General Specification

NTPS 470

Exaspot

GS36J06D51-01E

Real Time Plant Optimisation System

■ GENERAL

Exaspot *is based upon 'SPOT', the Shell Global Solutions' technology for closed-loop optimisation. Exaspot combines real-time plant data with economic objectives to replicate and optimise plant operations. Optimisation is applied to a Unit, typically a high-value section of a Refinery, where small changes to operation conditions can result in large savings. The purpose of Exaspot is to maximise Unit margins within all operational, technological and economic constraints.*

By measuring Optimiser performance in terms of economic value, users are provided with the profit delta generated for each run.

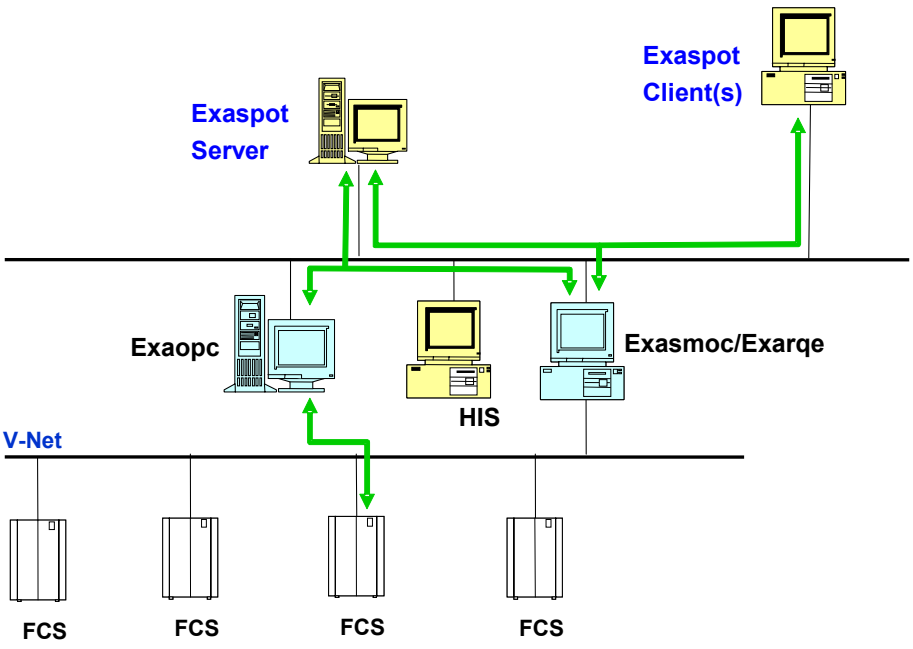
Exaspot *provides configuration tools and application programs to merge all software seamlessly. Exaspot also includes the following software packages:*

- *Yokogawa's 'Exaquantum' Data Historian.*
- *Shell's 'PROMOTE', a process simulator incorporating Shell's refinery database and conversion models which is used for non-linear rigorous process modelling.*
- *A data reconciliation engine.*

All Optimiser run based data is available for analysis through Online Analytical Processing (OLAP). Client reporting offers standard multi-dimensional views of Optimiser data. In addition, users can create their own views and store them into a shared library.

Exaspot comprises the following features:

- Process Control System(s) Interface
- Spreadsheet based Configuration Tool
- Steady State Analysis
- Unit Configuration Check Analysis
- External System Status Analysis
- Automatic Reconciliation
- Automatic Plant Model Simulation
- Optimiser side Application for Operator Interfacing and Setpoint Download
- Storage of Optimisation data for OLAP analysis
- Web reporting
- Rule based generation of Mass Balance, Economic Balance and Laboratory reports
- Ability for Exaspot applications to work Offline.



Exaspot System Overview

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KEY FEATURES

Process Control Systems Interface

Exaspot enables OPC compliant communication with Process Control Systems (PCS) as described below.

Data Access – OPC DA 2.05a
The tested and proven OPC servers are:

- Yokogawa Exaopc, for µXL, CENTUM-XL, CENTUM CS, CENTUM CS 1000 and CENTUM CS 3000.
- Matrikon OPC server for Honeywell TDC 3000, Foxboro I/A series and Modbus.

Alarms and Events Access – OPC A&E 1.02
The tested and proven OPC server is:

- Yokogawa Exaopc for µXL, CENTUM-XL, CENTUM CS, CENTUM CS 1000 and CENTUM CS 3000.

Historical Data Access – OPC HDA 1.1
The tested and proven OPC server is:

- Yokogawa Exaopc for µXL, CENTUM-XL, CENTUM CS, CENTUM CS 1000 and CENTUM CS 3000.

Text Files
This allows the import and/or export of data using an ASCII CSV format.

Spreadsheet Based Configuration Tool

The Configuration Tool creates Exaspot and Relational Data Base (RDB) configuration settings including the definition of Optimisation tags and their related functionality. This Tool will also:

- Automatically build Exaspot tag scripts
- Define and set manual tag values
- Define rule based reporting structures
- Define laboratory sample structures.

Steady State Analysis

A ‘Steady State’ is required before optimisation can be performed. A Steady State occurs when the rolling average over 30 minute periods falls within a specified tolerance for all tags defined within the Steady State set.

Unit Configuration Check Analysis

The optimiser model is configured to represent the unit for normal operational conditions. Unit Configuration Check Analysis checks specific streams for abnormal operation conditions. For example, the emergency stream flow to the regenerator is checked against a fixed threshold value.

Automatic Reconciliation

Raw plant data is reconciled using the data Reconciliation engine. Measurement redundancy, in combination with plant modelling, improves the accuracy of measured values and to close heat and mass balances.

Automatic Plant Model Simulation

This consists of three different PROMOTE process simulator models being run to produce the following:

- The ‘Rating’ case calculates process parameters such as the heat transfer coefficients.
- The ‘Base’ case represents the model in the predictive mode where the control strategy is included resulting in process biases being calculated.
- The ‘Optimisation’ case is similar to the Base case with the inclusion of economic optimisation by varying independent variables. The output of this case is a set of Independents or setpoint values for multivariable controls and/or DCS applications.

Downloading of Setpoints

Exaspot coordinates the download and activation of newly calculated setpoints to a DCS application. The DCS Operator has the opportunity to accept or reject the new setpoints however, the Operator action can be configured to be automatic for unattended operation. The DCS application controls the final transfer of new setpoints to the Advanced Process Control (APC). The DCS application is not supplied with Exaspot, the end user will provide this.

Storage of Optimisation Data

The data available for Optimisation presents many opportunities for further analysis resulting in improved profit from the Optimiser. The improvements can result from the reduction of negative influences or the promotion of positive influences.

Web Reporting

ProClarity is a web based OLAP client. Many reports are configured directly using ProClarity Trends and Data Tables. ProClarity also provides a seamless environment for the whole user interface with built in security. Exaquantum/Web reports are also available to present Exaspot tag values to users.

Rules Based Generation of Reports

Exaspot allows process structures to be defined for Mass and Economic balance Reports to be held in the RDB and OLAP. Laboratory structures link Materials to Samples and Tags. These structures are created with a minimum of configuration effort using the Exaspot Configuration tool. Reports created in ProClarity allow the presentation of many views of this data with no configuration effort required.

Ability for Exaspot Applications to Work Offline

Exaspot can be used off-line to run all stages of Optimisation without connection to any data providers to allow the development and testing of new model files during early project development.

This can also assist when locating a problem at site. If the site history (contained in a single file) is made available, the site environment can be reproduced offline allowing the same Optimisation run to be executed.

■ SYSTEM SPECIFICATION

Item	Specification
Number of servers required	1
Maximum Optimiser Point Count *	2,000
Minimum data item gathering interval	60 seconds
Minimum (typical) OPC deadband setting	0 for all tags
Maximum number of connected OPC servers	16
Maximum number of web clients	10

* Note: One Optimiser point typically expands to 10 Exaquantum tags.

■ OPERATING ENVIRONMENTS

The necessary hardware and software operating environments are detailed in the tables below. The specifications included are the minimum requirements. Please consult with your Yokogawa Representative to discuss the actual requirements.

Table: Hardware Operating Environment

Component	Specification
Exaspot Server	Dual 2 GHz CPUs with: ▪ 2 Gbytes RAM ▪ 30 Gbytes Disk
User PCs	333 MHz PentiumI CPU 128 Mbytes RAM 2 Gbytes Disk CRT resolution: 1024x768 Colour: 65,536

Table: Software Operating Environment

Hardware	Software Specification
Exaspot Server	Windows 2000 Server (SP3) with IIS 5
User PCs	Windows 2000 Professional (SP3) with Office 2000 or Office XP or Windows XP with Office XP

Table: Third party software included with Exaspot

Software Packages
Exaquantum R2.01
Microsoft SQL Server 2000
ProClarity Analytics Server 5.2
ProClarity Web Professional 5.2

PROMOTE 5.6 Build 11 and DATACON 3.12 are required.

■ INTEGRATION WITH EXAQUANTUM SYSTEMS

The PIMS element of Exaspot is standard Exaquantum. Exaquantum multi-server design features are available. Therefore, Exaspot can contribute to a multi-server architecture.

■ MODELS AND SUFFIX CODES

		Description
Model	NTPS470	Exaspot
Suffix Codes	-S	Basic Software License
	1	New Order (with Media)
	1	English Version

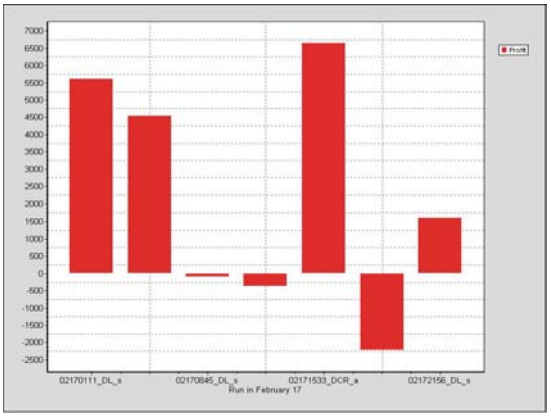
■ TRADEMARKS

Windows 2000 is a registered trademark of the Microsoft Corporation.

Exaspot, Exaquantum and Exaopc are registered trademarks of the Yokogawa Electric Corporation.

ProClarity is a registered trademark of the ProClarity Corporation.

All other company names and product names mentioned in this General Specification are registered trademarks of their respective companies.



Example of Exaspot Profit Display