



ARCHIVE EDITION

ERP, EAM, WMS and Remote Monitoring

Integration of management systems at PT Panca Amara Utama

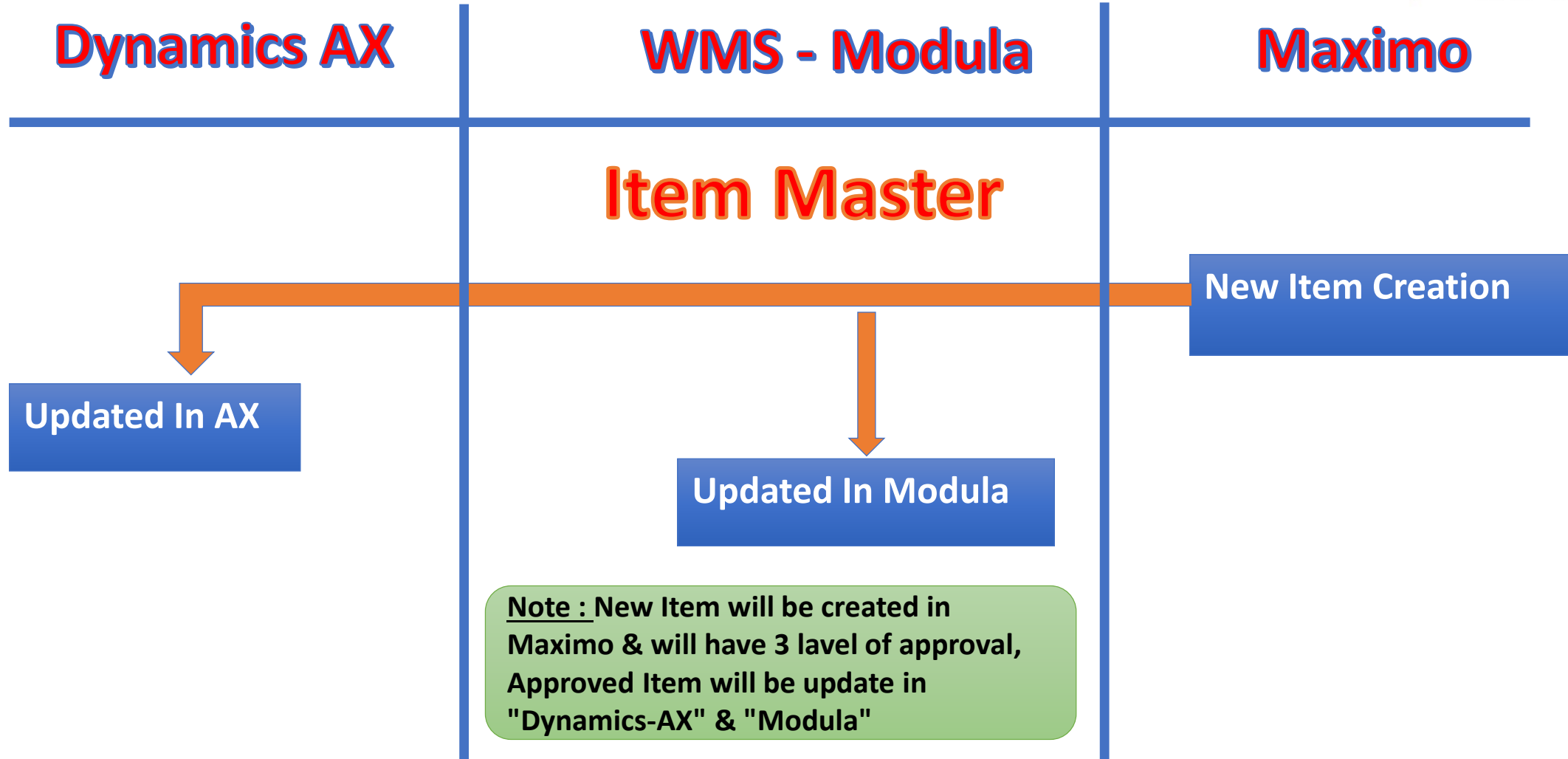
Suprit Pal Singh

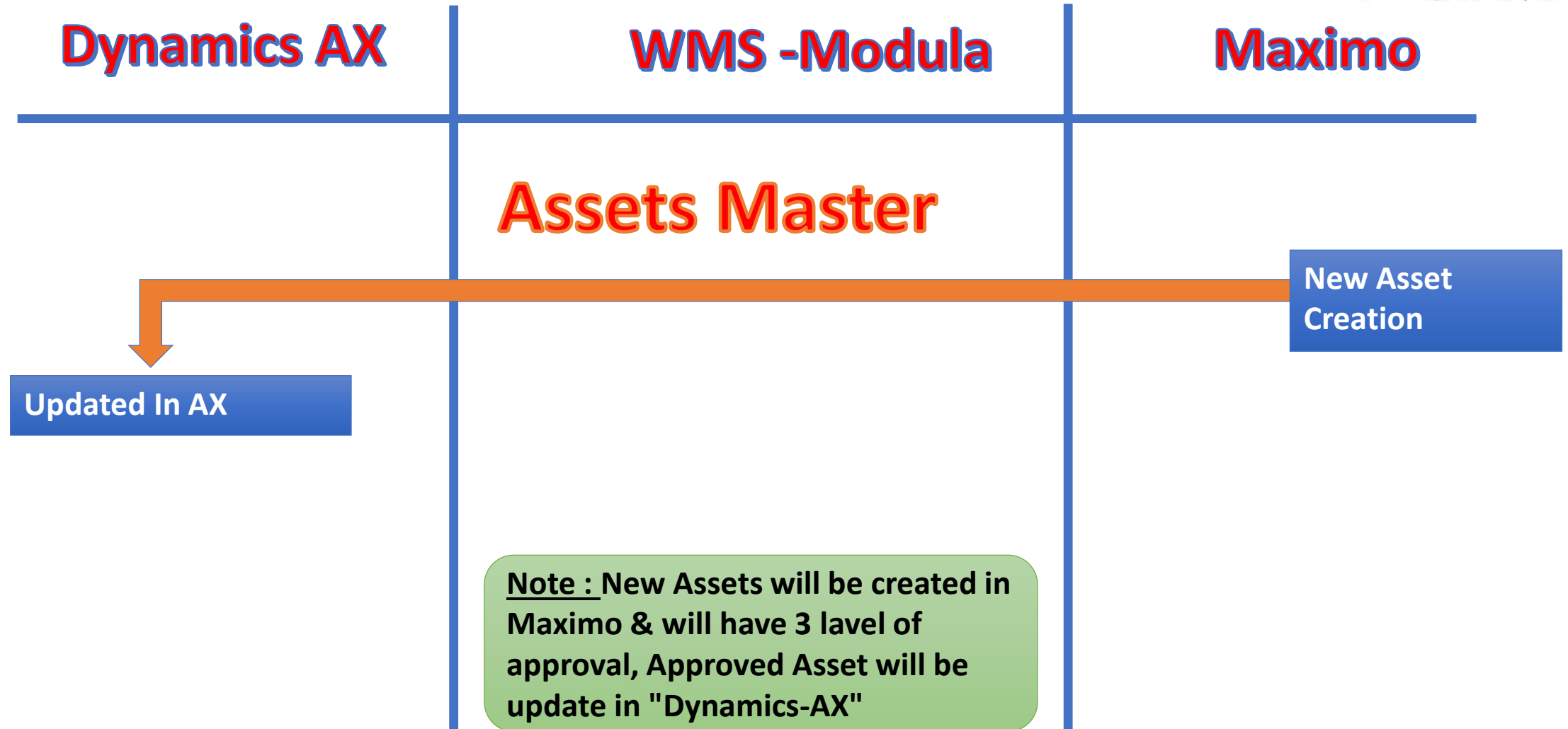
Integration design, Rev 12, December 2017, as Vice President Projects, PT Panca Amara Utama

ERP + EAM + WMS + RM

Integration of Management Systems @ PAU

- **Ax SQL ERP**
- **EAM Maximo**
- **WMS Modula**
- **RM Remote Monitoring**
- **Cognos Business Intelligence Engine**





Dynamics AX**WMS - Modula****Maximo****U of M Master****New U of M
Creation****Updated In
Maximo****Updated In Modula**

Note : New Uof M will be created in "Dynamics-AX" it will be updated in "Maximo" & "Modula". UOM we need that the separate UOM for machine parameters

Dynamics AX

WMS - Modula

Maximo

COA Master

New COA & Related
Cost Center Creation

Updated In
Maximo

Note : New COA & Related Cost
Center will be created in
"Dynamics-AX" it will be updated
in "Maximo" , sequential updation
of parameters

Dynamics AX

WMS - Modula

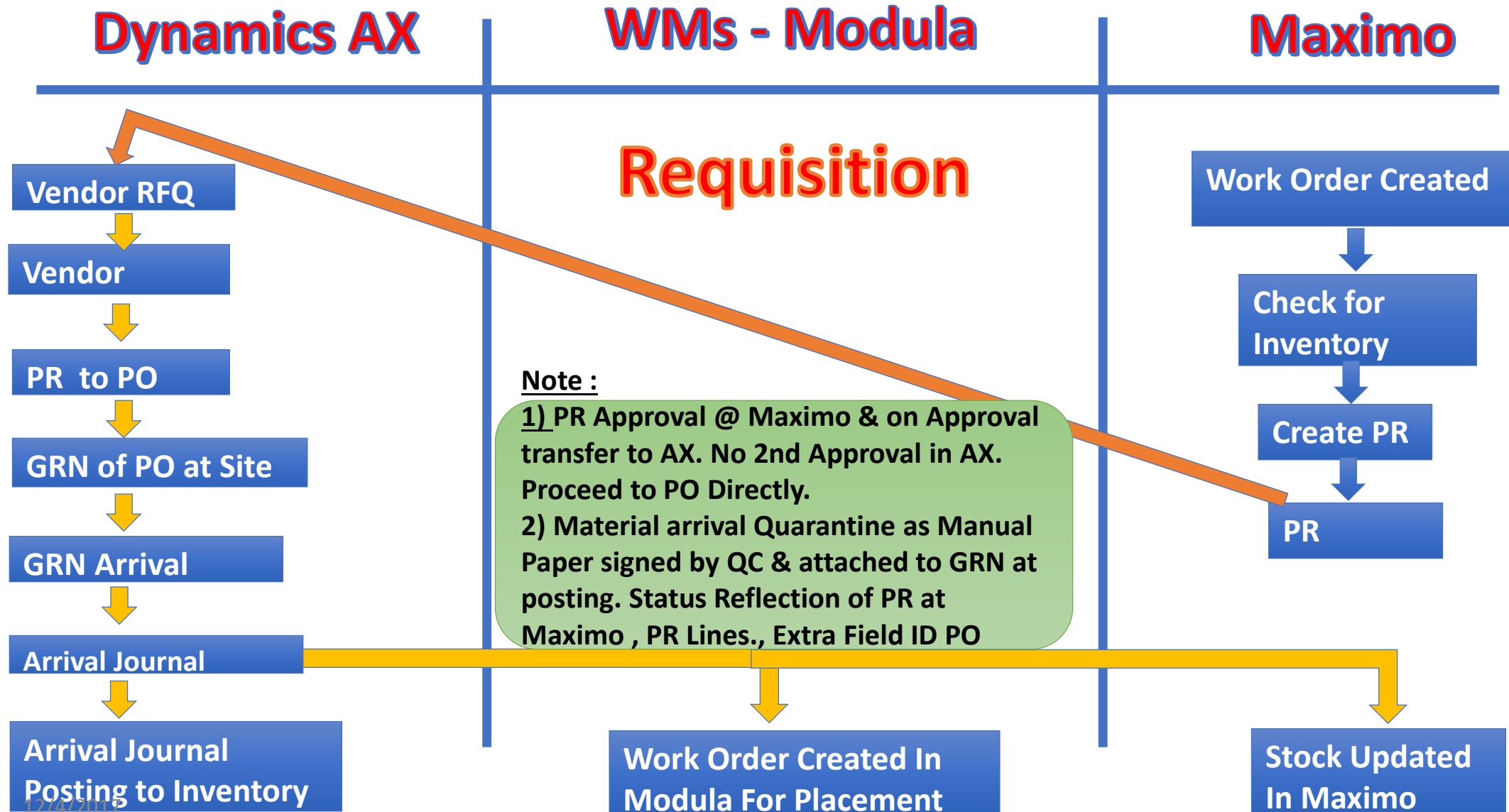
Maximo

Budget Control

Budget Created
at AX

Updated In
Maximo

Note : Budgets will be Created in AX
and Updated to Maximo.
Granularity Matching



12/4/2017

Dynamics AX

WMs - Modula

Maximo

Disposal / End of Life

Note :

1) EOL Approval @ Maximo & on Approval transfer to AX. No 2nd Approval in AX. Proceed to Sales Order Directly.
2) Material Sold Exit Note Paper signed by QC & attached EOL posting. Status Reflection of EOL Deletion at Maximo , Sales Order Posted @ Ax as per Asset or Inventory

Work Order Created

Disposal / EOL
Posted

EOL Approval

EOL Sales
Note

Stock/Asset Updated
In Maximo

Sales Enquiry

Buyer Evaluation

SE to SO

SO Exit at Site

Ax Deletion of Stock/Asset

Deletion @ Journal

Journal Posting (Inventory & Asset Adj)

If & Only If Inventory Item

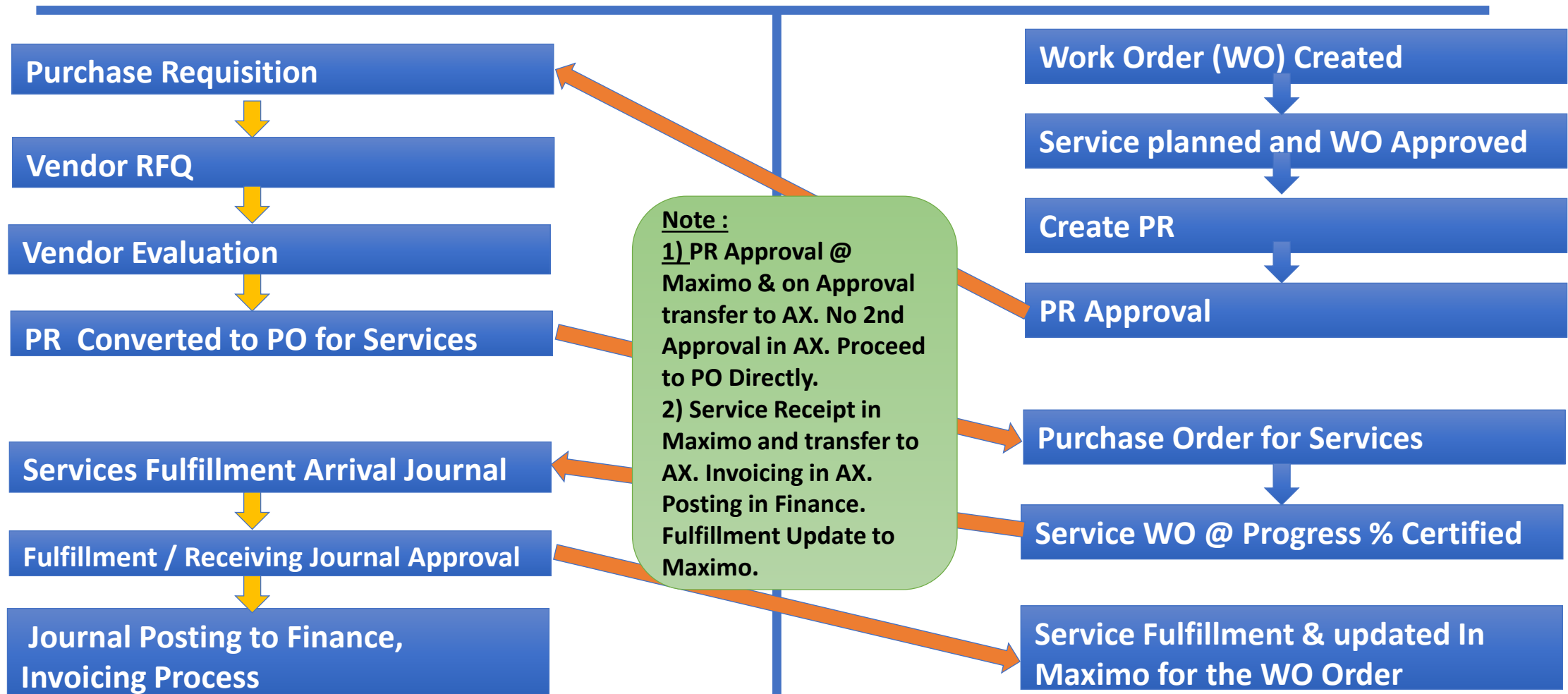
Work Order Created In
Modula For Placement

If & Only If Inventory Item

Dynamics AX

Services Order Fulfillment

Maximo

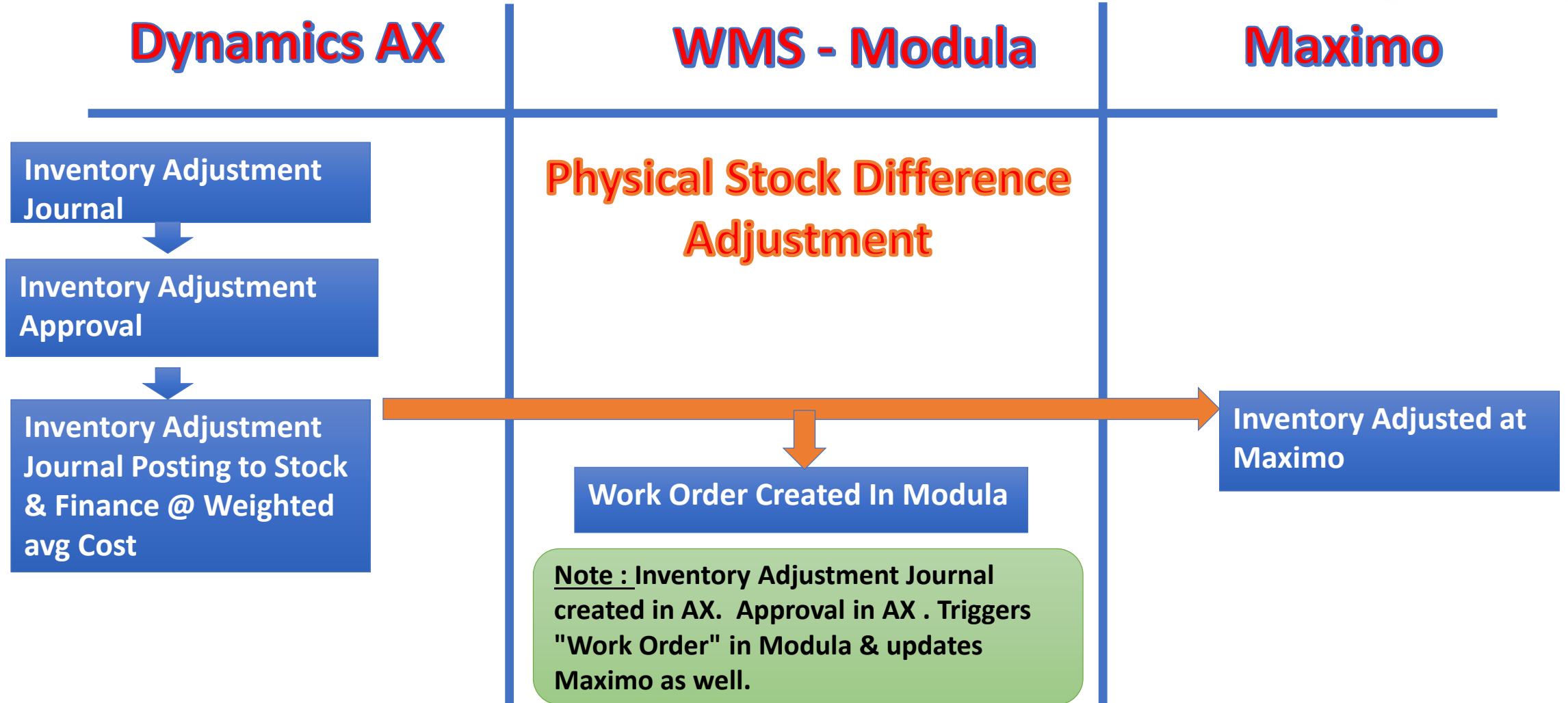


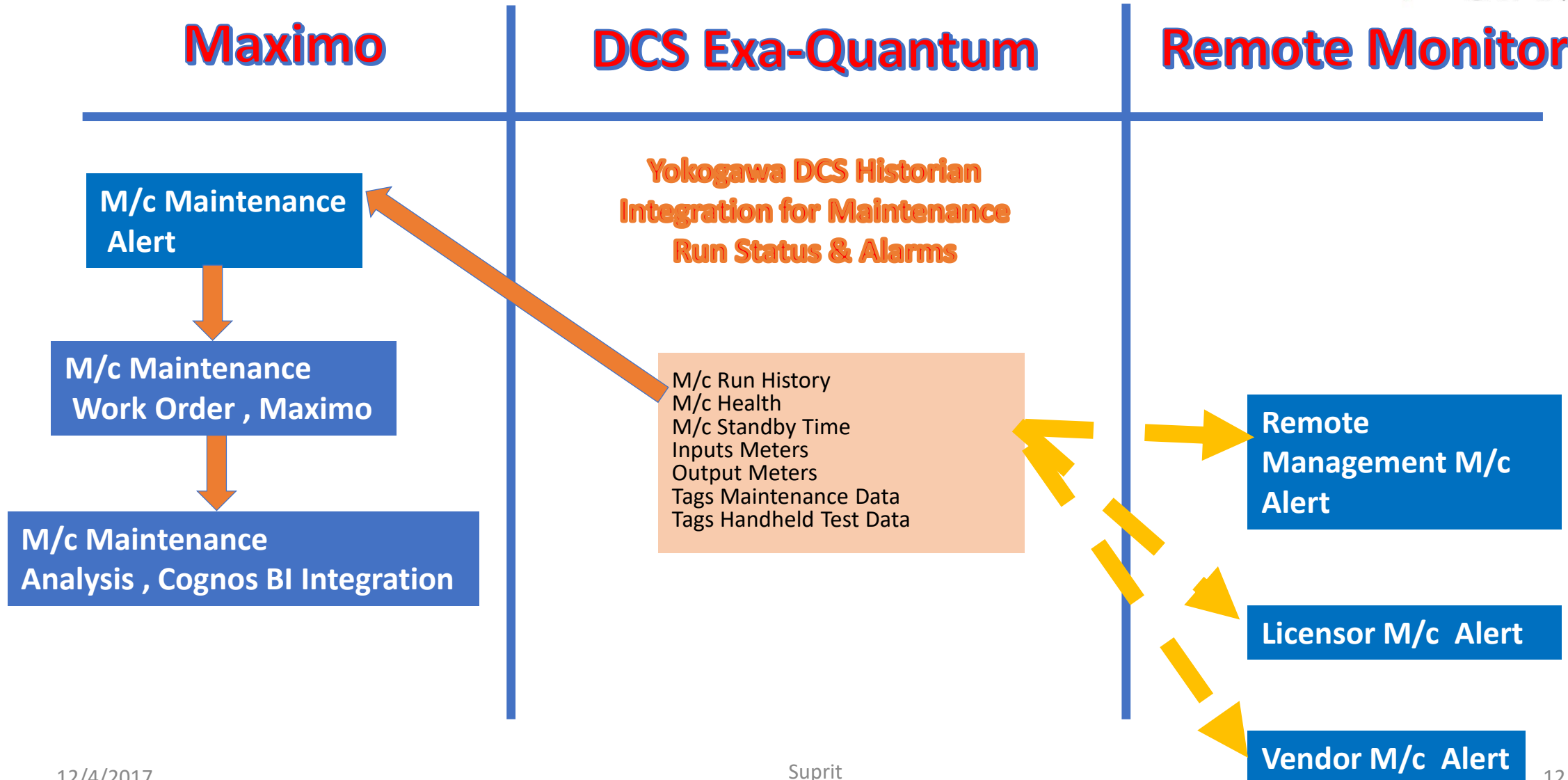
Dynamics AX**WMS - Modula****Maximo**

Material Issued

Updated In AX**Request For Material****Request Journal
Approval****Work Order Created In
Modula****Note :**

- 1) Maximo Creates "Material Issue" & Approval @ Maximo. Maximo Triggers Work Order to Modula
- 2) Modula Issues "Work Order" to Issue Material.
- 3) Modula Triggers update to Ax Inventory





Maximo

DCS Exa-Quantum

Remote Monitor

Consumption &
Output Metering

Consumption & Output Alerts
Maximo Time Integrated Data

M/c Maintenance
Analysis , Cognos BI Integration

Yokogawa DCS Historian
Integration for CONSUMPTION
& OUTPUT Metering

M/c CONSUMPTION
Metering
M/c Output Metering

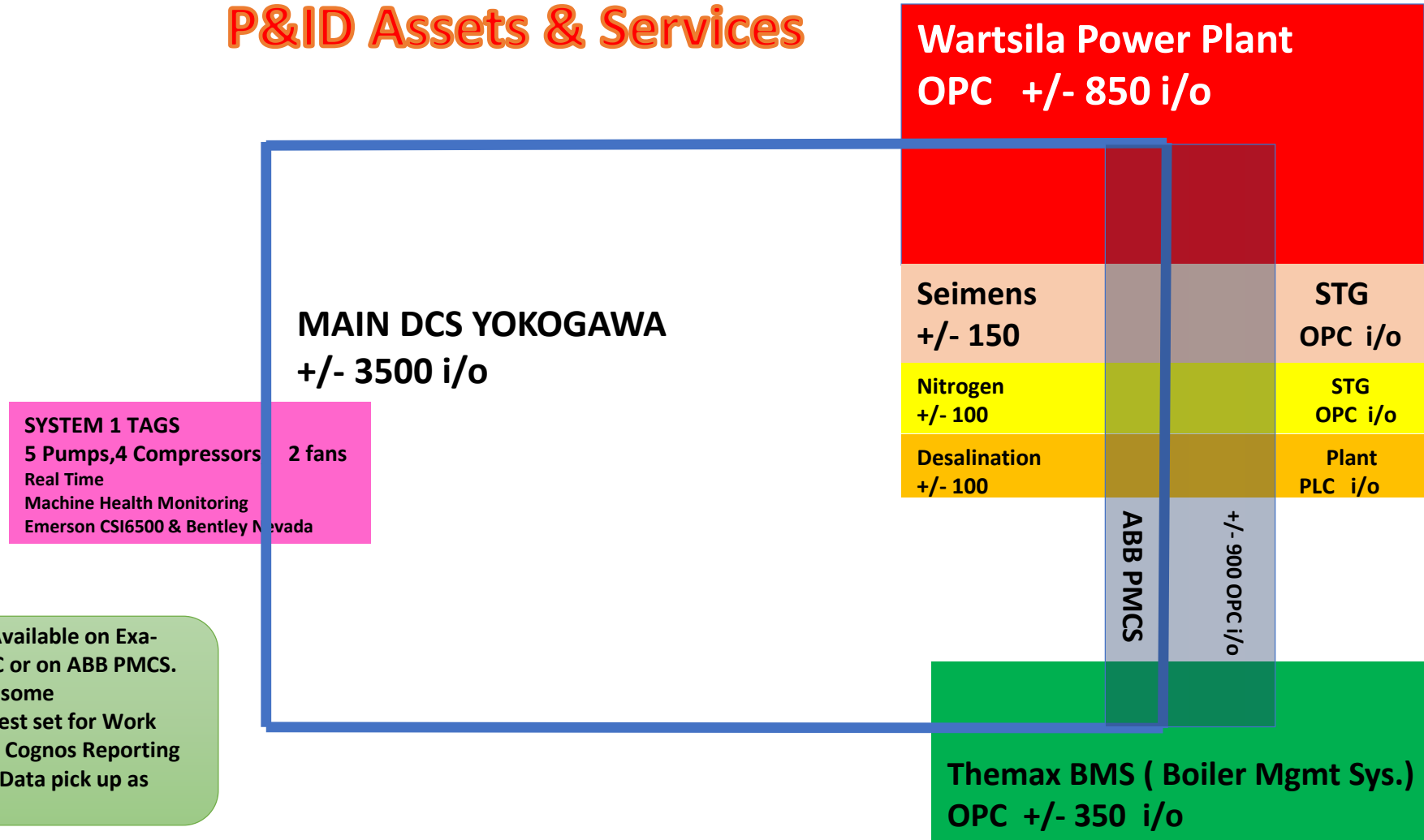
Remote
Management M/c
Alert

Licenser M/c Alert

Vendor M/c Alert

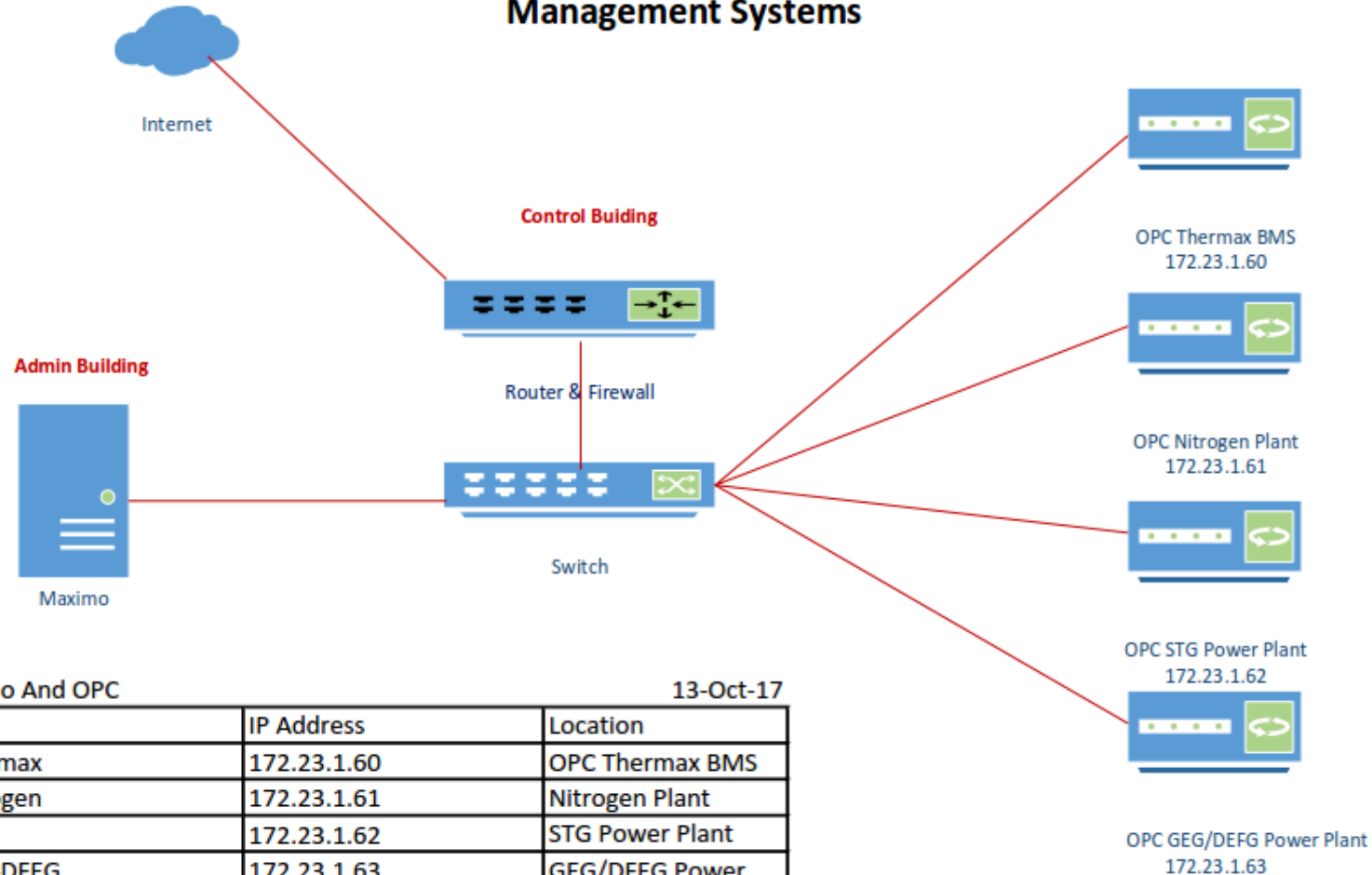
DATA SETS MANAGEMENT

P&ID Assets & Services



DATA SETS ON NETWORK

Topology Network Integration of Management Systems

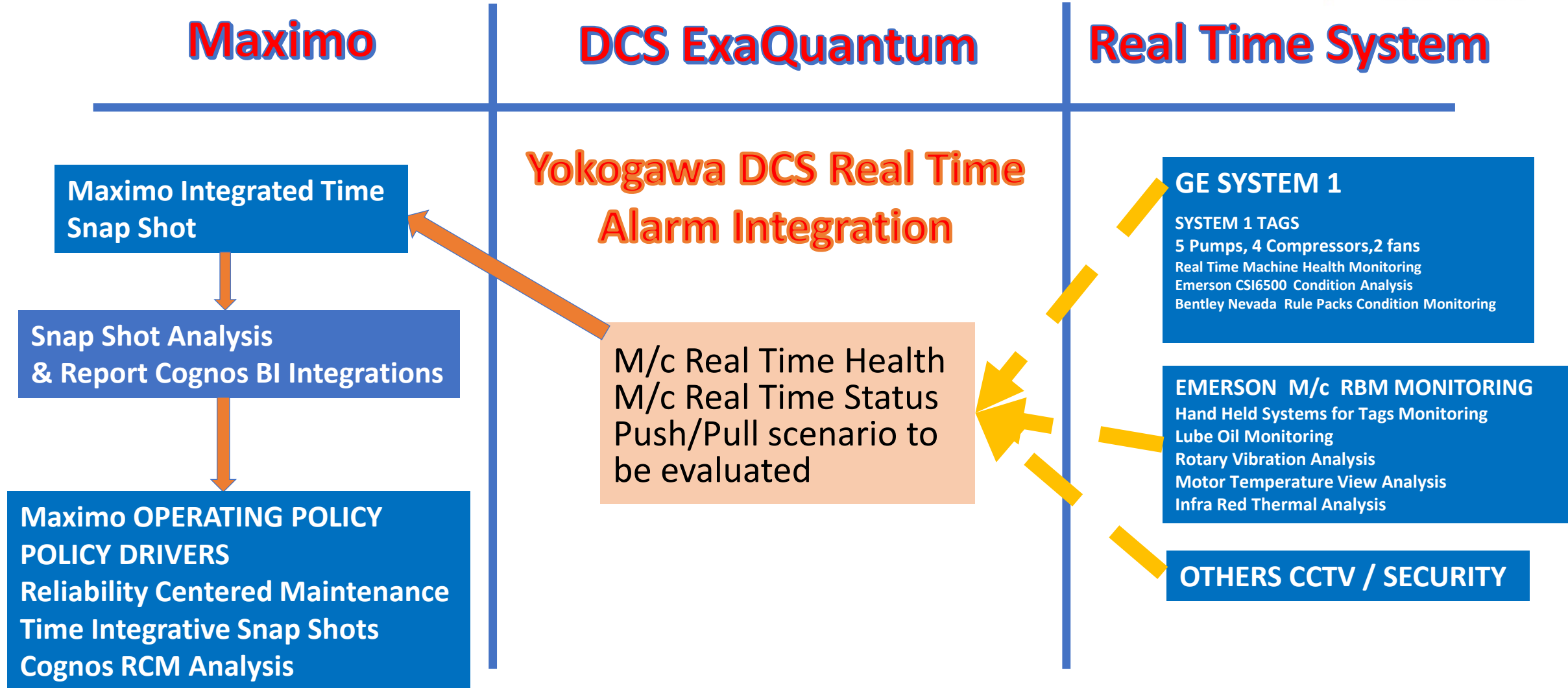


IP Address For Maximo And OPC

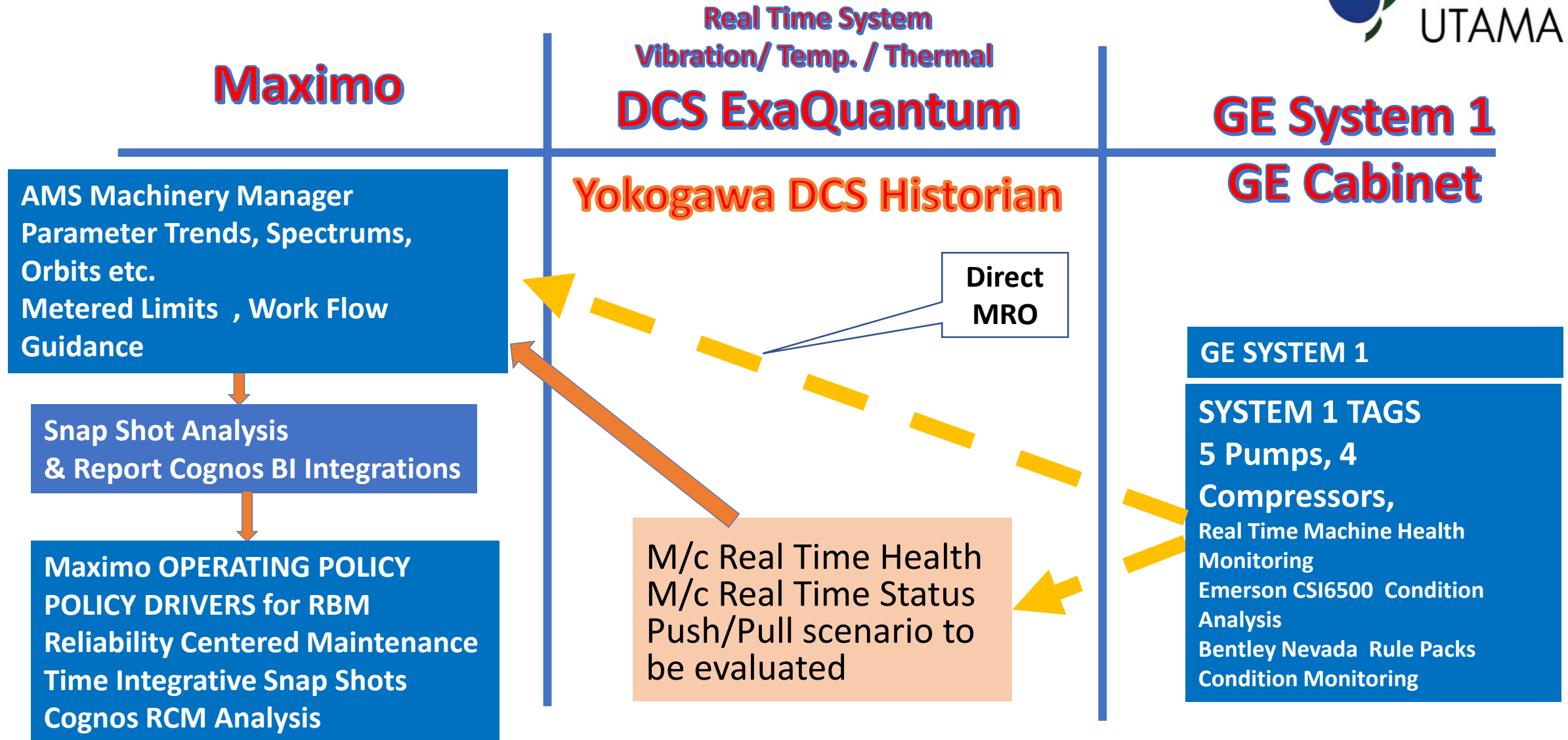
13-Oct-17

No	Host Name	IP Address	Location
1	USO-OPC-Thermax	172.23.1.60	OPC Thermax BMS
2	USO-OPC-Nitrogen	172.23.1.61	Nitrogen Plant
3	USO-OPC-STG	172.23.1.62	STG Power Plant
4	USO-OPC-GEG-DFEG	172.23.1.63	GEG/DFEG Power
5	USO-OPC-Maximo	172.23.1.64	Maximo

SYSTEM 1 BENTLEY NEVADA ASSETS

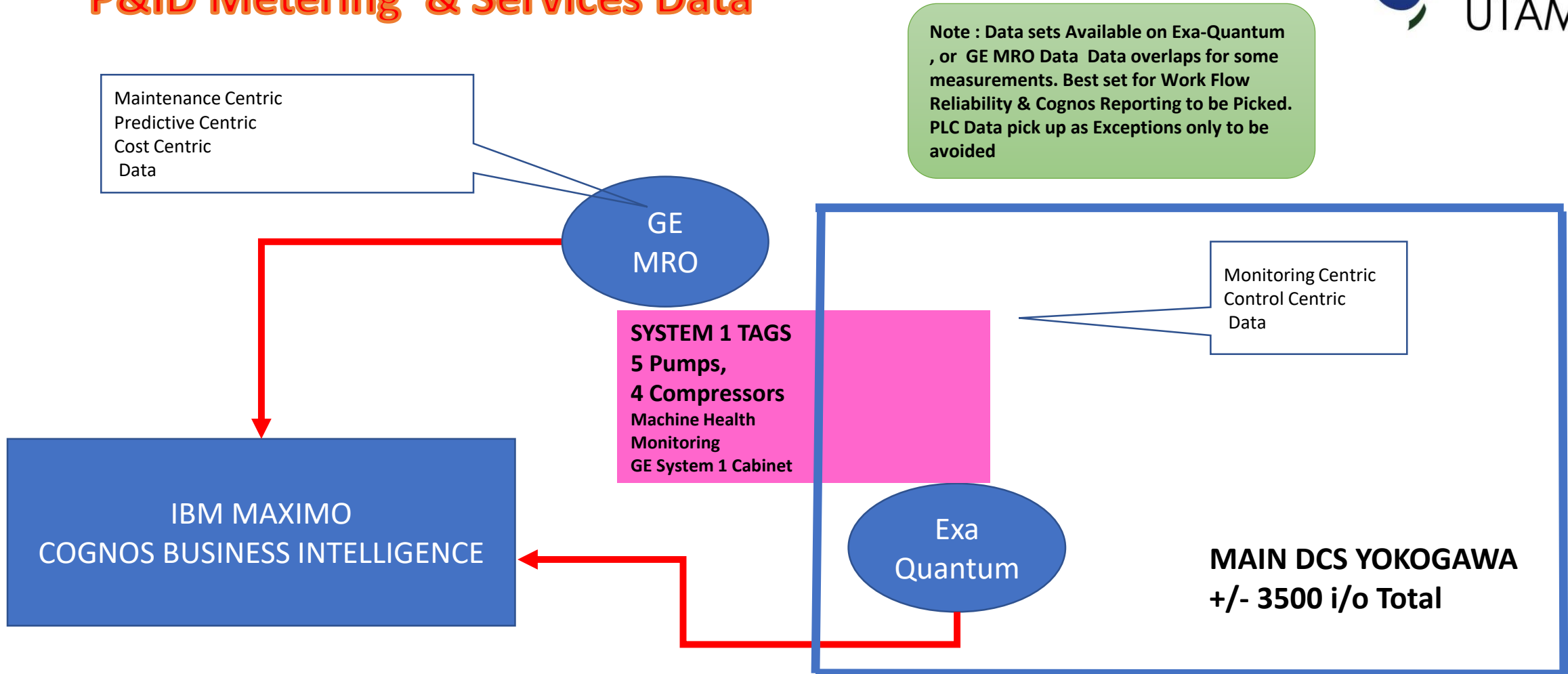


SYSTEM 1 GE INTEGRATED ASSETS

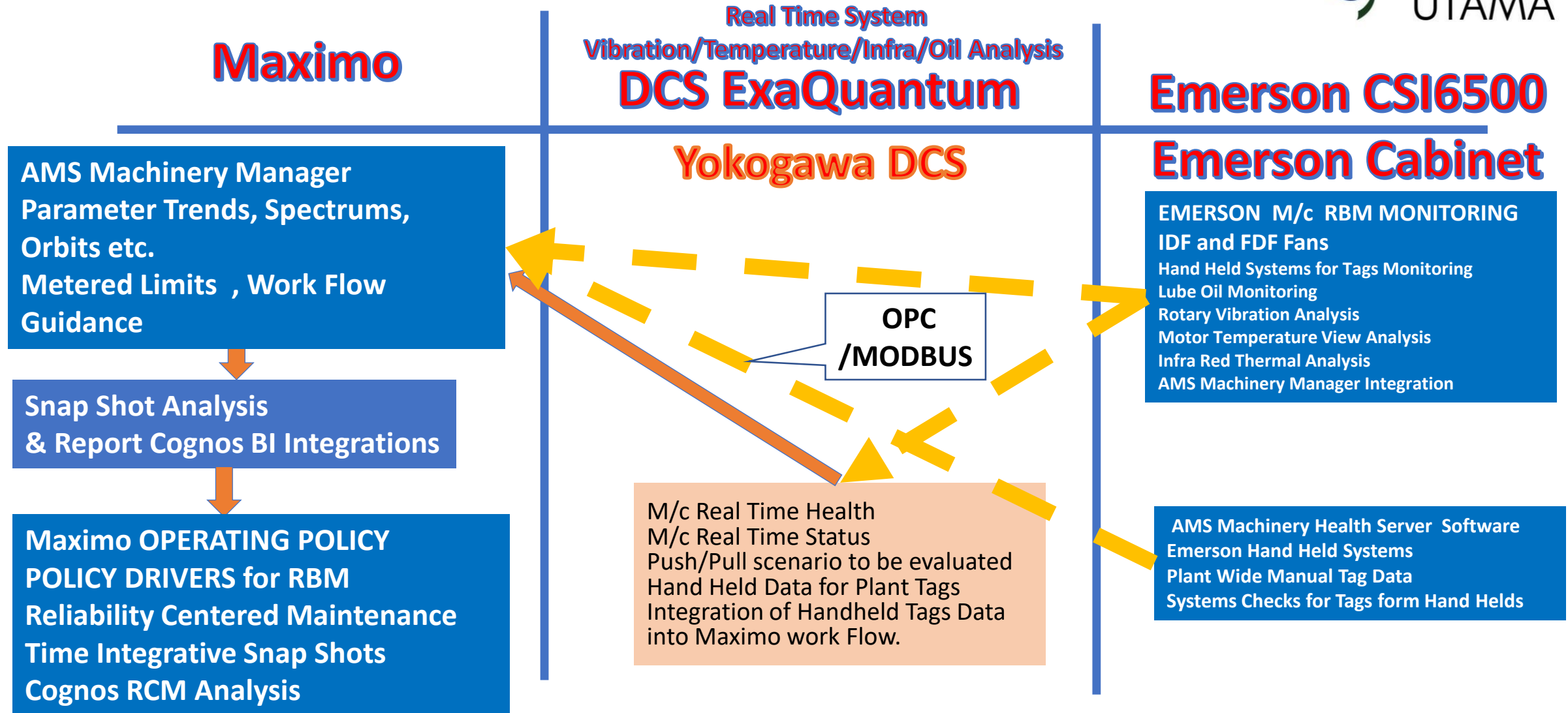


GE SYSTEMS DATA SETS MANAGEMENT

P&ID Metering & Services Data

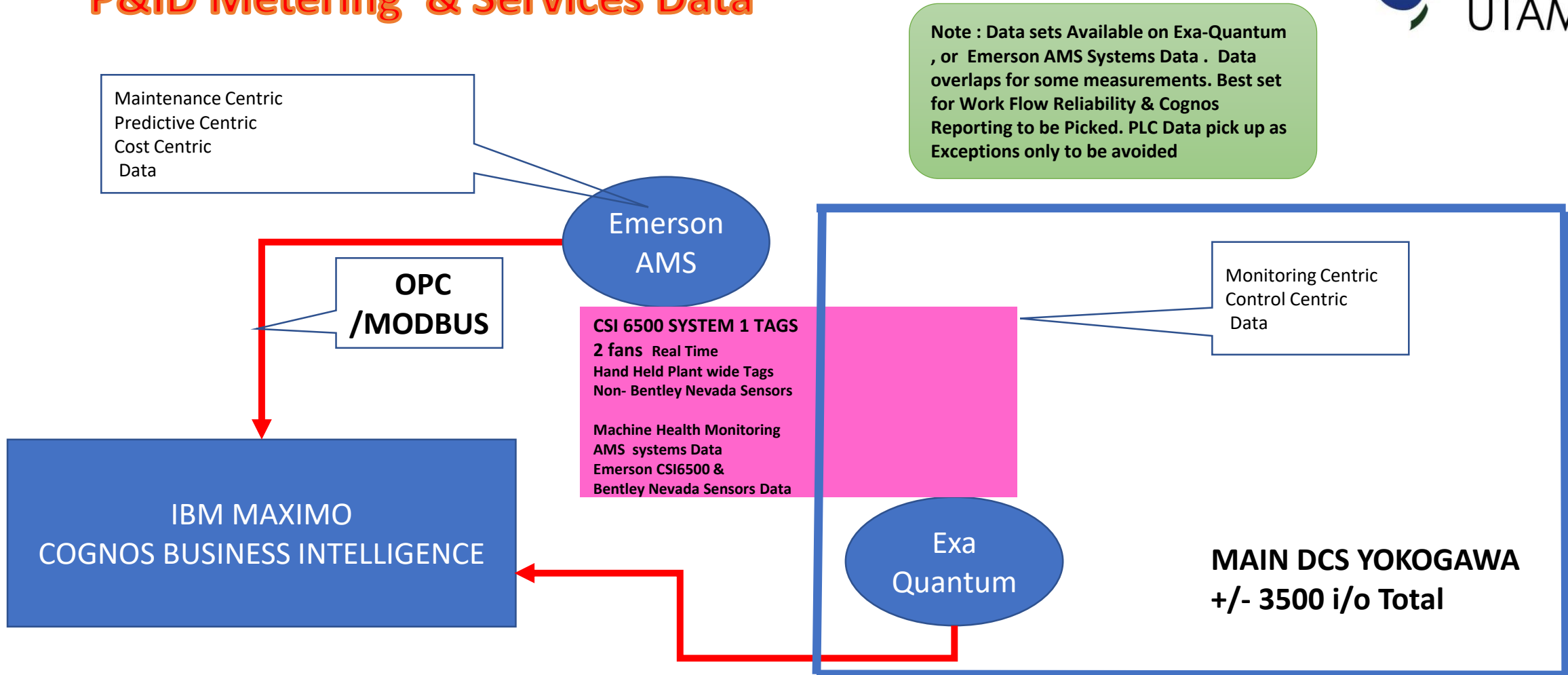


SYSTEM 1 EMERSON INTEGRATED ASSETS



CSI6500 DATA SETS MANAGEMENT

P&ID Metering & Services Data



Maximo

ABB PMCS

Real Time System

Maximo Plant Wide Data
Plant Operations Server Data Base
Data Integration
Maintenance Work Orders
Operations Weekly /
Daily Snap Shot

Power Analysis
Area Wise Power consumptions
Power Outputs
Parasitic Losses Reporting
Cognos BI Integration & Analysis

Data Integration

SLD Bus Total Up-Time
Power Data
Parasitic Losses
KwHr Historian

Note : All Power Breaker Tags Exist on ABB Mini DCS System which is called PMCS (Power management and Controls System) . Some Tags exist Parallel on Yokogawa DCS also.

Granular Breaker Power Data

Area Wise Amalgamation

Historical / Intermittent Trends

ABB PMCS DATA SETS MANAGEMENT

P&ID Metering & Services Data

Note : Data sets Available on Exa-Quantum , or ABB PMCS Data overlaps for some measurements. Best set for Work Flow Reliability & Cognos Reporting to be Picked. PLC Data pick up as Exceptions only to be avoided

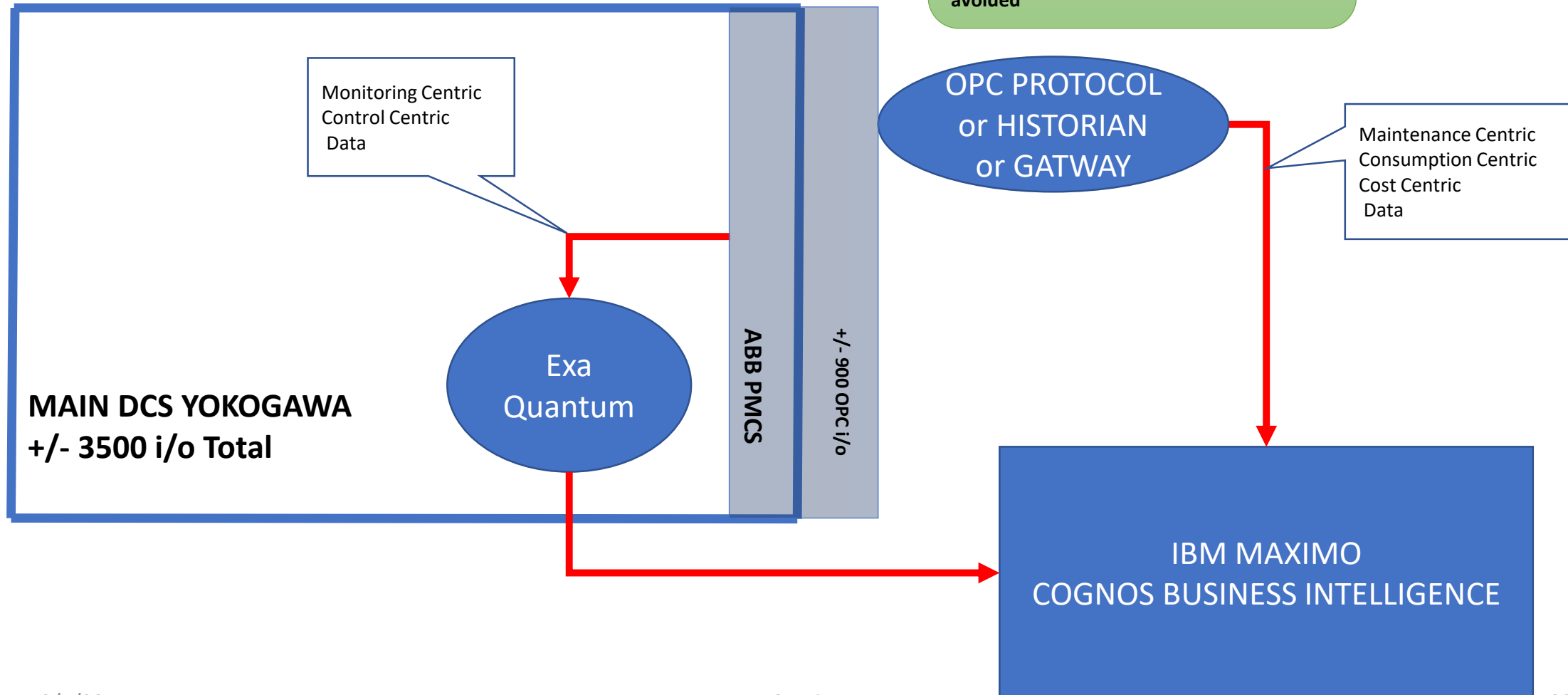
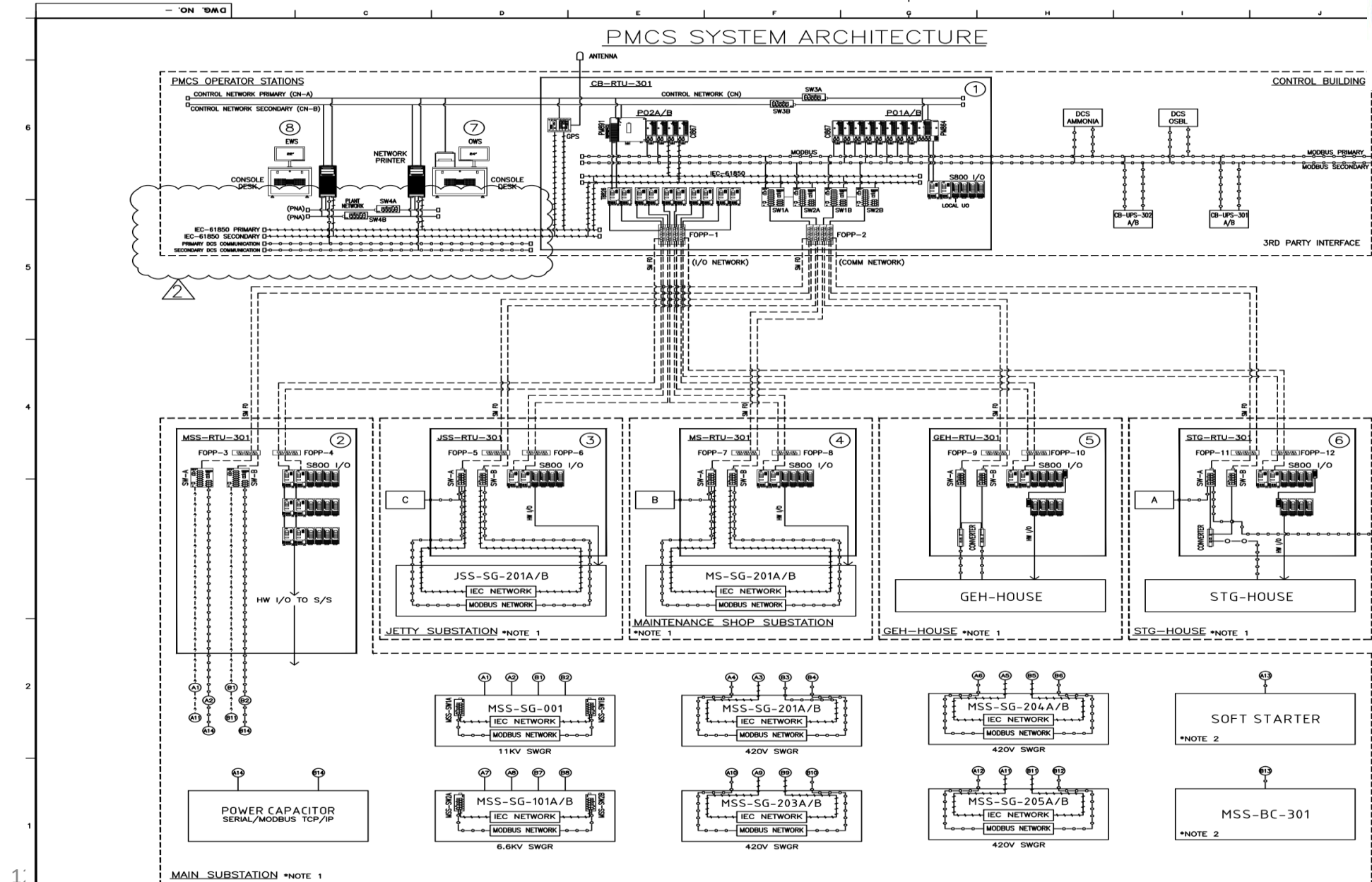


ABB PMCS SYSTEM ARCHITECTURE



Maximo

THERMAX BMS

Real Time System

**BMS (Boiler management system
OPC/GATEWAY Data Integration)**

Maximo Boiler and Steam
Operations Server Data Base
Data Integration Database
Snap Shot

Boiler Up-Time
Gas Data
Maintenance Schedules Dataa
Maintenance schedules
Standby Time
Blowdown Losses

**Note : These Tags Exist on THERMAX
BMS (Boiler Management System) a
Micro DCS System.**

Boiler Maintenance
Steam Analysis
Consumption Data
& Report Cognos BI Integration

Boiler Steam/ Gas Data

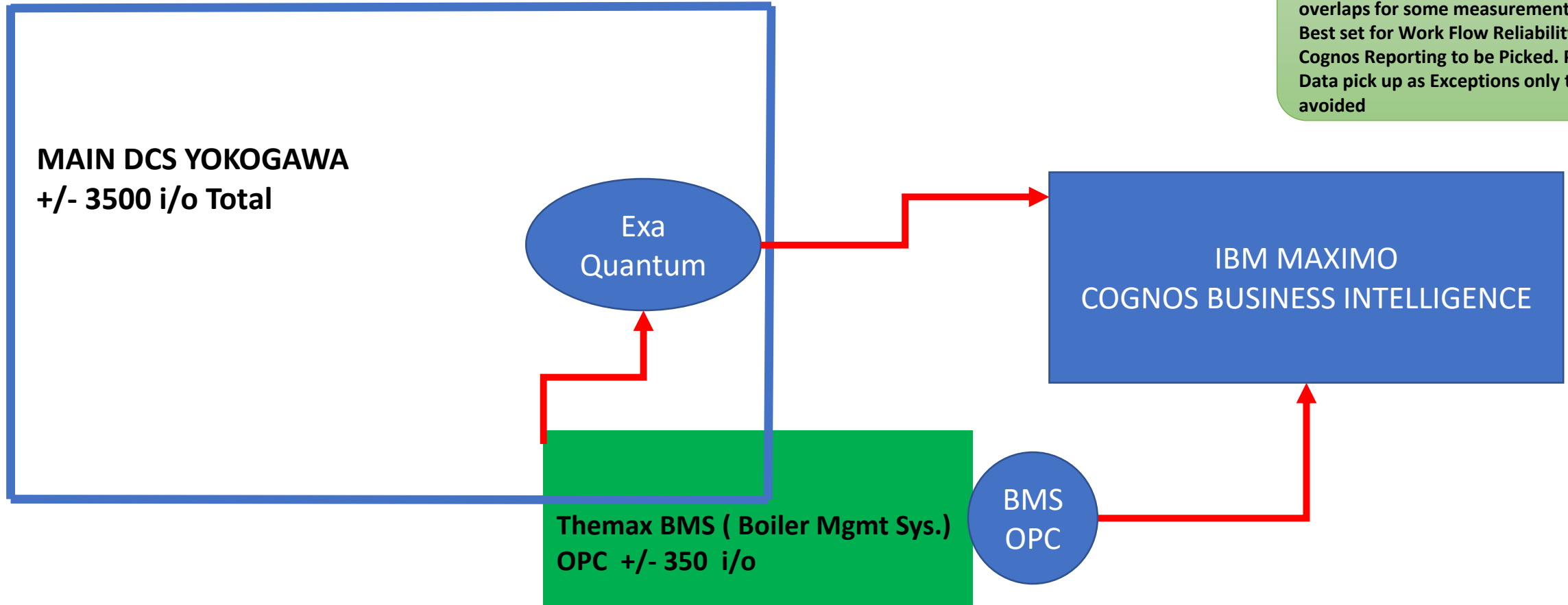
Boiler Blow Down

Historical / Intermittent Trends

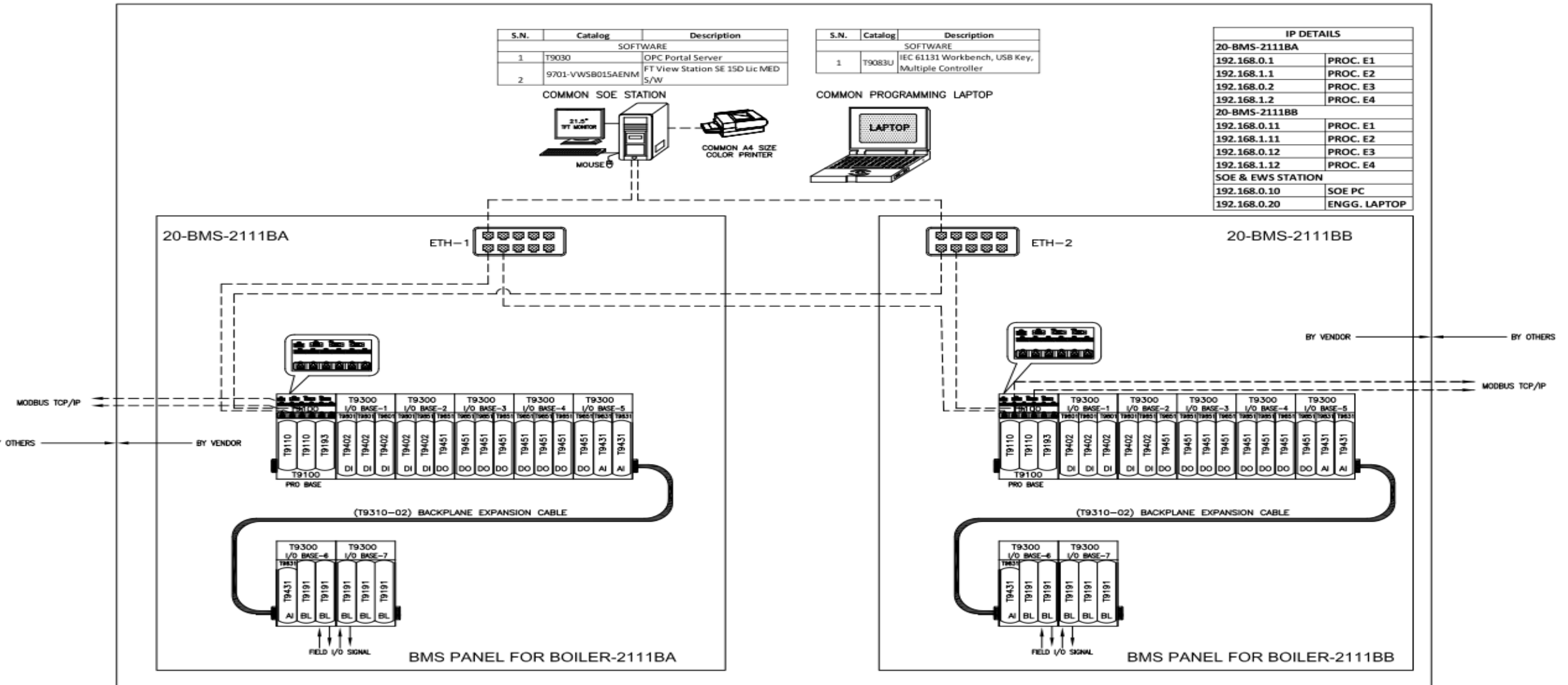
THERMAX DATA SETS MANAGEMENT

P&ID Metering & Services Data

Note : Data sets Available on Exa-Quantum , or Thermax. Data overlaps for some measurements. Best set for Work Flow Reliability & Cognos Reporting to be Picked. PLC Data pick up as Exceptions only to be avoided



THERMAX BMS ARCHITECTURE



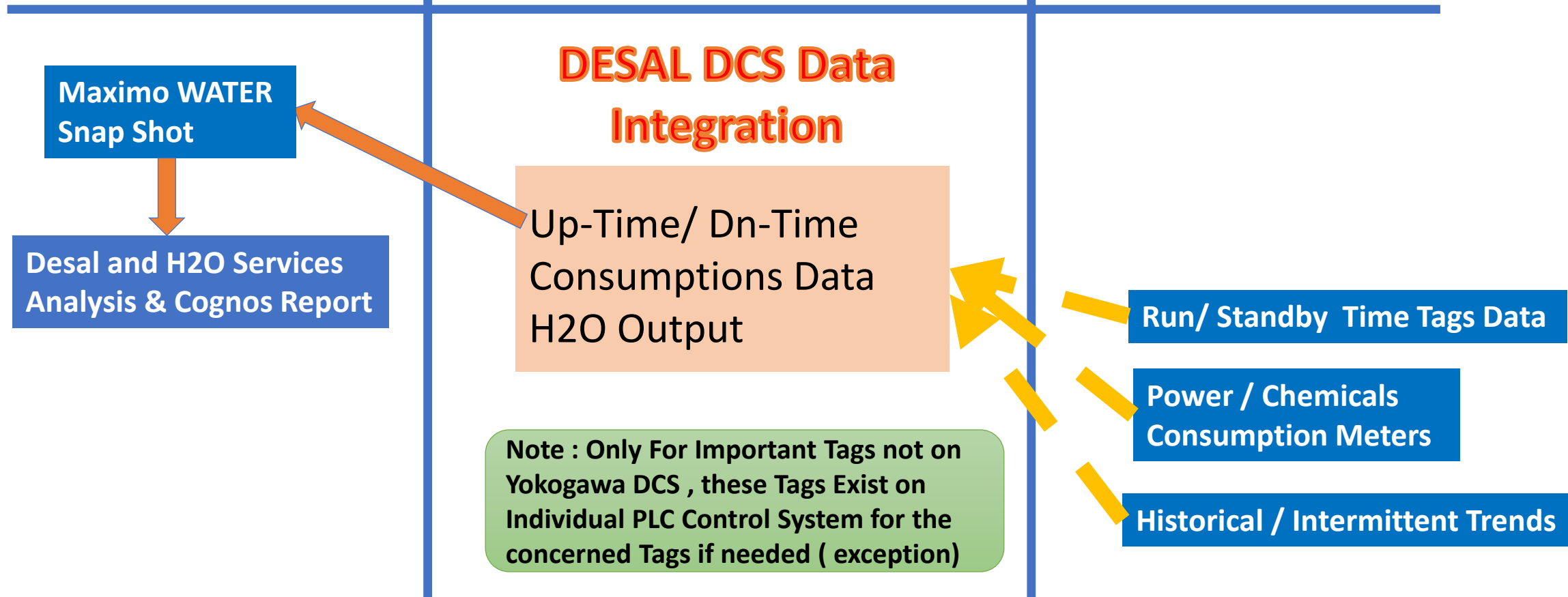
NOTE1: AADVANCE SIL2 PLC SYSTEM WITH DUAL REDUNDANT PROCESSOR AND NON-REDUNDANT IO CONFIGURATION

LEGEND:

DESAL / Mix BED DCS Data @ Exa-quantum

Maximo

PLC System



Maximo

Nitrogen Plant @ OPC Available

PLC System

Maximo Plant Wide Data
Plant Operations Server Data Base
Data Integration
Consumption & Costs
Maintenance Work Orders
Operations Weekly /
Monthly Snap Shots

Nitrogen Services Analysis
& Cognos Integration Report

Data Integration Air Liquide OPC Data

Up-Time/ Dn-Time
Consumptions Data
Maintenance Data
Longterm Anamoly Metering
N2 Output Metering

Note : Only For Important Tags not
on Yokogawa DCS , these Tags Exist
on Air Liquide Integrated PLC Control
System.

Run/ Standby Time Tags Data

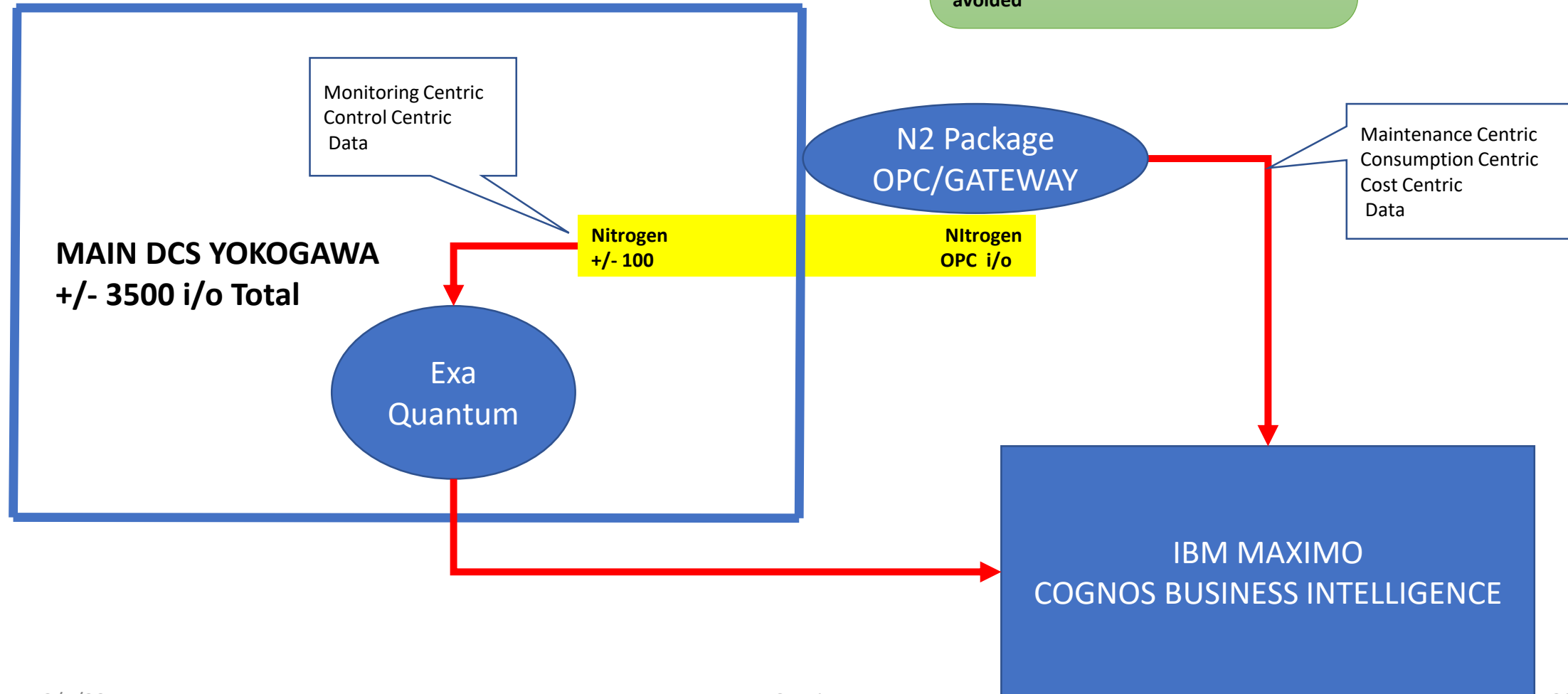
Power / Chemicals
Consumption Meters

Historical / Intermittent Trends

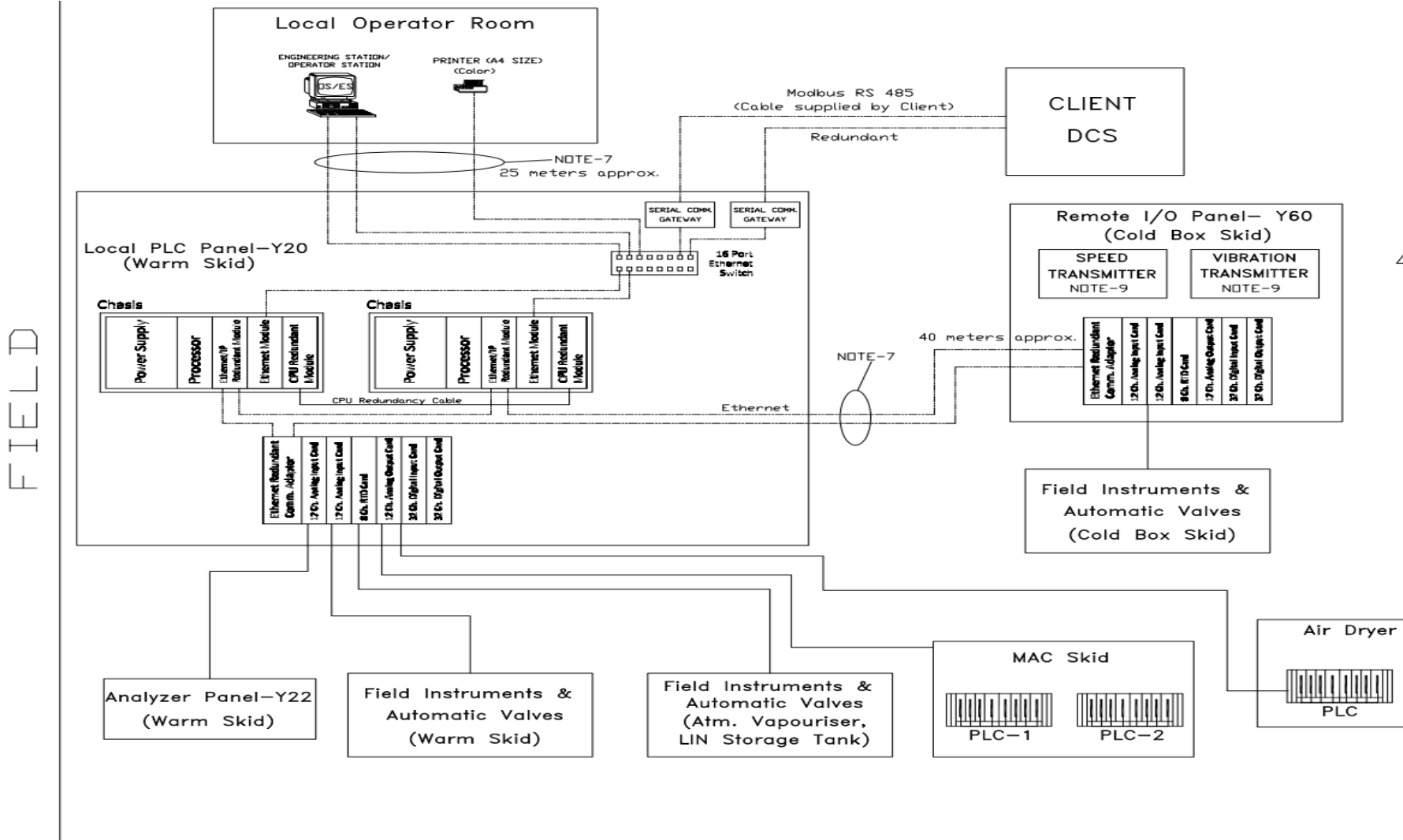
N2 PLANT DATA SETS MANAGEMENT

P&ID Metering & Services Data

Note : Data sets Available on Exa-Quantum , or Air Liquide OPC Data overlaps for some measurements. Best set for Work Flow Reliability & Cognos Reporting to be Picked. PLC Data pick up as Exceptions only to be avoided



Nitrogen Plant DATA Architecture



NOTE

1. The system architecture provided is typical only.
2. The monitor shall be as 22" LED high resolution type, 16:10 Aspect Ratio.
3. CPU, PSU & Communication are Redundant I/O Cards are Non-Redundant.
4. 230V AC, 50 Hz Non-UPS Power Supply to be considered.
5. Local PLC Panel (Y20) & Remote I/O Panel (Y60) shall be IP54 minimum, with AC & canopy. These panels shall be field mounted.
6. All logics shall be developed using combination of functional block & ladder.
7. Cables between PLC Panel(Y20) & ES/OS, Y20 & Printer; Y20 & Y60 shall be in AL's PLC vendor scope.
8. Cables and termination between PLC Panel (Y20) & Client DCS shall be in Client's scope.
9. Supplied by others. To be mounted in the Panel. Cable entry details, mounting style shall be confirmed later. Tentative space requirement: 600mm (L) x 250mm (H).

LEGEND:

I/O : INPUT-OUTPUT CARDS
PSU : POWER SUPPLY UNIT
CPU : CONTROL PROCESSOR UNIT
COMM : COMMUNICATION MODULE
ES/OS : ENGINEERING STATION / OPERATOR STATION

DWG. NO.		TITLE			
REFERENCE DRAWINGS					
3	05.09.16	Approved For Design	AKL	AKM	VIA APT
2	01.08.16	Approved For Design	AKL	AKM	VIA APT
1	02.06.16	Approved For Design	AKL	AKM	VIA APT
0	21.04.16	Approved For Inquiry	AKL	AKL	AKM APT
REV. NO.	DATE	DESCRIPTION	PROJ.	CHGT.	APPD. STATUS
BANGGAI AMMONIA PLANT (BAP) PROJECT 1900 MTPD AMMONIA BANGGAI – CENTRAL SULAWESI, INDONESIA					
 PT PANCA AMARA UTAMA BANGGAI – CENTRAL SULAWESI INDONESIA					
 PT REKAYASA INDUSTRI					
SCALE: NTS		CLIENT DWG NO. BAP-27-95-VG-7960-R			ORIGINAL REV. A0
Classification: • INTERNAL Business Owner: Local Electricity Manager, Instrumentation & Control Systems Distribution Unit: PUG PROJECT NAME: NPK PACKAGE BANGGAI PART: - TITLE: - USE: 					
TOTAL CONTROL SYSTEM		Cryogenics Lurgi			
					

STG Power Plant

Data available @ DCS

PLC System

Maximo

Maximo Plant Wide Data
Operations Server Data Base
Data Integration
Maintenance Work Orders
Operations Monthly /Weekly /
Daily Snap Shot

Data Integration Siemens
STG@ DCS

Up-Time/ Dn-Time
Consumptions Data
Power Output
Maintenance Data
Long term Metering Trends

Siemens Power Plant
Work Flow Management
Maintenance Analysis
Consumption Analysis &
Cognos BI Integration Report

Run/ Standby Time Tags Data

Power / Lube / Steam
Consumption Meters

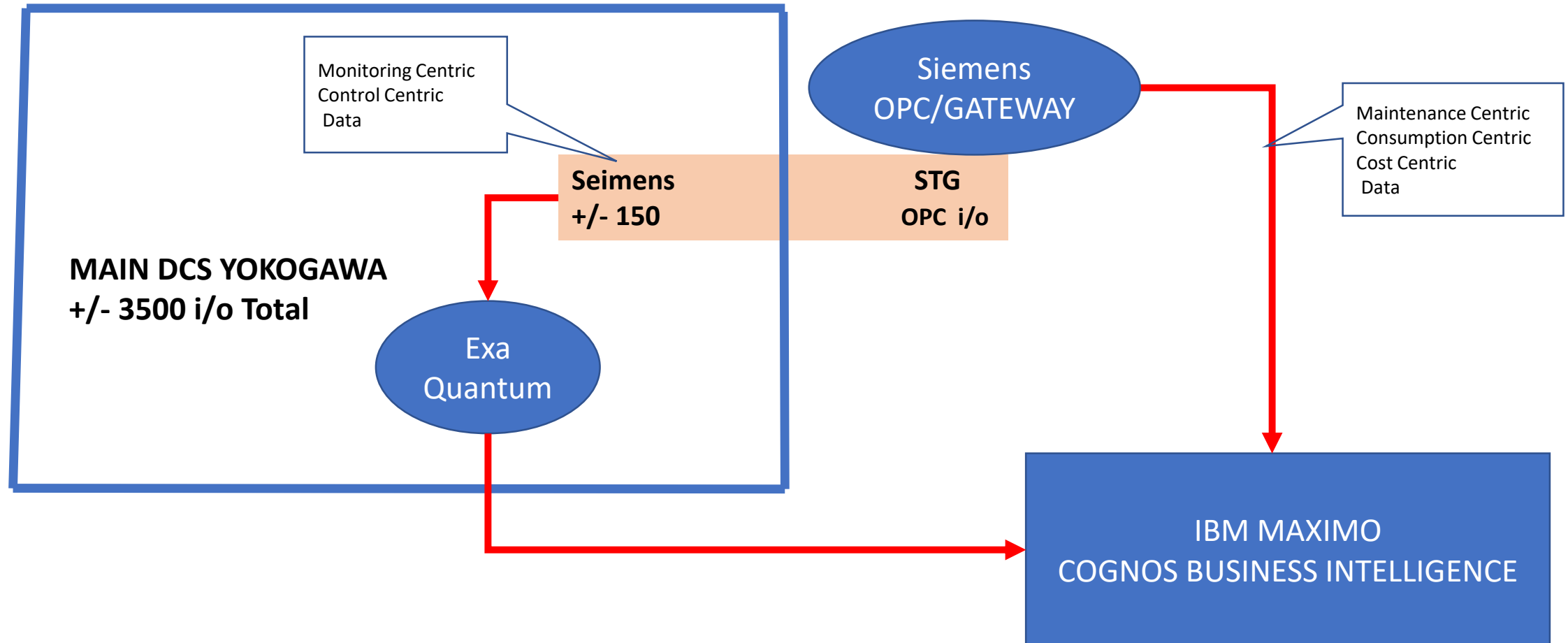
Historical / Intermittent Trends

Note : Tags not on DCS , these Tags Exist on
Siemens Integrated OPC and PLC Control
System. PLC data only on exception need to
be Integrated if related to Maintenance,
Plant Operation & Consumptions

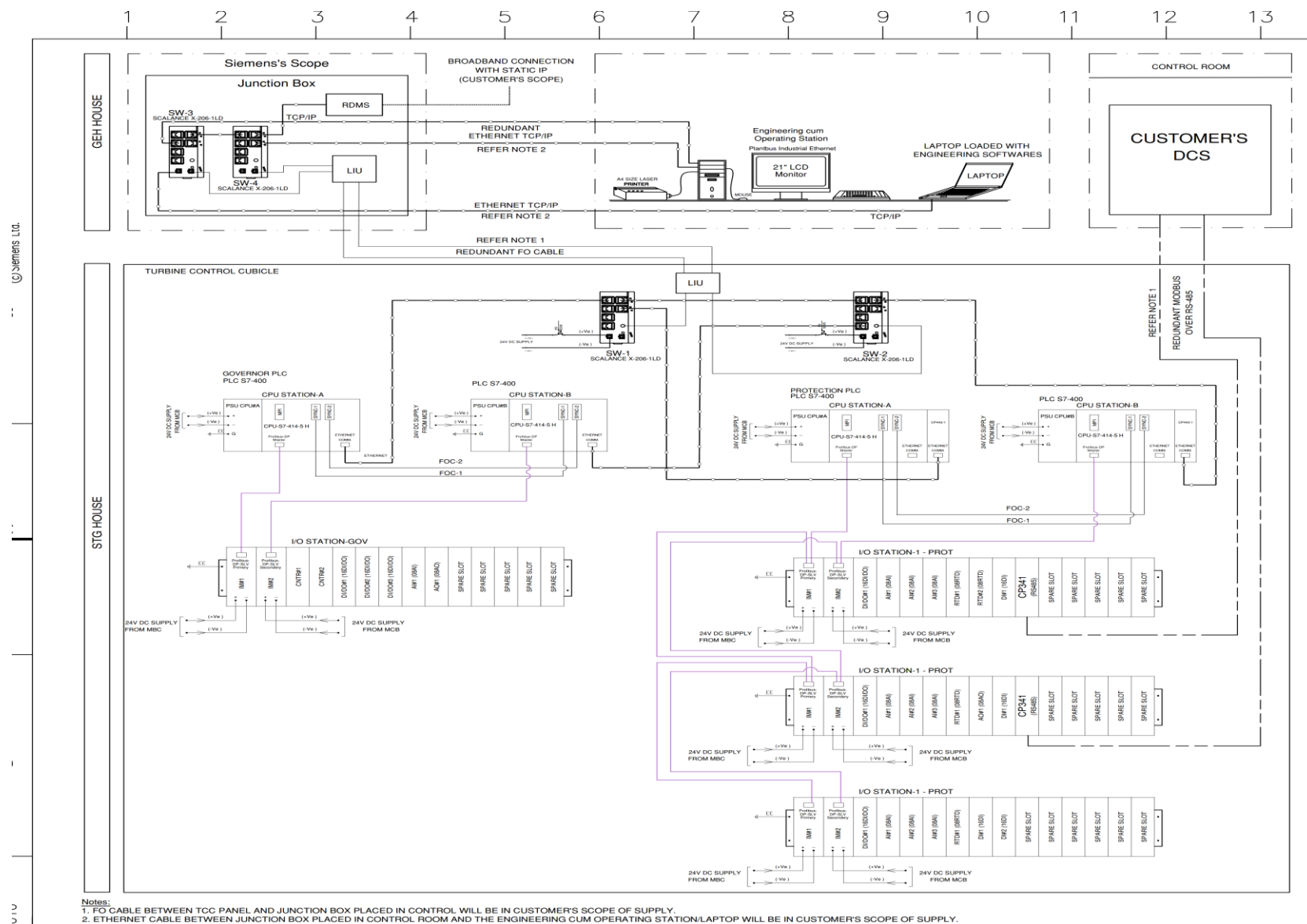
SIEMENS DATA SETS MANAGEMENT

P&ID Metering & Services Data

Note : Data sets Available on Exa-Quantum , or Siemens OPC Data overlaps for some measurements. Best set for Work Flow Reliability & Cognos Reporting to be Picked. PLC Data pick up as Exceptions only to be avoided



STG Power Plant Data available @ DCS



Maximo

GEG/DFEG Power Plant

PLC System

Maximo Plant Wide Data
Plant Operations Server Data Base
Data Integration
Maintenance Work Orders
Operations Weekly / Daily Snap Shot

**Wartsila Data
Integration with WOIS/
OPC or GATEWAY**

Up-Time/ Dn-Time
Consumptions Data
Power Output
Maintenance Data

**Note : These Tags Exist on Wartsila
WOIS Mini DCS System and can be
OPC Pick up**

Wartsila Power Plant
Work Flow Management
Maintenance Analysis
Consumption Analysis &
Cognos BI Integration Report

Run/ Standby Time Tags Data

Power/ Lube/ Diesel
Consumption Meters

Historical / Intermittent Trends


```
graph TD; WPP[Wartsila Power Plant OPC +/- 850 i/o] -- "Monitoring Centric Control Centric Data" --> EQ((Exa Quantum)); WPP -- "Maintenance Centric Consumption Centric Cost Centric Data" --> WOIS([WOIS OPC/GATEWAY]); EQ --> IBM[IBM MAXIMO COGNOS BUSINESS INTELLIGENCE]; WOIS --> IBM;
```

The diagram illustrates the data integration architecture for the Wartsila Power Plant. It shows the flow of data from the plant's OPC system to the IBM MAXIMO COGNOS BUSINESS INTELLIGENCE system. The Wartsila Power Plant OPC system (red box) provides data to the Exa Quantum system (blue oval) and the WOIS OPC/GATEWAY (blue oval). The Exa Quantum system then feeds data into the IBM MAXIMO COGNOS BUSINESS INTELLIGENCE system (blue box). The WOIS OPC/GATEWAY also feeds data into the IBM MAXIMO COGNOS BUSINESS INTELLIGENCE system. The data is categorized into Monitoring Centric, Control Centric, Maintenance Centric, Consumption Centric, and Cost Centric Data.

Wartsila Power Plant
OPC +/- 850 i/o

WOIS
OPC/GATEWAY

Monitoring Centric
Control Centric
Data

Maintenance Centric
Consumption Centric
Cost Centric
Data

Exa Quantum

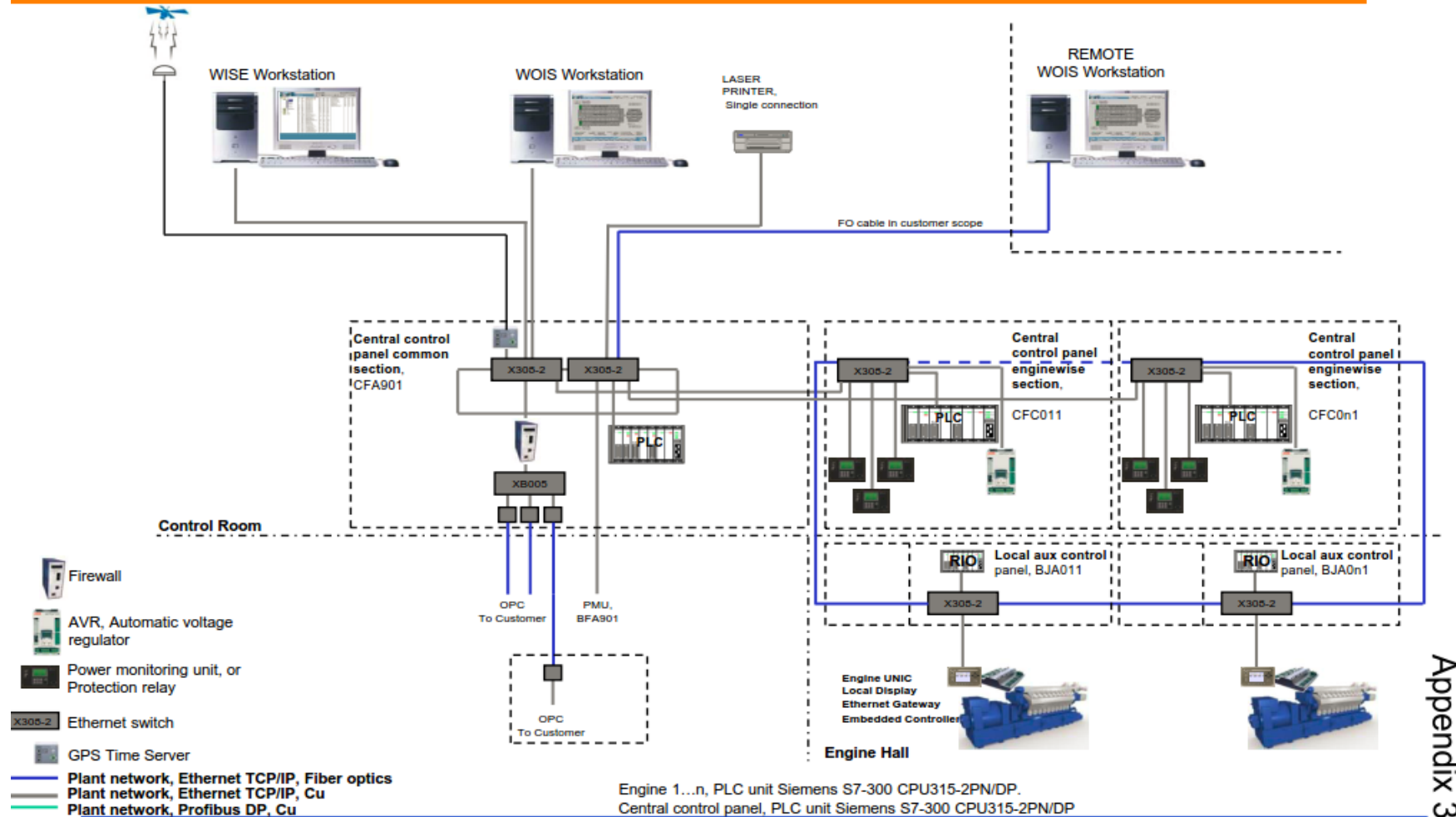
MAIN DCS YOKOGAWA
+/- 3500 i/o Total

IBM MAXIMO
COGNOS BUSINESS INTELLIGENCE

12/4/2017

GEG/DFEG Power Plant Architecture

BAP - PAU GEG project 2x16V34SG+1x16V34DF, Indonesia



Wärtsilä Power Plant

Made date: 13.10.15 / LN ABB Oy
Appr. date:

Page 1
Doc ID: CBG-029619 Rev a, 15.10.15

Dynamics AX

Managing HRD @ Site in Ax

1. +/- 250 Employee HRD
2. Employee Pay Roll
3. Employee Attendance

Non P&ID Assets & Services

Note : HRD function would be automated at the Ax. Maximo would need to be able to take care of ONLY Contract Workforce or Vendor Manpower Attendance/ Presence.

Maximo

Managing Assets/Services @ Site in Maximo

1. +/- 225 Room On Site accommodation and Room Occupancy.
2. At-Site Canteen & Catering Services
3. Vendor/Contractor attendance and Time Sheets.
4. Site Buildings and Civil structures
5. 30 ea Vehicles @ Site
6. At Site Admin services
7. At Site Service Buildings
8. Private Jetty for Ships
9. Pilot and Tug Boats

Thank You

ERP + EAM + WMS + RM

Integration of Management Systems @ PAU

Namindo Pty Ltd

Thank you

Suprit Pal Singh, Founder Director

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This archive edition keeps the content as originally presented. Figures and forecasts are of their date.