

IT Service CMM®

a pocket guide



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Foreword

Back in 1997-1998, Frank Niessink developed the first version of the IT Service Capability Maturity Model, as part of his PhD Research at the Vrije Universiteit. The service point of view was taken as a starting point to investigate software maintenance. Furthermore, existing models for service quality were used to consider the quality of IT service organizations. Based upon this, the first version of the IT Service Capability Maturity Model was developed. In this version, the first plateau of the model was worked out reasonably well and mere sketches of the higher levels were given. Already, the model turned out to be very useful in explaining the successes and failures of some of the example IT service environments we had studied. And, together with a number of other deliverables, it proved the proficiency of Frank as a very capable researcher.

In later years, Frank and his colleagues at SERC and CIBIT continued to refine and expand the model, and successfully applied it at a number of small and large IT service organizations. The IT Service CMM is a nice example of successful transfer of research results to industrial practice. The present guide is a natural next step. It is a readable, accessible entry to an important topic for many an IT service organization: how to assess, and next improve, the capabilities of the organization to deliver value to its customers.

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1. Introduction

This pocket guide introduces the IT Service Capability Maturity Model (IT Service CMM®). It gives an overview of the model itself, and describes how to use it to improve the maturity of an IT service organization. This pocket guide does not contain all details and is not the official model specification. For a complete and in-depth description of the IT Service CMM you should refer to the official model specification, available from the IT Service CMM website. However, if you are looking for a concise and 'lighter' introduction to the model, this pocket guide is the best choice to start with. The pocket guide describes the contents of the IT Service CMM, the main ways in which you can apply it to improve an organization, and the background you need to understand the IT Service CMM specification.

Why you should be interested in the IT Service CMM

Whether you are a service manager, service team leader, IT project leader, IT manager, IT consultant, assessor, or a student in IT, you will be interested in improving the capability of organizations¹ to provide high quality IT services. You may even be looking for an instrument that provides a defined improvement path for your organization to follow. Such an instrument should provide you with the possibility to assess the current state of your organization and suggest concrete areas and steps to improve your organization. The IT Service CMM provides all this, and more.

Let's first give some examples of IT services: examples of IT services are the maintenance of software systems, operation of information systems, the management and maintenance of workstations,

¹) The service process capability of an organization describes the range of expected results an organization can achieve by following service processes (following [4]).

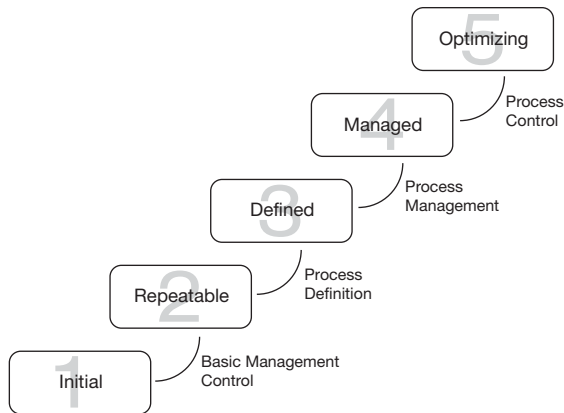


Figure 1. Maturity model of five levels

networks or mainframes, or the provision of contingency services. Delivering these services consistently and efficiently requires some amount of processes and procedures to exist within an IT service organization.

The IT Service CMM presents a predefined maturity growth path that an organization can follow to improve its IT processes and IT services. It does so by describing the maturity of organizations that provide IT services on a five level scale (figure 1).

Each level of the IT Service CMM represents a stage in the maturity of an organization. A maturity level is a well-defined evolutionary plateau toward achieving a mature service process; it provides a layer in the foundation for continuous process improvement. By implementing processes that are described in the different maturity levels, starting at the bottom and working your way up, an organization can improve its IT service maturity; improving maturity shifts an organization from being dependent on individual heroics to get the work done, towards having well-defined and consistently followed processes and procedures. Organizations at higher maturity levels do not necessarily deliver services with more quality (i.e. higher service levels) than organizations at lower maturity levels, but do deliver services in a more consistent and managed way. The IT Service CMM maturity levels have been based on the well-known *Capability Maturity Model for Software* [4] developed by the Software Engineering Institute. Both maturity models share the same structure, but obviously target different domains. Whereas the Software CMM improves the software development capability, the IT Service CMM focuses on the delivery of IT services.

By comparing an IT service organization to the IT Service CMM it is possible to determine the current maturity level of that organization. Such a comparison is called an assessment. Assessments can be

used by the IT service organization itself as a starting point for self-improvement. Assessments may also be used by customers to assess the maturity of their prospective suppliers or possible outsourcing partners. In that way, the assessment functions as an instrument for selecting a mature IT service provider.

So, the IT Service CMM offers you the possibility to assess the current maturity of your organization as well as providing guidelines and directions for improving your organization. Furthermore, the IT Service CMM is an open model, available for free from the IT Service CMM website. The advantage of this is that you are not dependent on one single supplier of 'IT Service CMM services' such as you might be if you use a proprietary model of a consultancy agency. Currently, several organizations provide consultancy and assessment services based on the IT Service CMM. Organizations applying the model to improve their IT service organizations include the Rabobank Group in the Netherlands and ING Direct USA.

To summarize, the IT Service CMM is a free, open model that can be used to assess the current maturity of your IT service organization, gives direction for improvement and does not cause vendor lock-in. So much for whetting your appetite!

History and background

Back in 1995, two Dutch companies observed that many methods and tools existed to support and improve software development, but that the field of IT management or IT service management received much less attention from both academics and business alike. These companies, Cap Gemini and Twijnstra Guddé, teamed up with research groups from three Dutch universities (the Delft and Eindhoven technical universities and the Vrije Universiteit Amsterdam). Together, these parties wrote a research project proposal and submitted it to the Dutch Ministry of Economic

Affairs. With the support of the Ministry of Economic Affairs, the project **Concrete Kit** started in 1995.

During Concrete Kit different case studies were performed at different organizations, both at the two project partners as well as at third parties. In some organizations, measurement processes were used as a way of improving the maintenance processes of these organizations; in other organizations a service level agreement specification method was applied to develop service level agreements in a structured, repeatable way. After Concrete Kit officially ended in 1997, much work remained to be done [10] and a follow-up project (**Kwintes**) was started in 1997 to continue the work. Some of organizations participating in the case studies that were done during the Concrete Kit project and at the start of the Kwintes project were more successful than others. When evaluating these case studies it became clear that these differences might be explained by the 'maturity' of the participating organization. Professor Hans van Vliet (Vrije Universiteit) then proposed the possibility of having an IT management maturity model, similar to the Software CMM, to explain the difference in maturity between different IT service organizations. As part of the Kwintes project, the idea was pursued further and this resulted in the first version of the IT Service CMM in 1999 [7].

The first version of the IT Service CMM was based on the Software CMM version 1.1 [3]. It showed that the Software CMM structure, consisting of maturity levels, key process areas, and practices, could be easily reused in a different setting (figure 2).

Each maturity level contains a number of key process areas. Each key process area comprises a set of goals that, when satisfied, stabilize an important component of the process. In order to satisfy a goal, an organization may² implement a number of key practices.

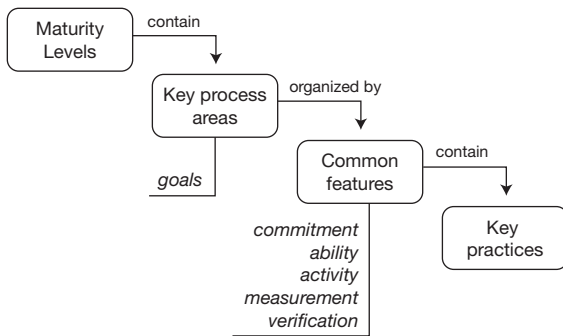


Figure 2. The structure of a CMM

The key practices can be grouped into five categories, so-called common features. Chapter 3 provides more detail on this structure.

Achieving each level of the maturity model institutionalizes a different component in the process, resulting in an overall increase in the process capability of the organization.

The content, however, needed to be changed to cater for the differences between developing software products and delivering (IT) services. First, an outline was made of the complete IT Service CMM, including all key process areas. Next, the first two maturity levels were specified in greater detail. Each version was reviewed several times by the Kwintes review board, consisting of several experienced employees of the different participating parties.

After the Kwintes project had ended, development of level three and up of the IT Service CMM was continued and coordinated by the Vrije Universiteit. As of 2001, SERC (Software Engineering Research Centre, Utrecht, the Netherlands) coordinates the further development of the IT Service CMM and promotes the application of the model. In 2003, SERC merged with CIBIT into CIBIT|SERC ICT Consultants, part of CIBIT Consultants|Educators. The company will continue to develop and endorse the IT Service CMM as an open standard, available at <http://www.itservicecmm.org/>.

2) 'May', because satisfying the goals of a key process area is really all that counts: key practices are sound and valid suggestions for satisfying the goals.

2. Overview of the IT Service CMM

Raison d'être

The objective of the IT Service CMM is twofold:

- It provides a **reference model** to assess the current situation of your organization with respect to its IT service process maturity.
- It provides **guidelines for improvement** of the IT service processes within your organization.

It does so by describing the maturity of organizations that provide IT services by means of five maturity levels. An assessment of your organization against the IT Service CMM will tell you the current maturity level your organization resides on. Analyzing the requirements of the next maturity level gives directions for your improvement efforts.

What is in and what is out

The IT Service CMM describes the maturity of organizations that deliver IT services. That means the model focuses on those aspects of IT service providers that are especially important to deliver IT services. These aspects include configuration management, service request and incident management, service delivery planning, et cetera. It does not describe how to perform general business practices that are performed by most companies, such as invoicing, business administration, or management.

The IT Service CMM specifies processes that are important for the delivery of services. This is a big difference as compared to the Software CMM on which the IT Service CMM was based. The Software CMM deals with the *development of software products*. The IT Service CMM targets the *delivery of IT services*. So what is

the difference between products and services? We define a service as a set of benefits that is created by activities and delivered by one party to another. The main characteristics of services are:

- **Intangibility** - you can't touch a service or pick it up. This means it is more difficult for a potential customer to assess the quality of the service beforehand.
- **Heterogeneity** - since services are created by activities, the service results are influenced by how the activities are performed, and thus by the people that perform the activities.
- **Simultaneous production and consumption** - the production and consumption of services cannot be separated. Think about it: you can't get a haircut without going to the hairdresser and you can't have your car serviced and at the same time drive to work.
- **Perishability** - services cannot be kept in stock; capacity to deliver services will vanish unused, so no one will gain benefits. For example, a physician will charge a patient for a missed appointment because the service value existed only at that point in time and now is lost.

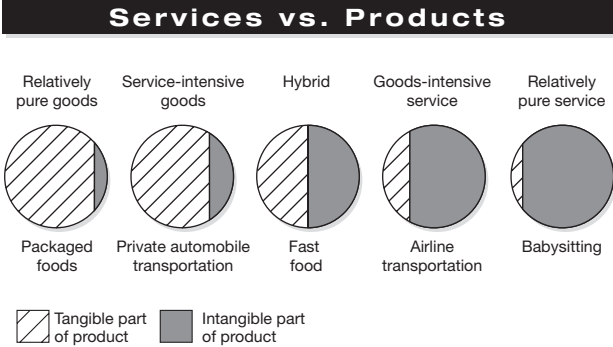


Figure 3. Product-service continuum

The difference between services and products normally is not clear-cut. Often, services are augmented with physical products to make them more tangible. For example, luggage tags provided with a travel insurance. In the same way, products are augmented with add-on services; for example a guaranteed delivery time of books that are bought on-line. A product-service continuum [1] shows that there is no clear boundary between services and products. Figure 3 shows this continuum.

In the case of fast food, both the product - the food itself - and the service - fast delivery - are essential to the customer. Both product and service aspects influence the quality perception by the customer.

The same holds for the mix of service and product in the domain of Information Technology (see figure 4).

Shrink-wrap software can largely be seen as a product; no additional service elements are provided. Custom software development that is involved in implementing a software product for a specific customer (e.g. a large CRM-suite) involves certain service aspects. Perfective maintenance can be seen as a hybrid form, because functional enhancements are made to a software product but service aspects are taken into account as well; e.g. the planning of testing activities in cooperation with the customer. Corrective maintenance has somewhat more service aspects because the product is not really enhanced and timely response to customers is essential for the user perceived quality. The activities involved in software operation are almost all service activities because these result in direct benefits for the customer.

The characteristics of services make other processes important for mature IT service delivery than those that are important for mature software development. For services, the interaction with the customer before and during service delivery is much more important than for products. This is caused by the fact that production and consumption of services occurs simultaneously. Therefore, the interaction with the customer and end-users receives much attention in the IT Service CMM [6].

The IT Service CMM focuses primarily on the maturity of organizations that *provide* IT services. However, the maturity of the *customer* organization, or organizations, may very well influence the end result. For example, it is hard for the service provider to tailor its services to the business needs of the customer, if the customer organization has difficulties articulating its own needs. Despite the fact that there clearly is a relationship between the service quality a

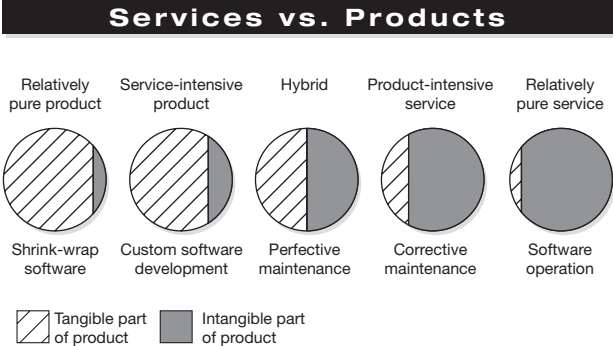


Figure 4. Product-service continuum within the software engineering domain.

provider can deliver and the maturity of the customer organization, the IT Service CMM does not contain maturity levels or processes for the customer. The main reason for this is that joint customer and service provider process improvement would be very difficult, if not flat out impossible, for most organizations.

The IT Service CMM does not pose restrictions on an organizational structure that must be implemented by IT service providers. Various best practices frameworks such as the IT Infrastructure Library (ITIL, [8]) do provide suggestions for organizational structures.

From ad-hoc firefighting to continuous improvement

The IT Service CMM describes the maturity of IT service providers by means of five maturity levels. Each of these levels describes practices an IT service provider should implement for the organization to mature to higher levels. No level can be skipped, since each level builds on the achievements of previous levels. The lower maturity levels contain more key process areas than the higher ones; therefore, the descriptions of the lower levels are somewhat lengthier than the descriptions of the higher levels.

Overview of the key process areas per level

As you may know by now, each maturity level of the IT Service CMM consists of key process areas that contain goals and practices as a suggested way of reaching those goals. Before we provide a description of the contents of each maturity level, we provide an overview of the key process areas of each maturity level of the IT Service CMM.

Maturity Level	Key process area	Short description of purpose
Level one	None	-
Level two	Service Commitment Management	Establishing service commitments that address the business needs of the customer
	Service Delivery Planning	Planning the activities, resources and components that are involved in delivering the service and meeting the service levels
	Service Tracking and Oversight	Monitoring the service delivery and taking corrective actions when necessary
	Subcontract Management	Managing (possible) IT subcontractors involved in delivering the service to the customer for whom the IT service provider remains responsible
	Configuration Management	Establish and maintain the IT components which are subject to, or part of, the IT services delivered
	Service Request and Incident Management	Managing events (incidents or end-user service quests) that cause or may cause deviation from the specified service levels
	Service Quality Assurance	Reviewing and auditing procedures, work products and activities to provide management with the appropriate visibility into the processes being used and the services being delivered
Level three	Organization Service Definition	Developing and maintaining a set of standard services in the organization and collecting information on the delivery of these services
	Organization Process Definition	Developing and maintaining a usable set of process assets that improve process performance across services
	Organization Process Focus	Establishing organizational responsibility for service process activities that improve the organization's overall service process capability
	Integrated Service Management	Integrating the service and management activities into a coherent, defined service process that is derived from the organization's standard service process(es)
	Service Delivery	Consistently performing a well-defined service delivery process that integrates all service delivery activities to deliver correct, consistent IT services effectively and efficiently
	Intergroup Coordination	Establishing means for communication between the different groups involved in delivering the service to the customer
	Training Program	Developing the skills and knowledge of individuals so they can perform their roles effectively and efficiently
	Resource Management	Maintaining control of the resources (hardware and software) needed to deliver the services
	Problem Management	Removing problems from the IT that is managed, maintained or operated by the service provider

Maturity Level	Key process area	Short description of purpose
Level four	Quantitative Process Management	Controlling the process performance and costs of the service delivery quantitatively
	Service Quality Management	Developing a quantitative understanding of the quality of the services delivered and achieve specific quality goals
	Financial IT Service Management	Developing a quantitative understanding of the cost structure of the IT services and provide tailored charging systems to customers
Level five	Process Change Management	Continually improving the service processes used in the organization with the intent of improving service quality and increasing productivity
	Technology Change Management	Identifying new technologies and inject them into the organization in an orderly manner
	Problem Prevention	Identifying the cause of problems and prevent them from recurring by making the necessary changes to the processes

Table 1 Overview of the key process areas per IT Service CMM maturity level

The remaining sections in this chapter describe each maturity level and its key process areas. Chapter 3 describes the contents of the key process areas of each maturity level more in-depth.

Level one - Initial

Organizations at maturity level one, the initial level, can be characterized as ad-hoc organizations. They have no fixed processes or procedures, results depend very much on individual performance, and a lot of the time of people is spent on 'firefighting', fixing bugs in software, and resolving incidents. Note that these organizations do not necessarily produce bad results. They can even be very successful. Due to the efforts of individual heroes, these organizations may still deliver the IT services and do so with acceptable results. However, these organizations depend very much on the heroes to make this happen. The 'hit-by-a-bus' risk is large, and if key individuals leave, a lot of knowledge leaves the company with them - knowledge that is not documented or available elsewhere.

Level two - Repeatable

Organizations at level two of the IT Service CMM, the repeatable level, institutionalize some of the knowledge and behavior that is needed to repeat earlier successes in similar circumstances. This means that level two organizations perform more repeatable because they have a consistent process; from a customer point of view, service delivery is more consistent and more predictable.

Organizations at maturity level two establish service level agreements with their customers that are based on the current and future needs of those customers - and not, as happens in many cases, solely on the capabilities and capacity of the IT service provider. While those latter aspects do play an important role in establishing the service level agreements, they should not be the primary driver in setting down the service level agreements.

Service delivery is explicitly planned at maturity level two. Organizations develop a service delivery plan for each service they deliver. The service delivery plan captures the activities needed to deliver the service, documents workload estimates and internal agreements, and is used for risk management. The service delivery plan helps the organization to prove to itself that it will be able to deliver the service as specified in the service level agreement. In addition, all different teams and individuals that play a part in the plan agree to the service delivery plan. That way, a level two organization prevents the dysfunctional behavior where executives or account managers will promise results to external parties without checking the feasibility or consequences of their promises. This 'check internally before making promises externally' is called the commitment process and is a crucial part of maturing from maturity level one to maturity level two and up.

Note that although the IT Service CMM requires a service delivery plan for each service that is to be delivered, this doesn't mean you need to have one physical document for each plan. It is possible, and often advisable, to group service delivery plans. For example, if you provide three different services to one customer, you may want to develop one service delivery plan for that specific customer that covers those three services. Alternatively, if you deliver the same service to different customers, you may want to develop one service delivery plan for that specific service that covers all customers.

During service delivery, the level two organization tracks and monitors actual service delivery. The information gathered is used to report the actual service levels to the customers. More importantly, it is used to take corrective actions to prevent actual service delivery from deviating from the specified levels.

Sometimes, the service delivery plan may need to be changed during service delivery. If this is the case, a level two organization will make sure affected parties agree with the changes that are to be made, i.e., it will keep following the commitment process. After the changes have been approved, the new version of the service delivery plan is made available to all affected parties.

Many IT service organizations subcontract part of their services to third parties. Often, these subcontracted services play an important role in the total set of services that the IT service provider is delivering. A level two organization (in its role as prime contractor) selects subcontractors based on their capability to adequately deliver the subcontracted service. The service commitments of the subcontractor are laid down in a service subcontract. Just like the prime contractor specifies the service levels it will deliver to its customers, the subcontractor needs to commit to service levels for

the subcontracted service. During the delivery of the subcontracted service, the prime contractor monitors the actual service delivery to ensure that the subcontractor is satisfying the subcontract service levels.

IT services are concerned with managing, operating, and maintaining IT. Hence, it is important to control IT components that are important to achieve the service levels. A level two IT service provider puts those IT components under configuration control. This means that the status and change history of the IT components is recorded and that changes to the components are controlled.

For example, before installing a new version of a software package onto a production machine, the organization first does an impact analysis of the requested change as part of the change procedure. The impact analysis checks, amongst other things, whether there is any other software package that depends on the old version of the package that is upgraded. In addition, the impact analysis checks whether the new version has different dependencies as compared to the old version, and whether any of the file formats that the software package uses has changed in the new version. If the change is approved, part of actually performing the change is updating the configuration baseline library.

For most IT service providers, the baseline library will contain all the information needed to identify the current status of the production environment, including computers, routers, network connections, phone switches, installed operating systems (i.e. which computer has what version of the OS and what patches were applied), and installed software (i.e. which software is installed on what machines).

Note that the IT Service CMM does not tell you what IT components should be put under configuration control. It does, however, require your organization to make a conscious decision about what IT components should be put under configuration control in your circumstances. IT components should also be interpreted in a broad way: software licenses, documentation, and user accounts may be considered IT components too. Hence, if they are important for your service delivery, they should be included in your configuration management system as well.

A common characteristic of IT services is that a lot of the activities that have to be performed can not be planned, mostly because the amount and the exact moment of occurrence is difficult to predict. Hence, a process is needed to meticulously handle all of such events. A level two organization has a procedure to identify, record, analyze, and resolve events. These events can be incidents, for example a server that is down. Other events may be requests for service, for example a request to install a certain piece of software on a desktop computer. In both cases, activities need to be performed within a certain amount of time to satisfy the service levels. A level two organization monitors all of these requests and incidents to make sure they are resolved appropriately.

For most of the above activities a level two organization develops policies and procedures to help the organization achieve repeatable performance. To monitor the application of policies and procedures a level two organization has a service quality assurance (SQA) group that regularly audits and reviews the service activities and work products (such as service delivery plans and service level agreements). If this SQA group identifies non-conformance issues, such as a procedure that is not followed or a plan that does not comply with the template, it sits down with the affected people to

determine the cause of the non-conformance. Often, non-conformance is caused by time-pressure or by procedures that are not appropriate for a specific situation. Together with the affected people, the SQA group addresses the issue. This could lead to e.g. an improved procedure or training for the people, that are supposed to follow the procedure. If the non-conformance cannot be resolved, the SQA group escalates the issue to senior management.

Level three - Defined

Organizations at level three of the IT Service CMM gain further control over their processes and performance by standardizing their services and processes. At maturity level two the focus lies on getting those processes in place that are necessary for repeatable delivery of services. However, different parts of the organization may still be using different processes. At maturity level three, the organization standardizes the processes used throughout the organization. At the same time, organization-wide issues are coordinated, such as shared resources, training of employees, and problem management.

Standardization is not a goal on its own, but rather a preparation for the quantitative process control to be established at maturity level four; however, before processes can be quantitatively controlled, they need to be standardized, changed in a controlled manner, and coordinated across the organization. And that's what level three is aimed at.

A level three organization describes the IT services it can deliver in a service catalog. Based on past experience, the organization knows what service levels it can deliver and against what costs. The service catalog is a communication instrument as well: it functions as the starting point for discussions with prospective customers about their IT service needs. Usually, the service commitments that are



negotiated with the customer will be a tailored version of one or more of the standard services from the service catalog.

For each of the standard services the IT service provider can deliver, it also describes its standard process. This standard process describes what activities are performed to deliver the standard service. Suppose one of the standard services of the IT service provider is application availability; the IT service provider makes applications available to end-users within the company. The standard process for application availability specifies the different activities that need to be performed to make applications available. One of the activities may be management of user accounts: how to create user accounts, how to perform security checks, how to remove user accounts, what to do when a user forgets his or her password, et cetera. The standard process thus describes the activities needed to deliver the service.

Note that just as you are free to group service delivery plans in different ways, the standard process of the organization can be grouped in different ways as well. You may want to have one big standard process with different variants embedded, or you may want to describe one process for each standard service that is part of your service catalog.

If a new or existing customer decides to buy a standard service, a level three organization plans the delivery of the service by developing a service delivery plan. This is not different from a level two organization. However, in addition to developing a service delivery plan, a level three organization also selects the standard process that belongs to the service to be delivered. Every customer is different, so let's not expect the standard process to be one-size-fits-all. A level three organization analyzes the characteristics of the service to be delivered to this customer and tailors the process. An

example of tailoring may be the adaptation of the standard process for making applications available to cater for making applications available on a specific hardware platform. So to summarize, before starting service delivery a level three organization develops service level agreements and service delivery plans just like the level two organization. But in addition, it also tailors its standard processes to get a defined process that exactly fits the circumstances in which this service is being delivered.

Of course, standard services and processes need maintenance. They need to be updated and improved. To achieve this, the level three organization applies feedback processes to feed back lessons learned and improve the specified standard services and standard processes. New versions of the processes need to be rolled out in the organization, people need to be informed and maybe trained. All this requires considerable attention. To support this, the level three organization will often establish a separate group to coordinate the process improvement activities, or it might make line management responsible.

It is possible to define clear roles and responsibilities when they are part of a standard process or set of standard processes. Building on that, the organization can specify the required knowledge and skills people need to possess to perform certain roles and explicitly train people to achieve the necessary knowledge and skills for the roles they fulfill. In addition, based on the standard services, the organization educates people in the appropriate technology, methodology or skills.

Organizations at maturity level two handle incidents and requests for service in a controlled manner. In addition, level three organizations investigate the underlying causes of incidents and trends in incidents and service requests. By investigating incidents

and their causes, the organization may detect faulty components in the infrastructure, or lack of production acceptance testing, or other causes. The removal of these causes will prevent incidents from recurring. Performing these activities is called problem management. Often, removing underlying causes of incidents involves changing the process. This is one of the reasons why these activities are part of level three of the IT Service CMM. Only at maturity level three does the organization have the ability to change its processes in a controlled manner for the whole organization.

Before committing to service levels, level two organizations develop a service delivery plan to show the feasibility of the service level agreements. Usually, shared resources are needed to deliver services. Examples are shared infrastructure like networks, hardware and operating systems and shared facilities such as backup facilities. A level three organization explicitly manages the capacity and availability of these resources. By keeping these resources under control and tracking them, the organization may improve the reliability of its service delivery even more.

Especially in larger IT organizations, many groups need to work together to deliver IT services. A level three organization proactively coordinates the communication between groups and makes sure that the necessary internal commitments are made to make the external commitments, i.e. the service level agreements, achievable.

Level four - Managed



Organizations at maturity level four manage their services and processes quantitatively. By measuring process performance, and by removing variance from process performance, they gain quantitative insight in their service and processes. This provides the IT service organization the ability to set specific quality goals and measure progress towards them.

An important instrument at level four is statistical process control. Suppose we want to reduce the average solving time for incidents. First, we measure the solving time for all incidents. Next, we can calculate how long it usually takes to solve incidents. Let's say 95% of the incidents take between 30 minutes and five hours to solve. Each incident that takes more than five hours to solve will be investigated to understand the reason why it took more than five hours to solve that particular incident. When we understand the reason, the next step is to remove that reason so that it can never cause such difficulty to solve incidents again. An example could be that a number of incidents took long to solve due to a lack of necessary knowledge of a helpdesk employee in combination with improper training. The solution is to improve the training process for helpdesk employees so they all have the proper knowledge to solve this kind of incidents.

Level five - Optimizing



A level five organization builds upon the standard processes developed as part of the level three key process areas and the quantitative control established at level four. This enables the level five organization to continuously evaluate processes and technology and change these processes and technology when necessary to achieve its goals. In addition, the organization pro-actively prevents problems by changing its processes and technology to remove the sources of problems.

Note that maturity level five is not synonymous with a bureaucratic monolith, but rather with an agile and adaptable organization. At level five, change is natural and occurs in a controlled manner.

The frameworks quagmire³

You are probably wondering; this all sounds nice, but how does the IT Service CMM relate to ITIL? Or to CMM-I? Or to ASL? Well, that is not very difficult to explain. There are several characteristics that these models and improvement frameworks may share. One example characteristic is 'maturity model'. Some frameworks are maturity models, i.e. they describe a number of maturity levels at which your organization can operate, others are not. The IT Service CMM, Software CMM and CMM-I are all maturity models. ITIL and ASL are not. Another characteristic of frameworks is the 'domain' they focus on. Some focus on a specific domain, some on a broader domain, some on no domain at all. IT Service CMM, ASL, and ITIL all focus on IT service management. ISO9000, for example, is not focused on any domain in particular.

Below, we discuss the differences and similarities between the IT Service CMM and a number of other frameworks in terms of 'maturity model', 'domain' and 'structure'. Note that we only include frameworks in this discussion that can be obtained for free or against a small fee, and that can be applied freely.

IT Service CMM versus ITIL

The IT Infrastructure Library (ITIL) is a set of best practices targeted at IT infrastructure management. ITIL is not a maturity model, meaning that it does not contain a predefined maturity growth path. Implementation order of the ITIL processes is not formally defined. Another difference with the IT Service CMM is that ITIL describes archetypical versions of processes such as incident

management and problem management that can, at least in theory, be implemented in an organization relatively easily. You could say that the IT Service CMM focuses more on *what* an organization should implement to mature, while ITIL focuses more on the *how* of IT service processes. They complement each other.

IT Service CMM and ITIL are similar in their focus on processes needed for the delivery of IT services. In addition, they focus on similar activities such as the handling of incidents and service requests, problem management, service level agreements, and the monitoring of service levels. Because of the difference in nature of both frameworks, there is no exact one-to-one mapping of ITIL processes and IT Service CMM key process areas... We give it a try nevertheless:

- The key process area Incident and Request Management goals can be largely met by implementing the ITIL process Incident Management.
- The key process area Configuration Management goals can be largely met by implementing the ITIL processes Change Management, Configuration Management, and Release Management. So, although both frameworks have a part called Configuration Management, note that the scope of the IT Service CMM key process area Configuration Management is much broader than the scope of the ITIL process Configuration Management.

Table 2 shows how the level two and three IT Service CMM key process areas and the ITIL Service Delivery and Service Support processes⁷ relate to each other.

3) See "The Frameworks Quagmire, A Brief Look", Sarah A. Sheard, INCOSE Conference, 1997. Available from <http://www.software.org/quagmire>. By the way, the word quagmire has two meanings: "swamp" or "sticky situation". Both seem appropriate here.

4) ITIL: IT Infrastructure Library (<http://www.itil.co.uk>)

5) CMMI: CMM-Integrated (<http://www.sei.cmu.edu/cmmi>)

6) ASL: Application Services Library (<http://www.aslfoundation.org>)

7) The complete ITIL library will consist of six books. The Service Delivery and Service Support books describe the activities in terms of service delivery activities and service support activities (see the glossary).

	IT Service CMM	ITIL
Level two	Service Commitment Management Service Tracking and Oversight Subcontract Management	Service Level Management
	Service Delivery Planning	
	Service Request and Incident Management	Service Desk Incident Management
	Configuration Management	Configuration Management Change Management Release Management
	Service Quality Assurance	
Level three	Organization Service Definition	
	Organization Process Definition	
	Organization Process Focus	
	Integrated Service Management	
	Service Delivery	Release Management IT Service Continuity Management Availability Management
	Resource Management	Capacity Management Availability Management
	Training Program	
	Intergroup Coordination	
	Problem Management	Problem Management
Level four	Financial IT Service Management	Financial Management for IT Services

Table 2 Mapping of IT Service CMM key process areas onto ITIL processes

Most of the activities of the ITIL process Service Level Management are covered by Service Commitment Management, Service Tracking and Oversight and Subcontract Management. There is no real counterpart for Service Delivery Planning in ITIL. The activities for Service Request and Incident Management are covered by the ITIL processes Service Desk and Incident Management. The IT Service CMM key process area Configuration Management is covered by the ITIL processes Configuration Management and Change Management. Service Quality Assurance has no clear counterpart in ITIL.

The IT Service CMM level three key process areas Organization Service Definition, Organization Process Definition, Organization

Process Focus, and Integrated Service Management have no clear counterpart in ITIL. The reason for this is that the IT Service CMM assumes an organization will define its own service processes, whereas ITIL provides those processes itself. Service Delivery is partly covered by the ITIL processes Release Management, IT Service Continuity Management, and Availability Management. Resource Management is comparable to the ITIL processes Capacity Management and Availability Management. The IT Service CMM key process areas Training Program and Intergroup Coordination have no counterpart in ITIL. Finally, the IT Service CMM key process area Problem Management and the ITIL process Problem Management are very similar.

Let's focus on two areas that are important parts of level two of the IT Service CMM and less prominently of ITIL: planning of service delivery and quality assurance.

Most organizations that have implemented ITIL score poorly on the planning aspect. Usually, organizations implementing ITIL explicitly assign process responsibilities, but forget to assign the responsibility for the delivery of specific services. Ask yourself this question: what are the services your organization is currently delivering, and for each service, who is responsible for meeting the service levels for that service? If the answer to the second part of the question is "senior IT management" or the CIO, then you haven't assigned service delivery responsibility. If the answer is "service manager", but the service manager is primarily involved in developing the service level agreements and not in delivery of the services, then again the responsibility for *delivering* the services has probably not been assigned explicitly. Responsibility might be distributed across the different process managers.

Quality assurance is the second area that organizations implementing ITIL are usually weak in. Often, independent quality assurance is missing or only partly implemented: e.g. a quality manager that only looks at processes and not at work products such as service level agreements or service delivery plans. Note that with quality assurance, we don't mean "testing". Testing is used as a means to verify the correct operation of a (software-) product. Besides verifying the work products, quality assurance focuses on verifying that procedures are applied correctly.

IT Service CMM versus ASL

The Application Services Library (ASL) is a set of practices targeted at application management. It is similar to ITIL in structure and language, but adds a division of processes into operational, tactical, and strategic processes. Just like ITIL, it is not a maturity growth model. Its focus is on application management, which is a specific type of IT service. The distinction that ASL makes between operational, tactical, and strategic processes is a difference with the IT Service CMM. The IT Service CMM makes no such distinction. Also, because ASL focuses on application management, it contains specific processes for changing software, such as impact analysis and testing. The IT Service CMM is meant for all types of IT services and thus does not contain detailed prescriptions on how to perform for instance application management. In that sense, ASL and IT Service CMM are complementary, just as ITIL and IT Service CMM are complementary.

IT Service CMM versus Software CMM

IT Service CMM and Software CMM⁸ have exactly the same structure, but focus on a different domain. Both models have five maturity levels, and key process areas on each level. Many of the key process areas are also very similar, such as Configuration Management on

level two, and Organization Process Definition on level three. The Software CMM is targeted at organizations that develop and support software. The IT Service CMM is aimed at organizations that deliver IT services. So the domains do overlap, but the Software CMM assumes that all work is organized in projects, whereas the IT Service CMM focuses on the continuous provision of IT services.

Because the IT Service CMM and the Software CMM are so similar, you can use many of the assessment methods that were developed for the Software CMM without problems in conjunction with the IT Service CMM. Examples are the CBA IPI (CMM-Based Appraisal for Internal Process Improvement, [5]) and the IP (Interim Profile, [11]) assessment methods.

IT Service CMM versus CMM-I

CMM-I (CMM Integrated)⁹ is the successor of the Software CMM that integrates a number of maturity models in one integrated capability maturity model. CMM-I has the notion of disciplines. It currently includes software engineering, systems engineering and integrated process and product development, but unfortunately no IT service management. Although the CMM-I structure is different from the Software CMM and IT Service CMM structure, the similarity is still significant. Both have maturity levels, key process areas (called process areas in CMM-I), goals (divided into specific and general goals in the CMM-I), and practices. However, a big difference is that CMM-I offers two representations. You can get a staged representation with five maturity levels just like the Software CMM and IT Service CMM and you can get a continuous model where each process area has its own maturity levels. The IT Service CMM is currently only available in the form of a staged maturity model.

8) <http://www.sei.cmu.edu/cmm>

9) <http://www.sei.cmu.edu/cmmi>

Can these frameworks be combined?

If your organization is already using one of the discussed frameworks, you will probably wonder if, and if so how, the IT Service CMM can be used to assess and improve your organization. If you are using ITIL to implement your IT service processes, experience has shown that the IT Service CMM can very appropriately be applied to assess the organization and suggest improvement points. Just make sure the assessment team contain assessors who speak both the ITIL and IT Service CMM languages and are able to translate between both. The same probably holds for ASL, although we as authors have no practical experience with combining ASL and the IT Service CMM. The Software CMM and IT Service CMM can be combined very well, and have been in practice, since they have exactly the same structure. Using both CMM-I and the IT Service CMM involves more since the CMM-I has a different structure. CMM-I for example, introduced generic and specific goals, while the IT Service CMM only has specific goals. Experience shows, however, that with relatively little effort both can be combined successfully.

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