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Stefan Jablonski and
Leszek Maciaszek (Eds.)

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Volume Editors

Stefan Jablonski
University of Bayreuth
Germany

and

Leszek Maciaszek
Macquarie University
Australia

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Foreword

The mission of the ENASE (Evaluation of Novel Approaches to Software Engineering) conferences is to be a prime international forum to discuss and publish research findings and IT industry experiences with relation to evaluation of novel approaches to software engineering. By comparing novel approaches with established traditional practices and by evaluating them against software quality criteria, the ENASE conferences advance knowledge and research in software engineering, identify most hopeful trends and propose new directions for consideration by researchers and practitioners involved in large-scale software development and integration.

An innovative idea and important highlight of all ENASE conferences is the Advocatus Diaboli Forum (ADF). The main agenda for ADF-s is defined as to adversarially assess claims to novelty and utility for selected software engineering approaches. For ADF at ENASE 2009 the SE approach on trial was SOA (Service-Oriented Architecture). The devil's advocate who assembled a prosecution case against SOA was Ernesto Damiani. The defence attorney in the court proceedings was Mike P. Papazoglou. The forum was organized and moderated by Cesar Gonzalez-Perez.

We believe that after four successive and successful conferences ENASE has established itself as an important international event for researchers and practitioners to review and evaluate emerging as well as established SE methods, practices, architectures, technologies and tools. Additionally, we have now secured archival publication of modified and extended versions of the best ENASE papers in Springer's LNBIP (Lecture Notes in Business Information Processing). The first LNBIP book will include six best papers from ENASE 2008 (Madeira) and six best papers from ENASE 2009 (Milan) as well as the papers prepared by the keynote speakers.

68 papers were submitted to ENASE 2009. The papers were sent to three PC members for review. After the careful consideration of research contributions, 20 papers were accepted, 18 were presented at the conference and are included as full papers in this volume (giving the acceptance rate of 25% for full paper presentations at the conference). The acceptance rate confirms the desire of the ENASE Steering Committee to ensure high quality of the conferences. In all

The reviewing process was carried out by 65 members of ENASE 2009 Program Committee. The final decision of acceptance/rejection was taken based on the received reviews by the PC chair Stefan Jablonski, in consultation with Cesar Gonzalez-Perez and with the Steering Committee. Borderline papers were subjected to extra considerations and discussions before decisions were reached.

May 2009,

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Harmonizing Improvement Technologies: A Comparison between CMMI-ACQ and ISO/IEC 12207:2008

Francisco J. Pino[1,3], Maria Teresa Baldassarre[2], Mario Piattini[3]
Giuseppe Visaggio[2] and Danilo Caivano[2]

[1]IDIS Research Group, Electronic and Telecommunications Engineering Faculty
University of Cauca, Street 5 # 4 – 70 Popayán, Colombia
fjpino@unicauca.edu.co
[2]RCOST, Department of Informatics
University of Bari, Via E. Orabona 4, 70126, Bari, Italy
{baldassarre,visaggio,caivano}@di.uniba.it
[3]Alarcos Research Group – Institute of Information Technologies & Systems
University of Castilla-La Mancha, Paseo de la Universidad, 4, 13071, Ciudad Real, Spain
Mario.Piattini@uclm.es

Abstract. Currently a great number of organizations are acquiring products and services from suppliers and developing less and less of these products in-house. The CMMI-ACQ and the ISO/IEC 12207:2008 are process reference model that addressing issue related to software acquisition. With the aim of to offer information on how the practices described in these two models are related, and considering that the comparison is one specific strategy for the harmonization of models, we have carried out a comparison of these two reference models. We have taken into account the latest versions of the models. Furthermore, to carry out this comparison in a way systematic, we defined a process for this purpose. This work intends to support organizations which are interested in introducing or improving their practices for acquisition of products and services using these models.

1 Introduction

Software process improvement is a planned, managed and controlled effort which aims to enhance the capability of the software development processes of an organization [1]. It is significant to highlight that in a software process improvement effort different types of models are involved. These include the process reference model, the process assessment method and the model that guides the process improvement [2]. According to [3] the purpose of the process reference models is to provide the description of the processes (and their entities) that can be applied during the acquisition, supply, development, operation and maintenance of software. These are acquiring products and services from suppliers and developing less and less of these products inhouse. These organizations can be customers who need to perform good practices to guarantee that the product and service purchased satisfy the defined acceptance criterias. These organizations can also be suppliers that may act as a customer when acquiring a product and service from another supplier.

Regarding the process reference model related to software acquisition, the Software Engineering Institute –SEI– has recently developed the CMMI-ACQ [5], and the International Standarization Organization –ISO– is addressing this issue in the agreement processes category of ISO 12207:2008 [6]. Each model has got its own structure, processes and entities of process for describing best practices in its scope of aplication.

Given the present need to harmonize different improvement technologies [7] to support organizations which are interested in introducing or improving their practices for acquisition of products and services, it is important to have information on how the practices described in these two models are related. In this sense, this paper presents a comparison of the CMMI-ACQ and ISO/IEC 12207:2008 models. According to [7] mapping is one of the most widely- used specific strategies for the harmonization of models. We have taken into account the following considerations for this comparison: (i) refer to the latest versions of the models, (ii) carry out comparison at a low level of abstraction , and (iii) guide the comparison through a well defined method. This work intends to support and guide a software organization to integrate, manage, and align its activities of software acquisition using these models.

The paper is structured as follows. The section 2 presents related works, and then the general considerations for comparison are described. Section 4 presents the comparison overview and describes the analysis of results. Lastly conclusions and future work are set out.

2 Related Work

Literature presents some works that involve comparisons and mapping between different processes models. Among these, those related to CMMI V1.1 and ISO 9001 are:

- In [8] a mapping between two models is described.
- In [9] a new model that integrates the content of these two models is introduced.
- In [10] a way for the transition from ISO 9001 to SW-CMM is defined.
- In [11] a comparison and a correspondence between ISO 9001 and SW-CMM are shown.

In the same sense, the following studies regarding the integration of specific assessment frameworks have been conducted:

- An analysis and comparison of ISO/IEC 15504:2004 and CMMI V1.1 for software

- In [3] the harmonization of CMMI V1.1 and ISO/IEC TR 15504-2:2002 is presented.
- In [14] and [15] a definition of compatibility structures and comparison between CMMI and SPICE is described.

The works that deal with the standards ISO/IEC 15504-2:2004 involve ISO/IEC 12207:2002 directly, because this latter standard is suggested by ISO/IEC 15504 as a process reference model.

As it can be seen from the work presented above, the most used models in mapping and comparisons are: ISO 9001, ISO/IEC 15504:2004 and CMMI V1.1. However, in none of these comparisons the latest versions of these models are involved. Moreover, from the analysis of these studies we have found that the process entities involved in the comparisons or mappings are of high level abstraction (as examples, objectives, outcomes or statements).

We have carried out a comparison between the last versions of models: ISO/IEC 12207:2008 [6] and CMMI-ACQ V1.2: 2007 [5]. For the development of our comparison we have followed an well defined process, which we also used for other comparisons that we have carried out (ISO 9001 to CMMI-DEV, and ISO 12207 to CMMI-DEV [16]). We might add that the entities involved in the process of comparison and subsequent mapping are: (i) activities and tasks for ISO/IEC 12207 and (ii) specific practices for CMMI-ACQ. These process entities are of low level abstraction in the description of the processes or process areas.

A comparison at this abstraction level provides information about what activities and tasks outlined in ISO/IEC 12207 give support to specific practices of CMMI-ACQ. Furthermore, an analysis at this abstraction level can give directions about how a model previously implemented in the organization (ISO 12207) can meet part of the requirements to establish a new model (CMMI-ACQ). This could reduce the effort and costs associated with the implementation of a new model, with reference to a model already used in the organization.

3 General Considerations

After an analysis of the different related pieces of work mentioned in the previous section, we have observed a constant relationship between some models of the SEI and ISO. Table 1 shows a high-level relationship extracted from the structures of these models and their comparisons.

Table 1. High-level relationship between some ISO and SEI standards.

			SEI	
			CMMI-DEV and CMMI-ACQ	
			Generic Goals / Generic Practices	Process Areas
	15504-5	Process		*Performance of the process*

As it arises from the table, the process areas of CMMI-DEV and CMMI-ACQ models are closely related to the process reference models described in ISO/IEC 15504-5 [17] and ISO/IEC 12207 [6, 18]. Furthermore, generic goals and practices of CMMI-DEV and CMMI-ACQ models are closely related to the process attributes described in the ISO/IEC 15504-2 standard [19].

Based on the relationship offered in Table 1, the comparison between CMMI-ACQ and ISO 12207:2008 must be carried out at the level of process performance, in other words this comparison doesn't involve goals and generic practices.

There follows a description of activities carried out to perform the comparison between these two models. These activities are related to the process that we have defined for the comparison of models. The purpose of this process is to provide a guide with which to perform the comparison and mapping of different models step-by-step. This process defines two roles: the performers and the reviewers of the comparison, along with five tasks: (i) understanding models, (ii) designing the comparison, (iii) carrying out the comparison, (iv) overview of comparison outcomes, and (v) analyzing the comparison outcomes. This comparison process is part of a methodology of harmonization and integration which we are currently developing.

3.1 Understanding Models

This task involves: (i) acquiring knowledge about the models to compare and (ii) analyzing the structure of these models. In this sense, a description of CMMI-ACQ and ISO/IEC 12207 is described in the next lines.

According to [5] the purpose of CMMI-ACQ is to provide guidance for the application of CMMI best practices by the acquirer. Best practices in the model focus on activities for initiating and managing the acquisition of products and services that meet the needs of the customer. Although suppliers may provide artefacts which are useful to the processes addressed in CMMI-ACQ, the focus of the model is on the processes of the acquirer. CMMI-ACQ integrates bodies of knowledge that are essential for an acquirer. It is a collection of best practices that is generated from the CMMI Framework, which is the basic structure that organizes CMMI components and combines them into CMMI constellations and models. Also in the framework is a CMMI model foundation (CMF) which exists within the CMMI Framework, and it is a skeleton model that contains each of the components that must be included in every CMMI model [20].

As regards the CMMI-ACQ's structure, it contains two main sections in its description: (i) generic goals and practices, and (ii) process areas. Each process area is defined in terms of the process entities: purpose, specific goals (required component), specific practices (expected component). A required component describes what an organization must achieve to satisfy a process area, and an expected component describes what an organization may implement to achieve a required component.

On the other hand, according to [6] the purpose of ISO/IEC 12207 standard (Systems and software engineering - Software life cycle processes) is to provide a defined set of processes to facilitate communication among acquirers, suppliers and other stakeholders in the life cycle of a software product.

With respect to the ISO/IEC 12207's structure, the processes are grouped in process groups, and each process is described in terms of the process entities: purpose, outcomes, activities and tasks. The purpose and outcomes are a statement of the goals of the performance of each process. The list of activities and tasks are performed to achieve the outcomes.

3.2 Designing and Carrying out the Comparison

This task involves: (i) fixing the process entities to be compared, based on the research needs, (ii) defining the comparison scale, and (iii) fixing the directionality of the comparison.

This comparison should find activities which ISO/IEC 12207 and CMMI-ACQ have in common, in order to define goals for a measurement plan using the Multiview Framework [21]. To apply the Multiview Framework, the comparison should be done at the level of: (i) the entity-specific practices for CMMI-ACQ and (ii) the entity activity and tasks for ISO/IEC 12207. These entities describe specific practice or activities that should be executed to obtain the intended product or service. Carrying out the comparison using these entities allows identifying common activities found (from now on called specific activities) in both CMMI-ACQ and ISO/IEC 12207. The above-mentioned specific activities can not be found using entities as purpose, outcomes or generic goals.

In order to express the degree of relationship between a Process from ISO/IEC 12207 and a Process area from CMMI-ACQ, we have defined a discrete scale (scale of comparison). Each of the elements of the scale has been associated with a set of numeric values which are described in terms of percentage. This scale is made up of the following elements:

- Strongly related (86% to 100%),
- Largely related (51% to 85%),
- Partially related (16% to 50%),
- Weakly related (1% to 15%), and
- Non-related (0%).

The numeric values can be found by dividing the number of specific practices (from a Process area of CMMI) that are related to activities (from a process of ISO/IEC 15504) by the total number of specific practices defined in that Process area.

When a comparison involves process entities of low level abstraction it is relevant to define the direction of the comparison (see a discusion of this issue in section 4.3). The direction of this comparison is from ISO/IEC 12207 to CMMI-ACQ.

We have carried out the comparison by means of an iterative and incremental procedure. It is iterative, because the execution (analyze and determine the relationship of the process entities of ISO/IEC 12207 and CMMI) of the comparison is carried out completely on one CMMI process area first, and then on the others in turn. It is also incremental in the sense that the template comparison (which is the product) grows and evolves with each iteration until it becomes the definitive one. The roles were assigned, two people as performers of the comparison and two reviewers.

4 Comparison Overview

Based on the general considerations of the comparison described in the previous section, the degree of support of the CMMI process areas from the ISO 12007 process is presented in Table 2.

Table 2. Overview of the comparison between ISO/IEC 12207 and CMMI-ACQ.

Direction of the comparison: From ISO/IEC 12207 to CMMI-ACQ
Process entities for the comparison:
- For ISO/IEC 12207: Activities and tasks of the standard's processes.
- For CMMI: specific practices.

Research question:
- What activities and tasks of ISO/IEC 12207 can offer support to specific practices of CMMI?
- What ISO/IEC 12207's activities and tasks are strongly related with the support to CMMI's specific practices?

Comparison goal: To determine which activities and tasks of ISO/IEC 12207 have a close relationship with some specific practice of CMMI. The goal is know which is the degree of fulfilment of the specific practices of CMMI based on the activities and tasks described in ISO/IEC 12207.
Scale of comparison:
- S - Strongly related (86% to 100%)
- L - Largely related (51% to 85%)
- P - Partially related (16% to 50%)
- W - Weakly related (1% to 15%)
- - Non-related (0%)

ISO/IEC 12207			CMMI-ACQ: CMMI Framework (16 Process areas)																CMMI-ACQ (6 New Process areas)					
			Causal Analysis and Resolution (CAR)	Configuration Management (CM)	Decision Analysis and Resolution (DAR)	Integrated Project Management (IPM)	Measurement and Analysis (MA)	Organizational Innovation and Deployment (OID)	Organizational Process Definition (OPD)	Organizational Process Focus (OPF)	Organizational Process Performance (OPP)	Organizational Training (OT)	Project Monitoring and Control (PMC)	Project Planning (PP)	Process and Product Quality Assurance (PPQA)	Quantitative Project Management (QPM)	Requirements Management (REQM)	Risk Management (RSKM)	Agreement Management (AM)	Acquisition Requirements Development (ARD)	Acquisition Technical Management (ATM)	Acquisition Validation (AVAL)	Acquisition Verification (AVER)	Solicitation and Supplier Agreement Development (SSAD)
System context process	Agreement processes (2 processes)	Acquisition process																	S	L	P			L
		Supply process																						
	Organizational Project-Enabling Processes (5 processes)	Life Cycle Model Management Process	L			W		W	P	P														
		Infrastructure Management Process		P										W										
		Project Portfolio Management Process				W							P											
		Human Resource Management Process				W			P			S		W										
		Quality Management Process														P								
	Project processes (7 processes)	Project Planning Process				W								L			P							
		Project Assessment and Control Process	L			W							L		P			W						
		Decision Management Process			P																			
		Risk Management Process											W	W				S						
		Configuration Management Process		S																				
		Information Management Process												W										
		Measurement Process					S		P															
	Technical processes (11 processes)	Stakeholder Requirements Definition Process															P			P				W
		System Requirements Analysis Process															L			P				
		System Architectural Design Process															P							
		Implementation Process																						
		System Integration Process																						
		System Qualification Testing Process																						
		Software Installation Process																						
		Software Acceptance Support Process																						
		Software Operation Process																						
		Software Maintenance Process																						
		Software Disposal Process																						
Software specific process	Software Implementation Processes (7 processes)	Software Implementation Process		P																				
		Software Requirements Analysis Process															L							
		Software Architectural Design Process																						
		Software Detailed Design Process																						
		Software Construction Process																						
		Software Integration Process																						
		Software Qualification Testing Process																						
	Software Support Processes (8 processes)	Software Documentation Management Process																						
		Software Configuration Management Process		S																				
		Software Quality Assurance Process													S									
		Software Verification Process																					P	
		Software Validation Process																				L		
		Software Review Process		W									P		S						P		P	
		Software Audit Process																	P		P			
		Software Problem Resolution Process	L																					
	Software reuse processes (3 processes)	Domain Engineering Process																						
		Reuse Asset Management Process							P															
		Reuse Program Management Process																						

We shall now go on to present a discussion and consideration of several issues

4.1 The Acquisition in both Models

The purpose of CMMI-ACQ is to provide guidance for the application of CMMI best practices by the acquirer [5]. This model shows a viewpoint from the side of the acquirer, so the focus of the model is on the processes of the acquirer. Supplier activities are not addressed in this model. It was very important to keep this perspective constantly in mind.

CMMI-ACQ contains 22 process areas. Of those, 16 are CMMI Model Foundation (CMF) process areas. Six process areas focus on practices which are specific to acquisition of both products and services, addressing:

- Agreement management (AM)
- Acquisition requirements development (ARD)
- Acquisition technical management (ATM)
- Acquisition validation (AVAL)
- Acquisition verification (AVER), and
- Solicitation and supplier agreement development (SSAD).

An analysis about the Agreement process group (labelled number 6.1 in the standard) has been carried out. This process group defines the activities necessary to establish an agreement between two organizations, and it defines two processes: Acquisition and Supply. The purpose of the Acquisition Process is to obtain the product and/or service that satisfies/satisfy the need expressed by the acquirer. The purpose of the Supply Process is to provide a product or service to the acquirer that meets the agreed requirements [6].

On analyzing the description of the Supply Process, a viewpoint from the supplier is observed. This perspective is opposite to that described by the CMMI-ACQ. Taking into account this consideration, it is observed that the Process Supply is not related to the six process areas which focus on practices specific to acquisition as described by CMMI-ACQ.

Based on the comparison carried out and the description of the Acquisition process from ISO/IEC 12207 standard, a relationship between these processes is shown in Fig. 1. The goal is to offer an overview to the acquirer of which processes are involved in the acquisition.

4.2 Detail View for Acquisition

Table 3 shows a summary of the comparison carried out between the six specific process areas of CMMI-AQC for the acquisition and the processes related to the Agreement processes of ISO 12207. The degree of relationship presented between process areas and process is only described in the direction from ISO 12207 to CMMI. In others word, how the activities of processes of ISO 12207 support the fulfilment of the specific practices of CMMI-ACQ. In Table 4 an example of a detailed comparison between activities and tasks of a process from ISO/IEC 12207

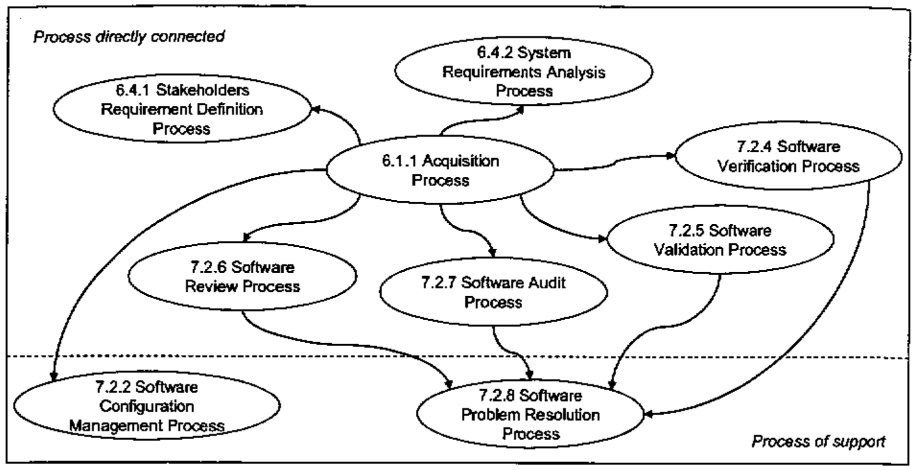

Fig. 1. Relationships among processes of ISO/IEC 12207 for Acquisition.

Table 3. Detailed view of the relationship for acquisition of ISO/IEC 12207 and CMMI-ACQ.

		CMMI-ACQ					
		AM	ARD	ATM	SSAD	AVAL	AVER
ISO 12207	**Acquisition process**	S 100%	L 63%	P 20%	L 56%		
	Software Review Process			P 20%			P 38%
	Software Audit Process	P 25%		P 20%			
	Stakeholder Req. Definition Process		P 50%		W 11%		
	System Req. Analysis Process		P 25%				
	Validation Process					L 80%	
	Verification Process						P 50%
	Degree of relation GENERAL	S 100%	L 75%	P 20%	L 66%	L 80%	S 88%

Table 4. Detailed comparison between activities and tasks of Acquisition process of ISO 12207 and specific practices of Agreement management of CMMI-ACQ.

		AGREEMENT MANAGEMENT - AM (Specific practices)			
		SP 1.1 Execute the Supplier Agreement.	SP 1.2 Monitor Selected Supplier Process	SP 1.3 Accept the Acquired Product	SP 1.4 Manage Supplier Invoices
6.1.1 Acquisition process (Activities)	6.1.1.3.1 Acquisition preparation.				
	6.1.1.3.2 Acquisition advertisement.				
	6.1.1.3.3 Supplier selection.				
	6.1.1.3.4 Contract agreement.				
	6.1.1.3.5 Agreement monitoring.	Task 6.1.1.3.5.1	Task 6.1.1.3.5.1		
	6.1.1.3.6 Acquirer acceptance.			Task 6.1.1.3.6.2	
	6.1.1.3.7 Closure.				Task 6.1.1.3.7.1
	Degree of relation (Direction ISO 12207 to CMMI) ***100% (Fulfilment 4 of 4 Specific Practices)***				

For each process of ISO/IEC 12207 and process areas of CMMI-ACQ that have some relationship, we have defined a detailed chart like Table 4.

In summary, there are 39 specific practices in 6 process areas (Agreement management - AM, Acquisition requirements development - ARD, Acquisition technical management - ATM, Acquisition validation - AVAL, Acquisition verification - AVER and Solicitation and supplier agreement development - SSAD) of CMMI-ACQ, of which 28 specific practices are related to one or more tasks or activities of ISO 12207. So the degree of general relationship is 72% (28/39).

The specific practices that are not supported by the activities from ISO 12207 are:

- Acquisition requirements development - ARD, SP 2.2 Allocate Contractual Requirements.
- Acquisition requirements development - ARD, SP 3.3 Analyze Requirements to Achieve Balance
- Acquisition technical management - ATM, SP 1.1 Select Technical Solutions for Analysis
- Acquisition technical management - ATM, SP 1.2 Analyze Selected Technical Solutions
- Acquisition technical management - ATM, SP 2.1 Select Interfaces to Manage
- Acquisition technical management - ATM, SP 2.2 Manage Selected Interfaces
- Solicitation and supplier agreement development - SSAD, SP 1.1 Identify Potential Suppliers
- Solicitation and supplier agreement development - SSAD, SP 2.2 Establish Negotiation Plans
- Solicitation and supplier agreement development - SSAD, SP 3.1 Establish an Understanding of the Agreement
- Acquisition validation - AVAL, SP 1.2 Establish the Validation Environment
- Acquisition verification - AVER, SP 1.2 Establish the Verification Environment

4.3 Lessons Learned

In a comparison at low level abstraction, the degree of relation, between a Process from ISO/IEC 12207 and a Process area from CMMI-ACQ, depends on the direction of the relationship. In others words, this relationship is not bi-directional. For instance, Table 4 shows the next degree of relationship:

- Direction from ISO 12207 to CMMI: The degree of relation is 100% (S) (Fulfilment 4 of 4 Specific Practices). As shown in the chart: 3 activities of this process of ISO 12207 meet 4 specific practices of the 4 that this process area of CMMI-ACQ has defined.
- Direction from CMMI to ISO 12007: The degree of relation is 43% (P) (Fulfilment of 3 out of 7 Activities). As shown in chart 4, specific practices of this process area meet 3 activities of the 7 that this process of ISO 12207 has defined.

With the early detailed comparisons between a process and a process area, an analysis of the degrees of relationship in the comparison was conducted. According to this analysis, we conclude that this degree is not always possible to establish in both directions. In some cases, in a given direction it loses meaning. An example is shown in Table 5. In this table it does not make sense to establish a degree of relationship in the direction from CMMI to ISO 12007, because it is not correct to say that the Software Audit Process has 100% of fulfilment if only the specific practices SP 1.3 of ATM process area have been carried out. In these cases this row is labelled as Not Applicable.

Table 5. Degree of relationship "Not Applicable" between activities from ISO 12207 and specific practices from CMMI-ACQ.

		ATM (Specific practices)					
		SP 1.1 Select Technical Solutions for Analysis	SP 1.2 Analyze Selected Technical Solutions	SP 1.3 Conduct Technical Reviews	SP 2.1 Select Interfaces to Manage	SP 2.2 Manage Selected Interfaces	*Degree of relation (Direction CMMI to ISO 12207)*
7.2.7 Software Audit Process (Activities)	7.2.7.3.1 Process implementation.			▓			*Not Applicable*
	7.2.7.3.2 Software audit.			▓			
	Degree of relation (Direction ISO 12207-CMMI) 20% (Fulfilment 1 of 5 Specific Practices)						

Regarding to the comparison process, to follow an iterative and incremental procedure to perform the comparison brought some advantages, for example:

- The performing of the comparison starts with a process area, to reduce the complexity and scope of each iteration.
- Each iteration of comparison is short and provides feedback for the next iteration.
- There is an integration of the results of each iteration into the comparison final report.
- With the design of the comparison the iterations can be carried out both independently and in parallel.
- The complexity of each iteration is easier to manage.

5 Conclusions

In this work we have presented a comparison between two reference models: CMMI-ACQ and ISO/IEC 12207:2008. To carry out this comparison in a way systematic, we defined a process for this purpose. To follow this process has helped us to organize and manage the work performed for comparison, with the aim of reduce the two types of error in the comparisons described by Yoo in [9]. For increase the reliability of results, this process proposes using pair review by the performers of the comparison in the task carrying out the comparison, furthermore the reviewer of the comparison validates the result and it resolves the divergences of the performers.

Taking into account the activities and tasks described by the processes of ISO/IEC 12207 for Acquisition and their relationship with six process areas focus on practices which are specific to acquisition of CMMI-ACQ, we can observed that there is a suitable support level to the process areas: Agreement Management, Acquisition Verification, Acquisition Validation, Acquisition Requirements Development and even to the process area of Solicitation and Supplier Agreement Development. However it is low the support level to the Acquisition Technical Management.

We will use specific activities for the definition of goals for a measurement plan in a software enterprise following the Multiview Framework. On the other hand, currently we are working in the definition of a methodology to offer to companies a strategy to harmonization and integration of process entities described by different reference models. The comparison process described in this paper is a component of this methodology of harmonization and integration.

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