

TECHNICAL GUIDE:
April 2024

VMware® Avi™ Load Balancer

Global Server Load Balancing
Deployment Guide

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Introduction

This deployment guide provides comprehensive instructions for configuring Avi GSLB to optimize the performance and availability of applications distributed across various geographic locations.

GSLB Overview

GSLB is primarily the DNS load balancing. It is the act of balancing an application's load across instances of the application that have been deployed to multiple locations (typically, multiple data centers and/or public clouds).

GSLB operates by providing dynamic “intelligent” DNS resolution of an application's FQDN to a location-specific IP address (known as a GSLB Pool Member), with the address selected based on a load balancing algorithm or on more advanced criteria such as geographic location of the client.

These IP addresses are most commonly Virtual IP addresses (VIPs) configured on a “local” Load Balancer which could be hosted on an Avi or a third-party ADC, but they may also be individual workload IP addresses.

GSLB is commonly deployed to fulfil specific objectives for an application, including:

- Provide optimal application experience and latency to users/clients who are geographically distributed.
- Offer resilience to loss of a data center or a network connection.
- Perform non-disruptive migration to or addition of another data center.

To achieve these goals Avi GSLB performs the following functions:

1. It chooses the location (data center/cloud) to which each client requests should be steered based on the GSLB algorithm configured.
2. It monitors the health of the GSLB Pool Members so that it can choose the best location (i.e., rule out unhealthy ones)
3. Through a Federation mechanism, it synchronizes configuration and state across GSLB sites.

GSLB Configuration Steps

Prerequisites

- Deploy Avi Controller cluster in the required DCs.
- Configure Cloud under Infrastructure
- Configure local LB Virtual Services on respective sites.
- You must login as a GSLB Admin i.e. a user who has at-least GSLB admin privileges.

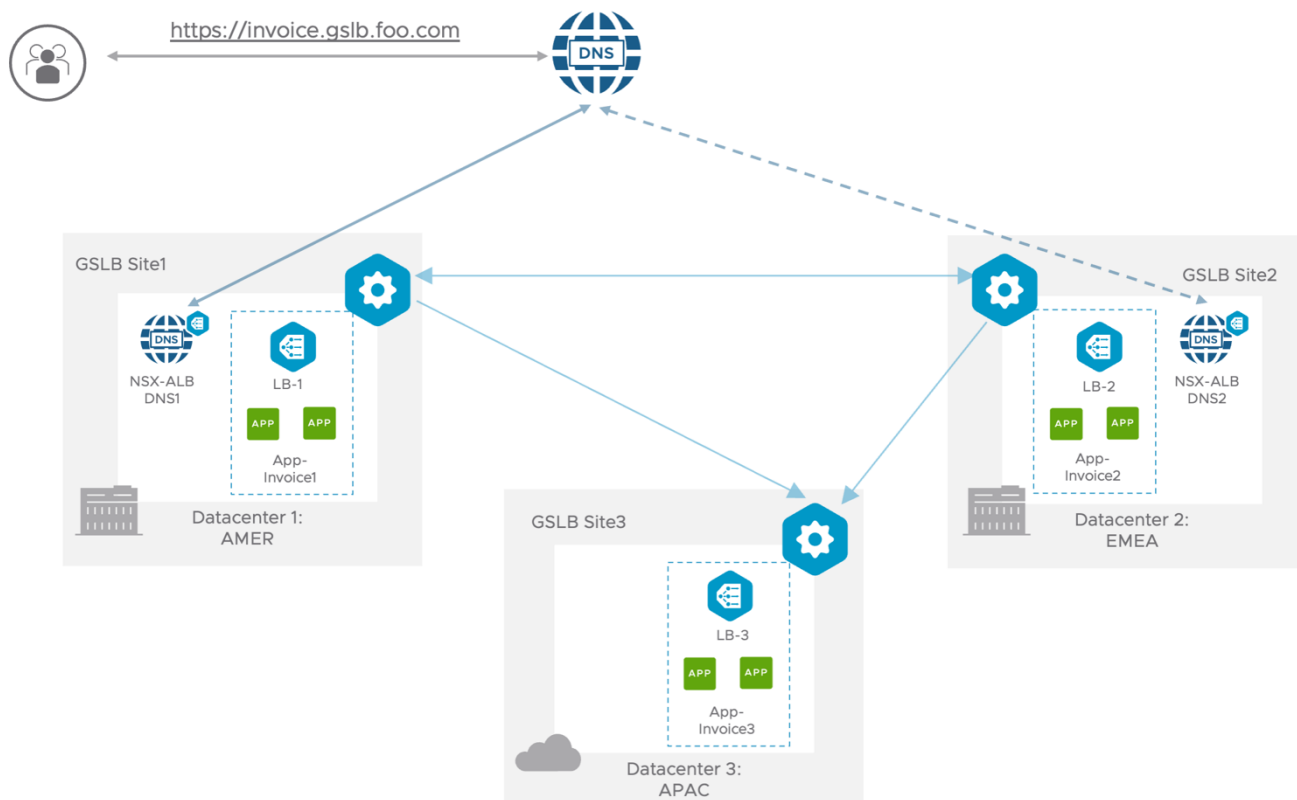
The following are the steps to configure Avi GSLB once the prerequisites are in place:

1. Create GSLB Service Engine Group
2. Create DNS VS on all active GSLB sites.
3. Configure GSLB Sites under Infrastructure
4. Configure GSLB services
5. GSLB Domain Delegation (Not on Avi. This needs to be done on the Customer DNS Side)

Scenario1: Active/Active Deployment

Sample Topology

In this use case, we have three data centers in different locations. All the locations host instances of the same application (“Invoice”) to ensure disaster recovery and business continuity as well as capacity. At any given point in time, traffic can go to any instance of the Invoice app based on the GSLB algorithm configured. If one instance of the Invoice app goes down, GSLB will detect it and will no longer send client traffic to that instance until it is back up and running.



Topology at a glance:

- Avi is running in three locations (GSLB sites), providing local load balancing to applications deployed in that site.
- GSLB Sites 1 and 2 are hosting Avi GSLB DNS Virtual Services and are designated as “Active Sites”. GSLB Site 3 does not host a GSLB DNS Virtual Service and is designated as a “Passive Site”.
Please check here to learn about Avi GSLB sites – https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/GSLB_Guide/GUID-98ADE296-1236-4131-8041-DC76C199E1DF.html
- The same application (“Invoice”) is deployed at all three locations and locally load balanced by an Avi Virtual Service distinct to each site (App-Invoice1, App-Invoice2, App-Invoice3).

Request Flow

Step 1: FQDN Address Resolution

The client is making an HTTPS request to access the application (<https://invoice.GSLB.foo.com>).

The GSLB FQDN (invoice.GSLB.foo.com) therefore needs to be resolved to an IP address not yet known to the client.

The client makes a DNS request for *invoice.gslb.foo.com* to its configured local DNS server. The LDNS server iteratively queries public DNS infrastructure to resolve this FQDN. During this iterative resolution, the query will be received by the authoritative name server for the customer's public DNS domain (in this case *foo.com*).

The customer's authoritative DNS server hosting the *foo.com* zone would be configured with a zone delegation for the subdomain *gslb.foo.com*, pointing (NS records) to the two GSLB DNS Virtual Service VIPs (Avi DNS1 and Avi DNS2) and will return this information to the client's LDNS server.

The client's LDNS server then asks one of the GSLB DNS Virtual Service (Avi DNS1 or Avi DNS2) to resolve *invoice.gslb.foo.com*. The GSLB DNS Virtual Service will make an intelligent site selection decision based on the load balancing algorithms and policies configured and return a DNS response containing the GSLB pool member (local VIP i.e. App-Invoice1, App-Invoice2 or App-Invoice3) from the selected site.

In this example, DNS1 will send request to one of the VIPs of LB i.e. App-Invoice1, App-Invoice2 or App-Invoice3 based on GSLB algorithm.

Step 2: Application Traffic Flows to Virtual Service

In this example, the client uses the VIP of site 1 i.e. LB App-Invoice1 to send its HTTPS request.

Step 3: Local Load Balancing

As soon as the request is received at the LB App-Invoice1, Avi will perform the local load balancing and send the request to one of the local application servers.

Configuration

Create GSLB Service Engine Group

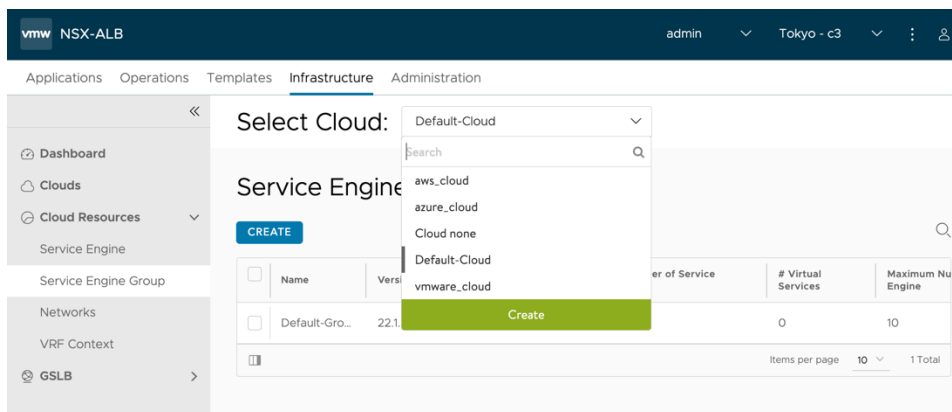
As a best practice, the GSLB DNS Virtual Service should be hosted in a dedicated Service Engine Group rather than sharing a Service Engine Group with other Virtual Services. This allows for optimal scaling, security, and functionality.

As a minimum, to have high availability for the GSLB DNS resolvers, at least two sites should host a GSLB DNS Virtual Service. In our sample topology Avi DNS1 is hosted on GSLB Site 1 and Avi DNS2 is hosted on GSLB Site2, so we will create a dedicated Service Engine Group on each of these sites for the GSLB DNS Virtual Services.

As a Passive site does not host a GSLB DNS Virtual Service, there is no need to configure a dedicate Service Engine Group on GSLB Site 3.

GSLB Site 1

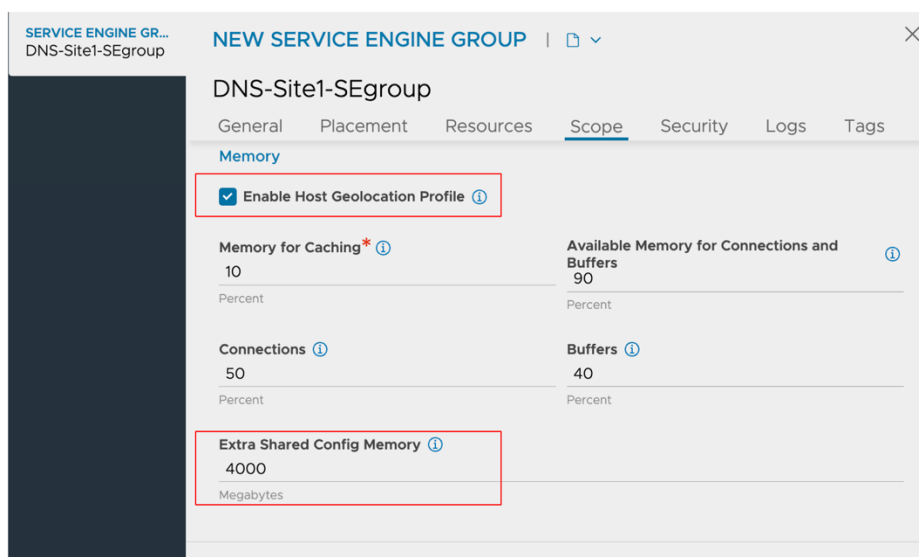
- Navigate to Infrastructure -> Cloud Resources -> Service Engine Group
- Select Cloud where you want to deploy the DNS Virtual Service from the drop-down menu



- Click on Create
- Configure the SE group settings as required

Note: If planning on using geolocation as the load balancing algorithm:

- The GSLB SE must have a minimum of 8Gb memory,
- The Host Geolocation Profile must be checked within the Service Engine Group, and
- The extra shared config memory should be configured. Please check here for Extra Shared Config memory requirements: https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/Configuration_Guide/GUID-ACB20C0D-7E70-4C6E-B089-1EBAFD0A134D.html



- Click Save

GSLB Site 2

Follow the same steps in GSLB Site 2 to create a service engine group for DNS virtual service on site 2.

GSLB Site 3

As this is a Passive site and does not host a GSLB DNS Virtual Service, there is no need to configure a Service Engine Group for DNS in GSLB Site 3.

Create DNS VS on all Active sites.

The GSLB DNS Virtual Service will be authoritative for the subdomains delegated to Avi for GSLB. A GSLB DNS Virtual Service is configured as a standard Avi Virtual Service with the Application Profile type of DNS and a UDP Per-Packet Network Profile. The Virtual Service listens on UDP Port 53. You can also configure a second Service Port on TCP port 53 (using the “Override TCP/UDP Profile” option to specify a TCP Proxy Network Profile for the TCP 53 service port) since DNS requests may utilize TCP in some instances.

The Virtual Service will be bound to the dedicated Service Engine Group we have created.

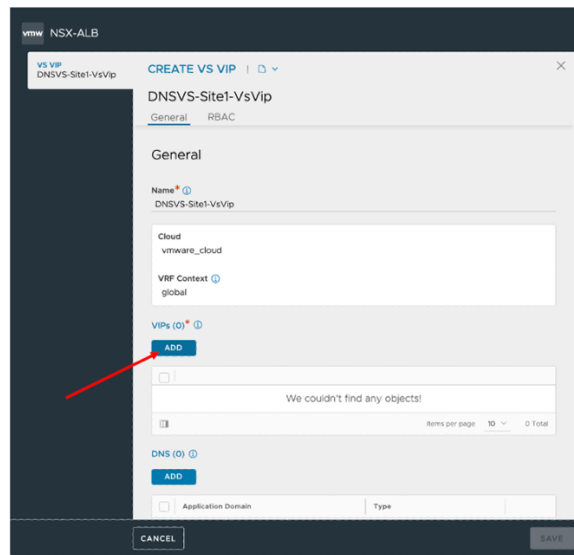
GSLB Site 1

Create a DNS VS

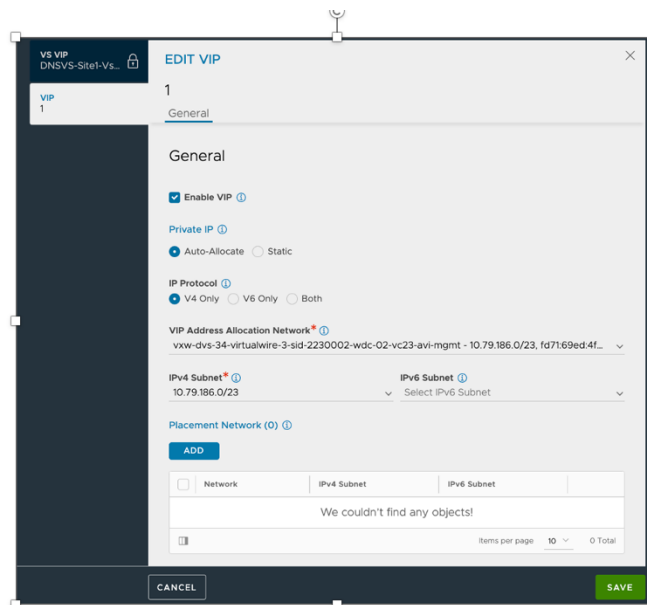
To create a DNS VS,

- Navigate to Applications > Virtual Services
- Click on Create Virtual Service > Advanced Set UP
- Select Cloud and VRF (if applicable) from the respective drop-down menu.
- Configure the settings as shown below:
 - Name
 - Select the existing VS VIP or create a new VS VIP.
- To create a new VSVIP, click on Create VS VIP

- Click ADD under VIPs



- Select Auto-Allocate if you are using IPAM or use a Static IP to configure the VIP. In this example, Auto-Allocate option is used.



- Click Save
- Click Save

- In the virtual service settings, set the Application Profile to **System-DNS**.

Note: In this example, we are using the default System-DNS app profile. If you need to customize the app profile or multiple DNS services are running, create a distinct Application Profile of type DNS used only for the GSLB DNS Virtual Service.

Check here to learn more about create application profiles- https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/Configuration_Guide/GUID-9E14A469-E0D3-4FB7-A741-F8FEB03F75AE.html?hWord=N4IghgNiBc4A5wgSwMZgC5IPYDsAEcATlgGZlQCmlAvkA#GUID-9E14A469-E0D3-4FB7-A741-F8FEB03F75AE__id-a6335bb0-57d7-4413-c1c2-a5af7bd59689

- Changing the application profile to System-DNS will automatically set the required TCP/UDP profile and port number.

Note: UDP port 53 is set by default. If TCP port 53 is required, it needs to be added by Switching to Advanced mode under Service Port configuration.

- Click Next and configure policies if required
Note: It is not required to add a Pool for DNS Virtual Service for the GSLB use case.
- Click Next and configure analytics settings as per your requirements.
- Click Next and select the dedicated Service Engine Group that was previously created.

- Click Next and Save

GSLB Site 2

Follow the same steps on other GSLB site to configure a GSLB DNS Virtual Service.

GSLB Site 3

As this is a Passive site, there is no DNS Virtual Service configuration required in Site 3.

Configure GSLB Infrastructure

Out of all the GSLB sites, one site is designated a GSLB Leader. By default, the site where you are starting to do the GSLB configuration will assume the role of GSLB leader site.

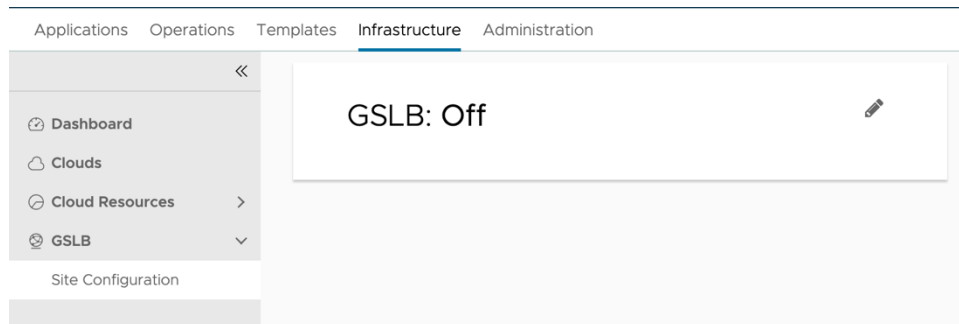
GSLB-specific configuration needs to be created on the GSLB Leader site only and will be propagated to the other Active Sites within the GSLB Federation.

In this example, we will start configuring on Site 1, so GSLB Site 1 (AMER) is our GSLB Leader Site, GSLB Site 2 (EMEA) is our Active Follower Site, GSLB Site 3 (APAC) is Passive Follower Site.

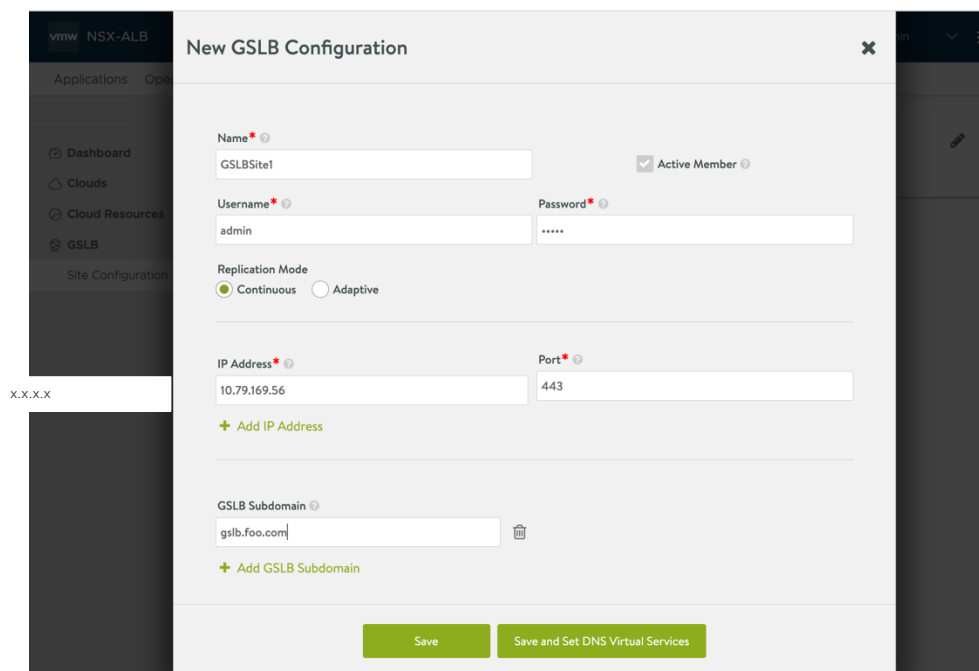
To know more about Leader and Follower sites, check here https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/GSLB_Guide/GUID-98ADE296-1236-4131-8041-DC76C199E1DF.html

On GSLB Site 1,

- Go to Infrastructure -> GSLB > Site Configuration
- Click on the pencil icon



- Enter the details – Name of the GSLB site, username, password, IP address of the controller and GSLB subdomain. As per the topology/example, the subdomain here is **GSLB.foo.com**



New GSLB Configuration

Name* ☒ Active Member

Username* Password*

Replication Mode
☒ Continuous ☐ Adaptive

IP Address* Port*
[+ Add IP Address](#)

GSLB Subdomain*
[+ Add GSLB Subdomain](#)

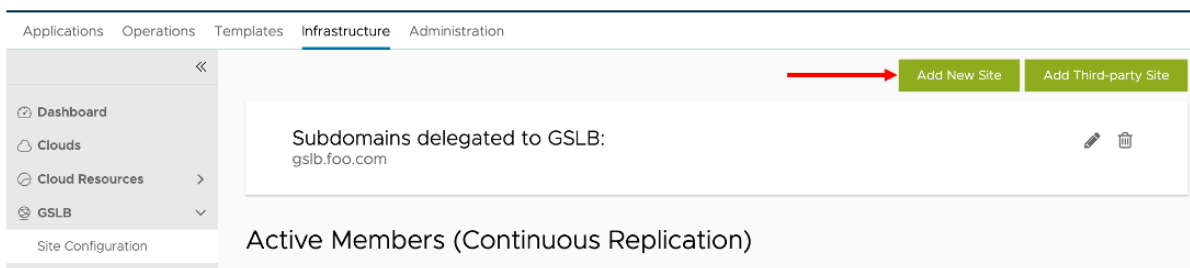
- Click on Save and Set DNS Virtual Service.
- Select the DNS Virtual Service that was created in the previous section

Note: Subdomains should be set to “All subdomains” as shown in the screenshot below.

- Click Save

Add another site to the GSLB configuration:

- Click on Add New Site



- Enter details of the other site (EMEA site)

New GSLB Site

Name* ☒ Active Member

Username* Password*

IP Address* Port*

+ Add IP Address

Advanced Settings

Health Monitor Proxy

Geo Location Source

Save Save and Set DNS Virtual Services

Make sure the Active Member checkbox is selected.

Note:

- The controller clusters on both sites (i.e. all 3 nodes on both sites) should be able to communicate with each other on port 443.
- It is recommended to use controller cluster VIP to add GSLB sites.
- Click Save and Set DNS Virtual Service.
- Select the DNS Virtual Service that was created in the previous section i.e. DNSVS-Site2
- Click Save

Similarly, add the third site (APAC). Make sure that the 'Active Member' checkbox is **not** selected as this is a passive site

New GSLB Site

Name * ☐ Active Member

Username * Password *

IP Address * Port *

+ Add IP Address

Advanced Settings

Health Monitor Proxy

Geo Location Source

Save Save and Set DNS Virtual Services

Configure GSLB service

Once site configuration is done, the next step is to deploy our global application instances using the GSLB service.

To configure a GSLB service,

- Navigate to Applications > GSLB services.
- Click Create > Advance Setup
- Enter details as shown below:

New GSLB Service

Name *

Application Name * Subdomain *

+ Add Application Name

Health Monitor

Health Monitor Scope ☒ All Members ☐ Only Non Avi Members ☒ Controller Health Status

Groups Load Balancing Algorithm

☐ Site Persistence ☐ Topology Policy

Minimum number of Servers

GSLB pools

Save

Health Monitor used here is an example. You can use Health monitor of your choice out of the pre-configured System-GSLB health monitors or create a new monitor on GSLB Leader site with 'Is Federated' check box enabled. For data plane Health Monitor, please ensure that the SEs hosting GSLB DNS Virtual Services can route to all the GSLB Pool members at all sites via their data interface.

Please check here for more details about [GSLB health monitoring](#).

- Click Add Pool under GSLB Pools
- On the new GSLB Pool screen, add GSLB Pool members (local LB Virtual Services) as highlighted

and click on add GSLB Pool member to add another instance of invoice app i.e. local LB Virtual Service on Site 2

Similarly, LB members from GSLB site 3 can be added

IP Address ☐ Virtual Service ☒

Site Cluster Controller* ? GSLBSite3-APAC ▼ Virtual Service* ? LB-invoice-Site3 ▼

Public IP(v4/v6) Address ?

Ratio* ?

Geo Location Source ? Select Geo Location Source ▼

Description

☒ Enabled ?

[Add GSLB Pool Member](#)

Note: If the users are coming over internet, they should be responded with the Public IP address of GSLB Pool member (LB-Invoice as per our example). For such scenario, public IP address needs to be configured in the GSLB Pool members configuration. This is further explained in Scenario 3 < Add a link>.

- Click Done
- Click Save

GSLB Domain Delegation (This needs to be done on the Customer Side)

To ensure that DNS requests for a particular subdomain reaches Avi DNS virtual service i.e. Avi DNS is authoritative for a particular subdomain, some changes are required on customer's side.

The customer needs to ensure that traffic reaches Avi DNS service for resolution of queries for that subdomain. As per our example, GSLB.foo.com is the subdomain for which Avi DNS virtual service is going to be an authoritative DNS server.

This can be done in various ways like

1. Delegating a subdomain to Avi DNS using NS record,
2. Conditional Forwarding,
3. CNAME etc.

Note: Delegating a subdomain to Avi DNS using NS record is the most common approach.

Here is a sample configuration to give you an idea of how delegation looks like on the corporate server to delegate the subdomains to Avi DNS Service.

GSLB.foo.com IN NS dns1.avi.foo.com

GSLB.foo.com IN NS dns2.avi.foo.com

dns1.avi.foo.com IN A <IP of DNSVS-Site1>

dns2.avi.foo.com IN A <IP of DNSVS-Site2>

Please note that this is just an example. The actual configuration depends on your DNS server. Please work with your DNS team. Please refer to the [AVI DNS document](#) for other ways for GSLB deployment on the DNS server.

GSLB Testing with dig

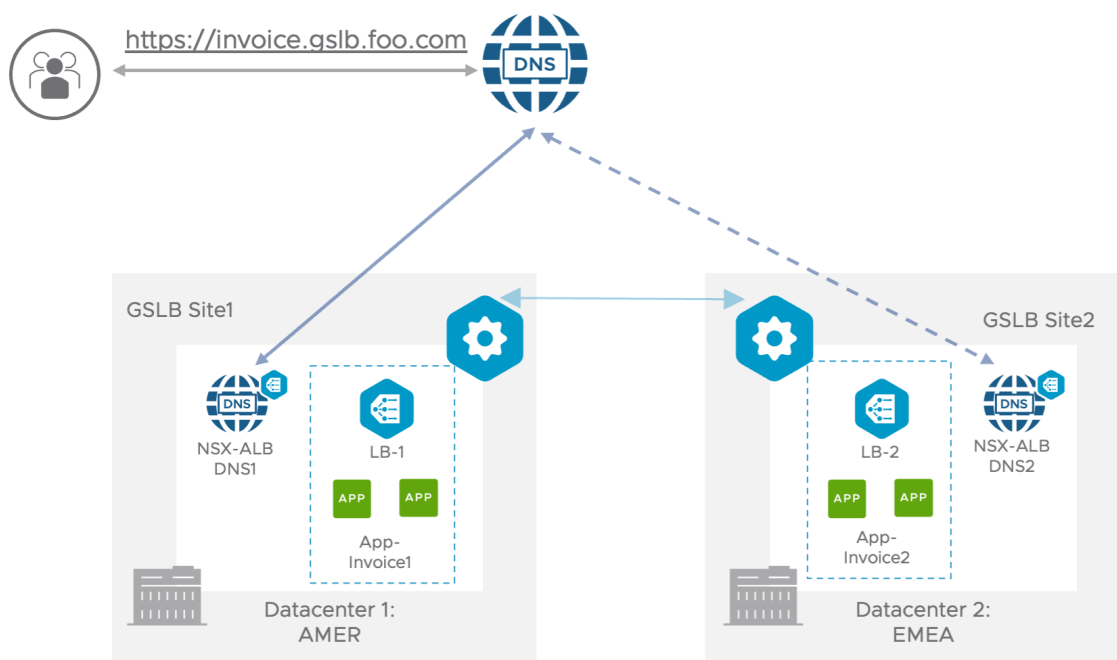
- If we are testing before DNS changes have been done, then we can use the following command to direct the traffic to Avi DNS VS:
dig @ <IP of DNSVS-Site1> invoice.gslb.foo.com
- If DNS settings are in place on Corp DNS, then GSLB.foo.com will automatically be delegated. We can use the following command:
dig invoice.gslb.foo.com

Scenario2: Active/Standby Deployment

In Scenario 1, we discussed an Active/Active deployment where traffic was distributed among all the available data centers. In this section, we will discuss Active/Standby deployment (also known as Primary/Secondary deployment).

In this type of deployment, Avi GSLB provides an **Active/Standby** model for backup or disaster recovery for applications.

One or more sites are designated as Standby/Secondary sites and are reserved only for disaster recovery i.e. traffic is not sent to these sites until and unless the Active/Primary site is unavailable.



Topology at a Glance:

- Avi is running in two on-prem DCs (GSLB sites), providing local load balancing to applications deployed on that site.
- GSLB Sites 1 and 2 are hosting Avi GSLB DNS Virtual Services and are designated as “Active Sites”.
- The same application (“Invoice”) is deployed at both locations and locally load-balanced by an Avi Virtual Service distinct to each site (App-Invoice1 and App-Invoice2).

In normal operation, we want all traffic to be directed to Site 1. In the event of an application failure on Site 1, or a network connectivity/catastrophic failure of the entire site, Avi GSLB will automatically detect this condition via GSLB Health Monitoring and will start directing traffic to the instance of the Invoice application at Site 2.

When the application or connectivity at Site 1 is restored and operational again, GSLB will resume directing traffic to Site 1 by default. Alternatively, the customer can decide to configure the solution to require a manual failback of traffic to Site 1 – for this advanced configuration option, please see: https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/GSLB_Guide/GUID-6F9DF7A0-B3B1-4EC2-9A53-328ED85E80A6.html

Configuration Steps

The configuration steps remain identical to Scenario 1 for the GSLB Sites. Instead of adding 2 follower sites, we need to add only 1 follower GSLB site i.e. EMEA site. The important change lies in configuring the GSLB service. In the GSLB service, separate GSLB Pools are defined for each site and a Priority load balancing algorithm is used to select the highest priority available GSLB Pool.

By configuring a Pool with a higher priority containing the Pool Member(s) in site 1, the system will always select this Pool provided a Pool Member is UP within that Pool (as determined by the Health Monitor). A Pool that has no Pool Members UP will be unavailable, and the next highest priority Pool will be considered.

Priority is defined by a number in the GSLB Pool configuration. The higher the number, the higher the priority. The configuration is explained as follows:

- Navigate to Applications > GSLB Services
- Create on Create > Advanced Setup
- Enter details as shown below:

New GSLB Service

Name * ⓘ
App-Invoice

Application Name * ⓘ
invoice

Subdomain * ⓘ
gslb.foo.com

+ Add Application Name

Health Monitor ⓘ
System-GSLB-HTTP

Health Monitor Scope ⓘ
☒ All Members
 ☐ Only Non Avi Members
 ☒ Controller Health Status ⓘ

Groups Load Balancing Algorithm ⓘ
Priority-based

☐ Site Persistence ⓘ
 ☐ Topology Policy ⓘ

Minimum number of Servers ⓘ
0

GSLB pools * Add Pool ➤

Save

Health Monitor used here is an example. You can use Health monitor of your choice out of the pre-configured System-GSLB health monitors or create a new monitor on GSLB Leader site with 'Is Federated' check box enabled. For data plane Health Monitor, please ensure that the SEs hosting GSLB DNS Virtual Services can route to all the GSLB Pool members at all sites via their data interface. Please check here for more details about [GSLB health monitoring](#).

- Click Add Pool under GSLB Pools
- On the new GSLB Pool screen, add GSLB Pool members (local LB Virtual Services) as shown below:
Note: Check that priority is set

New GSLB Pool

Name * ⓘ
Pool1

Priority ⓘ
5

Pool Members Load Balancing Algorithm * ⓘ
Round Robin

Min. Health Monitors to consider server 'up' ⓘ

Description

Pool Member

☐ Site Cluster Controller ☒ Virtual Service

Site Cluster Controller * ⓘ
GSLBSite1

Virtual Service * ⓘ
LB-Invoice-Site1

Public IP(v4/v6) Address ⓘ

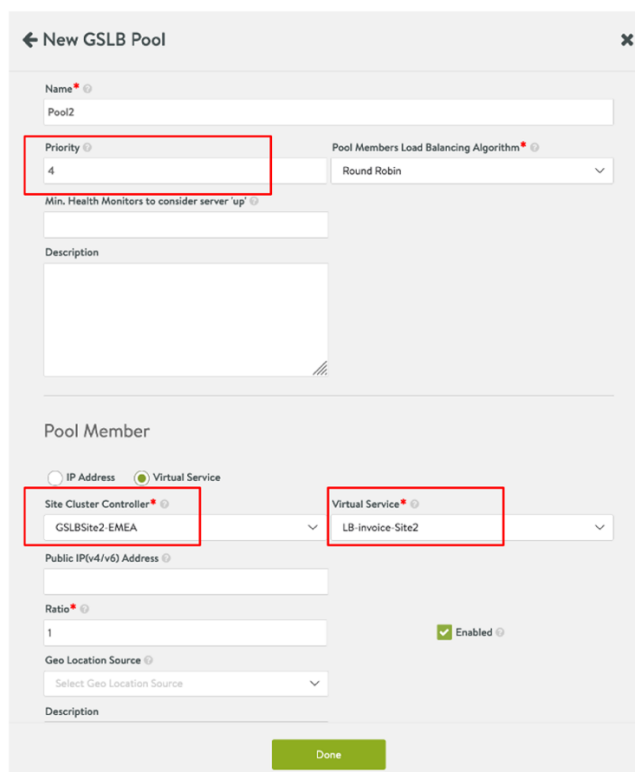
Ratio * ⓘ
1

Done

Note: If the users are coming over internet, they should be responded with the Public IP address of GSLB Pool member (LB-Invoice as per our example). For such scenario, public IP address needs to be configured in the GSLB Pool members configuration. This is further explained in Scenario 3 < Add a link>.

- Click Done

- Click Add Pool again and add the second Pool with lower priority



New GSLB Pool

Name*

Priority*

Pool Members Load Balancing Algorithm*

Min. Health Monitors to consider server up*

Description

Pool Member

☐ IP Address ☒ Virtual Service

Site Cluster Controller*

Virtual Service*

Public IP(v4/v6) Address

Ratio*

Geo Location Source

Description

☒ Enabled

Done

- Click Done

- This will look like the following:
Pool1 has higher priority. Pool2 has lower priority

Edit GSLB Service

Groups Load Balancing Algorithm

☐ Site Persistence ☐ Topology Policy

Minimum number of Servers

GSLB pools Add Pool >

Displaying 2 items

Name	Priority	Algorithm	Description
Pool1	5	Round Robin	
Pool2	4	Round Robin	

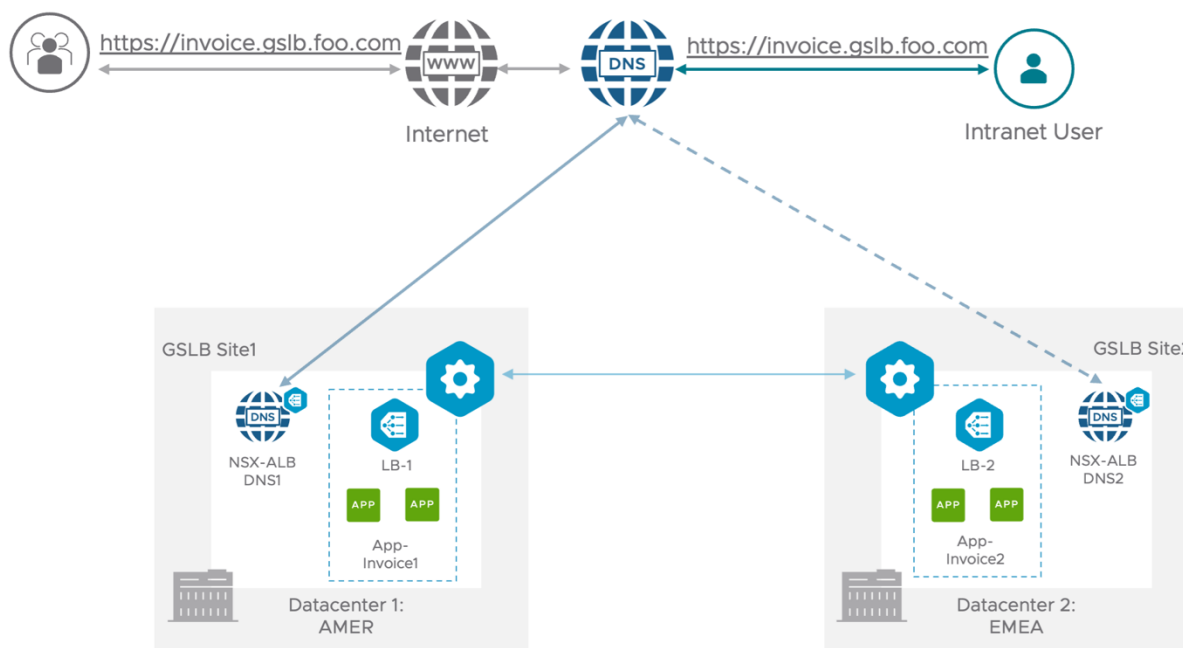
Number of IPs returned by DNS server TTL served by DNS Service Sec

Down Response ☐ Resolve CNAME

Save

- Click Save

Scenario3: Public/Private IP addresses for external/internal users



In a typical environment, clients can come from a mixture of public and private networks. In this scenario, we consider the case where a single FQDN is used by both internal and external to access an application, where it is required that internal users access the application via the internal network, while external users access the same application over the Internet and through a perimeter firewall performing Network Address Translation to the private application VIP. In this case, Avi GSLB should respond with a public IP address (the NAT address configured on the firewall) to the external user and the private IP address to the internal user.

The local Virtual Service VIP in this scenario is the private IP address – the public IP address is known only to the firewall that is performing NAT. We therefore need to make the Avi GSLB service aware of the corresponding public IP and define the criteria under which the public IP rather than the private IP should be returned to a given client.

This use case is valid for both active/active and active/passive deployments.

Notes:

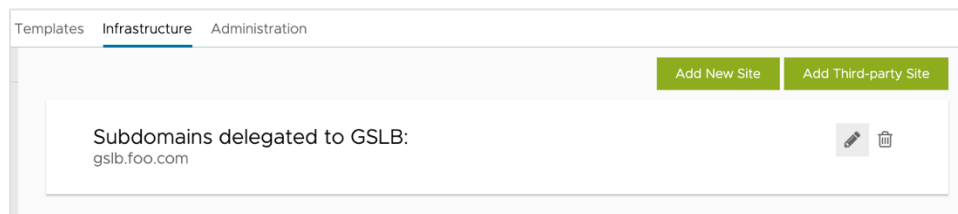
- This scenario and configuration are also valid for Public-only use cases (i.e. users are coming over the internet only), where the VIPs are configured as Private IPs with a firewall doing NAT. As users are coming over the internet, they should be served with Public IP addresses.
- The GSLB DNS Virtual Service can only make decisions based on the incoming DNS request. In most cases, the only information available is the IP address of the client's LDNS Server that is making the request, in which case this feature is typically dependent on internal clients using internal LDNS servers with well-defined internal IP addresses while external users on the Internet will be using LDNS servers with public IP addresses.
- In the case that the LDNS Server supports the ECS extension, the GSLB DNS Virtual Service can use the provided client subnet.

Configuration Steps

The configuration steps remain identical to Scenario 1 or Scenario 2 depending on the type of deployment. The additional steps required are as follows:

Defining IP range

- Navigate to Infrastructure -> GSLB -> Site Configuration
- Click on pencil icon



- Specify a list of IP addresses (specific addresses, ranges, or prefixes), and categorize them as either private or public. These are the IP ranges of the incoming client requests. Refer to the screenshot below. If a private list is specified, all other addresses are deemed public, and vice versa.

Note: As per the screenshot below, client IP addresses 10.24.14.0/16 in range will be served a private IP address record. Anything other than 10.24.14.0/16 range will be served with a public IP address. So, make sure to specify all the IP ranges of a given type.

- Click Save

Public IP address in GSLB Pool

- Navigate to Applications-> GSLB Service
- Edit GSLB service
- Under GSLB Pools > Edit Pool configuration
- Specify the public IP address as shown below:

Pool Member

☐ IP Address ☒ Virtual Service

Site Cluster Controller* ? Virtual Service* ?

GSLBSite1 LB-invoice-Site1

Public IP(v4/v6) Address ?

4.4.4.4

Ratio* ?

1

Geo Location Source ?

Select Geo Location Source

Description

Enabled ?

Add GSLB Pool Member

- Similarly add public IP addresses for other pool members.

Pool Member

☐ IP Address ☒ Virtual Service

Site Cluster Controller* ? Virtual Service* ?

GSLBSite2-EMEA LB-invoice-Site2

Public IP(v4/v6) Address ?

2.3.4.5

Ratio* ?

1

Geo Location Source ?

Select Geo Location Source

Description

Enabled ?

Add GSLB Pool Member

The screenshot shows the configuration page for a Virtual Service in the VMware Avi Load Balancer. The interface is divided into two main sections: 'Site Cluster Controller' and 'Virtual Service'. In the 'Site Cluster Controller' section, a dropdown menu is set to 'GSLBSite3-APAC'. In the 'Virtual Service' section, a dropdown menu is set to 'LB-invoice-Site3'. Below these, the 'Public IP(v4/v6) Address' field contains the value '6.7.8.9'. The 'Ratio' field is set to '1'. The 'Geo Location Source' dropdown is set to 'Select Geo Location Source'. The 'Description' field is empty. To the right of these fields, there is a green checkmark icon and the text 'Enabled'. At the bottom of the form, there is a green link labeled 'Add GSLB Pool Member'.

Site Cluster Controller * ⓘ
GSLBSite3-APAC

Virtual Service * ⓘ
LB-invoice-Site3

Public IP(v4/v6) Address ⓘ
6.7.8.9

Ratio * ⓘ
1

Geo Location Source ⓘ
Select Geo Location Source

Description

✓ Enabled ⓘ

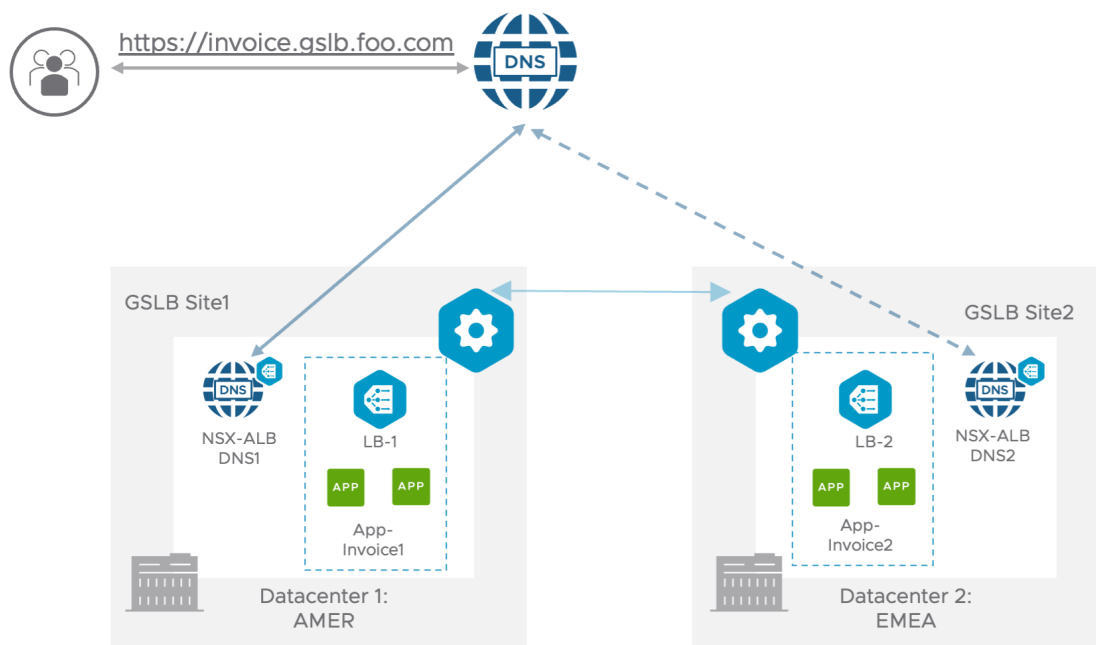
Add GSLB Pool Member

- Click Done
- Click Save

Scenario 4: Geo-based load balancing

The geolocation algorithm of the Avi DNS for GSLB directs client requests to the optimal site based on the longitude and latitude of the client IP and GSLB pool member IP as defined in the geolocation database. site

Note: The client IP address is the IP address of the LDNS server if the ECS extension (provides information about the actual client's subnet) is not present in the DNS query and EDNS is not enabled on Avi. If ECS extension is present in DNS query and EDNS processing is enabled on Avi, then the client IP address is the IP address of the client initiating the request and not the LDNS server.



Let's take an example:

If there are two data centers – One in the USA and one in EMEA. The requirement is to serve the clients coming from EMEA with the resources deployed in the EMEA region for optimal experience, legal requirements, etc. Similarly, users in the US should be served with the resources in the US region.

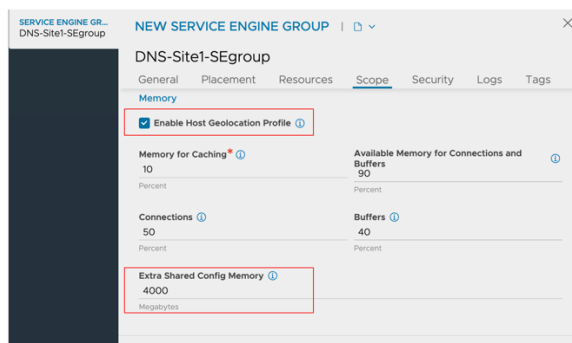
For such a requirement, Avi GSLB can help to distribute the traffic across the data centers based on the geographic location of the client.

Configuration Steps

The configuration steps remain identical to Scenario 1 or Scenario 2 depending on the type of deployment. The modifications are listed here:

SE group settings

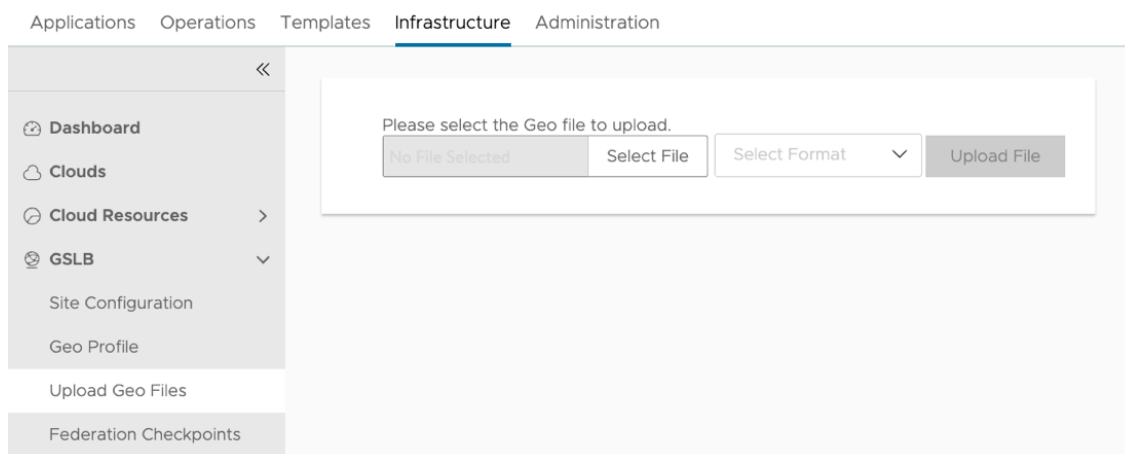
- Configure the SE group settings as required. For using geolocation as the load balancing algorithm:
 - The GSLB SE must have a minimum of 8Gb memory,
 - The Host Geolocation Profile must be checked within the Service Engine Group, and
 - The extra shared config memory should be configured. Please check here for Extra Shared Config memory requirements: https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/Configuration_Guide/GUID-ACB20C0D-7E70-4C6E-B089-1EBAFD0A134D.html



Upload Geo Files (Only if you need a custom Database)

On Avi Controller, a geo database is already present but if you need to upload some other database or create a custom database then upload that geo database using the steps mentioned below:

- Navigate to Infrastructure > GSLB> Upload Geo Files
- Select File and Format and Click Upload File



More details about database syntax are covered here - https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/GSLB_Guide/GUID-D5604F4A-11B7-419F-A708-6EF34983F73A.html

Set Geo Profile

In the lifecycle of an Avi GSLB configuration, geographic information for geolocated services is first loaded into the GSLB leader Avi Controller, in bulk or on a location-by-location basis. The data are placed into Avi geo-DB format (specified below) for download into all Avi DNS SEs in the SE group. The Avi geo-DB is subsequently replicated to all follower Avi DNS instantiations so that any one of them can reply to client-local DNSs with the same optimally located VIP.

- Navigate to Infrastructure > GSLB > Geo Profile
- Click Create
- Enter details and select the geo dB file. Note that you can add multiple files and assign priority to the files. While doing a geo look-up, Avi SE will start checking the databases as per the priority configured here. For most of the uses, Avi provided database is sufficient and it is being used here in the example below:

NEW GEO PROFILE

Demo

General Entries

General

Name * ⓘ
Demo

Entries

GeoDB Entries (1)

ADD

File Name	Priority	Format
AviGeoDb.txt.gz	10	Avi

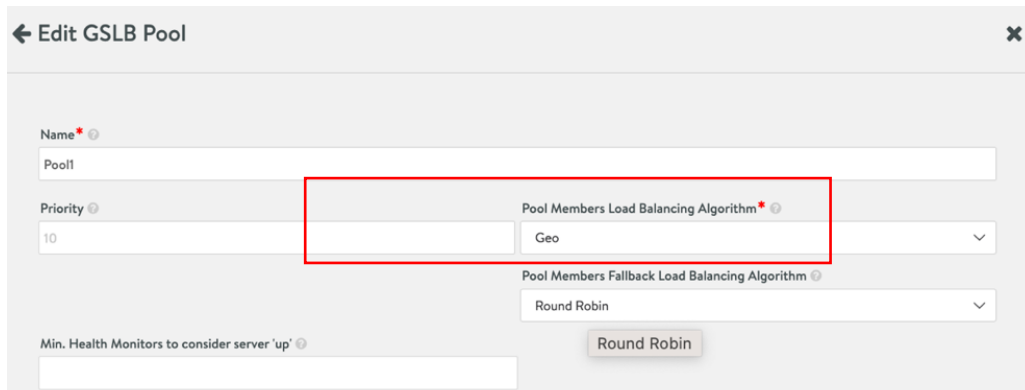
Items per page 10

CANCEL SAVE

- Click Save

Set the GSLB algorithm to Geo in the GSLB service configuration

- Navigate to Applications > GSLB services
- Configure the GSLB pool members as explained in previous sections.
- Additionally, in GSLB service configuration, set GSLB algorithm to Geo
- Set the Fall-back algorithm if required. By default, its round robin.



Edit GSLB Pool

Name* ⓘ
Pool1

Priority ⓘ
10

Pool Members Load Balancing Algorithm* ⓘ
Geo

Pool Members Fallback Load Balancing Algorithm ⓘ
Round Robin

Min. Health Monitors to consider server 'up' ⓘ
Round Robin

- Click Save
- Click Save

Best Practices

DNS VS - HA and placement

1. It is required to configure Avi DNS for GSLB in more than one location/GSLB site.
2. Within a location/site, use active/active HA with at least 2 SEs in case of mid or large deployments. The actual number of SEs depend on multiple factors so please contact your account team for SE sizing.
3. Local LB VS and DNS VS should not be part of same SE group.
4. Placing same domain on two DNS VSes which are in same SE group is not advisable.
5. In scaled environment where number of GSLB services is more than 5000, the recommendation is to use selective placements (avoid using wild card *)

Extra_shared memory config

- | | |
|---|---------|
| 1. GSLB using Geolocation | 2000 MB |
| 2. GSLB using any LB algorithm with 500-5000 GSLB Services | 1000 MB |
| 3. GSLB using any LB algorithm with greater than 5000 GSLB Services | 2000 MB |

If you are using more than one of these features simultaneously, then configure extra_shared_config_memory to be the sum of the requirements outlined above.

Example: Using GSLB Geo Location with 1000 GSLB Services

Total shared Memory to be configured **2000 + 1000 = 3000MB**

Please refer to this document for more information about extra_shared_memory https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/Configuration_Guide/GUID-21FE7D2C-C95B-4BDA-9736-A93D21381F84.html

GSLB sites – Use controller cluster VIP to add sites

It is recommended to use controller cluster VIP to add GSLB sites.

GSLB Upgrade

1. It is recommended to have the same Avi Vantage version on all the Avi sites participating in GSLB. The Controller that assumes the GSLB leader role *must not* run a later version than any of its GSLB follower sites. This restriction applies both during the initial configuration of GSLB and during subsequent [upgrades](#) of Avi Vantage (i.e., the leader site must be upgraded *after* all its follower sites have been upgraded)
2. The maintenance mode should be enabled on the leader controller as explained here https://docs.vmware.com/en/VMware-NSX-Advanced-Load-Balancer/22.1/GSLB_Guide/GUID-9158A120-3938-44A8-9B54-7BOA0B87B5AC.html
3. Passive followers should be upgraded first.
4. Active followers should be upgraded after passive followers.
5. The leader site should be upgraded at the end.
6. If manual pool resume is enabled pools may go down during upgrade , enabled disabled them to bring them up

