Configuration Management

Configuration Management (CM) is the discipline of identifying, recording, evaluating, tracking, coordinating, reporting, and controlling Configuration Items (CI) by performing supporting process activities that maintain the integrity of these items, including their versions, components, and relationships.

A CI is an artifact that can be individually managed and versioned, and has been placed under CM control. A CI may be anything that makes up a CM environment and should be recorded as part of the CM system. This includes hardware, software, documentation, and the physical relationships and logical dependencies between these CIs. Some common CM activities include:
• Identifying, defining, and baselining CIs.
• Controlling modifications and releases of CIs.
• Reporting and recording status of CIs and any requested modifications.
• Ensuring completeness, consistency, and correctness of CIs.
• Controlling storage, handling, and delivery of CIs.

The goals of using CM are to ensure product integrity and to better manage its evolution. Effective CM imposes control over the otherwise unmanageable activities that require the updating and using of multiple versions of artifacts. It is vital that the performing organization/project have in place a clearly defined CM process to manage the unique complexities of each product. This combined with well defined, documented, and accepted CM processes and procedures, and strict adherence to them, are necessary to effectively work with CM tools. This allows for the combined ability to build, deploy, correct, and update project artifacts and, if necessary, recreate earlier version of products.

In general, there are four classic operational aspects of CM:
• **Identification**: An identification scheme is needed to reflect the structure of the product. This involves identifying the structure and kinds of components, making them unique and accessible in some form by giving each component a name, version, and configuration identification.
• **Control**: Control the release of a product and changes to it throughout the life cycle by having controls in place that ensure consistency via the creation of a baseline product. This often involves implementing policies and processes to manage change both internally within the performing organization as well as change requests from external sources.
• **Status**: Record and report the status of components and change requests, and gathering vital statistics about the product.
• **Audit/Review**: Validate the completeness of a product and maintaining consistency among the components by ensuring that they are in an appropriate state throughout the entire project life cycle and that the product is a well-defined collection of such components.

Keeping these definitions in mind, there are ten key elements to identifying and addressing the CM needs of an organization. Seven relate to preparation, planning, and performing the necessary work. The other three are the results of the previous seven.
• **Planning**: Identifying, resolving, and documenting in the CM plan the objectives of the CM initiative and related organizational relationships, tools, resources, internal and external dependencies, policies, procedures, federal regulations, etc.
• **Process**: Defining CM processes and levels of control to be enforced upon its implementation.
• **People**: Identifying and defining the various roles and responsibilities of those working on and impacted by the CM initiative.
• **Culture**: Understanding the organizational culture as it exists before the implementation of CM and how the impact of incorporating CM tools, processes, and practices will impact that culture.

Plan approaches to mitigate any potential issues.
- **Product**: Determining what product(s) and part of product(s) will be placed under CM.
- **Automation**: Deciding on the requirements for the functionality of an automated CM system.
- **Management**: Resolving managerial decisions associated with the CM solution such as buying or building a CM solution.

The next three elements are the outputs of the above and are key to any successful CM solution.
- **CM plan**: The actual document that summarizes the needs, planning, processes, procedures, policies, schedules, responsibilities, etc. defined to integrate a CM system within an organization.
- **CM system**: The tool(s) chosen to assist in automating parts of the CM process. Choosing the most appropriate tool(s) requires extensive expertise in CM. In addition, tool review, and approval by appropriate authorizing individual(s) and/or departments will be required prior to any selection. Often organizations have CM tools in place that are recognized as standards to be used by all projects.
- **CM adoption strategy**: The strategy implemented by an organization when adopting a CM processes and/or system.

This and other relevant information, policies, and standards should be documented within a Configuration Management Plan (CMP). The CMP is used to document and inform stakeholders about CM within the organization, what CM tools and processes will be used, and how they will be applied. In addition, components of the CMP are also used to manage the implementation of the CM system.

It's important to note that a CM system can be very complex and often requires a subject matter expert experienced in CM and related tools to effectively structure and implement a feasible CM solution. Due to the complexity of the topic a best practice may be to consider outsourcing the effort or at least involving a CM subject matter expert in the planning and ongoing operations of any CM system.

For more information and tools related to configuration management, project management, the HHS Enterprise Performance Life Cycle, the CDC Unified Process, or the Project Management Community of Practice please visit the CDC UP website at http://www.cdc.gov/cdcup/. ▍

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CDC Unified Process Presentations

The CDC UP offers a short overview presentation to any CDC FTE or Non-FTE group. Presentations are often performed at your facility, on a day of the week convenient for your group, and typically take place over lunch structured as one hour lunch-and-learn style meeting.

Contact the CDC Unified Process at cdcup@cdc.gov or visit http://www.cdc.gov/cdcup to arrange a short overview presentation for your group. ▍

Contact the CDC Unified Process

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