



Certification Report

Bundesamt für Sicherheit in der Informationstechnik

BSI-DSZ-CC-0343-2007

for

**IBM Tivoli Access Manager for e-Business
Version 6.0 with Fixpack 3**

from

IBM Corporation

BSI - Bundesamt für Sicherheit in der Informationstechnik, Postfach 20 03 63, D-53133 Bonn
Phone +49 (0)3018 9582-0, Fax +49 (0)3018 9582-5477, Infoline +49 (0)3018 9582-111



Deutsches IT-Sicherheitszertifikat

erteilt vom

Bundesamt für Sicherheit in der Informationstechnik



Bundesamt für Sicherheit
in der Informationstechnik

BSI-DSZ-CC-0343-2007

IBM Tivoli Access Manager for e-Business Version 6.0 with Fixpack 3

from

IBM Corporation



Common Criteria 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, Version 2.3* (ISO/IEC 15408:2005) for conformance to the *Common Criteria for IT Security Evaluation, Version 2.3* (ISO/IEC 15408:2005).

Evaluation Results:

Functionality: **Product specific Security Target
Common Criteria Part 2 conformant**

Assurance Package: **Common Criteria Part 3 conformant
EAL3 augmented by ALC_FLR.1 - Basic flaw remediation**

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.

The notes mentioned on the reverse side are part of this certificate.

Bonn, 12 March 2007

The Vice President of the Federal Office
for Information Security



Hange

L.S.

SOGIS - MRA

Bundesamt für Sicherheit in der Informationstechnik

Godesberger Allee 185-189 - D-53175 Bonn - Postfach 20 03 63 - D-53133 Bonn
Phone +49 (0)3018 9582-0, Fax +49 (0)3018 9582-5477, Infoline +49 (0)3018 9582-111

The rating of the strength of functions does not include the cryptoalgorithms suitable for encryption and decryption (see BSI Section 4, Para. 3, Clause 2)

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.

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

Contents

Part A: Certification

Part B: Certification Results

Part C: Excerpts from the Criteria

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)
- Common Criteria for IT Security Evaluation (CC), version 2.3⁵
- Common Methodology for IT Security Evaluation (CEM), version 2.3
- BSI certification: Application Notes and Interpretation of the Scheme (AIS)
- Advice from the Certification Body on methodology for assurance components above EAL4 (AIS 34)

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 7 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 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-Agreement on the mutual recognition of certificates based on ITSEC became effective in March 1998. This agreement has been 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 levels (EAL 1 – EAL 7). The German Federal Office for Information Security (BSI) recognizes certificates issued by the national certification bodies of France and the United Kingdom within the terms of this Agreement.

2.2 International Recognition of CC - Certificates

An arrangement (Common Criteria 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 (CC-MRA). 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 resp. approved certification schemes can be seen on the web site: <http://www.commoncriteriaportal.org>

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 IBM Tivoli Access Manager for e-Business, Version 6.0 with Fixpack 3 has undergone the certification procedure at BSI. This is a re-certification based on BSI-DSZ-CC-0285-2005. For this evaluation specific results from the evaluation process based on BSI-DSZ-CC-0285-2005 were re-used.

The evaluation of the product IBM Tivoli Access Manager for e-Business, Version 6.0 with Fixpack 3 was conducted by atsec information security GmbH. The atsec information security GmbH is an evaluation facility (ITSEF)⁶ recognised by BSI.

The sponsor, vendor and distributor is:

IBM Corporation
11501 Burnet Road
Austin, TX 78758, USA

The certification is concluded with

- the comparability check and
- the production of this Certification Report.

This work was completed by the BSI on 12 March 2007.

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.

This Certification Report only applies to the version of the product indicated here. The validity can be extended to new versions and releases of the product, provided the sponsor applies for re-certification of the modified product, in accordance with the procedural requirements, and the evaluation does not reveal any security deficiencies.

For the meaning of the assurance levels and the confirmed strength of functions, please refer to the excerpts from the criteria at the end of the Certification Report.

⁶ Information Technology Security Evaluation Facility

4 Publication

The following Certification Results contain pages B-1 to B-30.

The product IBM Tivoli Access Manager for e-Business, Version 6.0 with Fixpack 3 has been included in the BSI list of the certified products, which is published regularly (see also Internet: [http:// www.bsi.bund.de](http://www.bsi.bund.de)). Further information can be obtained from BSI-Infoline +49 228 9582-111.

Further copies of this Certification Report can be requested from the vendor⁷ of the product. The Certification Report can also be downloaded from the above-mentioned website.

⁷ IBM Corporation
11501 Burnet Road
Austin, TX 78758, USA

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.

Contents of the certification results

1	Executive Summary	3
2	Identification of the TOE	12
3	Security Policy	14
4	Assumptions and Clarification of Scope	15
5	Architectural Information	16
6	Documentation	19
7	IT Product Testing	20
8	Evaluated Configuration	22
9	Results of the Evaluation	24
10	Comments/Recommendations	26
11	Annexes	26
12	Security Target	26
13	Definitions	27
14	Bibliography	29

1 Executive Summary

IBM Tivoli Access Manager for e-Business is a specific implementation of the access control framework defined by the ISO 10181-3 standard [9] and the Authorization API (aznAPI) [8].

IBM Tivoli Access Manager for e-Business is a complete authorization solution for corporate Web, client/server, Tivoli Access Manager applications, and legacy (pre-existing) applications. Tivoli Access Manager authorization allows an organization to securely control user access to protected information and resources, by providing a centralized, flexible, and scalable access control solution. Tivoli Access Manager is used in conjunction with standard Internet-based applications to build secure and well-managed intranets.

At its core, the TOE provides Authentication and Authorization services for protected objects. This core functionality is supplemented by an audit functionality, secure communication between TOE components and between the TOE and its environment. The TOE offers functionality to securely administer the aspects described above.

The product bundle IBM Tivoli Access Manager for e-Business, Version 6.0 with Fixpack 3 comprises the following product components, representing the TOE:

- Tivoli Access Manager Base 6.0, with Fixpack 3 for Base
- Tivoli Access Manager WebSEAL 6.0, with Fixpack 3 for WebSEAL

These two product components in turn comprise several installation packages. Details on these packages and how to obtain them can be found in chapter 2 of this report.

Details on the user guidance documentation delivered with the TOE can be found in chapter 6 of this report.

The operating system platforms the TOE is allowed to run on are the following:

- AIX 5.3
- Solaris 9
- Windows 2003 Enterprise Server
- SuSE Linux Enterprise Server 9 on IBM xSeries
- Red Hat Enterprise Linux 4 on IBM xSeries

For more details on environmental constraints and the evaluated configuration of the TOE please refer to chapters 1.5 and 1.6 of this report.

The IT product IBM Tivoli Access Manager for e-Business, Version 6.0 with Fixpack 3 was evaluated by atsec information security GmbH. The evaluation

was completed on 05 March 2007. The atsec information security GmbH is an evaluation facility (ITSEF)⁸ recognised by BSI.

The sponsor, vendor and distributor is

IBM Corporation
 11501 Burnet Road
 Austin, TX 78758, USA

1.1 Assurance package

The TOE security assurance requirements are based entirely on the assurance components defined in part 3 of the Common Criteria (see Annex C or [1], part 3 for details). The TOE meets the assurance requirements of assurance level EAL3+ (Evaluation Assurance Level 3 augmented). The following table shows the augmented assurance components.

Requirement	Identifier
EAL3	TOE evaluation: methodically tested and checked
+: ALC_FLR.1	Life cycle support – Basic flaw remediation

Table 1: Assurance components and EAL-augmentation

1.2 Functionality

The TOE Security Functional Requirements (SFR) selected in the Security Target are Common Criteria Part 2 conformant as shown in the following tables.

The following SFRs are taken from CC part 2:

Security Functional Requirement	Addressed issue
FAU	Security audit
FAU_GEN.1	Audit data generation
FAU_GEN.2	User identity association
FAU_SAR.1	Audit review
FAU_SEL.1	Selective audit
FAU_STG.1	Protected audit trail storage
FAU_STG.4	Prevention of audit data loss
FCS	Cryptographic support
FCS_CKM.1(1)	Cryptographic key generation (Symmetric algorithms)
FCS_CKM.1(2)	Cryptographic key generation (RSA)

⁸ Information Technology Security Evaluation Facility

Security Functional Requirement	Addressed issue
FCS_CKM.2(1)	Cryptographic key distribution (RSA public keys)
FCS_CKM.2(2)	Cryptographic key distribution (Symmetric keys)
FCS_COP.1(1)	Cryptographic operation (RSA)
FCS_COP.1(2)	Cryptographic operation (Symmetric operations)
FDP	User data protection
FDP_ACC.2(1)	Complete access control
FDP_ACC.2(2)	Complete access control
FDP_ACF.1(1)	Security attribute based access control
FDP_ACF.1(2)	Security attribute based access control
FIA	Identification and authentication
FIA_AFL.1	Authentication failure handling
FIA_ATD.1	User attribute definition
FIA_SOS.1	Verification of secrets
FIA_UAU.1	Timing of authentication
FIA_UAU.2	Administrator authentication before any action
FIA_UAU.5	Multiple authentication mechanisms
FIA_UAU.6	Re-authenticating
FIA_UID.1	Timing of identification
FIA_UID.2	Administrator identification before any action
FIA_USB.1	User-subject binding
FMT	Security Management
FMT_MOF.1	Management of security functions behaviour
FMT_MSA.1 (1)	Management of security attributes
FMT_MSA.1 (2)	Management of security attributes
FMT_MSA.2	Secure security attributes
FMT_MSA.3	Static attribute initialisation
FMT_MTD.1	Management of TSF data
FMT_SMF.1	Specification of Management Functions
FMT_SMR.1	Security roles
FPT	Protection of the TOE Security Functions
FPT_ITT.1	Basic internal TSF data transfer protection
FPT_RVM.1	Non-bypassability of the TSP
FPT_TRC.1	Internal TSF consistency
FPT_ITC.1	Inter-TSF trusted channel

Table 2: SFRs for the TOE taken from CC Part 2

Note: only the titles of the Security Functional Requirements are provided. For more details and application notes please refer to the ST chapter 5.1.1.

The following Security Functional Requirements are defined for the IT-Environment of the TOE:

Security Functional Requirement	Addressed issue
Requirements for a Directory Server located in the TOE environment:	
FDP	User data protection
FDP_ACC.1	Subset access control
FDP_ACF.1	Security attribute based access control
FDP_ETC.1	Export of user data without security attributes
FDP_ITC.1	Import of user data without security attributes
FIA_UAU.2	User authentication before any action
FIA_UID.2	User identification before any action
FMT	Security Management
FMT_MSA.1	Management of security attributes
FMT_MSA.3	Static attribute initialisation
FMT_SMF.1	Specification of Management Functions
FMT_SMR.1	Security roles
Requirements for the Operating System underlying the TOE:	
FIA	Identification and authentication
FIA_UID.1	Timing of identification
FPT	Protection of the TOE Security Functions
FPT_STM.1	Reliable time stamps

Table 3: SFRs for the IT-Environment

Note: only the titles of the Security Functional Requirements are provided. For more details and application notes please refer to the ST chapter 5.2.1 and 5.2.2.

These Security Functional Requirements are implemented by the TOE Security Functions:

TOE Security Function	Addressed issue
F.Audit	Audit of security relevant events
F.Authentication	Authentication of users and administrators. The TOE supports password and certificate based authentication.
F.Authorization	Authorisation enforcement based on ACLs (Access Control Lists) and POPs (Protected Object Policies) for objects to be protected by the TOE (Web objects, Tivoli Access Manager Management objects, User-defined objects).

TOE Security Function	Addressed issue
F.Management	Management of the security functionality.
F.Communication	Cryptographically (SSL and TLS, with restriction to certain cipher suites) protected communication links.

Table 4: Security Functions

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

1.3 Strength of Function

The TOE's strength of functions is claimed 'medium' (SOF-medium) for specific functions as indicated in the Security Target, chapter 6.2.

The rating of the strength of functions does not include the cryptoalgorithms suitable for encryption and decryption (see BSIG Section 4, Para. 3, Clause 2). For details see chapter 9 of this report.

1.4 Summary of threats and Organisational Security Policies (OSPs) addressed by the evaluated IT product

The following threats as defined in the security target [6], chapter 3.2.1 are averted by the TOE:

Threat against the TOE	Description
T.BYPASS	An attacker accesses protected resources of the TOE in a way that bypasses the TSF, exploiting non-TSF portions of the TOE.
T.UAACTION	An undetected violation of the TSP may be caused as a result of an attacker (possibly, but not necessarily, a person allowed to use the TOE) attempting to perform actions that the individual is not authorized to do.
T.UAUSER	An attacker (possibly, but not necessarily, a person allowed to use the TOE) may impersonate an authorized user of the TOE. This includes the threat of an authorized user that tries to impersonate as another authorized user without knowing the authentication credentials.
T.COM_ATT	An attacker intercepts the communication between the TOE and an external entity or between different parts of the TOE in order to get access to confidential information, to impersonate as an authorized user or part of the TOE or to manipulate the data transmitted between the TOE and an external or internal entity.

Table 5: Threats to be averted by the TOE

The TOE has to comply to the following Organisational Security Policy (OSP) (refer to [6], chapter 3.3).

OSP	Description
P.AUTHORIZED_USERS	Only those users who have been authorized to access web resources protected by the TOE may access those resources after they have been successfully authenticated (unless a protected web resource is defined to be accessible by unauthenticated users, in which case no prior authentication is required).
P.AUTHORIZED_ADMIN	Only administrators authorized for access to defined management resources of the TOE may access those resources after they have been successfully authenticated.
P.NEED_TO_KNOW	The system must allow to limit the access to, modification of, and destruction of the information in protected web resources to those authorized users which have a "need to know" for that information.
P.ACCOUNTABILITY	The administrators of the system shall be held accountable for their actions within the system.
P.ADM_DELEGATION	Specific administration tasks as well as management operations to defined subsets of the web resources protected by the TOE may be delegated to administrators that are only allowed to perform the management tasks within their defined area of responsibility and are not able to extend this area themselves.

Table 6: OSPs the TOE and its environment has to comply with

1.5 Special configuration requirements

The TOE is an implementation of the ISO 10181-3 and the Authorization API (aznAPI) framework. This framework knows the following logical components:

- Policy Server
- Authorization Evaluator
- aznAPI
- Resource Manager

For more details on these components refer to the architectural description in this report (chapter 5) or the information provided in the Security Target (chapter 2).

The following constraints are given for the TOE (refer also to Security Target [6], chapter 2.7):

- The Policy Server component of the TOE is installed and operated on a dedicated system that communicates via a network connection to the Resource Manager/Authorization Evaluator.

- The Resource Manager and Authorization Evaluator are installed and operated on the same system. They communicate with each other via a library interface (the aznAPI). They communicate with the Policy Server via a network connection with a dedicated application layer protocol running over TLS v1. Note that the evaluated configuration does not include Authorization Evaluator components running on a machine separate from the Resource Manager that uses them.
- The evaluated configuration has one Policy Server and one or more Resource Manager/Authorization Evaluator systems. All Resource Manager/Authorization Evaluator systems operate independent from each other and are only connected to the central Policy Server. Load balancing and failover configurations of Resource Manager/Authorization Evaluator systems are therefore not supported in the evaluated configuration.
- The Server and all the Resource Manager/Authorization Evaluator use the same operating system as a basis. Configurations using different operating system platforms for different components of the TOE are not part of the evaluated configuration.
- Communication between client systems and the TOE, the web server systems and the TOE or the LDAP server and the TOE is protected using the TLS v1 or SSL v3 protocol with one of the ciphersuites defined in the Security Target. Communication between the Policy Server and the Resource Manager/Authorization Evaluator systems is protected using only the TLS v1 protocol with one of the ciphersuites defined in the Security Target. The use of unencrypted communication is disabled in the TOE. Also the use of version 2 of the SSL protocol is disabled for communication to client systems and target systems. Within the TOE all components are configured to use TLS v1 only. The external LDAP server also needs to support TLS v1 and be configured to use TLS v1 as its preferred protocol.
- No hardware encryption device is used. The cryptographic services are fully provided by the software implementation of the GSKit component.
- FIPS mode (for GSKit) must be turned on in the evaluated configuration.
- In the evaluated configuration WebSEAL only supports the following ciphers:
 - DES, Triple DES, AES (128 bit and 256 bit keys)
- The TOE is configured to use password based authentication and SSL/TLS client certificate based authentication for the authentication of users. Other authentication mechanisms for user authentication are disabled.
- The TOE is configured to use password based authentication for administrators that request access to the TOE via the pdadmin interface or the C API.

- The use of the Web Portal Manager component for the administration of the TOE is not supported. Instead only the command line interface of pdadmin and the C API are supported in the evaluated configuration.
- No Application Development Kit is installed in the evaluated configuration.
- Only LDAP is supported for the access to the directory server in the evaluated configuration. Active Directory or other protocols are not supported. LDAP Replica are also not supported.
- The TOE uses only the English language pack.
- The TOE does not support the process of 'self-registration' by which a user can register to become an IBM Tivoli Access Manager user, without the administrator's involvement. Moreover, self-registration is a function of the Web Portal manager and controlled by the administrator.
- Single Sign-on mechanisms are not supported in the evaluated configuration.
- Multiple domains are not supported by the TOE and only the default domain is used.
- Authorization rules are not supported in the evaluated configuration.
- Session Cookies are excluded from the evaluated configuration.
- 'Credential attribute entitlement' is not supported in the evaluated configuration.
- The Java API is not supported in the evaluated configuration.
- The Policy Server Proxy is not supported in the evaluated configuration.
- The integration of the IBM Tivoli Identity Manager is not supported in the evaluated configuration.
- The TOE supports the usage of IPv6 except IPv6 POP based network authentication is not supported in the evaluated configuration.
- The use of Access Manager Session Management Server (SMS) is not supported in the evaluated configuration.
- The use of the Common Auditing and Reporting Service (CARS) is not supported in the evaluated configuration.
- The transparent path junction option for WebSEAL is not supported in the evaluated configuration.
- Export and import of security policys (POPs, ACLs, authorization rules, and objects) to other Tivoli Access Manager domains is not supported in the evaluated configuration.
- WebSEAL's support for maintaining session state using HTTP headers as session keys is not supported in the evaluated configuration.

- Only the “Minimal” LDAP data format (selected during the installation of the Policy Server) is supported in the evaluated configuration.

To install, set-up and use the evaluated configuration of the TOE the guidance documents as outlined in chapter 6 of this report have to be followed.

1.6 Assumptions about the operating environment

The following assumptions about the operating environment are made in the Security Target [6], chapter 3.1. They are reproduced here:

Assumption	Description
A.NOBYPASS	It has to be ensured that protected resources can not be accessed in a way that bypasses the TOE. All internal and external access attempts to protected resources have to be channeled through the TOE.
A.CLIENT_KEYMAN	Users have to administer and protect private keys of their client system used for authentication and key exchange with the TOE in a secure way. This includes the secure generation of strong keys as well as the protection of private keys against any kind of unauthorized access and use.
A.CLIENT_PWMAN	Users have to protect their passwords used for authentication to the TOE such that no unauthorized access to them is possible.
A.ADM_PWMAN	Administrators have to protect their passwords used for authentication to the TOE such that no unauthorized access to them is possible.
A.PHYS_PROT	The machines running the TOE software need to be protected against unauthorized physical access and modification. All machines running parts of the TOE software require this protection.
A.SINGLE_APP	Any machine used to run all or a part of the TOE software are assumed to be used solely for this purpose and are not used to run other application software except those required for the management and maintenance of the underlying operating system and hardware.
A.OS_CONF_MGMT	The operating system of the machines running the TOE are assumed to be configured and maintained by trained and trustworthy personnel such that the operating system provides a reliable basis for the operation of the TOE software. Especially it is assumed that the operating system is configured such that no unauthorized access to functions provided by the operating system software (including network daemons) is possible either locally or via any network connection.
A.ADMIN	The system administrative personnel are not careless, willfully negligent, or hostile, and will follow and abide by the instructions provided by the administrator documentation. They will perform administration activities from a secure environment using terminals and/or workstations they trust via

Assumption	Description
	secured connections to the Policy Server.
A.USER	Users of the TOE are not hostile and trying to deliberately attack the TSF.
A.DIR_PROT	The directory server used by the TOE provides protection mechanism against unauthorized access to TSF data stored in the directory. This includes the requirement for authentication when accessing user entries and the configuration to use TLS v1 as the preferred protocol to protect the communication links.

Table 7: Assumptions about the operational environment of the TOE

1.7 Disclaimers

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:

IBM Tivoli Access Manager for e-Business, Version 6.0 with Fixpack 3

The following table outlines the TOE deliverables:

No	Type	Identifier	Release	Form of Delivery
1	SW	Tivoli Access Manager Base	Version 6.0	Secure Download (Passport advantage)
2	SW	Tivoli Access Manager WebSEAL	Version 6.0	Secure Download (Passport advantage)
3	SW	Fixpack 3 for Tivoli Access Manager Base, Version 6.0	-	Secure Download (Passport advantage)
4	SW	Fixpack 3 for Tivoli Access Manager WebSEAL, Version 6.0	-	Secure Download (Passport advantage)
5	DOC	Guidance documents as listed in chapter 6 of this report.	-	Partially part of the SW packages and partially to be downloaded separately.

Table 8: Deliverables of the TOE

The installation of the abovementioned SW packages will result in the following component versions, comprising the evaluated configuration:

- Policy Server 6.0.0.3
- WebSEAL 6.0.0.3
- Runtime 6.0.0.3
- GSKit 7.0.3.17
- IBM Directory Client 6.0.0.2

Note: Only the IBM's Passport Advantage's secure download (Restartable Transfer) applet is allowed for downloading the TOE. Simple HTTP or FTP download is not an allowed way to get the TOE.

3 Security Policy

The TOE is an implementation of the ISO 10181-3 and the Authorization API (aznAPI) framework. Its main purpose is to provide Authentication and Authorization decisions and allow/deny access to protected resources. This is supplemented by audit functionality, secure communication between TOE components and between the TOE and the outside world. Management functionality as well as non-bypassability is provided as well.

Therefore the Security Policy of the TOE is defined by the following TOE security functional requirements:

- All SFR components being part of the CC class FIA (e.g. like FIA_SOS.1 defining the authentication policy constraints).
- Iterations of FDP_ACC.2 and FDP_ACF.1 defining (i) the Web-Space access control policy and (ii) the management access control policy that controls access to resources protected by the TOE.

A detailed description/definition of the Security Policy enforced by the TOE is given in the Security Target [6], chapter 5.1.1.

4 Assumptions and Clarification of Scope

4.1 Usage assumptions

The following assumptions are identified as relevant for a secure TOE usage. A complete definition of these assumptions can be found in [6], chapter 3.1 or chapter 1.6 of this report.

- A.CLIENT_KEYMAN
- A.CLIENT_PWMAN
- A.ADM_PWMAN
- A.SINGLE_APP
- A.OS_CONF_MGMT
- A.ADMIN
- A.USER

4.2 Environmental assumptions

The following assumptions are related to physical and connectivity aspects. A definition can be found in the Security Target [6], chapter 3.1. They are also provided in chapter 1.6 of this report.

- A.NOBYPASS
- A.PHYS_PROT
- A.DIR_PROT

4.3 Clarification of scope

The following threat is not averted by the TOE. Additional support from the operating environment of the TOE is necessary (for detailed information about the threat and how it is covered by the environment refer to the Security Target [6], especially chapter 3.2.2 and chapter 8.1).

TE.GET_CRED: An attacker may obtain credentials within the TOE environment that allow him to impersonate an authorized TOE user, or get unauthorized access to the directory information.

In addition the TOE is supported by a LDAP directory server (being part of the operational environment) in performing user authentication.

5 Architectural Information

The TOE is a specific implementation of the access control model defined in [8] and [9]. The overall TOE architecture is illustrated in figure 1 where the dotted line indicates the TOE boundary.

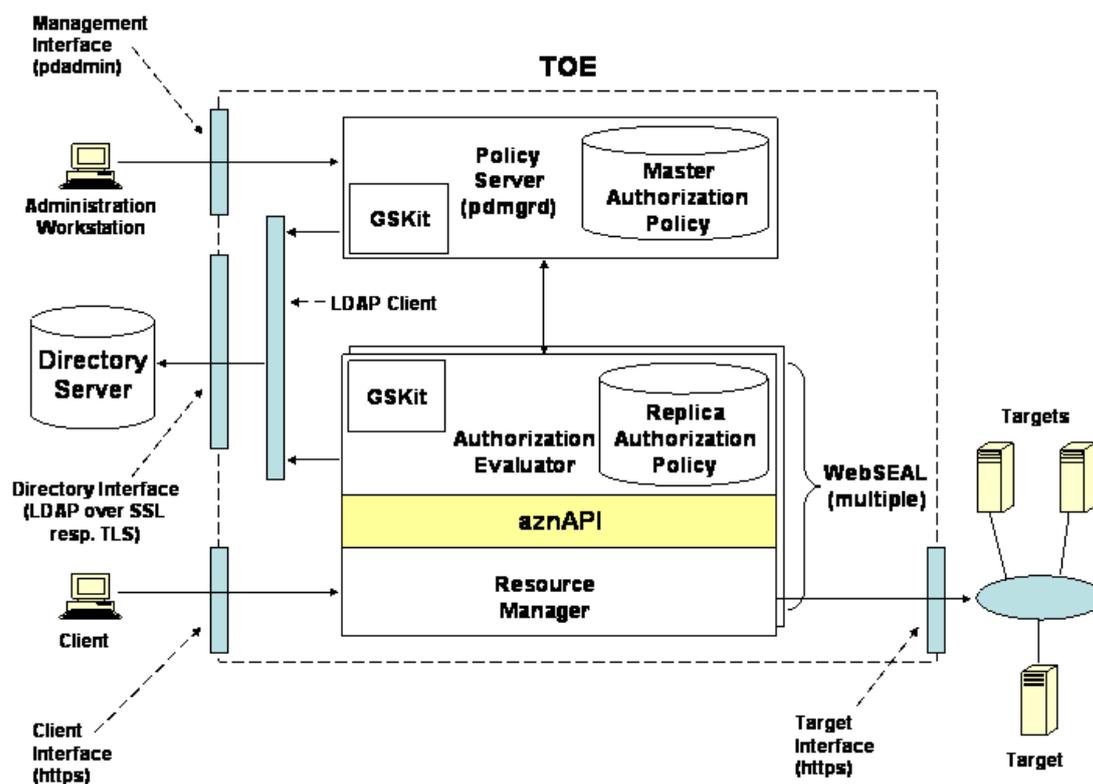


Figure 1: TOE Architecture

The TOE offers the enforcement of Access Control Decisions based on Access Control Policy (ACL) rules. The Authentication Mechanism as well as the “Initiator Security Attributes” Database are implemented using a Directory Server, which holds the user and ACL information and is itself not part of the TOE.

Also the target system which holds the actual resource to be protected is not part of the TOE.

In this model a user on a client submits a request for a resource (e. g. accessing an URL on a network protected by the TOE). This request is intercepted by the TOE (much in the same way as an application gateway firewall system intercepts network requests). The TOE performs the following actions:

- Checking if the requested resource is protected but accessible to unauthenticated users. If this is true, the request is passed through.

- Checking if the user has already been authenticated (i. e. there is a protected session where the user has been authenticated). If not, and authentication is required for the target of the access attempt, the user is required to authenticate (this is the case for password based authentication. Certificate based authentication will always take place when the session is established). This authentication makes use of an external Directory Server which stores user attributes and user credentials.
- Checking if the user has the right to access the requested resource in the requested mode. If not, the request is rejected. If yes, the request is passed through to the server holding the resource (the TOE works like a reverse proxy here).

To explain how the access rights are checked an overview on the Tivoli Access Manager components is provided first:

The “Resource Manager” is implemented within the TOE by the WebSEAL component. This component also includes the “Authorization Evaluator” as a subsystem.

The “Policy Server” is responsible to define and maintain the access control policy. It uses the “Master Authorization Policy” database to store the access control policy rules. To speed up the time required to make an access decision, the “Authorization Evaluator” manages a replica of the “Master Authorization Policy”.

Administration of the TOE is done via a command line interface or C language API in the evaluated configuration. The C language API may be used by an organization to define its own tools to automate some of the administration tasks. Such tools are not part of the evaluated configuration and it is up to the organization to ensure that those tools perform their task correctly. Only the command line interface has been considered during evaluation.

Administration includes the management of the Master Authorization Policy (defining access rules for protected objects) as well as management of the TOE. It should be noted that access rights of administrators to administrative objects of the TOE are also stored and maintained in the Master Authorization Policy.

To perform authentication the TOE uses an external directory server supporting the LDAP protocol. The directory server is used as a repository for user and administrator attributes and credentials. Authentication of users is done by the Resource Manager, authentication of administrators is performed by the Policy Server and both use the external Directory Server as the authentication means.

The communication links between the TOE and the LDAP server as well as between the TOE and the client systems and the TOE and the target systems is protected using the SSL v3 or TLS v1 protocol. Also the communication link between the Policy Server and the Resource Manager is secured by SSL v3 resp. TLS v1.

The Master Authorization Policy as well as the Replica Authorization Policy are databases. The Master Authorization Policy is a database held by the Policy Server and the Replica Authorization Policy is a database held by each Authorization Evaluator.

6 Documentation

The following documentation is provided with the product and has to be followed for a secure usage of the TOE:

- Base Installation Guide, Version 6.0 (October 2005)
- Base Administrator Guide, Version 6.0 (October 2005)
- WebSEAL Administrator Guide, Version 6.0 (October 2005)
- Command Reference, Version 6.0 (October 2005)
- IBM Tivoli Access Manager Base, Patch 6.0.0-TIV-TAM-FP0003 README (19 June 2006)
- IBM Tivoli Access Manager WebSEAL, Patch 6.0.0-TIV-AWS-FP0003 README (29 June 2006)
- Administration C API Developer's Reference, Version 6.0 (October 2005)
- Error Message Reference, Version 6.0 (October 2005)
- Common Criteria Guide, Version 6.0 (January 2007)

7 IT Product Testing

Test configuration

The evaluated configuration, as specified in the Security Target [6], is based on five types of underlying operating systems: IBM AIX 5.3, Sun Solaris 9, Microsoft Windows 2003 Enterprise Server, SuSE Linux Enterprise Server 9 and Red Hat Enterprise Linux 4. The two test plans (one for the Base and one for the WebSEAL part of the TOE) provided for the testing of the TOE mandate complete testing on all of these platforms.

The TOE, as tested according to the test plans, is Tivoli Access Manager Base 6.0 with Fixpack 3, and Tivoli Access Manager WebSEAL 6.0 with Fixpack 3.

The notes on secure installation and configuration of the TOE, as provided to the customer, reflect specific constraints and requirements for the evaluated configuration, as mandated by the TOE description, IT security environment and objectives for the TOE environment defined in the Security Target [6]. By requiring the test scenario to be set up according to this guidance, compliance with the evaluated configuration is achieved.

All test scenarios contain at least one system comprising the Policy Manager (pdmgrd) and one system comprising the WebSEAL resource manager of the TOE. For test cases where the absence of unexpected behavior needs to be tested (i.e. tests affecting the replication of the Security Policy Database), two WebSEAL instances are part of the test scenario.

Test coverage/depth

The developer has provided a test coverage and depth of testing analysis, demonstrating that all aspects of TSF behavior have been tested.

Tests for the evaluated configuration of the TOE have been devised to test all aspects of TSF behaviour, as it has been specified throughout the functional specification and high-level design. A correspondence analysis provided by the developer shows coverage of all TSF, subsystems and interfaces that affect the security functional behaviour of the TOE. The coverage has been determined to be overall sufficient.

Summary of Developer Testing Effort

Test configuration:

The tests have been carried out on the test configuration as described above.

Testing approach:

To demonstrate that all aspects of TSF behavior are tested the developer used a mixed approach of automated and manual testing, whereas in general a lot of manual interaction of the testers is required.

Complete testing on all of the OS platforms described above have been performed.

Testing results:

The test records of the developer show that all tests on all test platforms were executed successfully, i.e. the actual test results met the expected test results.

Summary of Evaluator Testing Effort

Test configuration:

All tests were run at the developer's sites in Austin, TX and Santa Cruz, CA. The developer granted access to their testing environment and their network.

Tests have been performed on the following OS platforms: SLES9 for x86, RHEL4 for x86, Windows 2003, AIX 5.3, and Solaris 9.

The TOE was installed as required by the respective guidance documentation (please refer to chapter 6 of this report). In addition for some tests a cygwin environment was used.

Testing approach:

Automated and manual developer tests were re-run and subsequently analyzed for correct results. In addition a set of own evaluator tests have been devised and performed focusing on different kinds of TOE security functionality.

Testing result:

All evaluator tests were executed successfully.

Evaluator penetration testing:

Penetration tests have been performed by the evaluation facility to assess possible vulnerabilities found during the evaluation of the different CC assurance classes. The TOE withstood the penetration efforts.

8 Evaluated Configuration

The Target of Evaluation is the IBM Tivoli Access Manager for e-Business, Version 6.0 with Fixpack 3. The product bundle comprises the following product components, representing the TOE:

- Tivoli Access Manager Base 6.0, with Fixpack 3 for Base
- Tivoli Access Manager WebSEAL 6.0, with Fixpack 3 for WebSEAL

These product components in turn comprise several installation packages which are listed here:

- Tivoli Access Manager Base, Version 6.0, comprising:
 - Policy Server (pdmgrd)
 - Runtime
 - IBM GSKit
 - IBM Directory Client (LDAP)
- Tivoli Access Manager WebSEAL, comprising:
 - WebSEAL (webseald)
 - Runtime
 - IBM GSKit
 - IBM Directory Client (LDAP)
- Fixpack 3 for Tivoli Access Manager Base 6.0 and Fixpack 3 for Tivoli Access Manager WebSEAL, comprising:
 - Fixpack 3 for Policy Server and Runtime
 - Fixpack 3 for WebSEAL

A customer has to download all installation packages via a secured internet download (for more details refer to chapter 2). For the evaluated version of the TOE these installation packages have to be updated to Fixpack 3 (also available via secure download). Applying this two step installation process will result in the following versions of TOE components:

- Policy Server 6.0.0.3
- WebSEAL 6.0.0.3
- Runtime 6.0.0.3
- GSKit 7.0.3.17
- IBM Directory Client 6.0.0.2

The operating system platforms the TOE is allowed to run on are the following:

- AIX 5.3

- Solaris 9
- Windows 2003 Enterprise Server
- SuSE Linux Enterprise Server 9 on IBM xSeries
- Red Hat Enterprise Linux 4 on IBM xSeries

Please note that

- the operating systems and the underlying hardware platforms,
- the Directory Server and
- the Web Server (also called Target System, refer to chapter 5 of this report)

are **not part of the TOE**.

For setting up and running the TOE according to the evaluated configuration all guidance documents (refer to chapter 6) and the implications given by the Security Target [6] have to be followed. These implications can also be found in chapter 1.5 and 1.6 of this report.

9 Results of the Evaluation

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 identical with EAL3.

The verdicts for the CC Part 3 assurance components (according to EAL3 augmented by ALC_FLR.1 - Basic flaw remediation and the class ASE for the Security Target evaluation) are summarised in the following table.

Assurance classes and components		Verdict
Security Target evaluation	CC Class ASE	PASS
TOE description	ASE_DES.1	PASS
Security environment	ASE_ENV.1	PASS
ST introduction	ASE_INT.1	PASS
Security objectives	ASE_OBJ.1	PASS
PP claims	ASE_PPC.1	PASS
IT security requirements	ASE_REQ.1	PASS
Explicitly stated IT security requirements	ASE_SRE.1	PASS
TOE summary specification	ASE_TSS.1	PASS
Configuration management	CC Class ACM	PASS
Authorisation control	ACM_CAP.3	PASS
TOE CM coverage	ACM_SCP.1	PASS
Delivery and operation	CC Class ADO	PASS
Delivery procedures	ADO_DEL.1	PASS
Installation, generation, and start-up procedures	ADO_IGS.1	PASS
Development	CC Class ADV	PASS
Informal functional specification	ADV_FSP.1	PASS
Security enforcing high-level design	ADV_HLD.2	PASS
Informal correspondence demonstration	ADV_RCR.1	PASS
Guidance documents	CC Class AGD	PASS
Administrator guidance	AGD_ADM.1	PASS
User guidance	AGD_USR.1	PASS
Life cycle support	CC Class ALC	PASS
Identification of security measures	ALC_DVS.1	PASS
Basic flaw remediation	ALC_FLR.1	PASS

Assurance classes and components		Verdict
Tests	CC Class ATE	PASS
Analysis of coverage	ATE_COV.2	PASS
Testing: high-level design	ATE_DPT.1	PASS
Functional testing	ATE_FUN.1	PASS
Independent testing – sample	ATE_IND.2	PASS
Vulnerability assessment	CC Class AVA	PASS
Examination of guidance	AVA_MSU.1	PASS
Strength of TOE security function evaluation	AVA_SOF.1	PASS
Developer vulnerability analysis	AVA_VLA.1	PASS

Table 9: Verdicts for the assurance components

This certification is a re-certification based on BSI-DSZ-CC-0285-2005. The evaluated functionality of the TOE has been extended and product components have been improved.

The evaluation has shown that:

- Security Functional Requirements specified for the TOE are Common Criteria Part 2 conformant
- the assurance of the TOE is Common Criteria Part 3 conformant, EAL3 augmented by ALC_FLR.1 - Basic flaw remediation.
- The following TOE Security Functions fulfil the claimed Strength of Function: Password based authentication of clients as part of the security function F.Authentication.

The rating of the strength of functions does not include the cryptoalgorithms suitable for encryption and decryption (see BSIG Section 4, Para. 3, Clause 2). This holds for

- (i) F.Communication implementing the SSLv3 and TLSv1 protocols and
- (ii) the part of F.Authentication that implements certificate based authentication.

The results of the evaluation are only applicable to the IBM Tivoli Access Manager for e-Business, Version 6.0 with Fixpack 3 as outlined in chapter 2 of this report.

The validity can be extended to new versions and releases of the product, provided the sponsor applies for re-certification or assurance continuity of the modified product, in accordance with the procedural requirements, and the evaluation of the modified product does not reveal any security deficiencies.

10 Comments/Recommendations

The operational documents as outlined in chapter 6 and the Security Target [6] contain necessary information about the usage of the TOE and all security hints therein have to be considered.

A customer has to download all installation packages for Tivoli Access Manger Base, WebSEAL and the Fixpacks using IBM's Passport Advantage's secure download (Restartable Transfer) applet. A simple HTTP or FTP download is not allowed for the evaluated TOE. This also holds true for the Common Criteria Configuration Guide [18].

To ensure that SOF rating for the password based user authentication of the security function F.Authentication holds true not more than four instances of Resource Manager / Authorization Evaluator systems (WebSEAL) are allowed to be used in the evaluated configuration of the TOE.

11 Annexes

None.

12 Security Target

For the purpose of publishing, the Security Target [6] of the target of evaluation (TOE) is provided within a separate document.

13 Definitions

13.1 Acronyms

API Application Programming Interface

BSI	Bundesamt für Sicherheit in der Informationstechnik / Federal Office for Information Security, Bonn, Germany
CC	Common Criteria for IT Security Evaluation
EAL	Evaluation Assurance Level
HTTP	Hyper Text Transfer Protocol
IT	Information Technology
LDAP	Lightweight Directory Access Protocol
PP	Protection Profile
SF	Security Function
SFP	Security Function Policy
SOF	Strength of Function
SSL	Secure Socket Layer Protocol
ST	Security Target
TAM	Tivoli Access Manager
TOE	Target of Evaluation
TLS	Transport Layer Security Protocol
TSC	TSF Scope of Control
TSF	TOE Security Functions
TSP	TOE Security Policy

13.2 Glossary

Augmentation - The addition of one or more assurance component(s) from CC Part 3 to an EAL or assurance 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 entity within the TSC that contains or receives information and upon which subjects perform operations.

Protection Profile - An implementation-independent set of security requirements for a category of TOEs that meet specific consumer needs.

Security Function - A part or parts of the TOE that have to be relied upon for enforcing a closely related subset of the rules from the TSP.

Security Target - A set of security requirements and specifications to be used as the basis for evaluation of an identified TOE.

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

Strength of Function - A qualification of a TOE security function expressing the minimum efforts assumed necessary to defeat its expected security behaviour by directly attacking its underlying security mechanisms.

SOF-basic - A level of the TOE strength of function where analysis shows that the function provides adequate protection against casual breach of TOE security by attackers possessing a low attack potential.

SOF-medium - A level of the TOE strength of function where analysis shows that the function provides adequate protection against straightforward or intentional breach of TOE security by attackers possessing a moderate attack potential.

SOF-high - A level of the TOE strength of function where analysis shows that the function provides adequate protection against deliberately planned or organised breach of TOE security by attackers possessing a high attack potential.

Subject - An entity within the TSC that causes operations to be performed.

Target of Evaluation - An IT product or system and its associated administrator and user guidance documentation that is the subject of an evaluation.

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

TOE Security Policy - A set of rules that regulate how assets are managed, protected and distributed within a TOE.

TSP Scope of Control - The set of interactions that can occur with or within a TOE and are subject to the rules of the TSP.

14 Bibliography

- [1] Common Criteria for Information Technology Security Evaluation, Version 2.3, August 2005
- [2] Common Methodology for Information Technology Security Evaluation (CEM), Evaluation Methodology, Version 2.3, August 2005
- [3] BSI certification: Procedural Description (BSI 7125)
- [4] Application Notes and Interpretations of the Scheme (AIS) as relevant for the TOE.
- [5] German IT Security Certificates (BSI 7148, BSI 7149), periodically updated list published also on the BSI Web-site
- [6] Security Target BSI-DSZ-0343-2007, Version 2.2, 2007-02-26, "Tivoli Access Manager for e-Business 6.0 Security Target", IBM Corporation
- [7] Evaluation Technical Report BSI-DSZ-CC-0343-2007, Version 1.2, 2007-03-05, atsec information security GmbH (confidential document)
- [8] Open Group Technical Standard: Authorization (AZN) API, The Open Group, January 2000
- [9] ISO/IEC 10181-3: Information Technology – Open Systems Interconnection – Security frameworks for open systems: Access control framework, 1996

User Guidance documentation:

- [10] Base Installation Guide, Version 6.0 (October 2005)
- [11] Base Administrator Guide, Version 6.0 (October 2005)
- [12] WebSEAL Administrator Guide, Version 6.0 (October 2005)
- [13] Command Reference, Version 6.0 (October 2005)
- [14] IBM Tivoli Access Manager Base, Patch 6.0.0-TIV-TAM-FP0003 README (19 June 2006)
- [15] IBM Tivoli Access Manager WebSEAL, Patch 6.0.0-TIV-AWS-FP0003 README (29 June 2006)
- [16] Administration C API Developer's Reference, Version 6.0 (October 2005)
- [17] Error Message Reference, Version 6.0 (October 2005)
- [18] Common Criteria Guide, Version 6.0 (January 2007)

This page is intentionally left blank.

C Excerpts from the Criteria

CC Part1:

Conformance results (chapter 7.4)

„The conformance result indicates the source of the collection of requirements that is met by a TOE or PP that passes its evaluation. This conformance result is presented with respect to CC Part 2 (functional requirements), CC Part 3 (assurance requirements) and, if applicable, to a pre-defined set of requirements (e.g., EAL, Protection Profile).

The conformance result consists of one of the following:

- a) **CC Part 2 conformant** - A PP or TOE is CC Part 2 conformant if the functional requirements are based only upon functional components in CC Part 2.
- b) **CC Part 2 extended** - A PP or TOE is CC Part 2 extended if the functional requirements include functional components not in CC Part 2.

plus one of the following:

- a) **CC Part 3 conformant** - A PP or TOE is CC Part 3 conformant if the assurance requirements are based only upon assurance components in CC Part 3.
- b) **CC Part 3 extended** - A PP or TOE is CC Part 3 extended if the assurance requirements include assurance requirements not in CC Part 3.

Additionally, the conformance result may include a statement made with respect to sets of defined requirements, in which case it consists of one of the following:

- a) **Package name Conformant** - A PP or TOE is conformant to a pre-defined named functional and/or assurance package (e.g. EAL) if the requirements (functions or assurance) include all components in the packages listed as part of the conformance result.
- b) **Package name Augmented** - A PP or TOE is an augmentation of a pre-defined named functional and/or assurance package (e.g. EAL) if the requirements (functions or assurance) are a proper superset of all components in the packages listed as part of the conformance result.

Finally, the conformance result may also include a statement made with respect to Protection Profiles, in which case it includes the following:

- a) **PP Conformant** - A TOE meets specific PP(s), which are listed as part of the conformance result.“

CC Part 3:

Assurance categorisation (chapter 7.5)

“The assurance classes, families, and the abbreviation for each family are shown in Table 1.

Assurance Class	Assurance Family
ACM: Configuration management	CM automation (ACM_AUT)
	CM capabilities (ACM_CAP)
	CM scope (ACM_SCP)
ADO: Delivery and operation	Delivery (ADO_DEL)
	Installation, generation and start-up (ADO_IGS)
ADV: Development	Functional specification (ADV_FSP)
	High-level design (ADV_HLD)
	Implementation representation (ADV_IMP)
	TSF internals (ADV_INT)
	Low-level design (ADV_LLD)
	Representation correspondence (ADV_RCR)
	Security policy modeling (ADV_SPM)
AGD: Guidance documents	Administrator guidance (AGD_ADM)
	User guidance (AGD_USR)
ALC: Life cycle support	Development security (ALC_DVS)
	Flaw remediation (ALC_FLR)
	Life cycle definition (ALC_LCD)
	Tools and techniques (ALC_TAT)
ATE: Tests	Coverage (ATE_COV)
	Depth (ATE_DPT)
	Functional tests (ATE_FUN)
	Independent testing (ATE_IND)
AVA: Vulnerability assessment	Covert channel analysis (AVA_CCA)
	Misuse (AVA_MSU)
	Strength of TOE security functions (AVA_SOF)
	Vulnerability analysis (AVA_VLA)

Table 1: Assurance family breakdown and mapping”

Evaluation assurance levels (chapter 11)

“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 11.1)

“Table 6 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 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 extended with explicitly stated assurance requirements.

Assurance Class	Assurance Family	Assurance Components by Evaluation Assurance Level						
		EAL1	EAL2	EAL3	EAL4	EAL5	EAL6	EAL7
Configuration management	ACM_AUT				1	1	2	2
	ACM_CAP	1	2	3	4	4	5	5
	ACM_SCP			1	2	3	3	3
Delivery and operation	ADO_DEL		1	1	2	2	2	3
	ADO_IGS	1	1	1	1	1	1	1
Development	ADV_FSP	1	1	1	2	3	3	4
	ADV_HLD		1	2	2	3	4	5
	ADV_IMP				1	2	3	3
	ADV_INT					1	2	3
	ADV_LLD				1	1	2	2
	ADV_RCR	1	1	1	1	2	2	3
	ADV_SPM				1	3	3	3
Guidance documents	AGD_ADM	1	1	1	1	1	1	1
	AGD_USR	1	1	1	1	1	1	1
Life cycle support	ALC_DVS			1	1	1	2	2
	ALC_FLR							
	ALC_LCD				1	2	2	3
	ALC_TAT				1	2	3	3
Tests	ATE_COV		1	2	2	2	3	3
	ATE_DPT			1	1	2	2	3
	ATE_FUN		1	1	1	1	2	2
	ATE_IND	1	2	2	2	2	2	3
Vulnerability assessment	AVA_CCA					1	2	2
	AVA_MSU			1	2	2	3	3
	AVA_SOF		1	1	1	1	1	1
	AVA_VLA		1	1	2	3	4	4

Table 6: Evaluation assurance level summary”

Evaluation assurance level 1 (EAL1) - functionally tested (chapter 11.3)

“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 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, and that it provides useful protection against identified threats.”

Evaluation assurance level 2 (EAL2) - structurally tested (chapter 11.4)

“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 practice. 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 11.5)

“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 practices.

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 11.6)

“Objectives

EAL4 permits a developer to gain maximum assurance from positive security engineering based on good commercial development practices 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 11.7)

“Objectives

EAL5 permits a developer to gain maximum assurance from security engineering based upon rigorous commercial development practices 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 11.8)

“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 11.9)

“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.“

Strength of TOE security functions (AVA_SOF) (chapter 19.3)

“Objectives

Even if a TOE security function cannot be bypassed, deactivated, or corrupted, it may still be possible to defeat it because there is a vulnerability in the concept of its underlying security mechanisms. For those functions a qualification of their security behaviour can be made using the results of a quantitative or statistical analysis of the security behaviour of these mechanisms and the effort required to overcome them. The qualification is made in the form of a strength of TOE security function claim.”

Vulnerability analysis (AVA_VLA) (chapter 19.4)

"Objectives

Vulnerability analysis is an assessment to determine whether vulnerabilities identified, during the evaluation of the construction and anticipated operation of the TOE or by other methods (e.g. by flaw hypotheses), could allow users to violate the TSP.

Vulnerability analysis deals with the threats that a user will be able to discover flaws that will allow unauthorised access to resources (e.g. data), allow the ability to interfere with or alter the TSF, or interfere with the authorised capabilities of other users.”

"Application notes

A vulnerability analysis is performed by the developer in order to ascertain the presence of security vulnerabilities, and should consider at least the contents of all the TOE deliverables including the ST for the targeted evaluation assurance level. The developer is required to document the disposition of identified vulnerabilities to allow the evaluator to make use of that information if it is found useful as a support for the evaluator's independent vulnerability analysis.”

“Independent vulnerability analysis goes beyond the vulnerabilities identified by the developer. The main intent of the evaluator analysis is to determine that the TOE is resistant to penetration attacks performed by an attacker possessing a low (for AVA_VLA.2 Independent vulnerability analysis), moderate (for AVA_VLA.3 Moderately resistant) or high (for AVA_VLA.4 Highly resistant) attack potential.”