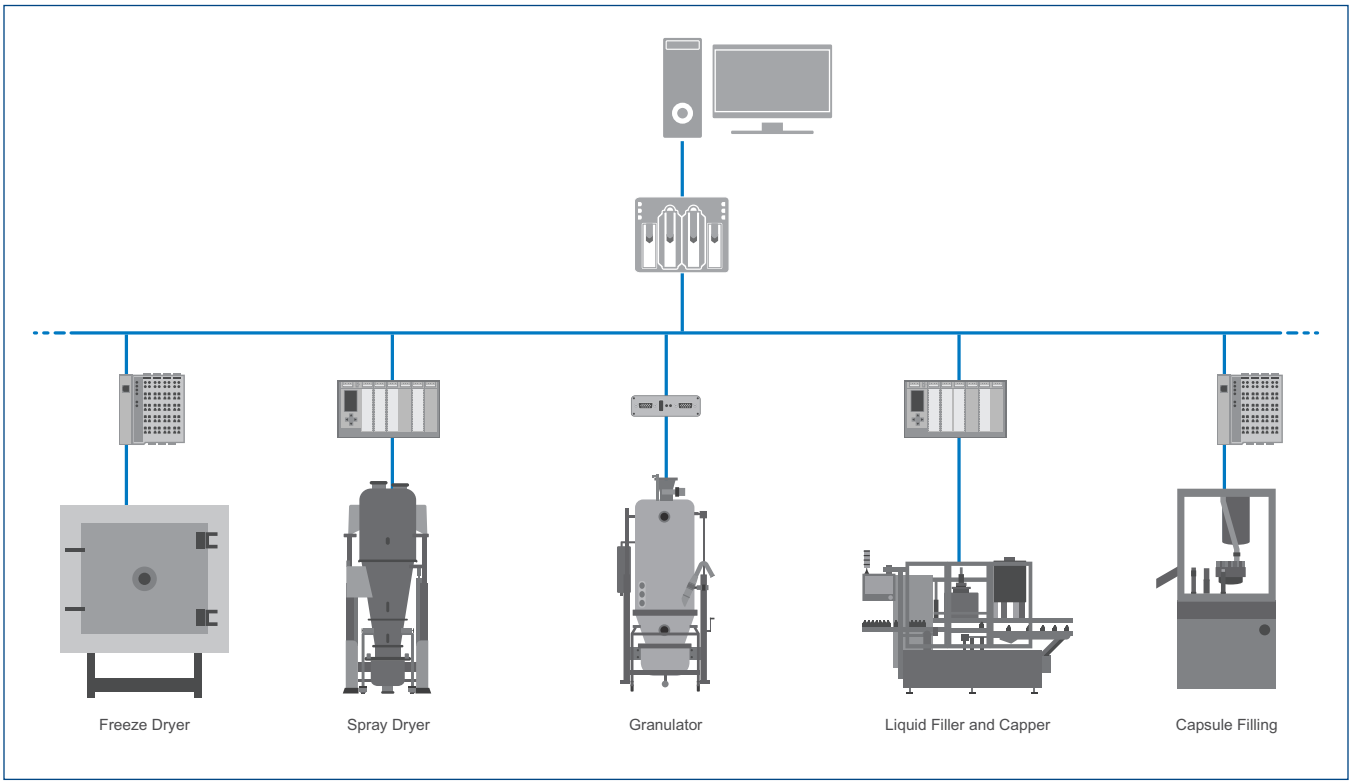
DeltaV™ Bridge

This document provides an initial overview of DeltaV™ Bridge.



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Executive Summary

The DeltaV Bridge hardware/software solution simplifies integration between the DeltaV™ distributed control system (DCS) with standalone equipment and devices. In facilities that use Emerson's PK Controller and DeltaV Batch, DeltaV Bridge extends to isolated equipment the full DCS system features and benefits such as batch contextualization and management, robust data integrity and 21 CFR Part 11 compliance, simplified/unified operator interfaces, and standard interfaces to level 3 and 4 systems. DeltaV Bridge also simplifies the typical network architecture required to integrate these equipment and devices by providing built-in Ethernet ports and multiple embedded communication protocols.

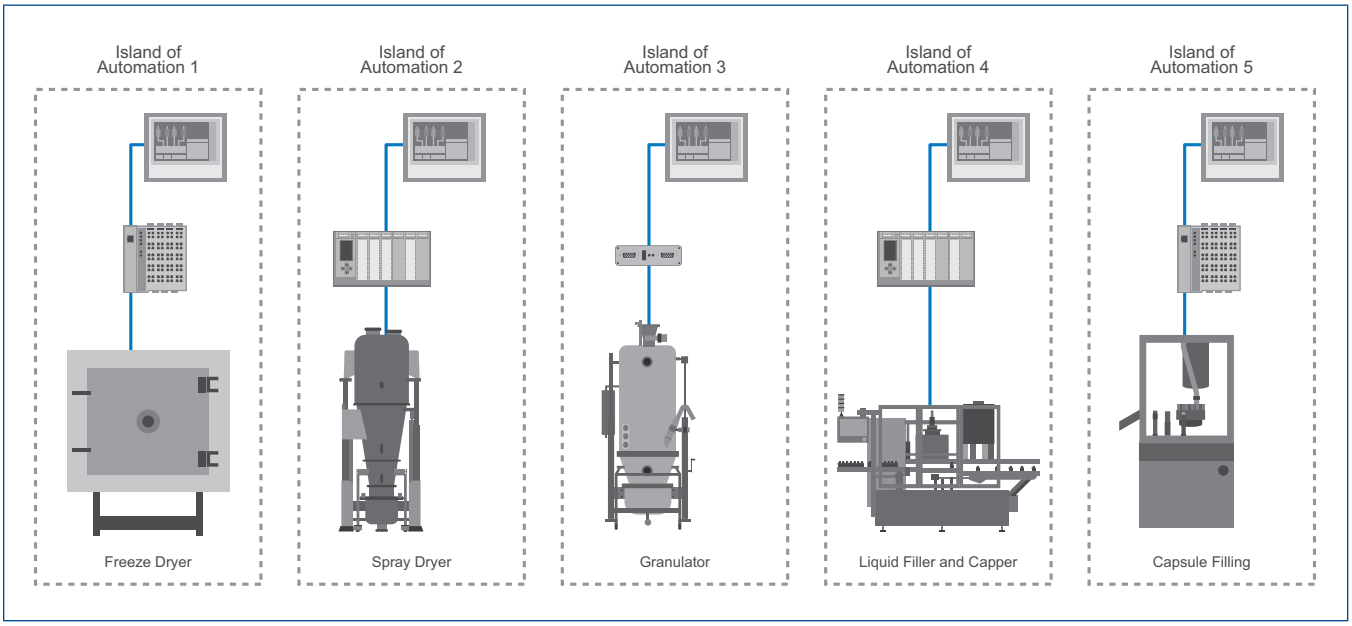
Overall, the DeltaV Bridge solution eases engineering work and enables facilities to extend automation capabilities to previously isolated equipment, thus enhancing both operations and maintenance.

Introduction

Manufacturers in many industries, including Life Sciences, leverage both DCS and standalone equipment in their processes. One common example is integration of a PLC with a DCS. Often, the DCS and disparate skids are not fully integrated, leaving isolated equipment or islands of automation. The existence of these islands results in the lack of batch, recipe, and data contextualization; reduced data integrity; and a poor operator experience. Additionally, the system architecture required to integrate these islands of automation with the larger system is complex and grows even more so when integrating them with MES and ERP systems.

DeltaV Bridge eases the integration work by combining DeltaV hardware and software into a purpose-built solution designed to connect these islands of automation. The result is a highly integrated production system that unifies the processing-floor/manufacturing suite and the overall production environment.

DeltaV Bridge utilizes Emerson's PK Controller to connect these islands of automation — easily integrating equipment and the DeltaV DCS. DeltaV Bridge provides a data pipeline and batch context to integrate disparate equipment operations seamlessly. This pipeline can significantly improve the ability to create and maintain batch records. It can also simplify or eliminate complex IT architectures while still providing secure connectivity to MES and ERP applications. The DeltaV Bridge functionality can be extended to include supervisory control over the third-party processing equipment skids and devices.



Benefits of DeltaV Bridge

Easier Batch Contextualization and Recipe Management

Isolation between the DCS and the skid and device equipment creates gaps in batch contextualization and recipe management, which can make batch processing difficult for manufacturers. Activities such as tracking batch IDs, using recipe and report parameters, and creating batch reports are less effective and more difficult when islands of automation exist.

Running DeltaV Batch as part of the DeltaV Bridge solution provides batch context to the equipment and allows for recipe management across multiple skids or devices. With the equipment data contextualized and stored in the Batch Historian, and relevant alarms and continuous data captured in the DeltaV system as well, a complete batch report can be generated from the DeltaV system.

Strong Data Integrity with More Sure Compliance

Many standalone skids and device equipment lack sufficient data integrity to become 21 CFR Part 11 compliant, which is critical in the Life Sciences Industry. Absence of individual and unique user-accounts controls leads to shared administrator account credentials, which prevents proper tracking of who made specific modifications or performed actions in the system. Additionally, many skids lack the ability to utilize electronic signatures, which is required by the FDA to clearly indicate the printed name of the signer, the date and time of the signing, and the meaning of the signing.

The DeltaV commercial off-the-shelf product supports 21 CFR Part 11compliance. The inherently integrated single database design eliminates issues that arise from multiple cross-system platforms while it provides unparalleled cybersecurity in a single environment.

DeltaV Bridge effectively extends the data integrity features of the DeltaV DCS to management of the equipment. A DeltaV Workstation with FlexLock and User Manager, layered on top of Active Directory, can be used to interface to standalone equipment and ensures operators have the appropriate level of control and access for their needs, while the DeltaV system automatically maintains the detailed audit trail.

An Efficient and Easier Operator Experience

Each island of automation traditionally has an individual HMI that an operator must use for critical activities such as inputting key parameter values, running commands, and visualizing alarm and process conditions. Having separate HMIs can result in operator inefficiencies because an operator must be located physically at each HMI to properly run the equipment. If multiple pieces of equipment are running concurrently during processing, sites are required to have an operator running each piece of equipment — an operator will have to focus on one HMI before moving to the next.

To solve that problem, every DeltaV workstation has direct access to all operating information in the system. Operators do not need to use a unique HMI for each piece of processing equipment. DeltaV Bridge allows manufacturers to easily connect islands of automation to the DeltaV system and they can therefore base the number of required HMIs on their needs to create an easy and efficient operator experience.

DeltaV Wireless Mobile Worker could also be used to allow operators to roam the facility while still being connected. Emerson can provide a fully secure, reliable WI-FI communication link in any location of a facility to provide hotspot access to process operations or business applications.

Utilizing DeltaV Bridge allows operators to have a powerful environment for process operation, with built-in features for easy information access, situational awareness, and analysis. Standard hierarchical displays, faceplates, and detailed displays provide a consistent operating philosophy.

Simplified Integration to L2

Using the PK Controller as the interface mechanism to the skid and device equipment simplifies the architectures often needed for integration and connection to the devices. The PK Controller has several embedded, supported protocols, including OPC UA, Modbus TCP, and EtherNet/IP — eliminating additional Ethernet switches for many applications. A key component of Emerson's I/O on-demand strategy is industrial Ethernet, including OPC UA. In many DeltaV Bridge scenarios, the equipment can be connected directly to the PK Controller without additional I/O cards, reducing the physical footprint of the architecture.

Time-Saving Integration of L2 with L3 and L4

Traditionally, any integration between islands of automation and MES or ERP systems requires a custom interface to be developed and validated for each individual skid or device. Custom interfaces require more time to develop and validate. They also typically require specific knowledge to troubleshoot and maintain. Parameter management is not straightforward and can require confirmation of values at both the MES/ERP and equipment systems.

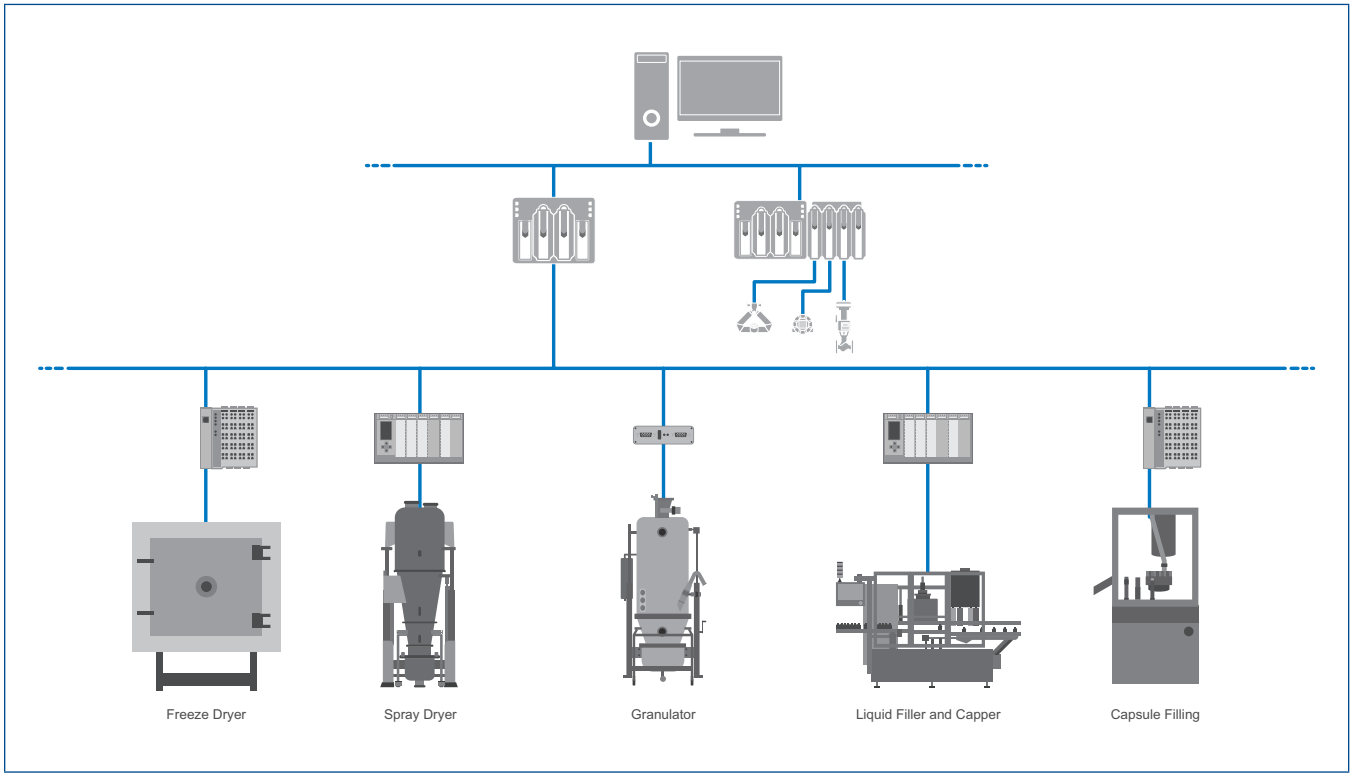
Promoting a simpler method, however, DeltaV Bridge allows the MES and ERP systems to use DeltaV's out-of-the-box Campaign Manager Web Services to integrate as a single interface in a standard and consistent manner for each piece of equipment.

How It Works

Architecture

The PK Controller sits on the Area Control Network along with the standard DeltaV ProPlus, DeltaV Workstation(s), Batch Executive, and Historians. A PK Controller can connect directly to the PLC or other equipment network using the built-in Ethernet ports, eliminating the need for any I/O cards and reducing the footprint of the equipment.

The MES and ERP systems sit on the Plant LAN and connect into DeltaV Bridge through standard firewalls.

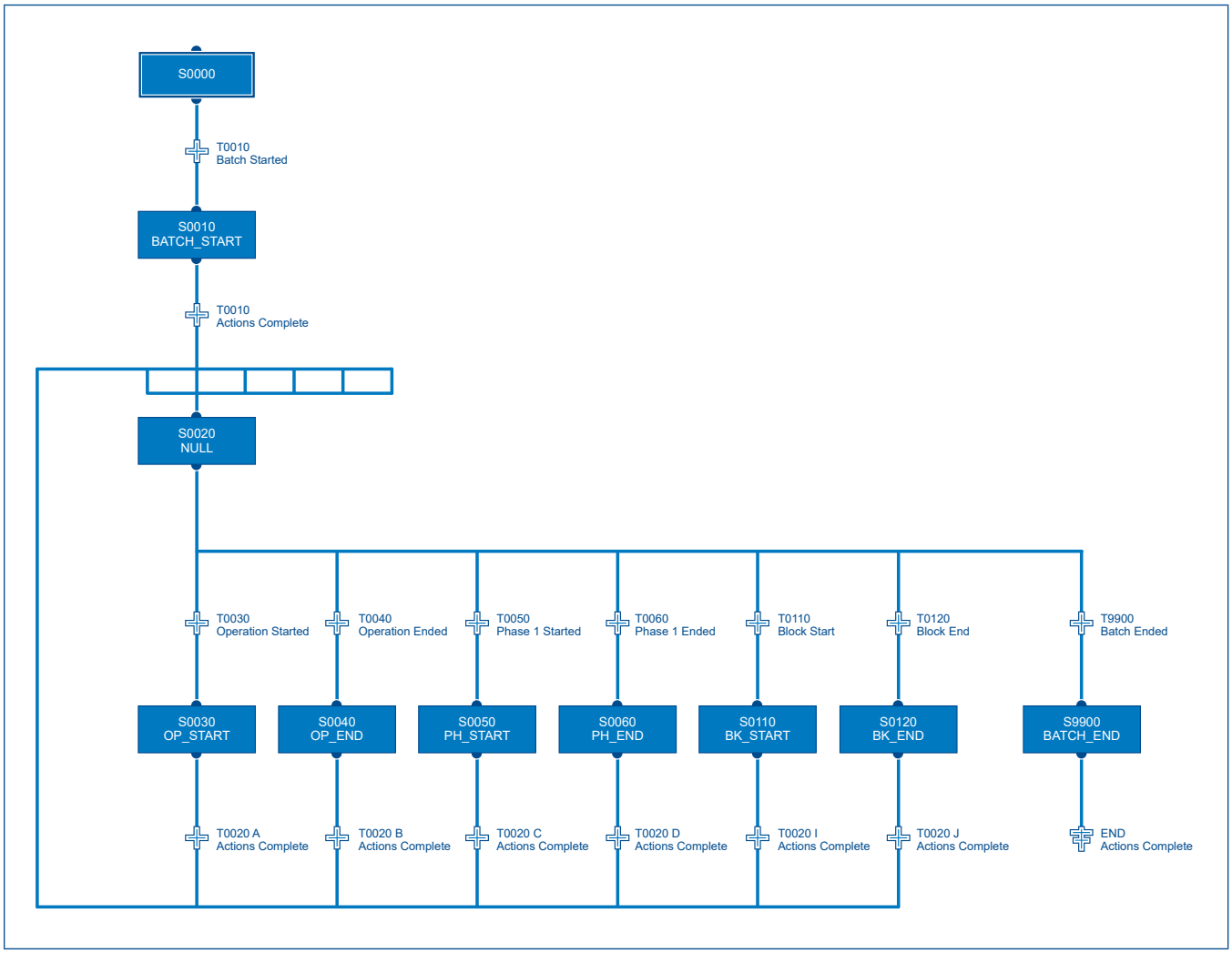


Execution

The operator creates and starts a recipe from the ERP, MES, or DeltaV system. This produces a unique batch ID, which starts a phase on the unit module associated with the skid or device equipment. At this point, DeltaV Bridge can be either the listener or the master. In the listener mode, the phase waits for a trigger signal from the equipment, indicating the process has started. In master mode, the phase initiates the communications, passing recipe and lot information, emulating the normal operator interface for starting and managing the process. In both scenarios, the equipment is actively controlling the process and the DeltaV system is in a supervisory role.

Once started, the phase monitors a pre-defined series of additional trigger parameters from the equipment. The phase can record batch report events for each trigger, such as totalized flow amounts or counters, or it can prompt for additional data or acknowledgements, such as lab results. When the process is finished, a final trigger from the equipment will tell the phase to complete. A final group of parameter values will be recorded and the recipe will be complete.

Independent of the recipe, a collection of control modules will map various parameters from the equipment into the DeltaV system. These parameters can be used for continuous historical collection and/or will be used to generate alarms. Based on event times recorded in the batch historian, the continuous and alarm data can be contextualized to the batch ID.



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