

GENERAL SPECIFICATION

Field Operations

GS EP EXP 131

Design and installation of Process Data Server

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General Specification		GS EP EXP 131
Design and installation of Process Data Server		
Rev.: 01	Effective date: 10/2012	Page: 2 of 27

Contents

1. Scope	4
2. Reference documents.....	4
3. Glossary.....	5
4. Architecture philosophy.....	6
4.1 Introduction	6
4.2 General principles	6
4.3 Outline drawing	7
4.4 Infrastructure at production site.....	8
4.5 Infrastructure at TEP Affiliate	8
4.6 Network.....	8
4.7 PDS collector for Packages.....	9
5. Data Acquisition nodes	10
5.1 Data Acquisition Redundancy	11
5.2 Buffering Mechanism	12
5.3 Configuration of the PI Interface.....	12
5.4 Data Acquisition throughput	13
5.5 Data acquisition nodes for packages:.....	13
6. Local PDS Server	14
7. Data Replication node.....	15
8. Affiliate PDS Server.....	15
8.1 Hardware requirements.....	15
8.2 Software requirements.....	15
8.3 Disks configuration.....	16
8.4 PI Server software configuration	16
9. Affiliate Replication node	17
10. PDS Clients.....	17
11. Configuration of PI Database	17



General Specification		GS EP EXP 131
Design and installation of Process Data Server		
Rev.: 01	Effective date: 10/2012	Page: 3 of 27

11.1	Tag types	17
11.2	Tags naming rules	18
11.3	Digital States naming	22
	Bibliography.....	23
Appendix 1	METOCEAN tags	24

General Specification		GS EP EXP 131
Design and installation of Process Data Server		
Rev.: 01	Effective date: 10/2012	Page: 4 of 27

1. Scope

This specification defines the mandatory requirements for the design, configuration and installation of Process Data Server (PDS) at Total E&P Affiliates. It shall be applied each time a project includes ICSS installation or upgrade with data acquisition by the PDS.

This specification applies to any equipment part of a PDS (servers, data acquisition nodes, data replication nodes, etc.). The PDS components are split between Industrial Information System (SII) and Enterprise Information System (SIE).

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
Not applicable	

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP INS 102	Instrumentation identification
GS EP INS 110	Instrumentation for package units
GS EP INS 135	Cyber Security requirements for design and supply of ICSS and Package Systems
GS EP SPS 019	Subsea production control systems

General Specification		GS EP EXP 131
Design and installation of Process Data Server		
Rev.: 01	Effective date: 10/2012	Page: 5 of 27

3. Glossary

AD	Active Directory
CPU	Central Processing Unit
DMZ	Demilitarized Zone
DRP	Disaster Recovery Procedure
ESD	Emergency ShutDown
FPSO	Floating Production Storage and Offloading unit
Gb	Giga-byte
GPS	Global Positioning System
ICSS	Integrated Control and Safety System
OPC	OLE for Process Control
I/O	Input/Output
IP	Internet Protocol
IRIG	Inter-Range Instrumentation Group
IST	Information System Telecom
LIMS	Laboratory Information Management System
Mbps	Mega-bit per second
MOV	Motor Operated Valve
NTP	Network Time Protocol
OS	Operating System
PDCS	Power Distribution Control System
PDS	Process Data Server
PI	Plant Information
PLC	Programmable Logic Controller
QoS	Quality of Service
SCADA	Supervisory Control And Data Acquisition
SIE	Enterprise Information System (French: Système Informatique Entreprise)
SII	Industrial Information System (French: Système Informatique Industriel)
SOE	Sequence Of Events
SSO	Single Sign-On
TCP	Transmission Control Protocol
TEP	Total Exploration Production
VSAT	Very Small Aperture Terminal
OFMS	Overall Flow Metering System

General Specification		GS EP EXP 131
Design and installation of Process Data Server		
Rev.: 01	Effective date: 10/2012	Page: 6 of 27

4. Architecture philosophy

4.1 Introduction

Production monitoring and optimisation of operations are mandatory to guarantee Total E&P performances. Today a real time database (or PDS as Process Data System) collecting all measurements, status and events from production sites is a central tool for this purpose.

This specification will describe the architecture and components to ensure availability and reliability of such a system.

4.2 General principles

The general principles for the implementation of a PDS at TEP Affiliate are the following:

- One PDS server shall be installed at TEP Affiliate premises.
- The PDS Server shall be based on PI (software from OSIsoft) software.
- The production site(s) infrastructure is made of:
 - One or several Data Acquisition nodes:
 - . For ICSS data.
 - . For P3 packages (as defined in [GS EP INS 110](#)).
 - . For P4 packages (as defined in [GS EP INS 110](#)).
 - One optional local PDS server.
 - One optional Data Replication node, for data replication between the local PDS server at production site and TEP Affiliate PDS server in.
- During the Project Phase a complete set of hardware and software with the relevant licences shall be provided for the PI completion and the testing. In case a temporary PI server is needed for a period including the FAT, EXP/OPF will provide a specific license.

Other principles are:

- Data collection shall be achieved using redundant data collection nodes for ICSS data, Subsea data (as per [GS EP SPS 019](#)).
- Data from TEP Affiliate PDS Server shall be replicated to the PDS Server at TEP Headquarters in Pau.
- Data collection from ICSS and P3 packages is mandatory. For P4 packages it is optional when not specified in this document, but highly recommended.

The main objectives are:

- PDS servers shall have 99.5% availability at least.
- Data acquisition shall have 99.9% availability for ICSS data.
- Data acquisition shall have 99.5% availability for other systems (Meteo, Mooring Monitoring System ...).

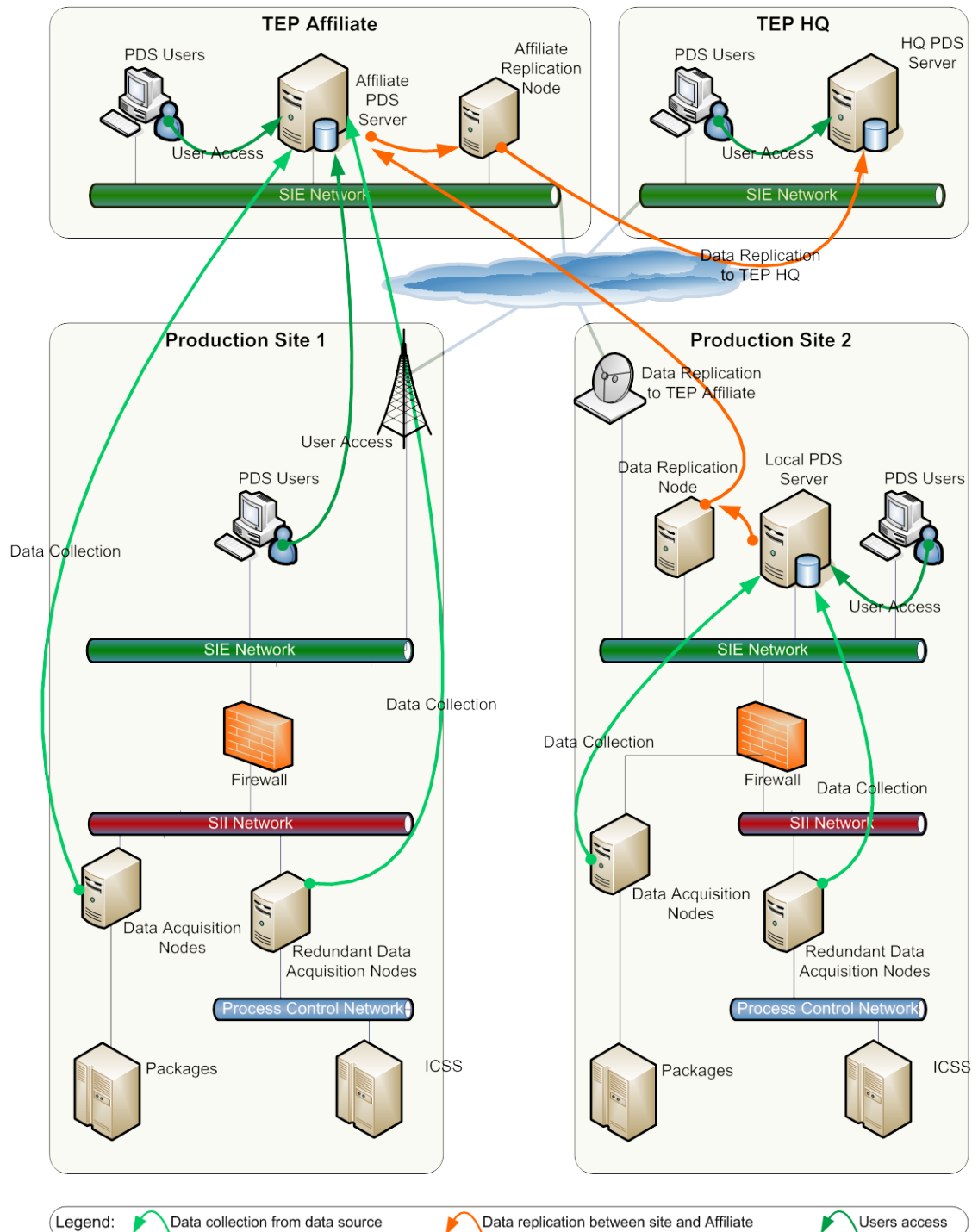
Design and installation of Process Data Server

Rev.: 01

Effective date: 10/2012

Page: 7 of 27

Those objectives shall be verified using trends of important PDS tags and computations of percentage of good values. For the PDS server itself it shall be based on the tags monitoring the percentage of CPU of the main processes of the software.

4.3 Outline drawing


General Specification		GS EP EXP 131
Design and installation of Process Data Server		
Rev.: 01	Effective date: 10/2012	Page: 8 of 27

4.4 Infrastructure at production site

Two distinct PDS infrastructures are allowed for the production sites as described in outline drawing from chapter "4.3 Outline drawing". The difference lies in whether or not a PDS server is installed locally.

4.4.1 No local PDS server

No local PDS server is installed at the production site. Data is collected from the data sources by the Data Acquisition node(s) and directly transmitted to the PDS server at TEP Affiliate. Both local and Affiliates PDS users are accessing data from the Affiliate PDS server.

This infrastructure shall be applied when the network link between production site and TEP Affiliate is efficient (bandwidth greater than 10 Mbps), reliable (redundant link), or when the number of PDS users at production site is limited (no more than 5). This architecture is also acceptable when local needs can be satisfied by the ICSS historian.

4.4.2 Local PDS server

One local PI server and one Data Replication node can be installed at the production site.

Data is collected from the data sources by the Data Acquisition node(s) and archived in the local PDS server.

Data from the local PDS server is replicated to the PDS server at TEP Affiliate by the Data Replication node.

Local PDS users access data from the local PDS server, while PDS users at TEP Affiliate access data from the PDS server at the Affiliate.

This infrastructure shall be applied when the number of PDS users working at the production site is greater than five and the overall bandwidth of the network between the production site and TEP Affiliate premises is below 10Mbps.

4.5 Infrastructure at TEP Affiliate

The infrastructure at TEP Affiliate shall contain:

- One PDS server that will gather data from all the production sites of the Affiliate.
- One Replication node to transmit data to TEP HQ in France. As this functionality requires very little IT resources it can be installed on mutualised hardware as long as the frequency of computer reboot is lower than one per week.

When the affiliate PDS system is used by more than 50 users or when it is frequently used by operators in control room then it shall be based on redundant PI servers (i.e. PI-HighAvailability).

4.6 Network

PI network communications are using TCP/IP protocol on Ethernet links. A unique TCP/IP port (5450) is dedicated to PI communications.

This chapter describes the requirements relevant to network architecture and performance.

General Specification		GS EP EXP 131
Design and installation of Process Data Server		
Rev.: 01	Effective date: 10/2012	Page: 9 of 27

4.6.1 Network bandwidth

Communications between the production sites and TEP Affiliate premises rely on network links that may use different technologies: microwaves, VSAT, Fiber-Optic, etc.

Network QoS shall give a high priority to PI TCP/IP port (5450) as soon as a link is used for data acquisition or data replication (a continuous real time flow is much better in bandwidth usage and PDS behaviour compared to bursts or batch of data).

4.6.2 Network topology

As a minimum requirement regarding the network, one firewall must be installed and configured to prevent users connected on SIE network to access the equipments on the SII network (ICSS workstations, etc.).

The firewall rules to be configured are described in [GS EP INS 135](#).

4.6.3 Other network aspects

All equipments involved in the PDS system (PDS servers, acquisition and replication nodes, etc. But not the users workstations) must have fixed IP addresses.

Remote access to Data Acquisition nodes located in SII from SIE for maintenance is not allowed. Changes of the configuration of the PI interface running on the acquisition node must be done by a local administrator.

4.7 PDS collector for Packages

The PDS shall be used to collect data from P3 packages and some P4 packages. These Packages may be the Overall Flow Monitoring System, Pipeline Monitoring System, MetOcean Monitoring System, Tank Gauging System, Ballast Monitoring, Marine Monitoring System, Mooring Monitoring System, Fatigue Monitoring System, Vessel Motion Monitoring System, Vessel Dynamic Positioning Monitoring System, Tendon Tension Monitoring System, Riser Monitoring System, Bio Diversity Monitoring System...

All these Packages shall be identified during the pre-project phase and clearly stated in the Statement Of Requirement.

During the Basic Engineering / Front End Engineering Design an architectural drawing shall be issued based on the requirement of this specification.

The quantity of Data Acquisition nodes shall be minimized in order to take into account the Obsolescence effects. For this Virtualisation Principle can be used.

During the Basic Engineering / Front End Engineering Design Contractor shall clearly state in the relevant Package Specifications the requirement for Hardware and Software design and supply.

During the Basic Engineering / Front End Engineering Design Contractor shall prepare a PDS Specification which defines the split of work and supply between all Parties involved e.g. ICSS Suppliers, Packages Suppliers, PDS software Vendor for having consistency during the design, the supply and the testing phases.

This PDS Specification shall also state the responsibility of each Party and shall define an Integrator for the Overall solution.