Goals and Challenges of Modernizing ITAIPU PI System Infrastructure

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Agenda

- About ITAIPU
- Business Goals & Challenges
- OT Infrastructure Projects
- PI System Timeline
- PI System Data Sources
- PI System Architecture
- PI System Benefits
- EA Roadmap
- Conclusion

About ITAIPU

Located at the border of

Brazil & Paraguay

World leader in clean and renewable energy

2.3 billion MWh since 1984

Installed Capacity of 14,000 MW

20 generating units

New 2016 World Record in annual Power Generation for Hydro Plant

103.1 million MWh

Business Goals & Challenges

ITAIPU Technological Modernization Plan

- Increase the digitalization degree of the plant
- Full modernization of supervision, control, automation, protection & monitoring systems
- Over 200,000 TAGs

Enterprise Agreement (EA) contract signed in 2014

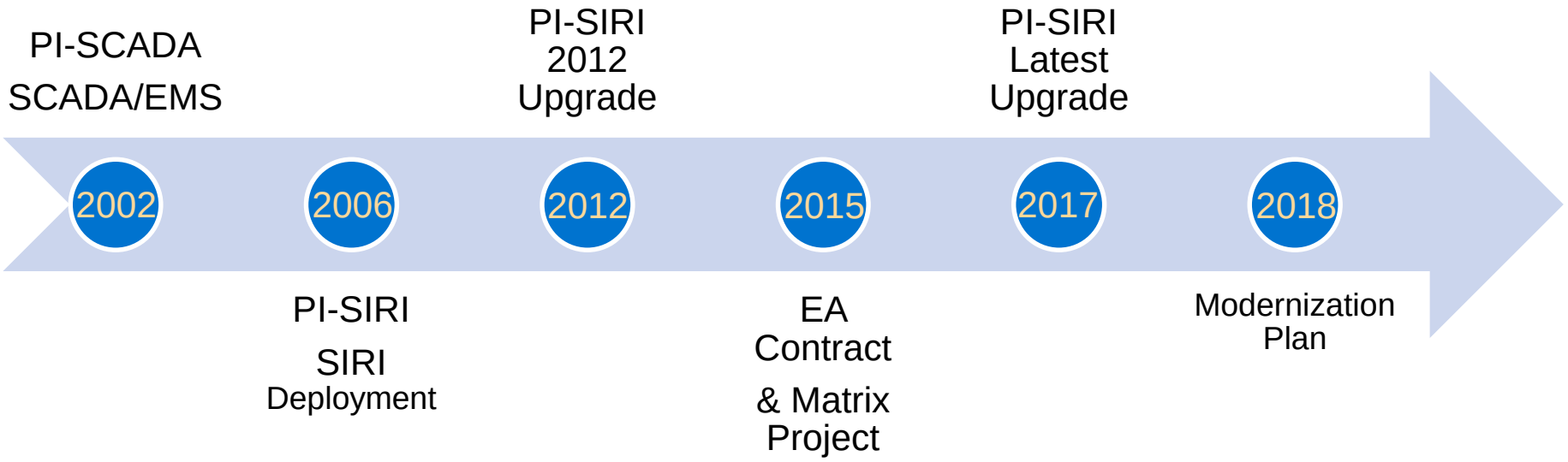
- Be prepared for the increasing demand
- Condition Based Monitoring deployment program

OT Infrastructure Projects

ENES.DT
Technical & Contract Management

- Technical Specification
- Aquisition Process
- Contract
- FAT
- SAT / Comissioning
- Guarantee

PI System Timeline



SIRI – Industrial Network Integrated System

PI System Data Sources –
PI-SIRI Integrated Systems (70,000 TAGs)

SCADA/EMS

- Power plant supervision and control (30,000 TAGs)

STH

- Hydrological Data (1,000 TAGs)

Matrix Project

- Condition Monitoring System
- System designed to collect temperature, vibrations and partial discharges (8,000 TAGs)

Others

- SMG – GIS Monitoring System
- SMT – Transformer Monitoring System
- RPMF – Oscilograph & Phasor Measurement

PI System Architecture – PI-SIRI

Current Production Environment

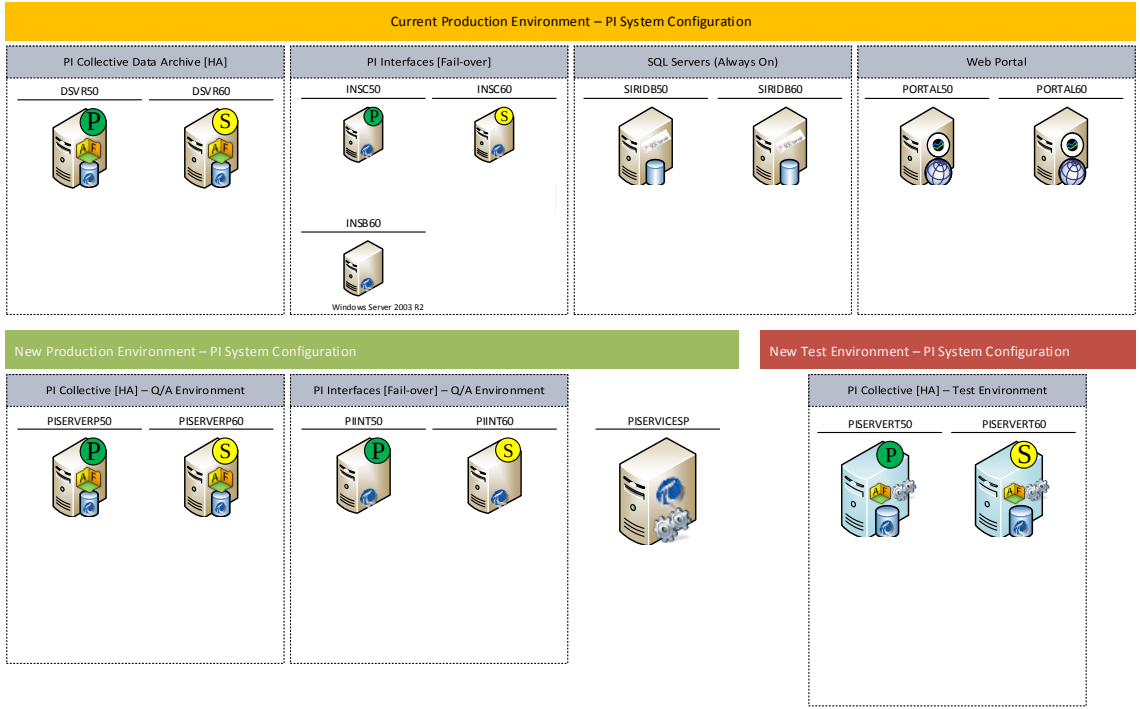
- Data Archive (HA)
- AF
- PI Interfaces: PI to PI, RDBMS, UFL
- PI WebParts

New Production Environment

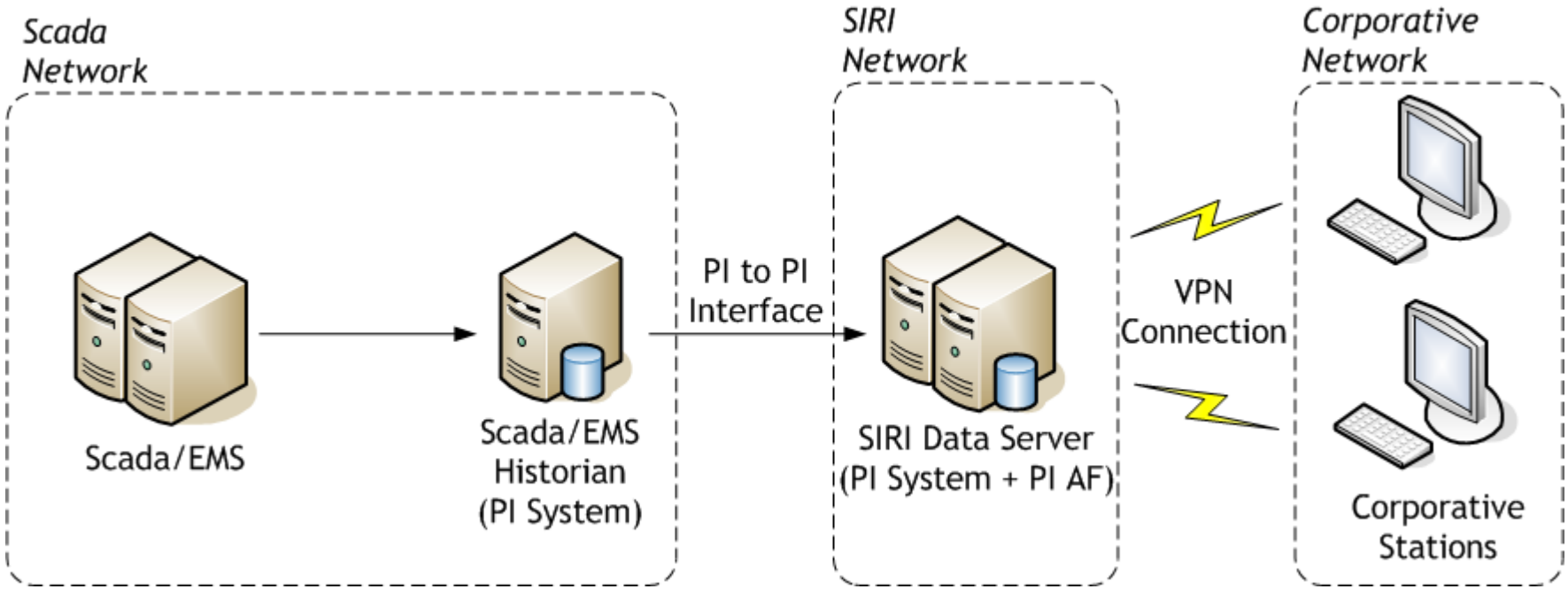
- Data Archive (HA)
- AF
- PI Interfaces: PI to PI, RDBMS, UFL
- Notifications
- PI Coresight
- Asset Analytics

New Test Environment

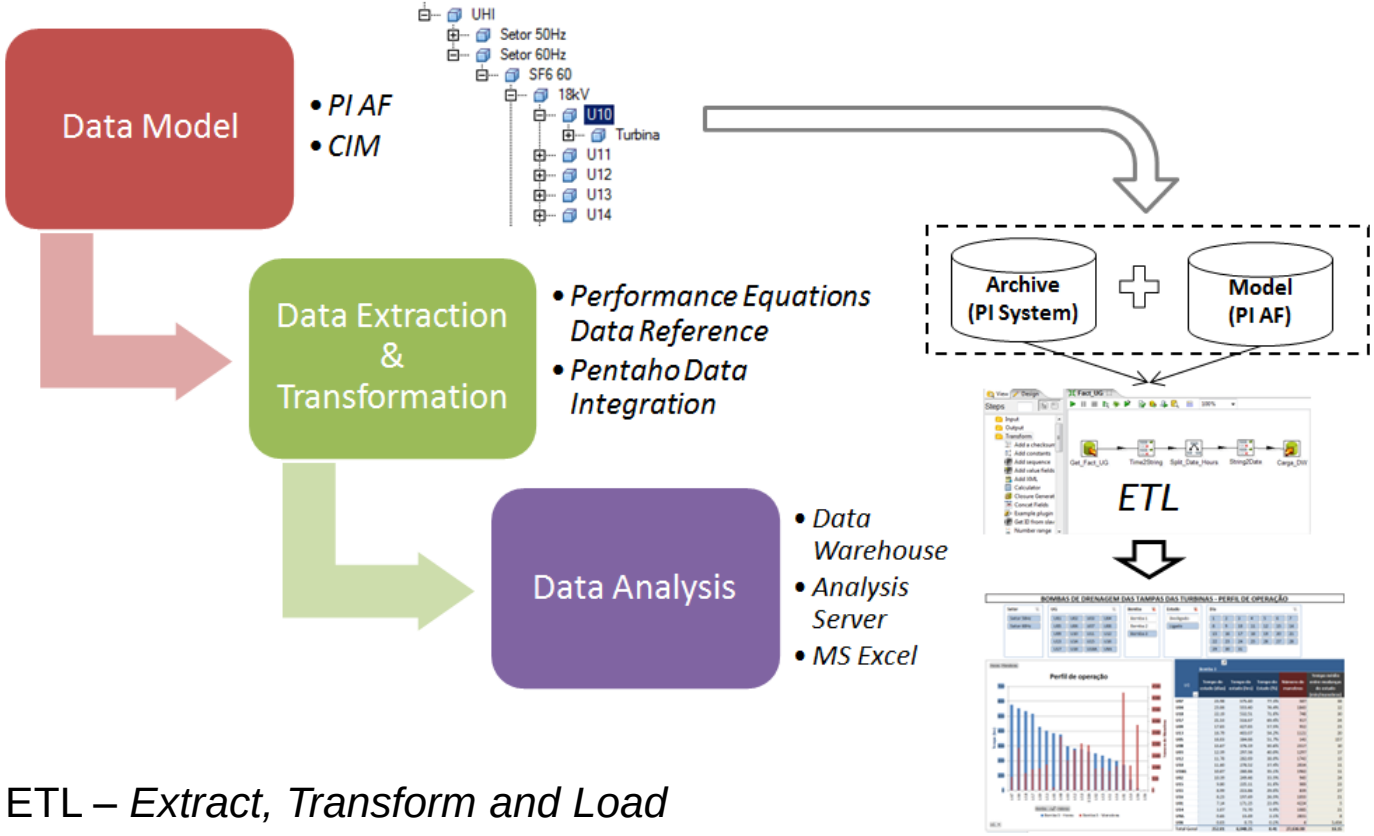
- Full PI System in 2 VMs



PI System Architecture – PI-SCADA to PI-SIRI

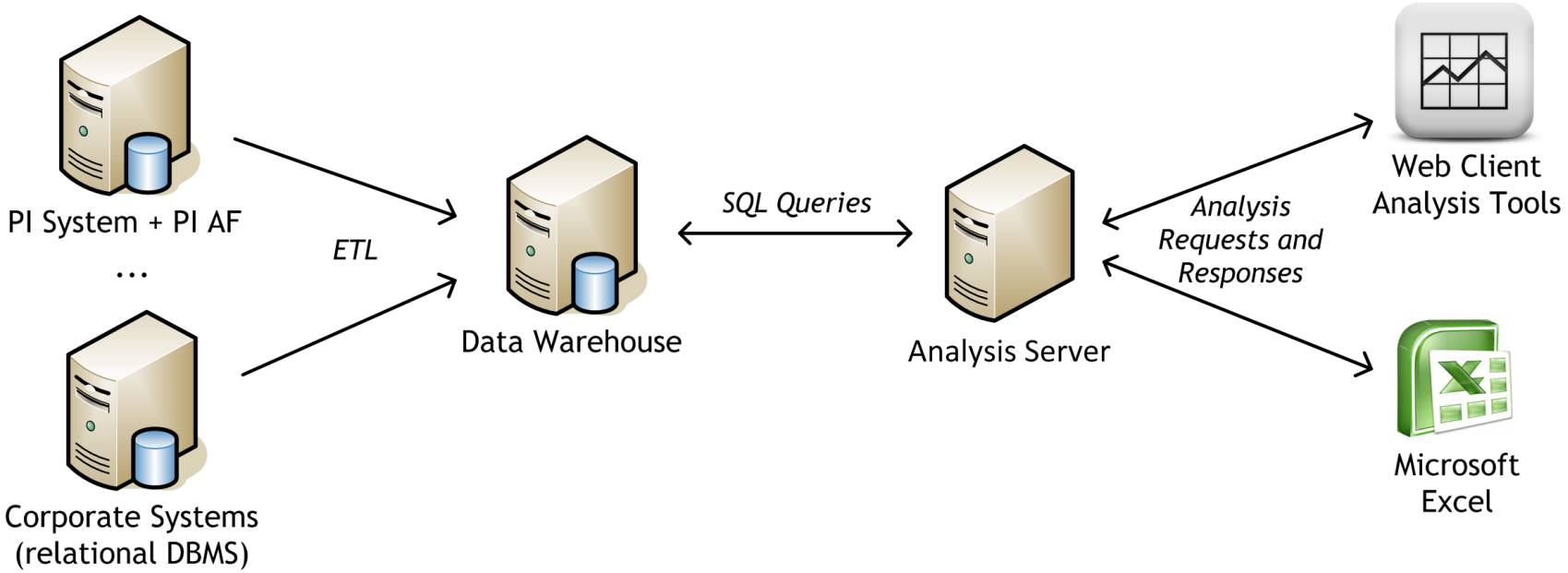


PI System Architecture – PI System Data Access for BI



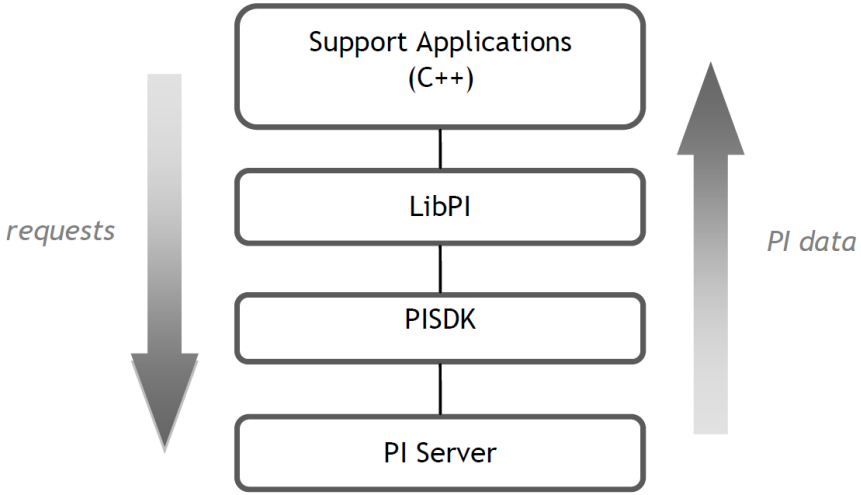
ETL – *Extract, Transform and Load*

PI System Architecture – PI System Data Access for BI

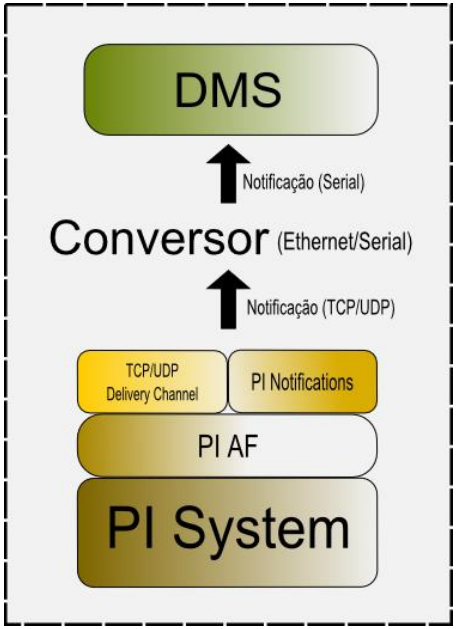


ETL – *Extract, Transform and Load*

PI System Architecture – PI System Data Access Special Purpose



Operation OT Team Solution



LASSE R&D+I Solution

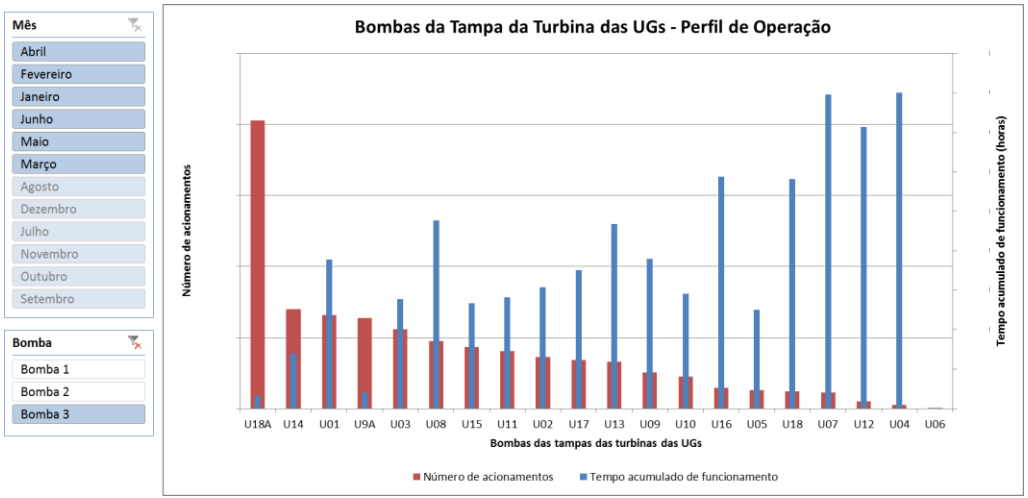
PI System Benefits - So What Value do We get from all of this?

BI Study Case I

Situational Awareness

Operational Profile of UG Drain Pumping

Activations & Working Time

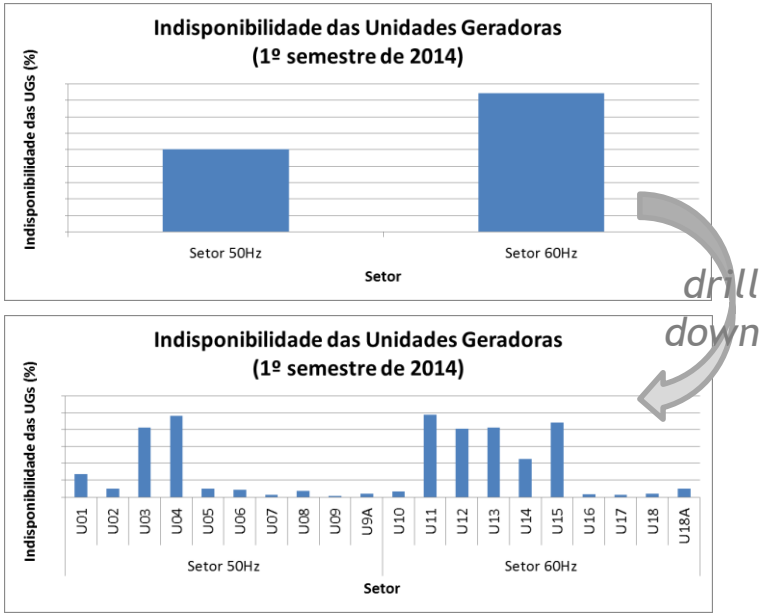


BI Study Case II

Situational Awareness

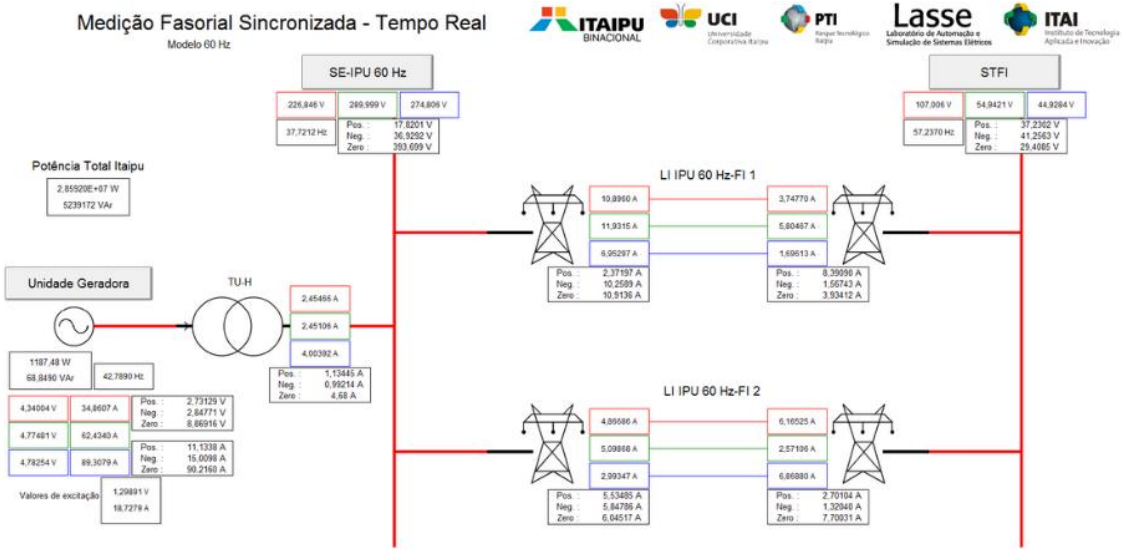
UG Unavailability

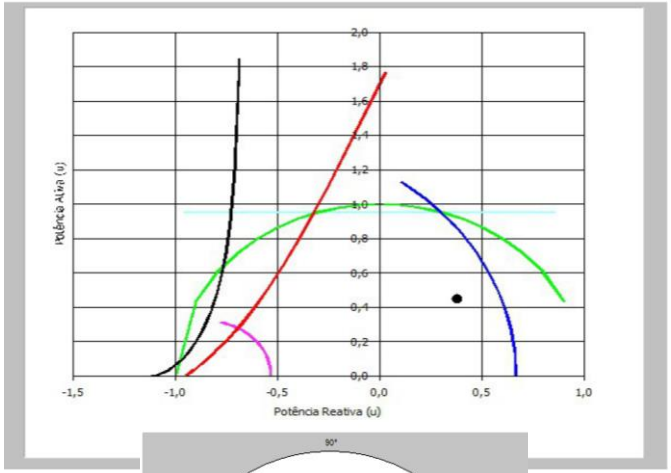
2014 1st Semester – 50 & 60 Hz Sector

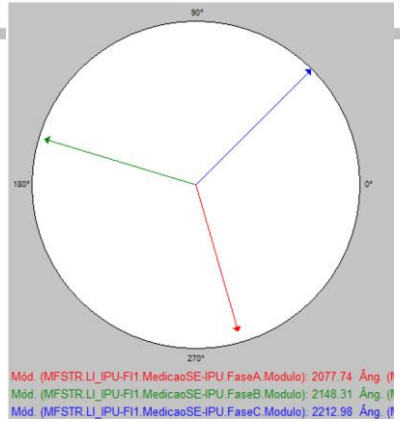


PI System Benefits - So What Value do We get from all of this?

PI ProcessBook new Widgets
Phasor Measurement Study Case
Electrical Synoptic & Phasor Diagram & Capability Curve







PI System Architecture – Modernization Plan

RTA

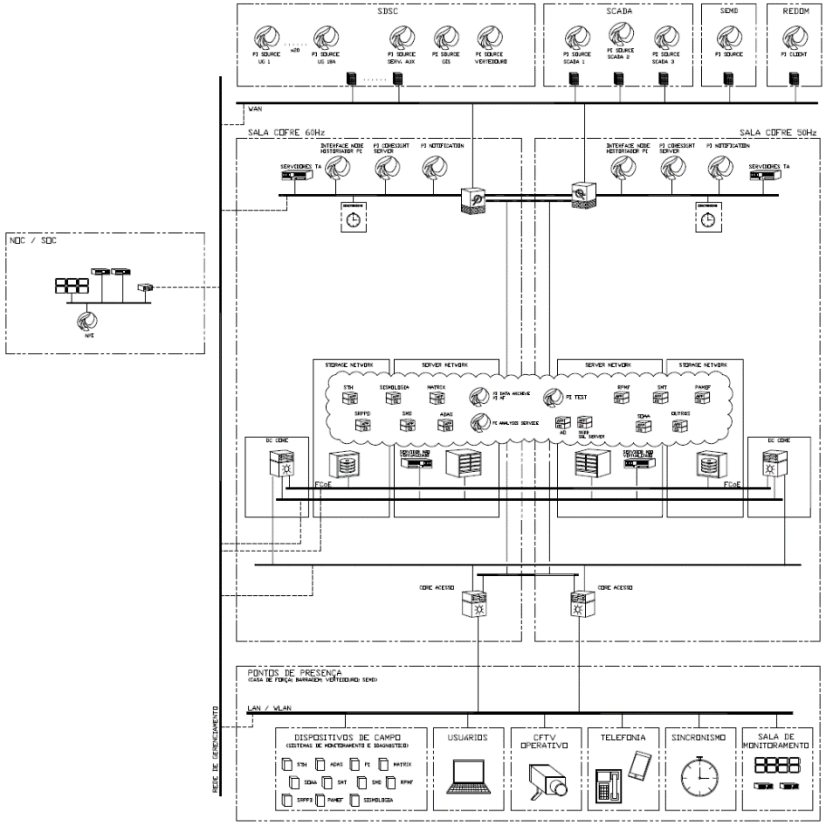
- OT Network
- SIRI Modernization & Expansion
- Industrial system integration
- Multiservices

UTAs

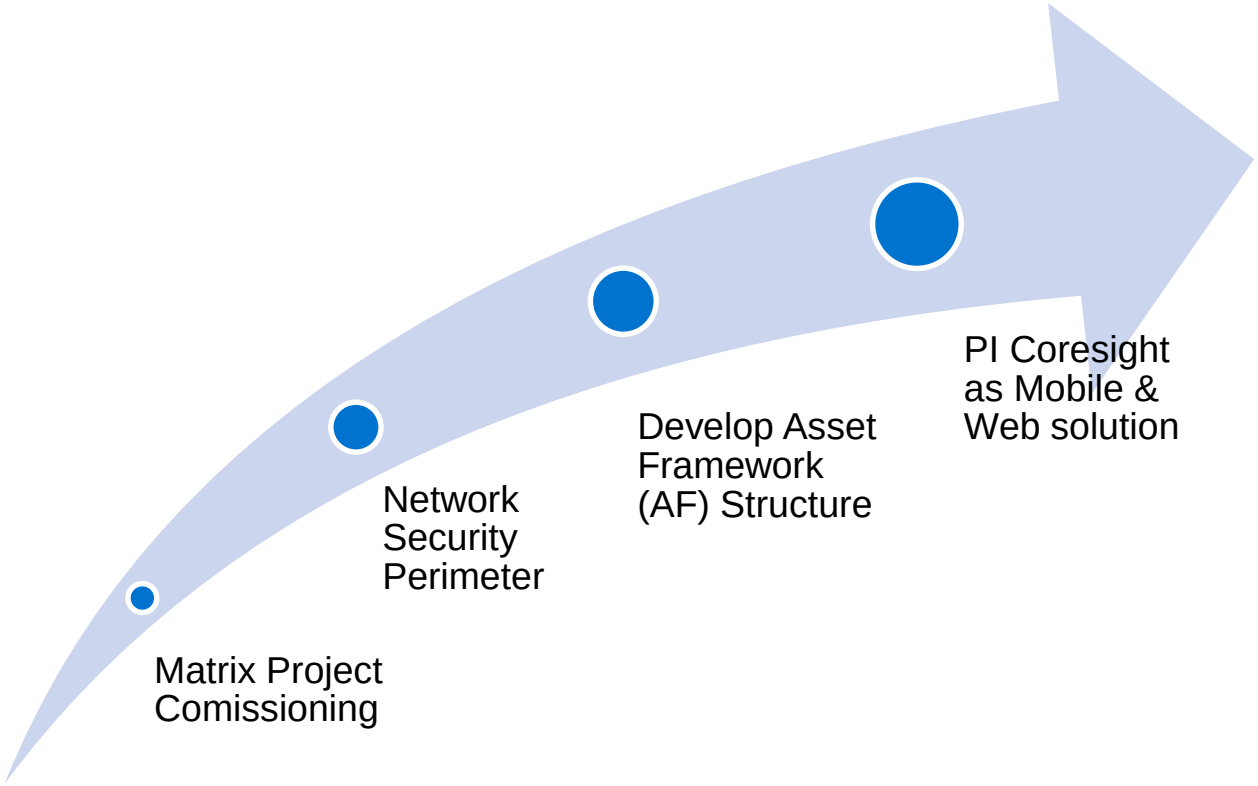
- Access Terminal Units
- Users & External systems interconnection
- Wifi network

PI System

- Core HA infra
- DMZ server / services
- Interface nodes distribution
- NOC with managed PI



EA Roadmap – 2016-2017



PI System Infrastructure & ITAIPU Technological Modernization Plan

COMPANY and GOAL

ITAIPU is pursuing the modernization of its OT infrastructure, mostly based on 80ths technology, to make the PI System the main data hub with which to integrate every OT system

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CHALLENGE

Improve the operational data infrastructure in order to support the power production growth and digital transformation

SOLUTION

Using the PI System as solution to monitor, manage and analyze large sets of operational data

RESULTS

PI System infrastructure consolidation, helping ITAIPU to reach the new world record in annual power generation for a hydro electrical power plant

- Total production of 103.1 million MWh in 2016

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Questions

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谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado

Aguije in Guarani