CMMI®-SVC, VERSION 1.2

CMMI® for Services

Guidelines for Superior Service

SEI SERIES IN SOFTWARE ENGINEERING

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The SEI Series in Software Engineering

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PREFACE

Services make up 80 percent of the world economy and comprise more than half of U.S. Department of Defense acquisitions. The primary purpose of the CMMI for Services (CMMI-SVC) model, which is the basis of this book, is to guide service providers as they improve the way they do their work—their processes. Improved processes result in improved service performance, customer satisfaction, and profitability. When organizations using CMMI-SVC make improvements in their performance, they can ultimately improve the health of the world economy.

CMMI (Capability Maturity Model Integration) models are collections of effective practices that help organizations to improve their processes. The CMMI-SVC model, like all of the CMMI Product Suite,[1] is developed by a team from industry, government, and the Software Engineering Institute (SEI). Hundreds of reviewers suggest new content and changes for the model. Early adopters pilot the model and give further feedback. A network of hundreds of SEI partners and thousands of users apply the model to their work and report their experience and results, further improving model content. In this way, the CMMI-SVC model represents the ongoing consensus of thousands of practitioners about how to provide superior service.

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[1] There are CMMI models that focus on the development of products and services (CMMI for Development) and on the acquisition of products and services (CMMI for Acquisition). See the CMMI website for more information about these members of the CMMI Product Suite (www.sei.cmu.edu/cmmi/).

Purpose

This book provides guidance on how all types of service provider organizations can establish, manage, and improve services that meet the needs of their customers and end users.

This guidance includes the following:

- Delivering services that meet the terms of service agreements
- Managing the organization's capacity to provide services and ensure the availability of services
- Addressing service incidents effectively
- Establishing standard services and service levels that meet the strategic needs of the organization as well as the needs of customers and end users
- Ensuring the continuity of services in the face of disaster

By integrating these and other practices, CMMI-SVC helps service providers to establish, deliver, and manage services.

Organization of This Book

This book is organized into three main parts:

- Part One—About CMMI for Services
- Part Two—Generic Goals and Generic Practices, and the Process Areas
- Part Three—The Appendices and Glossary

Part One, "About CMMI for Services," consists of six chapters.

- Chapter 1, "Introduction," offers a broad view of CMMI and the Services constellation,[2] concepts of process improvement, the history of models used for process improvement, and key concepts of CMMI for Services.
- Chapter 2, "Process Area Components," describes all of the components of the CMMI-SVC process areas.
- Chapter 3, "How to Start Using CMMI," describes the important roles needed for implementing a CMMI-based process improvement program, explains how appraisals can be used, identifies training that can help, and provides tips for getting started using CMMI.

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[2] A "constellation" is defined as a collection of components that are used to construct models, training materials, and apraisal materials in an area of interest (e.g., services, development).

- Chapter 4, “Achieving Process Improvement That Lasts,” explains how selected practices in all CMMI models enable the organization to make improvement part of how it does business, including descriptions of generic goals, generic practices, maturity levels, capability levels, and equivalent staging.
- Chapter 5, “Relationships among Process Areas,” describes how process areas interrelate and provides insight into the interactions of the CMMI-SVC process areas.
- Chapter 6, “Essays about CMMI for Services,” consists of invited essays from contributing authors. The essays cover early use of CMMI-SVC, unusual applications, use of CMMI-SVC in new domains, and solutions from field use to challenges such as including other frameworks in appraisals.

Part Two, “Generic Goals and Generic Practices, and the Process Areas,” contains all of the CMMI-SVC required and expected components. It also contains related informative components, including subpractices, notes, examples, and typical work products.

Part Two contains 25 sections. The first section contains the generic goals and practices. The remaining 24 sections each represent one of the CMMI-SVC process areas.[3] Process areas contain effective practices covering topics ranging from configuration management to service delivery.

To make these process areas easy to find, they are organized alphabetically by process area acronym. Most CMMI users quickly learn the process area acronyms and abandon their longer names for their shorter abbreviations. Here’s an example in which the order of the process areas by full process area title versus their abbreviations is different: Supplier Agreement Management (SAM) appears before Service Delivery (SD). Each section contains goals, practices, and examples in a format that enables you to locate information quickly.

Part Three, “The Appendices and Glossary,” consists of four sections:

- Appendix A, “References,” contains references you can use to locate documented sources of information, such as reports, process improvement models, industry standards, and books that are related to CMMI-SVC.
- Appendix B, “Acronyms,” defines the acronyms used in the model.

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[3] A process area is a cluster of related best practices in an area that, when implemented collectively, satisfies a set of goals considered important for making significant improvement in that area. This concept is covered in detail in Chapter 2.

- Appendix C, “CMMI for Service Project Participants,” contains lists of team members who participated in the development of CMMI-SVC, Version 1.2.
- Appendix D, “Glossary,” defines many of the terms used in CMMI-SVC.

Extras in This Book

Readers who are familiar with the model and with prior CMMI books will find these changes and extras in this book on CMMI-SVC. We extensively revised Part One to add more material on service concepts, including a discussion of lifecyles in service environments, as well as invited essays on the use and application of CMMI-SVC. We also clarified and shortened the material on generic goals and practices, and updated the material on getting started and sustaining improvement. In Part Two, we added margin notes to all the process areas. These notes describe why the practices in a process area are valuable and rephrase what the process area is about in plainer language than the formal model language. We also added author notes in Part Two to amplify service concepts or to explain how to apply core model concepts in a service context.

How to Use This Book

Whether you are new to process improvement, new to CMMI, or already familiar with CMMI, Part One can help you understand why CMMI-SVC is the model to use for improving your service processes. Over time, you will use Part Two the most because it contains the practices of the model. The primary value of Part Three is the glossary.

Readers New to Process Improvement

If you are new to process improvement or new to the Capability Maturity Model (CMM) concept, we suggest that you read Chapter 1 first. Chapter 1 contains an overview of CMMI-based process improvement as well as descriptions of the concepts and conventions used in the rest of the CMMI-SVC model.

Next, skim Part Two, including generic goals and practices as well as the process areas, to get a feel for the scope of the practices contained in the model. Pay close attention to the purpose and introductory notes at the beginning of each process area. Also pay attention to how information is organized and presented in Part Two.

In Part Three, skim the references in Appendix A to see if additional sources would be beneficial to read before using CMMI-SVC. Read through the acronyms and glossary to become familiar with the language of CMMI. Then, go back and read the details of Part Two.

Readers Experienced with Process Improvement

If you are new to CMMI but have experience with other process improvement models, such as Information Technology Infrastructure Library (ITIL) or International Organization for Standardization (ISO) 9000, you will recognize similarities in their structure and content.

We recommend that you read Part One to understand how CMMI is different from other process improvement models. If you have experience with other models, you may want to select which sections to read first. Read Part Two, looking for practices you recognize from other models that you have used, and note variations. You may notice a different level of detail in CMMI than in the models you are accustomed to using.

Next, review the glossary and the "Important CMMI-SVC Concepts" section in Chapter 1 to understand how some terminology may differ from that used in the process improvement models you know. Concepts may be shared by CMMI and other standards, but they may use different terms to name them.

Readers Familiar with CMMI

If you have reviewed or used a CMMI model before, you will quickly recognize the CMMI concepts discussed and many of the practices presented.

Review the process areas specific to CMMI-SVC first:

- Capacity and Availability Management (CAM)
- Incident Resolution and Prevention (IRP)
- Service Continuity (SCON)
- Service Delivery (SD)
- Service System Development (SSD)
- Service System Transition (SST)
- Strategic Service Management (STSM)

Then go back and review the other process areas you are already familiar with and see the guidance for applying these practices to a service environment.

User Feedback and Questions

Your suggestions for improving CMMI are continually reviewed and used to make changes to models, appraisal methods, and training materials each time they are released. For information on how to provide feedback, see the CMMI website at www.sei.cmu.edu/cmmi/models/change-requests.html. If you have questions about CMMI, send e-mail to cmmi-comments@sei.cmu.edu.

CHAPTER 1

INTRODUCTION

The service industry is a significant driver for worldwide economic growth. Guidance on developing and improving service processes is a critical contributor to improved performance, customer satisfaction, and profitability. The CMMI for Services (CMMI-SVC) model was designed to begin meeting that need for guidance within the CMMI Product Suite.

All CMMI-SVC model practices focus on the activities of the service provider organization. Seven process areas focus on practices specific to services, addressing capacity and availability management, service continuity, service delivery, incident resolution and prevention, service transition, service system development, and strategic service management processes. The remaining 17 process areas focus on practices that any organization should master to meet its business objectives.

Do You Need CMMI?

CMMI is being adopted by organizations all over the world. These organizations are large and small, government and private industry, and represent industries ranging from financial to health care, manufacturing to software, education to business services. What do all of these organizations have in common?

Do You Have These Common Problems?

Many organizations accept common problems as "normal," and they don't try to address them or eliminate them. What about your organization? Are you settling for less? Take a look through the following list and see if you have accepted problems that you can solve by adopting CMMI.

- Plans are made but not necessarily followed.
- Work is not tracked against the plan; plans are not adjusted.
- Expectations and service levels are not consistent; changes to them are not managed.
- Estimates are way off; over-commitment is common.
- When overruns become apparent, a crisis atmosphere develops.
- Most problems are discovered in operations or, worse yet, by the customer.
- Success depends on heroic efforts by competent staff members.
- Repeatability of effective behaviors is questionable.

Even if you've accepted that your organization could use something to reduce or eliminate these problems, some service providers reject the idea of using process improvement to address or resolve them. Some mythology has grown up around the idea of using process improvement. You may have heard some of these fallacies.

- I don't need process improvement; I have good people (or advanced technology, or an experienced manager).
- Process improvement interferes with creativity and introduces bureaucracy.
- Process improvement is useful only in large organizations and costs too much.
- Process improvement hinders agility in fast-moving markets.[1]

These common misconceptions serve only as excuses for organizations not willing to make the changes needed to move ahead, address their problems, and improve their bottom line.

Another way to look at whether your organization could benefit from CMMI is to think about whether it is often operating in crisis mode. Crisis mode is characterized by the following:

- Staff members working harder and longer
- Staff members moving from team to team
- Service teams lowering expectations to meet delivery deadlines
- Service teams adding more people to meet expectations or deadlines
- Everyone cutting corners
- A hero saving the day

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1. See the report "CMMI or Agile: Why Not Embrace Both!" for a discussion of how CMMI and Agile can work together effectively [Anderson 2008].

How Does CMMI Help You Solve These Problems?

In its research to help organizations to develop and maintain quality products and services, the Software Engineering Institute (SEI) has found several dimensions that an organization can focus on to improve its business. Figure 1.1 illustrates the three critical dimensions that organizations typically focus on: people, procedures and methods, and tools and equipment.

What ties everything together? Processes allow you to align people, procedures and methods, and tools and equipment with the way you do business. They allow you to address scalability and provide a way to incorporate knowledge of how to do things better. Processes allow you to get leverage from your resources and to examine business trends.

People and technology are important. However, we are living in a world in which technology is changing by an order of magnitude every few years, and people typically work for many companies throughout their careers. We live in a dynamic world. A focus on process provides the infrastructure and stability necessary to be competitive when faced with these ever-present changes.

CMMs (including CMMI) focus on improving processes in an organization. They contain the essential elements of effective processes for one or more disciplines and describe an evolutionary

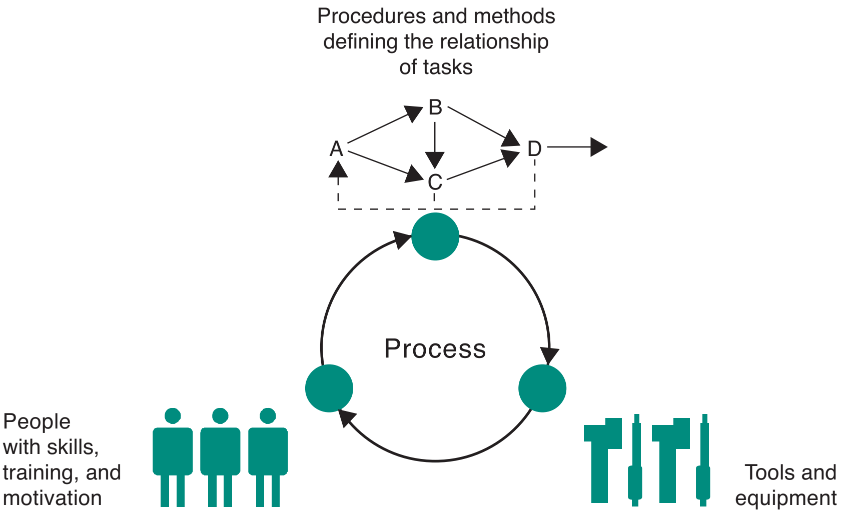


FIGURE 1.1
The Three Critical Dimensions

improvement path from ad hoc, immature processes to disciplined, mature processes with improved quality and effectiveness.

The advantage of a process focus is that it complements the emphasis the organization places on both its people and its technology.

- A well-defined process can provide the means to work smarter, not harder. That means using the experience and training of your workforce effectively. It also means shifting the “blame” for problems from people to processes, making the problems easier to address and solve.
- An appropriate process roadmap can help your organization use technology to its best advantage. Technology alone does not guarantee its effective use.
- A disciplined process enables an organization to discover which procedures and methods are most effective and to improve them as results are measured.

CMMI is a suite of products used for process improvement. These products include models, appraisal methods, and training courses.

- The models are descriptions of best practices that can help you achieve your business goals related to cost, schedule, service levels, quality, and so forth. CMMI best practices describe what to do, but not how to do it or who should do it.
- The appraisal methods evaluate an organization’s processes using a CMMI model as a yardstick. SCAMPI (Standard CMMI Appraisal Method for Process Improvement) is the group of SEI appraisal methods used with CMMI models. SCAMPI uses a formalized appraisal process, involves senior management as a sponsor, focuses the appraisal on the sponsor’s business objectives, and observes strict confidentiality and nonattribution of data.
- Training courses support knowledge about the use of CMMI models and appraisal methods.

The SEI has taken the process management premise that *the quality of a product (including service) is highly influenced by the quality of the process used to develop and maintain it* and defined CMMs that embody this premise. The belief in this premise is seen worldwide in quality movements, as evidenced by the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) body of standards.

How Can CMMI Benefit You?

Today, CMMI is an application of the principles introduced almost a century ago to achieve an enduring cycle of process improvement. The value of this process improvement approach has been confirmed over time. Organizations have experienced increased productivity and quality, improved cycle time, and more accurate and predictable schedules and budgets [Gibson 2006].

The benefits of CMMI have been published for years and will continue to be published in the future. See the SEI website for more information about performance results.

Although the cost of CMMI adoption is highly variable depending on many factors (organization size, culture, structure, current processes), regardless of the investment, history demonstrates a respectable return on investment.

Example returns on investment at various organizations using CMMI for Development (CMMI-DEV) include those shown in Table 1.1.

Since the CMMI-SVC model has been recently released, data on the results of its use are not yet available. The SEI will be collecting ROI data as organizations adopt the CMMI-SVC model.

See the CMMI website (www.sei.cmu.edu/cmmi/) for the latest information about CMMI adoption, including presentations by those who have adopted CMMI and want to share how they did it.

The History of CMMI

In the 1930s, Walter Shewhart began work in process improvement with his principles of statistical quality control [Shewhart 1931]. These principles were refined by W. Edwards Deming [Deming 1986], Phillip Crosby [Crosby 1979], and Joseph Juran [Juran 1988].

TABLE 1.1 Benefits Resulting from the Use of CMMI-DEV

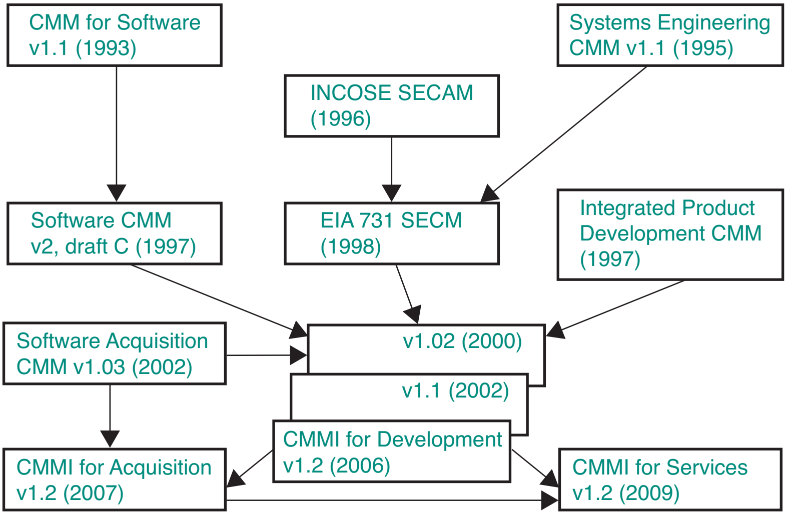
ROI	*Focus of Process Improvement Program*	*Organization*
5:1	Quality activities	Accenture
13:1	Defects avoided per hour spent in training and defect prevention	Northrop Grumman
2:1	Overall process improvement over three years	Siemens Information Systems Ltd., India

Watts Humphrey, Ron Radice, and others extended these principles even further and began applying them to software in their work at IBM and the SEI [Humphrey 1989]. Humphrey's book, *Managing the Software Process*, provides a description of the basic principles and concepts on which many of the Capability Maturity Models (CMMs) are based.

The SEI created the first CMM designed for software organizations and published it in a book, *The Capability Maturity Model: Guidelines for Improving the Software Process* [SEI 1995].

Figure 1.2 illustrates the models that were integrated into CMMI, Version 1.2. Developing the CMMI Product Suite involved more than simply combining some existing model materials. Using processes that promote consensus, the CMMI Product Team built a framework that accommodates multiple constellations and benefits multiple industries and areas of interest.

Some service providers attempted to use the CMMI-DEV model to address their process improvement needs, but the fit required some difficult interpretations.



CMM for Software v1.1 (1993)
Systems Engineering CMM v1.1 (1995)
INCOSE SECAM (1996)
Software CMM v2, draft C (1997)
EIA 731 SECM (1998)
Integrated Product Development CMM (1997)
Software Acquisition CMM v1.03 (2002)
v1.02 (2000)
v1.1 (2002)
CMMI for Development v1.2 (2006)
CMMI for Acquisition v1.2 (2007)
CMMI for Services v1.2 (2009)

FIGURE 1.2
The History of CMMs[2]

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[2] EIA 731 SECM is the Electronic Industries Alliance standard 731, or the Systems Engineering Capability Model. INCOSE SECAM is the International Council on Systems Engineering Systems Engineering Capability Assessment Model [EIA 2002].

Then, in 2006, Northrop Grumman approached the CMMI Steering Group with the idea of a distinct CMMI for Services model. The Steering Group approved the idea, and as a result, Northrop Grumman sponsored and led a volunteer industry team. This team eventually joined with the SEI to finish developing a pilot draft of a CMMI for Services model.

After collecting piloting results and feedback from the draft's use, the CMMI-SVC development team updated and improved the draft to be what it is today, CMMI-SVC, V1.2, the model contained in this book.

CMMI Framework

The *CMMI Framework* provides the structure needed to produce CMMI models, training materials, and appraisal-related materials. The CMMI Framework is a structure that allows the use of multiple models that serve different constituencies while maintaining a strong CMMI identity. Within the CMMI Framework, model components are classified as either common to all CMMI models or applicable to a specific area of interest or constellation. The common material that is present in all CMMI models is called the "CMMI Model Foundation," or "CMF."

CMF components are combined with material applicable to a constellation (e.g., Services, Development) to produce a model. Some of this material is shared across constellations, and other material is unique to only one.

A "constellation" is defined as a collection of components that are used to construct models, training materials, and appraisal-related materials in an area of interest. CMMI-SVC belongs to the Services constellation.

CMMI for Services

CMMI-SVC draws on concepts and practices from CMMI and other service-focused standards and models, including the following:

- Information Technology Infrastructure Library (ITIL)
- ISO/IEC 20000: Information Technology—Service Management
- Control Objectives for Information and Related Technology (CobiT)
- Information Technology Services Capability Maturity Model (ITSCMM)

Familiarity with these and other service-oriented standards and models is not required to understand and use CMMI-SVC, and the Services constellation is not structured in a way that is intended to conform to any of them (except CMMI, of course). However, knowledge of other standards and models may provide a richer understanding of CMMI-SVC models and content.

The Services constellation covers services of many different types. Although the standards and models used to develop CMMI-SVC predominately cover IT services, this model was purposely written more broadly to be useful by a wide variety of different service types. These service types include information services, engineering services, maintenance, operations, logistics, and research services.

As defined in the CMMI context, a service is an intangible, nonstorable product. The CMMI-SVC model has been developed to be compatible with this broad definition. CMMI-SVC goals and practices are therefore potentially relevant to any organization concerned with the delivery of services, including enterprises in sectors such as defense, information technology (IT), health care, finance, and transportation.

Early users of CMMI-SVC, who used the model during its development and piloting, deliver services as varied as training, logistics, maintenance, refugee services, lawn care, book shelving, research, consulting, auditing, independent verification and validation, human resources, financial management, health care, and IT services.

The Services constellation contains practices that cover project management, process management, service establishment, service delivery, and supporting processes. The CMMI-SVC model shares a great deal of material with CMMI models in other constellations. Therefore, those familiar with another CMMI constellations will find much of the CMMI-SVC content familiar.

In the context of CMMI-SVC, the term *project* is interpreted to encompass all of the resources required to satisfy a service agreement with a customer. Thus, the concept of *project management* in this context is intended to be similar to the concept of *service management* in other standards and models, although the correspondence may not be exact. See more about the meaning of “project” in the Important CMMI-SVC Concepts section of this chapter.

Organizations interested in evaluating and improving their processes to *develop* systems for delivering services may use a CMMI-DEV model. This approach is especially recommended for organizations that are already using CMMI-DEV or that must develop and maintain complex systems for delivering services. However, some organizations instead may choose to use the Service System Development (SSD) process area. This process area consolidates some of the practices in the CMMI-DEV model and interprets them for service systems. In fact, we recommend that even if you use CMMI-DEV to develop your service system, you review SSD for some of its service-specific guidance.

Important CMMI-SVC Concepts

The following concepts are particularly significant in the CMMI-SVC model. Although all are defined in the glossary, they each employ words that can cover a range of possible meanings to those from different backgrounds, and so they merit additional discussion to ensure that model material that includes these concepts is not misinterpreted.

Service

The most important of these terms is the word *service* itself, which the glossary defines as a product that is intangible and nonstorable. While this definition accurately captures the intended scope of meaning for the word *service*, it does not highlight some of the possible subtleties or misunderstandings of this concept in the CMMI context.

The first point to highlight is that a service is a kind of *product*, given this definition. Many people routinely think of products and services as two mutually exclusive categories. In CMMI models, however, products and services are not disjoint categories: A *service* is considered to be a special variety of *product*. Any reference to *products* can be assumed to refer to *services* as well. If you find a need to refer to a category of products that are not services in a CMMI context, you may find it helpful to use the term *goods*, as in the commonly used and understood phrase “goods and services.” (For historical reasons, portions of CMMI models still use the phrase “products and services” on occasion. However, this usage is always intended to explicitly remind the reader that services are *included* in the discussion.)

A second possible point of confusion is between *services* and *processes*, especially because both terms refer to entities that are by nature intangible and nonstorable, and because both concepts are intrinsically linked. However, in CMMI models, processes are *activities*, while services are a useful *result* of performing those activities. For example, an organization that provides training services performs training processes (activities) that are intended to leave the recipients of the training in a more knowledgeable state. This useful state of affairs (i.e., being more knowledgeable) is the *service* that the training provider delivers or attempts to deliver. If the training processes are performed but the recipients fail to become more knowledgeable (perhaps because the training is poorly designed, or the recipients don't have some necessary preliminary knowledge), then the service—the useful result—has not actually been delivered. Services are the results of processes (performed as part of a collection of resources), not the processes themselves.

A final possible point of confusion over the meaning of the word *service* will be apparent to those with a background in information technology, especially those familiar with disciplines such as service-oriented architecture (SOA) or software as a service (SaaS). In a software context, services are typically thought of as methods, components, or building blocks of a larger automated system, rather than as the results produced by that system. In CMMI models, services are useful intangible and nonstorable results delivered through the operation of a service system, which may or may not have any automated components. To completely resolve this possible confusion, an understanding of the *service system* concept is necessary.

Service System

A *service* is delivered through the operation of a *service system*, which the glossary defines as an integrated and interdependent combination of component resources that satisfies service requirements. The use of the word *system* in *service system* may suggest to some that service systems are a variety of information technology, and that they must have hardware, software, and other conventional IT components. This interpretation is too restrictive. While it is possible for some components of a service system to be implemented with information technology, it is also possible to have a service system that uses little or no information technology at all.

In this context, the word *system* should be interpreted in the broader sense of "a regularly interacting or interdependent group of items forming a unified whole," a typical dictionary definition. Also, systems created by people usually have an intended unifying purpose, as well as a capability to operate or behave in intended ways. Consider a package delivery system, a health care system, or an education system as examples of service systems with a wide variety of integrated and interdependent component resources.

Some may still have trouble with this interpretation because they may feel that the way they deliver services is not systematic, does not involve identifiable "components," or is too small or difficult to view through the lens of a systems perspective. While this difficulty may in some cases be true for service provider organizations with relatively immature practices, part of the difficulty may also be traced to an overly narrow interpretation of the word *resources* in the definition of service system.

The full extent of a service system encompasses *everything* required for service delivery, including work products, processes, tools, facilities, consumable items, and human resources. Some of these resources may belong to customers or suppliers, and some may be transient (in the sense that they are only part of the service system for a limited time). But all of these resources become part of a service system if they are needed in some way to enable service delivery.

Because of this broad range of included resource types and the relationships among them, a service system can be something large and complex, with extensive facilities and tangible components (e.g., a service system for health care or for transportation). Alternatively, a service system could be something consisting primarily of people and processes (e.g., for an independent verification and validation service). Since every service provider organization using the CMMI-SVC model must have at a minimum both people and process resources, they should be able to apply the service system concept successfully.

Service providers who are not used to thinking of their methods, tools, and personnel for service delivery from a broad systems perspective may need to expend some effort to reframe their concept of service delivery to accommodate this perspective. The benefits of doing so are great, however, because critical and otherwise unnoticed resources and dependencies among resources will become visible for the first time. This insight will enable the service provider organization to effectively improve its operations over time without being caught by surprises or wasting resources on incompletely addressing a problem.

Services and Service Systems in CMMI for Services versus SOA and SaaS

If you know something about SOA or SaaS, you might be a bit nonplussed by the preceding briefly stated distinction between the various meanings of the term *service,* followed by a forward reference to a discussion of the term *service system,* where neither SOA nor SaaS is mentioned at all. Here's some additional clarification. (If you're not interested in SOA or SaaS, you can skip over this discussion.)

Although there are a variety of interpretations of SOA and SaaS, they all tend to focus on information systems of one form or another and how they are designed to deliver value. SOA emphasizes certain characteristics of the architecture of these systems (e.g., the alignment of components with business functions), whereas SaaS considers different aspects of system architecture while emphasizing the flexibility of how software capabilities are delivered to end users. Because CMMI for Services, SOA, and SaaS practitioners all use the terms *service* and *system* somewhat differently, and because it's quite possible for CMMI for Services, SOA, and SaaS to all be employed in a single context, some confusion is likely if you are not sensitive to those differences.

In the CMMI for Services perspective, a service is the result of a process, and *system* (i.e., a service system) refers to all the resources required to deliver services. When done properly, the operation of a service system causes service delivery. Service systems may incorporate subsystems that are themselves information technology systems, but these IT systems might represent only a small fraction of a total service system infrastructure.

In the SOA perspective, a service is an IT system component that provides a distinct and loosely coupled function accessible through a standard, contractually governed interface. At the top level, the structure of these services is expected to correlate well with the structure of business functions that an organization performs, and SOA designs often involve analyses of one or more enterprise architectures to establish needed commonalities. No matter what level of abstraction, the term *service* in SOA is most likely to be applied to actions, methods, functions, and "things that are done" rather than to their results; and the term *system* typically refers to something that at its core is an IT system of some kind.

In the SaaS perspective, software is delivered as a service (e.g., a subscription service) without the need for the customer to pay for the full cost up front. The term *service* in SaaS therefore seems closer to the CMMI for Services usage than the SOA usage, but it's important to be clear. A SaaS service is not a software component that is made available (as in SOA), but rather is the on-demand availability of that component (and others) along with capabilities such as dynamic updates, tailorability, and load balancing. SaaS services are delivered via an IT system, but this may be only a portion of a larger service system that supplies other services, such as help desk support or network management.

Service Agreement

A *service agreement* is the foundation of the joint understanding between a service provider and a customer of what to expect from their mutual relationship. The glossary defines a service agreement as a binding, written record of a promised exchange of value between a service provider and a customer. Service agreements can appear in a wide variety of forms, ranging from simple posted menus of services and their prices, to tickets or signs with fine print that refers to terms and conditions described elsewhere, to complex multipart documents that are included as part of legal contracts. Whatever they may contain, it is essential that service agreements be recorded in a form that both the service provider and the customer can access and understand so that misunderstandings are minimized.

The “promised exchange of value” implies that each party to the agreement commits to providing the other party or parties with something they need or want. A common situation is for the service provider to deliver needed services and for the customer to pay money in return, but many other types of arrangements are possible. For example, an operating level agreement (OLA) between organizations in the same enterprise may require only that the customer organization notify the service provider organization when certain services are needed. Service agreements for public services provided by governments, municipal agencies, and nonprofit organizations may simply document what services are available, and identify what steps end users must follow to get those services. In some cases, the only thing the service provider needs or wants from the customer or end user is specific information required to enable service delivery.

See the glossary for additional discussion of the terms *service agreement*, *service level agreement*, *customer*, and *end user*.

Service Request

Even given a service agreement, customers and end users must be able to notify the service provider of their needs for specific instances of service delivery. In the CMMI-SVC model, these notifications are called “service requests,” and they can be communicated in every conceivable way, including face-to-face encounters, phone calls, all varieties of written media, and even nonverbal signals (e.g., pressing a button to call a bus to a bus stop).

However it is communicated, a service request identifies one or more desired services that the request originator expects to fall within the scope of an existing service agreement. These requests are often generated over time by customers and end users as their needs develop. In this sense, service requests are *expected* intentional actions that are an essential part of service delivery; they are the primary triggering events that cause service delivery to occur. (Of course, it is possible for the originator of a request to be mistaken about whether the request is actually within the scope of agreed services.)

Sometimes specific service requests may be incorporated directly into the service agreements themselves. This incorporation of service requests in the service agreement is often the case for services that are to be performed repeatedly or continuously over time (e.g., a cleaning service with a specific expected cleaning schedule or a network management service that must provide 99.9 percent network availability for the life of the service agreement). Even in these situations, ad hoc service requests may also be generated when needed, and the service provider should be prepared to deliver services in response to both types of requests.

Service Incident

Even with the best planning, monitoring, and delivery of services, unintended events may occur that are unwanted. Some instances of service delivery may have lower than expected or lower than acceptable degrees of performance or quality, or may be completely unsuccessful. The CMMI-SVC model refers to these difficulties as "service incidents." The glossary defines a service incident as an indication of an actual or potential interference with a service. The single word *incident* is used in place of *service incident* when the context makes the meaning clear.

Like requests, incidents require some recognition and response by the service provider; but unlike requests, incidents are *unintended* events, although some types of incidents may be anticipated. Whether or not they are anticipated, incidents must be resolved in some way by the service provider. In some service types and service provider organizations, service requests and incidents are both managed and resolved through common processes, personnel, and tools. The CMMI-SVC model is compatible with this kind of approach but does not require it, as it is not appropriate for all types of services.

The use of the word *potential* in the definition of service incident is deliberate and significant; it means that incidents do not always have to involve actual interference with or failure of service delivery. Indications that a service *may* have been insufficient or unsuccessful are also incidents, as are indications that it may be insufficient or unsuccessful in the future. (Customer complaints are an almost universal example of this type of incident because they are always indications that service delivery may have been inadequate.) This aspect of incidents is often overlooked, but it is important: Failure to address and resolve potential interference with services is likely to lead eventually to actual interference, and possibly to a failure to satisfy service agreements.

Project

While it refers to a concept that is used across all CMMI models, the term *project* deserves some special clarification in the context of the CMMI-SVC model. It is likely that no other single word in the model has the same potential to raise misunderstandings, questions, and even objections.

Those with prior experience using other CMMI models, or who routinely think of their work as part of a project-style work arrangement, may wonder where the difficulty lies. The CMMI glossary defines a project as a managed set of interrelated resources that delivers one or more products or services to a customer or end user, and continues by declaring that a project has a definite beginning (i.e., project startup) and typically operates according to a plan. These characteristics are conventional of a project according to many definitions, so why is there an issue? Why might there be a difficulty with applying terms such as *project planning* or *project management* in some service provider organizations?

One simple reason is that many people work on or know of projects that have a definite end as well as a definite beginning; such projects are focused on accomplishing an objective by a certain time. In fact, the glossary in prior versions of CMMI models (i.e., prior to V1.2) specifically included a definite end as part of the definition of *project*. This more restrictive definition reflected the original focus of CMMI (and the other maturity models that preceded it), which was principally on development efforts that normally come to some expected end once an overall objective has been reached. While some services follow this same pattern, many are delivered over time without an expected definite end (e.g., services from businesses that intend to offer them indefinitely, or typical municipal services). Service providers in these contexts would naturally be reluctant to describe their service delivery work as a project under this definition.

However, for the latest (V1.2) CMMI models, the definition of *project* was deliberately changed to eliminate this limitation, in part to allow the term to be applied easily to the full range of service types. Projects must be planned, but they do not *need* to have a planned end, and this broader definition can therefore make sense in the context of all service delivery (provided that CMMI model users are willing to suppress an expectation that all projects must come to an end).

Even given this adjustment, some people may still have difficulty thinking of the delivery of services as being a *project*, which often carries the connotation of trying to accomplish an overall objective by following some preset plan. Many services are delivered in response to what are effectively small independent objectives established over time—individual service requests—in ways that are not planned in advance according to predetermined milestones. In these circumstances, service providers are often not used to thinking of a single objective to be accomplished. Therefore, characterizing their work arrangements as projects may seem awkward at best.

For this reason, the CMMI-SVC model explicitly interprets the term *project* to encompass all of the resources required to satisfy a service agreement with a customer. Satisfaction of the terms of the service agreement becomes the overall objective under which individual service requests are handled. Planning the effort to satisfy the service agreement is required in the form of work structures, resource allocations, schedules, and other typical project planning work products and processes. If you think of a service agreement as outlining the scope of a project in this way, the use of *project* in a service context becomes less of a problem.

Even better, the glossary includes notes explaining that a project can be composed of projects. These additional notes mean that interrelated sets of service agreements or service agreements covering multiple customers can be treated as projects, as can distinct subsets of work within the scope of a single service agreement. For example, the development of a new version of a service system or the transition of a new service delivery capability into operational use can be treated as a project as well.

In the end, of course, organizations will use whatever terminology is comfortable, familiar, and useful to them, and the CMMI-SVC model does not require this approach to change. However, all CMMI models need a convenient way to refer consistently and clearly to the fundamental groupings of resources that organize work to achieve significant objectives. Given the glossary definition and the preceding discussion, the term *project* is still adequate and effective for this purpose, although its meaning has had to grow in scope over time. This adaptation is not a surprise, because CMMI models themselves have grown in scope over time, and are likely to continue to do so in the future. CMMI-SVC users are strongly encouraged to consider how they too may adapt their way of thinking to reflect greater flexibility, and thereby gain the benefits of different ways of improving services.

Stakeholder, Customer, and End User

In the model glossary, a *stakeholder* is defined as a group or individual who is affected by or is in some way accountable for the outcome of an undertaking. Stakeholders include any and all parties with a legitimate interest in the results of service delivery, such as service provider executives, staff members, customers, end users, suppliers, partners, and oversight groups. Remember that any given reference to stakeholders in the model covers all types of stakeholders, and not just the ones that might be most obvious in the particular context.

The model defines a *customer* as the party (individual, project, or organization) responsible for accepting the product or for authorizing payment. A customer must also be external to the project that develops (delivers) a product (service), although both the customer and the project may be part of the same larger organization. While this concept seems clear enough, the glossary includes some ambiguous language about how the term *customer* can include “other relevant stakeholders” in some contexts, such as *customer requirements*. Although this caveat reflects an accepted legacy usage of the term from earlier versions of CMMI models, it could be potentially confusing in a service context, where the distinction between customers and other stakeholders (especially end users) can be especially significant.

The CMMI for Services model addresses this concern in two ways. First, it avoids the term *customer requirements* except in those contexts where it refers to the requirements of *customers* in the narrow sense (those who accept a product or authorize payment). Second, the model includes added material in the glossary to distinguish between customers and end users, and to define the term *end user* itself.

The model defines an *end user* as the party (individual, project, or organization) that ultimately receives the benefit of a delivered service. While end users and customers therefore cover distinct roles in service establishment and delivery, both can often be represented by a single party. For example, a private individual who receives financial services from a bank is probably both the customer and the end user of those services. However, in health care services, the customers often include organizations such as employers and government agencies that negotiate (or dictate) health care plan coverage for the ultimate health care beneficiaries, who are the end users of those services. (Many of these end users may be customers as well, if they have a responsibility to pay for all or part of some services.)

To summarize: It's important to keep in mind the actual scope of the terms *stakeholder*, *customer*, and *end user* as you review and apply the CMMI for Services model in your unique service context so that you don't overlook or confuse crucial interactions and interfaces in your service system.

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