



New age of Digital Transformation on Hydro by PI Corporative on Azure Cloud

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Agenda

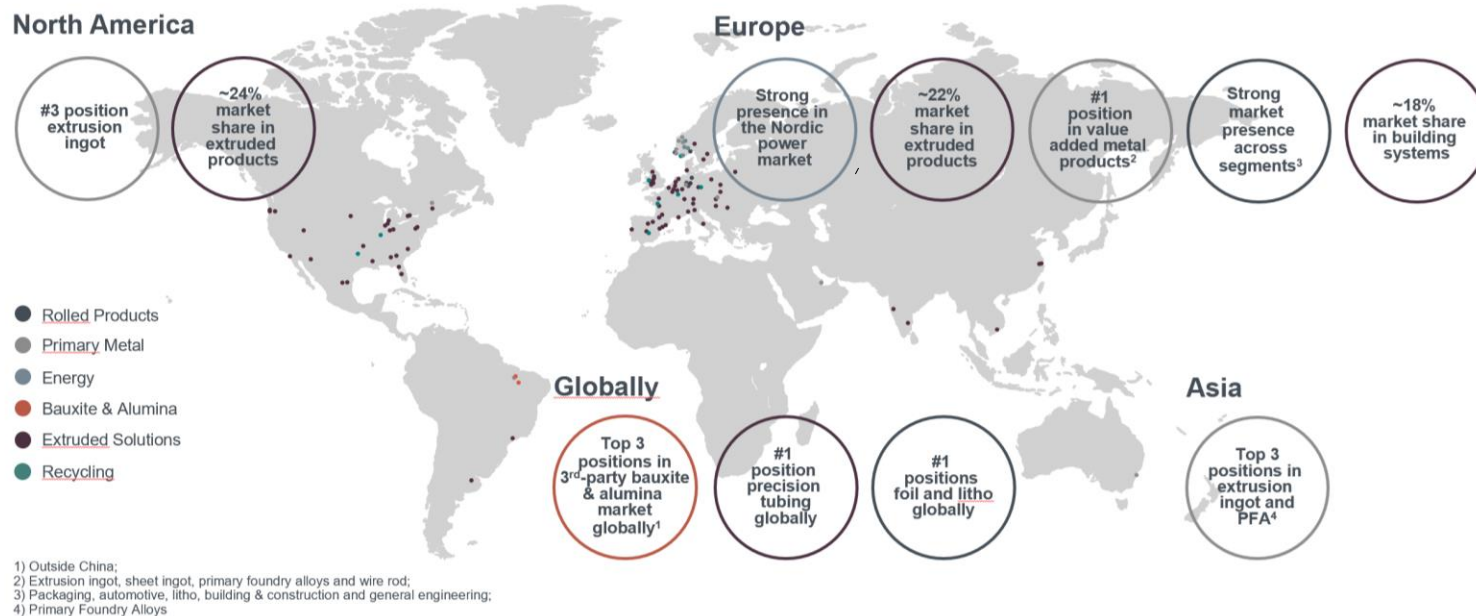
- About Hydro Brazil and its PI System
- Digital Transformation on Hydro
- Architecture and Technologies adopted
- Hydro Journey's experience
- New Age of Digital Transformation & Gains Achieved
- Hydro ahead into the Future

About Hydro Brazil and its PI System

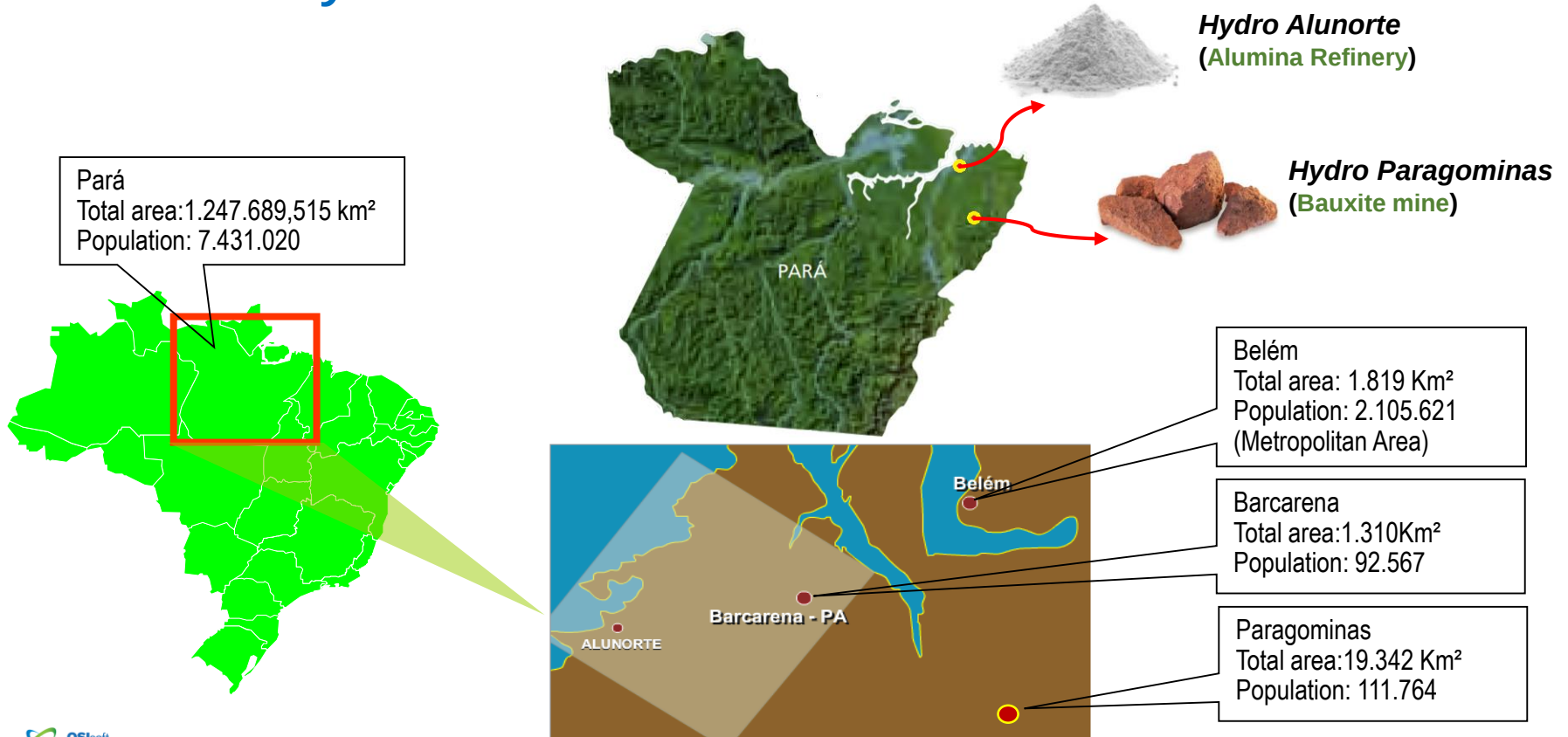
About Hydro

Product service offering and quality along the value chain

Built on market understanding, customer closeness and competence



About Hydro - Bauxite and Alumina Area



About Hydro Brazil and its PI System – Alunorte

PI System has been installed in HYDRO - Alunorte since 1996, totaling 23 years of historical data and several applications based on its data. Currently HYDRO is licensed and uses all the available tools on the PI Server.



PI Data Archive 2018

40.000 points

PI AF 2018

More than 60.000 elements

About Hydro Brazil and its PI System – Paragominas

PI System has been installed in HYDRO - Paragominas since 2018, totaling 10 months of historical data and implementing new applications based on its data. Currently HYDRO is licensed and uses all the available tools on the PI Server.



PI Data Archive 2018

15.000 points

PI AF 2018

More than 6.000 elements

Digital Transformation on Hydro

Digital Transformation on Hydro – Starting point..

This new reality...

- **Sensors**
 - Cost ↓
 - Capability ↑
 - Quality ↑
- **Connectivity**
 - Cost ↓
 - Reliability ↑
 - Speed ↑
 - Scalability ↑
- **Processing**
 - Cost ↓
 - Access ↑
 - Capability ↑



Alunorte



NHB



MPSA

... allow us:

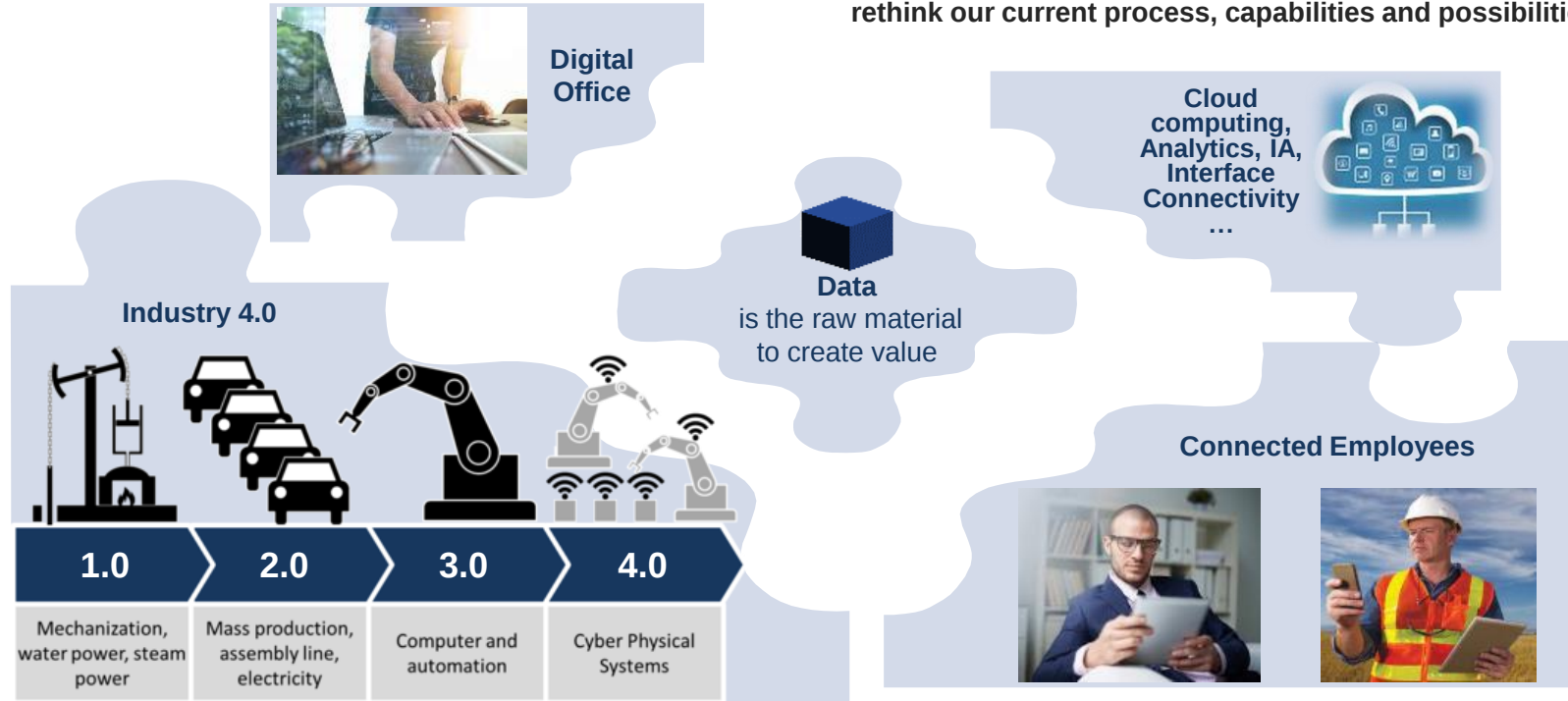
- **Improve our competitiveness**
 - Gains of efficiency
 - Cost reduction opportunities
 - Differentiation from competitors
- **A new perspective about our operation**
 - Better follow-up and control
 - Speed-up the learning process
 - Risk mitigation
- **Improve our decision process**
 - Data driven decisions
 - Agile
- **Our team ready for the future**
 - New tools and capabilities



B&A must be ready for the new competition standard in a near future, where digitalization will be an important drive to define which companies will be the leaders of our business segment.

Digital Transformation on Hydro – What is ?

Digital are several new technologies that combined allow us to collect and analyze data about all the process of our company, inviting us to rethink our current process, capabilities and possibilities.



Digital Transformation on Hydro – What is ?



Digital



Transformation

Several new technologies that combined allow us to collect and analyze data about all the process of our company, inviting us to rethink our current process, capabilities and possibilities.

All about people!



Think different...

... with an Agile attitude...

... but not be blinded by technology, the key point is in the value creation

Integration between the several company areas

Rethink (where needed) our process

Learn, learn and learn

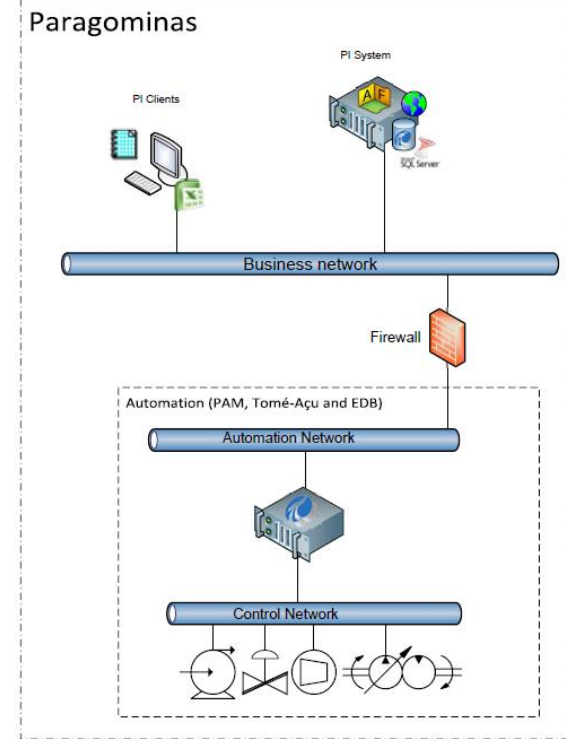
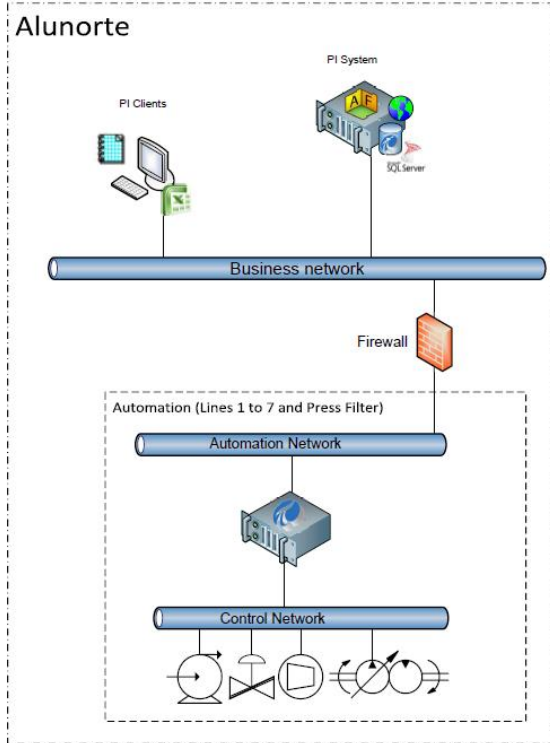
Build a strong value creation backlog through the digital implementation

Accept be part of this digital journey

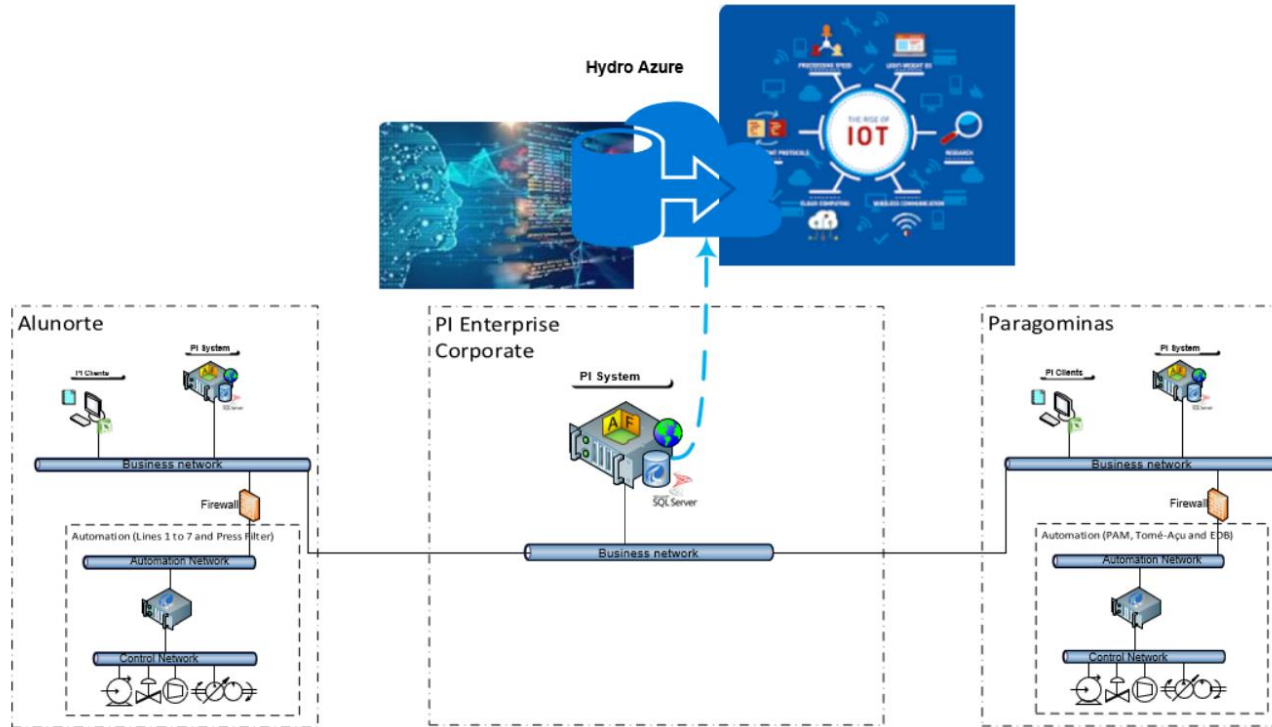
Digital Mindset

Architecture and Technologies adopted

Architecture and Technologies adopted (BEFORE)



Architecture and Technologies adopted (AFTER)



Hydro Journey's experience

Hydro Journey's experience - PI Enterprise Corporate

Justification

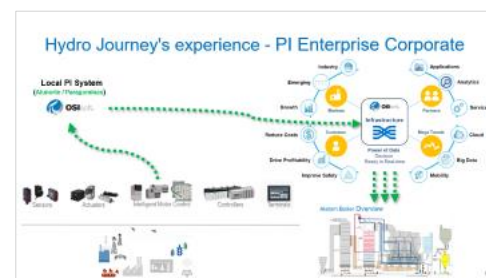
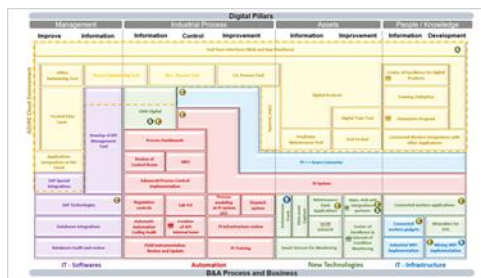
- Absence of corporate environment to consolidate historical data of Paragominas and Alunorte.
- Infrastructure servers more reliable to external access.

Benefits

- Consumption of Microsoft Azure platform Analytics and Services Tools based.
- Adoption PI Ecosystem like a pillar of data-infrastructure to Digital Transformation.
- To Enhance our intelligence to take quickly decisions aligned with affordable gains.

Objective

- To establish B&A Real-time Corporate data management.
- Integrated PI System Servers.
- Synergistic and Convergent Solution in B&A plants.



New Age of Digital Transformation & Gains Achieved

New Age of Digital Transformation – Gains Achieved

To PI open automatic PM Notifications on HAMP (Interface PI x SAP PM)



Justification

- Manual effort to register PM notification of critical assets on SAP.
- Historical data losses between both systems.
- Long time between the identification and registration (notification) of the problem;



Objective

- Better Accuracy of Maintenance plans
- Reduce costs and human input errors
- Automation & Maintenance process integrated.



Benefits

- Automatic generation of PM' Notifications that impact losses of production.
- All overhaul failures registered on SAP PM.
- To Avoid parallel control outside of our corporate systems.
- On-time data between PI x PM.



New Age of Digital Transformation – Gains Achieved

PI Asset Scan



Justification

- Need of asset information during shopfloor activities.
- Need to register anomalies during assets' inspections.
- Identification assets' plates unreadable.



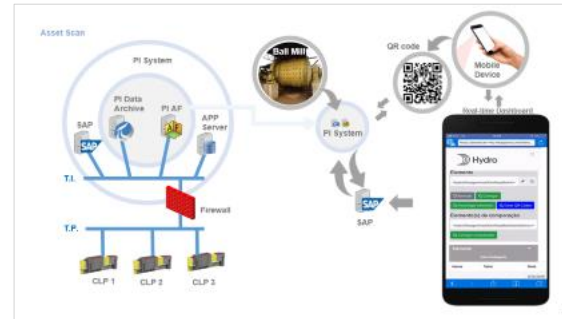
Objective

- Better Accuracy of Maintenance plans
- Improve Labour productivity
- Allow operators to acces real-time information.



Benefits

- Online information for shopfloor operators.
- Faster Preventive/Corrective work orders opening.
- Faster asset identification.
- On-time data between PI x PM.



New Age of Digital Transformation – Gains Achieved

PI Ecosystem on Azure



Justification

- Too many different sources of data
- Too time consuming for generating reports
- Lack of enhanced data



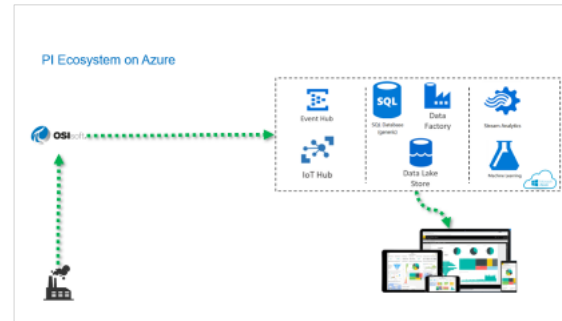
Objective

- To unify the main sources of relevant data
- To easily bring all the necessary data for an accurate DMS and general meetings
- To identify new opportunities



Benefits

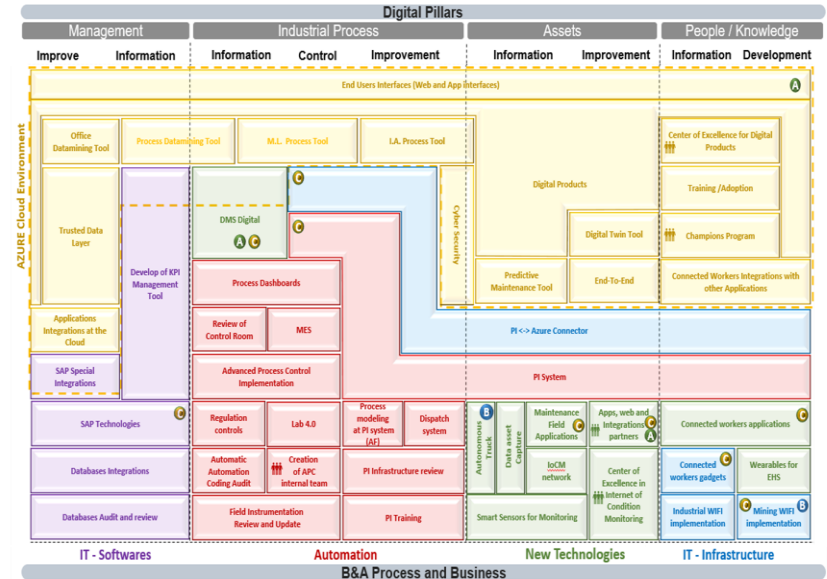
- Fully automated DMS
- Cost saving with predictive maintenance
- Potential new insights
- Increase the quality of analysis



Hydro ahead into the Future

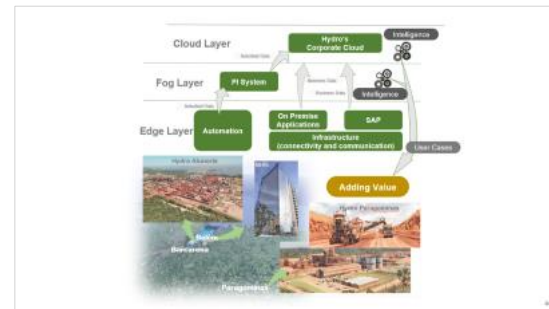
Hydro ahead into the Future – What we have done so far

- Digital Transformation team
- The puzzle
- Roadmap
- Enterprise Agreement



NORSK HYDRO

New age of Digital Transformation on Hydro by PI Corporate on Azure Cloud



CHALLENGE

Different PI databases not integrated w/lack standardization (different versions) and absence of corporate decision software.

- Difficulty in consolidating relevant information;
- Lack of critical analysis of data;
- Some operational areas not monitored (historian Server);

SOLUTION

Integration PI Corporate of Paragominas and Alunorte Environment with Azure Cloud Solution

- Replacement of Paragominas KM plant Historian System;
- PI Server Update and deploy PI System Corporate environment;
- Integration between PI System Servers of both mining plants;
- News tools and integration development

RESULTS

Bauxite & Alumina area moving ahead into the future (Digital transformation).

- Consumption of Azure platform Analytics and Services Tools based
- 10% gain on maintenance costs.
- 50% reduction of unplanned downtime during the PoC.

Speakers Contact



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