

Version 1.0

December 2021

SmartFiles Internal Load Balancer

*Guidelines for Distributing Client Connections
Across Multiple Nodes*

ABSTRACT

SmartFiles Internal Load Balancer enables Cohesity clusters distribute client connections across multiple nodes. This removes the dependency on External DNS and its cumbersome configuration. The guidelines and settings in this guide help you configure the smart Load Balancer for best results.

Table of Contents

Cohesity SmartFiles	4
Cohesity Internal Load Balancer	5
Internal Load Balancer—New Terminologies.....	6
External DNS vs Internal DNS Based Load Balancer Configuration Changes	7
How Does Internal Load Balancer Work?	8
Supported Configurations.....	9
Node VIP Failover	12
Recommendations for Number of VIP Addresses for Internal Load Balancer	13
How to Configure Internal Load Balancer	14
Additional Recommended Configurations	15
Reverse DNS Lookup	15
SmartFiles Integration with Active Directory	17
Advanced Configuration	18
Reference Architectures.....	19
Duplicate Share Names	19
Heterogeneous Cluster	19
Technical Support and Resources	20
Related Resources.....	21
Your Feedback	22
About the Authors.....	22
Document Version History.....	22

Figures

Figure 1: Internal Load Balancer Workflow	8
Figure 2: Cluster with 600 Clients and Only One VIP Per Interface Per Node	12
Figure 3: Cluster with 600 Clients and More Than One VIP Per Interface Per Node	12
Figure 4: Duplicate Share Names	19
Figure 5: Heterogeneous Cluster	19

Tables

Table 1: IP Address Types and Their Purposes Before Cohesity 6.6.0c.....	6
Table 2: IP Address Types and Their Purposes From Cohesity 6.6.0c and Onwards.....	6
Table 3: Site DNS Server and Internal Load Balancer Settings	7
Table 4: Supported Configurations.....	9
Table 5: IP Address(es) Requirement for an Interface Group/Subnet/VLAN.....	13
Table 6: Site DNS Server and Internal Load Balancer Configuration	15
Table 7: Site DNS Server and Internal Load Balancer Configuration	16
Table 8: Advanced Configuration	18

Cohesity SmartFiles

Cohesity SmartFiles delivers enterprise-class, unstructured data management with unified file and object storage and intelligent management applications such as security and tiering. As a web-scale platform, this solution offers multiple benefits, including unlimited scale-out, unparalleled storage efficiency, and robust fault tolerance across the Cohesity cluster.

Cohesity Internal Load Balancer

A Cohesity cluster usually consists of multiple nodes and Cohesity recommends spreading all the client connections across all the nodes to ensure availability and consistency.

Before Cohesity 6.6.0c, SmartFiles leveraged the round-robin response technique provided by External DNS for load balancing and fault tolerance client connection across the Cohesity nodes. This method involved creating multiple Forward and Reverse Lookup Records for VIP (Virtual IP) of each hostname, which introduces challenges such as:

- **Manageability overhead:** Adding multiple DNS entries can be a cumbersome and error-prone task, especially for large deployments.
- **Stale DNS data:** Manually updating DNS entries can lead to stale data, which needs to be cleaned up periodically.
- **RTO during unplanned DR:** Manual and complex DNS configuration can lead to RTO misses using unplanned Disaster Recovery situations.
- **Large complex environments:** Managing multiple DNS entries can be very painful for the storage administrator. Typically in large organizations, the storage and the networking teams are separate. The storage team doesn't have the required level of skill set, privileges, or clearance to manage the networking infrastructure.

You can introduce an External Load Balancer (Hardware/Software-based) to overcome the limitations on the round-robin response technique of External DNS. However, it also introduces an additional network hop along with other performance overheads, as it is usually unaware of the resource distribution and utilization.

Starting with Cohesity 6.6.0c, with the introduction of the Internal Load Balancer, the Cohesity cluster can act as a DNS server. The Internal Load Balancer currently uses the same round-robin technique to respond to the VIPs to distribute client connections across multiple nodes.

Internal Load Balancer—New Terminologies

Internal Load Balancer has introduced some new categories of IP Addresses.

Table 1: IP Address Types and Their Purposes Before Cohesity 6.6.0c

IP ADDRESS TYPE	ASSIGNMENT METHOD	IP ADDRESS SUB-TYPE	PURPOSE
Node IPs	Static	-	To communicate between nodes in a Cohesity cluster
VIPs	Dynamic	-	To communicate with clients

Table 2: IP Address Types and Their Purposes From Cohesity 6.6.0c and Onwards

IP ADDRESS TYPE	ASSIGNMENT METHOD	IP ADDRESS SUB-TYPE	PURPOSE
Node IPs	Static	-	To communicate between nodes in a Cohesity cluster
VIPs	Dynamic	DNS VIPs	To communicate with External DNS and return Resolved VIPs for client connections based on Internal Load Balancing algorithm
		Resolved VIPs	To communicate with clients

- **Static IP Address Assignment Method:** Only one IP Address per network interface. If the network interface becomes unavailable, its IP Address is not reassigned to any other available network interface. Once the impacted network interface becomes available, it is assigned the same IP Address.
- **Dynamic IP Address Assignment Method:** Assigns IP Addresses to each network interface in the interface group until all IP Addresses are assigned.

This means:

- If the number of network interfaces is more than the IP Addresses, then there can be network interfaces with no IP Addresses.
- If the number of network interfaces is less than the IP Addresses, then there can be network interfaces with more than one IP Addresses.

If the network interface becomes unavailable, its IP Address is automatically reassigned to any other available network interface. Once the impacted network interface becomes available, it is assigned the IP Address, but may not be the same ones as before.

External DNS vs Internal DNS Based Load Balancer Configuration Changes

Table 3: Site DNS Server and Internal Load Balancer Settings

	SITE DNS SERVER (OR EXTERNAL DNS) FOR LOAD BALANCING	INTERNAL LOAD BALANCER FOR LOAD BALANCING
DNS Side Settings	homedirs.foobar.com. A 10.15.15.22 homedirs.foobar.com. A 10.15.15.23 homedirs.foobar.com. A 10.15.15.24	cluster01-vip1.foobar.com. A 10.15.15.21 homedirs.foobar.com. NS cluster01-vip1.foobar.com <ul style="list-style-type: none"> NS (Name Server) records are also known as Delegation Zones. DNS resolution for homedirs.foobar.com has been forwarded from Site DNS server (or External DNS) to 10.15.15.21—which is hosted on the Cohesity Cluster, i.e., delegating homedirs.foobar.com DNS resolution to 10.15.15.21. As 10.15.15.21 in this case is acting as DNS server host on the Cohesity, it is at times referred to as Internal DNS or DNS VIP.
Cluster Side Settings	VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 *Note: Hostname declared in Networking → VIPs → FQDN is never used by External DNS.	VIP FQDN: cluster01-vip1.foobar.com DNS VIP: 10.15.15.21 Zone Name: homedirs.foobar.com <pre>{ VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 }</pre>
IP Address Requirements i.e. (Number of VIPs)	Equals to “Number of Interfaces” For Example, for a 3 node cluster with only 1 active interface per node: Minimum = 3 IP Addresses (one for each node)	Equals to “Number of Interfaces + DNS Resolver VIPs” For Example, for a 3 node cluster with only 1 active interface per node: Minimum = 4 IP Addresses (3 + 1) (one for each node + one additional for Internal Load Balancer) Recommended = Based on multiple parameters. For more details, see Recommendations for Number of IP Addresses for Internal Load Balancer .

How Does Internal Load Balancer Work?

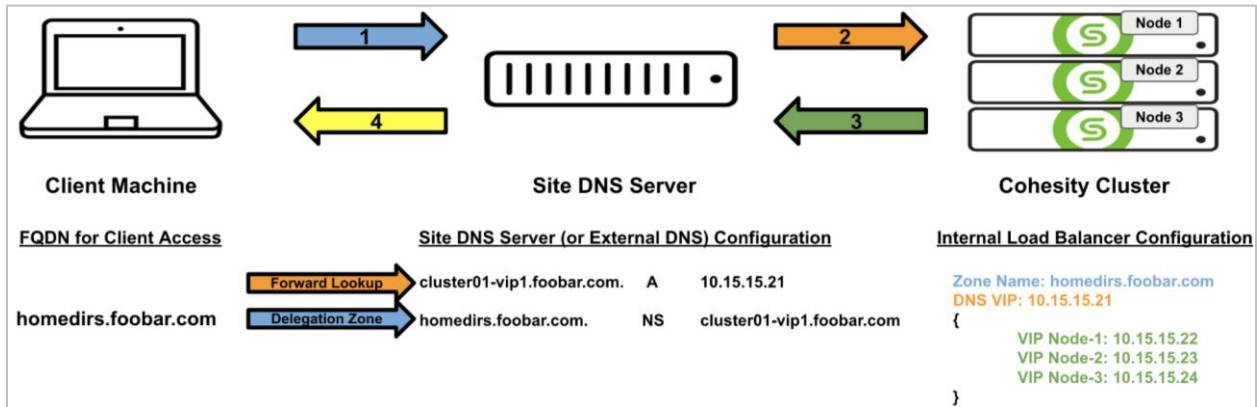
Cohesity's Internal Load Balancer leverages delegations from the External DNS to forward the name resolution requests for the Zone Names to the Cohesity cluster.

A DNS server must have a direct or indirect path to every zone in the namespace. These paths are created by utilizing delegation. A delegation is a record in a parent zone that lists a name server that is authoritative for the zone in the next level of the hierarchy. Delegations make it possible for servers in one zone to refer clients to servers in other zones. A delegation is essentially the ability to tell the DNS that whenever a specific server's information is requested, forward those requests, and forward only those requests externally (to Cohesity's Internal Load Balancer) for resolution.



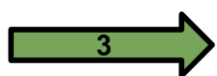
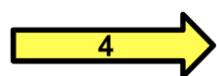
A delegation uses two types of records. The name server resource record provides the name of an authoritative server. Host (A) and host (AAAA) resource records provide IP version 4 (IPv4) and IP version 6 (IPv6) addresses of an authoritative server.

Below is an example configuration to illustrate how the Internal Load Balancer works.

Figure 1: Internal Load Balancer Workflow



Step-by-step DNS Resolution

- 
 The client makes a DNS request for 'homedirs.foobar.com' by sending a DNS request packet to the site DNS server.
- 
 The site DNS server has a delegation record for 'homedirs.foobar.com' and so delegates the DNS request to the defined name server address in the delegation record, i.e. '10.15.15.21'.
- 
 The Cohesity cluster node hosting the VIP '10.15.15.21' for the 'homedirs.foobar.com' zone receives the request, and selects an IP Address based on the round-robin technique, from the pool of IPs that are spread across multiple nodes. The selected IP Address is then sent back to the DNS server as a DNS response packet.
- 
 The site DNS server responds to the client with the IP Address received from Cohesity's Internal Load Balancer.

Supported Configurations

Cohesity Internal Load Balancer supports all possible DNS VIP—Zone Name—Node VIP combinations across multiple networks (interface groups, subnets, and VLANs). Below are some examples from the possible combinations.

Table 4: Supported Configurations

DETAILS	EXAMPLE CONFIGURATION
<p>Example Configuration 1:</p> <ul style="list-style-type: none"> • One DNS VIP • One DNS VIP for a Zone Name • One Node VIP (per interface per node) 	<p><u>Site DNS Server (or External DNS) Configuration</u></p> <pre>cluster01-vip1.foobar.com. A 10.15.15.21 homedirs.foobar.com. NS cluster01-vip1.foobar.com</pre> <p><u>Internal Load Balancer Configuration</u></p> <pre>Zone Name: homedirs.foobar.com DNS VIP: 10.15.15.21 { VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 }</pre>
<p>Example Configuration 2:</p> <ul style="list-style-type: none"> • One DNS VIP • One DNS VIP for a Zone Name • Multiple Node VIP (per interface per node) 	<p><u>Site DNS Server (or External DNS) Configuration</u></p> <pre>cluster01-vip1.foobar.com. A 10.15.15.21 homedirs.foobar.com. NS cluster01-vip1.foobar.com</pre> <p><u>Internal Load Balancer Configuration</u></p> <pre>Zone Name: homedirs.foobar.com DNS VIP: 10.15.15.21 { VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 VIP Node-1: 10.15.15.25 VIP Node-2: 10.15.15.26 VIP Node-3: 10.15.15.27 }</pre>

DETAILS	EXAMPLE CONFIGURATION
<p>Example Configuration 3:</p> <ul style="list-style-type: none"> • One DNS VIP • Multiple DNS VIP for a Zone Name <p>Multiple Node VIP (per interface per node)</p>	<p><u>Site DNS Server (or External DNS) Configuration</u></p> <pre>cluster01-vip1.foobar.com. A 10.15.15.21 cluster01-vip2.foobar.com. A 10.15.15.31 homedirs.foobar.com. NS cluster01-vip1.foobar.com homedirs.foobar.com. NS cluster01-vip2.foobar.com</pre> <p><u>Internal Load Balancer Configuration</u></p> <pre>Zone Name: homedirs.foobar.com DNS VIP: 10.15.15.21,10.15.15.31 { VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 VIP Node-1: 10.15.15.25 VIP Node-2: 10.15.15.26 VIP Node-3: 10.15.15.27 }</pre>
<p>Example Configuration 4:</p> <ul style="list-style-type: none"> • One DNS VIP • One DNS VIP for Multiple Zone Names • One Zone Name for Single Node VIP • Multiple Node VIPs (per interface per node) 	<p><u>Site DNS Server (or External DNS) Configuration</u></p> <pre>cluster01-vip1.foobar.com. A 10.15.15.21 cluster01-vip2.foobar.com. A 10.15.15.31 homedirs.foobar.com. NS cluster01-vip1.foobar.com homedirs.foobar.com. NS cluster01-vip2.foobar.com depts.foobar.com. NS cluster01-vip1.foobar.com</pre> <p><u>Internal Load Balancer Configuration</u></p> <pre>Zone Name: homedirs.foobar.com DNS VIP: 10.15.15.21,10.15.15.31 { VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 VIP Node-1: 10.15.15.25 VIP Node-2: 10.15.15.26 VIP Node-3: 10.15.15.27 } Zone Name: depts.foobar.com DNS VIP: 10.15.15.21 { VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 }</pre>

DETAILS	EXAMPLE CONFIGURATION
<p>Example Configuration 5:</p> <ul style="list-style-type: none"> • One DNS VIP • One DNS VIP for Multiple Zone Names • One Zone Name for Single Node VIP • Multiple Node VIPs (per interface per node) 	<p><u>Site DNS Server (or External DNS) Configuration</u></p> <pre> cluster01-vip1.foobar.com. A 10.15.15.21 cluster01-vip2.foobar.com. A 10.15.15.31 homedirs.foobar.com. NS cluster01-vip1.foobar.com homedirs.foobar.com. NS cluster01-vip2.foobar.com cluster01-vip3.foobar.com. A 192.168.100.151 depts.foobar.com. NS cluster01-vip3.foobar.com </pre> <p><u>Internal Load Balancer Configuration</u></p> <pre> Zone Name: homedirs.foobar.com DNS VIP: 10.15.15.21,10.15.15.31 { VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 VIP Node-1: 10.15.15.25 VIP Node-2: 10.15.15.26 VIP Node-3: 10.15.15.27 } Zone Name: depts.foobar.com DNS VIP: 192.168.100.151 { VIP Node-1: 192.168.100.151 VIP Node-2: 192.168.100.152 VIP Node-3: 192.168.100.153 } </pre>

Node VIP Failover

If a node becomes unavailable, the Cohesity cluster provides HA by transparently migrating the Node VIP Address from the failed node to an active node. If the failed node has multiple VIP Addresses, then all the VIPs hosted on the node will be evenly distributed across all the active nodes in round-robin mode.

In case of a large number of client connections, Cohesity recommends configuring multiple VIP Addresses to ensure an even distribution of client connections across all the nodes. The illustration below helps you understand the recommendation more clearly.

Figure 2: Cluster with 600 Clients and Only One VIP Per Interface Per Node

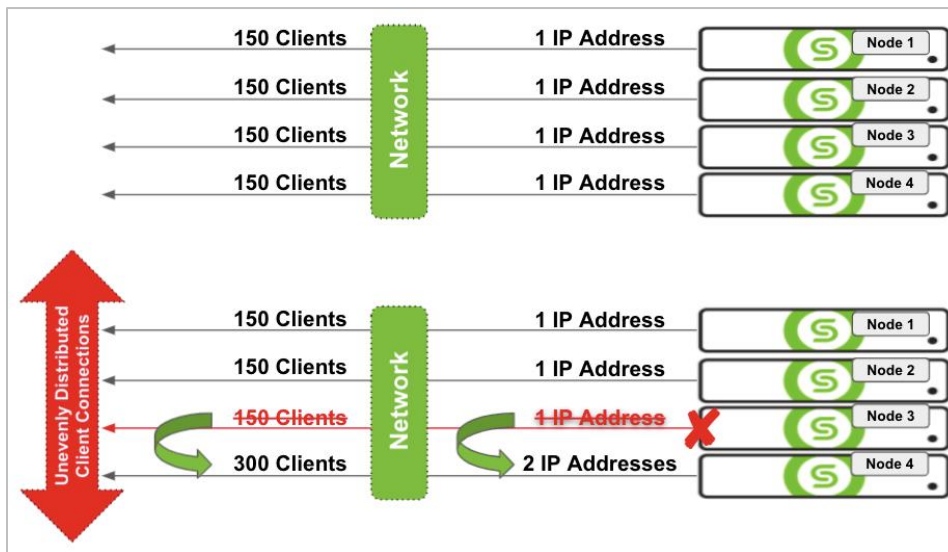
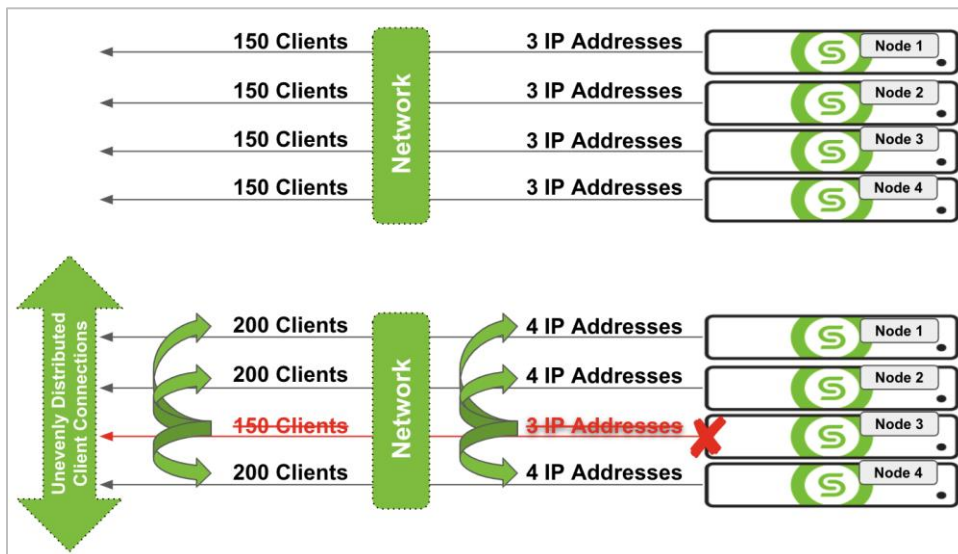


Figure 3: Cluster with 600 Clients and More Than One VIP Per Interface Per Node



Recommendations for Number of VIP Addresses for Internal Load Balancer

Total VIP Addresses = Total DNS VIP Address(es) + Total Resolved VIP Address(es)

The recommended number of DNS VIP Addresses and Node VIP Addresses depends on the factors such as:

- Number of nodes in the cluster
- Type of nodes
- Network Architecture
- Number of client connections
- Specific design considerations like Duplicate Shares, etc.

In the case of a large number of nodes, Cohesity highly recommends using more than one DNS VIP Address to provide fault tolerance for DNS resolutions.

Table 5: IP Address(es) Requirement for an Interface Group/Subnet/VLAN

	RECOMMENDED	MINIMUM
DNS VIPs	2 IP Addresses	1 IP Address
Resolved VIPs	$N \times (N-1)$ N = Number of Interfaces in the interface group of the Cohesity cluster	1 IP Address per Interface per node

NOTE: The above formula for the recommended number of Resolved VIPs is basic permutation-and-combination mathematics for N objects and can return unrealistic VIP addresses requirements in the case of a large cluster. So it's important to understand the approach and intent and choose what fits the best.

For example:

- For a 4 node cluster with 1 interface from each node in the interface group, $4 \times (4-1) = 12$ VIP addresses, is doable.
- For a 20 node cluster with 1 interface from each node in the interface group, $20 \times (20-1) = 380$ VIP Addresses, is unrealistic.
In such cases, Cohesity recommends at least 2 VIP Addresses per interface.

How to Configure Internal Load Balancer

Currently, as on version 6.6.0c, Cohesity has no UI to configure the Internal Load Balancer. Below is the `iris_cli` command to configure the Internal Load Balancer.

- `iris_cli` command syntax for creating a new DNS Zone:

- 1) Create DNS Zone.

```
vlan add-dns-zone dns-zone-name=<ZONE_NAME.FQDN> dns-zone-vips=<DNS_VIPs>
vlan-interface-group=<INTERFACE_GROUP>
```

- 2) Add Node VIPs to the resolve list for the DNS Zone.

```
vlan update-dns-zone dns-zone-name=<ZONE_NAME.FQDN> dns-zone-vips=<DNS_VIPs>
vlan-interface-group=<INTERFACE_GROUP> add-resolved-vips=<NODE_VIPs>
```

- `iris_cli` command syntax for deleting a DNS Zone:

- 1) Remove Node VIPs from the resolve list for the DNS Zone.

```
vlan update-dns-zone dns-zone-name=<ZONE_NAME.FQDN> dns-zone-vips=<DNS_VIPs>
vlan-interface-group=<INTERFACE_GROUP> remove-resolved-vips=<NODE_VIPs>
```

- 2) Delete DNS Zone.

```
vlan remove-dns-zones dns-zone-name=<ZONE_NAME.FQDN> vlan-interface-
group=<INTERFACE_GROUP>
```

Sample commands for the below example configuration:

Zone Name: apps.foobar.com

DNS VIP: 10.15.15.100,10.15.15.101

```
{
    VIP Node-1: 10.15.15.22
    VIP Node-2: 10.15.15.23
    VIP Node-3: 10.15.15.24
    VIP Node-1: 10.15.15.25
    VIP Node-2: 10.15.15.26
    VIP Node-3: 10.15.15.27
}
```

- 1) Create DNS Zone.

```
vlan add-dns-zone dns-zone-name=apps.spartans.local dns-zone-
vips=10.15.15.100,10.15.15.101 vlan-interface-group=intf_group1.0
```

- 2) Add Node VIPs to the resolve list for the DNS Zone.

```
vlan update-dns-zone dns-zone-name=apps.spartans.local dns-zone-
vips=10.15.15.100,10.15.15.101 vlan-interface-group=intf_group1.0 add-resolved-
vips=10.15.15.22,10.15.15.23,10.15.15.24,10.15.15.25,10.15.15.26,10.15.15.27
vlan-interface-group=intf_group1.0
```

Additional Recommended Configurations

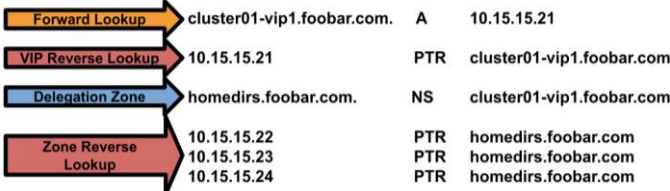
Reverse DNS Lookup

A Reverse DNS Lookup is the querying technique of the DNS to determine the domain name associated with an IP Address—the reverse of the usual "forward" DNS lookup of an IP Address from a domain name. The process of reverse resolving an External DNS uses PTR records.

Although a Reverse Lookup is usually not required, you must always set up a Reverse Lookup in the network as a best practice (usually created by default by most of the DNS applications while creating the Forward Lookup or a Record). The Reverse DNS Lookups are helpful while investigating and troubleshooting network issues using tools such as nslookup, dig, etc. Some applications also require the ability to perform Reverse DNS Lookups for security checks.

To ensure the validity of claimed names, some applications look up records in the reverse tree to get names, and then look up the resultant name to see if it maps back to the address originally known. Failure to find matching reverse mappings is interpreted as a potential security concern.

Table 6: Site DNS Server and Internal Load Balancer Configuration

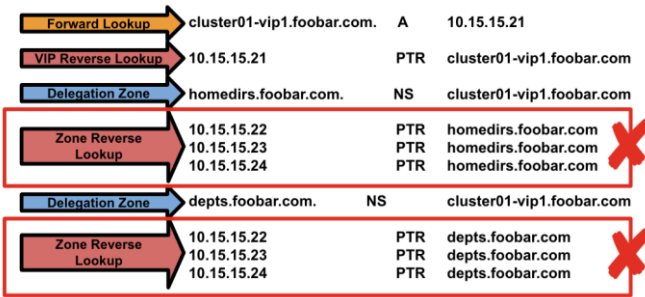
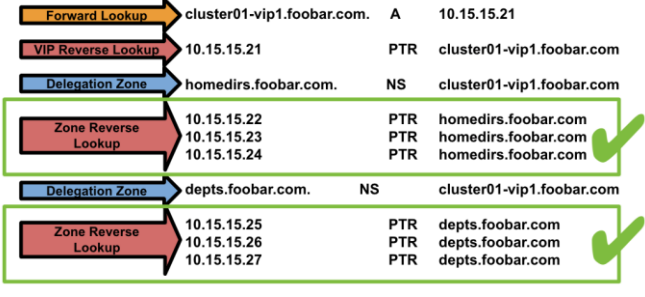
SITE DNS SERVER (OR EXTERNAL DNS) CONFIGURATION	INTERNAL LOAD BALANCER CONFIGURATION
	Zone Name: homedirs.foobar.com DNS VIP: 10.15.15.21 { VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 }

In the above example:

VIP Reverse Lookup i.e., Reverse Lookup (PTR record) for the Forward Lookup (A Record) of VIP Internal Load Balancer is usually created by default by the DNS applications (Site/External DNS) while creating the Forward Lookup. Cohesity recommends to create the VIP reverse lookup, as it's helpful while investigating and troubleshooting network issues.

Zone Reverse Lookup i.e., Reverse Lookup (PTR record) for the Delegation Zone (NS Record) of IP Addresses (Node VIPs) are not created by default and are only recommended if required by the client applications for security reasons. Also, in case of multiple zones implementation, the Zone that requires reverse lookups should have unique IP Addresses (Node VIPs). If not, then reverse lookup will be unpredictable as the DNS (Site/External DNS) has multiple hostnames to return for a given IP Address. This is not a Cohesity Internal Load Balancer limitation; it is just the way DNS works.

Table 7: Site DNS Server and Internal Load Balancer Configuration

SITE DNS SERVER (OR EXTERNAL DNS) CONFIGURATION	INTERNAL LOAD BALANCER CONFIGURATION
 <p>Forward Lookup → cluster01-vip1.foobar.com. A 10.15.15.21</p> <p>VIP Reverse Lookup → 10.15.15.21 PTR cluster01-vip1.foobar.com</p> <p>Delegation Zone → homedirs.foobar.com. NS cluster01-vip1.foobar.com</p> <p>Zone Reverse Lookup → 10.15.15.22 PTR homedirs.foobar.com ✗ 10.15.15.23 PTR homedirs.foobar.com ✗ 10.15.15.24 PTR homedirs.foobar.com ✗</p> <p>Delegation Zone → depts.foobar.com. NS cluster01-vip1.foobar.com</p> <p>Zone Reverse Lookup → 10.15.15.22 PTR depts.foobar.com ✗ 10.15.15.23 PTR depts.foobar.com ✗ 10.15.15.24 PTR depts.foobar.com ✗</p>	<p>Zone Name: homedirs.foobar.com DNS VIP: 10.15.15.21</p> <pre>{ VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 }</pre> <p>Zone Name: depts.foobar.com DNS VIP: 10.15.15.21</p> <pre>{ VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 }</pre>
 <p>Forward Lookup → cluster01-vip1.foobar.com. A 10.15.15.21</p> <p>VIP Reverse Lookup → 10.15.15.21 PTR cluster01-vip1.foobar.com</p> <p>Delegation Zone → homedirs.foobar.com. NS cluster01-vip1.foobar.com</p> <p>Zone Reverse Lookup → 10.15.15.22 PTR homedirs.foobar.com ✓ 10.15.15.23 PTR homedirs.foobar.com ✓ 10.15.15.24 PTR homedirs.foobar.com ✓</p> <p>Delegation Zone → depts.foobar.com. NS cluster01-vip1.foobar.com</p> <p>Zone Reverse Lookup → 10.15.15.25 PTR depts.foobar.com ✓ 10.15.15.26 PTR depts.foobar.com ✓ 10.15.15.27 PTR depts.foobar.com ✓</p>	<p>DNS VIP: 10.15.15.21</p> <pre>{ VIP Node-1: 10.15.15.22 VIP Node-2: 10.15.15.23 VIP Node-3: 10.15.15.24 }</pre> <p>Zone Name: depts.foobar.com DNS VIP: 10.15.15.21</p> <pre>{ VIP Node-1: 10.15.15.25 VIP Node-2: 10.15.15.26 VIP Node-3: 10.15.15.27 }</pre>

SmartFiles Integration with Active Directory

In an enterprise environment, Microsoft Active Directory is the most widely used directory services platform and can be configured in a variety of ways as per the requirement. Cohesity SmartFiles seamlessly integrates with Active Directory.

For detailed information on the best practices and recommendations, see [SmartFiles Integration with Active Directory](#).

Advanced Configuration

Cohesity offers advanced settings that are not part of the general administration options. The reasons for not exposing these advanced settings range from their sparse usefulness to the adverse impact they can cause if configured improperly. Cohesity restricts the documentation for these advanced settings to Cohesity Internal Personnel only.

[Advanced Configuration from SmartFiles KB Article](#) includes a list of commonly used advanced configuration settings. Please contact Cohesity Support to get them configured on your Cohesity cluster.

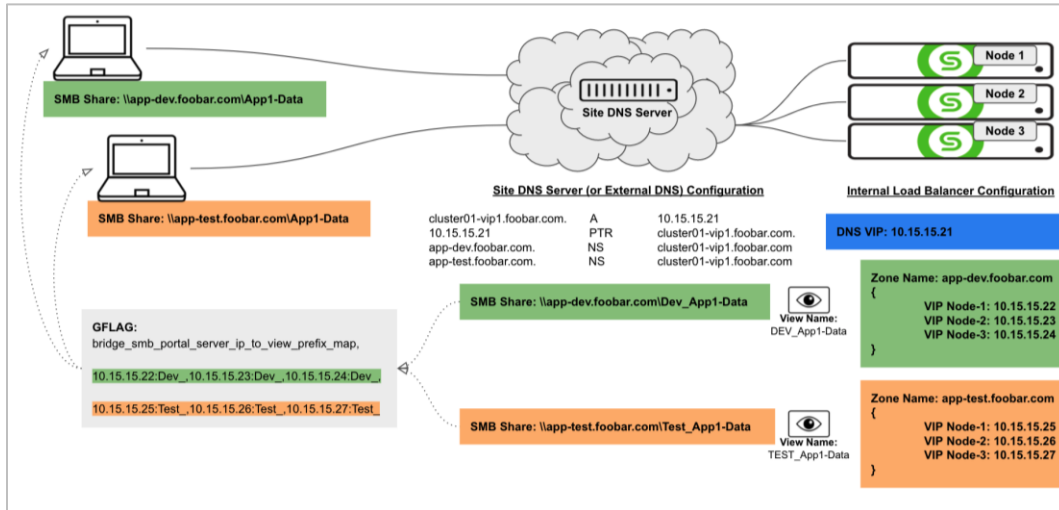
Table 8: Advanced Configuration

S NO.	ADVANCED CONFIGURATION OVERVIEW
1	If an Internal DNS Zone doesn't have Node VIPs defined, then by default, it will not return any IP Address. You can change this behavior to return all IP Addresses from that Interface Group/Subnet/VLAN.
2	When a new Zone is created, by default the Internal Load Balancer can resolve only <code>zone.domain</code> and not <code>machineaccount.zone.domain</code> . This behavior can be changed by enabling Internal Load Balancer to resolve both <code>zone.domain</code> and <code>machineaccount.zone.domain</code> .

Reference Architectures

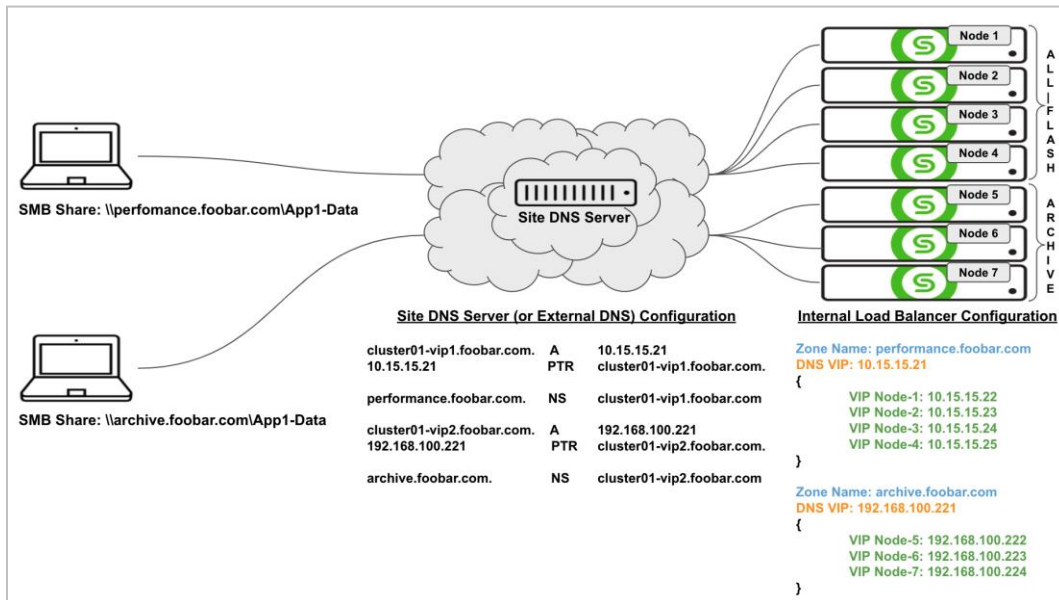
Duplicate Share Names

Figure 4: Duplicate Share Names



Heterogeneous Cluster

Figure 5: Heterogeneous Cluster



Technical Support and Resources

[Cohesity Support Portal](#) provides you access to a robust, on-demand, and detailed knowledge base, along with high-quality services to boost your experiences with Cohesity products.

[Cohesity Product Documentation](#) provides you access to the latest product documentation to support your deployment of Cohesity products including technical guides and third-party software support matrix for Cohesity Data Protection.

[Cohesity Developer Portal](#) provides you ready-to-use integrations with the automation and orchestration tools of your choice to streamline operations.

Related Resources

KBs / WHITE PAPERS / BLOGS

White Paper: [Best Practices for Integrating SmartFiles with Active Directory](#)

This guide provides an overview of Cohesity's implementation of services for Active Directory integration and the best practices and recommendations for the Active Directory configuration.

Knowledge Base: [Recommended settings when using Cohesity SmartFiles \(NFS, SMB, and S3\)](#)

Some generic recommendations and best practices for configuring and optimizing a Cohesity cluster for SmartFiles (NFS, SMB, and S3).

Knowledge Base: [Advanced Configuration from SmartFiles KB Article](#)

Advanced settings that are not part of the general administration options. Cohesity restricts the documentation for these advanced settings to Cohesity Internal Personnel only. Please contact Cohesity Support to get them configured on your Cohesity cluster.

Your Feedback

Was this document helpful? [Send us your feedback!](#)

About the Authors

Akshay Kumar is a Senior Product Solutions Engineer at Cohesity. In his role, he focuses on SmartFiles File and Object services.

Other essential contributors include:

- Adaikkappan Arumugham, Technical Marketing Engineering
- Ruby Garg, Technical Marketing Engineering
- Balakumaran Govindhasamy Radhakrishnan, Engineering
- Bowen Kang, Engineering
- Vijay Panghal, Engineering
- Krishna Ram Kuttuva Jeyaram, Engineering
- Rajesh Sivadasan, Professional Services
- Subash Babu, Technology Editor-Technical Marketing

Document Version History

VERSION	DATE	DOCUMENT HISTORY
1.0	Dec 2021	First release

ABOUT COHESITY

[Cohesity](#) radically simplifies data management. We make it easy to protect, manage, and derive value from data -- across the data center, edge, and cloud. We offer a full suite of services consolidated on one multicloud data platform: backup and recovery, disaster recovery, file and object services, dev/test, and data compliance, security, and analytics -- reducing complexity and eliminating [mass data fragmentation](#). Cohesity can be delivered as a service, self-managed, or provided by a Cohesity-powered partner.

Visit our [website](#) and [blog](#), follow us on [Twitter](#) and [LinkedIn](#) and like us on [Facebook](#).

© 2021. Cohesity, Inc. All Rights Reserved. The information supplied herein is the confidential and proprietary information of Cohesity and may only be used (a) by the intended recipients and (b) in conjunction with validly licensed Cohesity software and services. Find the terms of Cohesity licenses at www.cohesity.com/agreements.

Cohesity, the Cohesity logo, SnapTree, SpanFS, DataProtect, Helios, and other Cohesity marks are trademarks or registered trademarks of Cohesity, Inc. in the US and/or internationally. Other company and product names may be trademarks of the respective companies with which they are associated. This material (a) is intended to provide you information about Cohesity and our business and products; (b) was believed to be true and accurate at the time it was written, but is subject to change without notice; and (c) is provided on an "AS IS" basis. Cohesity disclaims all express or implied conditions, representations, warranties of any kind.