Implementation of a Standardized MES Solution Within The Dow Chemical Company

APRIL 2015
Agenda

• About
• Dow’s MES background
• Dow’s MES requirements
• Dow’s MES solution
• What are the day-to-day benefits
• What challenges does Dow face
The Dow Chemical Company, also referred to as Dow, is a multinational chemical corporation headquartered in Midland, Michigan, United States

- It ranks second in the world by revenue
- Dow is present in about 160 countries and employs about 54,000 people worldwide
- Dow is a member of the American Chemistry Council
Stefan Zippel, born 1981 in Leipzig

- Graduated 2006 from the HTWK Leipzig with the degree Dipl.-Ing. (FH) in Mechanical Engineering\Computer science
- Joined Dow 2007 in Schkopau as Process-Engineer in the Process Automation Support & Sustain department
- For the last 3 years he has internally consulted as a Level 3 Subject Matter Expert for MES
Dow’s MES Background

- From 1967 – 1978 Dow introduced, updated and developed several generations of its Process Control system called MOD™.
- The final generation MOD™ 5 was entirely developed by Dow itself and:
  - Featured redundant input/output boards, each communicating the field signals to independent computers
  - The two computers communicate and compare all input signals for discrepancies
  - Both computers calculate outputs and send these signals to field devices, based on the control program
MOD™ 5 features, cont.

- Two computers made it possible to load a new control program without shutting Down the MOD™ system (or the plant)
- As supporting IT infrastructure, VMS based computer systems were used including historical data collection of several months
- The data could be used for day-to-day process monitoring
- It was also now possible to use the data for analyses with specially designed programs on VMS or extracting them to MS Excel

This system was a grandfather of modern MES.
In the early 2000s, Dow started developing a modern MES Solution kit, based on a commercial vendor platform, to replace the VMS based legacy solution

- Until then Dow had used an uniform standardized platform working in almost every plant (install base > 300)
- The new MES solution was required to be designed in the same way, as a uniform standardized platform
Dow’s requirements for a modern MES solution:

- **Fast and Global Implementation**
  (“Build once use twice”)
- Standard platform design methodology for both soft- and hardware
- Standard training materials for both instructors and learners
- One design for global implementation, reducing the need for review each single implementation
Low Support Cost

• One standard configuration, implemented globally
• Focused support
• Standardized support procedures
  • Node replacement procedures
  • Remote support procedures
• **Managed Solutions**
  • Global lifecycle management
  • Continuous management after implementation

• **Integrated Security**
  • Firewall rules
  • Account administration
  • Media device lockout
  • All aspects working together ensuring a secure environment
The new Dow MES Solution met the requirements with:

- *Fast and Global Implementation*
- A Dow standard MES Server package allowing for fast, easy orders and installation
- A Dow standard application package using Aspen InfoPlus.21 by the Aspen Technology allowing the quick install of the MES application on any MES Server
• A standard package of training material cooperatively developed together with Aspen Technology, enabling fast and comprehensive training of a large user base

• The Dow MES Solution was leveraged to create a Dow standard AC&O/DMC solution also using Aspen InfoPlus.21 and the Aspen DMC products
• **Low Support Cost**
  
  • A work process enabling the existing internal Dow support organization to support and sustain the solution globally, 24x7
  
  • A process which allows the layering of extended functionality on the standard configuration
  
  • An internal network of SMEs (Subject Matter Experts)
Managed Solutions

- A tested solution
- A set of global implementation standards and naming conventions
- A standard update, migration and testing process
- A process for including new applications to the standard, or removing unnecessary applications
- A lifecycle process for all MES Solution documents
• **Integrated Security**

• A common solution for each system to manage the users quickly and efficiently, controlling what they can and cannot do

• A set of rules for communication and network security, allowing only what is needed and blocking everything else

• Configuration rules, reducing the risk of introducing malware through external devices
Using this approach, Dow enjoys numerous benefits on a day-to-day basis:

- Standard training material is always available for training new personnel
- The MES solution is extended to cover the AC&O space, enabling Dow plants to benefit from real time optimization
- MES and AC&O servers are monitored and supported 24x7, ensuring maximum availability
• Applications developed in one plant, or by one internal business, can be leveraged to create globally used standard solutions
• New servers are quickly brought online when needed
• Dow ensures there is minimum impact when doing patches or uplifts, by using a standard implementation and test process for all MES and AC&O Servers
• When a third party application is used once, work processes are used to verify its addition to the standard solution
• Dow speaks with one “common language” in regards to MES terminology, based on industry standard ISA-95 (The International Society of Automation)
• MES related documentation and training is managed on a global scale
• SMEs assist any plant when required
The challenges which Dow faces include:

- **Increased Use of Data**
  - the MES and AC&O servers require increased availability
  - data availability must be improved, increasing the time data is available online without resorting to tape backups
  - data storage needs to be increased to accommodate increased volume
• *Increased Demand for Availability and Integrity of Data*
  
  • The exchange of data between MES and AC&O Servers and other parts of the company through IT networks must be increased
  
  • availability of the MES and AC&O Servers needs to be improved
  
  • data integrity must be improved, by increasing redundancy and/or using cluster/cloud technology
What Challenges does Dow face

• *Increased Demands on IT Security*
  • improve IT security but keep it manageable

• *Decreased Cycle Times for Hard- and Software*
  • increase and speed up migration cycles

• *Increased Demand on IT Networks*
  • increase the capacities of networks, operational availability, network security, and reach
Questions ?