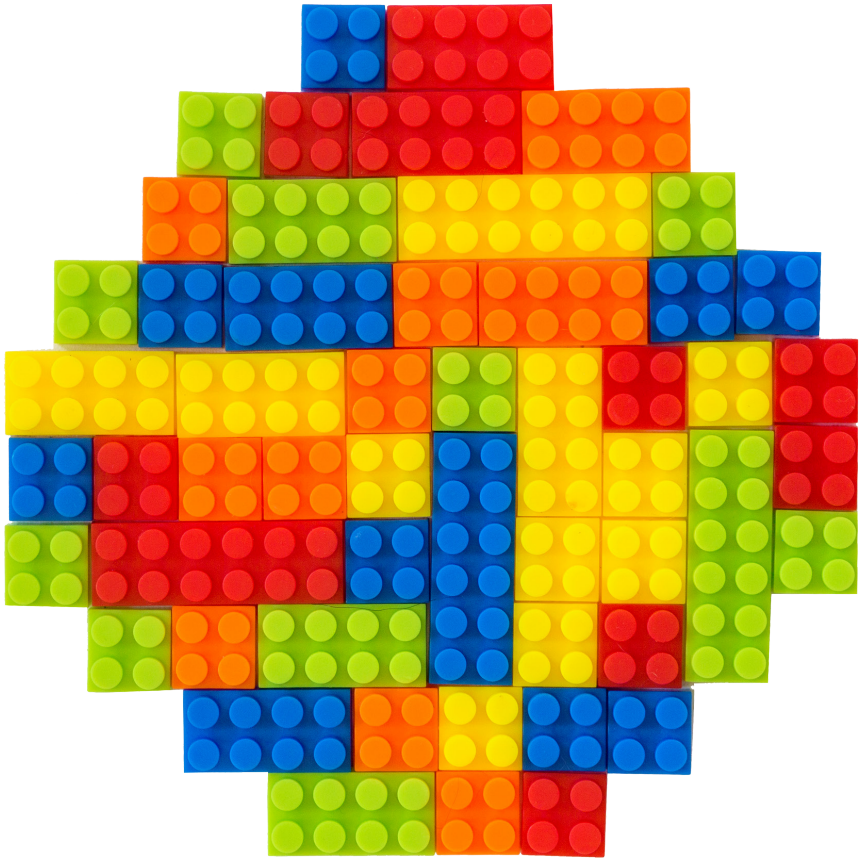


Scaling Public Sector Process Robotics through Shared Asset Libraries

Process Robotics is reshaping the way that the public sector delivers services to its citizens and the nation. In the future, we will see task automation drive organization-wide transformation marked by improved operational efficiency, employee morale, and service delivery. While a powerful change agent, Process Robotics must be deployed strategically and thoughtfully to realize long-term programmatic success.

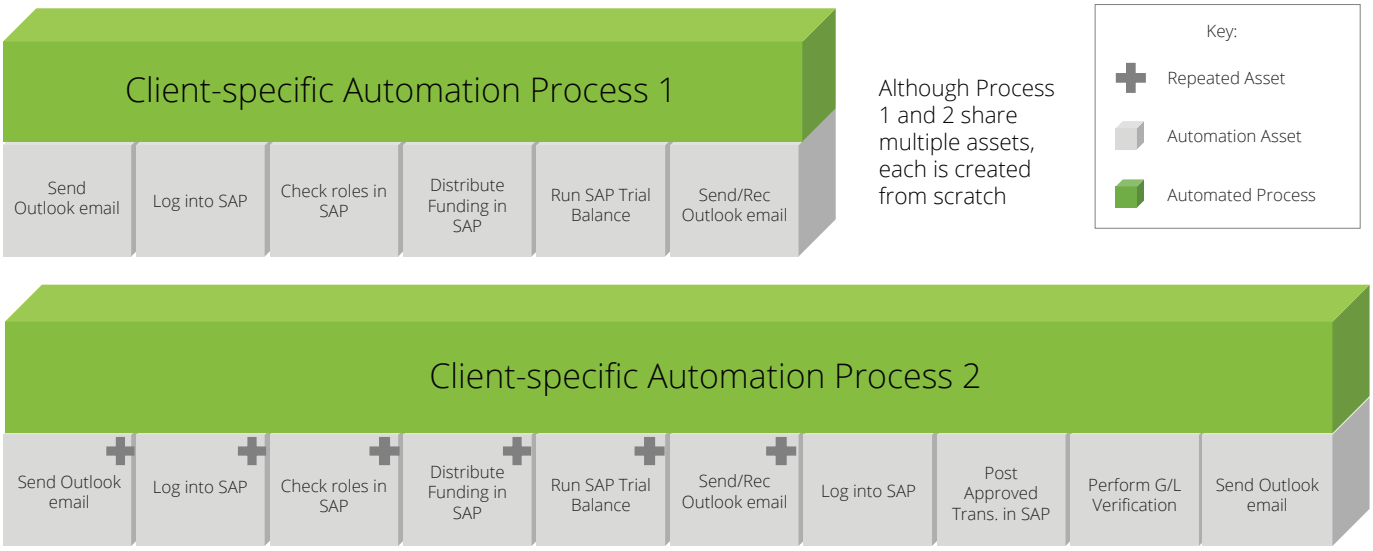
At the core of each highly-functioning Process Robotics program is a well-established automation asset library. Asset libraries support enterprise-wide scale as automated processes can be created with pre-developed, production-ready automation assets.

In this whitepaper, we will explore the two main styles of building Process Robotics solutions (linear vs. modular) and discuss how implementation of a modular development approach can enable an agency or multiple agencies to effectively scale Process Robotics. Additionally, we will address the need for common governing bodies and agreed upon standards to support automation asset quality, system-owner control, and program-wide communication to improve the likelihood of overall Process Robotics program success.

Linear Automation Development

Automated processes can be developed using two common approaches: linear development or modular development. An automated process constructed using a linear approach is developed by creating activities within the automation file for each process task, one after the other. When completed, each task included within the process is fully detailed within the automation file.

Following a linear development style can be alluring as it is initially easy to understand and allows for quick development through the nascent development stages. This is often the simplest way to automate processes, as a developer can create an automation without separating common tasks into reusable pieces. However, over time, this approach becomes unsustainable as an agency's bot taskforce grows.



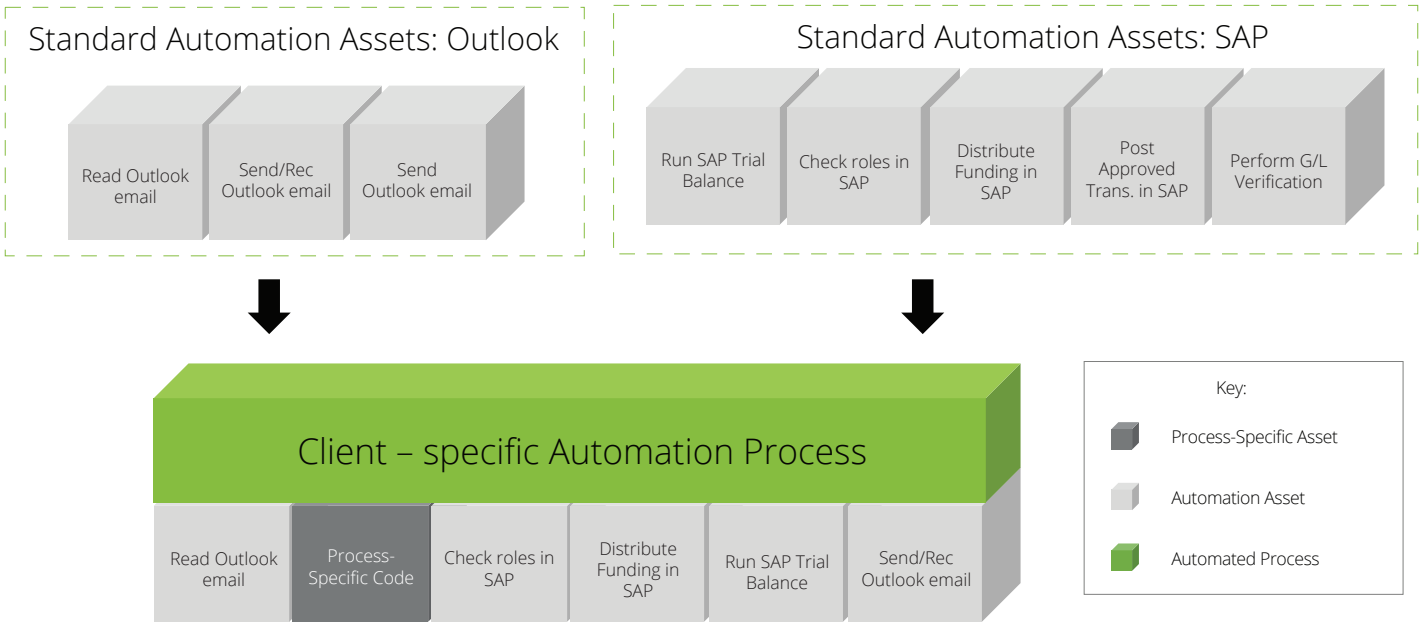
As digital labor solutions become more complex, a linear building style can result in automated processes with long and unwieldy code, which becomes difficult to review and nearly impossible to manage through process and system updates.Under this model, performing quality control activities becomes a significant effort as code reviewers must review the entire auomation file to confirm best practices have been followed. This often means reviewing common code sections multiple times. In addition, when a process inevitably changes or a system is updated, developers must update the relevant code sections for each effected automation, often making the same changes multiple times. This results in longer periods of bot downtime and a higher level of risk.

Modular Automation Development
A modular development approach improves a Process Robotics program's ability to scale development efforts, consistently meet automation quality standards across the enterprise, and efficiently address change management activities as they occur.

Under a modular approach, automated processes are composed of common, reusable automation assets, in addition to process-specific code, to complete the desired tasking. In this approach, a process is first mapped out into its smallest components, each assessed to determine reusability and whether an asset has already been developed. As new activities and process components are discovered, developers create generalized, automated tasks to be reused across future processes.

Once the developer has all the assets required to develop the full process, the automation is constructed primarily using prebuilt assets, and supplementing this with process – specific code.

Asset generalization
is a software design approach that emphasizes separating program functionality into independent, interchangeable pieces (building blocks), each containing code necessary to execute one aspect of the desired functionality. Although initially labor intensive, the up-front time investment results in future time savings as previously constructed building blocks can be reused to assist in future development efforts.



Benefits of Incorporating Automation Asset Libraries

Public sector agencies and organizations can realize many benefits by developing automated processes with prebuilt, modular assets. There are three broad classes of improvements that result from adopting such a model

- Improving speed to deployment,
- Controlling automation quality, and
- Efficiently managing change management efforts for automations that have been deployed.

Greater Speed to Deployment

By leveraging prebuilt assets to develop new automations, the effort required at each stage of the automation lifecycle stage (bot development, internal review, final testing) can be significantly reduced. Prebuilt assets facilitate the development process, especially when leveraged by new developers. These assets can help to provide real world examples and guidelines that can be easily mimicked for more process specific components. Review and validation efforts can be reduced as reviewers focus their efforts on how known assets are used rather than first understanding the asset and then assessing its function; in other words, prebuilt assets only require a revalidation of the outputs as opposed to a detailed review of each line of code as would be the case under a linear model. In our experience with public sector agencies, these savings can speed up the development-to-deployment lifecycle by 60% or more in advanced use cases.

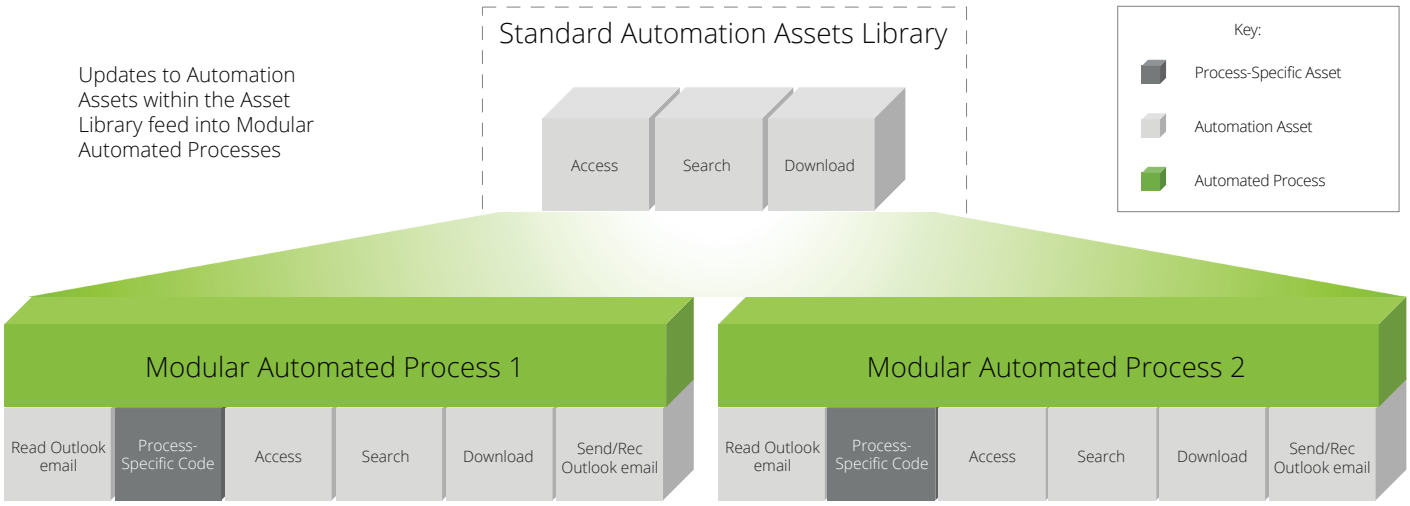
Stronger Quality Control

System owners often state concerns about bots' access to internal systems, specifically the potential negative impact a poorly designed automation could have upon systems. These apprehensions can lead to heightened review and testing periods prior to deployment. System-based asset libraries (discussed below) can relieve these operational concerns. Instead of requiring a pre-deployment review for multiple automations that perform the similar tasks within a system, system owners can perform separate quality assurance and control activities on standardized assets performing tasks within their systems. These streamlined reviews produce thoroughly vetted assets and result in higher quality, system-owner approved automations.

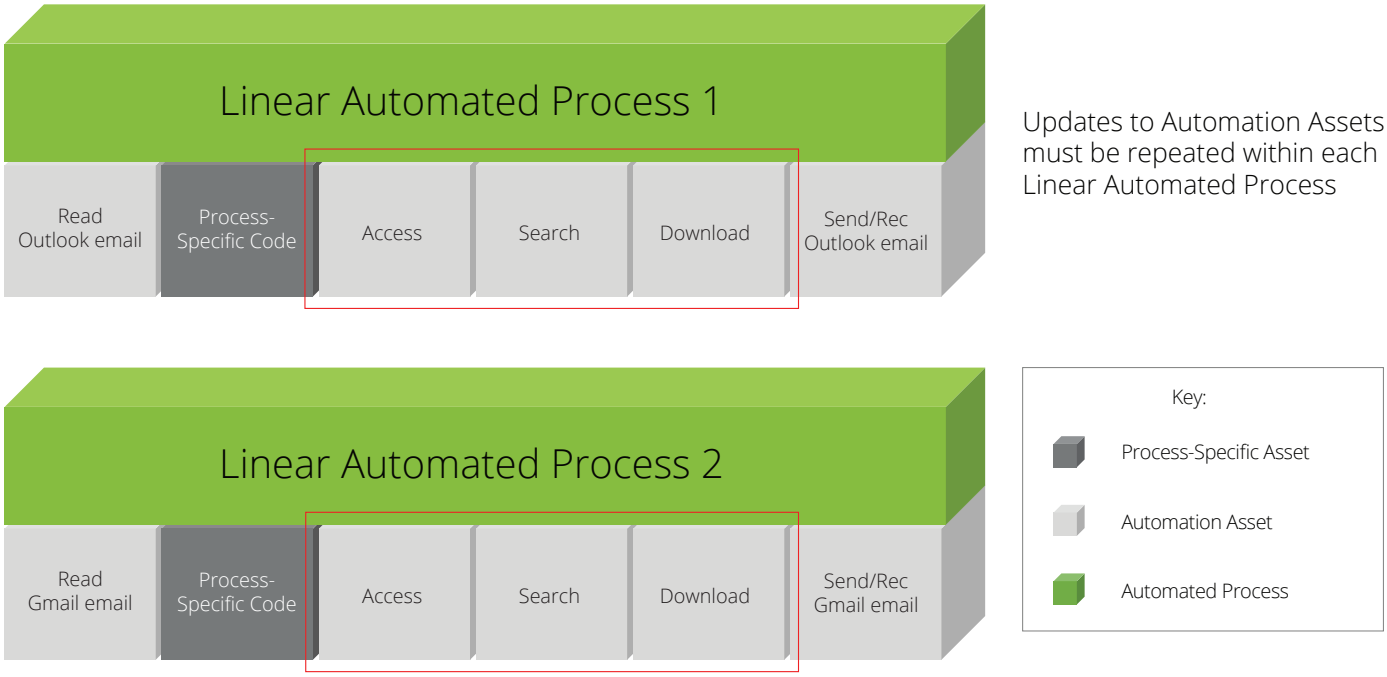
Improved Change Management

To the extent underlying systems change, automated processes will likely require updates to account for tasks affected. If automated processes are built using a modular development method, and reference shared assets from an asset library, any maintenance or updates performed on these asset updates will be reflected across all processes that reference the asset, significantly improving response time to system changes. Conversely, if automated processes are developed using a linear approach, each automated process impacted by the system change requires independent reviews and potential updates.

For example, consider an organization is running 100 automations, each with a "read email" "access", "search", "download" and "send email" function included. Additionally, assume these functions are pre-developed assets in an asset library, and are referenced by the automated process (modular approach). When a system is updated, the assets in the library are updated, and because each fully automated process references those assets, the update is inherited by each of the automated processes.



In contrast, if these same automations are developed using a linear approach, each of the 100 automations will have the "access", "search", and "download" functionality written directly into the full automated process. When the system is updated in this example, a developer will need to locate each of the "access", "search", and "download" sections of code within each of the 100 automations (300 sections of code), and update each section individually.



While the disparity of effort can be illustrated simply through understanding the volume difference in this example, a mature Process Robotics program can quickly have 50-100 or more different systems accessed in production automations, exponentially amplifying efforts to manage this approach. Modular approaches to develop can substantially reduce the resources and time necessary to manage updates and keep automations running as intended.

Impact on Public Sector Agencies

Organizations throughout the public sector access similar government systems (e.g., ERPs, agency-specific systems, and cross-agency systems) using similar functionality within those systems (e.g., system searches, transactions, data manipulation), but complete different actions based solely on the information that is fed into the system. For example, searching for and downloading a contract document within a knowledge management system will yield different results than searching for an invoice on the same site. The automated functionality required for both searches is identical (system access, search, download), however, it is the data fed into the search (contract number vs. invoice number) that determines the resulting output. By leveraging modular development methods, agencies and system owners can create automation assets for common system functionality used by many organizations and store them in a Process Robotics asset library to be referenced by many process-specific automations.

Public Sector agencies and organizations can realize significant benefits by implementing system-specific automation asset libraries, as this can enable scalability of operations by offering these assets to automation developers throughout the agency. Instantly, manual processes that utilize this newly automated functionality can now be engineered quickly and at a much lower cost than when compared to developing the process from the ground up.

This impact can be realized at an organizational level, agency level, or even across agencies in the case of multiple agencies accessing the same system. A case for cross-agency, system-specific asset libraries can be illustrated with Department of Defense (DoD) systems. Currently, there are DoD financial systems that provide services to many branches of the DoD, for example iRAPT, EDA, and CHOOSE to name a few. Users throughout the DoD frequently access these systems each month, using the same system-specific functionality to support hundreds of widely different processes and functions. By automating common functionality within these systems (e.g. access, search, and download the results), developers can use these pre-developed assets as a baseline to build full process automations for each organization-specific process quickly and efficiently.

Success through Shared Governance

As you might imagine, a coordinated effort to develop, share, and manage automated assets across one or many agencies will require efforts to establish a strong governance model. Agencies should seek to stand up a central governing body, made of representatives from impacted stakeholders and system owners, whose responsibility is to manage the program for the benefit of these stakeholders. Commonly referred to as a Process Robotics Center of Excellence or Digital Management Office, this governing body establishes common development standards, minimum quality expectations, review and testing policies, change management procedures, and other imperative policies and procedures to ensure established automated assets are of the highest quality. Additionally, communications about program status, policies and procedures, and ongoing system-specific efforts can be provided through the governing body.

While the governing body will be responsible for common, widely-used policy and procedures, each system owner will have the minimum responsibility to review, test, and approve standard automated assets. Some system owners may desire to take greater control of this by developing and maintaining automation assets related to their system(s), or creating bot design and quality standards equal to, or above, those of the common governing body.

Conclusion

As Process Robotics capabilities mature across public sector agencies and organizations, common themes will emerge to improve development speed, consistently maintain quality across a wide developer base, and effectively respond to system changes.

To respond to these issues, agencies should focus efforts on developing and maintaining an effective automation asset library and standing up governance functions to support the effort. A well-designed asset library supported by an effective governance structure can yield significantly faster development speeds, improved automated asset and process quality, and reduced change management efforts. It is a required foundation for scaling Process Robotics across organizations, agencies, and the public sector.

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