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CERTICS Assessment Method Conformity to ISO/IEC 15504

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Executive Summary

The CERTICS Assessment Method (CERTICS Method) is a method to assess software process in order to determine whether a given software is resulting from technological development and innovation carry out in Brazil. CERTICS Method is complemented by CERTICS Assessment Reference Model (CERTICS Model). These two components (CERTICS Model and CERTICS Method) are the CERTICS Methodology. CERTICS Method uses ISO/IEC 15504 Standard for Process Assessment as a reference. The Method is described in a detailed version in a technical report.

The conformity of CERTICS Method to ISO/IEC 15504 requirements are demonstrated in Statements of Conformity Tables with three columns: a sequential identification starting from S01, an ISO/IEC requirement and a conformity statement describing where and how the requirement is attended. From an analysis of the statements of conformity of an assessment with CERTICS Method with the ISO/IEC 15504-2 requirements for an assessment process, we conclude that CERTICS Method can be considered as a Documented Assessment Process. From similar analysis for ISO/IEC 15504-7 requirements we also conclude that an assessment with CERTICS Method can also be considered as a documented assessment process for an assessment of organizational maturity. The documentation of CERTICS Method, however, should be improved in order to facilitate the understanding of how these requirements are addressed.

Resumo Executivo

O Método de Avaliação CERTICS (Método CERTICS) é um método para avaliar o processo de software, a fim de determinar se um determinado software é resultante de desenvolvimento e inovação tecnológica realizados no Brasil. O Método CERTICS é complementado pelo Modelo de Referência de Avaliação CERTICS (Modelo CERTICS) formando a Metodologia CERTICS. O Método CERTICS utiliza a Norma ISO/IEC 15504 Norma para Avaliação de Processos como uma referência.

A conformidade da CERTICS com os requisitos da ISO/IEC 15504 são demonstrados nas Declarações de Conformidade das Tabelas de conformidade com três colunas: uma identificação sequencial a partir de S01, um requisito da ISO/IEC 15504 e uma declaração de conformidade que descrever onde e como o requisito é atendido. A partir de uma análise das declarações de conformidade de uma avaliação com o Método CERTICS com os requisitos da ISO/IEC 15504-2 para o processo de avaliação, concluímos que o Método CERTICS pode ser considerado como um Processo Documentado de Avaliação de Processo. A partir de uma análise semelhante para a os requisitos da ISO/IEC 15504-7 também podemos concluir que o Método CERTICS pode ser considerado como um Processo Documentado de Avaliação de Maturidade Organizacional. A documentação do Método CERTICS, no entanto, deve ser melhorada, a fim de facilitar a compreensão de como esses requisitos são atendidos.

1. Introduction

This technical report presents statements of conformity of CERTICS Assessment Method (CERTICS Method) [4] with the requirements of ISO/IEC 15504-2 [1] and ISO/IEC 15504-7 [2].

ISO/IEC 15504 series of standards, also known as SPICE (Software Process Improvement and Capability dEtermination) established requirements, a measurement framework, guidelines and examples of models and methods for process assessment [1] [2]. Using ISO/IEC 15504, different models and methods can be developed to address specific objectives and domains. ISO/IEC 15504-2 “addresses the assessment of process and the application of process assessment for improvement and capability determination” [1]. ISO/IEC 15504-7 “addresses the expression of the results of assessment of processes in terms of the overall maturity of an organizational unit, and the application of the results of assessment of organizational maturity for process improvement and capability determination” [2].

The term Assessment Methodology is used to name a set composed by an Assessment Reference Model and an Assessment Method. The CERTICS Assessment Methodology for Software (CERTICS Methodology) is a methodology to assess software process in order to determine a specific criterion, named as the Fundamental Concept: whether a given software is resulting from technological development and technological innovation carry out in Brazil. A design decision for CERTICS Methodology was to use ISO/IEC 15504 Standard for Process Assessment as a reference for two major methodological components: CERTICS Assessment Reference Model (CERTICS Model) and CERTICS Assessment Method (CERTICS Method). A special attention was given to the requirement to identify and take actions to achieve consensus within the community of interest of the methodology.

The CERTICS Method is described in a detailed version in a technical report [4]. The CERTICS Methodology, that describes an overview of the CERTICS Model and the CERTICS Method, is documented in another technical report [3].

In a Note, ISO/IEC 15504-2 clarifies that “Conformity is fulfillment by a product, process or service of specified requirements. Compliance is adherence to those requirements contained in standards and technical reports which specify requirements to be fulfilled by other standards, technical reports or International Standardized Profiles (ISPs) (e.g. reference models and methodologies)”.

Any CERTICS assessment process must follows the CERTICS Method. ISO/IEC 15504-2 defines requirement for process assessment process. One of these requirements defines that “The assessment shall be conducted according to a documented assessment process that is capable of meeting the assessment purpose”. Then all other requirements are actually for this documented assessment process. Therefore the statements of conformity of these other requirements refer to CERTICS Method. Similar rationality is valid for ISO/IEC 15504-7 requirements for assessment of organizational maturity.

The statements of conformity are described in a set of tables with three columns: a statement sequential identification starting from S01, an ISO/IEC requirement and a conformity statement. Then a conformity statement concludes with a comment on how the requirement is addressed. As the CERTICS Model document is in Portuguese, the Table 1 presents an English translation to its outline.

Table 1 - CERTICS Method document outline in Portuguese and English

Original Title in Portuguese	Title in English Translation
Resumo Executivo	Executive Summary
1. Introdução	1. Introduction
2. Regras de Pontuação	2. Rating Rules
3. Visão Geral e Elementos do Método de Avaliação da CERTICS	3. Overview and Elements of CERTICS Assessment Method
3.1 Objetivo	3.1 Objective
3.2 Arranjo Institucional e Sistema de Apoio à Avaliação	3.2 Institutional Arrangement and Support Assessment System
3.3 Papéis e Responsabilidades na Avaliação	3.3 Roles and Responsibilities in Assessment
3.4 Artefatos da Avaliação	3.4 Artifacts of Assessment
3.5 Relação das Fases, Processos e Atividades	3.5 List of Phases, Activities and Processes
3.6 Diagramas das Fases e Processos	3.6 Diagrams of Phases and Processes
4. Fases do Método de Avaliação da CERTICS	4. Phases of CERTICS Assessment Method
4.1 Fase 1: Exploração	4.1 Phase 1: Exploration
4.2 Fase 2: Contratação	4.2 Phase 2: Agreement
4.3 Fase 3: Preparação	4.3 Phase 3 Preparation
4.4 Fase 4: Visita	4.4 Phase 4: Visit
4.5 Fase 5: Validação	4.5 Phase 5: Validation
4.6 Fase 6: Conclusão	4.6 Phase 6: Conclusion
5. Considerações Finais	5. Concluding Remarks

2. Statements of conformity for a Process Assessment Process

A CERTICS assessment process must follow the CERTICS Method. ISO/IEC 15504-2 defines requirements for process assessment process. One of these requirements defines that “The assessment shall be conducted according to a documented assessment process that is capable of meeting the assessment purpose”. Then all other requirements are actually for this documented assessment process. Therefore the statements of conformity of these other requirements refer to CERTICS Method.

Table 2 presents the statements of conformity with the requirements for a Process Assessment Process.

Table 2 - Statements of conformity with the requirements for a Process Assessment

Id	Requirements in ISO/IEC 15504-2	Statement of CERTICS assessment and CERTICS Method conformity
S01	4 Performing an Assessment	This requirement is covered by statements S02 to S84
S02	4.1 General: The purpose of Process Assessment is to understand the capability of the processes implemented by an organization. As a result of successful implementation of process assessment:	This requirement is covered by statements S03 to S04
S03	a) information and data that characterise the processes assessed is determined.	These information and data are requested and documented in Phase 1 process P.1.2. They can be reviewed and documented also in the result of Phase 2 process P.2.3 in the Agreement.
S04	b) the extent to which the processes achieve the process purpose is determined.	The extent is always the same: capability level 1. It is defined in the assessment method
S05	4.2 The assessment process	This requirement is covered by statements S08 to S31
S06	4.2.1 The assessment shall be conducted according to a documented assessment	A CERTICS assessment must be conducted according CERTICS Method. During Phase P4: Validation a quality assurance is performed in order to assure that the process and results so

	process that is capable of meeting the assessment purpose.	far actually follows the method. In Phase P6: Conclusion there is another quality assurance to assure that the whole process actually followed the method. The method was extensively revised and improved to assure that it is capable to meet the assessment purpose.
S07	4.2.2 The documented assessment process shall contain at minimum the following activities:	This requirement is covered by statements S08 to S31
S08	a) Planning A plan for the assessment shall be developed and documented, including at minimum:	The assessment plan is documented in the CERTICSys software platform and parts of it are also documented in the agreement contract (generated in activity 1 of process 2.3 of phase 2) and in the schedule (generated in activity 2 of process 3.3 of phase 3).
S09	1) the required inputs specified in this part of ISO/IEC 15504;	All required inputs are defined in the CERTICS Method. They are documented in the CERTICSys software platform and parts of it are also documented in the agreement contract (generated in activity 1 of process 2.3 of phase 2) and in the schedule (generated in activity 2 of process 3.3 of phase 3).
S10	2) the activities to be performed in conducting the assessment;	The activities are already defined in the CERTICS Method and they are documented for each assessment in the CERTICSys software platform.
S11	3) the resources and schedule assigned to these activities;	The resources are already defined in the CERTICS Method and they are documented (with the schedule) for each assessment in the CERTICSys software platform.
S12	4) the identity and defined responsibilities of the participants in the assessment;	The identity and defined responsibilities are documented in the CERTICSys software platform and parts of it are also documented in the agreement contract (generated in activity 1 of process 2.3 of phase 2) and in the schedule (generated in activity 2 of process 3.3 of phase 3).
S13	5) the criteria to verify that the requirements of this International Standard have been met;	Any assessment must be performed following CERTICS Method. This is verified during Phase 4: Validation. As CERTICS Method is a documented assessment process that meets ISO/IEC 15504-2 requirements for process assessment, the Phase 4: Validation is that criteria.
S14	6) a description of the planned assessment outputs.	They are defined in the CERTICS Method and they are generated in activities 1 to 4 of process 6.1 of phase 6)
S15	b) Data Collection Data required for evaluating the processes within the scope of the assessment (see 4.4.2 (c)) and additional information (see 4.4.2 (j)) shall be collected in a systematic	This requirement is covered by statements S16 to S20

	manner, applying at minimum the following:	
S16	1) the strategy and techniques for the selection, collection, analysis of data and justification of the ratings shall be explicitly identified and shall be demonstrable;	They are defined in the CERTICS Method and they started in phase 1 and progress until phase 4. The justification of the ratings are generated in activities 1 to 3 of process 4.3 of phase 4) and are documented in the CERTICSys software platform
S17	2) correspondence shall be established between the organizational unit's processes, specified in the assessment scope, and the elements in the Process Assessment Model;	This correspondence is documented in the CERTICSys software platform where each evidence is related with one or more outcome, as described in activity 4 of process 1.3 of phase 1). This correspondence is validated in phases 3, 4 and 5.
S18	3) each process identified in the assessment scope shall be assessed on the basis of objective evidence;	This is required in CERTICS Method. It is implemented in activities 1 to 3 of process 4.3 of phase 4.
S19	4) the objective evidence gathered for each attribute for each process assessed shall be sufficient to meet the assessment purpose and scope;	This is required in CERTICS Method. It is implemented in activities 1 to 3 of process 4.3 of phase 4.
S20	5) the identification of the objective evidence gathered shall be recorded and maintained to provide the basis for verification of the ratings.	They are recorded and maintained in CERTICSys software platform.
S21	c) Data Validation The data collected shall be validated to:	This requirement is covered by statements S22 to S24
S22	1) confirm that the evidence collected is objective;	This confirmation is performed during phase 4. They are recorded and maintained in CERTICSys software platform.
S23	2) ensure that the objective evidence is sufficient and representative to cover	This verification is performed during phase 4. They are recorded and maintained in CERTICSys software platform.

	the scope and purpose of the assessment;	
S24	3) ensure that the data as a whole is consistent.	This verification is performed during phase 4. They are recorded and maintained in CERTICSys software platform.
S25	d) Process Attribute Rating A rating shall be assigned based on validated data for each process attribute.	This is required in CERTICS Method. It is implemented in activities 1 to 3 of process 4.3 of phase 4. They are recorded and maintained in CERTICSys software platform.
S26	1) the set of process attribute ratings shall be recorded as the process profile for the defined organizational unit;	This is required in CERTICS Method. It is implemented in activities 1 to 3 of process 4.3 of phase 4. They are recorded and maintained in CERTICSys software platform.
S27	2) during the assessment, the defined set of assessment indicators in the Process Assessment Model shall be used to support the assessors' judgement in rating process attributes in order to provide the basis for repeatability across assessments;	This is required in CERTICS Method. It is implemented in activities 1 to 3 of process 4.3 of phase 4.
S28	3) the decision-making process that is used to derive rating judgements shall be recorded;	The decision is by the leader appraiser as documented in phase 4.
S29	4) traceability shall be maintained between an attribute rating and the objective evidence used in determining that rating;	This traceability is maintained in CERTICSys software platform.
S30	5) for each process attribute rated, the relationship between the indicators and the objective evidence shall be recorded.	This relationship is recorded in CERTICSys software platform.
S31	e) Reporting The assessment results, including at minimum the outputs specified in clause 4.5, shall be documented and reported to the assessment sponsor or to	The preliminary assessment result is recorded in CERTICSys software platform and presented to the assessment sponsor or to their delegated, as described in activity 2 of process 4.4 of phase 4. The final assessment result is delivery to the assessment sponsor or to their delegated in phase 6.

	their delegated representative.	
S32	4.3 Roles and responsibilities	This requirement is covered by statements S33 to S48
S33	4.3.1 The sponsor of the assessment shall:	This role and its responsibilities are defined in Section 3.3 of CERTICS Method and in the description of phases 1 to 6.
S34	a) verify that the individual who is to take responsibility for conformity of the assessment is a competent assessor;	This is verified by the Assessment Service Unit (Unidade de Serviços de Avaliação) and confirmed by the sponsor in the agreement contract.
S35	b) ensure that resources are made available to conduct the assessment;	Same as Statement S34.
S36	c) ensure that the assessment team has access to the relevant resources.	Same as Statement S34.
S37	4.3.2 The competent assessor shall:	This requirement is covered by statements S38 to S45
S38	a) confirm the sponsor's commitment to proceed with the assessment;	This is verified by the Assessment Service Unit (Unidade de Serviços de Avaliação) and confirmed by the competent assessor during phases 3 and 4.
S39	b) ensure that the assessment is conducted in accordance with the requirements of this part of ISO/IEC 15504;	This is verified by the Assessment Service Unit (Unidade de Serviços de Avaliação) and confirmed by the competent assessor during phases 3 and 4.
S40	c) ensure that participants in the assessment are briefed on the purpose, scope and approach of the assessment;	This is performed in process 4.1 of phase 4.
S41	d) ensure that all members of the assessment team have knowledge and skills appropriate to their roles;	This is performed in phase 3.
S42	e) ensure that all members of the assessment team have access to appropriate	This is provided by the Assessment Service Unit (Unidade de Serviços de Avaliação) and confirmed by the competent assessor during phases 3 and 4.

	documented guidance on how to perform the defined assessment activities;	
S43	f) ensure that the assessment team has the competencies to use the tools chosen to support the assessment;	Same as Statement S42
S44	g) confirm receipt of the assessment result deliverables by the sponsor;	This is performed by the competent assessor during process 4.4 of phase 4 for the preliminary result and by the Assessment Service Unit (Unidade de Serviços de Avaliação) during phase 6
S45	h) on completion of the assessment, verify and document the extent of conformance of the assessment to ISO/IEC 15504 (See also clause 7.4).	This is performed by the Assessment Service Unit (Unidade de Serviços de Avaliação) during phases 5 and 6. By verifying that the assessment follows the CERTICS Method, it also follows ISO/IEC 15504.
S46	4.3.3 The assessor(s) shall:	This requirement is covered by statements S47 to S48
S47	a) carry out assigned activities associated with the assessment, e.g. detailed planning, data collection, data validation and reporting;	The assessor participates in all processes and activities of phase 4. These activities are the “assigned activities associated”.
S48	b) rate the process attributes.	The assessor participates in process P.4.3 in where the rating is performed.
S49	4.4 Defining the initial assessment input	This requirement is covered by statements S50 to S75
S50	4.4.1 The assessment input shall be defined prior to the data collection phase of an assessment and approved by the sponsor of the assessment or the sponsor's delegated authority.	The assessment input is defined in phase 2: the sponsor approves Agreement and it.
S51	4.4.2 At minimum, the assessment input shall specify:	This requirement is covered by statements S52 to S54
S52	a) the identity of the sponsor of the assessment and the sponsor's relationship to the	This is performed in the phase 2: Agreement and it is recorded in the Agreement Contract and in the CERTICSys

	organizational unit being assessed;	
S53	b) the assessment purpose;	This is performed in the phase 2: Agreement and it is recorded in the CERTICSys. The purpose is always the same.
S54	c) the assessment scope including:	This requirement is covered by statements S55 to S58
S55	1) the processes to be investigated within the organizational unit;	The processes are always the same: the four competence areas and this is documented in the method.
S56	2) the highest capability level to be investigated for each individual process within the assessment scope;	The capability level is always the same: level 1 and this is documented in the method.
S57	3) the organizational unit that deploys the processes;	This is performed in the phase 2: Agreement and it is recorded in the Agreement Contract and in the CERTICSys
S58	4) the context which includes:	This requirement is covered by statements S59 to S61
S59	i) the size of the organizational unit;	This is performed in the phase 2: Agreement and it is recorded in the Agreement Contract and in the CERTICSys
S60	ii) the application domain of the products or services of the organizational unit;	This is performed in the phase 2: Agreement and it is recorded in the Agreement Contract and in the CERTICSys
S61	iii) key characteristics (e.g. size, criticality, complexity and quality) of the products or services of the organizational unit.	This is performed in the phase 2: Agreement and it is recorded in the Agreement Contract and in the CERTICSys
S62	d) the assessment approach;	CERTICS Method already defines this.
S63	e) the assessment constraints considering, at minimum:	This requirement is covered by statements S64 to S69
S64	1) availability of key resources;	This is performed in the phase 3: Preparation Process 3.3 Activity 2 and it is recorded in the CERTICSys
S65	2) the maximum duration of the assessment;	This is performed in the phase 3: Preparation Process 3.3 Activity 2 and it is recorded in the CERTICSys
S66	3) specific processes or organizational units to be excluded from the	If necessary, this is performed in the phase 3: Preparation Process 3.3 Activity 2 and it is recorded in the CERTICSys

	assessment;	
S67	4) the quantity and type of objective evidence to be examined in the assessment;	The quantity is already defined in CERTICS Method: At least one evidence for each item in the orientation section in each Outcome description in CERTICS Method. The same section presents examples of types of evidence.
S68	5) the ownership of the assessment outputs and any restrictions on their use;	The assessment outputs are delivery to the sponsor at the end of the assessment. The sponsor has ownership.
S69	6) controls on information resulting from a confidentiality agreement.	A confidentiality clause is part of the contract and each assessor signs a confidentiality agreement.
S70	f) the identity of the Process Assessment Model (including the identity of the Process Reference Model(s) used) that meets the requirements defined in clause 6.3; If the Process Reference Model(s) includes system or software engineering processes then the relationship of these processes with ISO/IEC 15288 or ISO/IEC 12207 Amd 1 (Annex F)) shall be defined;	The Process Assessment Model is always the CERTICS Model, as stated in the CERTICS Method.
S71	g) the identity of the competent assessor;	CERTICS uses the name lead assessor for the competent assessor. He or She is defined in the Phase 2 and his or her identity is registered in the contract and in the software platform CERTICSys.
S72	h) the criteria for competence of the assessor who is responsible for the assessment;	The assessor must be authorized by Facti as a CERTICS Lead Assessor in order to be responsible. The CERTICSys allows only authorized assessor to be selected for an assessment. There are criteria to be an authorized.
S73	i) the identity and roles of assessees, the assessment team and assessment support staff with specific responsibilities for the assessment;	These identity and roles are described in the CERTICS Method and in the assessment schedule
S74	j) any additional information to be collected during the	If necessary this is performed as guided by CERTICS Method.

	assessment to support process improvement or process capability determination, e.g. specific data (or metrics) that are needed to quantify the organization's ability to meet a particular business goal (this may also include information detailed at clause 6.3.5 and associated note).	
S75	4.4.3 Any changes in the assessment input shall be agreed with the sponsor or the sponsor's delegated authority and documented in the assessment record.	If necessary this is performed as guided by CERTICS Method.
S76	4.5 Recording the assessment output	This requirement is covered by statements S77 to S84
S77	4.5.1 Information which is pertinent to the assessment and will support understanding of the output of the assessment shall be compiled and included in the assessment record for retention by the sponsor or their delegated authority.	The sponsor receives a detailed report with all pertinent information.
S78	4.5.2 At minimum, the assessment record shall contain:	This requirement is covered by statements S79 to S84
S79	a) the date of the assessment;	The date of each relevant assessment event is recorded in CERTICSys. The date of the visit to the organization, that is the date of the assessment, is documented in all relevant assessment record.
S80	b) the assessment input;	They are described in the assessment result and recorded in CERTICSys.
S81	c) the identification of the objective evidence gathered;	They are listed as an annex of the assessment results and recorded in CERTICSys.
S82	d) identification of the	The process is always CERTIC Method.

	documented assessment process;	
S83	e) the set of process profiles resulting from the assessment (i.e. one profile for each process assessed);	They are documented as part of the assessment result.
S84	f) the identification of any additional information collected during the assessment as specified in clause 4.4.2(i).	If necessary, any additional information is also identified in the assessment output.

3. Statements of conformity for an assessment of organizational maturity

A CERTICS assessment process must follow the CERTICS Method. ISO/IEC 15504-7 defines a requirement for an assessment of organizational maturity. One of these requirements defines that “The assessment shall be conducted according to a documented assessment process that is capable of meeting the assessment purpose”. Then all other requirements are actually for this documented assessment process. Therefore the statements of conformity of these other requirements refer to the CERTICS Method.

Table 3 presents the statements of conformity with the requirements for an assessment of organizational maturity.

Table 3 - Statements of conformity with the requirements for an assessment of organizational maturity

Id	Requirements in ISO/IEC 15504-2	Statement of CERTICS assessment and CERTICS Method conformity
S85	5.2 The assessment process	Statements S86 to S111 cover this requirement.
S86	5.2.1 General - An assessment of organizational maturity shall be conducted according to a documented process that is capable of meeting the assessment purpose. The documented assessment process shall contain at minimum the following activities.	The document process is the CERTICS Method. Statements S87 to S111 complement this requirement.
S87	5.2.2 Planning - A plan for the assessment shall be developed and documented, as specified in ISO/IEC 15504-2, Clause 4.2.2(a).	See statement S88 of Table 2 on 15504-2 requirements.
S88	5.2.3 Data Collection	Statements S89 to S94 cover this requirement.

S89	<p>5.2.3.1 General Requirements: Objective evidence required for evaluating the processes within the scope of the assessment shall be collected in a systematic manner, applying the requirements listed in ISO/IEC 15504-2, Clause 4.2.2(b).</p>	See statement S15 of Table 2 on 15504-2 requirements.
S90	<p>5.2.3.2 Specific Requirements – Class 1 and Class 2 Assessments: For a Class 1 Assessment, a minimum of four process instances shall be identified for each process within the scope of the assessment. For a Class 2 Assessment, a minimum of two process instances shall be identified for each process within the scope of the assessment. If there is fewer than the required number of instances available in the organization, all instances shall be selected. Note that for Class 3 assessments there is no minimum of process instances stated. In the collection of data from the identified process instances, the following criteria shall be satisfied:</p>	Only one process instance is required. Therefore it is Class 2 assessment. Statements S91 to S94 complement this requirement.
S91	<p>a) For each Process Attribute of each Process in the scope of the assessment, across the set of instances, objective evidence drawn both from evaluation of work products and from testimony of performers of the process shall be collected.</p>	Objective evidence for each Process Attribute drawn both from evaluation of work products and from testimony of performers of the process are collected.

S92	b) For each process instance, objective evidence drawn both from evaluation of work products and from testimony of performers of the process shall be collected for each Process within the scope of the assessment.	Objective evidence for each process instance drawn both from evaluation of work products and from testimony of performers of the process are collected.
S93	These requirements are illustrated in Table 1 which shows that all process attributes of all process instances must be assessed, and the assessment of each process instance (columns) must include both work product evaluations and testimony, and that the assessment of each process attribute (rows) must include both work product evaluations and testimony.	This is performed as guided by CERTICS Method.
S94	Note that for any specific process attribute for a specific process instance data may be gathered through both work product evaluation and testimony.	This is performed as guided by CERTICS Method.
S95	5.2.4 Data Validation - The Data Validation approach for the assessment shall ensure that the requirements of ISO/IEC 15504-2 are met in respect of every instance identified in the Assessment Scope, and that the coverage requirements in Clause 5.2.3 of this Part of ISO/IEC 15504 are satisfied.	The requirements of ISO/IEC 15504-2 are met as demonstrated in Table 2.
S96	5.2.5 Process Attribute and Maturity Level Rating	Statements S97 to S108 complement this requirement.

S97	5.2.5.1 General Requirements: The approach to Process Attribute Rating for the assessment shall ensure that the requirements of ISO/IEC 15504-2 are met in respect of each Process and Process Attribute within the scope of the assessment, and that an organization Maturity Level rating is derived.	The requirements of ISO/IEC 15504-2 are met as demonstrated in Table 2.
S98	5.2.5.2 Specific requirements – Class 1 Assessments: For a Class 1 assessment, the approach to Process Attribute Rating shall satisfy the following conditions:	Statements S99 to S104 cover this requirement.
S99	a) The achievement of each Outcome of every Process within the scope of the Assessment shall be characterised for each process instance, based on validated data;	This is performed in the phase 4: Visit Process 4.3 Activity 1 and it is recorded in the CERTICSys.
S100	b) The extent of achievement of each Attribute Achievement for every Process Attribute within the scope of the Assessment shall be characterised for each process instance, based on validated data;	This is performed in the phase 4: Visit Process 4.3 Activity 2 and it is recorded in the CERTICSys.
S101	c) Where a Process Outcome or Attribute Achievement cannot be characterised as Fully Achieved for any process instance, the issue resulting in the lack of achievement shall be documented as a gap in performance.	This is performed in the phase 4: Visit Process 4.3 Activity 1 and it is recorded in the CERTICSys as a weakness.

S102	<p>d) Prior to rating the overall achievement of the Process Attribute, the assessment team shall make a judgement whether the set of performance gaps identified for the process instances examined represent an overall weakness in performance, and what the extent of the weakness is. The individual gaps in performance, and any resulting weakness statements, shall be documented and retained in the Assessment Record.</p>	<p>This is performed in the phase 4: Visit Process 4.3 Activity 1 and it is recorded in the CERTICSys.</p>
S103	<p>e) The extent of achievement of each Process Attribute within the scope of the Assessment shall be rated, using the approach defined in ISO/IEC 15504-2. In order for a Process Attribute to be rated as Fully Achieved or Largely Achieved, there shall be two sources of objective evidence available from each process instance.</p>	<p>The requirements of ISO/IEC 15504-2 are met as demonstrated in Table 2. The complement of this requirement is performed in the phase 4: Visit Process 4.3 Activity 1 and it is recorded in the CERTICSys.</p>
S104	<p>f) Following the completion of rating of all of the Processes within the Assessment Scope, the assessment team will review the Process Profile and determine the Maturity Level Rating, based on the requirements of the selected Organizational Maturity Model.</p>	<p>This is performed in the phase 4: Visit Process 4.3 Activity 3 and it is recorded in the CERTICSys.</p>
S105	<p>5.2.5.3 Specific requirements – Class 2 Assessments: For a Class 2 assessment, the approach to Process Attribute Rating shall satisfy the following conditions:</p>	<p>Statements S106 to S108 cover this requirement.</p>

S106	a) The extent of achievement of each Process Attribute within the scope of the Assessment shall be rated, based on validated data. In order for a Process Attribute to be rated as Fully Achieved or Largely Achieved, there shall be two sources of objective evidence available from each process instance.	This is performed in the phase 4: Visit Process 4.3 Activity 2 and it is recorded in the CERTICSys.
S107	b) Where a Process Attribute cannot be rated as Fully Achieved, the issue resulting in the lack of achievement shall be documented as a weakness and retained in the Assessment Record.	This is performed in the phase 4: Visit Process 4.3 Activity 1 and it is recorded in the CERTICSys as a weakness.
S108	c) Following the completion of rating of all of the Processes within the Assessment Scope, the assessment team will review the Process Profiles and determine the Maturity Level Rating, based on the requirements of the selected Organizational Maturity Model.	This is performed in the phase 4: Visit Process 4.3 Activity 3 and it is recorded in the CERTICSys.
S109	5.2.6 Reporting	Statements S110 to S111 cover this requirement.
S110	5.2.6.1 General Requirements: The assessment results, including at minimum the outputs specified in 5.5, shall be documented and reported to the assessment sponsor or to their delegated representative. The results shall include the recorded Organizational Maturity Level Rating, the identity of the Organization Maturity Model used, and the Class of the assessment.	This is performed in the phase 4: Visit Process 4.1 Activity 1 and it is recorded in the CERTICSys. The results are validated in phase 5. The final results are recorded in CERTICSys and delivery to the sponsor in phase 6 process 6.1 activity 4. CERTICS Method does not mention class of assessment. Following the definition and requirements in 15504-7, CERTICS assessment is class 2.

S111	<p>5.2.6.2 Specific requirements – Class 1 & 2 Assessments: In addition to the elements specified above, the weaknesses established during Process Attribute Rating shall be documented and reported to the assessment sponsor.</p>	<p>This is performed in the phase 4: Visit Process 4.3 Activities 1 to 3 and it is recorded in the CERTICSys.</p>
S112	<p>5.3 Roles and responsibilities - The roles of sponsor of the assessment, competent assessor and assessor and their responsibilities are as defined in ISO/IEC 15504-2. In addition to these requirements, for the assessment of organizational maturity, the following minimum sizes of the assessment team shall apply:</p>	<p>The requirements of ISO/IEC 15504-2 are met as demonstrated in Table 2. Statements S113 to S117 complement this requirement.</p>
S113	<p>a) For a Class 1 assessment, at least two members, including the Competent Assessor. The Competent Assessor shall be independent of the organization unit being assessed.</p>	<p>CERTICS Method defines the assessment team with at least the lead assessor (the competent assessor). This team may include one or more assessor (See CERTICS Method Section 3.3 Assessment Team). The lead assessor is always independent of the OU. The effort in a CERTICS assessment depends on the size of the OU. There are four predefined ranges: micro, small, medium and large. For micro and small, the team is one (therefore, no Class 1). For medium, the team is two (therefore Class 1). For large, the team is three (Therefore Class 1).</p>
S114	<p>b) For a Class 2 assessment, at least two members, including the Competent Assessor.</p>	<p>Similar to previous statement (S113): For micro and small, the team is one (therefore, no Class 2). For medium, the team is two (therefore Class 2). For large, the team is three (Therefore Class 2).</p>
S115	<p>c) For a Class 3 assessment, at least one member, who shall be a Competent Assessor.</p>	<p>Similar to statement S113: All assessments are at least class 3.</p>
S116	<p>NOTE: For Class 1 assessment a team size greater than two is typically required to address workload for data collection and validation.</p>	<p>As describe in S113, for large organization, the team is by three.</p>

S117	NOTE: For a Class 2 assessment the Competent Assessor should be independent of the organization unit being assessed	The competent assessor (named as Lead Appraiser in CERTICS) is always independent.
S118	5.4 Defining the initial assessment input	Statements S119 to S31 cover this requirement.
S119	5.4.1 General requirements - The assessment input shall be defined prior to the data collection phase of an assessment and approved by the sponsor of the assessment or the sponsor's delegated authority. In addition to the content specified in ISO/IEC 15504-2, the assessment input shall include the following elements.	This requirement is covered. The input is defined in the agreement phase (phase 2) and the data collection is in visit phase (phase 4). The sponsor approves the input. The content specified in 15504-2 is covered as described in S09 of Table 2. Statements S120 to S129 complement this requirement.
S120	5.4.2 Assessment purpose - The assessment purpose shall include the assessment of organizational maturity as a fundamental element, and shall include justification for seeking the rating of organizational Maturity Level.	The assessment purpose always includes the maturity. This requirement is covered.
S121	5.4.3 Assessment scope - In defining the scope of the assessment, the following issues shall be specifically addressed:	Statements S122 to S126 cover this requirement.
S122	d) The set of processes, and the relevant Capability Levels, to be included in the assessment scope shall be specified, based upon the selected Organizational Maturity Model to be used, and the Maturity Level(s) to in the assessment scope.	These elements are always the same as defined in the CERTICS Method and Model. This requirement is covered.

S123	<p>e) Assessment of organizational maturity shall be performed against a defined and declared organization scope. The scope may include:</p> <ul style="list-style-type: none"> — One or more site locations ; — One or more geographic units ; — One or more product lines ; — One or more application domains ; — One or more business units; — Multiple companies ; — An entire organization 	<p>The organization scope is defined in the agreement and refined in the assessment schedule for the visit phase. This requirement is covered.</p>
S124	<p>f) The identification and justification for selection of the instances to be examined shall be defined for each of the Processes within the Scope of the Assessment;</p>	<p>For each outcome, the assessed organization identifies and justifies one or more evidences, during phase 1. The lead assessor revise and if necessary ask for substitution, during phase 3. The lead assessor to be considered must accept the evidences and the justification.</p>
S125	<p>g) The set of instances shall be representative of the defined organisation scope.</p>	<p>The lead assessor verifies and assurances that the evidences are representative.</p>
S126	<p>Organizations that do not perform the minimum set of processes in the basic process set specified in an Organizational Maturity model shall not be assessed for organizational maturity based upon that model.</p>	<p>A CERTICS Assessment is performed covering all four processes in the model.</p>
S127	<p>5.4.4 Class of Assessment - Explicit identification of the Class of the Assessment and an explanation of the reason for selection of the Class of Assessment shall be recorded.</p>	<p>CERTICS Method does not mention class of assessment. Following the definition and requirements in 15504-7, CERTICS assessment is class 2.</p>

S128	5.4.5 Organizational Maturity Model - The Organizational Maturity Model to be employed for the assessment shall be recorded together with the identification of the specified Process Assessment Model(s) on which it is based, and the highest level of organizational maturity to be investigated.	The model is always the CERTICS Model.
S129	5.4.6 Roles and Responsibilities - In identifying and specifying the responsibilities of the Competent Assessor and the other Assessor(s) involved in the Assessment, the independence of the body and assessment team performing the assessment shall be explicitly identified.	This independency is necessary and it is verified during phase 2: agreement.
S130	5.5 Recording the assessment output	This requirement is covered by statement S131.
S131	5.5.1 General requirements - In addition to the elements specified in ISO/IEC 15504-2, the Assessment Output shall include: a) the additional items recorded in the Assessment Input; and b) the recorded Maturity Level Rating,	The requirements of ISO/IEC 15504-2 are met as demonstrated in Table 2. The additional items are recorded and the maturity level rating is performed in the phase 4: Visit Process 4.3 Activity 3 and they are recorded in the CERTICSys.

4. Conclusion

From an analysis of the statements of conformity of CERTICS Model with the ISO/IEC 15504-2 requirements for process assessment, we conclude that a CERTICS assessment can be considered as an ISO/IEC 15504 conformance process assessment. This assessment uses CERTICS method as the documented process assessment.

From similar analysis for ISO/IEC 15504-7 requirements we also conclude that a CERTICS assessment can be considered as an ISO/IEC 15504-7 conformance assessment of organizational maturity, for at least Class 1 assessment. The CERTICS Method can be considered as a documented process that is capable of meeting the assessment purpose. The CERTICS Method does not mention class of assessment. Following the definition and requirements in 15504-7, a CERTICS assessment is

at least class 1 assessment. With minor adjustments in CERTICS Method, a CERTICS assessment can be a class 2 assessment.

The documentation of CERTICS Model, however, should be improved in order to facilitate the understanding of how these requirements are addressed.

References

1. The International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC), ISO/IEC 15504-2 - Information technology - Process assessment - Part 2: Performing an assessment, 2003.
2. ISO/IEC, ISO/IEC 15504-7 - Information technology - Process assessment - Part 7: Assessment of organizational maturity, 2008.
3. Equipe CERTICS, Metodologia de Avaliação da CERTICS para Software - Documento de Definição - Versão 1.1, Relatório Técnico CTI Renato Archer – TRT0012113, 2013 (available, in Portuguese, from www.certics.cti.gov.br).
4. Equipe CERTICS, Método de Avaliação da CERTICS - Documento de Detalhamento - Versão 1.1, Relatório Técnico CTI Renato Archer – TRT0083113, 2013 (available, in Portuguese, from www.certics.cti.gov.br).