MOL Integrated Production Optimization at INA d.d. Upstream supported by OSIsoft PI System

Presented by: Boris Žeželj

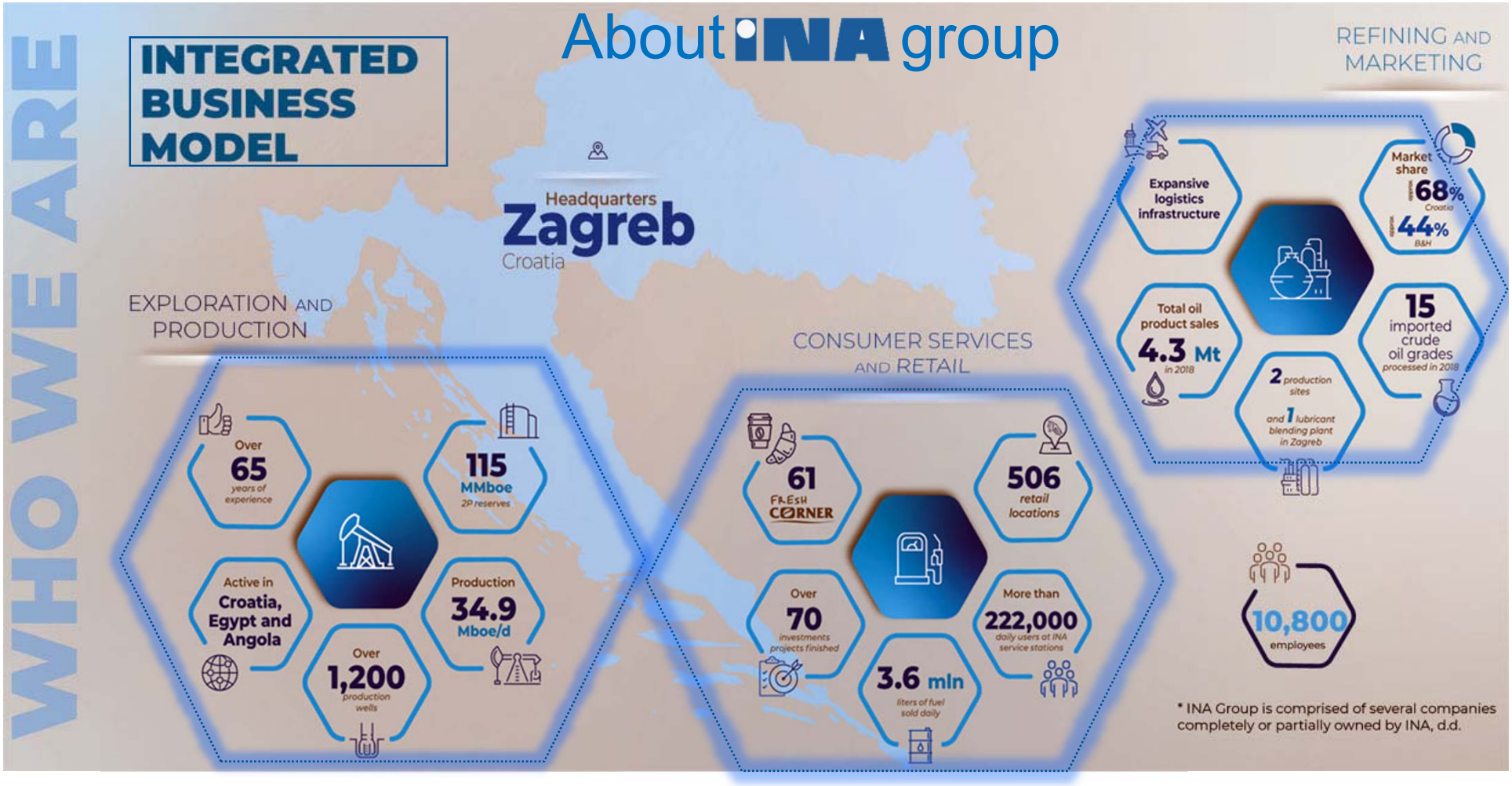
Agenda

- About Company
  - MOL group at a glance
  - About INA group
  - INA Upstream business (short review)
- Business & Implementation Challenges
- Application of the PI System
- Ease of Expansion
- Implementation Details
- PI Vision User Experience
- Results Obtained and Business Impact
- Conclusion

Group at a glance

- MOL GROUP IS AN INTEGRATED, INTERNATIONAL OIL AND GAS COMPANY, HEADQUARTERED IN BUDAPEST, HUNGARY
- ACTIVE IN OVER 30 COUNTRIES
- INTERNATIONAL WORKFORCE OF OVER 25,000 PEOPLE
- TRACK RECORD OF MORE THAN 100 YEARS IN THE INDUSTRY
- 4 REFINERIES, 2 PETROCHEM PLANTS
- LOGISTICS INCLUDING 2,000 RETAIL STATIONS

About INA group

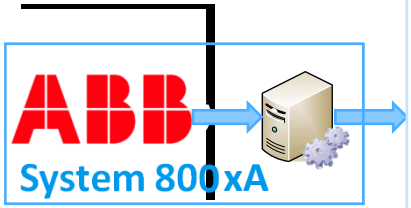


THE BEST OF INA UPSTREAM

- **E&P made the largest cash contribution to the INA Group**
- **Acquisition of North Adriatic assets increased 2P reserves and opened up field development opportunities**
- **Fifth consecutive year of domestic oil production increase on existing assets**
- **91 capital well workovers were performed in 2018**

Business Challenge

To ensure **continous and secure data flow** from oil fields to business oriented expert systems for modeling, optimization and diagnostics engine of the production system thus achieving **higher engineering efficiency along with improved analytics** in considerably shorter time.



INA Upstream requested a 90-day Try & Buy PI System from OSIsoft.

PI System installation:

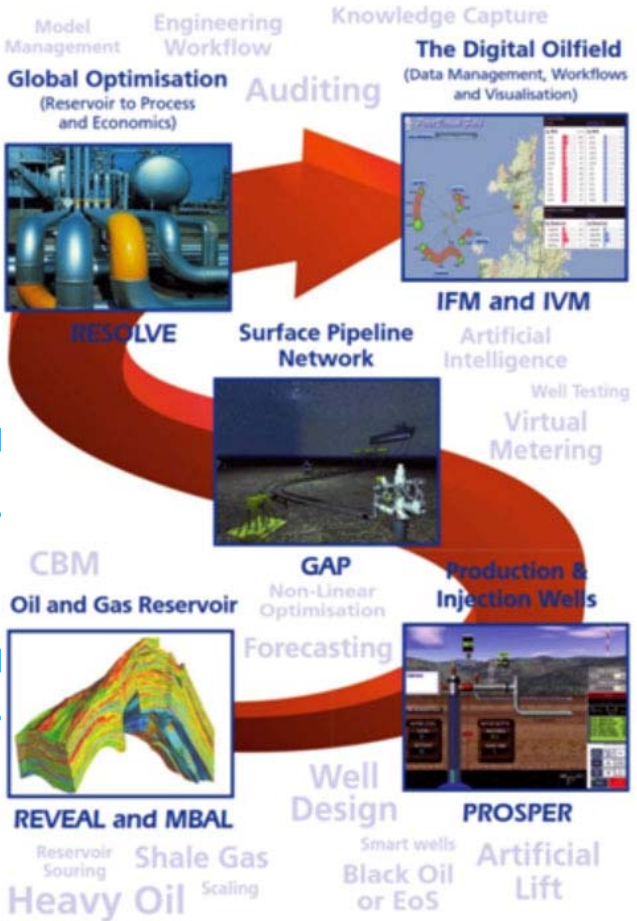
- 10,000 PI Tags,
- Up to 3 interfaces,
- 10 PI Vision clients

OSIsoft Try & Buy PI System can be converted to a production deployment without reinstallation.

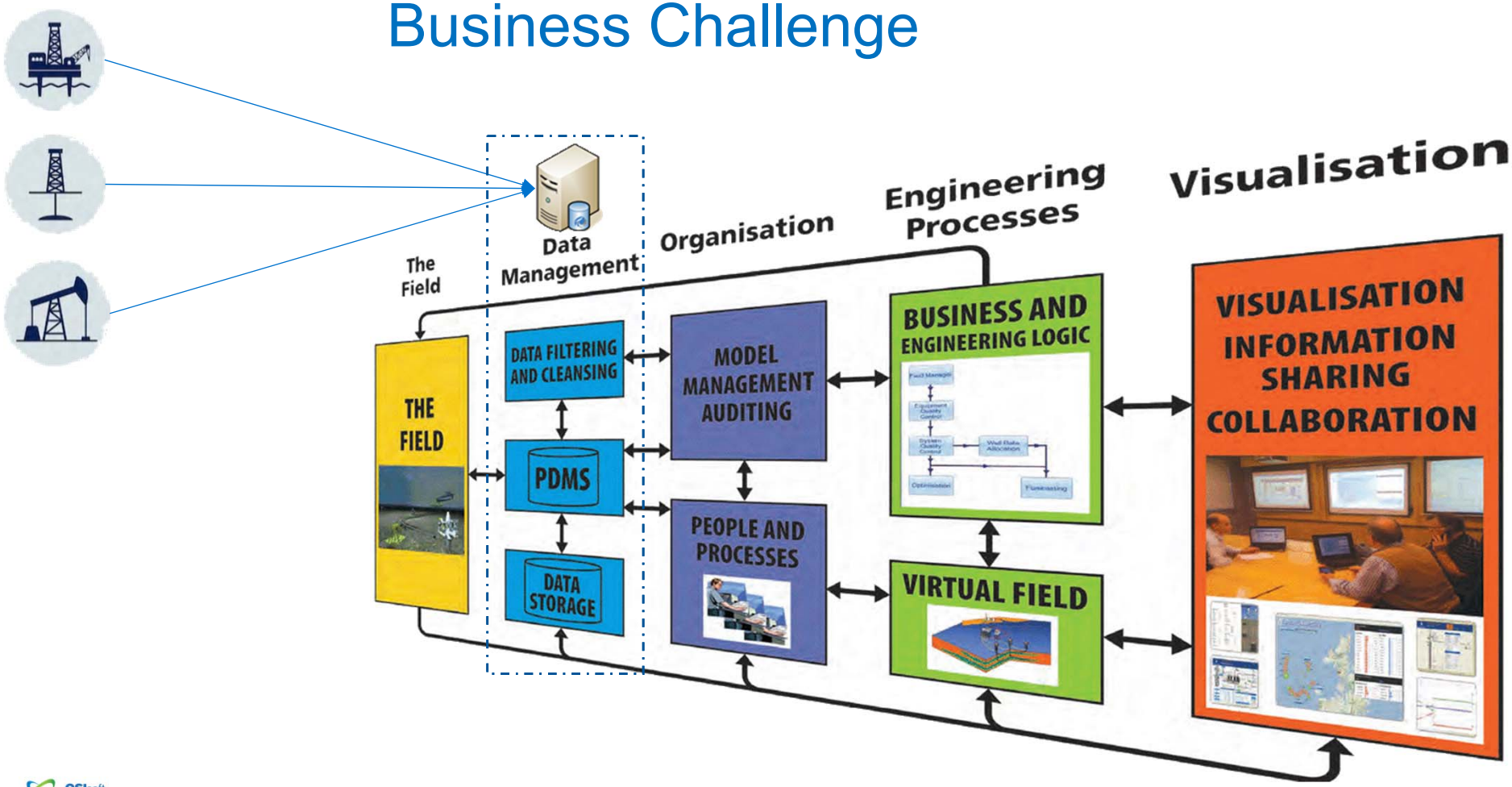
FROM OIL FIELD

OSIsoft.

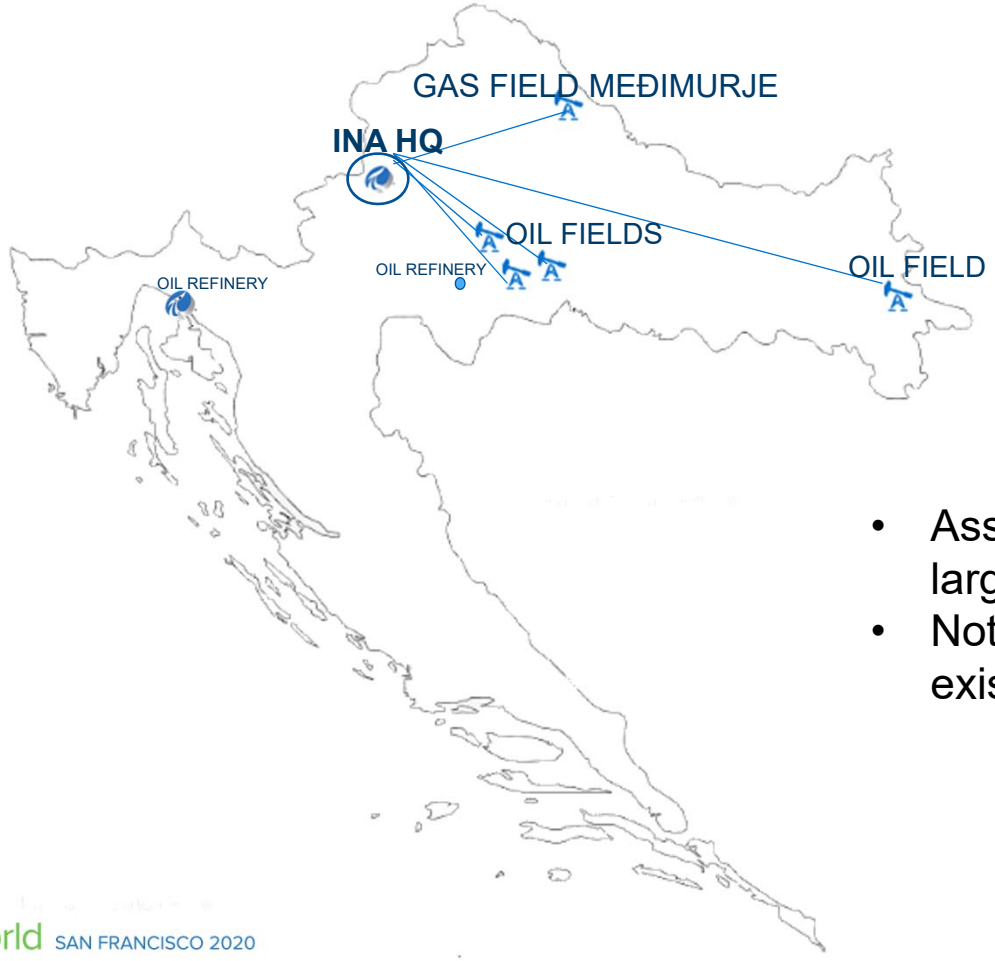
TO DIGITAL OIL FIELD



Business Challenge



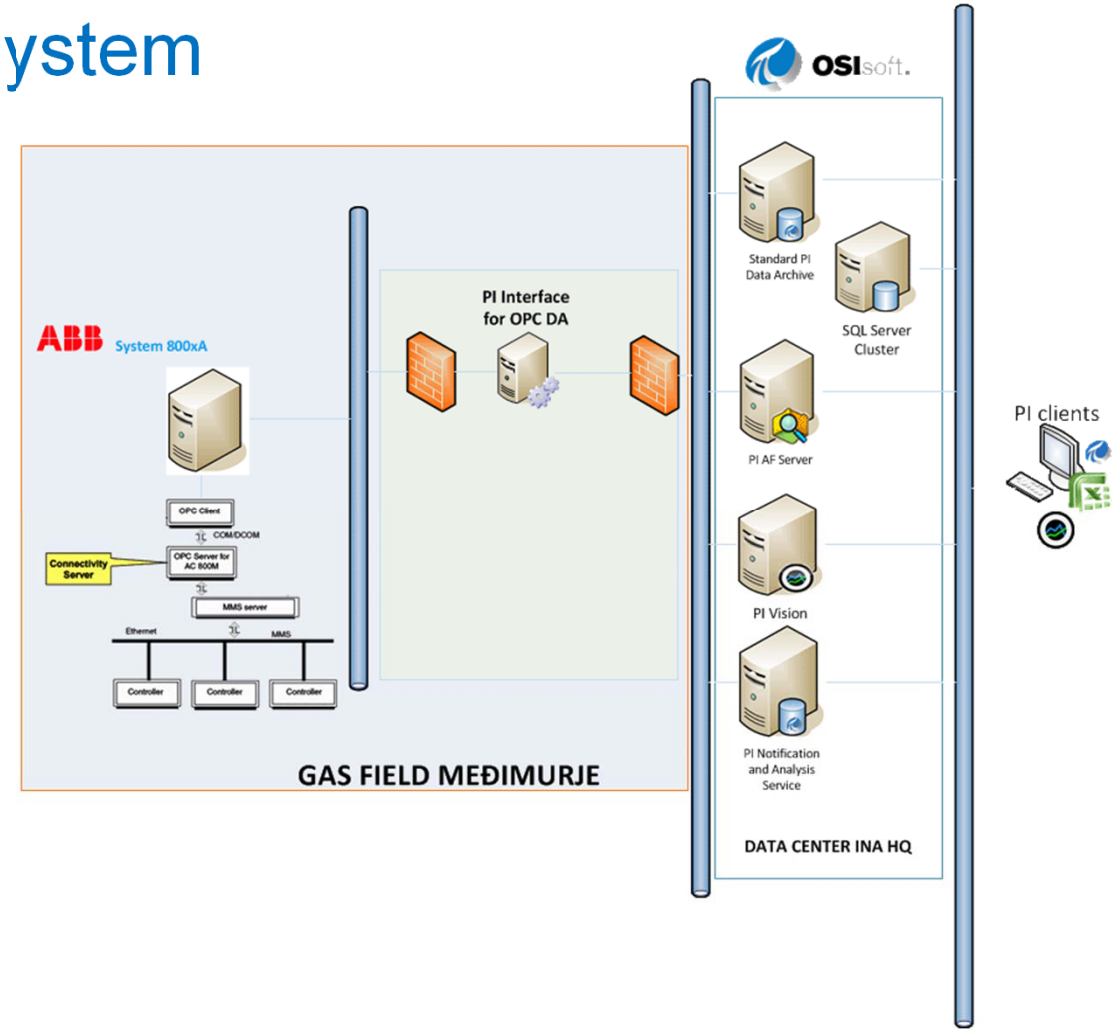
Implementation Challenges



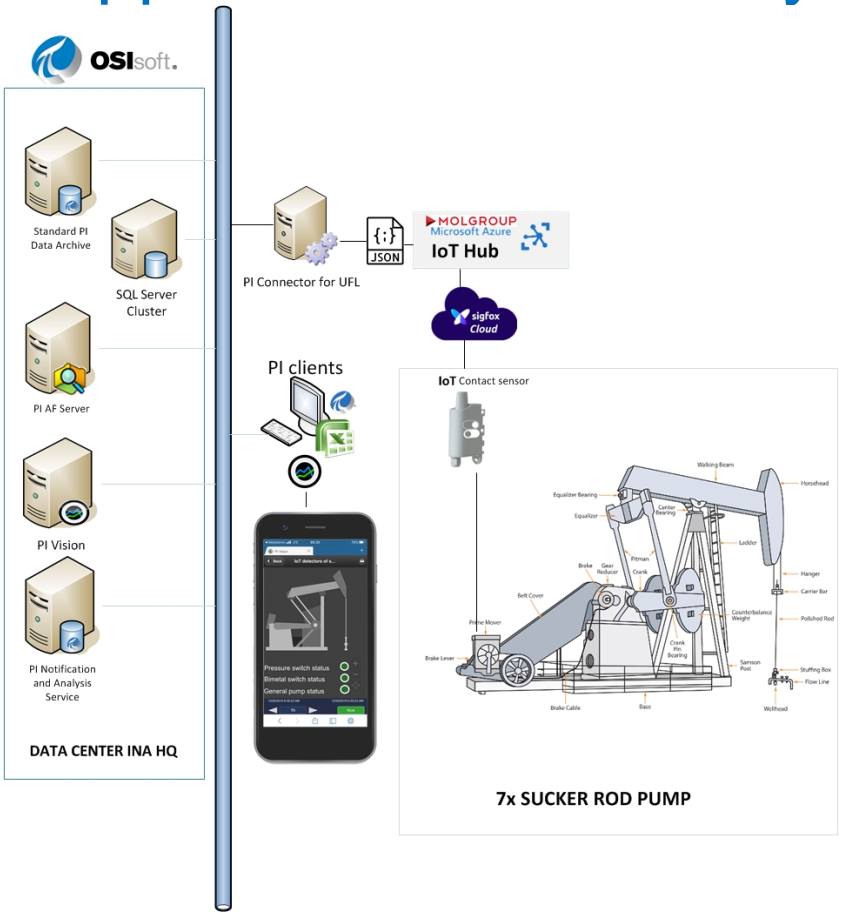
- Assets are distributed across a large geography
- Not all equipment is connected to existing SCADA systems

Application of the PI System

- Medjimurje cluster field is selected for PI System pilot project due to relatively lower complexity of production systems (5 gas producing wells, 1 water disposal injection well).
- Existing well surveillance system is connected to local SCADA (wellhead pressures, temperatures and production rates) with associated Integrated Production Modeling which is updated twice per year.



Application of the PI System

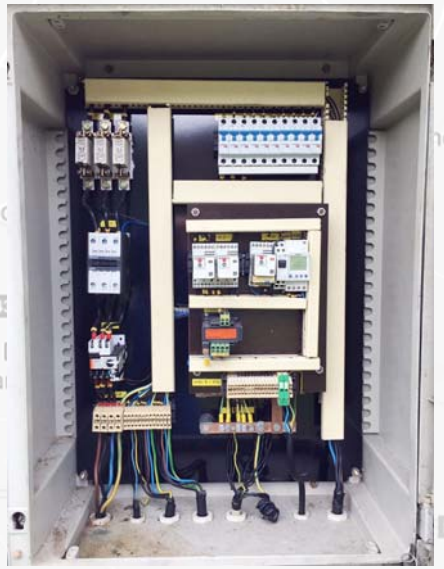


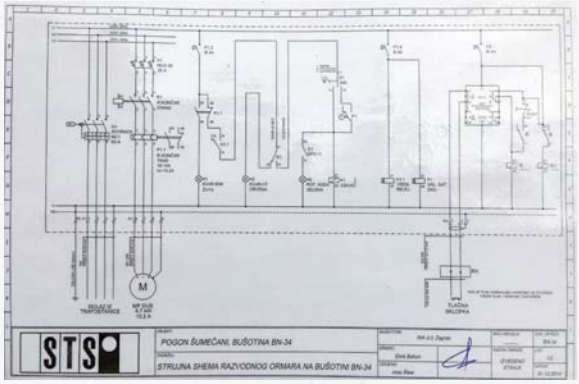
IOT Devices Enabled: In parallel to the PI System proof of concept deployment, IoT devices were installed for sucker rod monitoring.

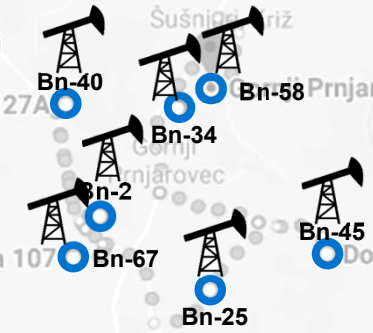
Solution enables engineers to remotely monitor sucker rod pump equipment on mobile device **PI Vision** screen:

- **General pump status,**
- **pressure switch** (detecting pump failure caused by abnormally high pressure in the connecting pipeline),
- **bimetal switch** (detecting pump failure due to pump pulling abnormally high current)

Application of the PI System



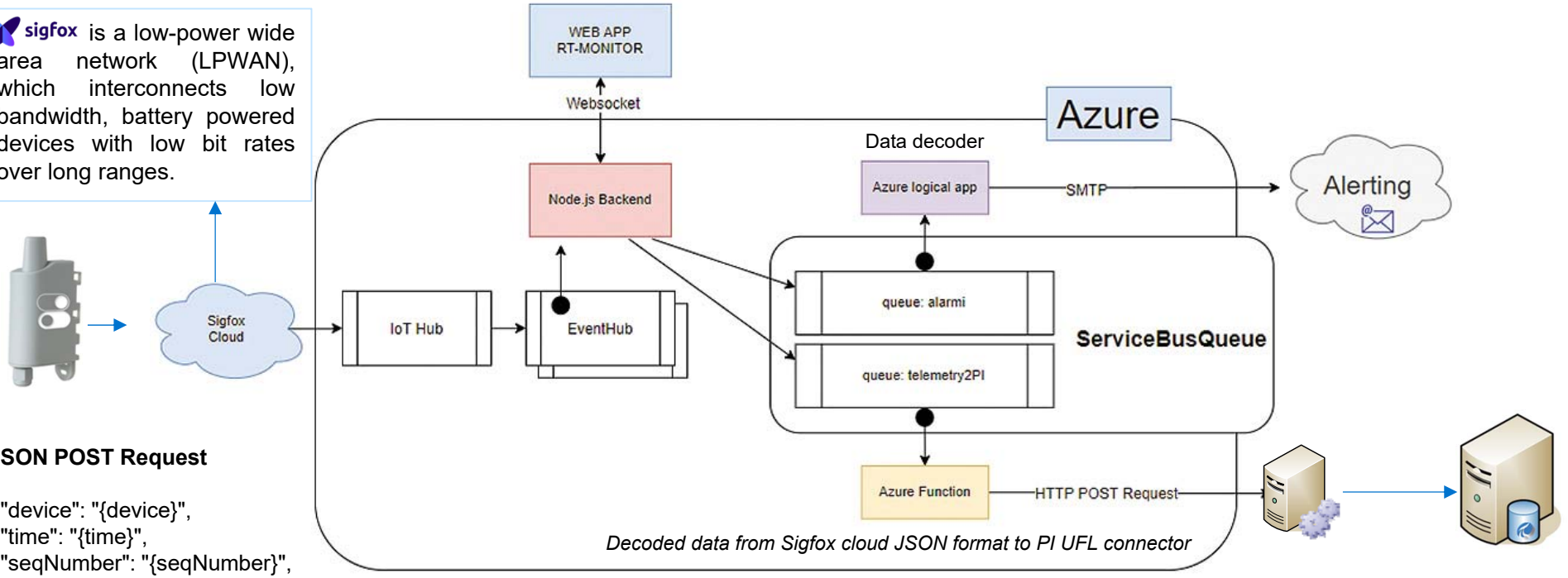




Bn-40	45°41'09.56"N, 16°30'54.40"E
Bn-2	45°40'38.65"N, 16°31'07.92"E
Bn-67	45°40'26.83"N, 16°30'56.99"E
Bn-25	45°40'17.95"N, 16°31'51.31"E
Bn-45	45°40'28.01"N, 16°32'38.21"E
Bn-34	45°41'08.70"N, 16°31'38.57"E
Bn-58	45°41'14.40"N, 16°31'52.26"E

Application of the PI System (Sigfox Cloud to AZURE IoT HUB)

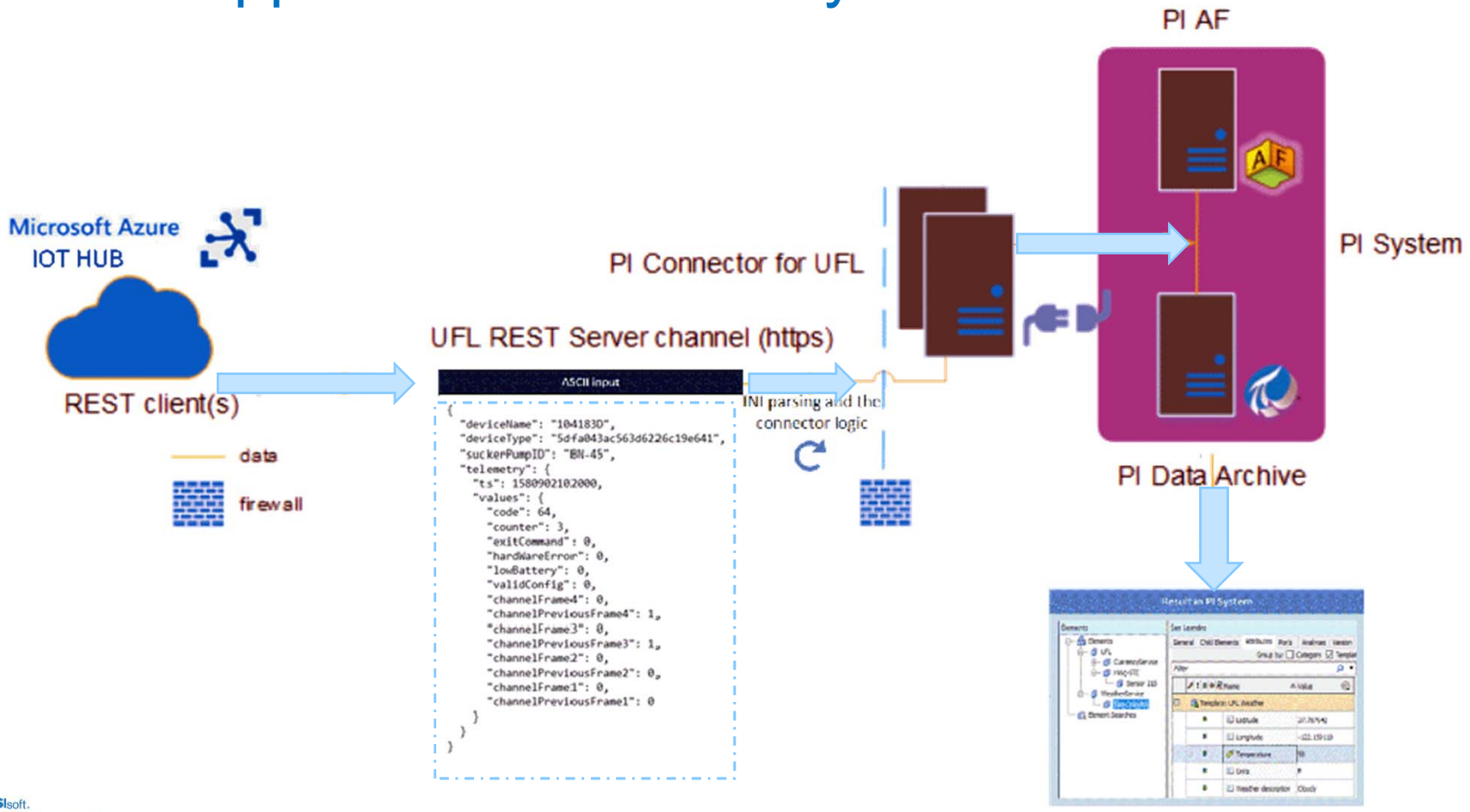
sigfox is a low-power wide area network (LPWAN), which interconnects low bandwidth, battery powered devices with low bit rates over long ranges.



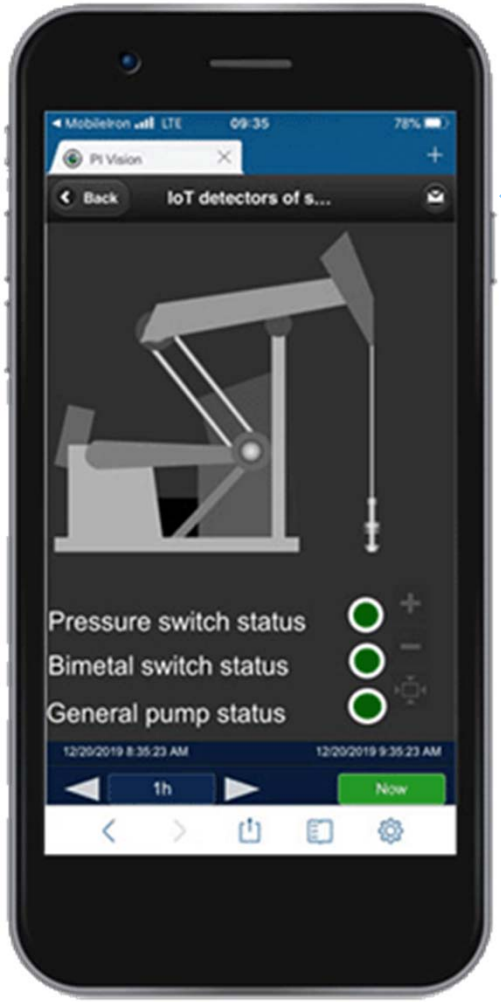
JSON POST Request

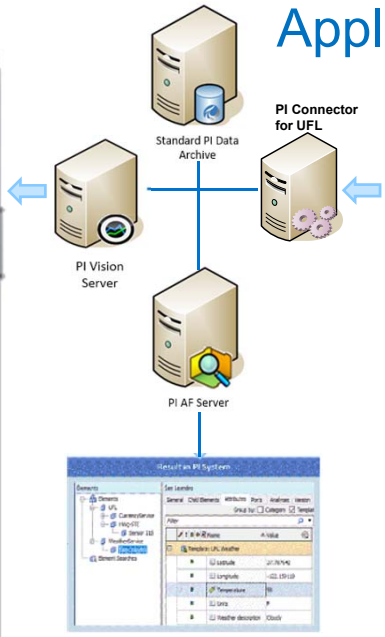
```
{
  "device": "{device}",
  "time": "{time}",
  "seqNumber": "{seqNumber}",
  "data": "{data}",
  "deviceTypeId": "{deviceTypeId}",
  "azureRoute": "INA-PT-PUMPE-LIVE"
}
```

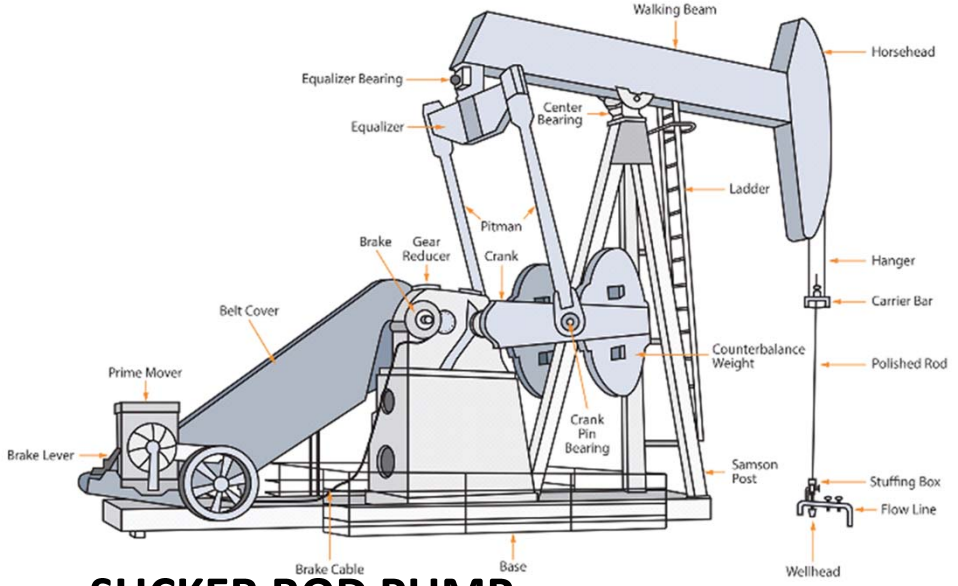
Application of the PI System



Application of the PI System



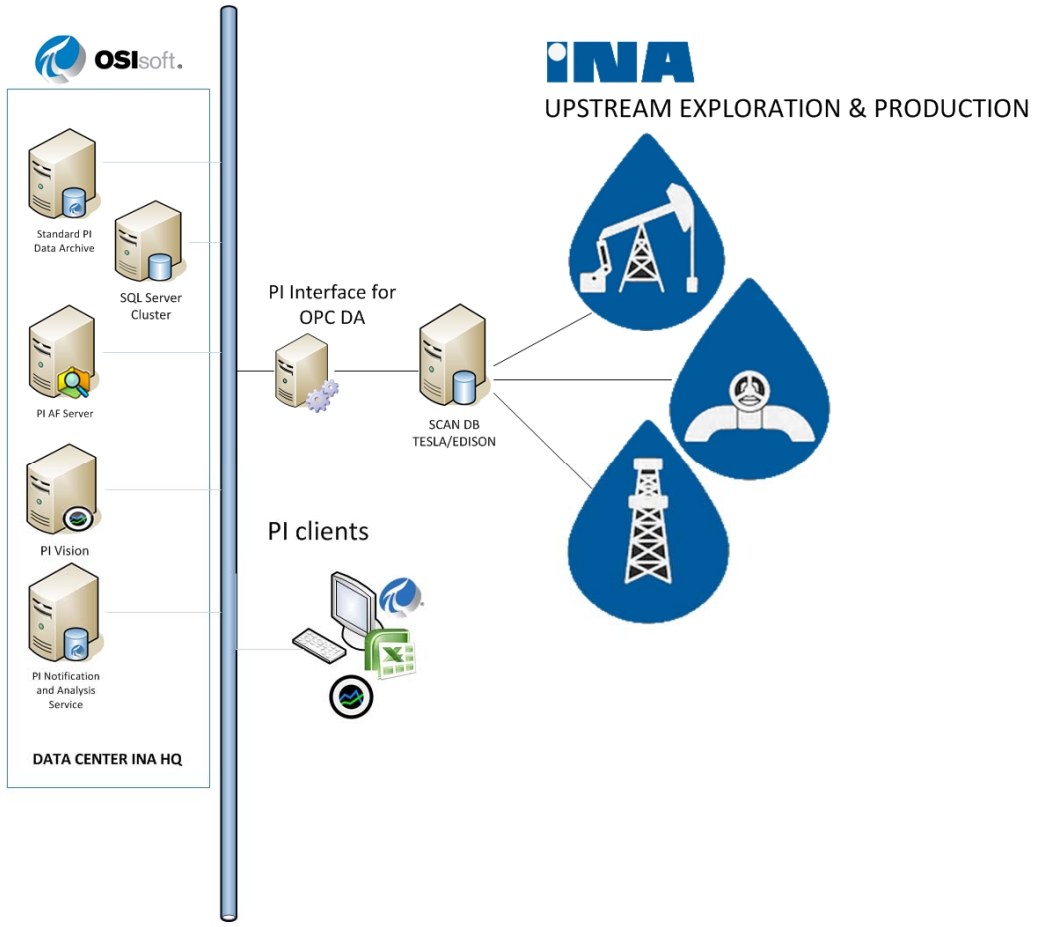




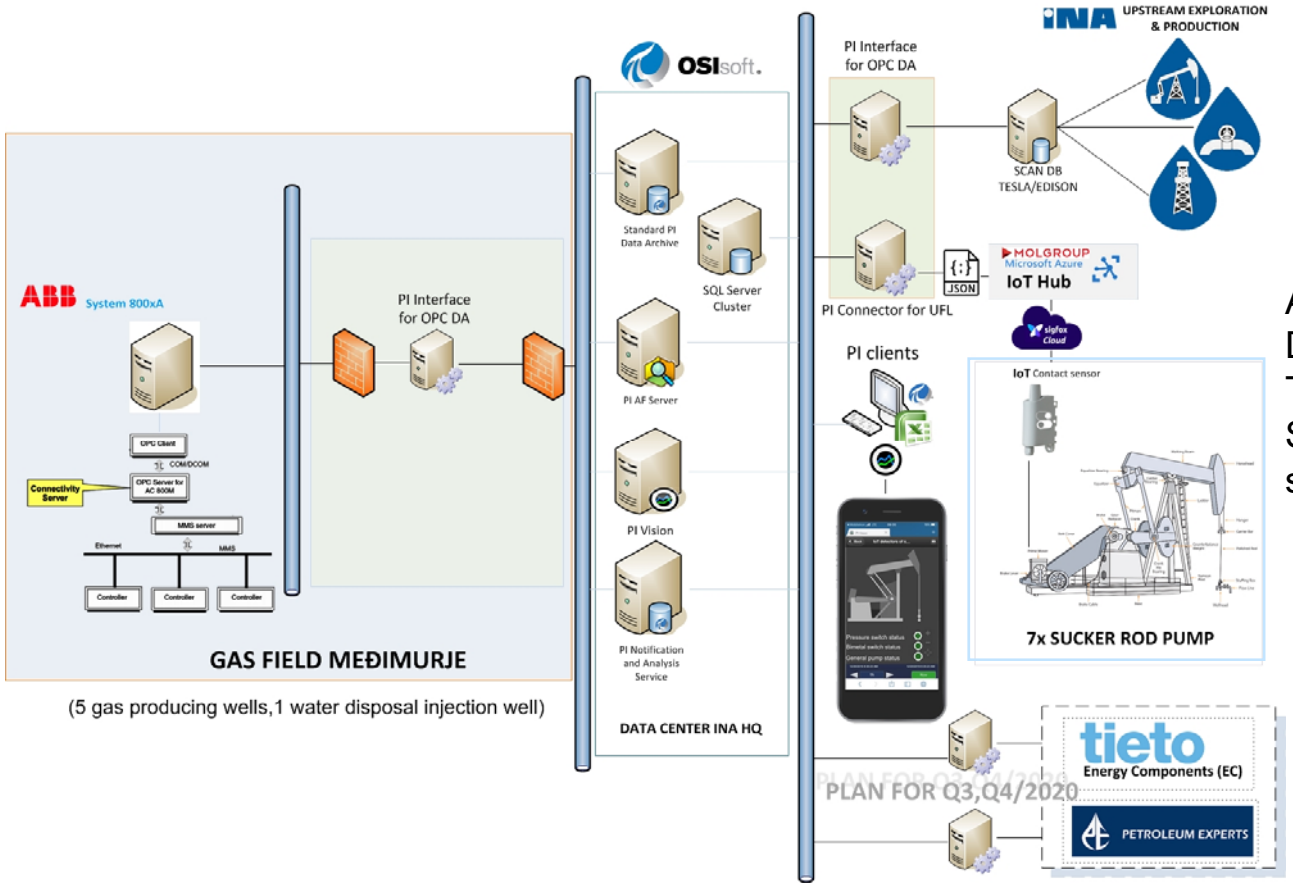
SUCKER ROD PUMP

Ease of Expansion

Finally it was identified that for the rest of four oil fields planned for roll out of PI system there is already existed connection established on one central point, OPC server which can read data from remote locations and therefore can be used as OPC DA interface data source for PI System data collection.



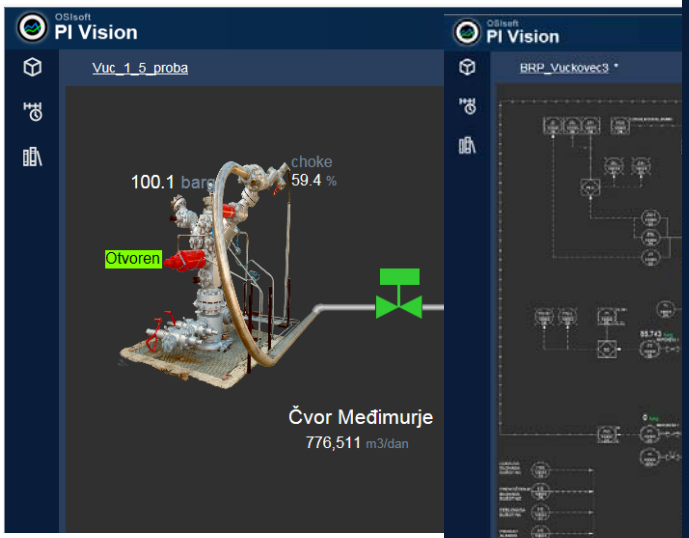
Implementation Details

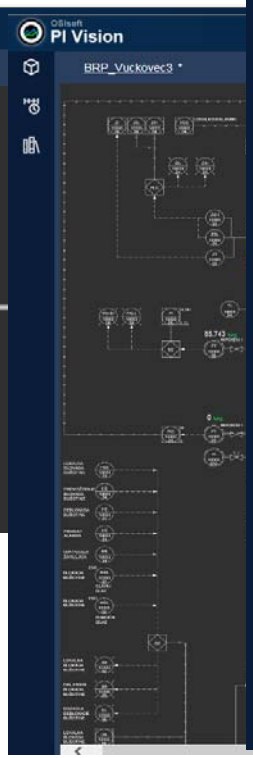


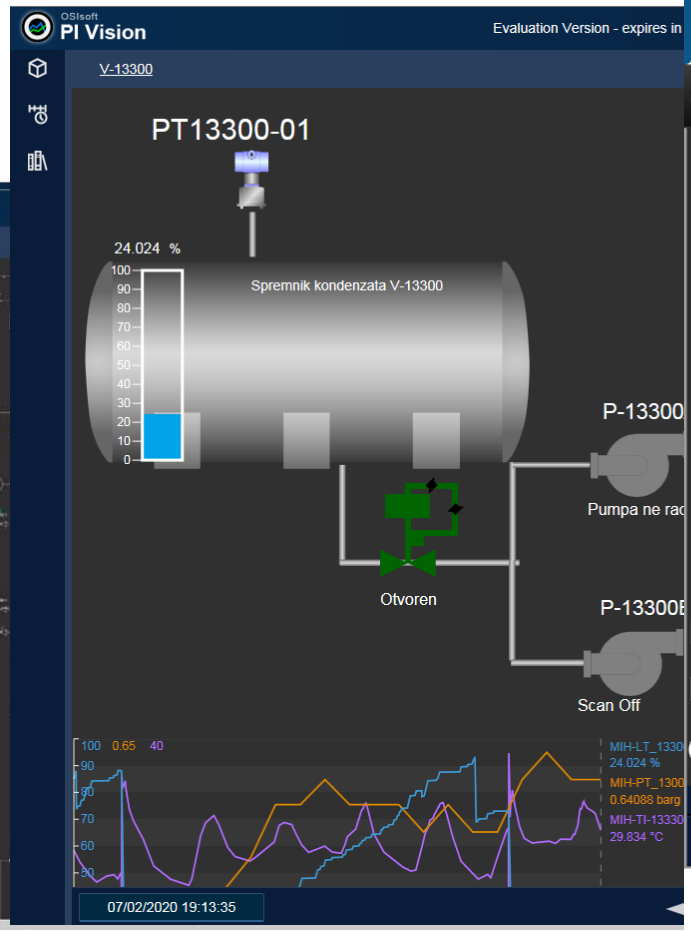
Application Extensibility:
Discussion with Petex as well as Tieto to prepare for future PI System connection to those systems

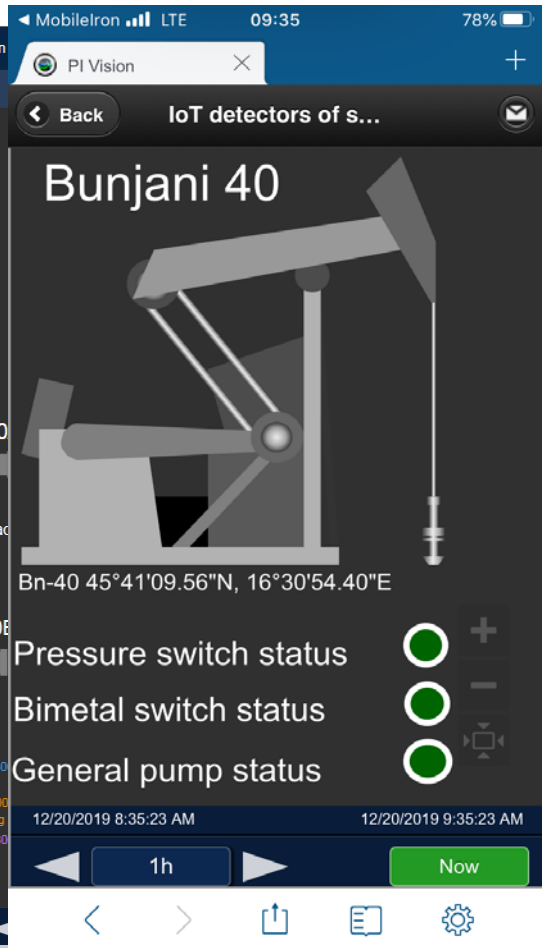
PI Vision User Experience

Employees without previous experience with PI Vision enthusiastically began drawing graphics.





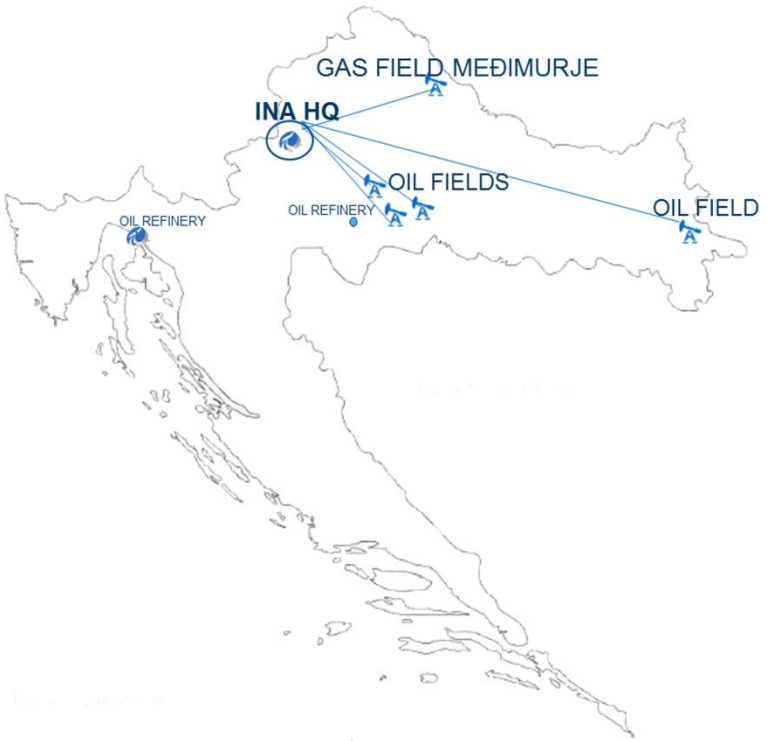




Realized how easy they can draw in their own

Results Obtained and Business Impact

- PI System deployment took a total of 12 working days.
- Greatest benefit for INA Upstream is continued use of the PI System after production license is procured, including expansion to 4 additional oil fields in Q3/Q4 2020.
- Employees from all oil fields identified for future PI System implementation were trained for PI Vision and PI DataLink.
- For the first phase (pilot project) on gas field as build documentation was delivered, detailed design for full project scope including rest of oil fields with PI System architecture proposal will be further delivered



Conclusion

- The Digital Oil Field software applications replicate the behaviour of an oil or gas field on a computer, using workflows for automation and computer clusters to speed up calculations.

- Integrated Production Optimization 4.0 project is expected to:
  - decrease reaction time to underperforming production,
  - enable advanced well surveillance,
  - collaborative engineering environment.

- Financial impact is based on benchmark from digital oil field system implementation currently used in the world and it shows that implementation can increase production between 3 and 5 % with reducing costs in well testing and chemical consumption. *

* according to digital oil field software vendors experience

CHALLENGES

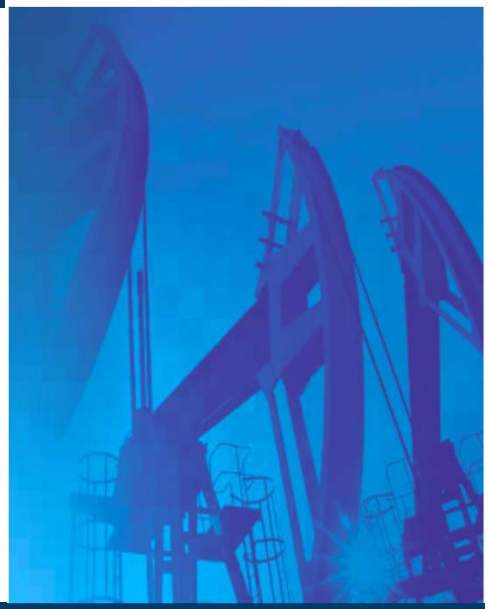
- Make data available on one single place for future usage, analytics, automated data transfer to DOF.
- Make people familiar with complete new approach and prepare PI System infrastructure in advance.
- Ensure continous data flow from gas field to PI System

SOLUTION

- Establish PI System Infrastructure ecosystem, develop PI OPC DA interfaces, develop connectivity for IoT devices through MS Azure IoT HUB

BENEFITS

- Benchmarked 3-5% cost reduction in well testing and chemical usage
- Completed training and data preparation for gas field DOF implementation. We achieved continous data flow from gas field to the PI System



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- Using opportunity to benchmark PI System Infrastructure, we saved time needed for data preparation and employee training before launching full scale project to additional four selected oil fields planned implementation begins Q3 and Q4/2020

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Presenter

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State your
name & company

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