## An IT Services Scenario Applying CMMI for Services: The Story of How HeRus Improved Its IT Services

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### *By Drew Allison of SSCI*

*Book authors' comments: In this essay, Drew Allison, a Certified ITIL V3 Expert and Certified Lead Appraiser and Instructor for CMMI-DEV and CMMI-SVC from the Systems and Software Consortium, draws on her experiences bringing CMMI to IT service organizations to provide some observations and a scenario that reflects an amalgam of those experiences. These experiences indicate that some of the challenges that IT service organizations face in implementing CMMI-SVC are similar to those that were faced by development organizations in the early days of adopting SW-CMM and CMMI. However, some challenges are due to the unique characteristics of services discussed earlier in this book. At least for organizations like the one in the scenario, unique challenges are caused by the business and service delivery environments they face as external IT service providers. The good news is that ITIL and CMMI play very well together. Many of the assets developed in the last years of ITIL and CMMI implementation can be leveraged to speed up and strengthen the adoption of good IT service management and delivery practice, resulting in improved IT service performance and quality (and eventually, reduced cost).*

### Observations

Organizations like the one in the scenario I've provided are external IT service providers and they have internal IT departments. One of the great challenges they all face as IT contractors is managing the variety of services they provide to many different customers in a competitive environment in which periods for transitioning in a complex service system, operating the service system at required service levels, and transitioning out may by force happen within very short time periods and while operating "to the bone." Customers do not understand enough about CMMI or ITIL to understand their critical role in the successful implementation of both frameworks. Therefore, customer participation in fulfilling the true intent of CMMI-SVC and ITIL may be lacking. The customer may not allow adequate time for contractors to institutionalize good practices and experience performance results, which can result in frequent contractor turnover. Poor acquisition practice can further aggravate these issues.

Other challenges relate to who is responsible for implementing CMMI-SVC (often legacy CMMI-DEV process groups with little understanding of services). These issues could be categorized as knowledge management and organizational issues. There isn't much IT service contractors can do about the competition and customer maturity. However, the following observations will concentrate on knowledge management and organizational issues that companies can influence.

All of the companies that inspired the scenario implemented CMMI-DEV and achieved maturity level 3. This means they had a functioning process infrastructure, which included process and training groups with CMMI-DEV expertise and assets such as standard processes, training, and measurement data collected from development projects and other groups (but not service groups). All of the companies had active IT service improvement groups focused on the ITIL (which stands for Information Technology Infrastructure Library) framework separate from the CMMI process groups. The core members of the CMMI process groups had many challenges to work through, which included these:

- Mastering an understanding of what services are about, including where and how CMMI-DEV assets can and cannot be leveraged
- Being able to communicate with the ITIL group despite different terminology, framework purposes, structures, and levels of abstraction
- Working through the political and organizational challenges (which included obtaining charge codes for the time and resources necessary to coordinate between the two groups)
- Identifying assets developed by the ITIL groups that could be leveraged for the CMMI-SVC effort

Of course, the "elephant in the room" was how or whether these two groups' paths would cross organizationally. As happens with so many organizations, true coordination between process and performance improvement initiatives for compliance with various standards and frameworks is rarely achieved because they have separate and sometimes competing reporting chains, budgets, incentives, and domain expertise. These differences result in language, cultural, and knowledge barriers. It will take time for the CMMI process groups to either learn about services or recruit members who do understand services and can communicate comfortably with the rest of the CMMI group. Organizational and knowledge management barriers are substantial.

The good news is that if the CMMI process group is operating at maturity level 3, it will have a good training infrastructure in place to bring the new service members of the group "up to speed" quickly on topics they will need to be effective members of the CMMI process group. Topics commonly include the scope of CMMI, process management, measurement, and process and product quality assurance. An active, functional process management infrastructure also serves as an example. Unfortunately, such a functioning infrastructure is not the case in all CMMI maturity level 3 organizations. Some have little or no process maturity in the area of process management and training despite having achieved maturity level 3. For example, no process descriptions for process management activities may be available, or process management may be simply inactive and dysfunctional. (Such dysfunction is often due to a lack of ongoing and consistent senior management support or constant organizational upheaval, including frequent changes in leadership or changes in customer direction regarding the importance of CMMI. Under such circumstances, it is difficult for new process group members to "hit the ground running.")

Old habits die hard when a process professional has spent years growing and perfecting his or her knowledge in a particular framework. It was difficult for CMMI-DEV groups to stop focusing on schedules, effort, size, and tangible deliverables in favor of capacity, availability, performance, and other aspects of operating, monitoring, and managing the service system. What made understanding these aspects of services even harder is the state of practice in the service industry, which is nowhere near the ideal represented in ITIL and CMMI-SVC.

Most IT service organizations have not yet developed service catalogs (or if they have, the catalogs do not provide great value), are not planning strategically for their service, are not performing capacity and availability management beyond basic monitoring, and are not meeting the intent of service level management (often because they do not have customers mature enough to give them the opportunity to meet the intent). In other words, the processes in a service organization may not "live up to" SVC process area specific goals as well as a development organization might "live up to" DEV Engineering process area specific goals. Therefore, defining processes to satisfy the SVC process area specific goals may require more than discussions with subject matter experts (SMEs) to document how work is currently being done.

Process management, Process and Product Quality Assurance (PPQA), Measurement and Analysis (MA), and training processes plague many service organizations, just as they do many development organizations. Just as MA was the "long pole in the tent" for most organizations implementing CMMI-DEV, so it appears to be for SVC. However, the pole may be even longer given the state of the service industry. Not only are processes not documented, but the practices are neither performed nor managed. There is little focus on measurement objectives, process measurement, or measurement beyond what is currently provided by their tools automatically.

The situation faced by these implementers of CMMI-SVC was different from their experience with CMMI-DEV in many ways, including the following.

- They didn't have a background in the services sold by their organization. (Although, of course, they were themselves providers of process improvement services.) For example, CMMI process group members lacked knowledge about how services were managed (e.g., day to day, week to week) and where and how interactions with customers occurred. Attempting to understand and document service activities and mapping the activities to CMMI-SVC practices is more difficult because roles and processes are not documented and GP 2.4, Assign Responsibility, is lacking.
- Some learning curves were misperceptions carried over from the use of CMMI-DEV such as "Configuration Management (CM) doesn't exist in services because it's only for software," or "there's no place for Decision Analysis and Resolution (DAR) in service operations because that's about making design decisions during development." Knowledge of how or even *whether* services did configuration management was lacking. In one case, the communication barrier between a legacy CMMI-DEV person discussing CM with a services person was so bad that the DEV person walked away with the impression that there was no CM on the services side.

- The gaps between the specific practices of CMMI-SVC and the activities of the organization were larger than they had been with CMMI-DEV due to the state of the industry described earlier. Most shortcomings using CMMI-DEV had been to process maturity and institutionalization practices (e.g., generic goals, process management, training, support) more so than the Engineering practices. This difference left the process team with not only a learning curve to understand services but, for at least some of the specific practices, no SMEs to consult in the organization who could tell them how the practices were performed (because they weren't). In other words, there was a learning curve for potential SMEs as well as process group members.
- As always, scheduling time with SMEs was a challenge. However, given the dynamic and often unpredictable nature of the services (i.e., amount and frequency of ad hoc, firefighting activity) and the business pressure to operate "at the bone," it was more difficult than ever. This shortage of SME availability affected process development and appraisal activities. One appraisal was affected by a major incident that made most interviewees unavailable.

Despite these challenges, there were many bright spots when the "light went on" either for the ITIL group or for the CMMI group. Each realized that an asset existed that one or the other needed. A barrier in communication dropped and they enjoyed an "aha" moment together. Or an organizational barrier showed signs of weakening, such as the CMMI group telling the ITIL group who they needed to contact in the training group to get training defined and coordinated for service roles. Rather than trying to co-opt the ITIL group's efforts, the CMMI group proved they could be an asset because they had worked through many of the questions and challenges the ITIL group faced. Trust and sharing issues existed between some groups when they feared that their territory was being invaded or co-opted or that their processes would be thrown away or replaced with less useful ones.

Once the CMMI process groups had access to an expert that was fluent in both ITIL and CMMI and who could help them with mapping and other resources, the translation and learning process went considerably faster.

Another bright spot was that existing CMMI-DEV processes for Process Management, Support, and Project and Work Management process areas were leveraged for CMMI-SVC. However, no "plug and play" or "silver bullet" solutions were available and the definition of processes was in various stages of completion. The effort required to construct a process solution that works well for both development and service groups should not be underestimated.

ITIL provides insight into how some development processes may be made more useful for IT services. For example, ITIL has excellent IT service processes for CM (see ITIL's Service Asset and Configuration Management and Change Management processes in the *Service Transition* book) and Supplier Agreement Management or SAM (see ITIL's Supplier Management process in the *Service Design* book). Additional IT service insights for Organizational Process Focus (OPF), Organizational Process Definition (OPD), and MA can be extracted from ITIL's *Continual Service Improvement* book and Knowledge Management process in the *Service Transition* book.

Of course, ITIL provides detailed processes for many of the SVC process areas of CMMI-SVC, such as these:

- Strategic Service Management or STSM (see ITIL's Service Catalog Management process in the *Service Design* book and strategic service planning information in the *Service Strategy* book)
- Service Delivery or SD (see ITIL's Service Level Management process in the *Service Design* book and Service Request Fulfillment process and service operation functions in the *Service Operation* book)
- Capacity and Availability Management or CAM (see ITIL's Capacity Management and Availability Management processes in the *Service Design* book)
- Service Continuity or SCON (see ITIL's IT Service Continuity Management process in the *Service Design* book)
- Service System Transition or SST (see ITIL's Release and Deployment Management process in the *Service Transition* book)
- Incident Resolution and Prevention or IRP (see ITIL's Incident Management and Problem Management processes in the *Service Operation* book)

Additional IT service insights may be gained for the Service System Development (SSD) and Project and Work Management process areas by reviewing the *Service Design* and *Service Transition* books, though these process areas are more difficult to map into specific ITIL processes because the related content is distributed.

Decades of ITIL use has resulted in additional literature that provides measurement examples for IT services, publicly available service catalog examples, user groups for IT service management (itSMF), and many other resources that will speed the implementation of CMMI-SVC in an IT services organization. Conversely, decades of CMMI use has resulted in powerful resources for implementing effective Process Management (e.g., OPF, OPD, Organizational Training or OT), Project and Work Management (e.g., Work Planning or WP, Work Monitoring and Control or WMC, Integrated Work Management or IWM, SAM, Requirements Management or REQM), and Support (CM, MA, PPQA, DAR, Causal Analysis and Resolution or CAR) so critical to institutionalizing good IT service management practice.

### What It Looks Like in Practice

With challenges and opportunities for joint ITIL and CMMI-SVC use, let's look at a scenario that is fictionalized but drawn from several real-world experiences to demonstrate how ITIL and CMMI-SVC work together in practice. The following scenario describes how a fictional IT service organization called Heroes Are Us (HeRus) applied the CMMI-SVC model to improve its service performance, reduce cost, and increase customer satisfaction. The scenario focuses on four Service process areas in the CMMI-SVC model. Mappings between the scenario and goals in CMMI-SVC are provided to help you make the connection between the scenarios and the model and to increase your depth of knowledge about CMMI-SVC. For help with terms, please refer to the glossary.

### Introduction to the HeRus Scenario

Ms. Shandra Takie manages the IT department for HeRus, a mid-size (approximately 900 employees), privately held (family-owned), government contractor providing database management, application development, service desk, and data center services primarily to the Department of Defense (DoD). The IT department has 50 employees who support the work of HeRus. Like the employees they support, their motto is to be "Johnny on the spot" (i.e., available and willing to do whatever is needed).

HeRus has aggressive growth plans for the next five years and would like to "go public." To realize its growth plans, HeRus must justify and control costs, increase performance, improve quality, and showcase the value its services provide. HeRus is under pressure from competitors, particularly in the area of cost. To realize its growth plans, HeRus must adopt industry best practices. Instead of relying on heroes and rewarding "end justifies the means" behavior, HeRus wants to rely on standard procedures and processes across the company that can be adapted to the requirements of each contract.

The business development office scans for requests for proposals (RFPs) from federal and state civil agencies and the DoD for IT services. Bidding on, ramping up for, and shutting down contracts consume a great deal of time and effort at HeRus. The business development office is often far along in developing a proposal before the right technical stakeholders in the company are identified and brought in to provide advice. Sometimes the advice of technical experts is too late and commitments are made to provide services that are not in the best interests of HeRus's future. The current services and service levels offered are not documented in any centralized fashion. What little information exists on current services is documented in various contracts and service level agreements (SLAs) without a basis in standard services.

Shandra has been assigned the role of IT Service Process Czar with the goal of piloting new IT service processes with the internal IT staff before deploying them to contracts. Shandra attended a recent SEI Software Engineering Process Group (SEPG) conference and learned the importance of aligning services with business goals. Shandra has her own motives for moving forward with the process improvement initiative.

Budget cuts in recent years have reduced support for existing systems and applications as well as delayed the purchasing of new capacity. Shandra wants to show the value to HeRus's bottom line of the IT services her department is providing. She knows that to support corporate growth plans, an upgrade to IT systems is needed, but in the current climate, strong rationale backed by data would have to be provided.

Shandra also understands that with better data and the means to estimate required capacity and availability to support HeRus's growth plans, she can justify needed upgrades and increased automation of processes. Currently, HeRus relies on primarily manual processes that hinder the IT department's ability to provide quality services at required service levels. She wants to justify greater investment in tools and automation of processes.

Shandra believes that the more closely IT services and service processes are aligned to business objectives and business processes, the more successful she will be. To achieve success, she must provide greater visibility into the achievements, challenges, performance, quality, costs, and contributions IT makes to HeRus. She must move the IT department from being focused on technology and infrastructure to being focused on service, with business objectives and processes driving IT service plans and processes.

### Service Delivery (SD)

Shandra has had no SLA for IT operations, but the number and frequency of complaints indicate that IT is not meeting expectations. A service-level management process owner is appointed to address how HeRus plans, coordinates, agrees (Service Delivery process area), monitors, and reports on SLAs (Work Monitoring and Control process area), and maintains the SLAs (Service Delivery process area). The process owner will provide templates of SLAs for use by HeRus's service-level managers.

The service-level management process owner decides that, as a first step, service-level managers should base their SLAs on the service catalog and analyze existing SLAs and data. These data include input from the capacity management process, availability of management process, incident management process, problem management process, service continuity process, information security process, and various IT functions. With this input, the SLA will then be defined, negotiated, and agreed. Quality Assurance (QA) will check whether the SLA is available to service providers, customers, and end users as planned. QA will also check whether the SLAs are periodically updated (SD SG 1).

Up until this time, no documentation existed to describe how to prepare for service delivery and how to deliver service. HeRus had relied on the knowledge of its experienced IT staff. Shandra knows that 50 percent of IT knowledge is in people's heads, and 45 percent of IT will retire within five years. Because of this, and to increase consistency and quality, Shandra decides it's time to document how HeRus prepares for and delivers its services. Standard processes and process assets will be stored in a Process Asset Library (PAL) available to the organization and used by QA in its compliance activities. QA is thrilled that it will have better information on what to check, but given the increased awareness of what actually needs QA's involvement they're lobbying for more resources (SG 2).

Shandra's IT service process improvement steering committee decides to use the service desk as a pilot for its processes for SD preparation and fulfillment. The service-desk manager will document the approach used for SD, including how service requests are handled and required resources. What the service-desk manager documents will likely be elevated to a standard service-desk process for use on future contracts. Service-desk staff members will confirm readiness to deliver services according to procedures, and evidence of having followed readiness check procedures will be documented. Shandra has read the latest literature on the importance of checklists for improving service quality, so she encourages the use of checklists in the new processes (SG 2).

Service requests currently are processed and tracked in the same system as incidents, and there have been problems with the volume of service requests bogging down the incident management staff. Shandra decides that separate processes for service requests are needed. Service requests will be distinguished clearly from incidents, and procedures and mechanisms for storing, accessing, updating, tracking, and reporting service request records will be defined. Shandra will argue for investment in more self-help and self-service mechanisms to free the service-desk staff to work on incidents (SG 2).

The service-desk staff reports that they are receiving and processing service requests according to the SLA and meeting their targets consistently. The incident management staff reports that their performance has improved as a result of having clearer service request processes, including clear assignment of responsibility and authority (GP 2.4). Now that the service-request staff consistently review service-request status and resolution and confirm results with relevant stakeholders, customer satisfaction is way up. The service logs, performance reports, customer satisfaction data, and request management system records all show that the service system is being operated to deliver services according to SLAs and in compliance with processes (QA has confirmed this!). It is clear from looking at maintenance notifications, logs, and schedules that the service system is being maintained to ensure the continuation of service delivery (SG 3).

### Capacity and Availability Management (CAM)

The IT department has been achieving a decent 99.9 percent uptime, but the downtime occurs at the worst times, and with the cutbacks in purchasing, increased demand, and lack of demand management, Shandra anticipates that she will not be able to maintain this uptime rate. To support HeRus's long-term growth plans, a strategic approach to capacity and availability management is needed that considers future capacity and availability requirements.

She knows that these requirements are influenced by the other processes being defined, including the service continuity process and future innovations and emerging technologies process. Other influencers are patterns of business activity, demand, and how HeRus can affect them. Up until now, capacity and availability management has had an operational perspective focused on monitoring the performance, utilization, and throughput of the IT infrastructure and some aspects of IT services, such as response to incidents. HeRus has also monitored availability and reliability to a certain extent, forecasting whether agreed targets will be met.

Little analysis is going on and HeRus relies on the expert knowledge of its IT staff for many of the activities in CAM. HeRus has little documentation about what thresholds are set and why and what action should take place when certain conditions are met. Shandra knows that when the economy improves, some of her expert staff members will leave for "greener pastures." The reliance on expert judgment and ad hoc practices has led to inconsistent performance and quality and represents a risk for HeRus.

When SLAs are documented, CAM data are rarely consulted, which is due in part to the overall lack of data. When decisions are made about changes to the service system, CAM data are rarely consulted. IT service continuity plans at HeRus do not have a firm foundation on data from other processes, such as capacity management or availability management. Shandra would like that to change because she knows the performance of the new processes relies in part on the availability and use of good data.

Shandra judges that IT service quality and performance at HeRus will improve with more analysis, a proactive approach to CAM, more reporting to relevant stakeholders, and more input from CAM to other processes, such as these:

- Service-level management (to enable better decisions about what targets are agreed in SLAs)
- Change management (to enable better decisions about change)
- IT service continuity management (to enable better continuity planning and reduce the risk of not being able to meet IT service continuity requirements)

The approach to CAM has been largely reactive at HeRus. Shandra decides that the approach has to change. She understands that with the budget constraints and competition in the marketplace, including vendors who represent possible IT outsourcing opportunities for HeRus, she must implement more sophisticated CAM practices and tools that will support a more proactive, data-based approach. She wants HeRus to reduce costs and increase performance by using tuning and exploring demand management.

Shandra establishes a process owner for capacity management and another process owner for availability management and reminds them that they need to get started right away on defining measures and analytic techniques to support the analysis she hopes to put into place. Shandra would like to see baseline models of current performance and resource utilization as a start. She knows these baseline models must be established before more predictive models can be established to help answer "what if" questions about changes, workload allocation and volume, SLAs, application sizing, and other questions from the design team, problem management group, and service continuity planning group.

## Service Continuity (SCON)

HeRus has weak business continuity plans and policies, which only mention the importance of ensuring that there are contingency plans in place for "computer systems" and IT. Shandra knows this is a woefully inadequate treatment of IT service continuity. She knows that detailed plans must be put into place, personnel need training on the plans, and the plans should be validated to ensure that IT services can be resumed within required, agreed-to time frames (SG 2).

Shandra helps the IT service continuity process owner to begin planning by identifying and prioritizing the essential functions that must be performed and the essential resources to ensure service continuity (SG 1). They do this in close coordination with HeRus's business process owners knowing that their ultimate goal is to support business continuity. To understand the essential resources, they need input from CM and other HeRus IT service processes.

Having a good start on the service catalog provides valuable input to their planning efforts. To maintain their IT service continuity plan adequately, they must receive inputs from HeRus's change management process (to assess the potential impact of changes on their plans); CM (to understand the relationships between services, technology, and business processes); and other processes.

Having finished the HeRus IT service continuity plan, they establish training to ensure that the plans can be successfully executed. Having conducted the training, they analyze the evaluations and determine that some improvements are needed to both the training and their plans before they will be ready to verify and validate the plans. Once the improvements are made and preparations for verification and validation of the IT service continuity plan are made, they conduct the verification and validation activities as planned and analyze the results, making additional improvements where necessary (SG 3).

## Incident Resolution and Prevention (IRP)

HeRus's internal IT department has only been able to meet the target response time (35 minutes) for incidents about 30 percent of the time. They have no single repository for incidents, their underlying causes, and approaches to addressing them. Partly because of this lack of information, communication has been poor between the service desk and the rest of the IT department, particularly about known errors, incidents, and their underlying causes. Causes of incidents were not tracked sufficiently, and in fact, no effort was being made to discover the underlying causes of incidents and prevent their recurrence.

Shandra decided to define an incident management process focused on handling interruptions to normal service and returning normal service as quickly as possible. She also defined a process for preventing incidents, developing workarounds, and addressing underlying causes of selected incidents. She decided to clearly assign responsibility and authority (GP 2.4) for incident management, preventing incidents, developing workarounds, and developing action plans for underlying causes when documented criteria were met (SG 3).

Staff members were trained on the processes (GP 2.5). Responsibilities included identifying, controlling, and addressing incidents (SG 2). Using the new processes, staff members now responded in specific ways to specific incidents. They consulted the incident management system to know whether there were workarounds. Information recorded in the incident management system and other sources was used as input to help prevent incidents (e.g., through trend analysis). Information about incidents was recorded and could be grouped and linked to support analysis of trends and underlying causes.

Monitoring the status of incidents and communicating with stakeholders throughout incident handling (SP 2.5, SP 2.6) were emphasized in the training because many complaints had been received in the past about "being kept in the dark" and having to call the service desk to find out what was happening with an incident. These weaknesses were publicly acknowledged, and the new procedures were advertised to make sure stakeholders were aware that the IT department was doing something to address its poor service image.

The processes included preparing for incident resolution and prevention by establishing an approach to them and establishing an incident management system (SG 1). The approach included definitions of incidents and incident categories, incident handling, and incident reporting mechanisms.

Following the introduction of incident management processes based on CMMI-SVC's IRP process area, the target response time is being met 85 percent of the time, and the number of recurring incidents has dropped.

## Conclusion

Five years after initiating service process improvements at HeRus, Shandra received a Success Contributor Award on behalf of the internal IT department. The improvements implemented there have been adopted throughout HeRus and have been a major contributor to HeRus's achievement of its growth plans. Service process improvements have helped HeRus remain competitive by delivering quality and performance while holding costs in check and increasing customer satisfaction. With this foundation of using data and measurement to ensure that quality and performance are well established, HeRus is positioned for even higher maturity and capability, and the business results associated with them.

## Are Services Agile?

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### *By Hillel Glazer*

*Book authors' comments: Practitioners who are champions of Agile principles and practitioners using CMMI have been realizing recently just how much they have in common, rather than what separates them. This isn't a recent insight for Hillel Glazer from Entinex, however, who has been a thought leader in both communities for some time. In this essay, Hillel considers the ways in which services may already be agile, an interesting insight into the nature of services as a means of organizing product development, and what CMMI for Services might bring to the conversation about using Agile methods and CMMI together. He is a certified instructor and high maturity lead appraiser for CMMI.*

Some argue that "Agile" in the context of software development came about in response to an unhealthy trend. That trend distracted the attention of development projects from customer service and product excellence to demonstrable proof of process fidelity. That love affair with tools and an obsession with plans, contracts, and rigidity usurped relationships with customers and calcified responsiveness.

Look at the Agile Manifesto:

> *We are uncovering better ways of developing*
> *software by doing it and helping others do it.*
> *Through this work we have come to value:*
>
> ***Individuals and interactions*** *over processes and tools*
>
> ***Working software*** *over comprehensive documentation*
>
> ***Customer collaboration*** *over contract negotiation*
>
> ***Responding to change*** *over following a plan*
>
> *That is, while there is value in the items on*
> *the right, we value the items on the left more* [Beck 2001].

The values in the Agile Manifesto are clearly in favor of individuals, interactions, results, customers, and responsiveness: all attributes classically characteristic of the business and the operation of a service.