



SAP Leonardo **Live**

North America

MINING LIKE A STARTUP

helio.mosquim@vale.com | SAP Leonardo Live Summit | Chicago, November 2017



We are one of the world's largest mining companies, working with passion to transform natural resources into prosperity.



Innovation



Environmental



Social

PURPOSE





TEAM





DIVERSITY



+US\$ 124 bi

Investments over the last 10 years



FUNDING

3Q17 US\$ 3.1 bi

Generated Cash



90 Million Tpy



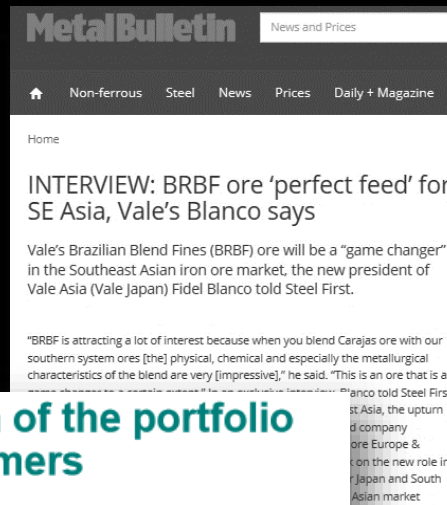
DISRUPT

Radical Efficiency and Sustainability

-41% C1 Cost @ US\$ 7.7/t , -70% Fuel, -93% Water Consumption, -50% CO² Emission

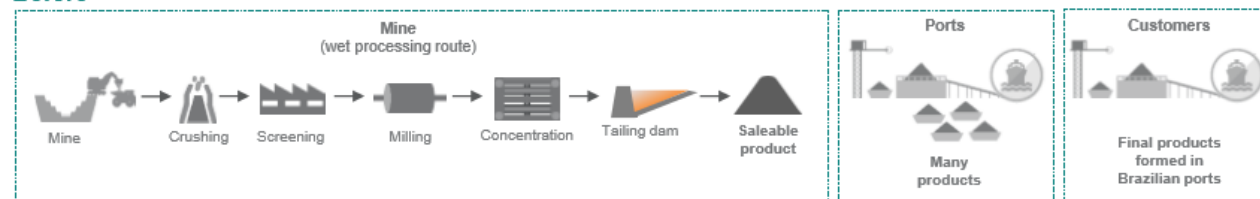


Customer Centric

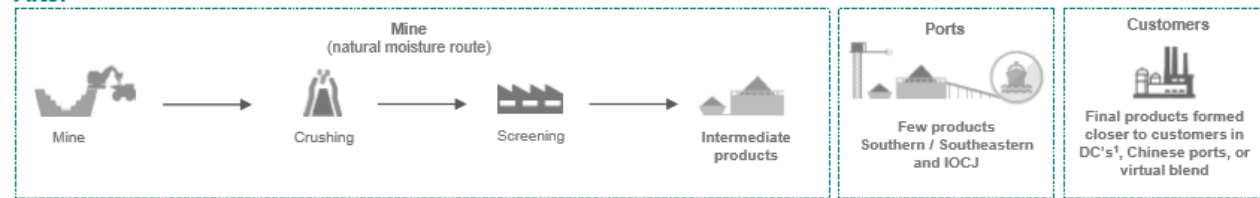


The new mine plan is based on the simplification of the portfolio with final products being formed closer to customers

Before



After



DESIGN

Brazilian Blend Fines

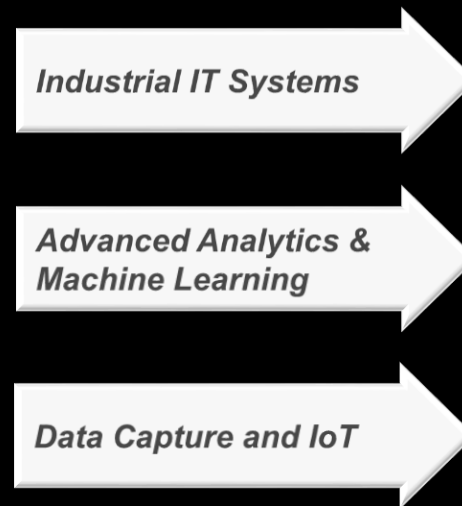


Business Imperatives

Integration + Simplification + Productivity



Digital Transformation



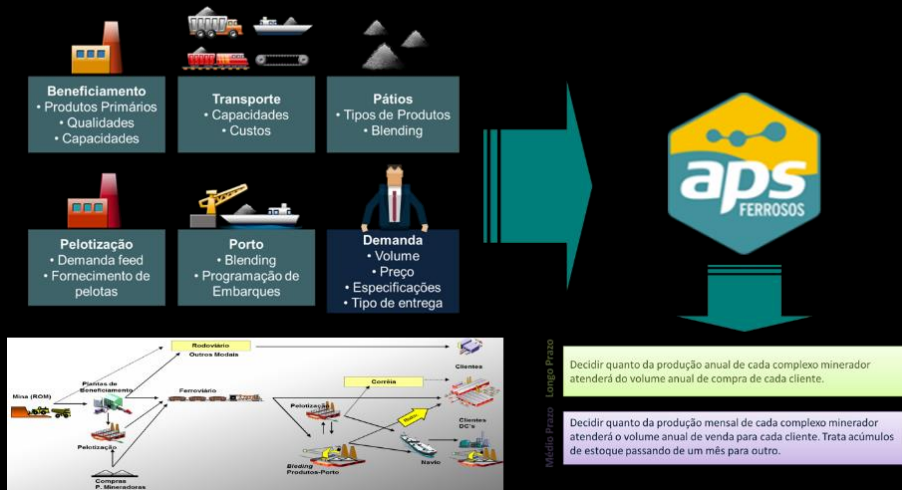
Business Outcomes



~US\$
↑ 2bi
EBITDA*



Digital Supply Chain

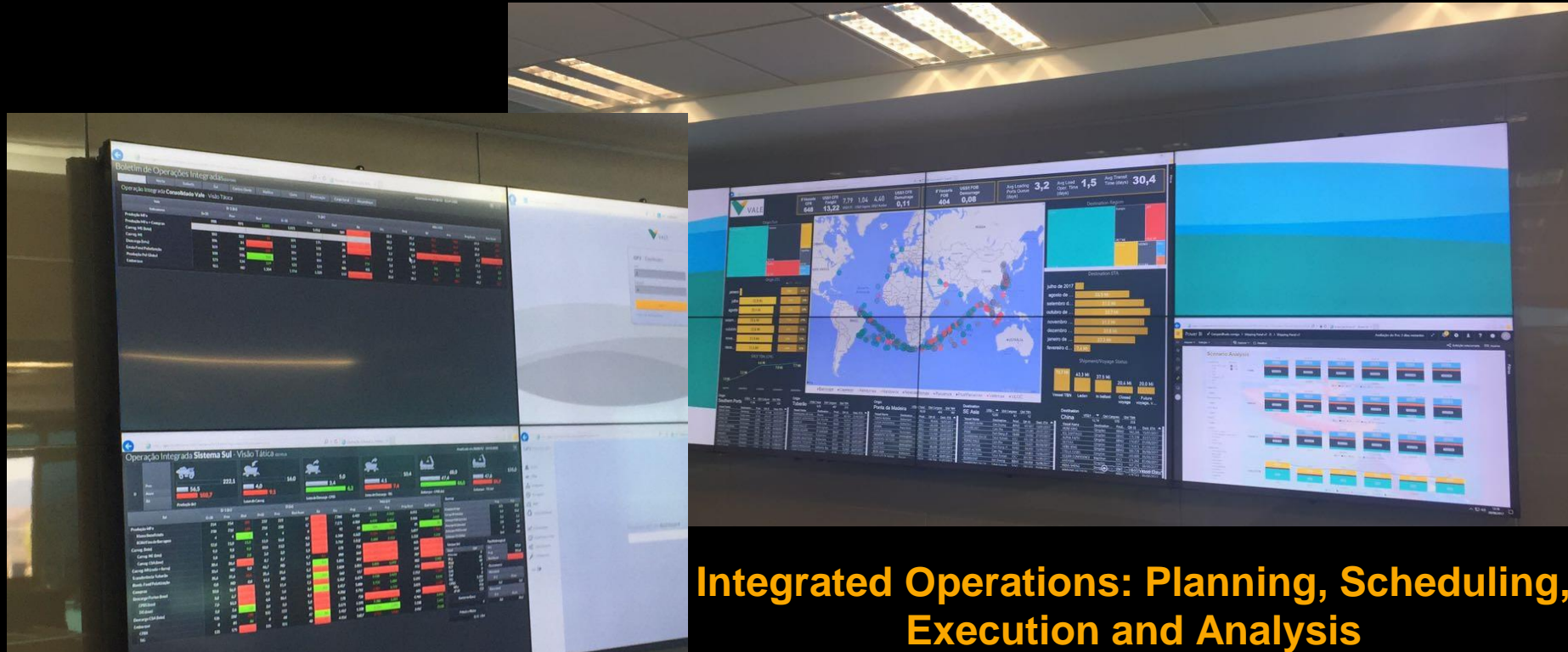


Optimization Models: Volume x Costs x Prices

Shipping Fleet Optimization System

↑ **MARGIN**

Digital Operation



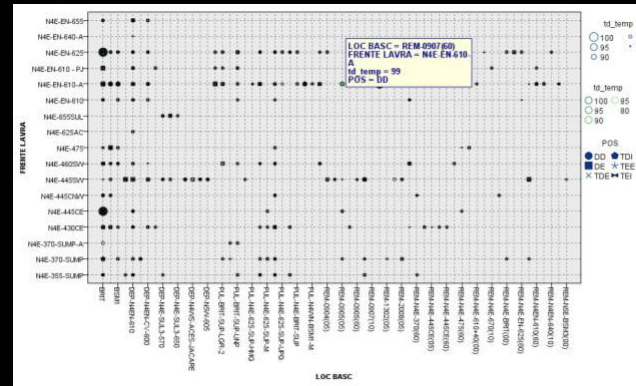
Integrated Operations: Planning, Scheduling, Execution and Analysis

“Don't tell it, show it.”

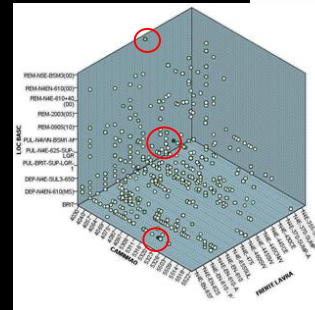
Health & Safety Prediction Model



Predictive Maintenance



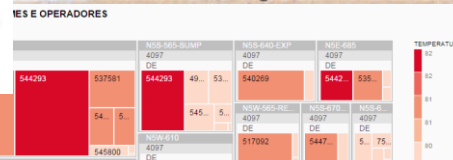
Early warning signals



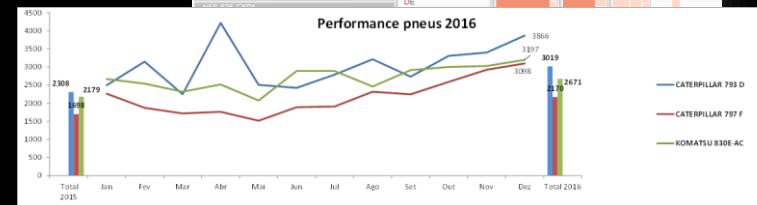
Predict imminent failures

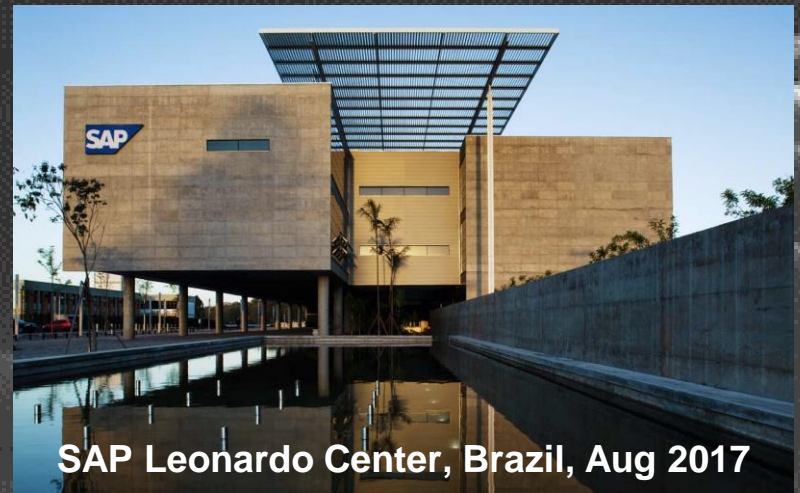


Predict tire life cycle



Rapid low cost prototype for showing impressive results





SAP Leonardo Center, Brazil, Aug 2017

A STARTUP CHALLENGE

Aug 2nd
Wed

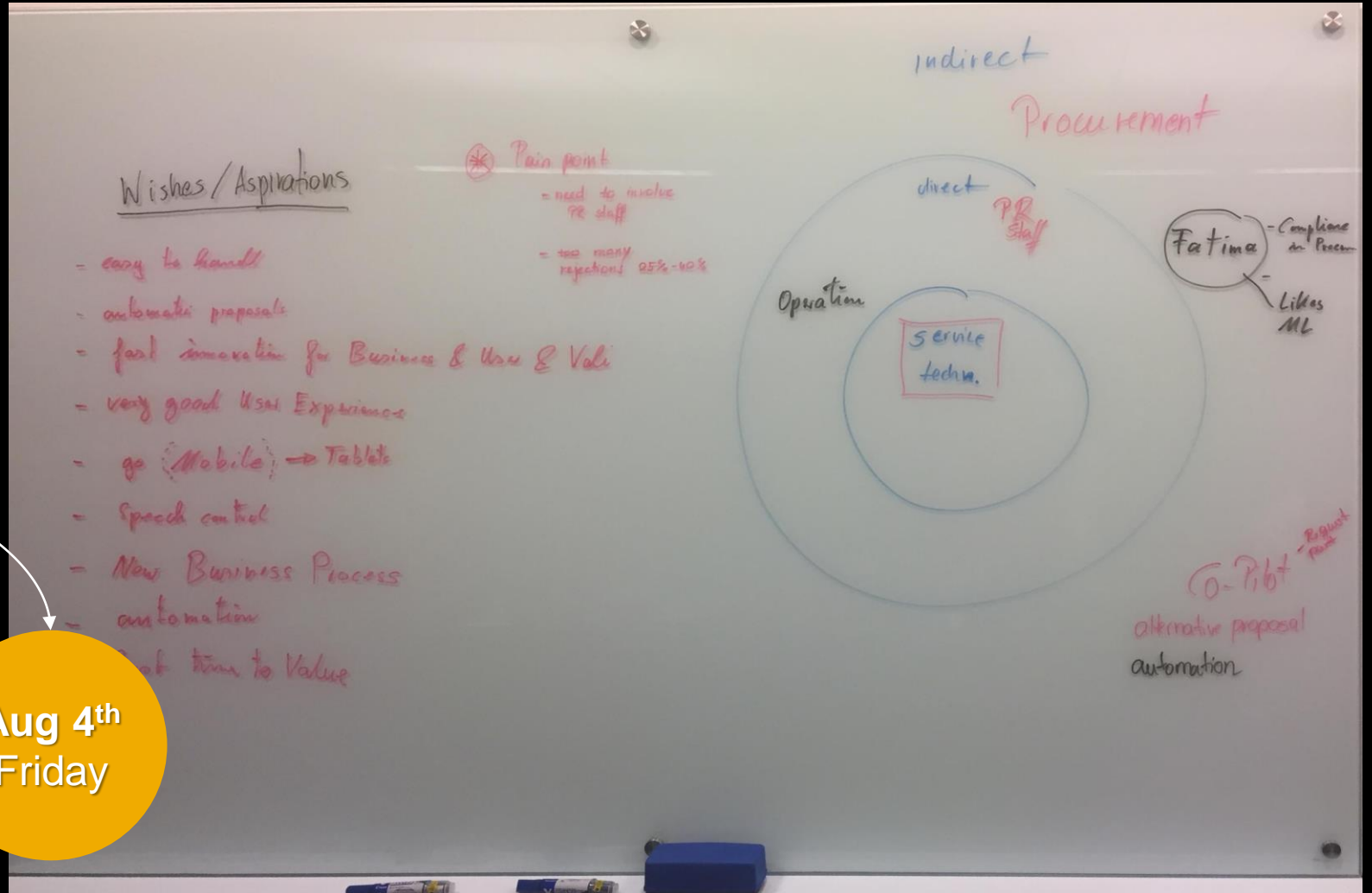
1st touch point
with sharing the
challenges and
the vision

Aug 3rd
Thursday

Draft 4 week
work plan for a
fast jump start

Aug 4th
Friday

Vale ready to go
for Exploration
workshop



Aug 5th
Saturday

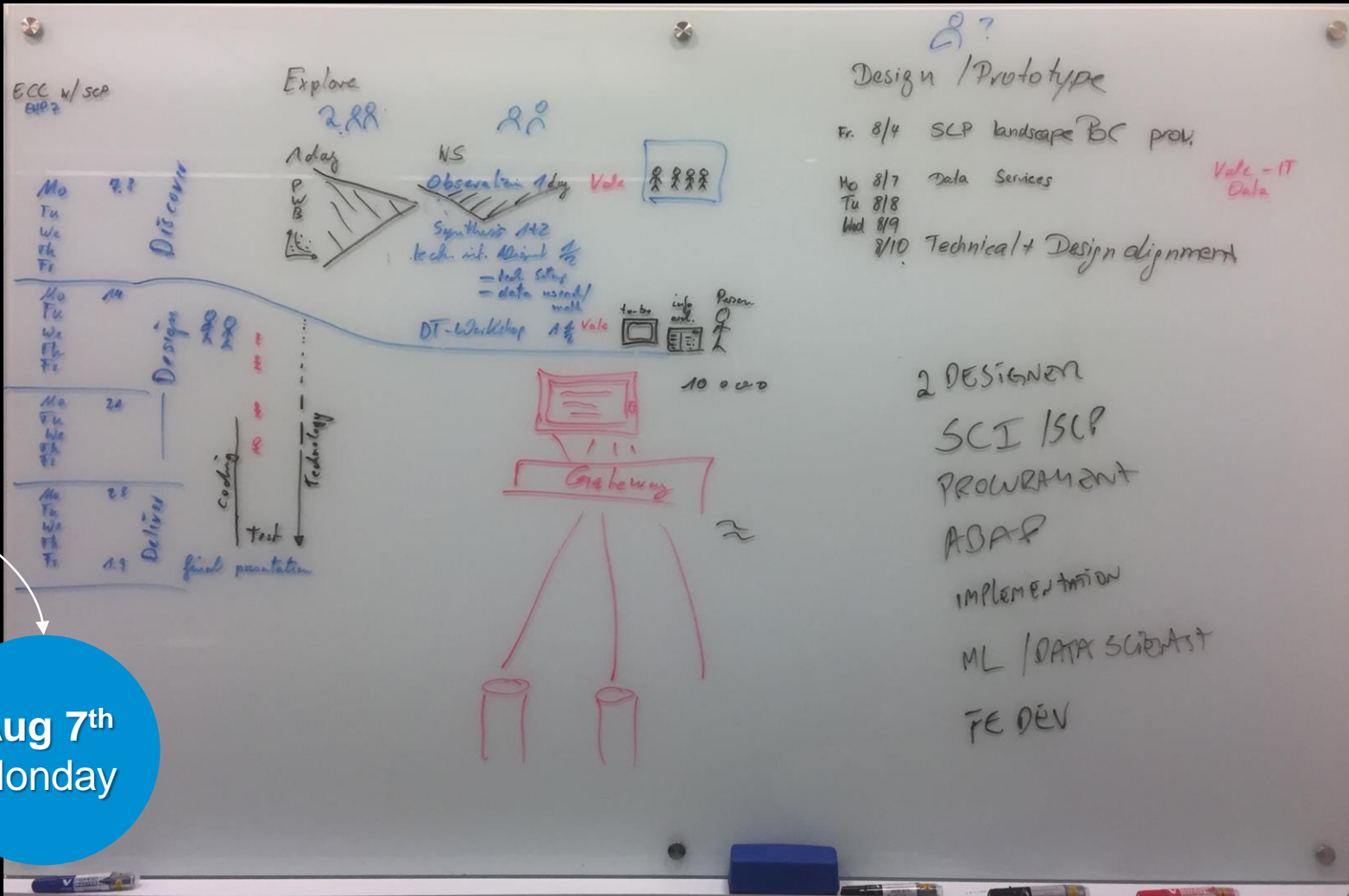
Onboarding of SAP
team members and
flight / hotel
bookings

Aug 6th
Sunday

Briefing in Belo
Horizonte for 3
day engagement

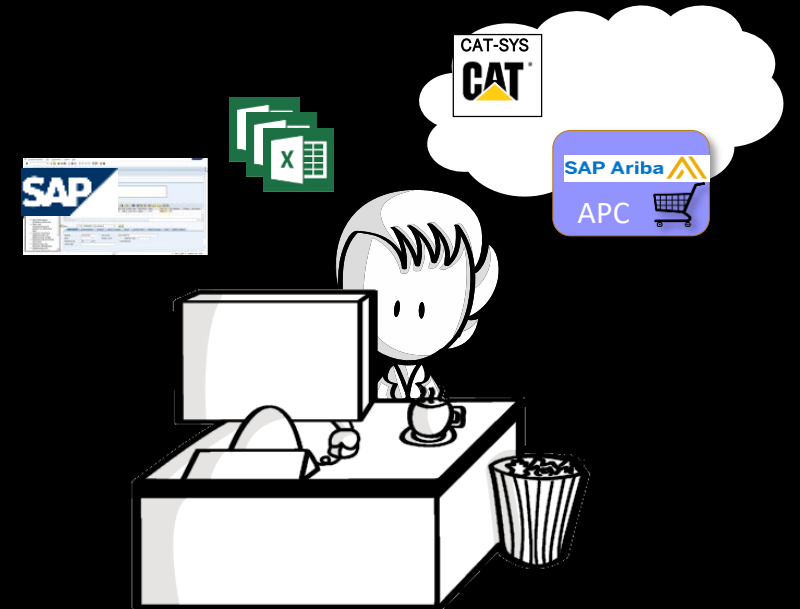
Aug 7th
Monday

Exploration
Workshop



User Pain Points

- | Manual Process
- | A lot of screens
- | Decentralized information
- | A lot of shared files
- | Unknown information
- | High number of rejections



Summary

As part of a larger digital transformation, VALE is innovating their processes to be more efficient and effective. The goal was to operate and innovate user centric and design driven to have the most improvements including the people participating in the process. The challenge was to reduce the number of purchase requisitions that are being rejected causing a lot of delays in the maintenance and operations of the mines. Thus, VALE engaged with SAP to build an integrated prototype in 4 weeks using Design Thinking methodology and Leonardo cloud service platform.

User research: key figures

5

End-users
Interviewed

3

Roles
involved

2

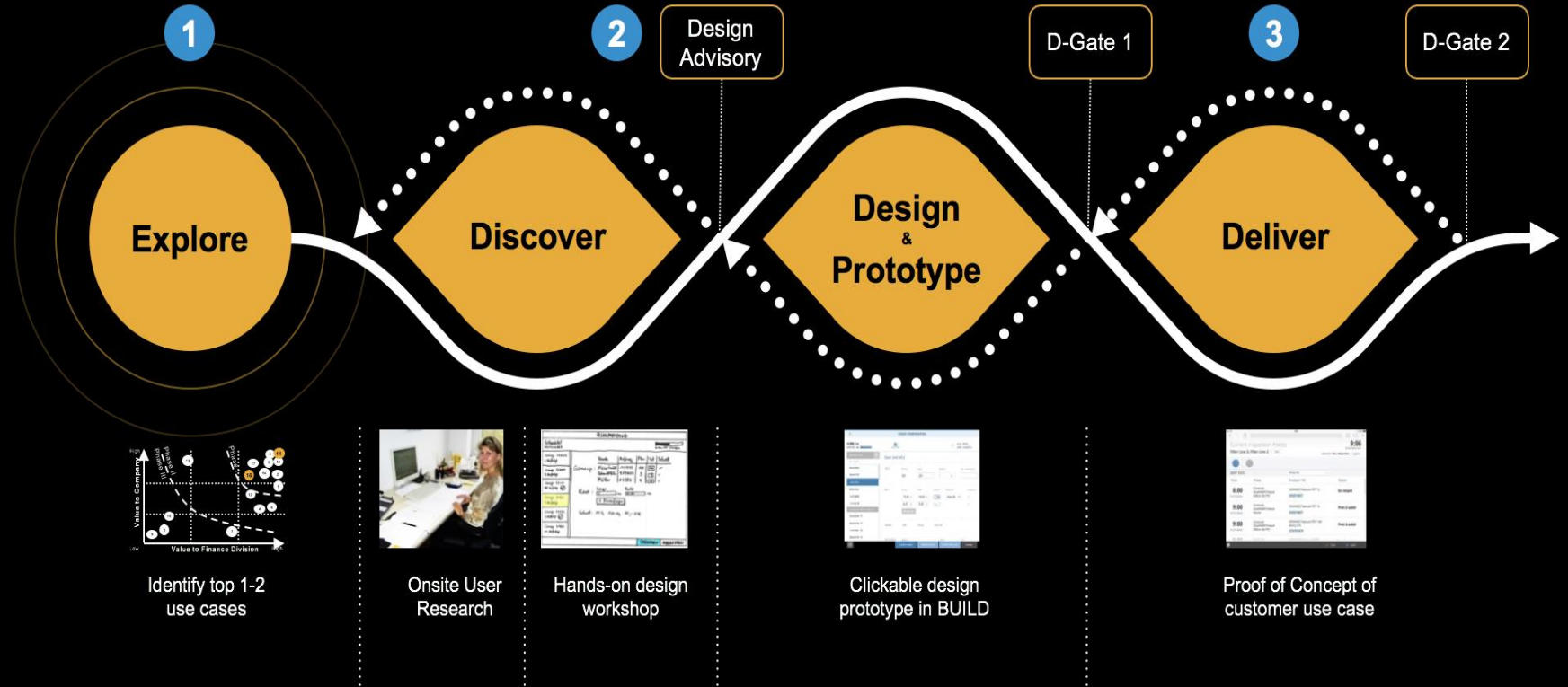
DT Workshops

26

participants

SAP Leonardo Open Innovation

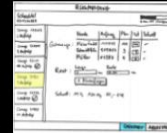
Deliver SAP Leonardo Innovation Use Cases by involving Real End Users



Identify top 1-2 use cases



Onsite User Research



Hands-on design workshop



Clickable design prototype in BUILD



Proof of Concept of customer use case

Objective:

Reduce the high number of rejections for spot purchase requisitions in VALE

From Exploration workshop to live Prototype on SAP Leonardo in

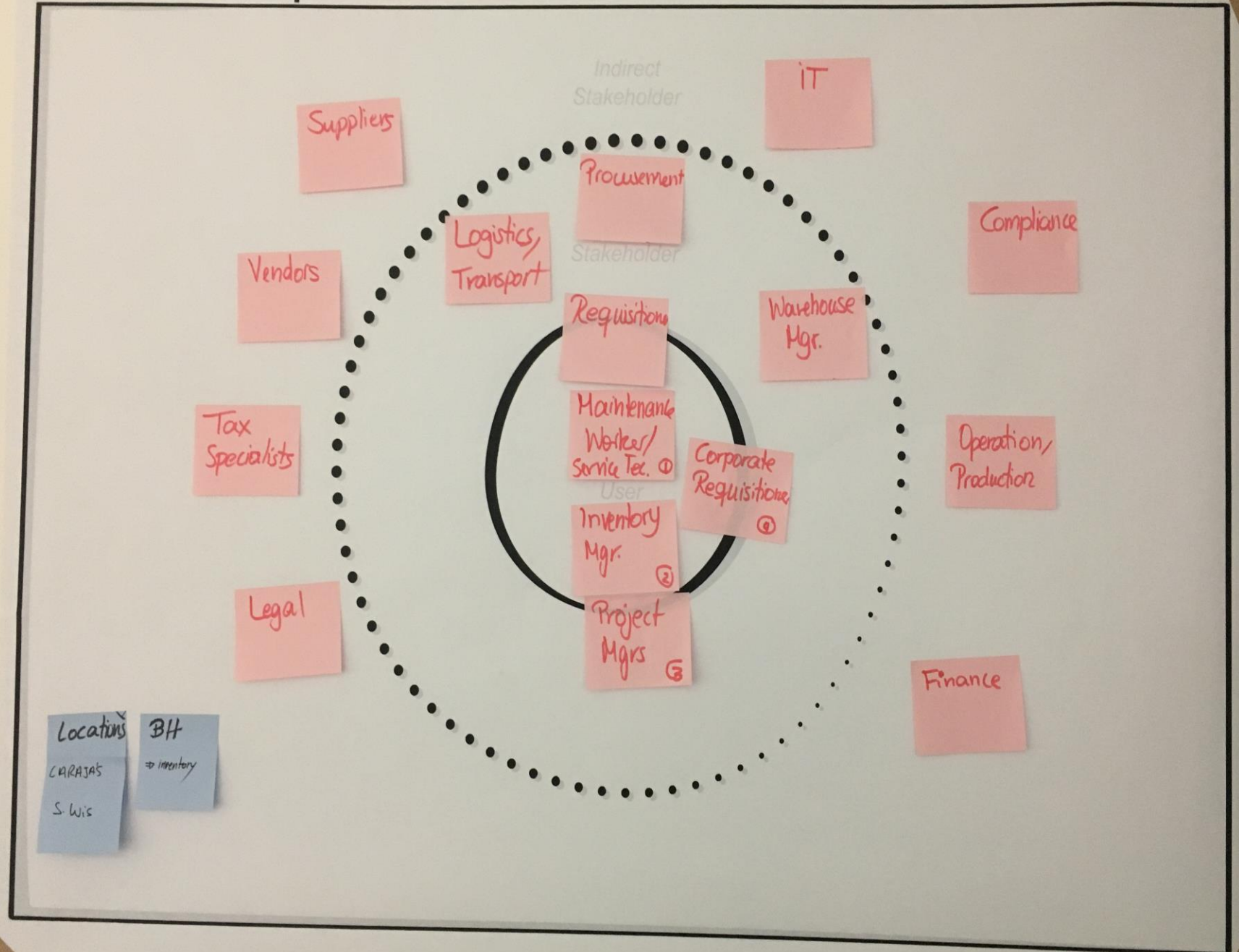
4 weeks

Challenges

- Several unnecessary fields in the purchase requisition confusing the user;
- Different source to find the proper item (associated to a contract);
- Complex Integration landscape to support the process;
- 25-40% of the Purchase Requisition rejected by procurement;
- ~50% of Rejection are related to the items with Contracts already in place;
- Huge volume of RFQs lines with different vendor lists;
- Generic Service Master – Lack of description for the service required;

Stakeholder Map from Exploration workshop

Stakeholder Map



How Might We from Exploration workshop

August 7th

Problem Statement - How Might We...? Question

What can we do for our Persona?

How might we help

Juan

in his
role

Service
Technician

(Persona)
Who are you trying to help?

Who

WORKS
IN THE
FIELD

(Conditions)
*What did you learn from the UX
(conditions based on moment of truth)*

To

TO
ORDER
PARTS

QUICKLY
AND
FAST/
DIRECTLY

AVOIDING
REJECTIONS

AND
DOWN
TIMES

(Achievements)
*What does this Persona want to
(The Person's goals and tasks)*

Discover



Scope

Mobile App that supports an intelligent purchase requisition process

360° Research

On-site visit to the mine for observation and interviews with 3 related roles.

Synthesize

Workshop with end users to present the synthesis results and design solution together

Outcome

Low-fidelity prototype of smart purchase requisition process to reduce rejections



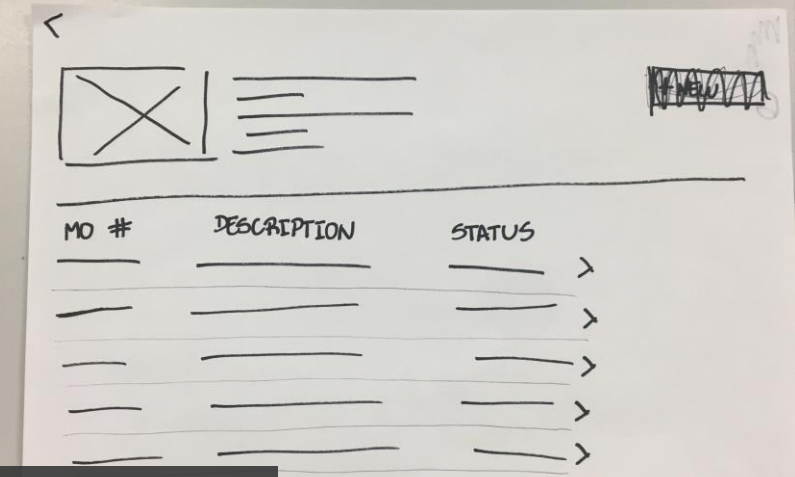
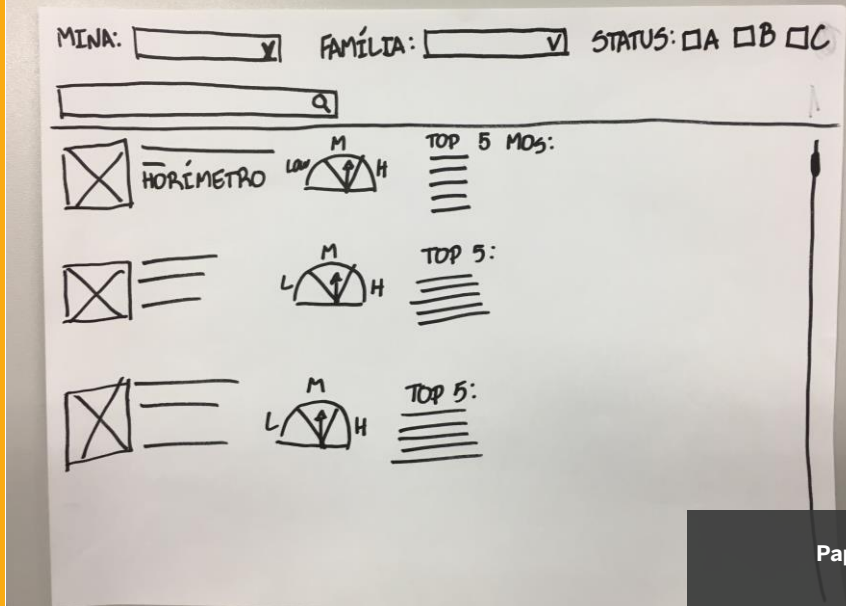
On-site observations

Synthesis presentation

Design workshop



Design



Paper prototypes

Prototype

Mobile App that supports an intelligent purchase requisition process

Validate

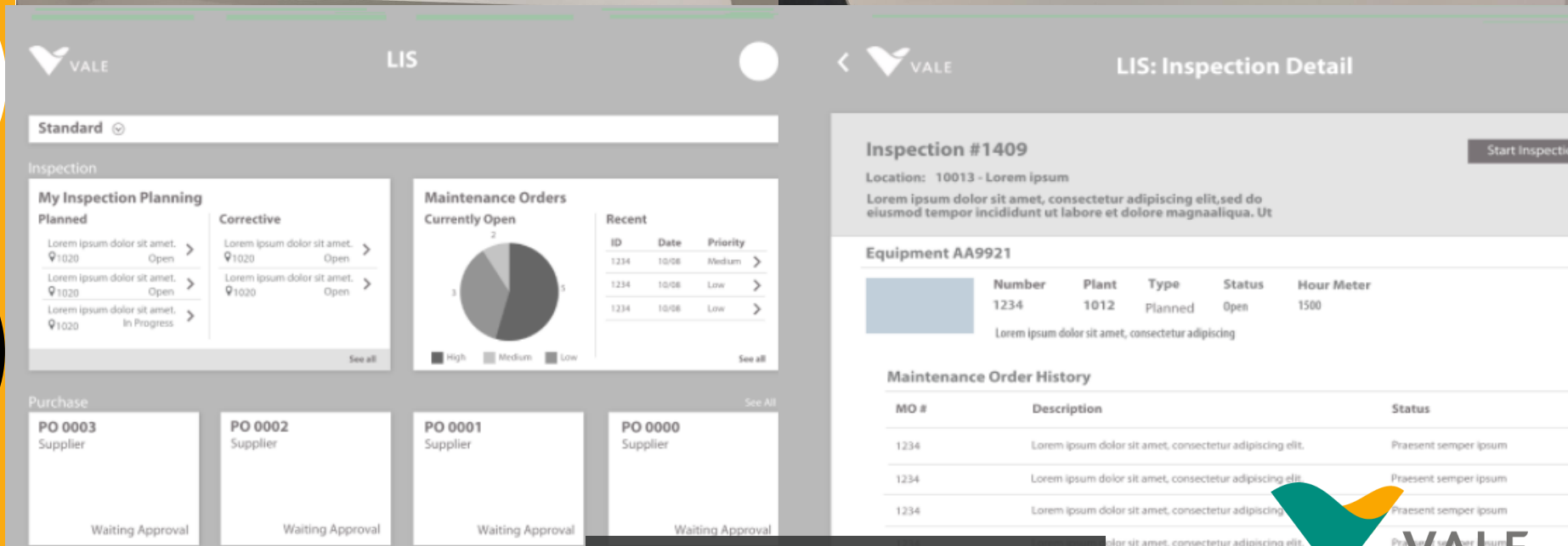
Validation with end-users and business

Iterate

Integration of the end-user feedback in the clickable prototypes and visual design.

Outcome

Implemented prototypes with integration to ERP using machine learning on SAP Cloud Platform



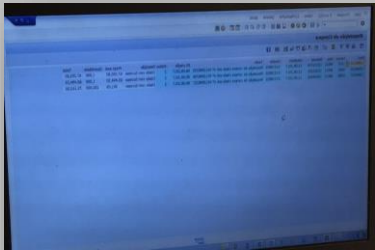
Interactive prototype



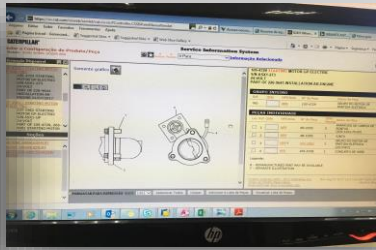
BEFORE



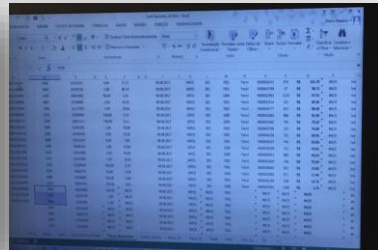
Manual updated wall with information on inspections



SAP ERP



Vendor Catalogue



Personal Excel File

AFTER

Increased asset, maintenance and people effectiveness

Equipment	Location	Status
P-3000-N007	C1-BR2-22	Open

Equipment	Location	Status
P-3000-N007	C1-BR2-22	Open

Single access point, simplified process, intelligent check for contract with intelligence for easy update of ERP through SAP Cloud Platform

86% reduction of purchase Requisition rejections



Deliver



Leonardo Smart Purchase Requisitions

Procurement Overview

Standard

My Planned-Predicted Inspections

Today [View All](#)

Equipment	Location	Status
P-3000-N007	C1-BR2-22	Open

Showing 1 of 1

My Corrective Inspections

Today [View All](#)

My Inspections

Today **1**
[View All](#)

Requisitions

Recent

#10051963	Caterpillar	Waiting Approval
#10051962	Caterpillar	Waiting Approval
#10051961	Caterpillar	Waiting Approval

Open Requisitions

Warehouse (Not Attended)
10

Open Requisitions Vendor

Maintenance Orders

Currently Open [View All](#)

#5550
Caterpillar Waiting Approval

Showing 1 of 1

Maintenance Orders

Last 7 Days

Dashboard

Outcome

Creation of a functional integrated, user validated PoC

Inspection Planning

Days: Today

September 2017

ID	Equipment	Location	Hour	Status	Type
821880	P-3000-N007	C1-BR2-22	14:00	Open	Corrective

Inspection planning

Inspection Details

Inspection #821880

Location: C1-BR2-22 Type: Corrective Planned Effort: 19.9 hours
Description: Engine review and lubrication 250HRS

Equipment PM01

Number: 821880 Location: C1-BR2-22

Maintenance Order History

Maintenance Order Number	Description	Created on	Priority	Status
1233	Bi-Annual Black Smoke Measurement	07/06/2017	Medium	Closed

Inspection details

Select Parts

Inspection #821880

Location: C1-BR2-22 Type: Corrective Planned Effort: 19.9 hours
Description: Engine review and lubrication 250HRS

Equipment PM01

Number: 821880 Location: C1-BR2-22

3D model for part selection

XB2446 MM03
Description: Tire 59R0R63 CAT
Supplier: CATERPILLAR

3D model for part selection

Long term approach

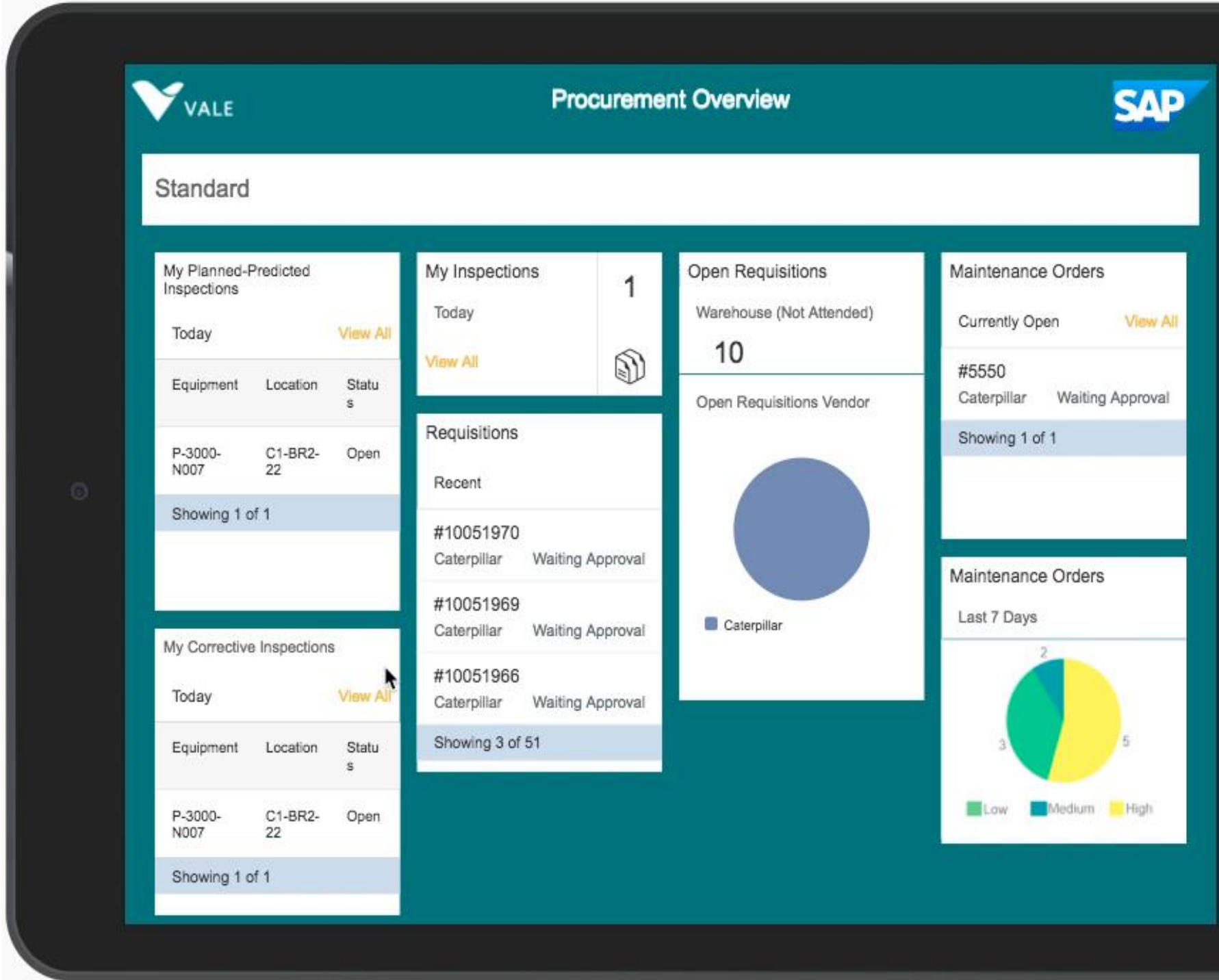
Design produces results!

Optimizing purchase requisition and maintenance process

Increased asset, maintenance and people effectiveness

86%

elimination of purchase requisition rejections





THANK YOU



VALE



SAP Leonardo **Live**

North America