

Fluent Teamwork

Reducing development costs with IT-based workflows

The merging of IT and OT is an objective often alluded to for progressive digitalization. Continuous Integration is just one example of such an application: enhancing quality of the software, this process facilitates a reduction in engineering costs for automation.

As well as constituting the most essential elements, engineering in machine manufacturing also consumes the greatest amount of time. While the hardware costs tend to stagnate, the effort – and consequently costs – for the engineering escalates as a result of increasingly efficient and more complex machine concepts. There are numerous methods and processes in the field of IT to improve software development, and at the same time quality of the results. One such process is Continuous Integration, which provides a wide range of advantages and can be used in automation projects with state-of-the-art engineering tools such as TIA Portal from Siemens.

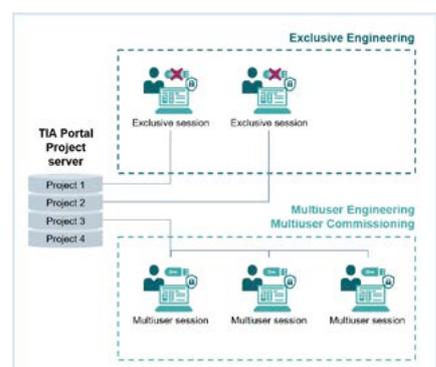
Standardization as a basis

Standardization is an essential precondition for the incorporation of IT-based workflows in automation. For machine manufacturing in particular, it is imperative nowadays that programming of the controller is an integral part of the overall development process for machines rather than an independent element. Standardized software development is characterized by efficient cooperation with complete transparency of software changes, based on a uniform database and seamless interconnection of workflows with integrated interfaces.

Turbo for software development

What exactly is Continuous Integration? This continuous development process essentially comprises three components: efficient development within the team, management of software changes in a source code-based version management, and the test-driven and

automated testing of functions to guarantee software quality. The objective here is to identify integration problems at an early stage, by applying interdisciplinary methods and complete transparency, for example. Today's automation applications are so complex that they require an efficient interaction of multiple programmers. Software is therefore absolutely essential for tool-based support. Distributed working and versioning with Exclusive and Multiuser Engineering in TIA Portal. This should ensure that all participants are focused on the application, without having to worry about coordination within the team. Maintenance of the software changes and commenting them is extremely important within the



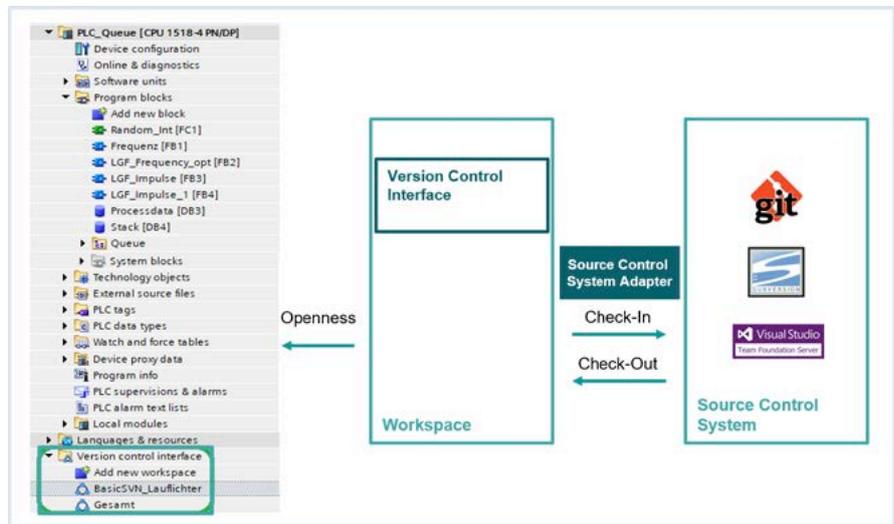
framework of standardized software development. Documenting the application ensures comprehensibility first and foremost, and in turn facilitates long-term maintenance and the reuse of software modules in the context of an integrated development workflow. The aim of optimum software development is always to ensure comprehensibility, even for colleagues which are not directly involved in the development.

Switch point for engineering and commissioning

The TIA Portal has been supporting cooperation within the team for some time now. For this purpose, projects are stored centrally on a server and managed, versioned and viewed with a separate tool. A version management records any changes to software objects and documents throughout the entire machine life cycle. All versions are provided with a time stamp and user ID. Each version can be easily restored. With the new version V16 of the TIA Portal, these and further server functions are now available to all users. Multi-vendor versioning tools are now an established element in software development and must be integrated in the development and documentation process. With the Version Control Interface (VCI) in TIA Portal, connection of these tools is an integral component of application development and rounds off the possibilities for user-specific selection of tools.

Continuous Integration in automation

In addition to standardized structures and uniform programming specifications, optimum software development also encompasses integrated test processes. This is essential in ensuring that the

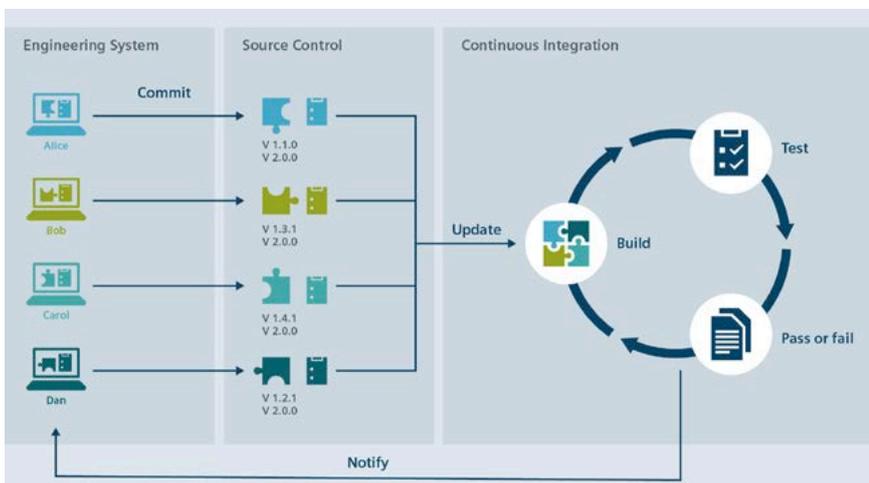


Connection of versioning systems to the TIA Portal with the Version Control Interface (VCI)

requirements for software quality and ever faster time-to-market for machines can be achieved. A Continuous Integration server is instrumental in merging the three elementary processes Creation, Testing and Documentation and coordinating them with each other. The Build process creates a subproject (referred to as Build) automatically from the standardized software modules, and then runs it through application tests defined in the Testing process step. The result is then returned to the programmer as a report. As many steps as possible should be performed here (semi-)automatically by creating and executing test cases on the server as jobs. A continuous cycle, which saves on engineering time, in addition to improving software quality. With version 16 of the TIA Portal, a Test Suite supports the user specifically in the application test process step and in checking conformance with the programming guidelines. Moreover, it is also possible to develop independent tools and to integrate these using the TIA Portal API.

Efficient software development

The advantages of IT-based workflows and standardization in automation are obvious: the cycle of rapid changes and automatic function tests minimizes the risk of errors, enhances software quality, and creates transparency in the development process. Additionally, automated procedures ensure consistency and reduce the time required for engineering. TIA Portal includes an extensive library concept to support standardization and to enable parallelization of the workflows. New functions such as Exclusive or Multiuser Engineering, Test Suite or Version Control Interface are extremely beneficial in this regard. Continuous Integration is just one step of many on the road to digital transformation. Cooperation within the team is paramount here, and this must be permitted in a variety of ways with tool-based support.



Basic principle of software development with Continuous Integration

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