This standard defines the verification and validation processes that are applied to the system, software, and hardware development throughout the life cycle, including acquisition,
that are applied to the system, software, and hardware development throughout the life cycle, including acquisition, supply, development, operations, maintenance, and retirement. This standard applies to the system, software, and hardware being acquired, developed, maintained, or reused. The term software also includes firmware and microcode (e.g., Field Programmable Gate Arrays and Programmable Logic Devices). Each of the terms system, software, and hardware includes its associated documentation. V&V processes consist of the Verification Process and Validation Process. The Verification Process provides objective evidence for whether the products perform the following:

a) Conform to requirements (e.g., for correctness, completeness, consistency, and accuracy) for all activities during each life cycle process

b) Satisfy the standards, practices, and conventions during life cycle processes

c) Successfully complete each life cycle activity and satisfy all the criteria for initiating succeeding life cycle activities (i.e., builds the product correctly)

The Validation Process provides evidence for whether the products perform the following:

- Satisfy system requirements allocated to the products at the end of each life cycle activity

- Solve the right problem (e.g., correctly model physical laws, implement business rules, and use the proper system assumptions)

- Satisfy intended use and user needs in the operational environment (i.e., builds the correct product)

The Verification Process and the Validation Process are interrelated and complementary processes that use each other's process results to establish better completion criteria and analysis, evaluation, review, inspection, assessment, and test V&V tasks for each life cycle activity. The V&V task criteria described in Table 1a through Table 1d explicitly define the conformance requirements for V&V processes.

The development of a sufficient body of evidence requires a trade-off between the amount of time spent and a finite set of system conditions and assumptions against which to perform the V&V tasks. Each project should define criteria for a sufficient body of evidence (i.e., selecting an integrity level establishes one of the basic parameters), time schedule, and scope of the V&V analysis and test tasks (i.e., range of system conditions and assumptions).

This standard does not assign the responsibility for performing the V&V tasks to any specific organization. The analysis, evaluation, and test activities may be performed by multiple organizations; however, the methods and purpose will differ for each organization's functional objectives.

ISO/IEC 15288:2008 and ISO/IEC 12207:2008 require that the developer perform various testing and evaluation tasks as an integral part of implementation. The techniques described in this standard may be useful in performing the developer's tests and evaluations. Therefore, whenever this standard mentions the developer's performance of a verification or validation activity, it is to be understood that the reference applies to the test and evaluation tasks of implementation.
5.3 Is the completion of this standard dependent upon the completion of another standard: No

5.4 Purpose: The purpose of the standard is to perform the following:
- Establish a common framework of the V&V processes, activities, and tasks in support of all system, software, and hardware life cycle processes
- Define the V&V tasks, required inputs, and required outputs in each life cycle process

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5.5 Need for the Project: The revision of the standard shall update the existing standards to address the following:
- Expand the minimum and optional activities and tasks for system level V&V and element V&V for hardware, software and other elements throughout the system lifecycle.
- Expand the overarching system V&V tasks during all stages, especially for system element implementation (e.g., modeling and simulation)
- Expand criteria on system V&V testing
- Modify tasks on hazard/security/risk to include cyber
- Expand the criteria on the use and application of software metrics (e.g., leading indicators)
- Enhance V&V to provide criteria for component reuse
- Provide additional clarification information.
- Describe the qualification criteria of the V&V team
- Maintain conformance with updates to International and IEEE standards.

5.6 Stakeholders for the Standard: The stakeholder include all federal and government agencies, and industries with critical systems and software applications.

Intellectual Property

6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No
6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

7.1 Are there other standards or projects with a similar scope?: No

7.2 Joint Development
Is it the intent to develop this document jointly with another organization?: Yes
- Organization: ISO/IEC JTC1
- Technical Committee Name: Software Engineering
- Technical Committee Number: SC7/WG7
- Contact Name: Anatol Kark
- Phone:
- Email: wg7conv@gmail.com

8.1 Additional Explanatory Notes (Item Number and Explanation): The revision consists of changes and updates to the existing standard in response to user comments for additional information.

5.2: Referenced titles -

IEEE 1074 - Standard for Developing a Software Project Life Cycle Process