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Ingénierie du logiciel et des systèmes — Capacités des outils de construction et de déploiement

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

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Introduction

Build and deployment tools and methods have long been central to software engineering, and the importance of their role continues to increase. Traditionally, build and deployment tools were simple mechanisms used to create executable code from the source code written in a programming language, typically comprising a compiler and a linker bundled with the operating system. Over time, these mechanisms have become much more complex, where application software is built using the source code and libraries distributed across multiple servers. Furthermore, the testing and operation of a system often requires deployment to a large number of servers. Increasing sophistication in software development environments is another factor in the increasing the importance of advanced build and deployment tools and methods.

Many modern build and deployment tools are now available on the market, independent of the vendor providing the operating system. These tools can be configured as independent automation on top of compilers and linkers bundled with individual operating systems, as well as repositories that manage assets. Therefore, there are multiple options available, and it is essential to choose the appropriate one for each different software engineering context. This document provides guidance in the selection of commercially available tools from different vendors as well as tools provided as open source.

This document treats tasks and tools related to change management and configuration management as out of scope. Build and deployment processes are typically initiated by modifications to the source code, indicating they are closely related to change management and configuration management. However, while change management and configuration management primarily deal with source code, build and deployment involves the transformation of source code into sophisticated operational representations and structures. Therefore, change management and configuration management are excluded to enable focus on the single build and deployment concern.

From a user's perspective, it is important to choose the right tools from the variety of available build and deployment tools, especially in large organizations. It is imperative that tool evaluation and selection be done in accordance with fair and public standards. To this end, ISO/IEC 20741 was published in 2017 as a guideline to evaluate and select software engineering tools. However, ISO/IEC 20741 does not identify the standard capabilities specific to build and deployment tools since it is generalized without regard to a specific tool category.

This document defines the requirements for capabilities of build and deployment tools and is intended to be used in conjunction with ISO/IEC 20741 to select the appropriate tool (see Annex A). The document provides a list of capabilities in build and deployment tools. The capabilities described in this document are gathered from existing tools (see Annex B).

Build, deploy, and CI/CD tools are separate and independent tools, which can logically be treated in separate standards. However, in most software engineering environments, they are applied in highly integrated, interdependent, and continuous workflows. Evaluation and selection are best conducted from this integrated viewpoint and this document functions as a single standard for this integrated collection tools.

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Software and systems engineering — Capabilities of build and deployment tools

1 Scope

This document defines the requirements for capabilities of build and deployment tools to support and automate building, packaging, and deploying work.

This document is intended for use in evaluating and selecting build and deployment tools according to the procedures defined in ISO/IEC 20741.

This document is applicable to different development methodologies and approaches (e.g. Waterfall, Agile, or DevOps).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
build
process of generating an executable and testable system from source versions or baselines

[SOURCE: ISO/IEC/IEEE 32675:2022]

3.2
continuous integration
CI
technique that continually merges artefacts, including source code updates from all developers on a team, into a shared mainline to build and test the developed system

[SOURCE: ISO/IEC/IEEE 32675:2022, modified — The abbreviated term "CI" has been added.]

3.3
continuous delivery
CD
software engineering practices that allow for frequent releases of new systems (including software) to staging or various test environments through the use of automated tools

[SOURCE: ISO/IEC/IEEE 32675:2022, modified — The abbreviated term "CD" has been added.]

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