5 Things to Consider Before Implementing Your Next Automation System Project

A true paradigm shift is needed to improve capital efficiency and keep automation system projects off the critical path.
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Predictability in today’s capital-sensitive markets is a challenge. Project cost overruns are one of the areas that are out of control and contributing to this dynamic. CAPEX planning, returns on invested capital and cash flow are all impacted negatively by these inefficiencies. During new construction, particularly on very large projects, it is crucial to minimize risk, increase flexibility, shorten schedules, and most importantly, keep automation systems off the critical path. The demands placed on automation system suppliers to accommodate evolving project execution models have required reassessment of traditional delivery models.

After decades of executing automation projects in a traditional way, it is time for new thinking:

- What if you could reduce avoidable schedule delays?
- What if you could minimize unwanted productivity costs?
- What if you could be virtually free of hardware dependencies?
- What if you could reduce commissioning time and effort?
- What if you could lower your engineering travel costs?
Meet today’s automation project challenges

Industrial organizations must simplify what has traditionally been a long and expensive automation system design process, and achieve time and cost savings so plants can get up and running quickly.

Improve Effectiveness Throughout the Project Lifecycle

Despite the use of various database tools and strategies to streamline execution, there remains a fundamental problem with the long-established techniques used in most control and safety system projects. New approaches to project execution should optimize processes and eliminate non-value-added activities. This requires the elimination of repetitive tasks, rework and redundant tasks.

A radically new approach is needed to drive effectiveness—not efficiency—because to efficiently do what is not required is not effective.

Eliminate Hardware Dependence

Process control systems are moving away from their long-standing reliance on specialized hardware. Software-based systems can be run on standardized, multi-purpose hardware supporting a greater variety of functionality with fewer, more versatile components. In this sense, the software supports functional requirements capabilities while the hardware supports physical requirements, such as input and output (I/O) connections to the process.

The Key: Change How Project Engineering is Typically Done

Project engineering processes typically progress through a series of tasks that build upon each other to advance the control system from abstract ideas to engineering designs.

Traditional project workflow

- Start
- Define
- Design
- Manufacture
- Configure
- Test
- Install
- 2 Years

Although tweaking the project execution process has resulted in incremental improvements, it has changed very little in the past 30 years. Tasks are executed in fixed sequence to meet install dates, and any delay in issue of design data that may arise directly affects the subsequent activities.

The ultimate efficiency for this model is to execute each task in the timeliest manner possible, and only execute it once. In the real world. However, this is easier said than done.

Ensure Flexibility in Control System Design

Last-minute design changes can be both costly and add risk to your project schedule. The functionality of control systems has moved steadily away from dependency on hardware configuration to software configuration. This allows configuration activities to occur out of the traditional order of tasks.
Why Driving Changes in Project Workflows is Important

Plant automation systems must be implemented on tight schedules, but modifications to a project's scope or definition often occur in its later stages requiring design or configuration changes, as well as additional testing of components. To remove the impact that these changes have on project delivery, control system suppliers have to think differently to eliminate or streamline steps in the overall automation project implementation.

Eliminating Waste
Project managers focus on eliminating waste and non-value-added activities, such as rework and repetitive tasks. A lean approach allows for flexible procurement to drive down hardware expenditures. Using this project methodology, engineering teams can maintain their best practices without being encumbered by a system's physical design.

Transforming Project Implementation
Recent changes in project implementation strategies support an optimized workflow for physical hardware components and an independent workflow for functional software. This approach moves beyond lean execution by removing the dependencies that once forced project flows to be sequential in nature. Users can drastically improve the overall project schedule—keeping automation systems off the critical path.

Removing Dependencies in the Design Process
The key to improved effectiveness is separating streams of work for the physical and functional aspects of project design. Two separate execution paths can be managed with greater flexibility than the traditional model.

Configuration activities can start much earlier in the schedule without relying on the physical system design. This independence can eliminate many change orders in the latter stages of the project.
This flexibility reduces the traditional back-end workload and costs due to managing changes in design near the end of the project.

With a more modular, incremental design model, the company can level-load the project execution costs. Frantic management of changes late in the project cycle can be avoided. Ultimately, this can greatly reduce both cost and schedule risk significantly.
Thanks to innovative abstraction technologies, industrial firms can realize the benefits of late binding of system configuration data in their overall project results. These technologies are specifically designed to de-couple physical design from functional design.

By separating the physical and functional aspects of a control system into independent hardware and software design activities, both tasks are performed in parallel, which allows configuration activities to be undertaken prior to design completion. The functional and physical designs are then bound together at the conclusion of both workflows.

Virtualization allows virtual machines to be installed on the final physical virtual infrastructure late in the project cycle. And with cloud engineering, automation work can be performed in the cloud, independently from the physical infrastructure.

Through the use of standardized I/O technology, late data binding can occur well into the construction phase of a project without the typical affects of last-minute instrumentation design changes.
Hardware costs and related overhead are on the rise. That’s why plant management is concerned about the number of computers in the facility, as well as the total cost of ownership for its control system infrastructure.

Deployments of each application require dedicated physical server hardware, which is frequently under-utilized by a given application.

Virtualization technology answers this problem. It “abstracts” operating systems and applications from the underlying physical infrastructure by representing the hardware as virtual machines.

Virtualization allows a huge reduction in hardware footprint, thereby also resulting in corresponding savings in space, power, cooling and weight. Virtual machines also enable the adoption of standardized server cabinets.

Not all solutions are “control system ready.” It is crucial to find a supplier with a clear understanding of how virtualization is employed in an industrial environment.
Domain expertise matters

There's no substitute for an automation supplier with experience and credibility in the virtualization field, and a clear focus on the industrial domain. This includes virtualization solutions designed for implementation in new and existing process plants.

A Complete Solution – Not just application support

It's important to align yourself with a vendor offering innovative solutions developed with control and automation users in mind. Beyond just IT, this means understanding the demands of process automation design.

A virtualization technology supplier should deliver:

- Proven expertise in virtualizing process control systems, which leverages one of the industry’s recognized innovators in virtualization technology.
- Virtualization portfolio consisting of all required components.
- Installation and configuration assistance to aid in virtualization deployment, plus performance guidelines for supported nodes.
- “One-stop-shop” for products, services and long-term support for a virtualization infrastructure.
- Strategic approach to virtualization, including a roadmap for future products.

Your Vendor Should Provide a Comprehensive Virtualization Portfolio
How to Use Standardized Designs to Save Time and Reduce Risk

During physical design for plant automation systems, the objective is to start design tasks as late as possible. As project manager, you want to remove configuration activities from the critical path and reduce the time required for these activities by simplifying the design process itself.

The use of standardized designs revolutionizes the way plants deal with control system projects, significantly reducing total cost of ownership from project implementation to overall system costs. With access to standardized hardware, for example, plants have the freedom use identical cabinets in every rack room. The universal nature of the solution also offers flexible options for future expansions and upgrade planning.

Increased standardization also means less engineering work and less documentation to maintain, since you have fewer drawings to maintain. Standardization simplifies training, too.
Standardization in automation design allows companies to not only shorten project commissioning schedules and accommodate late project changes, but also eliminate equipment and cabinets, reduce wiring and installation costs, and dramatically simplify the final control system design.

Deploying standard, multi-function hardware for control systems can eliminate your dependency on customized solutions. These components have greater immunity from design churn—reducing the volume of engineering, simplifying product order placement and eliminating the need for hardware factory acceptance tests (FATs).

I/O Standardization
Standardized I/O has changed the way we look at automation system design. Universal Channel Technology enables an entire cabinet to become a standard part, with I/O channels remotely configurable to allow modules to serve as analog or digital and as input or output. This technology delivers the flexibility to add I/O anywhere in the plant without affecting the control room cabinets. No re-design, no re-wiring. It enables engineers to make late additions or modifications to I/O schedules with just a soft configuration change—potentially saving weeks of schedule delay when late-stage design alterations are required.

Standardized I/O allows engineers to specify standard cabinets solely on the basis of estimated total I/O counts, without predetermining how many of what kinds of I/O.

Cabinets can be built, shipped and installed before the control system is designed and are essentially immune to change orders, since wiring can be landed before the I/O is configured.

Server Standardization
Virtualization allows for the adoption of standardized server cabinets. It transforms servers that used to be fixed, single-purpose devices into a multi-use asset with variable capacity.

After it is tested, the system and related databases can be easily downloaded from the cloud engineering environment to the local virtualization infrastructure without reinstallation.

Virtualized designs also provide a major reduction in hardware footprint. This delivers a corresponding reduction in space, power, cooling and weight. Upgrading to a fixed-footprint blade server chassis standardized at the supervisory layer extends these benefits and offers remote management capabilities that are pre-configured, shortening the time to deploy.
In a global economy, a growing number of companies manage their manufacturing operations across multiple sites and on multiple continents. This sector is data-intensive and project-based, involving collaboration between various people, using a variety of different systems. This, along with the industry's strong information sharing and processing requirements, means that the management of data is complex and challenging.

A lot of automation systems teams don't have to be defined by geographical proximity anymore. Instead, engineers can work as a “human cloud” that is made possible thanks to the rapid development of new cloud computing technologies. With secure remote access into the engineering environment, professionals can collaborate interactively. They can concentrate on their work rather than how, when and where their jobs are executed.
Industrial firms need a trusted partner to tap the power of the cloud for project engineering

With cloud engineering, industrial organizations can bring the system to the engineers instead of the traditional approach of bringing the engineers to the system. Project activities can be consolidated in a centrally hosted cloud environment. This allows for execution and testing anywhere in the world. Engineers spend less time traveling and more time working, and specialized expertise becomes readily available.

Protecting Your Intellectual Property
A secure virtual platform is essential for any type of real-time cloud engineering. You need a technology provider with dedicated resources and capacity whom you trust to protect your valuable intellectual property. This means utilizing a private cloud that’s only accessible by the vendor and the customer—not a public cloud or environment entrusted to a third-party data center provider. The virtual engineering platform should be 100% owned and centrally managed by your supplier for optimization of resources, security, data protection, and virus and patching control.

Ready Infrastructure from “Day 1”
With a cloud infrastructure that provides global access for engineering collaboration, your project’s engineering environment can be spun-up immediately. System designs are easily transferred from the automation vendor’s design center to your own engineering infrastructure. All functional design can be done in the cloud without having to purchase development system hardware early in the project.

In addition, your project team no longer has to wait for the instrumentation freeze to allow physical equipment to be constructed and installed, displays to be built and tested, and then shipment to the site. You can ship standard cabinets and virtualization infrastructure at the end of the project and then download the virtual machines along with the databases effortlessly from the cloud without reinstallation. Since the entire system is validated before download, it may even be possible to forego the FAT.

By utilizing the supplier’s equipment through a virtual platform, you can also avoid the need for a hardware refresh at later stages of the project while compressing schedules and reducing risks. And, hardware will be more current when it’s ready to be handed over.

Improved Collaboration, Lower Travel Costs
Cloud engineering is also the answer to better resource management. Engineers no longer have to travel to the staging area to participate in a project. They can work concurrently and collaborate in the engineering cloud and design a system that can be created virtually, and then loaded into the physical system infrastructure right before deployment.
Honeywell provides a true transformation in automation project execution.

Make the LEAP in Project Implementation
LEAP™ takes a step further than lean execution by separating physical from functional design, using standardized designs and enabling engineering to be done from anywhere in the world. It enhances Honeywell's project implementation services with three Experion® Orion technologies: Universal Channel Technology, Virtualization, and Cloud Engineering.

You have the flexibility to utilize these solutions individually as needed to meet your specific objectives; however, full deployment of our methodology provides the utmost benefits.

Universal I/O: Honeywell uses Universal Technology to standardize input/output cabinets, reduce or eliminate marshalling cabinets and reduce equipment needed for both process and safety I/O. Honeywell's Universal I/O allows instant remote configuration of channel types.

Experion Virtualization: Honeywell was the first automation supplier to provide a comprehensive virtualization solution supported from assessment and virtualized design through implementation and management.

Cloud Engineering: Honeywell's Virtual Engineering Platform (VEP) is a private cloud operated from multiple internal datacenters with a total of 15,000 virtual machines (VMs) worth of capacity. We typically have a turnover of hundreds of systems each month.
LEAP Benefits

The synergies of Experion Orion technologies result in better management of change, schedule and resources. LEAP benefits include predictable automation costs, reduced project schedule risk, efficient CAPEX, and earlier production dates.

- Up to 30% automation
- CAPEX savings
- Up to 25% increased schedule flexibility
- Reduced risk of startup delays

"The savings due to the design are achieved by minimizing overall footprint of the integrated control and safety system (ICSS) in the electrical substations and control building rack room by reducing the number of ICSS cabinets,” says Robert Resendez, Control and Automation Manager, Bechtel Oil, Gas and Chemicals Inc. “The design also reduces the amount of engineering hours during the design phase of the project, allowing more flexibility and reducing the overall impact to the ICSS design, testing, and implementation."
To learn more about how you can optimize automation system projects, visit www.honeywellprocess.com/leap or contact your Honeywell account manager in your country/region.