5<sup>th</sup> July 2017

Mr Jody Cloutier Microsoft Corporation One Microsoft Way Redmond WA 98052-6399 USA

Dear Sir.

# SUBMISSION OF ANNUAL AUDIT REPORT FOR NETRUST CA - MICROSOFT WINDOWS CERTIFICATION AUTHORITY AGREEMENT

We are pleased to enclose the following documents as part of the requirements stated in the Microsoft Windows Certification Authority Agreement:

- 1. Grant of Accredited CA status to Netrust, by the Controller of CA in Singapore, valid for period till 13 June 2019.
- 2. CA Audit Report of Netrust Certificate Authority dated 31st May 2017.
- 3. Print-out from the Infocomm Media Development Authority of Singapore's (IMDA) website on the current accreditation status of Netrust.

In addition, please note that Netrust's existing CA, Netrust CA1, has been in existence since 30th March 2001. It has a lifespan of 20 years till 30th March 2021. We would like to officially notify Microsoft that Netrust has setup a new Root CA (Netrust CA 2), with two subordinate CAs (Netrust CA 2-1 and Netrust CA 2-1), and these are included in the recent audit and accreditation by the Controller of CA, Singapore. The root certificates of the Netrust CA 2 and the Subordinate CAs are available for download at: <a href="https://www.netrust.net/root-cert">https://www.netrust.net/root-cert</a>. The certificates have thumbprints as indicated below:

#### Root CA

Netrust CA 2 Root Certificate Thumbprint:

0a b5 c3 cd 74 48 b8 6d 71 1e 77 a5 49 83 8b 87 ce 52 5f 7f

#### **Subordinate CAs**

Netrust CA 2-1 Certificate Thumbprint:

11 1a a9 d4 d2 e9 e3 77 8c ff 71 86 5c f8 bb e8 1c df 42 a8

#### Netrust CA 2-2 Certificate Thumbprint:

a9 6e d0 93 d6 26 78 cc f0 18 97 94 0e 0e 04 5b 4c e9 0b 28

We would need to incorporate the new Root Certificates into the Microsoft Root Store as well. Please contact me at telephone: +65-6212-1368 or email: jongai.foo@netrust.net should you require any clarifications on the documents submitted.

Yours Sincerely,

**FOO JONG AI** 

**Chief Executive Officer** 

# Grant of Accreditation of Certification Authority

Pursuant to regulation 3 of the Electronic Transactions (Certification Authority) Regulations 2010, the Controller hereby grants accreditation to the following Company as an accredited certification authority:

Name of Company:

Netrust Pte Ltd

Address:

70 Bendemeer Road

#05-03 Luzerme Singapore 339940

Date of Accreditation:

14 June 2017

Valid Up To:

13 June 2019

Accreditation No.:

CAA000001



Controller of Certification Authority

# **CERTIFICATION AUTHORITY AUDIT REPORT**

# **NETRUST PTE LTD**

Ref: Q2017/WLB/12336

31st May 2017

Version 1.0 (Final)



Prepared by:

Elean Kwek, Associate Security Consultant Professional Security Services

Reviewed by:

Edwina Tan, Project Manager, Senior Security Consultant Professional Security Services

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QUANN Asia Pacific Pte Ltd 23 Serangoon North Ave 5 #06-01 BTH Centre Singapore 554530

To: Netrust Pte Ltd

#### **SIGNOFF & ACKNOWLEDGMENT**

QUANN Asia Pacific would like to take this opportunity to thank the Management and staff of **Netrust Pte Ltd** for all their assistance and time during the course of this assessment & review.

This report is intended solely for use by the Management of **Netrust Pte Ltd** and QUANN Asia Pacific accept no responsibility for any reliance on the report by any third parties, unless our permission is sought for the provision of the particular report to specified third parties and such request is given to us in writing prior to provision of the report.

This acknowledgement represents the agreement between QUANN Asia Pacific and Netrust Pte Ltd with respect to the objectives, obligations and responsibilities performed in the Certification Authority Audit had been completed.

The results of the Certification Authority Audit – vulnerabilities identified along with recommendations are documented in this report. The recommendations provided by QUANN Asia Pacific are to assist **Netrust Pte Ltd** in strengthening the security posture of their network. It is necessary to ensure that the vulnerabilities identified are resolved promptly to minimize threats.

The information contained in this document represents the view of QUANN Asia Pacific on the vulnerabilities as of the date of the assessment. QUANN Asia Pacific shall not be held liable for any damaged due to the negligence of the vulnerabilities.

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# CERTIFICATION AUTHORITY AUDIT REPORT

NETRUST PTE LTD Ref: Q2017/WLB/12336

Version 1.0 (Final)

Accepted by:

Prepared by:

Elean Kwek

Associate Security Consultant

Date: 14- 06 2017

Date: 14 66 2017

Reviewed by:

**Edwina Tan** 

Project Manager, Senior Security Consultant

Date: 14|06|2017

Please return or fax this copy to QUANN Asia Pacific at +65 6788 8883



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# 1. Executive Summary

The objective of this assessment is to detect any vulnerability in **Netrust Pte Ltd's** IT assets under the scope and to check the effectiveness of the implemented security controls in preventing any potential unauthorized information access through the aforementioned IT assets. The list of in-scope assessments can be found in Section 4 of this document.

#### a. Certification Authority Audit

The objective of this assessment on **Netrust Pte Ltd** was to review whether **Certification Authority** process is developed accordance to Security Guidelines for Certification Authorities Version 2.0 policies. Furthermore, it shall also evaluate the security controls implemented in the application.

Except for the findings mentioned in Section 5, Netrust was in all material respects, in compliance with the Security Guidelines for Certification Authorities Version 2.0 policies. QUANN has provided recommendations under Section 5 to address the issues identified during the review.

Below is the summary of findings for this engagement. Detailed observations and our recommendations to mitigate the risks can be found in Section 5 of this document.

Severity level	Findings	Areas of Findings
High		-
Medium	1	5.1 Physical and Environmental Controls Lapse
Low	3	<ul> <li>5.2 Record Management Lapse – Records of Periodic Review Absent</li> <li>5.3 Documentation Management Lapse</li> <li>5.4 Vulnerability Management Lapse – Periodic Assessment Not Met</li> </ul>
Total	4	

Chart 1: Number of Vulnerabilities by Severity Level

We are of the opinion that even when all the above vulnerabilities have eventually been addressed – in order to maintain on-going security posture of the network infrastructure, **Netrust Pte Ltd** should consider the following:

⇒ To conduct periodic IT Security Assessment as well as Security Audit reviews especially when after major changes in the systems and infrastructure.





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#### 2. Introduction

Netrust was established in May 1997 as the first Certification Authority ("CA") in Southeast Asia. Netrust provides individuals, businesses and government organizations with a complete online identification and security infrastructure to enable secure electronic transactions via the Internet and other wireless media.

In its capacity as a CA, Netrust acts as a trusted third party ("TTP") that issues and manages digital certificates. Netrust maintains a Public Key Infrastructure ("PKI") certification service and in its CA role creates and signs X.509 digital certificates which bind individuals, organizations and application servers with the particular public key of each subscriber.

Netrust's PKI provides a secure environment where faceless electronic transactions can take place with trust on the Internet, Intranet and on wireless networks. It issues to participants of this environment, digital certificates - which are equivalent to electronic IDs - that give online identities to individuals, organizations and application servers. Netrust's digital certificates can be issued globally and provide complete online identification and security for secure electronic transactions.

Netrust issues a range of digital certificates for online applications including secure access to government applications, Internet banking, supply chain management, virtual private networks and secure access to intranet portals. It supports the core Security Guidelines of Authentication, Authorization, Confidentiality, Data Integrity and Non-Repudiation.

The Electronic Transactions Act ("ETA") was first enacted on 10 July 1998 to create a legal framework for electronic commerce transactions in Singapore. Following the ETA, the Electronic Transactions (Certification Authority) Regulations ("ETR") came into operation on 10 February 1999 to provide regulations for the licensing and regulation of certification authorities ("CAs") in Singapore. The ETA 1998 has since been replaced by the Electronic Transactions Act 2010. The Controller of Certification Authorities ("CCA") also published security guidelines in 2010 to establish the security criteria for the management, systems and operations of CAs. The voluntary licensing programme aims to promote high integrity licensed CAs that can be trusted. The CCA awarded the CA License to Netrust in June 2001.

Netrust CA1 would reach it's lifespan by March 2021. In preparation for the migration, Netrust has setup a new Root CA2, with two Subordinate CAs, CA2-1 & CA2-2.

The ETR requires regular audits to be conducted on Netrust to provide assurance that the IT systems and processes of Netrust fulfill the requisite Security Guidelines, as set forth in the security guidelines issued by the CCA.





Netrust Pte Ltd ("Netrust") has engaged QUANN Asia Pacific to perform a Certificate Authority Audit from 10<sup>th</sup> April 2017 to 13<sup>th</sup> April 2017 on their IT assets, CA1, CA2 (CA2-1 & CA2-2).

- 1. Certification Authority Audit
  - Assessment Period: 10th April 2017 13th April 2017
  - Audit Criteria:
    - Security Guidelines for Certification Authorities Version 2.0

Note: This document was issued by the Controller of Certification Authority from the Infocommunications Media Development Authority ("IMDA") of Singapore

- Audit Scope:
  - Certification Authority Overall Governance
    - 1. Obligations to Subscribers, Relying Party and User Community
    - 2. Certificate Practice Statement (CPS) and Certificate Policies (CP)
    - 3. Security Management
    - 4. Risk Management
    - 5. Personnel Controls
    - 6. Subscribers' Data
    - 7. Incident Management
    - 8. Business Continuity Planning
  - Certificate Management Controls
    - 1. Registration Process
    - Generation Process
    - 3. Issuance Process
    - 4. Publication Process
    - 5. Renewal Process
    - 6. Certificate Suspension Process
    - 7. Revocation Process
    - 8. Archival Process
    - 9. Audit Trails
  - Key Management Controls
    - 1. Generation
    - 2. Distribution
    - 3. Storage
    - 4. Usage
    - 5. Backups
    - Key Change
    - 7. Destruction
    - 8. Key Compromise
    - 9. Key Archival
    - 10. Cryptographic Engineering
  - System and Operational Controls
    - 1. Physical Security
    - 2. General Security Controls
    - 3. General Operational Controls
    - Change and Configuration Management

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- 5. Network Security
- Monitoring and Audit Trails
- Application Integration Controls





The overall testing procedure consisted of:

- Compliance verification
- · Compiling the results of all analysis into report.

The report here is presented in the following format:

- Summary of vulnerabilities identified.
- · Overview of area tested and tests performed.
- Detailed explanation of vulnerabilities found with recommended fixes.

The limitations of the Certificate Authority Audit are as follows:

Use of Our Report

This report has been prepared solely for the management of Netrust. We would not generally permit the use of our deliverables, or references to it, in material disseminated to the general public or third parties without our written permission, with the exception of the Info-communications Media Development of Singapore ("IMDA").

Limitation of Controls

Control policies and procedures designed to address specified control objectives are subject to inherent limitations and, accordingly, errors or irregularities may occur and not be detected. Therefore, constant monitoring is needed to ensure that system controls that exist remain effective over time.

Limitation of Liability

Netrust will indemnify and hold harmless QUANN Asia Pacific from claims, liabilities and costs to third parties where Netrust divulges any advice rendered by QUANN Asia Pacific pursuant to this engagement without QUANN Asia Pacific's consent to such parties and such third parties claim against QUANN Asia Pacific for losses suffered by them as a result of their reliance on such advice.



#### 3. Risk Classification

# 3.1 Impact Rating

An analysis of impact of the findings was performed based on the confidentiality, integrity and availability impact, wherever applicable. The impact ratings are as follows:

Impact Rating	Description of rating
	When impact of vulnerability poses an immediate or direct effect resulting either loss of confidentiality, integrity and availability of the information asset of the organization.
High (H)	Example:  1) Reliable exploitation of code that result in compromise of system.
	Processes that involved information assets without procedures in place.
	When impact of vulnerability is not immediately exploitable but has a potential of deteriorating to higher impact level resulting high impact as outlined above.
Medium (M)	Example:  1) Unreliable exploitation of code that result in system instability such as denial of service  2) Processes that involved information assets with procedures in place but not maintained to company standard such as frequent record inconsistency.
Low (L)	When impact of vulnerability has a remote chance of further deteriorating to the above Medium impact level OR when it provides excessive information that may lead to compromising confidentiality, integrity, and/or availability of the information assets.
Eow (E)	Example:  1) Information leakage gathered during service probing.  2) Processes that involved information assets with procedures in place but not maintained to company standard such as slight record inconsistency.

Table 1: Impact Rating Matrix





# 3.2 Likelihood Rating

The threat likelihood is estimated and determined based on detailing aspects of the threat agent, and the amount of expertise needed by the threat agent to perform the system compromise. The likelihood ratings are as follows:

Likelihood Rating	Description of rating
High (H)	When likelihood of vulnerability occurrence is of high frequency OR ease of vulnerability exploitation by unskilled attackers.  Example:  1) 'Point and click' exploits available for unskilled attackers.
,	When likelihood of vulnerability occurrence is of medium frequency OR ease of vulnerability exploitation by attackers with technical knowledge.
Medium (M)	Example:  1) Exploit codes available in raw source code. Thus, attackers would require programming knowledge as well as the understanding of network infrastructure environment for the exploit to work.
Low (L)	When likelihood of vulnerability occurrence is of low frequency OR services with no known vulnerability.  Example:  1) Exploit code unknown and not available.

Table 2: Likelihood Rating Matrix



# 3.3 Summary Risk Rating

The summary risk rating is then evaluated based on both the impact and likelihood of threats. The summary risk ratings are as follows:

Impact \ Likelihood	High	Medium	Low
High	High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Low

Table 3: Summary Risk Rating Matrix



# 3.4 Risk Controls Resolution Timeline

Based on the summary risk rating, we suggest the following risk controls resolution timeline:

Risk Rating	Risk Controls Resolution Timeline	
High	Immediately / During Next Maintenance Period / Resolved in less than 2 weeks	
Medium	Resolved in less than 4 weeks	
Low	Resolved in less than 6 weeks	

Table 4: Risk Controls Resolution Timeline



### 4. Test Scope

Below is a listing of the test components. It gives an overview of the areas tested. The results of these tests are explained in more detail thereafter.

# Types of tests performed

Checked

#### 1. Certification Authority Audit

- Interviews and discussions with appropriate stakeholders
- Sighted of relevant records, documentation and processes
- Visited the Data Centre for its implementation of the physical and logical security
- Discussion on interim findings





# 5. Certification Authority Audit

This section attempts to determine whether in-scope applications are developed accordance to Security Guidelines for Certification Authorities Version 2.0 policies. Moreover, it shall also evaluate the security controls implemented in the application and system. Recommendations were provided to close up any non-compliance findings.

# 5.1 Physical and Environmental Controls Lapse (M)

Security Guidelines for Certification Authorities Version 2.0 Reference Number: 25, 78

#### Observation

During the course of assessment, it was observed that the following physical and environmental controls were not met:

#### DR Site

- Cables were untidy and hidden underneath the server rack.
- 2. Combustible materials were kept next to the server rack.
- 3. Server racks were not locked at all times.
- 4. Although there was a camera installed to monitor user activities within the DR site, however there was no physical protections implemented to protect the camera from unauthorized removal.

#### **Equinix Data Centre**

- 1. Combustible materials were kept next to the server rack.
- 2. Server cabinet rear door were not locked at all times.
- 3. Cables were untidy.

For Equinix Data Centre, it was noted that the primary site was hosted in a private hosting centre that has multiple layer of security controls implemented including biometric access, CCTV, security screening, etc. All these controls could largely eliminate/mitigate the possibility of outsiders (e.g. vendors, auditors, etc.) from exploiting the risk. However, this control may not be sufficient to mitigate the risk of an insider attack.

#### **Implication**

Poorly routed cables can lead to decreased airflow and improper hardware management.

A latent risk of fire exists due to the presence of both, constant ignition source electricity and plentiful supply of combustible materials.

The lack of rack level security could potentially allow unauthorized access and criminal activity from happening.

The absence of physical security controls implemented to secure the camera would potentially allow ones to hinder the controls to deviate from its primary purpose. As a result, the footage captured by the camera may not reflect the actual activities happened within the DR site. For example: The camera which was installed at the entrance of the DR site was secured only using blu-tack. The controls were not effective in preventing unauthorized removal/replacement.

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#### Recommendation

We recommend the following:

Server racks shall be locked at all times to prevent any unauthorized access.

 Proper cable management shall be enforced at all times which would aid in reducing any unnecessary time spent on identifying tangled cables.

Monitoring devices shall be installed at areas that are non-reachable to any personnel. In addition, hardware protection shall also be implemented to prevent unauthorized from tampering with the AC and network cable.

#### Management Response

Netrust would take measures to ensure that the server racks are locked. Do note that the servers are in a private suite, with access controlled by biometrics. The suite is accessible to Netrust authorized personnel only. There are already multiple layers of access control – the first layer is controlled by Equinix security staff for access to the Data Centre itself. The second layer is for access to Netrust suite, where only authorized Netrust personnel with pre-registered biometrics can access.

Surveillance camera will be upgraded and be mounted on a higher level to prevent unauthorized tampering.



# 5.2 Record Management Lapse – Records of Periodic Review Absent (L)

Security Guidelines for Certification Authorities Version 2.0 Reference Number: 9, 17, 47, 50, 77, 84

#### Observation

During the course of assessment, although there was review performed for the following, however it was not being documented:

- 1. Monthly security management access control matrixes review
- Quarterly job responsibilities and access matrix (logical and physical) review
   Annual archival review
- 4. Alternate days audit trails review

#### Implication

The lack of sufficient records to validate that the review has been conducted, could potentially lead to accountability issues. For example: If a user mentioned he has reviewed the application logs but was not documented, there could be a possibility whereby the review was not conducted. In the event whereby a security incident occurs, there will not be any records to trace who has reviewed the application logs and has he performed what is required from him.

#### Recommendation

We recommend documenting records of review conducted. The documentation shall minimally include:

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- Personnel who performed the review
- Personnel who validated the review was indeed conducted
- Period of the audit trails/archival/access control matrix being reviewed
- Timeline of when the review was performed
- Any security violations/security breaches being flagged.

#### Management Response

Netrust will improve the recording of the reviews.





# 5.3 Documentation Management Lapse (L)

Security Guidelines for Certification Authorities Version 2.0 Reference Number: 6, 10, 12

#### Observation

During the course of assessment, it was observed that following controls were not met:

- 1. Documented policies/procedures resided at Equinix Data Centre were not the latest updated version.
  - a. Netrust Security Policy Version 1.6 March 2016
  - b. Netrust Public Key Infrastructure Architecture Version 2.2 March 2016
  - c. Netrust Business Continuity Plan (BCP) Version 1.0.21 March 2016
  - d. Netrust Critical Incident Response Procedures Version 1.7 March 2016
- 2. Documented procedures for vulnerability management were not available.
- Although the risk assessment policy last revision history reflected was during December 2014, it was noted that there was a review conducted during January 2017 with no amendment made. However, under section 3.4 Techniques Recommendation, it was observed that the document is still referencing to the older version of OWASP Top 10 2010, and SANS Top 20.

#### Implication

The use of outdated policy and procedure manual could potentially misguide the employees in the wrong direction. As a result, this would affect the organization business in terms of consistency and efficiency.

The lack of clearly defined procedures would potentially lead to enforcement issues, whereby users may develop their own perspective of processes which may not be aligned with the organization's goals.

#### Recommendation

We recommend the following:

- Ensure a copy of the updated policies and procedure manual are resided at Equinix Data Centre at all times. Any copies of the earlier version shall be secure disposal.
- Implement documented vulnerability management procedure, where it defines how should vulnerabilities identified by automated tools are handled (Identification, Rectification, Verification).
- Revise the existing risk assessment policy to be updated with the latest references instead.

#### **Management Response**

All Netrust staffs are apprised of the updated policy and procedure documents. However, there is an oversight in not replacing the documents at the Data Centre with the latest. This has been rectified. For the vulnerability management, we will not create a separate document but instead enhance on the Critical Incident Response Procedures document, which would comprise of both critical and non-critical incidents. The editorial error in referencing the older version of OWASP Top 10 and SANS Top 20 had been corrected.

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# 5.4 Vulnerability Management Lapse – Periodic Assessment Not Met (L)

Security Guidelines for Certification Authorities Version 2.0 Reference Number: 75

#### Observation

During the course of assessment, it was observed that latest Network Penetration Test (inclusive of both network components and operating system) was conducted during January 2017. According to the Security Guidelines for Certification Authorities Version 2.0, the respective Certification Authority is required to perform the assessment on weekly basis.

Due to the application is situated in an isolated network segregated from the internet, access to production system could only be done via direct console access or remote administrative through VPN access. Remote administrative are restricted to only authorized personnel, Netrust Operations team.

With the considerations of the abovementioned factors plus there was quarterly network penetration test performed, the risk level was classified as low.

#### Implication

The absence of periodic security assessment conducted could potentially overlook security weakness within the network. As a result, this would affect the organization rectification process in mitigating the issues before it can be exploited.

#### Recommendation

We recommend implementing weekly vulnerability scanning to identify any security weaknesses within the network. The assessment performed has to be documented together with the rectification controls implemented to mitigate the security vulnerabilities identified.

#### Management Response

Netrust will implement weekly vulnerability scanning to identify any security weaknesses within the network.





## 6. Version Control

Version Number	Date	Amendments	Author	Reviewed By
0.1	18 <sup>th</sup> April 2017	initial Draft Created	Elean Kwek Associate Security Consultant	Edwina Tan Project Manager, Senior Security Consultant
0.2	20th April 2017	Section 5.3 Removed.  Management Response Incorporated.	Elean Kwek Associate Security Consultant	Edwina Tan Project Manager, Senior Security Consultant
0.3	21st April 2017	Cover Page and Sign-Off Page Amended	Elean Kwek Associate Security Consultant	Edwina Tan Project Manager, Senior Security Consultant
0,4	24 <sup>th</sup> April 2017	Section 5.2 Management Response Amended	Elean Kwek Associate Security Consultant	Edwina Tan Project Manager, Senior Security Consultant
1.0	31 <sup>st</sup> May 2017	Final Report Created	Elean Kwek Associate Security Consultant	Edwina Tan Project Manager, Senior Security Consultant



# **END OF DOCUMENT**





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Home > Regulations, Licensing and Consultations > Acts and Regulations > Electronic Transactions Act and Regulations > Controller of Certification Authorities > Accredited CAs in Singapore

# **Accredited CAs in Singapore**

LAST UPDATED 05 JULY 2017

The following company has been accredited by the Controller:

#### **Netrust Pte Ltd**

1. Contact Details:

The Operations Manager

Netrust Pte Ltd

70 Bendemeer Road

#05-03, Luzerne,

Singapore 339940

Tel: +65 6212 1388

Fax: +65 6212 1366

Email: infoline@netrust.net

- 2. Netrust Pte Ltd has commenced operation as a licensed CA on 14 June 2001.
- 3. With the changes from the voluntary licensing scheme to a voluntary accreditation scheme for CAs, under the re-enacted 2010 ETA and 2010 ETR, Netrust Pte Ltd has been an accredited since 14 June 2011.
- 4. The current CA accreditation is valid for 2 years from 14 June 2017 to 13 June 2019.
- 5. CA Certificates

Netrust Root CA 1 Certificate (ZIP)

# Netrust Root CA 2 Certificate (ZIP)

### 6. Repository

- URL of repository:
- Netrust CA1 Idap://Idap1.netrust.net
- Netrust CA2-1 Idap://Idap21.netrust.net
- Netrust CA2-2 Idap://Idap22.netrust.net

#### 7. Certification Practice Statement and Certificate Policies

The Netrust Certificate Practice Statement and relevant Certificate Policies can be assessed at http://www.netrust.net

# 8. Recognised Certificates

- 1. Netrust Root CA Certificate
- 2. Netrust Signing CA Certificate
- 3. Netrust Personal Net-ID Certificate
- 4. Netrust Corporate Net-ID Certificate
- 5. Netrust NetServer Server Certificate

# 9. Logos For Accredited CAs

Accredited CAs may display the following logos during the conduct of their business as an indication that they have been accredited by the Controller.



The accreditation criteria are stipulated in the Electronic Transactions Act 2010, Electronic Transac (Certification Authorities) Regulations 2010 and the Compliance Audit Checklist for Certification Authorities.

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