SteelHead™ Security Technical Implementation Guides (STIGs) User's Guide

RiOS Version 8.6 (xx50, xx55, xx60, xx70)

February 2016

STIG Release: 1

Benchmark Date: 30 Nov 2015

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Contents

Preface

Welcome to the *SteelHead Security Technical Implementation Guides (STIGs) User's Guide*. Read this preface for the documentation conventions, additional reading, and contact information. This preface includes the following sections:

About This Guide

This guide functions as a user's guide to the *Defense Information Systems Agency (DISA) Riverbed SteelHead v8 ALG and NDM Security Technical Implementation Guide (STIG),* Release: 1 Benchmark Date: 30 Nov 2015.

The STIGs are tools to improve the security of Department of Defense (DoD) information systems. The requirements are derived from the National Institute of Standards and Technology (NIST) 800-53 and related documents.

You can obtain the STIG from the Information Assurance Support Environment (IASE) website at http://iase.disa.mil/. This site contains the latest copies of the STIGs, Security Requirement Guides (SRG), and other related security information.

This guide includes information relevant to this product:

- Riverbed SteelHead (SteelHead) running Riverbed Optimization System (RiOS) 8.6

Audience

This guide is written for storage and network administrators who are familiar with administering and managing WANs using common network protocols such as TCP, CIFS, HTTP, FTP, and NFS.

Document Conventions

This table summarizes the document conventions used in this guide.

Convention	Meaning
italics	Within text, new terms and emphasized words appear in *italic* typeface.
boldface	Within text, CLI commands, CLI parameters, and REST API properties appear in **bold** typeface.

Courier	Code examples appear in Courier font:
	`amnesiac > enable`
	`amnesiac # configure terminal`

< >	Values that you specify appear in angle brackets: **interface <ip-address>**
[ ]	Optional keywords or variables appear in brackets: **ntp peer <ip-address> [version <number>]**
{ }	Elements that are part of a required choice appear in braces: **{<interface-name> | ascii <string> | hex <string>}**
|	The pipe symbol separates alternative, mutually exclusive elements of a choice. The pipe symbol is used in conjunction with braces or brackets; the braces or brackets group the choices and identify them as required or optional: **{delete <filename> | upload <filename>}**

Contacting Riverbed

This section describes how to contact departments within Riverbed.

- **Technical support** - If you have problems installing, using, or replacing Riverbed products, contact Riverbed Support or your channel partner who provides support. To contact Riverbed Support, open a trouble ticket by calling 1-888-RVBD-TAC (1-888-782-3822) in the United States and Canada or +1 415-247-7381 outside the United States. You can also go to https://support.riverbed.com.
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CHAPTER 1 Overview of STIGs

This chapter provides an overview of the Security Technical Implementation Guides (STIGs). It includes these sections:

What Are STIGs?

Riverbed, working with the Department of Defense (DoD) and the Defense Information's Security Agency (DISA) has developed the Riverbed SteelHead STIG. A STIG is the configuration guide for deploying Riverbed products into a DoD environment so that they qualify as an Information Assurance (IA) or IA-enabled device (that is, the operating system, network appliance, application, software, and so on). The STIG outlines the recommended procedures, configuration steps, and administrative activities, that should be followed to secure the SteelHead.

The SteelHead WAN optimization solution consists of the Riverbed Optimization System (RiOS) software and the SteelHead hardware or virtual appliance. The primary difference between the hardware appliances in the series is the number of WAN ports available and bandwidth capabilities. The RiOS software can also be hosted on a customer-provided host and implemented using a virtual appliance.

While the SteelHead v8.6 Network Device Management (NDM) STIG can be used to secure the management functions of all SteelHead products that use RiOS 8.x.x, the scope of the application layer gateway (ALG) STIG includes only SteelHead CX implementations.

For detailed information about the DoD Instruction (DoDI) 8500.01, see the STIG on the Information Assurance Support Environment (IASE) website at http://iase.disa.mil/.

Understanding Vulnerability Severity Category Code Definitions

Severity Category Codes (referred to as CAT) are a measure of vulnerabilities used to assess a facility or system security posture. Each security policy specified in this document is assigned a Severity Category Code of CAT I, II, or III.

Severity	DISA Category Code Guidelines
CAT I	Any vulnerability that **will directly and immediately** result in loss of confidentiality, availability, and integrity when exploited.
CAT II	Any vulnerability that **has a potential** to result in loss of confidentiality, availability, and integrity when exploited.
CAT III	Any vulnerability that degrades measures to protect against loss of confidentiality, availability, and integrity when exploited.

Obtaining the SteelHead STIG

You can obtain the SteelHead STIG from the Information Assurance Support Environment (IASE) website at http://iase.disa.mil/stigs/Pages/index.aspx. This website contains the latest copies of the STIGs, Security Requirement Guides (SRG), and other related security information.

Security Assessment Considerations

Two STIGs are packaged together to ensure both the network backplane and the WAN optimization functions are secured. The SteelHead 8.6 NDM STIG contains requirements which address the management and backplane functions of RiOS. RiOS is installed on all of the Riverbed SteelHead products. While the SteelHead v8.6 Network Device Management (NDM) STIG can be used to secure the management functions of all SteelHead products that use RiOS 8.x.x, the scope of the application layer gateway (ALG) STIG includes only SteelHead CX implementations.

For assessments using the SteelHead virtual appliance, an assessment of the host using the applicable operating system STIG (for example, Windows or Linux) must be performed. Also, an assessment of applications cohosted on the host is also required.

Overview of the SteelHead

WAN optimization is an important part of the enterprise network strategy. With the increasing move to enterprise and cloud services, applications are being migrated to data centers or the Cloud, which moves them farther away from users. The need for access by remote and mobile users also drives the increasing need to prevent the WAN from being a performance bottleneck.

The SteelHead provides WAN optimization at OSI Layers 1, 4, and 7 to perform three major functions: perform data, transport, and application streamlining. RiOS combines data reduction and compression to perform data streamlining, reducing bandwidth. Transport and application streamlining minimize protocol and application communication redundancy by reducing packet round trips.

The SteelHead WAN optimization solution can also be configured to provide path optimization and Quality of Service (QoS). An organization can optimize some or the entire available network communications path, depending on the architecture implemented. Organizations can assign each optimized application a QoS class and can granularly assign each application class to a path. This configuration can be leveraged to create primary and secondary paths to each application based on the priority or other characteristics of the traffic. This path selection system also ensures bandwidth failover of the primary communications pathway.

SteelHead Deployments

Optimally, the SteelHead must be architecturally placed at the perimeter of the network in front of the perimeter router and in-line. Thus, traffic must be directed for firewall and Intrusion Detection and Prevention System (IDPS) inspection for inbound and outbound traffic in compliance with DoD policy. Additionally, from an operational perspective, this architecture avoids the need to open many ports and services in the firewall to accommodate TCP options 76 and 78 and ports 7800, 7810, and 7870. Some other configurations might involve even more ports and services.

When the solution is implemented using a SteelHead hardware appliance consisting of RiOS installed on the SteelHead, administrators are not able to install any software that is not part of a Riverbed upgrade. RiOS enforces this feature by performing a validity check when an upgrade is attempted.

However, the RiOS application suite is available in a virtual appliance version, which can be installed on an organization-provided host. This type of implementation adds risk because more ports might need to be opened in the firewall if placed in the recommended logical position in the architecture after the router and before the firewall and IDPS. The traffic should then be routed for inspection after traversing the WAN optimizer.

Additional SteelHead Security Best Practices

As a supplement to this guide, consult *Securing SteelHeads* in the *SteelHead Deployment Guide* 9.1 or later. This guide provides additional guidance regarding security best practices for SteelHead deployments.

Connecting to the Management Console and the Command Line Interface

Throughout this guide you will perform procedures to ensure security compliance using the SteelHead Management Console and the command line interface (CLI). This guide assumes that you are familiar with installing and configuring the SteelHead appliance.

For detailed information about installing and running the initial configuration wizard, see the *SteelHead Installation and Configuration Guide* for SteelHead at https://support.riverbed.com/content/support/software/steelhead/cx-appliance.html.

For detailed information about configuring the SteelHead, see the *SteelHead Management Console User's Guide* at https://support.riverbed.com/content/support/software/steelhead/cx-appliance.html.

Connecting to the Management Console

To connect to the Management Console you must know the URL and administrator password that you assigned in the configuration wizard of the SteelHead appliance. For details, see the *SteelHead Installation and Configuration Guide*.

To connect to the Management Console

1. Specify the URL for the Management Console in the address bar of your web browser:

   ```
   <protocol>://<host>.<domain>
   ```

   <protocol> is HTTPS. HTTPS uses the SSL protocol to ensure a secure environment. When you connect using HTTPS, the system prompts you to inspect and verify the approved DoD SSL certificate. Self signed certificates are not approved for use in DoD. You must use a DoD approved Certificate Authority.

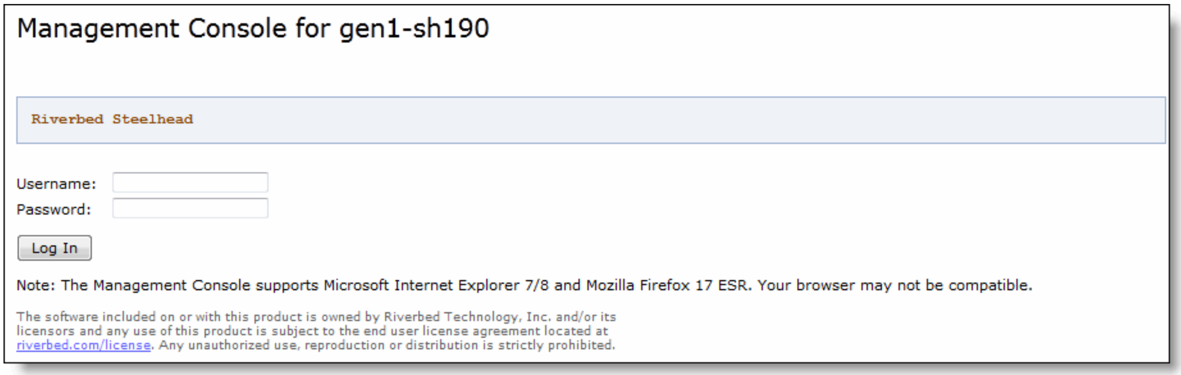
   <host> is the hostname you assigned to the SteelHead appliance primary interface in the configuration wizard. If your DNS server maps that IP address to a name, you can specify the DNS name.

   <domain> is the full domain name for the appliance.

Tip: Alternatively, you can specify the IP address instead of the host and domain name.

   The Management Console appears, displaying the Login page.

Figure 1-1. Login Page



Management Console for gen1-sh190

Riverbed Steelhead

Username:

Password:

Note: The Management Console supports Microsoft Internet Explorer 7/8 and Mozilla Firefox 17 ESR. Your browser may not be compatible.

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2. In the Username text box, specify the user login from a RADIUS or TACACS+ database, or any local accounts created using the Role-Based Accounts feature.

   Users with administrator (admin) privileges can configure and administer the SteelHead appliance. Users with monitor (monitor) privileges can view the SteelHead appliance reports, user logs, and change their own password. A monitor user cannot make configuration changes.

3. In the Password text box, specify the password you assigned in the configuration wizard of the SteelHead appliance.

4. Click **Log In** to display the Home page.

For detailed information about configuring SteelHead features, see the *SteelHead Management Console User's Guide*.

Connecting to the CLI

This section assumes you have already performed the initial setup of the appliance using the configuration wizard. For detailed information, see the *SteelHead Installation and Configuration Guide*.

To connect to the CLI

1. You can connect to the CLI using one of the following options:

   - An ASCII terminal or emulator that can connect to the serial console. It must have the following settings: 9600 baud, 8 bits, no parity, 1 stop bit, and no flow control.

   - A computer with an SSH client that is connected to the appliance Primary port. (In rare cases, you might connect through the Auxiliary port.)

2. At the system prompt enter the following command if the appliance resolves to your local DNS:

   ```
   ssh admin@<host>.<domain>
   ```

   Otherwise at the system prompt enter the following command:

   ```
   ssh admin@<ipaddress>
   ```

3. When prompted, enter the administrator password. This is the password you set during the initial configuration process. For example:

   ```
   login as: <system administrator>
   password: <system administrator password>
   Riverbed SteelHead
   Last login: Wed Jan 20 13:02:09 2010 from 10.0.1.1
   amnesiac >
   ```

CHAPTER 2

Network Device Management Rules

This chapter provides a summary of the Network Device Management (NDM) security rules and the procedures for ensuring security compliance. It includes these sections:

- "Account Management" on page 15
- "System Auditing (Logging)" on page 24
- "Alerts and Events" on page 39
- "System Administration" on page 48

As a supplement to this guide, consult *Securing SteelHeads* in the *SteelHead Deployment Guide* 9.1 or later. This guide provides additional guidance regarding security best practices for SteelHead deployments.

Account Management

This section includes these rules:

- "Ensuring Automated Support for Account Management" on page 15
- "Ensuring Local Shared and Group Account Credentials Are Terminated" on page 19
- "Ensuring that the Monitor and Shark Accounts Are Disabled" on page 21
- "Ensuring the Correct Privilege Level for Administrators" on page 23

Ensuring Automated Support for Account Management

Rule Title: RiOS must provide automated support for account management functions.

STIG ID: RICX-DM-000001

Rule ID: SV-77279r1_rule	Severity: CAT II
Vuln ID: V-62789	Class: Unclass

Account management functions include:

- assignment of group or role membership.
- identifying account type.
- specifying user access authorizations (i.e., privileges).

- account removal, update, or termination.
- administrative alerts.

The network device must be configured to automatically provide account management functions, and these functions must immediately enforce the organization's current account policy.

All accounts used for access to the network device are privileged or system-level accounts. Therefore, if account management functions are not automatically enforced, an attacker could gain privileged access to a vital element of the network security architecture.

This control does not include emergency administration accounts that provide access to the network device components in case of network failure. There must be only one such locally defined account.

All other accounts must be defined. All other accounts must be created and managed on the site's authentication server (for example, RADIUS, LDAP, or Active Directory). This requirement is applicable to account management functions provided by the network device application. If the function is provided by the underlying OS or an authentication server, it must be secured using the applicable security guide or STIG.

Verifying Automated Support for Account Management

Verify that RiOS provides automated support for account management.

To verify automated support for account management

1. Connect to the Management Console.
2. Choose Configure > Security > User Permissions to display the User Permissions page.
3. Verify that the user permissions are defined. If the account management is not set, this is a security vulnerability finding.

Configuring Automated Support for Account Management

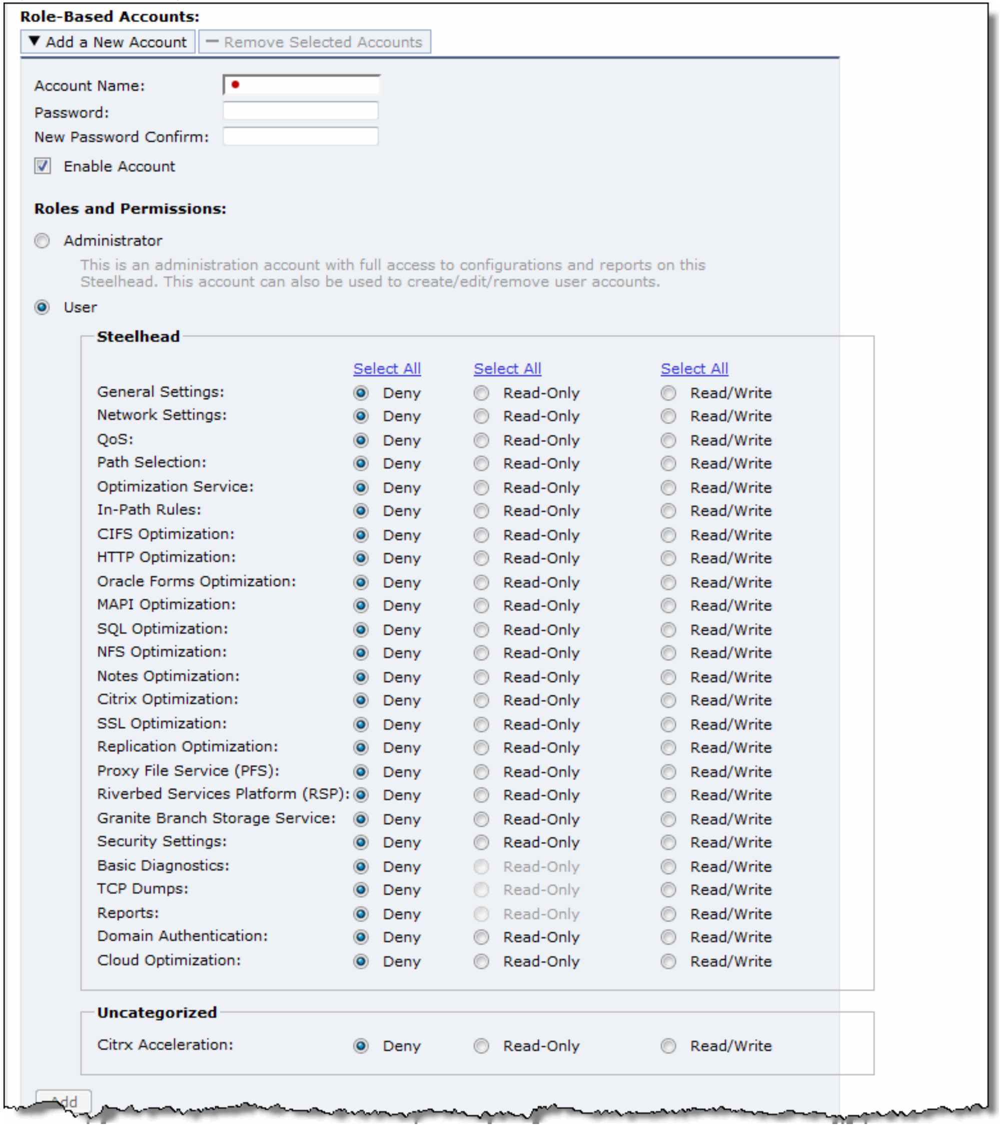
Configure RiOS to provide automated support for account management.

To configure automated support for account management

1. Choose Configure > Security > User Permissions to display the User Permissions page.

2. Click **Add a New Account** to expand the page.

Figure 2-1. Adding Role-Based Accounts



Role-Based Accounts:

▼ Add a New Account — Remove Selected Accounts

Account Name:

Password:

New Password Confirm:

☑ Enable Account

Roles and Permissions:

○ Administrator

This is an administration account with full access to configurations and reports on this Steelhead. This account can also be used to create/edit/remove user accounts.

● User

Steelhead

	Select All	Select All	Select All
General Settings:	● Deny	○ Read-Only	○ Read/Write
Network Settings:	● Deny	○ Read-Only	○ Read/Write
QoS:	● Deny	○ Read-Only	○ Read/Write
Path Selection:	● Deny	○ Read-Only	○ Read/Write
Optimization Service:	● Deny	○ Read-Only	○ Read/Write
In-Path Rules:	● Deny	○ Read-Only	○ Read/Write
CIFS Optimization:	● Deny	○ Read-Only	○ Read/Write
HTTP Optimization:	● Deny	○ Read-Only	○ Read/Write
Oracle Forms Optimization:	● Deny	○ Read-Only	○ Read/Write
MAPI Optimization:	● Deny	○ Read-Only	○ Read/Write
SQL Optimization:	● Deny	○ Read-Only	○ Read/Write
NFS Optimization:	● Deny	○ Read-Only	○ Read/Write
Notes Optimization:	● Deny	○ Read-Only	○ Read/Write
Citrix Optimization:	● Deny	○ Read-Only	○ Read/Write
SSL Optimization:	● Deny	○ Read-Only	○ Read/Write
Replication Optimization:	● Deny	○ Read-Only	○ Read/Write
Proxy File Service (PFS):	● Deny	○ Read-Only	○ Read/Write
Riverbed Services Platform (RSP):	● Deny	○ Read-Only	○ Read/Write
Granite Branch Storage Service:	● Deny	○ Read-Only	○ Read/Write
Security Settings:	● Deny	○ Read-Only	○ Read/Write
Basic Diagnostics:	● Deny	○ Read-Only	○ Read/Write
TCP Dumps:	● Deny	○ Read-Only	○ Read/Write
Reports:	● Deny	○ Read-Only	○ Read/Write
Domain Authentication:	● Deny	○ Read-Only	○ Read/Write
Cloud Optimization:	● Deny	○ Read-Only	○ Read/Write

Uncategorized

Citrx Acceleration:	● Deny	○ Read-Only	○ Read/Write

Add

3. Set the values of Roles and Permissions according to the privilege level and in compliance with the applicable policy.

Control	Description
Account Name	Specify a name for the role-based account.
Password	Specify a password in the text box, and then retype the password for confirmation.
Enable Account	Select the check box to enable the new account.
Administrator	Configures a system administrator role. This role allows permission for all other RBM roles, including creating, editing, and removing user accounts. The system administrator role allows you to add or remove a system administrator role for any other user, but not for yourself. Read-only permission is not allowed for this role.

Control	Description
User	Configures a role that determines whether the user: • has permission to view current configuration settings but not change them (Read-Only). • has permission to view settings and make configuration changes for a feature (Read/Write). • cannot view or save settings or configuration changes for a feature (Deny).
General Settings	Configures per-source IP connection limit and the maximum connection pooling size.
Network Settings	Configures host and network interface settings, including DNS cache settings and hardware assist rules.
QoS	Enforces QoS policies.
Path Selection	Configures path selection.
Optimization Service	Configures alarms, performance features, SkipWare, HS-TCP, and TCP optimization.
In-Path Rules	Configures TCP traffic for optimization and determines how to optimize traffic by setting in-path rules. This role includes WAN visibility to preserve TCP/IP address or port information. For details about WAN visibility, see the *SteelHead Deployment Guide*.
CIFS Optimization	Configures CIFS optimization settings (including SMB-signing) and Overlapping Open optimization.
HTTP Optimization	Configures enhanced HTTP optimization settings: URL learning, Parse and Prefetch, Object Prefetch Table, keep-alive, insert cookie, file extensions to prefetch, and the ability to set up HTTP optimization for a specific server subnet.
Oracle Forms Optimization	Optimizes Oracle E-business application content and forms applications.
MAPI Optimization	Optimizes MAPI and sets Exchange and NSPI ports.
NFS Optimization	Configures NFS optimization.
Notes Optimization	Configures Lotus Notes optimization.
Citrix Optimization	Configures Citrix optimization.
SSL Optimization	Configures SSL support and the secure inner channel.
Replication Optimization	Configures the SRDF/A, FCIP, and SnapMirror storage optimization modules.
Proxy File Service (PFS)	Configures the PFS.
Riverbed Services Platform (RSP)	Configures functionality into a virtualized environment on the client Steelhead appliance. The functionality can include third-party packages such as a firewall security package, a streaming video server, or a package that provides core networking services (for example, DNS and DHCP). This role includes permission to install VMware tools and add subnet side rules. For details, see the *RSP User's Guide*.
SteelFusion Edge Storage Service	Configures branch storage services on SteelFusion Edge appliances (the branch storage services are only available on a SteelHead EX appliance).
Security Settings	Configures security settings, including RADIUS and TACACS authentication settings and the secure vault password.
Basic Diagnostics	Customizes system diagnostic logs, including system and user log settings, but does not include TCP dumps.

Control	Description
TCP Dumps	Customizes TCP dump settings and allows use of the Shark function for detailed packet analysis through Cascade Pilot.
Reports	Sets system report parameters.
Domain Authentication	Allows joining a Windows domain and configuring Windows domain authentication.
Citrix Acceleration	Configures Citrix optimization.
Add	Adds your settings to the system.
Remove Selected Accounts	Select the check box next to the name and click **Remove Selected**.

4. Click **Save** at the top of the page to save these settings permanently.

Ensuring Local Shared and Group Account Credentials Are Terminated

Rule Title: RiOS must terminate local shared and group account credentials, such as the Admin account, when members who know the account password leave the group.

STIG ID: RICX-DM-000002

Rule ID: SV-77325r1_rule Severity: CAT II

Vuln ID: V-62835 Class: Unclass

If shared or group account credentials are not terminated when individuals leave the group, the user that left the group can still gain access even though they are no longer authorized.

A shared or group account credential is a shared form of authentication that allows multiple individuals to access the network device using a single account. There might also be instances when specific user actions need to be performed on the network device without unique administrator identification or authentication. Examples include system accounts, account of last resort, accounts used for testing/maintenance, and shared secrets that are configured on the administrator's workstation.

When users with knowledge of the account of last resort or default accounts are no longer authorized, account credentials must be changed in accordance with the DoD policy.

Verifying Local Shared and Group Account Credentials Are Terminated

Verify local shared and group account credentials, such as the Admin account, when members who know the account password leave the group.

To verify local shared and group account credentials are terminated

1. Connect to the Management Console.

2. Type **admin** in the Username text box.

3. Type **password** in the Password text box.

4. Click **Log In**. If login occurs and administrative access is allowed, this is a security vulnerability finding.

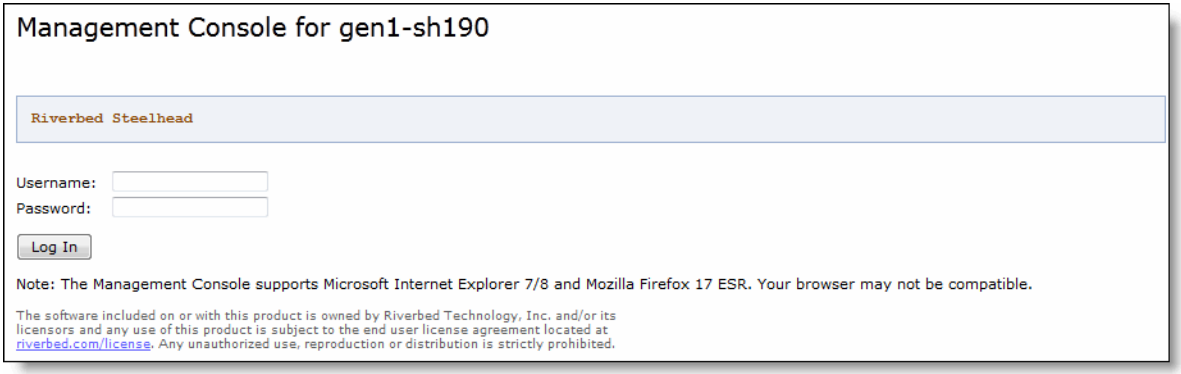
Terminating Local Shared and Group Account Credentials

Terminate local shared and group account credentials, such as the Admin account, when members who know the account password leave the group.

To terminate local shared and group account credentials

1. Connect to the Management Console.

Figure 2-2. Logging In



Management Console for gen1-sh190

Riverbed Steelhead

Username:

Password:

Log In

Note: The Management Console supports Microsoft Internet Explorer 7/8 and Mozilla Firefox 17 ESR. Your browser may not be compatible.

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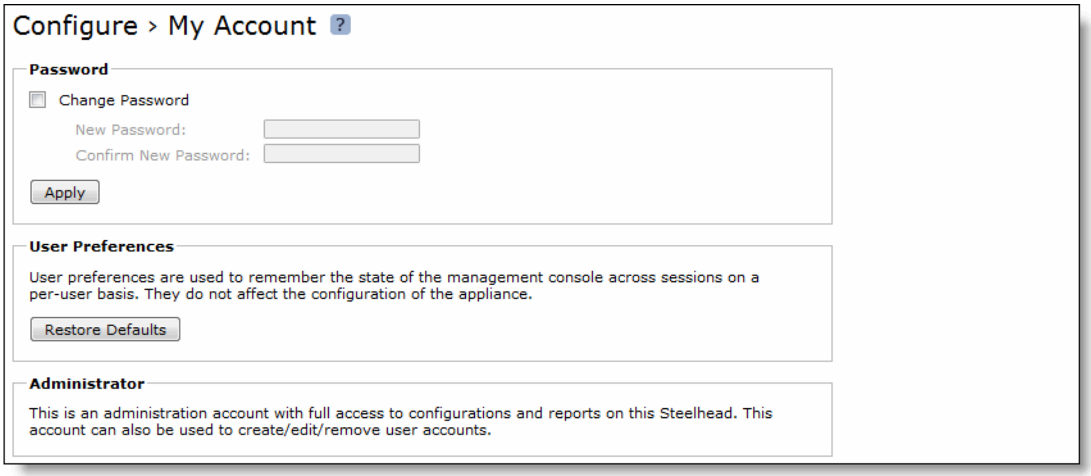
2. Type **admin** in the Username text box.

3. Type **password** in the Password text box.

4. Click **Log In**. If login occurs and administrative access is allowed, this is a security vulnerability finding.

5. Choose Configure > My Account to display the e > My Account page.

Figure 2-3. Changing the Default Password



Configure > My Account ?

Password

□ Change Password

New Password:

Confirm New Password:

Apply

User Preferences

User preferences are used to remember the state of the management console across sessions on a per-user basis. They do not affect the configuration of the appliance.

Restore Defaults

Administrator

This is an administration account with full access to configurations and reports on this Steelhead. This account can also be used to create/edit/remove user accounts.

6. Select the Change Password check box.

7. Type and confirm the new password.

8. Click **Apply**.

9. On the top right-hand side of the page, click **Logout** to exit the current session.

10. Reconnect to the Management Console.

11. Log in as the admin user.

12. Type the new password and click **Log In**. Verify that the administrator obtains access to the Management Console Home Page.

13. On the top right-hand side of the page, click **Logout** to exit the current session.

Ensuring that the Monitor and Shark Accounts Are Disabled

Rule Title: RiOS must disable the local monitor and shark accounts so they cannot be used as shared accounts by users.

STIG ID: RICX-DM-000003

Rule ID: SV-77327r1_rule	Severity: CAT II
Vuln ID: V-62837	Class: Unclass

The monitor and shark accounts are default group accounts with shared credentials. Monitor and shark accounts are not enabled by default, but cannot be deleted because these network tools are designed to look for that account. Monitor is a read-only account for auditor's configuration management. Shark is used to access packet captures. If the credentials for these accounts are changed, the function of the system will not be adversely impacted.

Verifying that the Monitor and Shark Accounts are Disabled

Verify that the local monitor and shark accounts are disabled so they cannot be used as shared accounts by users.

To verify that the monitor account is disabled

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Click **monitor** to expand the page.

4. Verify that the Enable Account check box is selected. If the check box is not selected, this is a security vulnerability finding.

To verify that the shark account is disabled

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Under Role-Based Accounts, click **shark** to expand the page.

4. Make sure all the shark permissions are set to Deny. If all privileges for the shark account are not set to Deny, this is a security vulnerability finding.

Disabling the Monitor and Shark Accounts

Disable the local monitor and shark accounts so they cannot be used as shared accounts by users.

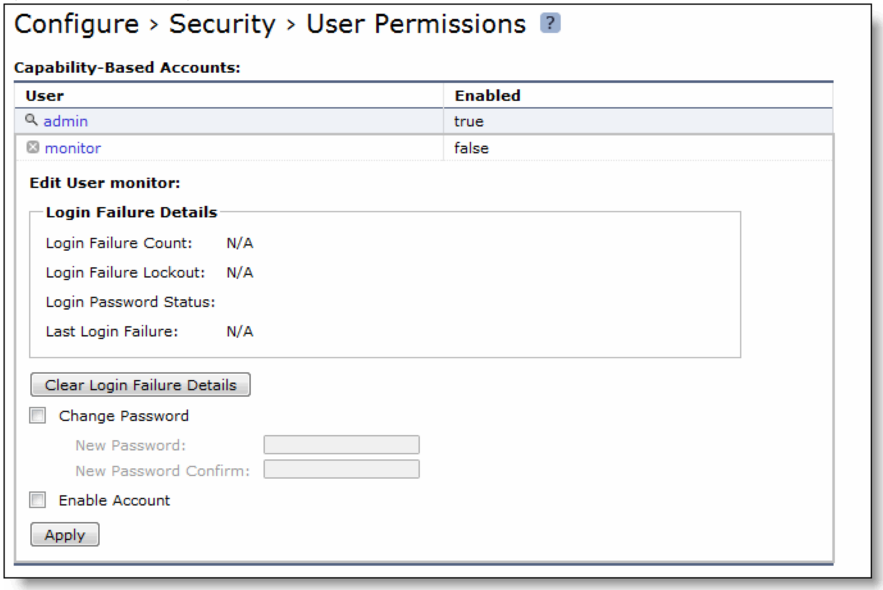
To disable the monitor account

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Click **monitor** to expand the page.

Figure 2-4. Verifying the Monitor Account is Disabled



Configure > Security > User Permissions ?

Capability-Based Accounts:

User	Enabled
admin	true
monitor	false

Edit User monitor:

Login Failure Details

Login Failure Count: N/A

Login Failure Lockout: N/A

Login Password Status:

Last Login Failure: N/A

Clear Login Failure Details

□ Change Password

New Password:

New Password Confirm:

□ Enable Account

Apply

4. Make sure that the Enable Account check box is not selected.

5. Click **Apply**.

6. Click **Save** at the top of the page to save these setting permanently.

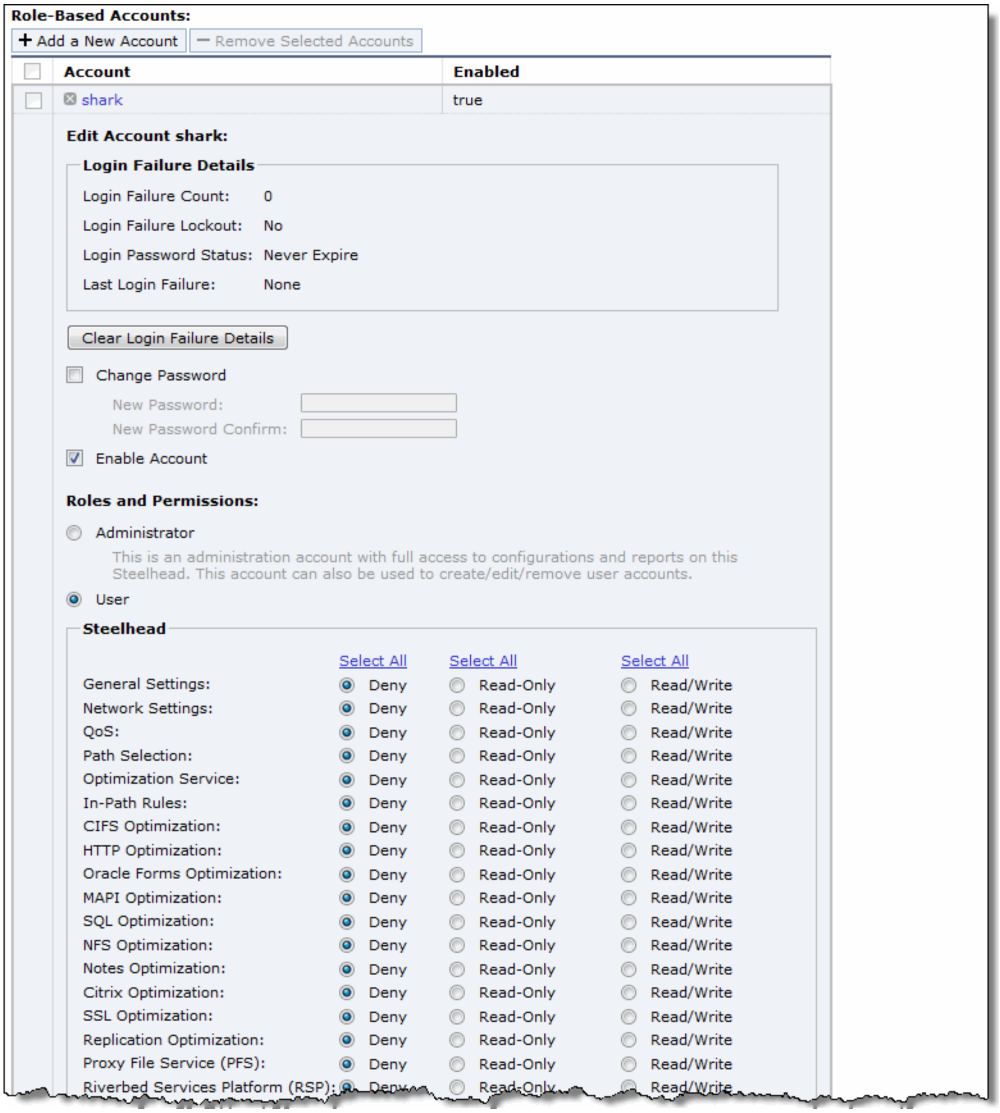
To disable the shark account

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Under Role-Based Accounts, click **shark** to expand the page.

Figure 2-5. Verifying the Shark Account Is Disabled



Role-Based Accounts:

+ Add a New Account | − Remove Selected Accounts

□	Account	Enabled
□	☒ shark	true

Edit Account shark:

Login Failure Details

Login Failure Count:	0
Login Failure Lockout:	No
Login Password Status:	Never Expire
Last Login Failure:	None

Clear Login Failure Details

□ Change Password

New Password:

New Password Confirm:

☑ Enable Account

Roles and Permissions:

○ Administrator

This is an administration account with full access to configurations and reports on this Steelhead. This account can also be used to create/edit/remove user accounts.

● User

Steelhead

	Select All	Select All	Select All
General Settings:	● Deny	○ Read-Only	○ Read/Write
Network Settings:	● Deny	○ Read-Only	○ Read/Write
QoS:	● Deny	○ Read-Only	○ Read/Write
Path Selection:	● Deny	○ Read-Only	○ Read/Write
Optimization Service:	● Deny	○ Read-Only	○ Read/Write
In-Path Rules:	● Deny	○ Read-Only	○ Read/Write
CIFS Optimization:	● Deny	○ Read-Only	○ Read/Write
HTTP Optimization:	● Deny	○ Read-Only	○ Read/Write
Oracle Forms Optimization:	● Deny	○ Read-Only	○ Read/Write
MAPI Optimization:	● Deny	○ Read-Only	○ Read/Write
SQL Optimization:	● Deny	○ Read-Only	○ Read/Write
NFS Optimization:	● Deny	○ Read-Only	○ Read/Write
Notes Optimization:	● Deny	○ Read-Only	○ Read/Write
Citrix Optimization:	● Deny	○ Read-Only	○ Read/Write
SSL Optimization:	● Deny	○ Read-Only	○ Read/Write
Replication Optimization:	● Deny	○ Read-Only	○ Read/Write
Proxy File Service (PFS):	● Deny	○ Read-Only	○ Read/Write
Riverbed Services Platform (RSP):	● Deny	○ Read-Only	○ Read/Write

4. Above the Deny column, click **Select All** to disable the shark account.

5. Click **Apply**.

6. Click **Save** at the top of the page to save these setting permanently.

Ensuring the Correct Privilege Level for Administrators

Rule Title: RiOS must enforce the assigned privilege level for each administrator and authorizations for access to all commands relative to the privilege level in accordance with applicable policy for the device.

STIG ID: RICX-DM-000017

Rule ID: SV-77345r1_rule	Severity: CAT II
Vuln ID: V-62855	Class: Unclass

To mitigate the risk of unauthorized access to sensitive information by entities that have been issued certificates by DoD-approved PKIs, all DoD systems must be properly configured to incorporate access control methods that do not rely solely on the possession of a certificate for access. Successful authentication must not automatically give an entity access to an asset or security boundary. Authorization procedures and controls must be implemented to ensure each authenticated entity also has a validated and current authorization. Authorization is the process of determining whether an entity, once authenticated, is permitted to access a specific asset. Network devices use access control policies and enforcement mechanisms to implement this requirement.

Access control policies include identity-based policies, role-based policies, and attribute-based policies. Access enforcement mechanisms include access control lists, access control matrices, and cryptography. These policies and mechanisms must be employed by the network device to control access between administrators (or processes acting on behalf of administrators) and objects (for example, device commands, files, records, processes) in the network device.

Verifying that Administrators Have the Correct Security Privileges

Verify that RiOS is configured to the assigned privilege level for each administrator.

For detailed information, see "Verifying That Administrators Have the Correct Security Privileges" on page 39.

Configuring Correct Security Privileges for Administrators

Configure RiOS to enforce assigned privilege level for each administrator.

For detailed information, see "Configuring the Correct Security Privileges for Administrators" on page 39.

System Auditing (Logging)

This section includes these rules:

- "Generating Log Events When Accounts Are Created" on page 25
- "Generating Log Events When Accounts Are Modified" on page 27
- "Generating Log Events When Accounts Are Disabled" on page 28
- "Generating Log Events When Accounts Are Modified" on page 27
- "Generating Log Events When Accounts Are Disabled" on page 28
- "Generating Log Events When Accounts Are Removed" on page 29
- "Generating Log Events When Privileged Commands Are Executed" on page 29
- "Generating Log Events of Privileged Commands" on page 31
- "Protecting Audit Information" on page 31
- "Protecting Audit Information from Unauthorized Modification" on page 33
- "Protecting Audit Information from Unauthorized Deletion" on page 34
- "Protecting Audit Tools from Unauthorized Access" on page 35
- "Protecting Audit Tools from Unauthorized Deletion" on page 35

Generating Log Events When Accounts Are Created

Rule Title: RiOS must automatically generate a log event when accounts are created.

STIG ID: RICX-DM-000007

Rule ID: SV-77329r1_rule Severity: CAT III

Vuln ID: V-62839 Class: Unclass

Upon gaining access to a network device, an attacker will often first attempt to create a persistent method of reestablishing access. One way to accomplish this is to create a new account. Notification of account creation helps to mitigate this risk. Auditing account creation provides the necessary reconciliation that account management procedures are being followed. Without this audit trail, personnel without the proper authorization might gain access to critical network nodes.

Verifying Log Events are Generated When Accounts Are Created

Verify that RiOS is configured to generate log events when accounts are created.

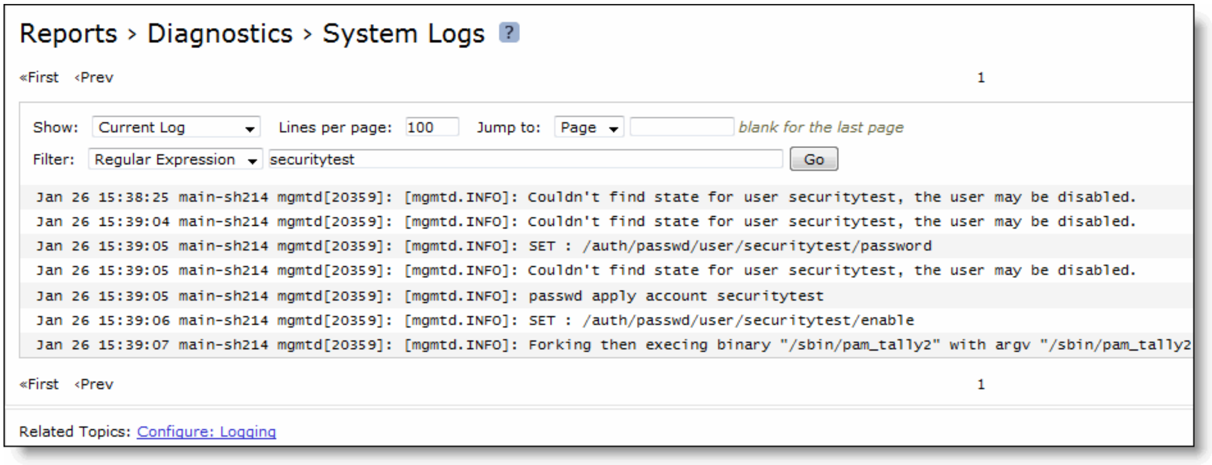
To verify that log events are generated when accounts are created

1. Connect to the Management Console.
2. Choose Configure > Security > User Permissions to display the User Permissions page.
3. Click **Add a New Account** to expand the page.
4. Create a user account as described in this table.

Control	Description
Account Name	Specify a name for the role-based account.
Password	Specify a password in the text box, and then retype the password for confirmation.
Enable Account	Select the check box to enable the new account.
User	Configures a role that determines whether the user: • has permission to view current configuration settings but not change them (Read-Only). • has permission to view settings and make configuration changes for a feature (Read/ Write). • cannot view or save settings or configuration changes for a feature (Deny).
Add	Adds your settings to the system.

5. Choose Reports > Diagnostics > System Logs to display the System Logs page.

Figure 2-6. Displaying System Logs



Reports > Diagnostics > System Logs

Show: Current Log Lines per page: 100 Jump to: Page *blank for the last page*

Filter: Regular Expression securitytest

```
Jan 26 15:38:25 main-sh214 mgmtd[20359]: [mgmtd.INFO]: Couldn't find state for user securitytest, the user may be disabled.
Jan 26 15:39:04 main-sh214 mgmtd[20359]: [mgmtd.INFO]: Couldn't find state for user securitytest, the user may be disabled.
Jan 26 15:39:05 main-sh214 mgmtd[20359]: [mgmtd.INFO]: SET : /auth/passwd/user/securitytest/password
Jan 26 15:39:05 main-sh214 mgmtd[20359]: [mgmtd.INFO]: Couldn't find state for user securitytest, the user may be disabled.
Jan 26 15:39:05 main-sh214 mgmtd[20359]: [mgmtd.INFO]: passwd apply account securitytest
Jan 26 15:39:06 main-sh214 mgmtd[20359]: [mgmtd.INFO]: SET : /auth/passwd/user/securitytest/enable
Jan 26 15:39:07 main-sh214 mgmtd[20359]: [mgmtd.INFO]: Forking then execing binary "/sbin/pam_tally2" with argv "/sbin/pam_tally2
```

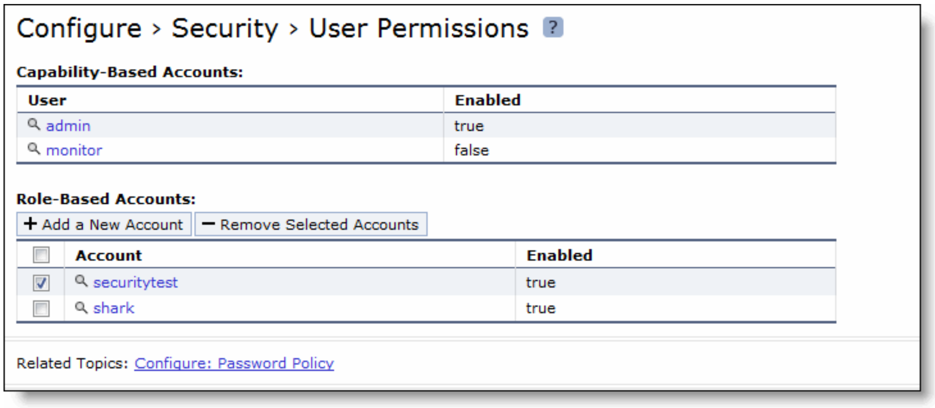
Related Topics: Configure: Logging

6. Type the account name in the Filter text box and click **Go**.

7. Choose Configure > Security > User Permissions to display the User Permissions page.

8. To delete the account, select the check box next to the account name and click **Remove Selected Accounts**.

Figure 2-7. Deleting a User Account



Configure > Security > User Permissions

Capability-Based Accounts:

User	Enabled
admin	true
monitor	false

Role-Based Accounts:

□	Account	Enabled
☑	securitytest	true
□	shark	true

Related Topics: Configure: Password Policy

9. Choose Reports > Diagnostics > System Logs to display the System Logs page.

10. Type the account name in the Filter text box and click **Go**. If no event record for the account appears in the event log, this is a security vulnerability finding.

Generating Log Events When Accounts Are Created

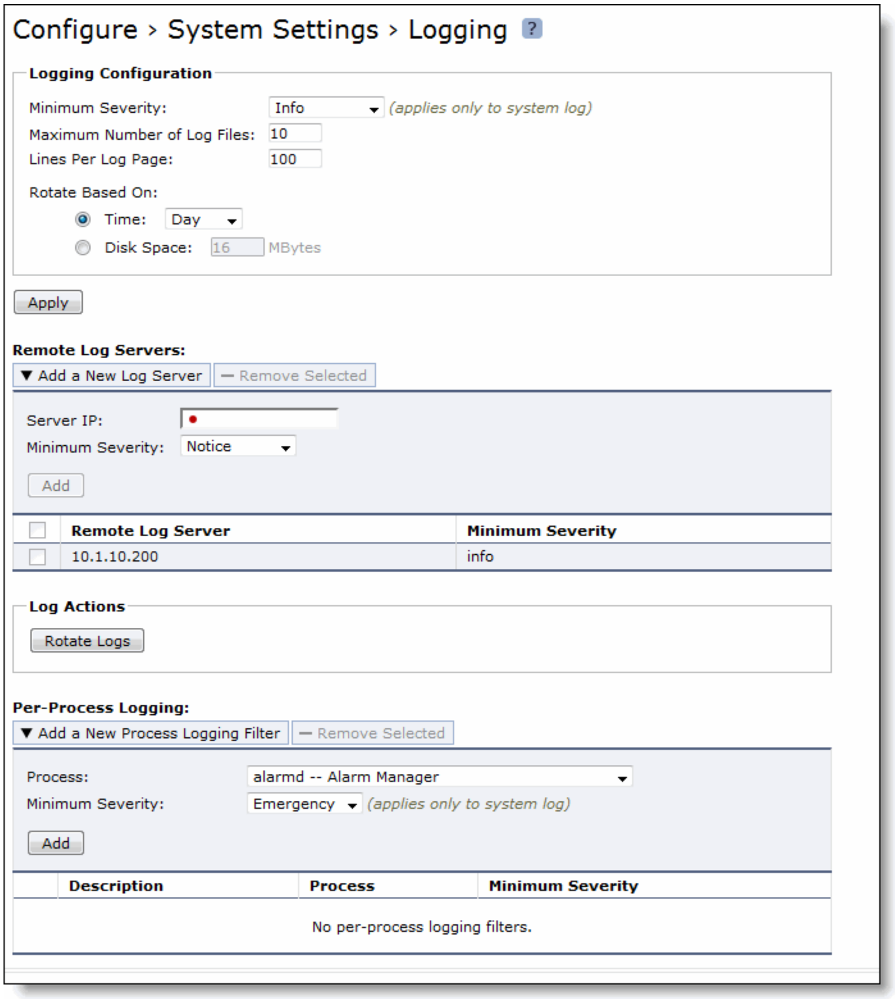
Configure RiOS to generate log events when accounts are created.

To generate log events when accounts are created

1. Connect to the Management Console.

2. Choose Configure > System Settings > Logging to display the Logging page.

Figure 2-8. Setting System Logs to Info



Configure > System Settings > Logging

Logging Configuration

Minimum Severity: Info *(applies only to system log)*

Maximum Number of Log Files: 10

Lines Per Log Page: 100

Rotate Based On:

● Time: Day

○ Disk Space: 16 MBytes

Apply

Remote Log Servers:

▼ Add a New Log Server — Remove Selected

Server IP:

Minimum Severity: Notice

Add

□	Remote Log Server	Minimum Severity
□	10.1.10.200	info

Log Actions

Rotate Logs

Per-Process Logging:

▼ Add a New Process Logging Filter — Remove Selected

Process: alarmd -- Alarm Manager

Minimum Severity: Emergency *(applies only to system log)*

Add

Description	Process	Minimum Severity
	No per-process logging filters.	

3. Under Logging Configuration, select Info from the Minimum Severity drop-down list.

4. To prevent log files from being overwritten, increase the Maximum Number of Log Files to a value that reflects what is needed for your deployment.

5. Click **Apply**.

6. Click **Save** at the top of the page to save these setting permanently.

Generating Log Events When Accounts Are Modified

Rule Title: RiOS must automatically create log events when accounts are modified.

STIG ID: RICX-DM-000008

Rule ID: SV-77331r1_rule Severity: CAT III

Vuln ID: V-62841 Class: Unclass

Because the accounts in the network device are privileged or system-level accounts, account management is vital to the security of the network device. Account management by a designated authority ensures access to the network device is being controlled in a secure manner by granting access to only authorized personnel with the appropriate and necessary privileges. Auditing account modification along with an automatic notification to appropriate individuals will provide the necessary reconciliation that account management procedures are being followed. If modifications to management accounts are not audited, reconciliation of account management procedures cannot be tracked.

Verifying Log Events Are Generated When Accounts Are Modified

Verify that RiOS is configured to generate log events when accounts are modified.

For detailed information, see "Verifying Log Events are Generated When Accounts Are Created" on page 25.

Generating Log Events When Accounts Are Modified

Configure RiOS to generate log events when accounts are modified.

For detailed information, see "Generating Log Events When Accounts Are Created" on page 25.

Note: The actual level for these messages is Notification; however, other settings in this STIG call for the Info level and only one can be selected.

Generating Log Events When Accounts Are Disabled

Rule Title: RiOS must automatically generate a log event when accounts are disabled.

STIG ID: RICX-DM-000009

Rule ID: SV-77333r1_rule Severity: CAT III

Vuln ID: V-62843 Class: Unclass

Account management, as a whole, ensures access to the network device is being controlled in a secure manner by granting access to only authorized personnel. Auditing account disabling actions will support account management procedures. When device management accounts are disabled, user or service accessibility might be affected. Auditing also ensures authorized active accounts remain enabled and available for use when required.

Verifying Log Events Are Generated When Accounts Are Disabled

Verify that RiOS is configured to generate log events when accounts are disabled.

For detailed information, see "Verifying Log Events are Generated When Accounts Are Created" on page 25.

Generating Logging Events When Accounts Are Disabled

Configure RiOS to generate log events when accounts are disabled.

For detailed information, see "Generating Log Events When Accounts Are Created" on page 25.

Generating Log Events When Accounts Are Removed

Rule Title: RiOS must automatically generate log events for accounts that are removed.

STIG ID: RICX-DM-000010

Rule ID: SV-77335r1_rule	Severity: CAT III
Vuln ID: V-62845	Class: Unclass

Account management, as a whole, ensures access to the network device is being controlled in a secure manner by granting access to only authorized personnel. Auditing account removal actions will support account management procedures. When device management accounts are terminated, user or service accessibility might be affected. Auditing also ensures authorized active accounts remain enabled and available for use when required.

Verifying Log Events Are Generated When Accounts Are Removed

Verify that RiOS is configured to generate log events when accounts are removed.

For detailed information, see "Verifying Log Events are Generated When Accounts Are Created" on page 25.

Generating Log Events When Accounts Are Removed

Configure RiOS to generate log events when accounts are removed.

For detailed information, see "Generating Log Events When Accounts Are Created" on page 25.

Generating Log Events When Privileged Commands Are Executed

Rule Title: RiOS must generate log events when privileged commands are executed.

STIG ID: RICX-DM-000023

Rule ID: SV-77347r1_rule	Severity: CAT III
Vuln ID: V-62857	Class: Unclass

Misuse of privileged commands, either intentionally or unintentionally by authorized users, or by unauthorized external entities that have compromised information system accounts, is a serious and ongoing concern and can have significant adverse impacts on organizations. Auditing the use of privileged commands is one way to detect such misuse and identify the risk from insider threats and the advanced persistent threat.

Verifying Log Events Are Generated When Commands Are Executed

Verify the device generates log events when commands are executed.

To verify log events are generated when commands are executed

1. Connect to the Management Console.
2. Choose Configure > System Settings > Logging to display the Logging page.
3. Under Logging Configurations, verify Minimum Severity is set to Info.

4. If the Standard Mandatory DoD Notice and Consent Banner does not exist on this page, this is a security vulnerability finding.

Generating Log Events When Commands Are Executed

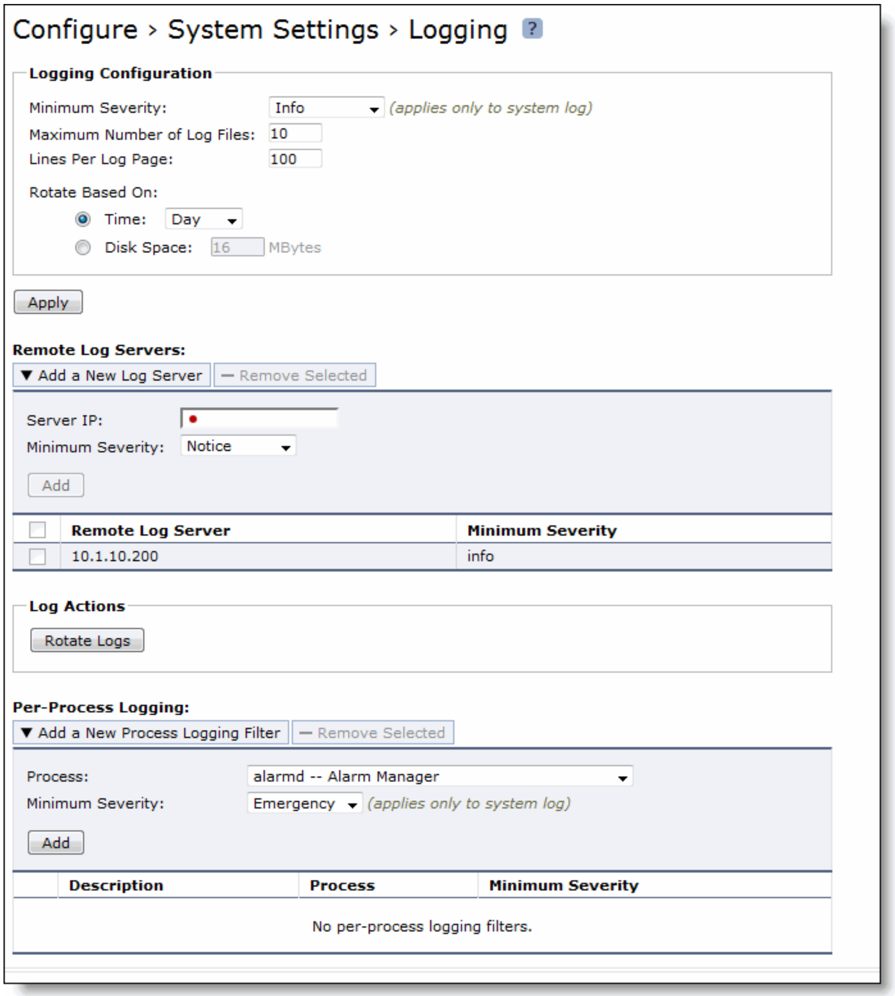
Since all commands on the device are privileged commands, the following procedures ensure execution of commands are sent to the Syslog server.

To generate log events when commands are executed

1. Connect to the Management Console.

2. Choose Configure > System Settings > Logging to display the Logging page.

Figure 2-9. Adding Remote Logging Servers



Configure > System Settings > Logging

Logging Configuration

Minimum Severity: Info (applies only to system log)

Maximum Number of Log Files: 10

Lines Per Log Page: 100

Rotate Based On:

● Time: Day

○ Disk Space: 16 MBytes

Apply

Remote Log Servers:

▼ Add a New Log Server — Remove Selected

Server IP:

Minimum Severity: Notice

Add

□	Remote Log Server	Minimum Severity
□	10.1.10.200	info

Log Actions

Rotate Logs

Per-Process Logging:

▼ Add a New Process Logging Filter — Remove Selected

Process: alarmd -- Alarm Manager

Minimum Severity: Emergency (applies only to system log)

Add

Description	Process	Minimum Severity
	No per-process logging filters.	

3. Under Logging Configurations, select Info from the Minimum Severity drop-down list.

4. Under Remote Log Servers, click **Add a New Log Server** to expand the page.

5. Type the server IP address and click **Add** to add the server.

6. Repeat Step 3 through Step 5 for the backup system log server.

7. Click **Save** at the top of the page to save these setting permanently.

Generating Log Events of Privileged Commands

Rule Title: RiOS must generate audit records (log events) containing the full-text recording of privileged commands.

STIG ID: RICX-DM-000049

Rule ID: SV-77389r1_rule	Severity: CAT II
Vuln ID: V-62899	Class: Unclass

Reconstruction of harmful events or forensic analysis is not possible if audit records do not contain enough information.

Organizations consider limiting the additional audit information to only that information explicitly needed for specific audit requirements. The additional information required is dependent on the type of information (i.e., sensitivity of the data and the environment within which it resides). At a minimum, the organization must audit full-text recording of privileged commands. The organization must maintain audit trails in sufficient detail to reconstruct events to determine the cause and impact of the security compromise.

Verifying Log Events Are Generated for Privileged Commands

Verify that RiOS is configured to generate audit records (log events) containing the full-text recording of privileged commands.

For detailed information, see “Verifying Log Events are Generated When Accounts Are Created” on page 25.

Generating Log Events for Privileged Commands

Configure RiOS to generate audit records (log events) containing the full-text recording of privileged commands.

For detailed information, see “Generating Log Events When Accounts Are Created” on page 25.

Protecting Audit Information

Rule Title: RiOS must protect audit information from any type of unauthorized read access.

STIG ID: RICX-DM-000061

Rule ID: SV-77413r1_rule	Severity: CAT II
Vuln ID: V-62923	Class: Unclass

Audit information includes all information (for example, audit records, audit settings, and audit reports) needed to successfully audit information system activity.

If audit data were to become compromised, then competent forensic analysis and discovery of the true source of potentially malicious system activity is difficult, if not impossible, to achieve. In addition, access to audit records provides information an attacker could use to his or her advantage.

To ensure the veracity of audit data, the information system and/or the network device must protect audit information from any and all unauthorized read access.

This requirement can be achieved through multiple methods, which will depend upon system architecture and design. Commonly employed methods for protecting audit information include least privilege permissions as well as restricting the location and number of log file repositories.

Additionally, network devices with user interfaces to audit records should not allow for the unfettered manipulation of or access to those records through the device interface. If the device provides access to the audit data, the device becomes accountable for ensuring audit information is protected from unauthorized access.

Verifying the System Is Protecting Audit Information

Verify that RiOS is configured to protect audit information from any type of unauthorized read access.

To verify the system is protecting audit information

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Under Role-Based Accounts, select the user that must have modified permissions to expand the page.

4. Verify that the Basic Diagnostics option is set to Deny. If the control Basic Diagnostics is not set according to the authorization level of the user, this is a security vulnerability finding.

Configuring the System to Protect Audit Information

Configure RiOS to protect audit information from any type of unauthorized read access.

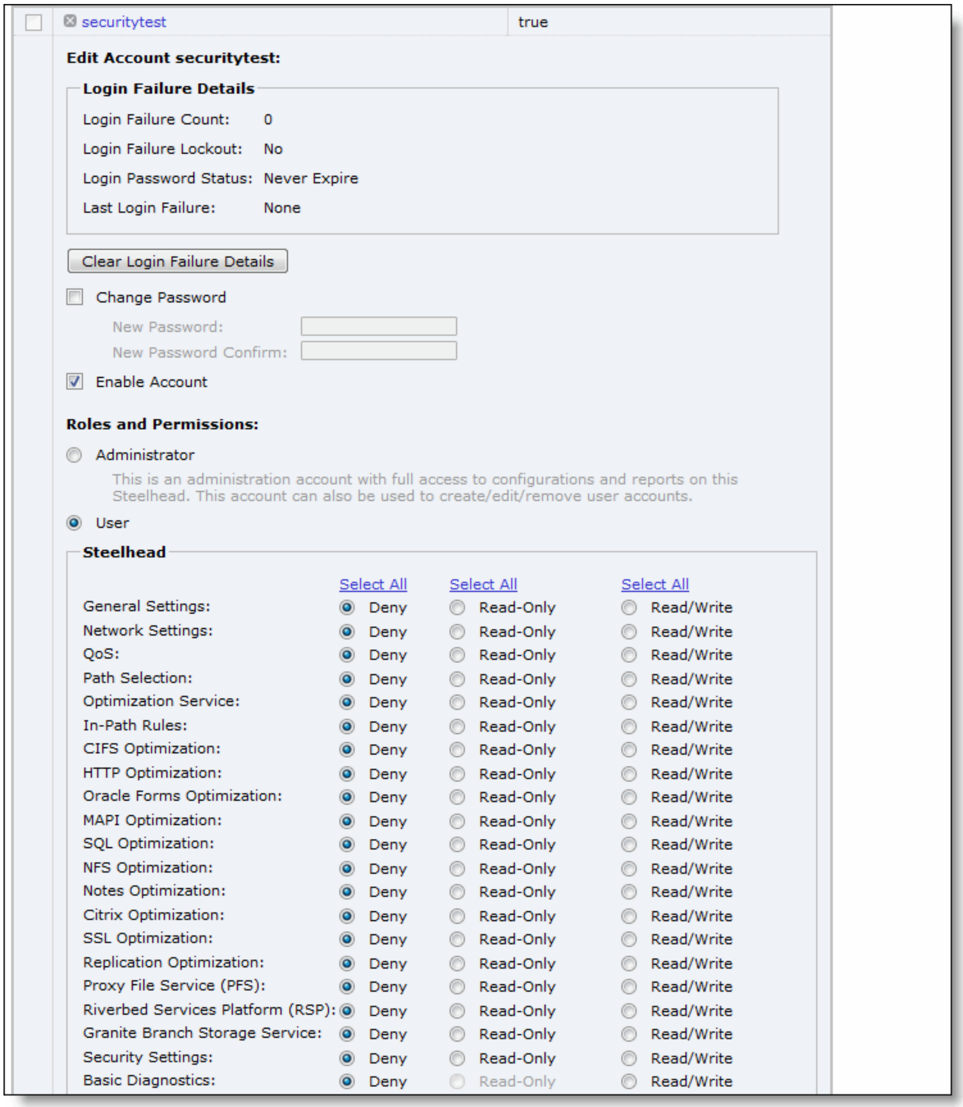
To configure the system to protect audit information

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Under Role-Based Accounts, select the user that must have modified permissions to expand the page.

Figure 2-10. Modifying Basic Diagnostics Option to Deny



□ ☒ securitytest true

Edit Account securitytest:

Login Failure Details

Login Failure Count:	0
Login Failure Lockout:	No
Login Password Status:	Never Expire
Last Login Failure:	None

□ Change Password

New Password:

New Password Confirm:

☑ Enable Account

Roles and Permissions:

○ Administrator

This is an administration account with full access to configurations and reports on this Steelhead. This account can also be used to create/edit/remove user accounts.

● User

Steelhead

	Select All	Select All	Select All
General Settings:	● Deny	○ Read-Only	○ Read/Write
Network Settings:	● Deny	○ Read-Only	○ Read/Write
QoS:	● Deny	○ Read-Only	○ Read/Write
Path Selection:	● Deny	○ Read-Only	○ Read/Write
Optimization Service:	● Deny	○ Read-Only	○ Read/Write
In-Path Rules:	● Deny	○ Read-Only	○ Read/Write
CIFS Optimization:	● Deny	○ Read-Only	○ Read/Write
HTTP Optimization:	● Deny	○ Read-Only	○ Read/Write
Oracle Forms Optimization:	● Deny	○ Read-Only	○ Read/Write
MAPI Optimization:	● Deny	○ Read-Only	○ Read/Write
SQL Optimization:	● Deny	○ Read-Only	○ Read/Write
NFS Optimization:	● Deny	○ Read-Only	○ Read/Write
Notes Optimization:	● Deny	○ Read-Only	○ Read/Write
Citrix Optimization:	● Deny	○ Read-Only	○ Read/Write
SSL Optimization:	● Deny	○ Read-Only	○ Read/Write
Replication Optimization:	● Deny	○ Read-Only	○ Read/Write
Proxy File Service (PFS):	● Deny	○ Read-Only	○ Read/Write
Riverbed Services Platform (RSP):	● Deny	○ Read-Only	○ Read/Write
Granite Branch Storage Service:	● Deny	○ Read-Only	○ Read/Write
Security Settings:	● Deny	○ Read-Only	○ Read/Write
Basic Diagnostics:	● Deny	○ Read-Only	○ Read/Write

4. Set Basic Diagnostics to Deny.

5. Click **Apply**.

6. Click **Save** at the top of the page to save these setting permanently.

Protecting Audit Information from Unauthorized Modification

Rule Title: RiOS must protect audit information from unauthorized modification.

STIG ID: RICX-DM-000062

Rule ID: SV-77415r1_rule Severity: CAT II

Vuln ID: V-62925 Class: Unclass

Audit information includes all information (for example, audit records, audit settings, and audit reports) needed to successfully audit network device activity.

If audit data were to become compromised, then forensic analysis and discovery of the true source of potentially malicious system activity is impossible to achieve.

To ensure the veracity of audit data, the network device must protect audit information from unauthorized modification.

This requirement can be achieved through multiple methods, which will depend upon system architecture and design. Some commonly employed methods include ensuring log files receive the proper file system permissions and limiting log data locations.

Network devices providing a user interface to audit data will leverage user permissions and roles identifying the user accessing the data and the corresponding rights that the user enjoys in order to make access decisions regarding the modification of audit data.

Verifying Audit Information Is Protected from Unauthorized Modification

Verify that RiOS is configured to protect audit information from unauthorized modification.

For detailed information, see "Verifying the System Is Protecting Audit Information" on page 32.

Configuring the System to Protect Audit Information from Unauthorized Modification

Configure RiOS to protect audit information from unauthorized modification.

For detailed information, see "Configuring the System to Protect Audit Information" on page 32.

Protecting Audit Information from Unauthorized Deletion

Rule Title: RiOS must protect audit information from unauthorized deletion.

STIG ID: RICX-DM-000063

Rule ID: SV-77417r1_rule	Severity: CAT II
Vuln ID: V-62927	Class: Unclass

Audit information includes all information (for example, audit records, audit settings, and audit reports) needed to successfully audit information system activity.

If audit data were to become compromised, then forensic analysis and discovery of the true source of potentially malicious system activity is impossible to achieve.

To ensure the veracity of audit data, the network device must protect audit information from unauthorized deletion. This requirement can be achieved through multiple methods, which will depend upon system architecture and design. Some commonly employed methods include ensuring log files receive the proper file system permissions using file system protections, restricting access, and backing up log data to ensure log data is retained.

Network devices providing a user interface to audit data will leverage user permissions and roles identifying the user accessing the data and the corresponding rights the user enjoys in order to make access decisions regarding the deletion of audit data.

Verifying Audit Information Is Protected from Unauthorized Deletion

Verify that RiOS is configured to protect audit information from unauthorized deletion.

For detailed information, see “Verifying the System Is Protecting Audit Information” on page 32.

Configuring the System to Protect Audit Information from Unauthorized Deletion

Configure RiOS to protect audit information from unauthorized deletion.

For detailed information, see “Configuring the System to Protect Audit Information” on page 32.

Protecting Audit Tools from Unauthorized Access

Rule Title: RiOS must protect audit tools from unauthorized access.

STIG ID: RICX-DM-000064

Rule ID: SV-77419r1_rule	Severity: CAT II
Vuln ID: V-62929	Class: Unclass

Protecting audit data also includes identifying and protecting the tools used to view and manipulate log data. Therefore, protecting audit tools is necessary to prevent unauthorized operation on audit data.

Network devices providing tools to interface with audit data will leverage user permissions and roles identifying the user accessing the tools and the corresponding rights the user enjoys in order to make access decisions regarding the access to audit tools.

Audit tools include, but are not limited to, vendor-provided and open source audit tools needed to successfully view and manipulate audit information system activity and records. Audit tools include custom queries and report generators.

Verifying Audit Tools Are Protected from Unauthorized Access

Verify that RiOS is configured to protect audit tools from unauthorized access.

For detailed information, see “Verifying the System Is Protecting Audit Information” on page 32.

Configuring the System to Protect Audit Tools from Unauthorized Access

Configure RiOS to protect audit tools from unauthorized access.

For detailed information, see “Configuring the System to Protect Audit Information” on page 32.

Protecting Audit Tools from Unauthorized Deletion

Rule Title: RiOS must protect audit tools from unauthorized deletion.

STIG ID: RICX-DM-000066

Rule ID: SV-77421r1_rule	Severity: CAT II
Vuln ID: V-62931	Class: Unclass

Protecting audit data also includes identifying and protecting the tools used to view and manipulate log data. Therefore, protecting audit tools is necessary to prevent unauthorized operations on audit data.

Network devices providing tools to interface with audit data will leverage user permissions and roles identifying the user accessing the tools and the corresponding rights the user enjoys in order to make access decisions regarding the access to audit tools.

Audit tools include, but are not limited to, vendor-provided and open source audit tools needed to successfully view and manipulate audit information system activity and records. Audit tools include custom queries and report generators.

Verifying Audit Tools Are Protected from Unauthorized Deletion

Verify that RiOS is configured to protect audit tools from unauthorized deletion.

For detailed information, see "Verifying the System Is Protecting Audit Information" on page 32.

Configuring the System to Protect Audit Tools from Unauthorized Deletion

Configure RiOS to protect audit tools from unauthorized deletion.

For detailed information, see "Configuring the System to Protect Audit Information" on page 32.

Generating Audit Records

Rule Title: RiOS must provide audit record generation capability for DoD-defined auditable events within the network device.

STIG ID: RICX-DM-000071

Rule ID: SV-77423r1_rule Severity: CAT II

Without the capability to generate audit records, it would be difficult to establish, correlate, and investigate the events relating to an incident or identify those responsible for one.

Audit records can be generated from various components within the network device (for example, process, module). Certain specific device functionalities might be audited as well. The list of audited events is the set of events for which audits are to be generated. This set of events is typically a subset of the list of all events for which the system is capable of generating audit records.

The DoD has defined the list of events for which the device will provide an audit record generation capability as the following:

- Successful and unsuccessful attempts to access, modify, or delete privileges, security objects, security levels, or categories of information (for example, classification levels);
- Access actions, such as successful and unsuccessful log in attempts, privileged activities or other system level access, starting and ending time for user access to the system, concurrent log ins from different workstations, successful and unsuccessful accesses to objects, all program initiations, and all direct access to the information system; and
- All account creation, modification, disabling, and termination actions.

Verifying If the System Is Generating Audit Records

Verify that RiOS is configured to off-load audit records (logs) onto a different system than the system being audited.

To verify if the system is generating audit records

1. Connect to the Management Console.

2. Choose Configure > System Settings > Logging to display the Logging page.

3. Under Remote Log Servers verify the list contains IP addresses for all available log servers. If no servers are listed or some are missing, this is a security vulnerability finding.

4. Under Per-Process Logging, verify if a process or severity is listed. (Per-process logging only affects the system log, not the user type facilities.) If a filter has been added in Per-Process Logging that prevents the capture of DoD-defined auditable events, this is a security vulnerability finding.

Configuring the System to Generate Audit Records

Configure RiOS to off-load audit records onto a different system than the system being audited.

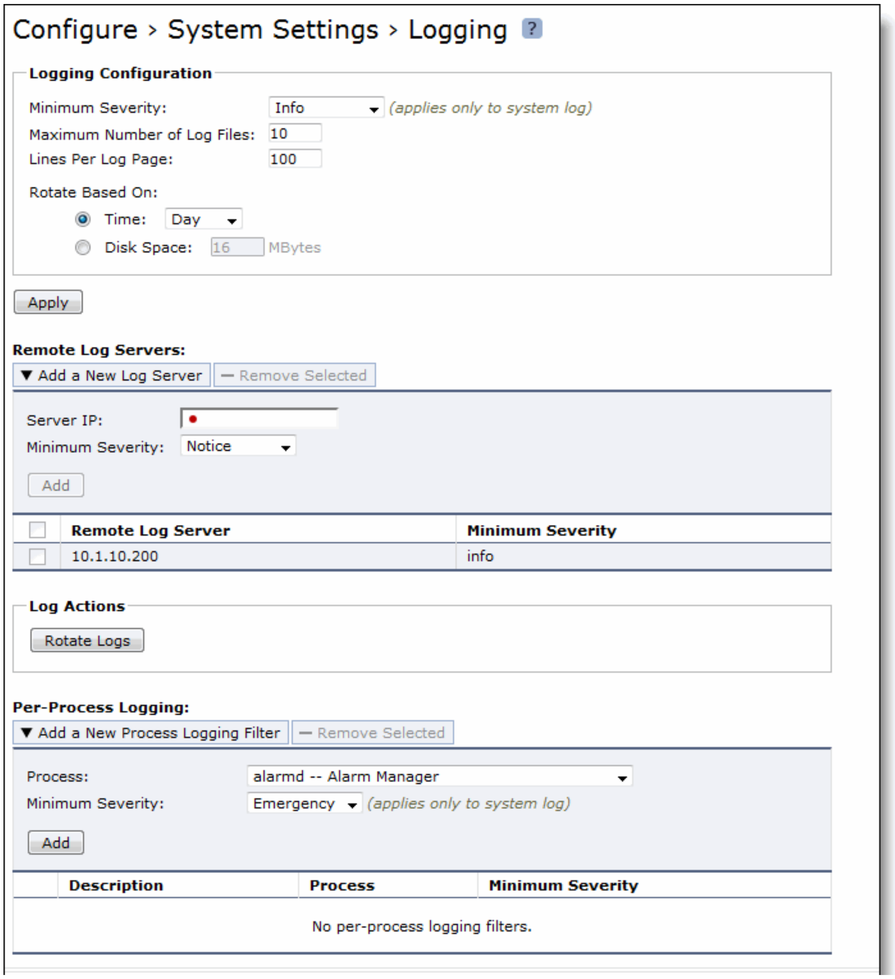
To configure the system to generate audit records

1. Connect to the Management Console.

2. Choose Configure > System Settings > Logging to display the Logging page.

3. Click **Add a New Log Server** to expand the page.

Figure 2-11. Adding a Log Server



Configure > System Settings > Logging

Logging Configuration

Minimum Severity: Info *(applies only to system log)*

Maximum Number of Log Files: 10

Lines Per Log Page: 100

Rotate Based On:

● Time: Day

○ Disk Space: 16 MBytes

Remote Log Servers:

Server IP:

Minimum Severity: Notice

□	Remote Log Server	Minimum Severity
□	10.1.10.200	info

Log Actions

Per-Process Logging:

Process: alarmd -- Alarm Manager

Minimum Severity: Emergency *(applies only to system log)*

Description	Process	Minimum Severity
No per-process logging filters.		

4. Set Server IP to the IP address of the remote log server.

5. Select Info from the Minimum Severity drop-down list.

6. Click **Add**.

7. Under Per-Processing Logging, if any of the filtered processes violate the capture of DoD-defined auditable events, select the check box next to the name and click **Remove Selected**.

8. Click **Apply**.

9. Click **Save** at the top of the page to save these settings permanently.

Ensuring Auditable Events Are Configured by the ISSM

Rule Title: RiOS must allow only the ISSM (or individuals or roles appointed by the ISSM) to select which auditable events are to be logged.

STIG ID: RICX-DM-000072

Rule ID: SV-77425r1_rule	Severity: CAT II
Vuln ID: V-62935	Class: Unclass

Without the capability to restrict which roles and individuals can select which events are audited, unauthorized personnel might be able to prevent the auditing of critical events. Misconfigured audits might degrade the system's performance by overwhelming the audit log. Misconfigured audits might also make it more difficult to establish, correlate, and investigate the events relating to an incident or identify those responsible for one.

Verifying the System Restricts Permissions on Auditable Events

Verify that RiOS restricts permission to select auditable event to authorized administrators.

To verify the system restricts permissions

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Verify that Deny is selected for Basic Diagnostics, TCP Dumps, and Reports permissions. If Deny is not set for users who are not authorized access to configure auditable events, this is a security vulnerability finding.

Configuring the System to Restrict Permissions on Auditable Events

Configure RiOS permission for auditable events.

To configure the system restricts permissions

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Under Role Based Accounts, select a user to expand the page.

4. Select Deny for Basic Diagnostics, TCP Dumps, and Reports user permissions.

5. Click **Save** at the top of the page to save these settings permanently.

Alerts and Events

This section includes these rules:

Generating SNMP Alerts When Local Accounts Are Created

Rule Title: RiOS must generate alerts that can be forwarded to the administrators and ISSO when local accounts are created.

STIG ID: RICX-DM-000011

Rule ID: SV-77337r1_rule Severity: CAT II

Vuln ID: V-62847 Class: Unclass

An authorized insider or individual who maliciously creates a local account could gain immediate access from a remote location to privileged information on a critical security device. Sending an alert to the administrators and ISSO when this action occurs greatly reduces the risk that accounts will be secretly created.

RiOS can be configured to send an SNMP trap to the SNMP server. It also sends a message to the Syslog and the local log. Either of these methods results in an alert that can be forwarded to authorized accounts.

Verifying That Administrators Have the Correct Security Privileges

Verify that RiOS captures an SNMP trap for user creation events that can be sent to the ISSO and designated administrators by the SNMP server.

To verify that administrators have the correct privilege level

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Verify that the privilege level is correct for each administrator. If the privilege level settings are not in accordance with applicable policy, this is a security vulnerability finding.

Configuring the Correct Security Privileges for Administrators

Configure RiOS to capture an SNMP trap for user creation events that can be sent to the information system security officer (ISSO) and designated administrators by the SNMP server.

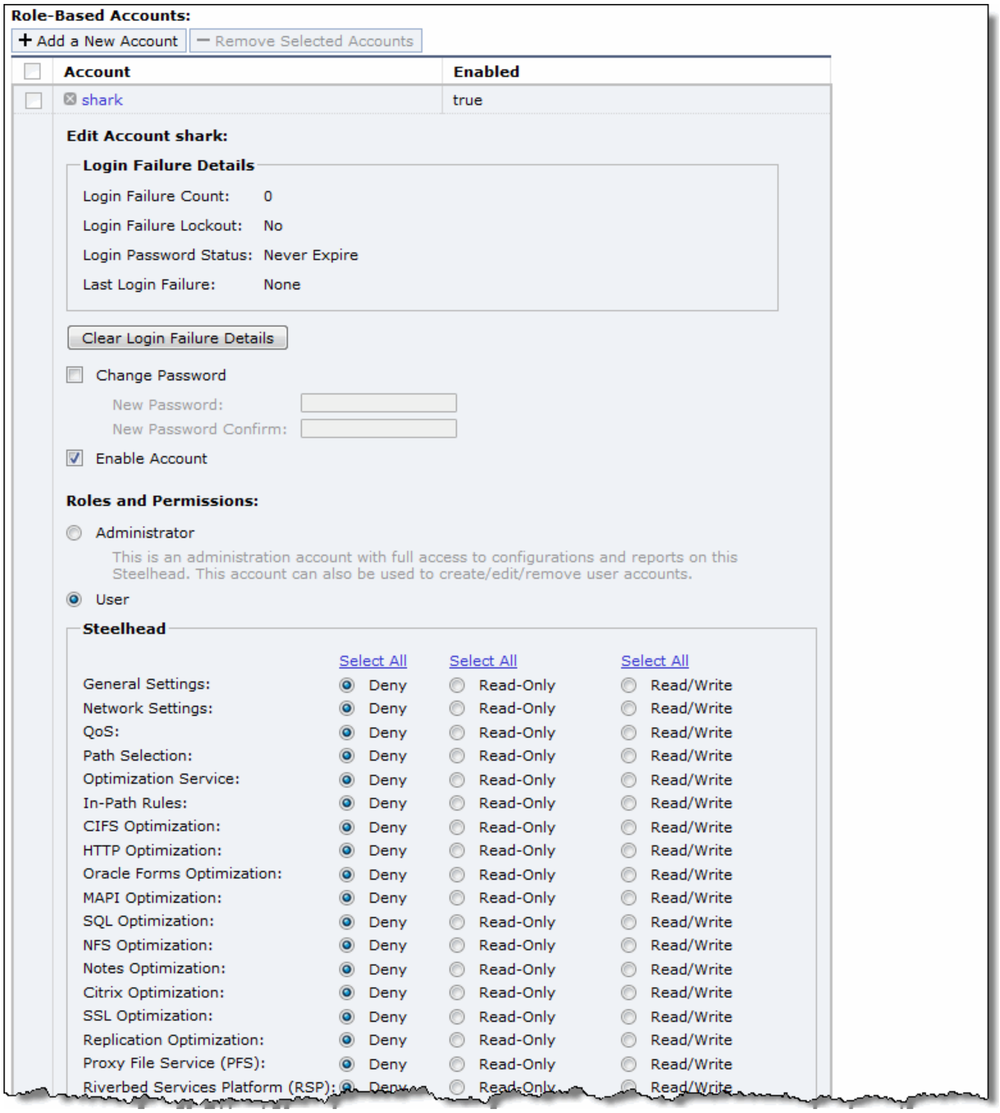
To configure security privileges for administrators

1. Connect to the Management Console.

2. Choose Configure > Security > User Permissions to display the User Permissions page.

3. Click **Add a New Account** to expand the page.

Figure 2-12. Verifying the Shark Account Is Disabled



Role-Based Accounts:

+ Add a New Account — Remove Selected Accounts

□	Account	Enabled
□	☒ shark	true

Edit Account shark:

Login Failure Details

Login Failure Count:	0
Login Failure Lockout:	No
Login Password Status:	Never Expire
Last Login Failure:	None

Clear Login Failure Details

□ Change Password

New Password:

New Password Confirm:

☑ Enable Account

Roles and Permissions:

○ Administrator

This is an administration account with full access to configurations and reports on this Steelhead. This account can also be used to create/edit/remove user accounts.

● User

Steelhead

	Select All	Select All	Select All
General Settings:	● Deny	○ Read-Only	○ Read/Write
Network Settings:	● Deny	○ Read-Only	○ Read/Write
QoS:	● Deny	○ Read-Only	○ Read/Write
Path Selection:	● Deny	○ Read-Only	○ Read/Write
Optimization Service:	● Deny	○ Read-Only	○ Read/Write
In-Path Rules:	● Deny	○ Read-Only	○ Read/Write
CIFS Optimization:	● Deny	○ Read-Only	○ Read/Write
HTTP Optimization:	● Deny	○ Read-Only	○ Read/Write
Oracle Forms Optimization:	● Deny	○ Read-Only	○ Read/Write
MAPI Optimization:	● Deny	○ Read-Only	○ Read/Write
SQL Optimization:	● Deny	○ Read-Only	○ Read/Write
NFS Optimization:	● Deny	○ Read-Only	○ Read/Write
Notes Optimization:	● Deny	○ Read-Only	○ Read/Write
Citrix Optimization:	● Deny	○ Read-Only	○ Read/Write
SSL Optimization:	● Deny	○ Read-Only	○ Read/Write
Replication Optimization:	● Deny	○ Read-Only	○ Read/Write
Proxy File Service (PFS):	● Deny	○ Read-Only	○ Read/Write
Riverbed Services Platform (RSP):	● Deny	○ Read-Only	○ Read/Write

4. Set the values of Roles and Permissions according to the privilege level in accordance with applicable policy.

Control	Description
Account Name	Specify a name for the role-based account.
Password	Specify a password in the text box, and then retype the password for confirmation.
Enable Account	Select the check box to enable the new account.
Administrator	Configures a system administrator role. This role allows permission for all other RBM roles, including creating, editing, and removing user accounts. The system administrator role allows you to add or remove a system administrator role for any other user, but not for yourself. Read-only permission is not allowed for this role.

Control	Description
User	Configures a role that determines whether the user: • has permission to view current configuration settings but not change them (Read-Only). • has permission to view settings and make configuration changes for a feature (Read/Write). • cannot view or save settings or configuration changes for a feature (Deny).
General Settings	Configures per-source IP connection limit and the maximum connection pooling size.
Network Settings	Configures host and network interface settings, including DNS cache settings and hardware assist rules.
QoS	Enforces QoS policies.
Path Selection	Configures path selection.
Optimization Service	Configures alarms, performance features, SkipWare, HS-TCP, and TCP optimization.
In-Path Rules	Configures TCP traffic for optimization and how to optimize traffic by setting in-path rules. This role includes WAN visibility to preserve TCP/IP address or port information. For details about WAN visibility, see the *Steelhead Appliance Deployment Guide*.
CIFS Optimization	Configures CIFS optimization settings (including SMB-signing) and Overlapping Open optimization.
HTTP Optimization	Configures enhanced HTTP optimization settings: URL learning, Parse and Prefetch, Object Prefetch Table, keep-alive, insert cookie, file extensions to prefetch, and the ability to set up HTTP optimization for a specific server subnet.
Oracle Forms Optimization	Optimizes Oracle E-business application content and forms applications.
MAPI Optimization	Optimizes MAPI and sets Exchange and NSPI ports.
NFS Optimization	Configures NFS optimization.
Notes Optimization	Configures Lotus Notes optimization.
Citrix Optimization	Configures Citrix optimization.
SSL Optimization	Configures SSL support and the secure inner channel.
Replication Optimization	Configures the SRDF/A, FCIP, and SnapMirror storage optimization modules.
Proxy File Service (PFS)	Configures the PFS.
Riverbed Services Platform (RSP)	Configures functionality into a virtualized environment on the client Steelhead appliance. The functionality can include third-party packages such as a firewall security package, a streaming video server, or a package that provides core networking services (for example, DNS and DHCP). This role includes permission to install VMware tools and add subnet side rules. For details, see the *RSP User's Guide*.
Granite Branch (SteelFusion Edge) Storage Service	Configures branch storage services on SteelFusion Edge appliances (the branch storage services are only available on a Steelhead EX appliance).
Security Settings	Configures security settings, including RADIUS and TACACS authentication settings and the secure vault password.
Basic Diagnostics	Customizes system diagnostic logs, including system and user log settings, but does not include TCP dumps.

Control	Description
TCP Dumps	Customizes TCP dump settings and allows use of the Shark function for detailed packet analysis through Cascade Pilot.
Reports	Sets system report parameters.
Domain Authentication	Allows joining a Windows domain and configuring Windows domain authentication.
Citrix Acceleration	Configures Citrix optimization.
Add	Adds your settings to the system.
Remove Selected Accounts	Select the check box next to the name and click **Remove Selected**.

5. Click **Apply**.

6. Click **Save** at the top of the page to save these setting permanently.

Generating SNMP Alerts When Accounts Are Modified

Rule Title: RiOS must generate alerts that can be forwarded to the administrators and ISSO when accounts are modified.

STIG ID: RICX-DM-000012

Rule ID: SV-77339r1_rule Severity: CAT III

Vuln ID: V-62849 Class: Unclass

Once an attacker establishes initial access to a system, the attacker often attempts to create a persistent method of reestablishing access. One way to accomplish this is for the attacker to simply modify an existing account. Notification of account modification is one method for mitigating this risk. A comprehensive account management process will ensure an audit trail that documents the modification of device administrator accounts and notifies administrators and Information System Security Officers (ISSO). Such a process greatly reduces the risk that accounts will be secretly modified and provides logging that can be used for forensic purposes.

The network device must generate the alert. Notification might be done by a management server.

Verifying Servers Are Configured as Trap Receivers

Verify that RiOS uses automated mechanisms to alert security personnel to threats identified by authoritative sources.

To verify SNMP settings

1. Connect to the Management Console.

2. Choose Configure > System Settings > SNMP Basic to display the SNMP Basic page.

3. Under Trap Receivers, verify that the host servers in your deployment are listed in the table. If there are no Host Servers defined in Trap Receivers, this is a security vulnerability finding.

Configuring Servers as Trap Receivers

Configure RiOS to use automated mechanisms to alert security personnel to threats identified by authoritative sources.

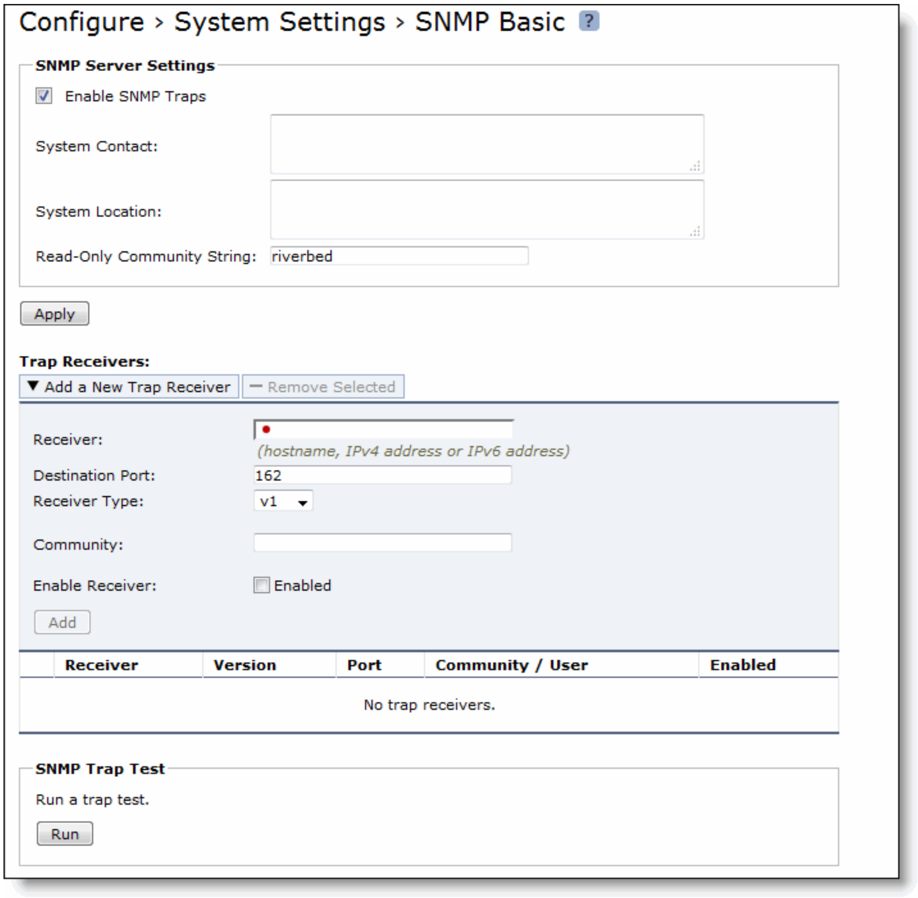
To configure servers as trap receivers

1. Connect to the Management Console.

2. Choose Configure > System Settings > SNMP Basic to display the SNMP Basic page.

3. Click **Add a New Trap Receiver** to expand the page.

Figure 2-13. Adding Trap Receivers



Configure > System Settings > SNMP Basic

SNMP Server Settings

☑ Enable SNMP Traps

System Contact:

System Location:

Read-Only Community String: riverbed

Trap Receivers:

Receiver: (hostname, IPv4 address or IPv6 address)

Destination Port: 162

Receiver Type: v1

Community:

Enable Receiver: □ Enabled

	Receiver	Version	Port	Community / User	Enabled
No trap receivers.					

SNMP Trap Test

Run a trap test.

4. Complete the configuration as described in this table.

Control	Description
Receiver	Specify the destination IPv4 or IPv6 address or hostname for the SNMP trap.
Destination Port	Specify the destination port the receiver is listening on.
Receiver Type	Select SNMP v3 (user-based security model).
Remote User	Specify a remote username on the trap receiver.
Authentication	Optionally, select Supply a Key to use while authenticating users.

Control	Description
Authentication Protocol	Select an authentication method from the drop-down list: • **SHA** - Specifies the Secure Hash Algorithm, a set of related cryptographic hash functions. SHA is considered to be the successor to MD5.
Security Level	Determines whether a single atomic message exchange is authenticated. Select this level from the drop-down list: • **AuthPriv** - Authenticates packets using AES 128 and DES to encrypt messages for privacy. **Note:** A security level applies to a group, not to an individual user.
Privacy Protocol	Select the AES protocol from the drop-down list. AES uses the AES128 algorithm.
Privacy	Select Same as Authentication Key to use while authenticating users. The default setting is Same as Authentication Key.
MD5/SHA Key	Specify a unique authentication key. The key is either a 32-hexadecimal digit MD5 or a 40-hexadecimal digit SHA digest created using md5sum or sha1sum.
Privacy MD5/SHA Key	Specify the privacy authentication key. The key is either a 32-hexadecimal digit MD5 or a 40-hexadecimal digit SHA digest created using md5sum or sha1sum.
Enable Receiver	Select to enable the new trap receiver. Clear to disable the receiver.
Add	Adds a new trap receiver to the list.
Remove Selected	Select the check box next to the name and click **Remove Selected**.

5. Click **Save** at the top of the page to save these settings permanently.

Generating SNMP Alerts When Accounts Are Disabled

Rule Title: RiOS must generate alerts that can be forwarded to the administrators and ISSO when accounts are disabled.

STIG ID: RICX-DM-000013

Rule ID: SV-77341r1_rule Severity: CAT III

Vuln ID: V-62851 Class: Unclass

When application accounts are disabled, administrator accessibility is affected. Accounts are used for identifying individual device administrators or for identifying the device processes themselves.

In order to detect and respond to events that affect administrator accessibility and device processing, devices must audit account disabling actions and, as required, notify the appropriate individuals so they can investigate the event. Such a capability greatly reduces the risk that device accessibility will be negatively affected for extended periods of time and also provides logging that can be used for forensic purposes.

Verifying Servers Are Configured as Trap Receivers

Verify that RiOS uses automated mechanisms to alert security personnel to threats identified by authoritative sources.

For detailed information, see “Verifying Servers Are Configured as Trap Receivers” on page 42.

Configuring Servers as Trap Receivers

Configure RiOS to use automated mechanisms to alert security personnel to threats identified by authoritative sources.

For detailed information, see “Configuring Servers as Trap Receivers” on page 43.

Generating SNMP Alerts When Accounts Are Removed

Rule Title: RiOS must generate alerts that can be forwarded to the administrators and ISSO when accounts are removed.

STIG ID: RICX-DM-000014

Rule ID: SV-77343r1_rule	Severity: CAT III
Vuln ID: V-62853	Class: Unclass

When application accounts are removed, administrator accessibility is affected. Accounts are utilized for identifying individual device administrators or for identifying the device processes themselves.

In order to detect and respond to events that affect administrator accessibility and device processing, devices must audit account removal actions and, as required, notify the appropriate individuals so they can investigate the event. Such a capability greatly reduces the risk that device accessibility will be negatively affected for extended periods of time and also provides logging that can be used for forensic purposes.

Verifying Servers Are Configured as Trap Receivers

Verify that RiOS uses automated mechanisms to alert security personnel to threats identified by authoritative sources.

For detailed information, see “Verifying Servers Are Configured as Trap Receivers” on page 42.

Configuring Servers as Trap Receivers

Configure RiOS to use automated mechanisms to alert security personnel to threats identified by authoritative sources.

For detailed information, see “Configuring Servers as Trap Receivers” on page 43.

Generating Email Alerts

Rule Title: RiOS must generate an email alert for all log in failure events requiring alerts.

STIG ID: RICX-DM-000053

Rule ID: SV-77391r1_rule	Severity: CAT II
Vuln ID: V-62901	Class: Unclass

It is critical for the appropriate personnel to be aware if a system is at risk of failing to process audit logs as required. Without a real-time alert, security personnel might be unaware of an impending failure of the audit capability and system operation might be adversely affected.

Alerts provide organizations with urgent messages. Real-time alerts provide these messages immediately (i.e., the time from event detection to alert occurs in seconds or less).

Verifying the System Is Generating Email Alerts

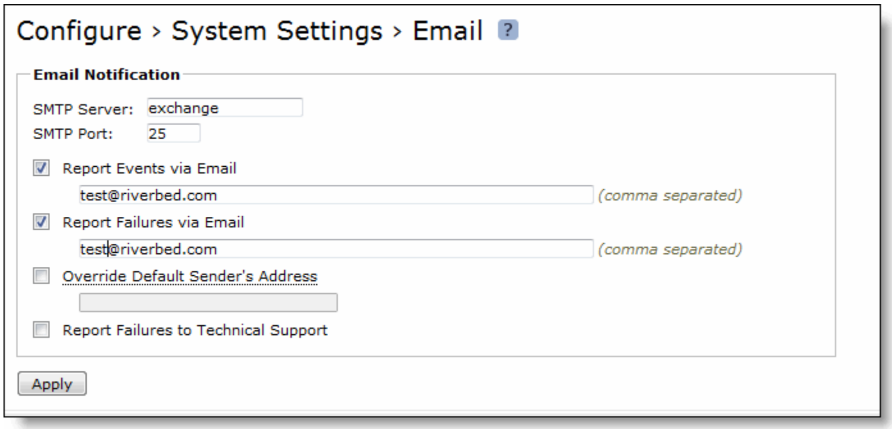
Verify that RiOS is configured to generate an immediate real-time alert for all audit failure events requiring real-time alerts.

To verify the system is generating email alerts

1. Connect to the Management Console.

2. Choose Configure > System Settings > Email to display the Email page.

Figure 2-14. Email Settings



Configure > System Settings > Email

Email Notification

SMTP Server: exchange

SMTP Port: 25

☑ Report Events via Email

test@riverbed.com (comma separated)

☑ Report Failures via Email

test@riverbed.com (comma separated)

□ Override Default Sender's Address

□ Report Failures to Technical Support

3. Verify that an SMTP Server is defined.

4. Verify that an SMTP Port is defined.

5. Verify that the Report Events via Email and the Report Failures via Email check boxes are selected and that at least one email address is defined for each. If no email accounts are defined, this is a security vulnerability finding.

Configuring the System Is Generating Email Alerts

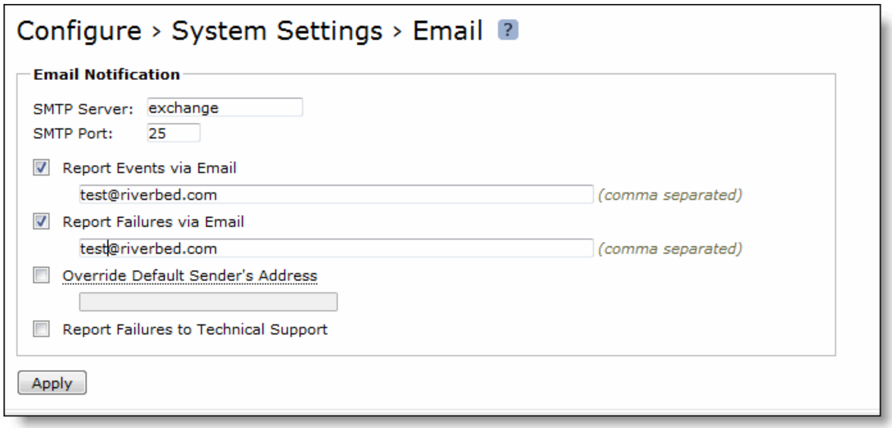
Configure RiOS to generate an immediate real-time alert for all audit failure events requiring real-time alerts.

To configure the system to generate email alerts

1. Connect to the Management Console.

2. Choose Configure > System Settings > Email to display the Email page.

Figure 2-15. Configuring Email Alerts



Configure > System Settings > Email

Email Notification

SMTP Server: exchange
SMTP Port: 25

☑ Report Events via Email
test@riverbed.com *(comma separated)*

☑ Report Failures via Email
test@riverbed.com *(comma separated)*

☐ Override Default Sender's Address

☐ Report Failures to Technical Support

3. Type an SMTP Server name and port number.

4. Select the Report Events via Email and the Report Failures via Email check boxes and specify least one email address for each.

5. Click **Apply**.

6. Click **Save** at the top of the page to save your settings permanently.

Ensuring SNMP Alerts Are Generated if Logging Fails

Rule Title: RiOS must alert the ISSO and the system administrator (SA), at a minimum, in the event of an audit processing failure.

STIG ID: RICX-DM-000054

Rule ID: SV-77407r1_rule Severity: CAT II

Vuln ID: V-62917 Class: Unclass

It is critical for the appropriate personnel to be aware if a system is at risk of failing to process audit logs as required. Without this notification, the security personnel might be unaware of an impending failure of the audit capability and system operation might be adversely affected.

Audit processing failures include software/hardware errors, failures in the audit capturing mechanisms, and audit storage capacity being reached or exceeded.

Verifying Servers Are Configured as Trap Receivers

Verify that RiOS uses automated mechanisms to alert security personnel to threats identified by authoritative sources.

For detailed information, see "Verifying Servers Are Configured as Trap Receivers" on page 42.

Configuring Host Servers Are Configured as Trap Receivers

Configure RiOS to use automated mechanisms to alert security personnel to threats identified by authoritative sources.

For detailed information, see “Configuring Servers as Trap Receivers” on page 43.

System Administration

This section includes these rules:

- “Ensuring Limited Login Attempts” on page 49
- “Ensuring Limited Login Attempts for Web-Based Management” on page 50
- “Ensuring the System Locks After Three Unsuccessful Login Attempts” on page 51
- “Ensuring the Login Message Displays the DoD Notice” on page 51
- “Limiting Concurrent Sessions for Each Administrator” on page 53
- “Ensuring Time Stamps Are Mapped to Coordinated Universal Time” on page 54
- “Ensuring System Clocks are Secure” on page 56
- “Ensuring Logging of System Changes” on page 59
- “Ensuring Secure Passwords” on page 59
- “Ensuring the System Backs Up Configuration Files” on page 60
- “Ensuring the System Implements Replay-Resistant Authentication” on page 62
- “Ensuring the System Authenticates Endpoint Devices” on page 63
- “Ensuring Centrally Managed Authentication Settings” on page 64
- “Ensuring Authentication Settings Are Applied” on page 68
- “Ensuring Authentication Settings Are Centrally Verified” on page 69
- “Ensuring the System Prohibits Use of Nonsecure Functions” on page 69
- “Ensuring the System Authenticates SNMP Servers Before Establishing a Connection” on page 72
- “Ensuring the System Authenticates NTP Servers” on page 73
- “Ensuring the Correct Password Length” on page 76
- “Ensuring Passwords Have an Uppercase Character” on page 77
- “Ensuring Passwords Have a Lowercase Character” on page 79
- “Ensuring Passwords Have a Numeric Character” on page 80
- “Ensuring Passwords Have a Special Character” on page 81
- “Ensuring at Least 15 Password Characters Are Changed” on page 83
- “Ensuring Passwords Enforce 60-Day Maximum Lifetime” on page 84
- “Prohibiting Password Reuse for Five Generations” on page 86
- “Ensure the System is Using FIPS 140-2 Cryptographic Modules” on page 87
- “Ensuring Maintenance Functions Are Restricted” on page 89
- “Ensuring Applications Implement Cryptographic Mechanisms” on page 91
- “Ensuring the System Terminates Network Connections” on page 91

Ensuring Limited Login Attempts

Rule Title: RiOS must enforce the limit of three (3) consecutive invalid login attempts by a user during a 15-minute time period for device console access.

STIG ID: RICX-DM-000024

Rule ID: SV-77349r1_rule	Severity: CAT II
Vuln ID: V-62859	Class: Unclass

By limiting the number of failed login attempts, the risk of unauthorized system access through user password guessing, otherwise known as brute-forcing, is reduced.

Verifying the System Is Configured for a Limited Number of Login Attempts

Verify that RiOS is configured to limit the number of invalid login attempts during a 15 minute period to 3.

To verify whether login attempts are restricted

1. Connect to the Management Console.
2. Choose Configure > Security > Password Policy to display the Password Policy page.
3. Verify that the Maximum unsuccessful logins before account lockout text box is set to 3.
4. Verify that the Wait before account unlock text box is set to 900 seconds.
5. If these settings are missing or incorrect, this is a security vulnerability finding.

Configuring the System for a Limited Number of Log In Attempts

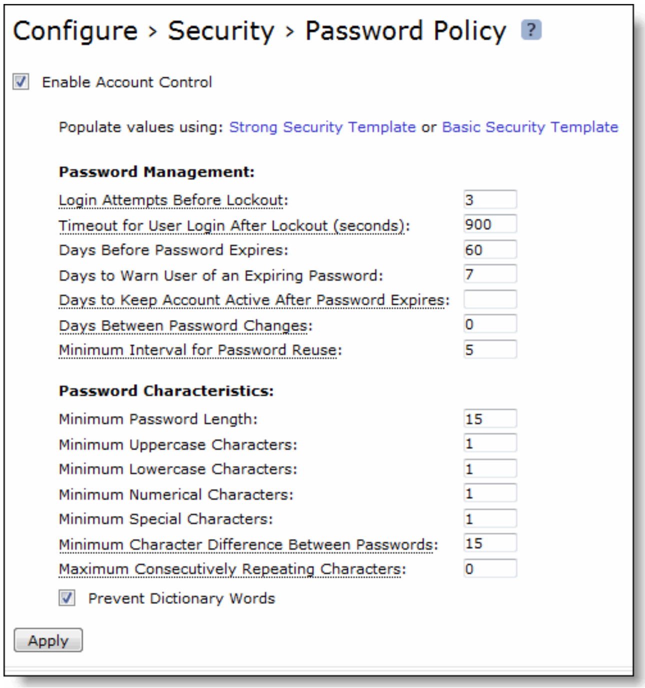
Configure RiOS to limit the number of invalid log in attempts during a 15 minute period to 3.

To configure the system for a limited number of log in attempts

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-16. Configuring a Password Policy



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout:	3
Timeout for User Login After Lockout (seconds):	900
Days Before Password Expires:	60
Days to Warn User of an Expiring Password:	7
Days to Keep Account Active After Password Expires:	
Days Between Password Changes:	0
Minimum Interval for Password Reuse:	5

Password Characteristics:

Minimum Password Length:	15
Minimum Uppercase Characters:	1
Minimum Lowercase Characters:	1
Minimum Numerical Characters:	1
Minimum Special Characters:	1
Minimum Character Difference Between Passwords:	15
Maximum Consecutively Repeating Characters:	0

☑ Prevent Dictionary Words

3. Set the Login Attempts Before Lockout text box to 3.

4. Set the Timeout for the User Login After Lockout (seconds) text box to 900 seconds.

5. Click **Apply**.

6. Click **Save** at the top of the page to save these setting permanently.

Ensuring Limited Login Attempts for Web-Based Management

Rule Title: RiOS must enforce the limit of three consecutive invalid login attempts by a user during a 15-minute time period for web-based management access.

STIG ID: RICX-DM-000025

Rule ID: SV-77351r1_rule	Severity: CAT II
Vuln ID: V-62861	Class: Unclass

By limiting the number of failed login attempts, the risk of unauthorized system access through user password guessing, otherwise known as brute-forcing, is reduced.

Verifying the System Is Configured for a Limited Number of Login Attempts

Verify that RiOS is configured to limit the number of invalid login attempts during a 15-minute period to 3.

For detailed information, see "Verifying the System Is Configured for a Limited Number of Login Attempts" on page 49.

Configuring the System for a Limited Number of Login Attempts

Configure RiOS to limit the number of invalid login attempts during a 15-minute period to 3.

For detailed information, see "Configuring the System for a Limited Number of Log In Attempts" on page 49.

Ensuring the System Locks After Three Unsuccessful Login Attempts

Rule Title: RiOS must automatically lock the account until the locked account is released by an administrator when three unsuccessful login attempts in 15 minutes are exceeded.

STIG ID: RICX-DM-000026

Rule ID: SV-77353r1_rule	Severity: CAT II
Vuln ID: V-62863	Class: Unclass

By limiting the number of failed login attempts, the risk of unauthorized system access through user password guessing, otherwise known as brute-forcing, is reduced. Limits are imposed by locking the account.

Verifying the System Locks After Three Login Attempts

Verify that RiOS is configured to limit the number of invalid login attempts during a 15-minute period to 3.

For detailed information, see "Configuring the System for a Limited Number of Log In Attempts" on page 49.

Configuring the System to Lock After Three Login Attempts

Configure RiOS to limit the number of invalid login attempts during a 15-minute period to 3.

For detailed information, see "Configuring the System for a Limited Number of Log In Attempts" on page 49.

Ensuring the Login Message Displays the DoD Notice

Rule Title: RiOS must display the Standard Mandatory DoD Notice and Consent Banner before granting access to the device.

STIG ID: RICX-DM-000027

Rule ID: SV-77355r1_rule	Severity: CAT II
Vuln ID: V-62865	Class: Unclass

Display of the DoD-approved use notification before granting access to the network device ensures privacy and security notification verbiage used is consistent with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance.

System use notifications are required only for access through login interfaces with human users.

Verifying the System Displays the DoD Notice as the Login Message

Verify that RiOS is configured to display the Standard Mandatory DoD Notice and Consent Banner before granting access to the device.

To verify the login message

1. Connect to the Management Console.

2. Choose Configure > System Settings > Announcements to display the Announcements page.

3. Verify that the Standard Mandatory DoD Notice and Consent Banner is contained in the loin message. If the DoD notice and consent banner do not appear on this page, this is a security vulnerability finding.

Configuring the System Displays the DoD Notice as the Log in Message

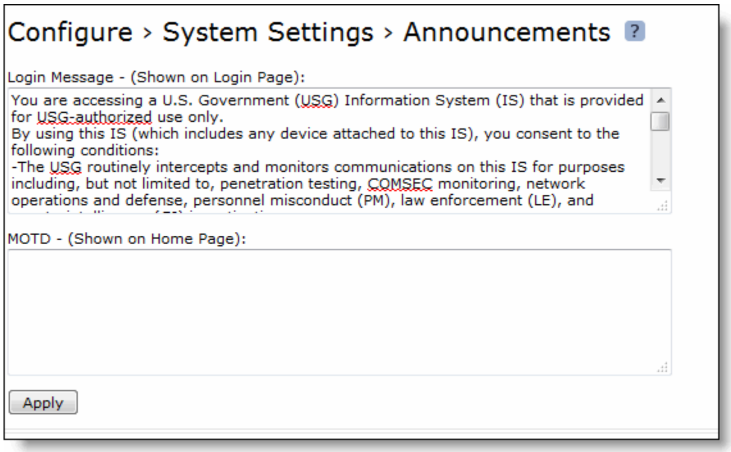
Configure RiOS to display the Standard Mandatory DoD Notice and Consent Banner before granting access to the device.

To configure the login message

1. Connect to the Management Console.

2. Choose Configure > System Settings > Announcements to display the Announcements page.

Figure 2-17. Login Message



Configure > System Settings > Announcements

Login Message - (Shown on Login Page):

You are accessing a U.S. Government (USG) Information System (IS) that is provided for USG-authorized use only.
By using this IS (which includes any device attached to this IS), you consent to the following conditions:
-The USG routinely intercepts and monitors communications on this IS for purposes including, but not limited to, penetration testing, COMSEC monitoring, network operations and defense, personnel misconduct (PM), law enforcement (LE), and

MOTD - (Shown on Home Page):

3. Cut and past the DoD banner into the Login Message text box:

```
You are accessing a U.S. Government (USG) Information System (IS) that is provided for USG-
authorized use only.
By using this IS (which includes any device attached to this IS), you consent to the following
conditions:
-The USG routinely intercepts and monitors communications on this IS for purposes including,
but not limited to, penetration testing, COMSEC monitoring, network operations and defense,
personnel misconduct (PM), law enforcement (LE), and counterintelligence (CI) investigations.
-At any time, the USG might inspect and seize data stored on this IS.
-Communications using, or data stored on, this IS are not private, are subject to routine
monitoring, interception, and search, and might be disclosed or used for any USG-authorized
purpose.
-This IS includes security measures (e.g., authentication and access controls) to protect USG
interests--not for your personal benefit or privacy.
-Notwithstanding the above, using this IS does not constitute consent to PM, LE or CI
investigative searching or monitoring of the content of privileged communications, or work
product, related to personal representation or services by attorneys, psychotherapists, or
clergy, and their assistants. Such communications and work product are private and
confidential. See User Agreement for details.
```

4. Click **Apply**.

5. Click **Save** at the top of the page to save these setting permanently.

Limiting Concurrent Sessions for Each Administrator

Rule Title: RiOS must limit the number of concurrent sessions to one for each administrator account and/or administrator account type.

STIG ID: RICX-DM-000034

Rule ID: SV-77357r1_rule	Severity: CAT II
Vuln ID: V-62867	Class: Unclass

Device management includes the ability to control the number of administrators and management sessions that manage a device. Limiting the number of allowed administrators and sessions per administrator is helpful in limiting risks related to DoS attacks.

This requirement addresses concurrent sessions for administrative accounts and does not address concurrent sessions by a single administrator through multiple administrative accounts. The maximum number of concurrent sessions should be defined based upon mission needs and the operational environment for each system.

Recommended best practice for authentication and authorization is to leverage an AAA server (for example, TACACS or RADIUS). Password of Last Resort is not affected by this requirement. Note that this is a hidden CLI command. Access to the Management Console is not affected by this command.

Verifying Concurrent Sessions are Limited

Verify that RiOS is configured to limit the number of concurrent sessions to one for each administrator account and/or administrator account type. This requirement does not apply to the Admin account.

To verify concurrent sessions are limited

1. Connect to the CLI and enter these commands:

```
enable
show username <user-other-than-admin> detailed
```

2. Verify that Maximum Logins option is set to 1. If it is not set to 1, this is a security vulnerability finding.

Configuring Limited Concurrent Sessions

Configure the number of concurrent sessions to an organization define number for each administrator account and/or administrator type account.

To configure concurrent sessions to be limited

- Connect to the CLI and enter these commands.

```
enable
configuration terminal
authentication policy user <username> max-logins 1
write memory
```

Ensuring Administrator Sessions Are Terminated

Rule Title: RiOS must automatically terminate a network administrator session after organization-defined conditions or trigger events requiring session disconnect.

STIG ID: RICX-DM-000039

Rule ID: SV-77387r1_rule Severity: CAT II

Vuln ID: V-62897 Class: Unclass

Automatic session termination addresses the termination of administrator-initiated logical sessions in contrast to the termination of network connections that are associated with communications sessions (i.e., network disconnect). A logical session (for local, network, and remote access) is initiated whenever an administrator (or process acting on behalf of a user) accesses a network device. Such administrator sessions can be terminated (and thus terminate network administrator access) without terminating network sessions.

Session termination terminates all processes associated with an administrator's logical session except those processes that are specifically created by the administrator (that is, session owner) to continue after the session is terminated.

Conditions or trigger events requiring automatic session termination can include, for example, organization-defined periods of user inactivity, targeted responses to certain types of incidents, and time-of-day restrictions on information system use. These conditions will vary across environments and network device types.

Verifying Administrator Sessions Are Terminated

Verify that RiOS is configured to terminate a network administrator's session after a trigger event such as inactivity timeout.

To verify administrator sessions are terminated

1. Connect to the CLI and enter these commands:

```
enable
show web
```

2. Verify that the Inactivity Timeout option is set to the organizations defined condition. If no triggers are required by the organization, this is a security vulnerability finding.

Configuring Administrator Sessions to Terminate

Configure RiOS to automatically terminate a network administrator's session after a trigger event such as an inactivity timeout.

To configure administrator sessions to terminate

- Connect to the CLI and enter these commands:

```
enable
configuration terminal
web auto-logout <organization defined condition in minutes>
write memory
```

Ensuring Time Stamps Are Mapped to Coordinated Universal Time

Rule Title: RiOS must record time stamps for audit records that can be mapped to Coordinated Universal Time (UTC).

STIG ID: RICX-DM-000059

Rule ID: SV-77411r1_rule Severity: CAT II

Vuln ID: V-62921 Class: Unclass

If time stamps are not consistently applied and there is no common time reference, it is difficult to perform forensic analysis.

Time stamps generated by the application include date and time. Time is commonly expressed in Coordinated Universal Time (UTC), a modern continuation of Greenwich Mean Time (GMT), or local time with an offset from UTC.

Verifying the System Is Configured for UTC

Verify that RiOS is configured to UTC.

To verify the system is configured for UTC

1. Connect to the Management Console.

2. Choose Configure > System Settings > Date and Time to display the Date and Time page.

3. Under Date and Time, verify that UTC is selected in the Time Zone drop-down list. If UTC is not selected this is a security vulnerability finding.

Configuring the System for UTC

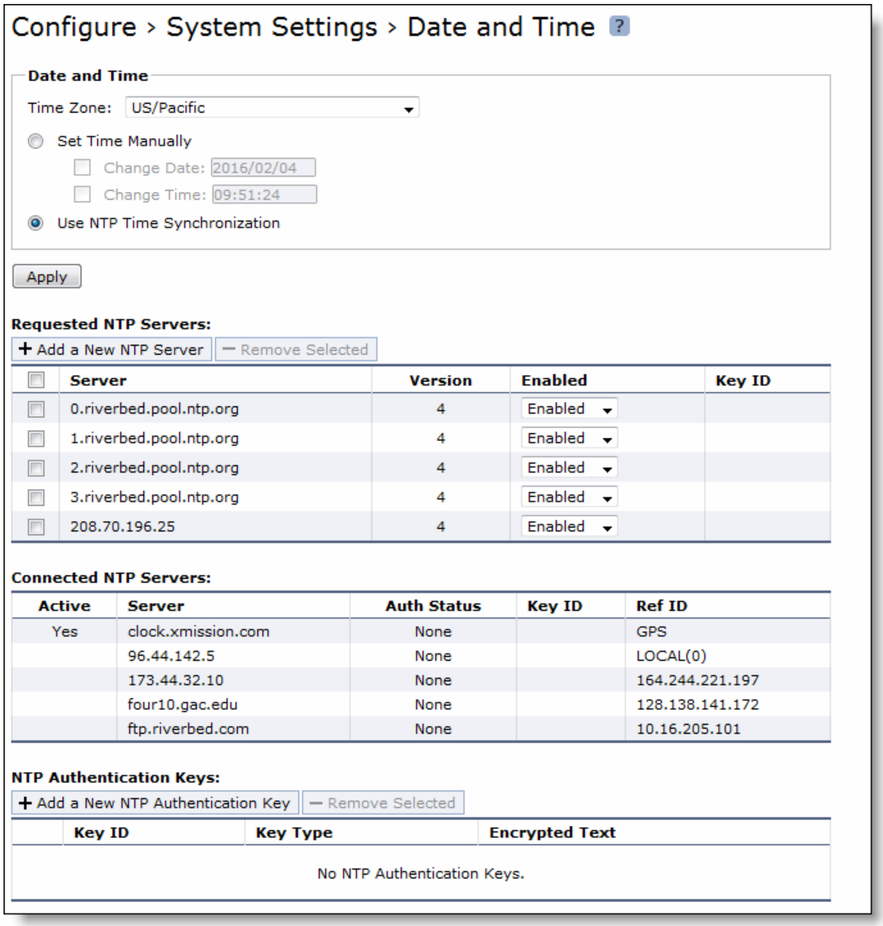
Configure RiOS enable UTC.

To configure the system for UTC

1. Connect to the Management Console.

2. Choose Configure > System Settings > Date and Time to display the Date and Time page.

Figure 2-18. Configuring NTP Servers



Configure > System Settings > Date and Time ?

Date and Time

Time Zone: US/Pacific

○ Set Time Manually

□ Change Date: 2016/02/04

□ Change Time: 09:51:24

● Use NTP Time Synchronization

Requested NTP Servers:

□	Server	Version	Enabled	Key ID
□	0.riverbed.pool.ntp.org	4	Enabled	
□	1.riverbed.pool.ntp.org	4	Enabled	
□	2.riverbed.pool.ntp.org	4	Enabled	
□	3.riverbed.pool.ntp.org	4	Enabled	
□	208.70.196.25	4	Enabled	

Connected NTP Servers:

Active	Server	Auth Status	Key ID	Ref ID
Yes	clock.xmission.com	None		GPS
	96.44.142.5	None		LOCAL(0)
	173.44.32.10	None		164.244.221.197
	four10.gac.edu	None		128.138.141.172
	ftp.riverbed.com	None		10.16.205.101

NTP Authentication Keys:

	Key ID	Key Type	Encrypted Text
	No NTP Authentication Keys.		

3. Select UTC in the Time Zone drop-down list.

4. Click **Apply**.

5. Click **Save** at the top of the page to save these settings permanently.

Ensuring System Clocks are Secure

Rule Title: RiOS must be configured to synchronize internal information system clocks with the primary and secondary time sources located in different geographic regions using redundant authoritative time sources.

STIG ID: RICX-DM-000082

Rule ID: SV-77427r1_rule Severity: CAT II

Vuln ID: V-62937 Class: Unclass

The loss of connectivity to a particular authoritative time source will result in the loss of time synchronization (free-run mode) and increasingly inaccurate time stamps on audit events and other functions.

Multiple time sources provide redundancy by including a secondary source. Time synchronization is usually a hierarchy; clients synchronize time to a local source while that source synchronizes its time to a more accurate source. The network device must utilize an authoritative time server and/or be configured to use redundant authoritative time sources. This requirement is related to the comparison done in CCI-001891.

DoD-approved solutions consist of a combination of a primary and secondary time source using a combination or multiple instances of the following: a time server designated for the appropriate DoD network (NIPRNet/SIPRNet); United States Naval Observatory (USNO) time servers; and/or the Global Positioning System (GPS). The secondary time source must be located in a different geographic region than the primary time source.

Verifying System Clocks are Secure

Verify that RiOS is configured to synchronize internal information system clocks with the primary and secondary time sources located in different geographic regions.

To verify the system clocks are secure

1. Connect to the Management Console.
2. Choose Configure > System Settings > Date and Time to display the Date and Time page.
3. Under Requested NTP Servers, verify that at least two servers are configured. If no NTP servers are visible, this is a security vulnerability finding.

Configuring System Clocks for Security

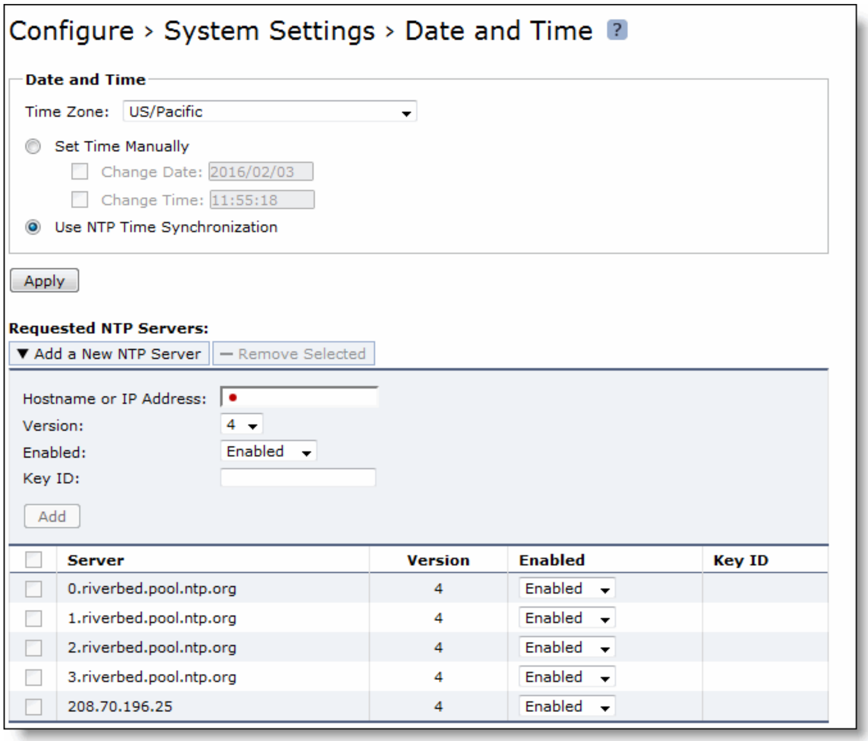
Configure RiOS to synchronize internal information system clocks with the primary and secondary time sources located in different geographic regions.

To configure the system clocks for security

1. Connect to the Management Console.
2. Choose Configure > System Settings > Date and Time to display the Date and Time page.
3. Click **Add a New NTP Server** to expand the page.

4. Select Use NTP Time Synchronization and click **Apply**.

Figure 2-19. Adding NTP Servers



Configure › System Settings › Date and Time

Date and Time

Time Zone: US/Pacific

○ Set Time Manually

□ Change Date: 2016/02/03

□ Change Time: 11:55:18

● Use NTP Time Synchronization

Apply

Requested NTP Servers:

▼ Add a New NTP Server — Remove Selected

Hostname or IP Address:

Version: 4

Enabled: Enabled

Key ID:

Add

□	Server	Version	Enabled	Key ID
□	0.riverbed.pool.ntp.org	4	Enabled	
□	1.riverbed.pool.ntp.org	4	Enabled	
□	2.riverbed.pool.ntp.org	4	Enabled	
□	3.riverbed.pool.ntp.org	4	Enabled	
□	208.70.196.25	4	Enabled	

5. Configure two NTP servers by completing the configuration as described in this table.

Control	Description
Add a New NTP Server	Displays the controls to add a server.
Hostname or IP Address	Specify the hostname or IP address for the NTP server. You can connect to an NTP public server pool. For example, 0.riverbed.pool.ntp.org. When you add an NTP server pool, the server is selected from a pool of time servers.
Version	Select the NTP server version from the drop-down list: 3 or 4.
Enabled/Disabled	Select Enabled from the drop-down list to connect to the NTP server.
Key ID	Specify the MD5 or SH1 key identifier to use to authenticate the NTP server. The valid range is from 1 to 65534. The key ID must appear on the trusted keys list.
Add	Adds the NTP server to the server list.
Remove Selected	Select the check box next to the name and click **Remove Selected**.

6. Click **Save** at the top of the page to save these settings permanently.

Ensuring Logging of System Changes

Rule Title: RiOS must generate a log event for the enforcement actions used to restrict access associated with changes to the device.

STIG ID: RICX-DM-000085

Rule ID: SV-77429r1_rule	Severity: CAT II
Vuln ID: V-62939	Class: Unclass

Without auditing the enforcement of access restrictions against changes to the device configuration, it will be difficult to identify attempted attacks, and an audit trail will not be available for forensic investigation for after-the-fact actions.

Enforcement actions are the methods or mechanisms used to prevent unauthorized changes to configuration settings. Enforcement action methods might be as simple as denying access to a file based on the application of file permissions (access restriction). Audit items might consist of lists of actions blocked by access restrictions or changes identified after the fact.

For RiOS, all configuration changes authorized or unauthorized are logged in the system logs. Log entries include the user that initiated the configuration change for accountability.

Verifying Logging of Changes to the System

Verify that RiOS is configured to audit the enforcement actions used to restrict access associated with changes to the device.

For detailed information, see "Verifying Log Events are Generated When Accounts Are Created" on page 25.

Configuring Logging of Changes to the System

Configure RiOS to audit the enforcement actions used to restrict access associated with changes to the device.

For detailed information, see "Generating Log Events When Accounts Are Created" on page 25.

Ensuring Secure Passwords

Rule Title: RiOS must enable the password authentication control policy to ensure password complexity controls and other password policy requirements are enforced.

STIG ID: RICX-DM-000091

Rule ID: SV-77431r1_rule	Severity: CAT II
Vuln ID: V-62941	Class: Unclass

Password complexity, or strength, is a measure of the effectiveness of a password in resisting attempts at guessing and brute-force attacks.

Verifying Passwords Are Secured

Verify authentication policy is enabled.

To verify that a password policy is configured

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

3. Verify the Enable Account Control check box is selected. If the check box is selected, this is a security vulnerability finding.

Configuring a Password Policy

Enable RiOS authentication policy.

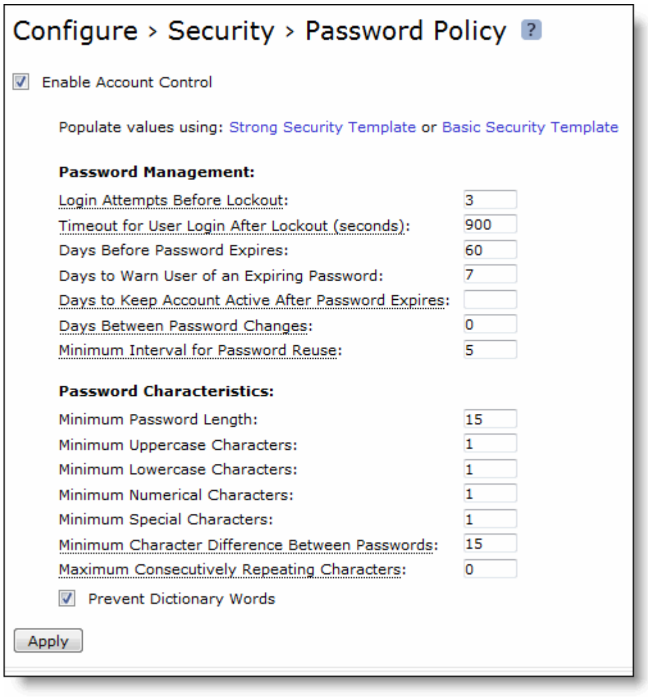
To configure a password policy

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

3. Select the Enable Account Control check box.

Figure 2-20. Setting Password Policy



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout: 3

Timeout for User Login After Lockout (seconds): 900

Days Before Password Expires: 60

Days to Warn User of an Expiring Password: 7

Days to Keep Account Active After Password Expires:

Days Between Password Changes: 0

Minimum Interval for Password Reuse: 5

Password Characteristics:

Minimum Password Length: 15

Minimum Uppercase Characters: 1

Minimum Lowercase Characters: 1

Minimum Numerical Characters: 1

Minimum Special Characters: 1

Minimum Character Difference Between Passwords: 15

Maximum Consecutively Repeating Characters: 0

☑ Prevent Dictionary Words

4. Set the user account values.

5. Click **Apply**.

6. Click **Save** at the top of the page to save these settings permanently.

Ensuring the System Backs Up Configuration Files

Rule Title: RiOS must back up the system configuration files when configuration changes are made to the device.

STIG ID: RICX-DM-000100

Rule ID: SV-77441r1_rule	Severity: CAT II
Vuln ID: V-62951	Class: Unclass

Information system backup is a critical step in maintaining data assurance and availability. Information system and security-related documentation contains information pertaining to system configuration and security settings. If this information were not backed up, and a system failure were to occur, the security settings would be difficult to reconfigure quickly and accurately. Maintaining a backup of information system and security-related documentation provides for a quicker recovery time when system outages occur.

This control requires the network device to support the organizational central backup process for user account information associated with the network device. This function might be provided by the network device itself; however, the preferred best practice is a centralized backup rather than each network device performing discrete backups.

Verifying the System Backs Up Configuration Files

Verify that RiOS is backed up when system configuration changes are made to the device by interviewing the site representative and checking any existing backup log. Evidence might also be provided by the date of the last back up.

To verify the system backs up configuration files

1. Connect to the Management Console.

2. Choose Configure > Configurations to display the Configurations page.

3. Verify that the table for Configuration and Date contains backup configurations. If there are no entries under Configuration and Date, this is a security vulnerability finding.

Configuring the System to Back Up Configuration Files

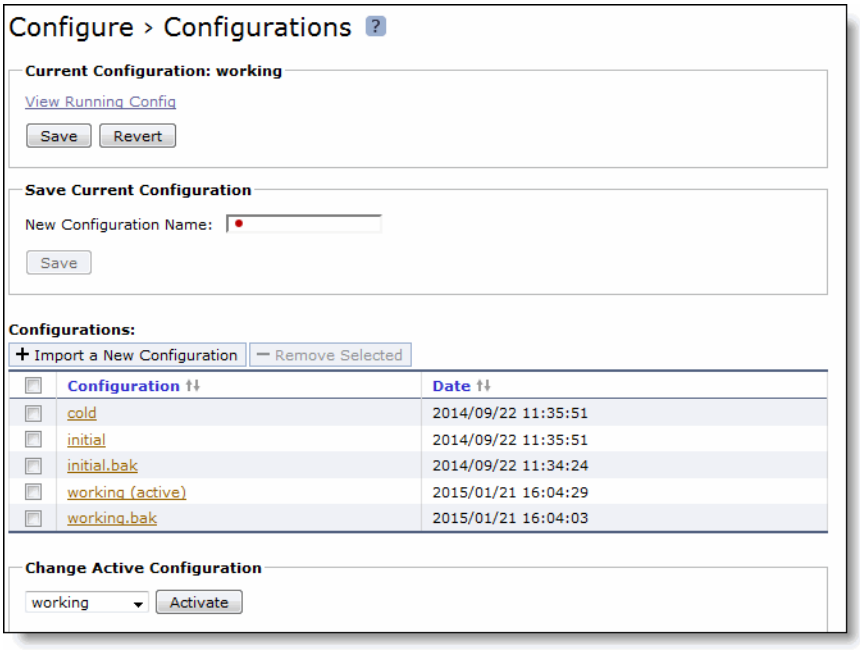
When changes are made to the system configuration, use the following procedure for backing up the device.

To configure the system backs up configuration files

1. Connect to the Management Console.

2. Choose Configure > Configurations to display the Configurations page.

Figure 2-21. Managing Configurations



Current Configuration: working

Save Current Configuration

New Configuration Name:

Configurations:

□	Configuration	Date
□	cold	2014/09/22 11:35:51
□	initial	2014/09/22 11:35:51
□	initial.bak	2014/09/22 11:34:24
□	working (active)	2015/01/21 16:04:29
□	working.bak	2015/01/21 16:04:03

Change Active Configuration

working

3. Set the value of New Configuration Name to the naming standards for the organization backups.

4. Click **Save**.

5. Under Configurations, verify that the saved configuration is listed with the current date and time.

Ensuring the System Implements Replay-Resistant Authentication

Rule Title: RiOS must implement replay-resistant authentication mechanisms for network access to privileged accounts.

STIG ID: RICX-DM-000106

Rule ID: SV-77443r1_rule Severity: CAT II

Vuln ID: V-62953 Class: Unclass

A replay attack might enable an unauthorized user to gain access to the application. Authentication sessions between the authenticator and the application validating the user credentials must not be vulnerable to a replay attack.

An authentication process resists replay attacks if it is impractical to achieve a successful authentication by recording and replaying a previous authentication message.

Techniques used to address this security issue include protocols using nonces (for example, numbers generated for a specific one-time use) or challenges (for example, TLS, WS_Security). Additional techniques include time-synchronous or challenge-response one-time authenticators.

Verifying the System Implements Replay-Resistant Authentication

Verify that RiOS is configured to implement replay resistant authentication mechanisms for network access to privileged accounts.

To verify the system implements replay-resistant authentication

1. Connect to the CLI and enter these commands:

```
enable
show config full
```

2. Press the spacebar to scroll through the configuration and verify that these commands are contained in the configuration:

```
no web http enable
web https enable
no web ssl protocol sslv3
no web ssl protocol tlsv1
web ssl protocol tlsv1.1
web ssl protocol tlsv1.2
```

   If all of the above configurations are not defined as listed, this is a security vulnerability finding.

Configuring the System Implements Replay-Resistant Authentication

Configure RiOS to implement replay resistant authentication mechanisms for network access to privileged accounts.

To configure the system implements replay-resistant authentication

- Connect to the CLI and enter these commands:

```
enable
configuration terminal
no web http enable
web https enable
no web ssl protocol sslv3
no web ssl protocol tlsv1
web ssl protocol tlsv1.1
web ssl protocol tlsv1.2
write memory
exit
```

Ensuring the System Authenticates Endpoint Devices

Rule Title: RiOS must authenticate network management endpoint devices before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based.

STIG ID: RICX-DM-000109

Rule ID: SV-77445r1_rule Severity: CAT II

Vuln ID: V-62955 Class: Unclass

Without authenticating devices, unidentified or unknown devices might be introduced, thereby facilitating malicious activity. Bidirectional authentication provides stronger safeguards to validate the identity of other devices for connections that are of greater risk.

A local connection is any connection with a device communicating without the use of a network. A network connection is any connection with a device that communicates through a network (for example, local area or wide area network, Internet). A remote connection is any connection with a device communicating through an external network (for example, the Internet).

Because of the challenges of applying this requirement on a large scale, organizations are encouraged to only apply the requirement to those limited number (and type) of devices that truly need to support this capability. For network device management, this has been determined to be network management device addresses, SNMP authentication, and NTP authentication.

Verifying the System Authenticates Endpoint Devices

Verify that RiOS is configured to authenticate network management endpoint devices before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based (network management portion of the requirement).

To verify the system authenticates endpoint devices

1. Connect to the CLI and enter these commands:

```
enable
show configuration full
```

2. Press the spacebar to scroll through the configuration and verify that these commands are contained in the configuration:

```
no telnet-server enable
ssh server enable
web enable
no web http enable
web https enable
```

If any one of the above settings is missing from the configuration, this is a security vulnerability finding.

Configuring the System Authenticates Endpoint Devices

Configure RiOS to Authenticate network management endpoint devices before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based (network management portion of the requirement).

To configure the system to authenticate endpoint devices

- Connect to the CLI and enter these commands:

```
enable
show configuration full
no telnet-server enable
ssh server enable
ssh server allowed-cyphers aes128-cbc,3des-cbc,aes192-cbc,aes256-cbc,aes128-ctr,aes192-
ctr,aes256-ctr
web enable
no web http enable
web https enable
write memory
exit
exit
```

Ensuring Centrally Managed Authentication Settings

Rule Title: RiOS must employ automated mechanisms to centrally manage authentication settings.

STIG ID: RICX-DM-000092

Rule ID: SV-77433r1_rule Severity: CAT II

Vuln ID: V-62943 Class: Unclass

The use of authentication servers or other centralized management servers for providing centralized authentication services is required for network device management. Maintaining local administrator accounts for daily usage on each network device without centralized management is not scalable or feasible. Without centralized management, it is likely that credentials for some network devices will be forgotten, leading to delays in administration, which itself leads to delays in remediating production problems and in addressing compromises in a timely fashion.

Verifying Centrally Managed Authentication Settings

Verify that RiOS is configured to employ automated mechanisms to centrally manage authentication settings.

To verify centrally managed authentication

1. Connect to the Management Console.
2. Choose Configure > Security > TACACS+ to display the TACACS+ page.
3. Verify that TACACS+ Servers has at least one server defined. Verify that TACACS+ Servers has at least one server defined. f no servers exist in the TACACS+ Servers list, this is a security vulnerability finding.

— or —

4. Choose Configure > Security > RADIUS to display the RADIUS page.
5. Verify that RADIUS Servers has at least one server defined. If no servers exist in the RADIUS Servers list, this is a security vulnerability finding.

Configuring Centrally Managed Authentication

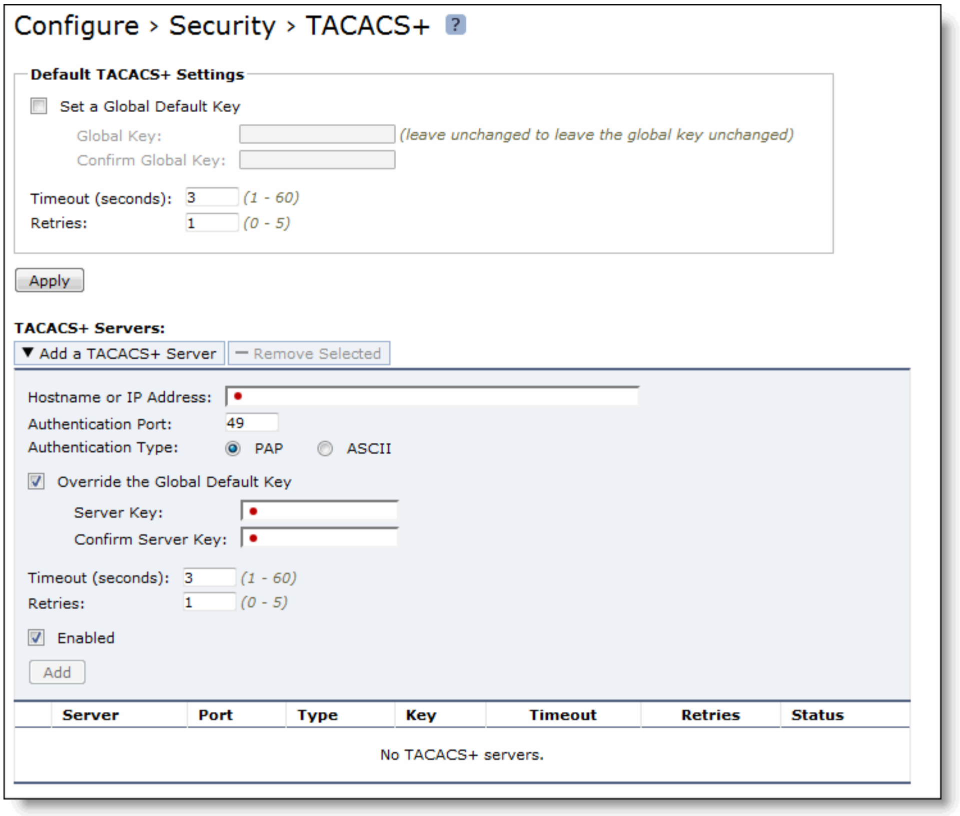
Configure RiOS to employ automated mechanisms to centrally manage authentication settings.

To configure centrally managed authentication settings

1. Connect to the Management Console.
2. Choose Configure > Security > TACACS+ to display the TACACS+ page.

3. Click **Add a TACACS+ Server** to expand the page.

Figure 2-22. Adding a TACACS+ Server



Configure > Security > TACACS+

Default TACACS+ Settings

☐ Set a Global Default Key

Global Key: *(leave unchanged to leave the global key unchanged)*

Confirm Global Key:

Timeout (seconds): 3 *(1 - 60)*

Retries: 1 *(0 - 5)*

Apply

TACACS+ Servers:

▼ Add a TACACS+ Server — Remove Selected

Hostname or IP Address:

Authentication Port: 49

Authentication Type: ● PAP ○ ASCII

☑ Override the Global Default Key

Server Key:

Confirm Server Key:

Timeout (seconds): 3 *(1 - 60)*

Retries: 1 *(0 - 5)*

☑ Enabled

Add

	Server	Port	Type	Key	Timeout	Retries	Status
	No TACACS+ servers.						

4. Under Default TACACS+ Settings, configure a Global Default Key as described in this table.

Control	Description
Set a Global Default Key	Enable a global server key for the server.
Global Key	Specify the global server key to the required value.
Confirm Global Key	Confirms the global server key.
Timeout	Optionally, specify the time-out period in seconds (1 to 60). The default value is 3.
Retries	Optionally, specify the number of times you want to allow the user to retry authentication. Valid values are from 0 to 5. The default is 1.

5. Click **Apply**.

6. Under TACACS+ Servers, add a TACACS+ server as described in this table.

Control	Description
Hostname or IP Address	Specify the hostname or server IP address.
Authentication Port	Specify the port for the server. The default value is 49.
Authentication Type	Select either PAP or ASCII as the authentication type. The default value is PAP.

Control	Description
Override the Global Default Key	Specify this option to override the global server key for the server.
Server Key	Specify the override server key.
Confirm Server Key	Confirm the override server key.
Timeout	Specify the time-out period in seconds (1 to 60). The default is 3.
Retries	Specify the number of times you want to allow the user to retry authentication. Valid values are from 0 to 5. The default is 1.
Enabled	Enables the new server.

7. Click **Add**.

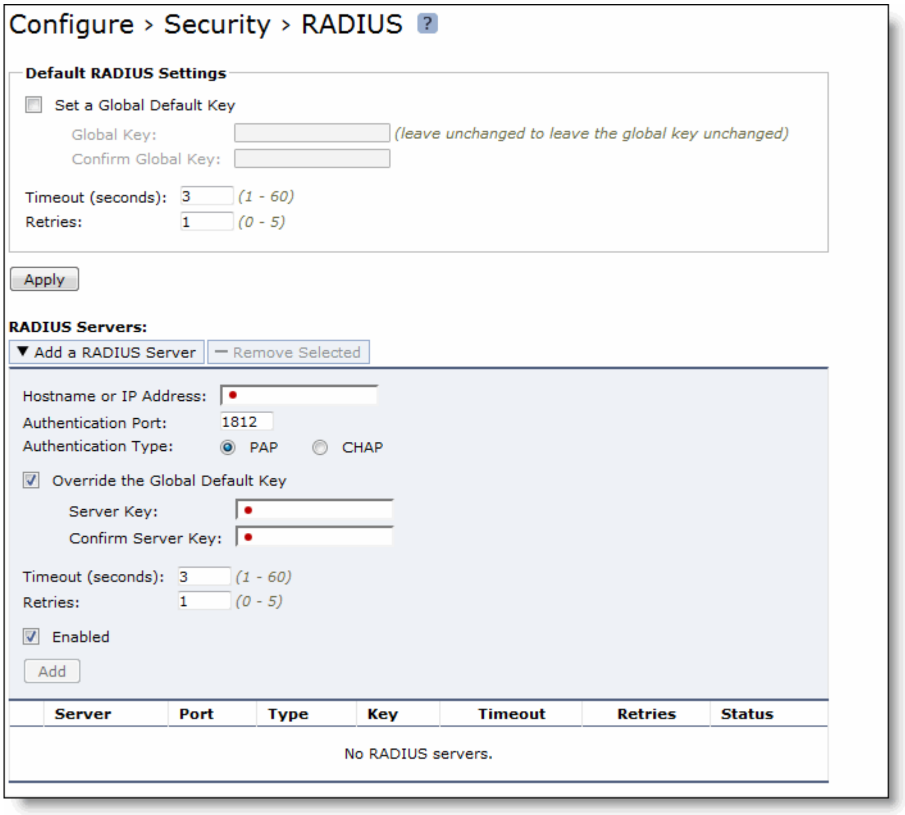
8. Click **Save** at the top of the page to save these settings permanently.

— or —

1. Choose Configure > Security > RADIUS to display the RADIUS page.

2. Click **Add a RADIUS Server** to expand the page.

Figure 2-23. Adding a RADIUS Server



□ Set a Global Default Key

Global Key: (leave unchanged to leave the global key unchanged)

Confirm Global Key:

Timeout (seconds): 3 (1 - 60)

Retries: 1 (0 - 5)

Hostname or IP Address:

Authentication Port: 1812

Authentication Type: ● PAP ○ CHAP

☑ Override the Global Default Key

Server Key:

Confirm Server Key:

Timeout (seconds): 3 (1 - 60)

Retries: 1 (0 - 5)

☑ Enabled

Server	Port	Type	Key	Timeout	Retries	Status

No RADIUS servers.

3. Under Default RADIUS Settings, configure a Global Default Key as described in this table.

Control	Description
Set a Global Default Key	Enable a global server key for the RADIUS server.
Global Key	Specify the global server key to the required value.
Confirm Global Key	Confirm the global server key.
Timeout	Specify the time-out period in seconds (1 to 60). The default value is 3.
Retries	Specify the number of times you want to allow the user to retry authentication. The default value is 1.

4. Click **Apply**.

5. Under RADIUS Servers, add a RADIUS server as described in this table.

Control	Description
Add a RADIUS Server	Displays the controls for defining a new RADIUS server.
Hostname or IP Address	Specify the hostname or server IP address. RiOS does not support IPv6 server IP addresses.
Authentication Port	Specify the port for the server.
Authentication Type	Select this authentication type: • **CHAP** - Challenge-Handshake Authentication Protocol (CHAP), which provides better security than PAP. CHAP validates the identity of remote clients by periodically verifying the identity of the client using a three-way handshake. This validation happens at the time of establishing the initial link and might happen again at any time. CHAP bases verification on a user password and transmits an MD5 sum of the password from the client to the server.
Override the Global Default Key	Overrides the global server key for the server. • **Server Key** - Specify the override server key. • **Confirm Server Key** - Confirm the override server key.
Timeout	Specify the time-out period in seconds (1 to 60). The default value is 3.
Retries	Specify the number of times you want to allow the user to retry authentication. Valid values are from 0 to 5. The default value is 1.
Enabled	Enables the new server.

6. Click **Add**.

7. Click **Save** at the top of the page to save these settings permanently.

Ensuring Authentication Settings Are Applied

Rule Title: RiOS must employ automated mechanisms to centrally apply authentication settings.

STIG ID: RICX-DM-000093

Rule ID: SV-77435r1_rule Severity: CAT II

Vuln ID: V-62945 Class: Unclass

The use of authentication servers or other centralized management servers for providing centralized authentication services is required for network device management. Maintaining local administrator accounts for daily usage on each network device without centralized management is not scalable or feasible. Without centralized management, it is likely that credentials for some network devices will be forgotten, leading to delays in administration, which itself leads to delays in remediating production problems and in addressing compromises in a timely fashion.

Verifying That Authentication Settings Are Centrally Applied

Verify that RiOS is configured to employ automated mechanisms to centrally apply authentication settings.

For detailed information, see "Verifying Centrally Managed Authentication Settings" on page 65.

Configuring the System to Centrally Apply Authentication Settings

Configure RiOS to employ automated mechanisms to centrally apply authentication settings.

For detailed information, see "Configuring Centrally Managed Authentication" on page 65.

Ensuring Authentication Settings Are Centrally Verified

Rule Title: RiOS must employ automated mechanisms to centrally verify authentication settings.

STIG ID: RICX-DM-000094

Rule ID: SV-77437r1_rule	Severity: CAT II
Vuln ID: V-62947	Class: Unclass

The use of authentication servers or other centralized management servers for providing centralized authentication services is required for network device management. Maintaining local administrator accounts for daily usage on each network device without centralized management is not scalable or feasible. Without centralized management, it is likely that credentials for some network devices will be forgotten, leading to delays in administration, which itself leads to delays in remediating production problems and in addressing compromises in a timely fashion.

Verifying That Authentication Settings Are Centrally Verified

Verify that RiOS is configured to employ automated mechanisms to centrally verify authentication settings.

For detailed information, see "Verifying Centrally Managed Authentication Settings" on page 65.

Configuring the System to Centrally Verify Authentication Settings

Configure RiOS to employ automated mechanisms to centrally verify authentication settings.

For detailed information, see "Configuring Centrally Managed Authentication" on page 65.

Ensuring the System Prohibits Use of Nonsecure Functions

Rule Title: RiOS must be configured to prohibit the use of all unnecessary and/or nonsecure functions, ports, protocols, and/or services, as defined in the PPSM CAL and vulnerability assessments.

STIG ID: RICX-DM-000096

Rule ID: SV-77439r1_rule	Severity: CAT II
Vuln ID: V-62949	Class: Unclass

In order to prevent unauthorized connection of devices, unauthorized transfer of information, or unauthorized tunneling (i.e., embedding of data types within data types), organizations must disable unused or unnecessary physical and logical ports/protocols on information systems.

Network devices are capable of providing a wide variety of functions and services. Some of the functions and services provided by default might not be necessary to support essential organizational operations. Additionally, it is sometimes convenient to provide multiple services from a single component (for example, email and web services); however, doing so increases risk over limiting the services provided by any one component.

To support the requirements and principles of least functionality, the network device must support the organization's requirements providing only essential capabilities and limiting the use of ports, protocols, and/or services to only those required, authorized, and approved to conduct official business or to address authorized quality of life issues.

Verifying the System Prohibits Use of Nonsecure Functions

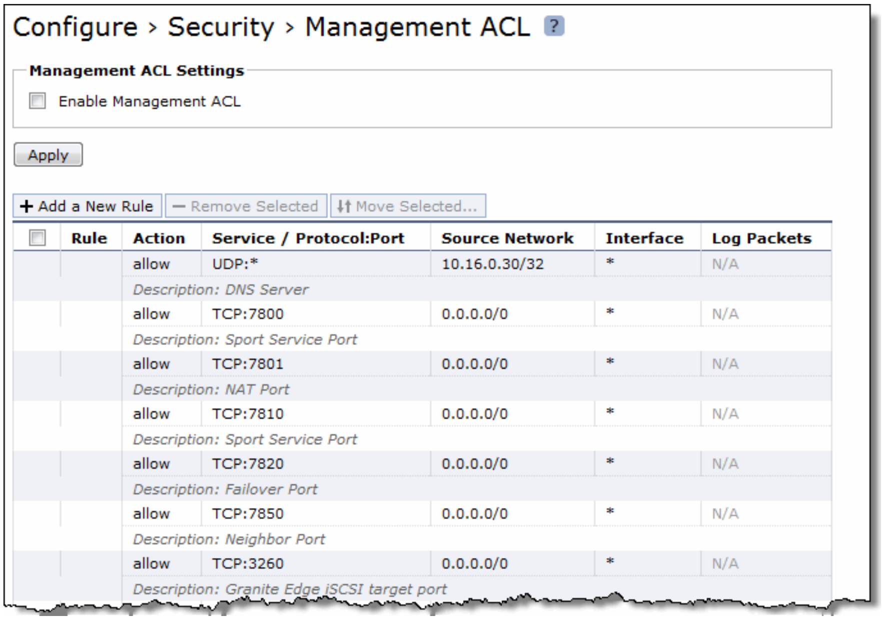
Verify that RiOS is configured to prohibit the use of all unnecessary and/or nonsecure functions, ports, protocols, and/or services as defined in the PPSM CAL and vulnerability assessments.

To verify the system prohibits use of nonsecure functions

1. Connect to the Management Console.

2. Choose Configure > Security > Management ACL to display the Management ACL page.

Figure 2-24. Managing ACL Page



Configure > Security > Management ACL

Management ACL Settings

□ Enable Management ACL

□	Rule	Action	Service / Protocol:Port	Source Network	Interface	Log Packets
		allow	UDP:*	10.16.0.30/32	*	N/A
		Description: DNS Server				
		allow	TCP:7800	0.0.0.0/0	*	N/A
		Description: Sport Service Port				
		allow	TCP:7801	0.0.0.0/0	*	N/A
		Description: NAT Port				
		allow	TCP:7810	0.0.0.0/0	*	N/A
		Description: Sport Service Port				
		allow	TCP:7820	0.0.0.0/0	*	N/A
		Description: Failover Port				
		allow	TCP:7850	0.0.0.0/0	*	N/A
		Description: Neighbor Port				
		allow	TCP:3260	0.0.0.0/0	*	N/A
		Description: Granite Edge iSCSI target port				

3. Verify that the Enable Management ACL check box is selected.

4. Verify that the list contains all unnecessary and/or nonsecure functional, ports, protocols, and/or services as defined in the PPSM CAL and vulnerability assessments. If no PPSM CAL or vulnerability assessment information is presented on this page or Enable Management ACL is not checked, this is a security vulnerability finding.

Configuring the System to Prohibit Use of Nonsecure Functions

Configure RiOS to prohibit the use of all unnecessary and/or nonsecure functions, ports, protocols, and/or services, as defined in the PPSM CAL and vulnerability assessments.

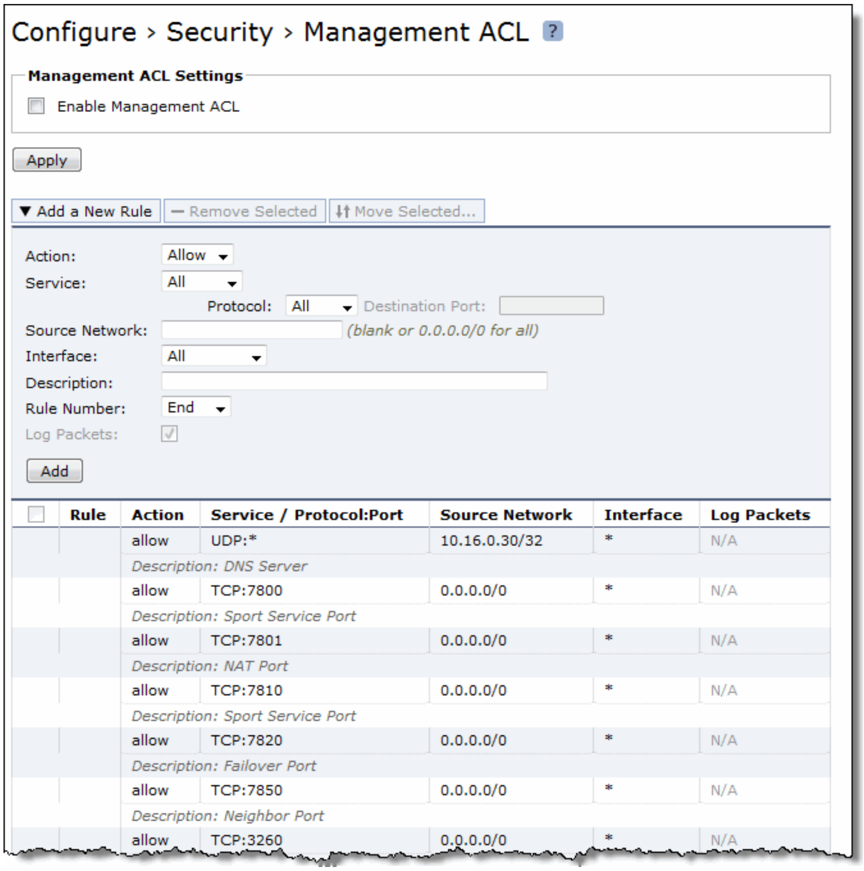
To configure the system to prohibit use of nonsecure functions

1. Connect to the Management Console.

2. Choose Configure > Security > Management ACL to display the Management ACL page.

3. Click **Add a New Rule** to expand the page.

Figure 2-25. Managing ACL Page



Configure > Security > Management ACL

Management ACL Settings

□ Enable Management ACL

Apply

▼ Add a New Rule — Remove Selected ⇅ Move Selected...

Action: Allow

Service: All

Protocol: All Destination Port:

Source Network: (blank or 0.0.0.0/0 for all)

Interface: All

Description:

Rule Number: End

Log Packets: ☑

Add

□	Rule	Action	Service / Protocol:Port	Source Network	Interface	Log Packets
		allow	UDP:*	10.16.0.30/32	*	N/A
		Description: DNS Server				
		allow	TCP:7800	0.0.0.0/0	*	N/A
		Description: Sport Service Port				
		allow	TCP:7801	0.0.0.0/0	*	N/A
		Description: NAT Port				
		allow	TCP:7810	0.0.0.0/0	*	N/A
		Description: Sport Service Port				
		allow	TCP:7820	0.0.0.0/0	*	N/A
		Description: Failover Port				
		allow	TCP:7850	0.0.0.0/0	*	N/A
		Description: Neighbor Port				
		allow	TCP:3260	0.0.0.0/0	*	N/A

4. Select the Enable Management ACL check box.

5. Add rules so that the list contains unnecessary and/or nonsecure functional, ports, protocols, and/or services as defined in the PPSM CAL and vulnerability assessments.

Control	Description
Action	Select one of these rule types from the drop-down list: • **Allow** - Allows a matching packet access to the SteelHead. This is the default action. • **Deny** - Denies access to any matching packets.

Control	Description
Service	Optionally, select Specify Protocol, or HTTP, HTTPS, SOAP, SNMP, SSH, Telnet. When specified, the Destination Port is dimmed.
Protocol	(Appears only when Service is set to Specify Protocol.) Optionally, select All, TCP, UDP, or ICMP from the drop-down list. The default setting is All. When set to All or ICMP, the Service and Destination Ports are dimmed.
Source Network	Optionally, specify the source subnet of the inbound packet; for example, 1.2.3.0/24.
Destination Port	Optionally, specify the destination port of the inbound packet, either a single port value or a port range of port1-port2, where port1 must be less than port2. Leave it blank to specify all ports.
Interface	Optionally, select an interface name from the drop-down list. Select All to specify all interfaces.
Description	Optionally, describe the rule to facilitate administration.
Rule Number	Optionally, select a rule number from the drop-down list. By default, the rule goes to the end of the table (just above the default rule). SteelHeads evaluate rules in numerical order starting with rule **1**. If the conditions set in the rule match, then the rule is applied, and the system moves on to the next packet. If the conditions set in the rule do not match, the system consults the next rule. For example, if the conditions of rule 1 do not match, rule 2 is consulted. If rule 2 matches the conditions, it is applied, and no further rules are consulted. **Note:** The default rule, Allow, which allows all remaining traffic from everywhere that has not been selected by another rule, cannot be removed and is always listed last.
Log Packets	Tracks denied packets in the log. By default, packet logging is enabled.
Add	Adds the rule to the list. The Management Console redisplays the Rules table and applies your modifications to the running configuration, which is stored in memory.
Remove Selected	Select the check box next to the name and click **Remove Selected**.
Move Selected	Moves the selected rules. Click the arrow next to the desired rule position; the rule moves to the new position.

6. Click **Save** at the top of the page to save these settings permanently.

Ensuring the System Authenticates SNMP Servers Before Establishing a Connection

Rule Title: RiOS must authenticate SNMP servers before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based.

STIG ID: RICX-DM-000110

Rule ID: SV-77447r1_rule Severity: CAT II

Vuln ID: V-62957 Class: Unclass

Without authenticating devices, unidentified or unknown devices might be introduced, thereby facilitating malicious activity. Bidirectional authentication provides stronger safeguards to validate the identity of other devices for connections that are of greater risk.

A local connection is any connection with a device communicating without the use of a network. A network connection is any connection with a device that communicates through a network (for example, local area or wide area network, Internet). A remote connection is any connection with a device communicating through an external network (for example, the Internet).

Because of the challenges of applying this requirement on a large scale, organizations are encouraged to only apply the requirement to those limited number (and type) of devices that truly need to support this capability. For network device management, this has been determined to be network management device addresses, SNMP authentication, and NTP authentication.

Verifying the System Authenticates SNMP Servers Before Establishing a Connection

Verify that RiOS is configured to authenticate SNMP servers before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based (SNMP portion of the requirement).

For detailed information, see "Verifying Servers Are Configured as Trap Receivers" on page 44.

Configuring the System to Authenticate SNMP Servers Before Establishing a Connection

Configure RiOS to authenticate SNMP servers before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based (SNMP portion of the requirement).

For detailed information, see "Configuring Servers as Trap Receivers" on page 45.

Ensuring the System Authenticates NTP Servers

Rule Title: RiOS must authenticate NTP servers before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based.

STIG ID: RICX-DM-000111

Rule ID: SV-77449r1_rule	Severity: CAT II
Vuln ID: V-62959	Class: Unclass

Without authenticating devices, unidentified or unknown devices might be introduced, thereby facilitating malicious activity. Bidirectional authentication provides stronger safeguards to validate the identity of other devices for connections that are of greater risk.

A local connection is any connection with a device communicating without the use of a network. A network connection is any connection with a device that communicates through a network (for example, local area or wide area network, Internet). A remote connection is any connection with a device communicating through an external network (for example, the Internet).

Because of the challenges of applying this requirement on a large scale, organizations are encouraged to only apply the requirement to those limited number (and type) of devices that truly need to support this capability. For network device management, this has been determined to be network management device addresses, SNMP authentication, and NTP authentication.

Verifying the System Authenticates NTP Servers

Verify that RiOS is configured to authenticate NTP servers before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based (NTP portion of the requirement).

To verify the system clocks are secure

1. Connect to the Management Console.

2. Choose Configure > System Settings > Date and Time to display the Date and Time page.

3. Under Requested NTP Servers, verify that at least two servers are configured. If no NTP servers are visible, this is a security vulnerability finding.

Configuring the System to Authenticate NTP Servers

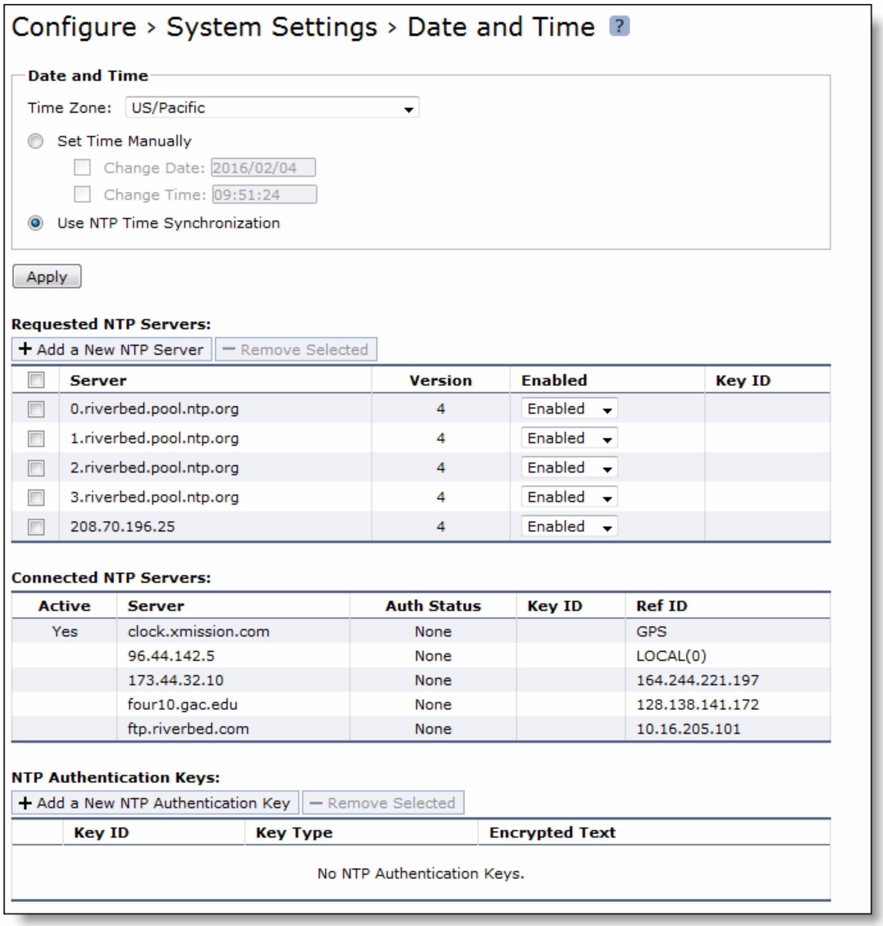
Configure RiOS to authenticate NTP servers before establishing a local, remote, and/or network connection using bidirectional authentication that is cryptographically based (NTP portion of the requirement).

To configure the system to authenticate NTP servers

1. Connect to the Management Console.

2. Choose Configure > System Settings > Date and Time to display the Date and Time page.

Figure 2-26. Authenticating NTP Servers



Configure > System Settings > Date and Time

Date and Time

Time Zone: US/Pacific

○ Set Time Manually

□ Change Date: 2016/02/04

□ Change Time: 09:51:24

● Use NTP Time Synchronization

Apply

Requested NTP Servers:

+ Add a New NTP Server — Remove Selected

□	Server	Version	Enabled	Key ID
□	0.riverbed.pool.ntp.org	4	Enabled	
□	1.riverbed.pool.ntp.org	4	Enabled	
□	2.riverbed.pool.ntp.org	4	Enabled	
□	3.riverbed.pool.ntp.org	4	Enabled	
□	208.70.196.25	4	Enabled	

Connected NTP Servers:

Active	Server	Auth Status	Key ID	Ref ID
Yes	clock.xmission.com	None		GPS
	96.44.142.5	None		LOCAL(0)
	173.44.32.10	None		164.244.221.197
	four10.gac.edu	None		128.138.141.172
	ftp.riverbed.com	None		10.16.205.101

NTP Authentication Keys:

+ Add a New NTP Authentication Key — Remove Selected

Key ID	Key Type	Encrypted Text

No NTP Authentication Keys.

3. Select the Use NTP Time Synchronization check box.

4. Click **Add a New NTP Authentication Key** to expand the page.

5. Configure two NTP servers by completing the configuration as described in this table.

Control	Description
Hostname or IP Address	Specify the hostname or IP address for the NTP server. You can connect to an NTP public server pool. For example, 0.riverbed.pool.ntp.org. When you add an NTP server pool, the server is selected from a pool of time servers.
Version	Select the NTP server version from the drop-down list: 3 or 4.
Enabled/Disabled	Select Enabled from the drop-down list to connect to the NTP server.
Key ID	Specify the MD5 or SH1 key identifier to use to authenticate the NTP server. The valid range is from 1 to 65534. The key ID must appear on the trusted keys list.
Add	Adds your servers.

6. Click **Add a New NTP Authentication Key** to expand the page.

7. Complete the configuration as described in this table.

Control	Description
Key ID	Specify the key ID. The valid range is from 1 to 65534.
Key Type	Select the authentication key type: MD5 or SHA1.
Secret	Specify the shared secret. You must configure the same shared secret for both the NTP server and the NTP client. The MD5 shared secret: • is limited to 16 alphanumeric characters or less, or exactly 40 characters hexadecimal. • cannot include spaces or pound signs (#). • cannot be empty. • is case sensitive. The SHA1 shared secret: • is limited to exactly 40 characters hexadecimal. • cannot include spaces or pound signs (#). • cannot be empty. • is case sensitive. The secret appears in the key list as its MD5 or SHA1 hash value.
Add	Adds the authentication key to the trusted keys list.

8. Click **Save** at the top of the page to save these settings permanently.

Ensuring the Correct Password Length

Rule Title: RiOS must enforce a minimum 15-character password length.

STIG ID: RICX-DM-000114

Rule ID: SV-77451r1_rule Severity: CAT II

Vuln ID: V-62961 Class: Unclass

Password complexity, or strength, is a measure of the effectiveness of a password in resisting attempts at guessing and brute-force attacks. Password length is one factor of several that helps to determine strength and how long it takes to crack a password.

The shorter the password, the lower the number of possible combinations that need to be tested before the password is compromised. Use of more characters in a password helps to exponentially increase the time and/or resources required to compromise the password.

Verifying the Correct Password Length

Verify that RiOS is configured to enforce a minimum 15-character password length.

To verify the correct password length

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Date and Time page.

3. Verify that the Minimum Password Length is set to 15. If the Minimum Password Length is not set to 15, this is a security vulnerability finding.

Configuring the Correct Password Length

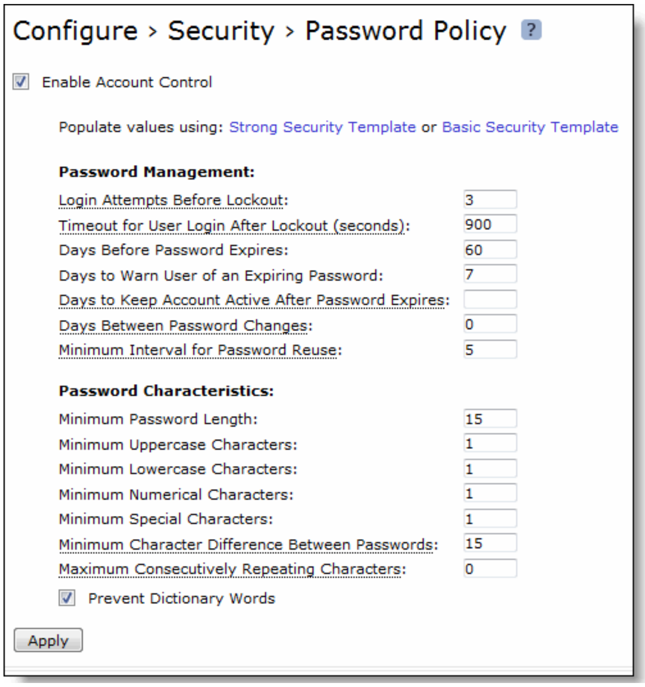
Verify that RiOS is configured to enforce a minimum 15-character password length.

To configure the correct password length

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-27. Setting the Password Length



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout:	3
Timeout for User Login After Lockout (seconds):	900
Days Before Password Expires:	60
Days to Warn User of an Expiring Password:	7
Days to Keep Account Active After Password Expires:	
Days Between Password Changes:	0
Minimum Interval for Password Reuse:	5

Password Characteristics:

Minimum Password Length:	15
Minimum Uppercase Characters:	1
Minimum Lowercase Characters:	1
Minimum Numerical Characters:	1
Minimum Special Characters:	1
Minimum Character Difference Between Passwords:	15
Maximum Consecutively Repeating Characters:	0

☑ Prevent Dictionary Words

3. Specify the value of the Minimum Password Length text box to 15.

4. Click **Apply**

5. Click **Save** at the top of the page to save these settings permanently.

Ensuring Passwords Have an Uppercase Character

Rule Title: RiOS must enforce password complexity by requiring that at least one uppercase character be used.

STIG ID: RICX-DM-000115

Rule ID: SV-77453r1_rule Severity: CAT II

Vuln ID: V-62963 Class: Unclass

Use of a complex passwords helps to increase the time and resources required to compromise the password. Password complexity, or strength, is a measure of the effectiveness of a password in resisting attempts at guessing and brute-force attacks.

Password complexity is one factor of several that determines how long it takes to crack a password. The more complex the password is, the greater the number of possible combinations that need to be tested before the password is compromised.

Ensuring Passwords Have an Uppercase Character

Verify that RiOS is configured to enforce password complexity that requires at least one uppercase character.

To verify passwords have an uppercase character

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

3. Verify that the Minimum Uppercase Characters is set to 1. If the Minimum Uppercase Characters is not set to 1, this is a security vulnerability finding.

Configuring Passwords to Have and Uppercase Character

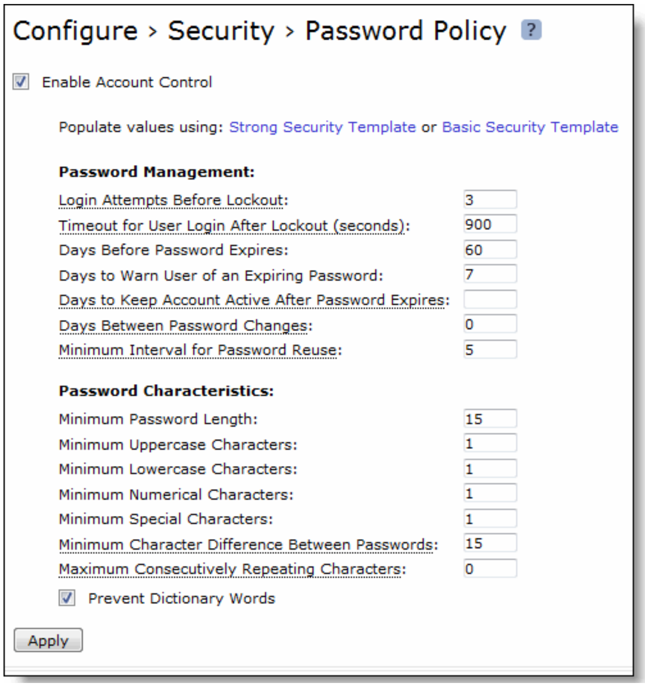
Configure RiOS to enforce password complexity that requires at least one uppercase character.

To configure passwords to have an uppercase character

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-28. Setting the Password Length



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout:	3
Timeout for User Login After Lockout (seconds):	900
Days Before Password Expires:	60
Days to Warn User of an Expiring Password:	7
Days to Keep Account Active After Password Expires:	
Days Between Password Changes:	0
Minimum Interval for Password Reuse:	5

Password Characteristics:

Minimum Password Length:	15
Minimum Uppercase Characters:	1
Minimum Lowercase Characters:	1
Minimum Numerical Characters:	1
Minimum Special Characters:	1
Minimum Character Difference Between Passwords:	15
Maximum Consecutively Repeating Characters:	0

☑ Prevent Dictionary Words

3. Specify the value of the Minimum Uppercase Characters text box to 1.

4. Click **Apply**.

5. Click **Save** at the top of the page to save these settings permanently.

Ensuring Passwords Have a Lowercase Character

Rule Title: RiOS must enforce password complexity by requiring that at least one lowercase character be used.

STIG ID: RICX-DM-000116

Rule ID: SV-77455r1_rule	Severity: CAT II
Vuln ID: V-62965	Class: Unclass

Use of a complex password helps to increase the time and resources required to compromise the password. Password complexity, or strength, is a measure of the effectiveness of a password in resisting attempts at guessing and brute-force attacks.

Password complexity is one factor of several that determines how long it takes to crack a password. The more complex the password, the greater the number of possible combinations that need to be tested before the password is compromised.

Ensuring Passwords Have a Lowercase Character

Verify that RiOS is configured to enforce password complexity that requires at least one lowercase character.

To verify passwords have a lowercase character

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

3. Verify that the Minimum Uppercase Characters is set to 1. If the Minimum Lowercase Characters is not set to 1, this is a security vulnerability finding.

Configuring Passwords to Have a Lowercase Character

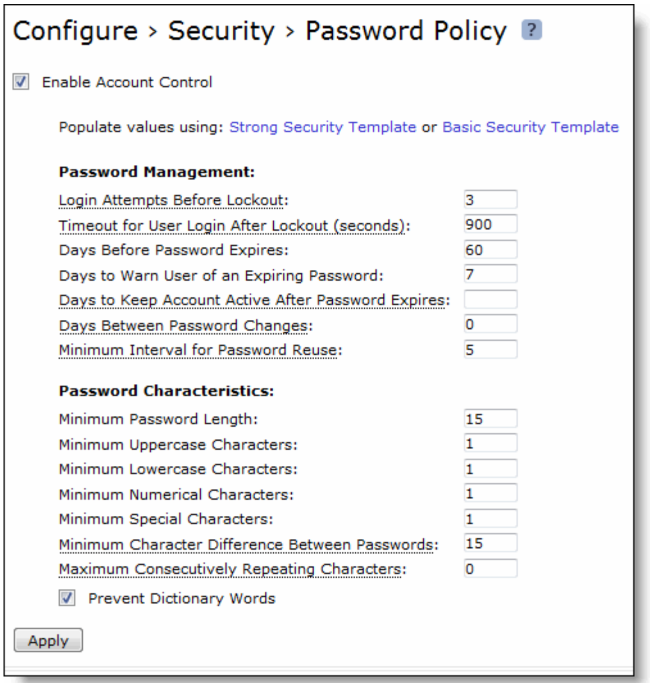
Configure RiOS to enforce a password complexity that requires at least one lowercase character.

To configure passwords to have a lowercase character

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-29. Setting the Password Length



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout: 3

Timeout for User Login After Lockout (seconds): 900

Days Before Password Expires: 60

Days to Warn User of an Expiring Password: 7

Days to Keep Account Active After Password Expires:

Days Between Password Changes: 0

Minimum Interval for Password Reuse: 5

Password Characteristics:

Minimum Password Length: 15

Minimum Uppercase Characters: 1

Minimum Lowercase Characters: 1

Minimum Numerical Characters: 1

Minimum Special Characters: 1

Minimum Character Difference Between Passwords: 15

Maximum Consecutively Repeating Characters: 0

☑ Prevent Dictionary Words

3. Specify the value of the Minimum Lowercase Characters text box to 1.

4. Click **Apply**.

5. Click **Save** at the top of the page to save these settings permanently.

Ensuring Passwords Have a Numeric Character

Rule Title: RiOS must enforce password complexity by requiring that at least one numeric character be used.

STIG ID: RICX-DM-000117

Rule ID: SV-77457r1_rule Severity: CAT II

Vuln ID: V-62967 Class: Unclass

Use of a complex password helps to increase the time and resources required to compromise the password. Password complexity, or strength, is a measure of the effectiveness of a password in resisting attempts at guessing and brute-force attacks.

Password complexity is one factor of several that determines how long it takes to crack a password. The more complex the password, the greater the number of possible combinations that need to be tested before the password is compromised.

Ensuring Passwords Have a Numeric Character

Verify that RiOS is configured to enforce password complexity that requires at least one numeric character.

To verify passwords have a numeric character

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

3. Verify that the Minimum Numerical Characters is set to 1. If the Minimum Numerical Characters is not set to 1, this is a security vulnerability finding.

Configuring Passwords to Have a Numerical Character

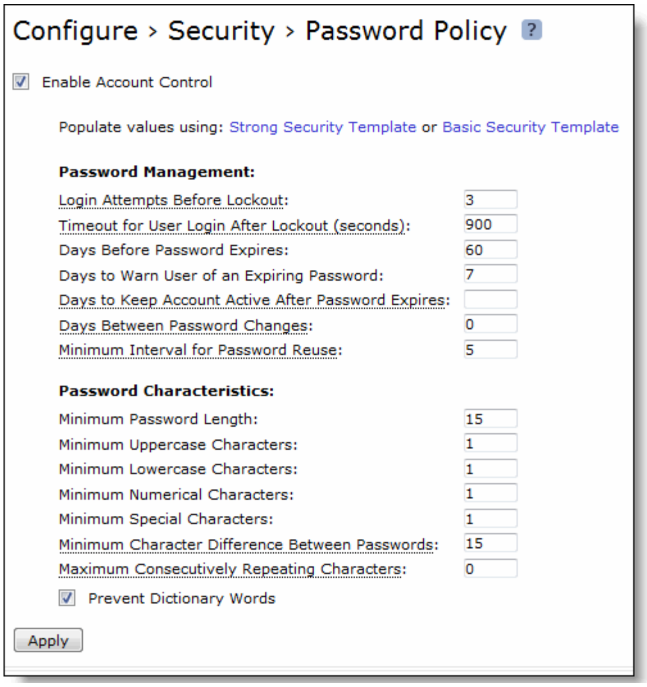
Configure RiOS to enforce a password complexity that requires at least one numerical character.

To configure passwords to have a numerical character

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-30. Setting the Password Length



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout:	3
Timeout for User Login After Lockout (seconds):	900
Days Before Password Expires:	60
Days to Warn User of an Expiring Password:	7
Days to Keep Account Active After Password Expires:	
Days Between Password Changes:	0
Minimum Interval for Password Reuse:	5

Password Characteristics:

Minimum Password Length:	15
Minimum Uppercase Characters:	1
Minimum Lowercase Characters:	1
Minimum Numerical Characters:	1
Minimum Special Characters:	1
Minimum Character Difference Between Passwords:	15
Maximum Consecutively Repeating Characters:	0

☑ Prevent Dictionary Words

3. Specify the value of the Minimum 1umerical Characters text box to 1.

4. Click **Apply**.

5. Click **Save** at the top of the page to save these settings permanently.

Ensuring Passwords Have a Special Character

Rule Title: RiOS must enforce password complexity by requiring that at least one special character be used.

STIG ID: RICX-DM-000118

Rule ID: SV-77459r1_rule	Severity: CAT II
Vuln ID: V-62969	Class: Unclass

Use of a complex password helps to increase the time and resources required to compromise the password. Password complexity, or strength, is a measure of the effectiveness of a password in resisting attempts at guessing and brute-force attacks.

Password complexity is one factor of several that determines how long it takes to crack a password. The more complex the password, the greater the number of possible combinations that need to be tested before the password is compromised.

Ensuring Passwords Have a Special Character

Verify that RiOS is configured to enforce password complexity that requires at least one special character.

To verify passwords have a special character

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

3. Verify that the Minimum Special Characters is set to 1. If the Minimum Special Characters is not set to 1, this is a security vulnerability finding.

Configuring Passwords to Have a Special Character

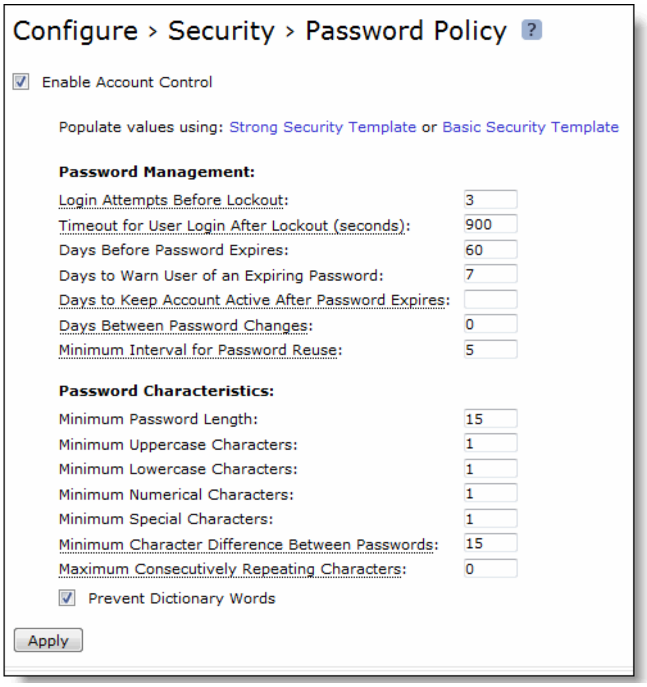
Configure RiOS to enforce a password complexity that requires at least one special character.

To configure passwords to have a special character

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-31. Setting the Password Length



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout: 3
Timeout for User Login After Lockout (seconds): 900
Days Before Password Expires: 60
Days to Warn User of an Expiring Password: 7
Days to Keep Account Active After Password Expires:
Days Between Password Changes: 0
Minimum Interval for Password Reuse: 5

Password Characteristics:

Minimum Password Length: 15
Minimum Uppercase Characters: 1
Minimum Lowercase Characters: 1
Minimum Numerical Characters: 1
Minimum Special Characters: 1
Minimum Character Difference Between Passwords: 15
Maximum Consecutively Repeating Characters: 0

☑ Prevent Dictionary Words

3. Specify the value of the Minimum Special Characters text box to 1.

4. Click **Apply**.

5. Click **Save** at the top of the page to save these settings permanently.

Ensuring at Least 15 Password Characters Are Changed

Rule Title: RiOS must require that when a password is changed, the characters are changed in at least 15 of the positions within the password.

STIG ID: RICX-DM-000119

Rule ID: SV-77461r1_rule	Severity: CAT II
Vuln ID: V-62971	Class: Unclass

If the application allows the user to consecutively reuse extensive portions of passwords, this feature increases the chances of password compromise by increasing the window of opportunity for attempts at guessing and brute-force attacks.

The number of changed characters refers to the number of changes required with respect to the total number of positions in the current password. In other words, characters might be the same within the two passwords; however, the positions of the like characters must be different.

Ensuring at Least 15 Password Characters Are Changed

Verify that RiOS is configured to require that when a password is changed, the characters are changed in at least 15 of the positions within the password.

To verify least 15 password characters are changed

1. Connect to the Management Console.
2. Choose Configure > Security > Password Policy to display the Password Policy page.
3. Verify that the Minimum Character Difference Between Passwords is set to 15. If the Minimum Character Difference Between Passwords is not set to 15, this is a security vulnerability finding.

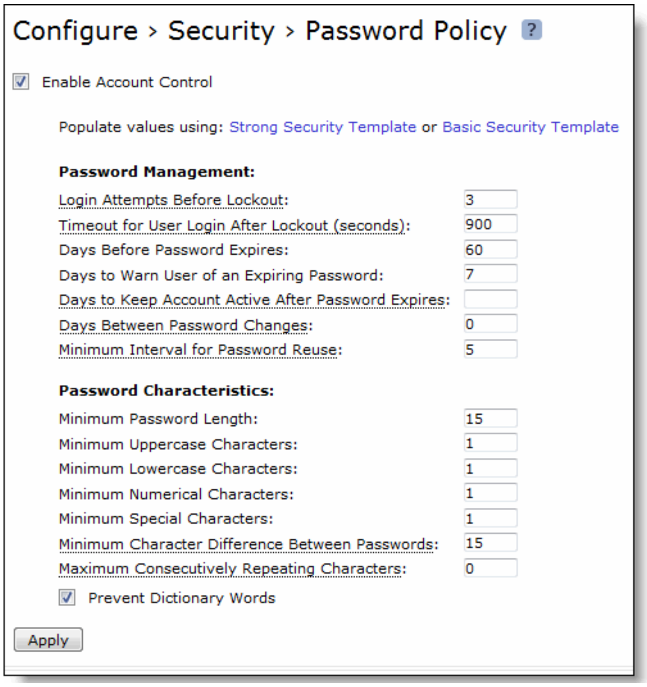
Configuring Passwords That at Least 15 Password Characters Are Changed

Configure RiOS to require that when a password is changed, the characters are changed in at least 15 of the positions within the password.

To configure passwords so that at least 15 password characters are changed

1. Connect to the Management Console.
2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-32. Setting the Password Length



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout:	3
Timeout for User Login After Lockout (seconds):	900
Days Before Password Expires:	60
Days to Warn User of an Expiring Password:	7
Days to Keep Account Active After Password Expires:	
Days Between Password Changes:	0
Minimum Interval for Password Reuse:	5

Password Characteristics:

Minimum Password Length:	15
Minimum Uppercase Characters:	1
Minimum Lowercase Characters:	1
Minimum Numerical Characters:	1
Minimum Special Characters:	1
Minimum Character Difference Between Passwords:	15
Maximum Consecutively Repeating Characters:	0

☑ Prevent Dictionary Words

3. Specify the value of the Minimum Character Difference Between Passwords text box to 15.
4. Click **Apply**.
5. Click **Save** at the top of the page to save these settings permanently.

Ensuring Passwords Enforce 60-Day Maximum Lifetime

Rule Title: RiOS must enforce a 60-day maximum password lifetime restriction.

STIG ID: RICX-DM-000123

Rule ID: SV-77463r1_rule Severity: CAT II

Vuln ID: V-62973 Class: Unclass

Any password, no matter how complex, can eventually be cracked. Therefore, passwords need to be changed at specific intervals.

One method of minimizing this risk is to use complex passwords and periodically change them. If the network device does not limit the lifetime of passwords and force users to change their passwords, there is the risk that the passwords could be compromised.

This requirement does not include emergency administration accounts, which are meant for access to the network device in case of failure. These accounts are not required to have maximum password lifetime restrictions.

Ensuring Passwords Enforce 60-Day Maximum Lifetime

Verify that RiOS is configured to enforce a 60-day maximum password lifetime restriction.

To verify passwords enforce 60-day maximum lifetime

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

3. Verify that the Days Before Password Expires is set to 60, If the Days Before Password Expires is not set to 60, this is a security vulnerability finding.

Configuring Passwords to Enforce 60-Day Maximum Lifetime

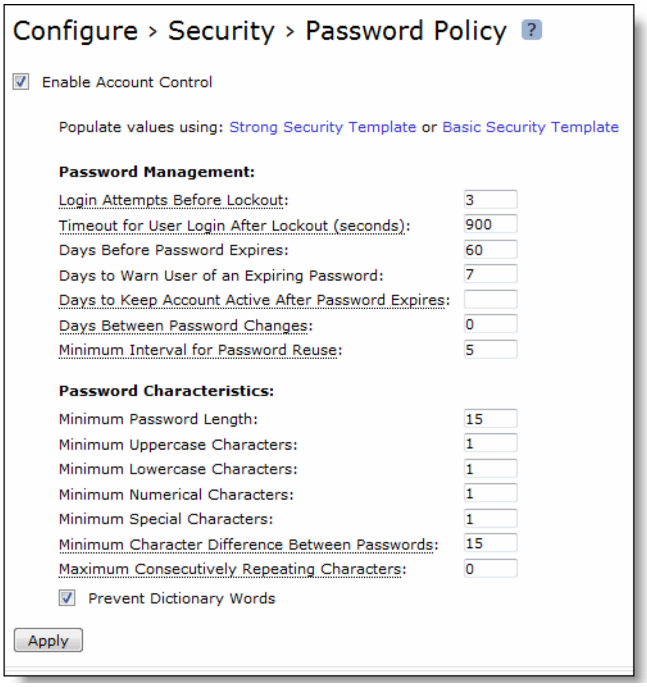
Configure RiOS to enforce a 60-day maximum password lifetime.

To configure passwords to enforce 60-day maximum lifetime

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-33. Setting the Password Length



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout:	3
Timeout for User Login After Lockout (seconds):	900
Days Before Password Expires:	60
Days to Warn User of an Expiring Password:	7
Days to Keep Account Active After Password Expires:	
Days Between Password Changes:	0
Minimum Interval for Password Reuse:	5

Password Characteristics:

Minimum Password Length:	15
Minimum Uppercase Characters:	1
Minimum Lowercase Characters:	1
Minimum Numerical Characters:	1
Minimum Special Characters:	1
Minimum Character Difference Between Passwords:	15
Maximum Consecutively Repeating Characters:	0

☑ Prevent Dictionary Words

3. Specify the value of the Days Before Password Expires text box to 60.

4. Click **Apply**.

5. Click **Save** at the top of the page to save these settings permanently.

Prohibiting Password Reuse for Five Generations

Rule Title: RiOS must prohibit password reuse for a minimum of five generations.

STIG ID: RICX-DM-000124

Rule ID: SV-77465r1_rule Severity: CAT II

Vuln ID: V-62975 Class: Unclass

Password complexity, or strength, is a measure of the effectiveness of a password in resisting attempts at guessing and brute-force attacks.

To meet password policy requirements, passwords need to be changed at specific policy-based intervals.

If the network device allows the user to consecutively reuse their password when that password has exceeded its defined lifetime, the end result is a password that is not changed as per policy requirements.

Verifying Password Is Not Reused for Five Generations

Verify that RiOS is configured to prohibit password reuse for a minimum of five generations.

To verify passwords password is not reused for five generations

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

3. Verify that the Minimum Interval for Password Reuse is set to 5. If the Minimum Interval for Password Reuse is not set to 5, this is a security vulnerability finding.

Configuring Passwords to Not Be Reused for Five Generations

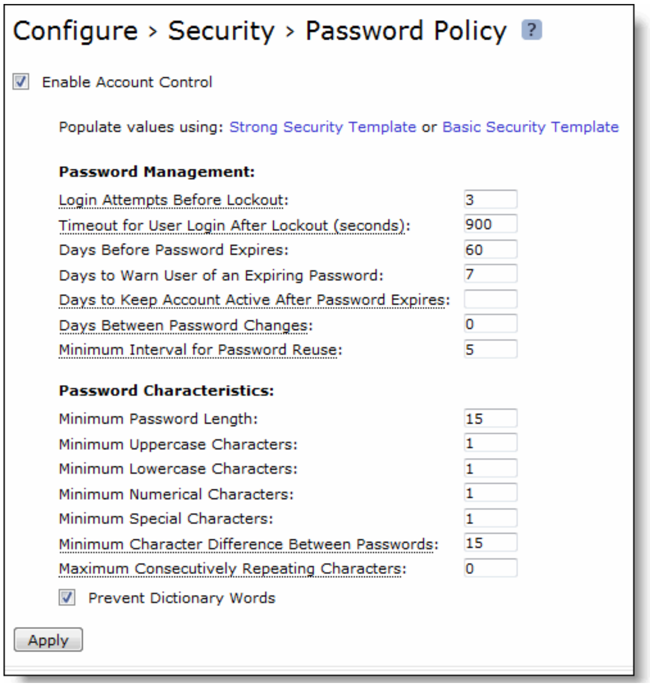
Configure RiOS to prohibit password reuse for a minimum of five generations.

To configure passwords to not be reused for five generations

1. Connect to the Management Console.

2. Choose Configure > Security > Password Policy to display the Password Policy page.

Figure 2-34. Setting the Password Length



Configure > Security > Password Policy

☑ Enable Account Control

Populate values using: Strong Security Template or Basic Security Template

Password Management:

Login Attempts Before Lockout:	3
Timeout for User Login After Lockout (seconds):	900
Days Before Password Expires:	60
Days to Warn User of an Expiring Password:	7
Days to Keep Account Active After Password Expires:	
Days Between Password Changes:	0
Minimum Interval for Password Reuse:	5

Password Characteristics:

Minimum Password Length:	15
Minimum Uppercase Characters:	1
Minimum Lowercase Characters:	1
Minimum Numerical Characters:	1
Minimum Special Characters:	1
Minimum Character Difference Between Passwords:	15
Maximum Consecutively Repeating Characters:	0

☑ Prevent Dictionary Words

3. Specify the value of the Minimum Interval for Password Reuse text box to 5.

4. Click **Apply**.

5. Click **Save** at the top of the page to save these settings permanently.

Ensure the System is Using FIPS 140-2 Cryptographic Modules

Rule Title: RiOS must use mechanisms meeting the requirements of applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance for authentication to a cryptographic module.

STIG ID: RICX-DM-000130

Rule ID: SV-77467r1_rule Severity: CAT II

Vuln ID: V-62977 Class: Unclass

Unapproved mechanisms that are used for authentication to the cryptographic module are not verified and therefore cannot be relied upon to provide confidentiality or integrity, and DoD data might be compromised.

Network devices using encryption are required to use FIPS-compliant mechanisms for authenticating to cryptographic modules.

FIPS 140-2 is the current standard for validating that mechanisms used to access cryptographic modules utilize authentication that meets DoD requirements.

Note that adding the FIPS 140-2 licenses incurs a cost from the vendor for support for FIPS mode/module.

Verifying the System Is Using FIPS 140-2 Cryptographic Modules

Verify that RiOS is licensed to use FIPS 140-2 cryptographic modules.

To verify the system is using FIPS 140-2 cryptographic modules

1. Connect to the CLI and enter these commands.

```
enable
config terminal
show licenses
```

2. Verify the FIPS License has been installed.

3. At the system prompt, enter:

```
show web ssl cipher
```

4. Verify that the web ssl cipher string is:

```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

If a FIPS license is not present and the web SSL cipher string is not set properly, this is a security vulnerability finding.

Configuring the System to Use FIPS 140-2 Cryptographic Modules

Configure RiOS to be licenses to use FIPS 140-2 cryptographic modules.

To configure the system to use FIPS 140-2 cryptographic modules

1. Connect to the CLI and enter these commands.

```
enable
config terminal
license install <license-string>
web ssl cipher TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
write memory
```

2. To verify the FIPS License has been installed, at the system prompt, enter:

```
show licenses
show web ssl cipher
```

Ensuring Maintenance Functions Are Restricted

Rule Title: RiOS performing maintenance functions must restrict use of these functions to authorized personnel only.

STIG ID: RICX-DM-000133

Rule ID: SV-77469r1_rule Severity: CAT II

Vuln ID: V-62979 Class: Unclass

There are security-related issues arising from software brought into the network device specifically for diagnostic and repair actions (for example, a software packet sniffer installed on a device in order to troubleshoot system traffic, or a vendor installing or running a diagnostic application in order to troubleshoot an issue with a vendor-supported device). If maintenance tools are used by unauthorized personnel, they might accidentally or intentionally damage or compromise the system.

This requirement addresses security-related issues associated with maintenance tools used specifically for diagnostic and repair actions on organizational network devices. Maintenance tools can include hardware, software, and firmware items. Maintenance tools are potential vehicles for transporting malicious code, either intentionally or unintentionally, into a facility and subsequently into organizational information systems. Maintenance tools can include, for example, hardware/software diagnostic test equipment and hardware/software packet sniffers. This requirement does not cover hardware/software components that might support information system maintenance yet are a part of the system (for example, the software implementing ping, ls, ipconfig, or the hardware and software implementing the monitoring port of an Ethernet switch).

Verifying That Maintenance Functions Are Restricted

Verify that RiOS is configured so that performing maintenance functions is restricted to authorized personnel only.

To verify maintenance functions are restricted

1. Connect to the Management Console.
2. Choose Configure > Security > User Permissions to display the User Permissions page.
3. Verify that only authorized personnel have the permissions to perform maintenance functions. If user permissions for authorized personnel are not set to authorize maintenance functions, this is a security vulnerability finding.

Configuring the System so that Maintenance Functions Are Restricted

Configure RiOS to restrict use of maintenance functions to authorized personnel only.

To configure the system so that maintenance functions are restricted

1. Connect to the Management Console.
2. Choose Configure > Security > User Permissions to display the User Permissions page.
3. Under Role Based Accounts, click **Add New User Account** to expand the page.
4. Set User Permissions of authorized personnel to allow performance of maintenance functions
5. Click **Add**.

6. Click **Save** at the top of the page to save these settings permanently.

Ensuring Nonlocal Maintenance Is Restricted

Rule Title: Applications used for nonlocal maintenance sessions must implement cryptographic mechanisms to protect the integrity of nonlocal maintenance and diagnostic communications.

STIG ID: RICX-DM-000134

Rule ID: SV-77471r1_rule	Severity: CAT II
Vuln ID: V-62981	Class: Unclass

This security issue requires the use of secure protocols instead of their unsecured counterparts, such as SSH instead of telnet, SCP instead of FTP, and HTTPS instead of HTTP. If unsecured protocols (lacking cryptographic mechanisms) are used for sessions, the contents of those sessions will be susceptible to manipulation, potentially allowing alteration and hijacking of maintenance sessions.

Verifying Nonlocal Maintenance Is Restricted

Verify that RiOS is configured to implement cryptographic mechanisms to protect the integrity of nonlocal maintenance and diagnostic communications.

To verify that nonlocal maintenance is restricted

1. Connect to the CLI and enter these commands:

```
enable
show configuration full
```

2. Press the space-bar to scroll through the configuration and verify that these commands are listed:

```
no telnet-server enable
ssh server enable
web enable
no web http enable
web https enable
```

If any one of the above settings is missing from the configuration, this is a security vulnerability finding.

Configuring the System so That Nonlocal Maintenance Is Restricted

Configure RiOS to implement cryptographic mechanisms to protect the integrity of nonlocal maintenance and diagnostic communications.

To configure the system so that nonlocal maintenance is restricted

- Connect to the CLI and enter these commands:

```
enable
config terminal
no telnet-server enable
ssh server enable
ssh server allowed-cyphers aes128-cbc, 3des-cbc,aes192-cbc,aes256-cbc,aes128-ctr,aes192-
ctr,aes256-ctr
web enable
no web http enable
web https enable
write memory
```

```
exit
exit
```

Ensuring Applications Implement Cryptographic Mechanisms

Rule Title: Applications used for nonlocal maintenance sessions must implement cryptographic mechanisms to protect the confidentiality of nonlocal maintenance and diagnostic communications.

STIG ID: RICX-DM-000135

Rule ID: SV-77473r1_rule Severity: CAT II

Vuln ID: V-62983 Class: Unclass

This requires the use of secure protocols instead of their unsecured counterparts, such as SSH instead of telnet, SCP instead of FTP, and HTTPS instead of HTTP. If unsecured protocols (lacking cryptographic mechanisms) are used for sessions, the contents of those sessions will be susceptible to eavesdropping, potentially putting sensitive data (including administrator passwords) at risk of compromise and potentially allowing hijacking of maintenance sessions.

Verifying Applications Implement Cryptographic Mechanisms

Verify that RiOS is configured to implement cryptographic mechanisms to protect the confidentiality of nonlocal maintenance and diagnostic communications.

For detailed information, see “Verifying Nonlocal Maintenance Is Restricted” on page 90.

Configuring Applications to Implement Cryptographic Mechanisms

Configure RiOS to implement cryptographic mechanisms to protect the confidentiality of nonlocal maintenance and diagnostic communications.

For detailed information, see “Configuring the System so That Nonlocal Maintenance Is Restricted” on page 90.

Ensuring the System Terminates Network Connections

Rule Title: RiOS must terminate all network connections associated with a device management session at the end of the session, or the session must be terminated after 10 minutes of inactivity except to fulfill documented and validated mission requirements.

STIG ID: RICX-DM-000137

Rule ID: SV-77475r1_rule Severity: CAT II

Vuln ID: V-62985 Class: Unclass

Terminating an idle session within a short time period reduces the window of opportunity for unauthorized personnel to take control of a management session enabled on the console or console port that has been left unattended. In addition, quickly terminating an idle session will also free up resources committed by the managed network element.

Terminating network connections associated with communications sessions includes, for example, de-allocating associated TCP/IP address/port pairs at the operating system level, or de-allocating networking assignments at the application level if multiple application sessions are using a single, operating system-level network connection. This does not mean that the device terminates all sessions or network access; it only ends the inactive session and releases the resources associated with that session.

Verifying the System Terminates Network Connections

Verify that RiOS is configured to terminate a device management session at the end of the session, or after 10 minutes of inactivity.

To verify the system terminates network connections

1. Connect to the Management Console.

2. Choose Configure > Security > Web Settings to display the Web Settings page.

3. Verify that Web Inactivity Timeout (minutes) is set to 10. If Inactivity Timeout or Web Inactivity Timeout (minutes) is not set to 10, this is a security vulnerability finding.

Configuring the System to Terminate Network Connections

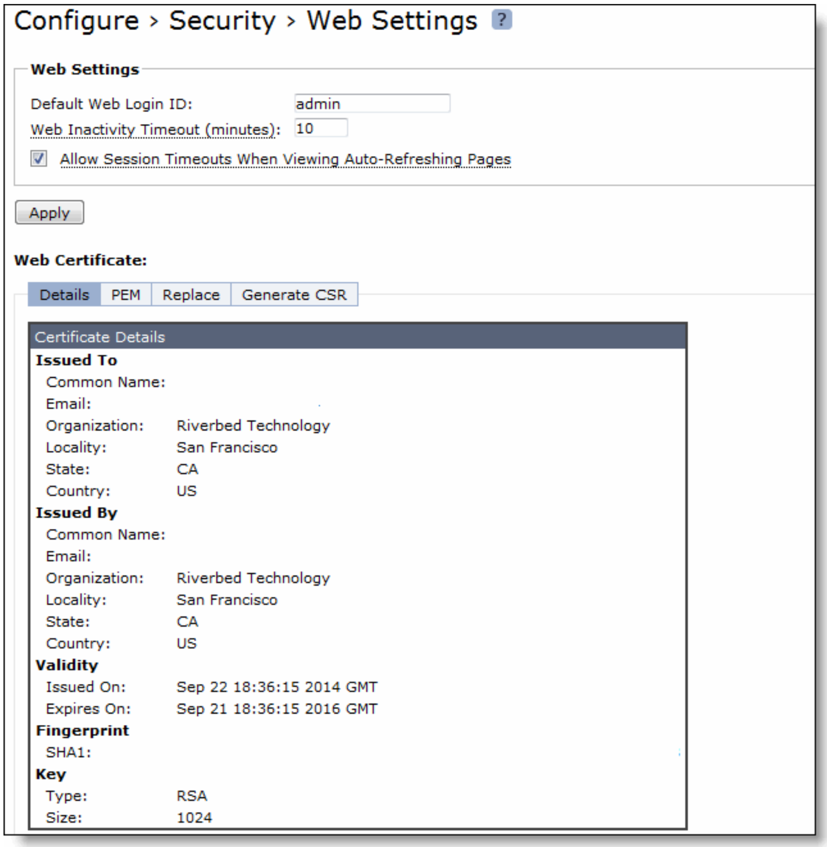
Configure RiOS to terminate a device management session at the end of the session, or after 10 minutes of inactivity.

To verify the system terminates network connections

1. Connect to the Management Console.

2. Choose Configure > Security > Web Settings to display the Web Settings page.

Figure 2-35. Setting Web Termination



Configure > Security > Web Settings

Web Settings

Default Web Login ID: admin

Web Inactivity Timeout (minutes): 10

☑ Allow Session Timeouts When Viewing Auto-Refreshing Pages

Web Certificate:

Certificate Details

Issued To

Common Name:	
Email:	
Organization:	Riverbed Technology
Locality:	San Francisco
State:	CA
Country:	US

Issued By

Common Name:	
Email:	
Organization:	Riverbed Technology
Locality:	San Francisco
State:	CA
Country:	US

Validity

Issued On:	Sep 22 18:36:15 2014 GMT
Expires On:	Sep 21 18:36:15 2016 GMT

Fingerprint

SHA1:	

Key

Type:	RSA
Size:	1024

3. Specify the Web Inactivity Timeout (minutes) to 10.

4. Click **Apply**.

5. Click **Save** at the top of the page to save these settings permanently.

Ensuring the System Obtains Approved Public Key Certificates

Rule Title: RiOS must obtain its public key certificates from an appropriate certificate policy through an approved service provider.

STIG ID: RICX-DM-000138

Rule ID: SV-77477r1_rule Severity: CAT II

Vuln ID: V-62987 Class: Unclass

For user certificates, each organization obtains certificates from an approved, shared service provider, as required by OMB policy. For federal agencies operating a legacy public key infrastructure cross-certified with the Federal Bridge Certification Authority at medium assurance or higher, this Certification Authority will suffice.

Verifying the System Obtains Approved Public Key Certificates

Verify that RiOS is configured to obtain its public key certificates from an appropriate certificate policy through an approved service provider.

To verify the system obtains approved public key certificates

1. Connect to the Management Console.

2. Choose Configure > Optimization > Certificate Authorities to display the Certificate Authorities page.

3. Verify that DoD Root Certificates are listed on this page. If no DoD Root CA Certificates are listed on this page, this is a security vulnerability finding.

Configuring the System to Obtain Approved Public Key Certificates

Configure RiOS to use public key certificates from an appropriate certificate policy through an approved service provider.

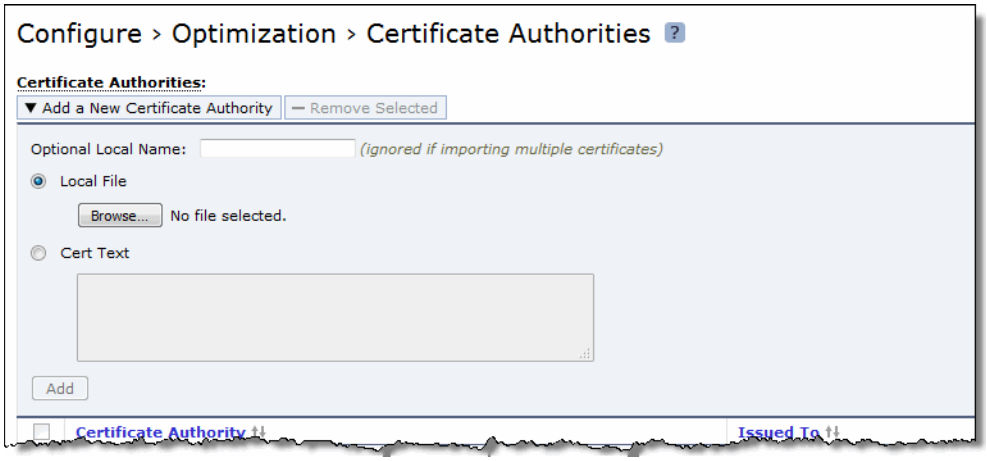
To configure the system to obtain approved public key certificates

1. Connect to the Management Console.

2. Choose Configure > Optimization > Certificate Authorities to display the Certificate Authorities page.

3. Click **Add a New Certificate Authority** to expand the page.

Figure 2-36. Adding Certificate Authorities



Configure > Optimization > Certificate Authorities

Certificate Authorities:

Optional Local Name: *(ignored if importing multiple certificates)*

● Local File

No file selected.

○ Cert Text

4. Select Local File and click **Browse**.

5. Navigate to your local DoD CA Root Certificates and select a certificate.

6. Click **Add**.

7. Repeat Step 3 through Step 6 to add all the remaining DoD CA Root Certificates.

8. Click **Save** at the top of the page to save these settings permanently.

Ensuring the System Generates Unique Session Identifiers

Rule Title: RiOS must generate unique session identifiers using a FIPS 140-2 approved random number generator.

STIG ID: RICX-DM-000141

Rule ID: SV-77479r1_rule	Severity: CAT II
Vuln ID: V-62989	Class: Unclass

Sequentially generated session IDs can be easily guessed by an attacker. Ensuring unique session identifiers are randomly generated helps to protect against brute-force attacks to determine future session identifiers.

Unique session IDs address man-in-the-middle attacks, including session hijacking or insertion of false information into a session. If the attacker is unable to identify or guess the session information related to pending application traffic, they will have more difficulty in hijacking the session or otherwise manipulating valid sessions.

This requirement applies to devices that use a web interface for device management. The recommended best practice is that the FIPS license be installed and used.

Verifying the System Generates Unique Session Identifiers

Verify that RiOS is configured to generate unique session identifiers using a FIPS 140-2 approved random number generator.

To verify the system generates unique session identifiers

1. Connect to the CLI and enter these commands:

   ```
   enable
   configuration terminal
   show fips status
   ```

2. Verify that FIPS Mode: Enabled is displayed on the console. If FIPS Mode: Enabled is not displayed on the console, this is a security vulnerability finding.

Configuring the System to Generate Unique Session Identifiers

Configure RiOS to generate unique session identifiers using a FIPS 140-2 approved random number generator.

To configure the system to generate unique session identifiers

1. Connect to the CLI and enter these commands:

   ```
   enable
   configuration terminal
   fips enable
   write memory
   reload
   show fips status
   ```

2. Verify that FIPS Mode: Enabled is displayed on the screen.

Ensuring the System Protects Against Denial of Service Attacks

Rule Title: RiOS must protect against or limit the effects of all known types of Denial of Service (DoS) attacks on the network device management network by employing organization-defined security safeguards.

STIG ID: RICX-DM-000143

Rule ID: SV-77481r1_rule	Severity: CAT II
Vuln ID: V-62991	Class: Unclass

DoS is a condition when a resource is not available for legitimate users. When this occurs, the organization either cannot accomplish its mission or must operate at degraded capacity.

This requirement addresses the configuration of network devices to mitigate the impact of DoS attacks that have occurred or are ongoing on device availability. For each network device, known and potential DoS attacks must be identified and solutions for each type implemented. A variety of technologies exist to limit or, in some cases, eliminate the effects of DoS attacks (for example, limiting processes or restricting the number of sessions the device opens at one time). Employing increased capacity and bandwidth, combined with service redundancy, might reduce the susceptibility to some DoS attacks.

The security safeguards cannot be defined at the DoD level because they vary according to the capabilities of the individual network devices and the security controls applied on the adjacent networks (for example, firewalls performing packet filtering to block DoS attacks).

Verifying the System Protects Against Denial of Service Attacks

Verify that RiOS is configured to protect against or limit the effects of all know types of Denial of Service (DoS) attacks on the device management network.

To verify the system protects against denial of service attacks

1. Connect to the Management Console.

2. Choose Configure > Security > Management ACL to display the Management ACL page.

3. Verify that the Enable Management ACL check box is selected.

4. Verify that there is a rule to limit management access from authorized devices and that the interface is set to other than an in-path interface.

   If Management ACLs are not defined to limit access to identified or known devices and/or a management interface is not defined that is different from the in-path interface and/or Enable Management ACL is not checked, this is a security vulnerability finding.

Configuring the System to Protect Against Denial of Service Attacks

Configure RiOS to protect against or limit the effects of all known types of Denial of Service (DoS) attacks on the network device management network.

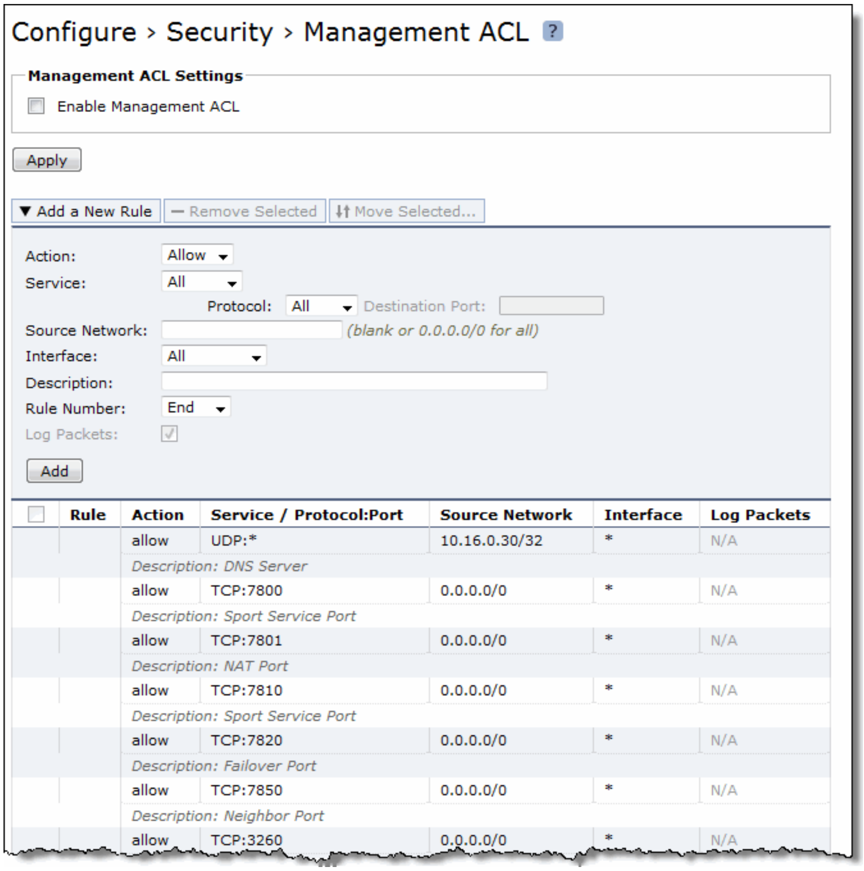
To configure the system to protect against denial of service attacks

1. Connect to the Management Console.

2. Choose Configure > Security > Management ACL to display the Management ACL page.

3. Click **Add a New Rule** to expand the page.

Figure 2-37. Adding Management ACL Rules



Configure > Security > Management ACL

Management ACL Settings

□ Enable Management ACL

Apply

▼ Add a New Rule | — Remove Selected | Move Selected...

Action: Allow

Service: All

Protocol: All Destination Port:

Source Network: (blank or 0.0.0.0/0 for all)

Interface: All

Description:

Rule Number: End

Log Packets: ☑

Add

□	Rule	Action	Service / Protocol:Port	Source Network	Interface	Log Packets
		allow	UDP:*	10.16.0.30/32	*	N/A
		Description: DNS Server				
		allow	TCP:7800	0.0.0.0/0	*	N/A
		Description: Sport Service Port				
		allow	TCP:7801	0.0.0.0/0	*	N/A
		Description: NAT Port				
		allow	TCP:7810	0.0.0.0/0	*	N/A
		Description: Sport Service Port				
		allow	TCP:7820	0.0.0.0/0	*	N/A
		Description: Failover Port				
		allow	TCP:7850	0.0.0.0/0	*	N/A
		Description: Neighbor Port				
		allow	TCP:3260	0.0.0.0/0	*	N/A

4. Select the Enable Management ACL check box.

5. Add rules so that the list contains unnecessary and/or nonsecure functional, ports, protocols, and/or services as defined in the PPSM CAL and vulnerability assessments.

Control	Description
Action	Select the Allow rule type from the drop-down list.
Service	Specify HTTPS.
Source Network	Specify the Management device network: for example, 1.2.3.0/24.
Interface	Select an interface used for network management from the drop-down list.
Description	Set to enable ease of management.
Add	Adds the rule to the list. The Management Console redisplays the Rules table and applies your modifications to the running configuration, which is stored in memory.

6. Click **Add a New Rule** to expand the page and repeat all actions for SSH.

7. Click **Apply**.

8. Click **Save** at the top of the page to save these settings permanently.

Ensuring the System Generates Alerts to Security Personnel

Rule Title: RiOS must generate an alert that can be sent to security personnel when threats identified by authoritative sources (for example, chief technology officers) and in accordance with Chairman of the Joint Chiefs of Staff Manuals (CJCSM) 6510.01B occur.

STIG ID: RICX-DM-000144

Rule ID: SV-77483r1_rule Severity: CAT II

Vuln ID: V-62993 Class: Unclass

By immediately displaying an alarm message, potential security violations can be identified more quickly even when administrators are not logged into the network device. An example of a mechanism to facilitate this would be through the utilization of SNMP traps.

Verifying the System Generates Alerts to Security Personnel

Verify that RiOS uses automated mechanisms to alert security personnel to threats identified by authoritative sources.

For detailed information, see "Verifying Servers Are Configured as Trap Receivers" on page 44.

Configuring the System to Generate Alerts to Security Personnel

Configure RiOS to use automated mechanisms to alert security personnel to threats identified by authoritative sources.

For detailed information, see "Configuring Servers as Trap Receivers" on page 45.

Ensuring Applications Only Reveal Error Messages to Authorized Personnel

Rule Title: The application must reveal error messages only to authorized individuals (ISSO, ISSM, and SA).

STIG ID: RICX-DM-000145

Rule ID: SV-77485r1_rule Severity: CAT II

Vuln ID: V-62995 Class: Unclass

Only authorized personnel should be aware of errors and the details of the errors. Error messages are an indicator of an organization's operational state. Additionally, sensitive account information must not be revealed through error messages to unauthorized personnel or their designated representatives.

Verifying the System Restricts Error Messages

Verify that RiOS is configured to reveal error messages only to authorized individuals (ISSO, ISSM, and SA).

For detailed information, see "Verifying the System Is Protecting Audit Information" on page 32.

Configuring the System Restricts Error Messages

Verify that RiOS is configured to reveal error messages only to authorized individuals (ISSO, ISSM, and SA).

For detailed information, see "Configuring the System to Protect Audit Information" on page 32.

CHAPTER 3 Application Layer Gateway Rules

This chapter provides a summary of the application layer gateway (ALG) security rules and the procedures for ensuring security compliance. It includes these sections:

As a supplement to this guide, consult *Securing SteelHeads* in the *SteelHead Deployment Guide* 9.1 or later. This guide provides additional guidance regarding security best practices for SteelHead deployments.

Firewall and IDPS Compliance

This section includes this rule:

Ensuring the Firewall and Intrusion Detection and Prevention Systems (IDPS) Are in Compliance

Rule Title: RiOS must be configured to ensure inbound and outbound traffic is forwarded to be inspected by the firewall and IDPS in compliance with remote access security policies.

STIG ID: RICX-AG-000037

Rule ID: SV-77303r1_rule	Severity: CAT II
Vuln ID: V-62813	Class: Unclass

Automated monitoring of remote access traffic allows organizations to detect cyber attacks and also ensure ongoing compliance with remote access policies by inspecting connection activities of remote access capabilities.

Remote access methods include both unencrypted and encrypted traffic. Inbound traffic must be inspected prior to being allowed on the enclave's trusted networks. Outbound traffic inspection must occur prior to being forwarded to destinations outside of the enclave.

Optimally, the SteelHead must be architecturally placed at the perimeter of the network in front of the perimeter router. Thus, traffic is directed for firewall and IDPS inspection for inbound and outbound traffic in compliance with DoD policy. Additionally, from an operational perspective, this architecture avoids the need to open many ports and services in the firewall to accommodate TCP options 76 and 78 and ports 7800, 7810, and 7870. Some other configurations might involve even more ports and services.

Verifying SteelHead Placement for Firewall and IDPS Security Requirements

Inspect the architectural placement of the device. Verify the traffic from the device is directed to the firewall and intrusion detection system (IDS) or intrusion prevention system (IPS) for inspection.

If RiOS is not configured to ensure inbound and outbound traffic is forwarded to be inspected by the firewall and IDPS in compliance with remote access security policies, this is a security vulnerability finding.

Deploying SteelHeads for Firewall and IDPS Security Requirements

Architecturally place the SteelHead device to avoid the need to open TCP ports in the firewall. The best practice for the SteelHead appliance is to install it at the perimeter of the network in front of the perimeter router configure it to direct traffic to the router. Thus, inbound and outbound traffic is forwarded to be inspected by the firewall and IDPS in compliance with remote access security policies.

SMB and Encrypted MAPI

This section includes this rule:

- “Ensuring Signed SMB and Encrypted MAPI Protect the Integrity of the DATA” on page 100

Ensuring Signed SMB and Encrypted MAPI Protect the Integrity of the DATA

Rule Title: If TLS optimization is used, signed SMB and encrypted MAPI must ensure the integrity and confidentiality of data transmitted over the WAN.

STIG ID: RICX-AG-000032

Rule ID: SV-77277r1_rule	Severity: CAT II
Vuln ID: V-62787	Class: Unclass

Protecting the end-to-end security of transport layer security (TLS) is required to ensure the integrity and confidentiality of the data in transit.

Signed SMB and encrypted MAPI traffic use techniques to protect against unauthorized man-in-the-middle devices from making modifications to their exchanged data. Additionally, encrypted MAPI traffic and encrypted SMB3 traffic ensure data confidentiality by transmitting data with protection across the network.

To securely optimize this traffic, a properly configured client and server-side SteelHead appliance with WAN optimization must:

- decrypt and remove signatures on received LAN-side data from the client or server.

- perform bandwidth and application layer optimization.
- use the secure-inner channel feature to maintain data integrity and confidentiality of the data transmitted over the WAN.
- convert the received optimized data back to its native form.
- encrypt and apply signatures for LAN side transmission of data to the client or server.

To query the Windows domain controller for the necessary cryptographic information to optimize this traffic, the server-side SteelHead appliance must join a Windows domain. The SteelHead appliance can require other configuration settings, both on the SteelHead appliance, and in the Windows domain. This cryptographic information is only useful for the lifetime of an individual connection or session. The information is obtained at the beginning of a connection, and transferred to the client-side SteelHead appliance as needed, using the secure-inner channel feature. You must configure the secure-inner channel to ensure maximum security.

Only the server-side SteelHead appliance is required to join the domain, and it does so using a machine account in the same way that a Windows device joins the domain using a machine account. The SteelHead appliance joins the domain to obtain a client-user session key (CUSK) or server-user session key (SUSK), which allows the SteelHead appliance to sign and/or decrypt MAPI on behalf of the Windows user that is establishing the relevant session.

The server-side SteelHead appliance must join a domain that is either:

- the user domain. The domain must have a trust relationship with the domains that includes the application servers you want to optimize (that is, the file server, Exchange server, and so on).
- a domain with a bidirectional trust relationship with the user domain. The domain might include some or all of the Windows application servers for SteelHead appliance optimization (that is, the file server and Exchange server). Production deployments can have multiple combinations of client and server Windows operating system versions and can include different configuration settings for signed SMB and encrypted MAPI. The Windows NT LAN Manager (NTLM) is not approved for use for DoD implementations. Therefore it is possible that the security authentication between clients and servers can use Kerberos, or a combination of the two.

Verifying the SMB and MAPI Security Settings

Verify that signed SMB and encrypted MAPI is configured to ensure the integrity and confidentiality of data transmitted over the WAN.

To verify that the domain is defined

1. Connect to the Management Console.
2. Choose Configure > Optimization > Windows Domain Auth to display the Windows Domain Auth page.
3. Under Kerberos, verify that a Domain is defined.

To verify that signed SMB1 is secure

1. Choose Configure > Optimization > CIFS (SMB1) to display the CIFS (SMB1) page.
2. Under SMB Signing, verify that the Enable SMB Signing, NTLM Delegation Mode, and Enable Kerberos Authentication Support check boxes are selected.

To verify that signed SMB2/3 is secure

3. Choose Configure > Optimization > SMB2/3 to display the SMB2/3 page.

4. Under Signing, verify that the Enable SMB2 and SMB3 Signing, NTLM Delegation Mode, and Enable Kerberos Authentication Support check boxes are selected.

To verify that MAPI is secure

1. Choose Configure > Optimization > MAPI to display the MAPI page.

2. Under Settings, verify that the Enable Encrypted Optimization, NTLM Delegation Mode, and Enable Kerberos Authentication Support check boxes are selected.

3. If any SMB Signing or Encrypted MAPI is selected and "In Domain Mode, Status: In a Domain" is not displayed on the page, this is a security vulnerability finding.

Configuring the SMB and MAPI Security Settings

Configure signed SMB and encrypted MAPI optimization services to ensure the integrity and confidentiality of data transmitted over the WAN.

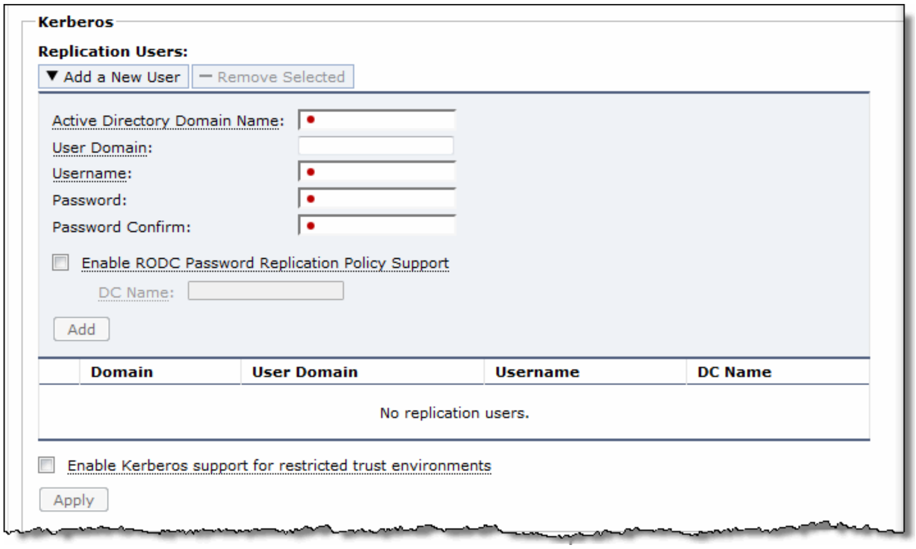
To configure signed SMB and encrypted MAPI for security

1. On the server-side SteelHead appliance connect to the Management Console.

2. Choose Configure > Optimization > Windows Domain Auth to display the Windows Domain Auth page.

3. Under Kerberos, click **Add a New User** to expand the page.

Figure 3-1. Defining a Kerberos Replication User


Kerberos
Replication Users:
▼ Add a New User
— Remove Selected
Active Directory Domain Name:
User Domain:
Username:
Password:
Password Confirm:
□ Enable RODC Password Replication Policy Support
DC Name:
Add
□ Enable Kerberos support for restricted trust environments
Apply

Domain	User Domain	Username	DC Name
No replication users.			

4. Type the Active Directory Domain Name.

5. Type the User Domain ID.

6. Type the User Account Password and confirm it.

7. Select the Enable RODC Password Replication Policy check box.

8. Type the Domain Controller Name(s) or IP Addresses.

9. Click **Add**.

10. Verify that "In Domain Mode, Status: In a Domain" is displayed on the page.

11. Click **Save** at the top of the page to save these setting permanently.

To configure SMB1

1. Choose Configure > Optimization > CIFS (SMB1) to display the CIFS (SMB1) page.

2. Select the Enable SMB Signing, NTLM Delegation Mode, and Enable Kerberos Authentication Support check boxes.

3. Click **Apply**.

4. Click **Save** at the top of the page to save these setting permanently.

To configure SMB2/3

1. Choose Configure > Optimization > SMB2/3 to display the SMB2/3 page.

2. Select the Enable SMB2 and SMB3 Signing, NTLM Delegation Mode, and Enable Kerberos Authentication Support check boxes.

3. Click **Apply**.

4. Click **Save** at the top of the page to save these setting permanently.

To configure MAPI

1. Choose Configure > Optimization > MAPI to display the MAPI page.

2. Select the Enable Encrypted Optimization, NTLM Delegation Mode, and Enable Kerberos Authentication Support check boxes.

3. Click **Apply**.

4. Click **Save** at the top of the page to save these setting permanently.

SSL and CRL Security

This section includes these rules:

- "Ensuring Private Keys Stay in the Data Center" on page 104
- "Ensuring Secure Pairing Trust Relationships for SSL" on page 108
- "Ensuring RFC 5280-Compliant Certification Path Validation" on page 110

Ensuring Private Keys Stay in the Data Center

Rule Title: If TLS WAN optimization is used, SSL optimization must protect private keys ensuring that they stay in the data center by ensuring end-to-end security.

STIG ID: RICX-AG-000038

Rule ID: SV-77305r1_rule Severity: CAT II

Vuln ID: V-62815 Class: Unclass

Protecting the end-to-end security of TLS is required to ensure integrity and confidentiality of the data in transit.

RiOS TLS optimization accelerates data transfers that are encrypted using TLS for SteelHead appliances that are deployed locally to both the client-side and server-side of the network. All of the same optimized connections that are applied to normal nonencrypted TCP traffic can also apply to encrypted TLS traffic. SteelHead appliances accomplish this without compromising end-to-end security and the established trust model. Private keys remain in the data center and are not exposed in remote locations where they might be compromised.

The RiOS TLS optimization solution starts with SteelHead appliances that have a configured trust relationship, enabling them to exchange information securely over their own dedicated TLS connection. Each client uses unchanged server addresses and each server uses unchanged client addresses; no application changes or explicit proxy configuration is required. RiOS uses a unique technique to split the TLS handshake. The handshake is the sequence of message exchanges at the start of a TLS connection. In an ordinary TLS handshake, the client and server first establish identity using public-key cryptography, and then negotiate a symmetric session key to use for data transfer. When using RiOS TLS acceleration, the initial TLS message exchanges take place between the client application (for example, a Web browser) and the server-side SteelHead appliance.

SteelHead WAN optimization platform works to ensure that TLS acceleration delivers the following:

- sensitive cryptographic information is kept in the secure vault—a separate, encrypted store on the disk.
- built-in support for popular Certificate Authorities (CAs) such as VeriSign, Thawte, Entrust, and GlobalSign. In addition, SteelHead appliances allow the installation of other commercial or privately operated Certificate Authorities (CAs).
- import of server proxy certificates and keys in PEM, PKCS12, or DER formats. SteelHead appliances also support the generation of new keys and self-signed certificates. If your certificates and keys are in another format, first you must convert them to a supported format before you can import them into the SteelHead appliance.
- separate control of cipher suites for client connections, server connections, and peer connections.
- bulk export or bulk import server configurations (including keys and certificates) from or to, respectively, the server-side SteelHead appliance.

Verifying End-to-End SSL Security Settings

Verify that TLS optimization services are configured to ensure end-to-end security and protect private keys from unauthorized access.

To configure end-to-end SSL security

1. Connect to the Management Console.

2. Choose Configure > Optimization > SSL Main Settings to display the SSL Main Settings page.

3. Verify that the Enable SSL Optimization check box is selected.

4. Verify that the SSL Server Certificates contain the certificates for SSL services that the organization wants to optimize.

5. If Enable SSL Optimization is not checked or there are no SSL Sever Certificates, this is a security vulnerability finding.

Configuring End-to-End SSL Security Settings

Configure TLS optimization services to provide end-to-end security and protection for private keys.

To configure SSL security settings

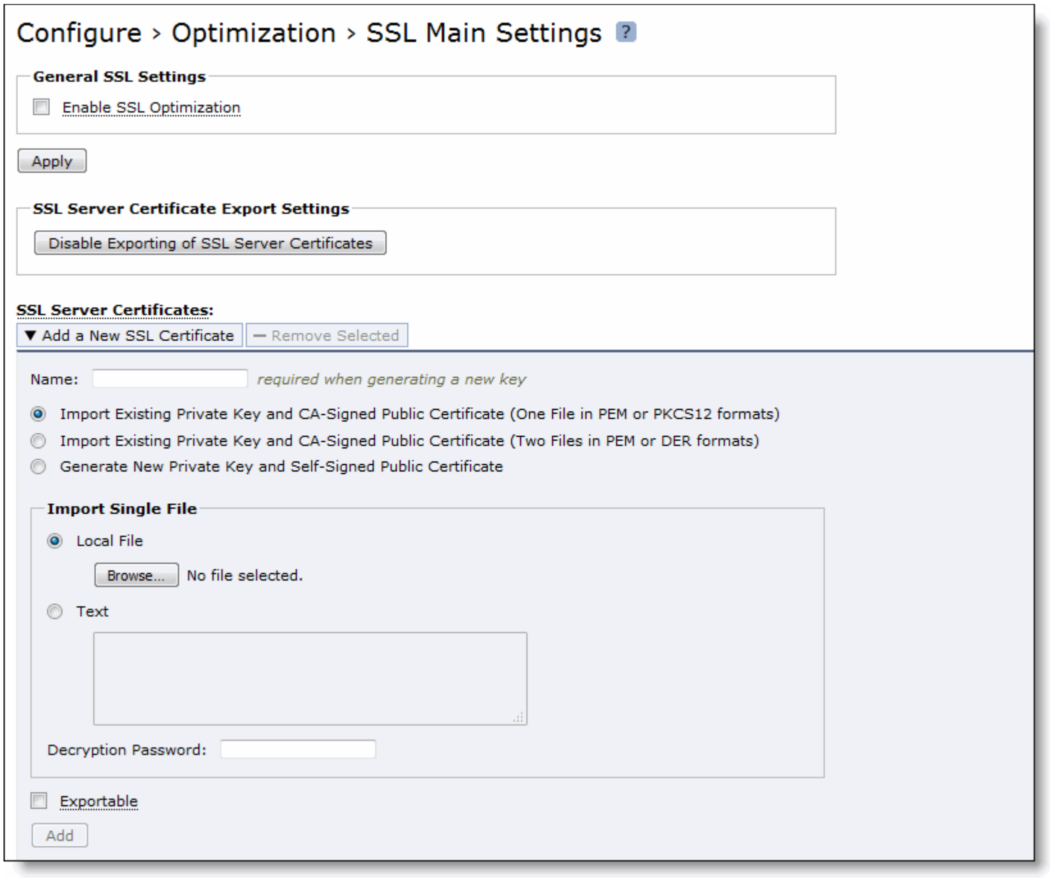
1. Connect to the Management Console.

2. Choose Configure > Optimization > SSL Main Settings to display the SSL Main Settings page.

3. Choose SSL Server Certificates.

4. Click **Add a New SSL Certificate** to expand the page.

Figure 3-2. Adding SSL Certificates



Configure > Optimization > SSL Main Settings

General SSL Settings

□ Enable SSL Optimization

SSL Server Certificate Export Settings

SSL Server Certificates:

Name: required when generating a new key

● Import Existing Private Key and CA-Signed Public Certificate (One File in PEM or PKCS12 formats)

○ Import Existing Private Key and CA-Signed Public Certificate (Two Files in PEM or DER formats)

○ Generate New Private Key and Self-Signed Public Certificate

Import Single File

● Local File

No file selected.

○ Text

Decryption Password:

□ Exportable

?
Apply
Disable Exporting of SSL Server Certificates
▼ Add a New SSL Certificate
— Remove Selected
Browse...
Add

5. Select Import Existing Private Key and CA-Signed Public Certificates.

6. Select Local File and navigate to the certificate location on the management workstation.

7. Click **Add**.

8. Select the Enable SSL Optimization check box.

9. Click **Apply**.

10. Click **Save** at the top of the page to save these setting permanently.

To enable secure peering

1. If you are securing encrypted MAPI traffic or Citrix traffic, enable one of these on both the server-side and client-side Steelhead appliances:

   - Choose Configure > Optimization > MAPI and select Enable Encrypted Optimization.

   —or—

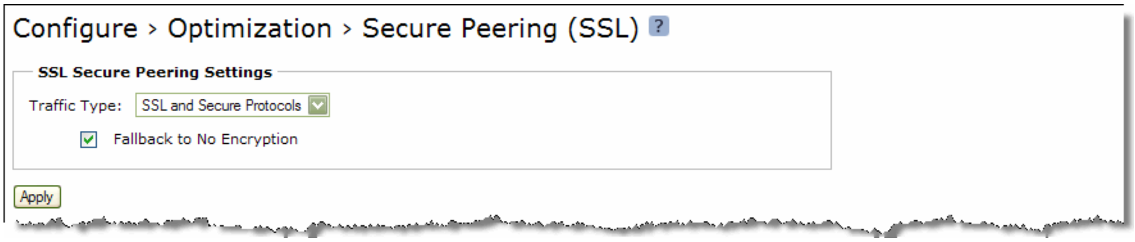
   - Choose Configure > Optimization > Citrix and select Enable SecureICA Encryption. Both Steelhead appliances must be running RiOS v7.0 or later.

   If you are securing SMB-signed traffic, choose Configure > Optimization > CIFS and select Enable SMB Signing on the server-side Steelhead appliance.

2. Riverbed recommends using N TP time synchronization or manually synchronizing the clocks on both the server-side and client-side Steelhead appliances. It is critical that the peer Steelhead appliance time is the same for the trust relationship to work.

3. On both the server-side and client-side Steelhead appliances, choose Configure > Optimization > Secure Peering (SSL) to display the Secure Peering (SSL) page.

Figure 3-3. Secure Peering (SSL) Page



Configure > Optimization > Secure Peering (SSL)

SSL Secure Peering Settings

Traffic Type: SSL and Secure Protocols

☑ Fallback to No Encryption

4. Under SSL Secure Peering Settings, complete the configuration as described in this table.

Control	Description
Traffic Type	Select one of these traffic types from the drop-down list: • **SSL Only** - The peer client-side Steelhead appliance and the server-side Steelhead appliance authenticate each other and then encrypt and optimize all SSL traffic; for example, HTTPS traffic on port 443. This is the default setting. • **SSL and Secure Protocols** - The peer client-side Steelhead appliance and the server-side Steelhead appliance authenticate each other and then encrypt and optimize all traffic traveling over these secure protocols: Citrix, SSL, SMB-signed, and encrypted MAPI. MAPI encryption or Secure ICA encryption must be enabled on both the client-side and server-side Steelhead appliances when securing encrypted MAPI traffic, or encrypted Citrix ICA traffic (RiOS v7.0 and later). Enabling this option requires an optimization service restart. • **All** - The peer client-side Steelhead appliance and the server-side Steelhead appliance authenticate each other and then encrypt and optimize all traffic. Only the optimized traffic is secure; pass-through traffic is not. Enabling this option requires an optimization service restart. Selecting All can cause up to a 10 percent performance decline in higher-capacity Steelhead appliances. Take this performance metric into account when sizing a complete secure Steelhead appliance peering environment.
Fallback to No Encryption	Specifies that the Steelhead appliance optimizes but does not encrypt the connection when it is unable to negotiate a secure, encrypted inner channel connection with the peer. This is the default setting. Enabling this option requires an optimization service restart. **Important:** Riverbed strongly recommends enabling this setting on both the client-side and the server-side Steelhead appliances, especially in mixed deployments where one Steelhead appliance is running RiOS v6.0 or later and the other Steelhead is running an earlier RiOS version. This option applies only to non-SSL traffic and is unavailable when you select SSL Only as the traffic type. Clear the check box to pass through connections that do not have a secure encrypted inner channel connection with the peer. Use caution when disabling this setting, as doing so specifies that you strictly do not want traffic optimized between non-secure Steelheads. Consequently, when this setting is disabled connections might be dropped: for example, consider a configuration with a client-side Steelhead running RiOS v5.5.x or earlier and a server-side Steelhead running RiOS v6.0. When this setting is disabled on the server-side Steelhead and All is selected as the traffic type, it will not optimize the connection when a secure channel is unavailable, and might drop it.

5. Click **Apply**.

6. Click **Save** at the top of the page to save your settings permanently.

7. If you have changed an encryption setting, you need to restart the optimization service.

Important: The Steelhead appliance supports RSA private keys for peers and SSL servers.

Ensuring Secure Pairing Trust Relationships for SSL

Rule Title: RiOS must protect the authenticity of communication sessions by configuring securing pairing trust relationships for SSL and secure protocols.

STIG ID: RICX-AG-000123

Rule ID: SV-77323r1_rule Severity: CAT II

Vuln ID: V-62833 Class: Unclass

Authenticity protection provides protection against man-in-the-middle attacks, session hijacking, and the insertion of false information into sessions.

This authenticity protection control focuses on communications protection for the application session rather than for the network packet and establishes grounds for confidence at both ends of communication sessions in ongoing identities of other parties and in the validity of information transmitted. Depending on the required degree of confidentiality and integrity, web services and service-oriented architecture (SOA) will require the use of mutual authentication (that is, two-way or bidirectional).

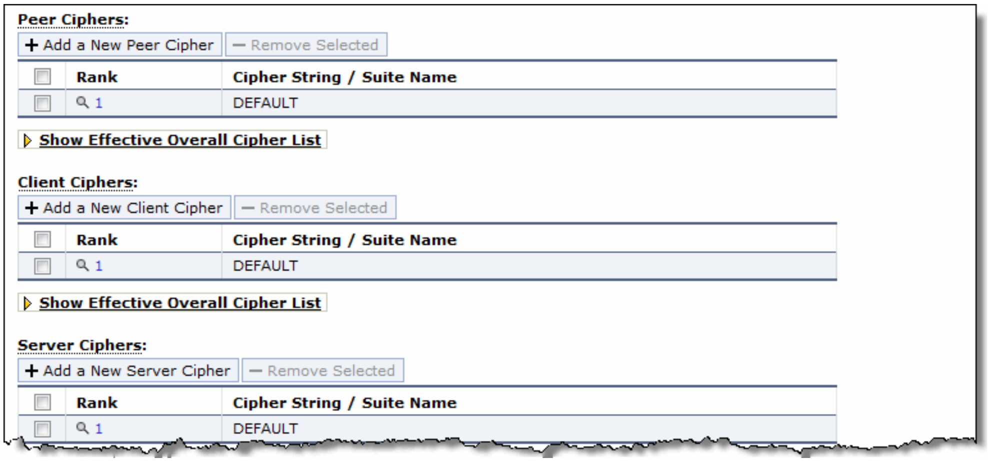
Verifying the TLS Version

Verify RiOS is configured to support TLS v1.1 as a minimum and preferably TLS v1.2.

To verify the TLS version

1. Connect to the Management Console.
2. Choose Configure > Optimization > Advanced Settings to display the Advanced Settings page.
3. Scroll down to Peer Ciphers.

Figure 3-4. Viewing Ciphers


+ Add a New Peer Cipher
— Remove Selected
Show Effective Overall Cipher List
+ Add a New Client Cipher
— Remove Selected
Show Effective Overall Cipher List
+ Add a New Server Cipher
— Remove Selected

Peer Ciphers:

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

Client Ciphers:

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

Server Ciphers:

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

4. Verify that Peer Ciphers: Rank 1 contains the following string:

```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

5. Verify that Client Ciphers: Rank 1 contains the following string:

```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

6. Verify that Server Ciphers: Rank 1 contains the following string:

```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

If any of the above Ciphers contains strings or groups other than what is listed, this is a security vulnerability finding.

Configuring TLS Version for Peer, Client, and Server Ciphers

Configure RiOS to support TLS v1.1 as a minimum and preferably TLS v1.2.

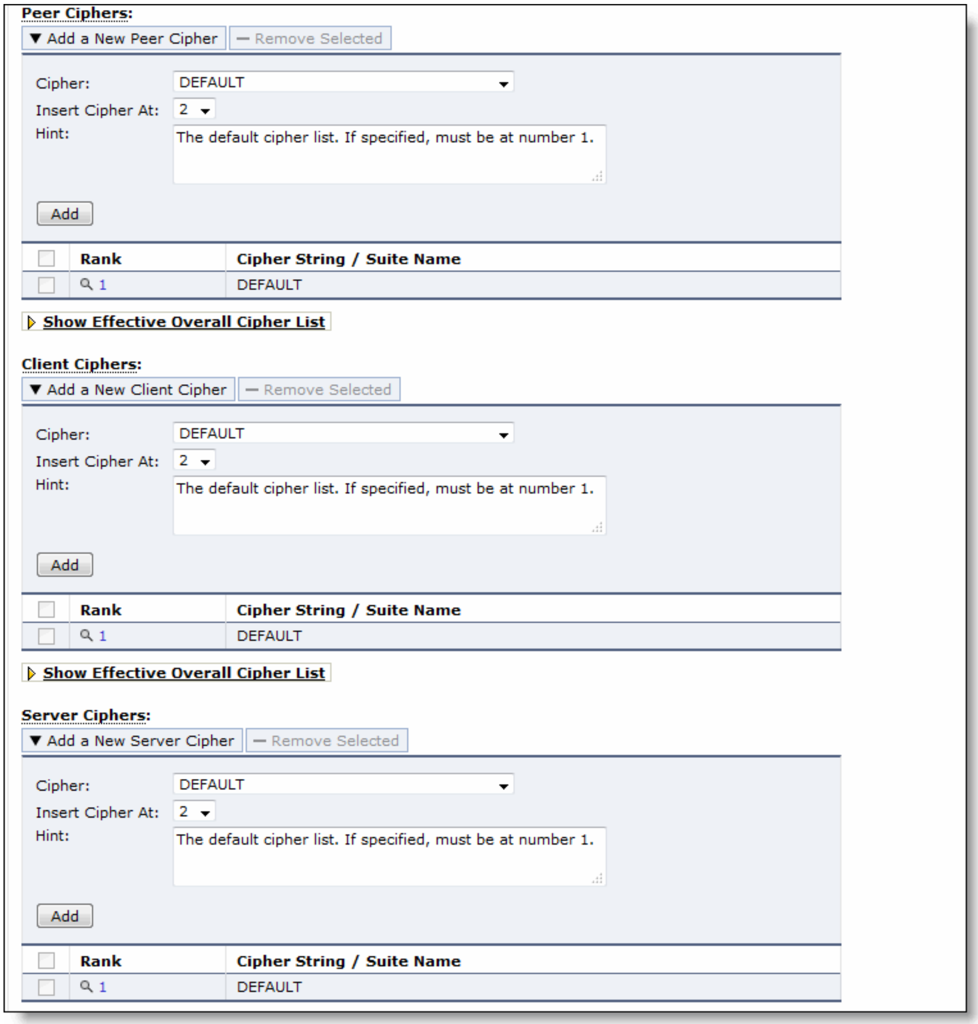
To configure the TLS version

1. Connect to the Management Console.

2. Choose Configure > Optimization > Advanced Settings to display the Advanced Settings page.

3. Click **Add a New Peer Cipher**, **Add a New Client Cipher**, and **Add a New Server Cipher** to expand the page.

Figure 3-5. Adding Ciphers



Peer Ciphers:

▼ Add a New Peer Cipher | — Remove Selected

Cipher: DEFAULT
Insert Cipher At: 2
Hint: The default cipher list. If specified, must be at number 1.

Add

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

▷ Show Effective Overall Cipher List

Client Ciphers:

▼ Add a New Client Cipher | — Remove Selected

Cipher: DEFAULT
Insert Cipher At: 2
Hint: The default cipher list. If specified, must be at number 1.

Add

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

▷ Show Effective Overall Cipher List

Server Ciphers:

▼ Add a New Server Cipher | — Remove Selected

Cipher: DEFAULT
Insert Cipher At: 2
Hint: The default cipher list. If specified, must be at number 1.

Add

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

4. Select this option from the Cipher drop-down list:

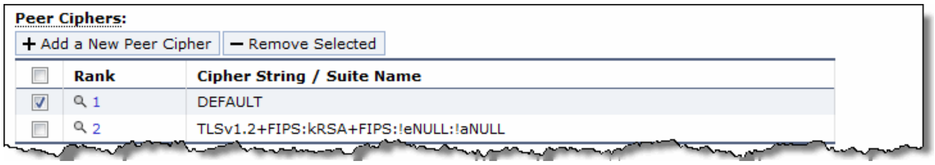
```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

5. Select 2 from the Insert Cipher At drop-down list.

6. Click **Add**.

7. Select the Rank 1 Default Cipher String check box and click **Remove Selected** to remove the default cipher string.

Figure 3-6. Removing the Default Cipher



□	Rank	Cipher String / Suite Name
☑	1	DEFAULT
□	2	TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL

8. Repeat Step 4 through Step 7 for Client Ciphers and Server Ciphers.

9. Click **Save** at the top of the page to save your settings permanently.

Ensuring RFC 5280-Compliant Certification Path Validation

Rule Title: RiOS must validate certificates used for TLS functions by performing RFC 5280-compliant certification path validation.

STIG ID: RICX-AG-000098

Rule ID: SV-77321r1_rule	Severity: CAT II
Vuln ID: V-62831	Class: Unclass

A certificate's certification path is the path from the end-entity certificate to a trusted-root certificate authority (CA). Certification path validation is necessary for a relying party to make an informed decision regarding acceptance of an end entity certificate.

Certification path validation includes checks such as certificate issuer trust, time validity, and revocation status for each certificate in the certification path. Revocation status information for CA and subject certificates in a certification path is commonly provided through certificate revocation lists (CRLs) or online certificate status protocol (OCSP) responses.

Verifying Certificate Path Validation Is Configured

Verify that RiOS is configured to validate certificates used for TLS functions by performing certificate path validation.

To verify certificate path validation is configured

1. Connect to the Management Console.

2. Choose Configure > Optimization > CRL Management to display the CRL Management page.

3. Verify that the Enable Automatic CRL Polling For CAs and Enable Automatic CRL Polling For Peering CAs check boxes are selected.

4. If the Enable Automatic CRL Polling For CAs and/or Enable Automatic CRL Polling For Peering CAs check boxes are not set, this is a security vulnerability finding.

Configuring Certificate Path Validation Is Configured

Configure RiOS to validate certificates used for TLS functions by performing certificate path validation.

To verify certificate path validation is configured

1. Connect to the Management Console.
2. Choose Configure > Optimization > CRL Management to display the CRL Management page.
3. Select the Enable Automatic CRL Polling For CAs, and the Enable Automatic CRL Polling For Peering CAs check boxes.
4. Click **Apply**.
5. Click **Save** at the top of the page to save these setting permanently.

TLS Versions and FIPS Approved Key Management

This section includes these rules:

- "Ensuring NIST FIPS-Validated Cryptography to Protect the Confidentiality of TLS" on page 111
- "Ensuring FIPS-Approved Management of Private and Secret Cryptographic Keys" on page 112
- "Configuring TLS Settings for National Institute of Standards and Technology Special Publication (NIST SP) 800-52" on page 112
- "Ensuring RFC 5280-Compliant Certification Path Validation" on page 110

Ensuring NIST FIPS-Validated Cryptography to Protect the Confidentiality of TLS

Rule Title: If TLS optimization is enabled RiOS must use encryption services that implement NIST FIPS-validated cryptography to protect the confidentiality of TLS.

STIG ID: RICX-AG-000039

Rule ID: SV-77307r1_rule	Severity: CAT II
Vuln ID: V-62817	Class: Unclass

Without confidentiality protection mechanisms, unauthorized individuals might gain access to sensitive information through a remote access session.

Remote access is access to DoD-nonpublic information systems by an authorized user (or an information system) communicating through an external, nonorganization-controlled network. Remote access methods include broadband and wireless connections. Remote access methods include, for example, proxied remote encrypted traffic (for example, transport layer security (TLS) gateways, web content filters, and web email proxies).

Encryption provides a means to secure the remote connection to prevent unauthorized access to the data traversing the remote access connection, thereby providing a degree of confidentiality. The encryption strength of the mechanism is selected based on the security categorization of the information.

This requirement applies to ALGs providing remote-access proxy services as part of its intermediary services (for example, OWA or TLS gateway).

Verifying the TLS Version Support

Verify RiOS is configured to support TLS v1.1 as a minimum and preferably TLS v1.2.

For detailed information, see “Verifying the TLS Version” on page 108.

Configuring TLS Version for Peer, Client, and Server Ciphers

Configure RiOS to support TLS v1.1 as a minimum and preferably TLS v1.2.

For detailed information, see “Configuring TLS Version for Peer, Client, and Server Ciphers” on page 109.

Ensuring FIPS-Approved Management of Private and Secret Cryptographic Keys

Rule Title: If TLS optimization is used, RiOS, which stores secret or private keys, must use FIPS-approved key management technology and processes in the production and control of private/secret cryptographic keys.

STIG ID: RICX-AG-000040

Rule ID: SV-77309r1_rule	Severity: CAT II
Vuln ID: V-62819	Class: Unclass

Private key data is used to prove that the entity presenting a public key certificate is the certificate's rightful owner. Compromise of private key data allows an adversary to impersonate the key holder.

Private key data associated with software certificates, including those issued to an ALG, is required to be generated and protected in at least a FIPS 140-2 Level 1 validated cryptographic module.

The RiOS secure vault contains sensitive information from your SteelHead appliance configuration, including SSL private keys and the data store encryption key. These configuration settings are encrypted on the disk using AES 256-bit encryption.

The secure vault always runs in FIPS mode.

Configuring TLS Settings for National Institute of Standards and Technology Special Publication (NIST SP) 800-52

Rule Title: RiOS must be configured to comply with the required TLS settings in NIST SP 800-52.

STIG ID: RICX-AG-000041

Rule ID: SV-77311r1_rule	Severity: CAT II
Vuln ID: V-62821	Class: Unclass

Class: Unclass

SP 800-52 provides guidance on using the most secure version and configuration of the TLS/SSL protocol. Using older unauthorized versions or incorrectly configuring protocol negotiation makes the gateway vulnerable to known and unknown attacks that exploit vulnerabilities in this protocol.

This requirement applies to TLS gateways (also known as the SSL gateways) and is not applicable to virtual private network (VPN) devices. Application protocols such as HTTPS and DNSSEC use TLS as the underlying security protocol and are in scope for this requirement. The NIS SP 800-52 provides additional guidance.

NIST SP 800-52 sets TLS v1.1 as a minimum version, thus all versions of SSL are not allowed (including for client negotiation) either on DoD-only or on public facing servers.

Verifying the TLS Version

Verify that RiOS is configured to support TLS v1.1 as a minimum and preferably TLS v1.2.

For detailed information, see "Verifying the TLS Version Support" on page 112.

Configuring TLS Version Support

Configure RiOS to support TLS v1.1 as a minimum and preferably TLS v1.2.

For detailed information, see "Configuring TLS Version for Peer, Client, and Server Ciphers" on page 112.

NIST FIPS-Validated Cryptography to Protect the Integrity of Remote Access Sessions

Rule Title: RiOS must use NIST FIPS-validated cryptography to protect the integrity of remote access sessions.

STIG ID: RICX-AG-000042

Rule ID: SV-77313r1_rule	Severity: CAT II
Vuln ID: V-62823	Class: Unclass

Without cryptographic integrity protections, information can be altered by unauthorized users without detection.

Remote access is access to DoD-nonpublic information systems by an authorized user (or an information system) communicating through an external, nonorganization-controlled network. Remote access methods include broadband and wireless connections. Remote access methods include, for example, proxied remote encrypted traffic (for example, TLS gateways, web content filters, and webmail proxies).

Cryptographic mechanisms used for protecting the integrity of information include, for example, signed hash functions using asymmetric cryptography enabling distribution of the public key to verify the hash information while maintaining the confidentiality of the secret key used to generate the hash.

This requirement applies to ALGs providing remote access proxy services as part of its intermediary services (for example, OWA or TLS gateway).

Verifying the Management of Cryptographic Keys

Verify that RiOS is configured to support FIPS-approved key management technology and processes in the production and control of private and secret cryptographic keys.

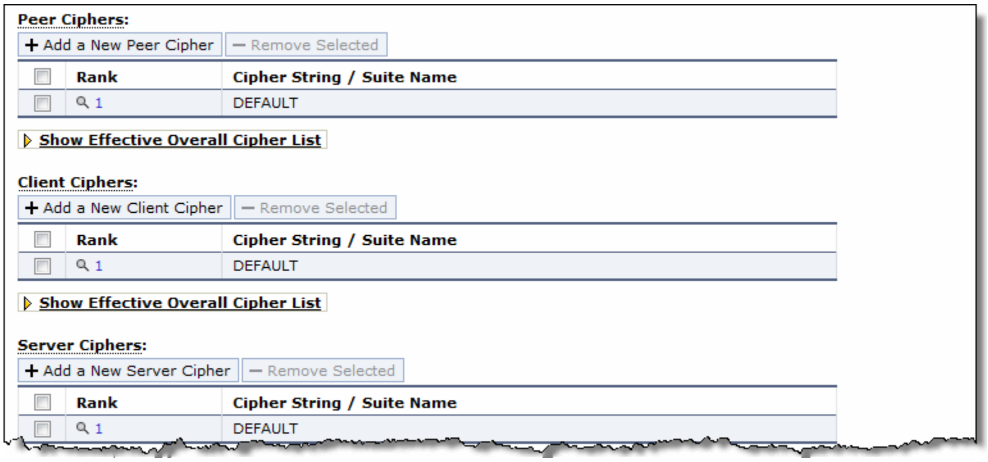
To verify FIPS approved production and control of private and secret cryptographic keys

1. Connect to the Management Console.

2. Choose Configure > Optimization > Advanced Settings to display the Advanced Settings page.

3. Scroll down to Peer Ciphers.

Figure 3-7. Viewing Ciphers



+ Add a New Peer Cipher
— Remove Selected
▷ Show Effective Overall Cipher List
+ Add a New Client Cipher
— Remove Selected
▷ Show Effective Overall Cipher List
+ Add a New Server Cipher
— Remove Selected

Peer Ciphers:

☐	Rank	Cipher String / Suite Name
☐	1	DEFAULT

Client Ciphers:

☐	Rank	Cipher String / Suite Name
☐	1	DEFAULT

Server Ciphers:

☐	Rank	Cipher String / Suite Name
☐	1	DEFAULT

4. Verify that Peer Ciphers: Rank 1 contains the following string:

```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

5. Verify that Client Ciphers: Rank 1 contains the following string:

```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

6. Verify that Server Ciphers: Rank 1 contains the following string:

```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

   If any of the above Ciphers contains strings or groups other than what is listed, this is a security vulnerability finding.

Configuring the Management of Cryptographic Keys

Configure RiOS to support FIPS-approved key management technology and processes in the production and control of private and secret cryptographic keys.

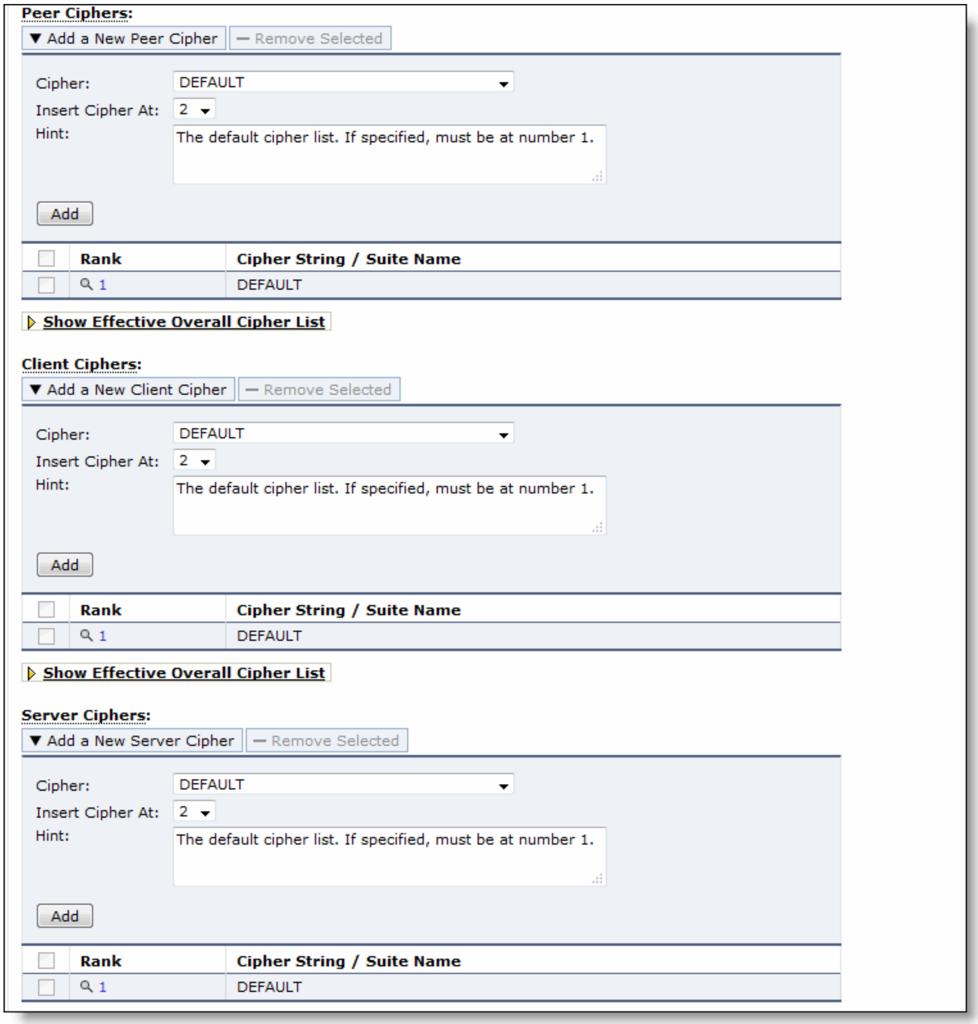
To configure FIPS approved production and control of private and secret cryptographic keys

1. Connect to the Management Console.

2. Choose Configure > Optimization > Advanced Settings to display the Advanced Settings page.

3. Click **Add a New Peer Cipher**, **Add a New Client Cipher**, and **Add a New Server Cipher** to expand the page.

Figure 3-8. Adding Ciphers


▼ Add a New Peer Cipher
— Remove Selected
Add
Show Effective Overall Cipher List
▼ Add a New Client Cipher
— Remove Selected
Add
Show Effective Overall Cipher List
▼ Add a New Server Cipher
— Remove Selected
Add

Peer Ciphers:

Cipher: DEFAULT

Insert Cipher At: 2

Hint: The default cipher list. If specified, must be at number 1.

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

Client Ciphers:

Cipher: DEFAULT

Insert Cipher At: 2

Hint: The default cipher list. If specified, must be at number 1.

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

Server Ciphers:

Cipher: DEFAULT

Insert Cipher At: 2

Hint: The default cipher list. If specified, must be at number 1.

□	Rank	Cipher String / Suite Name
□	1	DEFAULT

4. Select this option from the Cipher drop-down list:

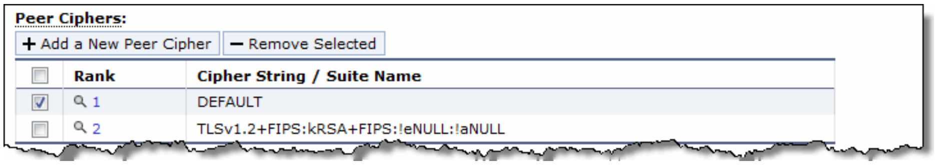
```
TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL
```

5. Select 2 from the Insert Cipher At drop-down list.

6. Click **Add**.

7. Select the Rank 1 Default Cipher String check box and click **Remove Selected** to remove the default cipher string.

Figure 3-9. Removing the Default Cipher



□	Rank	Cipher String / Suite Name
☑	1	DEFAULT
□	2	TLSv1.2+FIPS:kRSA+FIPS:!eNULL:!aNULL

8. Repeat Step 4 through Step 7 for Client Ciphers and Server Ciphers.

9. Click **Save** at the top of the page to save your settings permanently.

Device and Host Security

This section includes these rules:

- "Ensuring Unnecessary Services Are Not Enabled on the Host" on page 116
- "Ensuring Unnecessary Services and Functions Are Not Enabled" on page 117
- "Ensuring Protocols, Ports, and Service Management, Category Assurance Levels (PPSM) Category Assurance Levels (CAL) Compliance" on page 119

Ensuring Unnecessary Services Are Not Enabled on the Host

Rule Title: RiOS must not have unrelated or unnecessary services enabled on the host.

STIG ID: RICX-AG-000086

Rule ID: SV-77315r1_rule Severity: CAT II

Vuln ID: V-62825 Class: Unclass

Typically, the SteelHead is installed in the architecture at the perimeter of the network. Installation of unnecessary functions and services on the same host increases the security risk by implementing these functions before the network inspection occurs and opens excessive ports on the firewall for these functions and services to operate. Loading functions that are outside the scope and unrelated to the WAN optimization function is unauthorized and might create an attack vector. Related services include content filtering, traffic analysis, decryption, caching, and traffic inspection tools (for example, firewall, IDS), unrelated services include email, DNS, and web server.

When the solution is deployed using a SteelHead appliance consisting of the RiOS software installed on the SteelHead, administrators are not allowed to install any software that is not part of a Riverbed software upgrade. RiOS enforces this restriction by performing a validity check when an upgrade is attempted.

However, the RiOS software is available in a virtual appliance that can be installed on an organization-provided host. This type of implementation adds a security risk because more ports might be opened in the firewall if placed in the recommended logical position in the architecture (that is, after the router and before the firewall and IDS). The traffic would then be routed for inspection after traversing the WAN optimizer.

Verifying Unnecessary Services Are Not Enabled on the Host

If RiOS, as a virtual appliance, is installed on the SteelHead appliance, this is a security vulnerability finding.

Inspect the services and applications that are installed on the host with the RiOS application suite.

Ask the site representative if a security review using the applicable STIG has been performed on the operating system and applications that are cohosted.

If unrelated or unnecessary services are installed on the same host as the RiOS, this is a security vulnerability finding.

If a security review using the applicable STIG has not been performed on the operating system and applications cohosted on RiOS, this is a security vulnerability finding.

Disabling Unnecessary Services on the Host

Disable or uninstall unrelated or unnecessary services from the host.

Ensuring Unnecessary Services and Functions Are Not Enabled

Rule Title: RiOS must not have unnecessary services and functions enabled.

STIG ID: RICX-AG-000087

Rule ID: SV-77317r1_rule	Severity: CAT II
Vuln ID: V-62827	Class: Unclass

Unrelated or unneeded proxy services increase the attack vector and add excessive complexity to the securing of RiOS 8.x.x. Multiple application proxies can be installed on many ALGs. However, proxy types must be limited to related functions. At a minimum, the web and email gateway represent different security domains/trust levels. Organizations should also consider separation of gateways that service the DMZ and the trusted network.

Verifying Unnecessary Services Are Not Enabled

Verify that RiOS is configured to disable unrelated or unneeded application proxy services.

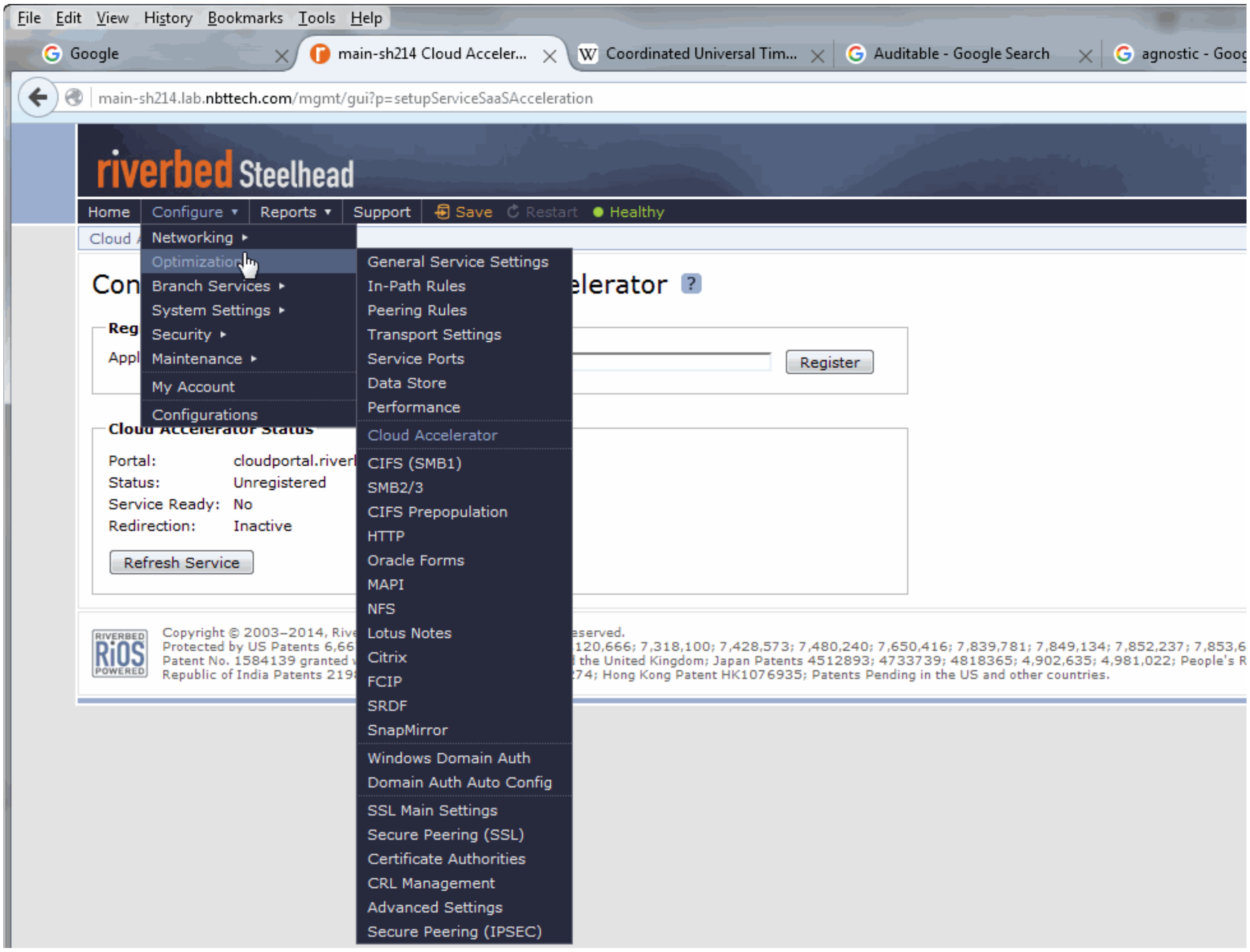
Obtain documentation for which applications are approved and disapproved for optimization by the organization.

To verify if unnecessary services are enabled

1. Connect to the Management Console.

2. Choose Optimize > Optimization to display the menu.

Figure 3-10. Displaying the Optimization Menu



Portal: cloudportal.riverl
Status: Unregistered
Service Ready: No
Redirection: Inactive

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Protected by US Patents 6,66 ... 120,666; 7,318,100; 7,428,573; 7,480,240; 7,650,416; 7,839,781; 7,849,134; 7,852,237; 7,853,6
Patent No. 1584139 granted ... the United Kingdom; Japan Patents 4512893; 4733739; 4818365; 4,902,635; 4,981,022; People's R
Republic of India Patents 219 ... 74; Hong Kong Patent HK1076935; Patents Pending in the US and other countries.

3. Verify that the approved or disapproved applications are enabled or disabled according to organization requirements. If optimization features are not enabled or disabled according to the organization's requirements, this is a security vulnerability finding.

Ensuring Unnecessary Services Are Not Enabled

Check to see if services other than the authorized services are enabled for optimization.

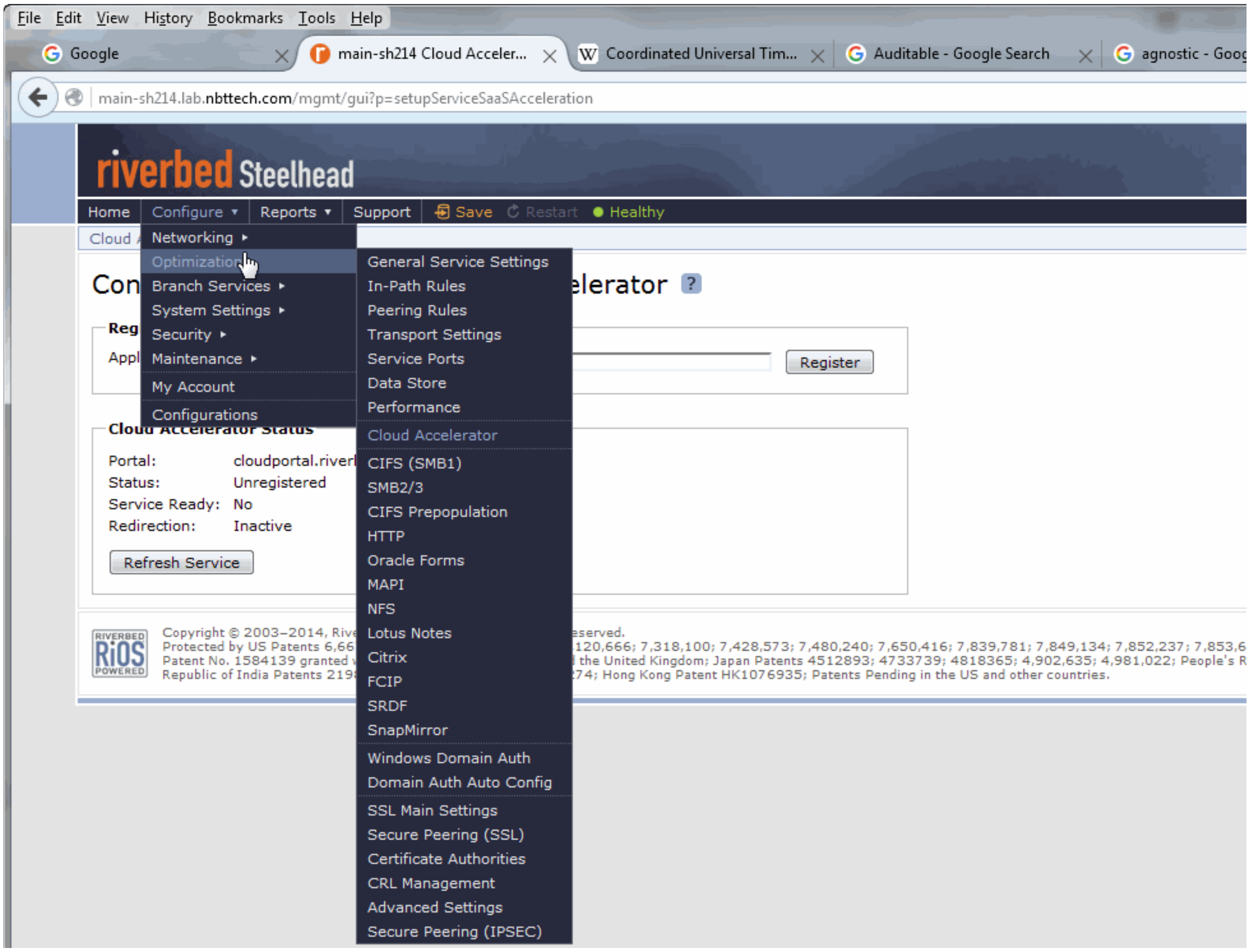
Obtain documentation for which applications are approved and disapproved for optimization by the organization.

To ensure unnecessary services are not enabled

1. Connect to the Management Console.

2. Choose Optimize > Optimization to display the menu.

Figure 3-11. Displaying the Optimization Menu



3. Set the approved or disapproved applications to enabled or disabled according to organization requirements.

Ensuring Protocols, Ports, and Service Management, Category Assurance Levels (PPSM) Category Assurance Levels (CAL) Compliance

Rule Title: RiOS must be configured to prohibit or restrict the use of functions, ports, protocols, and/or services, as defined in the PPSM CAL and vulnerability assessments.

STIG ID: RICX-AG-000088

Rule ID: SV-77319r1_rule Severity: CAT II

Vuln ID: V-62829 Class: Unclass

In order to prevent unauthorized connection of devices, unauthorized transfer of information, or unauthorized tunneling (that is, embedding of data types within data types); organizations must disable or restrict unused or unnecessary physical and logical ports and protocols on information systems.

ALGs are capable of providing a wide variety of functions and services. Some of the functions and services provided by default might not be necessary to support essential organizational operations. DoD continually assesses the ports, protocols, and services that can be used for network communications. Some ports, protocols or services have known exploits or security weaknesses. Network traffic using these ports, protocols, and services must be prohibited or restricted in accordance with DoD policy. RiOS is a key network element for preventing these noncompliant ports, protocols, and services from causing harm to DoD information systems.

The network ALG must be configured to prevent or restrict the use of prohibited ports, protocols, and services throughout the network by filtering the network traffic and disallowing or redirecting traffic as necessary. Default and updated policy filters from the vendors will disallow older version of protocols and applications and will address most known nonsecure ports, protocols, and/or services. However, sources for further policy filters are the Information Assurance Vulnerability Management (IAVM) and the PPSM requirements.

Verifying PPSM CAL Compliance

Verify that RiOS is configured to disable unrelated or unneeded application proxy services.

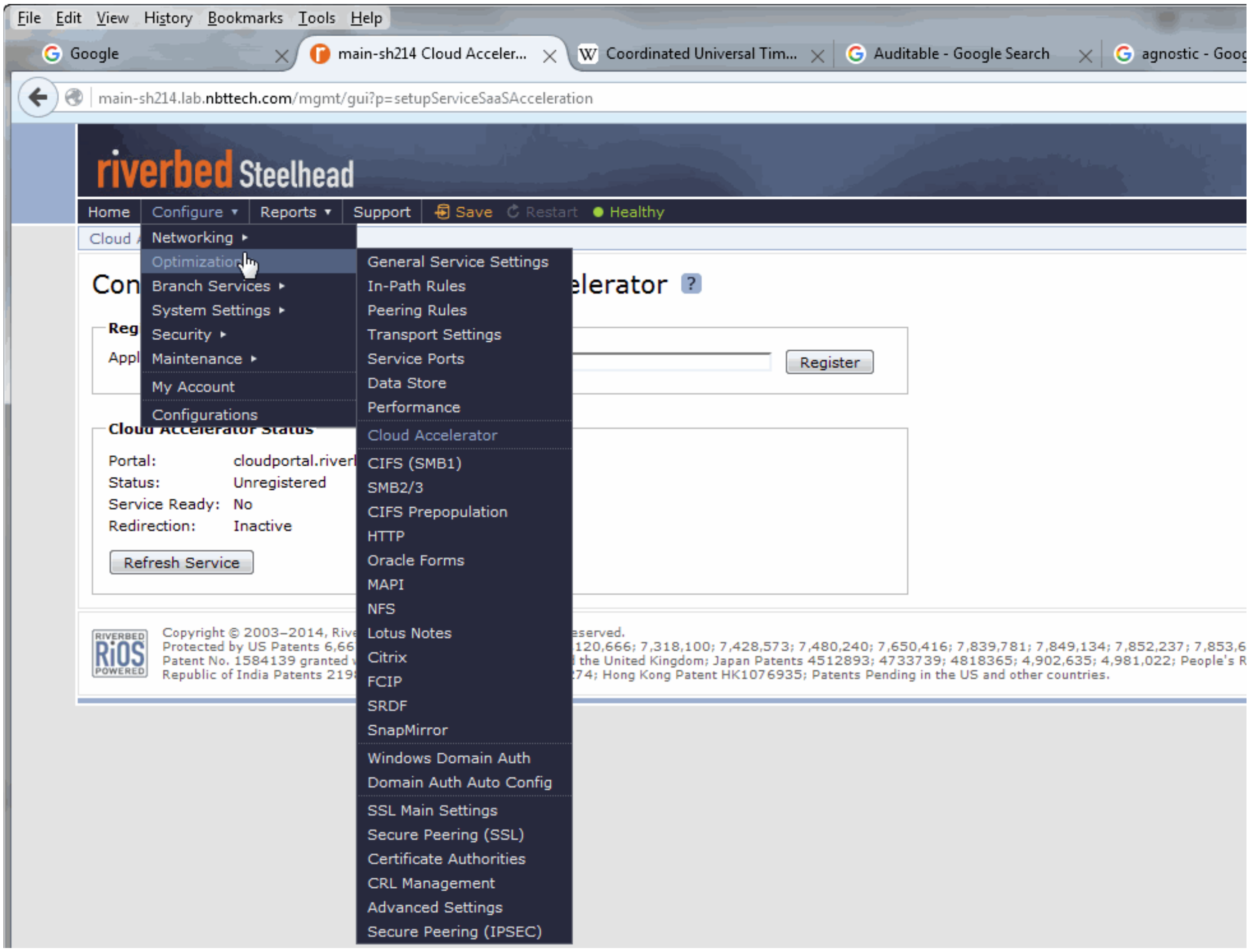
Obtain documentation for which applications are approved and disapproved for optimization by the organization.

To verify PPSM CAL compliance

1. Connect to the Management Console.

2. Choose Configure > Optimization to display the menu.

Figure 3-12. Displaying the Optimization Menu



Portal: cloudportal.river

Status: Unregistered

Service Ready: No

Redirection: Inactive

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Protected by US Patents 6,66 120,666; 7,318,100; 7,428,573; 7,480,240; 7,650,416; 7,839,781; 7,849,134; 7,852,237; 7,853,6
Patent No. 1584139 granted i the United Kingdom; Japan Patents 4512893; 4733739; 4818365; 4,902,635; 4,981,022; People's R
Republic of India Patents 219 74; Hong Kong Patent HK1076935; Patents Pending in the US and other countries.

3. Verify that the approved or disapproved applications are enabled or disabled according to organization requirements. For example, open the pages for Lotus Notes, Citrix, and so on to make sure only approved applications are enabled.

   If optimization features are not enabled or disabled according to the organization's requirements, this is a security vulnerability finding.

Ensuring PPSM CAL Compliance

Check to see if services other than the authorized services are enabled for optimization.

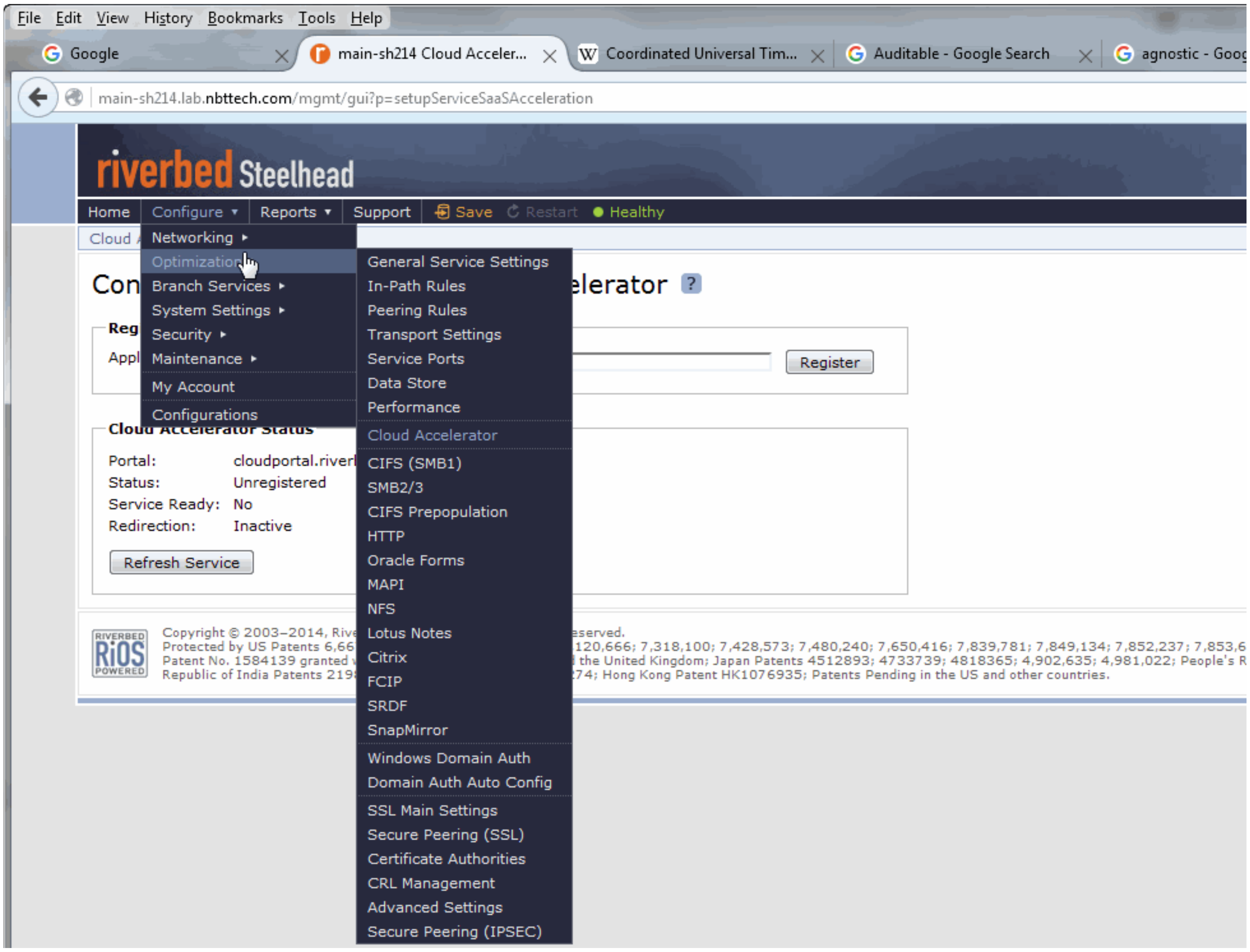
Obtain documentation for which applications are approved and disapproved for optimization by the organization.

To ensure PPSM CAL compliance

1. Connect to the Management Console.

2. Choose Configure > Optimization to display the menu.

Figure 3-13. Displaying the Optimization Menu



Portal: cloudportal.riverl

Status: Unregistered

Service Ready: No

Redirection: Inactive

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Protected by US Patents 6,66 120,666; 7,318,100; 7,428,573; 7,480,240; 7,650,416; 7,839,781; 7,849,134; 7,852,237; 7,853,6
Patent No. 1584139 granted the United Kingdom; Japan Patents 4512893; 4733739; 4818365; 4,902,635; 4,981,022; People's R
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