



DIGITAL SOLUTIONS

# Synergi Plant Foundation Bundle

## Introduction and Demonstration

# Integrity Management – Cost and Benefit

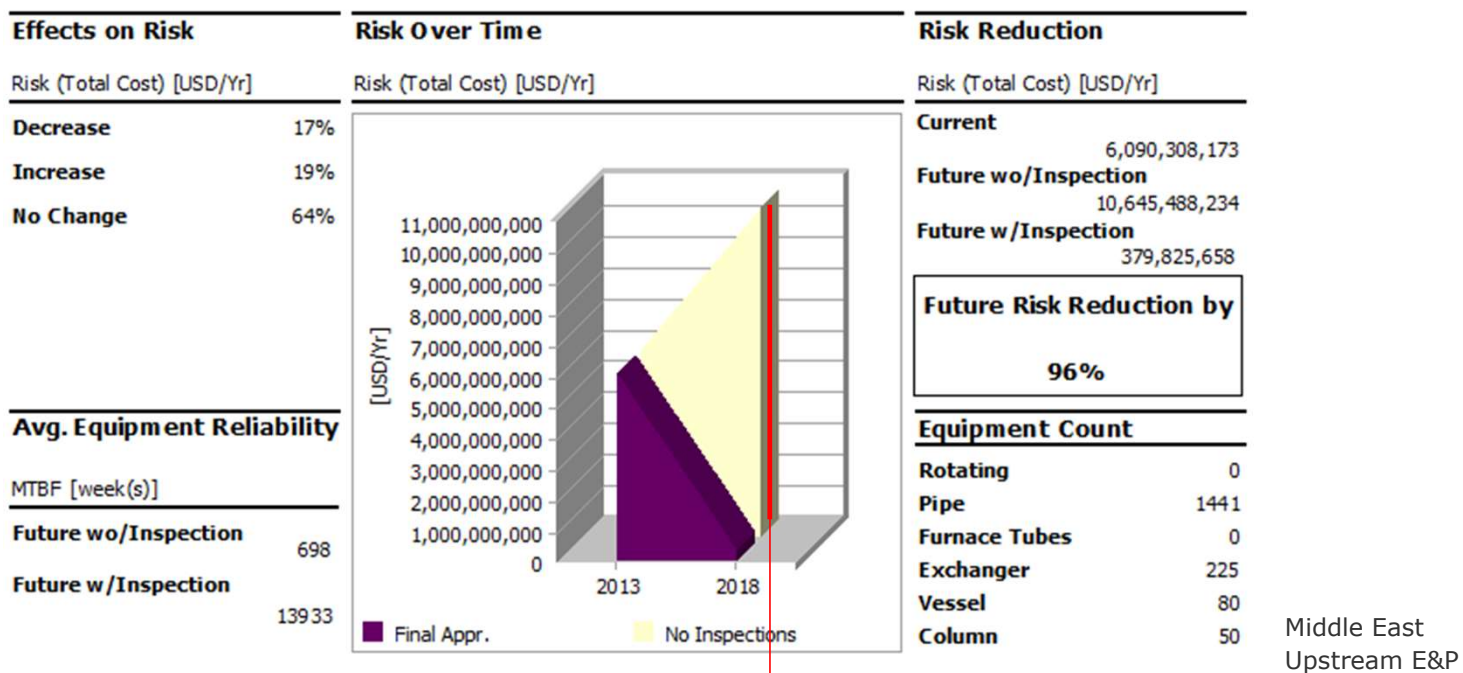


Method / Cost

Goal / Benefit

- \* Ever-greening is more important than sequence
- \* Final ROI should be total benefit v.s. total cost

# Case Study 1: Measuring risk reduction based on risk and inspection effectiveness



Risk reduction with risk-based effective inspection: 10 billions USD per year  
Risk reduction : 96 %

## Case Study 2: Financial return by implementing AIM with inspection extension

Asia  
Refinery

### Extension of Units

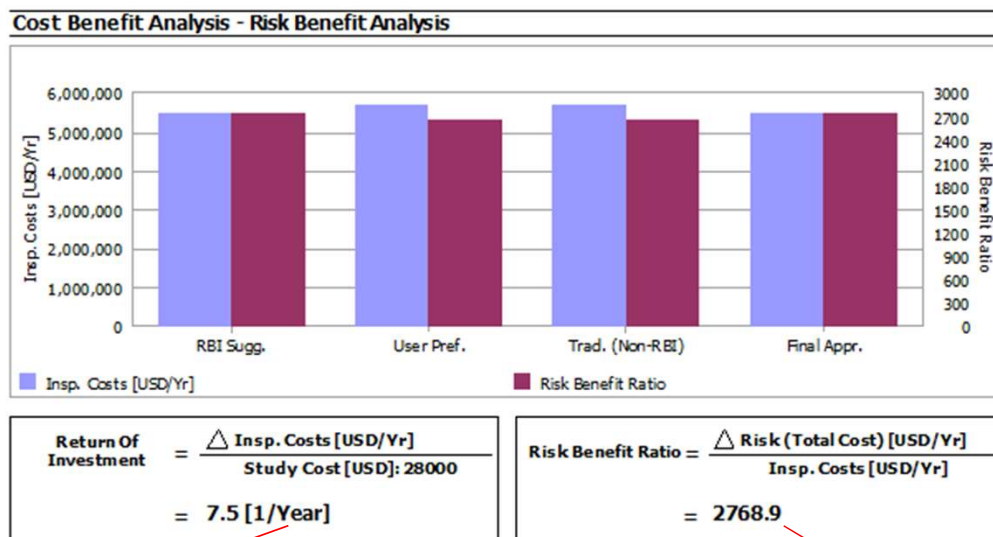
Year	Goal (Unit)	Actual (Unit)	Achieve rate	Approved extension period			
				Half year	One year	Two years	Comment
2005	-	8	-	<b>3</b>	<b>5</b>	0	Inspection extended for 517 equipment
2006	4	4	100%	0	4	0	
2007	3	9	300%	0	8	1	7 of 8 units approved to set the interval as 3 years

### Extension of Tanks

Year	Goal (Tank)	Actual (Tank)	Achieve rate	Approved extension period		
				Below 5 years	5 years	Comment
2005	-	1	-	0	<b>1</b>	
2006	2	9	450%	0	9	Including 5 crude oil tanks
2007	3	9	300%		9	Including 3 crude oil tanks

**For 2005, the extension of 8 units and 1 tank has the financial benefit 153 million USD**

## Case Study 3: Measuring 2 financial factors after implementing RBI

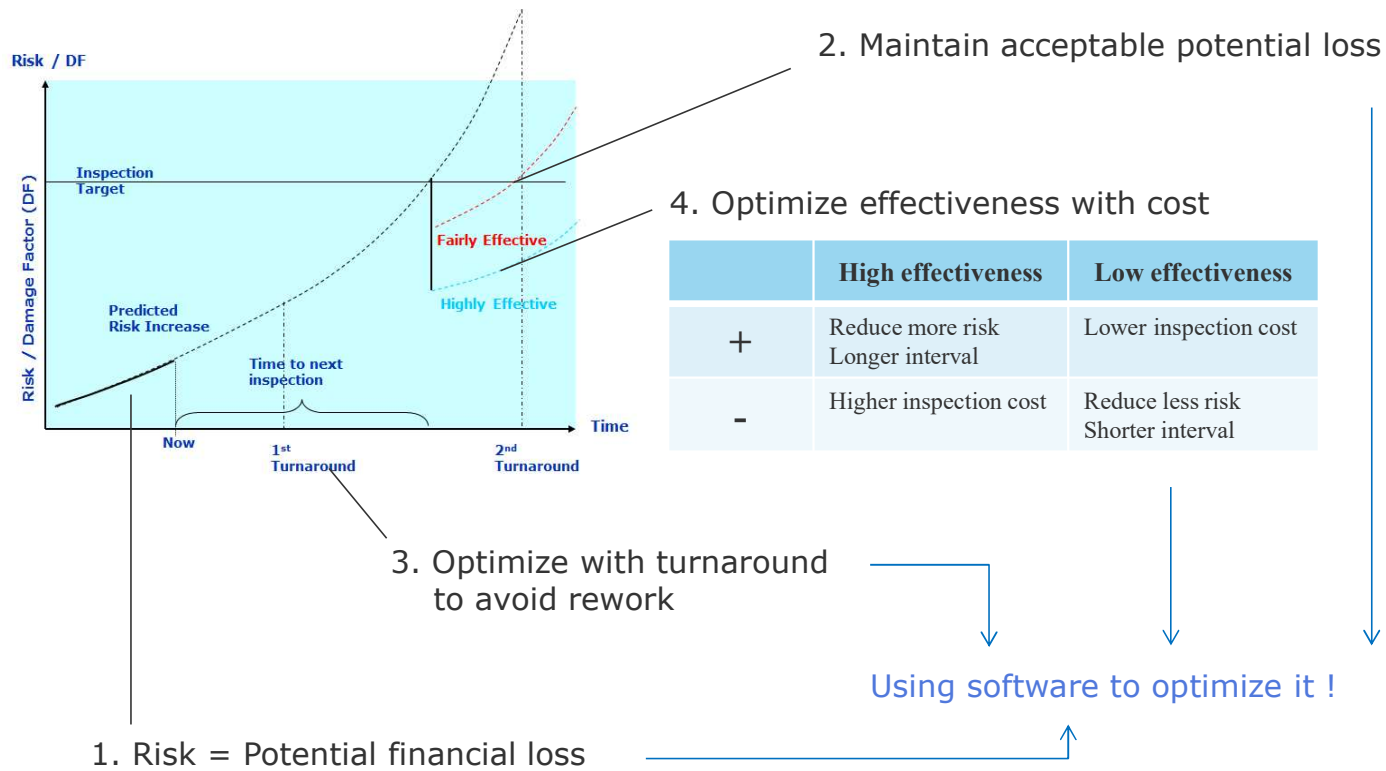


Asia  
Chemical Plant

Spend 1 dollar on RBI implementation,  
Save 7.5 dollars inspection cost per year

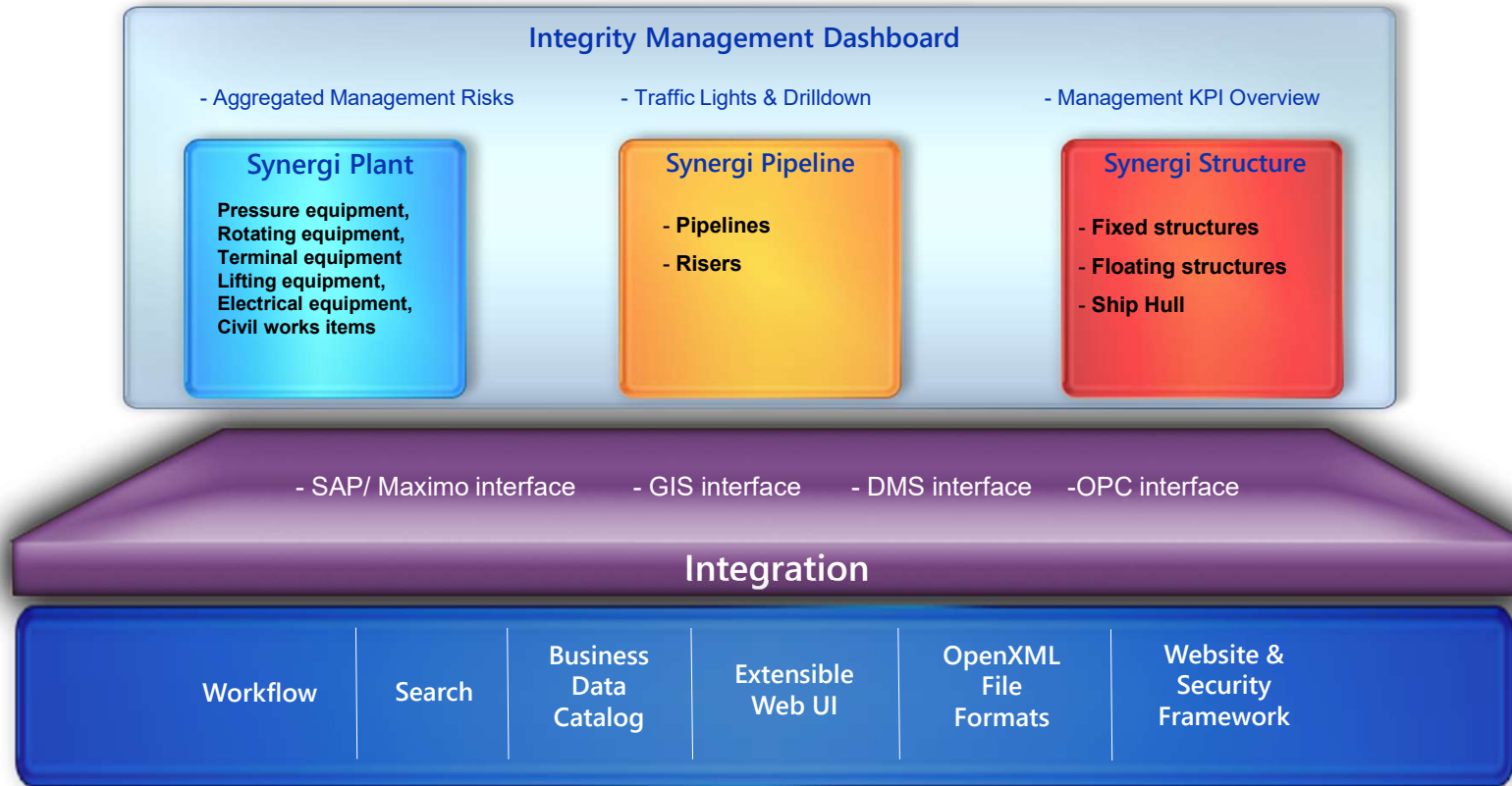
Spend 1 dollar on effective inspection,  
Reduce 2,768 dollars potential loss

# Why? Inspection optimization, effectiveness and efficiency



# **Synergi Plant Foundation Bundle Introduction and Demostration**

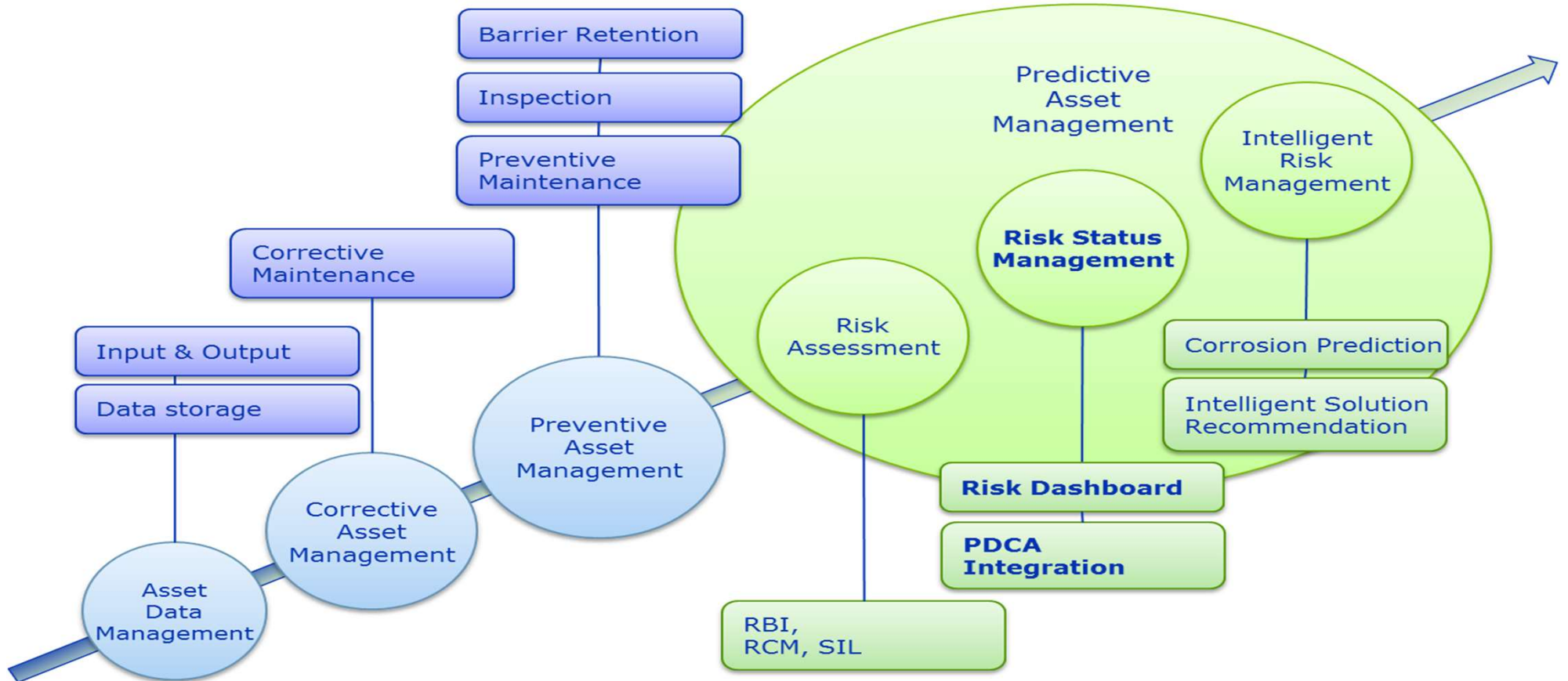
## Synergi Plant is part of the DNV's asset integrity management suite





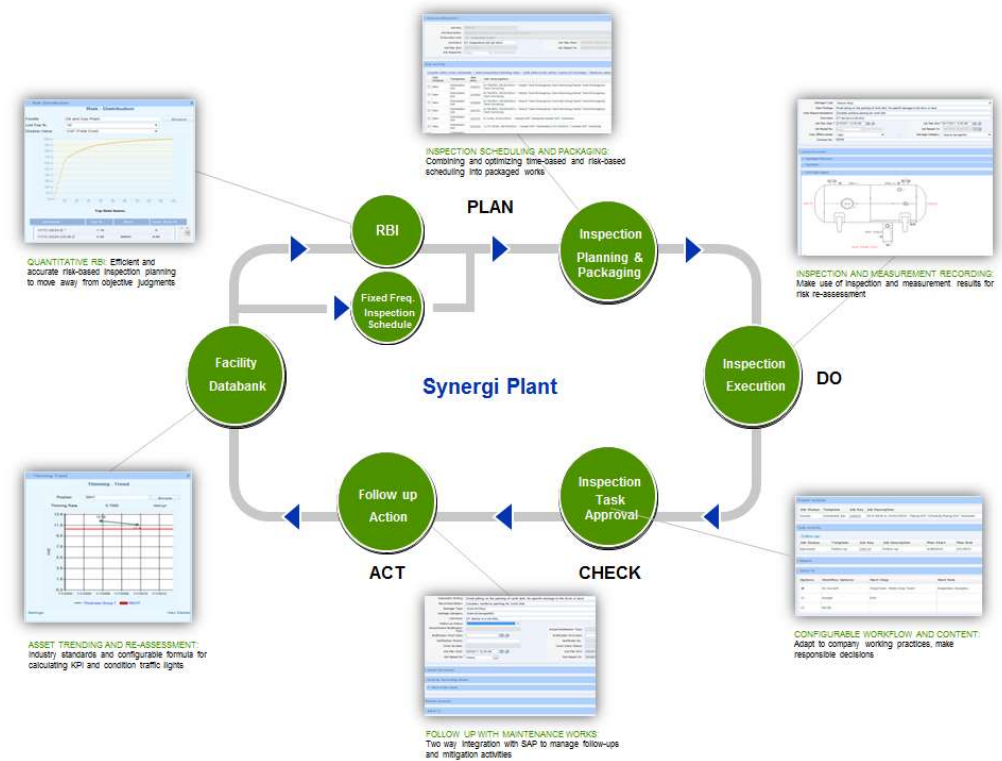
# Synergi Plant

## - Supporting your asset integrity journey



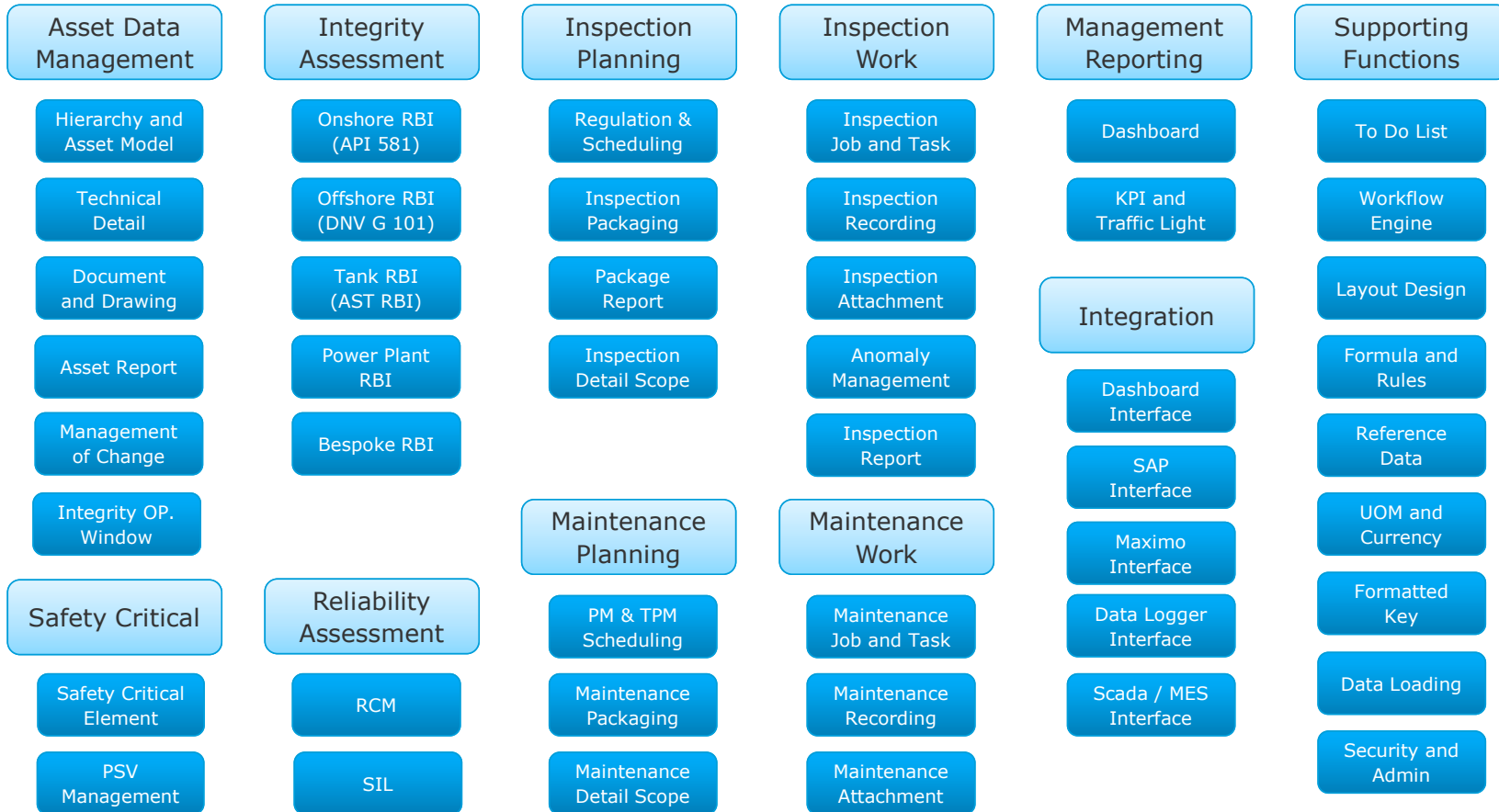
## Synergi Plant today

- Fully web-based and cross browser, can be hosted on cloud
- 48 customers in 20+ countries, use IDMS and other modules like RCM or MMS, with 100+ customers using the standard RBI module.
- 4 major types of SAP integration
- 1 system supporting various configurations for all customers
- Link from expert tools to management dashboard
- Migrated modules from GL's Galiom AIMS software



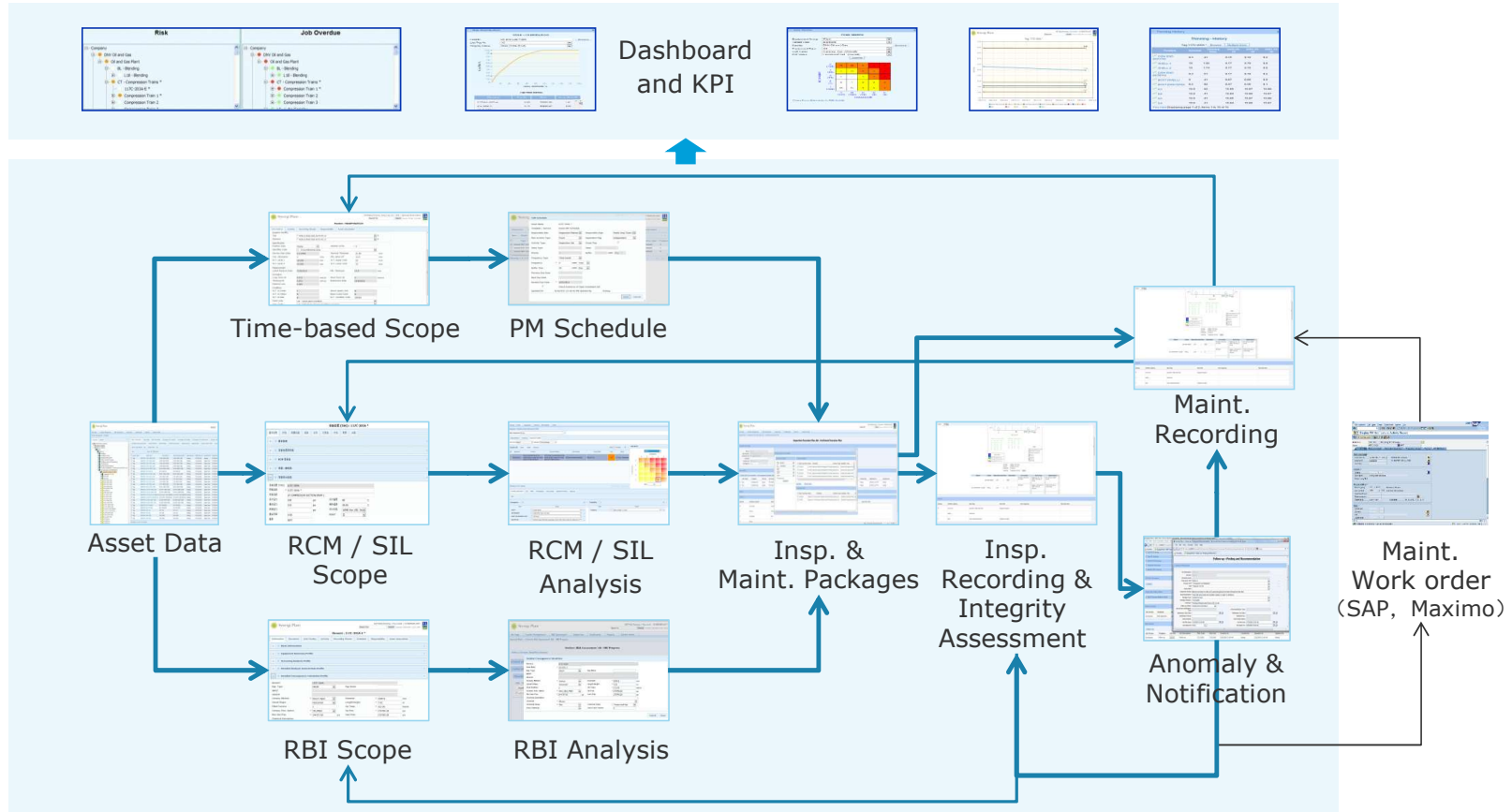
# Synergi Plant

## – Functional modules to fit you needs

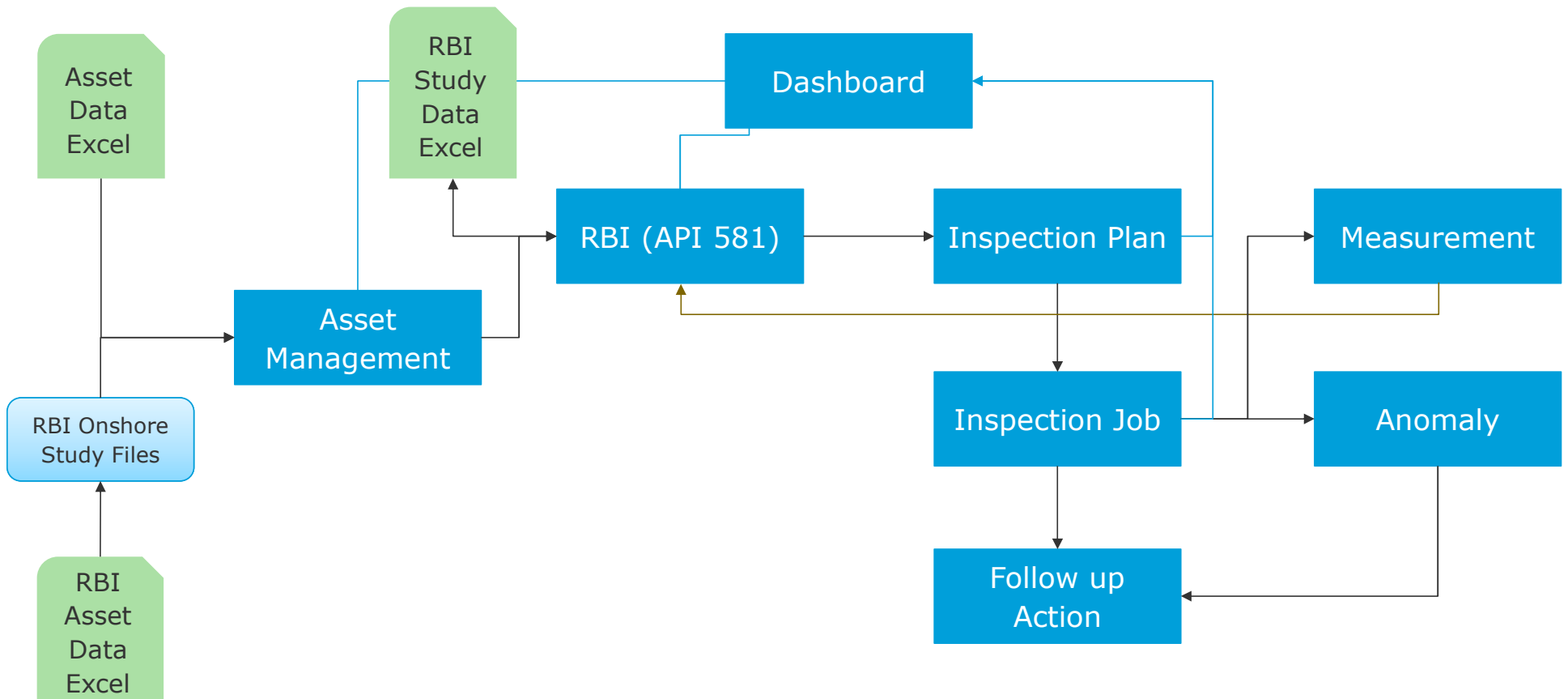


# Synergi Plant

– Expand to the journey in managing risk for your plant continuously



## Synergi Plant Standard Configuration - Functional Diagram



# Synergi Plant Standard

## - RBI (API 581) module main functions

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### ▪ **Create Asset**

- Loading asset hierarchy from Excel
- Loading assets and RBI data from RBI files
- Create a Tag
- Create a Part
- Copy assets

### ▪ **Perform RBI Assessment**

- Create a new RBI assessment
- Add the risk parts to the RBI assessment
- Consequence of failure input and calculation
- Likelihood of failure input and calculation
  - Including various corrosion mechanisms
- Batch calculation for multiple assets

### ▪ **What-if Analysis**

- Change consequence input
- Change likelihood input
- Change active damage mechanisms

### ▪ **Utilize RBI Result**

- Risk and inspection plan output
- Add RBI recommended inspections to inspection plan
- Approve inspection plan
- Create risk-based inspection plan for the Tag

### ▪ **Track the Success by Risk Dashboard**

- Risk status dashboard
- Consequence and probability drivers

## Synergi Plant Standard - IDMS module main functions

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### ▪ **Manage Inspection Program and Plan**

- Create inspection program on asset
- Create time-based inspection plan
- Create risk-based inspection plan
- Forecast inspection plan by search panel

### ▪ **Manage Inspection Job**

- Generate time-based inspection job
- Create risk-based inspection job
- Create ad hoc inspection job
- Manage inspection job by search panel
- Record inspection result
- Create inspection report
- Find inspection history by search panel

### ▪ **Manage Thickness Measurement**

- Create thickness measurement recording template
- Record thickness measurement
- Upload and transfer measurement
- Validation and re-inspect
- Viewing corrosion result

### ▪ **Manage Anomaly**

- Create inspection memo
- Record anomaly result
- Create follow up action
- Manage action by search panel

### ▪ **Track the Performance by Job Dashboard**

- Asset condition dashboard
- Job status dashboard

# Synergi Plant

## - 3D models showing asset risk and inspection anomalies

Synergi Plant : Demo Package

Facility data | RBI | Inspection | Measurement | Anomaly | Library | RBI Setup

SPDEMO [English - United States] MCP Demo  
Version No: 5.7.0.242 / 5.7.0.001

Asset details | Import / Export | Inspection report | Risk matrix | 3D Viewer

Process unit : \* 20 Separation and Stabilisation

Asset View | Members Group | Anomalies Registered

Filter TAG

Asset Type	Asset Key	Description	Risk Color	Grp
TAG	VERITAS-0.5-DH-1104-C15B	0.5-DH-1104-C15B	#F9B806	VE
TAG	VERITAS-0.5-DH-1204-C15B	0.5-DH-1204-C15B	#F9B806	VE
TAG	VERITAS-0.75-GC17-192-001-B1	0.75-GC17-192-001-B1	#E9F906	VE
TAG	VERITAS-0.75-GC17-192-003B-B1	0.75-GC17-192-003B-B1	#E9F906	VE

Showing 1 to 33 of 33 entries

Synergi Plant : Demo Package

Facility data | RBI | Inspection | Measurement | Anomaly | Library | RBI Setup

MGR [English - United States] POC  
Version No: 6.0.1.1588 / 5.7.1.000

Asset details | Import / Export | Inspection report | Risk matrix | 3D Viewer

Process unit : 250 - Gas Conditioning

Asset View | Members Group | Anomalies Registered

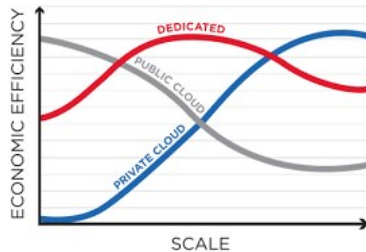
Filter

Asset Name	Insp ID	Report No	Anomaly No	Insp Date	Follow Up Date	Insp Type	Anomaly Code	FFP Status	Inspection
V-250-0716	V-250-0716 COR	2019/0011	DNVGL-ANOM-008	12/06/2020		SCHEDULED_JOB		YELLOW	

Showing 1 to 1 of 1 entries



## Synergi Plant can be deployed on premise or hosted on Cloud



- **Utilise the power of industrial cloud investment**
  - With thousands of companies using the cloud, investment in security is many times more and takes a holistic approach
- **Only pay for what you use**
  - Scalable storage
  - Scalable processing power
- **Reduce overall costs of IT infrastructure and software deployment**
  - Reduced hardware costs
  - Reduced IT function costs
  - Faster deployment to the business

# RBI Software Options

## Product / Solutions

Deploy platform	Suggested Product Name	Current Product Name and Modules
On Prem.	Synergi RBI 581 Desktop	Synergi RBI Onshore Desktop
	Synergi Plant RBI Foundation	Synergi Plant Foundation Bundle with hidden IDMS module
	Synergi Plant IDMS Foundation	Synergi Plant Foundation Bundle with hidden RBI module
	Synergi Plant Foundation Bundle	Synergi Plant Foundation Bundle
On Cloud	Synergi RBI 581 Veracity	RBI SaaS
	Synergi Plant RBI Cloud	Synergi Plant Azure SaaS with hidden IDMS module
	Synergi Plant IDMS Cloud	Synergi Plant Azure SaaS with hidden RBI module
	Synergi Plant Cloud	Synergi Plant Azure SaaS

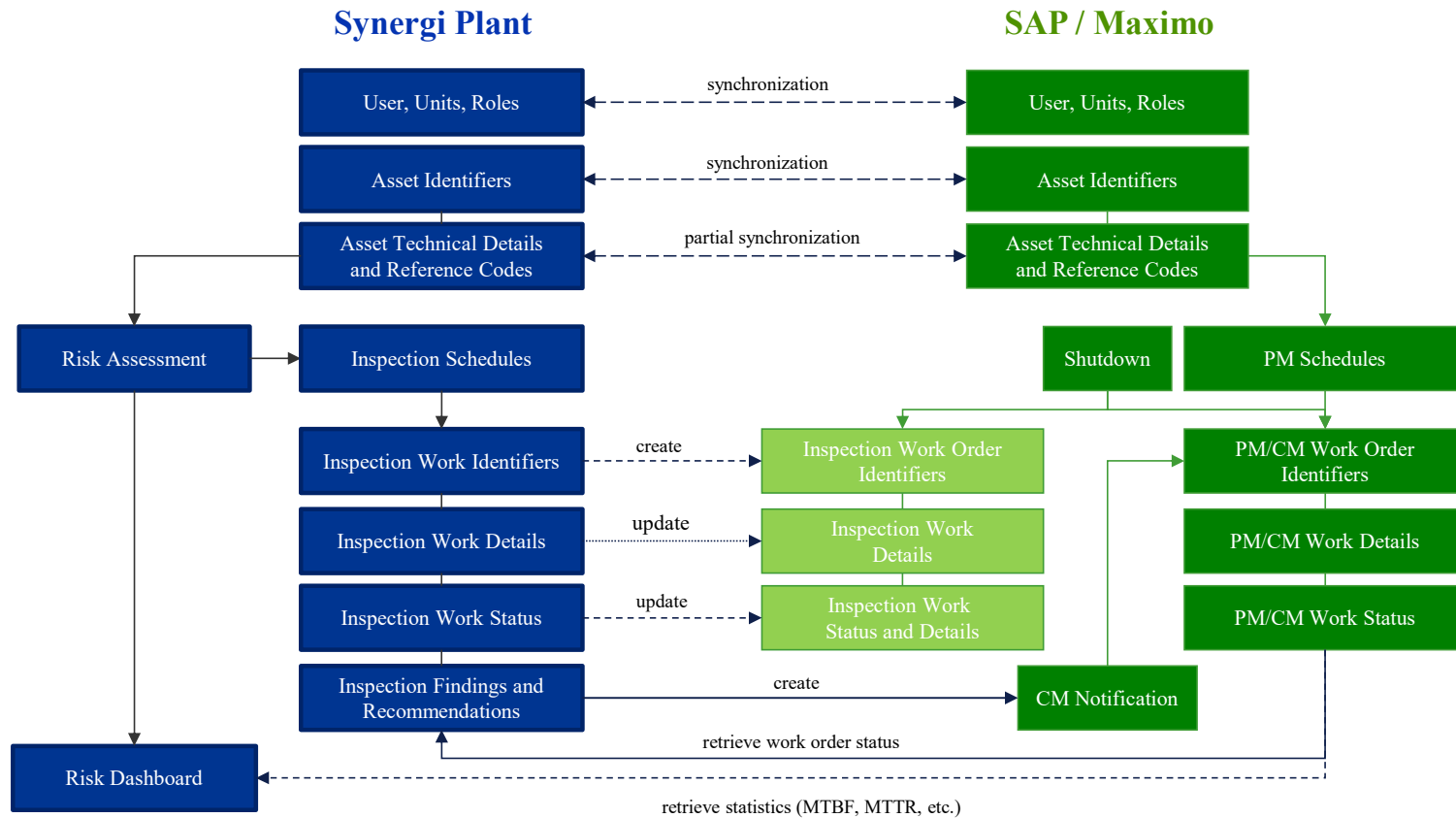
## Scoring Table for RBI Software Options (1: Low – 4: High)

Deploy platform	Suggested Deployed Product	Cost Value per user	Data Sharing	RBI Functionality	User experience	IT Fulfilment	Scalability	Reliability	Integration
On Prem.	Synergi RBI 581 Desktop	3	1	4	4	1	1	4	1
	Synergi Plant RBI Foundation	4	2	2	2	2	2	3	4
On Cloud	Synergi RBI 581 Veracity	1	3	3	3	4	3	2	2
	Synergi Plant RBI Cloud	2	4	2	2	3	4	1	3

# **Synergi Plant and SAP/Maximo / CMMS Integration**

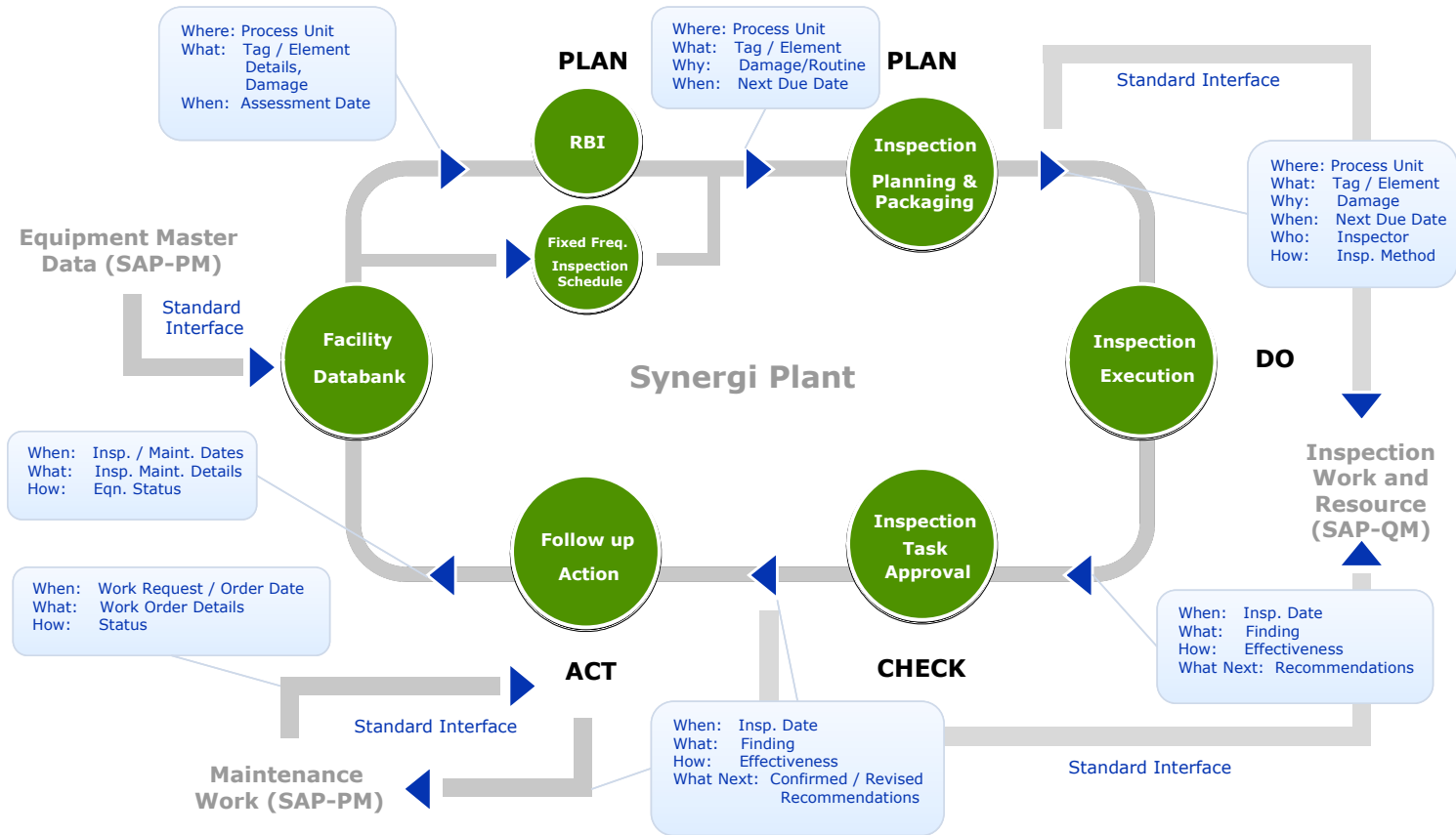
# Integration with SAP

## - Linking asset integrity to resource optimization



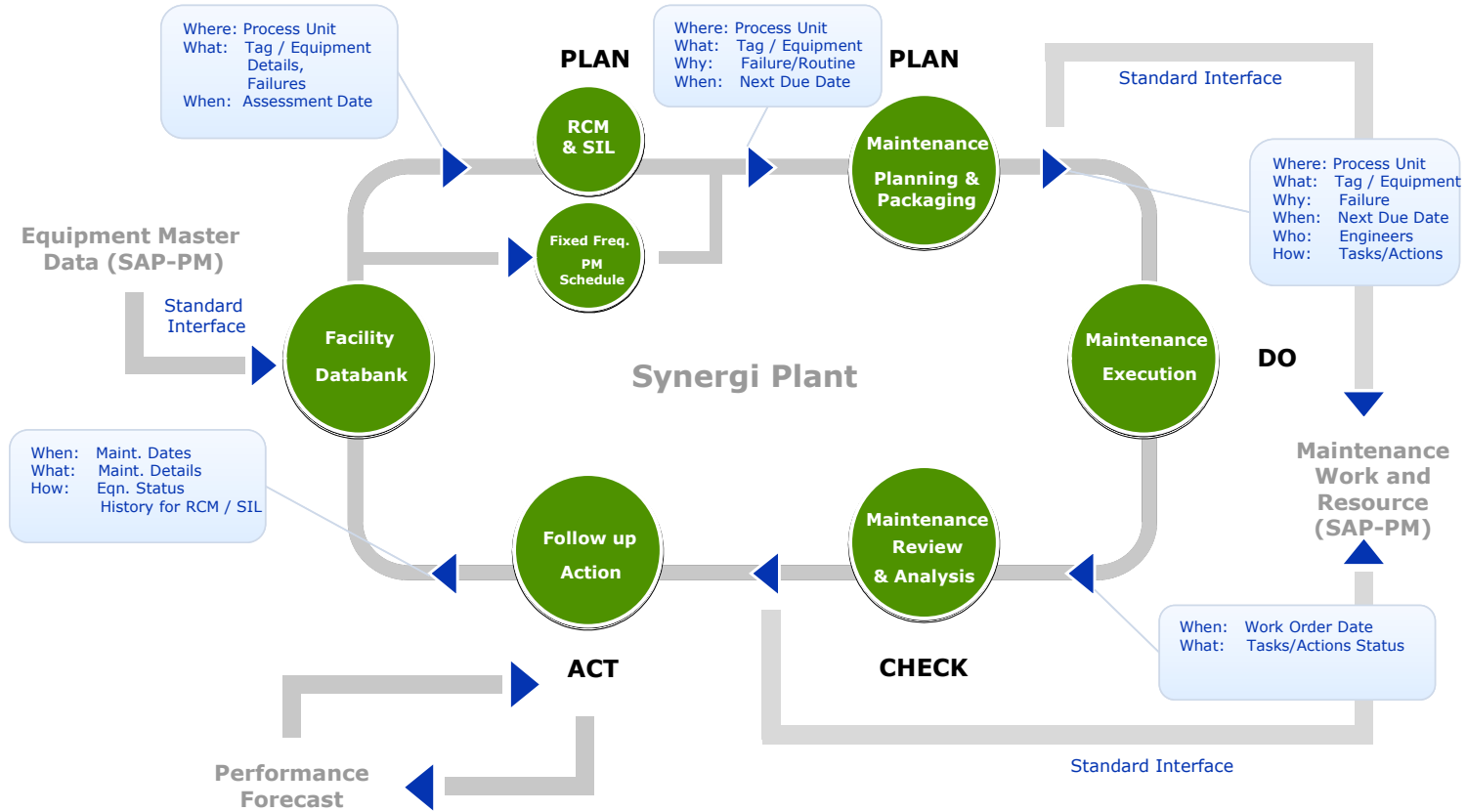
# SAP / Maximo Integration Scenario 1

## - Synergi Plant Integrity PDCA cycle



# SAP / Maximo Integration Scenario 2

## - Synergi Plant Reliability PDCA cycle



**Synergi Plant**  
**as a platform for the journey to excellence**  
**– A customer case study**

# Run the gap analysis workshops

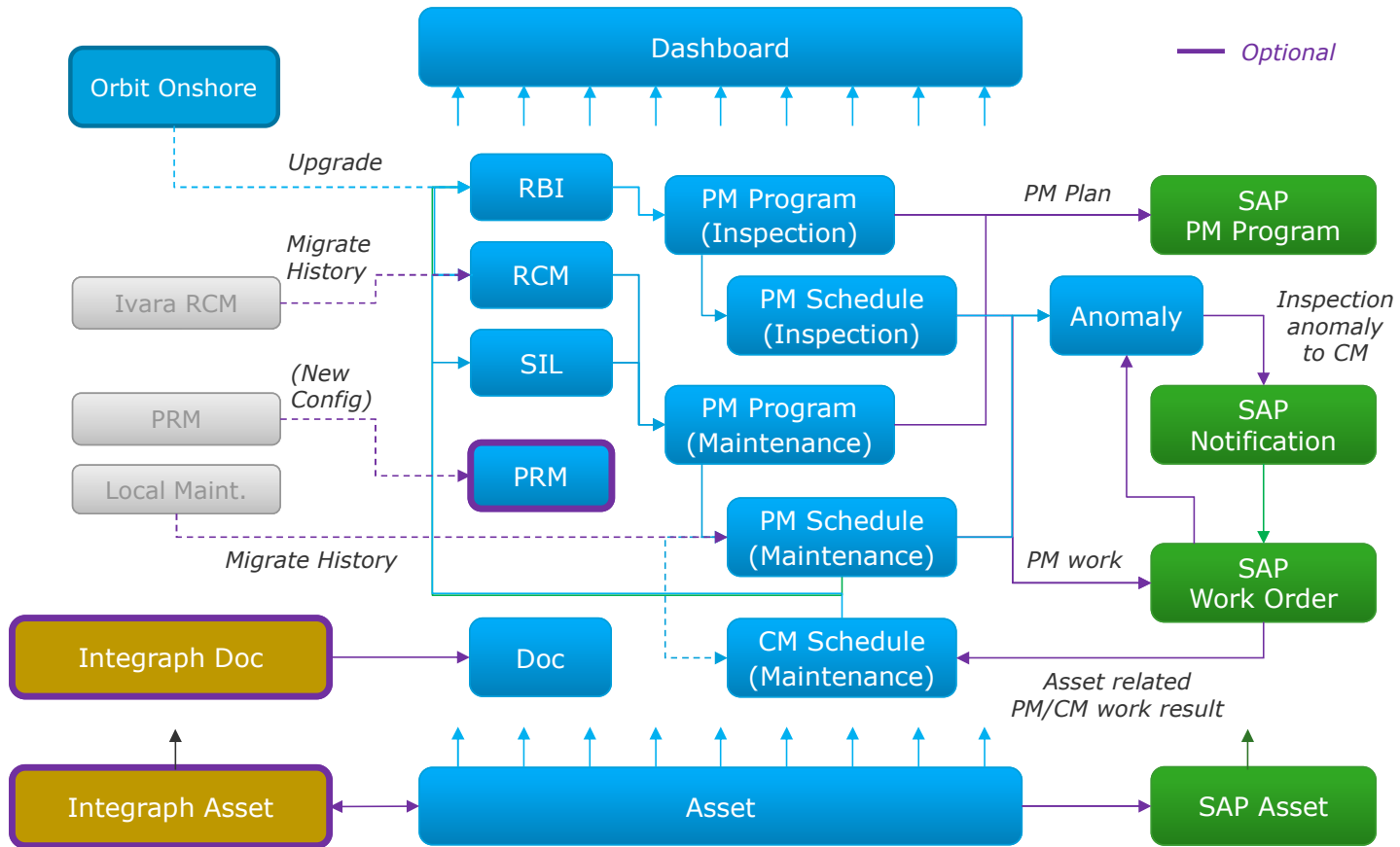
Date	Time	Activity	Remarks
Day 1 11-Sep-2017, Monday	08:00 - 09:45	Opening Meeting with RUIV Team	All DNV GL + Customer as required
Day 2 12-Sep-2017, Tuesday	08:00 - 09:00	Daily Morning Planning Meeting (If Required)	All DNV GL + CUSTOMER core team
Day 3 13-Sep-2017, Wednesday	08:00 - 09:00	Daily Morning Planning Meeting (If Required)	All DNV GL + CUSTOMER core team
Day 4 14-Sep-2017, Thursday	08:00 - 09:00	Daily Morning Planning Meeting (If Required)	All DNV GL + CUSTOMER core team
Day 5 15-Sep-2017, Friday	08:00 - 11:30	Roadmap Workshop (Gaps Analysis Findings and Recommendations)  1. Final verifications, clarifications, outstanding issues / evidence, 2. CUSTOMER Gap Analysis closing meeting preparation.	All DNV GL + CUSTOMER core team
	11:30 - 14:00	Lunch / Rest	
	14:00 - 16:00	Roadmap Workshop (Gaps Analysis Findings and Recommendations) & Closing Meeting  1. Asset management framework 2. ISRS Level 8 Quick wins 3. Maintenance Excellence Working Program roadmap 4. Software solution	All DNV GL + CUSTOMER Senior Management
	16:00	Depart Home	All DNV GL



## Customer Existing Software Systems

Name	Main Content	Comment
SAP (PM)	Asset hierarchy, asset identifier, PM program (Maint.), PM work order, CM work order	Managed by HQ IT Maintenance results not in yet Inspection PM and results not in yet
A Local web app.	Maintenance result, Condition snapshot, Tag no, photo, etc. Insp. report (anomaly)	Developed by local IT (In-house) Has color-coded asset condition
Ivara (Bentkey)	RCM data	
Orbit Onshore (DNV)	RBI data	Using old version 2.x, SLA expired
Palladio (Antea)	RBI / IDMS similar to Synergi Plant	IDMS plan to buy, currently using Excel/PPT Insp. on failures, turnaround, annual program Insp. program based on insurance and others
Navisworks	3D model	Get the model from construction project
Integraph		Plan to use for asset and PSM data/doc mgm.
Plant Reliability Model (Web, Local)	Reliability effect model	Has some dashboard on reliability
Plant Risk Register (Excel)	Plant level risk and evaluation, mitigation, etc.	Identified from assessment, RBI, complains

# DNV proposed solution



## Current system and data

		SAP	Orbit Onshore	Irava	PRM	Local M.	CFM	Excel	PDF	Smart Plant	Synergi Plant
Master Data	Asset Identifier	●	●	●	●	●	●	●	○	○	○
	Asset Hierarchy	●	●	●	●	●	○	●	○	○	○
	Asset Attributes	●	●	●	○	●	○	●	○	○	○
	Failure Library	●	○	●	○	○	○	○	○	○	○
Risk Assessment	RBI	○	●	○	○	○	○	○	○	○	○
	RCM	○	○	●	●	○	○	○	○	○	○
	SIL	○	○	○	○	○	○	●	○	○	○
Preventive Maintenance Planning	Insp. Plan	○	●	○	●	○	○	●	○	○	○
	Maint. Plan	●	○	●	●	○	○	○	○	○	○
	Test Plan	○	○	○	●	○	○	●	○	○	○
	Cond. Mon. Plan	○	○	○	○	●	○	●	○	○	○
Preventive Maintenance Work and Result	Insp. Work & Res.	○	○	○	○	●	○	○	●	○	○
	Maint. Work & Res.	●	○	○	○	●	○	○	●	○	○
	Test Work & Res.	○	○	○	○	●	○	○	●	○	○
	Cond. Mon. Res.	○	○	○	○	●	○	●	○	○	○
Corrective Maintenance Work and Result	PM Anomaly	●	○	○	○	○	●	○	○	○	○
	Ad-hoc Anomaly	●	○	○	○	○	●	○	○	○	○
	CM Notification	●	○	○	○	○	●	○	○	○	○
	CM Work and Res.	●	○	○	○	●	○	○	●	○	○

● Valid / In use    ● Partial / Out-dated    ● Refer    ○ Not relevant

## Target system and data

		SAP	Orbit Onshore	Irava	PRM	Local M.	CFM	Excel	Share Doc	Smart Plant	Synergi Plant
Master Data	Asset Identifier	●	○	○	○	○	○	○	○	●	●
	Asset Hierarchy	●	○	○	○	○	○	○	○	●	●
	Asset Attributes	●	○	○	○	○	○	○	○	●	●
	Failure Library	●	○	○	○	○	○	○	○	○	●
Risk Assessment	RBI	○	○	○	○	○	○	○	○	○	●
	RCM	○	○	○	○	○	○	○	○	○	●
	SIL	○	○	○	○	○	○	○	○	○	●
Preventive Maintenance Planning	Insp. Plan	●	○	○	○	○	○	○	○	○	●
	Maint. Plan	●	○	○	○	○	○	○	○	○	●
	Test Plan	●	○	○	○	○	○	○	○	○	●
	Cond. Mon. Plan	●	○	○	○	○	○	○	○	○	●
Preventive Maintenance Work and Result	Insp. Work & Res.	●	○	○	○	○	○	○	○	○	●
	Maint. Work & Res.	●	○	○	○	○	○	○	○	○	●
	Test Work & Res.	●	○	○	○	○	○	○	○	○	●
	Cond. Mon. Res.	●	○	○	○	○	○	○	○	○	●
Corrective Maintenance Work and Result	PM Anomaly	○	○	○	○	○	○	○	○	○	●
	Ad-hoc Anomaly	○	○	○	○	○	○	○	○	○	●
	CM Notification	●	○	○	○	○	○	○	○	○	●
	CM Work and Res.	●	○	○	○	○	○	○	○	○	●

● Valid / In use   ● Partial / Uncertain   ○ Refer   ○ Not relevant

## Main gaps for Synergi Plant implementation

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- **Lack of integrated processes, systems, and common data platform**
  - Separated processes, applications, data, files
  - Duplicated information and double work
  - Data in all applications, spreadsheets, and files are not aligned
- **Lack of evergreening improvement**
  - Implement the plans
  - Feed back from histories for planning
- **Lack of digitalization**
  - Too many results in PDF / papers
  - No systematic processes and digital templates for contractors
- **Lack of common measurement and benchmark on success**
  - Need to have cross functional KPI
  - Need to have department KPI

# Proposed Synergi Plant implementation roadmap



## Phase 1 Implementation Project

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- Asset Register Consolidation – from multiple sources into Synergi Plant
  - From 15 data sources
- Confirmation of decision and plan : Going forward to revive RBI, RCM and SIL
- Confirmation of decision and plan: Inspection and Maintenance Scheduling
- Confirmation of decision and plan: Inspection & Maintenance Execution
- Confirmation of decision and plan: Anomaly and corrective maintenance
- Discussion on KPI and Dashboard:
- Data collection and population plan. (SP Template)
- Configuration of system
- Data upload into Synergi Plant & FAT
- Installation of Synergi Plant & UAT
- Software User Training
- Go live

## Synergi Plant Configuration - Considerations

Configuration	Consideration
Asset Hierarchy	Purpose of object, Synergi Plant and other external system hierarchies
Asset Identifier	Asset matching and mapping
Asset Structure	Unit of work, logical structure, physical identities
Asset Datasheet	Data required for each module and external systems, data groups.
RBI	Previous studies, additional data required for API 581 2016 edition
RCM	Methodology, failures and FMEA, task selection rules, link to PM
SIL	Methodology, classification and verification process and content
PM	Time-based, risk-based, condition-based schedules and groups
Inspection workflow	Level of activities, work package, work, report, and review processes
Inspection content	What, when, who, where, which, how, and why
Maintenance workflow	Level of activities, work package, work, report, and review processes
Maintenance content	What, when, who, where, which, how, and why
Dashboard	Default KPI and custom KPI, permission and usage
Report	Default reports and custom reports, permission and usage



**Our vision**

# A trusted voice to tackle global transformations

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