Simplifying Configurations for Product Development Solutions

A Case Study:

How SEAKR Engineering Leveraged Cognition's Integrated Development Environment for Managing Cockpit Configurations

COGNITION
NAVIGATING PRODUCT DEVELOPMENT

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Introduction

SEAKR Engineering, Inc. has been revolutionizing spacecraft memory and processing systems since 1981. They design and manufacture data storage units, command and data handling systems, advanced processing payloads, and manned space hardware, including state-of-the-art space communications processors capable of communications channelization and beamforming.

For the past six years, SEAKR has implemented the Cognition Cockpit™ platform as part of their product development process (PDP). Their Systems Engineering group has developed the platform to seamlessly work in concert with their engineering PDP organization-wide.

Challenges

The Cockpit platform is delivered with pre-defined templates, workflows, permissions, harm and hazard libraries, and other features. This is beneficial for small organizations looking to quickly implement a solution and streamline their product development process within Cockpit.

However, organizations like SEAKR require Cockpit to adhere to their existing standard operating procedures and to adapt over time. Thus, their engineers have customized Cockpit configurations to complement the design and development activities. These customizations are tested and verified to be fully functional prior to official use in the PDP.

After Cockpit adoption, SEAKR spent several years in developing and maturing the implementation of Cockpit to replicate not only systems engineering processes,

but also to reflect an evolving, growing organization with new product lines. Their current Cockpit configurations closely mirror the current engineering processes reflected in their PDP and allow for flexibility with project and business growth over time.

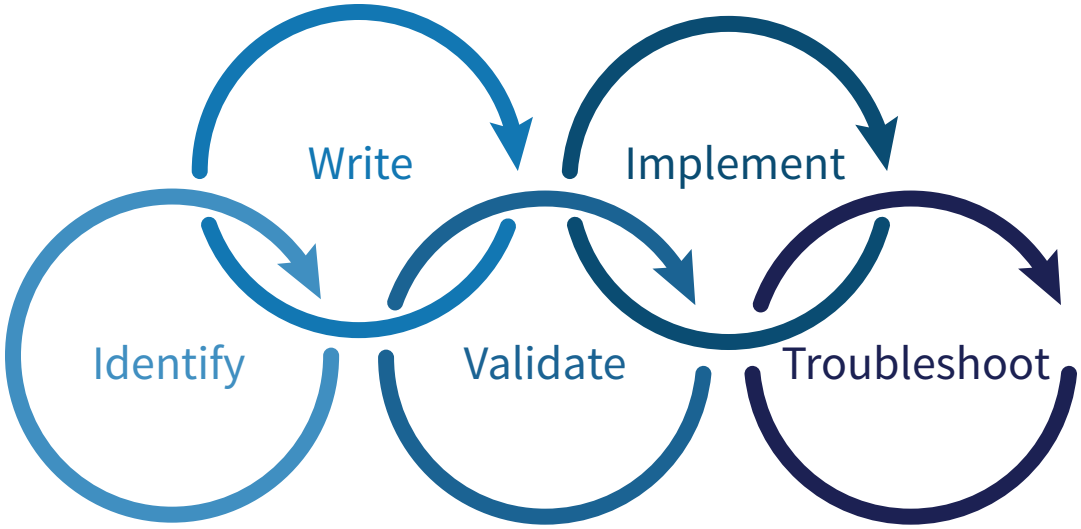

Image 1: High-level diagram of SEAKR's configuration development process

Paramount to the implementation of Cockpit for meeting the SEAKR engineering PDP needs was flexibility as projects and the organization continued growing. Early in implementation, the time invested in configuration building and testing diverted engineers from valuable product development time. The Systems Engineering team began looking at methods of Cockpit configuration management that would be scalable over the long term, minimize invested time, and maximize their management of existing and future configurations. Most importantly, the resulting implementation was designed to ensure that the tool helped the engineering staff do their jobs more efficiently rather than add unnecessary work.

Cognition's Solution: Cockpit IDE™

Cognition offers the Cockpit Integrated Development Environment (IDE) for configuration management. Alternately known as the "Configurator," the Cockpit IDE is a stand-alone, web-based portal that targets an existing Cockpit server. It provides a unified configuration environment that is user-friendly and intuitive. With features including simultaneous configuration authoring and management, autocomplete features with descriptors next to each function called, search functions, and abilities to see dependencies between configurations, the IDE is a powerful tool that teams can leverage in configuring Cockpit.

"IDE is…a graphical user interface (GUI)-based workbench designed to aid a developer in building software applications with an integrated environment combined with all the required tools at hand." (Techopedia)

Implementing the IDE

After coordinating with Cognition and completing an evaluation trial, SEAKR implemented the Cockpit IDE in 2016. The team identified that the Cockpit IDE could help them overcome multiple concerns with the configuration management process. Among those concerns were time invested into their Cockpit configurations and identifying a scalable method for simultaneous, multi-configuration management.

Problem One: Invested Time in Configuration Authoring, Change Management, Verification/ Validation

SEAKR has constantly evolved their PDP since first implementing the Cockpit platform, requiring their engineers to update it with configurations that match updated SOPs, business requirements, software upgrades, and so on. This work is undertaken with a systems engineering approach that ensures consistent output of configurations that are well-integrated, user-friendly (where applicable), and sufficiently verified and validated prior to implementation.

Since first adopting Cockpit in 2011, SEAKR expanded their capabilities within it while integrating it with their PDP. This required a higher number of custom configurations to be built, analyzed, tested, implemented, and manually tracked. This, SEAKR realized, was not scalable for them in the long term; time invested in configuration management was increasing, taking engineers away from valuable product development and systems engineering efforts.

Solution One

With use of the Cockpit IDE, SEAKR has reduced time invested in writing, validating, implementing, and troubleshooting their Cockpit configurations. Their engineering team has realized a reduction in configuration time and effort of about 60 to 70 percent.

The IDE lays out code intuitively, eliminating time invested in those coding activities. Autocomplete options and other ease-of-use features also allow the code or snippet insertion into multiple configurations quickly and easily. The engineers are able to shift focus onto whether the configuration is built correctly as well as quickly assess impacts to related configurations.

The features of the IDE also allow for faster, in-depth insight into configuration change errors. Troubleshooting and finding root causes of issues can be done much more rapidly. IDE coding language features, including hover over help, language shortcuts, and autocomplete, also minimize the likelihood of error from the start.

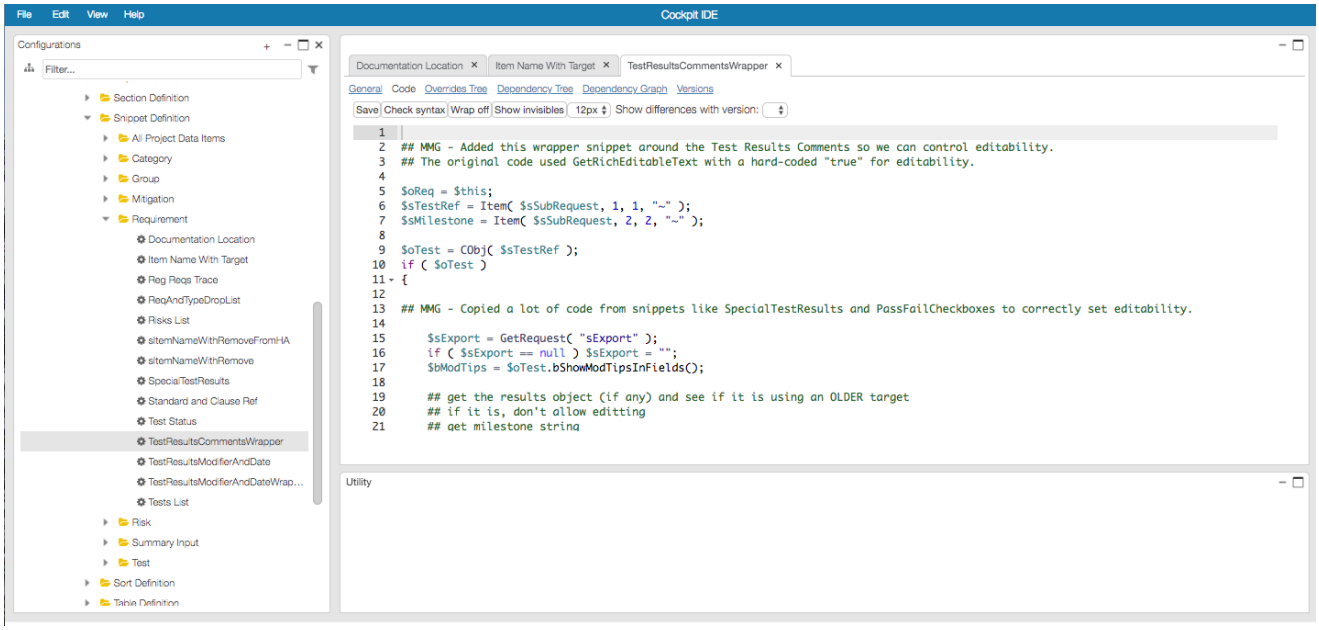

Image 2: Cognition Integrated Development Environment code editor and UI

Once it's time to validate and implement new or updated configurations, SEAKR can test them in a sandbox environment prior to implementation. This allows them to work out what impact the configuration may have on the rest of the system. This, combined with their work within the IDE, has significantly reduced the time of configuration changes and allowed them to continue focusing on critical product development tasks.

Problem Two: Managing Multiple Configurations

Much of SEAKR's usage of Cockpit is configured to their particular SOPs. As their products and engineering processes grow, their form of Cockpit requires regular configuration to support them both.

Prior to implementing the Cockpit IDE, the Systems Engineering group approached configuration management in a serial manner. In standard, out-of-box Cockpit, any configuration must be done one at a time. They were therefore tasked with completing configurations one by one, and tracking them manually.

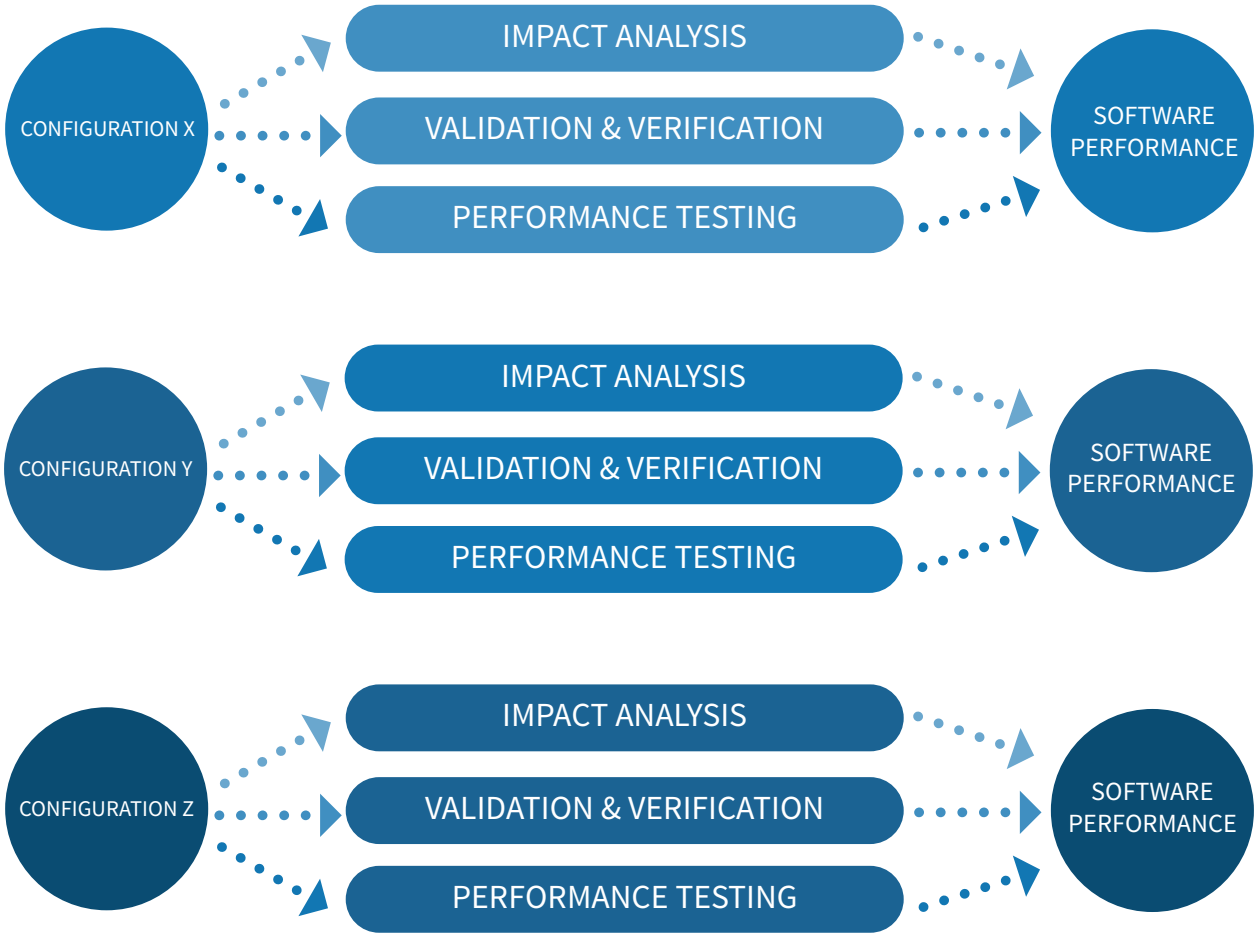

Image 3: Manual Configuration Process

Solution Two

With the Cockpit IDE, SEAKR manages their configurations in an intuitive, scalable fashion. The IDE allows the Systems Engineering team to work on multiple configurations at once. They can see lists and categories of their configurations organized and maintained by their Cockpit administrators. Configurations are simple to create, access, alter, or remove.

This approach to configuration management reduces time and burden for the engineering team. Their capabilities for writing and tracking configurations are enhanced by the IDE. As their business requirements for Cockpit change or product complexity increases—requiring additional configurations—SEAKR engineers have a scalable solution that is simple to use and maintain.

Image 4: Configuration Management in Cockpit IDE

Conclusion

SEAKR's team has seen significant reductions in the time it takes to write, test, validate, implement, and manage their configurations with the Cockpit IDE. As they continue to grow and expand, the solution is scalable for their requirements of the Cockpit platform. The IDE allows the SEAKR team to maximize engineering capabilities for configuration work while minimizing invested time. This time is directed back into development, where SEAKR continues to utilize its core talents to deliver robust, first-class aerospace products while adhering to the sensitivities of meeting customer schedules.

About Cognition Corporation

At Cognition, our goal is to provide medical device companies with collaborative solutions to the compliance problems they face every day, allowing them to focus on their products rather than the system used to create them. We know we are successful when our customers have seamlessly combined risk management, requirements management, verification, and validation activities in Cockpit.

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