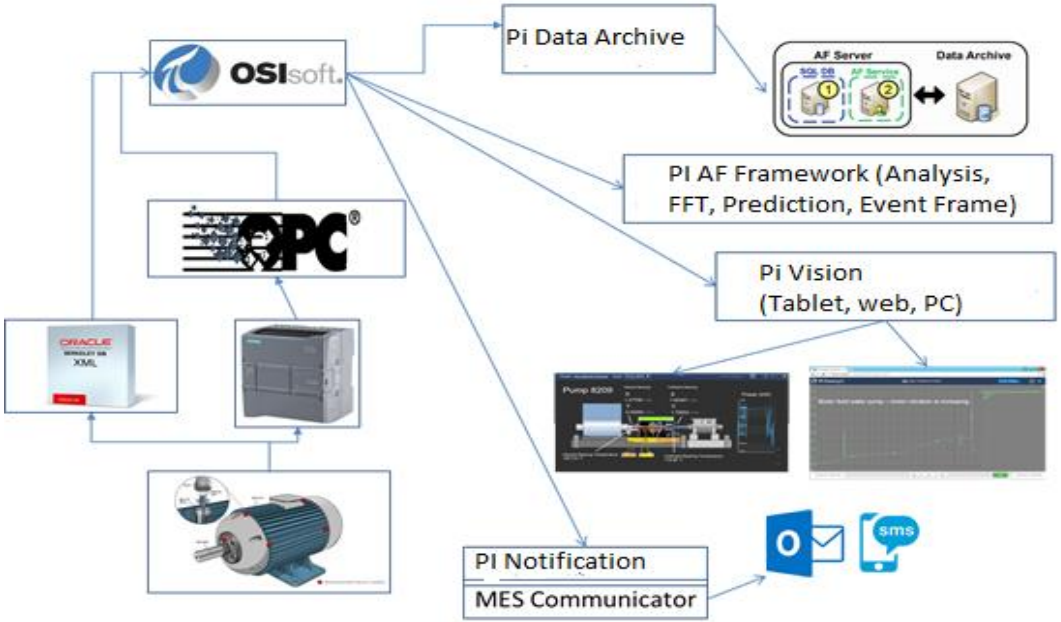
PI and Maintenance – predictive maintenance



Current status

Just basic processing of vibro-data

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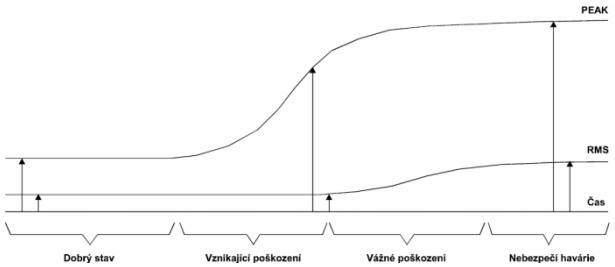
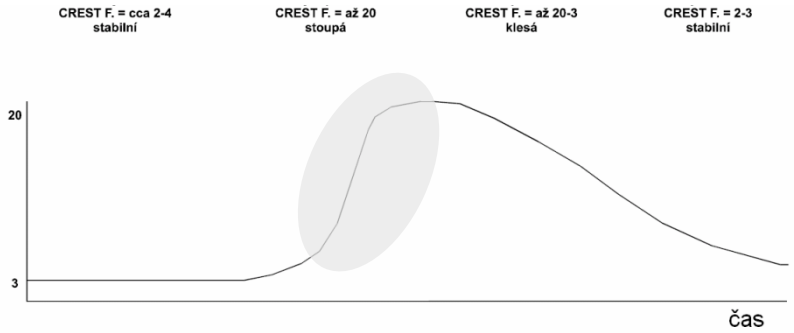
PI and Maintenance – predictive maintenance





CREST factor

Rate between PEAK and RMS of vibration. Easy and simple method for problem detection

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Plans to future

Merge of PI systems

- Merge BF PI system and Plant PI system to one system
- Increase tags amount
- Consolidate develop platforms

Increase and finalise CbM

- Support all production plants
- Consolidate all frameworks

Create platform for predictive maintenance

- Cooperation with external suppliers using PI platform

Support models platform form Steelwork and Continual casting process

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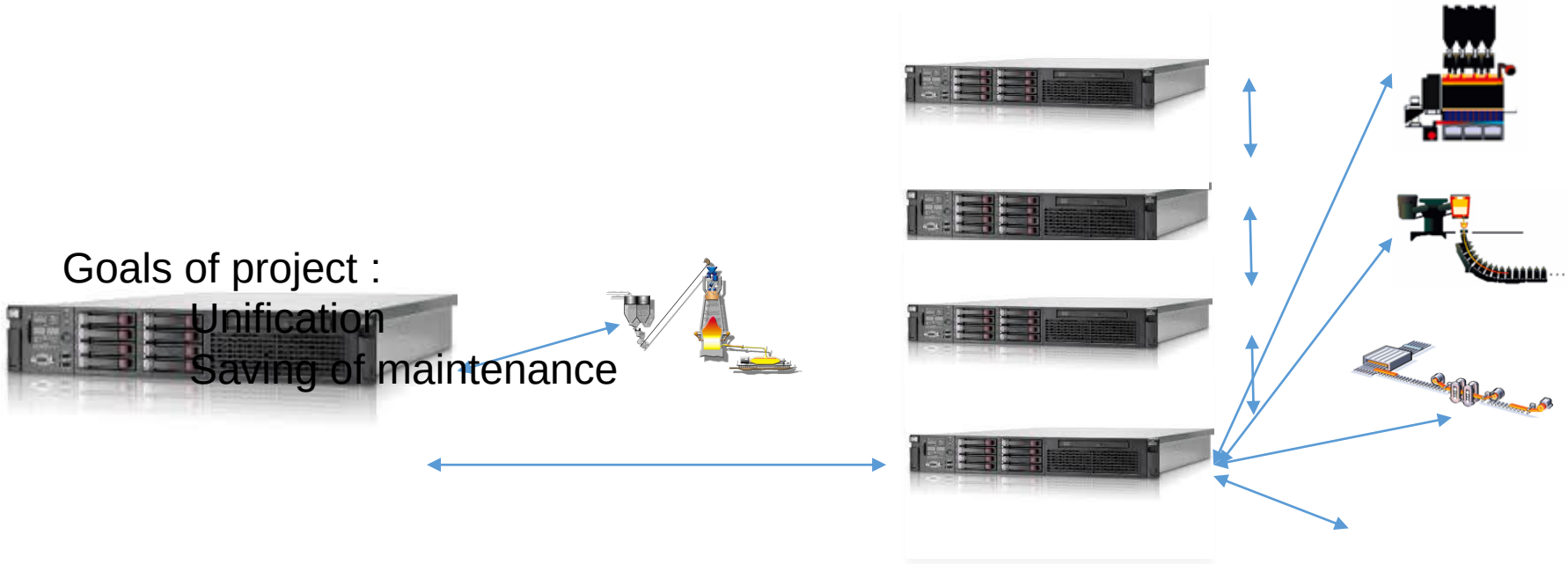
Plans to future - Merge of PI systems

Goals of project :

Unification

Saving of maintenance



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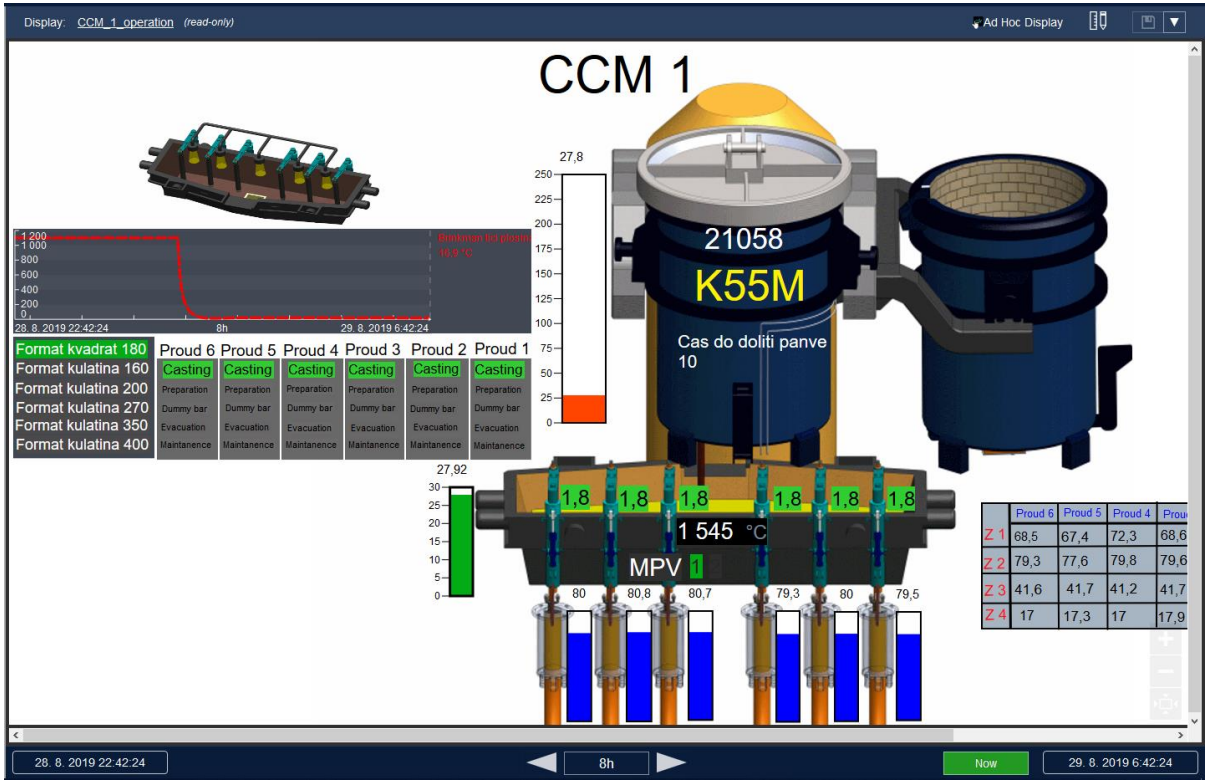
Plans to future – Steel work models support



Continue casting process via PI system

Currently we have data from casting process ready for models related to :

- Billet length optimizing
- Casting ladle temperature prediction

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Questions?

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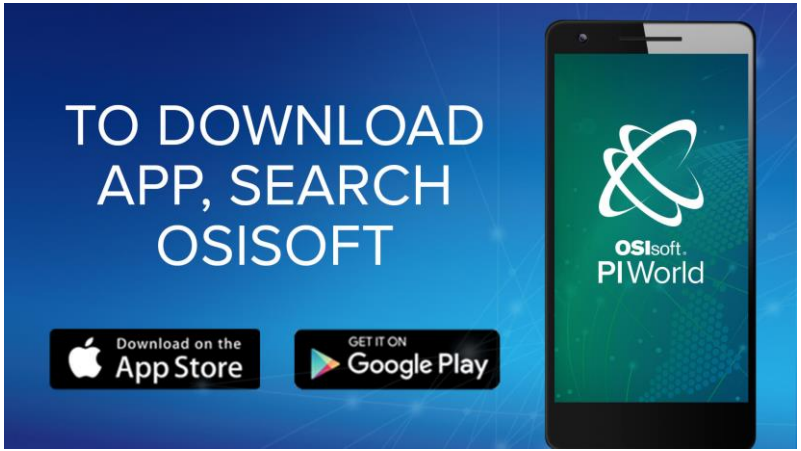
State your **name & company**

Please remember to…

Complete Survey!

Navigate to this session in mobile agenda for survey



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