

NGINX

Deployment Guide

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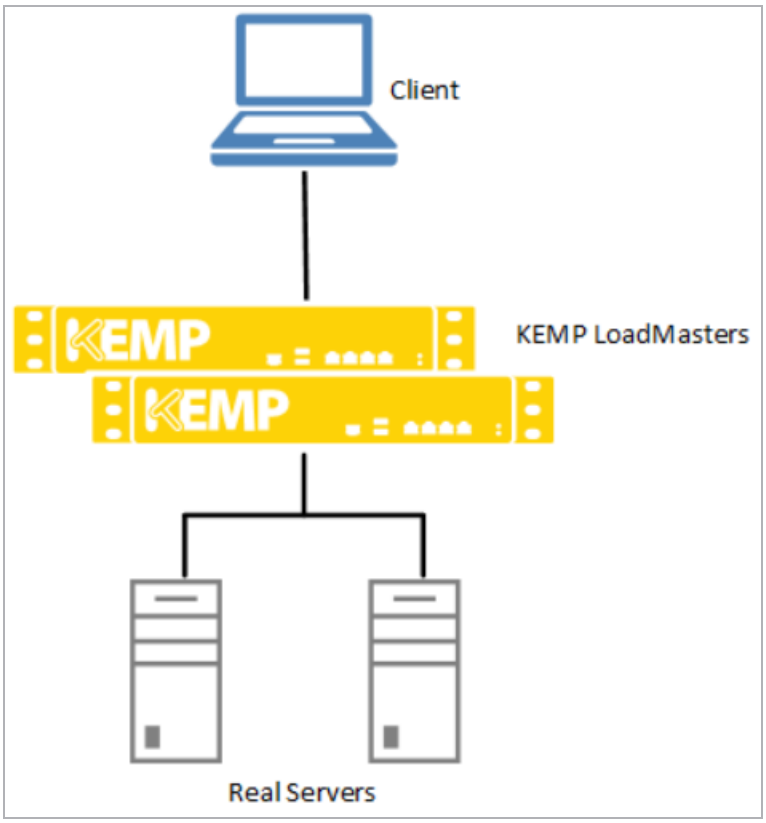
1 Introduction

NGINX is a free, open-source, high-performance HTTP server and reverse proxy, as well as an IMAP/POP3 proxy server. NGINX is known for its high performance, stability, rich feature set, simple configuration, and low resource consumption.

NGINX is one of a handful of servers written to address the C10K problem. Unlike traditional servers, NGINX does not rely on threads to handle requests. Instead it uses a much more scalable event-driven (asynchronous) architecture. This architecture uses small, but more importantly, predictable amounts of memory under load. Even if you do not expect to handle thousands of simultaneous requests, you can still benefit from NGINX's high-performance and small memory footprint. NGINX scales in all directions: from the smallest Virtual Private Server (VPS) all the way up to large clusters of servers.



The LoadMaster offers advanced Layer 4 and Layer 7 server load balancing, SSL Acceleration and a multitude of other advanced Application Delivery and Optimization (ADC) features. The Kemp

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LoadMaster can load balance the NGINX workload. The LoadMaster intelligently and efficiently distributes user traffic among the servers so that users get the best experience possible.

This document provides guidance and recommended settings on how to load balance NGINX with a Kemp LoadMaster. The Kemp Support Team is available to provide solutions for scenarios not explicitly defined.

The Kemp support site can be found at: https://support.kemptechnologies.com.

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2 Configure the LoadMaster

Follow the steps in the sections below to configure the LoadMaster with the recommended settings to load balance the NGINX workload.

2.1 Enable Subnet Originating Requests Globally

It is best practice to enable the **Subnet Originating Requests** option globally.

In a one-armed setup (where the Virtual Service and Real Servers are on the same network/subnet) **Subnet Originating Requests** is usually not needed. However, enabling **Subnet Originating Requests** should not affect the routing in a one-armed setup.

In a two-armed setup where the Virtual Service is on network/subnet A, for example, and the Real Servers are on network B, **Subnet Originating Requests** should be enabled on LoadMasters with firmware version 7.1-16 and above.



When **Subnet Originating Requests** is enabled, the Real Server sees traffic originating from 10.20.20.21 (LoadMaster eth1 address) and responds correctly in most scenarios.

With **Subnet Originating Requests** disabled, the Real Server sees traffic originating from 10.0.0.15 (LoadMaster Virtual Service address on **eth0**) and responds to **eth0** which could cause asymmetric routing.

When **Subnet Originating Requests** is enabled globally, it is automatically enabled on all Virtual Services. If the **Subnet Originating Requests** option is disabled globally, you can choose whether to enable **Subnet Originating Requests** on a per-Virtual Service basis.

To enable **Subnet Originating Requests** globally, follow the steps below:

1. In the main menu of the LoadMaster User Interface (UI), go to **System Configuration > Miscellaneous Options > Network Options**.
2. Select the **Subnet Originating Requests** check box.

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2.2 Configure the LoadMaster

Follow the steps in the sections below to configure the LoadMaster with the recommended settings to load balance the NGINX workload.

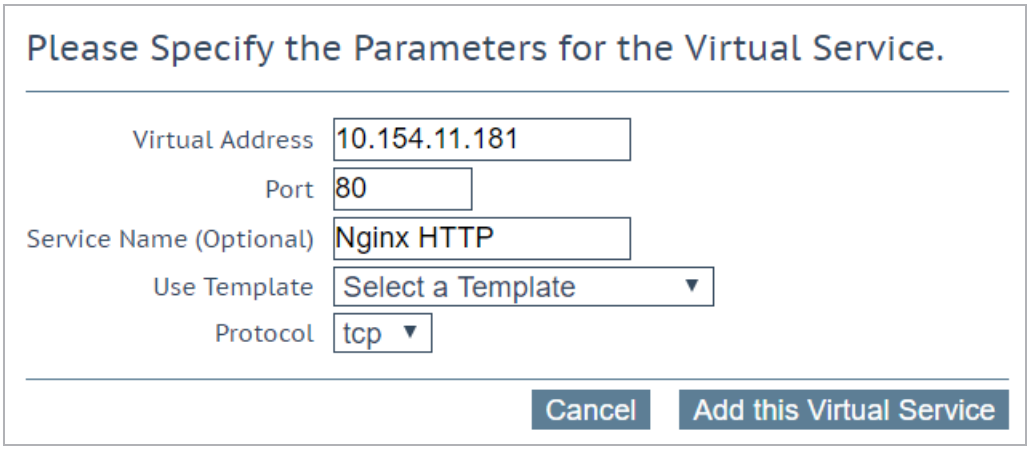
2.2.1 Create the HTTP/HTTPS Virtual Services

Refer to the sections below for recommended settings for the HTTP/HTTPS Virtual Services.

2.2.1.1 Create the NGINX HTTP Virtual Service

Follow the steps below to create and configure the recommended settings for the NGINX HTTP Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.



2. Type a valid IP address in the **Virtual Address** text box.
3. Type **80** in the **Port** text box.
4. Enter a recognizable **Service Name**, for example **Nginx HTTP**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value
Standard Options	Persistence Mode	Active Cookie

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Section	Option	Value
	Cookie name	JSESSIONID
	Timeout	1 Hour
	Scheduling Method	least connection
	Idle Connection Timeout	900
Real Servers	URL	/

8. Add the Real Servers:

   a) Expand the **Real Servers** section.

   b) Click **Add New**.

   c) Type the address of the Real Server.

   d) Type **80** as the **Port**.

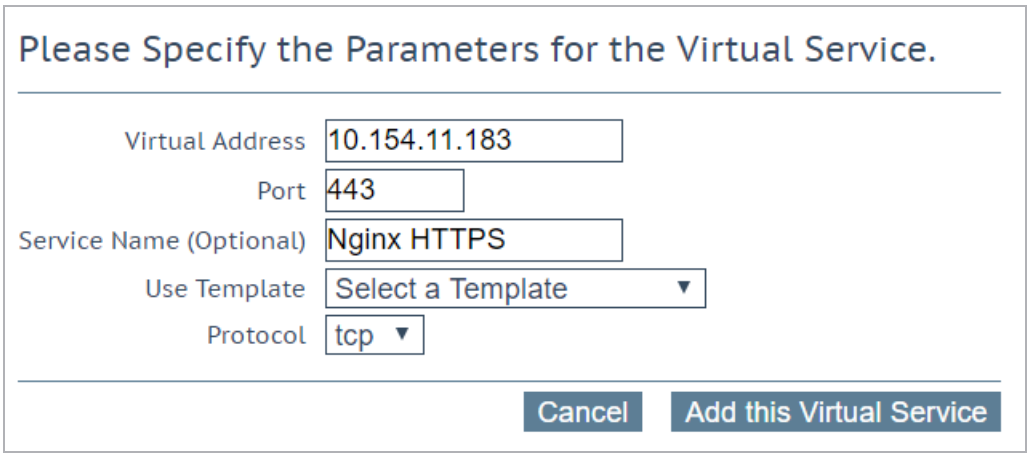
   e) Click **Add This Real Server**.

   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.2.1.2 Create the NGINX HTTPS Virtual Service

Follow the steps below to create and configure the recommended settings for the NGINX HTTPS Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.



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2. Type a valid IP address in the **Virtual Address** text box.
3. Type **443** in the **Port** text box.
4. Enter a recognizable **Service Name**, for example **Nginx HTTPS**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value	Comments
Standard Options	Persistence Mode	Source IP Address	
	Timeout	1 Hour	
	Scheduling Method	least connection	
	Idle Connection Timeout	900	
Advanced Properties	Add a Port 80 Redirector VS	https://%h%s	Click **Add HTTP Redirector**. This automatically creates a redirect on port 80. **Note:** This field disappears after it is clicked.
Real Servers	URL	/	

8. Add the Real Servers:
   a) Expand the **Real Servers** section.
   b) Click **Add New**.
   c) Type the address of the Real Server.
   d) Type **443** as the **Port**.
   e) Click **Add This Real Server**.
   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

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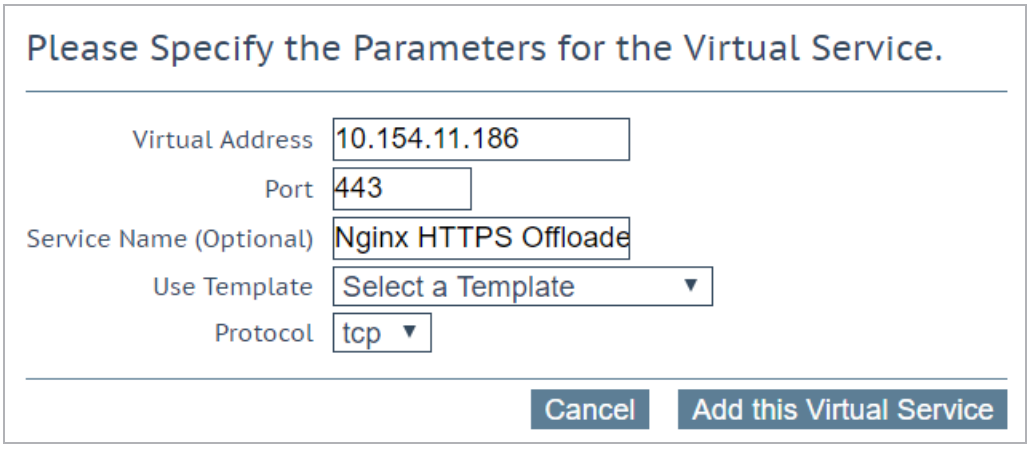
2.2.1.2.1 Configure the NGINX HTTPS HTTP Redirect Virtual Service

Clicking the **Add HTTP Redirector** button automatically creates a port 80 redirect Virtual Service. This is optional, but the purpose of this Virtual Service is to redirect any clients who have connected using HTTP to the HTTPS Virtual Service. Kemp also recommends changing the **Real Server Check Method** and **Persistence Mode** to **None**.

2.2.1.3 Create the NGINX HTTPS Offloaded Virtual Service

Follow the steps below to create and configure the recommended settings for the NGINX HTTPS Offloaded Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.



2. Type a valid IP address in the **Virtual Address** text box.
3. Type **443** in the **Port** text box.
4. Enter a recognizable **Service Name**, for example **Nginx HTTPS Offloaded**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value	
Standard Options	Persistence Mode	Active Cookie	You need to enable **SSL Acceleration** before you can select **Active**

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Section	Option	Value	
			Cookie as the **Persistence Mode**.
	Timeout	1 Hour	
	Cookie name	JSESSIONID	
	Scheduling Method	least connection	
	Idle Connection Timeout	900	
SSL Properties	SSL Acceleration	Enabled	
	Supported Protocols	TLS1.0, TLS1.1, TLS1.2, TLS1.3	While this workload may not support TLS1.3 yet, Kemp recommend enabling it for future proofing.
	Cipher Set	BestPractices	
Advanced Properties	Add a Port 80 Redirector VS	https://%h%s	Click **Add HTTP Redirector**. This automatically creates a redirect on port 80. **Note:** This field disappears after it is clicked.
Real Servers	URL	/	

8. Add the Real Servers:

   a) Expand the **Real Servers** section.

   b) Click **Add New**.

   c) Type the address of the Real Server.

   d) Type **443** as the **Port**.

   e) Click **Add This Real Server**.

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f) Repeat the steps above to add more Real Servers as needed, based on the environment.

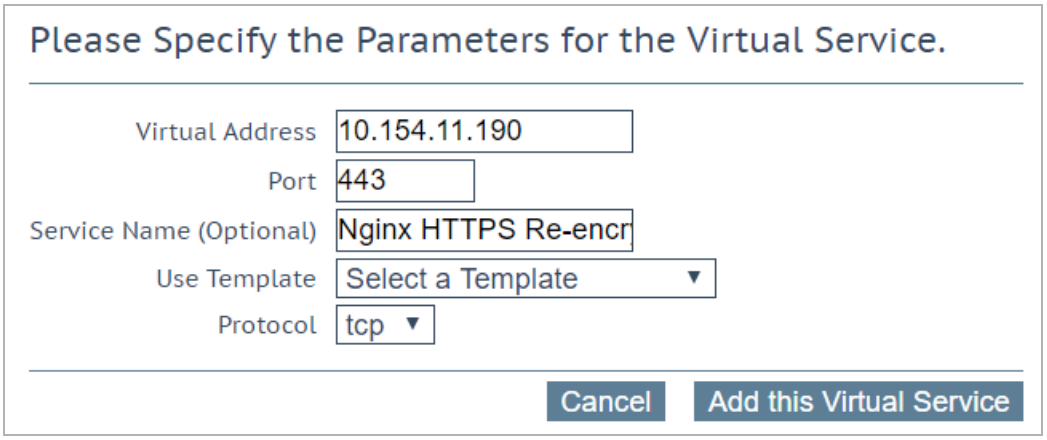
2.2.1.3.1 Configure the NGINX HTTPS Offloaded HTTP Redirect Virtual Service

Clicking the **Add HTTP Redirector** button automatically creates a port 80 redirect Virtual Service. This is optional, but the purpose of this Virtual Service is to redirect any clients who have connected using HTTP to the HTTPS Virtual Service. Kemp also recommends changing the **Real Server Check Method** and **Persistence Mode** to **None**.

2.2.1.4 Create the NGINX HTTPS Re-encrypt Virtual Service

Follow the steps below to create and configure the recommended settings for the NGINX HTTPS Re-encrypt Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.



2. Type a valid IP address in the **Virtual Address** text box.
3. Type **443** in the **Port** text box.
4. Enter a recognizable **Service Name**, for example **Nginx HTTPS Re-encrypt**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

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Section	Option	Value	Comments
Standard Options	Persistence Mode	Active Cookie	You need to enable **SSL Acceleration** before you can select **Active Cookie** as the **Persistence Mode**.
	Timeout	1 Hour	
	Cookie name	JSESSIONID	
	Scheduling Method	least connection	
	Idle Connection Timeout	900	
SSL Properties	SSL Acceleration	Enabled	
	Reencrypt	Enabled	
	Supported Protocols	TLS1.0, TLS1.1, TLS1.2, TLS1.3	While this workload may not support TLS1.3 yet, Kemp recommend enabling it for future proofing.
	Cipher Set	BestPractices	
Advanced Properties	Add a Port 80 Redirector VS	https://%h%s	Click **Add HTTP Redirector**. This automatically creates a redirect on port 80. **Note:** This field disappears after it is clicked.
Real Servers	URL	/	

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8. Add the Real Servers:

    a) Expand the **Real Servers** section.

    b) Click **Add New**.

    c) Type the address of the Real Server.

    d) Type **443** as the **Port**.

    e) Click **Add This Real Server**.

    f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.2.1.4.1 Configure the NGINX HTTPS Re-encrypt HTTP Redirect Virtual Service

Clicking the **Add HTTP Redirector** button automatically creates a port 80 redirect Virtual Service. This is optional, but the purpose of this Virtual Service is to redirect any clients who have connected using HTTP to the HTTPS Virtual Service. Kemp also recommends changing the **Real Server Check Method** and **Persistence Mode** to **None**.

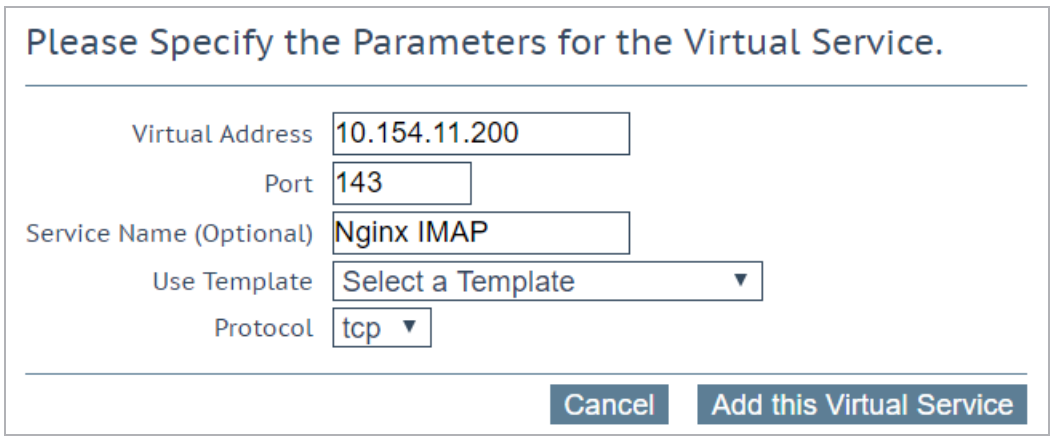
2.3 Create the Mail Virtual Services

Refer to the sections below for recommended settings for the mail Virtual Services.

2.3.1 Create the NGINX IMAP Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

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



2. Type a valid IP address in the **Virtual Address** text box.

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3. Type **143** in the **Port** text box.
4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value
Standard Options	Idle Connection Timeout	3600
Real Servers	Checked Port	143

8. Add the Real Servers:

    a) Expand the **Real Servers** section.

    b) Click **Add New**.

    c) Type the address of the Real Server.

    d) Type **143** as the **Port**.

    e) Click **Add This Real Server**.

    f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.2 Create the NGINX IMAP with STARTTLS Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

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

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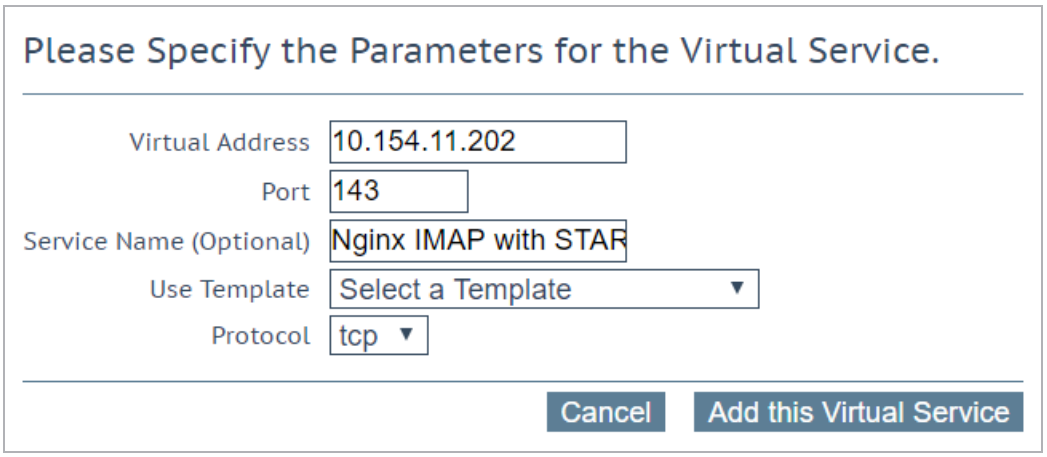

2. Type a valid IP address in the **Virtual Address** text box.
3. Type **143** in the **Port** text box.
4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value	Comments
Basic Properties	Service Type	STARTTLS protocols	
Standard Options	Idle Connection Timeout	3600	
SSL Properties	Supported Protocols	TLS1.0, TLS1.1, TLS1.2, TLS1.3	While this workload may not support TLS1.3 yet, Kemp recommend enabling it for future proofing.
	Cipher Set	BestPractices	
Real Servers	Checked Port	143	

8. Add the Real Servers:

    a) Expand the **Real Servers** section.

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b) Click **Add New**.

c) Type the address of the Real Server.

d) Type **143** as the **Port**.

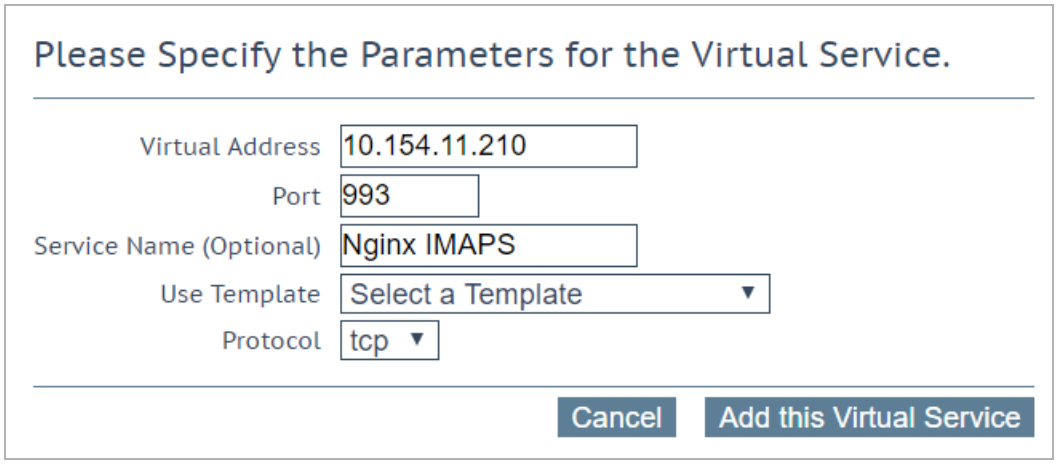
e) Click **Add This Real Server**.

f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.3 Create the NGINX IMAPS Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

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



2. Type a valid IP address in the **Virtual Address** text box.

   a) Type **993** as the **Port**.

3. Enter a recognizable **Service Name**.

4. Ensure **tcp** is selected as the **Protocol**.

5. Click **Add this Virtual Service**.

6. Configure the settings as shown in the following table:

Section	Option	Value
Standard Options	Server Initiating Protocol	IMAP4

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Section	Option	Value
	Idle Connection Timeout	3600
Real Servers	Checked Port	993

7. Add the Real Servers:

   b) Expand the **Real Servers** section.

   c) Click **Add New**.

   d) Type the address of the Real Server.

   e) Type **993** as the **Port**.

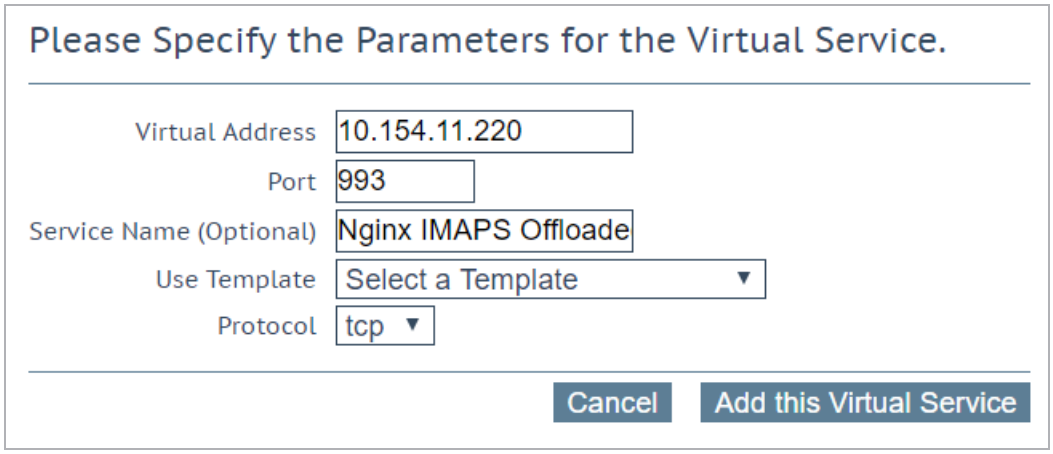
   f) Click **Add This Real Server**.

   g) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.4 Create the NGINX IMAPS Offloaded Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

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



2. Type a valid IP address in the **Virtual Address** text box.
3. Type **993** in the **Port** text box.
4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.

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6. Click **Add this Virtual Service**.

7. Configure the settings as shown in the following table:

Section	Option	Value	Comments
Standard Options	Server Initiating Protocol	IMAP4	
	Idle Connection Timeout	3600	
SSL Properties	SSL Acceleration	Enabled	
	Supported Protocols	TLS1.0, TLS1.1, TLS1.2, TLS1.3	While this workload may not support TLS1.3 yet, Kemp recommend enabling it for future proofing.
	Cipher Set	BestPractices	
Real Servers	Checked Port	143	

8. Add the Real Servers:

   a) Expand the **Real Servers** section.

   b) Click **Add New**.

   c) Type the address of the Real Server.

   d) Type **993** as the **Port**.

   e) Click **Add This Real Server**.

   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.5 Create the NGINX POP Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.

2. Type a valid IP address in the **Virtual Address** text box.

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3. Type **110** in the **Port** text box.
4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value
Standard Options	Idle Connection Timeout	3600
Real Servers	Checked Port	110

8. Add the Real Servers:
   a) Expand the **Real Servers** section.
   b) Click **Add New**.
   c) Type the address of the Real Server.
   d) Type **110** as the **Port**.
   e) Click **Add This Real Server**.
   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.6 Create the NGINX POP with STARTTLS Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.
2. Type a valid IP address in the **Virtual Address** text box.
3. Type **110** in the **Port** text box.
4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

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Section	Option	Value	Comments
Basic Properties	Service Type	STARTTLS protocols	
Standard Options	Idle Connection Timeout	3600	
SSL Properties	Supported Protocols	TLS1.0, TLS1.1, TLS1.2, TLS1.3	While this workload may not support TLS1.3 yet, Kemp recommend enabling it for future proofing.
	Cipher Cet	BestPractices	
Real Servers	Checked Port	110	

8. Add the Real Servers:

   a) Expand the **Real Servers** section.

   b) Click **Add New**.

   c) Type the address of the Real Server.

   d) Type **110** as the **Port**.

   e) Click **Add This Real Server**.

   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.7 Create the NGINX POPS Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.
2. Type a valid IP address in the **Virtual Address** text box.
3. Type **995** in the **Port** text box.
4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.

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7. Configure the settings as shown in the following table:

Section	Option	Value
Standard Options	Server Initiating Protocols	POP3
	Idle Connection Timeout	3600
Real Servers	Checked Port	995

8. Add the Real Servers:

   a) Expand the **Real Servers** section.

   b) Click **Add New**.

   c) Type the address of the Real Server.

   d) Type **995** as the **Port**.

   e) Click **Add This Real Server**.

   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.8 Create the NGINX POPS Offloaded Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.

2. Type a valid IP address in the **Virtual Address** text box.

3. Type **995** in the **Port** text box.

4. Enter a recognizable **Service Name**.

5. Ensure **tcp** is selected as the **Protocol**.

6. Click **Add this Virtual Service**.

7. Configure the settings as shown in the following table:

Section	Option	Value	Comments
Standard Options	Server Initiating	POP3	

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Section	Option	Value	Comments
	Protocols		
	Idle Connection Timeout	3600	
SSL Properties	SSL Acceleration	Enabled	
	Supported Protocols	TLS1.0, TLS1.1, TLS1.2, TLS1.3	While this workload may not support TLS1.3 yet, Kemp recommend enabling it for future proofing.
	Cipher Set	BestPractices	
Real Servers	Real Server Check Method	Mailbox (POP3) Protocol	
	Checked Port	110	

8. Add the Real Servers:

   a) Expand the **Real Servers** section.

   b) Click **Add New**.

   c) Type the address of the Real Server.

   d) Type **995** as the **Port**.

   e) Click **Add This Real Server**.

   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.9 Create the NGINX SMTP Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.

2. Type a valid IP address in the **Virtual Address** text box.

3. Type **587** in the **Port** text box.

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4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value
Standard Options	Server Initiating Protocols	SMTP
	Persistence Mode	Source IP Address
	Persistence Timeout	1 Hour
	Idle Connection Timeout	120
Real Servers	Checked Port	587

8. Add the Real Servers:
   a) Expand the **Real Servers** section.
   b) Click **Add New**.
   c) Type the address of the Real Server.
   d) Type **587** as the **Port**.
   e) Click **Add This Real Server**.
   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.10 Create the NGINX SMTP with STARTTLS Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.
2. Type a valid IP address in the **Virtual Address** text box.
3. Type **25** in the **Port** text box.
4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.

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6. Click **Add this Virtual Service**.

7. Configure the settings as shown in the following table:

Section	Option	Value	Comments
Basic Properties	Service Type	STARTTLS protocols	
Standard Options	Persistence Mode	Source IP Address	
	Persistence Timeout	1 Hour	
	Idle Connection Timeout	120	
SSL Properties	Supported Protocols	TLS1.0, TLS 1.1, TLS1.2, TLS1.3	While this workload may not support TLS1.3 yet, Kemp recommend enabling it for future proofing.
	Cipher Set	BestPractices	
Real Servers	Checked Port	25	

8. Add the Real Servers:

   a) Expand the **Real Servers** section.

   b) Click **Add New**.

   c) Type the address of the Real Server.

   d) Type **25** as the **Port**.

   e) Click **Add This Real Server**.

   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.11 Create the NGINX SMTPS Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.

2. Type a valid IP address in the **Virtual Address** text box.

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3. Type **587** in the **Port** text box.
4. Enter a recognizable **Service Name**.
5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value
Standard Options	Server Initiating Protocols	SMTP
	Persistence Mode	Source IP Address
	Persistence Timeout	1 Hour
	Idle Connection Timeout	120
Real Servers	TCP Connection Only	587

8. Add the Real Servers:
   a) Expand the **Real Servers** section.
   b) Click **Add New**.
   c) Type the address of the Real Server.
   d) Type **587** as the **Port**.
   e) Click **Add This Real Server**.
   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

2.3.12 Create the NGINX SMTPS Offloaded Virtual Service

Follow the steps below to create and configure the recommended settings for the Virtual Service:

1. In the main menu of the LoadMaster Web User Interface (WUI), go to **Virtual Services > Add New**.
2. Type a valid IP address in the **Virtual Address** text box.
3. Type **587** in the **Port** text box.
4. Enter a recognizable **Service Name**.

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5. Ensure **tcp** is selected as the **Protocol**.
6. Click **Add this Virtual Service**.
7. Configure the settings as shown in the following table:

Section	Option	Value	Comments
Standard Options	Server Initiating Protocols	SMTP	
	Persistence Mode	Source IP Address	
	Persistence Timeout	1 Hour	
	Idle Connection Timeout	120	
SSL Properties	SSL Acceleration	Enabled	
	Supported Protocols	TLS1.0, TLS1.1, TLS1.2, TLS1.3	While this workload may not support TLS1.3 yet, Kemp recommend enabling it for future proofing.
	Cipher Set	BestPractices	
Real Servers	Real Server Check Method	Mail (SMTP) Protocol	
	Checked Port	25	

8. Add the Real Servers:

   a) Expand the **Real Servers** section.

   b) Click **Add New**.

   c) Type the address of the Real Server.

   d) Type **587** as the **Port**.

   e) Click **Add This Real Server**.

   f) Repeat the steps above to add more Real Servers as needed, based on the environment.

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