

CM Justification

To be able to justify CM to your managers you will first have to explain what it is. This is not because it is a complicated area or requires too much expertise but because over time CM has come to mean different things to different people.

So, what is Configuration Management?

Configuration Management (CM) is a term given to the procedures followed, and control imposed, upon an item that an organisation considers important. This is a very generic definition so let's drill down a bit to see what things live under this "CM" umbrella.

Configuration Identification

A Configuration Item (CI) is anything that your business decides it is important to be able to record and identify any and all versions of a particular product. The sort of information you might be interested in keeping about a CI include; how those versions are created, modified and destroyed (known as the items life cycle), who is allowed to perform these actions (known as Access Control) and under what circumstances (business process).

You can see that almost anything can be a "Configuration Item". They can be physical items like computer hardware or engineering components, documents or, as is usually the case, software. The only rule is that it has to be something that is of importance to your business.

OK, I know what a Configuration Item is. Is that it?

Change Management

Identifying what you want to control and keep information about is just the first step. Once you have established that you have some items that are so important to you that you want to keep them as Configuration Items (CIs) then, you also have to consider how you are going to make sure that the correct procedures are followed to ensure these items are protected and that any changes to them are recorded for Audit purposes. This is known as "Change Management".

Typically, change to an item is managed by recording all the details about the change on a "Change Request" (CR) form.

NB: This is usually where people tend to start being confused. We have coined the term Change Request but others are probably used to another term like, Problem Report, Maintenance Report, Off Specification report, Request For Change (RFC) or one of many other terms organisations tend to use to mean..... a description of a change, to an item, that someone believes is necessary.

Also typically, these Change Requests (CRs) have to be approved by someone and consequently your business will have a procedure to handle them. Perhaps along the lines of, Raised by, Considered and then either Approved or Denied.

OK, I've got it now. Configuration Items are things I want to control and Change Requests are things that describe how a Configuration Item is to be changed, why and who has authorised it. Is that it? What's the big mystery?

Release Management

There is no big mystery to Configuration Management but we still have not finished looking at all of its aspects so let's turn to Release Management.

The term "Release Management" comes from the software development aspects of CM where a group of configuration Items were collected together and "Released" on an unsuspecting world. Well, not quite unsuspecting but anyone who uses software and has seen the amount of trouble a new "Release" can cause will know exactly what I mean.

However, Release Management can be applied to any group of Configuration Items that your business considers need to be controlled and manipulated together, as a group. For instance, a wordprocessor is made up of a number of files that must be used together to make work correctly. Similarly, an

electric kettle is made up of a number of items such as, its body, the electrical element and its plastic handle which may be specific to a particular make and model.

How do we make sure that the right bits are used to make the item work? We link the changes that are described on the Change Requests to the Configuration Item to tell us what the CI should look like and how it should perform and then we use Release Management to ensure that it is built correctly, tested and sent out to the right people.

Wait a moment. Are you telling me that if I build kettles, and use Configuration Management that all my Kettles will be built correctly, tested and sent out to people?

Yes, subject to your procedures being adhered to and followed correctly.

Interesting but we are good here, that already happens. Nothing you have said so far convinces me that I need CM.

OK, but remember, that what I have described so far is still not everything under that CM umbrella I mentioned at the start.

Management Information

CM is also about storing the information, about things, you need and presenting that information to you in a form you can easily use. This includes statistical information about the Configuration Items themselves (How many kettles of what model have been sent to SE England in the last 3 months and how many have been returned as faulty, been replaced or damaged and so on) and the changes that were made (Plastic Handles were replaced by rubber ones for better grip), why (3000 complaints were made via the Change Requests) and from there identify trends, costs and become more proactive.

For example:

If you have a problem or perhaps a product recall is required, with CM you have the ability to find out precisely which product models were built with which bit, why they were changed, what the change was and who made the change. That's a lot of very useful information enabling you to respond more quickly and more accurately than you would otherwise be able to do.

Audit Trails

Finally, Who did what and when is often vital information for today's organisations. Many are ISO 9000 compliant, others striving towards this and still others just want to be able to prove to their shareholders and accountants that correct records are being held and the business is operating in a controlled manner.

Configuration Management provides the mechanisms to record this information.

Hmmm..so if I understand all this correctly what you are saying is that Configuration Management is a framework which we can use to ensure that we have:

- A secure repository for those items that are important to us to make sure we never lose them and that should anything happen we have all the information we need to re-create them.
- A record of everything that we have done, who did it and why it was done to help us analyse what is driving us to change the way we do business.
- Controls in place to make sure only correctly authorised people do appropriately authorised tasks.
- The right information to be able to identify trends and weaknesses and therefore take corrective action more quickly and accurately.
- The right processes and procedures in place to operate in a controlled manner.
- The knowledge of what was delivered how, when, why to where and to whom.

Now you are beginning not only to understand what Configuration Management is but also why you must have it. In fact, it is probably true to say that you have already got it to some extent because nothing I have said should be new to you.

You are likely to have a number of manual or partially automated processes in place to help you do everything I have talked about and you may well be concerned that they are not being done as quickly and easily as you might like.

But, if you are like the many other organisations out there you may not have realised that the reasons you were having these problems was because you lacked the information to tell you that a problem was coming and CM even helps with that.

Yes I see the possibilities but what's the big deal if our controls aren't quite up to scratch?

The “deal” is summed up by;

Control Costs, No Control Costs More!

Organisations often fall into an all too familiar trap. They want controls but get frightened off when the costs of implementing them are brought to their attention. This leads to a reduction in controls down to an affordable level. This, in turn, leads to problems arising through lack of control which cost the organisation more money. This increases the overall costs so they look to make savings and reduce overheads by reducing control. This loop repeats until so much money is being spent on treating the symptoms of poor control that the organisation never has sufficient funds available to it to put the correct controls in place.

Although a cost benefit analysis of CM is the subject of another paper we can illustrate the point made above by the following.

We have discussed Configuration Management and established that it helps you to ensure:

- Change is performed in a controlled manner.
- Change is accurately described, assessed for impact and then acted upon.
- What you release to the end user is known in terms of its constituent parts.
- What you believe you have released is actually what was released.
- Should you need to regress to a previous version you have all the information to do so quickly and efficiently.
- Your procedures and build processes are enforced in the manner you require.
- Security is as rigorous as your business requires it to be.
- You are able to work on different versions of a Configuration Item at the same time, merge the work later on and build a new composite object.
- Information is available to Management for Historic, Audit and Statistical purposes.

All well and good but this level of control, security and auditability has a cost in that you are likely to require:

- a review of your current procedures to ensure they meet your requirements.
- new forms and methods of recording, assessing and making changes.
- the resultant changes to your current business process to be described and communicated to those who are to use it.
- a software tool to support your process, record your information and help you analyse the results.

Sometimes these costs can be significant depending upon the size of your organisation and the complexity of your business process.

Sometimes they seem prohibitive and are viewed as just “not worth it” as the returns are often not perceived in terms of traditional investment payback or even not perceived at all.

In these circumstances managers have to ask themselves one question.

What is the cost to my business if something goes wrong?

Count the cost of releasing the wrong thing. The time that is wasted as resource is diverted from production to rushing around trying to find out what went wrong, why it went wrong, where the error actually is and how to get things back to where they were before you did your release.

Count the cost of lost customer confidence. Future contracts that are not awarded, damage to the company image, existing contracts not renewed, penalty clauses put into effect and even damages claims and court cases where members of the public are affected.

Count the cost of poor quality control. Products requiring recall, damaging publicity, internal resource required to record, analyse and respond to customer complaints, costs of replacing faulty items, and re-issuing the products.

All the above costs do not exist if they do not occur if they do occur the cost can be huge, the benefits to be accrued from using Configuration Management lie in helping to prevent these disasters occurring.

We have borrowed two case studies from a very good book on CM called,

“Configuration Management for Software” by Stephen B Compton & Guy R Connor.

These studies serve to illustrate that controls often seem inappropriate only until something goes wrong because they were not in place. Sometimes lives are lost because of it, sometimes only money is lost because of it but, ALL the time someone, somewhere, WILL suffer because of it.

1

“In 1986 and 1987 a Canadian manufacturer of medical instruments had problems with its linear accelerator (a device that administers radiation therapy). Three cancer patients died from overdoses of radiation apparently caused by errors in the computer software. Additionally, the two ton cobalt treatment head had a way of breaking lose and falling on the patients, crushing them to death. Eventually, in 1992 the US Food and Drug Administration banned imports of their equipment until the problems were solved.

Admittedly we do not know if this manufacturers problems could have been prevented or that the problems had anything to do with CM. All we do know is that people died because the computer software and engineering hardware did not perform as it was specified to do.”

2

In a large Californian aerospace firm doing business with NASA, an engineer found that he could not complete a particular Configuration Item in time. When the finish date arrived the item still required a month’s development time. So he obtained a copy of the acceptance test plan and in order to short cut the test procedures he designed the specific answers to the tests into the item. The item therefore passed the tests and was accepted by the customer. Eventually, the engineer finished the correct design and tried to introduce the changes into the configuration. The CM process highlighted what was happening and exposed the deficiencies in the previous design. Shortly after managers had apologised to the customer the individual was fired.

This not only proves that “cheats never prosper” but also that Configuration Management helps you identify where and why changes are happening, sometimes months or years after the event and provides you with the information you need to find out who was responsible and take corrective action.