XI Jornadas Técnicas ABB en Chile

Warehouse Management System para gestión de almacenes inteligentes

Nicolás Gamba - Argentina

XI Jornadas Técnicas ABB en Chile

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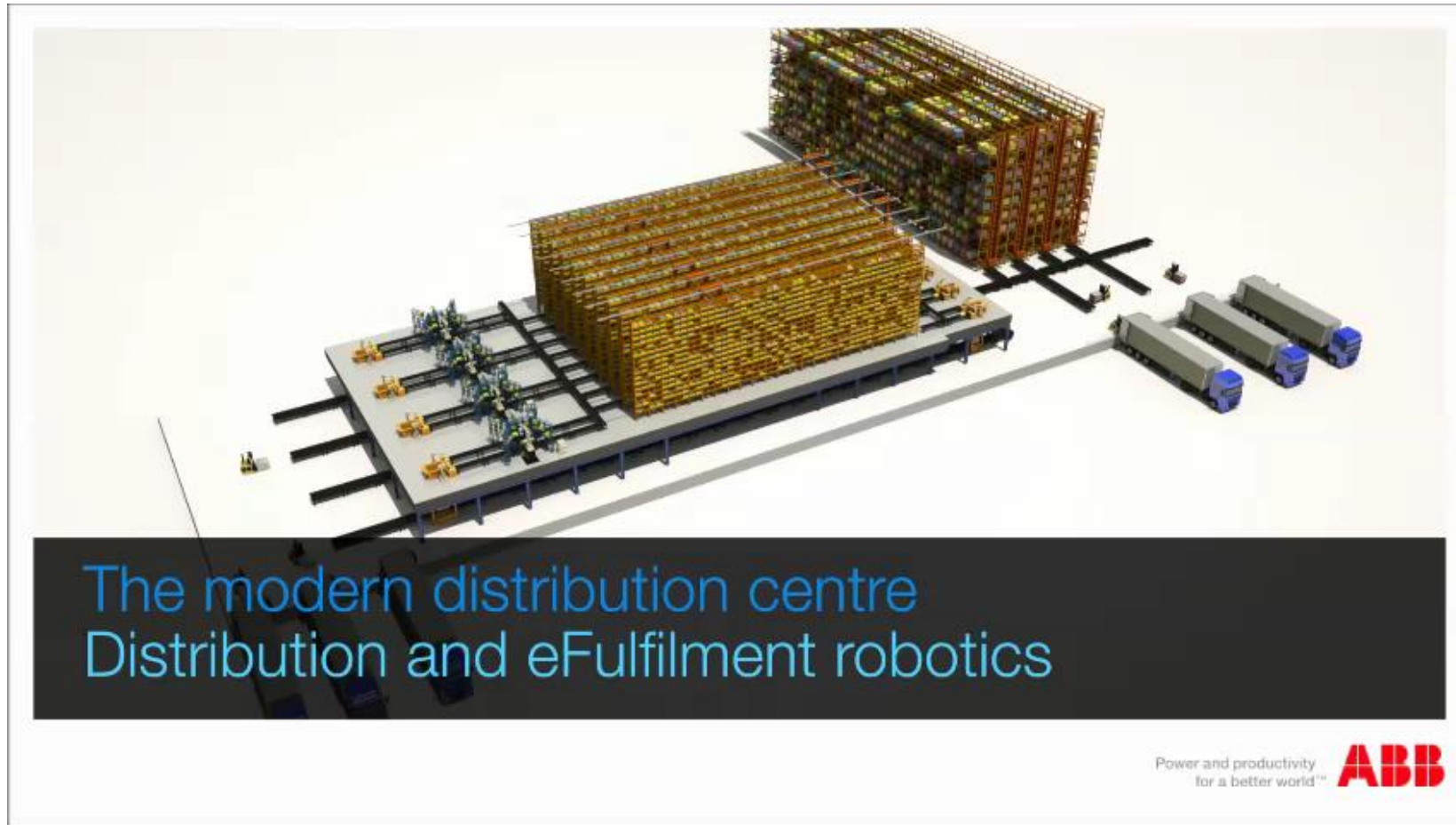# Warehouse Management System para gestión de almacenes inteligentes

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- Objetivo
- Introducción
- Descripción de la solución
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Objetivo

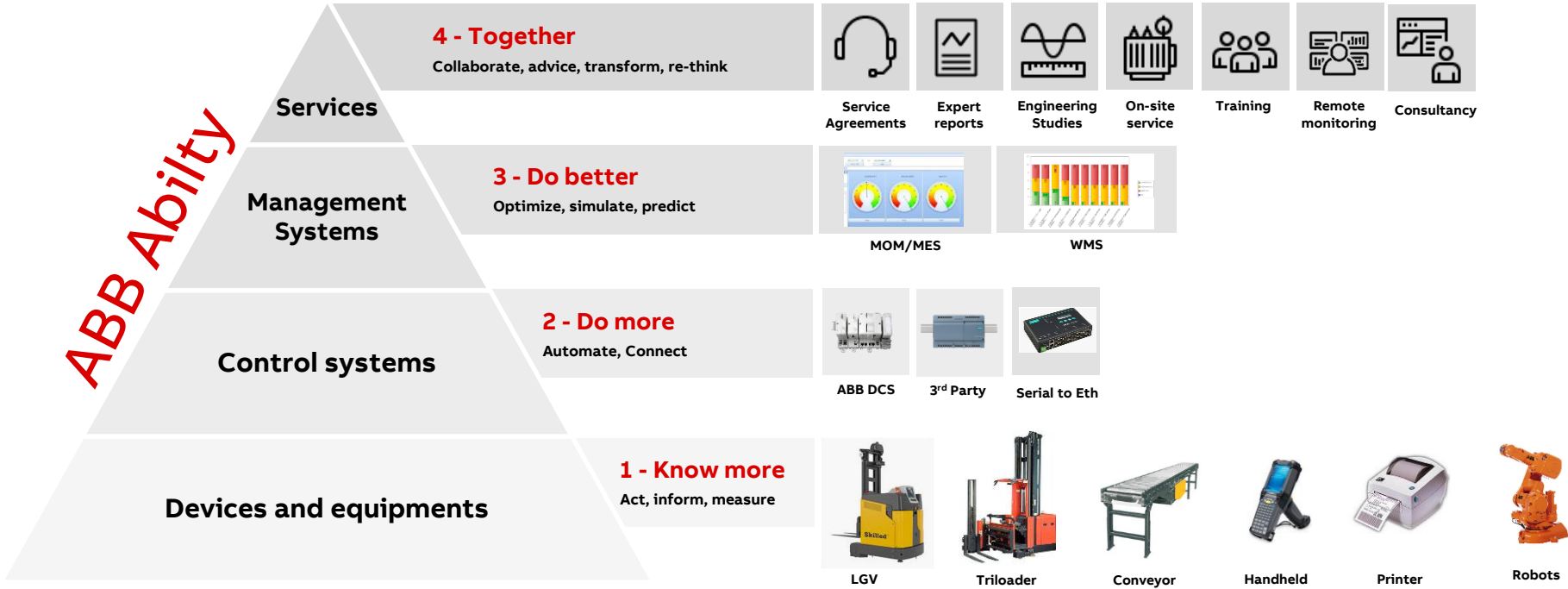# Warehouse Management System para gestión de almacenes inteligentes

Objetivo

The modern distribution centre
Distribution and eFulfilment robotics

Power and productivity
for a better world™ ABB

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Introducción

ABB Ability™ Management Systems
Productos y Servicios

ABB Abilty

4 - Together
Collaborate, advice, transform, re-think

Services

Service Agreements · Expert reports · Engineering Studies · On-site service · Training · Remote monitoring · Consultancy

3 - Do better
Optimize, simulate, predict

Management Systems

MOM/MES · WMS

2 - Do more
Automate, Connect

Control systems

ABB DCS · 3rd Party · Serial to Eth

1 - Know more
Act, inform, measure

Devices and equipments

LGV · Triloader · Conveyor · Handheld · Printer · Robots

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Manufacturing Execution Systems
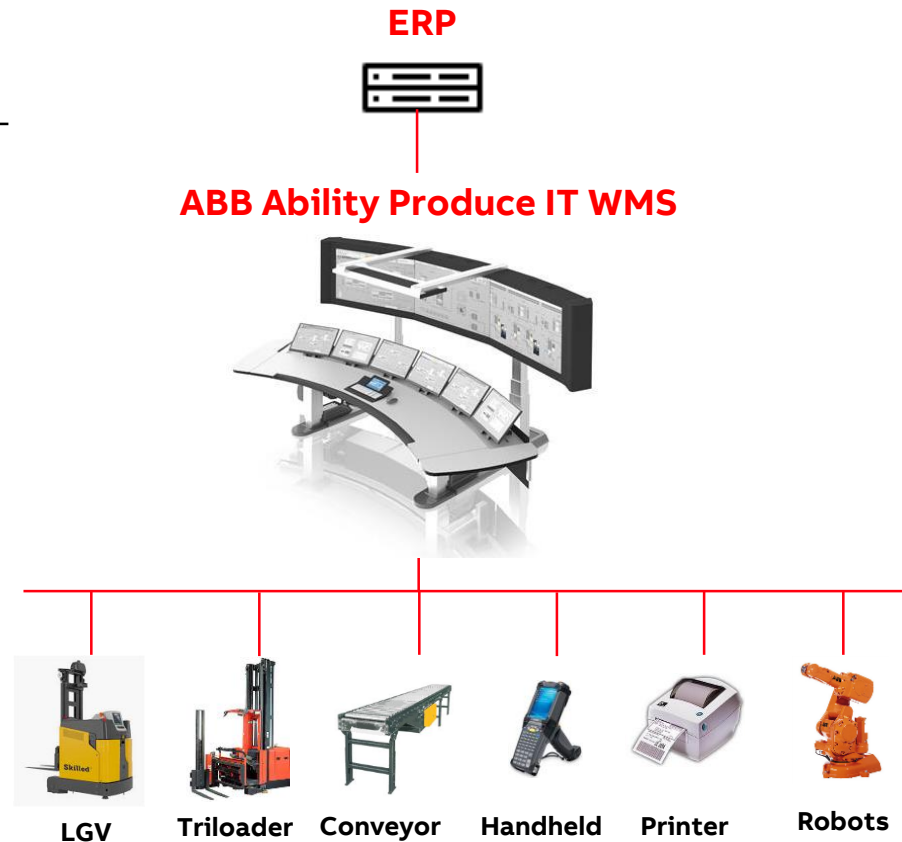
Definiciones
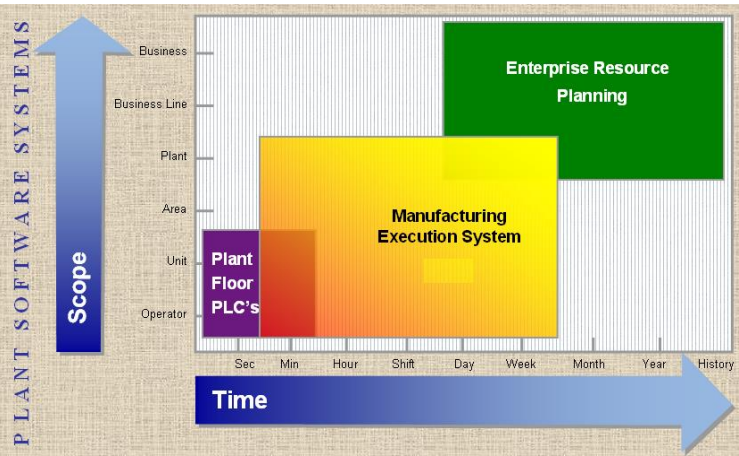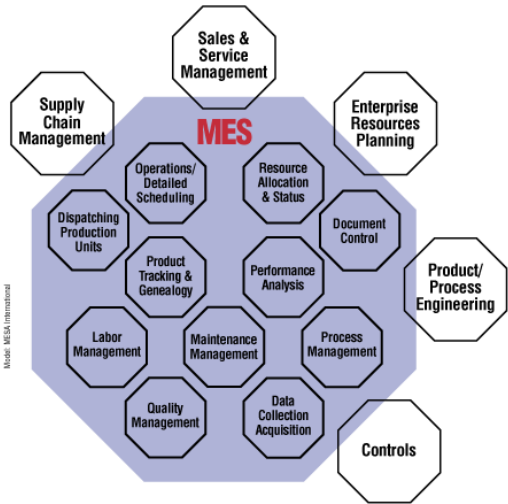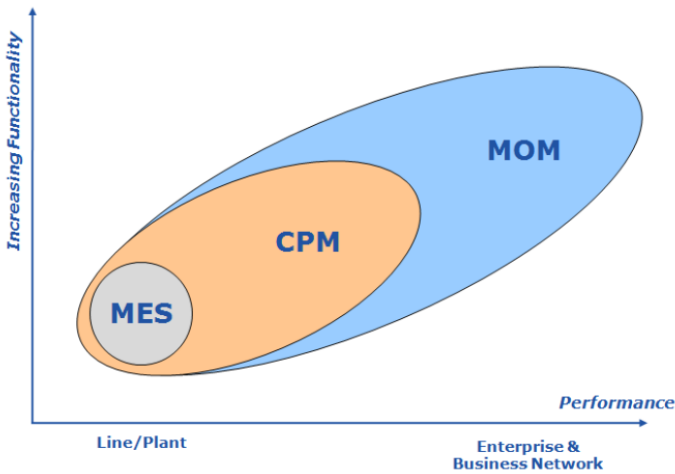
Warehouse Management System

Introduction

ERP

Definition

- The main purpose of Warehouse Management is to provide a detailed overview of material storage and support material movement processes within warehouses and its elements

ABB Ability Produce IT WMS

Type of Warehouse

- Green fields or Brown fields
- Manual warehouse
- Full Automated warehouse
  - Cranes
  - Conveyors
  - Triloaders
  - AGVs
- Hybrid

LGV **Triloader** **Conveyor** **Handheld** **Printer** **Robots**

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Descripción de la solución

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System Components

ERP   LIMS   PM

Corporate LAN

Firewall

Plant LAN

WMS Server

- Performs all tasks related
  with management
  movement orders, charges
  preparation, revenue
  management, operations
  persistence,
  communication with
  handhelds and ERP system.

WMS Client

- Operation, configuration and
  maintenance of the WMS
  Server system.
- Monitors all system
  functions.
- This application is intended
  to be used by system
  administrators or supervisors

WMS Terminal

- It operates all
  radiofrequency/wifi
  system movements. It
  includes income,
  outcome and pallets
  consultation.

**e-mobile
console client**

- Industrial tablet
- Read/write
  functionalities
- Optional Barcode
  Reader and RFID
  Reader
- Android or Window

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System Architecture

Level 4	**Business Planning and Logistics (ERP)** Production scheduling, customer orders, invoicing
Level 3	**Warehouse Management System** Product movement, detailed schedule, inventory
Level 2	
Level 0, 1	**Warehouse Control** Basic control, supervision, object activation

Central control room

INTRANET OR INTERNET

Corporate host · Sales PC · Thin clients · Router · Router · Firewall · Firewall · WAN

PLANT NETWORK

Operator workplaces · Reports printer · FAN printer · BOL printer · Router

WMS Server · WMS Server (Redundant) · WMS Client

CONTROL NETWORK

Third-party PLCs · Controllers AC800M · Serial terminal server

LGV · Triloader · Conveyor · Robots · Motor operated stacker cranes · Weight stations · Electronic presets · Card readers

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Main modules

ERP

| Incoming orders | Dispatch orders | Inventory orders | Inter warehouse movements | Quality | Master data |

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| Reception | Storage | Picking | Inventory | Replenishments | Dispatch |

- Reception
  - Production Lines
  - 3rd party products
  - Returns
- Storage
  - Traditional
  - Automatic
- Picking
  - Picking (layer, box, units)
  - Complete
  - Croosdocking
- Inventory
  - Guided
  - Per position
- Replenishments
  - Traditional
  - Automatic
- Dispatch
  - Traditional / Automatic
  - Load control
  - Exports

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Interfaces

ERP

Middleware

Flat files

Data Base

Web Services

FTP

Shared folders

Replica

Queries

Queries

WMS Interface managers

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At a glance

Main Functions

- Manual shelving management
- Automatic shelving management
- Manual picking management
- Automatic picking management
- Inventory control
- Automatic stock balance
- Returns management
- Export Management
- Deconsolidation management

Main Interfaces

- Interface with all ERP
- Native Interface with ABB PLC
- Interface with other 3rd system
- Interface with 3rd-party PLC
- Interface with Handheld
- Interface with AGV
- Web Access

Others capabilities

- Optimization of positions
- Optimization of shipping and freight
- Truck load control
- Croosdocking
- Voice Picking
- Customizable Reports
- Customizable features

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Screen shots (Examples)

Vertical Hall
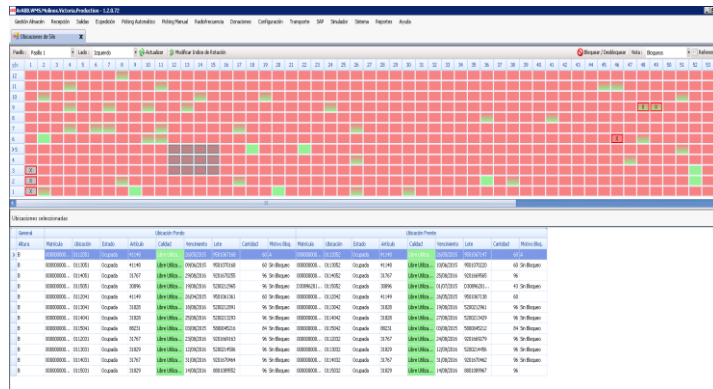
Occupational Report
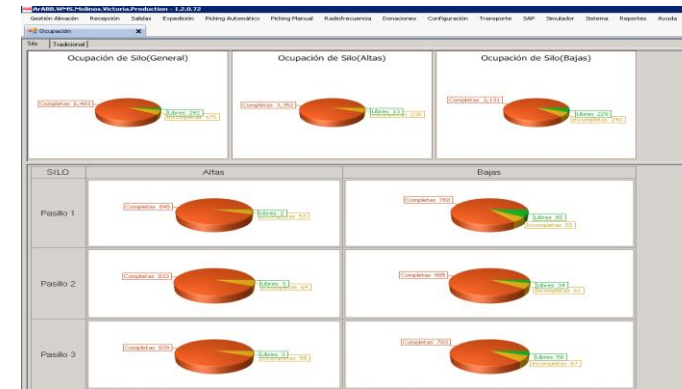
Automatic Picking
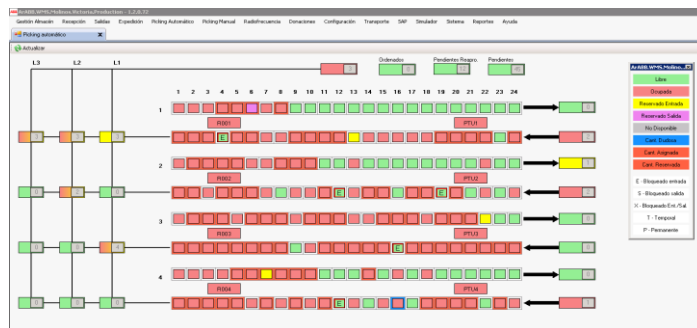
Manual Picking

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Look & Feel Web Application

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Screen shots mobility solution (Examples)

ABB Ability Produce IT WMS

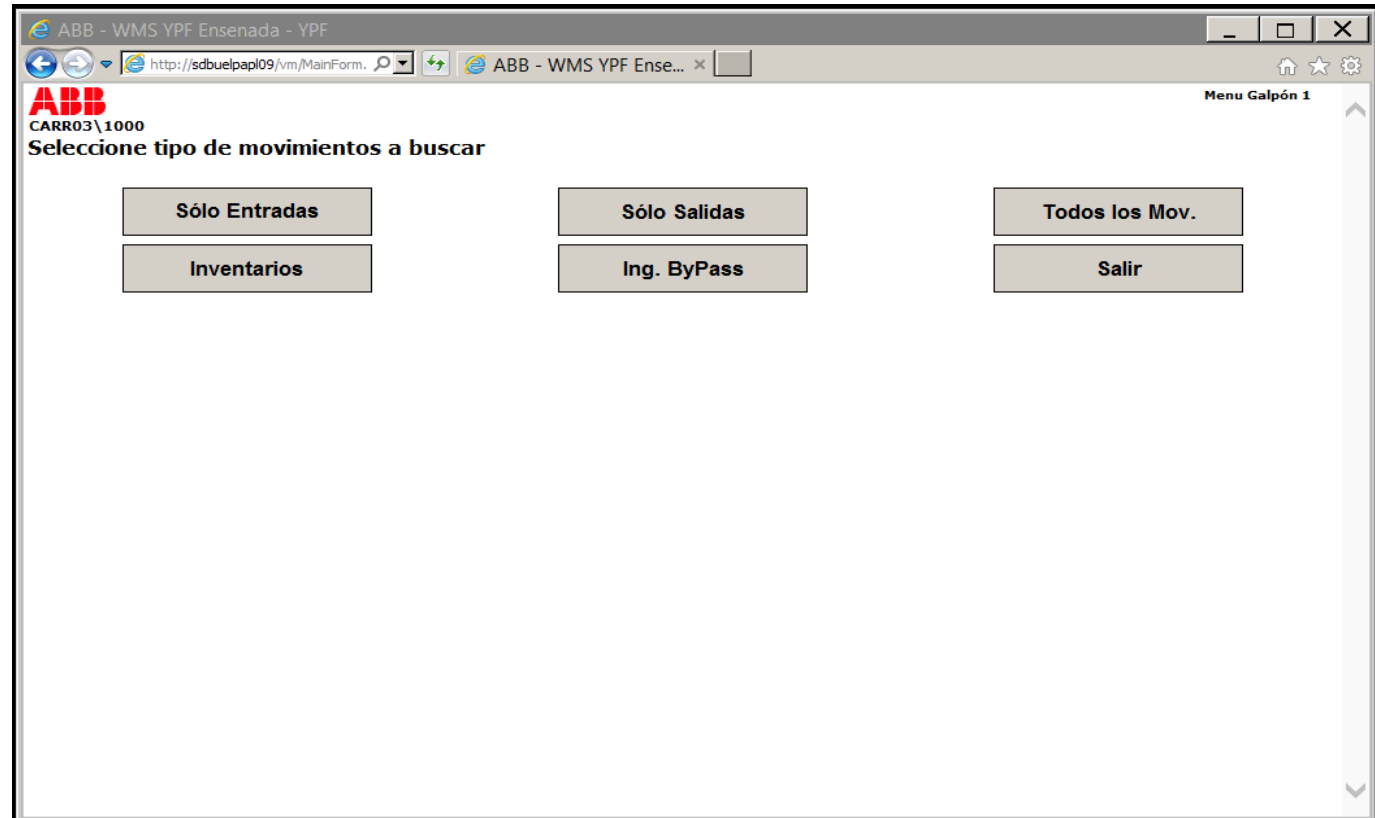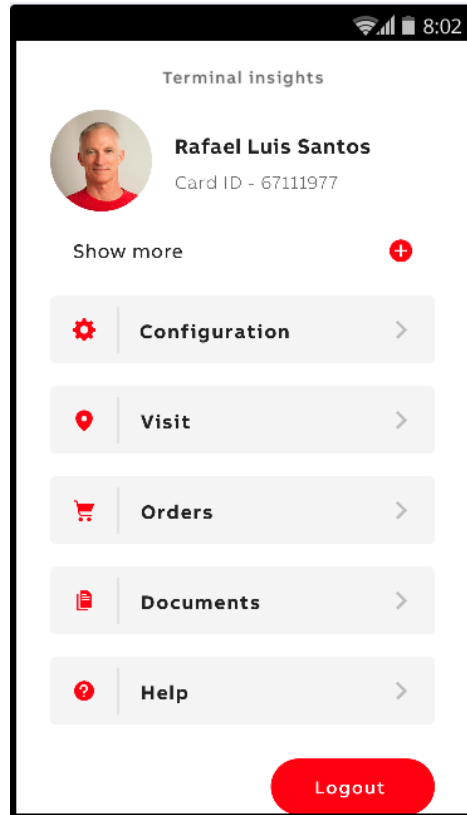Screen shots mobility solution (Examples)

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Technologies

Latest technologies

- The PitWMS is developed using .Net/framework 4.7.2

- All the communications between process use data bases and MSMQ.

- The data base could be Oracle or Microsoft SQL Server.

- The WMS Terminal is developed using .Net/framework 4.7.2

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HW and SW requirements

WMS Server

- Brand: IBM, Dell or HP
- Processor: 3GHz
- RAM: 8 GB
- CPU Core: 4
- Memory: 250GB EIDE/RAID1
- NIC Card: fast ethernet 100MB/s
- CD-RW/DVD-ROM 48X
- Operation System: Window server 2012 (64 bits)
- Microsoft Office 2010
- Microsoft .Net framework 4.0

Database Server

- Brand: IBM, Dell or HP
- Processor: 3GHz
- RAM: 8 GB
- CPU Core: 4
- Memory: 250 GB
- RAID5
- NIC Card: fast ethernet 100MB/s
- CD-RW/DVD-ROM 48X
- Operation System: Window server 2012 (64 bits) con Oracle or Microsoft SQL Server 2012

Workstation

- Brand: IBM, Dell or HP
- Memory: 250 GB
- RAID5
- NIC Card: fast ethernet 100MB/s
- CD-RW/DVD-ROM 48X
- Operation System: Oracle or Microsoft SQL Server

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Testing environment

WMS Sim

- It Minimizes the implementations times.

- Future modifications to the operating system are invisible

- The productive environment is always up & running

- The software installation or uninstallations for every test in the productive environment is not needed.

- It provides more security to reengineering.

- Testing complexity is reduced

- All movements of pallets in the warehouse are simulated

- The interface is a copy of each PLC communication.

Aplicación de Simulación de Movimientos y Diagnósticos

Servidor Genérico

Server Matrikon

Entorno Simulado

Entorno Real

Selección

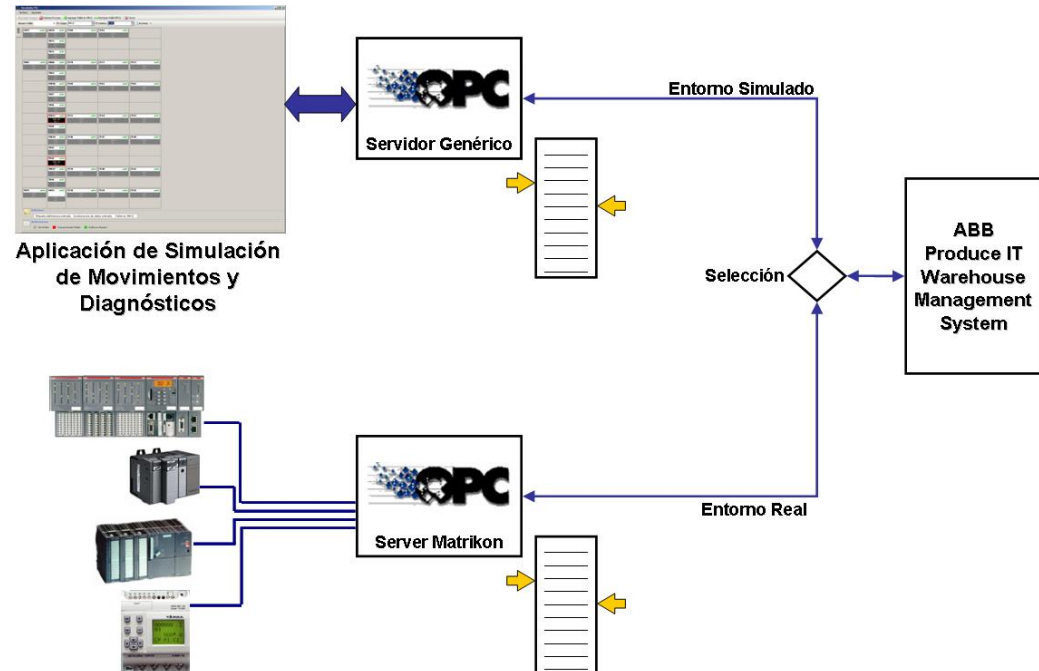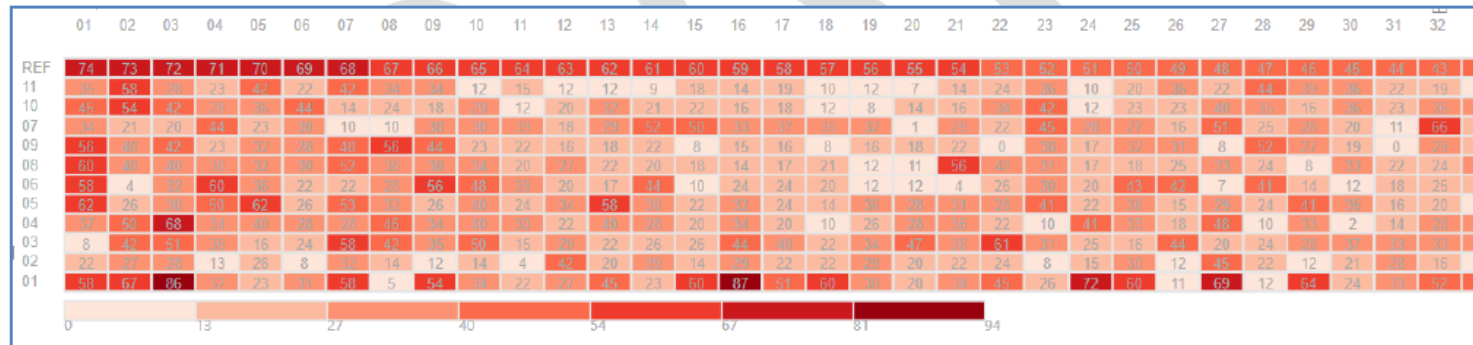ABB Produce IT Warehouse Management System

ABB Ability Produce IT WMS

Analytics

Warehouse Optimization

- Missions history query

- Heat map of the warehouse

- Review of the position selection algorithm

- Light colors indicate positions with few movements

- Dark colors indicate positions with many movements

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LGVs solution

Why to use LGV?

- Safety operations.
- customer's building protection
- customer's machines protection
- Logistic cost reduction
- Increase good corporate image

Main Features

- Laser Navigation
- LGV Vehicle Traffic Management
- Dynamic location and allocation of vehicles
- Load capacity up to 6000 kg.
- Manipulate from 1 single palette to a maximum of 8 pallets.
- Speed max 100 m/min
- Accuracy +/- 5 mm.
- Height up to 9 mt

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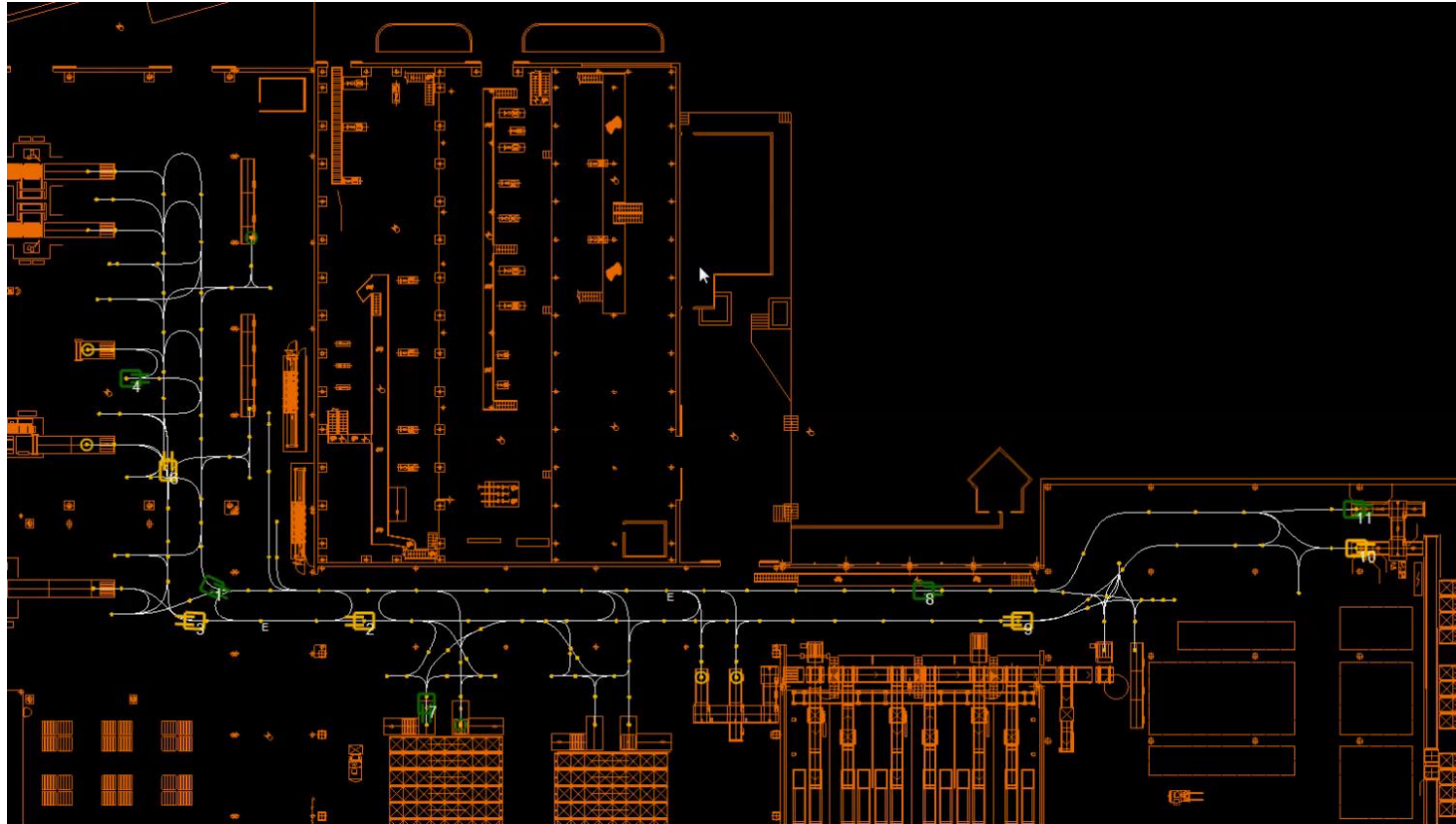# ABB Ability Produce IT WMS

LGVs solution

Full traceability

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Professional Services and Support

Maintenance Strategy (vertical axis, bottom to top): Reactive, Maintenance Strategy, Predictive

Operational Efficiency
- Process & Functional Safety
- Cyber Security

Performance Improvement
- Asset Management and Condition Monitoring
- Predictive Maintenance

Lifecycle Management
- Preventive maintenance
- Engineering and Consulting
- Software Management

Rapid Response
- Technical support
- Remote troubleshooting
- Mobilization to Site
- Corrective maintenance
- Parts
- Training

Contract Management
- ABB Service Desk
- Contract Manager
- Technical Account Manager
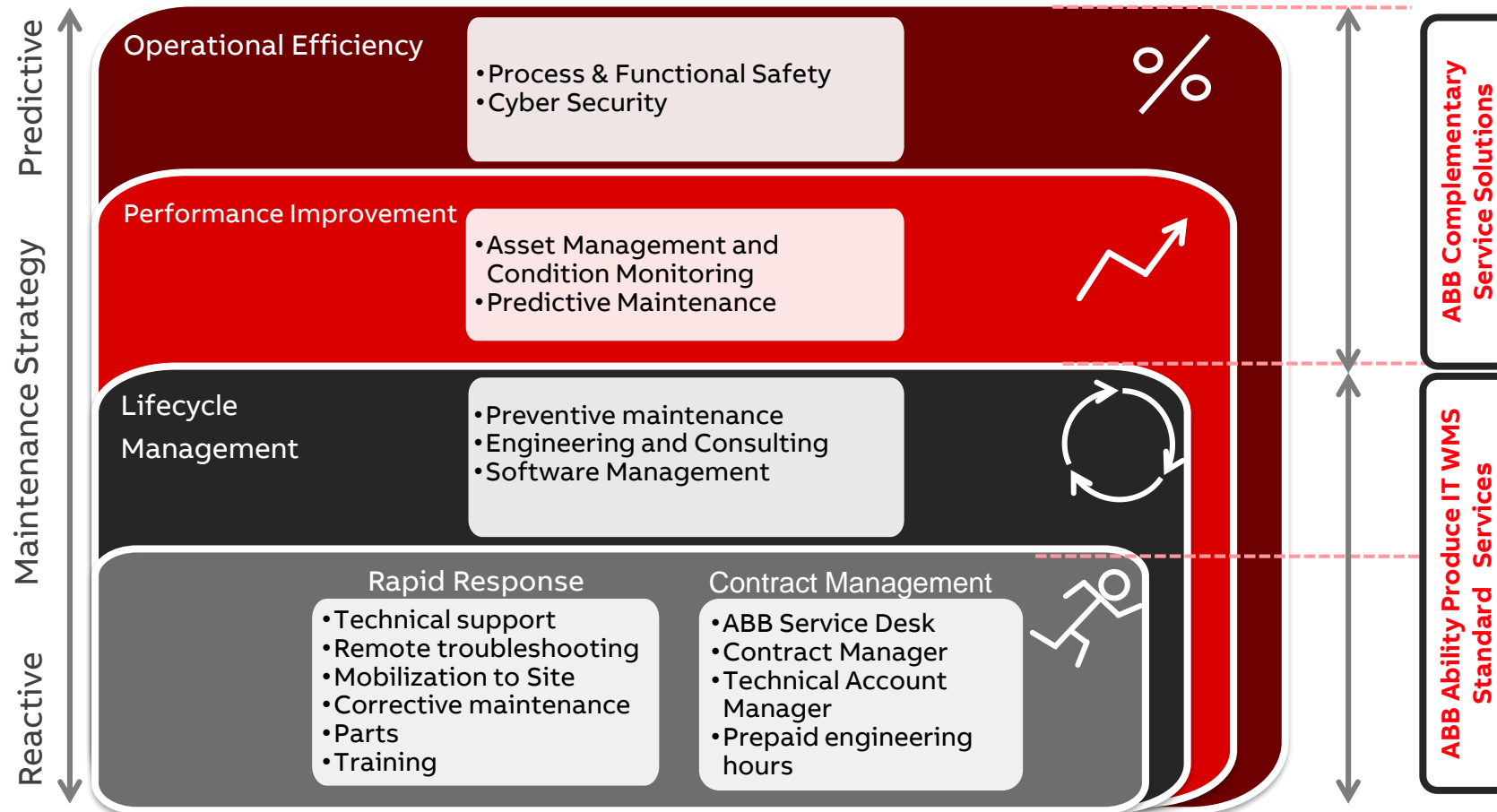- Prepaid engineering hours

ABB Complementary Service Solutions

ABB Ability Produce IT WMS Standard Services

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Casos de éxito

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Succes Case I – YPF: Full integrated Lube Oil Plant

SITUATION: Biggest Lube Oil producer in Argentina

- Increasing the product portfolio to satisfy the market requirement
- Productivity cost reduction
- Limited insights across the efficiency, quality and performance of processes
- Technological revamping Full traceability as a must

PETROCHEMICAL, ARGENTINA

SOLUTION: Full integrated Lube Oil Plant

- Full automated Lube Oil Plant, covering the entire industrial complex: from the Blending Plant, the automated filling lines, until the intelligent warehouses
- Horizontal and vertical integration at each plant, creating the IT-OT convergence: from SAP (real time synchronization), MES systems, until plant floor.
- 10 Laser Guided Vehicles, integrated by ARABB

SCOPE OF DELIVERY

- Blending Plant
  - 800xA control System (2.200 I/O) + IM + Batch System + ARABB MES system
- Filling Lines (1L, 4L, 20L, 205L)
  - 800xA control System + ARABB MES system + 4 packing/palletizing IRB460 robots
- Intelligent Warehouse (raw and terminated products)
  - 800xA control System + ARABB WMS system + 10 LGVs.

SUCCESS: Better KPIs

- Reduction of the production batch minimum from 10 to 3 m3
- Reduction of the rework rate from 15 to 5%
- Reduction of the amount of laboratory analysis (Reduction of 200 hrs./ year)
- Improve productivity up to 20% (3% - Reprocesses + 12% - Better use of resources + 5% - Higher capacity)
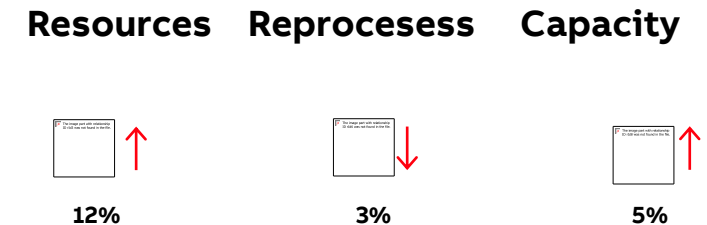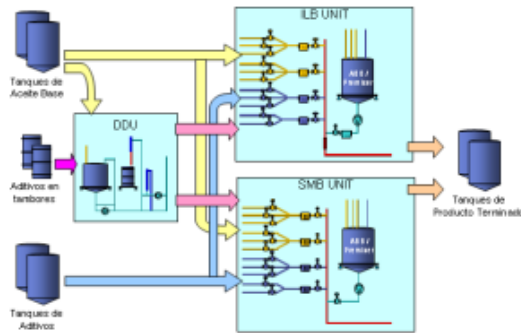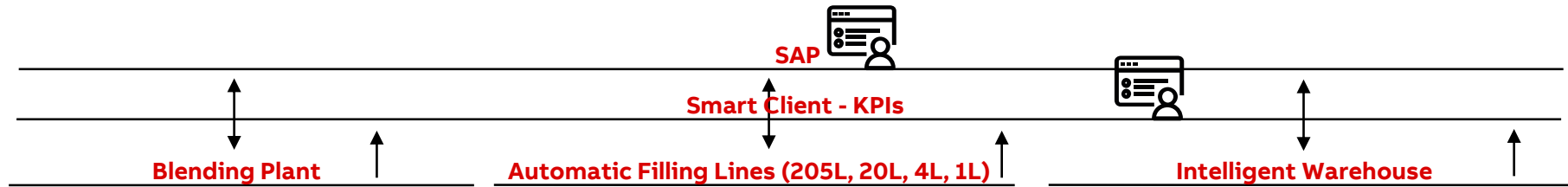
BENEFITS

Resources	Reprocesess	Capacity
12%	3%	5%

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Succes Case I – YPF: Full integrated Lube Oil Plant

SAP

Smart Client - KPIs

Blending Plant   **Automatic Filling Lines (205L, 20L, 4L, 1L)**   **Intelligent Warehouse**

- **ABB Ability MES system**
- **ABB Ability 800xA + ABB Ability IM**
- **ABB Ability Batch System**

- **ABB Ability MES system**
- **ABB Ability 800xA**
- **4 packing/palletizing IRB460 robots**

- **ABB Ability WMS system**
- **ABB Ability 800xA**
- **10 LGVs.**

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Succes Case II – Telefónica Argentina

Collaborative Robot in an automated warehouse

- The company
  - Spanish company, located in Argentina since 1990
  - #1 Telecommunication Company in Argentina
  - 18.000 employees
- The Warehouse
  - ABB Ability Produce IT WMS
  - ABB digital Reverse Logistics System
  - High level of automation (stacker cranes, conveyors, transfer car, sorter) and system integration (SAP, SIGLO, TMS, etc)
- The Project
  - Preparation of terminal equipments
  - **First YuMi in LATAM (except Brazil)**

CONFIDENTIAL

Proyecto SILO CATER
Movistar - Telefónica
Preparación de Celulares para su distribución para todo Argentina

Proyecto C180015 (IAEN)
Etapa: Pre-Productivo

FEBRERO 2019

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Other references I

MOLINOS

- Site: Victoria, Provincia de Buenos Aires.
- WMS and WCS revamping
- Communication with cranes, transfer cars and conveyor, automatic and manual picking robots
- Truck Management-WMS System.
- Automatic and manual picking.
- Improved weight control in manual picking.
- Croosdocking
- Voice picking

MOLINOS

- Site: Esteban Echeverría, Provincia de Buenos Aires.
- New warehouse
- ABB Produce IT WMS + 800xA Control System + ABB Robot Palletizing
- Cranes revamping
- Communication with cranes, LGVs, transfer cars and conveyor, automatic and manual picking robots.
- 2016: Silo Area + 2017: automated and manual picking area.

MOLINOS

- Site: Barracas, CABA.
- Software replacement for Automated Warehouse
- Communication with cranes
- Cranes revamping

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Other references II

YPF

- Industry: Petrochemicals
- Site: Ensenada, La Plata
- Plant: CILE – Lubricant Supply Warehouse
- Communication RF, transfer cars and conveyor

McCain

- Site: Balcarce, Provincia de Buenos Aires
- ERP: SAP and McCalux System
- New warehouse
- First Automated Cold Store (-20°C)
- Communication with cranes and conveyors.

GEMEZ S.A.

- Site: Barracas, CABA.
- Software replacement for Automated Warehouse
- Communication with cranes.
- Cranes revamping

Mondelēz International

- Site: Pacheco, Provincia de Buenos Aires
- ERP: JD Edwards
- Software replacement for Automated Cold Store
- Communication with cranes and conveyors.
- ABB Robots end of line

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Propuesta de valor

Warehouse Management System para gestión de almacenes inteligentes

Propuesta de valor

ABB has an extensive industry know-how. Well-proof solution with a high level of customization. Unmatched connectivity capability

Reduces operational costs by integrating all subsystems and devices into one platform, thereby requiring fewer operators.

Improves and accelerates decision making by providing the right information at the right time to the right people remotely via e-mail or SMS.

ABB solution helps to manage all inter-logistic movements, which means: increase storage capacity, improve operations (full traceability, optimized transport paths, shorter picking times), reduce logistic costs, and increase asset security, among other benefits.

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Conclusión

Warehouse Management System para gestión de almacenes inteligentes

Why choose **ABB Ability Produce IT WMS** ?

- Emergency and non emergency support 24 x 365.

- Industry Know-how and large experience in similar projects.

- Project execution plan, business oriented.

- Flexible and scalable architecture.

- Customizable features.

- Complete integration with 3rd parties systems.

- Native integration with ABB products and systems.

- Testing environment.

- Latest technologies.

- Program management and support throughout the life cycle of the system.

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Warehouse Management System para gestión de almacenes inteligentes

ABB Argentina CoE

Single point of contact

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Material

- ABB web page: Warehouse Management software
- ABB Produce IT WMS (Brochure)
- ABB Produce IT WMS (General Description)
- ABB Produce IT WMS - Success Stories
- ABB Ability Produce IT WMS- Checklist

ABB