# Process Solutions

**Honeywell**

## Case Study

## Valero's Successful On-Process Migration: Experion® R310 to R410

"Valero completed its Experion R310 to R410 migration ahead of schedule and without significant impact to operators. Thanks to this upgrade, reliability, functionality and performance were noticeably improved."

– Andrew Carr, System Administrator, Valero Benicia Refinery

### Background

Valero Energy Corporation is a Fortune 500 company based in San Antonio, Texas. Valero is the world's largest independent petroleum refiner and marketer. Its operations include 15 refineries and 10 ethanol plants in the U.S., Canada, U.K. and Caribbean. The company's diversified product line supports industries ranging from health care and plastics to transportation, beauty products and manufacturing.

Valero acquired its Benicia, California, refinery from ExxonMobil in 2000. Built as a grassroots project in 1968, the refinery has a total feedstock throughput capacity of 170,000 barrels per day. Its end products include propane, butane, CARB gasoline, ultra-low-sulfur diesel (ULSD), jet fuel, fuel oil, residual oil and asphalt. The refinery's crude sources include the San Joaquin Valley and Alaskan North Slope, along with foreign sour crudes.



The Benicia refinery recently migrated five of its Experion Process Knowledge System (PKS) R310 control systems to

Experion R410. This on-process migration provided access to a variety of new Experion capabilities. The project goals were to minimize the time systems operated in non-redundant mode, minimize operational impact to board operators, and eliminate unplanned shutdowns and negative impact to process units.

### Benefits

Valero completed its Experion R310 to R410 migration ahead of schedule and without significant impact to operators. Server and station hardware were successfully refreshed, and station display call-up time has improved.

Refinery operators favor new functionality such as Drag-and-Drop Trends and Message Acknowledge/Clear, whereas plant engineers appreciate History Search and Control Builder improvements. In addition, system administrators have found DSP Auto-priming to be useful.

For Valero, Experion R410 migration and cloning enabled upgrades to be deployed faster and more consistently than with prior releases. The Benicia refinery is now benefiting from enhancements to its operational environment and improved overall control system performance. Technology upgrades enabled the site to take advantage of the latest Experion features. Plus, Experion R410 meets future expansion needs by allowing additional station nodes per cluster, and additional clusters per LCN.

### Challenges

Like other process industry companies, Valero is faced with an increasingly competitive business environment. Control system performance can have a major impact on ROI throughout the lifecycle of a facility. A structured, organized approach to

upgrades enhances the benefits of new technology. Migration also reduces risks and preserves valuable intellectual property.

The Benicia refinery identified specific objectives for its control system migration. These included:

- Ensure future hardware compatibility (update five-year-old hardware to current Honeywell platforms)
- Replace outdated operating system (original 32-bit OS supported only 4 GB of memory; new 64-bit OS increased server memory)
- Expand infrastructure (additional station nodes per cluster, and additional clusters per LCN)
- Leverage Experion R400 and R410 improvements (Control Builder updates, CAB Blocks for C300 controllers, DSP Auto-priming, Trend Drag-and-Drop, Message Acknowledgement and Clear, History Tag Search and local USB control)
- Utilize new controllers (installation of C300s was on hold pending R410 migration)

The refinery's control system topology consists of three production clusters and two test bed clusters. Each cluster is connected to its own Local Control Network (LCN) network, and all Experion servers and stations are T-Nodes. Applications employed include Symantec System Restore, Microsoft Office 2007, DMC Interface, ACM, Matrikon A&E and DOC4000, Net-It Central and many OS customizations.



LCN Topology
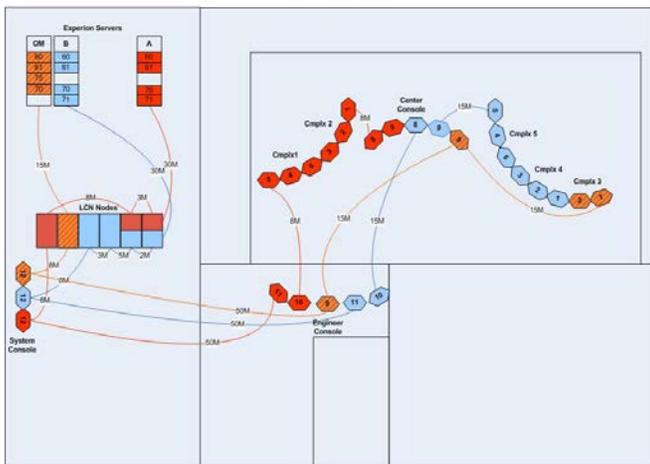
Migration of the control platform required rebuilding the system on new hardware, operation system and Experion software. At the time of the project, there were no C300 controllers in use at the site. However, as soon as the migration was completed, refinery personnel installed five of the C300 units.

Originally, the Benicia refinery planned to upgrade to Experion R400 to take advantage of its many new features. However, the R400 release had one significant drawback: it was based upon a 32-bit operating system. The refinery was encountering issues with its existing R310 servers due to limited memory, and did not want to repeat the problems with an R400 system. Valero engineers believed there was enough life in the legacy server and station hardware to last until the R410 release was ready. In addition, two of the control system clusters had reached capacity at 11 ESTs and R410 would enable this number to be increased to 20.

### Solution

After consulting with Honeywell, Valero decided to perform on-process migration to minimize the dual primary mode for its Experion servers. Personnel at the Benicia site allotted one week per LNC cluster for the necessary upgrades. Their plan was to utilize a two-team migration methodology employing two system administrators, a graphics engineer, Honeywell migration help desk support and a certified Honeywell Site Support Specialist.



During initial preparations, the project team created a timeline for critical milestones. The required activities were broken up into two main groups: server migration tasks and station migration tasks.

Engineers employed a node-cloning technique to accelerate the migration process, and software migration and hardware refresh were performed simultaneously to simplify the work. Upgrades were completed on a test bed system prior to migration of online process systems. The refresh would establish a current hardware platform enabling Experion software to progress over the coming years.

As part of the migration strategy, test bed 2 was chosen for migration of LCN cluster 1 due to the availability of correct hardware. The project team researched enhanced R400/R410 methods for software installation and migration, and investigated R410 changes and new functionality. Valero personnel also

attended Honeywell EXP23 server administration training and learned the tips & trick of R410 installation. R310 graphics were sent to a third-party graphics vender to migrate to R410.

When it came time to address LCN cluster 2, engineers had created a detailed procedure for server and station migration. Their approach started with rigorous testing of the procedure to resolve any challenges. A master clone file was then created from the test bed 2 station, and the test bed 1 station was restored and renamed. A separate procedure was developed for creating the master image and restoring and deploying cloned stations.

Migration of the first production cluster (cluster 3) was the most critical part of the effort. The project team migrated the B server and one station to R410, applied station customizations and validated the R410 displays. Next, it resolved issues and created the master clone file. Team members completed the upgrade by deploying the remaining stations and finishing the server migration.

During the final migrations (clusters 4 and 5), server and station migrations were smooth. Project engineers were able to finish all of the necessary tasks on schedule.

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**For More Information**
To learn more about how Honeywell's Experion PKS can improve business performance, visit our website www.honeywellprocess.com or contact your Honeywell account manager.

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