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Firmenich Batch Reporting Spreadsheet System

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Firmenich

- Flavor & Fragrance
- Company foundation: 1895 In Geneva, Switzerland
- Private and family owned
- Turnover: 1.9 billion Swiss Francs in 2002
- Average growth per year since 1989: 8.7%
- Position in the market: number 3
- 26 production & manufacturing sites worldwide
- 31 awards and distinctions received for achievements in R&D since 1939, including Nobel Prize awarded to our director of R&D
- Clients: the world's number one multinational manufacturers of beauty, household and fabric care products, as well as pharmaceuticals, food & drinks.

Newark Plant

- Chemical manufacturing facility in Newark, NJ
- Processing Units
 - Continuous and Batch
 - Multipurpose and Dedicated

Data Historian Business Drivers

Acquire/manage data to:

- Drive Continuous Improvement and Operational Excellence
 - Support troubleshooting
- Produce Batch Records for Reporting and Costing
- Reduce time operators spend filling out spreadsheets with batch and lab data
 - Improve reporting accuracy

OSI-PI at Firmenich

- Selected as the Data Historian of choice
- Interfaced with 2 Distributed Control Systems:
 - Fisher-Provox via Fisher-Rosemount CHIP Interface
 - Emerson DeltaV via PI to PI Interface
 - Acquiring real-time data since 12/2003
- Batch contexts provided by:
 - PI Batch Generator V2.0 Interface for batches running on Fisher-Provox
 - PI Batch Event File Monitor Interface for batches running on Emerson DeltaV
 - Acquiring batch contexts since May 2004
- Batch Reporting is the first data consuming application at Firmenich



Project Requirements

- Reports must be Excel based
- Reports must be compatible with Batch Generator V2.0 and Batch Event File Monitor batch contexts
- Provide entry capability for lab data
- Partner necessary due to existing support and development duties of staff

Batch Reports Requirements

- 2 types of reports:
 - Monthly production report
 - Single-batch report
 - Multiple types of data items:
 - Material movements; In/Out, Quantity, Identity
 - Batch Start and End Times, Duration
 - Phase Start and End Times, Duration
 - Batch properties at specific times
 - Analytical (lab) data

Methodology

 Technical discussion with GAP and targeted users

- Review of business needs
- Identification of potential technical solutions
- Identification of risks and constraints
- Preparation of URS
- Divided Project in 3 Phases with clear deliverables

Project Tasks and Roles

- Roll out PI Batch Generator V2.0 Interface;
 Firmenich with support from GAP
- Roll out PI Batch Event File Monitor Interface;
 Firmenich with support from GAP
- Modify existing reports for OSI-PI using VBA code; GAP, remotely from Montreal offices, with support from Firmenich
- Roll out individual reports; Firmenich with support from GAP

12

Project Timeline

- Kick-off: April 2004
- Roll out PI Batch Generator V2.0 and PI Batch Event File Monitor interfaces; May-June 2004
- Design custom code, modify existing reports; May-August 2004
- Roll out individual reports; September 2004, ongoing.

PI Batch Generator V2.0 and Batch Event File Monitor Roll Out

PI Batch Generator V2.0 Interface

- Configuration of existing Provox unit operations for batch active points and some data registers (Unit Variables)
- Creation of PE points to provide accurate triggers
- Installation/configuration of PI Batch Generator V2.0 on existing PI system for Provox batch contexts
- PI Batch Event File Monitor Interface
 - Installation/configuration of PI Batch Event File Monitor for DeltaV batch contexts
 - Event logging to tags was configured for selected events.

14

Custom Code Development

- GAP designed and implemented an SDK and Module db-based VBA module to extract batch contexts
- Functions provided to:
 - Login on to a PI server
 - Extract Batch-level data
 - Extract UnitBatch-level data
 - Retrieve the start or end of a batch
 - Retrieve the start or end of an operation
 - Retrieve the start or end of a phase
- No limits other than those imposed by Excel
- Supports mixing PI Batch Generator V2.0 and PI Batch Event File Monitor interface batch contexts in the same report through the "Insert Linked Module" functionality of the Module db Editor.

Batch Report User Interface

- Report users interact with Excel only
- Reports look very similar to the manual versions
- Reports update automatically when workbook opens
 - Login is handled transparently
- Report appears to the user as a single page Excel workbook
- Production Reports:
 - Users can specify a different time frame
 - Users can specify a range of batches
- Single-batch Reports:
 - Users can specify a specific batch

Production Report

PRODUCTION REPORT

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517835	3/19/2005	9:02 PM	120	7,000	981	21	4,169		1,854	1,043
517830	3/19/2005	3:45 AM	120	7,000	981	21	4,169		1,854	1,044
517828	3/18/2005	4:40 PM	120	7,000	981	21	4,224		1,856	1,043
517822	3/18/2005	1:29 AM	120	7,000	981	21	4,196		1,857	1,044
517818	3/17/2005	1:28 PM	120	7,000	981	21	4,191		1,855	1,043
517816	3/17/2005	12:07 AM	120	7,000	981	21	4,191		1,857	1,045
517808	3/16/2005	7:44 AM	120	7,000	980	21	4,111		1,856	1,043
517804	3/15/2005	10:19 AM	120	7,000	981	21	4,223		1,856	1,045
517800	3/14/2005	11:05 PM	120	7,000	981	21	4,257		1,854	1,043
517795	3/14/2005	11:05 AM	120	7,000	981	21	4,201		1,855	1,043
517792	3/13/2005	6:50 PM	120	7,000	981	21	4,201		1,856	1,043
517786	3/13/2005	8:00 AM	120	7,000	981	21	4,264		1,859	1,044
517784	3/12/2005	8:56 PM	120	7,000	981	21	4,278		1,855	1,044
517782	3/12/2005	9:47 AM	120	7,000	981	21	4,238		1,856	1,044
517779	3/11/2005	5:51 PM	120	7,000	980	21	6,618		1,857	1,043
517777	3/11/2005	5:33 AM	120	7,000	981	21	4,253		1,854	1,044
517773	3/10/2005	6:25 PM	120	7,000	980	21	4,189		1,855	1,042
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Single Batch Report

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Batch Report Configuration

The configuration resides:

- In rows and columns hidden on the report main page
- On a page hidden from the user. This page contains:
 - Login information
 - Module db path information
 - Unit, recipe, product information. This named range can be expanded as needed
 - Destination path for saved reports
 - A username for scheduled report generation



Batch Report - Config

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Batch Context Extraction

Batch context information is extracted in named ranges

- One page contains named ranges that receive Batchlevel data
 - One page contains named ranges that receive UnitBatch-level data
- The number of units can be expanded by adding named ranges to these two pages
- The pages that contain Batch and UnitBatch data can be revealed to assist in debugging

Batch Report – Batch Data

Microsoft Excel - Example.xls

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Batch Report – UnitBatch Data

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23

Lab Entry Worksheet

GAP designed and implemented an SDK and Module db-based VBA module to enter or modify lab entry data

- Functions provided to:
 - Insert data into insert/update data into the PI archives

The code developed for batch context extraction is leveraged by the lab entry worksheet in tying the data entered to a particular batch

Lab entry worksheet

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GAP - Global Automation

Partners

- Firmenich partners to develop custom code and template batch reporting spreadsheets.
 - http://www.gap5.com
 - Global Automation Partners is an engineering consultant firm specialized in automation and manufacturing IT.
 - Its mission is to provide the FDA regulated industry effective, up to current standards, processes and solutions to improve productivity and meet regulatory compliance.

Project Evaluation

- Basically successful; moving to place in normal use.
- Problems included the SDK and Pi-Batch interface, which held up development.
- Remaining problems are really only with DCS (flags, etc).
- Format of existing reports is easily adaptable to new reports.

What's Next?

- Finish up present spreadsheets; place into regular use.
- More reports will be requested.