



The Art of Configuration Management

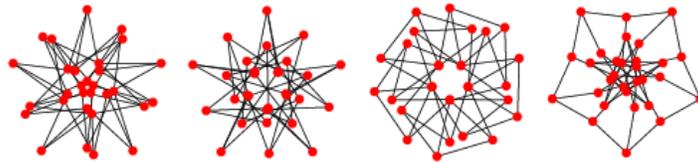
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2017, Elite Engineering Services
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What is Configuration Management?

Configuration Management (CM) is the concept of fully and explicitly defining an item—particularly all of the various forms of itself (configurations), the inception and lifecycle of each version, and the exact differences between them—and the overall process to manage it.



The bigger question often overlooked is...

Why is it Important?

An item that is considered configurable potentially exists as different versions of itself at different points in time; e.g. initially from a set of requirements or order, ongoing through physical changes and iterations, and even after delivery during maintenance and support.

Some industry standard organizations consider CM important; most notably, the AS9100 standard based on the ISO 9001 quality system requirements but specifically for aerospace—an area in which produced items that fail can substantially impact the environment and humans.



Items that both succeed and fail are traced back to gain a better understanding for further improvements.

Crucial to traceability is the ability to capture and reference an item's varying configurations, whether to identify a problem item that was delivered to a customer, utilize a lesson learned from an issue during the design process, communicate the rationale for deviations that occurred during the lifecycle, and much more.

How is it an Art?

The ease and clarity in which to define and express such details is an art. The easier it is to gather information and the more clear it is to grasp, the better "the CM" is.

Most interestingly, the better the CM is, the easier it becomes to maintain existing items and simplify new ones. Eventually, the system of optimized CM becomes self-sustaining.

As with any art, there needs a strong underlying philosophy to self-drive the craft.

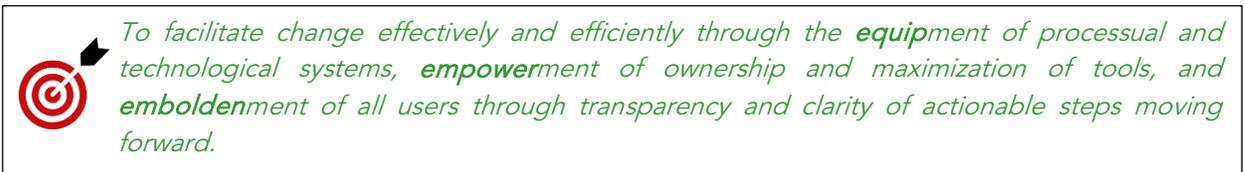
Foundation, Purpose, & Mission

The art of CM lies foundationally on the bedrock of the same basic principles that govern any robust, sustainable process:

- i. Simplicity – Simple to teach, simple to adopt, simple to do
- ii. Minimalism – Less—or just the “right” amount—is more
- iii. Balance – Ideal state vs. realistic state vs. practical state of affairs
- iv. Organization – Standardization and consistency of shared information
- v. Change – Change is ever occurring and requires effective handling
- vi. Transparency – Visibility of the what, why, who, when, and how
- vii. Open Communication – Accessibility, ease, translation, and clarity of messages
- viii. Human-Centered Design (HCD) – Inclusion, trust, and engagement of the users
- ix. Impact – Desired result vs. actual result and the difference between them

The purpose of CM is to integrate the foundational principles into the process of production, such that its inherent mission becomes the means to efficiently and effectively facilitate variation and change throughout the lifecycle of an item.

The mission of Elite with respect to the art and purpose of CM is simply:



Exploration

When it comes to designing a process and defining support tools, all options should be explored: historically tried-and-true ones, outrageously wild unheard-of ones, and everything in between. If the art of CM is the art of simplification, then refinement and improvement always exist and a better solution is always possible; thus, all options deserve exploration.



Exploration requires a level of fearlessness in facing the unknown and embracing ambiguity, as a multitude of valid solutions may exist and the ability to recognize and differentiate between them is key. The most innovative ideas often come from intensive journeys and lessons learned from failed ones. So prioritize the time to explore deeply and then radically accept whatever presents itself and react with appropriate judgment.

Process

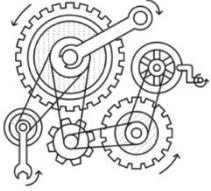
A process is explicitly defined so that there is a path to follow and is continually refined so that the pathway is efficient.

A pathway from the start to a desired end goal is efficient if there is an adequate number of “milestone gates” along the way to provide sufficient support of the desired end goal—ideally not too few and not too many—such the chance of success in reaching the goal is enhanced.

A process path with discrete steps that are apparent in its relation to one another provides transparency and clarity to more easily determine status and planning, as well as expose strengths and areas for improvement. This transparency is what drives the means for traceability.

System

A system facilitates the process by propelling the mechanisms to feed inputs through work to produce outputs as part of a complex whole.



A system can be both tangible (e.g. a software application) and intangible (e.g. an overlying scheme). Either way, it is the system that drives the process in its definition and runs continuously—ideally on its own and constructively.

The goal is to set up a system that is sustainable: continually improving the state of affairs and not detracting from related processes or users.

Application

The scope of CM is broader than one might traditionally believe. Expressed as an art with the basic principles outlined above, it can be applied to virtually any type of item—a physical product, a digital file, a concept—in any department or industry. While the details of storage and accessibility may slightly differ, the underlying process of simplifying and managing configuration versions and changes should universally be the same.

It can even be said that this art is applicable to the everyday activities of work itself at the level of personal management.

As such, this art is truly a practice, and the more it is practiced, the more improved it will be.

Impact

The practice of the art promotes simplicity, effectiveness, and transparency in operational processes, which has a compounding positive impact on every person involved: users and managers alike.



A **process** that is well-facilitated in a manner that is **easy and efficient** to use can **reduce error** and promote standardized habits, while transparency can **improve** information handling and **communication**. People will more easily collaborate on shared data and more **clearly convey** their contributions. **Happiness just might result.** †

† Statement not guaranteed.

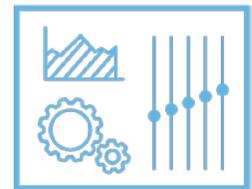
Core Processes

Now let's define the art of CM in the context of operational processes in a business—often referred to as a company's "core processes." In our definition, we shall remain agnostic of item type, department, and industry, bearing in mind the universal application of the art.

Configuration Control

Standardization reigns, despite the stigma that has historically been attached to it. When standards are vague, complicated, or both, their true value often becomes overshadowed by their cumbersome nature, and users develop distaste for it.

Effective standardization provides an appropriate level of control, where balance is key. Too rigorous of a standard, and a process becomes overly complicated and feels restrictive with seemingly overbearing control. Too lax of a standard, and a process becomes disorganized with potential for gaps while control is hardly existent. An appropriate standard is generic enough to



apply universally to all scenarios (or as much as possible) and is simple enough to understand and utilize, while effectively maintaining control.

The heart of CM lies in the mandated control of configuration data. The art of CM is defining the appropriate depth of standardization in which to facilitate control.

Item configurations and data are controlled such that the most relevant version is easy to acquire and use. While this seems like a simple goal, it becomes more difficult to keep track of with multiple users modifying and utilizing the information. Each person has his or her own style of how to distinguish such details, which underlines the necessity of standardization in collaborative team environments. With multiple users sharing information, control of who sees what, what can be modified, how it is handled, and managing copies becomes critical.

Change Control

Change is inevitable. It will happen, and everything will be okay.

That is, things will be okay—if not great—so long as change is well facilitated, captured, and controlled.

Capturing and processing a change needs to be standardized as much as the details of the change (request and realization) itself for optimal control. Control that is optimized means that appropriate changes get performed at the appropriate times and in a timely manner. Depending on the complexity of a change, proposals are approved by designated experts before being performed in order to ensure effectiveness.



Further, changes that are properly captured not only provide invaluable information on lessons learned, potentially hidden costs, and opportunities for enhancements, but also highlight the reasoning “WHY?” changes have occurred and patterns that serve as a basis for improvement.

Communication



Essentially, the product of standardizing and controlling processes and data is a means for effective communication between companies and customers, departments, and people.

In terms of processes, status and changes can be tracked and referenced, producing accountability for involved personnel and facilitating management through defined metrics and reporting.

In terms of data, descriptive metadata—such as release status, ownership, comments, etc.—facilitate team collaboration through detailed knowledge sharing. Further, properly structured data provides a means to translate from one system or person to another, which is critical for accurately passing information downstream, upstream, sideways, or wherever.

The ability to clearly communicate or convey accurate information can make or break a system in its attempt to be robust. A system with good communication harbors the following attributes:

- Accuracy – Resilience to error-proneness
- Transparency – Fully detailed and exposed
- Visibility – Ease of identifying key information
- Traceability – Ability to reference retroactively or proactively

With good communication, the art of CM is realized through a system that is fully integrated with clear and easy-to-use information for its users.

A fully integrated system begins with a strategy of appropriate depth, complexity, and phased integration depending on the desired end goal.

Strategization

This section is intended to serve as a practical guideline for strategizing CM project planning before moving into actual integration.

It serves to answer questions arising from the consultation process, such as:

- Who are my clients in each step of the process?
 - What are each of their needs?
- What am I trying to achieve?
 - How do I produce a win-win scenario for me and my client?
 - To what depth of processual and system detail should I dig to?
 - How do I incorporate sustainability?
 - What level of involvement should I maintain with clients, stakeholders, end-users, and people in between?
- What are best practices to follow?
- Which adventurous path to CM integration should I lead?
- How do I best provide support?
- How will I know that I achieved the goal?

Let's get started.

The Mission

1. Define the end goal collaboratively with the Client.
2. Outline the issues preventing achievement of the end goal.
3. Identify the gap between.
4. Brainstorm all possible solutions to bridge the gap—anything goes!
5. Map out discrete steps to build the bridge and the itinerary to reach the goal.

To begin, the above can be a bare-bones skeleton or rough idea of the plan moving ahead, as it serves as a requirements basis with the client to that ensure your understanding of their needs actually matches their understanding, and to agree on a solution.

Win-Win²

Solutions are best adopted, and even warmly embraced, when a winning scenario is set up for everyone involved. Each participant may have differing benefits, so long as there is at least one (or ideally more) for each. More ideally, a scenario in which not one person "loses" is the true goal, or at least if a deficit is deemed necessary then it best be mitigated by a greater "win" coupled with it.

For example, as a consultant we would want to:

1. Align with our client's specific demands; and also
2. Minimize our cost (time, resources, and effort).



There are various ways to achieve both of the above, depending on how much winning is balanced on either side (see the "Win-Win Matrix" below).

WIN-WIN MATRIX		
	Consultant Win	Consultant Loss
Client Win	Planning for & agreeing upon a balanced deliverable that meets Client objectives through a method deemed efficient & effective by the Consultant	Providing unnecessarily extraneous features requested by the Client that overconsume Consultant resources
Client Loss	Adhering to Client demands exactly as prescribed, despite the Consultant's awareness of more efficient and cost-effective methods	Supplying low-quality or error-prone work in an effort to keep initial costs down on both sides, without consideration of sustainability

The creative expression of ideas resulting from deep exploration paves the way for scenarios in which all participants can benefit, which further underlines the importance of intensive brainstorming.

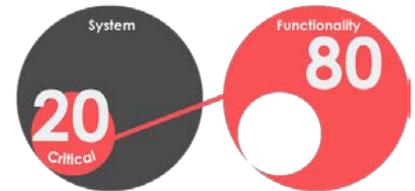
Winning applies to every role and relationship: consultant to client, manager to end-user, user to downstream user, and each overlap between. We always want to strive to win-win exponentially and beyond, because it's simply the right thing to do.

Depth & Customization

Striking a balance not only applies to benefits of participants, but also to the depth or amount of effort in which the project scope encompasses.

In a utopian situation, a client would want to have every problem fully resolved at each level of a whole system, completed all at once and immediately ready to be utilized. More commonly there are restraints in time, cost, and resources which direct prioritization of problem solving.

This is an ideal scenario to employ the Pareto principle (a.k.a. 80/20 rule), in which we specifically target the 20% of the system that affects 80% of the desired functionality. It's basically more bang for your buck, since aiming for 100% coverage is often not feasible, can be susceptible to obsolescence before completion, or provides little return on the investment.



Planning Sustainability

Regardless of how shallow or deep we dive into the system scope, we want to carefully plan the execution of a system that will be sustainable—that is, robust in its use and valuable in its effects long after its inception:

1. Processes that are easy to understand, adopt, and use
2. Functions that require little maintenance and administration
3. Tools that are free of bugs and well controlled
4. A system that is easy to train for and transfer knowledge

Planning for sustainability naturally creates a win-win situation for everyone involved: less headaches for end-users, less maintenance for administrators and core process owners, and less debugging by the consultants. All persons involved are then free to progress in other areas, either focusing on improvements or—the ultimate goal—innovating new ideas.

Human-Centered Design

When working with data and software, more often than ideally there is a tendency to overlook the most critical aspect of a well-tuned system: the human factor. Humans use it and are part of it—so design accordingly.

Human-centered design (HCD) is a creative approach to problem solving; it's a process that starts with the people you're designing for and ends with new solutions that are tailor-made to suit their needs.

While the concept of including the end-user closely with the integration process is nothing new, its practice has been minimal since its adoption has been weak, for whatever reason.

Why is HCD important? It tears down the barriers of culture change when implementing new processes and systems by presenting them as what the masses truly need, thereby satisfying their wants and motivating people to embrace the change, rather than fear it.

What does incorporating HCD entail? According to *IDEO.org*:



“Embracing human-centered design means believing that all problems, even the seemingly intractable ones, are solvable. Moreover, it means believing that the people who face those problems every day are the ones who hold the key to their answer. Human-centered design offers problem solvers of any stripe a chance to design with communities, to deeply understand the people they’re looking to serve, to dream up scores of ideas, and to create innovative new solutions rooted in people’s actual needs.”

With the CM philosophy as an undercurrent to many processes and broad system usage, encompassing a multitude of team members, departments, and hierarchies, its adoption is critical to its success. Engaging the end-users will not only motivate better system usage and process compliance, but can also bring out enthusiasm and zest.

The Model

The Institute of Process Excellence (formerly Institute of Configuration Management) provides *The CM2/IPX Model* (CMII-500H) which outlines the processes, tools, and forms/templates to be used for assessment and implementation of the [CMII Standard for Enterprise-Wide Configuration Management and Integrated Process Excellence \(CMII-100H\)](#).

Tried and true, as well as industry-accepted, the model and standard will direct our CM technical implementation and fill in the details.

Next Step...

Contact Elite for the full scope of “The Art of Configuration Management” (handbook), as well as a consultation for a tailored “Choose Your Own Adventure” approach to achieving your business objectives with an expansive CM scope.