# Department of Defense Public Key Infrastructure

## DoD Approved External PKIs Master Document

Version 5.6

January 26, 2016

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# Revision Page

| Date | Version | Change Description |
|---|---|---|
| 6/7/2011 | 1.0 | Release 1.0 |
| 8/18/2011 | 1.1 | Updated Treasury and ORC SSP sections, updated Department of State assurance level section, incorporated text comments, added additional VeriSign ECA CA, and added VeriSign NFI and ActivIdentity, Inc. NFI as a DoD approved PKIs. |
| 10/05/2011 | 1.2 | Added Citi NFI PKI and new DOD CAs 27-30 and DOD EMAIL CAs 27-30. |
| 11/04/2011 | 1.3 | Added Entrust NFI PKI as a DoD Approved External PKI |
| 01/05/2012 | 2.0 | Added Verizon Business NFI PKI as a DoD Approved External PKI<br>Removed expired DoD [EMAIL] CAs 11,12,14 |
| 04/27/2012 | 2.1 | Added ORC NFI PKI as a DoD Approved External PKI<br>Removed expired DoD [EMAIL] CA 13<br>Removed expired Treasury Root CA and 3 Issuing CAs (OCIO, Fiscal, Treasury Public) |
| 06/22/2012 | 2.2 | Added new SHA-256 Dept. of State CA and updated Assurance Level information<br>Added Boeing PKI as a DoD Approved External PKI<br>Removed expired DoD [EMAIL] CA 15-18 and expired Entrust SSP SHA-1 chains |
| 08/01/2012 | 2.3 | Removed ActivIdentity NFI PKI as a DoD Approved External PKI<br>Updated VeriSign NFI SHA-256 chain with US Senate and Millennium PIV-I CAs |
| 02/13/2013 | 2.4 | Added content for DoD [EMAIL] CA 31-32 and NPE CA 1-2<br>Updated VeriSign NFI PKI SHA-256 chain with Booz Allen and CSC SHA-256 PIV-I CAs<br>Replaced expired Exostar FIS Certificate Authority |
| 03/25/2013 | 2.5 | Added Netherlands Ministry of Defence PKI as a DoD Approved External PKI |
| 05/28/2013 | 3.0 | Added Australian Defence Organisation (ADO) PKI as a DoD Approved External PKI<br>Added content for DoD CCEB Interoperability Root CA 1 |
| 07/01/2013 | 3.1 | Removed Citi NFI PKI as a DoD Approved External PKI<br>Added content for Exostar FIS Signing CA 2 Issuing CA |
| 09/05/2013 | 3.2 | Renamed VeriSign NFI and SSP to Symantec NFI and SSP<br>Updated Symantec NFI PKI SHA-256 chain with Eid Passport – RAPIDGate PIV-I CA |
| 11/06/2013 | 3.3 | Added content for HHS Intermediate CA under Entrust SSP<br>Added content for Veterans Affairs Issuing CA under Treasury SSP<br>Removed expired Treasury OCIO Issuing CA |
| 01/01/2014 | 4.0 | Removed expired SHA-1 content from ORC SSP and Symantec NFI/SSP PKIs. |
| 02/20/2014 | 4.1 | Added content for IdenTrust ECA 4 |
| 03/24/2014 | 4.2 | Added content for Symantec Client ECA – G4<br>Added new Federal PKI Policy OID: id-fpki-common-piv-contentSigning |
| 05/06/2014 | 4.3 | Removed expired CAs: DoD [EMAIL] CA 19-20 and IdenTrust ECA 2.<br>Updated CCEB IRCA 1 > ADOCA03 cross certificate<br>Added content for additional Raytheon SHA-1 trust chain |
| 06/10/2014 | 4.4 | Added content for ORC ECA HW 5, ORC ECA SW 5, and ADOCA016<br>Removed expired content for ORC ECA HW 3 and ORC ECA SW 3 |

# Revision Page (continued)

| Date | Version | Change Description |
|---|---|---|
| 07/01/2014 | 4.5 | Added Exostar SHA-256 PKI as a DoD Approved External PKI,<br>Removed expired content for VeriSign Client ECA – G2<br>Removed FPKI SHA-1 Authentication and CardAuth OIDs<br>Removed SHA-1 OIDs from Symantec NFI and SSP, and Verizon Business SSP |
| 08/01/2014 | 4.6 | Added Cassidian NFI PKI as a DoD Approved External PKI<br>Removed Exostar SHA-1 PKI as a DoD Approved External PKI<br>Replaced ORC Root 2 with the Federal Common Policy CA (FCPCA) as trust anchor for ORC SSP<br>Removed ORC SSP Inherited Policies from ORC Root 2 |
| 08/22/2014 | 4.6.1 | Added Eid Passport – RAPIDGate Premier Issung CA (Symantec NFI) |
| 02/02/2015 | 4.7 | Removed expired CAs: DoD [EMAIL] CA 21-24 and ADOCA014 |
| 06/01/2015 | 5.0 | Added content for DoD Root CA 3 and ECA Root CA 4<br>Added Northrop Grumman SHA-256 PKI as DoD Approved External PKI<br>Added content for NRC Issuing CA (Symantec SSP)<br>Added new FPKI OIDs: id-fpki-common-pivAuth-derived and id-fpki-common-pivAuth-derived-hardware<br>Removed expired Raytheon trust chain |
| 07/01/2015 | 5.1 | Added content for re-keyed Treasury issuing CAs (DHS, NASA, OCIO, SSA) |
| 09/04/2015 | 5.2 | Added content for Raytheon SHA-256 PKI |
| 11/13/2015 | 5.3 | Added content for DoD [ID \| SW] [EMAIL] CAs 33-38 and ORC ECA 6.<br>Removed content for Cassidian/Airbus (decommissioned) |
| 12/04/2015 | 5.4 | Added content for DoD [ID] [EMAIL] CAs 39-44 |
| 01/12/2016 | 5.5 | Added content for Carillon Federal Services PKI<br>Removed expired content for DoD [EMAIL] CA 25-26 |
| 01/26/2016 | 5.6 | Added content for re-keyed Entrust SSP PKI chain |

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# 1.0 Introduction

This document provides Certification Authority (CA) certificate trust chain and assurance level information for all Department of Defense (DoD) approved Public Key Infrastructures (PKIs). DoD Chief Information Officer (CIO) is the governing authority for DoD approved external PKIs. Prior to 2008, the only DoD approved external PKI was the DoD-managed External Certification Authority (ECA) program PKI. On May 24, 2011, DoD CIO released Department of Defense Instruction (DoDI) 8520.02 authorizing PKI interoperability with DoD approved external PKIs The DoD External Interoperability Plan describes the criteria and process for DoD approved external PKIs and is available on the DoD authoritative external Interoperability site http://iase.disa.mil/pki-pke/interoperability/Pages/index.aspx. DoD approved PKIs must conform to all criteria stated in the DoD External Interoperability Plan to include cross certification with the Federal PKI (FPKI) at Federal Bridge Certification Authority (FBCA) medium hardware assurance level or higher and successful completion of Joint Interoperability Test Command (JITC) testing[1]. DoD organizations that wish to interoperate with DoD approved external PKIs must comply with DoD Instruction 8520.02.[2] DoD relying parties may interoperate using cross-certificate trust or direct trust. If interoperating using direct trust, DoD relying parties must ensure that they are only accepting PKI credentials that meet the FBCA medium hardware assurance level restriction.[3] In addition to PKI authentication and validation, administrators should ensure that DoD information systems are performing access control.[4]

[1] The DoD Partner PKI Interoperability test plan is located on the external interoperability site at http://iase.disa.mil/pki-pke/interoperability/Pages/index.aspx

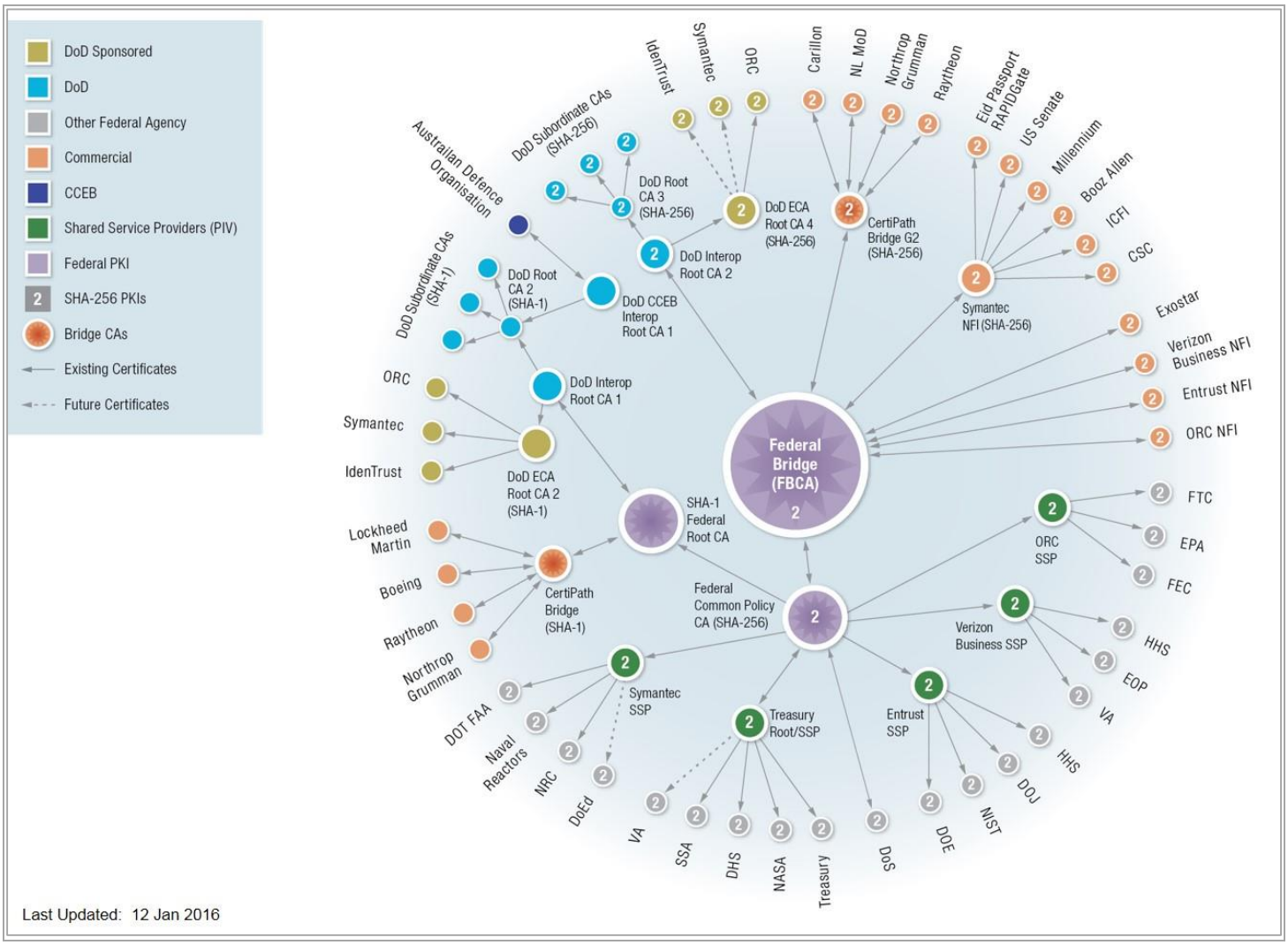
[2] DoD 8520.02 is available at http://www.dtic.mil/whs/directives/corres/pdf/852002p.pdf

[3] For more information on Assurance Levels, see Section 6.

[4] DoD CIO Memorandum, "Compliance and Review of Logical Access Control in Department of Defense (DoD) Processes is available at http://www.doncio.navy.mil/uploads/0205OPP64355.pdf

# 2.0 DoD PKI External Interoperability Landscape

The following diagram provides an overview of the Federal PKI Interoperability Landscape and illustrates the cross-certificate trust relationships between DoD PKI and DoD approved external PKIs:



# 3.0 DoD PKI Trust Chains

DoD PKI began as a medium assurance pilot in 1998 and has since evolved to a heavily operationalized PKI with over 4.5 million subscribers. DoD currently has over 30 issuing CAs that issues both hardware and software certificates at various assurance levels. DoD most commonly distributes CA certificates with the PKE InstallRoot utility.[5] It also has CA certificates which support cross-certificate interoperability with its Federal, industry, and international partners which are not included in the base InstallRoot package.

## *3.1 DoD Trust Anchors*

### 3.1.1 DoD Root CA 2

DoD Root CA 2 is the primary SHA-1 DoD trust anchor for which all DoD end entity and intermediate CA certificates should be validated against. This trust anchor has issued DOD [EMAIL] CAs 25-32 and DoD Intermediate CA 1-2.

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x05 |
| **Valid From** | Dec 13 15:00:10 2004 GMT |
| **Valid To** | Dec 5 15:00:10 2029 GMT |
| **SHA-1 Print** | 8C:94:1B:34:EA:1E:A6:ED:9A:E2:BC:54:CF:68:72:52:B4:C9:B5:61 |

### 3.1.2 DoD Root CA 3

DoD Root CA 3 is the primary SHA-256 DoD trust anchor for which all DoD SHA-256 end entity and intermediate CA certificates should be validated against. This trust anchor will issue SHA-256 issuing CAs. Currently, no SHA-256 CAs have been issued by DoD Root CA 3.

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01 |
| **Valid From** | Mar 20 18:46:41 2012 GMT |
| **Valid To** | Dec 30 18:46:41 2029 GMT |
| **SHA-1 Print** | D7:3C:A9:11:02:A2:20:4A:36:45:9E:D3:22:13:B4:67:D7:CE:97:FB |

### 3.1.3 DoD Interoperability Root CA 1

DoD Interoperability Root CA 1 is the SHA-1 DoD trust anchor for cross-certificate trust with SHA-1 DoD approved external PKIs.

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=DoD Interoperability Root CA 1,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DoD Interoperability Root CA 1,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x06 |
| **Valid From** | Jun 20 14:49:11 2007 GMT |
| **Valid To** | Jun 15 14:49:11 2027 GMT |
| **SHA-1 Print** | 0A:34:BE:0A:96:BA:D5:33:55:8D:16:84:2C:38:7D:74:91:0D:AF:12 |

[5] InstallRoot is available on the IASE PKE site at http://iase.disa.mil/pki-pke/Pages/tools.aspx

### 3.1.4 DoD Interoperability Root CA 2

DoD Interoperability Root CA 2 is the SHA-256 DoD trust anchor for cross-certificate trust with SHA-256 DoD approved external PKIs.

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=DoD Interoperability Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DoD Interoperability Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01 |
| **Valid From** | Nov 29 14:25:10 2010 GMT |
| **Valid To** | Nov 24 14:25:10 2030 GMT |
| **SHA-1 Print** | 52:2E:1B:F5:BE:15:2F:A9:8B:ED:4F:01:AA:44:1D:01:09:2D:5A:31 |

### 3.1.5 DoD CCEB Interoperability Root CA 1

US DoD CCEB Interoperability Root CA 1 is the SHA-1 DoD trust anchor for cross-certificate trust with the SHA-1 Combined Communications-Electronics Board (CCEB) partner National Defense PKIs. Partner National Defense PKIs include Australian Defence Organisation (ADO), Canada Department of National Defence (DND), New Zealand Defence Force, and the United Kingdom Ministry of Defence (MOD). Since the preferred method of certificate path processing is cross-certificate trust, cross certificate trust chains will be published. Additionally, for applications that do not support cross-certificate trust, the direct trust chains will also be posted. However, application owners that interoperate using direct trust will need to ensure extra precautions are in place to ensure that only certificates with DoD approved PKI certificate policy OIDs are accepted for authentication. Additionally, direct trust application owners will need to remove the CCEB partner PKI trust anchors in the event of a compromise since they will be unable to rely upon a revocation by the DoD. Since CCEB is a Category III PKI, the trust chains will be listed in Section 5.4, *Foreign, Allied, or Coalition Partner PKIs or other PKIs*.

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=US DoD CCEB Interoperability Root CA 1,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=US DoD CCEB Interoperability Root CA 1,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01 |
| **Valid From** | Nov 29 17:47:23 2010 GMT |
| **Valid To** | Nov 24 17:47:23 2030 GMT |
| **SHA-1 Print** | E0:41:0B:4A:58:2F:B1:C4:DD:52:B0:31:2B:A3:F4:39:4D:4F:01:B8 |

## *3.2 DoD Intermediate and Subordinate/Issuing CAs*

DoD Intermediate and Subordinate CA certificates are a part of the PKE InstallRoot utility. Additionally, they are hosted in Global Directory Service (GDS).[6]

### 3.2.1 DoD SHA-1 Subordinate CAs

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD CA-27,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01B2 |
| **Valid From** | Sep 8 15:50:25 2011 GMT |
| **Valid To** | Sep 8 15:50:25 2017 GMT |
| **SHA-1** | CE:D0:0D:53:66:8B:58:7E:7B:6B:A6:E1:3C:05:1D:1B:59:C2:5E:6B |

[6] All DoD Intermediate and Subordinate/Issuing CAs issued from DoD Root CA 2 can be pulled from GDS at http://crl.disa.mil/issuedby/DODROOTCA2_IB.p7c or https://crl.disa.mil

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-27,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01B6 |
| **Valid From** | Sep 8 16:00:18 2011 GMT |
| **Valid To** | Sep 8 16:00:18 2017 GMT |
| **SHA-1 Print** | 6F:EE:67:34:5F:F6:26:5F:13:37:00:AC:00:1A:51:F0:01:3B:47:7D |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD CA-28,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01B3 |
| **Valid From** | Sep 8 15:57:01 2011 GMT |
| **Valid To** | Sep 8 15:57:01 2017 GMT |
| **SHA-1 Print** | F0:26:B3:B7:86:6E:4D:EC:FE:5C:3E:C1:5C:60:AC:6C:A1:24:61:1C |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-28,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01B7 |
| **Valid From** | Sep 8 16:01:19 2011 GMT |
| **Valid To** | Sep 8 16:01:19 2017 GMT |
| **SHA-1 Print** | 38:CA:D5:1F:D6:03:E4:50:BC:66:CD:8B:C1:52:FB:CE:35:44:C7:A4 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD CA-29,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01B4 |
| **Valid From** | Sep 8 15:58:26 2011 GMT |
| **Valid To** | Sep 8 15:58:26 2017 GMT |
| **SHA-1 Print** | 4E:9B:43:6D:B4:F0:90:AD:3D:9E:6E:00:AE:DF:44:48:1C:AA:B7:6F |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-29,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01B8 |
| **Valid From** | Sep 8 16:02:14 2011 GMT |
| **Valid To** | Sep 8 16:02:14 2017 GMT |
| **SHA-1 Print** | 81:0B:FB:48:C1:AF:A8:E3:C5:FF:7D:50:B3:28:57:6A:5E:BF:9E:29 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD CA-30,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01B5 |
| **Valid From** | Sep 8 15:59:24 2011 GMT |
| **Valid To** | Sep 8 15:59:24 2017 GMT |
| **SHA-1 Print** | BC:AB:48:78:BA:72:DC:43:5B:20:86:02:E8:BB:76:9D:08:E1:A9:0E |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-30,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01B9 |
| **Valid From** | Sep 8 16:03:08 2011 GMT |
| **Valid To** | Sep 8 16:03:08 2017 GMT |
| **SHA-1 Print** | 44:F7:8C:98:37:19:29:1E:CB:87:70:09:40:68:DA:84:1D:AC:85:45 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD CA-31,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x039D |
| **Valid From** | Jan 16 14:49:30 2013 GMT |
| **Valid To** | Jan 16 14:49:30 2019 GMT |
| **SHA-1 Print** | 07:A2:9B:87:8A:0D:C9:C3:F9:79:B9:8B:92:E4:0D:DD:33:9C:F0:87 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-31,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x039F |
| **Valid From** | Jan 16 14:52:43 2013 GMT |
| **Valid To** | Jan 16 14:52:43 2019 GMT |
| **SHA-1 Print** | 8C:41:53:A8:95:CE:01:1A:E1:31:1F:C7:E0:71:4C:BA:86:D7:1A:3E |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD CA-32,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x03A1 |
| **Valid From** | Feb  4 20:44:05 2013 GMT |
| **Valid To** | Feb  4 20:44:05 2019 GMT |
| **SHA-1 Print** | 2C:3C:9B:8B:2D:9B:D4:29:DF:DE:BB:80:E9:07:E8:A2:E6:A1:AE:40 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-32,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x03A2 |
| **Valid From** | Feb  4 20:48:12 2013 GMT |
| **Valid To** | Feb  4 20:48:12 2019 GMT |
| **SHA-1 Print** | 60:75:8C:59:72:01:93:EB:45:72:5C:AB:34:E8:F8:DE:5C:C5:B5:FD |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID CA-33,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x079C |
| **Valid From** | Sep 23 13:32:32 2015 GMT |
| **Valid To** | Sep 22 13:32:32 2021 GMT |
| **SHA-1 Print** | C2:02:48:28:7B:45:71:67:D4:F2:A4:36:63:A9:83:25:3E:B2:9E:84 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-33,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x079D |
| **Valid From** | Sep 23 13:34:57 2015 GMT |
| **Valid To** | Sep 22 13:34:57 2021 GMT |
| **SHA-1 Print** | A5:3A:58:85:C1:3C:5B:D4:9D:60:E2:43:0E:6C:E3:13:4C:7F:D9:C1 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID CA-34,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x079F |
| **Valid From** | Sep 23 13:40:30 2015 GMT |
| **Valid To** | Sep 22 13:40:30 2021 GMT |
| **SHA-1 Print** | 4C:52:90:42:A6:74:FE:F7:67:18:92:3D:8F:78:88:AC:4C:B6:C1:33 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-34,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x07A0 |
| **Valid From** | Sep 23 13:41:54 2015 GMT |
| **Valid To** | Sep 22 13:41:54 2021 GMT |
| **SHA-1 Print** | 38:53:E2:8E:C5:4F:2F:00:8A:53:F9:2C:57:A1:C1:8B:0C:DE:0C:56 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID SW CA-35,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x079E |
| **Valid From** | Sep 23 13:37:50 2015 GMT |
| **Valid To** | Sep 22 13:37:50 2021 GMT |
| **SHA-1 Print** | 03:61:1D:56:F2:53:D3:9F:DB:51:E1:92:05:4F:A8:CE:30:06:A8:44 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID SW CA-36,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x07A1 |
| **Valid From** | Sep 23 13:44:42 2015 GMT |
| **Valid To** | Sep 22 13:44:42 2021 GMT |
| **SHA-1 Print** | 5B:A6:36:9B:2F:85:4A:7E:96:96:8A:EB:E0:1C:C3:84:45:9B:5C:FD |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID CA-39,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x07C3 |
| **Valid From** | Nov 9 14:21:57 2015 GMT |
| **Valid To** | Nov 8 14:21:57 2021 GMT |
| **SHA-1 Print** | 39:CC:E3:82:DD:33:07:A5:23:2A:33:EA:4F:16:B3:55:FC:F4:D4:6B |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-39,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x07C1 |
| **Valid From** | Nov 9 14:14:47 2015 GMT |
| **Valid To** | Nov 8 14:14:47 2021 GMT |
| **SHA-1 Print** | E2:0C:A9:37:03:DE:60:B1:20:B9:DB:1B:86:E0:DF:8E:82:F8:58:16 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID CA-40,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x07C4 |
| **Valid From** | Nov 9 14:22:54 2015 GMT |
| **Valid To** | Nov 8 14:22:54 2021 GMT |
| **SHA-1 Print** | 37:24:FD:13:51:73:4A:2D:11:F7:2B:7D:D2:03:A4:F1:D6:8A:63:D2 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-40,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x07C2 |
| **Valid From** | Nov 9 14:18:43 2015 GMT |
| **Valid To** | Nov 8 14:18:43 2021 GMT |
| **SHA-1 Print** | 6F:69:DD:25:2E:13:D8:75:36:BA:AE:71:44:7F:71:54:87:29:39:3F |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DoD Intermediate CA-1,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x2C |
| **Valid From** | Feb 5 15:36:43 2008 GMT |
| **Valid To** | Feb 4 14:36:43 2018 GMT |
| **SHA-1 Print** | 50:43:43:5C:89:B7:A7:7D:88:41:37:FE:EF:C0:0D:C7:E2:AB:94:78 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DoD Intermediate CA-2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x2D |
| **Valid From** | May 7 14:44:51 2008 GMT |
| **Valid To** | May 7 13:44:51 2018 GMT |
| **SHA-1 Print** | 77:B6:B9:42:F8:87:60:8B:AD:B8:37:56:4D:9A:ED:85:AE:D6:FC:7D |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD NPE CA-1, ou=PKI, ou=DoD, o=U.S. Government, c=US |
| **Serial #** | 0x031C |
| **Valid From** | Sep 17 13:01:16 2012 GMT |
| **Valid To** | Sep 17 13:01:16 2018 GMT |
| **SHA-1 Print** | F2:0E:5D:8D:BE:D9:32:AD:35:24:AC:6F:81:36:F0:C8:76:FE:D2:70 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 2,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD NPE CA-2, ou=PKI, ou=DoD, o=U.S. Government, c=US |
| **Serial #** | 0x032B |
| **Valid From** | Oct 1 13:32:18 2012 GMT |
| **Valid To** | Oct 1 13:32:18 2018 GMT |
| **SHA-1 Print** | 05:83:6F:FB:EB:A9:74:2B:39:85:8A:87:1F:4C:D1:C2:06:8B:56:53 |

### 3.2.2 DoD SHA-256 Subordinate CAs

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID SW CA-37,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x12 |
| **Valid From** | Sep 23 15:23:05 2015 GMT |
| **Valid To** | Sep 23 15:23:05 2021 GMT |
| **SHA-1 Print** | 5E:AE:74:A8:06:8D:42:F2:F3:E0:17:4B:F2:70:A1:3A:92:EA:AA:5D |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID SW CA-38,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x13 |
| **Valid From** | Sep 23 15:24:51 2015 GMT |
| **Valid To** | Sep 23 15:24:51 2021 GMT |
| **SHA-1 Print** | 81:8E:DA:EF:92:57:79:F0:41:93:94:F5:A3:05:FF:CC:46:3D:75:EE |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID CA-41,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x18 |
| **Valid From** | Nov 9 16:13:56 2015 GMT |
| **Valid To** | Nov 9 16:13:56 2021 GMT |
| **SHA-1 Print** | FE:E5:43:48:3A:C0:AC:B5:19:68:87:15:23:7D:3B:57:B9:D3:47:55 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-41,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x14 |
| **Valid From** | Nov 9 16:05:27 2015 GMT |
| **Valid To** | Nov 9 16:05:27 2021 GMT |
| **SHA-1 Print** | 38:34:49:9D:17:5C:03:C4:B8:EF:E5:2D:D8:B8:BF:03:18:5C:AB:DB |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID CA-42,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x19 |
| **Valid From** | Nov 9 16:15:02 2015 GMT |
| **Valid To** | Nov 9 16:15:02 2021 GMT |
| **SHA-1 Print** | 8B:12:5C:FC:27:16:55:8D:71:6A:9F:87:DB:7C:A8:31:6D:11:23:6E |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-42,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x15 |
| **Valid From** | Nov 9 16:09:42 2015 GMT |
| **Valid To** | Nov 9 16:09:42 2021 GMT |
| **SHA-1 Print** | C3:AD:7E:15:9F:17:4B:E6:AA:42:AF:83:93:98:0E:98:5B:78:D5:FE |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID CA-43,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x1A |
| **Valid From** | Nov 9 16:16:01 2015 GMT |
| **Valid To** | Nov 9 16:16:01 2021 GMT |
| **SHA-1 Print** | 98:D3:E3:3B:50:B8:F6:AC:FF:8C:60:20:E2:9F:F9:67:EB:0E:9C:18 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-43,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x16 |
| **Valid From** | Nov 9 16:11:02 2015 GMT |
| **Valid To** | Nov 9 16:11:02 2021 GMT |
| **SHA-1 Print** | A9:0A:AC:BD:D1:85:68:18:28:A4:CA:A4:69:5D:39:EC:9C:24:59:9F |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD ID CA-44,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x1B |
| **Valid From** | Nov 9 16:18:14 2015 GMT |
| **Valid To** | Nov 9 16:18:14 2021 GMT |
| **SHA-1 Print** | CB:B4:92:C4:E8:A5:2F:02:47:72:BA:4E:53:D4:73:91:B9:8F:CE:F0 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=DoD Root CA 3,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=DOD EMAIL CA-44,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x17 |
| **Valid From** | Nov 9 16:12:16 2015 GMT |
| **Valid To** | Nov 9 16:12:16 2021 GMT |
| **SHA-1 Print** | 21:00:1F:0B:33:5F:F9:15:91:00:DD:9A:9C:CA:76:1A:E4:97:10:05 |

# 4.0 ECA PKI Trust Chains

The DoD sponsored External Certification Authority (ECA) program was the first DoD approved external PKI. Prior to the 2008 CIO memorandum, *Approval of External Public Key Infrastructures,* it was the only means for DoD partners to interoperate with DoD users and servers. The ECA program is managed by the DoD PKI PMO and has four types of certificates and three different assurance levels. The ECA certificates are included in InstallRoot and GDS hosts the ECA CA information to include CA certificates, cross-certificate content, and Certificate Revocation Lists (CRLs). The DoD Robust Certificate Validation Service (RCVS) does not provide Online Certificate Status Protocol (OCSP) responses for ECA certificates. More information can be found on the ECA homepage, http://iase.disa.mil/pki/eca/Pages/index.aspx. DoD users and systems that choose to trust ECA PKI, should implement direct trust by installing the appropriate trust chain into the application or system trust store. Please note that for servers, this provides the capability to authenticate ECA PKI certificates and a separate access control decision to determine need-to-know should be made before providing access to DoD information systems.

## *4.1 ECA Trust Anchors*

### 4.1.1 ECA Root CA 2

ECA Root CA 2 is the SHA-1 ECA PKI trust anchor. ECA Root CA 2 has a one-way cross-certificate relationship with DoD Interoperability Root CA 1 which is cross certified with the SHA-1 Federal Root CA. This allows DoD partners to validate ECA SHA-1 certificates against their own PKI trust anchors.

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x05 |
| **Valid From** | Apr 4 14:24:49 2008 GMT |
| **Valid To** | Mar 30 14:24:49 2028 GMT |
| **SHA-1 Print** | C3:13:F9:19:A6:ED:4E:0E:84:51:AF:A9:30:FB:41:9A:20:F1:81:E4 |

### 4.1.2 ECA Root CA 4

ECA Root CA 4 is the SHA-256 ECA trust anchor. ECA Root CA 4 has a one-way cross-certificate relationship with DoD Interoperability Root CA 2 which is cross certified with the Federal Bridge CA. This will allow DoD partners to validate ECA SHA-256 certificates against their own PKI trust anchors. .

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=ECA Root CA 4,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=ECA Root CA 4,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x01 |
| **Valid From** | Mar 20 16:13:04 2012 GMT |
| **Valid To** | Dec 30 16:13:04 2029 GMT |
| **SHA-1 Print** | 73:E8:BB:08:E3:37:D6:A5:A6:AE:F9:0C:FF:DD:97:D9:17:6C:B5:82 |

## 4.2 ECA Subordinate/Issuing CAs

There are currently three ECA vendors which operate ECA subordinate CAs: IdenTrust, ORC, and Symantec (formerly VeriSign).

### 4.2.1 ECA SHA-1 Subordinate CAs[7]

| ISSUING CA | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=IdenTrust ECA 4,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x15 |
| **Valid From** | Jan 16 14:35:32 2014 GMT |
| **Valid To** | Jan 16 14:35:32 2020 GMT |
| **SHA-1 Print** | 19:44:65:2D:36:F8:CF:A2:79:C4:74:0D:1D:1D:E1:82:7D:49:4D:B3 |

| ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=IdenTrust ECA 3,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x0D |
| **Valid From** | Mar 30 13:39:23 2011 GMT |
| **Valid To** | Mar 28 13:39:23 2017 GMT |
| **SHA-1 Print** | 40:91:D6:00:A7:41:E3:7F:B3:18:6B:E1:02:14:E2:FE:2C:1F:0F:71 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=ORC ECA HW 5,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x18 |
| **Valid From** | May 19 12:45:53 2014 GMT |
| **Valid To** | May 18 12:45:53 2020 GMT |
| **SHA-1 Print** | F3:D7:4B:5B:F2:AB:DB:18:70:43:FC:C9:A0:73:81:6C:39:14:74:C0 |

| ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=ORC ECA HW 4,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x0E |
| **Valid From** | Jun 1 13:41:30 2011 GMT |
| **Valid To** | May 30 13:41:30 2017 GMT |
| **SHA-1 Print** | 34:52:42:F5:8E:D3:E7:87:7F:20:56:1E:8C:9F:C3:CB:F9:E4:3D:40 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=ORC ECA SW 5,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x17 |
| **Valid From** | May 19 12:33:55 2014 GMT |
| **Valid To** | May 18 12:33:55 2020 GMT |
| **SHA-1 Print** | E4:64:68:51:F0:95:2A:25:22:C6:4B:96:6A:E2:7E:CE:37:68:DD:B3 |

| ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=ORC ECA SW 4,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x0F |
| **Valid From** | Jun 1 13:43:33 2011 GMT |
| **Valid To** | May 30 13:43:33 2017 GMT |
| **SHA-1 Print** | 74:B8:20:94:0D:E0:07:1E:2C:1D:81:41:52:F7:49:80:2E:CE:89:D1 |

[7] All issuing CAs off ECA Root CA 2 can also be pulled from http://crl.disa.mil/issuedby/ECAROOTCA2_IB.p7c or https://crl.disa.mil

| ISSUING CA | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=Symantec Client External Certification Authority - G4,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x16 |
| **Valid From** | Mar 20 14:24:40 2014 GMT |
| **Valid To** | Mar 19 14:24:40 2020 GMT |
| **SHA-1 Print** | 4A:F9:0B:43:0F:FF:B2:35:C2:14:35:14:CF:A0:55:3F:A9:71:38:00 |

| ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | CN=ECA Root CA 2,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=VeriSign Client External Certification Authority - G3,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x10 |
| **Valid From** | Jul 6 14:05:39 2011 GMT |
| **Valid To** | Jul 4 14:05:39 2017 GMT |
| **SHA-1 Print** | 3C:7D:56:57:87:67:68:7F:38:24:2E:48:C4:D9:68:66:6F:94:D8:88 |

### 4.2.2 ECA SHA-256 Subordinate CAs[8]

| ISSUING CA | |
|---|---|
| **Issuer** | CN=ECA Root CA 4,OU=ECA,O=U.S. Government,C=US |
| **Subject** | CN=ORC ECA 6,OU=Certification Authorities,OU=ECA,O=U.S. Government,C=US |
| **Serial #** | 0x08 |
| **Valid From** | Sep 1 13:34:20 2015 GMT |
| **Valid To** | Sep 1 13:34:20 2021 GMT |
| **SHA-1 Print** | 66:6D:13:D6:EF:E8:35:29:31:9E:88:F3:FB:F5:AD:E4:40:D4:A5:DA |

[8] All issuing CAs off ECA Root CA 4 can also be pulled from http://crl.disa.mil/issuedby/ECAROOTCA4_IB.p7c or https://crl.disa.mil

# 5.0 DoD Approved External PKI Trust Chains

In addition to the DoD and ECA PKI, the external PKIs listed in this section are approved for use within DoD at the Federal PKI medium hardware assurance level or higher (although many PKIs have multiple assurance levels).[9] Some of the partners listed in this section maintain their own PKI, referred to within the Federal PKI community as "Legacy PKIs", and many obtain their PKI certificates through Shared Service Providers (SSPs) or other commercial Non-Federal Issuers (NFIs).

The DoD External Interoperability Plan (EIP) defines three categories of PKIs:[10]

1. Category I: U.S. Federal agency PKIs
2. Category II: Non-Federal Agency PKIs cross certified with the FBCA or PKIs from other PKI Bridges that are cross certified with the FBCA
3. Category III: Foreign, Allied, or Coalition Partner PKIs or other PKIs

## *5.1 DoD Approved External PKI Summary*

| Type | PKI | Highest Assurance Level | Date Tested | Date Retested |
|---|---|---|---|---|
| DoD Sponsored | **DoD External Certification Authority (ECA) Program** | Medium Hardware | N/A | |
| Category I | **Entrust SSP PKI**<br><br>*Agencies include, but are not limited to:* | PIV | Feb-10 | Jan-16 |
| | ***Department of Energy*** | | | |
| | ***Department of Justice*** | | | |
| | ***National Institute of Standards and Technology*** | | | |
| | ***Health and Human Services*** | PIV | Oct-13 | |
| Category I | **ORC SSP PKI**<br><br>*Agencies include, but are not limited to:*<br>***Environmental Protection Agency*** | PIV | Dec-08 | |
| Category I | **Department of State PKI** | PIV | Sep-08 | |
| Category I | **Symantec SSP PKI (formerly VeriSign SSP PKI)**<br><br>*Agencies include, but are not limited to:* | PIV | Nov-08 | |
| | ***Department of Transportation / Federal Aviation Administration*** | PIV | Nov-08 | |
| | ***Naval Reactors*** | PIV | | |

[9] See Section 6.0 for more details on assurance levels.

[10] The DoD External Interoperability Plan is available on the DoD authoritative External PKI Interoperability site at http://iase.disa.mil/pki-pke/Documents/unclass-dod_xternal_interop_plan_082010.pdf or on the JITC External PKI site at http://jitc.fhu.disa.mil/pki/documents/dod_external_interoperability_plan_aug_2010.pdf

| Type | PKI | Highest Assurance Level | Date Tested | Date Retested |
|---|---|---|---|---|
| | ***Nuclear Regulatory Commission*** | PIV | Apr-15 | |
| Category I | **U.S. Treasury SSP PKI**<br><br>*Agencies include:* | PIV | Sep-08 | |
| | ***Department of Homeland Security*** | PIV | Mar-09 | |
| | ***Fiscal Service*** | PIV | Mar-09 | |
| | ***National Aeronautics and Space Administration*** | PIV | Mar-09 | |
| | ***Social Security Administration*** | PIV | Jan-09 | |
| | ***U.S. Treasury Department - OCIO*** | PIV | Sep-08 | |
| | ***Department of Veteran Affairs*** | PIV | Pending | |
| Category I | **Verizon Business SSP PKI**<br><br>*Agencies include:* | PIV | Oct-09 | |
| | ***Department of Veteran Affairs*** | PIV | Oct-09 | |
| | ***Executive Office of the President*** | PIV | | |
| | ***Health and Human Services*** | PIV | | |
| Category II | **Boeing PKI** | Medium Hardware | May-12 | Jun-13 |
| Category II | **Carillon Federal Services PKI** | PIV-I | Dec-15 | |
| Category II | **Entrust Managed Services NFI PKI** | PIV-I | Oct-11 | |
| Category II | **Exostar LLC PKI** | Medium Hardware | Sep-09 | Apr-14 |
| Category II | **Lockheed Martin PKI** | Medium Hardware | Mar-09 | Jun-13 |
| Category II | **Netherlands Ministry of Defence** | Medium Hardware | Sep-12 | |
| Category II | **Northrop Grumman PKI** | PIV-I | Nov-08 | Jan-15 |
| Category II | **ORC NFI PKI** | PIV-I | Mar-12 | |
| Category II | **Raytheon PKI** | Medium Hardware | Mar-09 | Aug-15 |
| Category II | **Symantec NFI PKI (formerly VeriSign NFI PKI)**<br><br>*Organizations include:* | PIV-I | Apr-11 | |
| | ***Booz Allen Hamilton*** | PIV-I | Apr-11 | Dec-12 |
| | ***California Prison Health Care Services*** | Medium Hardware | | |
| | ***Computer Sciences Corporation*** | PIV-I | Jan-13 | |
| | ***Eid Passport*** | PIV-I | Feb-13 | Aug-14 |
| | ***ICF International*** | PIV-I | | |
| | ***Millennium Challenge Corporation*** | PIV-I | | |
| | ***State of Colorado*** | Medium Hardware | | |
| | ***State of Kansas*** | Medium Hardware | | |
| | ***U.S. Senate*** | PIV-I | | |
| Category II | **Verizon Business NFI PKI** | PIV-I | Jul-11 | |
| Category III | **Australian Defence Organisation** | Medium Hardware | Jun-13 | Jun-14 |

## 5.2 Federal Agencies (Category I PKIs)

Federal Agency PKIs are defined in the DoD External Interoperability Plan as Category I PKIs and must adhere to FIPS 201 and the Personal Identity Verification (PIV) standard.[11] Although the Category I PKIs have PIV certificates, some have other non-PIV certificates at varying assurance levels. All PIV certificates issued after December 31, 2010 must be SHA-256. DoD application owners should ensure their systems are patched or upgraded as applicable to support validation of SHA-256 certificates.

### 5.2.1 Entrust SSP PKI (GSA MSO)

The General Services Administration Managed Service Office (GSA MSO) provides PIV credentials to a number of Federal agencies as a Shared Service Provider (SSP).[12] The GSA MSO established the USAccess program to offer federal agencies a managed, shared service solution to simplify the process of procuring and maintaining PIV credentials. Currently GSA MSO credentials are provided solely by the Entrust SSP. DoD approved U.S. Federal Agencies that receive certificates from the Entrust SSP PKI include but not limited to Department of Energy, Department of Justice, and National Institute of Standards and Technology. Entrust SSP PKI has two trust chains as shown below[13]. Entrust SSP currently has a one-way cross-certificate relationship with Federal Common Policy CA.

#### 5.2.1.1 SHA-256 Trust Chain 1 - Current

| TRUST ANCHOR- KEY UPDATE #1 (CERTS ISSUED 5/9/09-PRESENT) | |
|---|---|
| **Issuer** | OU=Entrust Managed Services Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Subject** | OU=Entrust Managed Services Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Serial #** | 0x447F9CF2 |
| **Valid From** | May 9 13:32:31 2009 GMT |
| **Valid To** | May 9 14:02:31 2019 GMT |
| **SHA-1 Print** | 69:27:4F:4B:F3:0B:74:BE:27:F7:39:6D:50:AC:46:8D:FE:5F:01:65 |

| Entrust SSP ISSUING CA-KEY UPDATE #1 (CERTS ISSUED 5/9/09-PRESENT) | |
|---|---|
| **Issuer** | OU=Entrust Managed Services Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Subject** | OU=Entrust Managed Services SSP CA,OU=Certification Authorities,O=Entrust,C=US |
| **Serial #** | 0x447F9D1F |
| **Valid From** | May 9 15:32:06 2009 GMT |
| **Valid To** | May 9 14:02:31 2019 GMT |
| **SHA-1 Print** | B6:7E:30:BE:F7:4C:37:F9:71:6B:00:BC:DC:5C:85:9F:73:92:59:62 |

| HEALTH AND HUMAN SERVICES INTERMEDIATE CA- | |
|---|---|
| **Issuer** | OU=Entrust Managed Services Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Subject** | CN=HHS-FPKI-Intermediate-CA-E1,OU=Certification Authorities,OU=HHS,O=U.S. Government,C=US |
| **Serial #** | 0x44801668 |
| **Valid From** | Mar 7 17:41:14 2013 GMT |
| **Valid To** | May 9 14:02:31 2019 GMT |
| **SHA-1 Print** | 35:F9:51:6B:2C:CC:54:95:92:94:58:4E:72:B2:72:EF:CC:A9:65:A3 |

[11] Details on FIPS 201 and PIV can be found at http://csrc.nist.gov/groups/SNS/piv/index.html
[12] The full list of GSA MSO agencies can be found here: http://www.fedidcard.gov/statistics.aspx
[13] Entrust SSP maintains production CA information at https://federaladminservices.managed.entrust.com/fedcerts/

#### 5.2.1.2 SHA-256 Trust Chain 2 - Current

| TRUST ANCHOR- KEY UPDATE #2 (CERTS ISSUED 7/23/15-PRESENT) | |
|---|---|
| **Issuer** | OU=Entrust Managed Services Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Subject** | OU=Entrust Managed Services Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Serial #** | 0x448062F4 |
| **Valid From** | Jul 23 16:06:36 2015 GMT |
| **Valid To** | Jul 23 16:36:36 2025 GMT |
| **SHA-1 Print** | 59:C3:01:37:60:A6:A9:67:99:F0:6D:95:BE:92:E2:1D:B1:93:89:6F |

| Entrust SSP ISSUING CA-KEY UPDATE #2 (CERTS ISSUED 7/23/15-PRESENT) | |
|---|---|
| **Issuer** | OU=Entrust Managed Services Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Subject** | OU=Entrust Managed Services SSP CA,OU=Certification Authorities,O=Entrust,C=US |
| **Serial #** | 0x448063D5 |
| **Valid From** | Jul 30 16:37:44 2015 GMT |
| **Valid To** | Jul 23 16:36:36 2025 GMT |
| **SHA-1 Print** | DE:C0:1B:F4:0C:15:3F:BC:38:BF:2C:A7:66:B0:4F:9D:FB:DA:30:64 |

#### 5.2.1.3 End Entity Information

Entrust SSP PKI issues SHA-256 end entity certificates.

### 5.2.2 ORC SSP PKI

ORC SSP PKI provides PIV credentials to federal agencies including the DoD approved Environmental Protection Agency. ORC SSP PKI has one SHA-256 trust chain as shown below. ORC SSP PKI has a one-way cross-certificate relationship with a certificate issued from Federal Common Policy CA to ORC SSP 3.

#### 5.2.2.1 SHA-256 Trust Chain – Current

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Subject** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Serial #** | 0x0130 |
| **Valid From** | Dec 1 16:45:27 2010 GMT |
| **Valid To** | Dec 1 16:45:27 2030 GMT |
| **SHA-1 Print** | 90:5F:94:2F:D9:F2:8F:67:9B:37:81:80:FD:4F:84:63:47:F6:45:C1 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Subject** | CN=ORC SSP 3,O=ORC PKI,C=US |
| **Serial #** | 0x02C2 |
| **Valid From** | Jan 12 00:54:57 2011 GMT |
| **Valid To** | Jan 12 00:52:59 2021 GMT |
| **SHA-1 Print** | BB:FA:5A:BD:8A:09:D7:3B:E1:FA:30:36:3F:87:40:2F:EC:53:16:F9 |

#### 5.2.2.2 End Entity Information

ORC SSP PKI issues SHA-256 end entity certificates.

### 5.2.3 Department of State PKI

The Department of State maintains its own PKI and has one trust anchor with two active issuing CAs: U.S. Department of State AD High Assurance CA (Serial Number: 0x4e331551) which issues user signature and encryption certificates as well as SSL certificates; and U.S. Department of State PIV CA (S/N: 0x40DA5F3D) which issues user PIV authentication certificates. The two active issuing CAs certificates were rolled over; having previously used the following certificates: U.S. Department of State PIV CA (S/N: 0x40DA049D) and U.S. Department of State AD High Assurance CA (S/N: 0x40D9CD13). The Department of State Root CA is two-way cross certified with the Federal Common Policy CA.

#### 5.2.3.1 SHA-256 Trust Chain - Current

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=U.S. Department of State AD Root CA,CN=AIA,CN=Public Key Services,CN=Services,CN=Configuration,DC=state,DC=sbu |
| **Subject** | CN=U.S. Department of State AD Root CA,CN=AIA,CN=Public Key Services,CN=Services,CN=Configuration,DC=state,DC=sbu |
| **Serial #** | 0x40D9CA01 |
| **Valid From** | Jun 23 17:50:55 2004 GMT |
| **Valid To** | Jun 23 18:20:55 2034 GMT |
| **SHA-1 Print** | 31:8F:93:37:82:A2:80:88:11:5A:CE:0F:D9:62:EB:EC:8D:3D:EB:FA |

| SSL/SIGNATURE/ENCRYPTION ISSUING CA (CURRENT) | |
|---|---|
| **Issuer** | CN=U.S. Department of State AD Root CA,CN=AIA,CN=Public Key Services,CN=Services,CN=Configuration,DC=state,DC=sbu |
| **Subject** | CN=U.S. Department of State AD High Assurance CA,CN=AIA,CN=Public Key Services,CN=Services,CN=Configuration,DC=state,DC=sbu |
| **Serial #** | 0x4e331551 |
| **Valid From** | Mar 19 19:03:48 2012 GMT |
| **Valid To** | Mar 19 19:33:48 2022 GMT |
| **SHA-1 Print** | 35:81:79:8B:77:68:00:A2:B2:BE:F7:F8:B8:36:21:35:AD:8A:7A:E7 |

| PIV ISSUING CA (CURRENT) | |
|---|---|
| **Issuer** | CN=U.S. Department of State AD Root CA,CN=AIA,CN=Public Key Services,CN=Services,CN=Configuration,DC=state,DC=sbu |
| **Subject** | CN=U.S. Department of State PIV CA,CN=AIA,CN=Public Key Services,CN=Services,CN=Configuration,DC=state,DC=sbu |
| **Serial #** | 0x40DA5F3D |
| **Valid From** | Sep 30 23:18:39 2009 GMT |
| **Valid To** | Sep 30 23:48:39 2019 GMT |
| **SHA-1 Print** | 1A:48:54:E1:8F:FB:BB:2B:15:82:B8:78:CD:5C:BC:24:2E:4E:30:57 |

#### 5.2.3.2 End Entity Information

The Department of State PKI issues SHA-256 end entity certificates.

### 5.2.4 U.S. Treasury SSP PKI[14][15]

U.S. Treasury operates a SSP PKI which provides PIV credentials to Treasury, Department of Homeland Security, Social Security Administration, and National Aeronautics and Space Administration. Treasury SSP PKI has one Root CA with separate issuing CAs for each agency. All revocation data from each CA is SHA-256. The addition of the SHA-256 issuing CAs occurred at the end of 2010. The U.S. Treasury Root CA is two-way cross certified with Federal Common Policy CA.

#### 5.2.4.1 SHA-256 Trust Chain - Current

| TRUST ANCHOR – CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x443EA73A |
| **Valid From** | Aug 5 14:16:30 2006 GMT |
| **Valid To** | Aug 5 14:46:30 2026 GMT |
| **SHA-1 Print** | 02:FF:F6:B3:FC:81:5C:57:E6:83:2D:FC:38:61:85:13:33:B0:C3:0B |

[14] U.S. Treasury SSP PKI certificates can be obtained from http://pki.treas.gov/root_sia.p7c

[15] CAs that have been identified as "CRLs only" do not issue new certificates and only issue CRLs. Certificates previously issued from these CAs are still valid.

| DHS ISSUING CA – CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=DHS CA4,OU=Certification Authorities,OU=Department of Homeland Security,O=U.S. Government,C=US |
| **Serial #** | 0x4E398128 |
| **Valid From** | Jun 13 14:35:04 2015 GMT |
| **Valid To** | Jun 13 15:05:04 2025 GMT |
| **SHA-1 Print** | A3:1A:5D:F2:F1:C1:01:9B:9C:F5:B7:CA:4E:3B:26:65:0B:9C:A9:3F |

| DHS ISSUING CA – CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=DHS CA4,OU=Certification Authorities,OU=Department of Homeland Security,O=U.S. Government,C=US |
| **Serial #** | 0x4A61D293 |
| **Valid From** | Jan 21 19:11:28 2011 GMT |
| **Valid To** | Jan 21 19:41:28 2021 GMT |
| **SHA-1 Print** | 49:AE:4F:02:74:19:A3:EB:22:7E:4C:D4:CC:F4:FF:1B:C7:52:13:B6 |

| DHS ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=DHS CA4,OU=Certification Authorities,OU=Department of Homeland Security,O=U.S. Government,C=US |
| **Serial #** | 0x46EACDA1 |
| **Valid From** | Mar 13 14:53:32 2008 GMT |
| **Valid To** | Mar 13 15:23:32 2018 GMT |
| **SHA-1 Print** | 06:2E:35:55:C2:7A:1F:0B:74:8A:FE:24:5A:8C:E9:A6:C6:C5:77:0D |

| NASA ISSUING CA – CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=NASA Operational CA,OU=Certification Authorities,OU=NASA,O=U.S. Government,C=US |
| **Serial #** | 0x4E398116 |
| **Valid From** | Jun 13 14:24:52 2015 GMT |
| **Valid To** | Jun 13 14:54:52 2025 GMT |
| **SHA-1 Print** | FE:75:72:BB:DE:7B:7F:44:15:2A:CC:8E:17:15:C1:87:14:DC:9D:63 |

| NASA ISSUING CA – CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=NASA Operational CA,OU=Certification Authorities,OU=NASA,O=U.S. Government,C=US |
| **Serial #** | 0x4A61D2A5 |
| **Valid From** | Jan 22 13:39:06 2011 GMT |
| **Valid To** | Jan 22 14:09:06 2021 GMT |
| **SHA-1 Print** | 76:A6:EA:A8:52:71:0E:00:B3:68:C4:10:80:E6:13:11:40:AA:F1:89 |

| NASA ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=NASA Operational CA,OU=Certification Authorities,OU=NASA,O=U.S. Government,C=US |
| **Serial #** | 0x45F94AB5 |
| **Valid From** | Mar 15 21:37:07 2007 GMT |
| **Valid To** | Mar 15 22:07:07 2017 GMT |
| **SHA-1 Print** | F0:8B:32:1E:A8:34:A6:4B:98:68:68:AB:9D:07:05:C8:79:2F:07:AF |

| NASA ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=NASA Operational CA,OU=Certification Authorities,OU=NASA,O=U.S. Government,C=US |
| **Serial #** | 0x443EA7E9 |
| **Valid From** | Sep 20 18:41:08 2006 GMT |
| **Valid To** | Sep 20 19:11:08 2016 GMT |
| **SHA-1 Print** | 84:44:CF:42:FC:B8:9B:73:5B:30:BE:CD:8B:A1:A8:B8:50:47:AF:96 |

| TREASURY OCIO ISSUING CA - CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=OCIO CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x4E398101 |
| **Valid From** | Apr 19 15:17:45 2015 GMT |
| **Valid To** | Apr 19 15:47:45 2025 GMT |
| **SHA-1 Print** | 5A:D2:54:C3:EC:EB:B5:B7:E1:08:CA:A0:CC:80:30:59:8A:7B:77:09 |

| TREASURY OCIO ISSUING CA - CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=OCIO CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x4A61D192 |
| **Valid From** | Nov 7 14:46:08 2010 GMT |
| **Valid To** | Nov 7 15:16:08 2020 GMT |
| **SHA-1 Print** | 91:8A:68:D8:7F:B6:01:1A:FE:36:66:07:63:19:ED:04:62:DF:09:40 |

| TREASURY OCIO ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=OCIO CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x4A61D147 |
| **Valid From** | Sep 12 14:46:41 2010 GMT |
| **Valid To** | Sep 12 15:16:41 2020 GMT |
| **SHA-1 Print** | F9:29:97:90:EB:27:11:25:FD:91:E6:61:CE:DE:4E:E2:02:D7:E7:58 |

| SSA ISSUING CA - CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=Social Security Administration Certification Authority,OU=SSA,O=U.S. Government,C=US |
| **Serial #** | 0x4E3980EF |
| **Valid From** | Apr 19 15:04:29 2015 GMT |
| **Valid To** | Apr 19 15:34:29 2025 GMT |
| **SHA-1 Print** | BB:6C:62:E6:48:D5:03:F1:BE:AB:75:EF:5F:69:B1:72:56:17:59:93 |

| SSA ISSUING CA - CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=Social Security Administration Certification Authority,OU=SSA,O=U.S. Government,C=US |
| **Serial #** | 0x4A61D2BA |
| **Valid From** | Feb 16 23:29:58 2011 GMT |
| **Valid To** | Feb 16 23:59:58 2021 GMT |
| **SHA-1 Print** | B4:B2:09:AA:DE:83:08:34:C9:B5:C2:F8:15:02:1D:28:DC:38:1F:E1 |

| SSA ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=Social Security Administration Certification Authority,OU=SSA,O=U.S. Government,C=US |
| **Serial #** | 0x45F94AA3 |
| **Valid From** | Mar 15 15:36:50 2007 GMT |
| **Valid To** | Mar 15 16:06:50 2017 GMT |
| **SHA-1 Print** | 70:7C:F3:73:50:83:56:17:47:A2:B9:AA:04:0B:11:DF:F8:DD:A5:79 |

| TREASURY PUBLIC ISSUING CA - CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=US Treasury Public CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x4A61D1DB |
| **Valid From** | Dec 5 18:52:36 2010 GMT |
| **Valid To** | Dec 5 19:22:36 2020 GMT |
| **SHA-1 Print** | 14:D4:45:41:52:A6:A1:38:40:52:18:6A:DB:B9:44:FB:2E:1A:76:8D |

| TREASURY PUBLIC ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=US Treasury Public CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x46EACF61 |
| **Valid From** | Jun 17 23:31:52 2009 GMT |
| **Valid To** | Jun 18 00:01:52 2015 GMT |
| **SHA-1 Print** | FE:F3:21:93:28:74:EB:09:BA:F5:09:6F:79:DB:C7:CB:70:24:B0:DC |

| TREASURY FISCAL SERVICE ISSUING CA – CURRENT | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=Fiscal Service,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x4A61D1C9 |
| **Valid From** | Dec 5 13:38:40 2010 GMT |
| **Valid To** | Dec 5 14:08:40 2020 GMT |
| **SHA-1 Print** | B3:B9:0E:DE:68:B0:5F:00:96:F5:AA:49:77:87:F9:50:FD:D8:CC:AD |

| TREASURY FISCAL SERVICE ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=Fiscal Service,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x4A61D01A |
| **Valid From** | Jul 19 13:43:51 2009 GMT |
| **Valid To** | Jul 19 14:13:51 2019 GMT |
| **SHA-1 Print** | 70:F6:B2:81:9A:37:1F:D4:64:C0:E4:01:93:52:D8:BD:EA:C0:79:8A |

| TREASURY FISCAL SERVICE ISSUING CA (CRLS ONLY) | |
|---|---|
| **Issuer** | OU=US Treasury Root CA,OU=Certification Authorities,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Subject** | OU=Fiscal Service,OU=Department of the Treasury,O=U.S. Government,C=US |
| **Serial #** | 0x46EACEA1 |
| **Valid From** | Jan 18 14:18:31 2009 GMT |
| **Valid To** | Jan 18 14:48:31 2019 GMT |
| **SHA-1 Print** | 72:2E:ED:EC:5A:B9:F5:18:6D:F7:5B:95:B7:84:87:A7:99:3B:7A:BB |

#### *5.2.4.2 End Entity Information*

U.S. Treasury SSP PKI issues SHA-256 end entity certificates.

### 5.2.5 Symantec SSP PKI (formerly VeriSign SSP PKI)

Symantec SSP PKI provides SHA-256 Personal Identity Verification (PIV) credentials to Federal agencies. DoD approved Federal agencies that receive credentials from the Symantec SSP PKI are the Department of Transportation/Federal Aviation Administration and the Department of Energy Naval Reactors. Symantec SSP has one SHA-256 trust chain as shown below. Each trust chain shares a Root and Intermediate CA with different issuing CAs for each agency. Symantec SSP PKI also has device Issuing CA certificates which are currently not included because they don't meet the medium hardware assurance level requirement.

Symantec SSP SHA-2 PKI is subordinate to Federal Common Policy CA which has a two-way cross-certificate with FBCA and several legacy PKIs. Federal Common Policy is also the trust anchor for the other SSPs.

#### *5.2.5.1 Symantec SSP SHA-256 Trust Chain - Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Subject** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Serial #** | 0x0130 |
| **Valid From** | Dec 1 16:45:27 2010 GMT |
| **Valid To** | Dec 1 16:45:27 2030 GMT |
| **SHA-1 Print** | 90:5F:94:2F:D9:F2:8F:67:9B:37:81:80:FD:4F:84:63:47:F6:45:C1 |

| INTERMEDIATE CA | |
|---|---|
| **Issuer** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Subject** | CN=VeriSign SSP Intermediate CA - G3,O=VeriSign, Inc.,C=US |
| **Serial #** | 0x0196 |
| **Valid From** | Dec 9 19:11:52 2010 GMT |
| **Valid To** | Dec 9 19:10:21 2020 GMT |
| **SHA-1 Print** | E9:C8:71:5B:87:1D:B1:D8:7B:B6:5B:A2:A5:BB:FA:80:00:DF:78:61 |

| TRANSPORTATION ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign SSP Intermediate CA - G3,O=VeriSign, Inc.,C=US |
| **Subject** | CN=U.S. Department of Transportation SSP Agency CA G3,OU=U.S. Department of Transportation,O=U.S. Government,C=US |
| **Serial #** | 0x5FFE0ACFA12B6147F3275B2BBAD93FFF |
| **Valid From** | Dec 10 00:00:00 2010 GMT |
| **Valid To** | Dec 9 23:59:59 2017 GMT |
| **SHA-1 Print** | D2:F1:45:78:99:30:1C:FD:5A:73:D5:AB:27:BA:87:C3:92:85:E7:C3 |

| NAVAL REACTORS ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign SSP Intermediate CA - G3,O=VeriSign, Inc.,C=US |
| **Subject** | CN=Naval Reactors SSP Agency CA G2,OU=U.S. Department of Energy,O=U.S. Government,C=US |
| **Serial #** | 0x27B128BB46171BE1C10BB00FDEC27219 |
| **Valid From** | Dec 10 00:00:00 2010 GMT |
| **Valid To** | Dec 9 23:59:59 2017 GMT |
| **SHA-1 Print** | 93:94:09:F0:4F:CB:2B:EB:71:9D:D2:DF:18:A4:B8:EC:6C:7E:65:A3 |

| NUCLEAR REGULATORY COMMISSION ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign SSP Intermediate CA - G3,O=VeriSign\, Inc.,C=US |
| **Subject** | CN=NRC SSP Agency CA G2,OU=U.S. Nuclear Regulatory Commission,O=U.S. Government,C=US |
| **Serial #** | 0x312C238615EF33B963936445ACC9EC4E |
| **Valid From** | May 12 00:00:00 2011 GMT |
| **Valid To** | May 11 23:59:59 2018 GMT |
| **SHA-1 Print** | 5F:54:9C:AC:60:C0:57:CB:69:A1:7E:D1:A9:3E:8B:CF:DE:25:D5:BD |

#### *5.2.5.2 End Entity Information*

Symantec SSP PKI issues SHA-256 end entity certificates.

### 5.2.6 Verizon Business SSP PKI

Verizon Business SSP PKI provides PIV credentials to federal agencies. DoD approved federal agencies that receive credentials from the Verizon Business SSP PKI are the Department of Veteran Affairs, Executive Office of the President, and Health and Human Services. Verizon Business SSP PKI has one trust chain as shown below. Verizon Business has the same Root and intermediate CA with separate issuing CAs for each agency. DoD relying parties who interoperate with Verizon Business SSP PKI certificates must ensure they can support SHA-256. Verizon Business PKI is subordinate to Federal Common Policy CA which has a two-way cross-certificate with FBCA and several legacy PKIs.

#### *5.2.6.1 SHA-256 Trust Chain - Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Subject** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Serial #** | 0x0130 |
| **Valid From** | Dec 1 16:45:27 2010 GMT |
| **Valid To** | Dec 1 16:45:27 2030 GMT |
| **SHA-1 Print** | 90:5F:94:2F:D9:F2:8F:67:9B:37:81:80:FD:4F:84:63:47:F6:45:C1 |

| INTERMEDIATE CA | |
|---|---|
| **Issuer** | CN=Federal Common Policy CA,OU=FPKI,O=U.S. Government,C=US |
| **Subject** | CN=Betrusted Production SSP CA A1,OU=Betrusted Production SSP CA A1,OU=SSP,O=Betrusted US Inc,C=US |
| **Serial #** | 0x019A |
| **Valid From** | Dec 9 19:55:24 2010 GMT |
| **Valid To** | Dec 9 19:49:04 2020 GMT |
| **SHA-1 Print** | 06:01:BB:DA:D5:A2:82:31:BC:94:36:75:0B:4F:3A:48:4B:AB:06:C3 |

| VETERAN AFFAIRS ISSUING CA | |
|---|---|
| **Issuer** | CN=Betrusted Production SSP CA A1,OU=Betrusted Production SSP CA A1,OU=SSP,O=Betrusted US Inc,C=US |
| **Subject** | CN=Veterans Affairs User CA B1,OU=PKI,OU=Services,DC=va,DC=gov |
| **Serial #** | 0x1C5E |
| **Valid From** | Aug 7 15:08:04 2008 GMT |
| **Valid To** | Aug 7 15:04:49 2018 GMT |
| **SHA-1 Print** | 7B:D3:F4:8D:67:D4:8D:52:C0:D0:B2:6F:E7:3C:B5:5A:E4:A6:38:0D |

| EXECUTIVE OFFICE OF THE PRESIDENT SHA-1 ISSUING CA | |
|---|---|
| **Issuer** | CN=Betrusted Production SSP CA A1,OU=Betrusted Production SSP CA A1,OU=SSP,O=Betrusted US Inc,C=US |
| **Subject** | CN=Executive Office of the President CA-B4,OU=PKI,OU=Services,DC=ssp,DC=eop,DC=gov |
| **Serial #** | 0x204A |
| **Valid From** | Oct 8 16:12:11 2008 GMT |
| **Valid To** | Oct 8 16:09:17 2018 GMT |
| **SHA-1 Print** | 4B:80:C4:9F:B0:7C:FC:74:62:C2:1C:09:0C:34:A8:A8:C3:83:AA:FB |

| EXECUTIVE OFFICE OF THE PRESIDENT SHA-256 ISSUING CA | |
|---|---|
| **Issuer** | CN=Betrusted Production SSP CA A1,OU=Betrusted Production SSP CA A1,OU=SSP,O=Betrusted US Inc,C=US |
| **Subject** | CN=Executive Office of the President CA-B8,OU=PKI,OU=Services,DC=ssp,DC=eop,DC=gov |
| **Serial #** | 0x49FC |
| **Valid From** | Jan 25 15:44:57 2011 GMT |
| **Valid To** | Jan 25 15:43:46 2021 GMT |
| **SHA-1 Print** | A5:41:6C:D5:80:E3:05:DB:C7:65:97:01:BA:8B:F3:9A:41:A1:C9:AA |

| HEALTH AND HUMAN SERVICES ISSUING CA | |
|---|---|
| **Issuer** | CN=Betrusted Production SSP CA A1,OU=Betrusted Production SSP CA A1,OU=SSP,O=Betrusted US Inc,C=US |
| **Subject** | CN=HHS-SSP-CA-B7,OU=HHS,O=U.S. Government,C=US,DC=hhs,DC=gov |
| **Serial #** | 0x0E2B |
| **Valid From** | Jul 6 16:07:08 2007 GMT |
| **Valid To** | Jul 6 16:05:18 2017 GMT |
| **SHA-1 Print** | 2F:90:08:7B:96:F7:EC:4A:4C:91:19:5C:64:98:A6:FB:F7:C5:E7:3B |

#### *5.2.6.2 End Entity Information*

Verizon Business SSP PKI issues SHA-256 end entity certificates.

## *5.3 Industry Partners (Category II PKIs)*

Industry Partners are classified in the DoD External Interoperability Plan as Category II PKIs and in addition to meeting the technical requirements and successfully completing JITC testing, must sign a Memorandum of Agreement (MOA), and be sponsored by a DoD relying party. Industry partners can be approved at PIV-I or Medium Hardware and often have additional assurance levels.[16] PIV-I certificates must be SHA-256. Application owners that need to validate PIV-I certificates should ensure that their applications are patched or upgraded as necessary to be able to validate SHA-256 signed certificates.

### 5.3.1 Boeing PKI

Boeing PKI is an Aero Defense partner through CertiPath. They currently have a SHA-1 only infrastructure but will be adding a SHA-256 infrastructure at a later date (no timeframe has been announced). The Boeing Root CA currently has a two-way cross-certificate relationship with the SHA-1 CertiPath Bridge CA. The SHA-1 CertiPath Bridge CA has a two-way cross-certificate relationship with the SHA-1 Federal Root CA.

[16] For more information on assurance levels, see Section 6.0.

#### 5.3.1.1 SHA-1 Trust Chain - Current

| TRUST ANCHOR | |
|---|---|
| Issuer | CN=Boeing PCA G2,OU=certservers,O=Boeing,C=US |
| Subject | CN=Boeing PCA G2,OU=certservers,O=Boeing,C=US |
| Serial # | 0x1CAF04E33ED4A2A745EE302C64D206EC |
| Valid From | Jan 21 17:52:52 2012 GMT |
| Valid To | Sep 21 17:58:13 2029 GMT |
| SHA-1 Print | C9:59:F3:41:30:A7:74:A7:8F:DA:09:97:90:39:4B:A2:5B:BB:79:37 |

| ISSUING CA | |
|---|---|
| Issuer | CN=Boeing PCA G2,OU=certservers,O=Boeing,C=US |
| Subject | CN=Boeing SecureBadge Medium G2,OU=certservers,O=Boeing,C=US |
| Serial # | 0x611EEB96000000000006 |
| Valid From | Feb 3 20:17:02 2012 GMT |
| Valid To | Feb 3 20:27:02 2019 GMT |
| SHA-1 Print | 44:43:2B:B6:29:E1:D7:81:A9:99:F3:88:24:FC:32:5C:D1:C8:9F:78 |

#### 5.3.1.2 End Entity Information

Boeing currently issues SHA-1 end entity certificates.

### 5.3.2 Carillon Federal Services PKI

Carillon Federal Services PKI issues PIV-I credentials to Federal, State & Local Agencies as well as private companies that provide products and services to the DoD. The PKI has one SHA-256 Trust Chain as shown below. The Root CA has a two-way trust relationship with the Federal Bridge CA as mapped through the CertiPath Bridge CA-G2 (SHA-256). DoD relying parties that wish to interoperate with Carillon should ensure their applications support SHA-256.

#### 5.3.2.1 SHA-256 Trust Chain – Current

| TRUST ANCHOR | |
|---|---|
| Issuer | CN=Carillon Federal Services NFI Root CA1,OU=Certification Authorities,O=Carillon Federal Services Inc.,C=US |
| Subject | CN=Carillon Federal Services NFI Root CA1,OU=Certification Authorities,O=Carillon Federal Services Inc.,C=US |
| Serial # | 0x014325B6A074 |
| Valid From | Jun 12 18:46:31 2015 GMT |
| Valid To | Jun 12 18:46:31 2035 GMT |
| SHA-1 Print | 55:E9:A9:43:49:CD:45:19:0D:C0:FE:ED:B2:2C:B7:C9:71:5C:28:98 |

| ISSUING CA | |
|---|---|
| Issuer | CN=Carillon Federal Services NFI Root CA1,OU=Certification Authorities,O=Carillon Federal Services Inc.,C=US |
| Subject | CN=Carillon Federal Services PIV-I CA1,OU=Certification Authorities,O=Carillon Federal Services Inc.,C=US |
| Serial # | 0x0BB34DC334FF |
| Valid From | Jun 12 19:01:13 2015 GMT |
| Valid To | Jun 12 19:01:13 2028 GMT |
| SHA-1 Print | DC:78:C9:7B:02:19:E4:9F:93:81:33:44:5E:18:2D:FA:AC:7C:C8:76 |

#### 5.3.2.2 End Entity Information

Carillon issues SHA-256 end entity certificates.

### 5.3.3 Entrust Managed Services NFI PKI

Entrust Managed Services NFI PKI issues PIV-I credentials to non-DoD entities and personnel desiring to use those certificates to interact with DoD Relying Parties. Entrust NFI PKI has one SHA-256 Trust Chain as shown

below. The issuing CA also has a two-way cross-certificate relationship with the Federal Bridge CA. DoD relying parties that wish to interoperate with Entrust NFI PKI should ensure their applications support SHA-256.

#### *5.3.3.1 SHA-256 Trust Chain - Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | OU=Entrust Managed Services NFI Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Subject** | OU=Entrust Managed Services NFI Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Serial #** | 0x4AA7C26D |
| **Valid From** | Sep 9 14:27:51 2009 GMT |
| **Valid To** | Sep 9 14:57:51 2019 GMT |
| **SHA-1 Print** | 83:CC:EA:42:6D:45:F7:A4:31:D7:B4:D0:B9:A6:FC:9C:C2:CC:A6:60 |

| ISSUING CA | |
|---|---|
| **Issuer** | OU=Entrust Managed Services NFI Root CA,OU=Certification Authorities,O=Entrust,C=US |
| **Subject** | OU=Entrust NFI Medium Assurance SSP CA,OU=Certification Authorities,O=Entrust,C=US |
| **Serial #** | 0x4AA7F719 |
| **Valid From** | May 23 22:22:23 2011 GMT |
| **Valid To** | Aug 23 22:52:23 2019 GMT |
| **SHA-1 Print** | 73:CA:3C:6D:19:80:1D:D5:AB:88:C8:D0:58:0B:34:DE:82:32:16:41 |

#### *5.3.3.2 End Entity Information*

Entrust NFI PKI issues SHA-256 end entity certificates.

### 5.3.4 Exostar, LLC.

Exostar, LLC PKI is a SHA-256 Federal Bridge partner. Exostar Federated Identity Service Root CA 2 currently has a two-way cross-certificate relationship with the SHA-256 Federal Bridge CA. Exostar has one SHA-256 trust chain as shown below.

#### *5.3.4.1 SHA-256 Trust Chain – Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=Exostar Federated Identity Service Root CA 2,OU=Certification Authorities,O=Exostar LLC,C=US |
| **Subject** | CN=Exostar Federated Identity Service Root CA 2,OU=Certification Authorities,O=Exostar LLC,C=US |
| **Serial #** | 0x315A18EF287EEE924ED386C42DB24B17 |
| **Valid From** | Jan 25 15:23:41 2013 GMT |
| **Valid To** | Jan 25 15:30:19 2030 GMT |
| **SHA-1 Print** | C6:B4:F6:D0:B8:6E:EE:2C:02:96:0C:EA:8A:F4:29:37:E8:66:87:EC |

| ISSUING CA 1 | |
|---|---|
| **Issuer** | CN=Exostar Federated Identity Service Root CA 2,OU=Certification Authorities,O=Exostar LLC,C=US |
| **Subject** | CN=Exostar Federated Identity Service Signing CA 3,DC=evincible,DC=com |
| **Serial #** | 0x2E0000000292A6E5517B158B23000000000002 |
| **Valid From** | Apr 9 16:31:10 2014 GMT |
| **Valid To** | Apr 9 16:31:10 2024 GMT |
| **SHA-1 Print** | F2:42:5B:9A:2F:50:E3:DA:04:42:0D:88:4F:B7:6B:EF:BE:B3:04:15 |

#### *5.3.4.2 End Entity Information*

Exostar currently issues SHA-1 end entity certificates only.

### 5.3.5 Lockheed Martin

Lockheed Martin PKI is an Aero Defense partner through CertiPath. Lockheed currently has a SHA-1 only infrastructure, but will be adding a SHA-256 infrastructure in 2012. Lockheed Martin currently has a two-way

cross-certificate relationship with the SHA-1 CertiPath Bridge CA. The SHA-1 CertiPath Bridge CA has a two-way cross-certificate relationship with the SHA-1 Federal Root CA.

#### *5.3.5.1 SHA-1 Trust Chain - Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=Lockheed Martin Root Certification Authority,OU=Certification Authorities,O=Lockheed Martin Corporation,L=Denver,ST=Colorado,C=US |
| **Subject** | CN=Lockheed Martin Root Certification Authority,OU=Certification Authorities,O=Lockheed Martin Corporation,L=Denver,ST=Colorado,C=US |
| **Serial #** | 0x13F530A23F6D8EAE437A43064AC60420 |
| **Valid From** | Jun 8 17:29:09 2006 GMT |
| **Valid To** | Nov 15 17:03:39 2026 GMT |
| **SHA-1 Print** | E6:DC:D4:3B:E3:9A:88:BB:F2:63:75:59:C6:09:D5:F9:75:A5:2A:37 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=Lockheed Martin Root Certification Authority,OU=Certification Authorities,O=Lockheed Martin Corporation,L=Denver,ST=Colorado,C=US |
| **Subject** | CN=Lockheed Martin US Certification Authority-2,OU=Certification Authorities,O=Lockheed Martin Corporation,L=Denver,ST=Colorado,C=US |
| **Serial #** | 0x6175CFF9000100000006 |
| **Valid From** | Nov 15 18:48:33 2007 GMT |
| **Valid To** | Nov 15 18:58:33 2017 GMT |
| **SHA-1 Print** | B0:3A:08:89:94:37:84:F7:63:08:CA:B6:DA:79:76:EE:39:24:90:A5 |

#### *5.3.5.2 End Entity Information*

Lockheed currently issues SHA-1 end entity certificates only.

### 5.3.6 Netherlands Ministry of Defence PKI

The Netherlands Ministry of Defence (NL MoD) operates a PKI to provide defense employees with a capability for secure communications with reliable authentication. It is an implementation of the Dutch Law for electronic signatures and is subordinate to the Dutch government PKI Policy. The NL MoD PKI primarily issues certificates to defense employees and affiliates. Although NL MoD is a foreign PKI, they are considered a Category II PKI since they are a CertiPath Bridge partner. The CertiPath Policy Management Authority (PMA) is responsible for setting, implementing, and administering policy decisions related to the CertiPath Bridge and the related CAs that are cross certified with the CertiPath Bridge.

NL MoD PKI has one SHA-256 Trust Chain as shown below. The NL MoD Intermediate CA has a two-way trust relationship with the Federal Bridge CA as mapped through the CertiPath Bridge CA-G2 (SHA-256). DoD relying parties that wish to interoperate with NL MoD should ensure their applications support SHA-256.

#### *5.3.6.1 SHA-256 Trust Chain – Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=Staat der Nederlanden Root CA - G2,O=Staat der Nederlanden,C=NL |
| **Subject** | CN=Staat der Nederlanden Root CA - G2,O=Staat der Nederlanden,C=NL |
| **Serial #** | 0x98968C |
| **Valid From** | Mar 26 11:18:17 2008 GMT |
| **Valid To** | Mar 25 11:03:10 2020 GMT |
| **SHA-1 Print** | 59:AF:82:79:91:86:C7:B4:75:07:CB:CF:03:57:46:EB:04:DD:B7:16 |

| INTERMEDIATE CA | |
|---|---|
| **Issuer** | CN=Staat der Nederlanden Root CA - G2,O=Staat der Nederlanden,C=NL |
| **Subject** | CN=Staat der Nederlanden Organisatie CA - G2,O=Staat der Nederlanden,C=NL |
| **Serial #** | 0x9896F4 |
| **Valid From** | Mar 31 12:03:09 2008 GMT |
| **Valid To** | Mar 24 13:02:08 2020 GMT |
| **SHA-1 Print** | 0B:28:99:53:45:31:27:C4:0B:22:FA:95:3D:11:F7:9E:05:2C:05:80 |

| INTERMEDIATE CA | |
|---|---|
| **Issuer** | CN=Staat der Nederlanden Organisatie CA - G2,O=Staat der Nederlanden,C=NL |
| **Subject** | CN=Ministerie van Defensie Certificatie Autoriteit - G2,O=Ministerie van Defensie,C=NL |
| **Serial #** | 0x0131354B |
| **Valid From** | Nov 10 09:34:25 2010 GMT |
| **Valid To** | Mar 23 09:31:44 2020 GMT |
| **SHA-1 Print** | B8:4F:18:64:05:75:25:52:09:3D:50:1E:14:8D:27:A8:C2:A3:3E:E3 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=Ministerie van Defensie Certificatie Autoriteit - G2,O=Ministerie van Defensie,C=NL |
| **Subject** | CN=Ministerie van Defensie Certificatie Autoriteit Defensiepas - G2,O=Ministerie van Defensie,C=NL |
| **Serial #** | 0x2E11232C15D59733D1CB7DEF514FE305 |
| **Valid From** | Nov 16 14:29:29 2010 GMT |
| **Valid To** | Mar 22 09:31:00 2020 GMT |
| **SHA-1 Print** | 66:9E:8B:FC:6B:EC:EC:7C:56:B3:06:9C:C6:2C:38:36:9A:50:22:5F |

#### *5.3.6.2 End Entity Information*

NL MoD issues SHA-256 end entity certificates.

### 5.3.7 Northrop Grumman

Northrop Grumman PKI is an Aero Defense partner through CertiPath. Northrop Grumman Corporation Root CAs currently have two-way cross-certificate relationships with the SHA-1 CertiPath Bridge CA for their SHA-1 PKI and a two-way cross-certificate relationship with the SHA-256 CertiPath Bridge CA – G2 for their SHA-256 PKI.

#### *5.3.7.1 SHA-1 Trust Chain - Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=Northrop Grumman Corporation Root CA,O=Northrop Grumman Corporation,C=US |
| **Subject** | CN=Northrop Grumman Corporation Root CA,O=Northrop Grumman Corporation,C=US |
| **Serial #** | 0x09ACBF24A21A94B649DD8B86A22D3062 |
| **Valid From** | Dec 8 18:08:14 2006 GMT |
| **Valid To** | Dec 12 20:10:01 2026 GMT |
| **SHA-1 Print** | EE:2A:A5:E7:ED:17:03:EF:98:3D:02:B4:9A:59:06:96:49:6F:5B:DD |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=Northrop Grumman Corporation Root CA,O=Northrop Grumman Corporation,C=US |
| **Subject** | CN=Northrop Grumman Corporation Issuing CA 2,OU=Northrop Grumman Information Technology,O=Northrop Grumman Corporation,C=US |
| **Serial #** | 0x6129FFC500010000000E |
| **Valid From** | Jun 12 20:28:52 2008 GMT |
| **Valid To** | Jun 12 20:38:52 2018 GMT |
| **SHA-1 Print** | 1A:1C:E7:1D:46:07:E7:A4:0D:BE:6A:B3:5D:FE:DF:7D:76:29:CC:01 |

#### 5.3.7.2 SHA-256 Trust Chain - Current

| TRUST ANCHOR | |
|---|---|
| Issuer | CN=Northrop Grumman Corporate Root CA-G2,OU=Northrop Grumman Information Technology,O=Northrop Grumman Corporation,C=US |
| Subject | CN=Northrop Grumman Corporate Root CA-G2,OU=Northrop Grumman Information Technology,O=Northrop Grumman Corporation,C=US |
| Serial # | 0x32ADA9B80CB58EAC43DC76F8AD0C0CFB |
| Valid From | Oct 11 16:07:09 2013 GMT |
| Valid To | Oct 11 16:07:09 2033 GMT |
| SHA-1 Print | 41:16:57:F7:83:2C:26:2F:37:3D:8F:9E:09:A1:AF:C4:D0:A1:0A:6A |

| ISSUING CA | |
|---|---|
| Issuer | CN=Northrop Grumman Corporate Root CA-G2,OU=Northrop Grumman Information Technology,O=Northrop Grumman Corporation,C=US |
| Subject | CN=Northrop Grumman Corporate Signing CA-G2,OU=Northrop Grumman Information Technology,O=Northrop Grumman Corporation,C=US |
| Serial # | 0x61848400000000000002 |
| Valid From | Oct 11 18:56:36 2013 GMT |
| Valid To | Oct 11 19:06:36 2026 GMT |
| SHA-1 Print | E4:54:AC:18:FC:9A:E0:17:3C:36:5E:87:67:B6:79:CF:E0:36:E6:3F |

#### 5.3.7.3 End Entity Information

Northrop currently issues SHA-1 and SHA-256 end entity certificates.

### 5.3.8 ORC NFI PKI

ORC NFI PKI provides PIV-I credentials to federal agencies, authorized federal contractors, agency-sponsored universities and laboratories, and, if authorized by law, state, local, and tribal governments. ORC NFI PKI has one SHA-256 trust chain as shown below. The ORC NFI Issuing CA has a two-way cross-certificate relationship with the Federal Bridge CA.

#### 5.3.8.1 SHA-256 Trust Chain – Current

| TRUST ANCHOR | |
|---|---|
| Issuer | CN=ORC Root 2,O=ORC PKI,C=US |
| Subject | CN=ORC Root 2,O=ORC PKI,C=US |
| Serial # | 0x36046D351A45D7AFF0C2E995BFE2969D |
| Valid From | Dec 13 19:22:00 2010 GMT |
| Valid To | Dec 13 19:22:00 2035 GMT |
| SHA-1 Print | A3:29:B4:BE:09:30:70:2A:A6:05:79:B1:56:EC:56:5A:BA:83:63:9C |

| ISSUING CA | |
|---|---|
| Issuer | CN=ORC Root 2,O=ORC PKI,C=US |
| Subject | CN=ORC NFI CA 2,O=ORC PKI,C=US |
| Serial # | EE7CAF3AC34501FD7E415A88A0C4BF51 |
| Valid From | Mar 11 19:54:00 2011 GMT |
| Valid To | Mar 11 19:56:00 2019 GMT |
| SHA-1 Print | F4:F9:A3:EC:D9:C8:FA:03:73:A7:28:41:37:F1:D2:CA:AD:2D:D8:34 |

#### 5.3.8.2 End Entity Information

ORC NFI PKI issues SHA-256 end entity certificates.

### 5.3.9 Raytheon

Raytheon is an Aero Defense partner through CertiPath. They currently have SHA-1 and SHA-256 infrastructures. They maintain infrastructure details at http://www.raytheon.com/pki/technical/index.html.

The Raytheon Root SHA-1 and SHA-256 Root CAs currently have a two-way cross-certificate relationship with the SHA-1 and SHA-256 CertiPath Bridge CAs respectively.

#### *5.3.9.1 SHA-1 Trust Chain*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | OU=RaytheonRoot,O=CAs,DC=raytheon,DC=com |
| **Subject** | OU=RaytheonRoot,O=CAs,DC=raytheon,DC=com |
| **Serial #** | 0X465D9A2A |
| **Valid From** | Jan 15 21:55:39 2014 GMT |
| **Valid To** | Jan 15 22:25:39 2024 GMT |
| **SHA-1 Print** | 87:D3:E5:7C:C6:DF:B7:7C:7C:F0:D0:FC:D0:1D:6C:20:92:D0:47:62 |

| ISSUING CA | |
|---|---|
| **Issuer** | OU=RaytheonRoot,O=CAs,DC=raytheon,DC=com |
| **Subject** | OU=class3,O=CAs,DC=raytheon,DC=com |
| **Serial #** | 0x465D9BF7 |
| **Valid From** | Apr 9 22:32:56 2014 GMT |
| **Valid To** | Feb 10 13:33:18 2022 GMT |
| **SHA-1 Print** | DA:5C:A3:26:66:F4:54:94:C9:1E:AC:D0:18:26:10:DA:CF:A4:FE:AB |

#### *5.3.9.2 SHA-256 Trust Chain*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=Raytheon Root CA,OU=RaytheonRoot-g2,O=CAs,DC=raytheon,DC=com |
| **Subject** | CN=Raytheon Root CA,OU=RaytheonRoot-g2,O=CAs,DC=raytheon,DC=com |
| **Serial #** | 0x55132536 |
| **Valid From** | Mar 25 20:45:18 2015 GMT |
| **Valid To** | Mar 25 21:15:18 2035 GMT |
| **SHA-1 Print** | FC:A0:EC:B4:01:32:21:7E:07:B1:65:25:62:D1:CB:24:DE:67:E7:1F |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=Raytheon Root CA,OU=RaytheonRoot-g2,O=CAs,DC=raytheon,DC=com |
| **Subject** | CN=Raytheon Class 3 MASCA,OU=Class3-g2,O=cas,DC=raytheon,DC=com |
| **Serial #** | 0x551326E7 |
| **Valid From** | May 26 15:11:04 2015 GMT |
| **Valid To** | May 26 15:41:04 2023 GMT |
| **SHA-1 Print** | 74:87:74:6F:25:33:30:75:18:8A:E9:B0:DF:93:A6:E1:73:B8:8A:33 |

#### *5.3.9.3 End Entity Information*

Raytheon currently issues SHA-1 and SHA-256 end entity certificates only.

### 5.3.10 Symantec NFI PKI (formerly VeriSign NFI PKI)

Symantec Non-Federal Issuer (NFI) PKI provides PKI credentials to state and local Government as well as contractors. Symantec NFI issues two types of DoD approved certificates: PIV-Interoperable (PIV-I) certificates and Medium Hardware certificates. Symantec NFI has two SHA-256 trust chains as shown below. In addition to installing the proper trust chain, DoD relying parties that interoperate with Symantec NFI certificates must ensure that their applications support SHA-256. Symantec NFI PKI also has device Issuing CA certificates which are currently not included because they don't meet the medium hardware assurance level requirement. Symantec NFI PKI has a two-way cross-certificate relationship between the VeriSign and Symantec Class 3 SSP Intermediate CAs and the Federal Bridge CA.

### 5.3.10.1 SHA-256 Trust Chain 1– Current

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=VeriSign Universal Root Certification Authority,OU=(c) 2008 VeriSign, Inc. - For authorized use only,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Subject** | CN=VeriSign Universal Root Certification Authority,OU=(c) 2008 VeriSign, Inc. - For authorized use only,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Serial #** | 0x401AC46421B31321030EBBE4121AC51D |
| **Valid From** | Apr 2 00:00:00 2008 GMT |
| **Valid To** | Dec 1 23:59:59 2037 GMT |
| **SHA-1 Print** | 36:79:CA:35:66:87:72:30:4D:30:A5:FB:87:3B:0F:A7:7B:B7:0D:54 |

| INTERMEDIATE CA | |
|---|---|
| **Issuer** | CN=VeriSign Universal Root Certification Authority,OU=(c) 2008 VeriSign, Inc. - For authorized use only,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Subject** | CN=VeriSign Class 3 SSP Intermediate CA - G2,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Serial #** | 0x316CEB691DCB2E153D9BFA8A121BD52D |
| **Valid From** | Dec 6 00:00:00 2010 GMT |
| **Valid To** | Dec 5 23:59:59 2020 GMT |
| **SHA-1 Print** | D1:D6:05:84:7B:A3:11:1C:83:EA:EF:32:E4:C8:E2:AE:93:61:50:54 |

| BOOZ ALLEN HAMILTON ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign Class 3 SSP Intermediate CA - G2,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Subject** | CN=Booz Allen Hamilton CA 02,OU=Certification Authorities,O=Booz Allen Hamilton,C=US |
| **Serial #** | 0x7B15016346C0BD9532EA3B3EE366E865 |
| **Valid From** | Jul 31 00:00:00 2012 GMT |
| **Valid To** | Jul 30 23:59:59 2019 GMT |
| **SHA-1 Print** | F8:9A:25:F0:D3:5D:67:F9:45:40:CF:69:6E:79:86:06:88:98:59:C0 |

| COMPUTER SCIENCES CORPORATION ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign Class 3 SSP Intermediate CA - G2,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Subject** | CN=CSC CA - 2,OU=NPS,O=Computer Sciences Corporation,C=US |
| **Serial #** | 0x547B28C1E722F86897CF9ADF96940EC6 |
| **Valid From** | Jun 20 00:00:00 2012 GMT |
| **Valid To** | Jun 19 23:59:59 2019 GMT |
| **SHA-1 Print** | B3:4B:9D:DF:3C:59:05:D1:28:D9:51:D5:0E:F9:7D:41:29:55:4B:BA |

| EID PASSPORT - RAPIDGATE PIV-I ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign Class 3 SSP Intermediate CA - G2,OU=VeriSign Trust Network,O=VeriSign\, Inc.,C=US |
| **Subject** | CN=RAPIDGate PIV-I Agency CA,O=Eid Passport\, Inc.,C=US |
| **Serial #** | 0x7C5123D5F59B9A2C88ED864873B1EE68 |
| **Valid From** | May 17 00:00:00 2012 GMT |
| **Valid To** | May 16 23:59:59 2019 GMT |
| **SHA-1 Print** | DE:6E:C5:29:7A:56:FA:57:D0:16:62:5A:C3:CC:8A:F5:23:4B:39:6B |

| EID PASSPORT - RAPIDGATE PREMIER ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign Class 3 SSP Intermediate CA - G2,OU=VeriSign Trust Network,O=VeriSign\, Inc.,C=US |
| **Subject** | CN=RAPIDGate Premier CA,O=Eid Passport\, Inc.,C=US |
| **Serial #** | 0x1414A035C1288EC17AD8FD3D1171E211 |
| **Valid From** | Dec 17 00:00:00 2013 GMT |
| **Valid To** | Dec 4 23:59:59 2020 GMT |
| **SHA-1 Print** | 61:71:C2:76:18:99:6F:E4:E7:C2:48:F2:3F:17:51:59:8B:5E:0F:08 |

| ICF INTERNATIONAL ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign Class 3 SSP Intermediate CA - G2,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Subject** | CN=ICFI PIV Interoperable CA,OU=ICF International,O=ICF Incorporated LLC,C=US |
| **Serial #** | 0x7EF7F0186038DCFF4842A2D8F3570BA3 |
| **Valid From** | Jan 18 00:00:00 2011 GMT |
| **Valid To** | Jan 17 23:59:59 2018 GMT |
| **SHA-1 Print** | 14:77:93:46:E3:6F:D7:6D:66:84:B0:E7:46:D7:60:19:A9:41:EB:B6 |

| MILLENIUM CHALLENGE CORPORATION ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign Class 3 SSP Intermediate CA - G2,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Subject** | CN=Millennium Challenge Corporation Medium HW CA - G2,OU=MCC,O=U.S. Government,C=US |
| **Serial #** | 0x4CF5B1F83DE78A00C4FBAD4D5E761D08 |
| **Valid From** | Feb 3 00:00:00 2011 GMT |
| **Valid To** | Feb 2 23:59:59 2018 GMT |
| **SHA-1 Print** | B7:81:96:70:B3:88:76:20:27:93:3B:A5:7D:FE:3A:88:52:6F:45:5F |

| U.S. SENATE ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=VeriSign Class 3 SSP Intermediate CA - G2,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Subject** | CN=Senate PIV-I CA G2,OU=Office of the Sergeant at Arms,OU=U.S. Senate,O=U.S. Government,C=US |
| **Serial #** | 0x0954E4BCD441044BCB144691027E0DB4 |
| **Valid From** | Jul 21 00:00:00 2011 GMT |
| **Valid To** | Jul 20 23:59:59 2018 GMT |
| **SHA-1 Print** | 4B:EA:1A:78:ED:4B:9B:E5:A4:12:34:EA:E8:D6:44:5D:9C:AB:74:72 |

### *5.3.10.2 SHA-256 Trust Chain 2 – Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=VeriSign Universal Root Certification Authority,OU=(c) 2008 VeriSign, Inc. - For authorized use only,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Subject** | CN=VeriSign Universal Root Certification Authority,OU=(c) 2008 VeriSign, Inc. - For authorized use only,OU=VeriSign Trust Network,O=VeriSign, Inc.,C=US |
| **Serial #** | 0x401AC46421B31321030EBBE4121AC51D |
| **Valid From** | Apr 2 00:00:00 2008 GMT |
| **Valid To** | Dec 1 23:59:59 2037 GMT |
| **SHA-1 Print** | 36:79:CA:35:66:87:72:30:4D:30:A5:FB:87:3B:0F:A7:7B:B7:0D:54 |

| INTERMEDIATE CA | |
|---|---|
| **Issuer** | CN=VeriSign Universal Root Certification Authority,OU=(c) 2008 VeriSign\, Inc. - For authorized use only,OU=VeriSign Trust Network,O=VeriSign\, Inc.,C=US |
| **Subject** | CN=Symantec Class 3 SSP Intermediate CA - G3,OU=Symantec Trust Network,O=Symantec Corporation,C=US |
| **Serial #** | 0x45B1BEB5F3D47BFBC145F4D9179E22F2 |
| **Valid From** | Sep 30 00:00:00 2014 GMT |
| **Valid To** | Sep 29 23:59:59 2024 GMT |
| **SHA-1 Print** | 55:DB:7B:0B:02:A0:CD:64:4E:2B:B7:62:45:F8:F0:89:3A:E9:F9:A9 |

| EID PASSPORT – LRA 2 ISSUING CA (USER CERTIFICATES ONLY) | |
|---|---|
| **Issuer** | CN=Symantec Class 3 SSP Intermediate CA - G3,OU=Symantec Trust Network,O=Symantec Corporation,C=US |
| **Subject** | CN=Eid Passport LRA 2 CA,OU=Eid Passport PIV-I LRA Network,O=Eid Passport\, Inc.,C=US |
| **Serial #** | 0x74FA80B580B11F82CDE84EF3AD8E36A4 |
| **Valid From** | Mar 10 00:00:00 2015 GMT |
| **Valid To** | Sep 28 23:59:59 2024 GMT |
| **SHA-1 Print** | 03:35:E3:67:01:06:DA:48:DB:61:E0:06:65:FA:16:F8:D8:C1:10:AE |

### *5.3.10.3 End Entity Information*

Symantec NFI PKI issues SHA-256 end entity certificates.

## 5.3.11 Verizon Business NFI PKI

Verizon Business Non-Federal Issuer (NFI) PKI provides PKI credentials to state and local government as well as contractors. Verizon Business NFI PKI has one SHA-256 Trust Chain as shown below and has a two-way trust relationship with the Federal Bridge CA. DoD relying parties that wish to interoperate with Verizon Business NFI PKI should ensure their applications support SHA-256.

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=CT-CSSP-CA-A1,OU=PKI,OU=Services,O=Cybertrust,C=US |
| **Subject** | CN=CT-CSSP-CA-A1,OU=PKI,OU=Services,O=Cybertrust,C=US |
| **Serial #** | 0x01 |
| **Valid From** | Aug 6 20:27:13 2008 GMT |
| **Valid To** | Aug 6 20:23:03 2028 GMT |
| **SHA-1 Print** | 98:C2:ED:E6:51:89:EE:1B:BF:CB:5B:13:B5:4E:72:82:15:36:E1:9D |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=CT-CSSP-CA-A1,OU=PKI,OU=Services,O=Cybertrust,C=US |
| **Subject** | CN=CT-GEN-MSO-CA-B1,OU=PKI,OU=Services,O=Cybertrust,C=US |
| **Serial #** | 0x67 |
| **Valid From** | Dec 5 18:45:46 2008 GMT |
| **Valid To** | Dec 5 18:45:46 2018 GMT |
| **SHA-1 Print** | 73:00:AD:0B:CB:71:F2:E2:FE:C3:B9:A3:15:1B:27:87:2D:54:64:97 |

#### *5.3.11.1 End Entity Information*

Verizon Business NFI PKI issues SHA-256 end entity certificates.

## *5.4 Foreign, Allied, or Coalition Partner PKIs or other PKIs (Category III PKIs)*

Foreign, Allied, or Coalition Partners are classified in the DoD External Interoperability Plan as Category III PKIs. In addition to meeting the technical requirements and successfully completing JITC testing, Category III PKIs must sign a Cross Certification Arrangement (CCA). The Category III PKI Certificate Policy will be mapped to the DoD PKI Certificate Policy in accordance with DoD PKI policy. With respect to CCEB, the CCA will comply with Allied Communications Publication (ACP) 185 which is the framework for PKI Interoperability between CCEB partner nations. Category III partners can be approved at Medium Hardware or Device and often have additional assurance levels. For applications that cannot perform cross-certificate path validation, direct trust may be used with additional consideration. DoD users and systems that choose to directly trust a Category III PKI should install the appropriate trust chain into the application or system trust store and ensure that the application is inspecting the certificate to ensure it asserts a DoD approved certificate policy OID. For more information DoD approved OIDs, refer to Section 6, Assurance Levels.

### 5.4.1 Australian Defence Organisation (ADO) PKI

The Australian Defence Organisation (ADO) PKI provides PKI credentials to military and civilian personnel. Subscribers include any individual that has been approved as having a requirement to be authenticated as affiliated with ADO. Subscribers include:

- Defence personnel (permanent and reserve members of the Australian Defence Force (ADF), and Australian Public Service (APS) employees)
- Members of the ADF Cadets
- Contractors, Consultants and Professional Service Providers (individuals)
- Other individuals approved by ADO as having a requirement for an ADO Certificate.
- Secure Communications Resource Certificates are only issued to non-person entities (NPE), not individuals

ADO PKI has two SHA-1 Trust Chains as shown below and has a two-way trust relationship with US DoD CCEB IRCA1. DoD relying parties that wish to interoperate with ADO cross-certificates should ensure their applications support cross certificate path processing.

#### *5.4.1.1 SHA-1 Cross-Certificate Trust Chain – US to Australia - Current*

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=US DoD CCEB Interoperability Root CA 1,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=US DoD CCEB Interoperability Root CA 1,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Serial #** | 0x01 |
| **Valid From** | Nov 29 17:47:23 2010 GMT |
| **Valid To** | Nov 24 17:47:23 2030 GMT |
| **SHA-1 Print** | E0:41:0B:4A:58:2F:B1:C4:DD:52:B0:31:2B:A3:F4:39:4D:4F:01:B8 |

| US DOD CCEB INTEROPERABILITY ROOT CA 1-ADOCA03 CROSS CERTIFICATE | |
|---|---|
| **Issuer** | CN=US DoD CCEB Interoperability Root CA 1,OU=PKI,OU=DoD,O=U.S. Government,C=US |
| **Subject** | CN=ADOCA03,OU=CAs,OU=PKI,OU=DoD,O=GOV,C=AU |
| **Serial #** | 0x012C |
| **Valid From** | Apr 16 12:51:41 2014 GMT |
| **Valid To** | Apr 16 12:51:41 2017 GMT |
| **SHA-1 Print** | A6:5C:12:55:BE:19:EB:58:2B:4A:00:A7:F0:E5:BB:84:58:7D:A8:96 |

| ADOCA03-ADOCA016 CROSS CERTIFICATE | |
|---|---|
| **Issuer** | CN=ADOCA03,OU=CAs,OU=PKI,OU=DoD,O=GOV,C=AU |
| **Subject** | CN=ADOCA016,OU=CAs,OU=PKI,OU=DoD,O=GOV,C=AU |
| **Serial #** | 0x65C85DF22A3E9234346EBA21C8B718770630AAD1 |
| **Valid From** | Dec 17 23:48:09 2013 GMT |
| **Valid To** | Dec 17 23:48:09 2016 GMT |
| **SHA-1 Print** | A7:8D:76:29:A7:8C:35:7B:DE:7A:D6:AF:84:D7:C6:18:04:33:4D:7C |

#### *5.4.1.2 SHA-1 Direct Trust Chain – Current*

**ACP 185 specifies that cross-certificate trust should be used for PKI validation between partner nations. Direct trust should only be used in special cases where cross-certificates cannot be processed by the relying party application.** Using Direct Trust may cause relying party systems to inadvertently inherit trust from unapproved PKIs that are cross certified with ADO. Any direct trust implementations must also use the Trust Anchor Constraints Tool (TACT) or implement another OID and name constraint filtering mechanism to prevent acceptance of certificates from unapproved PKIs and/or assurance levels.

| TRUST ANCHOR | |
|---|---|
| **Issuer** | CN=ADOCA02,OU=CAs,OU=PKI,OU=DoD,O=GOV,C=AU |
| **Subject** | CN=ADOCA02,OU=CAs,OU=PKI,OU=DoD,O=GOV,C=AU |
| **Serial #** | 0x0715 |
| **Valid From** | Sep 1 04:26:07 2011 GMT |
| **Valid To** | Jan 27 02:31:24 2019 GMT |
| **SHA-1 Print** | 84:42:9D:9F:E2:E7:3A:0D:C8:AA:0A:E0:A9:02:F2:74:99:33:FE:02 |

| ISSUING CA | |
|---|---|
| **Issuer** | CN=ADOCA02,OU=CAs,OU=PKI,OU=DoD,O=GOV,C=AU |
| **Subject** | CN=ADOCA016,OU=CAs,OU=PKI,OU=DoD,O=GOV,C=AU |
| **Serial #** | 0x396001BD02A6000145FCFD991537A2F9C7D2A252 |
| **Valid From** | Dec 17 23:36:16 2013 GMT |
| **Valid To** | Dec 17 23:36:16 2018 GMT |
| **SHA-1 Print** | SHA1 Fingerprint=E8:C2:59:43:6E:B9:9B:91:40:F9:E5:1D:71:7A:20:B5:27:8C:C6:C5 |

#### *5.4.1.3 End Entity Information*

ADO PKI currently issues SHA-1 end entity certificates only.

# 6.0 Assurance Levels[17]

Assurance levels are represented by Certificate Policy Object Identifiers (OIDs) which are asserted in the *Certificate Policies* x509 certificate extension.[18] Every PKI has its own certificate policy OIDs which are registered uniquely to the organization and are defined in the PKI's certificate policy. Since each PKI has different certificate policy OIDs which are separately defined, it is easier to speak in terms of relative Federal PKI (FPKI) assurance levels. This especially works well since part of the cross certification process includes mapping equivalent policies. In the cross certification trust model, a PKI can enforce a set of acceptable certificate policies through policy mappings. *Policy Mappings* is an x509 certificate extension used in cross-certificates. In DoD, policy mappings are defined in the cross-certificate issued by the Interoperability Root CAs. DoD PKI only maps to FBCA medium hardware assurance level or higher, which causes all lower assurance levels to be invalid according to the standard. In the direct trust model, the responsibility is on the data owner to enforce the DoD allowable set of policies. This can be done through defining an initial-policy-set for applications that support it or through some other means of certificate policy OID restriction or filtering. Some commercial applications such as the Trust Anchor Constraints Tool (TACT), Webcullis or Threat Management Gateway support this functionality.[19]

DoD PKI and ECA PKI, software certificates are allowed as an approved form of identity credential per DoD instruction 8520.03. However, DoD Instruction 8520.02, Enclosure 3 Paragraph 1c states: "While DoD medium assurance (software) certificates are acceptable for use within the DoD, they are primarily intended for use in servers and other non-person entities (e.g., SSL certificates), and their use for identifying people (i.e., issuance of an identity certificate for a person) should be minimized".

[17] For more information on assurance levels, see NIST 800-63, Electronic Authentication Guideline http://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-63-2.pdf

[18] RFC 5280 can be found at http://www.ietf.org/rfc/rfc5280.txt

[19] Webcullis can be found at http://pkif.sourceforge.net/webcullis.html and Threat Management Gateway can be found at http://www.microsoft.com/forefront/threat-management-gateway/en/us/default.aspx

## 6.1 DoD Assurance Levels

All DoD assurance levels are permitted for use within DoD. Although some DoD relying parties may wish to further restrict the set of acceptable DoD policies. For instance, some application owners may require hardware certificates and not accept software certificates which have a lower assurance level. The DoD certificate policy OIDs are shown below. More information is provided in the DoD Certificate Policy.[20]

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|
| 2.16.840.1.101.2.1.11.2 | id-US-dod-basic[21] | Yes. All DoD Certificate Policies are allowed per DoD policy. |
| 2.16.840.1.101.2.1.11.4 | id-US-dod-FORTEZZA[22] | |
| 2.16.840.1.101.2.1.11.5 | id-US-dod-medium | |
| 2.16.840.1.101.2.1.11.6 | id-US-dod-type1 | |
| 2.16.840.1.101.2.1.11.9 | id-US-dod-mediumhardware | |
| 2.16.840.1.101.2.1.11.10 | id-US-dod-PIV-Auth[23] | |
| 2.16.840.1.101.2.1.11.17 | id-US-dod-mediumNPE | |
| 2.16.840.1.101.2.1.11.18 | id-US-dod-medium-2048 | |
| 2.16.840.1.101.2.1.11.19 | id-US-dod-mediumHardware-2048 | |
| 2.16.840.1.101.2.1.11.20 | id-US-dod-PIV-Auth-2048[24] | |
| 2.16.840.1.101.2.1.11.31 | id-US-dod-peerInterop[25] | |
| 2.16.840.1.101.2.1.11.36 | id-US-dod-mediumNPE-112 | |
| 2.16.840.1.101.2.1.11.37 | id-US-dod-mediumNPE-128 | |
| 2.16.840.1.101.2.1.11.39 | id-US-dod-medium-112 | |
| 2.16.840.1.101.2.1.11.40 | id-US-dod-medium-128 | |
| 2.16.840.1.101.2.1.11.42 | id-US-dod-mediumHardware-112 | |
| 2.16.840.1.101.2.1.11.43 | id-US-dod-mediumHardware-128 | |

## 6.2 ECA PKI Assurance Levels

All ECA PKI assurance levels are permitted for use within DoD. Although some relying parties may wish to further restrict the set of acceptable ECA policies. For instance, some application owners may require hardware certificates and not accept software certificates which have a lower assurance level. The ECA certificate policy OIDs are shown below. More information is provided in the ECA Certificate Policy.[26]

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|
| 2.16.840.1.101.3.2.1.12.1 | id-eca-medium | Yes. All ECA Certificate Policies are allowed per DoD policy |
| 2.16.840.1.101.3.2.1.12.2 | id-eca-medium-hardware | |
| 2.16.840.1.101.3.2.1.12.3 | id-eca-medium-token | |
| 2.16.840.1.101.3.2.1.12.4 | id-eca-medium-sha256 | |
| 2.16.840.1.101.3.2.1.12.5 | id-eca-medium-token-sha256 | |
| 2.16.840.1.101.3.2.1.12.6 | id-eca-medium-hardware-pivi | |
| 2.16.840.1.101.3.2.1.12.7 | id-eca-cardauth-pivi | |
| 2.16.840.1.101.3.2.1.12.8 | id-eca-contentsigning-pivi[27] | |
| 2.16.840.1.101.3.2.1.12.9 | id-eca-medium-device-sha256 | |
| 2.16.840.1.101.3.2.1.12.10 | id-eca-medium-hardware-sha256 | |

[20] The DoD Certificate Policy can be found at http://iase.disa.mil/pki-pke/Documents/unclass-dod_cp_v10-5.pdf
[21] id-US-dod-basic is not used operationally within DoD
[22] id-US-dod-high is not used operationally within DoD.
[23] id-US-dod-PIV-Auth is not used operationally within DoD.
[24] id-US-dod-PIV-Auth-2048 is not used operationally within DoD.
[25] The Peer Interop OID is only used for cross-certificates issued to external PKIs that cannot demonstrate comparability to one or more requirements of Medium Assurance and the DoD determines that there is a need for interoperation and acceptance of certificates issued by the external PKIs. Relying Parties need to ensure that it is appropriate to use the certificate issued by a PKI that maps to Peer Interop before enabling systems to accept these certificates.
[26] The ECA Certificate Policy can be found at http://iase.disa.mil/pki-pke/Documents/unclass-dod_eca_v4-3_4jan12.pdf
[27] All contentsigning OIDs are intended only for use in digitally signing data objects on a PIV-I smart card and shall not be used for any other purpose. Content Signing PIV-I certificates shall only be issued to Card Management Systems.

## 6.3 Federal PKI (FPKI) Assurance Levels

All DoD approved external PKIs are cross certified with FPKI, either directly or through an SSP or another bridge. Part of the cross certification process includes mapping organizational certificate policy OIDs to equivalent FPKI policy OIDs. DoD currently has cross-certificate relationships with two Federal PKI CAs. DoD Interoperability Root CA 1 is two-way cross certified with the SHA-1 Federal Root CA in order to support cross-certificate trust with our SHA-1 partners and DoD Interoperability Root CA 2 is two-way cross certified with the Federal Bridge CA to support cross-certificate trust with our SHA-256 partners. DoD enforces RFC 5280 constraints in its cross-certificates and only maps to FPKI policies which are at id-fpki-SHA1-hardware level or higher, causing all lower assurance certificate policies to be considered invalid by policy. Application owners that interoperate using direct trust will be responsible for ensuring that only certificates at DoD allowed assurance levels are accepted by their applications. In order to comply with NIST cryptographic guidance, FPKI recently introduced a significant architectural redesign[28]. The redesign introduced two new SHA-256 FPKI systems: Federal Bridge CA and Federal Common Policy CA. Additionally they deployed the SHA-1 Federal Root CA to support FPKI partners that remain SHA-1. FPKI has decommissioned the legacy FBCA (ou=Entrust) and Common Policy systems.

### 6.3.1 SHA-1 Federal PKI Assurance

FPKI partners that are cross certified with the SHA-1 Federal Root CA must assert and map to specific SHA-1 distinguishing policies shown below.

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|
| 2.16.840.1.101.3.2.1.3.21 | id-fpki-SHA1-medium-CBP | No |
| 2.16.840.1.101.3.2.1.3.22 | id-fpki-SHA1-mediumHW-CBP | No |
| 2.16.840.1.101.3.2.1.3.23 | id-fpki-SHA1-policy | No |
| 2.16.840.1.101.3.2.1.3.24 | id-fpki-SHA1-hardware | Yes |
| 2.16.840.1.101.3.2.1.3.25 | id-fpki-SHA1-devices | No |

### 6.3.2 Federal PKI Assurance Levels

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|
| 2.16.840.1.101.3.2.1.3.1 | id-fpki-certpcy-rudimentaryAssurance | No |
| 2.16.840.1.101.3.2.1.3.2 | id-fpki-certpcy-basicAssurance | No |
| 2.16.840.1.101.3.2.1.3.3 | id-fpki-certpcy-mediumAssurance | No |
| 2.16.840.1.101.3.2.1.3.4 | id-fpki-certpcy-highAssurance | Yes |
| 2.16.840.1.101.3.2.1.3.5 | fpki-certpcy-testAssurance | No |
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | No |
| 2.16.840.1.101.3.2.1.3.9 | id-eGov-Level1 | No |
| 2.16.840.1.101.3.2.1.3.10 | id-eGov-Level2 | No |
| 2.16.840.1.101.3.2.1.3.11 | id-eGov-Applications | No |
| 2.16.840.1.101.3.2.1.3.12 | id-fpki-certpcy-mediumHardware | Yes |
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes |
| 2.16.840.1.101.3.2.1.3.14 | id-fpki-certpcy-medium-CBP | No |
| 2.16.840.1.101.3.2.1.3.15 | id-fpki-certpcy-mediumHW-CBP | No |
| 2.16.840.1.101.3.2.1.3.16 | id-fpki-common-High | Yes |
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes-Physical access only |

[28] NIST Special Publication 800-78-3 can be found at http://csrc.nist.gov/publications/nistpubs/800-78-3/sp800-78-3.pdf

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|
| 2.16.840.1.101.3.2.1.3.18 | id-fpki-certpcy-pivi-hardware | Yes |
| 2.16.840.1.101.3.2.1.3.19 | id-fpki-certpcy-pivi-cardAuth | Yes-Physical access only |
| 2.16.840.1.101.3.2.1.3.20 | id-fpki-certpcy-pivi-contentSigning | Yes |
| 2.16.840.1.101.3.2.1.3.28 | id-eGov-Level1-IdP | No |
| 2.16.840.1.101.3.2.1.3.29 | id-eGov-Level2-IdP | No |
| 2.16.840.1.101.3.2.1.3.30 | id-eGov-Level3-IdP | No |
| 2.16.840.1.101.3.2.1.3.31 | id-eGov-Level4-IdP | No |
| 2.16.840.1.101.3.2.1.3.32 | id-eGov-BAE-Broker | No |
| 2.16.840.1.101.3.2.1.3.33 | id-eGov-RelyingParty | No |
| 2.16.840.1.101.3.2.1.3.34 | id-eGov-MetaSigner | No |
| 2.16.840.1.101.3.2.1.3.35 | id-eGov-MetaSigner-Hardware | No |
| 2.16.840.1.101.3.2.1.3.36 | id-fpki-common-devicesHardware | Yes |
| 2.16.840.1.101.3.2.1.3.37 | id-fpki-certpcy-mediumDevice | No. Currently under consideration. |
| 2.16.840.1.101.3.2.1.3.38 | id-fpki-certpcy-mediumDeviceHardware | Yes |
| 2.16.840.1.101.3.2.1.3.39 | id-fpki-common-piv-contentSigning | Yes |
| 2.16.840.1.101.3.2.1.3.40 | id-fpki-common-pivAuth-derived | No |
| 2.16.840.1.101.3.2.1.3.41 | id-fpki-common-pivAuth-derived-hardware | No |

## 6.4 Entrust SSP PKI Assurance Levels

Entrust SSP PKI currently has a one-way cross-certificate relationship with Federal Common Policy CA. The Federal Common Policy CA issued a certificate to Entrust Managed Services Root CA, but there is no reverse certificate. Entrust SSP PKI currently asserts the following certificate policies in its certificates, five of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | Yes-asserted | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | Yes-asserted | No |
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes-asserted | Yes-Physical access only |
| 2.16.840.1.101.3.2.1.3.36 | id-fpki-common-devicesHardware | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.39 | id-fpki-common-piv-contentSigning | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.40 | id-fpki-common-pivAuth-derived | Yes-asserted | No |
| 2.16.840.1.101.3.2.1.3.41 | id-fpki-common-pivAuth-derived-hardware | Yes-asserted | No |

## 6.5 ORC SSP PKI Assurance Levels

ORC SSP PKI has a one-way cross-certificate relationship with FPKI, with a certificate issued from Federal Common Policy CA to ORC SSP 3.

### 6.5.1 ORC SSP PKI Asserted Policies

ORC SSP PKI currently asserts the following certificate policies in its certificates, three of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | Yes-asserted | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | Yes-asserted | No |

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes-asserted | Yes-Physical access only |
| 2.16.840.1.101.3.2.1.3.36 | id-fpki-common-devicesHardware | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.39 | id-fpki-common-piv-contentSigning | Yes-asserted | Yes |

## 6.6 Department of State PKI Assurance Levels

Department of State currently has a two-way cross-certificate relationship with Federal Common Policy CA. It currently asserts the following certificate policies in its certificates, six of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.6.1 | state-basic | Yes. Mapped | No |
| 2.16.840.1.101.3.2.1.6.2 | state-low | Yes. Mapped | No |
| 2.16.840.1.101.3.2.1.6.3 | state-moderate | Yes. Mapped | No |
| 2.16.840.1.101.3.2.1.6.4 | state-high | Yes. Mapped | Yes |
| 2.16.840.1.101.3.2.1.6.12 | state-medHW | Yes. Mapped | Yes |
| 2.16.840.1.101.3.2.1.6.37 | state-certpcy-mediumDevice | No | No |
| 2.16.840.1.101.3.2.1.6.38 | state-certpcy-mediumDeviceHardware | No | No |
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.16 | id-fpki-common-high | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes. Asserted | Yes-Physical access only |

## 6.7 U.S. Treasury SSP PKI Assurance Levels

U.S Treasury Root CA currently has a two-way cross-certificate relationship with Federal Common Policy CA. U.S. Treasury SSP PKI currently asserts the following certificate policies in its certificates, six of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.5.2 | id-treasury-certpcy-rudimentary | Yes. Mapped | No |
| 2.16.840.1.101.3.2.1.5.3 | id-treasury-certpcy-basicindividual | Yes. Mapped | No |
| 2.16.840.1.101.3.2.1.5.4 | id-treasury-certpcy-mediumhardware | Yes. Mapped | Yes |
| 2.16.840.1.101.3.2.1.5.5 | id-treasury-certpcy-high | Yes. Mapped | Yes |
| 2.16.840.1.101.3.2.1.5.7 | id-treasury-certpcy-medium | Yes. Mapped | No |
| 2.16.840.1.101.3.2.1.5.8 | id-treasury-certpcy-basicorganizational | No. | No |
| 2.16.840.1.101.3.2.1.3.1 | id-fpki-certpcy-rudimentaryAssurance | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.2 | id-fpki-certpcy-basicAssurance | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | Yes. Asserted | No |

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.16 | id-fpki-common-high | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes. Asserted | Yes-Physical access only |
| 2.16.840.1.101.3.2.1.3.36 | id-fpki-common-devicesHardware | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.39 | id-fpki-common-piv-contentSigning | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.40 | id-fpki-common-pivAuth-derived | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.41 | id-fpki-common-pivAuth-derived-hardware | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.15.8 | id-dhs-certpcy-internalNpe | No | No |

## *6.8 Symantec SSP PKI Assurance Levels*

Symantec SSP SHA-2 PKI is subordinate to Federal Common Policy CA which has a two-way cross-certificate with FBCA and several legacy PKIs. Federal Common Policy is also the trust anchor for the other SSPs.

### 6.8.1 Symantec SSP PKI Asserted Policies

Symantec SSP PKI currently asserts the following certificate policies in its certificates, four of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.16 | id-fpki-common-High | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes. Asserted | Yes-Physical access only |

### 6.8.2 Symantec SSP PKI Inherited Policies

Although Symantec SSP PKI only asserts the certificate policies in section 6.8.1, the parent of its SHA-256 PKI, Federal Common Policy CA, has issued subordinate CA certificates to each SSP as well as cross-certificates to Department of State and Federal Bridge CA. Federal Common Policy CA asserts the following certificate policies in its cross-certificate to FBCA, extending trust to the entire FBCA community at many assurance levels.

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.1 | id-fpki-certpcy-rudimentaryAssurance | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.2 | id-fpki-certpcy-basicAssurance | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | Yes. Mapped | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes. Mapped | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.14 | id-fpki-certpcy-medium-CBP | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.15 | id-fpki-certpcy-mediumHW-CBP | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.16 | id-fpki-common-High | Yes. Mapped | Yes |

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes. Asserted | Yes-Physical access only |
| 2.16.840.1.101.3.2.1.3.18 | id-fpki-certpcy-pivi-hardware | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.19 | id-fpki-certpcy-pivi-cardAuth | Yes. Asserted | Yes-Physical access only |
| 2.16.840.1.101.3.2.1.3.20 | id-fpki-certpcy-pivi-contentSigning | Yes. Asserted | Yes |

## *6.9 Verizon Business SSP PKI Assurance Levels*

Verizon Business SSP PKI is subordinate to Federal Common Policy CA which has a two-way cross-certificate with FBCA and several legacy PKIs. Federal Common Policy is also the trust anchor for the other SSPs.

### 6.9.1 Verizon Business SSP PKI Asserted Policies

Verizon Business SSP PKI currently asserts the following certificate policies in its certificates, three of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | Yes-asserted | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | Yes-asserted | No |
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes-asserted | Yes |
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes-asserted | Yes-Physical access only |

### 6.9.2 Verizon Business SSP PKI Inherited Policies

Although Verizon Business SSP PKI only asserts the certificate policies in section 6.9.1, its parent, Federal Common Policy CA, has issued subordinate CA certificates to each SSP as well as cross-certificates to Department of State and FBCA. Federal Common Policy CA asserts the following certificate policies in its cross-certificate to FBCA, extending trust to the entire FBCA community at many assurance levels.

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.101.3.2.1.3.1 | id-fpki-certpcy-rudimentaryAssurance | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.2 | id-fpki-certpcy-basicAssurance | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.6 | id-fpki-common-policy | Yes. Mapped | No |
| 2.16.840.1.101.3.2.1.3.7 | id-fpki-common-hardware | Yes. Mapped | Yes |
| 2.16.840.1.101.3.2.1.3.8 | id-fpki-common-devices | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.13 | id-fpki-common-authentication | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.14 | id-fpki-certpcy-medium-CBP | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.15 | id-fpki-certpcy-mediumHW-CBP | Yes. Asserted | No |
| 2.16.840.1.101.3.2.1.3.16 | id-fpki-common-High | Yes. Mapped | Yes |
| 2.16.840.1.101.3.2.1.3.17 | id-fpki-common-cardAuth | Yes. Asserted | Yes-Physical access only |
| 2.16.840.1.101.3.2.1.3.18 | id-fpki-certpcy-pivi-hardware | Yes. Asserted | Yes |
| 2.16.840.1.101.3.2.1.3.19 | id-fpki-certpcy-pivi-cardAuth | Yes. Asserted | Yes-Physical access only |
| 2.16.840.1.101.3.2.1.3.20 | id-fpki-certpcy-pivi-contentSigning | Yes. Asserted | Yes |

## 6.10 Boeing PKI Assurance Levels

Boeing currently has a two-way cross-certificate relationship with the SHA-1 CertiPath Bridge CA. The SHA-1 CertiPath Bridge CA has a two-way cross-certificate relationship with the SHA-1 Federal Root CA. Boeing currently asserts the following certificate policies in its certificates, one of which is permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.73.15.3.1.4 | id-mediumSoftware-SHA-1 | Yes | No |
| 1.3.6.1.4.1.73.15.3.1.5 | id-mediumHardware-SHA-1 | Yes | Yes |
| 1.3.6.1.4.1.73.15.3.1.8 | id-mediumCBPSoftware-SHA-1 | No | No |
| 1.3.6.1.4.1.73.15.3.1.9 | id-mediumCBPHardware-SHA-1 | No | No |
| 1.3.6.1.4.1.73.15.3.1.10 | id-mediumHardware-cardAuthentication-SHA1 | No | No |
| 1.3.6.1.4.1.73.15.3.1.11 | id-mediumSoftware-SHA256 | Yes | No |
| 1.3.6.1.4.1.73.15.3.1.12 | id-mediumHardware-SHA256 | Yes | Yes |
| 1.3.6.1.4.1.73.15.3.1.13 | id-mediumCBPSoftware-SHA256 | No | No |
| 1.3.6.1.4.1.73.15.3.1.14 | id-mediumCBPHardware-SHA256 | No | No |
| 1.3.6.1.4.1.73.15.3.1.15 | id-mediumHardware-cardAuthentication-SHA256 | Yes | Yes – Physical Access Only |
| 1.3.6.1.4.1.73.15.3.1.16 | id-mediumHardware-contentSigning-SHA1 | Yes | Yes |
| 1.3.6.1.4.1.73.15.3.1.17 | id-mediumHardware-contentSigning-SHA256 | Yes | Yes |

## 6.11 Carillon Federal Services PKI Assurance Levels

Carillon currently has a two-way cross-certificate relationship with the (SHA-256) CertiPath Bridge CA – G2. It currently asserts the following certificate policies in its certificates, four of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.45606.3.1.1 | id-CFSINFRASTRUCTURE | No | No |
| 1.3.6.1.4.1.45606.3.1.2 | id-CFSINFRASTRUCTURE-256 | No | No |
| 1.3.6.1.4.1.45606.3.1.3 | id-basicSoftware | No | No |
| 1.3.6.1.4.1.45606.3.1.4 | id-basicHardware | No | No |
| 1.3.6.1.4.1.45606.3.1.7 | id-mediumSoftware | No | No |
| 1.3.6.1.4.1.45606.3.1.8 | id-mediumHardware | No | No |
| 1.3.6.1.4.1.45606.3.1.9 | id-basicSoftware-256 | No | No |
| 1.3.6.1.4.1.45606.3.1.10 | id-basicHardware-256 | No | No |
| 1.3.6.1.4.1.45606.3.1.11 | id-mediumSoftware-256 | No | No |
| 1.3.6.1.4.1.45606.3.1.12 | id-mediumHardware-256 | Yes | Yes |
| 1.3.6.1.4.1.45606.3.1.20 | id-AIVHardware | Yes | Yes |
| 1.3.6.1.4.1.45606.3.1.21 | id-AIVCardAuth | Yes | Yes – Physical Access Only |
| 1.3.6.1.4.1.45606.3.1.22 | id-AIVContentSigning | Yes | Yes |

**NOTE**: AIV (Advanced Identity Verification) enables the issuance of smart cards that are technically interoperable with United States Federal Government Personal Identity Verification (PIV) Card readers and applications as well as PIV-Interoperable (PIV-I) card readers and applications. AIV fully maps to PIV-I specification as defined by the U.S. Federal Government.[29]

[29] Carillon Federal Services Inc. Public Key Infrastructure Certificate Policy, *CFS-POL-007,* https://pub.carillonfedserv.com/CertificatePolicy.pdf August 28th, 2015.

## 6.12 CertiPath Bridge Assurance Levels[30]

CertiPath an organization that provides bridge services and has two bridge CAs that are cross certified with Federal PKI. They have a SHA-1 CertiPath Bridge CA, which is cross certified with the SHA-1 Federal Root CA and a (SHA-256) CertiPath Bridge CA – G2 which is cross certified with Federal Bridge CA. CertiPath vets and cross-certifies commercial and Aero/Defense partners to include PIV-Interoperable (PIV-I) partners.

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.24019.1.1.1.1 | id-mediumSoftware | Yes. Mapped | No |
| 1.3.6.1.4.1.24019.1.1.1.2 | id-mediumHardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.24019.1.1.1.3 | id-highHardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.24019.1.1.1.4 | id-mediumCBPSoftware | Yes. Mapped | No |
| 1.3.6.1.4.1.24019.1.1.1.5 | id-mediumCBPHardware | Yes. Mapped | No |
| 1.3.6.1.4.1.24019.1.1.1.6 | id-highCBPHardware | No. | No |
| 1.3.6.1.4.1.24019.1.1.1.7 | id-IceCAP-hardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.24019.1.1.1.8 | id-IceCAP-cardAuth | Yes. Mapped | Yes-Physical access only |
| 1.3.6.1.4.1.24019.1.1.1.9 | id-IceCAP-contentSigning | Yes. Mapped | Yes |
| 1.3.6.1.4.1.24019.1.1.1.17 | id-variant-mediumSoftware | Yes. Mapped | No |
| 1.3.6.1.4.1.24019.1.1.1.18 | id-variant-mediumHardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.24019.1.1.1.19 | id-variant-highHardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.24019.1.1.1.20 | id-variant-mediumCBPSoftware | Yes. Mapped | No |
| 1.3.6.1.4.1.24019.1.1.1.21 | id-variant-mediumCBPHardware | Yes. Mapped | No |
| 1.3.6.1.4.1.24019.1.1.1.22 | id-variant-highCBPHardware | Yes. Mapped | No |

## 6.13 Entrust Managed Services NFI PKI Assurance Levels

Entrust NFI PKI currently has a two-way cross-certificate relationship with the SHA-256 FBCA. It currently asserts the following certificate policies in its certificates, five of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.114027.200.3.10.7.1 | id-emspki-nfssp-medium-policy | Yes. Mapped | No |
| 2.16.840.1.114027.200.3.10.7.2 | id-emspki-nfssp-medium-hardware | Yes. Mapped | Yes |
| 2.16.840.1.114027.200.3.10.7.3 | id-emspki-nfssp-medium-devices | Yes. Mapped | No |
| 2.16.840.1.114027.200.3.10.7.4 | id-emspki-nfssp-mediumauthentication | Yes. Mapped | Yes |
| 2.16.840.1.114027.200.3.10.7.5 | id-emspki-nfssp-medium-cardAuth | Yes. Mapped | Yes-Physical access only |
| 2.16.840.1.114027.200.3.10.7.6 | id-emspki-nfssp-pivi-hardware | Yes. Mapped | Yes |
| 2.16.840.1.114027.200.3.10.7.7 | id-emspki-nfssp-basic-policy | Yes. Mapped | No |
| 2.16.840.1.114027.200.3.10.7.8 | id-emspki-nfssp-rudimentary-policy | Yes. Mapped | No |
| 2.16.840.1.114027.200.3.10.7.9 | id-emspki-nfssp-pivi-contentsigning | Yes. Mapped | Yes |
| 2.16.840.1.114027.200.3.10.8.1 | id-emspki-safeca-basic | No | No |
| 2.16.840.1.114027.200.3.10.8.2 | id-emspki-safeca- | No | No |

[30] CertiPath has additional OIDs that are obsolete, reserved, or used for test purposes. CertiPath lists the entire arc here: http://www.certipath.com/downloads/CertiPath%20CP-v.3.26_final.pdf

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| | medium-software | | |
| 2.16.840.1.114027.200.3.10.8.3 | id-emspki-safeca-medium-hardware | No | No |

## 6.14 Exostar Assurance Levels

Exostar Federated Identity Service Root CA 2 currently has a two-way cross-certificate relationship with the SHA-256 Federal Bridge CA. It currently asserts the following certificate policies in its certificates, one of which is permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.13948.1.1.1.5 | id-mediumSoftware-sha2 | Yes. Mapped | No |
| 1.3.6.1.4.1.13948.1.1.1.6 | id-mediumHardware-sha2 | Yes. Mapped | Yes |
| 1.3.6.1.4.1.13948.1.1.1.8 | id-basic-sha2 | Yes. Mapped | No |

## 6.15 Lockheed Martin Assurance Levels

Lockheed Martin currently has a two-way cross-certificate relationship with the SHA-1 CertiPath Bridge CA. The SHA-1 CertiPath Bridge CA has a two-way cross-certificate relationship with the SHA-1 Federal Root CA. Lockheed Martin currently asserts the following certificate policies in its certificates, one of which is permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.103.100.1.1.3.1 | id-variant-mediumHardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.103.100.1.1.3.2 | id-variant-mediumSoftware | Yes. Mapped | No |

## 6.16 Netherlands Ministry of Defence PKI Assurance Levels

The Netherlands Ministry of Defence PKI currently has a two-way cross-certificate relationship with the CertiPath Bridge CA – G2 (SHA-256). It currently asserts the following certificate policies in its certificates, all of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.528.1.1003.1.2.5.1 | Authenticity | Yes. Mapped | Yes |
| 2.16.528.1.1003.1.2.5.2 | Irrefutability/signature | Yes. Mapped | Yes |
| 2.16.528.1.1003.1.2.5.3 | Confidentiality | Yes. Mapped | Yes |

## 6.17 Northrop Grumman PKI Assurance Levels

Northrop Grumman Corporation Root CAs currently has a two-way cross-certificate relationship with the SHA-1 CertiPath Bridge CA for their SHA-1 PKI and a two-way cross-certificate relationship with the SHA-256 CertiPath Bridge CA – G2 for their SHA-256 PKI. It currently asserts the following certificate policies in its certificates, five of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.16334.509.2.5 | Northrop Grumman Enterprise Medium Assurance-Software | Yes. Mapped | No |
| 1.3.6.1.4.1.16334.509.2.6 | Northrop Grumman Enterprise Medium Assurance-Hardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.16334.509.2.7 | Medium Assurance-256 Software Certificate | Yes. Mapped | No |

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.16334.509.2.8 | Medium Assurance-256 Hardware Token | Yes. Mapped | Yes |
| 1.3.6.1.4.1.16334.509.2.9 | PIV-I Assurance-256 Hardware Token | Yes. Mapped | Yes |
| 1.3.6.1.4.1.16334.509.2.10 | PIV-I Assurance-256 Card Authentication | Yes. Mapped | Yes. Physical Access Only |
| 1.3.6.1.4.1.16334.509.2.11 | PIV-I Assurance-256 Content Signing | Yes. Mapped | Yes |

## 6.18 ORC NFI PKI Assurance Levels

ORC NFI CA 2 has a two-way cross-certificate relationship with the Federal Bridge CA. ORC NFI currently asserts the following certificate policies in its certificates, four of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.2.840.113549.5.6.1.3.1.3 | id-orc-nfissp-medium | Yes | No |
| 1.2.840.113549.5.6.1.3.1.12 | id-orc-nfissp-mediumhardware | Yes | Yes |
| 1.2.840.113549.5.6.1.3.1.18 | id-orc-nfissp-pivi-hardware | Yes | Yes |
| 1.2.840.113549.5.6.1.3.1.19 | id-orc-nfissp-pivi-cardAuth | Yes | Yes – Physical Access Only |
| 1.2.840.113549.5.6.1.3.1.20 | id-orc-nfissp-pivi-contentSigning | Yes | Yes |
| 1.2.840.113549.5.6.1.3.1.21 | id-orc-nfissp-devices | Yes | No |

## 6.19 Raytheon PKI Assurance Levels

Raytheon currently has a two-way cross-certificate relationship with the SHA-1 and SHA-256 CertiPath Bridge CAs. It has multiple assurance levels defined below. It currently asserts the following certificate policies in its certificates, three of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.1569.10.1.1 | id-raytheon-SHA1-high | Yes. Mapped | Yes |
| 1.3.6.1.4.1.1569.10.1.2 | id-raytheon-SHA1-mediumHardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.1569.10.1.3 | id-raytheon-SHA1-mediumSoftware | Yes. Mapped | No |
| 1.3.6.1.4.1.1569.10.1.4 | id-raytheon-SHA1-mediumCBPHardware | Yes. Mapped | No |
| 1.3.6.1.4.1.1569.10.1.5 | id-raytheon-SHA1-mediumCBPSoftware | Yes. Mapped | No |
| 1.3.6.1.4.1.1569.10.1.6 | id-raytheon-lowHardware | No | No |
| 1.3.6.1.4.1.1569.10.1.7 | id-raytheon-lowSoftware | No | No |
| 1.3.6.1.4.1.1569.10.1.11 | id-raytheon-high | No | No |
| 1.3.6.1.4.1.1569.10.1.12 | id-raytheon-mediumHardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.1569.10.1.13 | id-raytheon-mediumSoftware | No | No |
| 1.3.6.1.4.1.1569.10.1.14 | id-raytheon-mediumCBPHardware | No | No |
| 1.3.6.1.4.1.1569.10.1.15 | id-raytheon-mediumCBPSoftware | No | No |
| 1.3.6.1.4.1.1569.10.1.20 | id-raytheon-test | No | No |

## 6.20 Symantec NFI PKI Assurance Levels

Symantec NFI PKI currently has a two-way cross-certificate relationship with the SHA-256 FBCA. Symantec NFI PKI currently asserts the following certificate policies in its certificates, six of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 2.16.840.1.113733.1.7.23.3.1.6 | Non-Federal SSP Medium | Yes. Mapped | No |
| 2.16.840.1.113733.1.7.23.3.1.7 | Non-Federal SSP MediumHardware | Yes. Mapped | Yes |
| 2.16.840.1.113733.1.7.23.3.1.8 | Non-Federal SSP Devices | Yes. Mapped | No |
| 2.16.840.1.113733.1.7.23.3.1.13 (no longer issued, found in legacy certificates only) | Non-Federal SSP Auth | Yes. Mapped | Yes |
| 2.16.840.1.113733.1.7.23.3.1.14 | Non-Federal SSP Medium CBP | Yes. Mapped | No |
| 2.16.840.1.113733.1.7.23.3.1.15 | Non-Federal SSP MediumHardware CBP | Yes. Mapped | No |
| 2.16.840.1.113733.1.7.23.3.1.17 | Non-Federal SSP PIV-I cardAuth | Yes. Mapped | Yes – Physical Access Only |
| 2.16.840.1.113733.1.7.23.3.1.18 | Non-Federal SSP PIV-I Hardware | Yes. Mapped | Yes |
| 2.16.840.1.113733.1.7.23.3.1.20 | Non-Federal SSP PIV-I contentSigning | Yes. Mapped | Yes |
| 2.16.840.1.113733.1.7.23.3.1.36 | Non-Federal SSP mediumDevicesHardware | Yes. Mapped | Yes |

## 6.21 Verizon Business NFI PKI Assurance Levels

Verizon Business NFI PKI currently has a two-way cross-certificate relationship with the Federal Bridge CA. It currently asserts the following certificate policies in its certificates, four of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO FBCA (Y/N) | ALLOWABLE PER POLICY (Y/N) |
|---|---|---|---|
| 1.3.6.1.4.1.23337.1.1.1 | id-Cybertrust-Commercial-CBP-Software | Yes. Mapped | No |
| 1.3.6.1.4.1.23337.1.1.2 | id-Cybertrust-Commercial-CBP-Hardware | Yes. Mapped | No |
| 1.3.6.1.4.1.23337.1.1.3 | id-Cybertrust-Commercial-CBP-Devices | Yes. Mapped | No |
| 1.3.6.1.4.1.23337.1.1.4 | id-Cybertrust-Commercial-CBP-Authentication | Yes. Mapped | No |
| 1.3.6.1.4.1.23337.1.1.5 | id-Cybertrust-Commercial-CBP-Basic | Yes. Mapped | No |
| 1.3.6.1.4.1.23337.1.1.6 | id-Cybertrust-Commercial-CBP-cardAuthentication | Yes. Mapped | No |
| 1.3.6.1.4.1.23337.1.1.7 | id-Cybertrust-Software | Yes. Mapped | No |
| 1.3.6.1.4.1.23337.1.1.8 | id-Cybertrust-Hardware | Yes. Mapped | Yes |
| 1.3.6.1.4.1.23337.1.1.9 | id-Cybertrust-Devices | Yes. Mapped | No |
| 1.3.6.1.4.1.23337.1.1.10 | id-Cybertrust-Authentication | Yes. Mapped | Yes |
| 1.3.6.1.4.1.23337.1.1.11 | Id-Cybertrust-contentSigner | Yes. Mapped | Yes |
| 1.3.6.1.4.1.23337.1.1.12 | id-Cybertrust-cardAuthentication | Yes. Mapped | Yes-Physical access only |

## 6.22 Australian Defence Organisation (ADO) PKI Assurance Levels

ADO currently has a two-way cross-certificate relationship with the US DoD CCEB Interoperability Root CA 1. It currently asserts the following certificate policies in its certificates, three of which are permitted by DoD policy:

| CERTIFICATE POLICY OID | DESCRIPTIVE NAME | MAPPED BACK TO DoD (Y/N) | ALLOWABLE PER CCA (Y/N) |
|---|---|---|---|
| 1.2.36.1.334.1.2.1.1 | ADO Individual Low Assurance | No | No |
| 1.2.36.1.334.1.2.1.2 | ADO Individual Medium Assurance | Yes. Mapped | Yes |
| 1.2.36.1.334.1.2.1.3 | ADO Individual High Assurance | No | No |
| 1.2.36.1.334.1.2.1.4 | ADO Individual Very High Assurance | No | No |
| 1.2.36.1.334.1.2.2.1 | ADO Resource Low Assurance | Yes. Mapped | Yes |
| 1.2.36.1.334.1.2.2.2 | ADO Resource Medium Assurance | Yes. Mapped | Yes |
| 1.2.36.1.334.1.2.2.3 | ADO Resource High Assurance | No | No |

# Glossary of Terms[31]

| | |
|---|---|
| **Access Control** | The process of granting or denying specific requests: 1) for obtaining and using information and related information processing services; and 2) to enter specific physical facilities (e.g., Federal buildings, military establishments, and border crossing entrances). |
| **Access Control mechanism** | Security safeguards (i.e., hardware and software features, physical controls, operating procedures, management procedures, and various combinations of these) designed to detect and deny unauthorized access and permit authorized access to an information system. |
| **Assurance** | Measure of confidence that the security features, practices, procedures, and architecture of an information system accurately mediates and enforces the security policy. |
| **Assurance Level** | The level of assurance refers to the strength of the binding between the public key and the individual whose subject name is cited in the certificate, the mechanisms used to control the use of the private key, and the security provided by the PKI itself.[32] In the context of this document, assurance levels are represented by Certificate Policy Object Identifiers (OIDs) which translate back to defined controls specified in corresponding organizational or Federal PKI Certificate Policy documents. |
| **Authenticate** | To verify the identity of a user, user device, or other entity. |
| **Authentication** | Hardware or software-based algorithm that forces users, devices, or processes to prove their identity before accessing data on an information system. |
| **Authorization** | Access privileges granted to a user, program, or process or the act of granting those privileges. |
| **Category I PKI** | U.S. Federal Agency PKI. |
| **Category II PKI** | Non-Federal Agency PKIs cross certified with the FBCA or PKIs from other PKI Bridges that are cross certified with the FBCA |
| **Category III PKI** | Foreign, Allied, or Coalition Partner PKIs or other PKI |
| **Certification Authority** | A trusted third party that issues digital certificates and verifies the identity of the holder of the digital certificate. |

[31] Definitions were largely taken directly from the National Information Assurance Glossary, CNSS- 4009 https://www.cnss.gov/CNSS/issuances/Instructions.cfm. Some definitions were taken from CIO Council *Personal Identity Verification (PIV) Interoperability For Non-Federal Issuers* document. Full text and requirements are available here: http://www.idmanagement.gov/sites/default/files/documents/PIV_IO_NonFed_Issuers.pdf

[32] Assurance level definition taken from FBCA Certificate Policy document, http://www.idmanagement.gov/sites/default/files/documents/FBCA%20Certificate%20Policy%20v2.27.pdf

| | |
|---|---|
| **Certificate** | A digitally signed representation of information that 1) identifies the authority issuing it, 2) identifies the subscriber, 3) identifies its valid operational period (date issued / expiration date). |
| **Certificate Policy (CP)** | A specialized form of administrative policy tuned to electronic transactions performed during certificate management. A Certificate Policy addresses all aspects associated with the generation, production, distribution, accounting, compromise recovery, and administration of digital certificates. Indirectly, a certificate policy can also govern the transactions conducted using a communications system protected by a certificate-based security system. By controlling critical certificate extensions, such policies and associated enforcement technology can support provision of the security services required by particular applications. |
| **Certificate Revocation List (CRL)** | A list of revoked public key certificates created and digitally signed by a Certification Authority. |
| **Credential** | Evidence or testimonials that support a claim of identity or assertion of an attribute and usually are intended to be used more than once. |
| **Credential Service Provider (CSP)** | A trusted entity that issues or registers subscriber tokens and issues electronic credentials to subscribers. The CSP may encompass registration authorities and verifiers that it operates. A CSP may be an independent third party, or may issue credentials for its own use. |
| **Cross-certificate** | A certificate used to establish a trust relationship between two Certification Authorities. |
| **Digital Signature** | Cryptographic process used to assure data object originator authenticity, data integrity, and time stamping for prevention of replay. |
| **Direct Trust** | Method of PKI trust where the relying party directly installs the trust anchor of another PKI. (Note: this does not mean cross-certificate trust is not inherited via transitive trust) |
| **Distinguished Name (DN)** | A unique name or character string that unambiguously identifies an entity according to the hierarchical naming conventions of X.500 directory service. |
| **DoD CIO** | Office of the Department of Defense (DoD) Chief Information Officer (CIO). Governing authority for DoD approved external PKIs. |
| **Cross-certificate trust** | Method of PKI trust where the relying party installs an internal trust anchor and inherits trust through issued cross-certificates. |
| **Federal Bridge Certification Authority (FBCA)** | See Federal PKI. |
| **External Certification Authority (ECA)** | DoD program to support the issuance of DoD-approved certificates to industry partners and other external entities and organizations. |
| **Federal Information Processing Standard (FIPS)** | A standard for adoption and use by Federal agencies that has been developed within the Information Technology Laboratory and published by the National Institute of Standards |

and Technology, a part of the U.S. Department of Commerce. A FIPS covers some topic in information technology in order to achieve a common level of quality or some level of interoperability.

**Federal Public Key Infrastructure (Federal PKI or FPKI)**

The Federal PKI consists of a collection of Public Key Infrastructure components (Certificate Authorities, Directories, Certificate Policies and Certificate Practice Statements) that are used to provide peer-to-peer interoperability and a Federal Trust Anchor for SSP PKIs.

In the context of this document there are five specific FPKI systems.

1. Legacy FBCA (ou=Entrust). Legacy FBCA system that is being decommissioned on 6/30/11.
2. Legacy Common Policy. The old Federal trust anchor and former parent for Shared Service Provider PKIs. It is to be decommissioned on 6/30/11.
3. SHA-1 Federal Root CA. This system is the new SHA-1 trust anchor and bridge CA that cross certifies other SHA-1 bridge member CAs and provides a Federal trust anchor for some SHA-1 legacy SSP PKIs.
4. Federal Bridge CA (FBCA). New SHA-256 FBCA system that cross certifies with other SHA-256 bridge member CAs.
5. Federal Common Policy CA. SHA-256 trust anchor for most of the Federal Government to include SSP PKIs. It also issues cross-certificates to some legacy PKIs.

**Federal PKI Policy Authority (FPKI PA)**

The Federal Public Key Infrastructure (FPKI) Policy Authority is an interagency body set up under the CIO Council to enforce digital certificate standards for trusted identity authentication across the federal agencies and between federal agencies and outside bodies, such as universities, state and local governments and commercial entities.

**Global Directory Service (GDS)**

DoD directory service that hosts all CA information to include CA certificates, cross-certificate content, and CRLs. GDS provides both a web and directory service. GDS hosts CA information at via HTTP/HTTPS at crl.disa.mil and via LDAP at crl.gds.disa.mil. GDS also hosts user encryption certificates at https://dod411.gds.disa.mil.

**Legacy PKI**

Agency-operated PKI that was in existence prior to Jan 1, 2008.[33]

**Memorandum of Agreement (MOA)**

Binding agreement between DoD Policy Management Authority and the External PKI. Required for Category I or Category II PKIs.

**Non-Federal Issuer**

A PKI or Card issuer that is not a Federal PIV issuer.

[33] FIPS 201 describes Legacy PKI requirements and is available at http://nvlpubs.nist.gov/nistpubs/FIPS/NIST.FIPS.201-2.pdf

| | |
|---|---|
| **Online Certificate Status Protocol (OCSP)** | Online Certificate Status Protocol (OCSP) is an Internet protocol used for obtaining the revocation status of an X.509 digital certificate and is described in RFC 2560. |
| **Personal Identity Verification (PIV)** | The process of creating and using a government-wide secure and reliable form of identification for Federal employees and contractors, in support of HSPD 12, *Policy for a Common Identification Standard for Federal Employees and Contractors*. |
| **Personal Identity Verification (PIV) Card** | A government-issued credit card-sized identification that contains a contact and contactless chip. The holder's facial image will be printed on the card, along with other identifying information and security features. The contact chip will store a PKI certificate, the Cardholder Unique Identifier (CHUID), and a fingerprint biometric, all of which can be used to authenticate the user for physical access to federally controlled facilities and logical access to federally-controlled information systems. A PIV Card is fully conformant with federal PIV standards (i.e., Federal Information Processing Standard (FIPS) 201 and related documentation). Only cards issued by federal entities can be fully conformant. Federal standards ensure the PIV Cards are interoperable with and trusted by all Federal government relying parties. |
| **PIV-Interoperable (PIV-I)** | The process of creating and using a secure and reliable form of identification that is interoperable with the Federal government PIV process.[34] |
| **PIV Interoperable (PIV-I) Card** | A PIV-I (Personal Identity Verification – Interoperable) Card meets the PIV technical specifications to work with Federal PIV infrastructure elements such as card readers, and is issued in a manner that allows Federal government Relying Parties to trust the card. The PIV-I Card is suitable for level of assurance 4 as defined in OMB Memorandum M-04-04 and NIST SP 800-63, as well as multi-factor authentication as defined in NIST SP 800-116. A PIV-I card differs from a PIV card in that it does not meet all the requirements of FIPS-201.[35] |
| **Public Key** | A cryptographic key that may be widely published and is used to enable the operation of an asymmetric cryptography scheme. This key is mathematically linked with a corresponding private key. Typically, a public key can be used to encrypt, but not decrypt, or to validate a signature, but not to sign. |
| **Public Key Enabling (PKE)** | The incorporation of the use of PKI certificates for security services such as authentication, confidentiality, data integrity, and non-repudiation. |
| **Public Key Infrastructure (PKI)** | The framework and services that provide for the generation, production, distribution, control, accounting and destruction of public key certificates. Components include the personnel, policies, processes, server platforms, software, and workstations used for the purpose of administering certificates and public-private key pairs, including the ability to issue, maintain, recover, and revoke public key certificates. |
| **Relying party** | An entity that relies upon the subscriber's credentials, typically to process a transaction or grant access to information or a system |

[34] The PIV-I certification process is detailed at http://www.idmanagement.gov/sites/default/files/documents/PIVI_Certification_Process_V1.1_0.pdf
[35] PIV-I FAQ available at http://www.idmanagement.gov/sites/default/files/documents/PIV-I_FAQ.pdf

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| **Robust Certificate Validation Service (RCVS)** | DoD service that provides certificate validation information to DoD PKI relying parties to include OCSP responses. |
| **Root Certification Authority** | In a hierarchical Public Key Infrastructure, the Certification Authority whose public key serves as the most trusted datum (i.e., the beginning of trust paths) for a security domain. |
| **Shared Service Provider**[36] | Entity authorized by Federal PKI PA to perform CA services for Agencies. |
| **Subordinate Certification Authority** | In a hierarchal PKI, a Certification Authority whose certificate signature key is certified by another CA, and whose activities are constrained by that other CA. |
| **Subscriber** | A party who receives a credential or token from a Credentials Service Provider (CSP) and becomes a claimant in an authentication protocol. |
| **Transitive Trust** | Term used to describe trust inherited from direct trust implementations. An implementation example would be installing another PKI trust anchor which has issued a cross-certificate outside its own PKI. |
| **Trust Anchor** | An established point of trust (usually based on the authority of some person, office, or organization) from which an entity begins the validation of an authorized process or authorized (signed) package. A "trust anchor" is sometimes defined as just a public key used for different purposes (e.g., validating a Certification Authority, validating a signed software package or key, validating the process (or person) loading the signed software or key). |
| **Unclassified** | Information that has not been determined pursuant to E.O. 12958, as amended, or any predecessor order, to require protection against unauthorized disclosure and that is not designated as classified. |
| **User** | Individual, or (system) process acting on behalf of an individual, authorized to access an information system |
| **Validation** | Confirmation (through the provision of strong, sound, objective evidence) that requirements for a specific intended use or application have been fulfilled (e.g., a trustworthy credential has been presented, or data or information has been formatted in accordance with a defined set of rules, or a specific process has demonstrated that an entity under consideration meets, in all respects, its defined attributes or requirements). |
| **X.509 Public Key Certificate** | The public key for a user (or device) and a name for the user (or device), together with some other information, rendered unforgeable by the digital signature of the certification authority that issued the certificate, encoded in the format defined in the ISO/ITU-T X.509 standard. Also known as X.509 Certificate. |

[36] Brief SSP definition was taken from http://fips201ep.cio.gov/ssp.htm. Official list of certified Shared Service Providers is available at http://www.idmanagement.gov/list-certified-shared-service-providers.