

INDEPENDENT ASSURANCE REPORT

To the management of Agence Nationale de Certification Electronique ("ANCE" or "TunTrust"):

Scope

We have been engaged, in a reasonable assurance engagement, to report on ANCE management's [assertion](#) that in generating and protecting the asymmetric key pairs for its:

1. TunTrust Root CA
2. TunTrust Qualified CA
3. TunTrust Services CA

(collectively, "ANCE CAs") during the period of 12 April 2019 to 19 April 2019 at Tunis, Tunisia, with the following identifying information (full identifying information enumerated in [Attachment A](#)):

CA Name	Subject Key Identifier
1. TunTrust Root CA	06:9A:9B:1F:53:7D:F1:F5:A4:C8:D3:86:3E:A1:73:59:B4:F7:44:21
2. TunTrust Qualified CA	28:6C:72:5F:B0:89:10:9C:8E:10:D6:30:96:9E:8F:FC:FB:9F:74:36
3. TunTrust Services CA	9F:25:17:CE:6F:90:AB:61:2F:C1:47:A9:E0:2F:99:13:5D:FA:23:39

ANCE has:

- followed the CA key generation and protection requirements in its:
 - TunTrust PKI Certificate Policy / Certification Practice Statement, v01, 11 April 2019 ("CP/CPS")
- included appropriate, detailed procedures and controls in its Key Generation Scripts:
 - Key Ceremony Preparation, 15 April 2019
 - Key Ceremony, 16-18 April 2019
 - Key Ceremony Finalisation, 19 April 2019
- maintained effective controls to provide reasonable assurance that ANCE CAs were generated and protected in conformity with the procedures described in its CP/CPS and its Key Generation Scripts
- performed, during the key generation process, the procedures required by the Key Generation Scripts
- generated the CA keys in a physically secured environment as described in its CP/CPS
- generated the CA keys using personnel in trusted roles under multiple person control and split knowledge
- generated the CA keys within cryptographic modules meeting the applicable technical and business requirements as disclosed in its CP/CPS

in accordance with CA Key Generation Criterion 4.1 of the [WebTrust Principles and Criteria for Certification Authorities v2.1](#).

Certification authority's responsibilities

ANCE's management is responsible for its assertion, including the fairness of its presentation, and for generating and protecting its CA keys in accordance with CA Key Generation Criterion 4.1 of the WebTrust Principles and Criteria for Certification Authorities v2.1.

Our independence and quality control

We have complied with the independence and other ethical requirements of the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

The firm applies International Standard on Quality Control 1, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Auditor's responsibilities

Our responsibility is to express an opinion on management's assertion based on our procedures. We conducted our procedures in accordance with International Standard on Assurance Engagements 3000, *Assurance Engagements Other than Audits or Reviews of Historical Financial Information*, issued by the International Auditing and Assurance Standards Board. This standard requires that we plan and perform our procedures to obtain reasonable assurance about whether, in all material respects, management's assertion is fairly stated, and, accordingly, included:

- (1) obtaining an understanding of ANCE's documented plan of procedures to be performed for the generation of the certification authority key pairs for the ANCE CAs;
- (2) reviewing the detailed CA key generation scripts for conformance with industry standard practices;
- (3) testing and evaluating, during the CA key generation process, the effectiveness of controls over the integrity, confidentiality, and availability of all private keys, including back-up copies, and access keys (including physical keys, tokens, and passwords), used in the establishment of the service;
- (4) physical observation of all procedures performed during the CA key generation process to ensure that the procedures actually performed during the period of 12 April 2019 to 19 April 2019 were in accordance with the Key Generation Scripts for the ANCE CAs; and
- (5) performing such other procedures as we considered necessary in the circumstances.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

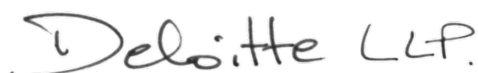
Opinion

In our opinion, in all material respects, based on ANCE management's assertion, ANCE has generated and protected the asymmetric key pairs for its:

1. TunTrust Root CA
2. TunTrust Qualified CA
3. TunTrust Services CA

in accordance with CA Key Generation Criterion 4.1 of the WebTrust Principles and Criteria for Certification Authorities v2.1.

This report does not include any representation as to the quality of ANCE's services beyond those covered by CA Key Generation Criterion 4.1 of the WebTrust Principles and Criteria for Certification Authorities v2.1, nor the suitability of any of ANCE's services for any customer's intended purpose.



Deloitte LLP
Chartered Professional Accountants
Toronto, Ontario, Canada
26 April 2019



Attachment A

CA Certificate for the TunTrust Root CA

Certificate:

Data:

Version: 3 (0x2)

Serial Number:

27:b4:bd:1d:08:28:9f:6d:78:e2:ce:dc:ee:f2:5d:ca:3a:70:29:90

Signature Algorithm: sha256WithRSAEncryption

Issuer: C=TN, O=Agence Nationale de Certification Electronique, CN=TunTrust Root CA

Validity

Not Before: Apr 18 09:42:39 2019 GMT

Not After : Apr 18 09:42:39 2044 GMT

Subject: C=TN, O=Agence Nationale de Certification Electronique, CN=TunTrust Root CA

Subject Public Key Info:

Public Key Algorithm: rsaEncryption

Public-Key: (4096 bit)

Modulus:

00:c3:cd:d3:fc:bd:04:53:dd:0c:20:3a:d5:88:2e:
05:4b:41:f5:83:82:7e:f7:59:9f:9e:9e:63:e8:73:
da:f6:06:a9:4f:1f:b4:f9:0b:1f:39:8c:9a:20:d0:
7e:06:d4:ec:34:d9:86:bc:75:5b:87:88:f0:d2:d9:
d4:a3:0a:b2:6c:1b:eb:49:2c:3e:ac:5d:d8:94:03:
a0:ec:34:e5:30:c4:35:7d:fb:26:4d:1b:6e:30:54:
d8:f5:80:45:9c:39:ad:9c:c9:25:04:4d:9a:90:3e:
4e:40:6e:8a:6b:cd:29:67:c6:cc:2d:e0:74:e8:05:
57:0a:48:50:fa:7a:43:da:7e:ec:5b:9a:0e:62:76:
fe:ea:9d:1d:85:72:ec:11:bb:35:e8:1f:27:bf:c1:
a1:c7:bb:48:16:dd:56:d7:cc:4e:a0:e1:b9:ac:db:
d5:83:19:1a:85:d1:94:97:d7:ca:a3:65:0b:f3:38:
f9:02:ae:dd:f6:67:cf:c9:3f:f5:8a:2c:47:1a:99:
6f:05:0d:fd:d0:1d:82:31:fc:29:cc:00:58:97:91:
4c:80:00:1c:33:85:96:2f:cb:41:c2:8b:10:84:c3:
09:24:89:1f:b5:0f:d9:d9:77:47:18:92:94:60:5c:
c7:99:03:3c:fe:f7:95:a7:7d:50:a1:80:c2:a9:83:
ad:58:96:55:21:db:86:59:d4:af:c6:bc:dd:81:6e:
07:db:60:62:fe:ec:10:6e:da:68:01:f4:83:1b:a9:
3e:a2:5b:23:d7:64:c6:df:dc:a2:7d:d8:4b:ba:82:
d2:51:f8:66:bf:06:46:e4:79:2a:26:36:79:8f:1f:
4e:99:1d:b2:8f:0c:0e:1c:ff:c9:5d:c0:fd:90:10:
a6:b1:37:f3:cd:3a:24:6e:b4:85:90:bf:80:b9:0c:
8c:d5:9b:d6:c8:f1:56:3f:1a:80:89:7a:a9:e2:1b:
32:51:2c:3e:f2:df:7b:f6:5d:7a:29:19:8e:e5:c8:
bd:36:71:8b:5d:4c:c2:1d:3f:ad:58:a2:cf:3d:70:
4d:a6:50:98:25:dc:23:f9:b8:58:41:08:71:bf:4f:
b8:84:a0:8f:00:54:15:fc:91:6d:58:a7:96:3b:eb:
4b:96:27:cd:6b:a2:a1:86:ac:0d:7c:54:e6:66:4c:
66:5f:90:be:21:9a:02:46:2d:e4:83:c2:80:b9:cf:
4b:3e:e8:7f:3c:01:ec:8f:5e:cd:7f:d2:28:42:01:
95:8a:e2:97:3d:10:21:7d:f6:9d:1c:c5:34:a1:ec:
2c:0e:0a:52:2c:12:55:70:24:3d:cb:c2:14:35:43:
5d:27:4e:be:c0:bd:aa:7c:96:e7:fc:9e:61:ad:44:
d3:00:97

Exponent: 65537 (0x10001)

X509v3 extensions:

X509v3 Subject Key Identifier:

06:9A:9B:1F:53:7D:F1:F5:A4:C8:D3:86:3E:A1:73:59:B4:F7:44:21

X509v3 Basic Constraints: critical

CA:TRUE

X509v3 Authority Key Identifier:

keyid:06:9A:9B:1F:53:7D:F1:F5:A4:C8:D3:86:3E:A1:73:59:B4:F7:44:21

X509v3 Key Usage: critical

Digital Signature, Certificate Sign, CRL Sign

Signature Algorithm: sha256WithRSAEncryption

71:37:f2:1b:60:b2:91:f0:2d:99:db:1b:07:4c:e2:d2:60:64:



CA Certificate for the TunTrust Qualified CA

Certificate:

Data:

Version: 3 (0x2)

Serial Number:

51:22:20:0c:68:e4:cc:e4:bc:38:e5:cf:f0:eb:24:24:38:8a:ea:19

Signature Algorithm: sha256WithRSAEncryption

Issuer: C=TN, O=Agence Nationale de Certification Electronique, CN=TunTrust Root CA

Validity

Not Before: Apr 18 12:01:27 2019 GMT

Not After : Apr 18 12:01:27 2039 GMT

Subject: C=TN, O=Agence Nationale de Certification Electronique, CN=TunTrust Qualified CA

Subject Public Key Info:

Public Key Algorithm: rsaEncryption

Public-Key: (4096 bit)

Modulus:

00:b8:02:1c:e1:bf:37:90:dd:a6:b1:7f:55:ec:e4:
43:44:e7:32:a0:3c:0f:1d:f7:58:93:ac:4f:a0:0b:
76:4d:5f:87:bc:b5:bc:bc:c7:71:31:17:4a:cb:ad:
da:c9:67:ed:2b:9a:f0:67:07:b5:68:db:a4:4c:16:
3a:30:69:0a:6c:71:5a:b9:eb:9e:2e:ef:c6:0c:92:
69:7b:b2:42:98:02:ed:eb:b0:96:63:fb:54:a3:ea:
72:16:6e:4d:7e:8c:08:09:5d:5c:05:77:3d:77:8b:
7c:60:4c:ce:63:36:a4:13:d6:d9:5a:79:e2:0c:20:
e9:d9:3a:df:f4:18:ad:cc:e8:73:62:99:6f:46:0e:
57:b3:15:c2:89:0a:77:66:fd:a0:36:07:34:9e:12:
e6:10:e1:68:a9:e4:0f:3f:5b:a5:00:b9:31:ea:23:
79:f8:ad:4a:c7:cf:6e:91:99:76:de:33:ba:44:65:
2b:2b:82:f7:fe:35:43:b5:d3:44:60:80:83:79:7e:
47:09:8c:20:8a:a1:39:b5:9e:a4:b2:b1:af:80:68:
2a:5e:1a:b1:6d:1e:02:95:63:aa:ef:a7:cf:cd:1b:
8d:49:fe:bb:48:b7:a4:cd:2e:e5:ea:57:56:94:b6:
12:92:e9:2f:a1:08:e3:9c:97:cb:8a:7f:31:d7:01:
4f:50:24:10:5b:47:b2:de:53:cc:47:5a:db:5c:39:
1c:98:b4:f6:83:f4:ce:9c:ee:a4:eb:a4:c4:dc:17:
f4:ed:06:e4:56:63:f5:f1:34:72:aa:0b:62:be:17:
e9:7c:99:43:e7:31:06:40:3e:b1:da:12:df:fd:de:
83:a3:b3:5b:6a:ef:11:8b:f8:07:f7:38:f3:f1:2b:
25:4e:74:cd:6b:15:0f:ad:7d:9d:36:75:03:3c:c6:
96:bd:54:cf:e6:c2:0d:ca:22:29:70:83:a8:c4:13:
87:e5:31:8d:46:a0:67:16:48:d5:85:12:7f:29:98:
28:aa:2b:46:08:cb:68:ba:ef:1a:9f:a8:bc:42:0a:
b7:57:b6:0d:16:fe:1f:74:70:b8:ef:9f:87:f4:fb:
28:29:90:cd:47:50:15:21:1c:af:9c:aa:f6:d7:a2:
be:91:33:1f:42:f3:0e:6e:db:22:04:a9:07:24:fe:
32:de:42:cd:3c:8f:19:21:8a:9d:c0:24:26:bb:46:
c8:b5:86:ef:df:e2:04:62:86:94:a7:c1:ac:86:8e:
21:0e:7f:63:88:12:a7:30:08:25:2a:f4:c5:c7:3e:
45:7c:2b:87:f2:72:e8:83:54:23:1e:64:8e:21:07:
13:17:24:42:ad:8c:29:86:8e:f4:b0:b1:19:39:00:
0d:e9:e3

Exponent: 65537 (0x10001)

X509v3 extensions:

Authority Information Access:

CA Issuers - URI:http://www.tuntrust.tn/pub/TnTrustRootCA.crt

OCSP - URI:http://va.tuntrust.tn

X509v3 Subject Key Identifier:

28:6C:72:5F:B0:89:10:9C:8E:10:D6:30:96:9E:8F:FC:FB:9F:74:36

X509v3 Basic Constraints: critical

CA:TRUE, pathlen:0

X509v3 Authority Key Identifier:

keyid:06:9A:9B:1F:53:7D:F1:F5:A4:C8:D3:86:3E:A1:73:59:B4:F7:44:21

X509v3 Certificate Policies:

Policy: 2.16.788.1.2.7.1.1.1



hSE327KRqiQe4Pqe3o46EBZQJjuB5UawzVtTBiUe+ATTNGoMTJUOH9AJ059GDQDr
hg8m2Rcqdc21StQJ/krSJYArngtRLYYszLeNrhAoXgA4ZMhTp5xEM4S9ZVPrcUp0
Fdu0/XVjK6WY009WzjfXEjtuwH+zans4NFkIRGHgotHP0Rks8mORD3LQINKItCJj
qY1m1FIjPqopnq0aVskMc/RSPrJ5USHQWP002Yjvh6TdWk0Lq5e5DqFTTyECHUBc
OQM5nhPF3ciQk8BBpLu762F6GcYytMhSoTYNFM6InEP6w1co6aOrUhvuDIq4nyfZ
ngL3xC+ZvC18BNj1bWrWBk/sQR6uXHHVrJuuxYZb7fJn9geS40wRyEqVpbadZfxV
xiDqGhru/vNIhLC1SqSI/m95scXtTcsST5n6d1DzvgsAKMR+i6hN7S91jSkEYsS+
beEP1wPzf13n0b9J0HXyv7pauodQKpsce18NwfCd
-----END CERTIFICATE-----



CA Certificate for the TunTrust Services CA

Certificate:

Data:

Version: 3 (0x2)

Serial Number:

57:4e:bb:95:29:34:83:33:3d:74:29:90:c2:4a:4d:00:c4:96:81:e6

Signature Algorithm: sha256WithRSAEncryption

Issuer: C=TN, O=Agence Nationale de Certification Electronique, CN=TunTrust Root CA

Validity

Not Before: Apr 18 10:36:54 2019 GMT

Not After : Apr 18 10:36:54 2039 GMT

Subject: C=TN, O=Agence Nationale de Certification Electronique, CN=TunTrust Services CA

Subject Public Key Info:

Public Key Algorithm: rsaEncryption

Public-Key: (4096 bit)

Modulus:

00:cc:43:3a:00:f6:8e:26:7b:16:97:43:ad:7b:ee:
68:47:cb:82:75:bf:5e:70:75:84:8b:ab:c9:87:9c:
5a:fc:32:a8:3f:7b:4d:56:e1:66:15:37:0d:56:73:
f5:8b:69:e4:44:cf:77:50:7c:b9:47:db:2b:b2:65:
54:db:53:17:34:3e:9f:b6:dc:15:11:68:4d:88:0f:
08:36:ef:3c:ed:17:9b:52:3c:df:d5:63:22:29:25:
e9:2d:c8:5a:ec:42:5b:c7:07:af:f7:96:32:68:33:
82:69:a6:8f:00:ee:a1:ab:60:1c:36:e4:b4:cf:93:
e1:b8:ad:ed:b7:fd:24:ba:bb:5e:88:f9:93:85:a5:
87:63:b3:98:7c:7f:5c:4d:5a:47:0a:1c:fb:bc:4c:
e3:0c:92:0a:69:c8:e7:72:11:c3:e8:36:4e:35:89:
ee:81:1e:72:f4:bd:53:84:f5:a6:b6:e1:20:ca:0f:
6c:8b:e2:b9:a7:de:5c:ff:19:b6:16:c0:5b:73:48:
9a:26:7d:19:5f:23:2a:c2:2a:db:fa:2b:07:39:0b:
24:28:96:0a:97:94:9e:79:ca:4f:31:b7:f4:e5:b6:
77:56:00:5d:a7:42:05:81:ac:17:85:44:90:00:59:
d2:b5:1f:76:69:ed:ef:66:79:94:f9:42:3c:33:68:
50:22:38:a9:5b:e2:d9:18:cb:19:40:38:e1:b7:bc:
16:0a:82:d2:0a:26:ee:23:31:33:f5:73:3c:df:44:
76:07:eb:38:8b:65:b2:81:47:55:32:88:54:e5:91:
8c:9f:73:0a:f4:68:9b:43:97:9e:84:2d:70:40:39:
f6:29:a0:25:ad:a7:78:ba:01:64:e9:e9:3e:71:17:
a4:ef:46:5f:a4:16:1c:be:74:c5:f2:29:77:44:24:
96:1f:bc:35:f2:5c:a6:fc:d5:cf:ba:6d:7d:96:77:
52:c5:8f:64:83:2c:40:e9:d8:2a:b8:89:e3:e2:38:
d6:40:1b:d3:21:80:45:f0:0c:00:9f:95:d6:45:1e:
52:10:3e:57:9a:f9:79:18:c5:80:ba:18:74:1d:da:
08:5c:f1:41:0a:87:1d:cc:79:08:74:29:8a:cd:74:
43:98:a6:16:05:46:7f:3d:f3:02:1a:1f:dc:56:61:
e9:9c:b4:3a:e4:a7:d2:76:b4:17:47:39:9a:91:2c:
73:3f:bf:b6:b0:b8:b2:5b:0e:f3:68:ed:59:e9:90:
21:36:bc:fc:14:01:dd:05:0e:5f:93:e7:17:5d:5d:
57:0b:71:b7:68:01:7f:59:77:00:c1:df:c9:fa:31:
c3:fb:8b:0a:1f:4e:79:95:74:37:1f:b3:2d:75:59:
e1:9a:45

Exponent: 65537 (0x10001)

X509v3 extensions:

X509v3 Name Constraints: critical

Permitted:

DNS:tn

DirName: C = TN

Excluded:

IP:0.0.0.0/0.0.0.0

IP:0:0:0:0:0:0:0:0/0:0:0:0:0:0:0:0

Authority Information Access:

CA Issuers - URI:http://www.tuntrust.tn/pub/TnTrustRootCA.crt

OCSP - URI:http://va.tuntrust.tn

X509v3 Subject Key Identifier:

9F:25:17:CE:6F:90:AB:61:2F:C1:47:A9:E0:2F:99:13:5D:FA:23:39

X509v3 Basic Constraints: critical

CA:TRUE, pathlen:0

X509v3 Authority Key Identifier:

keyid:06:9A:9B:1F:53:7D:F1:F5:A4:C8:D3:86:3E:A1:73:59:B4:F7:44:21



X8Ts+tf1WuexR3y4McUfvW/P1wnWdic+ssKcC5VSagsDJQXSU8pc3DI0YTEyZ71S
 DRae1RBjk9wEjhcPNK3nVEmEMH5LIPU0naf9sv11BhUibpoyOx/gtNWawycGCIDY
 QNe5wYaQXRJAhwMZnuXZhf+yH+6ogK/MJxDFQhc9L1+42SXuCzaGHZr7aU7+GEdx
 6361ATA6qHtGRrhD/qWNkPrrenRPw5mTxawAkQtmrtY0JgrZCwIBXPIAhseAlwqe
 IxIJAE4PBfM08ofuQ6bWIXqB06N51dV77Bu1viKDD5L/kJc7jenstrbwBasty12g
 DyjU8rYvW0Xn3+drGkTTOfcnhf0cwYx2E14NjbGQBFWPNA5GF7d3BNybItcLM0WN
 /7cpvhFMuc7eIJba+V2au7a3Q0ooK1RRHqxe+JFyd4/nHXvq11Eb1osqs71xUhjU
 JC4cajg0+4AQESig
 -----END CERTIFICATE-----

ANCE MANAGEMENT'S ASSERTION

Agence Nationale de Certification Electronique ("ANCE" or "TunTrust"): has deployed a public key infrastructure. As part of this deployment, it was necessary to create certificate authorities known as:

1. TunTrust Root CA
2. TunTrust Qualified CA
3. TunTrust Services CA

(collectively, "ANCE CAs"). In order to allow the CAs to be installed in a final and useable configuration, a Key Generation Ceremony was conducted, the purpose of which was to formally witness and document the creation of each CA's private signing key. This helps assure the non-refutability of the integrity of the ANCE CAs' key pairs, and in particular, the private signing keys.

ANCE management has securely generated key pairs, each consisting of a public and private key, in support of its CA operations. The key pairs were generated in accordance with procedures described in ANCE's Certificate Policy/Certification Practice Statement (CP/CPS), and its Key Generation Scripts, which are in accordance with CA Key Generation Criterion 4.1 of the [WebTrust Principles and Criteria for Certification Authorities v2.1](#).

ANCE management established and maintained effective controls over the generation of these keys. These controls were designed to provide reasonable assurance of adherence to the above-mentioned practices throughout the root key generation process.

ANCE management is responsible for establishing and maintaining procedures over its CA root key generations, and over the integrity and confidentiality of all private keys and access keys (including physical keys, tokens, and passwords) used in the establishment of the ANCE CAs, and for the CA environmental controls relevant to the generation and protection of its CA keys.

ANCE management has assessed the procedures and controls for the generation of the CA keys. Based on that assessment, in management's opinion, in generation and protecting its CA keys for the ANCE CAs during the period of 12 April 2019 to 19 April 2019 at Tunis, Tunisia, with the following identifying information:

CA Name	Subject Key Identifier
1. TunTrust Root CA	06:9A:9B:1F:53:7D:F1:F5:A4:C8:D3:86:3E:A1:73:59:B4:F7:44:21
2. TunTrust Qualified CA	28:6C:72:5F:B0:89:10:9C:8E:10:D6:30:96:9E:8F:FC:FB:9F:74:36
3. TunTrust Services CA	9F:25:17:CE:6F:90:AB:61:2F:C1:47:A9:E0:2F:99:13:5D:FA:23:39

ANCE has:

- followed the CA key generation and protection requirements in its:
 - TunTrust PKI Certificate Policy / Certification Practice Statement, v01, 11 April 2019 ("CP/CPS")
- included appropriate, detailed procedures and controls in its Key Generation Scripts:
 - Key Ceremony Preparation, 15 April 2019
 - Key Ceremony, 16-18 April 2019
 - Key Ceremony Finalisation, 19 April 2019
- maintained effective controls to provide reasonable assurance that ANCE CAs were generated and protected in conformity with the procedures described in its CP/CPS and its Key Generation Scripts
- performed, during the key generation process, the procedures required by the Key Generation Scripts
- generated the CA keys in a physically secured environment as described in its CP/CPS

- generated the CA keys using personnel in trusted roles under multiple person control and split knowledge
- generated the CA keys within cryptographic modules meeting the applicable technical and business requirements as disclosed in its CP/CPS

in accordance with CA Key Generation Criterion 4.1 of the [WebTrust Principles and Criteria for Certification Authorities v2.1](#).

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