



# RADIUS ESP Authentication

## Feature Description

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# 1 Introduction

As part of the Kemp Edge Security Pack (ESP), the LoadMaster supports a number of authentication protocols, including Remote Authentication Dial-In User Service (RADIUS).

RADIUS is a widely deployed protocol enabling centralized authentication, authorization and accounting for network access. Originally developed for dial-up remote access, RADIUS is now supported by Virtual Private Network (VPN) servers, wireless access points, authenticating Ethernet switches, Digital Subscriber Line (DSL) access, and other network access types.

A RADIUS client (typically an access server such as a dial-up server, VPN server, or wireless access point) sends user credentials and connection parameter information in the form of a RADIUS message to a RADIUS server. The RADIUS server authenticates and authorizes the RADIUS client request, and sends back a RADIUS message response. RADIUS clients also send RADIUS accounting messages to RADIUS servers. Additionally, the RADIUS standards support the use of RADIUS proxies. A RADIUS proxy is a computer that forwards RADIUS messages between RADIUS clients, RADIUS servers and other RADIUS proxies. RADIUS messages are never sent between the access client and the access server.

## 1.1 Document Purpose

This document provides step-by-step instructions on how to configure authentication and Single Sign On (SSO) using RADIUS in the LoadMaster.

For instructions on how to use RADIUS authentication for LoadMaster Web User Interface (WUI) access, refer to the [RADIUS Authentication and Authorization, Technical Note](#).

## 1.2 Intended Audience

This document is intended to be used by anyone who is interested in finding out how to configure RADIUS ESP authentication in the Kemp LoadMaster.

# 2 Configure RADIUS ESP Authentication

Follow the steps in the sections below to configure the LoadMaster to use Radius ESP authentication.

## 2.1 Prerequisites

Before configuring the LoadMaster, please ensure that there is a RADIUS authentication server in place and that it is configured with the client details (the IP address of the LoadMaster and the shared secret which is used for password encryption).

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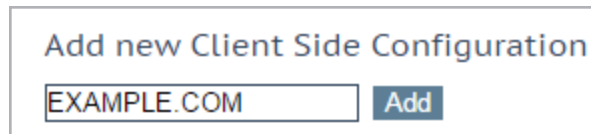
It is not possible to use RADIUS authentication if you are using a FIPS LoadMaster.

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## 2.2 Create an SSO Domain

Follow the steps below to create an SSO domain in the LoadMaster:

1. In the LoadMaster WUI, navigate to **Virtual Services > Manage SSO**.



2. Enter the name of the SSO configuration in the **Add new Client Side Configuration** field and click **Add**.

## 2 Configure RADIUS ESP Authentication

Domain EXAMPLE.COM

Authentication Protocol	<input type="text" value="RADIUS"/>																									
RADIUS Server(s)	<input type="text"/>	<input type="button" value="Set RADIUS Server(s)"/>																								
RADIUS Shared Secret	<input type="text" value="Please Set Password"/>	<input type="button" value="Set Shared Secret"/>																								
Send NAS Identifier	<input checked="" type="checkbox"/>																									
RADIUS NAS Identifier	<input type="text" value="b100"/>	<input type="button" value="Set NAS Identifier"/>																								
Domain/Realm	<input type="text"/>	<input type="button" value="Set Domain/Realm Name"/>																								
Logon Format (Phase 1 RADIUS)	<input type="text" value="Principalname"/>																									
Logon Format (Phase 2 Real Server)	<input type="text" value="Principalname"/>																									
Logon Transcode	<input type="text" value="Disabled"/>																									
Failed Login Attempts	<input type="text" value="0"/>	<input type="button" value="Set Failed Login Attempts"/>																								
<table border="0"> <tr> <td><b>Public - Untrusted Environment</b></td> <td></td> <td><b>Private - Trusted Environment</b></td> <td></td> </tr> <tr> <td>Session Timeout</td> <td><input type="text" value="900"/></td> <td><input type="text" value="900"/></td> <td></td> </tr> <tr> <td></td> <td><input type="button" value="Set Idle Time"/></td> <td><input type="button" value="Set Idle Time"/></td> <td></td> </tr> <tr> <td></td> <td><input type="text" value="1800"/></td> <td><input type="text" value="28800"/></td> <td></td> </tr> <tr> <td></td> <td><input type="button" value="Set Max Duration"/></td> <td><input type="button" value="Set Max Duration"/></td> <td></td> </tr> <tr> <td colspan="4">Use for Session Timeout: <input type="text" value="idle time"/></td> </tr> </table>			<b>Public - Untrusted Environment</b>		<b>Private - Trusted Environment</b>		Session Timeout	<input type="text" value="900"/>	<input type="text" value="900"/>			<input type="button" value="Set Idle Time"/>	<input type="button" value="Set Idle Time"/>			<input type="text" value="1800"/>	<input type="text" value="28800"/>			<input type="button" value="Set Max Duration"/>	<input type="button" value="Set Max Duration"/>		Use for Session Timeout: <input type="text" value="idle time"/>			
<b>Public - Untrusted Environment</b>		<b>Private - Trusted Environment</b>																								
Session Timeout	<input type="text" value="900"/>	<input type="text" value="900"/>																								
	<input type="button" value="Set Idle Time"/>	<input type="button" value="Set Idle Time"/>																								
	<input type="text" value="1800"/>	<input type="text" value="28800"/>																								
	<input type="button" value="Set Max Duration"/>	<input type="button" value="Set Max Duration"/>																								
Use for Session Timeout: <input type="text" value="idle time"/>																										
Test User	<input type="text"/>	<input type="button" value="Set Test User"/>																								
Test User Password	<input type="text"/>	<input type="button" value="Set Test User Password"/>																								

### 3. Select the relevant **Authentication Protocol**.

For RADIUS authentication the following options are valid:

- **RADIUS**
- **RADIUS and Unencrypted LDAP** (two factor authentication)

### 4. Select the relevant **LDAP Endpoint**, if using two factor authentication.

5. Enter the address(es) of the **RADIUS Server(s)** to be used to authenticate this domain and click **Set RADIUS Server(s)**.

Multiple addresses can be entered using a space-separated list.

IPv6 is not supported for RADIUS authentication.

6. Enter the **RADIUS Shared Secret** that is to be used between the RADIUS server and the LoadMaster and click **Set Shared Secret**.

The Shared Secret is a text string that serves as a password between the LoadMaster and the RADIUS server.

### 7. Decide whether or not to enable the **Send NAS Identifier** check box.

If this check box is disabled (default), a Network Access Server (NAS) identifier is not sent to the RADIUS server. If it is enabled,

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a NAS identifier string is sent to the RADIUS server. By default, this is the hostname. Alternatively, if a value is specified in the **RADIUS NAS Identifier** text box, this value is used as the NAS identifier. If the NAS identifier cannot be added, the RADIUS access request is still processed.

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8. If you enabled the **Send NAS Identifier** check box, decide whether or not to specify the **RADIUS NAS Identifier**.

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If the **Send NAS Identifier** check box is selected, the **RADIUS NAS Identifier** field is shown. When specified, this value is used as the NAS identifier. Otherwise, the hostname is used as the NAS identifier. If the NAS identifier cannot be added, the RADIUS access request is still processed.

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9. Enter the **Domain/Realm** and click **Set Domain/Realm Name**.

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This is also used with the logon format to construct the normalized username, for example:

- **Principalname:** <Username>@<Domain>
  - **Username:** <Domain>\<Username>
- 

10. Select the relevant logon string format in the **Logon Format (Phase 1)** drop-down list.
11. Select the relevant logon string format in the **Logon Format (Phase 2)** drop-down list.
12. Fill out the remaining fields as needed.

## 2.3 Create a Virtual Service

Follow the steps below to create a Virtual Service and configure the ESP Options:

1. In the main menu of the LoadMaster WUI, navigate to **Virtual Services > Add New**.

## 2 Configure RADIUS ESP Authentication

Please Specify the Parameters for the Virtual Service.

Virtual Address	<input type="text" value="10.154.11.179"/>
Port	<input type="text" value="80"/>
Service Name (Optional)	<input type="text" value="Example Virtual Service"/>
Use Template	<input type="text" value="Select a Template"/>
Protocol	<input type="text" value="tcp"/>

2. Enter a valid IP address in the **Virtual Address** text box.
3. Fill out the other fields as needed.
4. Click **Add this Virtual Service**.

ESP Options

Enable ESP ☐

5. Expand the **ESP Options** section.
6. Tick the **Enable ESP** check box.



## 2 Configure RADIUS ESP Authentication

ESP Options

Enable ESP

☒

ESP Logging

User Access:

Security:

Connection:

☒
☒
☒

Client Authentication Mode

Form Based

SSO Domain

EXAMPLE.COM

Alternative SSO Domains

Available Domain(s)

SECOND.COM

THIRD.COM

Assigned Domain(s)

None Assigned

>

<

Set Alternative SSO Domains

Allowed Virtual Hosts

Set Allowed Virtual Hosts

Allowed Virtual Directories

/\*

Set Allowed Directories

Pre-Authorization Excluded Directories

Set Excluded Directories

Permitted Groups

Set Permitted Groups

Permitted Group SID(s)

Set Permitted Group SIDs

Include Nested Groups

☐

Steering Groups

Set Steering Groups

Verify Bearer Header

☐

SSO Image Set

Exchange

SSO Greeting Message

Set SSO Greeting Message

Logoff String

Set SSO Logoff String

Display Public/Private Option

☒

Disable Password Form

☐

Enable Captcha

☐

Use Session or Permanent Cookies

Session Cookies Only

User Password Change URL

https://serverlink

Set Password Change URL

User Password Change Dialog Message

You must change your

Set Dialog Message

User Password Expiry Warning

☐

Server Authentication Mode

None

## 2 Configure RADIUS ESP Authentication

▼ ESP Options

Enable ESP ☒

ESP Logging User Access: ☒ Security: ☒ Connection: ☒

Client Authentication Mode **Form Based**

SSO Domain **EXAMPLE.COM**

Allowed Virtual Hosts **mail.exchange.com mail.exch** [Set Allowed Virtual Hosts](#)

Allowed Virtual Directories **/owa\*** [Set Allowed Directories](#)

Pre-Authorization Excluded Directories [Set Excluded Directories](#)

Permitted Groups [Set Permitted Groups](#)

Permitted Group SID(s) [Set Permitted Group SIDs](#)

Include Nested Groups ☐

Steering Groups [Set Steering Groups](#)

SSO Image Set **Exchange**

SSO Greeting Message [Set SSO Greeting Message](#)

Logoff String [Set SSO Logoff String](#)

Display Public/Private Option ☐

Disable Password Form ☐

Enable Captcha ☐

Use Session or Permanent Cookies **Session Cookies Only**

User Password Change URL **https://serverlink** [Set Password Change URL](#)

User Password Change Dialog Message [Set Dialog Message](#)

User Password Expiry Warning ☐

Server Authentication Mode **None**

7. Tick the **Enable ESP** check box.

▼ ESP Options

Enable ESP ☒

ESP Logging User Access: ☒ Security: ☒ Connection: ☒

Client Authentication Mode **Form Based**

SSO Domain **EXAMPLE.COM**

Alternative SSO Domains [Set Alternative SSO Domains](#)

Allowed Virtual Hosts **mail.exchange.com mail.exch** [Set Allowed Virtual Hosts](#)

Allowed Virtual Directories **/owa\*** [Set Allowed Directories](#)

Pre-Authorization Excluded Directories [Set Excluded Directories](#)

Permitted Groups [Set Permitted Groups](#)

Permitted Group SID(s) [Set Permitted Group SIDs](#)

Include Nested Groups ☐

Steering Groups [Set Steering Groups](#)

Verify Bearer Header ☒

Bearer Header Validation Certificate **None** [Set Bearer Text](#)

Bearer Header Validation Text [Set Bearer Text](#)

SSO Image Set **Exchange**

SSO Greeting Message [Set SSO Greeting Message](#)

Logoff String [Set SSO Logoff String](#)

Display Public/Private Option ☐

Disable Password Form ☐

Enable Captcha ☐

Use Session or Permanent Cookies **Session Cookies Only**

User Password Change URL **https://serverlink** [Set Password Change URL](#)

User Password Change Dialog Message **You must change your** [Set Dialog Message](#)

User Password Expiry Warning ☐

Server Authentication Mode **None**

8. Select the relevant **Client Authentication Mode**.

The RADIUS **SSO Domain** will not be available if the **Client Authentication Mode** is set to **Delegate to Server** – please select a different mode.

9. Select the RADIUS SSO domain, which was previously configured, from the **SSO Domain** drop-down list.
10. Fill out any other fields, as needed.
11. Add any Real Servers, as needed.

For an explanation of all of the WUI fields, refer to the [Web User Interface \(WUI\), Configuration Guide](#).

## 2.4 Set the L7 Client Token Timeout Value

The L7 Client Token Timeout is the duration of time (in seconds) to wait for the client token while the process of authentication is ongoing. The default L7 client token timeout is set to 120 seconds. This can be modified as needed in the LoadMaster WUI. The range of valid values is 60 to 300. To configure the timeout value, follow the steps below:

1. In the main menu, go to **System Configuration > Miscellaneous Options > L7 Configuration**.

## 2 Configure RADIUS ESP Authentication

Allow connection scaling over 64K Connections	<input type="checkbox"/>	
Always Check Persist	<input type="text" value="No"/>	
Add Port to Active Cookie	<input type="checkbox"/>	
Conform to RFC	<input checked="" type="checkbox"/>	
Close on Error	<input type="checkbox"/>	
Add Via Header In Cache Responses	<input type="checkbox"/>	
Real Servers are Local	<input type="checkbox"/>	
Drop Connections on RS failure	<input type="checkbox"/>	
Drop at Drain Time End	<input type="checkbox"/>	
L7 Connection Drain Time (secs)	<input type="text" value="300"/>	<a href="#">Set Time</a> (Valid values:0, 60 - 86400)
L7 Authentication Timeout (secs)	<input type="text" value="30"/>	<a href="#">Set Timeout</a> (Valid values:30 - 300)
L7 Wait after POST(ms)	<input type="text" value="2000"/>	<a href="#">Set Post Wait</a> (Valid values:1 - 2000)
L7 Client Token Timeout (secs)	<input type="text" value="120"/>	<a href="#">Set Timeout</a> (Valid values:60 - 300)
Additional L7 Header	<input type="text" value="X-Forwarded-For"/>	
100-Continue Handling	<input type="text" value="RFC-7231 Compliant"/>	
Allow Empty POSTs	<input type="checkbox"/>	
Allow Empty HTTP Headers	<input type="checkbox"/>	
Force Complete RS Match	<input type="checkbox"/>	
Least Connection Slow Start	<input type="text" value="0"/>	<a href="#">Set Slow Start</a> (Valid values:0 - 600)
Share SubVS Persistence	<input type="checkbox"/>	
Log Insight Message Split Interval	<input type="text" value="10"/>	<a href="#">Set Log Split Interval</a> (Valid values:1 - 100)
Include User Agent Header in User Logs	<input type="checkbox"/>	
Use CEF Log Format	<input type="checkbox"/>	
SSO Maximum Threads	<input type="text" value="128"/>	<a href="#">Set SSO Max Threads</a> (Valid values:64 - 512)
NTLM Proxy Mode	<input checked="" type="checkbox"/>	

2. Enter the new value in the **L7 Client Token Timeout** text box and click **Set Timeout**.

## 2.5 RADIUS Two Factor and LDAP Authentication

As of LoadMaster firmware version 7.2.52, RADIUS two-factor and LDAP authentication is supported. To configure this, follow the steps below in the LoadMaster WUI:

1. Select **RADIUS and LDAP** as the **Authentication Protocol** when adding or modifying a client-side Single Sign On (SSO) domain in **Virtual Services > Manage SSO**. If the RADIUS server is configured to use two-factor authentication, the LoadMaster will detect this automatically and perform RADIUS two-factor authentication.

2. Set the **LDAP Endpoint** and **RADIUS Server(s)** for this SSO domain.

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The LoadMaster uses the credentials specified for the LDAP Endpoint configuration to contact the RADIUS and LDAP servers and verify client SSO credentials. So, these administrative credentials must be configured on all the RADIUS and LDAP servers in the domain.

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3. Select **Exchange** or **Blank** as the **SSO Image Set** in the **ESP Options** section of the Virtual Service **Modify** screen.
4. Set the other parameters as appropriate for your configuration.

# 3 RADIUS Challenge/Response

The LoadMaster supports RADIUS challenge/response authentication. RADIUS challenge/response is supported transparently – if the server sends a challenge, an additional form is displayed and the user is asked to enter the additional token/password.

The authentication flow is as follows:

1. The end user is prompted to enter a username and password.
2. If the username and password credentials have authenticated successfully, the One Time Password (OTP) is requested using a server challenge. An additional form is displayed and the end user needs to enter the additional token/password.
3. The username and OTP details are then submitted to the server for authentication.

Regarding the methods used during the authentication flow – an Access Request is sent from the LoadMaster to the server (which includes the username and password), the server responds with an Access Challenge (if the credentials have authenticated successfully) which will result in a subsequent form to collect the OTP. The LoadMaster then sends another Access Request (with the State and OTP included) and the server then responds with either an Access Accept or Access Reject, depending on whether the authentication was successful or not.

# References

Unless otherwise specified, the following documents can be found at <http://kemptechnologies.com/documentation>.

**RADIUS Authentication and Authorization, Technical Note**

**Web User Interface (WUI), Configuration Guide**

# Last Updated Date

This document was last updated on 29 July 2023.