

BS ISO/IEC 15504-5:2012



BSI Standards Publication

Information technology — Process assessment

Part 5: An exemplar software
life cycle process assessment model

bsi.

...making excellence a habit.
AVA Documents™
Document Sharing Hub

National foreword

This British Standard is the UK implementation of ISO/IEC 15504-5:2012. It supersedes BS ISO/IEC 15504-5:2006, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/15, Software and systems engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2013.
Published by BSI Standards Limited 2013.

ISBN 978 0 580 76894 1

ICS 35.080

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2013.

Amendments issued since publication

Date	Text affected
------	---------------

**Information technology — Process
assessment —**

**Part 5:
An exemplar software life cycle process
assessment model**

Technologies de l'information — Évaluation des procédés —

*Partie 5: Un exemple de modèle d'évaluation des procédés du cycle de
vie d'un logiciel*



Reference number
ISO/IEC 15504-5:2012(E)

AVA Documents
Document Sharing Hub
© ISO/IEC 2012



COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	vi
Introduction.....	viii
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Overview of the exemplar Process Assessment Model	2
4.1 Introduction.....	2
4.2 Structure of the exemplar Process Assessment Model	3
4.2.1 Processes.....	4
4.2.2 Process dimension.....	9
4.2.3 Capability dimension	9
4.3 Assessment Indicators	10
4.3.1 Process Capability Indicators	12
4.3.2 Process Performance Indicators	13
4.4 Measuring process capability	13
5 The process dimension and process performance indicators (level 1)	15
5.1 Agreement Processes group (AGR)	16
5.1.1 AGR.1 Acquisition Process	16
5.1.2 AGR.1A Acquisition preparation (subprocess).....	17
5.1.3 AGR.1B Supplier selection (subprocess)	18
5.1.4 AGR.1C Agreement monitoring (subprocess)	19
5.1.5 AGR.1D Acquirer acceptance (subprocess).....	20
5.1.6 AGR.2 Supply	21
5.1.7 AGR.2A Supplier tendering (subprocess)	23
5.1.8 AGR.2B Contract agreement (subprocess)	24
5.1.9 AGR.2C Product/service delivery and support (subprocess).....	25
5.1.10 AGR.3 Contract change management.....	27
5.2 Organizational Project-Enabling Processes group (ORG).....	28
5.2.1 ORG.1 Life cycle model management.....	28
5.2.2 ORG.1A Process establishment (subprocess).....	29
5.2.3 ORG.1B Process assessment (subprocess)	31
5.2.4 ORG.1C Process improvement (subprocess)	32
5.2.5 ORG.2 Infrastructure management.....	34
5.2.6 ORG.3 Project portfolio management	35
5.2.7 ORG.4 Human resource management.....	36
5.2.8 ORG.4A Skill development (subprocess)	38
5.2.9 ORG.4B Skill acquisition and provision (subprocess).....	39
5.2.10 ORG.4C Knowledge management (subprocess)	40
5.2.11 ORG.5 Quality management.....	41
5.2.12 ORG.6 Organizational alignment	43
5.2.13 ORG.7 Organization management	44
5.3 Project Processes group (PRO).....	46
5.3.1 PRO.1 Project planning.....	46
5.3.2 PRO.2 Project assessment and control	47
5.3.3 PRO.3 Decision management	49
5.3.4 PRO.4 Risk management.....	50
5.3.5 PRO.5 Configuration management.....	51
5.3.6 PRO.6 Information Management.....	53
5.3.7 PRO.7 Measurement.....	54
5.4 Technical Processes group (ENG)	55

5.4.1	ENG.1 Stakeholder requirements definition	55
5.4.2	ENG.2 System requirements analysis	57
5.4.3	ENG.3 System architectural design	58
5.4.4	ENG.4 Software implementation	60
5.4.5	ENG.5 System integration.....	61
5.4.6	ENG.6 System qualification testing	63
5.4.7	ENG.7 Software installation.....	64
5.4.8	ENG.8 Software acceptance support.....	65
5.4.9	ENG.9 Software operation	66
5.4.10	ENG.9A Operational use (subprocess)	67
5.4.11	ENG.9B Customer support (subprocess)	68
5.4.12	ENG.10 Software maintenance.....	69
5.4.13	ENG.11 Software disposal	71
5.5	Software Implementation Processes group (DEV).....	72
5.5.1	DEV.1 Software requirements analysis	72
5.5.2	DEV.2 Software architectural design	74
5.5.3	DEV.3 Software detailed design	75
5.5.4	DEV.4 Software construction	76
5.5.5	DEV.5 Software integration.....	77
5.5.6	DEV.6 Software qualification testing	79
5.6	Software Support Processes group (SUP).....	80
5.6.1	SUP.1 Software documentation management	80
5.6.2	SUP.2 Software configuration management.....	81
5.6.3	SUP.3 Software quality assurance.....	83
5.6.4	SUP.4 Software verification	84
5.6.5	SUP.5 Software validation	86
5.6.6	SUP.6 Software review	87
5.6.7	SUP.7 Software audit.....	88
5.6.8	SUP.8 Software problem resolution.....	90
5.7	Software Reuse Processes group (REU)	91
5.7.1	REU.1 Domain engineering.....	91
5.7.2	REU.2 Reuse asset management.....	93
5.7.3	REU.3 Reuse program management.....	94
6	Process capability indicators (level 1 to 5)	96
6.1	Level 1: Performed process.....	96
6.1.1	PA 1.1 Process performance attribute.	96
6.2	Level 2: Managed process	96
6.2.1	PA 2.1 Performance management attribute	97
6.2.2	PA 2.2 Work product management attribute.....	99
6.3	Level 3: Established process	101
6.3.1	PA 3.1 Process definition attribute	101
6.3.2	PA 3.2 Process deployment attribute	103
6.4	Level 4: Predictable process	105
6.4.1	PA 4.1 Process measurement attribute	105
6.4.2	PA 4.2 Process control attribute	108
6.5	Level 5: Optimizing process	109
6.5.1	PA 5.1 Process innovation attribute	109
6.5.2	PA 5.2 Process optimization attribute	112
6.6	Related Processes for Process Attributes	113
Annex A	(informative) Conformity of the exemplar Process Assessment Model	115
A.1	Introduction	115
A.2	Requirements for Process Assessment Models (from ISO/IEC 15504-2)	115
A.2.1	Introduction	115
A.2.2	Process Assessment Model scope.....	115
A.2.3	Process Assessment Model elements and indicators.....	116
A.2.4	Mapping Process Assessment Models to Process Reference Models.....	116
A.2.5	Expression of assessment results.....	119
Annex B	(informative) Work product characteristics	120

B.1	Generic Work products.....	121
B.2	Generic and specific work products	126
Annex C	(informative) Adaptation of the assessment model.....	183
C.1	Assessment indicators identification.....	183
C.1.1	Base practices	183
C.1.2	Generic practices	184
C.2	Adaptation of the exemplar process assessment model.....	185
C.2.1	Adding to or removing processes from the process dimension.....	185
C.2.2	Identifying process performance indicators for a new process	185
Annex D	(informative) Supplementary process definitions.....	187
D.1	Supplementary processes.....	187
D.1.1	QNT.1 Quantitative process improvement.....	187
D.1.2	QNT.2 Quantitative performance management.....	190
D.1.3	SUP.9 Software change request management.....	192
D.1.4	AGR.2D Product release (subprocess)	193
D.1.5	AGR.2E Product/service acceptance support (subprocess)	194
	Bibliography.....	196

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 15504-5 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 7, *Software and systems engineering*.

This second edition cancels and replaces the first edition (ISO/IEC 15504-5:2006), which has been revised as follows:

- Clause 2 has been modified by updating the reference to ISO/IEC 12207;
- Clauses 4 and 5 have been replaced with new text;
- 6.6 has been replaced with new text;
- B.2 has been replaced with new text;
- a new Annex D – Supplementary process definitions has been added;
- the Bibliography has been updated to reflect current versions of works referenced.

ISO/IEC 15504 consists of the following parts, under the general title *Information technology — Process assessment*:

- *Part 1: Concepts and vocabulary*
- *Part 2: Performing an assessment*
- *Part 3: Guidance on performing an assessment*
- *Part 4: Guidance on use for process improvement and process capability determination*
- *Part 5: An exemplar software life cycle process assessment model*
- *Part 6: An exemplar system life cycle process assessment model* [Technical Report]
- *Part 7: Assessment of organizational maturity* [Technical Report]

- *Part 9: Target process profiles* [Technical Specification]
- *Part 10: Safety extension* [Technical Specification]

The following part is under preparation:

- *Part 8: An exemplar process assessment model for IT service management* [Technical Report]

Introduction

An integral part of conducting an assessment is to use a Process Assessment Model constructed for that purpose, related to a Process Reference Model and conformant with the requirements defined in ISO/IEC 15504-2. ISO/IEC 15504-2 provides a framework for process assessment and sets out the minimum requirements for performing an assessment in order to ensure consistency and repeatability of the ratings.

A Process Reference Model cannot be used alone as the basis for conducting consistent and reliable assessments of process capability since the level of detail is not sufficient. Therefore:

- the descriptions of process purpose and process outcomes provided by the Process Reference Model need to be supported with a comprehensive set of indicators of process performance; and
- the capability levels and process attributes defined in ISO/IEC 15504-2 and its associated rating scale need to be supported with a set of indicators of process capability.

Used in this way, in conjunction with a documented process, consistent and repeatable ratings of process capability will be possible.

The ISO/IEC 15504-5 exemplar Process Assessment Model contains a set of indicators to be considered when interpreting the intent of the Process Reference Model. These indicators may also be used when implementing a process improvement program or to help evaluate and select an assessment model, method, methodology or tools.

The Process Reference Model defined in ISO/IEC 12207:2008 has been used as the basis for the ISO/IEC 15504-5 exemplar software life cycle Process Assessment Model.

As an exemplar, this Process Assessment Model embodies the core characteristics that could be expected of any Process Assessment Model consistent with ISO/IEC 15504-2. Nevertheless, use of this Process Assessment Model is not required to meet the requirements of ISO/IEC 15504; any other Process Assessment Models meeting the requirements of ISO/IEC 15504-2 may be used in a conformant assessment.

Information technology — Process assessment —

Part 5:

An exemplar software life cycle process assessment model

1 Scope

This part of ISO/IEC 15504 provides an example of a Process Assessment Model for use in performing a conformant assessment in accordance with the requirements of ISO/IEC 15504-2.

This part of ISO/IEC 15504 is structured as follows.

- Clause 4 provides a detailed description of the structure and key components of the Process Assessment Model, which includes two dimensions: a process dimension and a capability dimension; assessment indicators are introduced in this clause.
- Clause 5 addresses the process dimension. It uses process definitions from ISO/IEC 12207:2008 to identify a Process Reference Model. The processes of the Process Reference Model are described in the Process Assessment Model in terms of purpose and outcomes and are grouped in three process categories. The Process Assessment Model expands the Process Reference Model process definitions by including a set of process performance indicators called base practices for each process. The Process Assessment Model also defines a second set of indicators of process performance by associating work products with each process. Annex B is also linked directly to Clause 5 as it defines the work product characteristics.
- Clause 6 addresses the capability dimension. It duplicates the definitions of the capability levels and process attributes from ISO/IEC 15504-2, and expands each of the nine attributes through the inclusion of a set of generic practices. These generic practices belong to a set of indicators of process capability, in association with generic resource indicators, and generic work product indicators.
- Annex A provides a statement of conformance of the Process Assessment Model to the requirements defined in ISO/IEC 15504-2.
- Annex B provides selected characteristics for typical work products to assist the assessor in evaluating the capability level of processes.
- Annex C contains style guides for defining base practices, work products and generic practices for adjusting the Process Assessment Model, and guidance explaining how to expand or adapt the model.
- Annex D presents some processes supplementary to the Process Assessment Model.

NOTE Copyright release for the Exemplar Process Assessment Model: Users of this part of ISO/IEC 15504 may freely reproduce the detailed descriptions contained in the exemplar assessment model as part of any tool or other material to support the performance of process assessments, so that it can be used for its intended purpose.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 12207:2008, *Systems and software engineering — Software life cycle processes*

ISO/IEC 15504-1:2004, *Information technology — Process assessment — Part 1: Concepts and vocabulary*

ISO/IEC 15504-2:2003, *Information technology — Process assessment — Part 2: Performing an assessment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 15504-1 apply.

4 Overview of the exemplar Process Assessment Model

4.1 Introduction

This part of ISO/IEC 15504 provides an exemplar Process Assessment Model that includes examples of assessment indicators.

A Process Assessment Model comprises a set of indicators of process performance and process capability. The indicators are used as a basis for collecting the objective evidence that enables an assessor to assign ratings. The set of indicators included in this part of ISO/IEC 15504 is not intended to be an all-inclusive set nor is it intended to be applicable in its entirety. Subsets that are appropriate to the context and scope of the assessment should be selected, and possibly augmented with additional indicators (see Annex C).

Any Process Assessment Model meeting the requirements defined in ISO/IEC 15504-2 concerning models for process assessment may be used for assessment. Different models and methods may be needed to address differing business needs. The assessment model in this part of ISO/IEC 15504 is provided as an exemplar of a model meeting all the requirements expressed in ISO/IEC 15504-2.

The Process Reference Model defined in ISO/IEC 12207:2008 and associated with the process attributes defined in ISO/IEC 15504-2, establish a Process Assessment Model used as a common basis for performing assessments of software engineering process capability, allowing for the reporting of results using a common rating scale.

The Process Assessment Model is a two-dimensional model of process capability. In one dimension, the process dimension, the processes are defined and classified into process categories. In the other dimension, the capability dimension, a set of process attributes grouped into capability levels is defined. The process attributes provide the measurable characteristics of process capability.

Figure 1 shows the relationship between the general structure of the Process Assessment Model, ISO/IEC 15504-2 and ISO/IEC 12207:2008.

The Process Reference Model and the capability dimension defined in ISO/IEC 15504-2 cannot be used alone as the basis for conducting reliable and consistent assessments of process capability since the level of detail provided is not sufficient. The descriptions of process purpose and outcomes in the Process Reference Model, and the process attribute definitions in ISO/IEC 15504-2, need to be supported with a comprehensive set of indicators of process performance and process capability that are used for assessment performance.

The exemplar Process Assessment Model defined in this part of ISO/IEC 15504 is conformant with the ISO/IEC 15504-2 requirements for a Process Assessment Model, and can be used as the basis for conducting an assessment of software engineering process capability.

In order to meet the requirements of ISO/IEC 15504-2, a documented process supporting other requirements of ISO/IEC 15504-2 is also required. This need may be met, for example, by the adoption of a supporting method for conducting assessments.

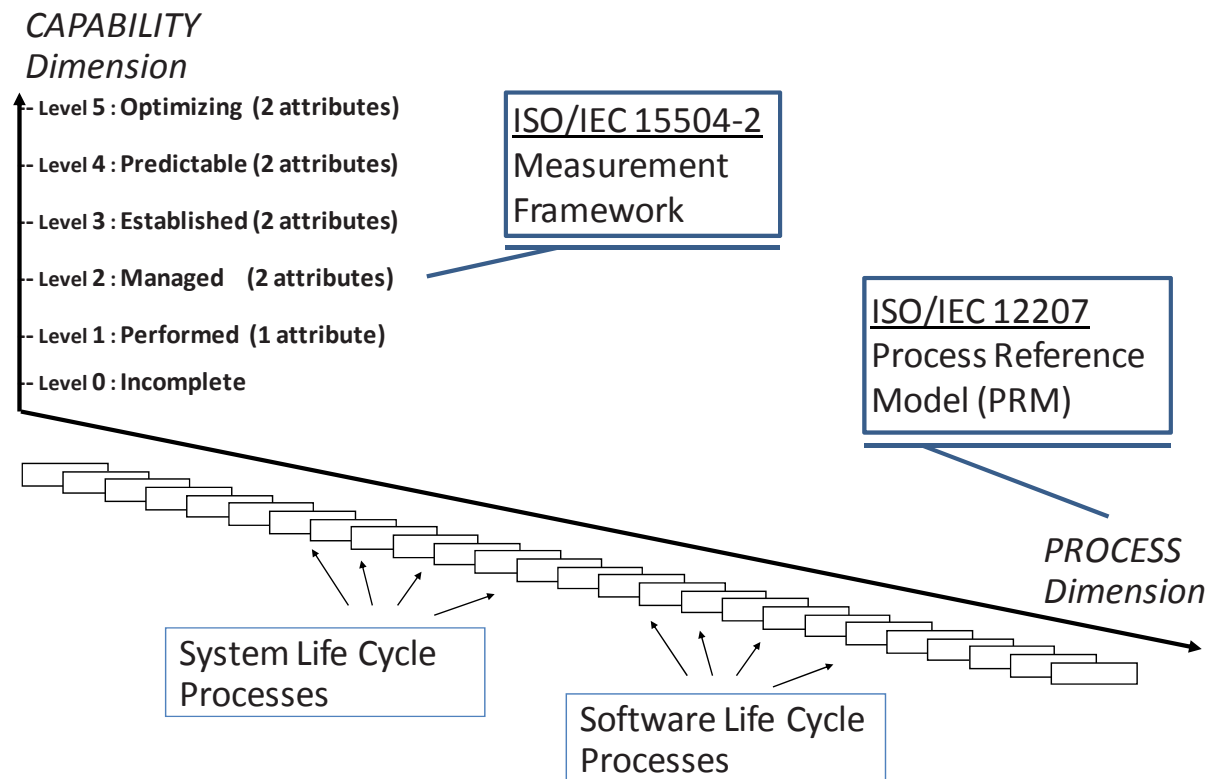


Figure 1 — Relationship between the Process Assessment Model and its inputs

4.2 Structure of the exemplar Process Assessment Model

This clause describes the detailed structure of the Process Assessment Model and its key components.

This Process Assessment Model expands upon the Process Reference Model by adding the definition and use of assessment indicators. Assessment indicators comprise indicators of process performance and process capability and are defined to support an assessor's judgment of the performance and capability of an implemented process.

Clause 5, together with its associated Annex B, describes the components of the process dimension, and clause 6 describes the components of the capability dimension. Annex A provides a demonstration of conformity that meets the requirements of ISO/IEC 15504-2.

ISO/IEC 15504-2 requires that processes included in a Process Reference Model satisfy the following:

"The fundamental elements of a Process Reference Model are the set of descriptions of the processes within the scope of the model. These process descriptions shall meet the following requirements:

- a) A process shall be described in terms of its Purpose and Outcomes.*
- b) In any description the set of process outcomes shall be necessary and sufficient to achieve the purpose of the process.*
- c) Process descriptions shall be such that no aspects of the measurement framework as described in clause 5 of this International Standard beyond level 1 are contained or implied."*

As processes are derived directly from ISO/IEC 12207:2008, these requirements are satisfied.

The Process Assessment Model includes processes, which are grouped in two process categories, similar to the process categories defined in ISO/IEC 12207:2008, which are:

- the System life cycle processes category; and
- the Software life cycle processes category.

Within a process category, processes are grouped at a second level according to the type of activity they address: the processes included in the same group contribute to a complementary area. These groups are defined in order to help assessors in defining the assessment scope in term of process selection.

4.2.1 Processes

Figure 2 lists the processes from ISO/IEC 12207:2008 that are included in the process dimension of the exemplar Process Assessment Model, and show their classification (for the purpose of this Process Assessment Model) into Process Categories and Process Groups.

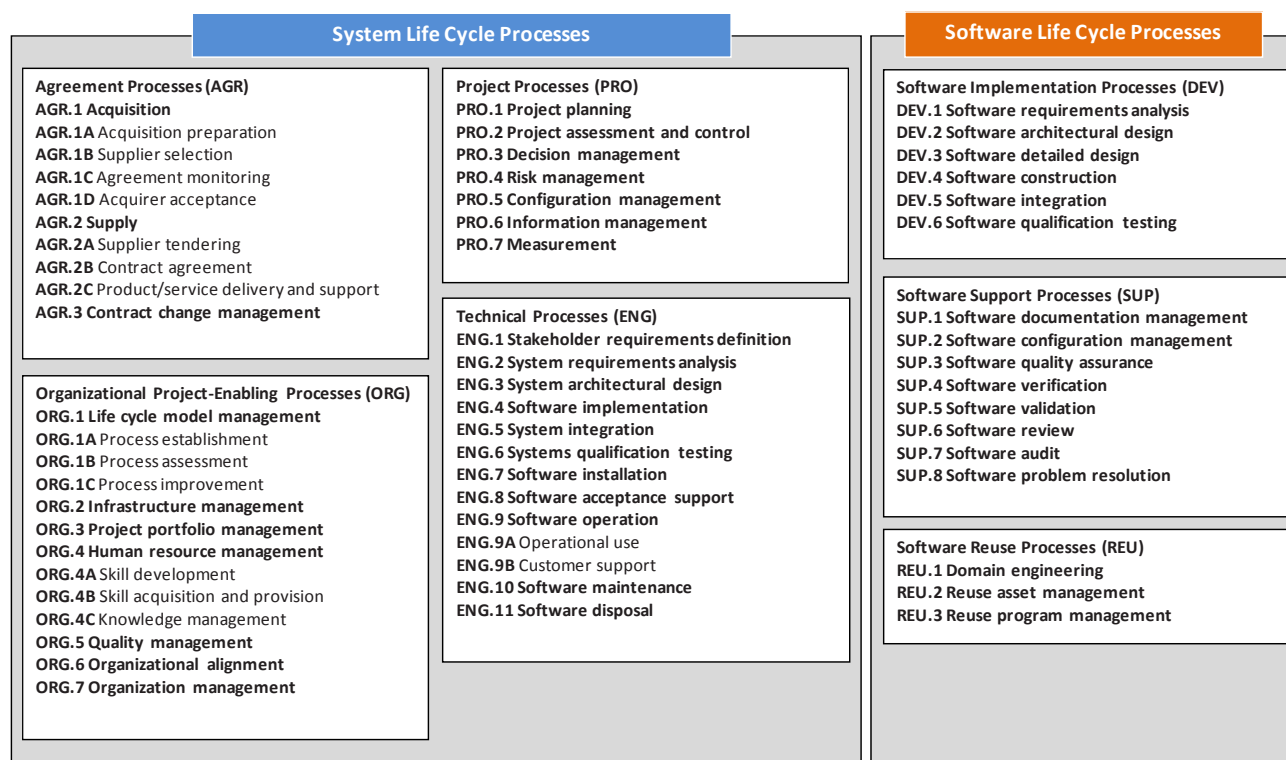


Figure 2 — Process Categories and Process Groups

The description of each Process Group includes a characterization of the processes it contains, followed by a list of the processes. Each process belonging to a Group is identified with a Process Identifier [ID] consisting of the Group abbreviated name and a sequential number of the process in that Group.

The Process Categories and Process Groups are described in more detail below.

4.2.1.1 System Life Cycle Processes Category

The **System Life Cycle Processes** consist of processes that serve primary parties during the life cycle of a system or software product. A primary party initiates or performs the development, operation, or maintenance of products. These primary parties are the acquirer, the supplier, the developer, the operator, and the maintainer of products.

The System Life Cycle Processes Category contains the following four groups of processes:

- the Agreement Processes group;;
- the Organizational Project-Enabling Processes group;
- the Project Processes group;
- the Technical Processes group.

The **Agreement Processes** (AGR) define the activities necessary to establish an agreement between two organizations. If the Acquisition Process is invoked, it provides the means for conducting business with a supplier of products that are supplied for use as an operational system, of services in support of an operational system, or of elements of a system being developed by a project. If the Supply Process is invoked, it provides the means for conducting a project in which the result is a product or service that is delivered to the acquirer. [ISO/IEC 12207:2008]

This group includes the processes listed in Table 1.

NOTE: A supplier may also act as a customer when acquiring a product and/or service from another supplier.

Table 1 — System Life Cycle Processes - Agreement Processes

Process Identification	Process name	Source
AGR.1	Acquisition	ISO/IEC 12207:2008, 6.1.1
AGR.1A	Acquisition preparation (subprocess)	ISO/IEC 12207:2008, B.3.1.1
AGR.1B	Supplier selection (subprocess)	ISO/IEC 12207:2008, B.3.1.2
AGR.1C	Agreement monitoring (subprocess)	ISO/IEC 12207:2008, B.3.1.3
AGR.1D	Acquirer acceptance (subprocess)	ISO/IEC 12207:2008, B.3.1.4
AGR.2	Supply	ISO/IEC 12207:2008, 6.1.2
AGR.2A	Supplier tendering (subprocess)	ISO/IEC 12207:2008, B.3.2.1
AGR.2B	Contract agreement (subprocess)	ISO/IEC 12207:2008, B.3.2.2
AGR.2C	Product/service delivery and support (subprocess)	ISO/IEC 12207:2008, B.3.2.3
AGR.3	Contract change management	ISO/IEC 12207:2008, F.3

The **Organizational Project-Enabling Processes** (ORG) manage the organization's capability to acquire and supply products or services through the initiation, support and control of projects. They provide resources and infrastructure necessary to support projects and ensure the satisfaction of organizational objectives and established agreements. They are not intended to be a comprehensive set of business processes that enable management of the organization's business. [ISO/IEC 12207:2008]

This group includes the processes listed in Table 2.

Table 2 — System Life Cycle Processes - Organizational Project-Enabling Processes

Process Identification	Process name	Source
ORG.1	Life cycle model management	ISO/IEC 12207:2008, 6.2.1
ORG.1A	Process establishment (subprocess)	ISO/IEC 12207:2008, B.3.3.1
ORG.1B	Process assessment (subprocess)	ISO/IEC 12207:2008, B.3.3.2
ORG.1C	Process improvement (subprocess)	ISO/IEC 12207:2008, B.3.3.3
ORG.2	Infrastructure management	ISO/IEC 12207:2008, 6.2.2
ORG.3	Project portfolio management	ISO/IEC 12207:2008, 6.2.3
ORG.4	Human resource management	ISO/IEC 12207:2008, 6.2.4
ORG.4A	Skill development (subprocess)	ISO/IEC 12207:2008, B.3.4.1
ORG.4B	Skill acquisition and provision (subprocess)	ISO/IEC 12207:2008, B.3.4.2
ORG.4C	Knowledge management (subprocess)	ISO/IEC 12207:2008, B.3.4.3
ORG.5	Quality management	ISO/IEC 12207:2008, 6.2.5
ORG.6	Organizational alignment	ISO/IEC 12207:2008, F.1
ORG.7	Organization management	ISO/IEC 12207:2008, F.2

There are two categories of the **Project Processes** (PRO). The Project Management Processes are used to plan, execute, assess and control the progress of a project. The Project Support Processes support specialized management objectives. [ISO/IEC 12207:2008]

The Project Management Processes (PRO.1 and PRO.2) are used to establish and evolve project plans, to assess actual achievement and progress against the plans and to control execution of the project through to fulfilment. Individual Project Management Processes may be invoked at any time in the life cycle and at any level in a hierarchy of projects, as required by project plans or unforeseen events. The Project Management Processes are applied with a level of rigor and formality that depends on the risk and complexity of the project.

The Project Support Processes (PRO.3, PRO.4, PRO.5, PRO.6 and PRO.7) provide a specific focused set of tasks for performing a specialized management objective. They are all evident in the management of any undertaking, ranging from a complete organization down to a single life cycle process and its tasks.

This group includes the processes listed in Table 3.

Table 3 — System Life Cycle Processes - Project Processes

Process Identification	Process name	Source
PRO.1	Project planning	ISO/IEC 12207:2008, 6.3.1
PRO.2	Project assessment and control	ISO/IEC 12207:2008, 6.3.2
PRO.3	Decision management	ISO/IEC 12207:2008, 6.3.3
PRO.4	Risk management	ISO/IEC 12207:2008, 6.3.4
PRO.5	Configuration management	ISO/IEC 12207:2008, 6.3.5
PRO.6	Information management	ISO/IEC 12207:2008, 6.3.6
PRO.7	Measurement	ISO/IEC 12207:2008, 6.3.7

The **Technical Processes** (ENG) are used to define the requirements for a system, to transform the requirements into an effective product, to permit consistent reproduction of the product where necessary, to use the product, to provide the required services, to sustain the provision of those services and to dispose of the product when it is retired from service.

The Technical Processes define the activities that enable organizational and project functions to optimize the benefits and reduce the risks that arise from technical decisions and actions. These activities enable products and services to possess the timeliness and availability, the cost effectiveness, and the functionality, reliability, maintainability, producibility, usability and other qualities required by acquiring and supplying organizations.

They also enable products and services to conform to the expectations or legislated requirements of society, including health, safety, security and environmental factors. [ISO/IEC 12207:2008]

This group includes the processes listed in Table 4.

Table 4 — System Life Cycle Processes - Technical Processes

Process Identification	Process name	Source
ENG.1	Stakeholder requirements definition	ISO/IEC 12207:2008, 6.4.1
ENG.2	System requirements analysis	ISO/IEC 12207:2008, 6.4.2
ENG.3	System architectural design	ISO/IEC 12207:2008, 6.4.3
ENG.4	Software implementation	ISO/IEC 12207:2008, 7.1.1
ENG.5	System integration	ISO/IEC 12207:2008, 6.4.5
ENG.6	Systems qualification testing	ISO/IEC 12207:2008, 6.4.6
ENG.7	Software installation	ISO/IEC 12207:2008, 6.4.7
ENG.8	Software acceptance support	ISO/IEC 12207:2008, 6.4.8
ENG.9	Software operation	ISO/IEC 12207:2008, 6.4.9
ENG.9A	Operational use (subprocess)	ISO/IEC 12207:2008, B.3.5.1
ENG.9B	Customer support (subprocess)	ISO/IEC 12207:2008, B.3.5.2
ENG.10	Software maintenance	ISO/IEC 12207:2008, 6.4.10
ENG.11	Software disposal	ISO/IEC 12207:2008, 6.4.11

4.2.1.2 Software Life Cycle Processes Category

The **Software Life Cycle Processes** consist of software specific processes that serve the stakeholders during the life cycle of a software product.

The Software Life Cycle Processes Category contains the following three groups of processes:

- the Software Implementation Processes group;
- the Software Support Processes group;
- the Software Reuse Processes group.

The **Software Implementation Processes** (DEV) are used to produce a specified system element (software item) implemented in software. Those processes transform specified behaviour, interfaces and implementation constraints into implementation actions resulting in a system element that satisfies the requirements derived from the system requirements. [ISO/IEC 12207:2008]

This group includes the processes listed in Table 5.

Table 5 — Software Life Cycle Processes - Software Implementation Processes

Process Identification	Process name	Source
DEV.1	Software requirements analysis	ISO/IEC 12207:2008, 7.1.2
DEV.2	Software architectural design	ISO/IEC 12207:2008, 7.1.3
DEV.3	Software detailed design	ISO/IEC 12207:2008, 7.1.4
DEV.4	Software construction	ISO/IEC 12207:2008, 7.1.5
DEV.5	Software integration	ISO/IEC 12207:2008, 7.1.6
DEV.6	Software qualification testing	ISO/IEC 12207:2008, 7.1.7

The **Software Support Processes** (SUP) provide a specific focused set of activities for performing a specialized software process. A supporting process assists the Software Implementation Process as an integral part with a distinct purpose, contributing to the success and quality of the software project. of processes which support another software specific process as an integral part of it, having a distinct purpose which contributes to the success and quality of the software project. A supporting process is employed and executed, as needed, by another process. [ISO/IEC 12207:2008]

This group includes the processes listed in Table 6.

Table 6 — Software Life Cycle Processes - Software Support Processes

Process Identification	Process name	Source
SUP.1	Software documentation management	ISO/IEC 12207:2008, 7.2.1
SUP.2	Software configuration management	ISO/IEC 12207:2008, 7.2.2
SUP.3	Software quality assurance	ISO/IEC 12207:2008, 7.2.3
SUP.4	Software verification	ISO/IEC 12207:2008, 7.2.4
SUP.5	Software validation	ISO/IEC 12207:2008, 7.2.5
SUP.6	Software review	ISO/IEC 12207:2008, 7.2.6
SUP.7	Software audit	ISO/IEC 12207:2008, 7.2.7
SUP.8	Software problem resolution	ISO/IEC 12207:2008, 7.2.8

The **Software Reuse Processes** group (REU) consists of processes that support an organization's ability to reuse software items across project boundaries. These processes are unique because, by their nature, they operate outside the bounds of any particular project. [ISO/IEC 12207:2008]

This group includes the processes listed in Table 7.

Table 7 — Software Life Cycle Processes - Software Reuse Processes

Process Identification	Process name	Source
REU.1	Domain engineering	ISO/IEC 12207:2008, 7.3.1
REU.2	Reuse asset management	ISO/IEC 12207:2008, 7.3.2
REU.3	Reuse program management	ISO/IEC 12207:2008, 7.3.3

4.2.2 Process dimension

For the process dimension, all the processes in Figure 2 are included within the process dimension of the Process Assessment Model. The processes are classified into Process Categories and Process Groups. There are two Process Categories: System Life Cycle Processes and Software Life Cycle Processes. Each process in the Process Assessment Model is described in terms of a purpose statement. These statements contain the unique functional objectives of the process when performed in a particular environment. A list of specific outcomes is associated with each of the process purpose statements, as a list of expected positive results of the process performance.

Satisfying the purpose statements of a process represents the first step in building a level 1 process capability where the expected outcomes are observable. The Process Groups and their associated processes are described in clause 5.

4.2.3 Capability dimension

For the capability dimension, the process capability levels and process attributes are identical to those defined in ISO/IEC 15504-2.

Evolving process capability is expressed in the Process Assessment Model in terms of process attributes grouped into capability levels. Process attributes are features of a process that can be evaluated on a scale of achievement, providing a measure of the capability of the process. They are applicable to all processes. Each process attribute describes a facet of the overall capability of managing and improving the effectiveness of a process in achieving its purpose and contributing to the business goals of the organization.

A capability level is a set of process attribute(s) that work together to provide a major enhancement in the capability to perform a process. The levels constitute a rational way of progressing through improvement of the capability of any process and are defined in ISO/IEC 15504-2.

There are six capability levels, incorporating nine process attributes.

Level 0: Incomplete process

The process is not implemented, or fails to achieve its process purpose.

At this level, there is little or no evidence of any systematic achievement of the process purpose.

Level 1: Performed process

The implemented process achieves its process purpose.

Level 2: Managed process

The previously described Performed process is now implemented in a managed fashion (planned, monitored and adjusted) and its work products are appropriately established, controlled and maintained.

Level 3: Established process

The previously described Managed process is now implemented using a defined process that is capable of achieving its process outcomes.

Level 4: Predictable process

The previously described Established process now operates within defined limits to achieve its process outcomes.

Level 5: Optimizing process

The previously described Predictable process is continuously improved to meet relevant current and projected business goals.

Within the Process Assessment Model, the measure of capability is based upon the nine process attributes (PA) defined in ISO/IEC 15504-2. Process attributes are used to determine whether a process has reached a given capability. Each attribute measures a particular aspect of the process capability.

At each level there is no ordering between the process attributes; each attribute addresses a specific aspect of the capability level. The list of process attributes is shown in Table 10.

Table 10 — Capability levels and process attributes

Process Attribute ID	Capability Levels and Process Attributes
	Level 0: Incomplete process
	Level 1: Performed process
PA 1.1	Process performance
	Level 2: Managed process
PA 2.1	Performance management
PA 2.2	Work product management
	Level 3: Established process
PA 3.1	Process definition
PA 3.2	Process deployment
	Level 4: Predictable process
PA 4.1	Process measurement
PA 4.2	Process control
	Level 5: Optimizing process
PA 5.1	Process innovation
PA 5.2	Continuous optimization

The process attributes are evaluated on a four point ordinal scale of achievement, as defined in ISO/IEC 15504-2. They provide insight into the specific aspects of process capability required to support process improvement and capability determination.

4.3 Assessment Indicators

The Process Assessment Model is based on the principle that the capability of a process can be assessed by demonstrating the achievement of process attributes on the basis of evidences related to assessment indicators.

There are two types of assessment indicators: process capability indicators, which apply to capability levels 1 to 5 and process performance indicators, which apply exclusively to capability level 1. These indicators are defined in Clause 4.3.2.

The process attributes in the capability dimension have a set of process capability indicators that provide an indication of the extent of achievement of the attribute in the instantiated process. These indicators concern significant activities, resources or results associated with the achievement of the attribute purpose by a process.

The process capability indicators are:

- Generic Practice (GP);
- Generic Resource (GR);
- Generic Work Product (GWP).

As additional indicators for supporting the assessment of a process at Level 1, each process in the process dimension has a set of process performance indicators which is used to measure the degree of achievement of the process performance attribute for the process assessed.

The process performance indicators are:

- Base Practice (BP);
- Work Product (WP).

The performance of Base Practices (BPs) provides an indication of the extent of achievement of the process purpose and process outcomes. Work Products (WPs) are either used or produced (or both), when performing the process.

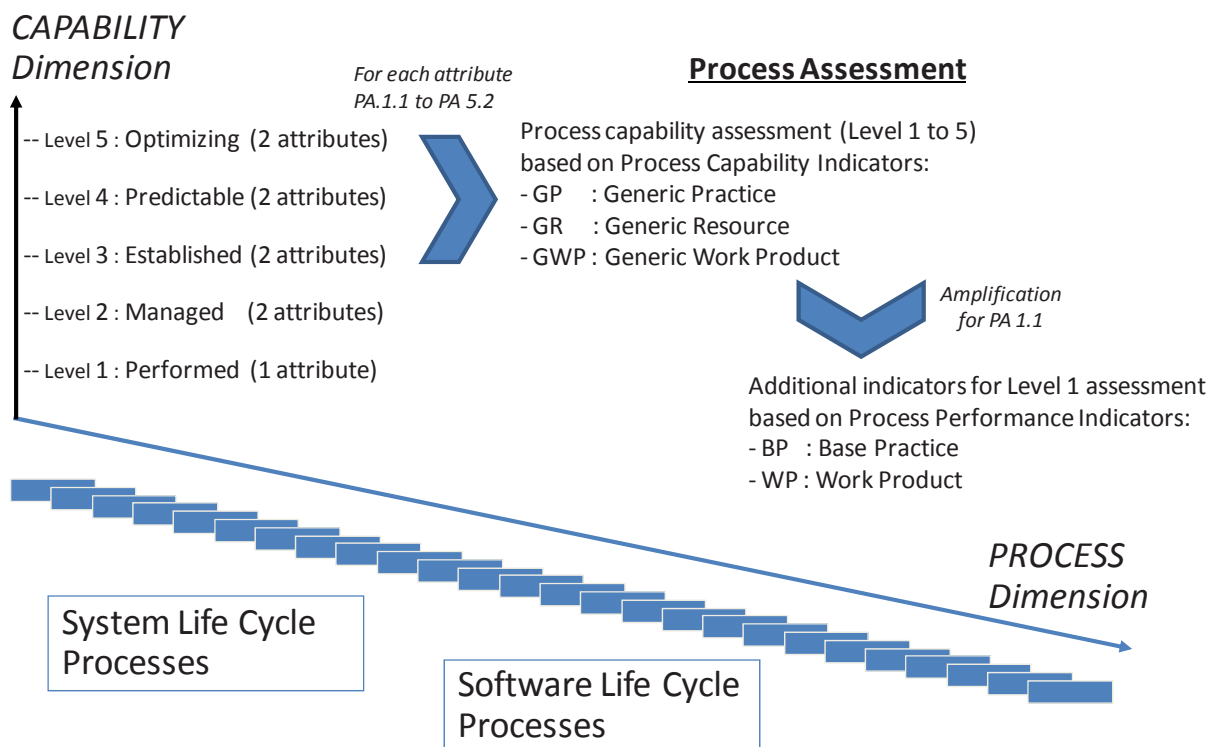


Figure 3 — Assessment indicators

The process performance and process capability indicators defined in the Process Assessment Model represent types of objective evidence that might be found in an instantiation of a process and therefore could be used to judge achievement of capability.

Figure 3 shows how the assessment indicators are related to process performance and process capability.

4.3.1 Process Capability Indicators

The three types of process capability indicators related to levels 1 to 5 are identified in Figure 4. They are intended to be applicable to all processes.

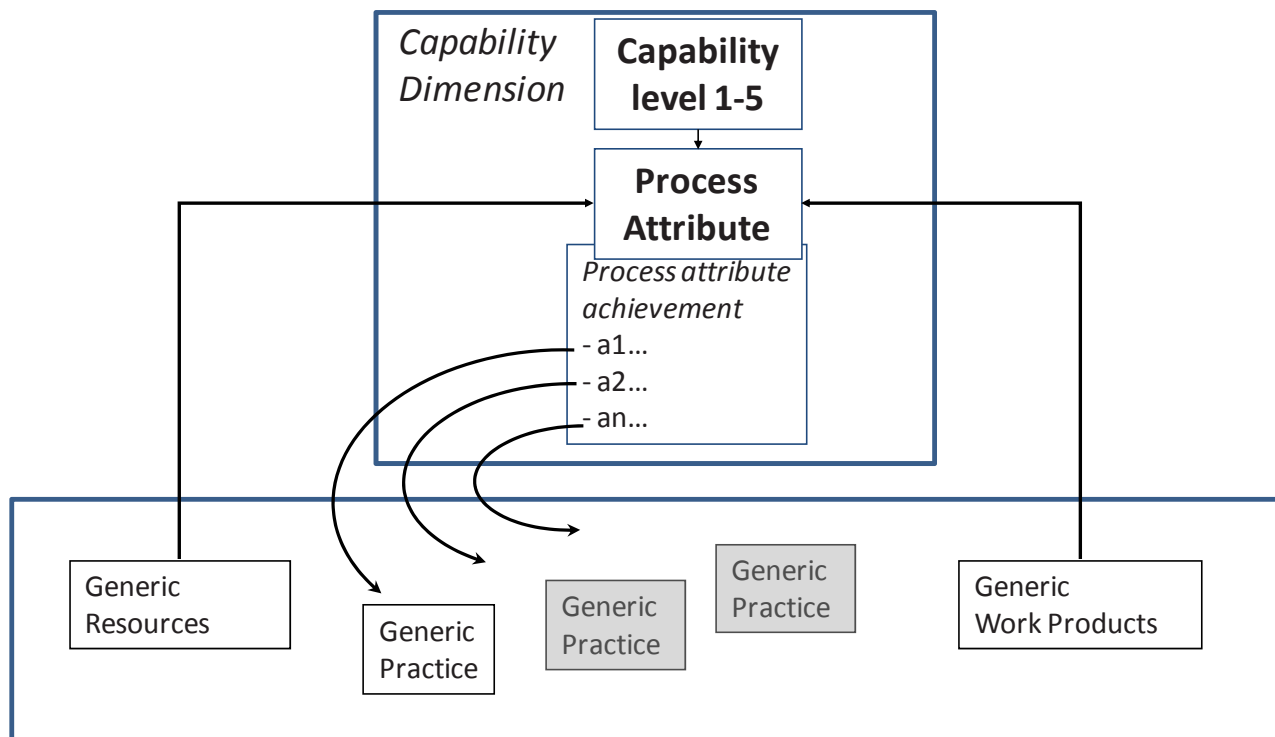


Figure 4 — Process capability indicators

All the process capability indicators relate to the process attributes defined in the capability dimension of the Process Assessment Model. They represent the type of evidence that would support judgments of the extent to which the attributes are achieved. Evidence of their effective performance or existence supports the judgment of the degree of achievement of the attribute. The generic practices are the principal indicators of process capability.

The **Generic Practice (GP)** indicators are activities of a generic type and provide guidance on the implementation of the attribute's characteristics. They support the achievement of the process attribute and many of them concern management practices, i.e. practices that are established to support the process performance as it is characterized at level 1.

During the evaluation of process capability, the primary focus is on the performance of the generic practices. In general, performance of all generic practices is expected for full achievement of the process attribute.

The **Generic Resource (GR)** indicators are associated resources that may be used when performing the process in order to achieve the attribute. These resources may include human resources, tools, methods and infrastructure. The availability of a resource indicates the potential to fulfil the purpose of a specific attribute.

NOTE: The assessor should interpret the generic resources according to the process assessed; e.g. for PA2.1 resources (with identified objectives, responsibilities and authorities), an assessor would look for roles (with identified objectives, responsibilities and authorities) in primary and supporting processes, but for organisational processes would

look for governance structures (e.g. mandated committees, positions) with identified objectives, responsibilities and authorities.

The **Generic Work Product (GWP)** indicators are sets of characteristics that would be expected to be evident in work products of generic types as a result of achievement of an attribute. The generic work products form the basis for the classification of the work products defined as process performance indicators; they represent basic types of work products that may be inputs to or outputs from all types of process.

These three types of indicators help to establish objective evidence of the extent of achievement of the specified process attribute.

Due to the fact that Level 1 capability of a process is only characterized by the measure of the extent to which the process purpose is achieved, the process performance attribute (PA.1.1) has a single generic practice indicator (GP.1.1.1). In order to support the assessment of PA.1.1 and to amplify the process performance achievement analysis, additional process performance indicators are defined in the Process Assessment Model.

4.3.2 Process Performance Indicators

There are two types of process performance indicators; **Base Practice (BP)** indicators and **Work Product (WP)** indicators. Process performance indicators relate to individual processes defined in the process dimension of the Process Assessment Model and are chosen to explicitly address the achievement of the defined process purpose.

Evidence of performance of the base practices, and the presence of work products with their expected work product characteristics, provide objective evidence of the achievement of the purpose of the process.

A base practice is an activity that addresses the purpose of a particular process. Consistently performing the base practices associated with a process will help the consistent achievement of its purpose. A coherent set of base practices is associated with each process in the process dimension. The base practices are described at an abstract level, identifying "what" should be done without specifying "how". Implementing the base practices of a process should achieve the basic outcomes that reflect the process purpose. Base practices represent only the first step in building process capability, but the base practices represent the unique, functional activities of the process, even if that performance is not systematic. The performance of a process produces work products that are identifiable and usable in achieving the purpose of the process. In this assessment model, each work product has a defined set of example work product characteristics that may be used when reviewing the work product to assess the effective performance of a process. Work product characteristics may be used to identify the corresponding work product produced/used by the assessed organization.

Clause 5 contains a complete description of the processes, including the base practices and the associated work products.

Annex B.1 contains a list of generic work products together with the work product characteristics.

Annex B.2 contains a complete list of specific work products, with the generic work products for completeness. Similar to the concept of modularity in object orientation, the shared characteristics of a group of work products have been extracted into a generic work product. An assessor would refer to both the specific work product and the generic work product in the context of the specific work product (e.g. 02-01 Commitment / agreement characteristics + 02-00 Contract characteristics) when performing an assessment.

4.4 Measuring process capability

The process performance and process capability indicators in this model give examples of evidence that an assessor might obtain, or observe, in the performance of an assessment. The evidence obtained in the assessment, through observation of the implemented process, can be mapped onto the set of indicators to enable correlation between the implemented process and the processes defined in this assessment model. These indicators provide guidance for assessors in accumulating the necessary objective evidence to support judgments of capability. They are not intended to be regarded as a mandatory set of checklists to be followed.

An indicator is defined as an objective characteristic of a practice or work product that supports the judgment of the performance or capability of an implemented process. The assessment indicators, and their relationship to process performance and process capability, are shown in Figure 5.

Assessment indicators are used to confirm that certain practices were performed, as shown by observable evidence collected during an assessment. All such evidence comes either from the examination of work products of the processes assessed, or from statements made by the performers and managers of the processes.

The existence of base practices, work products, and work product characteristics, provide evidence of the performance of the processes associated with them. Similarly, the existence of process capability indicators provides evidence of process capability.

The evidence obtained should be recorded in a form that clearly relates to an associated indicator, so that the support for the assessor's judgment can be readily confirmed or verified as required by ISO/IEC 15504-2.

The output from a process assessment is a set of process profiles, one for each process within the scope of the assessment. A typical process profile is illustrated in ISO/IEC 15504-4. Each process profile consists of a set of the process attribute ratings for an assessed process. Each attribute rating represents a judgment by the assessor of the extent to which the attribute is achieved. To improve the reliability and repeatability of the assessment, the judgments of the assessor are based on a coherent set of recorded objective evidences.

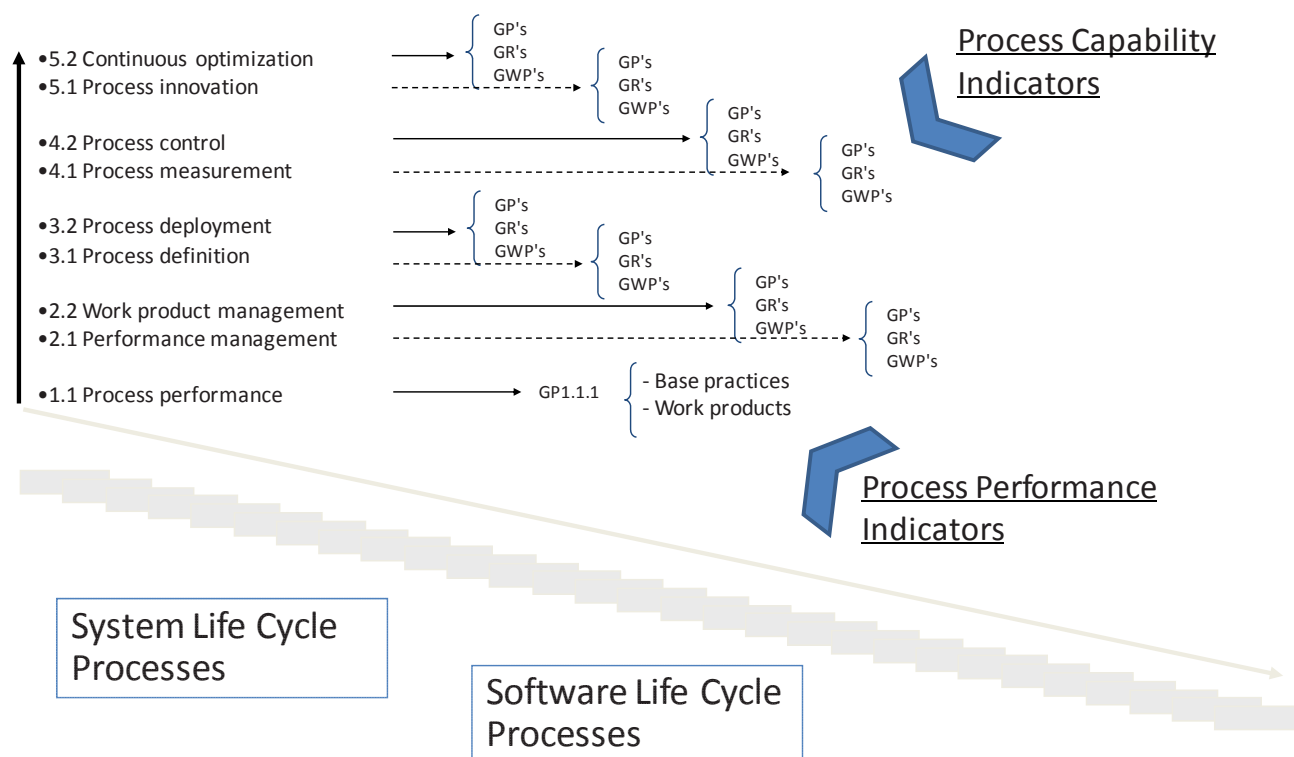


Figure 5 — Relationship between assessment indicators and process capability

5 The process dimension and process performance indicators (level 1)

This clause defines the processes and the process performance indicators, also known as the process dimension, of the Process Assessment Model. The processes in the process dimension can be directly mapped to the processes defined in the Process Reference Model.

The processes are classified (for the purpose of this Process Assessment Model) into Process Categories and Process Groups which are listed in Clause 4.

The individual processes are described in terms of Process Name, Process Purpose, and Process Outcomes as defined in ISO/IEC 12207:2008.

In addition, the process dimension of the Process Assessment Model provides information in the form of:

- a) a set of base practices for the process providing a definition of the tasks and activities needed to accomplish the process purpose and fulfil the process outcomes; each base practice is explicitly associated to a process outcome;
- b) a number of input and output work products associated with each process and related to one or more of its outcomes; and
- c) characteristics associated with each work product.

The process purposes, outcomes, the base practices and the work products associated with the processes are included in this clause. The work product characteristics are contained in Annex B. The base practices and work products constitute the set of indicators of process performance.

The associated work products listed in this clause may be used when reviewing potential inputs and outputs of an organization's process implementation.

The associated work products provide objective guidance for potential inputs and outputs to look for, and objective evidence supporting the assessment of a particular process. A documented assessment process and assessor judgment is needed to ensure that process context (application domain, business purpose, development methodology, size of the organization, etc.) is explicitly considered when using this information. This list should not be considered as a checklist of what each organization must have but rather as an example and starting point for considering whether, given the context, the work products are necessary and contributing to the intended purpose of the process.

These work products are identified with their work product identifier number as used in the Annex B.

5.1 Agreement Processes group (AGR)

5.1.1 AGR.1 Acquisition Process

Process ID	AGR.1
Process Name	Acquisition
Process Purpose	The purpose of the Acquisition process is to obtain the product and/or service that satisfies the need expressed by the acquirer. The process begins with the identification of customer needs and ends with the acceptance of the product and/or service needed by the acquirer.
Process Outcomes	As a result of successful implementation of the Acquisition process: a) acquisition needs, goals, product and/or service acceptance criteria and acquisition strategies are defined; b) an agreement is developed that clearly expresses the expectation, responsibilities and liabilities of both the acquirer and the supplier; c) one or more suppliers is selected; d) a product and/or service is acquired that satisfies the acquirer's stated need; e) the acquisition is monitored so that specified constraints such as cost, schedule and quality are met; f) supplier deliverables are accepted; and g) any identified open items have a satisfactory conclusion as agreed to by the acquirer and the supplier.
Base Practices	AGR.1.BP1: Define acquisition strategy. Define acquisition needs, goals, sourcing strategy and acceptance criteria. [Outcome: a] AGR.1.BP2: Establish agreement. Prepare acquisition by defining product and/or service requirements and communicate it to suppliers. [Outcome: b] AGR.1.BP3: Select supplier. Select supplier(s) based on acquisition strategy and needs. [Outcome: c] AGR.1.BP4: Acquire product and/or service. Implement acquisition according to strategy, needs and agreement. [Outcome: d] AGR.1.BP5: Monitor acquisition. Monitor achievement of agreement and requirements of deliverables and communicate potential deviation and risks. [Outcome: e] AGR.1.BP6: Accept deliverables. Accept each delivery according to defined criteria and communicate it to supplier. [Outcome: f] AGR.1.BP7: Manage open items and changes. Manage changes in agreement and resolve any open issues together with supplier. [Outcome: g]

Work Products	
Inputs	Outputs
02-00 Contract [Outcome: a, b]	02-00 Contract [Outcome: b]
02-01 Commitment / agreement [Outcome: b]	02-01 Commitment / agreement [Outcome: b]
08-02 Acquisition plan [Outcome: a, b]	08-02 Acquisition plan [Outcome: a, b]
08-19 Risk management plan [Outcome: b]	
11-00 Product [Outcome: d]	11-00 Product [Outcome: d, f]
	13-04 Communication record [Outcome: b, c, e, g]

Work Products	
Inputs	Outputs
	13-05 Contract review record [Outcome: b]
13-09 Meeting support record [Outcome: b, e, g]	13-09 Meeting support record [Outcome: b, e, g]
13-16 Change request [Outcome: g]	13-16 Change request [Outcome: g]
	13-19 Review record [Outcome: f]
15-19 Product needs assessment [Outcome: a]	15-19 Product needs assessment [Outcome: a, b]
	17-09 Product requirements [Outcome: a, b]
	17-10 Service requirements [Outcome: a, b]
	18-01 Acceptance criteria [Outcome: a, b]
	18-08 Supplier selection criteria [Outcome: a, b, c]

5.1.2 AGR.1A Acquisition preparation (subprocess)

Process ID	AGR.1A
Process Name	Acquisition preparation
Process Purpose	The purpose of the Acquisition preparation process is to establish the needs and goals of the acquisition and to communicate these with the potential suppliers.
Process Outcomes	As a result of successful implementation of the Acquisition preparation process: a) the concept or the need for the acquisition, development, or enhancement is established; b) stakeholder requirements are defined; c) an acquisition strategy is developed; and d) supplier selection criteria are defined.
Base Practices	AGR.1A.BP1: Establish the need. Establish a need to acquire, develop, or enhance a system, software product or service. [Outcome: a] AGR.1A.BP2: Define the requirements. Identify the customer / stakeholder requirements, including acceptance criteria, for a system and/or software product or service. [Outcome: b] AGR.1A.BP3: Review requirements. Analyze and validate the defined requirements against the identified needs. Validate the requirements to reduce risk of misunderstanding by the potential suppliers. [Outcome: b] AGR.1A.BP4: Develop acquisition strategy. Develop a strategy for the acquisition of the product according to the acquisition needs. [Outcome: c] NOTE: The strategy may include reference to the life cycle model, schedule, budget and selection criteria. AGR.1A.BP5: Define selection criteria. Establish and agree on supplier selection criteria and the means of evaluation to be used. [Outcome: c, d] AGR.1A.BP6 Communicate the need. Communicate the need for acquisition to interested parties through the identified channels. [Purpose; Outcome: a]

Work Products	
Inputs	Outputs
05-02 Business Goals [Outcome: a]	
	08-02 Acquisition plan [Outcome: c]
	09-04 Supplier selection policy [Outcome: c, d]
	12-01 Request for proposal [Outcome: a, c]
	15-01 Analysis report [Outcome: a, d]
15-04 Market analysis report [Outcome: b]	
15-19 Product needs assessment [Outcome: a]	15-19 Product needs assessment [Outcome: a, b, c]
	17-03 Stakeholder requirements [Outcome: b]
	17-09 Product requirements [Outcome: a, b]
	17-10 Service requirements [Outcome: a, b]
	18-01 Acceptance criteria [Outcome: c, d]
	18-08 Supplier selection criteria [Outcome: d]

5.1.3 AGR.1B Supplier selection (subprocess)

Process ID	AGR.1B
Process Name	Supplier selection
Process Purpose	The purpose of the Supplier selection process is to choose the organization that is to be responsible for the delivery of the requirements of the project.
Process Outcomes	As a result of successful implementation of the Supplier selection process: a) the supplier selection criteria are established and used to evaluate potential suppliers; b) the supplier is selected based upon the evaluation of the supplier's proposals, process capabilities, and other factors; and c) an agreement is established and negotiated between the acquirer and the supplier.
Base Practices	AGR.1B.BP1: Establish supplier selection criteria. Define supplier selection criteria based on business goals and acquisition strategy. [Outcome: a] AGR.1B.BP2: Evaluate stated or perceived supplier capability. Evaluate stated or perceived supplier capability against the stated requirements, according to the supplier selection criteria. [Outcome: a] NOTE: See Acquisition preparation process (AGR.1) for definition of supplier selection criteria. AGR.1B.BP3: Select supplier. Evaluate supplier's proposal against the stated requirements, according to the supplier selection criteria to select supplier. [Outcome: b] AGR.1B.BP4: Prepare and negotiate agreement. Negotiate a supplier agreement that clearly expresses the customer expectations and the relative responsibilities of the supplier and customer. [Outcome: c]

Work Products	
Inputs	Outputs
	02-01 Commitment / agreement [Outcome: c]
05-02 Business Goals [Outcome: a]	
	08-02 Acquisition plan [Outcome: a]
09-04 Supplier selection policy [Outcome: a]	09-04 Supplier selection policy [Outcome: a]
12-01 Request for proposal [Outcome: b]	
12-04 Supplier proposal response [Outcome: c]	12-04 Supplier proposal response [Outcome: c]
	13-04 Communication record [Outcome: b, c]
	13-05 Contract review record [Outcome: c]
13-09 Meeting support record [Outcome: b, c]	13-09 Meeting support record [Outcome: b, c]
	13-19 Review record [Outcome: b]
	14-05 Preferred suppliers register [Outcome: a, b]
15-13 Assessment report [Outcome: b]	15-13 Assessment report [Outcome: b]
	15-21 Supplier evaluation report [Outcome: b]
15-24 Audit report [Outcome: b]	15-24 Audit report [Outcome: b]
17-09 Product requirements [Outcome: a, b]	
17-10 Service requirements [Outcome: a, b]	
18-08 Supplier selection criteria [Outcome: a]	18-08 Supplier selection criteria [Outcome: a]

5.1.4 AGR.1C Agreement monitoring (subprocess)

Process ID	AGR.1C
Process Name	Agreement monitoring
Process Purpose	The purpose of the Agreement monitoring process is to track and assess performance of the supplier against agreed requirements.
Process Outcomes	As a result of successful implementation of the Agreement monitoring process: a) joint activities between the acquirer and the supplier are performed as needed; b) information on technical progress is exchanged regularly with the supplier; c) performance of the supplier is monitored against the agreed requirements; and d) agreement changes, if needed, are negotiated between the acquirer and the supplier and documented in the agreement.
Base Practices	AGR.1C.BP1: Establish and maintain communications link. Establish and maintain communications link between customer and supplier (i.e. define interfaces, schedule, agenda, messages, documents, meetings, joint review). [Outcome: a, b] AGR.1C.BP2: Exchange information on technical progress. Use the communication link to exchange information on technical progress of the supply, including the risks to successful completion. [Outcome: a, b]

	AGR.1C.BP3: Review supplier performance. Review performance aspects of the supplier (technical, quality, cost, and schedule) on a regular basis, against the agreed requirements. [Outcome: c] AGR.1C.BP4: Monitor the acquisition. Monitor the acquisition against the agreed acquisition documentation, analyzing information from the reviews with the supplier, so that progress can be evaluated to ensure that specified constraints such as cost, schedule, and quality are met. [Outcome: c] AGR.1C.BP5: Agree on changes. Changes proposed by either party are negotiated and the results are documented in the agreement. [Outcome: d] NOTE: The handling of changes will be performed by Contract change management process (AGR.3).
--	--

Work Products	
Inputs	Outputs
02-00 Contract [Outcome: a]	
02-01 Commitment / agreement [Outcome: c, d]	02-01 Commitment / agreement [Outcome: d]
	13-01 Acceptance record [Outcome: c]
	13-04 Communication record [Outcome: a]
13-09 Meeting support record [Outcome: a]	13-09 Meeting support record [Outcome: a]
13-14 Progress status record [Outcome: b]	13-14 Progress status record [Outcome: b]
13-16 Change request [Outcome: d]	
13-17 Customer request [Outcome: d]	
	13-19 Review record [Outcome: b]
14-08 Tracking system [Outcome: c]	
	15-01 Analysis report [Outcome: c]
	15-21 Supplier evaluation report [Outcome: c]

5.1.5 AGR.1D Acquirer acceptance (subprocess)

Process ID	AGR.1D
Process Name	Acquirer acceptance
Process Purpose	The purpose of the Acquirer acceptance process is to approve the supplier's deliverable when all acceptance criteria are satisfied.
Process Outcomes	As a result of successful implementation of the Acquirer acceptance process: a) the delivered software product and/or service are evaluated with regard to the agreement; b) the acquirer's acceptance is based on the agreed acceptance criteria; and c) the software product and/or service is accepted by the acquirer.
Base Practices	AGR.1D.BP1: Evaluate the delivered product. Carry out the evaluation of the product and/or service using the defined acceptance criteria. [Outcome: a, b]

	AGR.1D.BP2: Resolve noncompliance with agreement. Resolve any acceptance issues in accordance with the procedures established in the agreement and confirm that delivered product or service complies with the agreement. [Outcome: b] AGR.1D.BP3: Accept product. Accept the delivered product or service and communicate acceptance to the supplier. [Outcome: c]
--	---

Work Products	
Inputs	Outputs
02-00 Contract [Outcome: a]	
02-01 Commitment / agreement [Outcome: a]	
08-01 Acceptance test plan [Outcome: a]	
08-02 Acquisition plan [Outcome: a, b]	
11-00 Product [Outcome: a, c]	
	13-01 Acceptance record [Outcome: c]
	13-07 Problem record [Outcome: a]
	15-10 Test incident report [Outcome: b]
17-03 Stakeholder requirements [Outcome: a, b]	
18-01 Acceptance criteria [Outcome: a]	

5.1.6 AGR.2 Supply

Process ID	AGR.2
Process Name	Supply
Process Purpose	The purpose of the Supply process is to provide a product or service to the acquirer that meets the agreed requirements.
Process Outcomes	As a result of the successful implementation of the Supply process: a) an acquirer for a product or service is identified; b) a response to an acquirer's request is produced; c) an agreement is established between the acquirer and the supplier for developing, maintaining, operating, packaging, delivering, and installing the product and/or service; d) a product and/or service that meets the agreed requirements are developed by the supplier; e) the product and/or service is delivered to the acquirer in accordance with the agreed requirements; and f) the product is installed in accordance with the agreed requirements.
Base Practices	AGR.2.BP1: Identify acquirer and needs. Identify potential customer(s) and market for product and service. [Outcome: a] AGR.2.BP2: Propose response to customer needs. Define tender or other response to request of proposal. [Outcome: b] NOTE 1: Response should cover also regulatory and legal requirements.

	AGR.2.BP3: Agree on contract. Negotiate and agree contract with supplier and acquirer to cover development, maintenance, operation and delivery requirements. [Outcome: c] NOTE 2: Changes in contract should be made in an agreed way between supplier and acquirer. AGR.2.BP4: Execute contract. Develop and deliver product and/or service according to contractual requirements and criteria. [Outcome: d, e] AGR.2.BP5: Monitor contract. Monitor progress and quality of each deliverable. [Outcome: d, e] NOTE 3: See Acquisition process for monitoring of subcontractors. AGR.2.BP6: Provide support. Deliver product and/or service support according to contractual requirements. [Outcome: e] AGR.2.BP7: Close the contract. Accept the closure of contract and transfer of responsibilities as defined in the contract. [Outcome: e, f]
--	--

Work Products	
Inputs	Outputs
01-00 Configuration item [Outcome: d, e, f]	01-00 Configuration item [Outcome: d]
	02-00 Contract [Outcome: c]
	02-01 Commitment / agreement [Outcome: a]
05-02 Business goals [Outcome: c]	
10-03 Customer support procedure [Outcome: e, f]	10-03 Customer support procedure [Outcome: d]
12-01 Request for proposal [Outcome: b]	
	12-04 Supplier proposal response [Outcome: b]
13-04 Communication record [Outcome: d, f]	13-04 Communication record [Outcome: b, c]
	13-05 Contract review record [Outcome: d, e, f]
	13-06 Delivery record [Outcome: e]
	13-08 Installation record [Outcome: f]
15-04 Market analysis report [Outcome: a]	
17-03 Stakeholder requirements [Outcome: a, b, d, e, f]	17-03 Stakeholder requirements [Outcome: c, f]
17-09 Product requirements [Outcome: c, d, e, f]	
17-10 Service requirements [Outcome: c, d, e, f]	

5.1.7 AGR.2A Supplier tendering (subprocess)

Process ID	AGR.2A
Process Name	Supplier tendering
Process Purpose	The purpose of the Supplier tendering process is to establish an interface to respond to acquirer inquiries and requests for proposal, prepare and submit proposals.
Process Outcomes	As a result of successful implementation of the Supplier tendering process: a) a communication interface is established and maintained in order to respond to acquirer inquiries and requests for proposal; b) requests for proposal are evaluated according to defined criteria to determine whether or not to submit a proposal; c) the need to undertake preliminary surveys or feasibility studies is determined; d) suitable resources are identified to perform the proposed work; and e) a supplier proposal is prepared and submitted in response to the acquirer request.
Base Practices	AGR.2A.BP1: Establish communication interface. A communication interface is established and maintained in order to respond to customer inquiries or requests for proposal. [Outcome: a] AGR.2A.BP2: Perform customer enquiry screening. Perform customer enquiry screening to ensure source of lead is genuine, the nature or type of product or service is clearly established, and the right person is quickly identified to progress the lead. [Outcome: a] AGR.2A.BP3: Establish customer proposal evaluation criteria. Establish evaluation criteria to determine whether or not to submit a proposal based on appropriate criteria. [Outcome: b] AGR.2A.BP4: Evaluate customer request for proposal. Requests for proposal are evaluated according to appropriate criteria. [Outcome: b] AGR.2A.BP5: Determine need for preliminary evaluations or feasibility studies. Determine need for preliminary evaluations or feasibility studies to ensure that a firm quotation can be made based on available requirements. [Outcome: c] AGR.2A.BP6: Identify and nominate staff. Identify and nominate staff with appropriate competency for the assignment. [Outcome: d] AGR.2A.BP7: Perform preliminary overall estimation. Estimate total costs, resources, and needed delivery date. [Outcome: d, e] AGR.2A.BP8: Prepare and submit supplier proposal or tender response. A supplier proposal or tender is prepared and submitted in response to the customer request. [Outcome: e] NOTE 1: This may involve the selection of an appropriate solution (organizational or technical) amongst several alternatives in order to best meet requirements.

Work Products	
Inputs	Outputs
	02-00 Contract [Outcome: e]
	02-01 Commitment / agreement [Outcome: e]
05-02 Business goals [Outcome: b]	

Work Products	
Inputs	Outputs
12-01 Request for proposal [Outcome: a, b]	
	12-04 Supplier proposal response [Outcome: e]
13-04 Communication record [Outcome: a]	13-04 Communication record [Outcome: a]
	13-05 Contract review record [Outcome: e]
13-11 Personnel performance review record [Outcome: d]	
	13-15 Proposal review record [Outcome: b, e]

5.1.8 AGR.2B Contract agreement (subprocess)

Process ID	AGR.2B
Process Name	Contract agreement
Process Purpose	The purpose of Contract agreement process is to negotiate and approve a contract/agreement that clearly and unambiguously specifies the expectations, responsibilities, work products/deliverables and liabilities of both the supplier and the acquirer.
Process Outcomes	As a result of successful implementation of the Contract agreement process: a) a contract/agreement is negotiated, reviewed, approved and awarded to the supplier(s); b) mechanisms for monitoring the capability and performance of the supplier(s) and for mitigation of identified risks are reviewed and considered for inclusion in the contract conditions; c) proposers/tenderers are notified of the result of proposal/tender selection; and d) formal confirmation of agreement is obtained. NOTE: The Contract agreement process is used to obtain formal confirmation of assignments that were offered during the Supplier tendering process.
Base Practices	AGR.2B.BP1: Negotiate the contract / agreement. Negotiate all aspects of the contract / agreement with the supplier. [Outcome: a] AGR.2B.BP2: Approve contract. The contract is approved by relevant stakeholders. [Outcome: a] AGR.2B.BP3: Review contract for supplier capability monitoring. Review and consider a mechanism for monitoring the capability and performance of the supplier in the contract conditions. [Outcome: a] AGR.2B.BP4: Review contract for risk mitigation actions. Review and consider a mechanism for the mitigation of identified risk in the contract conditions. [Outcome: b] AGR.2B.BP5: Award contract. The contract is awarded to the successful supplier. [Outcome: a] AGR.2B.BP6: Communicate results to tenderers. Notify the results of the proposal / tender selection to proposers / tenders. After contract award, inform all tenderers of the decision. [Outcome: c] AGR.2B.BP7: Establish confirmation of contract / agreement. Formally confirm the contract / agreement to protect the interests of both parties. [Outcome: d] NOTE 1: The nature of the commitment should be agreed and evidenced in writing. Only authorized signatories should be able to commit to a contract.

Work Products	
Inputs	Outputs
	02-00 Contract [Outcome: a, d]
	02-01 Commitment / agreement [Outcome: a, d]
08-19 Risk management plan [Outcome: b]	
	13-04 Communication record [Outcome: a]
	13-05 Contract review record [Outcome: a]
13-09 Meeting support record [Outcome: a, c]	13-09 Meeting support record [Outcome: a, c]
14-08 Tracking system [Outcome: b, d]	
15-08 Risk analysis report [Outcome: b]	15-08 Risk analysis report [Outcome: b]
17-09 Product requirements [Outcome: a]	
17-10 Service requirements [Outcome: a]	

5.1.9 AGR.2C Product/service delivery and support (subprocess)

Process ID	AGR.2C
Process Name	Product/service delivery and support
Process Purpose	The purpose of the Product/service delivery and support process is to provide the specified product or service to the acquirer with support appropriate to achieve confidence that the requirements have been met.
Process Outcomes	As a result of the successful implementation of the Product/service delivery and support process: a) the contents of the product release are determined; b) the release is assembled from configured items; c) the release documentation is defined and produced; d) the release delivery mechanism and media are determined; e) release approval is effected against defined criteria; f) the product release is made available to the acquirer; g) confirmation of release is obtained; h) the product is completed and delivered to the acquirer; i) acquirer acceptance tests and reviews are supported; j) the product is put into operation in the customers' environment; and k) problems detected during acceptance are identified and communicated to those responsible for resolution. NOTE: Incremental delivery would be in completed increments.
Base Practices	AGR.2C.BP1: Define release products. The products associated with the release are defined, on the basis of agreement or development strategy. [Outcome: a] NOTE 1: The software product release may include programming tools where these are stated.

	AGR.2C.BP2: Assemble product for release. Prepare and assemble the deliverable product. Establish baseline for the product including user documentation, designs and the product itself. [Outcome: b, c] NOTE 2: Product release may consist of software and hardware products constituting a system, or just a software product or service. AGR.2C.BP3: The type, level and duration of support for the release are communicated. The type, level and duration of a release is identified and communicated. [Outcome: a, b] AGR.2C.BP4: Determine the delivery mechanism and media type for the release. The media type for product delivery is determined in accordance with the needs of the end user. [Outcome: d] NOTE 3: The media type for delivery may be intermediate (placed on a media and delivered to customer), or direct (such as delivered in firmware as part of the package) or a mix of both. The release may be delivered electronically by placement on a server. The release may also need to be duplicated before delivery. AGR.2C.BP5: Identify the packaging for the release media. The packaging for different types of media is identified. [Outcome: d] NOTE 4: The packaging for certain types of media may need physical or electronic protection, for instance floppy disk mailers or specific encryption techniques. AGR.2C.BP6: Ensure product release approval before delivery. Criteria for the release acceptance are satisfied before release takes place. [Outcome: e, f] AGR.2C.BP7: Deliver the release to the acquirer. The product is delivered to the acquirer, with positive confirmation of receipt. [Outcome: f, g, h] AGR.2C.BP8: Adapt product to customer's environment. The product shall be adapted and evaluated in parallel with the existing systems or processes until the acceptance test is passed. [Outcome: h, i, j] AGR.2C.BP9: Support acquirer in product evaluation. Provide support for acquirer during release review and acceptance testing. [Outcome: i, j] NOTE 5: This base practice is closely related to process Software review process (SUP.6). AGR.2C.BP10: Support acquirer to start operational use. Give necessary support and training for acquirer in preparing and initiating use of release in operational environment. [Outcome: j] AGR.2C.BP11: Manage problems during acceptance. Identify and communicate problems during delivery and acceptance and solve problems as agreed. [Outcome: i, k]
--	--

Work Products	
Inputs	Outputs
01-00 Configuration item [Outcome: a, b]	
08-01 Acceptance test plan [Outcome: e, i]	08-01 Acceptance test plan [Outcome: e]
10-03 Customer support procedure [Outcome: i, j]	10-03 Customer support procedure [Outcome: i, j]
11-00 Product [Outcome: a]	11-00 Product [Outcome: j]
	11-03 Product release information [Outcome: a, c]
	11-04 Product release package [Outcome: b, f, h]

Work Products	
Inputs	Outputs
	13-06 Delivery record [Outcome: g, h]
13-07 Problem record [Outcome: k]	13-07 Problem record [Outcome: k]
	13-08 Installation record [Outcome: h, j]
	13-13 Product release approval record [Outcome: i]
	15-03 Configuration status report [Outcome: b, c, h]
17-03 Stakeholder requirements [Outcome: a, i, j]	
	17-04 Delivery instructions [Outcome: f, h, j]
18-06 Product release criteria [Outcome: a, e]	18-06 Product release criteria [Outcome: e]
19-04 Product release strategy [Outcome: e, h, j]	

5.1.10 AGR.3 Contract change management

Process ID	AGR.3
Process Name	Contract change management
Process Purpose	The purpose of the Contract change management process is to develop the new contract contents as agreed by both the acquirer and the supplier when a change request affecting the agreed contract contents is proposed. This process begins with a proposal of the change request by either the acquirer or the supplier and ends with the conclusion acceptable for both parties: withdrawal or overall/partial approval of the change request.
Process Outcomes	As a result of successful implementation of the Contract change management process: a) the change request to the contract is proposed explicitly and formally; b) the roles and responsibilities of both the acquirer and the supplier for the contract change management are established; c) the impact of the change request to the contract on the project plans, costs, benefits, quality and schedule is evaluated; d) the actions against the change request are taken to get agreement and satisfaction of both the acquirer and the supplier; and e) the result of each change request is made known to all affected parties.
Base Practices	AGR.3.BP1: Define contract change management policy. Each party is involved and committed to common contract change management policy and mechanism. [Outcome: a, b] AGR.3.BP2: Request change to the contract. Make a contract change proposal according to common policy and mechanism. [Outcome: a, c] AGR.3.BP3: Evaluate the impacts of the change request. Carry out the evaluation of the change request. [Outcome: c] NOTE 1: Typical impact parameters are responsibilities, costs, benefits, quality and schedule. AGR.3.BP4: Confirm necessary actions. Negotiate and agree on necessary actions to find the most appropriate solution in contractual changes. [Outcome: d] AGR.3.BP5: Modify the contract. Revise the original contract. [Outcome: d]

	AGR.3.BP6: Incorporate contractual changes in plans. Define new baselines of relevant plans and specifications as needed. [Outcome: d, e] AGR.3.BP7: Communicate contractual changes. Communicate contractual changes and new baselines to all affected parties. [Outcome: e]
--	---

Work Products	
Inputs	Outputs
02-00 Contract [Outcome: a]	02-00 Contract [Outcome: a, d]
02-01 Commitment / agreement [Outcome: a]	
	02-01 Commitment / agreement [Outcome: a, b, d]
08-19 Risk management plan [Outcome: b]	
	13-04 Communication record [Outcome: e]
	13-05 Contract review record [Outcome: c, d]
13-09 Meeting support record [Outcome: a, c]	13-09 Meeting support record [Outcome: a, c]
13-16 Change request [Outcome: a]	
	13-19 Review record [Outcome: c]
	15-01 Analysis report [Outcome: c]
	15-08 Risk analysis report [Outcome: c]

5.2 Organizational Project-Enabling Processes group (ORG)

5.2.1 ORG.1 Life cycle model management

Process ID	ORG.1
Process Name	Life cycle model management
Process Purpose	The purpose of the Life cycle model management process is to define, maintain, and assure availability of policies, life cycle processes, life cycle models, and procedures for use by the organization with respect to the scope of this International Standard. This process provides life cycle policies, processes, and procedures that are consistent with the organization's objectives, that are defined, adapted, improved and maintained to support individual project needs within the context of the organization, and that are capable of being applied using effective, proven methods and tools.
Process Outcomes	As a result of the successful implementation of the Life cycle model management process: a) policies and procedures for the management and deployment of life cycle models and processes are provided; b) responsibility, accountability and authority for life cycle management are defined; c) life cycle processes, models and procedures for use by the organization are defined, maintained and improved; and d) prioritized process improvements are implemented.

Base Practices	ORG.1.BP1: Develop a life cycle model management strategy. Define policies, life cycle processes, life cycle models, and procedures for use by the organization. [Outcome: a] ORG.1.BP2: Organize life cycle model management. Define and support responsibility, accountability and authority for life cycle management. [Outcome: b] ORG.1.BP3: Deploy life cycle model management. Establish, assess and improve life cycle processes, models and procedures. [Outcome: c] ORG.1.BP4: Implement process improvements. Prioritize and implement process improvements based on process assessment and review. [Outcome: d]
-----------------------	---

Work Products	
Inputs	Outputs
03-03 Benchmarking data [Outcome: d]	
03-06 Process performance data [Outcome: d]	
07-04 Process measure [Outcome: c, d]	
07-06 Quality measure [Outcome: c, d]	
08-03 Process assessment plan [Outcome: c]	08-03 Process assessment plan [Outcome: a]
08-29 Improvement plan [Outcome: c, d]	08-29 Improvement plan [Outcome: a]
	09-00 Policy [Outcome: a, b]
10-00 Process description [Outcome: c, d]	10-00 Process description [Outcome: b, c]
	10-01 Life cycle model [Outcome: c]
13-18 Quality record [Outcome: c]	
13-19 Review record [Outcome: d]	
15-16 Improvement opportunity [Outcome: d]	15-16 Improvement opportunity [Outcome: c]
16-06 Process repository [Outcome: c, d]	16-06 Process repository [Outcome: d]
18-02 Assessment method standard [Outcome: c]	18-02 Assessment method standard [Outcome: a]
19-02 Process strategy [Outcome: b, c, d]	19-02 Process strategy [Outcome: a, b]
19-07 Software development methodology [Outcome: c]	19-07 Software development methodology [Outcome: a]

5.2.2 ORG.1A Process establishment (subprocess)

Process ID	ORG.1A
Process Name	Process establishment
Process Purpose	The purpose of the Process establishment process is to establish a suite of organizational processes for all life cycle processes as they apply to its business activities.
Process Outcomes	As a result of successful implementation of Process establishment process: a) a defined and maintained standard set of processes are established, along with an indication of each process's applicability;

	b) the detailed tasks, activities and associated work products of the standard process are identified, together with expected performance characteristics; c) a strategy for tailoring the standard process for the product or service is developed in accordance with the needs of the project; and d) information and data related to the use of the standard process for specific projects exist and are maintained.
Base Practices	ORG.1A.BP1: Define process architecture. Define a standard set of processes, purpose of each process and interactions between them. [Outcome: a] ORG.1A.BP2: Support deployment of processes. Support the organization-wide use of standard processes according to the purpose of each process. [Outcome: a] ORG.1A.BP3: Define standard processes. Define and maintain a description of each standard process according to the needs to establish processes in the organization. [Outcome: b] NOTE: Effective, organization-wide establishment of standard processes may require that they are documented. ORG.1A.BP4: Identify performance expectations. Identify expectations for process performance when using the organization's standard processes. [Outcome: b] ORG.1A.BP5: Establish process tailoring guidelines. Establish organizational guidelines for tailoring the organization's standard processes to meet the specific needs of projects. [Outcome: c] ORG.1A.BP6: Maintain process data. Capture and maintain information and data related to the use of standard processes. [Outcome: d]

Work Products	
Inputs	Outputs
03-03 Benchmarking data [Outcome: b]	
	03-06 Process performance data [Outcome: d]
07-04 Process measure [Outcome: d]	
07-06 Quality measure [Outcome: d]	
	09-00 Policy [Outcome: a, c]
	09-02 Quality policy [Outcome: a, c]
	09-05 Tailoring guidelines [Outcome: c]
10-00 Process description [Outcome: c, d]	10-00 Process description [Outcome: a, b]
	13-18 Quality record [Outcome: d]
	13-19 Review record [Outcome: d]
	15-01 Analysis report [Outcome: d]
16-06 Process repository [Outcome: d]	16-06 Process repository [Outcome: d]
17-00 Requirement specification [Outcome: b]	
	18-03 Coding standard [Outcome: a]
	19-07 Software development methodology [Outcome: b]

5.2.3 ORG.1B Process assessment (subprocess)

Process ID	ORG.1B
Process Name	Process assessment
Process Purpose	The purpose of the Process assessment process is to determine the extent to which the organization's standard processes contribute to the achievement of its business goals and to help the organization focus on the need for continuous process improvement.
Process Outcomes	As a result of successful implementation of the Process assessment process: a) information and data related to the use of the standard process for specific projects exists and is maintained; b) the relative strengths and weaknesses of the organization's standard processes are understood; and c) accurate and accessible assessment records are kept and maintained.
Base Practices	ORG.1B.BP1: Define assessment goals. Define and validate the assessment goals based on the organization's business goals. Identify the criteria to verify the achievement of the goals. [Outcome: a] ORG.1B.BP2: Plan the assessment. Develop and document a plan for the assessment. [Outcome: a] NOTE 1: Part 3 of this International standard provides guidance about performing an assessment ORG.1B.BP3: Obtain commitment. Obtain the commitment of the sponsor and the organisational unit(s) to be assessed to the planned assessment(s), including an agreed schedule and resources. [Outcome: a] ORG.1B.BP4: Perform the assessment to collect data. Perform the assessment to collect the data required for evaluating the processes within the scope of the assessment. [Outcome: a] ORG.1B.BP5: Validate the assessment data. Validate the assessment data collected as appropriate, ensuring that the data sufficiently covers the assessment goal. [Outcome: c] ORG.1B.BP6: Analyze the assessment data. Analyze the validated assessment data to understand the relative strengths and weaknesses of the organization's processes. [Outcome: b] ORG.1B.BP7: Report the assessment results. Report the planned assessment outputs to the assessment sponsor. [Outcome: a, c] ORG.1B.BP8: Maintain assessment record. Maintain record of the assessment including accurate and current assessment results in an accessible location and format. [Outcome: a, c]

Work Products	
Inputs	Outputs
03-01 Assessment data [Outcome: a]	03-01 Assessment data [Outcome: a]
05-01 Assessment goals [Outcome: a]	05-01 Assessment goals [Outcome: a]
08-03 Process assessment plan [Outcome: a]	08-03 Process assessment plan [Outcome: a]
13-00 Record [Outcome: a, c]	

Work Products	
Inputs	Outputs
	13-03 Back-up / recovery record [Outcome: c]
	13-04 Communication record [Outcome: a, b, c]
	13-19 Review record [Outcome: c]
	13-26 Assessment record [Outcome: c]
	15-13 Assessment report [Outcome: a, b, c]
	15-16 Improvement opportunity [Outcome: b, c]
	16-01 Assessment results repository [Outcome: c]
16-06 Process repository [Outcome: a]	
18-02 Assessment method standard [Outcome: b, c]	
21-00 Work product [Outcome: a, b]	

5.2.4 ORG.1C Process improvement (subprocess)

Process ID	ORG.1C
Process Name	Process Improvement
Process Purpose	The purpose of the Process improvement process is to continually improve the organization's effectiveness and efficiency through the processes used and maintained aligned with the business need.
Process Outcomes	As a result of successful implementation of Process improvement process: a) commitment is established to provide resources to sustain improvement actions; b) issues arising from the organization's internal/external environment are identified as improvement opportunities and justified as reasons for change; c) analysis of the current status of the existing process is performed, focusing on those processes from which improvement stimuli arise; d) improvement goals are identified and prioritized, and consequent changes to the process are defined and implemented; e) the effects of process implementation are monitored and confirmed against the defined improvement goals; f) knowledge gained from the improvements is communicated within the organization; and g) the improvements made are evaluated and consideration given for using solutions elsewhere within the organization. NOTE 1: Information sources providing input for change may include: process assessment results, audits, customer's satisfaction reports, organizational effectiveness/efficiency, cost of quality. NOTE 2: The current status of processes may be determined by process assessment.

Base Practices	ORG.1C.BP1: Establish commitment. Commitment is established to provide resources to sustain improvement actions. [Outcome: a] ORG.1C.BP2: Identify issues. Issues arising from the organization's internal / external environment are identified as improvement opportunities and with justified reasons for change. [Outcome: b] ORG.1C.BP3: Establish process improvement objectives. Analysis of the current status of the existing processes is performed; focusing on those processes from which improvement stimuli arise and/or process based risk is reduced, resulting in improvement objectives for the process being established. [Outcome: c] ORG.1C.BP4: Prioritize improvements. The improvement objectives are prioritized. [Outcome: d] ORG.1C.BP5: Plan process changes. Consequent changes to the process are defined and planned. [Outcome: d] ORG.1C.BP6: Implement process changes. The improvements to the process are implemented. [Outcome: d] ORG.1C.BP7: Confirm process improvement. The effects of process implementation are monitored, measured and confirmed against the defined improvement goals. [Outcome: e] ORG.1C.BP8: Communicate results of improvement. Knowledge gained from the improvements is communicated outside of the improvement project across relevant parts of the organization. [Outcome: f] ORG.1C.BP9: Evaluate the results of the improvement project. Evaluate the results of the improvement project to see if the solution can be used elsewhere in the organization. [Outcome: g]
-----------------------	---

Work Products	
Inputs	Outputs
	02-01 Commitment / agreement [Outcome: a]
03-03 Benchmarking data [Outcome: b, c, d]	
03-04 Customer satisfaction data [Outcome: b, c, d]	
03-06 Process performance data [Outcome: b, c, d, e, g]	
05-00 Goals [Outcome: d, e]	05-00 Goals [Outcome: d]
	07-04 Process measure [Outcome: f]
08-00 Plan [Outcome: b, c, d, e]	08-00 Plan [Outcome: b, d, g]
	08-29 Improvement plan [Outcome: d]
10-00 Process description [Outcome: c, e]	10-00 Process description [Outcome: d]
13-04 Communication record [Outcome: g]	13-04 Communication record [Outcome: f]
15-05 Evaluation report [Outcome: b, c]	15-05 Evaluation report [Outcome: b, c, d, g]
15-13 Assessment report [Outcome: b, c, d, e, g]	15-13 Assessment report [Outcome: c]
15-16 Improvement opportunity [Outcome: d, f, g]	15-16 Improvement opportunity [Outcome: b, c, d, g]
16-06 Process repository [Outcome: c]	16-06 Process repository [Outcome: d]

5.2.5 ORG.2 Infrastructure management

Process ID	ORG.2
Process Name	Infrastructure management
Process Purpose	The purpose of the Infrastructure management process is to provide the enabling infrastructure and services to projects to support organization and project objectives throughout the life cycle. This process defines, provides and maintains the facilities, tools, and communications and information technology assets needed for the organization's business with respect to the scope of this International Standard.
Process Outcomes	As a result of the successful implementation of the Infrastructure management process: a) the requirements for infrastructure to support processes are defined; b) the infrastructure elements are identified and specified; c) infrastructure elements are acquired; d) the infrastructure elements are implemented; and e) a stable and reliable infrastructure is maintained and improved. NOTE: The infrastructure elements may include hardware, software, methods, tools, techniques, standards, and facilities for development, operation, or maintenance.
Base Practices	ORG.2.BP1: Identify infrastructure scope. Identify the procedures, standards, environments, tools, and techniques that the infrastructure process should support. [Outcome: a] NOTE 1: The infrastructure may include hardware, software, methods, tools, techniques, standards, and facilities for development, operation, or maintenance. ORG.2.BP2: Define the infrastructure requirements. Define the infrastructure requirements to support the performance of appropriate processes. [Outcome: a, b] NOTE 2: Infrastructure process requirements may include: – security; – throughput and data sharing requirements; – backup and recovery; – remote access facility; – physical workspace and equipment; – user support requirements; and – maintenance requirements. ORG.2.BP3: Acquire infrastructure. Acquire an infrastructure, which satisfies the requirements. [Outcome: c] ORG.2.BP4: Establish the infrastructure. Assemble and integrate the elements of the infrastructure, providing an effective environment that supports implementation of the organization's processes. [Outcome: d] ORG.2.BP5: Provide support for the infrastructure. Provide support for those who utilize the infrastructure. [Outcome: d] ORG.2.BP6: Maintain the infrastructure. Perform maintenance on the infrastructure for the purposes of: – correcting defects; and – improving performance. [Outcome: e] NOTE 3: Process improvement process (ORG.1C) can be used to implement each improvement.

Work Products	
Inputs	Outputs
08-02 Acquisition plan [Outcome: c]	
08-05 Development environment plan [Outcome: b, c, d]	08-05 Development environment plan [Outcome: b, d]
08-11 Logistics maintenance plan [Outcome: c]	08-11 Logistics maintenance plan [Outcome: b, c]
09-04 Supplier selection policy [Outcome: c]	
10-00 Process description [Outcome: a, e]	
	13-03 Back-up / recovery record [Outcome: d, e]
13-06 Delivery record [Outcome: d]	13-06 Delivery record [Outcome: d, e]
	14-02 Corrective action register [Outcome: e]
14-03 Hardware assets register [Outcome: b, d]	14-03 Hardware assets register [Outcome: b, d]
14-07 Software assets register [Outcome: b, d]	14-07 Software assets register [Outcome: b, d]
14-08 Tracking system [Outcome: d]	14-08 Tracking system [Outcome: c, d]
17-07 Infrastructure requirements [Outcome: a, b]	17-07 Infrastructure requirements [Outcome: a]

5.2.6 ORG.3 Project portfolio management

Process ID	ORG.3
Process Name	Project portfolio management
Process Purpose	The purpose of the Project portfolio management process is to initiate and sustain necessary, sufficient and suitable projects in order to meet the strategic objectives of the organization. This process commits the investment of adequate organization funding and resources, and sanctions the authorities needed to establish selected projects. It performs continued qualification of projects to confirm they justify, or can be redirected to justify, continued investment.
Process Outcomes	As a result of the successful implementation of the Project portfolio management process: a) business venture opportunities, investments or necessities are qualified, prioritized and selected; b) resources and budgets for each project are identified and allocated; c) project management accountability and authorities are defined; d) projects meeting agreement and stakeholder requirements are sustained; and e) projects not meeting agreement or stakeholder requirements are redirected or terminated.
Base Practices	ORG.3.BP1: Collect business opportunities, needs and investments. Collect and analyse business needs and opportunities as items for current and future projects. [Outcome: a] ORG.3.BP2: Analyze business needs and necessities. Use organization level criteria to analyze, prioritize and select current and new development items. [Outcome: a] ORG.3.BP3: Estimate resources and budget for project portfolio. Calculate and balance resources and budget for the selected development items. [Outcome: b]

	ORG.3.BP4: Define governance mechanism for projects. Define common accountability and authority for projects. [Outcome: c] NOTE 1: Identify expected outcomes of the projects. Common metrics and measurement repository for all projects is an element of governance. ORG.3.BP5: Define scope for each project. Define resources, responsibilities, budget, scope, constraints, reporting requirements and review milestones for each project. [Outcome: b, c, d] ORG.3.BP6: Assess achievement of project goals. Collect and analyse data to assess project's progress and achievement of goals. [Outcome: d] ORG.3.BP7: Control projects. Use portfolio data to control project against agreements and stakeholder requirements. [Outcome: d, e] ORG.3.BP8: Act on deviation. Redirect or terminate project if agreement, stakeholder requirements or business benefits are not expected to be achieved. [Outcome: e]
--	---

Work Products	
Inputs	Outputs
	02-01 Commitment / agreement [Outcome: a]
03-06 Process performance data [Outcome: e]	
04-07 Organizational structure [Outcome: a]	
05-02 Business goals [Outcome: a, b, c]	05-02 Business goals [Outcome: a, b]
08-12 Project plan [Outcome: b, c, d, e]	08-12 Project plan [Outcome: b, c, d, e]
08-19 Risk management plan [Outcome: b, d, e]	08-19 Risk management plan [Outcome: d, e]
	13-04 Communication record [Outcome: c, d]
	13-19 Review record [Outcome: d, e]
15-04 Market analysis report [Outcome: a]	15-04 Market analysis report [Outcome: a]
15-06 Project status report [Outcome: d]	15-06 Project status report [Outcome: d]
16-06 Process repository [Outcome: d, e]	16-06 Process repository [Outcome: e]
17-03 Stakeholder requirements [Outcome: a, d, e]	17-03 Stakeholder requirements [Outcome: a, d, e]

5.2.7 ORG.4 Human resource management

Process ID	ORG.4
Process Name	Human resource management
Process Purpose	The purpose of the Human resource management process is to provide the organization with necessary human resources and to maintain their competencies, consistent with business needs. The process assures the providing of a supply of skilled and experienced personnel qualified to perform life cycle processes to achieve organization, project and customer objectives.

Process Outcomes	As a result of the successful implementation of the Human resource management process: a) skills required by projects are identified; b) necessary human resources are provided to projects; c) skills of personnel are developed, maintained or enhanced; d) conflicts in multi-project resource demands are resolved; and e) individual knowledge, information and skills are collected, shared, reused and improved throughout the organization.
Base Practices	ORG.4.BP1: Collect resource and skill needs from projects. Identify, collect and analyse human resource needs and required skills in projects. [Outcome: a] ORG.4.BP2: Define skill development strategy. Define organizational strategy for skill and competence development. [Outcome: a, b] ORG.4.BP3: Develop human resources. Develop, maintain and enhance human resources and their competencies. [Outcome: a, c] ORG.4.BP4: Provide human resources to projects. Satisfy human resource needs in projects. [Outcome: b] ORG.4.BP5: Balance resources between projects.. Manage conflicts in multi-project resource demands . [Outcome: d] ORG.4.BP6: Collect common knowledge base. Create common knowledge management system and repository to collect and share experiences and best practices. [Outcome: e] ORG.4.BP7: Reuse and improve common knowledge. Create and manage organisational learning mechanisms so that common knowledge remains relevant and is usable for future projects. [Outcome: e]

Work Products	
Inputs	Outputs
	01-04 Knowledge item [Outcome: e]
	02-01 Commitment / agreement [Outcome: d]
	03-02 Asset use data [Outcome: e]
08-08 Human resource management plan [Outcome: a, b, c]	08-08 Human resource management plan [Outcome: a, c]
	08-24 Training plan [Outcome: b]
09-01 Personnel policy [Outcome: a, b]	
13-12 Personnel record [Outcome: c]	13-12 Personnel record [Outcome: b, c]
13-23 Training record [Outcome: c]	13-23 Training record [Outcome c]
	15-15 Human resource needs analysis [Outcome: a]
16-04 Knowledge repository [Outcome: a, b, c]	16-04 Knowledge repository [Outcome: a, c]
	19-03 Knowledge management strategy [Outcome: c]

5.2.8 ORG.4A Skill development (subprocess)

Process ID	ORG.4A
Process Name	Skill development
Process Purpose	The purpose of the Skill development process is to provide the organization and project with individuals who possess the needed skills and knowledge to perform their roles effectively.
Process Outcomes	As a result of successful implementation of the Skill development process: a) training is developed or acquired to address the organization and project training needs; and b) training is conducted to ensure that all individuals have the skills required to perform their assignments, using mechanisms such as training strategies and materials.
Base Practices	ORG.4A.BP1: Develop a strategy for skill development. Develop a strategy for skill development and training including how the competence needs will be identified, how the needed development and training will be developed or acquired, and how the training will be performed. [Outcome: a] ORG.4A.BP2: Identify new skills and competencies. Identify and evaluate skills and competencies to be provided or improved through development and training. [Outcome: a] ORG.4A.BP3: Develop or acquire training. Develop or acquire training that addresses the common skill development needs. [Outcome: a] NOTE: training may include objectives, syllabus, material and other training resources. ORG.4A.BP4: Train personnel. Train personnel to have the knowledge and skills needed to perform their roles, and maintain adequate skill records. [Outcome: b] ORG.4A.BP5: Evaluate training effectiveness. Identify and evaluate added value provided by each training session, including the satisfaction in training results. [Outcome: b]

Work Products	
Inputs	Outputs
06-04 Training material [Outcome: b]	06-04 Training material [Outcome: b]
	08-02 Acquisition plan [Outcome a]
08-08 Human resource management plan [Outcome: a]	
08-24 Training plan [Outcome: a, b]	08-24 Training plan [Outcome: a]
09-01 Personnel policy [Outcome: a]	
	13-11 Personnel performance review record [Outcome: b]
	13-23 Training record [Outcome: b]
15-15 Human resource needs analysis [Outcome: a]	
	15-22 Training evaluation report [Outcome: b]
19-08 Training strategy [Outcome: a]	19-08 Training strategy [Outcome: a]

5.2.9 ORG.4B Skill acquisition and provision (subprocess)

Process ID	ORG.4B
Process Name	Skill acquisition and provision
Process Purpose	The purpose of the Skill acquisition and provision process is to provide the organization and projects with individuals who possess skills and knowledge to perform their roles effectively and to work together as a cohesive group.
Process Outcomes	As a result of successful implementation of the Skill acquisition and provision process: a) individuals with the required skills and competencies are identified and recruited; b) effective interaction between individuals and groups are supported; c) the work force have the skills to share information and co-ordinate their activities efficiently; and d) objective criteria are defined against which group and individual performance is monitored to provide performance feedback and to enhance performance.
Base Practices	ORG.4B.BP1: Identify needed skills and competencies. Identify and evaluate skills and competencies needed by the organization to achieve its goals. [Outcome: a] ORG.4B.BP2: Define evaluation criteria. Define objective criteria that can be used to evaluate candidates and assess staff performance. [Outcome: a, d] ORG.4B.BP3: Recruit qualified staff. Establish a systematic program for recruitment of staff competent to meet the needs of the organization. [Outcome: a] ORG.4B.BP4: Develop staff skills and competencies. Define and provide opportunities for development of the skills and competencies of staff. [Outcome: a, c] ORG.4B.BP5: Define team organization for projects and tasks. Define the structure and operating rules under which teams undertaking projects and/or tasks operate. [Outcome: b] ORG.4B.BP6: Empower project teams. Empower teams to perform their job, by ensuring that they have: - an understanding of their job; - a shared vision or sense of common interest; - appropriate mechanisms or facilities for communication; and - support from management for what they are trying to accomplish. [Outcome: b] ORG.4B.BP7: Maintain project team interactions. Obtain and maintain agreement on the management of interactions between teams. [Outcome: b] ORG.4B.BP8: Evaluate staff performance. Evaluate the performance of staff, in respect of their contributions to the goals of the organization as a whole. Ensure that feedback is discussed with the staff. [Outcome: a, d] ORG.4B.BP9: Provide feedback on performance. Ensure that feedback is provided to staff on the results of any performance evaluations performed. [Outcome: d] ORG.4B.BP10: Maintain staff records. Maintain adequate records of staff, including not only personnel details, but also information on skills, training completed, and performance evaluations. [Outcome: d]

Work Products	
Inputs	Outputs
	02-01 Commitment / agreement [Outcome: a]
08-08 Human resource management plan [Outcome: b]	08-08 Human resource management plan [Outcome: a, b]
	08-24 Training plan [Outcome: c]
09-01 Personnel policy [Outcome: a]	
	13-04 Communication record [Outcome: b]
	13-11 Personnel performance review record [Outcome: c, d]
13-12 Personnel record [Outcome: c]	13-12 Personnel record [Outcome: a]
13-23 Training record [Outcome: c]	13-23 Training record [Outcome: c]
	15-15 Human resource needs analysis [Outcome: a]
	15-17 Personnel performance evaluation [Outcome: d]
15-22 Training evaluation report [Outcome: c, d]	
	18-05 Personnel performance criteria [Outcome: d]

5.2.10 ORG.4C Knowledge management (subprocess)

Process ID	ORG.4C
Process Name	Knowledge management
Process Purpose	The purpose of the Knowledge management process is to ensure that individual knowledge, information and skills are collected, shared, reused and improved throughout the organization.
Process Outcomes	As a result of successful implementation of Knowledge management process: a) infrastructure is established and maintained for sharing common and domain information across the organization; b) knowledge is readily available and shared throughout the organization; and c) the organization will select an appropriate knowledge management strategy.
Base Practices	ORG.4C.BP1: Establish a knowledge management system. Establish and maintain a knowledge management infrastructure and mechanism to support the activities to identify, classify, exchange and use knowledge assets. [Outcome: a, b] ORG.4C.BP2: Create the network of knowledge contributors. Establish the network of experts and their mutual interaction. [Outcome: b, c] ORG.4C.BP3: Develop a knowledge management strategy. Define an appropriate knowledge management strategy based on organizational, individual, domain and project needs. [Outcome: c] ORG.4C.BP4: Capture knowledge. Identify and record each knowledge item according to the classification schema and asset criteria. [Outcome: b, c] ORG.4C.BP5: Disseminate knowledge assets. Share knowledge assets with experts, users and projects. [Outcome: c] ORG.4C.BP6: Improve knowledge assets. Validate and enrich knowledge assets to ensure their appropriateness and value to the organization. [Outcome: b, c]