

## Application Note



### Remote monitoring of high volume data at a large offshore installation

Monitoring large quantities of data remotely is challenging, due to geographical and environmental conditions. Often, this data needs to be collected and processed at a centralized data center onshore. However, how can you access and monitor all this information securely and efficiently to analyze operational data?

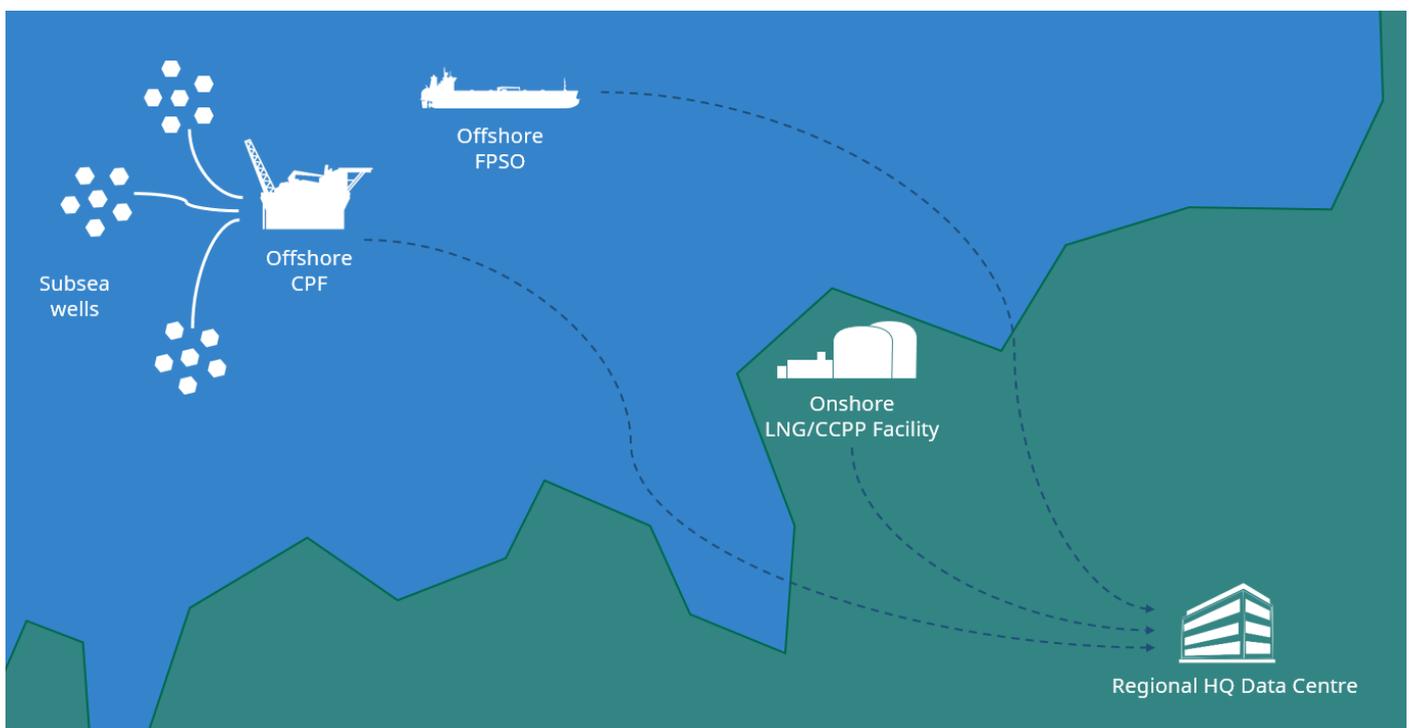
#### Data Collection from Multiple Offshore facilities

Many process industries need data to be available in a way that allows them to make better-informed decisions. For large offshore and remote installations, data collection and analysis from multiple offshore processing facilities can be difficult to realize.

A major energy customer wanted to have a consolidated view of data from multiple and distributed locations which could be mirrored and analyzed from a dedicated data center at their regional headquarters.

The information from these remote locations would be available in real time and help support plant analysis and operational improvements. Data was to be accessible via client applications in the form of graphical and report interfaces to aid analytical processes.

The geographic topography of the offshore facilities and the location of the onshore facility presented a number of challenges in how to make this data available to the dedicated data center at the regional headquarters. Perhaps most importantly was how to overcome the data communication issues of reliability and security, including unstable connections, bandwidth restrictions and limitations of the network infrastructure links.

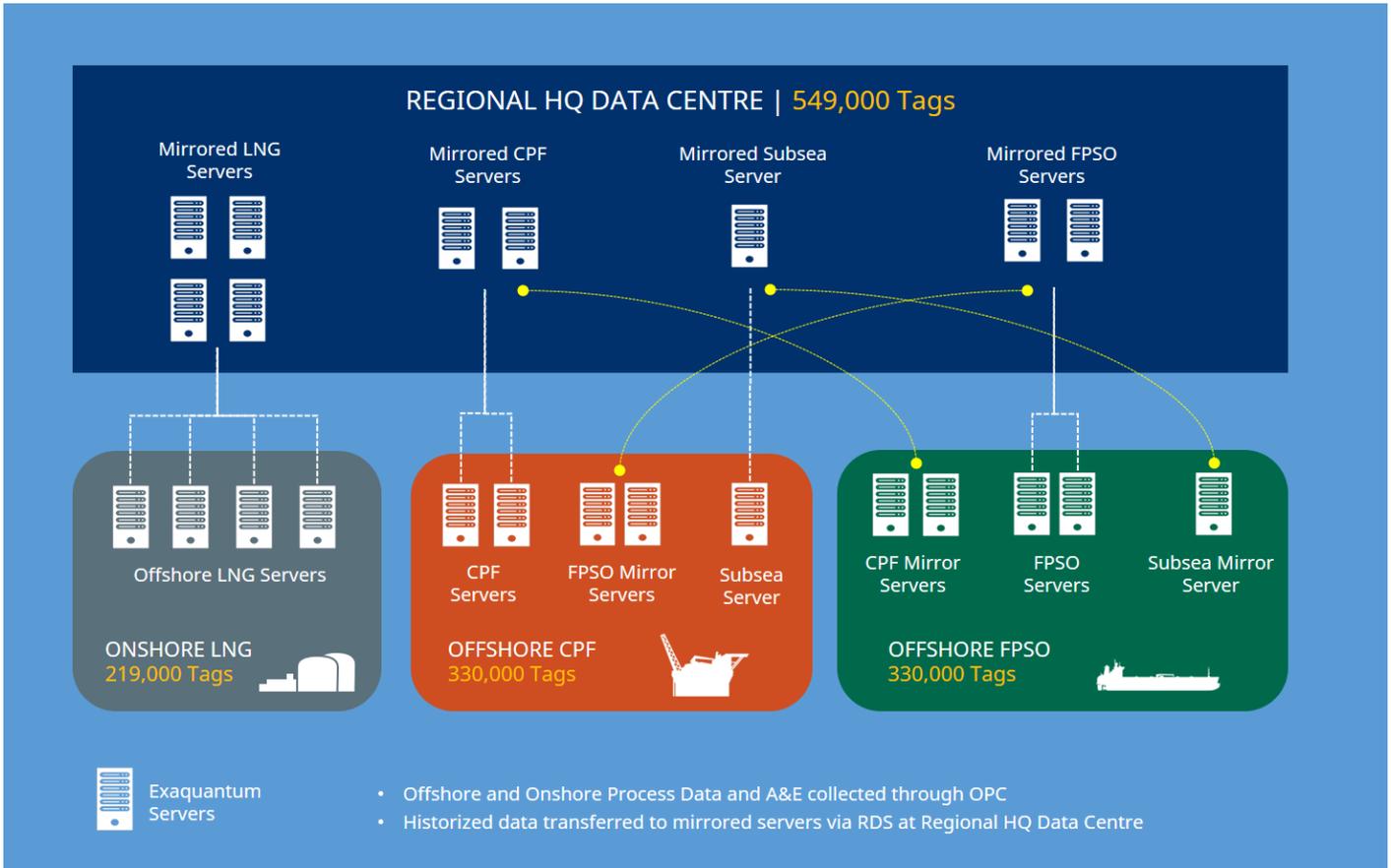


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With over 1.5 million tag data points of process data originating from the process control and safety system and third party packages from the offshore and onshore locations. The data consisted of a mix of analogue and digital tags between one and 60-second intervals. The analogue tags included aggregations of hour, day and month with minimum, maximum and mean, digital tags had aggregations of hour, day and month with state count. Additionally, there was a requirement to collect up to 1,000 alarm and events generated every minute for each OPC server. This high volume of data needed to be monitored, processed and transferred. Additionally some data was required to be time stamped in milliseconds for detailed analysis and reporting, which added to the complexity of the problem.

To collect process data and alarm and events from all offshore sites, over 20 Exaquantum data historians were connected. Mirrored data servers were installed at the data center to replicate all data from the offshore and onshore facilities. OPC servers provided both process and alarms and events data to all data historians at these locations. To transfer the data collected from offshore and onshore to the servers at the data center, Yokogawa's remote data synchronization (Exaquantum/RDS) solution was utilized. This is a secure and efficient method of transferring both process and alarm and events data across any potentially volatile network. This was easy to install and manage, providing an effective monitoring solution that enabled detailed analysis and reporting capabilities at the data center at regional headquarters.

### Data Analysis to Improve Operations

For this large project, Yokogawa developed multilevel solution for the offshore and onshore facilities that met all project requirements and delivered valuable operational information to help analyze operations of an ongoing oil and gas project from the data center at regional headquarters in real time.

### DATA LOCATIONS

- OFFSHORE – Floating production Storage and offloading (FPSO) vessel
- OFFSHORE – Central Processing Facility (CPF)
- ONSHORE – LNG/CCPP Facility
- REGIONAL HEADQUARTERS (Data Centre)

## What are the benefits?

By having a vast amount of widespread data from multiple sources consolidated into a single system, it helps management to **better understand their data** and take data driven decisions.

**Detailed data analysis** assists in operational performance, highlighting any issues or events that need to be actioned. It provides a consistency of analysis through multiple and geographically dispersed systems through a **secure and reliable connection**.

**Data is better protected** by maintaining duplicate data sets for backup and testing purposes, it provides a safety net for any unplanned incidents or events that may occur.

Information from these remote systems can also be made available to high end or other third party solutions that **transform data into additional information** and insight.

## Scope of the Project

There were a number of identified project requirements within this important project. Yokogawa reviewed the details and specifications and provided a monitoring and reporting solution of operational data that included:

- Collection and storage of over 1.5 million data tag points
- Up to 350,000 tags support for a single Exaquantum server
- Data transfer between servers utilizing remote data synchronization
- 10 Exaquantum servers to collect data from offshore locations
- 4 Exaquantum servers to collect data from the onshore facility
- 9 Exaquantum servers at data center at regional headquarters
- Support for up to 35 OPC connections per server
- Support for the storing of millisecond timestamp tag values
- Support for up to 100 users per server
- Scanning of OPC tag data at 500 millisecond rate
- OPC HDA in Exaquantum support for 500 milliseconds

## Implementation

In order to deliver all project requirements, a significant enhancement and improvement to the existing data historian system was required. The overall performance

needed to be upgraded to support the collection of over 1.5 million data tag points. Modifications were also required to support the storage of timestamped tag values in milliseconds in the Excel Add-in and Trend components, for analysis purposes. This enabled multiple location analysis, with display and reports that contained data from all offshore facilities.

## Key Takeaways

### Secure and reliable data transfer between onshore and offshore facilities

This important project required a reliable and secure method of collecting data from an offshore facility and transferring this data to an onshore state-of-the-art data center separated by over 500 miles. Monitoring huge amounts of data remotely is challenging due to geographical and environmental conditions. Yokogawa were able to provide a single and consolidated view of data from multiple and geographically dispersed systems via a secure and reliable solution.

### Project size and scale

This was a formidable project due to the size and scale of the operations and required a powerful solution to meet the range of requirements. Collecting and storing process data and alarms and events from widespread sources including; over 1.5 million data tag points, over 30 data historians installed offsite, mirrored servers located onsite and timestamped data at milliseconds for in-depth analysis, resulted in an impressive solution.

### Significant product enhancements

In order to meet all project challenges, the performance of the data historian was significantly improved to increase the data handling capabilities. With over 1.5 million data tag points and specifications for data analysis, Exaquantum performance was boosted which had benefits for this project and all subsequent applications that required a powerful data historian.

## References

Exaquantum Plant Information Management System  
Exaquantum Remote Data Synchronisation

## Source Information

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