Life Is On | Schneider Electric

The continuously current enterprise: Trends in life cycle management of automation assets

Table of contents

Introduction

Regardless of how well-designed or constructed an automation system, sooner or later all or part of it will need to be replaced. Industry research firm ARC estimates that some $65 billion in automation assets are approaching the end of a useful life cycle and identifies the following as the main reasons manufacturers should consider upgrading or replacing assets:

- Avoid unscheduled downtime.
- Take advantage of a new or emerging business opportunity.
- Avoid the rising cost of supporting an aging system.
- Implement the new benefits that technology brings.
- Replace a system that a vendor no longer supports or has phased out of production.
- Meet new business needs not supported by the current system.

Some manufacturers choose not to stay current by adopting an "if it ain't broke don't fix it" strategy. This can result in significant short-run cost savings and some increased return on existing investment, but it comes with great risk. When something does break unexpectedly, the cost of downtime, rush charges, and hasty replacement purchases can be devastating. And, even if there is time for product evaluation, many companies tend to replace existing functionality only, securing system availability but possibly missing out on competitive advantages that might come from technology advances.

Companies with more resources might go to the other extreme, totally ripping out the old and replacing with the new. While implementing a totally new system certainly has its advantages, installation requires some downtime, and cost justification requirements are still substantial. Total system replacement brings with it the risk of paying for functionality that may never be utilized or wasting technology that may still have many years of working life. Up to 95 percent of the existing system, in fact, is likely to be working just fine.

An increasing number of companies are finding a third approach, one that a combines the economy of "if it ain't broke don't fix it" with the business and performance benefits attainable from the most advanced technology available. This approach, called asset life cycle management, is a discipline that fully leverages the capacity of the existing automation investment while at the same time simplifies integration of new generations of technology.

Practicing life cycle management means that, while individual components will change over time, the total automation system never goes out of date. It evolves component by component as business needs change. The biggest drawback in the life cycle management approach is in the need for significant commitment on the part of the automation vendor. The cost of engineering, personnel training, and testing across multiple generations of product, for example, can be daunting. Also, the need for the vendor to manage multiple generations of components within its own supply chain is attributable to the fact that true life cycle management has been rare within the automation industry.

Today, however, as process manufacturers seek new ways to improve both availability and utilization of automation assets, they are increasingly demanding that their automation suppliers support them by keeping their systems continuously current in this way.

While some companies still sell closed-end, proprietary solutions with no easy upgrade path to newer technology, most are beginning to design technology that is more open and expandable. Much as one can replace one's desktop monitor, CPU, or keyboard with products from multiple vendors, as needed, the automation industry is moving toward enabling replacement of automation components such as workstations, control processors, I/O, and instrumentation.

Likewise, application development is also trending to the support of life cycle management. Advanced object managers, service-oriented architectures, and design on industry-standard platforms, such as UNIX workstations and Microsoft® .NET development environments, enable the creation of function and symbol libraries that preserve company process knowledge while making it more transportable.

In addition, technical support services are also advancing in ways that help facilitate the continuously current enterprise through a greater ability to manage the technical support life cycle. Advanced data and knowledge management tools capture and enable access to shared databases detailing the maintenance history of each asset. Around-the-clock management of a single global technical support queue optimizes resources that are applied to resolve problems. Real-time remote monitoring, diagnostics, and follow-the-sun support remove geographic barriers to keeping systems running at peak performance.

But, no matter how open and integrated the technology, or how advanced the service and support, it cannot result in a truly continuously current operation unless it is deliberately managed to that end. This requires having a holistic view of the life cycle of each automation asset. Knowledge of future product development, combined with identification of product transition dates, years before products actually move to the next life cycle phase, allows users to make intelligent, cost-effective choices.

Managing the automation life cycle

While automation users can track information on the availability, utilization, and performance of assets themselves, they are entirely dependent on automation vendors to control the availability of each component in their automation system. Too many process manufacturers have been taken totally by surprise when they receive notice from a vendor that the technology their business depends on is no longer supported.

Without information regarding the vendor's future plans, users are subject to uncertainty, ranging from concerns over increasingly high costs of buying spares to availability issues or the potential for unexpected shutdowns. Manufacturers can avoid such problems if they have reliable information on where their major automation assets are in their life cycle and the extent to which the vendor supports products at varying stages in their life cycle. They also need to know the vendor's plans for transitioning products from one generation to the next, how the products communicate across generations, and when transitions are coming so they can plan years in advance for when they need to upgrade. This kind of information makes budgeting more effective, enables manufacturers to coordinate upgrades with company actions, such as outages and strategic initiatives, and provides hard data they can bring to their management to justify the cost and expense of equipment upgrades.

Life cycle management includes a clear definition of the product life span and support available at each phase, clear rules defining backward compatibility across generations, and a roadmap that provides a wide-ranging view of future developments.

Defining the life cycle

The first step toward gathering such information is the creation of a classification system that identifies the progression through the life cycle. Figure 1, for example, illustrates the life cycle of chassis and communications module components, identifying each in one of the five life cycle phases: preferred, available, mature, lifetime, and obsolete.

- **Preferred** — Preferred products (dark green) are the most recent hardware and software available in this functional area. These products are actively produced, sold, promoted, and supported.
- **Available** — Available products (light green) are available for sale and are still supported in production, but have been replaced by more advanced technology. Available products are most typically sold for expansions, rather than new installations.
- **Mature** — Mature products (yellow) are no longer for sale, but are still supported and maintained through repair for a defined period of time.
- **Lifetime** — Lifetime products (red) are reaching the end of their usable life and components are becoming unavailable. These products are in jeopardy of becoming unrepairable, and should be upgraded or replaced.
- **Obsolete** — Obsolete products (blue) are products for which, despite best efforts, support, maintenance, and repair is no longer feasible. Vendors should provide advance notice of at least 12 months before transitioning to obsolete, along with proposals and suggestions for upgrading to new products.

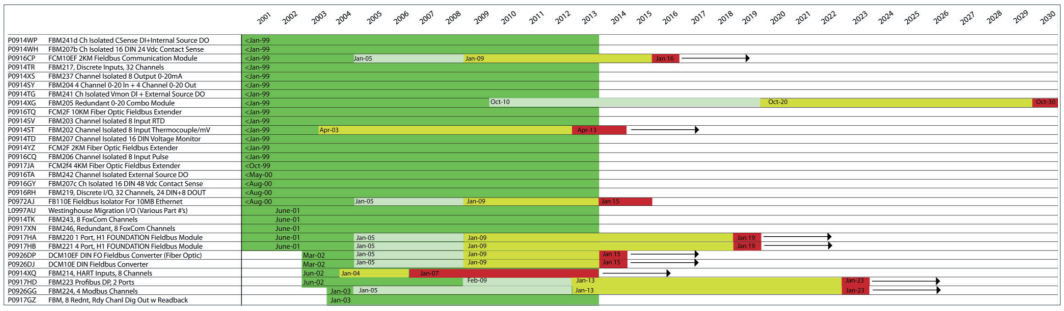

Figure 1

I/A Series Hardware

The effort to develop a timely and precise categorization so that it can be communicated effectively to customers has dissuaded some vendors from offering effective life cycle management. Automated tools are making this much easier, however. The most innovative vendors can interrogate the installed system and identify the products and their life cycle phase, providing timely field data to support upgrade planning decisions.

Backward compatibility

Backward compatibility is a fundamental design decision that is critical to being able to assure that the oldest and newest equipment communicate and share critical messaging structures. Vendors should identify the type of information that is communicated between various generations of products, which is primarily a function of the hardware design. They must also make sure that customers are aware of what is compatible with what, which is a key part of the life cycle management discipline.

End users need to know the rules that govern that compatibility and the vendor should work with its customers to ensure that the best life cycle planning decisions are made.

Forward compatibility

Due to changing technology and emerging standards, few vendors can be 100 percent certain about how future products will ultimately be designed. While there is risk in sharing development plans, many vendors are finding that it is in their best interest to share estimates of planned enhancements, new offerings, and development schedules with their customers. Both customers and vendors understand that although a roadmap does not represent a commitment to deliver a specific product, service, or functionality on a specific date, it can be of great help in preliminary planning.

Development activities that are scheduled for release in the near term will have a great deal of detail about the new offering, its functionality, and the benefits to the user. The anticipated delivery date will also be firmer than longer-term activities. As the projected time frames move further out in time, the details will be fewer and the delivery window will increase. However, even if the information provides little detail, the knowledge that the vendor is working on developing a product to satisfy a need — say, a new type of I/O device or a new wireless sensor — provides information the customer can use to make better long-range planning and budgeting decisions. The intent of offering a roadmap, even if vague, is to provide the customer with a vision of where the vendor is taking the product.

Return on upgrade investment

In addition to manufacturers having clear information on the life cycle phase of each asset and its backward and forward compatibility, they must understand the real financial benefit. Most companies justify upgrades based on projected cost increases of maintenance and the acquisition of spares. This will likely continue to be a significant upgrade driver, but there are other life cycle management reasons to replace aging equipment:

- Upgrades are significantly less expensive and faster than bulldozing and rebuilding.
- A discounted purchase price may be available on new equipment in exchange for the return of older products.
- Modernization planning simplifies the long-term planning and budgeting processes.
- Replacements/upgrades can be justified using maintenance money, reducing capital expenditure.
- Upgrades can be aligned with the business strategy.

One of the most convincing metrics is comparing the cost of a unit upgrade to the cost of replacing an entire system. For example, only a very small percentage of a continuously current system needs to be periodically replaced. In fact, throughout the life of the system, as little as 5–10 percent of the original installed price will typically keep the system up to date.

The costs associated with engineering, procurement, and construction to bulldoze and then install a completely new system vastly outweigh the costs associated with routinely updating small portions of the original system. Add to that the costs associated with lost production, and the total investment jumps dramatically!

Keeping a system continuously current creates savings due to preservation of intellectual property, such as designing and engineering the control strategy, historian configuration, graphic displays, and databases. If the entire system were removed and totally replaced, all of this would have to be recreated.

The fact that smaller-scale purchases are generally approved more quickly than large-capital budget expenditures (which means that benefits of the upgrade are realized sooner) is yet another way that life cycle management can cut costs. Additionally, upgrades can be installed in hours or days, versus weeks or months, significantly reducing downtime.

Financial benefits of life cycle management apply to software licenses as well. A scalable software license allows the selection of only those features and functions relevant to each application. A customer can configure a workstation as a host only, excluding licensing of engineering tools if they are not needed. Or, if an operator needs access to only a small number of I/O points, the license for that workstation would be less than a license that has plantwide access. If total access is needed at a later date, that option can be added.

Reducing capital expenditure

Also growing in popularity is the trend toward purchasing upgrades from maintenance budgets. Money targeted for purchase of product upgrades can be included in a service agreement. Using this method, customers can take the money from their maintenance budget to pay for planned upgrades, rather than the capital equipment expense, which is generally much more difficult to justify. This approach also allows for some flexibility to deliver and start the upgrade before 100 percent of the money has been accrued.

Aligning with business strategy

Cost-justifying upgrades based on revenue or performance enhancement is a bit more of a challenge, since traditional cost-management systems seldom have the granularity necessary to map the benefits of equipment upgrades to strategic business objectives. However, advances in the areas of real-time finance are making this increasingly easier. For example, revenue-boosting strategy for a refiner in today's market might involve boosting output, which means that upgrades supporting that strategy should have the greatest impact on the bottom line. If the process engineer seeking the upgrade can demonstrate its role in boosting output, it should be relatively easy to cost-justify the upgrade.

Ramping up to the enterprise

A continuously current approach delivers the latest productivity-enhancing software; thefastest, most capable control; the sharpest graphics; the highest capacity; and the most powerful applications at the lowest possible cost. Using this approach, manufacturers continue to use their oldest products until they are ready to upgrade or use multiple product versions together to meet their business needs. Whereas very few vendors are focused on keeping even their own product installations continuously current, it is now feasible to think about a continuously current enterprise in which the entire asset base is upgraded using a managed, disciplined approach.

Schneider Electric has been advancing its offerings in this direction since 1986, when its Foxboro™ unit introduced the first open control system designed for continuously current operation. The vast majority of I/A Series systems installed since then are still serving their intended purpose, with many having been transitioned over time to incorporate state-of-the-art advances such as high-speed Ethernet Mesh networks and wireless monitoring.

In 1994, Schneider Electric led the industry by announcing a comprehensive asset management approach called the Advantage Upgrade Program. This program continues to provide significant discounts on new products in exchange for the return of older equipment.

Schneider Electric demonstrated its commitment to customer asset protection further, in 2000, when it began manufacturing control I/O cards in the form factor of leading competitors' control systems. This provides a way for process manufacturers to migrate to an advanced distributed control system (DCS) without ripping and replacing existing wiring and termination.

Recently, the Schneider Electric life cycle management strategy was enhanced, when its Life Cycle Policy was announced for the I/A Series product line. This program defined life cycle phases, backward and forward compatibility, and product exchange programs for the I/A Series' DCS. It is now the basis of the comprehensive life cycle management discipline applied throughout the Schneider Electric™ product base, including the Triconex™ line of safety shutdown systems, Foxboro systems, and the recently introduced Foxboro PAC.

Having all automation systems — from ERP plant floor integration to instruments and asset management — subsumed under a consistent life cycle management discipline can magnify the cost savings and strategic value considerably. Although Schneider Electric is well ahead of the industry in offering a consistent life cycle management discipline across such a broad range of related enterprise automation products, the fact that its technology is very open makes it possible to encompass multiple vendor brand products into the system. As other automation suppliers follow suit with open technologies and tools, the continuously current enterprise becomes more of a reality every day.

Customer FIRST

The Schneider Electric Customer FIRST Support and Services Program helps clients protect and extend the value of Schneider Electric products and solutions. The program offers customers the flexibility to choose standardized service offerings from four support tiers: Elite, Premium, Standard, or Primary. Each tier includes support services for both hardware and software products with elements such as parts replacement, version upgrades, and technical support.

The Schneider Electric Operations Management Product Life Cycle discipline plays a strong underlying role in customer support. Because all products move through life cycle phases as they age, customers will benefit from having a clear understanding of product life cycle phases, which have a direct relationship to the supportability of each product. As a Customer FIRST member, you will receive life cycle management services to help you identify and manage the key life cycle stages of your assets to avoid obsolescence.

To learn more about how Schneider Electric ensures clients' enterprises remain continuously current, visit: schneider-electric.com/processautomation or contact a Schneider Electric Client Sales Executive.

Your DCS migration strategy is here! Free migration site audit at **www.real-time-answers.com/migration**