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Percy French
Automation Mgr., Lonmin Smelter

Lonmin Migrates Vast SCADA Resources from iFIX to ArchestrA

Goals

- Replace existing iFIX SCADA system with a modern, supported solution that would provide world-class technical and operational functionality
- Develop plant and company standards

Challenges

- Reconfiguring 300 000 I/O and redeveloping 530 SCADA screens without loss of production
- Prove the effectiveness of the chosen solution against all others and the ability of Lonmin to own the solution
- Tight time and budget constraints
- Concurrent running of old and new systems
- Simultaneous development by multiple SIs

Solutions and Products

- ArchestrA® System Platform
- Wonderware® Historian
- Wonderware InTouch® HMI

Results

- Enhanced performance
- Single set of standards
- Easier maintainability
- Superior reporting and delivery
- Fully-supported, constantly current software
- Ensured continued operation of production processes

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Marikana, South Africa – Lonmin's huge plant in Marikana near Rustenburg is in the business of mining and processing some of the most costly minerals available today – platinum and the family of platinum group metals. This is a non-stop operation that relies on the effectiveness of a vast control system which, in this case, was approaching the end of its useful life. Lonmin looked for a solution that would not only provide a risk-free migration from legacy to modern technology but that would also provide the future-proof scalability and flexibility they were looking for.

Project Goals

The goal of this project was to replace the existing iFIX SCADA system at the Lonmin platinum smelter in Marikana, with a modern, supported solution that would provide world-class technical and operational functionality and allow Lonmin to define, deploy and maintain automation standards while improving system up-time and on-line development time. In other words, the project needed to deliver an award-winning SCADA migration using the best functionality the chosen product could offer, on time and within budget constraints.

Risk Management and Other Challenges

Lonmin considered that this was a very risky project mainly because of the move to a different system. This wasn't an upgrade but a replacement of extensive facilities (300 000 I/O would have to be reconfigured and 530 SCADA screens would need redevelopment using the new automation standards library that would have to be developed). And it all had to be achieved in a short period of time with the ever-present threat of production losses.

Yet another challenge was the necessity to prove the capabilities of the chosen solution vis-a-vis all competitors regarding the technology used (standards management and performance), the supplier's support capabilities and Lonmin's ability to own and control the solution.

The existing PLCs were to remain and the plant should not be stopped at any time during commissioning therefore the old and new system would need to be run concurrently until the operational personnel was satisfied that the new system had at least the same functionality as the old system.

Solution selection

Although Wonderware was already a de-facto standard with Lonmin, persisting with this brand would only be considered if their solutions met the system design and performance criteria as well as all project requirements. Another factor in Wonderware's favour was the additional software the company could offer to add benefit to the installation. Once the Wonderware offering had proved that it would address the required issues, the company was appointed to manage the project as a whole.

"It was important that the delivery of the project was still done through our channel partners while minimizing risk," says Percy French, Lonmin automation manager at the Marikana smelter. "So Lonmin followed stringent selection criteria and, because of the large scale of the project, Control Systems Integration, Hatch Africa, Iritron and Quad Automation were the system integrators selected for the implementation while Wonderware Southern Africa managed the project. Since the new system would be based on the ArchestrA System Platform using ArchestrA technology as well as InTouch SCADA / HMI and the Wonderware Historian, it was important that all system integrators were certified professionals in all these products."

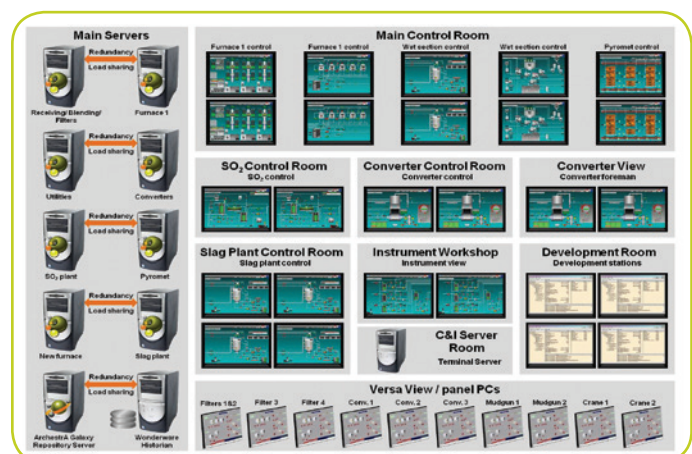
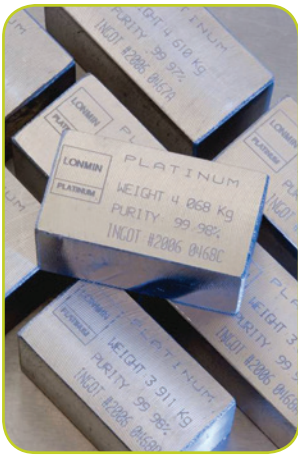


Fig. 1: System topology

Implementation

The project was implemented over 8 plant areas (each with dedicated redundant servers), 11 operator / control room view stations, 10 remote panel view stations and 25 manager view-only stations linked to Terminal Server.

The scope of the project was split into two major components, where Invensys managed the project end-to-end, developed the User Requirement Specification, the detailed design specification, developed the necessary templates and was also responsible for the quality control of the delivery of the project. Invensys appointed Jaco Laubscher of Realization Africa as the full-time project manager and allocated consultants to develop the required documents as well as all the required standards. Invensys Southern Africa also teamed up with the Global Delivery Team from Invensys in the USA in order to leverage their capabilities in developing an ArchestrA Standards Object Toolbox for Lonmin. This US team had completed a number of these projects in the past and their experience and participation would contribute to the delivery of a successful project.



The second major component was regarding the templates that were to be used to develop and instantiate the necessary SCADA screens, modifications to the PLC code in consideration of the new ArchestrA objects and finally, the ArchestrA objects themselves, all of which was completed by selected System

Integrators (SIs). These ArchestrA objects would form the Lonmin toolkit which would be used by the SIs later in the project.

Three SIs were appointed to instantiate the templates on the estimated 530 SCADA screens using System Platform graphics and 300,000 I/O items on the plant. The plant was divided into 3 equal parts in terms of I/O with the first

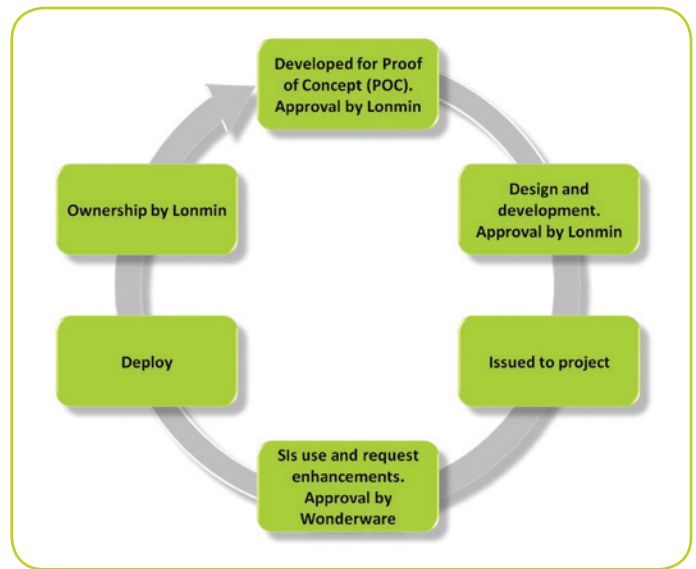


Fig. 2: The standards development process

SI responsible for the slag plant, the receiving and blending section and the filter plant. The second SI was responsible for furnace No. 1, utilities and Pyromets while the third SI tackled the converters, the SO₂ plant as well as the Wonderkop and MV substations.

A unique navigation and menu system was developed that would be intuitive for the operators and that would need the minimum of keystrokes to access the required functionality. The system is connected to the plant's intranet which has control room and remote office viewing nodes. Drivers from Software Toolbox were used throughout and the old and new systems ran concurrently until the team was comfortable to switch over. There was no change to the PLC code.

"In my view, the most outstanding features of this new system include the management of standards, its scalability and the ability to do development work on multiple fronts with multiple SIs simultaneously," says French. "This allowed accelerated development with the project starting in October 2010 and the migration being completed by July 2011 and we've been busy with a programme of ongoing enhancements ever since. In hindsight, it would have been even more expedient to bring the various SI development teams to a single location rather than have them work remotely since this would have helped resolve issues quicker."



Benefits

- Enhanced performance
- Single set of standards
- Easier maintainability
- Superior reporting and delivery
- Fully-supported, constantly current software
- Ensured continued operation of production processes

Conclusion

The modernization of any company's core wealth creation processes is justifiably looked upon with trepidation by production and financial management alike. Production management is worried because of the magnitude of the task and the ever-present threat of production stoppages. Financial management is concerned about the expense of such a move and is also worried about the loss of income and goodwill production stoppages could cause.

This large SCADA modernization project at Lonmin's Marikana plant categorically proves that migrating from a legacy system to modern technology can be done without any interruption to production, no matter how complex or critical, and that any financial concerns are dwarfed by the confidence that the company's wealth-creating machinery will continue to operate uninterrupted for the foreseeable future.

Regarding the development, deployment and maintenance of standards, French said that they could always be improved but there came a time when a design freeze needed to be imposed to prevent delaying the project. "It's best to regard standards as evolving entities that will be refined on an on-going basis after system commissioning."

Future plans include enhancing the graphics, review the alarm strategy, incorporating various capital projects into the system, integrating QI Analyst for Statistical Process Control and using the Information Server portal to publish graphics and reports.

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