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A Comparison of Service Design Processes in Relevant International ITSM Models and Standards

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Abstract
International IT Service Management models (CMMI-SVC, MOF-4, and ITUP) and de facto or de jure standards (ITIL v3, ISO 20000-4) include a Service Design process as part of their mandatory set of processes. Nevertheless such availability of processes, their used nomenclature, their phase-activity structure, and their granularity level used for their descriptions, are nonstandardized. Additionally, there are few - if any -comparative studies in Service Design processes. Consequently, ITSM academics are faced with a useful but disparate and disperse literature, and ITSM professionals lack of practical insights regarding comparative characteristics of such Service Design processes. In this research, we address such real and academic problematic, and develop a conceptual comparative study of Service Design processes of five relevant ITSM models and standards. Thus, we report a substantial description of each one, and report an initial comparative scheme based in the criteria of clarity, completeness and balance for assessing an overall value of each model or standard. Our findings suggest that ITSM models (MOF-4, ITUP and CMMI-SV) provide more informational value than ITSM standards (ITIL v3, ISO 20000-4). We conclude with the need to elaborate an integrative Service Design process which contains the minimal set of expected phases, activities, artifacts and roles using a common nomenclature.

Keywords: service design process, ITSM standard, ITSM model, ISO 20000-4, ITIL v3, CMMI-SVC,MOF-4, ITUP

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Completed Research Paper

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Abstract

International IT Service Management models (CMMI-SVC, MOF-4, and ITUP) and de facto or de jure standards (ITIL v3, ISO 20000-4) include a Service Design process as part of their mandatory set of processes. Nevertheless such availability of processes, their used nomenclature, their phase-activity structure, and their granularity level used for their descriptions, are non-standardized. Additionally, there are few - if any -comparative studies in Service Design processes. Consequently, ITSM academics are faced with a useful but disparate and disperse literature, and ITSM professionals lack of practical insights regarding comparative characteristics of such Service Design processes. In this research, we address such real and academic problematic, and develop a conceptual comparative study of Service Design processes of five relevant ITSM models and standards. Thus, we report a substantial description of each one, and report an initial comparative scheme based in the criteria of clarity, completeness and balance for assessing an overall value of each model or standard. Our findings suggest that ITSM models (MOF-4, ITUP and CMMI-SV) provide more informational value than ITSM standards (ITIL v3, ISO 20000-4). We conclude with the need to elaborate an integrative Service Design process which contains the minimal set of expected phases, activities, artifacts and roles using a common nomenclature.

Keywords: service design process, ITSM standard, ITSM model, ISO 20000-4, ITIL v3, CMMI-SVC, MOF-4, ITUP

Introduction

IT Service Management (ITSM) can be defined as a management system of organizational resources and capabilities for providing value to organizational customers through IT services (van Bon et al., 2007). IT Service Management has become a relevant organizational theme for IT areas in large and mid-sized organizations because it is expected that its utilization, jointly with other IT schemes of processes, deliver a more efficient and effective IT management, and ultimately a better organizational value (Johnson, Hately, Miller, & Orr, 2007; Gallup, Dattero, Quan, & Conger, 2009). While studies on ITSM impacts are still scarce (Hochstein, Tamm, & Brenner, 2005; Cater-Steel & Toleman, 2006; Potgetier, Botha, & Lew2006; Cater-Steel, Toleman & Wui-Gee, 2009) the few available studies share evidences of positive impacts. In Hochstein et al. (2005) the findings of six cases conducted in large European companies (5) and a governmental setting (1) are reported. In all of them, the overall assessment is of positive impacts categorized as follows: a better client/service orientation with positive impacts on the quality of IT services respectively, a better efficiency of IT processes, and a better visibility of IT processes (transparency and comparability documentary issues). Cater-Steel and Toleman (2006) also reports positive impacts of ITSM (derived from 5 cases of Australian companies). These are: a more consistent and documented service management process (less negative surprises or omissions), less conflictive SLAs negotiations (smoother), more precise predictions of IT infrastructure warranty issues, and a better manager of incidents, changes and testing tasks. Potegier et al. (2006) from a single case also support the notion of ITSM implementation is associated to benefits. In Cater-Steel et al. (2009) a survey realized in 65 Australian corporations identified as the main benefits to: an improved customer satisfaction, an improved response and resolution time, an improved IT service continuity, a clear identification of roles/responsibilities, a reduction in cost/incident, and an improved IT employee productivity.

However, in order to such benefits be realized IT practitioners – and organizations- must firstly to select, learn, and deploy an ITSM *de facto* and *de jure* standard or ITSM model. In former category most known and valued ITMS standards are: ISO/IEC 20000 (ISO, 2005; 2010) and ITIL v3 (Cartlidge, 2007; van Von et al., 2007). In latter category most relevant posed ITSM models are: CMMI-SVC (SEI, 2010), ITUP® (EMA, 2006; Ganek & Kloeckner, 2007; IBM, 2010), and MOF® 4.0 (Microsoft, 2008). Hence, it could be expected that the selection of any ITSM standard or model is indifferent, but unfortunately while they share a similar generic aim, they can be considered conceptually different. Their used nomenclature, their phase-activity structure, and their granularity level used for their description are non-standardized (Dougmore, 2006). Given that successful ITSM implementations require adequate training and staff awareness (Pollard & Cater-Steel, 2009), besides another CSFs, we believe that ITSM implementers need firstly to identify the core structure and characteristics of such ITSM standards and models, in order to realize a correct selection of the most suitable ITSM standard or model for your organization. In this research, we are interested in a single phase or process: *Service Design*. Few, if any, comparative studies in such Service Design processes have been reported in the literature. Furthermore, we consider that for ITSM practitioners, besides Service Transition, another ITSM phases (Strategy, Operation, and Continual Improvement) are best known in IT settings. IT strategic issues have been used for decades in organizations. IT operations (with or without a service approach) is also a strong practical available expertise in IT areas. Continual Improvement is based in well-known quality approaches already available from decades. In contrast, Service Design (and Service Transition), implies practically a new discipline demanding the adaptation/enhancement of usual software systems development methodologies or the emergence of totally new IT service design methodologies. At date of this research, in the five studied ITSM schemes (standards and models), while they report phases, activities, roles and activities, they also lack of a well-defined IT service design methodology. Furthermore, it is totally accepted that designing an IT service is more than designing an IT system, because an IT service involves several components (hardware, software, dbms, networks, data, applications, environment, and internal and external teams). Consequently, Service Design processes, and their detailed study on how to systematically conduct it emerges as a relevant current problem (Ebert, Uebernickel, Hochstein & Brenner, 2007; Weist, 2009).

In this paper, we address such real and academic problematic, and develop a conceptual comparative study of Service Design processes of the five relevant ITSM models and standards aforementioned. Firstly, we review foundations of service design process. Secondly, we report a substantial description of each one. Thirdly, we report a comparative scheme using the criteria of clarity, completeness and balance for assessing an overall value of each model or standard.

Service Design Foundations

On Service, IT Service, and IT Service System Concepts

Service and IT service has been defined in different modes by the most recognized ITSM process frameworks. In ITIL v3 (OGC glossary) service is defined *as a means of delivering value to customers by facilitating outcomes customers want to achieve without the ownership of specific costs and risks*. An IT service is defined *as a service provided to one or more customers by an IT service provider, based on the use of IT and supports the customer's business processes, and is made up from a combination of people, processes and technology and defined in a Service Level Agreement*. A service system is not defined in ITIL v3. In ISO 20000 (ISO, 2005), the concepts of service and IT service are used implicitly. The concept of system is neither defined but it can be used the usual ISO standard concept of system. Similarly the concept of service system is not explicitly reported. In contrast, the concept of process is relevant. A process is a set of interrelated or interacting activities which transforms inputs into outputs. A system is defined as a set of interrelated or interacting elements. In general a product is defined as the result of a process. In ISO 9000:2005, there are four generic categories of products: software (any intangible product in form of transactions or procedures), hardware (any tangible product which is countable), processed materials (tangible but with a continuous characteristic), or services (intangible resultant from the interaction of activities between a supplier and a customer). In particular, the hardware and processed materials are called goods. In ISO 90000, services is about executing activities on customer-supplied tangible, or delivering intangible products, or creating a particular ambience. In CMMI-SVC (SEI, 2010) the concepts of service, system, and service system are explicitly defined. The particular concept of IT service is not reported. A service is *a product that is intangible and nonstorable delivered through service systems designed to satisfy service requirements*. A service system is defined as *an integrated and interdependent combination of service component resources that satisfies service requirements*. In CMMI-SVC a service systems includes *everything required for service delivery as such work products, processes, facilities, tools, consumable and human resources (employees and service customers during the service delivery occurrence)*. In CMMI-SVC a system should be interpreted in the broader sense of "*a regularly interacting or interdependent group of items forming a unified whole*". In ITUP (IBM, 2010), the concepts of service and IT services are taken directly from ITIL v3. The concepts of service system and system are not explicitly defined. However, an additional concept called *solution* is reported as *the set of software, hardware, people, and other resources that work together to provide a service to IT customers service* (IBM, 2010). This definition of solution fits the IT service system concept. In MOF 4 (Microsoft, 2008), a service is *a collection of features and functions that enable a business process*. An IT service is not explicitly defined but MOF 4 pursues the goal "to provide guidance to IT organizations to help them create, operate, and support IT services while ensuring that the investment in IT delivers expected business value at an acceptable level of risk" (Microsoft, 2008, p. 1). From it, an IT service can be interpreted in MOF 4 as *a collection of IT features and functions that enable value at an acceptable level of risk to a business process*. Similarly to ITUP, in MOF 4 the concept of *solution* is reported: *a coordinated delivery of technologies, documentation, training, and support designed to successfully respond to a unique customer's business problem*. Solutions typically combine people, processes, and technology to solve problems. It can be interpreted that IT services are enabled by one or more solutions in MOF 4 (Microsoft, 2008).

On IT Service Design Concepts and Processes

According to March and Smith (1995) design – as a research paradigm- is a prescriptive mode for advancing the performance of systems. In contrast with a knowledge-producing descriptive mode –which pursues to understand their natural behavioral of used systems-, design is *a knowledge-using activity pursued for developing useful systems* (IT systems in particular in studied context). Authors based in Simon (1981) indicates that design is about "*devising artifacts for attain goals*". For authors (idem, p. 253) "*design attempts to create thing for human purposes*". Design products are assessed usually using utility or value criteria. Two core activities in design are build and evaluate. "*Building is the process of constructing an artifact for a specific purpose; evaluation is the process of determining how well the artifact performs*" (idem, p. 254). Design –as a substantive- is the generated artifact from design activity. It can be classified either: construct, model, method or implementation.

For ITIL v3 (Rudd & Lloyd, 2007) design is an Activity or Process that *identifies Requirements and then defines a solution that is able to meet these Requirements*. Systems (e.g. IT services in particular) must be carefully planned and designed in order to be as expected. An informal design process cannot establish performance, risk-based,

security and cost-effective guarantees to users. Design IT systems helps mainly to avoid costly system disruptions in operational settings caused by design flaws, and to produce expected performances. A high quality design implies to achieve it into the design space caused by the application of constrains (usually bounds on available resources) rather attaining the maximum or minimums values without consideration to the attached design constrains. In ITIL V3 Service Design can be identified the core process of gathering service needs and mapping them to requirements for integrated services, and creating the design specifications for the service assets needed to provide services. In the three first ISO 20000 (ISO, 2005) documents, derived from ITIL v2 mainly, is not reported an explicit IT service design phase or process. However, in ISO 20000-4:2010 document, two of the four new processes linked to service design activities are reported. This new category is called Design and Transition of New or Changes Services, and the two linked processes are: Service Requirements, and Service Design. Similarly to ITIL v2, additional processes are partially linked for this service design aim: Service Level Management (SLM), Release Management (RM), and Configuration Management (CM). In SLM the need of defining a service catalogue and service level agreements implies service design activities to be fulfilled. In RM, a final release package must be designed, build and configured. In turn, in CM all technical information of the configuration items (e.g. their components, physical, and logical interrelationships) must be documented.

In CMMI-SVC a design process is explicitly addressed into the Service System Development category (SEI, 2010). Design refers to "*the definition of the service system's components and their intended set of relationships; these components will collectively interact in intended ways to achieve actual service delivery*" (idem, p. 448). Two goals address the analysis and design activities in CMMI-SVC. They are: (i) SG1 Develop and Analyze Stakeholder Requirements, and (ii) SG2 Develop Service Systems. SG1 covers "the transformation of collected stakeholder needs, expectations, and constraints into requirements that can be used to develop a service system that enables service delivery" (idem, p. 439). SG2 concerns with "evaluating and selecting solutions that potentially satisfy an appropriate set of requirements; developing detailed designs for the selected solutions; implementing the designs of service system components as needed; and integrating the service system so that its functions can be verified and validated" (idem, p. 446). In ITUP (Ganek & Kloeckner, 2007) there is a particular process category called Solution Development or Realization concerned with design process. In ITUP service design defines "*how each service is delivered by using a combination of people, processes, tools, and technology*" (Black, Draper, Lococo, Matar & Ward, 2007, p. 408). In ITUP the Realization category "*exists to create solutions that will satisfy the requirements of IT customers and stakeholders, including both the development of new solutions and the enhancements or maintenance of existing ones. Development includes options to build or buy the components of that solution, and the integration of them for functional capability*" (IBM, 2010). The particular service design activities in ITUP are two: (i) A41 Solution Requirements for a systematic capture of the functional and nonfunctional requirements of the solution , and (ii) A42 Solution Analysis and Design for the creation of a documented design from solution requirements. In MOF 4.0 (Microsoft, 2008) there is a particular process category (Deliver phase) where the services are planned, designed, built and deployed (MOF4, 2008). Three activities are directly concerned with analysis and design issues: (i) Envision, (ii) Project Planning, and (iii) Built. In these activities the business needs and requirements prior to planning a solution are captured, a functional specification and solution design is prepared, and work plans, cost estimates, and schedules for the deliverables are developed. In MOF 4.0 the project team creates in Envision and Project Planning three design documents (conceptual, logical and physical design) as well as a separate functional specification. In Build, a low-level solution and feature design is realized.

Hence, we define Systems Design –as a verb- *as the intellectual activity to transform a set of system requirements in a set of system specifications which satisfy a set of agreed goals and constrains which will enable the development and building of the designed system*. Agreed goals are expected properties for system users (usually related with performance, security, and usability issues), while that agreed constrains are limits (minimums, maximums, or ranges) on characteristics of the design process per se (usually related with the consumption of time-based, financial, organizational, materials, and other related resources used for design, build and operate the expected system). In turn, System design – as a substantive- is defined as the *conceptual artifact which conveys a set of system specifications which enable its further development and building with assumed extant design resources*.

Description of Service Design Phases/Process in Relevant Five ITSM Schemes

In ITIL v3, there is a full phase devoted to the Service Design. It suggests the relevance of such activities for fulfilling the expected quality of service levels to be delivered. In this Service Design phase are included the following processes: Service Catalogue Management, Service Level Management, Capacity Management,

Availability Management, IT Service Continuity Management, Information Security Management, and Supplier Management. Interesting to be identifies, is the non explicit definition of a Service Design process. In contrast, in ITIL v3 5 dimensions of service design are proposed: Services, Design of Service Management systems and tools, Technology architectures and management systems, Processes, and Measurement methods and metrics. The role of Service Design is established as: '*The design of appropriate and innovative IT services, including their architectures, processes, policies and documentation, to meet current and future agreed business requirements*". Service design must consider the following elements in ITIL v3: business process to be supported, the service itself, SLAs/SLRs, Infrastructure (all of the IT equipment necessary to delivery the service to the customers and users), Environment (the environment required to secure and operate the infrastructure), Data, Applications, Support Services, Operational Level Agreements (OLAs) and contracts: any underpinning agreements necessary to deliver them, Support Teams, and Suppliers. The core activities of design the service itself are: (*i) 3.3 Identifying service requirements, (ii) 3.4 Identifying and documenting business requirements and drivers, (iii) Designing and Risk Assessment, (iv) Evaluation of alternative solutions, (v) Procurement of the preferred solution, and (vi) 3.7.3 Develop the service solution***.** In the three first ISO 20000 (ISO, 2005) documents, derived from ITIL v2 mainly, is not reported an explicit IT service design phase or process. However, in ISO 20000-4:2010 document, two of the four new processes linked to service design activities are reported. This new category is called Design and Transition of New or Changes Services, and the two linked processes are: Service Requirements, and Service Design. In Service Requirements, the service requirements are established and agreed. The service may be asked from the Service Catalogue (build for catalogue) or as totally new services (build to order). Five products are expected of this process: required characteristics and context of service, constraints for a service solution, service requirements, validation of such service requirements, and final agreed and negotiated implemented requirements. In Service Design, the new or changed service is designed and developed. This process must generate an agreed solution including the service per se plus service components. The design must guarantee that the agreed service requirements be satisfied. Four products are expected from this process: a new or changed service design which meets business needs and service requirements, a service specification, a detailed list of infrastructure and service components to support the designed service, and the development of the designed service. Similarly to ITIL v2, additional processes are partially linked for this service design aim: Service Level Management (SLM), Release Management (RM), and Configuration Management (CM). In SLM the need of defining a service catalogue and service level agreements implies service design activities to be fulfilled. In RM, a final release package must be designed, build and configured. In turn, in CM all technical information of the configuration items (e.g. their components, physical, and logical interrelationships) must be documented.

In CMMI-SVC there are 4 process categories: Support (SUP), Process Management (PRM), Project Management (PM), and Service Establishment and Delivery (SED). Into SEP category there are 5 processes: Strategic Service Management (STSM), Service System Development (SSD), Service System Transition (SST), Service Delivery (SD), and Incident Resolution and Prevention (IRP). STSM concerns with the identification of the strategic needs of services for a variety of markets, as well as with their business and technical descriptions (e.g. via a service catalog). SSD concerns with the design, building/assembling or service components, and their verification and validation in a development environment. For it, SSD interacts with REQM (Requirements Management process into Project Management category). In SST, the verified and validated service system is deployed in a production environment, SD accounts for the current provision of the services through the released service system, and IRP addressing the incidents. Hence, SSD is the process directly related with the design of service systems. The purpose of SSD is established as "*to analyze, design, develop, integrate, verify, and validate service systems, including service system components, to satisfy existing or anticipated service agreements*" (SEI, 2010, p. 437). The 3 specific goals of SSD are the following: SG1 Develop and Analyze Stakeholder Requirements, SG2 Develop Service Systems, and SG3 Verify and Validate Service Systems. 12 specific practices are included in such 3 specific goals. Several typical work products are posed. In ITUP, there are 8 process categories: A1 Governance and Management System, A2 Customer Relationships, A3 Direction, A4 Realization, A5 Transition, A6 Operations, A7 Resilience and A8 Administration. The design, building and testing of IT services corresponds to the 5 processes in the Realization category. These are the following: A41 Solution Requirements for a systematic capture of the functional and nonfunctional requirements of the solution; A42 Solution Analysis and Design for creation of a documented design from solution requirements; A43 Solution Development and Integration for creation and assembly of solution elements; A44 Solution Test for validation and verification of implemented requirements; and A45 Solution Acceptance for validation that the developed solution meets the needs of the stakeholders. According to ITUP the Realization category of process exists to create solutions that will satisfy the requirements of IT customers and stakeholders, including both the development of new solutions and the enhancements or maintenance of existing

ones. Development includes options to build or buy the components of that solution, and the integration of them for functional capability. In MOF4 exists 4 process categories: Plan, Deliver, Operate, and Manage. The first 3 phases are ongoing and the 4th helps to them as a foundational layer. The goal of MOF4 is to provide guidance to IT organizations to help them create, operate, and support IT services while ensuring that the investment in IT delivers expected business value at an acceptable level of risk. Design of IT service systems is realized in Deliver phase in MOF4. The goal of Deliver phase is to help IT professionals work within a project management discipline to build, stabilize, and deploy IT services, applications, and infrastructure improvements in the most efficient way possible. This phase consists of 5 processes: Envision, Project Planning, Build, Stabilize and Deploy. The design of IT services corresponds to Envision and Project Planning, its elaboration to Build, and its testing to Stabilize. IT services are finally transferred to the production environment in Deploy process. The design, building and testing of IT services in MOF4 implies that the project team: captures the business needs and requirements prior to planning a solution; prepares a functional specification and solution design; develops work plans, cost estimates, and schedules for the deliverables; builds the solution to the customer's specification, so that all features are complete, and the solution is ready for external testing and stabilization; and releases the highest-quality solution by performing thorough testing and release candidate piloting.

In Table 1 (appendix), a structured description of phases, activities, process interactions, and roles of each scheme is reported.

Discussion and Conclusions

In order to establish useful insights of such substantial ITSM service design process descriptions, we use the criteria of clarity, completeness, and balance. We define ***clarity*** as the lack of ambiguity perceived by IT practitioners in the used nomenclature of the ITSM scheme; ***completeness*** as the extent of the ITSM scheme includes descriptions for all core expected elements (phases, activities, roles, artifacts, and techniques); and ***balance*** as the extent of the ITSM scheme reports with similar granularity level each element (e.g. it is better an uniform description of elements rather an unbalanced one where some elements are totally detailed and other are insufficiently reported). We use a qualitative scale with the set of values very low, low, moderate, high, and very high for the three criteria. Table 2 reports the qualitative evaluations realized by authors based in the free-access documents for the ITSM models and the commercial official documents for ITSM standards.

Table 2. Core Service Design Phases in Service Process Models and Standards

Scheme	Clarity	Completeness	Balance
ITIL v3	**HIGH**. Most fundamental concepts are well-defined. They are used consistently through the scheme. Complementary material is provided.	**LOW.** Despite the existence of a dedicate book for Service Design process, the material provides minimal detailed processes and/or methodologies for designing an IT service.	**MODERATE.** The level of granularity is fair uniform. Some processes are more detailed than others.
ISO 20000	**LOW.** Most fundamental concepts are not defined. They are used implicitly through the scheme. Complementary material is missing.	**VERY LOW.** A 400-word description is the unique guideline provided.	**HIGH.** The level of granularity is uniform but is minimal the content reported by the standard.
CMMI-SVC	**HIGH.** Most fundamental concepts are well-defined. They are used consistently through the scheme. Complementary material is provided.	**HIGH.** A well-defined guideline is reported. Specific goals and practices are well-reported. Additional insights on work products are also reported.	**VERY HIGH.** The level of granularity is highly uniform and standardized.
MOF 4	**HIGH.** Most fundamental concepts are well-defined. They are used consistently through the scheme. Complementary material is provided.	**VERY HIGH.** Very well-defined guidelines are reported including templates. Complete information of phases, activities, roles and artifacts is reported.	**VERY HIGH.** The level of granularity is highly uniform and standardized.

ITUP	**HIGH.** Most fundamental concepts are well-defined. They are used consistently through the scheme. Complementary material is provided.	**VERY HIGH.** A well-defined guideline is reported including templates. Additional insights on work products are also reported.	**VERY HIGH.** The level of granularity is highly uniform and standardized.

From qualitative results reported in Table 2, plus the ITSM descriptions reported in Table 1 (appendix) it is possible to identify useful insights for ITSM practitioners. These are the following: (i) despite ITIL v3 and ISO 20000 are the most recognized ITSM schemes, organizations will need additional IT consulting for really deploying a Service Design process; (ii) of the three free-access ITSM schemes, MOF 4 and ITUP are the most complete; (iii) MOF 4 and ITUP introduces the concept of IT solution, as the core building-block for IT services; (iv) CMMI-SVC focus in the design of the whole service system, as the key concept rather the service per se; and (v) the specifications for the IT service design are non standardized in each scheme. Hence, we consider that this research contributes to ITSM with: (i) an initial description-comparison of main international five ITSM schemes; (ii) a review of the fundamental concepts on design and service design; (iii) an identification of the scarcity of well-defined IT service design methodologies in the two main ITSM standards; (iv) an implicit and real need in ITSM practitioner community for counting with more elaborated IT service design methodologies; and (v) a call for further sponsored both conceptual and empirical research in IT service design methodologies. Our next step is the elaboration of an integrated IT Service Design process, based in such best practices, for SMBs organizations.

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Table 1. Core Service Design Phases in Service Process Models and Standards				
Source	**Service Core Design Phases**	**Service Design Process / Activities (Artifacts)**	**Service Process Interactions**	**Service Design Roles**
ITIL v3	SERVICE DESIGN	SERVICE (ITSELF) DESIGN (Service Design Package) A1. Identifying service requirements A2. Identifying and documenting business requirements and drivers A3. Designing and Risk Assessment A4. Evaluation of alternative solutions A5. Procurement of the preferred solution A6. Develop the service solution.	It interacts with the Service Catalogue Management, Service Level Management, Capacity Management, Availability Management, IT Service Continuity Management, Information Security Management, and Supplier Management, processes.	1. Service Design Manager 2. IT Designer/Architect 3. Service Design Process Managers 4. Customer 5. User
ISO 20000	SERVICE DESIGN AND TRANSITION	SERVICE REQUIREMENTS Derived activities: A1. Identification of required characteristics and context of service. A2. Identification of constraints for a service solution. A3. Elicitation of service requirements. A4. Validation of service requirements. A5. Agreement of final implementable requirements.	It interacts with SERVICE LEVEL MANAGEMENT, RELEASE MANAGEMENT, and CONFIGURATION MANAGEMENT.	1. Service Design Team
		SERVICE DESIGN Derived activities: A1. General Design of a new or changed service design. A2. Specification of service. A3. Identification of detailed list of infrastructure and service components. A4. Development of the designed service.	It interacts with SERVICE LEVEL MANAGEMENT, RELEASE MANAGEMENT, and CONFIGURATION MANAGEMENT.	1. Service Design Team
CMMI-SVC	SERVICE ESTABLISHMENT AND DELIVERY	SERVICE SYSTEM DEVELOPMENT SG 1 Develop and Analyze Stakeholder Requirements (Service System Requirements Package) SP 1.1 Develop Stakeholder Requirements SP 1.2 Develop Service System Requirements SP 1.3 Analyze and Validate Requirements SG 2 Develop Service Systems (Service System Design and Development Package) SP 2.1 Select Service System Solutions SP 2.2 Develop the Design SP 2.3 Ensure Interface Compatibility SP 2.4 Implement the Service System Design SP 2.5 Integrate Service System Components SG 3 Verify and Validate Service Systems (Service System Verification and Validation Package) SP 3.1 Prepare for Verification and Validation SP 3.2 Perform Peer Reviews SP 3.3 Verify Selected Service System Components	It interacts with REQUIREMENTS MANAGEMENT and SERVICE SYSTEM TRANSITION processes.	1. Project Manager 2. SSD Manager 3. SSD Team 4. Customer 5. Users

		SP 3.4 Validate the Service System		
MOF 4.0	DELIVER	ENVISION (Vision Document) A1. Organize the core project team. A2. Write the vision/scope document. A3. Approve the vision/scope document. PROJECT PLANNING (Project Plan Document) A1. Evaluate products and technologies. A2. Write the functional specification. A3. Package the master project plan. A4. Create the master schedule. A5. Review the Project Plans Approved MR.	They interact with several processes of PLAN, OPERATE and MANAGE phases.	1. Program Manager 2. Product Manager 3. Test Manager 4. Developers 5. Testers
ITUP	REALIZATION	SOLUTION REQUIREMENTS (Solution Requirements Package) A1. Establish Solution Requirements Framework A2. Refine and Verify Business Context A3. Document and Analyze Solution Requirements A4.Validate Solution Requirements with Stakeholders A5. Manage Solution Requirements Baseline A6. Evaluate Solution Requirements Performance SOLUTION ANALYSIS AND DESIGN (Solution Analysis and Design Package) A1. Establish Solution Analysis and Design Framework A2. Create Conceptual Solution Design A3. Identify and Select Solution Components A4. Create Detailed Solution Design A5. Validate Solution Design With Stakeholders A6. Evaluate Solution Analysis and Design Performance	They interact with several processes of CUSTOMER RELATIONSHIPS, TRANSITION and OPERATIONS.	1. Realization Manager 2. Realization Architect 3. Realization Team 4. Customer 5. Users

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