FIPS 140-2 Non-Proprietary Security Policy for the Cisco Unified IP Phone 6901 and 6911

Introduction

This is a non-proprietary Cryptographic Module Security Policy for the Cisco Unified IP Phone 6901 and 6911. This policy describes how the Cisco Unified IP Phone 6901 and 6911 meet the requirements of FIPS 140-2. This document also includes instructions for configuring the phones in FIPS mode.

This policy was prepared as part of the Level 1 FIPS 140-2 validation for the Cisco Unified IP Phone 6901 and 6911. FIPS 140-2 (Federal Information Processing Standards Publication 140-2 — Security Requirements for Cryptographic Modules) details the U.S. Government requirements for cryptographic modules. More information about the FIPS 140-2 standard and validation program is available on the NIST website at http://csrc.nist.gov/groups/STM/index.html.

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This document includes the following sections:

• FIPS 140-2 Submission Package
• Overview
• Physical Characteristics and Phone Interfaces
• Roles and Services
• Self-Tests
• Mitigation of Other Attacks
• Secure Operation
• Non-FIPS Approved Algorithms
• Obtaining Documentation
• Documentation Feedback
• Cisco Product Security Overview
• Obtaining Technical Assistance
• Obtaining Additional Publications and Information

FIPS 140-2 Submission Package

The security policy document is one document in a FIPS 140-2 Submission Package. In addition to this document, the complete submission package contains:

• Vendor Evidence
• Finite State Machine
• Other supporting documentation as additional references
Overview

Today, more organizations can take advantage of Cisco Unified Communications, thanks to these affordable IP endpoints. The Cisco Unified IP Phones 6901 and 6911 deliver cost-effective, full-featured voice communication services in a clutter-free and earth-friendly, ergonomic design. Cisco Unified IP Phones 6901 and 6911 endpoints are earth-friendly. They are made with recyclable and reground plastics, so they are earth-responsible solutions. A deep-sleep power option, on select models, reduces power consumption by up to 50 percent in off-work hours, a feature that is good for your company’s profitability and good for the planet too.

The Data Sheet for the 6901 can be found on the Cisco website at http://goo.gl/MtGAl

Figure 1 - The Cisco Unified IP Phone 6901

The Data Sheet for the 6911 can be found on the Cisco website at http://goo.gl/NBCIG
Cryptographic Module Validation Level

Validation Level by Section lists the level of validation for each area in the FIPS PUB 140-2.

<table>
<thead>
<tr>
<th>No.</th>
<th>Area Title</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cryptographic Module Specification</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Cryptographic Module Ports and Interfaces</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Roles, Services, and Authentication</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Finite State Model</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Physical Security</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Operational Environment</td>
<td>N/A</td>
</tr>
<tr>
<td>7</td>
<td>Cryptographic Key management</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Electromagnetic Interface/Electromagnetic Compatibility</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Self-Tests</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Design Assurance</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Mitigation of Other Attacks</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Physical Characteristics and Phone Interfaces

The logical interfaces and their mapping for the 6901 and 6911 phones are described in Tables 2 and 3:

<table>
<thead>
<tr>
<th>Physical Interface</th>
<th>FIPS 140-2 Logical Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone Keypad, Data Port, Phone Microphone,</td>
<td>Data Input</td>
</tr>
<tr>
<td>Phone Speaker, Data Port</td>
<td>Data Output</td>
</tr>
<tr>
<td>Phone Keypad, Data Port, Power Port</td>
<td>Control Input</td>
</tr>
<tr>
<td>Phone Speaker, message waiting light, LEDs</td>
<td>Status Output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physical Interface</th>
<th>FIPS 140-2 Logical Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keypad, Data Port, Microphone</td>
<td>Data Input</td>
</tr>
<tr>
<td>Speaker, Data Port</td>
<td>Data Output</td>
</tr>
<tr>
<td>Keypad, Data Port, Power Port</td>
<td>Control Input</td>
</tr>
<tr>
<td>Phone Speaker, message waiting light, LEDs</td>
<td>Status Output</td>
</tr>
</tbody>
</table>
Roles and Services

As required by FIPS 140-2, there are two main roles in the 6901 and 6911 phones that operators may assume: a Crypto Officer role and User role. The respective services for each role are described in the Crypto Officer Services, and the User Services.

Crypto Officer Services

The Crypto Officer role is responsible for the configuration and maintenance of the phones. For the purposes of this testing, the Crypto Officer will be defined as the operations and processes performed by the Cisco Unified Call Manager (CUCM). The authentication mechanism associated with the Crypto-Officer has not been tested as part of this FIPS level one validation. The Crypto Officer services consist of the following:

- Establish TLS sessions for configuration
- Perform configuration of the phone
- Transport Keys to the phone
- View Status of the phone
- Restart the phone (Restart the connection between the phone and CUCM)
- Reset the phone
- Initiate Self-tests by rebooting the phone.

User Services

A user initializes the phone by turning it on. There is no explicit login interface for the phone, as level 1 allows for implicit role assumption. Some services may require the menu key to access the features. The services available to the User role consist of the following:

- Make and Receive Calls (Encrypt/Decrypt data)
- Run Self-Tests
- Customize keypad parameters
- Edit network profile parameters (SSID, DHCP Server, TFTP Server, etc.)
- Edit system configuration
- Edit device information (CallManager, Network, HTTP, Locale, QoS, and UI information)

Cryptographic Key Management

The phones use a variety of Critical Security Parameters during operation. Table 4 lists the cryptographic keys used by the 6901 and 6911 phones.
<table>
<thead>
<tr>
<th>#</th>
<th>Key/CSP Name</th>
<th>Generation/Algorithm</th>
<th>Description</th>
<th>Storage</th>
<th>Zeroization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Configuration File AES-128 Key</td>
<td>Generated by the CUCM</td>
<td>Key used to decrypt the configuration file once it is on the phone</td>
<td>Stored in volatile memory</td>
<td>Power Cycle or Device Reset</td>
</tr>
<tr>
<td>2</td>
<td>sRTP Master Key (AES)</td>
<td>Generated by the CUCM and sent to phone in TLS session</td>
<td>Key used to generate sRTP session keys</td>
<td>Stored in volatile memory</td>
<td>upon end of call or device reset.</td>
</tr>
<tr>
<td>3</td>
<td>sRTP Encryption key (AES)</td>
<td>Generated via the sRTP protocol</td>
<td>Key used to encrypt/decrypt sRTP packets</td>
<td>Stored in volatile memory</td>
<td>upon end of call or device reset.</td>
</tr>
<tr>
<td>4</td>
<td>sRTP Authentication key (HMAC)</td>
<td>Generated via the sRTP protocol</td>
<td>Key used to authenticate sRTP packets</td>
<td>Stored in volatile memory</td>
<td>upon end of call or device reset.</td>
</tr>
<tr>
<td>5</td>
<td>CUCM TLS Session Encryption key (AES)</td>
<td>Generated via the TLS Protocol</td>
<td>TLS sessions keys based on the Locally Significant Certificate (LSC) for derivation</td>
<td>Stored in volatile memory</td>
<td>upon end of call or device reset.</td>
</tr>
<tr>
<td>6</td>
<td>CUCM TLS Session Authentication key (HMAC)</td>
<td>Generated via the TLS Protocol</td>
<td>TLS sessions keys based on the LSC for derivation</td>
<td>Stored in volatile memory</td>
<td>upon end of call or device reset.</td>
</tr>
<tr>
<td>7</td>
<td>Webserver TLS Session Encryption key (AES/TDES)</td>
<td>Generated via the TLS Protocol</td>
<td>TLS sessions keys based on the LSC for derivation</td>
<td>Stored in volatile memory</td>
<td>upon end of call or device reset.</td>
</tr>
<tr>
<td>8</td>
<td>Webserver TLS Session Authentication key (HMAC)</td>
<td>Generated via the TLS Protocol</td>
<td>TLS sessions keys based on the LSC for derivation</td>
<td>Stored in volatile memory</td>
<td>upon end of call or device reset.</td>
</tr>
<tr>
<td>9</td>
<td>RNG Seed Key</td>
<td>Multiple data bytes (16-bytes) retrieved from a 32-bytes Hardware based entropy source (time, clock, thermal noise, interrupts, and</td>
<td>Seed Key used to randomize the initialization of the RNG</td>
<td>Stored in volatile memory</td>
<td>Reset or loss of power</td>
</tr>
</tbody>
</table>

Table 4  Secret and Private Cryptographic Keys Used by the 6901 and 6911 phones
memory, etc).

10  RNG Seed  Multiple data bytes (16-bytes) retrieved from a 32-bytes Hardware based entropy source (time, clock, thermal noise, interrupts, and memory, etc).
     Seed used to randomize the initialization of the RNG  Stored in volatile memory  Reset or loss of power

11  LSC Private Key (RSA)  Generated by the module but converted into a certificate by the CAPF/CUCM (Note that the RSA keys generated must be at least a 1024 bit key)  Private key for locally issued certificates. Used for TLS negotiation with CUCM and Web Clients  /flash0/sec/lsc0/phone Key.pvt  Zeroized by resetting phone to default settings

The services accessing the Critical Service Parameters (CSP)s, the type of access and which role accesses the CSPs are listed in Table 5.

<table>
<thead>
<tr>
<th>CSP/Role/Service Access Policy</th>
<th>Critical Security Parameter</th>
<th>CSP 1</th>
<th>CSP 2</th>
<th>CSP 3</th>
<th>CSP 4</th>
<th>CSP 5</th>
<th>CSP 6</th>
<th>CSP 7</th>
<th>CSP 8</th>
<th>CSP 9</th>
<th>CSP 10</th>
<th>CSP 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role/Service</td>
<td></td>
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<tr>
<td>User Role</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make and Receive Calls</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Run Self-Tests</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5  Cisco 6901 and 6911 phones Validation Level by Section
<table>
<thead>
<tr>
<th>Customize Sound and keypad parameters</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Edit Network Profile Parameters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edit System Configuration</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edit Device information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crypto-Officer Role</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Establish TLS sessions for configuration</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
</tr>
<tr>
<td>Perform configuration of the phone</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
</tr>
<tr>
<td>Transport Keys to the phone</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
<td>rw</td>
</tr>
<tr>
<td>View Status of the phone</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
<td>r</td>
</tr>
<tr>
<td>Reboot the phone</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
</tr>
<tr>
<td>Reset the phone</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
</tr>
<tr>
<td>Initiate Self-tests</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
<td>d</td>
</tr>
</tbody>
</table>

r = read  w = write  d = delete

**Self-Tests**

The 6901 and 6911 Phones include an array of self-tests that are run during startup and periodically during operations to prevent any secure data from being released and to ensure all components are functioning correctly.
Implementation Tests Performed

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Tests Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TI DSP Library</td>
<td>• AES KAT</td>
</tr>
<tr>
<td></td>
<td>• HMAC SHA-1 KAT</td>
</tr>
<tr>
<td>OpenSSL 0.9.8K</td>
<td>• RSA KAT (signature/verification)</td>
</tr>
<tr>
<td></td>
<td>• AES KAT</td>
</tr>
<tr>
<td></td>
<td>• Triple-DES KAT</td>
</tr>
<tr>
<td></td>
<td>• HMAC SHA-1 KAT</td>
</tr>
<tr>
<td></td>
<td>• RNG KAT</td>
</tr>
<tr>
<td>Module Firmware</td>
<td>• Firmware Integrity Test</td>
</tr>
</tbody>
</table>

The phone performs all power-on self-tests automatically at boot when FIPS mode is enabled. The power-on self-tests are performed after the cryptographic systems are initialized, and in the unlikely event that a power-on self-test fails, the module transitions into an error state and displays an error message via its status output interface.

Table 7 lists the conditional self-tests that the 6901 and 6911 phones perform.

<table>
<thead>
<tr>
<th>Implementation</th>
<th>Tests Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>TI DSP Library</td>
<td>• Conditional Bypass test</td>
</tr>
<tr>
<td>OpenSSL 0.9.8K</td>
<td>• Pairwise consistency test for RSA</td>
</tr>
<tr>
<td></td>
<td>• Continuous Random Number Generator Test for the FIPS-approved RNG</td>
</tr>
</tbody>
</table>

Mitigation of Other Attacks

The 6901 and 6911 do not claim to mitigate any attacks in a FIPS-approved mode of operation.

Secure Operation

The Cisco 6901 and 6911 phones meet FIPS 140-2 Level 1 requirements. This section describes how to place and keep a phone in a FIPS-approved mode of operation. Operating the phone without maintaining the following settings will remove the phone from the FIPS-approved mode of operation.
Crypto Officer Guidance – System Initialization

The Crypto Officer must create a device security profile in Call manager. Below, find instructions on creating the device security profile.

1. Login to Call Manager
2. Navigate to System -> Security Profile -> Phone Security Profile.
3. Click the Add New button
4. Select “Cisco 6901” or “Cisco 6911” from the drop down box and click next.
5. From the Drop down box, select SCCP for the security protocol profile and click next.
6. In the Name box, give an appropriate name such as “Cisco 6901 FIPS Security Profile”, or “Cisco 6911 FIPS Security Profile”, followed by an appropriate description.
7. In the section titled, “Phone Security Profile CAPF Information, Select the “Authentication Mode” to be “By Existing Certificate (Precedence to LSC), and select the key size to be 2048 bits.
8. While still in the “Phone Security Profile CAPF Information”, select the device security mode to “encrypted”
9. Click “Save”

Crypto Officer Guidance – System Configuration

The Cisco 6901 and 6911 phones were validated with software version 9.2.1 or 9.3.1 SR1(cmterm-6901_6911-sccp.9-2-1-a.cop.sgn or Cmterm-6901_6911-sccp.9.3.1-a.cop.sgn) This is the only allowable image for the FIPS-approved mode of operation, and once installed, the operator must not upgrade or change the firmware.

The Crypto Officer must configure and enforce the following initialization steps:

Login to Call Manager

- Navigate to phone page
- Select the 6901 or 6911 in the list of phones
- Click on the phone in question to navigate to the configuration page.
- Find the section titled “Product Specific Configuration Layout” and make sure that both web access and SSH are disabled
- Find the section titled “Protocol Specific Information” and select the device security profile that you created in the previous section above.
- At the bottom of the list of configuration items, select to enable FIPS mode.
- Save the configurations by clicking on save.
- Reset the phone by clicking reset
Approved Cryptographic Algorithms

The Cisco 6901 and 6911 phones support many different cryptographic algorithms; however, when configured for FIPS compliant operation (by following the instructions of this section), the module will only utilize FIPS-approved and FIPS allowed cryptographic algorithms. Table 8 lists all FIPS approved algorithms supported by the module.

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>TI DSP Library</th>
<th>OpenSSL Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>AES</td>
<td>1748</td>
<td>1746</td>
</tr>
<tr>
<td>Triple-DES</td>
<td>N/A</td>
<td>1131</td>
</tr>
<tr>
<td>SHA-1</td>
<td>1535</td>
<td>1533</td>
</tr>
<tr>
<td>HMAC SHA-1</td>
<td>1025</td>
<td>1023</td>
</tr>
<tr>
<td>RNG</td>
<td>N/A</td>
<td>930</td>
</tr>
<tr>
<td>RSA</td>
<td>N/A</td>
<td>867</td>
</tr>
</tbody>
</table>

Non-FIPS Approved Algorithms

The 6901 and 6911 implement the following non-FIPS-approved cryptographic algorithms:

- MD5
- MD5 HMAC
- RSA (allowed in FIPS mode for key transport) (key wrapping; key establishment methodology provides 80 or 112 bits of encryption strength)

Related Documentation

This document deals only with operations and capabilities of the phone in the technical terms of a FIPS 140-2 cryptographic device security policy. More information is available on the phone from the sources listed in this section and from the following source:

- The NIST Cryptographic Module Validation Program website (http://csrc.nist.gov/cryptval/) contains contact information for answers to technical or sales-related questions for the 6901 and 6911 phones.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.
Cisco.com

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- Nonemergencies — psirt@cisco.com

In an emergency, you can also reach PSIRT by telephone:

- 1 877 228-7302
- 1 408 525-6532

| Tip | We encourage you to use Pretty Good Privacy (PGP) or a compatible product to encrypt any sensitive information that you send to Cisco. PSIRT can work from encrypted information that is compatible with PGP versions 2.x through 8.x.  
Never use a revoked or an expired encryption key. The correct public key to use in your correspondence with PSIRT is the one linked in the Contact Summary section of the Security Vulnerability Policy page at this URL:  

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Access to all tools on the Cisco Technical Support & Documentation website requires a Cisco.com user ID and password. If you have a valid service contract but do not have a user ID or password, you can register at this URL:


Note
Use the Cisco Product Identification (CPI) tool to locate your product serial number before submitting a web or phone request for service. You can access the CPI tool from the Cisco Technical Support & Documentation website by clicking the Tools & Resources link under Documentation & Tools. Choose Cisco Product Identification Tool from the Alphabetical Index drop-down list, or click the Cisco Product Identification Tool link under Alerts & RMAs. The CPI tool offers three search options: by product ID or model name; by tree view; or for certain products, by copying and pasting show command output. Search results show an illustration of your product with the serial number label location highlighted. Locate the serial number label on your product and record the information before placing a service call.

Submitting a Service Request

Using the online TAC Service Request Tool is the fastest way to open S3 and S4 service requests. (S3 and S4 service requests are those in which your network is minimally impaired or for which you require product information.) After you describe your situation, the TAC Service Request Tool provides recommended solutions. If your issue is not resolved using the recommended resources, your service request is assigned to a Cisco engineer. The TAC Service Request Tool is located at this URL:

http://www.cisco.com/techsupport/servicerequest

For S1 or S2 service requests or if you do not have Internet access, contact the Cisco TAC by telephone. (S1 or S2 service requests are those in which your production network is down or severely degraded.) Cisco engineers are assigned immediately to S1 and S2 service requests to help keep your business operations running smoothly.

To open a service request by telephone, use one of the following numbers:

Asia-Pacific: +61 2 8446 7411 (Australia: 1 800 805 227)
EMEA: +32 2 704 55 55
USA: 1 800 553-2447
For a complete list of Cisco TAC contacts, go to this URL:
http://www.cisco.com/techsupport/contacts

**Definitions of Service Request Severity**

To ensure that all service requests are reported in a standard format, Cisco has established severity definitions.

Severity 1 (S1)—Your network is “down,” or there is a critical impact to your business operations. You and Cisco will commit all necessary resources around the clock to resolve the situation.

Severity 2 (S2)—Operation of an existing network is severely degraded, or significant aspects of your business operation are negatively affected by inadequate performance of Cisco products. You and Cisco will commit full-time resources during normal business hours to resolve the situation.

Severity 3 (S3)—Operational performance of your network is impaired, but most business operations remain functional. You and Cisco will commit resources during normal business hours to restore service to satisfactory levels.

Severity 4 (S4)—You require information or assistance with Cisco product capabilities, installation, or configuration. There is little or no effect on your business operations.

**Obtaining Additional Publications and Information**

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- Cisco Marketplace provides a variety of Cisco books, reference guides, documentation, and logo merchandise. Visit Cisco Marketplace, the company store, at this URL:
  http://www.cisco.com/go/marketplace/

- *Cisco Press* publishes a wide range of general networking, training and certification titles. Both new and experienced users will benefit from these publications. For current Cisco Press titles and other information, go to Cisco Press at this URL:
  http://www.ciscopress.com

- *Packet* magazine is the Cisco Systems technical user magazine for maximizing Internet and networking investments. Each quarter, Packet delivers coverage of the latest industry trends, technology breakthroughs, and Cisco products and solutions, as well as network deployment and troubleshooting tips, configuration examples, customer case studies, certification and training information, and links to scores of in-depth online resources. You can access Packet magazine at this URL:
  http://www.cisco.com/packet

- *iQ Magazine* is the quarterly publication from Cisco Systems designed to help growing companies learn how they can use technology to increase revenue, streamline their business, and expand services. The publication identifies the challenges facing these companies and the technologies to help solve them, using real-world case studies and business strategies to help readers make sound technology investment decisions. You can access iQ Magazine at this URL:
  http://www.cisco.com/go/iqmagazine

  or view the digital edition at this URL:
  http://ciscoiq.texterity.com/ciscoiq/sample/
• Internet Protocol Journal is a quarterly journal published by Cisco Systems for engineering professionals involved in designing, developing, and operating public and private internets and intranets. You can access the Internet Protocol Journal at this URL:
  http://www.cisco.com/ipj
• Networking products offered by Cisco Systems, as well as customer support services, can be obtained at this URL:
• Networking Professionals Connection is an interactive website for networking professionals to share questions, suggestions, and information about networking products and technologies with Cisco experts and other networking professionals. Join a discussion at this URL:
  http://www.cisco.com/discuss/networking
• World-class networking training is available from Cisco. You can view current offerings at this URL:

Definition List

AES—Advanced Encryption Standard
CMVP—Cryptographic Module Validation Program
CUCM—Cisco Unified Call Manager
CSP—Critical Security Parameter
DES—Data Encryption Standard
FIPS—Federal Information Processing Standard
HMAC—Hash Message Authentication Code
HTTP—Hyper Text Transfer Protocol
KAT—Known Answer Test
LED—Light Emitting Diode
MAC—Message Authentication Code
NIST—National Institute of Standards and Technology
NVRAM—Non-Volatile Random Access Memory
OSCP—Online Certificate Status Protocol
RAM—Random Access Memory
RNG—Random Number Generator
RSA—Rivest Shamir and Adleman method for asymmetric encryption
SHA—Secure Hash Algorithm
SSL—Secure Sockets Layer
Triple-DES—Triple Data Encryption Standard
TLS—Transport Layer Security
VOIP - Voice over IP Protocol
This document is to be used in conjunction with the documents listed in the “Related Documentation” section.

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