

Certification Report

BSI-DSZ-CC-0520-2009

for

**Database Engine of
Microsoft SQL Server 2008 Enterprise Edition
(English) x86 and x64, Version 10.0.1600.22**

from

Microsoft Corporation

BSI - Bundesamt für Sicherheit in der Informationstechnik, Postfach 20 03 63, D-53133 Bonn
Phone +49 (0)228 99 9582-0, Fax +49 (0)228 9582-5477, Infoline +49 (0)228 99 9582-111



Deutsches IT-Sicherheitszertifikat

erteilt vom



Bundesamt für Sicherheit in der Informationstechnik

BSI-DSZ-CC-0520-2009

**Database Engine of
Microsoft SQL Server 2008 Enterprise Edition (English) x86 and x64,
Version 10.0.1600.22**

from Microsoft Corporation

PP Conformance: None

Functionality: product specific Security Target
Common Criteria Part 2 extended

Assurance: Common Criteria Part 3 conformant
EAL 1 augmented by
ASE_OBJ.2, ASE_REQ.2 and ASE_SPD.1



Common Criteria
Recognition
Arrangement



The IT product identified in this certificate has been evaluated at an accredited and licensed / approved evaluation facility using the Common Methodology for IT Security Evaluation (CEM), Version 3.1 for conformance to the Common Criteria for IT Security Evaluation (CC), Version 3.1.

This certificate applies only to the specific version and release of the product in its evaluated configuration and in conjunction with the complete Certification Report.

The evaluation has been conducted in accordance with the provisions of the certification scheme of the German Federal Office for Information Security (BSI) and the conclusions of the evaluation facility in the evaluation technical report are consistent with the evidence adduced.

This certificate is not an endorsement of the IT product by the Federal Office for Information Security or any other organisation that recognises or gives effect to this certificate, and no warranty of the IT product by the Federal Office for Information Security or any other organisation that recognises or gives effect to this certificate, is either expressed or implied.

Bonn, 16 February 2009

For the Federal Office for Information Security



SOGIS - MRA

Bernd Kowalski
Head of Department

L.S.

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Preliminary Remarks

Under the BSIG¹ Act, the Federal Office for Information Security (BSI) has the task of issuing certificates for information technology products.

Certification of a product is carried out on the instigation of the vendor or a distributor, hereinafter called the sponsor.

A part of the procedure is the technical examination (evaluation) of the product according to the security criteria published by the BSI or generally recognised security criteria.

The evaluation is normally carried out by an evaluation facility recognised by the BSI or by BSI itself.

The result of the certification procedure is the present Certification Report. This report contains among others the certificate (summarised assessment) and the detailed Certification Results.

The Certification Results contain the technical description of the security functionality of the certified product, the details of the evaluation (strength and weaknesses) and instructions for the user.

¹ Act setting up the Federal Office for Information Security (BSI-Errichtungsgesetz, BSIG) of 17 December 1990, Bundesgesetzblatt I p. 2834

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A Certification

1 Specifications of the Certification Procedure

The certification body conducts the procedure according to the criteria laid down in the following:

- BSIG²
- BSI Certification Ordinance³
- BSI Schedule of Costs⁴
- Special decrees issued by the Bundesministerium des Innern (Federal Ministry of the Interior)
- DIN EN 45011 standard
- BSI certification: Procedural Description (BSI 7125) [3]
- Common Criteria for IT Security Evaluation (CC), Version 3.1⁵ [1]
- Common Methodology for IT Security Evaluation, Version 3.1 [2]
- BSI certification: Application Notes and Interpretation of the Scheme (AIS) [4]

2 Recognition Agreements

In order to avoid multiple certification of the same product in different countries a mutual recognition of IT security certificates - as far as such certificates are based on ITSEC or CC - under certain conditions was agreed.

2.1 European Recognition of ITSEC/CC - Certificates

The SOGIS-Mutual Recognition Agreement (MRA) for certificates based on ITSEC became effective on 03 March 1998.

This agreement was signed by the national bodies of Finland, France, Germany, Greece, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. This agreement on the mutual recognition of IT security certificates was extended to include certificates based on the CC for all Evaluation Assurance Levels (EAL 1 – EAL 7). The German Federal Office for Information Security (BSI) recognises certificates issued by the national certification bodies of France and the United Kingdom within the terms of this agreement.

The SOGIS-MRA logo printed on the certificate indicates that it is recognised under the terms of this agreement.

² Act setting up the Federal Office for Information Security (BSI-Errichtungsgesetz, BSIG) of 17 December 1990, Bundesgesetzblatt I p. 2834

³ Ordinance on the Procedure for Issuance of a Certificate by the Federal Office for Information Security (BSI-Zertifizierungsverordnung, BSIZertV) of 07 July 1992, Bundesgesetzblatt I p. 1230

⁴ Schedule of Cost for Official Procedures of the Bundesamt für Sicherheit in der Informationstechnik (BSI-Kostenverordnung, BSI-KostV) of 03 March 2005, Bundesgesetzblatt I p. 519

⁵ Proclamation of the Bundesministerium des Innern of 10 May 2006 in the Bundesanzeiger dated 19 May 2006, p. 3730

2.2 International Recognition of CC - Certificates

An arrangement (Common Criteria Recognition Arrangement) on the mutual recognition of certificates based on the CC Evaluation Assurance Levels up to and including EAL 4 has been signed in May 2000 (CCRA). It includes also the recognition of Protection Profiles based on the CC.

As of February 2007 the arrangement has been signed by the national bodies of: Australia, Austria, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, India, Israel, Italy, Japan, Republic of Korea, The Netherlands, New Zealand, Norway, Republic of Singapore, Spain, Sweden, Turkey, United Kingdom, United States of America. The current list of signatory nations and approved certification schemes can be seen on the web site: <http://www.commoncriteriaportal.org>

The Common Criteria Recognition Arrangement logo printed on the certificate indicates that this certification is recognised under the terms of this agreement.

3 Performance of Evaluation and Certification

The certification body monitors each individual evaluation to ensure a uniform procedure, a uniform interpretation of the criteria and uniform ratings.

The product Database Engine of Microsoft SQL Server 2008 Enterprise Edition (English) x86 and x64, Version 10.0.1600.22 has undergone the certification procedure at BSI.

The evaluation of the product Database Engine of Microsoft SQL Server 2008 Enterprise Edition (English) x86 and x64, Version 10.0.1600.22 was conducted by TÜV Informationstechnik GmbH. The evaluation was completed on 04 February 2009. The TÜV Informationstechnik GmbH is an evaluation facility (ITSEF)⁶ recognised by the certification body of BSI.

For this certification procedure the applicant is: Microsoft Corporation

The product was developed by: Microsoft Corporation

The certification is concluded with the comparability check and the production of this Certification Report. This work was completed by the BSI.

4 Validity of the certification result

This Certification Report only applies to the version of the product as indicated. The confirmed assurance package is only valid on the condition that

- all stipulations regarding generation, configuration and operation, as given in the following report, are observed,
- the product is operated in the environment described, where specified in the following report and in the Security Target.

For the meaning of the assurance levels please refer to the excerpts from the criteria at the end of the Certification Report.

The Certificate issued confirms the assurance of the product claimed in the Security Target at the date of certification. As attack methods may evolve over time, the resistance of the certified version of the product against new attack methods can be re-assessed if

⁶ Information Technology Security Evaluation Facility

required and the sponsor applies for the certified product being monitored within the assurance continuity program of the BSI Certification Scheme. It is recommended to perform a re-assessment on a regular basis.

In case of changes to the certified version of the product, the validity can be extended to the new versions and releases, provided the sponsor applies for assurance continuity (i.e. re-certification or maintenance) of the modified product, in accordance with the procedural requirements, and the evaluation does not reveal any security deficiencies.

5 Publication

The product Database Engine of Microsoft SQL Server 2008 Enterprise Edition (English) x86 and x64, Version 10.0.1600.22 has been included in the BSI list of the certified products, which is published regularly (see also Internet: <http://www.bsi.bund.de> and [5]). Further information can be obtained from BSI-Infoline +49 228 9582-111.

Further copies of this Certification Report can be requested from the developer⁷ of the product. The Certification Report may also be obtained in electronic form at the internet address stated above.

⁷ Microsoft Corporation
One Microsoft Way
Redmond
WA 98052-6399
USA

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B Certification Results

The following results represent a summary of

- the Security Target of the sponsor for the Target of Evaluation,
- the relevant evaluation results from the evaluation facility, and
- complementary notes and stipulations of the certification body.

1 Executive Summary

The Target of Evaluation (TOE) is the Database Engine of Microsoft SQL Server 2008 Enterprise Edition (English) x86 and x64 Version 10.0.1600.22 (named SQL Server 2008 hereinafter).

The Security Target [6] is the basis for this certification. It is not based on a certified Protection Profile.

SQL Server 2008 has the capability to limit TOE access to authorized users, enforce Discretionary Access Controls on objects under the control of the database management system based on user and/or role authorizations, and to provide user accountability via audit of users' actions.

The TOE is part of the product package of the SQL Server 2008. It provides a relational database engine providing mechanisms for the following security functions:

- Security Management,
- Access Control,
- Identification and Authentication,
- Security Audit.

The product package of SQL Server additionally includes a set of additional tools which are not part of the TOE, for details please read chapter 1.3 of the Security Target [6], chapter 7.4 of the Guidance Addendum [9], and chapter 8 of this report. The TOE itself comprises the database engine of the SQL Server 2008 platform which provides the security functionality described by the ST. The additional tools as listed in chapter 1.3 of the Security Target [6] interact with the TOE as a standard SQL client.

The TOE Security Assurance Requirements (SAR) are based entirely on the assurance components defined in Part 3 of the Common Criteria (see part C or [1], Part 3 for details). The TOE meets the assurance requirements of the Evaluation Assurance Level EAL 1 augmented by ASE_OBJ.2, ASE_REQ.2 and ASE_SPD.1.

The TOE Security Functional Requirements (SFR) relevant for the TOE are outlined in the Security Target [6] resp. [8], chapter 6. They are selected from Common Criteria Part 2 and some of them are newly defined. Thus the TOE is CC Part 2 extended.

The TOE Security Functional Requirements are implemented by the following TOE Security Functions:

TOE Security Function	Addressed issue
Security Management (SF.SM)	This Security Function of the TOE allows modifying the TSF data of the TOE and therewith managing the behaviour of the TSF.
Access Control (SF.AC)	This Security Function of the TOE provides Discretionary Access Control (DAC) mechanism to control the access of users to objects based on the identity of the user requesting access, the membership of this user to roles, the requested operation and the ID of the requested object.
Identification and Authentication (SF.I&A)	This Security Function realizes the identification and authentication function of the TOE which is used for the cases where the identity of the user

TOE Security Function	Addressed issue
	has not been verified by the environment.
Security Audit (SF.AU)	This Security Function realizes the audit functionality for the TOE.

Table 1: TOE Security Functions

For more details please refer to the Security Target [6], chapter 7.

The assets to be protected by the TOE are defined in the Security Target [6], chapter 3.1 . Based on these assets the TOE Security Environment is defined in terms of assumptions, threats and policies. This is outlined in the Security Target [6], chapter 3.2, 3.3, and 3.4.

The TOE SQL Server 2008 is a portion of the product package of the SQL Server 2008 consisting of the database engine of the SQL Server 2008 platform and including the security functions Security Management, Access Control, Identification and Authentication, and Security Audit.

For details about the evaluated configurations of the TOE and the configuration options relevant for a user please read chapter 8 of this report, Evaluated Configuration.

For details about necessary hardware requirements of the evaluated configuration please read the Security Target [6], chapter 1.3.

The vulnerability assessment results as stated within this certificate do not include a rating for those cryptographic algorithms and their implementation suitable for encryption and decryption (see BSIG Section 4, Para. 3, Clause 2).

The certification results only apply to the version of the product indicated in the certificate and on the condition that all the stipulations are kept as detailed in this Certification Report. This certificate is not an endorsement of the IT product by the Federal Office for Information Security (BSI) or any other organisation that recognises or gives effect to this certificate, and no warranty of the IT product by BSI or any other organisation that recognises or gives effect to this certificate, is either expressed or implied.

2 Identification of the TOE

The Target of Evaluation (TOE) is called:

Database Engine of Microsoft SQL Server 2008 Enterprise Edition (English) x86 and x64, Version 10.0.1600.22

The following table outlines the TOE deliverables:

No	Type	Identifier	Release	Form of Delivery
1	SW	Database Engine of Microsoft SQL Server 2008 Enterprise Edition (English) x86 and x64 (as part of the SQL Server 2008 Enterprise Edition product)	Version 10.0.1600.22	DVD (Boxed COTS Software as part of the SQL Server 2008 Enterprise Edition product)

No	Type	Identifier	Release	Form of Delivery
2	DOC	Guidance: SQL Server 2008 Books Online [8] (as part of the SQL Server 2008 Enterprise Edition product)	Version 10.0.1600.22, Date 2008-07-10 See also Note 1 below this table.	DVD (Boxed COTS Software as part of the SQL Server 2008 Enterprise Edition product)
3	SW	Guidance: Guidance addendum for Common Criteria Evaluation of Microsoft SQL Server 2008 Database Engine [9]	File properties: name: MS_SQL_AGD_ADD_1.3.pdf, size: 1,884,713 bytes, SHA-1 hash value: 0be74f149b741acf54ed6f6117813cec6c0abbcb	Download
4	SW	TOE verification tool: File Checksum Integrity Verifier (FCIV) utility	File properties name: windows-kb841290-x86-enu.exe size: 119,600 bytes SHA-1hash value: 99fb35d97a5ee0df703f0cdd02f2d787d6741f65	Download
5	SW	Integrity Check Validation Data (for the verification of the integrity of the SQL Server 2008 product; provided in form of a ZIP file)	integritycheck_SQL2008_EE.zip including - XML file "sqlserver2008.xml" with hash values - cmd file "integritycheck_sqlserver2008.cmd" File properties of the ZIP file: name: integritycheck_SQL2008_EE.zip size: 77,078 bytes SHA-1 hash value: 388f0621d87b7d261a6d93b3e9df1acaa031011e	Download
6	SW	SQL Trace Script to set up the Common Criteria compliant trace process	File properties name: SQL_Server2008_EAL1_trace.sql size: 23.238 bytes SHA-1 hash value: 2466c95a40301b3a6da04a0f067e0ce8f8b413f8	Download

No	Type	Identifier	Release	Form of Delivery
7	DOC	Complete hierarchy of permissions within SQL Server 2008 Database Engine	ZIP file permission_hierarchy.zip File properties: size: 228,836 bytes SHA-1 hash value: 578bf0aa2fb56e113118b6e00ed2aec75fe95a8f	Download

Table 2: Deliverables of the TOE

Note 1: Item number 2, "SQL Server 2008 Books Online" is being shipped together with the binaries of the TOE on a DVD. As such it inherits the version number of the TOE. The integrity of SQL Server 2008 Books Online is verified using hash values as described in the "Guidance addendum for Common Criteria Evaluation of Microsoft SQL Server 2008 Database Engine" [9].

Note 2: Although several tools and services are delivered together with the TOE, they are excluded from the TOE and are considered part of the environment.

The TOE environment also includes applications that are not delivered with the TOE. The TOE uses the functionality of the underlying operating system "Windows Server 2008, Enterprise Edition (English), 64-bit or 32 bit , Version 6.0.6001", e.g. for log file storage, for audit record readability, for hashing, for user data protection, for access control functions, for user authentication and identification, and for providing a reliable time stamp. Please read the Security Target [6] chapter 1.3.4 and chapter 3.2.

For HW-Requirements please read the Security Target [6], chapter 1.3.2.

The delivery of the TOE is secured by cryptographic hashes.

The download links for all TOE items that are listed in the table above are provided on the secure product homepage:

<https://www.microsoft.com/sql/commoncriteria/2008/EAL1/default.msp>

The page also contains the hash value for the FCIV tool (item 4 of the list above) and for the Guidance addendum for Common Criteria Evaluation of Microsoft SQL Server 2008 Database Engine [9] (item 3 of the list above). The other hash values are provided in [9].

The secure product homepage gives instructions for the download process that are summarised hereinafter.

- Download the FCIV tool from the link on the product homepage and verify the integrity using the provided hash value.
- Download the Guidance addendum for Common Criteria Evaluation of Microsoft SQL Server 2008 Database Engine [9] to the directory where FCIV has been extracted.
- Open a command prompt and change to the directory where FCIV has been extracted.
- Verify the integrity of the CC Guidance Addendum using the provided hash value.
- Follow the CC Guidance Addendum for further installation and configuration.

The secure product homepage and the Guidance addendum for Common Criteria Evaluation of Microsoft SQL Server 2008 Database Engine [9] detail these instructions.

To determine the TOE version one has to enter of the T-SQL statement “SELECT @@VERSION” and “GO”. The TOE will return the name of the product platform “Microsoft SQL Server 2008” of which the TOE is the central part, the version number of the TOE, and information about the operating system. The response to this command includes the strings

- Microsoft SQL Server 2008 (RTM) – 10.0.1600.22 (Intel X86), or
- Microsoft SQL Server 2008 (RTM) – 10.0.1600.22 (X64)

depending on the hardware platform “x86” or “x64”. Both configurations are included in the scope of the certificate.

3 Security Policy

The security policies of the TOE are to provide authorized administrators roles to isolate administrative actions and to provide administrators with the necessary information for secure management. Furthermore the TOE provides the capability to detect and create records of security relevant events associated with users. The TOE also provides all functions and facilities necessary to support the authorized administrators in their management of the security of the TOE, and restrict these functions and facilities from unauthorized use. The TOE will also provide a mechanism for identification and authentication of users, and will protect user data in accordance with its security policy.

4 Assumptions and Clarification of Scope

The Assumptions defined in the Security Target and some aspects of Threats and organisational Security Policies are not covered by the TOE itself. These aspects lead to specific security objectives to be fulfilled by the TOE-Environment. The following topics are of relevance:

- OE.NO_EVIL: Sites using the TOE shall ensure that authorized administrators are non-hostile, appropriately trained and follow all administrator guidance.
- OE.NO_GENERAL_PURPOSE: There will be no general-purpose computing capabilities (e.g., compilers or user applications) available on DBMS servers, other than those services necessary for the operation, administration and support of the DBMS.
- OE.OS: The TOE shall be installed on Windows Server 2008 Enterprise Edition. This Operating System provides functionality for Identification and authentication of users, Access Control for Files, Time stamps, Audit Storage, Hashing of passwords.
- OE.PHYSICAL: Physical security shall be provided for the server, on which the TOE will be installed, considering the value of the stored, processed, and transmitted information.
- OE.COMM: Any communication path from and to the TOE will be appropriately secured to avoid eavesdropping and manipulation.
- OE.AUDIT_REVIEW: The environment shall provide tools for the administrators to review the audit logs that are produced by the TOE.

Details can be found in the Security Target [6], chapter 4.2.

5 Architectural Information

The TOE, as illustrated in Fig. 1 of chapter 1.3.2 of the Security Target [6], can be described by following components:

- The Communication Part / Command Interpreter is the interface for programs accessing the TOE. It is the interface between the TOE and clients performing requests. All responses to user application requests return to the client through the Communication part and Command Interpreter.
- The Relational Engine is the core of the database engine and is responsible for all security relevant decisions.
- The Storage Engine is a resource provider. It manages the physical resources for the TOE by using the Windows OS.
- The SQL-OS is a resource provider for all situations where the TOE uses functionality of the operating system.
- Task Management provides an OS-like environment for threads but without calling the Windows Operating System.
- The Memory Manager is responsible for the TOE memory pool.

The IT-environment consists of the underlying operating system and hardware platform, as well as of the other parts of the SQL Server 2008 platform, and of the clients that interact with the TOE.

6 Documentation

The evaluated documentation as outlined in table 2 is being provided with the product to the customer. The documentation contains the required information for secure delivery and usage of the TOE in accordance with the Security Target.

Additional obligations and notes for secure usage of the TOE as outlined in chapter 10 of this report have to be followed.

7 IT Product Testing

The TOE exists in two configurations: x86 and x64 version, while a third configuration, the IA64 version of the database engine, is out of scope of this evaluation. The machines used for testing were a Dell Optiplex GX270 with an Intel Pentium 4 2.6 GHz CPU and 2.0 GB RAM as well as an ACPI x64-based PC that uses an Intel Core 2 Duo E4600 CPU at 2.4 GHZ and 3.0 GB RAM with the Operating System "Windows Server 2008 Enterprise Edition." The TOE has been installed and configured following all instructions and guidance given in [9].

All tests were performed using client tools installed from the SQL Server 2008 media (sqlcmd and Management Studio) and from the developer's website (SSEUtil). Audit log verification has been done with the "Profiler" tool from the SQL Server installation media.

For the evaluators testing, only the following components of SQL server were installed :

- Database Engine Services (includes the TOE),
- SQL Server Books Online
- Management Tools – Basic (includes Management Studio and client tools)

- Management Tools – Complete (includes “SQL Server Profiler” tool)

The evaluator's objective was to test the functionality of the TOE systematically against the TSF description in the security target [6] and the functional specification.

The evaluators tested all TSF defined in the security target [6] and the functional specification. The evaluators testing included positive and negative tests.

During the evaluator's TSF tests, the TOE operated as specified. The tests demonstrate that the security functions perform as specified.

The evaluators devised and conducted penetration tests after a search of publicly available information about potential vulnerabilities.

During the evaluator's penetration testing the TOE operated as specified. The vulnerabilities are not exploitable in the intended environment for the TOE. The TOE is resistant to easily identifiable exploitable vulnerabilities of basic attack potential.

8 Evaluated Configuration

The Target of Evaluation (TOE) and subject of the Security Target (ST) [6] is the “Database Engine of Microsoft SQL Server 2008 Enterprise Edition (English) x86 and x64 Version 10.0.1600.22”.

Not part of the TOE but part of the product package of SQL Server are tools, applications, and services, although they are delivered together with the TOE, they are excluded from the TOE and are considered part of the IT-environment. The clients are also considered part of the IT-environment. Please read the security target, chapter 1.3 for a description of the product type, the physical and logical scope of the TOE and the boundaries of the TOE.

The document „Guidance addendum for Common Criteria Evaluation of Microsoft SQL Server™ 2008 Database Engine“ [9] describes the evaluated configuration and the necessary setup to achieve the evaluated configuration.

Microsoft SQL Server 2008 is a complex Software product. Therefore, it must be remembered that the TOE is the database engine and thus the TOE environment includes many applications and services that are part of the product package but not part of the actual TOE, e.g. SQL Server Replication, Analysis Services, Reporting Services, Integration Services, Management tools, Development tools, Graphical User Interfaces (T-SQL is the evaluated interface to the TOE), Internationalization (Only the English version of SQL Server is evaluated), VIA Protocol, Encryption features, Clustered Servers, Full Text Search, Business Intelligence Development Studio, Client tools connectivity, Client tools backwards compatibility, Client tools SDK, SQL client connectivity SDK, Microsoft Sync framework. Please read the Security Target [6] chapter 1.3.1 and [9], chapter 7.4.

The product homepage is

<https://www.microsoft.com/sql/commoncriteria/2008/EAL1/default.aspx>

It gives instructions for a secure download and delivery of all TOE deliverables and gives necessary hash values for a verification of the TOE integrity. It also links to the downloads of all TOE deliverables that are additional to the boxed DVD.

The TOE is running on the operating system "Windows Server 2008, Enterprise Edition (English), 64-bit or 32 bit , Version 6.0.6001." The TOE itself has to be installed and configured following all instructions and guidance addendum given in [9].

For this evaluation the TOE was tested using the Server machines Dell Optiplex GX270 with an Intel Pentium 4 2.6 GHz CPU and 2.0 GB RAM and an ACPI x64-based PC that uses an Intel Core 2 Duo E4600 CPU at 2.4 GHz and 3.0 GB RAM as hardware platform.

The TOE also uses functionality of the underlying operating system, e.g. for log file storage, for audit record readability, for hashing, for user data protection, for access control functions, for user authentication and identification, and for providing a reliable time stamp. Please read the Security Target [6] chapter 1.3.4 and chapter 3.2.

For HW-Requirements please read the Security Target [6], chapter 1.3.2.

The TOE is delivered within the SQL Server 2008 product package in form of a boxed DVD (COTS product) through the sales channels. Some TOE deliverables according to table 2 of this report are delivered via the web only and are accessible through its secure product homepage. For more details please read chapter 2 of this report.

It has to be noted that the certification according to Common Criteria is only valid for the database engine of SQL Server 2008.

9 Results of the Evaluation

9.1 CC specific results

The Evaluation Technical Report (ETR) [7] was provided by the ITSEF according to the Common Criteria [1], the Methodology [2], the requirements of the Scheme [3] and all interpretations and guidelines of the Scheme (AIS) [4] as relevant for the TOE.

The Evaluation Methodology CEM [2] was used for those components up to EAL4 and all interpretations and guidelines of the Scheme (AIS) [4] as relevant for the TOE.

As a result of the evaluation the verdict PASS is confirmed for the following assurance components:

- All components of the EAL 1 package including the class ASE as defined in the CC (see also part C of this report)
- The components ASE_OBJ.2, ASE_REQ.2 and ASE_SPD.1 augmented for this TOE evaluation.

The evaluation has confirmed:

- for the Functionality: product specific Security Target
Common Criteria Part 2 extended
- for the Assurance: Common Criteria Part 3 conformant
EAL 1 augmented by
ASE_OBJ.2, ASE_REQ.2 and ASE_SPD.1

The results of the evaluation are only applicable to the TOE as defined in chapter 2 and the configuration as outlined in chapter 8 above.

9.2 Results of cryptographic assessment

The TOE does not include cryptoalgorithms. Thus, no such mechanisms were part of the assessment.

10 Obligations and notes for the usage of the TOE

The operational documents as outlined in table 2 of this report contain necessary information about the usage of the TOE and all security hints therein have to be considered. Additionally, for secure usage of the TOE the fulfilment of the assumptions about the environment in the Security Target [6] and the Security Target as a whole has to be taken into account. Therefore a user/administrator has to follow the guidance in these documents. Please read also chapter 8 of this report.

The administrator should verify that all software installed on the TOE server (other than the TOE itself) operates as intended.

Also, as there are no Microsoft or Third Party clients included in the evaluation, the user or administrator should verify that the client used to access the TOE operates as specified.

The user of the TOE has to be aware of the existence and purpose of the Guidance Documentation Addendum Document "Guidance addendum for Common Criteria Evaluation of Microsoft SQL Server™ 2008 Database Engine" [9]. Therefore, the TOE's Internet product homepage (see below) has to provide information about the existence of the document and describe how to access the document. The reference has to be unambiguous and permanent.

The developer must publish the secure product homepage

<https://www.microsoft.com/sql/commoncriteria/2008/EAL1/default.mspx>

The product homepage must contain all information for a secure download and verification of the TOE items including hash values as specified in this report and all links to the TOE items as specified in this report, see table 2 in chapter 2.

The links as well as the hash values are required for verification of the components along with the descriptions for a secure download and the FCIV tool. They have to be present throughout the validity of this certificate.

The Guidance and the Guidance Documentation Addendum contain necessary information about the secure administration, configuration, and usage of the TOE and all security hints therein have to be considered.

The Guidance Addendum [9], chapter 3 and the secure product homepage advise the user how to download and verify the integrity of the TOE components.

11 Security Target

For the purpose of publishing, the Security Target [6] of the Target of Evaluation (TOE) is provided within a separate document as Annex A of this report.

12 Definitions

12.1 Acronyms

BSI	Bundesamt für Sicherheit in der Informationstechnik / Federal Office for Information Security, Bonn, Germany
CC	Common Criteria for IT Security Evaluation
CD	Compact Disk
CCRA	Common Criteria Recognition Arrangement

CLR	Common Language Runtime
COTS	Commercial Off The Shelf
DBMS	Database Management System
DVD	Digital Versatile Disc
EAL	Evaluation Assurance Level
FCIV	File Checksum Integrity Verifier
GDR	General Distribution Release
IT	Information Technology
ITSEF	Information Technology Security Evaluation Facility
NSA	National Security Agency
OS	Operating system
PP	Protection Profile
RAM	Random Access Memory
SAR	Security Assurance Requirement
SDK	Software Development Kit
SF	Security Function
SFP	Security Function Policy
SFR	Security Functional Requirement
SHA	Secure Hash Algorithm
SoF	Strength of Function
SP	Service Pack
SQL	Structured Query Language
SSEUtil	SQL Server Express Utility
ST	Security Target
TOE	Target of Evaluation
TSC	TSF Scope of Control
TSF	TOE Security Functions
TSP	TOE Security Policy
T-SQL	Transact-SQL
VIA	Virtual Interface Adapter
XML	Extensible Markup Language

12.2 Glossary

Augmentation - The addition of one or more requirement(s) to a package.

Extension - The addition to an ST or PP of functional requirements not contained in part 2 and/or assurance requirements not contained in part 3 of the CC.

Formal - Expressed in a restricted syntax language with defined semantics based on well-established mathematical concepts.

Informal - Expressed in natural language.

Object - An passive entity in the TOE, that contains or receives information, and upon which subjects perform operations.

Protection Profile - An implementation-independent statement of security needs for a TOE type.

Security Target - An implementation-dependent statement of security needs for a specific identified TOE.

Semiformal - Expressed in a restricted syntax language with defined semantics.

Subject - An active entity in the TOE that performs operations on objects.

Target of Evaluation - A set of software, firmware and/or hardware possibly accompanied by guidance.

TOE Security Functionality - A set consisting of all hardware, software, and firmware of the TOE that must be relied upon for the correct enforcement of the SFRs.

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C Excerpts from the Criteria

CC Part1:

Conformance Claim (chapter 9.4)

„The conformance claim indicates the source of the collection of requirements that is met by a PP or ST that passes its evaluation. This conformance claim contains a CC conformance claim that:

- describes the version of the CC to which the PP or ST claims conformance.
- describes the conformance to CC Part 2 (security functional requirements) as either:
 - **CC Part 2 conformant** - A PP or ST is CC Part 2 conformant if all SFRs in that PP or ST are based only upon functional components in CC Part 2, or
 - **CC Part 2 extended** - A PP or ST is CC Part 2 extended if at least one SFR in that PP or ST is not based upon functional components in CC Part 2.
- describes the conformance to CC Part 3 (security assurance requirements) as either:
 - **CC Part 3 conformant** - A PP or ST is CC Part 3 conformant if all SARs in that PP or ST are based only upon assurance components in CC Part 3, or
 - **CC Part 3 extended** - A PP or ST is CC Part 3 extended if at least one SAR in that PP or ST is not based upon assurance components in CC Part 3.

Additionally, the conformance claim may include a statement made with respect to packages, in which case it consists of one of the following:

- Package name Conformant - A PP or ST is conformant to a pre-defined package (e.g. EAL) if:
 - the SFRs of that PP or ST are identical to the SFRs in the package, or
 - the SARs of that PP or ST are identical to the SARs in the package.
- Package name Augmented - A PP or ST is an augmentation of a predefined package if:
 - the SFRs of that PP or ST contain all SFRs in the package, but have at least one additional SFR or one SFR that is hierarchically higher than an SFR in the package.
 - the SARs of that PP or ST contain all SARs in the package, but have at least one additional SAR or one SAR that is hierarchically higher than an SAR in the package.

Note that when a TOE is successfully evaluated to a given ST, any conformance claims of the ST also hold for the TOE. A TOE can therefore also be e.g. CC Part 2 conformant.

Finally, the conformance claim may also include two statements with respect to Protection Profiles:

- PP Conformant - A PP or TOE meets specific PP(s), which are listed as part of the conformance result.
- Conformance Statement (Only for PPs) - This statement describes the manner in which PPs or STs must conform to this PP: strict or demonstrable. For more information on this Conformance Statement, see Annex A.

CC Part 3:

Class APE: Protection Profile evaluation (chapter 10)

“Evaluating a PP is required to demonstrate that the PP is sound and internally consistent, and, if the PP is based on one or more other PPs or on packages, that the PP is a correct instantiation of these PPs and packages. These properties are necessary for the PP to be suitable for use as the basis for writing an ST or another PP.

Assurance Class	Assurance Components
Class APE: Protection Profile evaluation	APE_INT.1 PP introduction
	APE_CCL.1 Conformance claims
	APE_SPD.1 Security problem definition
	APE_OBJ.1 Security objectives for the operational environment APE_OBJ.2 Security objectives
	APE_ECD.1 Extended components definition
	APE_REQ.1 Stated security requirements APE_REQ.2 Derived security requirements

APE: Protection Profile evaluation class decomposition”

Class ASE: Security Target evaluation (chapter 11)

“Evaluating an ST is required to demonstrate that the ST is sound and internally consistent, and, if the ST is based on one or more PPs or packages, that the ST is a correct instantiation of these PPs and packages. These properties are necessary for the ST to be suitable for use as the basis for a TOE evaluation.”

Assurance Class	Assurance Components
Class ASE: Security Target evaluation	ASE_INT.1 ST introduction
	ASE_CCL.1 Conformance claims
	ASE_SPD.1 Security problem definition
	ASE_OBJ.1 Security objectives for the operational environment ASE_OBJ.2 Security objectives
	ASE_ECD.1 Extended components definition
	ASE_REQ.1 Stated security requirements ASE_REQ.2 Derived security requirements
	ASE_TSS.1 TOE summary specification ASE_TSS.2 TOE summary specification with architectural design summary

ASE: Security Target evaluation class decomposition

Security assurance components (chapter 7)

“The following Sections describe the constructs used in representing the assurance classes, families, and components.”

“Each assurance class contains at least one assurance family.”

“Each assurance family contains one or more assurance components.”

The following table shows the assurance class decomposition.

Assurance Class	Assurance Components
ADV: Development	ADV_ARC.1 Security architecture description
	ADV_FSP.1 Basic functional specification ADV_FSP.2 Security-enforcing functional specification ADV_FSP.3 Functional specification with complete summary ADV_FSP.4 Complete functional specification ADV_FSP.5 Complete semi-formal functional specification with additional error information ADV_FSP.6 Complete semi-formal functional specification with additional formal specification
	ADV_IMP.1 Implementation representation of the TSF ADV_IMP.2 Implementation of the TSF
	ADV_INT.1 Well-structured subset of TSF internals ADV_INT.2 Well-structured internals ADV_INT.3 Minimally complex internals
	ADV_SPM.1 Formal TOE security policy model
	ADV_TDS.1 Basic design ADV_TDS.2 Architectural design ADV_TDS.3 Basic modular design ADV_TDS.4 Semiformal modular design ADV_TDS.5 Complete semiformal modular design ADV_TDS.6 Complete semiformal modular design with formal high-

Assurance Class	Assurance Components
	level design presentation
AGD:	AGD_OPE.1 Operational user guidance
Guidance documents	AGD_PRE.1 Preparative procedures
ALC: Life cycle support	ALC_CMC.1 Labelling of the TOE ALC_CMC.2 Use of a CM system ALC_CMC.3 Authorisation controls ALC_CMC.4 Production support, acceptance procedures and automation ALC_CMC.5 Advanced support
	ALC_CMS.1 TOE CM coverage ALC_CMS.2 Parts of the TOE CM coverage ALC_CMS.3 Implementation representation CM coverage ALC_CMS.4 Problem tracking CM coverage ALC_CMS.5 Development tools CM coverage
	ALC_DEL.1 Delivery procedures
	ALC_DVS.1 Identification of security measures ALC_DVS.2 Sufficiency of security measures
	ALC_FLR.1 Basic flaw remediation ALC_FLR.2 Flaw reporting procedures ALC_FLR.3 Systematic flaw remediation
	ALC_LCD.1 Developer defined life-cycle model ALC_LCD.2 Measurable life-cycle model
	ALC_TAT.1 Well-defined development tools ALC_TAT.2 Compliance with implementation standards ALC_TAT.3 Compliance with implementation standards - all parts
	ATE_COV.1 Evidence of coverage ATE_COV.2 Analysis of coverage ATE_COV.3 Rigorous analysis of coverage
	ATE: Tests
ATE_FUN.1 Functional testing ATE_FUN.2 Ordered functional testing	
ATE_IND.1 Independent testing – conformance ATE_IND.2 Independent testing – sample ATE_IND.3 Independent testing – complete	
AVA: Vulnerability assessment	AVA_VAN.1 Vulnerability survey AVA_VAN.2 Vulnerability analysis AVA_VAN.3 Focused vulnerability analysis AVA_VAN.4 Methodical vulnerability analysis AVA_VAN.5 Advanced methodical vulnerability analysis

Assurance class decomposition

Evaluation assurance levels (chapter 8)

“ The Evaluation Assurance Levels (EALs) provide an increasing scale that balances the level of assurance obtained with the cost and feasibility of acquiring that degree of assurance. The CC approach identifies the separate concepts of assurance in a TOE at the end of the evaluation, and of maintenance of that assurance during the operational use of the TOE.

It is important to note that not all families and components from CC Part 3 are included in the EALs. This is not to say that these do not provide meaningful and desirable assurances. Instead, it is expected that these families and components will be considered for augmentation of an EAL in those PPs and STs for which they provide utility.”

Evaluation assurance level (EAL) overview (chapter 8.1)

“Table 1 represents a summary of the EALs. The columns represent a hierarchically ordered set of EALs, while the rows represent assurance families. Each number in the resulting matrix identifies a specific assurance component where applicable.

As outlined in the next Section, seven hierarchically ordered evaluation assurance levels are defined in the CC for the rating of a TOE's assurance. They are hierarchically ordered inasmuch as each EAL represents more assurance than all lower EALs. The increase in assurance from EAL to EAL is accomplished by substitution of a hierarchically higher assurance component from the same assurance family (i.e. increasing rigour, scope, and/or depth) and from the addition of assurance components from other assurance families (i.e. adding new requirements).

These EALs consist of an appropriate combination of assurance components as described in Chapter 7 of this CC Part 3. More precisely, each EAL includes no more than one component of each assurance family and all assurance dependencies of every component are addressed.

While the EALs are defined in the CC, it is possible to represent other combinations of assurance. Specifically, the notion of “augmentation” allows the addition of assurance components (from assurance families not already included in the EAL) or the substitution of assurance components (with another hierarchically higher assurance component in the same assurance family) to an EAL. Of the assurance constructs defined in the CC, only EALs may be augmented. The notion of an “EAL minus a constituent assurance component” is not recognised by the standard as a valid claim. Augmentation carries with it the obligation on the part of the claimant to justify the utility and added value of the added assurance component to the EAL. An EAL may also be augmented with extended assurance requirements.

Assurance Class	Assurance Family	Assurance Components by Evaluation Assurance Level						
		EAL1	EAL2	EAL3	EAL4	EAL5	EAL6	EAL7
Development	ADV_ARC		1	1	1	1	1	1
	ADV_FSP	1	2	3	4	5	5	6
	ADV_IMP				1	1	2	2
	ADV_INT					2	3	3
	ADV_SPM						1	1
	ADV_TDS		1	2	3	4	5	6
Guidance Documents	AGD_OPE	1	1	1	1	1	1	1
	AGD_PRE	1	1	1	1	1	1	1
Life cycle Support	ALC_CMC	1	2	3	4	4	5	5
	ALC_CMS	1	2	3	4	5	5	5
	ALC_DEL		1	1	1	1	1	1
	ALC_DVS			1	1	1	2	2
	ALC_FLR							
	ALC_LCD			1	1	1	1	2
	ALC_TAT				1	2	3	3
Security Target Evaluation	ASE_CCL	1	1	1	1	1	1	1
	ASE_ECD	1	1	1	1	1	1	1
	ASE_INT	1	1	1	1	1	1	1
	ASE_OBJ	1	2	2	2	2	2	2
	ASR_REQ	1	2	2	2	2	2	2
	ASE_SPD		1	1	1	1	1	1
	ASE_TSS	1	1	1	1	1	1	1
Tests	ATE_COV		1	2	2	2	3	3
	ATE_DPT			1	2	3	3	4
	ATE_FUN		1	1	1	1	2	2
	ATE_IND	1	2	2	2	2	2	3
Vulnerability assessment	AVA_VAN	1	2	2	3	4	5	5

Table 1: Evaluation assurance level summary”

Evaluation assurance level 1 (EAL1) - functionally tested (chapter 8.3)

“Objectives

EAL1 is applicable where some confidence in correct operation is required, but the threats to security are not viewed as serious. It will be of value where independent assurance is required to support the contention that due care has been exercised with respect to the protection of personal or similar information.

EAL1 requires only a limited security target. It is sufficient to simply state the SFRs that the TOE must meet, rather than deriving them from threats, OSPs and assumptions through security objectives.

EAL1 provides an evaluation of the TOE as made available to the customer, including independent testing against a specification, and an examination of the guidance documentation provided. It is intended that an EAL1 evaluation could be successfully conducted without assistance from the developer of the TOE, and for minimal outlay.

An evaluation at this level should provide evidence that the TOE functions in a manner consistent with its documentation.”

Evaluation assurance level 2 (EAL2) - structurally tested (chapter 8.4)

“Objectives

EAL2 requires the co-operation of the developer in terms of the delivery of design information and test results, but should not demand more effort on the part of the developer than is consistent with good commercial practise. As such it should not require a substantially increased investment of cost or time.

EAL2 is therefore applicable in those circumstances where developers or users require a low to moderate level of independently assured security in the absence of ready availability of the complete development record. Such a situation may arise when securing legacy systems, or where access to the developer may be limited.”

Evaluation assurance level 3 (EAL3) - methodically tested and checked (chapter 8.5)

“Objectives

EAL3 permits a conscientious developer to gain maximum assurance from positive security engineering at the design stage without substantial alteration of existing sound development practises.

EAL3 is applicable in those circumstances where developers or users require a moderate level of independently assured security, and require a thorough investigation of the TOE and its development without substantial re-engineering.”

Evaluation assurance level 4 (EAL4) - methodically designed, tested, and reviewed
(chapter 8.6)**“Objectives**

EAL4 permits a developer to gain maximum assurance from positive security engineering based on good commercial development practises which, though rigorous, do not require substantial specialist knowledge, skills, and other resources. EAL4 is the highest level at which it is likely to be economically feasible to retrofit to an existing product line.

EAL4 is therefore applicable in those circumstances where developers or users require a moderate to high level of independently assured security in conventional commodity TOEs and are prepared to incur additional security-specific engineering costs.”

Evaluation assurance level 5 (EAL5) - semiformally designed and tested (chapter 8.7)**“Objectives**

EAL5 permits a developer to gain maximum assurance from security engineering based upon rigorous commercial development practises supported by moderate application of specialist security engineering techniques. Such a TOE will probably be designed and developed with the intent of achieving EAL5 assurance. It is likely that the additional costs attributable to the EAL5 requirements, relative to rigorous development without the application of specialised techniques, will not be large.

EAL5 is therefore applicable in those circumstances where developers or users require a high level of independently assured security in a planned development and require a rigorous development approach without incurring unreasonable costs attributable to specialist security engineering techniques.”

Evaluation assurance level 6 (EAL6) - semiformally verified design and tested
(chapter 8.8)**“Objectives**

EAL6 permits developers to gain high assurance from application of security engineering techniques to a rigorous development environment in order to produce a premium TOE for protecting high value assets against significant risks.

EAL6 is therefore applicable to the development of security TOEs for application in high risk situations where the value of the protected assets justifies the additional costs.”

Evaluation assurance level 7 (EAL7) - formally verified design and tested (chapter 8.9)

"Objectives

EAL7 is applicable to the development of security TOEs for application in extremely high risk situations and/or where the high value of the assets justifies the higher costs. Practical application of EAL7 is currently limited to TOEs with tightly focused security functionality that is amenable to extensive formal analysis."

Class AVA: Vulnerability assessment (chapter 16)

"The AVA: Vulnerability assessment class addresses the possibility of exploitable vulnerabilities introduced in the development or the operation of the TOE."

Vulnerability analysis (AVA_VAN) (chapter 16.1)

"Objectives

Vulnerability analysis is an assessment to determine whether potential vulnerabilities identified, during the evaluation of the development and anticipated operation of the TOE or by other methods (e.g. by flaw hypotheses or quantitative or statistical analysis of the security behaviour of the underlying security mechanisms), could allow attackers to violate the SFRs.

Vulnerability analysis deals with the threats that an attacker will be able to discover flaws that will allow unauthorised access to data and functionality, allow the ability to interfere with or alter the TSF, or interfere with the authorised capabilities of other users."

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D Annexes

List of annexes of this certification report

Annex A: Security Target provided within a separate document.

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