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Kemp® LoadMaster®

Deployment Guide NetApp StorageGRID

Generated on: 10 April 2025

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Introduction

NetApp StorageGRID is a software-defined, flexible, and expandable object storage solution. In combination with a Progress Kemp load balancer, a StorageGRID solution can provide object storage using the protocols S3 and SWIFT.

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- Intended Audience
- Document Purpose

Intended Audience

Anyone interested in configuring the LoadMaster to load balance NetApp StorageGRID.

Document Purpose

This deployment guide provides instructions on how to configure the LoadMaster to load balance NetApp StorageGRID services using Progress Kemp application templates. This guide should only be used as a reference for the load balancing configuration of StorageGRID services because each environment is unique and may have different requirements. This guide outlines the load balancing configuration using standard ports (80 and 443) in the Progress Kemp application templates, but StorageGRID custom ports can also be leveraged based on the environment.

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Template

Progress Kemp has developed a template containing our recommended settings for this workload. You can install this template to help create Virtual Services (VSs) because it automatically populates the settings. You can use the template to easily create the required VSs with the recommended settings. For some workloads, additional manual steps may be required such as assigning a certificate or applying port following. These steps are covered in the document, if needed.

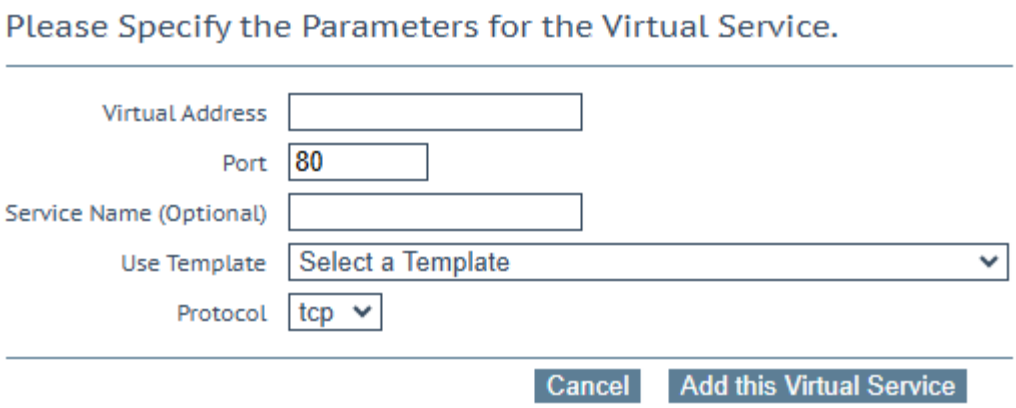
You can remove templates after use and this will not affect deployed services. If needed, you can make changes to any of the VS settings after using the template.

Download released templates from the following page: LoadMaster Templates.

You can import templates to the LoadMaster through the **Manage Templates** page under **Virtual Services** in the main menu of the LoadMaster User Interface (UI).

Click **Choose File**, select the template to install and click **Add New Template**. The template will then be available to select when you are adding a new Virtual Service.

To begin the process of creating a new Virtual Service, click **Virtual Services** and **Add New** in the main menu.



This opens the Virtual Service parameters page which prompts to enter the Virtual IP (VIP) address of the Virtual Service, the port, and the name to give the service and the protocol. You can select a previously-imported template in the **Use Template** drop-down list.

For more information and steps on how to use templates, refer to the Virtual Services and Templates, Feature Description.

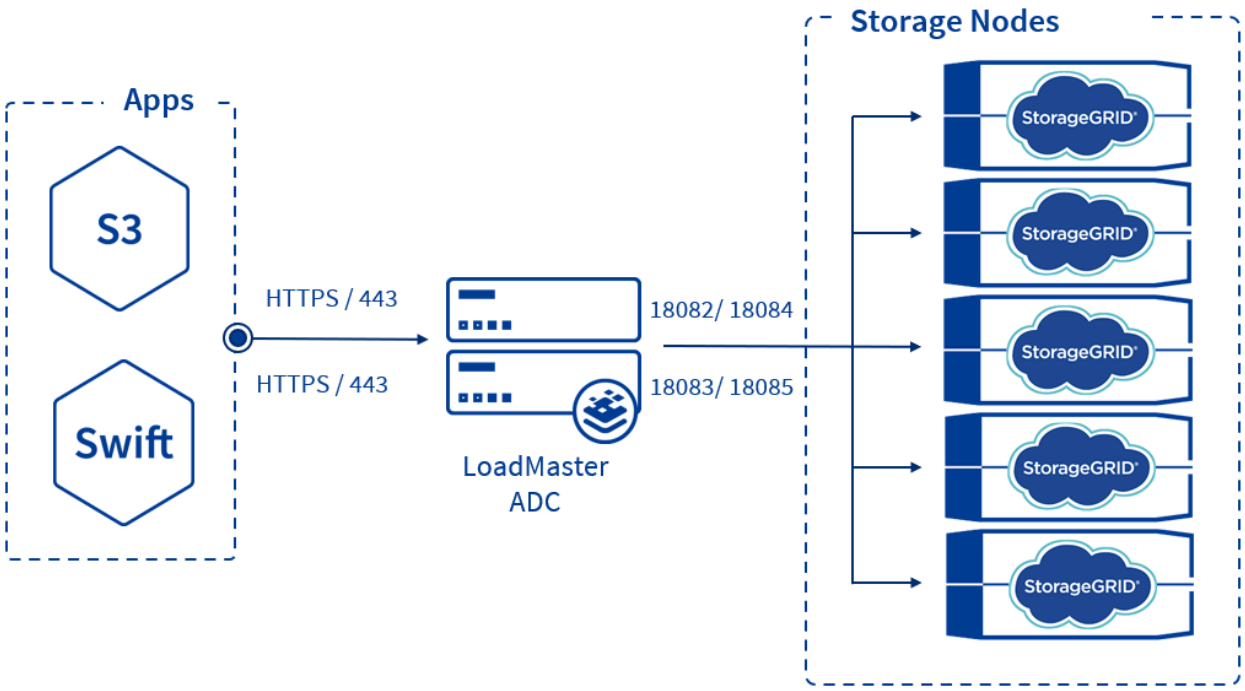
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NetApp StorageGRID

NetApp StorageGRID is a software-defined object storage solution for large archives, media, and web data storage. Policy-driven data management allows StorageGrid to move data seamlessly between on-premises and public cloud storage to optimize availability, protection, performance, and cost.

The following table provides a list of the NetApp StorageGRID default ports and protocols used for accessing the storage.

StorageGRID Protocol	Transport Protocol or Daemon Service	Port
S3	HTTP	18084
	HTTPS	18082
Swift	HTTP	18085
	HTTPS	18083


Apps
S3
Swift
HTTPS / 443
HTTPS / 443
LoadMaster
ADC
18082/ 18084
18083/ 18085
Storage Nodes
StorageGRID
StorageGRID
StorageGRID
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StorageGRID

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LoadMaster Global Settings

Before setting up the Virtual Services, the following global settings should be configured to support the workload.

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- Enable Subnet Originating Requests Globally

Enable Subnet Originating Requests Globally

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.



With **Subnet Originating Requests** enabled, the Real Server sees traffic originating from 10.20.20.21 (LoadMaster **eth1** address) and responds correctly.

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** causing 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 or not 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 Web User Interface (WUI), go to **System Configuration > Miscellaneous Options > Network Options**.

2. Select the **Subnet Originating Requests** check box.

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LoadMaster Virtual Services

This step-by-step setup of Virtual Services leverages the Progress Kemp application template for NetApp StorageGRID with Layer 7.

Layer 7 by default does not use transparency and therefore the IP address of the LoadMaster is used when accessing the StorageGRID environment. The X-Forwarded-For header is leveraged to provide the original source IP address in the StorageGRID logs for troubleshooting purposes. When a secure connection is used, a certificate must be installed on the LoadMaster to decrypt the traffic for the X-Forwarded-For header insertion. This traffic can then be re-encrypted or offloaded depending on the security requirements.

Note: NetApp StorageGRID S3 Virtual Services uses HTTP OPTIONS as the health checking method. This functionality requires LoadMaster version 7.2.52 or above.

The table in each section outlines the settings configured by the application template. You can use this information to manually configure Virtual Services or using the LoadMaster Application Programming Interface (API) and automation tools.

There are three supported configurations:

- **SSL pass-through:** The SSL certificate is installed on StorageGRID as a custom server certificate.
- **SSL termination and reencryption:** This might be beneficial if you are already doing SSL certificate management on the load balancer rather than installing the SSL certificate on StorageGRID. This configuration provides the additional security benefit of limiting the attack surface to the LoadMaster.
- **SSL termination with HTTP:** In this configuration, SSL is terminated on the LoadMaster and communication from the LoadMaster to StorageGRID is non-encrypted to take advantage of SSL offload.

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- Create a Virtual Service using a Template
- StorageGRID S3 Virtual Services
- StorageGRID Swift Virtual Services

Create a Virtual Service using a Template

To configure a Virtual Service using the application template, perform the following steps:

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

2. Type a valid **Virtual Address**.

3. Select the appropriate template in the **Use Template** drop-down list.

4. Click **Add this Virtual Service**.

5. **Required only for TLS/SSL Offload and Reencrypt:** Expand the **SSL Properties** section.

6. **Required only for TLS/SSL Offload and Reencrypt:** Select the certificate to use from **Available Certificates** and click the arrow (**>**) to move it to **Assigned Certificates**.

7. Expand the **Real Servers** section.

8. Click **Add New**.

9. Type the **Real Server Address**.

10. Confirm that the correct port is entered.

11. Click **Add This Real Server**.

12. Add additional Real Servers.

StorageGRID S3 Virtual Services

The following section outlines the Layer 7 configuration options for using S3 with NetApp StorageGRID.

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- S3 HTTP Virtual Service Recommended API Settings (optional)
- S3 HTTPS Passthrough Virtual Service Recommended API Settings (optional)
- S3 HTTPS Offloaded Virtual Service Recommended API Settings (optional)
- S3 HTTPS Reencrypted Virtual Service Recommended API Settings (optional)

S3 HTTP Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You

can use these settings with scripts and automation tools.

API Parameter	API Value
port	80
prot	tcp
VStype	http
SubnetOriginating	1
Schedule	lc
AddVia	1
CheckType	http
CheckUseGet	3
CheckUse1.1	1
CheckPort	18084

S3 HTTPS Passthrough Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	443
prot	tcp
VStype	http
SubnetOriginating	1
Schedule	lc
CheckType	http
CheckUseGet	3
CheckUse1.1	1

API Parameter	API Value
CheckPort	18082

S3 HTTPS Offloaded Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	443
prot	tcp
VStype	http
SubnetOriginating	1
Schedule	lc
SSLAcceleration	1
AddVia	1
TLSType	1
CipherSet	BestPractices
CheckType	http
CheckUseGet	3
CheckUse1.1	1
CheckPort	18084

S3 HTTPS Reencrypted Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	443
prot	tcp
VStype	http
SubnetOriginating	1
Schedule	lc
SSLAcceleration	1
SSLReencrypt	1
AddVia	1
TLSType	1
CipherSet	BestPractices
CheckType	http
CheckUseGet	3
CheckUse1.1	1
CheckPort	18082

StorageGRID Swift Virtual Services

The following section outlines the Layer 7 configuration options for using Swift with NetApp StorageGRID.

Contents

- Swift HTTP Virtual Service Recommended API Settings (optional)
- Swift HTTPS Passthrough Virtual Service Recommended API Settings (optional)
- Swift HTTPS Offloaded Virtual Service Recommended API Settings (optional)
- Swift HTTPS Reencrypted Virtual Service Recommended API Settings (optional)

Swift HTTP Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	80
prot	tcp
VStype	http
SubnetOriginating	1
Schedule	lc
AddVia	1
CheckType	http
CheckPort	18085
CheckUrl	/info
CheckUseGet	1
CheckUse1.1	1

Swift HTTPS Passthrough Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	443
prot	tcp
VStype	http
SubnetOriginating	1
Schedule	lc
CheckType	https
CheckPort	18083
CheckUrl	/info

API Parameter	API Value
CheckUseGet	1
CheckUse1.1	1

Swift HTTPS Offloaded Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You can use these settings with scripts and automation tools.

API Parameter	API Value
port	443
prot	tcp
VStype	http
SubnetOriginating	1
Schedule	lc
SSLAcceleration	1
AddVia	1
TLSType	1
CipherSet	BestPractices
CheckType	https
CheckPort	18085
CheckUrl	/info
CheckUseGet	1
CheckUse1.1	1

Swift HTTPS Reencrypted Virtual Service Recommended API Settings (optional)

This table outlines the API parameters and values set using the Progress Kemp application template. You

can use these settings with scripts and automation tools.

API Parameter	API Value
port	443
prot	tcp
VStype	http
SubnetOriginating	1
SSLAcceleration	1
SSLReencrypt	1
AddVia	1
TLSType	1
CipherSet	BestPractices
CheckType	tcp
CheckPort	18083
CheckUrl	/info
CheckUseGet	1
CheckUse1.1	1

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Troubleshooting

Refer to the sections below for details on some common issues seen when load balancing the NetApp StorageGRID workload.

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- Connections Rejected
- Source/Client IP Visibility

Connections Rejected

When using a non-default TCP port or offloading for StorageGRID services, you must ensure the Real Server port is correct. This is a common mistake when configuring the Real Servers when the Virtual Services port is different from the Real Server port. See the table in the NetApp StorageGRID section of this document for the required Real Server ports for StorageGRID.

Source/Client IP Visibility

If the client source IP address is required for audit logging, configure your load balancer so that it passes the requests through with the original requesting IP address.

Enable the load balancer to insert X-Forwarded-For for each request and then configure Audit to log the X-Forwarded-For header (Configuration > Audit > Header Name 1 = "X-Forwarded-For").

See "audit protocol header" in the StorageGRID Administration Guide.

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References

Some useful resources are listed below:

NetApp StorageGRID Solutions

Useful, related documents are listed below:

SSL Accelerated Services Feature Description

Transparency Feature Description

RESTful API documentation