Digital Engineering: Cloud-based Organizational Transformation

Company: VIVIX

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DIGITAL ENGINEERING:
CLOUD BASED ORGANIZATIONAL TRANSFORMATION
Our team

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VIVIX

100% BRAZILIAN CAPITAL

$520 MM – FLOAT 1 INVESTMENT

900 MTON/DAY
PROCESSING OF RAW MATERIAL

- Located at 12 km (7.5 mi) from Vivix
- Responsible for the extraction and processing of silica, feldspar and limestone

Only plant in Brazil having their OWN MINE
DIGITAL ENGINEERING ROADMAP

FLOAT 1
ENGINEERING & CONSTRUCTION
- 2D Documentation

FLOAT 1 START-UP
- As Built Design not available

FLOAT 1 ENGINEERING TRANSFORMATION
- 2014
- 2019
- Digital Twin
- AVEVANET

VIVIX INDUSTRIAL TRANSFORMATION
- 2021
- Float 1 Operation
- Float 2 Project Structuring

FLOAT 2
DIGITAL ENGINEERING
- 2022
- Aveva Connect (Go to the Cloud)
- Aveva Global
- BIM 4D

DIGITAL ASSETS
- 2022

START
BEFORE 2019 – FLOAT 1 CONSTRUCTION AND BEGINNING OF OPERATION

EXT. ENG. (DESIGN)

VIVIX ENGINEERING

FLOAT 1

IT (GCB)

2D DOCUMENTATION
AS-BUILT DESIGN NOT AVAILABLE AFTER CONSTRUCTION
IMPROVEMENTS IMPLEMENTED AND NOT FULLY DOCUMENTED

USE OF CONVENTIONAL 2D SOFTWARES
PROJECT DATA STORAGE: LOCAL SERVERS
BEFORE 2019 – FLOAT 1 CONSTRUCTION AND BEGINNING OF OPERATION

- AS-BUILT DESIGN NOT AVAILABLE
- 2D DOCUMENTATION
- ON SITE IMPROVEMENTS NOT ENTIRELY DOCUMENTED

4.0 INDUSTRY

- CUTTING EDGE DESIGN
- HIGH LEVEL OF AUTOMATION
- LOW ENERGY MELTER TECHNOLOGY
2019 – DIGITAL TWIN: THE BEGINNING OF THE DIGITAL TRANSFORMATION

VIVIX ENGINEERING

EXT. ENG. (DESIGN)

FLOAT 1

IT (GCB)

AVEVA

PROJECT: DIGITAL TWIN
- Laser Scan
- 3D Modelling (AVEVA E3D)

PROJECT: DMS VIVIX (DOCUMENT MANAGEMENT SYSTEM)

2D CONVENTIONAL SOFTWARES + AVEVA SOLUTIONS

PROJECT DATA STORAGE: HYBRID
- 2D Documentation – Cloud (DMS)
- 3D Database + Point Clouds (LFM) – Local Server

INTEGRATION SOLUTIONS
AVEVANET – LFM NETVIEW
- AVEVA E3D
- DMS
- SAP
Basis for 3D Modelling
100% of the factory scanned
4.4 TB
AVEVA Point Cloud Manager

• AVEVA E3D Design
• VIVIX Data Library

• Insert Project Data

Points Cloud – PCM Viewer
3D Model – AVEVA E3D Design
DMS – ProjectWise
Maintenance Report - SAP
Gêmeo Digital - Utilizando o AVEVA AIM - Asset Information Management
2019 – DIGITAL TWIN: THE BEGINNING OF THE DIGITAL TRANSFORMATION

CHALLENGES

- **Point Cloud Large Size: 4.4 TB**
  - Internet transfer not feasible;
  - External HD;
  - Courier transfer (Engineering x Vivix x AVEVA);
  - Information Security;
  - Server slowness.

- **3D Database stored on the Engineering Company’s Local Servers**
  - Tracking the project’s progress;
  - Verify the quality of the deliverables;
  - Weekly Design Review Meetings.
2021 – THE INDUSTRIAL TRANSFORMATION

Support and accelerating initiatives
• Innovation/AI
• Industry 4.0
• Data Science / Data Engineering
• Cyber Security
• Emerging Technologies
• Digital Engineering

Benefits
• Engineering cost optimization
• Improved decision-making process
• Data ownership
• Increased Safety
• Sustainability Improvement
• Increased Efficiency
3 STEPS FOR SUCCESS

AVEVA SOLUTIONS
• AVEVA CONNECT
• AVEVA GLOBAL
• AIM
• UNIFIED ENGINEERING

FLOAT 1
FLOAT 2

EXT. ENG. (DESIGN)

VIVIX ENGINEERING

FLOAT 2 PROJECT
COLLABORATIVE ENVIRONMENT – REAL TIME
OWNERSHIP OF INFORMATION

INFORMATION SECURITY SUPPORT

2021 – PREPARING TO EXPANSION – FLOAT 2
STEP 1 – FROM SERVERS TO CLOUD

VIVIX – DECISION POINT

AVEVA Connect

GO

• IT BENEFITS
  • Reduce server costs (new equipment, maintenance)
  • Reduce Vivix dependency on IT services (external)
  • Enable the data sharing
  • Increase Storage Capacity and Scalability
  • Improve Access Performance
  • Ensure Information Security
  • Ensure Data Availability and Security

• MEET PROJECT REQUIREMENTS FOR FLOAT 2
  • Collaborative Environment
  • Engineering Located in different places
  • Vivix as the data owner of the project
  • Information available in real time
STEP 1 – FROM SERVERS TO CLOUD

VIVIX – HYBRID ENVIRONMENT

AVEVA Connect

AVEVA Unified Engineering + ISM

AVEVA AIM

AVEVA Connect

AVEVA Information Standards Manager
(Datapoint Class Library, Data Source Format, Source to Class Library Mapping, Audit Trail for Changes)

DABACON Tools

AVEVA Engineering (Unified Data, Master Tag Management, Collaboration work)

AVEVA E3D

Deliverable Information Standard

AVEVA AIM Gateways (Identify, Classify, Extract, Validate, Transform)

AVEVA AIM Workhub and Dashboard (Organize, Interlink, Visualize)

Issued Deliverables

On-Premise

AVEVA Engage
STEP 2 – DATABASE SHARING FOR FLOAT 2

- Float 1 Database – Writing
- Float 2 Database – Reading
- Automatic Transfer (Daily)
- Global Hub (ALS) Licence
- Float 1 Database – Reading
- Float 2 Database – Writing
STEP 2 – DATABASE SHARING FOR FLOAT 2

COLLABORATIVE ENGINEERING

GLOBAL

GO

• BENEFITS
  
• Single Catalog for Float 1 and 2, ensuring the standardization of projects;

• Ext. Engineering is responsible for the catalog updates;

• Vivix has owned the project's database from the beginning;

• Collaborative Environment to verify and approve the project in real time (daily update)
NEEDS:

- Organize processes and methods for higher value creation and ROI from Engineering to Start-up.

SOLUTION:

- Leverage BIM level 2 adoption.
- Opportunity for more productive projects, predictable, shorter duration and lower costs and higher quality.

OUTCOME:

- Guarantee a better coordination and collaboration between teams and third parties;
- Reduction of claims;
- Finish projects on time or, if possible, ahead of schedule;
- Cash flow according to the project S progression curve;
- Zero quality deviation
ACHIEVED BENEFITS

REDUCED IT INFRASTRUCTURE COSTS
• 100% reduction CAPEX – Local Servers
  • Flexibility Opex utilization
  • 80% reduction in dependency on the IT team

FLOAT 2 – ENGINEERING – COST REDUCTION
• 15% of Engineering Project cost reduction (3D catalog and automatic data sharing);
  • 50% Travel Expenses

EFFICIENCY IN ENGINEERING PROCESSES AND OPERATIONS
• Accurate information available in Real Time
  • Reduction of Inconsistencies

SUSTAINABILITY
• 50% less CO2 emissions (air travels)
LESSONS LEARNED FROM VIVIX
CALL TO ACTION

Consider team’s mindset transformation
• check if you are including the “people” variable in your digital engineering journey

Cloud now
• overcome challenges that should stay in the past
• hybrid or not, you choose.

Industry 4.0 for all
• make sure you are moving both Engineering and Operations at the same pace
VIDROS PLANOS

CRIE O NOVO
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