Infoblox DNS Cache Acceleration Administrator Guide

January 2019

About DNS Cache Acceleration

The IB-4030 and IB-4030-10GE are high-performance DNS caching-only name servers. Using DNS cache acceleration services, DNS query resolution can be more responsive for resolvers across the network. The appliance can be part of an Infoblox Grid or operates as an independent DNS caching appliance. The IB-4030 and IB-4030-10GE appliances support DNS queries on the LAN1, LAN2, MGMT, and HA ports.
Figure 1 illustrates a basic implementation of the IB-4030 or IB-4030-10GE. In *Figure 1*, the network uses an IB-4030 or IB-4030-10GE appliance in an optimized deployment through the LAN1, LAN2, and MGMT ports, in which the appliance caches DNS responses for the Intranet and for resolvers in the Internet. The IB-4030 or IB-4030-10GE operates as a member of the Infoblox Grid, and responds to DNS requests from its cache, offloading that work from the authoritative servers. DNS requests, whose responses are not currently cached, are passed on to the authoritative servers, and their responses are returned to and cached by the IB-4030 or IB-4030-10GE appliance.
The DNS resource records are kept in its cache until they expire. The appliance uses the cache pre-fetch option to detect cached records that are about to expire and fetch another copy before actual expiration. When a query asks for data that has been cached, in addition to returning the data, the appliance fetches a fresh copy from the authoritative server if the pre-fetch condition (**Eligible** and **Trigger** settings) is met. This option helps minimize the time window in which no answer is available in the cache. The pre-fetch option is controlled by the following parameters:

- **Eligible** – The records that arrive with TTL greater than the eligible value are considered for pre-fetch. The default value is 9 seconds.
- **Trigger** – The TTL value at which pre-fetch takes place. The default value is 2 seconds.

The pre-fetch option is enabled by default and currently you cannot configure the **Eligible** and **Trigger** values. Configuration for these values might be supported in future releases.

Note: The pre-fetch option is not supported on servers that use Unbound as the DNS resolver.
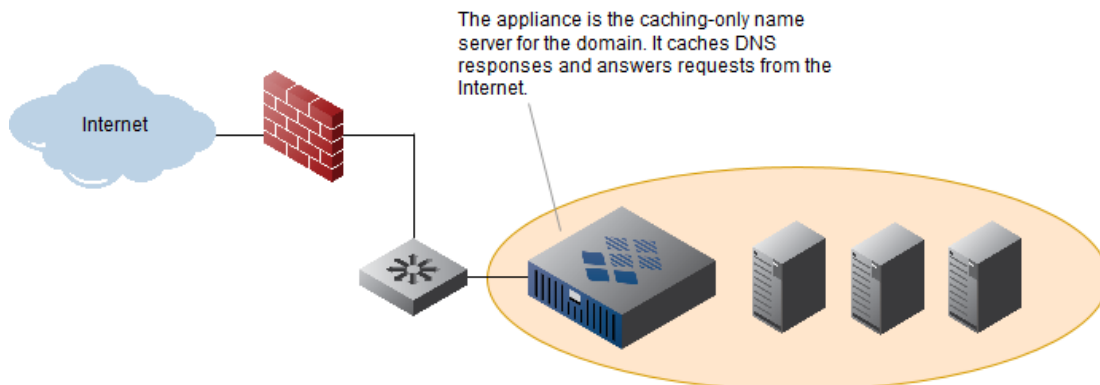

Figure 1. IB-4030 or IB-4030-10GE Grid Installation
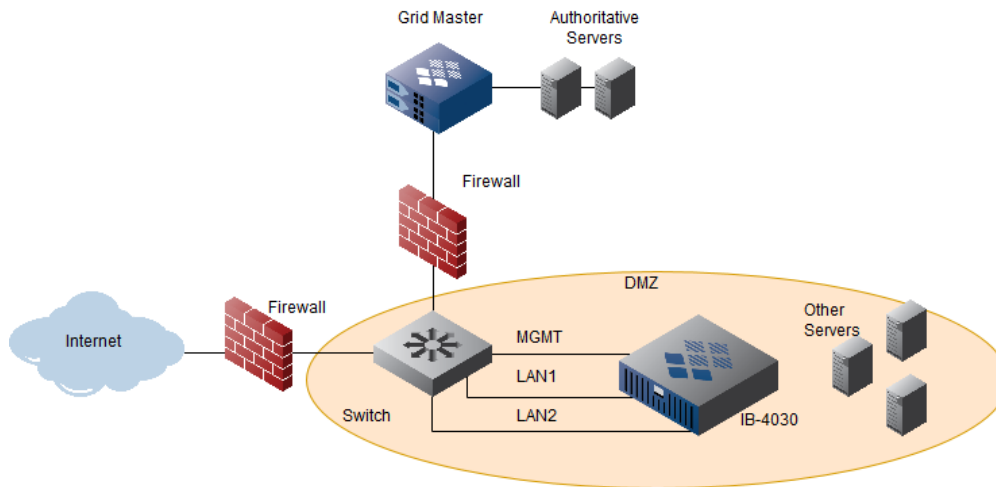
Independent Appliance

You can deploy the IB-4030 or IB-4030-10GE as an independent Infoblox appliance. A simplified example of which is shown in *Figure 2*.

*Figure 2. IB-4030 or IB-4030-10GE as an Independent Appliance*

HA Configuration

You can deploy two IB-4030 or IB-4030-10GE appliances of the same model to form an HA pair, as shown in *Figure 3*. Note that only the active node in an HA pair handles DNS traffic. The passive node is in a standby mode ready to take over if a failover occurs. Note that the passive node does not operate with a pre-loaded cache or hot cache during a failover; it builds up the DNS cache over time. For information about how to configure an HA pair, refer to *Chapter 5 Deploying a Grid* in the *Infoblox NIOS Administrator Guide*.

Note: A reset of the cache acceleration card on the active node of an HA pair can trigger an HA failover.

Figure 3. IB-4030 or IB-4030-10GE as an HA Pair

The HA pair provides high availability. Only the active node handles DNS traffic in the HA pair. The passive node is in standby mode ready to take over if a failover occurs.
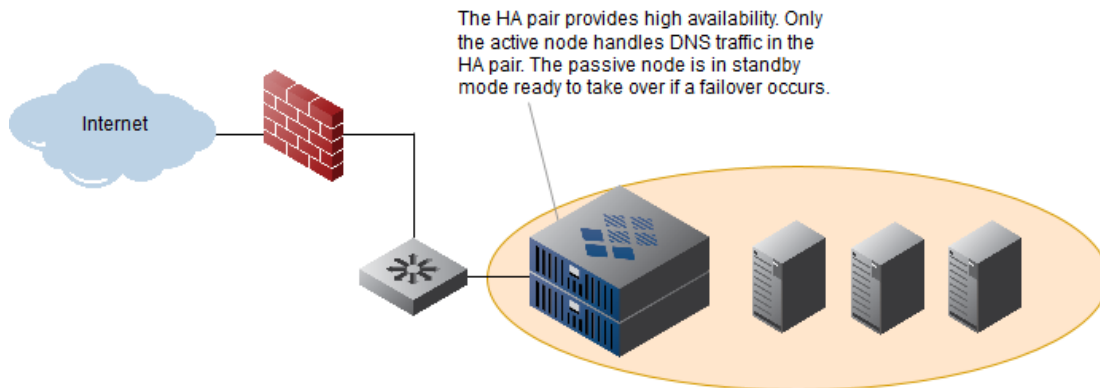
Operational Guidelines

The specialized function of the IB-4030 or IB-4030-10GE is to act as a high-speed DNS caching-only name server. Associated characteristics of the IB-4030 and IB-4030-10GE appliances include the following:

- Support for the following features:
    - Up to six DNS views
    - Forward zones and stub zones, but not authoritative zones
    - Only selected Finisar Copper and Fiber SFP modules
    - Anycast for BGP v6 and OSPF v3
    - DNS Anycast and IPv6 Anycast
    - Up to 10,000 entries for each ACL (Access Control List)
    - Only the cyclic ordering for A records over the IPv4 transport
- The IB-4030 or IB-4030-10GE LAN1, LAN2, MGMT and HA interfaces all support IPv4 and IPv6 transports and DNS services over IPv4 and IPv6.
- Support for the following IPv6 functions and applications:
    - DNS over IPv6 LAN1, LAN2, MGMT, and HA interfaces
    - IP6 address on loopback interface
    - CLI (SSH) access over IPv6
    - GUI access over IPv6
    - PAPI access over IPv6
    - Sending SNMP traps over IPv6
    - SNMP query over IPv6
    - Sending messages to external syslog server over IPv6
    - Email relay over IPv6
    - IPv6 static routes
- You may continue to receive responses for cached queries from the DNS cache accelerator when the NIOS appliance or the host restarts. Queries that are not cached will not be answered.
- If query logging is enabled, only DNS queries are logged.
- The IB-4030 and IB-4030-10GE do not support the following features:
    - DHCP and IPAM functions
    - Zone transfers or dynamic DNS updates
    - DSCP (Differentiated Services Code Point)

Additional characteristics when you put the IB-4030 or IB-4030-10GE in the cache accelerated mode:

- DNS queries over IPv4 and IPv6 transports are supported only for the following record types: A, AAAA, MX, PTR, and CNAME.
- When DNS service restarts due to DNS configuration changes, all DNS caches are cleared.
- The IB-4030 or IB-4030-10GE appliance with cached acceleration does not support DNS packet monitoring (still supports DNS monitoring alerts and IP rate limiting).

The table below lists the features that are supported and not supported for DNS cache acceleration feature on an IB-4030 appliance:

Table 1 Features on the IB-4030 DNS cache acceleration platforms

Features	Supported / Not Supported
Tiered licensing	Supports four tiers of DNS queries per second. Rate limiting enforces Queries Per Second (QPS) levels for Tier-2, Tier-3 and Tier-4.
RPZ	Yes, the maximum cache lifetime for DNS cache acceleration is set to 300 seconds when you enable the RPZ license.
Caching (A, AAAA, MX, CNAME, PTR)	Yes
Do not cache: EDNS, TCP, Any, TSIG	Yes
Caching over additional interfaces (v4, v6)	Yes
Dump Acceleration Cache (CLI, GUI, PAPI)	Yes
Clear Acceleration Cache (CLI, GUI, PAPI)	Yes
Cache pre-fetch and cache refresh	Yes
ACLs (Allow-queries/Responses, Match-Clients/Destination, Blackhole)	Yes
AAAA Filtering (Bypassed but support configuring)	Yes
Fixed RRSET ordering	Yes
DNS64	Yes
DNS monitoring feature (netmon)	Yes, but this feature does not capture cached responses for DNS cache acceleration.
DNS Query logging (BIND only)	Yes
DNS Views	Yes, supports up to six DNS views.
Forward/Stub zones	Yes
Unbound as DNS resolver	Yes, unbound is supported when you install the dual engine DNS license.
DNS cache acceleration related restrictions for configuration.	Yes, for NIOS version 8.2.0 restrictions are enforced based on whether the DNS cache acceleration feature is enabled or disabled.
Reporting	Yes, please see *Reports for IB-4030 and IB-4030-10GE.*
VLAN	Yes
DSCP	Yes
Sort list	Yes
Anycast (OSPF and BGP)	Yes
BFD (Bidirectional Forwarding Detection)	Yes
HA Support	Yes
NIC Bonding	Yes
Multiple-Interfaces on same subnet	Yes
IP Rate-limit and Response logging	No
EDNS Client Subnet support	No
NXDOMAIN redirection	Yes

DNSSEC (Bypassed but support configuring)	Yes
Debug enhancements	Yes
SNMP Support for DCA service related traps	Yes
SNMP stats support for DNS QPS and CHR	Yes
NX Mitigation	No
NetFilter (Tracking tables)	Yes
Traffic-capture (All modes)	Yes
No flush-mode support for DNS cache acceleration cache	Yes
Per-interface UDP DNS cache acceleration response counters	Yes
CLI commands	You can use the commands `set dns-accel` and `show dns-accel` to view and set DNS cache acceleration information. For more information, refer to the *Infoblox CLI Guide*.
DNS Query rewrite (Bypassed but supports configuring)	No
Threat Protection	Yes, you can enable threat protection and DNS cache acceleration simultaneously.

IB-4030 and IB-4030-10GE System Configuration

Initial hardware setup instructions can be found in the *Infoblox Installation Guide for the Infoblox-4030 Appliance*. Once you install the system and run the **set network** command, you enable the DNS service and the DNS Cache Acceleration service on the IB-4030 or IB-4030-10GE.
The procedure to start DNS Cache Acceleration service consists of the following:

1. Install and activate the DNS Cache Acceleration license, as described in *Licensing Requirements*.
2. Enable the DNS service and the DNS Cache Acceleration service, as described in *Enabling the DNS Cache Acceleration Service* and *Enabling the DNS Service*.

Licensing Requirements

IB-4030 or IB-4030-10GE DNS cache acceleration service requires a **DNS Cache Acceleration** license. The IB-4030 and IB-4030-10GE support three tiers of **DNS Cache Acceleration** licenses. These licenses enable DNS caching and control DNS queries per second performance on the appliance. The Tier-2 and Tier-3 licenses enable the appliance to process up to 300K and 600K qps (queries per second) respectively. The Tier-1 license enables the appliance to perform at its full capacity of 1 million queries per second.
You can install either a temporary or a permanent license on the appliance. The temporary license provides a 60 days free trial for up to one million queries per second. You can upgrade a temporary license to any of the permanent **DNS Cache Acceleration** license on the appliance using either Grid Manager or the CLI.
Note that a lower tier license cannot be added for DNS cache acceleration when a higher tier permanent license is installed. You can add a lower tier license if a temporary license exists. You cannot downgrade any permanent DNS cache acceleration license from a higher tier license to a lower tier license. For more information about the different tier licenses, contact your Infoblox representative.
The appliance displays a warning message if the DNS cache acceleration utilization exceeds a predefined threshold. You can configure the appliance for various levels of performance based on your current license type.
The system restarts automatically when you install the license or upgrade it to a higher tier. For more information about adding and upgrading licenses through Grid Manager, refer to the *Infoblox NIOS Administrator Guide*.
You can also use the CLI command set license to apply a permanent license or the set temp_license command to add a temporary license. For more information about the CLI command, refer to the *Infoblox CLI Guide*.

Configuring DNS Cache Acceleration

To achieve optimal DNS query resolution performance, ensure that the switching infrastructure surrounding the IB-4030 or IB-4030-10GE can handle high performance gigabit ethernet traffic load. Efficient IB-4030 or
IB-4030-10GE operation requires switches with adequate memory buffer capacity and support for 1000Base-TX full duplex operation.

Note: Operation of the DNS caching features requires a **DNS Cache Acceleration** license. For information, see *Licensing Requirements*.

The DNS service and the DNS cache acceleration service are disabled by default on NIOS appliances. They must be enabled after adding the appliance to the network. For information, see *Enabling the DNS Cache Acceleration Service* and *Enabling the DNS Service*.

Enabling the DNS Cache Acceleration Service

Note: You can select to start the DNS Cache Acceleration Service first. Should you do so, the appliance will also start the DNS service and display a notification that it is doing so.

To enable the DNS cache acceleration service on the IB-4030 or IB-4030-10GE, do the following:

1. From the **Grid** tab, select the **Grid Manager** tab and click **DNS Cache Acceleration**.
2. Select the *Grid_member* check box for the appliance.
3. Click the Start icon to activate the DNS Cache Acceleration service on the appliance.
   To disable DNS Cache Acceleration Service: click the Stop icon.

If the IB-4030 or IB-4030-10GE is an independent appliance, do the following:

1. From the **System** tab, select the **System Manager** tab and click **DNS Cache Acceleration**.
2. Click the Start icon to activate the DNS cache acceleration service on the appliance.

Note: The appliance displays a warning message if the average DNS cache acceleration utilization rate exceeds 85%.

Enabling the DNS Service

Note: The DCA (DNS Cache Acceleration) service is dependent upon the DNS service. Thus, when you start the DCA service, the DNS service will start automatically. However, if you start the DNS service first, you must start the DCA service separately. When both services are running on an appliance and you want to stop both services, you can select to stop the DCA service first and then stop the DNS service. If you stop only the DCA service, the DNS service will continue to run. In the same situation when both services are running and you stop the DNS service first, then the DCA service will stop automatically.

To enable the DNS name resolution service for an installed IB-4030 or IB-4030-10GE appliance in an Infoblox Grid:

1. From the **Grid** tab, select the **Grid Manager** tab, ensure that DNS is currently selected and select the *Grid_member* check box.
2. Click the Start icon to activate the DNS service on the appliance. To disable DNS, click the Stop icon.
3. Save the configuration and click **Restart** when it appears at the top of the screen.

If the appliance is an independent appliance for the network, do the following:

1. From the **System** tab, select the **System Manager** tab, ensure that DNS is currently selected and select the *Grid_member* check box.
2. Click the Start icon to activate the DNS service on the appliance. To disable DNS, click the Stop icon.
3. Save the configuration and click **Restart** if it appears at the top of the screen.

Specifying Grid-Level DNS Cache Acceleration Settings

Each DNS response cached in the IB-4030 or IB-4030-10GE appliance has its own TTL (Time-To-Live) value. For example, entering a value of 3599 seconds (1 hour-1 second) ensures that the appliance caches all DNS responses with a defined TTL of one hour (3600 seconds) or greater. All DNS responses with TTL values of 3599 seconds or less will not be cached by the appliance, and will instead be cached by non-accelerated cache server.
To specify Grid DNS cache acceleration settings:

1. From the **Data Management** tab, select the **DNS** tab, expand the Toolbar and click **Grid DNS Properties.**
2. In the *Grid DNS Properties* editor, click **DNS Cache Acceleration**.
3. By default, the **Don't Cache Records with TTL Less Than...** setting defaults to a value of One (1) second. The maximum permissible value is 65000 seconds (slightly over 18 hours).
4. Enter the new TTL value in the **Don't Cache Records with TTL Less Than...** field.
5. Save the configuration and click **Restart** to restart services.

Specifying Member-Level DNS Cache Acceleration Settings

The TTL setting on the Member page applies only to an independent appliance.
You select the **Override** option to modify the TTL cache setting for the appliance. By doing so, the new caching value supersedes the value

specified at the Grid level. If you select the Override option and do nothing else, the appliance inherits its settings from the Grid.
To specify DNS Cache Acceleration settings for the member:

1. From the **Data Management** tab, select the **DNS** tab -> **Members** tab -> *member* check box.
2. Click **Edit**.
3. In the *Member DNS Properties* editor, click **DNS Cache Acceleration**.
4. By default, the **Don't Cache Records with TTL Less Than...** setting is defined to inherit its value from the global Grid setting. The **Overr ide** button is associated with this field.
5. To modify the TTL value, click **Override**. The field is enabled and the button changes to **Inherit**.
6. Enter the new TTL value in the **Don't Cache Records with TTL Less Than...** field. The maximum permissible value for this setting is 65000 seconds (slightly over 18 hours).
7. To use the caching TTL value used across the Grid, click **Inherit**. The button changes to **Override** and the field is disabled.
8. Save the configuration.

Supported Features for IB-4030 and IB-4030-10GE

The IB-4030 and IB-4030-10GE support the following features:

- *Managing Query Performance*
- *Using Unbound DNS Resolution*

Preserving the RRset Order for Cached DNS Responses

- *Defining Sort List for Cached DNS Responses*
- *Configuring Multi-Interface Networks*
- *Clearing DNS Cache*
- *Configuring Forward and Stub Zones*
- *Infoblox DNS Firewall*
- *VLAN Tagging support*
- *DSCP support*

Managing Query Performance

The IB-4030 or IB-4030-10GE appliance is configured by default to serve up to 1,000 concurrent clients that serve recursive queries. To improve query performance for the appliance, Infoblox recommends that you increase this setting to 40,000 concurrent clients.

1. From the **Data Management** tab, select the **DNS** tab and click the **Members** tab -> *member* check box -> Edit icon.
2. In the *Member DNS Properties* editor, click **Toggle Advanced Mode**.
3. When the additional tabs appear, click the **Advanced** subtab of the **Queries** tab.
4. Select the **Limit number of recursive clients to** option and enter the value **40000**.
5. Save the configuration and click **Restart** if it appears at the top of the screen.

Using Unbound DNS Resolution

You now have the ability to switch between BIND or Unbound resolvers on IB-4030-10GE appliances. Following are a couple scenarios for which you may consider using Unbound DNS resolution:

- To maintain optimum query performance in networks that have lower CHR (Cache Hit Ratio). For more information about CHR, see *DNS Statistics for Cache Acceleration*.
- To temporarily switch from BIND to Unbound when you encounter an unresolved vulnerability in BIND. Upon resolution of the vulnerability, you can switch back to BIND. For information about how to switch from BIND to Unbound and vice versa, see *Configuring D NS Resolver Type*.

To use Unbound DNS, you must install the **Dual Engine DNS** license (in addition to the **DNS Cache Acceleration** license) on your IB-4030-10GE appliance. Contact your Infoblox representative to obtain these licenses. For information about how to install licenses, refer to the *I nfoblox NIOS Administrator Guide*.

Note: When the **Dual Engine DNS** license (either temporary or permanent) expires, you will not be able to change the resolver type from Unbound to BIND. You must install a permanent license or extend the current license in order to change the resolver type.

When you use Unbound as the DNS resolver, the appliance acts as a recursive-only name server. Before you use Unbound DNS resolution, ensure that you understand some of the limitations and ramifications. For more information, see *Best Practices for Configuring Unbound DNS*.

Best Practices for Configuring Unbound DNS

Following are some guidelines for consideration before you use Unbound as the DNS resolver:

- When you configure your IB-4030-10GE to use Unbound DNS, it acts as a recursive-only name server and some of the NIOS features are not supported. For a list of unsupported features, see *Unsupported NIOS Features for Unbound DNS*.
- In general, for all unsupported NIOS features for Unbound DNS, their corresponding functions and tabs do not appear in Grid Manager. However, this might not hold true in a Grid when Unbound is configured for only one member and there are other members not configured for Unbound. In this case, you might still be able to see some of the unsupported tabs and functions through Grid Manager.
- Unbound DNS supports only the default DNS view; it does not support other user-defined DNS views that are supported by BIND. When you switch from BIND to Unbound, the appliance falls back to the default DNS view configuration.
- You must restart DNS service each time you switch between Unbound and BIND in order for the configuration to take effect. Switching between Unbound and BIND might cause some service interruptions.
- Query results could be different when using BIND versus Unbound. For example, when you query the auto created zone "0.0.127.in-addr.arpa," query results for BIND and Unbound are as follows:
  BIND:
    ```
    ;; ANSWER SECTION:
    0.0.127.in-addr.arpa. 3600 IN SOA cluster. please_set_email.absolutely.nowhere. 2 10800 3600
    604800 3600
    ```
  UNBOUND:
    ```
    ;; AUTHORITY SECTION:
    127.in-addr.arpa. 10800 IN SOA localhost. nobody.invalid. 1 3600 1200 604800 10800
    ```

For more information about Unbound specifications and how it works, refer to the Unbound documentation at *https://www.unbound.net/documentation/index.html*.

- There might be a few known general issues when configuring Unbound DNS resolution. Refer to the latest version of the NIOS 7.2.x release notes to review these issues.

Configuring DNS Resolver Type

To use Unbound as the DNS resolver:

1. Ensure that you have the **Dual Engine DNS** license installed on the appliance.
2. From the **Data Management** tab, select the **DNS** tab -> **Members** tab -> *member* check box -> Edit icon.
3. In the *Member DNS Properties* editor, click **Toggle Advanced Mode**.
4. When the additional tabs appear, click the **General** tab -> **Advanced** tab.
5. In the DNS Resolver Type section, select **Unbound**. To use the standard DNS resolution, select **BIND**. Note that when you switch between **Unbound** and **BIND**, the appliance preserves all relevant configurations.
6. Save the configuration and click **Restart** to restart DNS service.

Note: You must restart DNS service for the configuration to take effect.

Unbound DNS Logging

Logging is available when you select Unbound as the DNS resolver. However, the format and severity levels are different than that of the standard DNS logging. You can select the severity level for Unbound DNS logging, but you cannot configure logging facilities and categories—these functions will not be displayed in Grid Manager.
To configure the severity level for Unbound DNS logging:

1. From the **Data Management** tab, select the **DNS** tab -> **Members** tab -> *member* check box -> Edit icon.
2. In the *Member DNS Properties* editor, click **Toggle Advanced Mode**.
3. When the additional tabs appear, click the **Logging** tab -> **Basic** tab.
4. From the Logging Severity drop-down list, select one of the following:
    - **Cache Misses**: Logs client identification for missed caches.
    - **Algorithm**: Logs information at the algorithm level.
    - **Query**: Logs information at the query level.
    - **Detailed Operations**: Logs detailed information for operations.
    - **Errors Only**: Logs errors only.

      Note: The default is **Detailed Operations**. Infoblox highly recommends that you keep the default setting or select **Errors Only**. Selecting other options might result in large log files, which could possibly affect your system performance.

5. Save the configuration and click **Restart** to restart DNS service.

Unsupported NIOS Features for Unbound DNS

When you configure your appliance to use Unbound as the DNS resolver, the IB-4030-10GE acts as a recursive-only name server and some of the NIOS features are not supported. As a result, corresponding tabs and functions for these features do not appear in Grid Manager when Unbound DNS is configured. *Table 4* lists NIOS features that are not supported for Unbound DNS.

Note: In the default DNS view, certain unsupported features are displayed in Grid Manager and you can configure these features for members that are not using Unbound DNS resolution.

Table 4 Unsupported Features for Unbound DNS

Unsupported features	Notes
Authoritative name server and all related functions	Unsupported features include but are not limited to DNS64, AAAA filtering, DDNS updates, notify source and delay, slave mode, wildcard, bulk hosts, IP blocks/IP block groups, and DNS zone transfers. Unbound DNS supports forward and stub zones.
Security related features	Some security related features are not supported. They include the following: DNS blackhole lists, DNS blacklist rulesets, GSS-TSIG, enabling and disabling accept-expired-signature for DNSSEC (other aspects of DNSSEC are supported, such as trust anchors and negative trust anchors), NXDOMAIN mitigation/RRL (Response Rate Limiting), recursive client limits, recursive client SNMP traps, and Infoblox DNS Firewall (RPZ). **Note:** The **TSIG Key** menu item remains in the Queries and Recursive Queries tables even though it is not supported for Unbound DNS.
UDP source port configuration	Port configuration and network settings are automatically switched between Unbound DNS and standard DNS when you change the DNS resolution configuration.
DNS requests through a single TCP session	This is not supported for Unbound DNS even though this option might appear in the *Member Security Properties* editor of the Grid Manager when Unbound is configured for the member.
DNS views	User-defined DNS views are not supported. Unbound DNS supports only the default DNS view.
Logging	DNS query logging and DNS response logging are not supported. Logging format and severity levels for Unbound DNS are different than that of the standard DNS. For more information, see *Unbound DNS Logging.*
Reporting	The *DNS Replies Trend* report is the only supported report for Unbound DNS. Also, the *DNS Response Latency Trend* report periodically queries against the DNS server to determine latency and is not affected by Unbound DNS. All other reports that do not support Unbound are still available and include data from members running standard DNS. However, they do not collect data from members using Unbound DNS. For information about reports for IB-4030-10GE, see *Reports for IB-4030 and IB-4030-10GE.*
RRset order	This is not supported. For information about this feature, see *Preserving the RRset Order for Cached DNS Responses.*
Sort list	This is not supported. For information about this feature, see *Defining Sort List for Cached DNS Responses.*
HSM group status and traps	Although HSM groups are not supported, the HSM event type remains visible in the **Notifications** tab of the *Grid Member Properties* editor.
Other DNS features	The following DNS enhancements are not supported: DNS query capture, disabling EDNS0 (Extension Mechanism for DNS), DNS Traffic Control, and HA mode transition optimizations.

Configuring Hostname and Server ID Options for Unbound DNS

Unbound DNS supports the configuration of hostname bind directive and server-id directive options, which enables the appliance to return the hostname of the answering DNS name server in response to queries from clients in a DNS anycast configured environment. For information about how to configure the hostname bind directive and server-id directive options, refer to the **Configuring Hostname and Server ID Options** section in the *Infoblox NIOS Administrator Guide*.

Note: Even though you can configure both hostname bind directive and server-id directive options, Unbound DNS ignores the hostname bind directive setting and considers only the server-id directive setting.

Preserving the RRset Order for Cached DNS Responses

By default, when a client queries a domain name, the DNS caching appliance returns the A and AAAA records of the domain name in the cyclic order. However, this default behavior can be overridden if you have enabled and configured (at the Grid level) fixed RRset order for hosts that have multiple addresses. When you override the default behavior and preserve the fixed RRset order for cached DNS responses, the DNS caching appliance returns A and AAAA records associated with domain names in the order they were received from an upstream server. You can specify the fixed RRset order for A, AAAA, or both A and AAAA records at the Grid level and override at the member and DNS view levels. Note that configuring fixed RRset order for specific FQDNs might slightly affect the performance of the DNS caching appliance.

To preserve the fixed RRset order for cached DNS responses at the Grid, member, or DNS view level:

1. **Grid**: From the **Data Management** tab -> **DNS** tab, expand the Toolbar, and then click **Grid DNS Properties.**
   Member: From the **Data Management** tab, select the **DNS** tab and click the **Members** tab -> *member* check box -> Edit icon.
   DNS View: From the **Data Management** tab, select the **DNS** tab -> **Zones** tab -> *dns_view* check box -> Edit icon.
2. In the editor, select the **RRset Order** tab -> click the **Basic** tab, and then complete the following:
   - **Enable fixed RRset order for following FQDNs:** Select this check box to preserve the configuration of RRset order for cached DNS responses.
   - In the FQDN table, specify the list of FQDN entries for which you want to preserve the RRset order. Note that you can configure a maximum of 25 FQDNs for the specified RRset order.
     You can click the Add icon and complete the following to add a new entry to the list:
     - **FQDN:** Enter the fully qualified domain name with which the A or AAAA record is associated.

       Note: If you enter a wildcard character as part of the domain name, the appliance considers the wildcard character as a literal character. For example, if you enter test*.com, the appliance matches the domain name with test*.com only.

     - **Record Type:** Select the record type from the drop-down list. You can select **A**, **AAAA**, or **Both A and AAAA**.
3. Save the configuration and click **Restart** if it appears at the top of the screen.

Defining Sort List for Cached DNS Responses

You can define a sort list for the cached DNS responses on the appliance to prioritize A and AAAA records on certain networks, sorting them to the beginning of the list in the response. For example, you can define a sort list when a recursive server has two interfaces and you want the DNS clients to prefer one interface because it has a faster link. You can define sort lists for the cached DNS responses on the appliance, regardless of whether DNS cache acceleration license is installed or not.

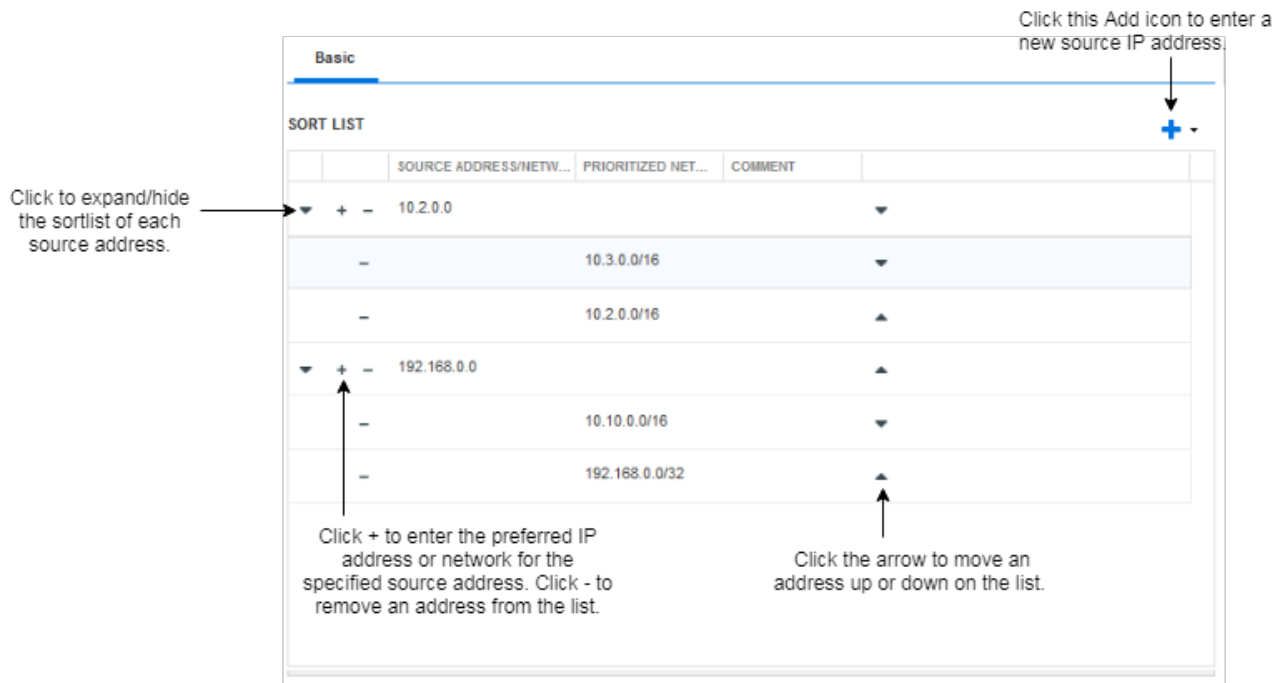Consider the following when the DNS cache acceleration license is installed on the appliance:

- Authoritative and stub zones are not supported by the appliance. Hence, sort lists are supported only for recursive caching.
- You can define up to 200 sort lists with a maximum of 50 IP addresses per sort list.
- A DNS view cannot be associated with the appliance if the DNS view has more than 200 sort lists or more than 50 IP addresses per sort list configured.

Note: If more than 200 sort lists or more than 50 IP addresses per sort list are configured for the cached DNS responses, you cannot upgrade the appliance to a later release.

When both RRset order and sort list are defined for cached DNS responses, the appliance sorts the responses based on the RRset order first, and then sorts based on the sort list. For information about preserving the RRset order for cached DNS responses, see *Preserving the RRset Order for Cached DNS Responses*. Note that defining sort lists for the cached DNS responses might have a performance impact on DNS caching.

To define a sort list for a Grid, member, or DNS view:

1. **Grid:** From the **Data Management** tab, select the **DNS** tab, expand the Toolbar and click **Grid DNS Properties.**
   Member: From the **Data Management** tab, select the **DNS** tab > **Members** tab -> *member* check box -> Edit icon.
   DNS View: From the **Data Management** tab, click the **DNS** tab -> **Zones** tab> *dns_view* check box -> Edit icon.
   To override an inherited property, click **Override** next to it and complete the appropriate fields.
2. In the editor, click **Toggle Advanced Mode**, and then click **Sort List**.
3. Click the Add icon and select either **Any** to define a sort list for any address and network, or **Address/Network** to define a sort list for a particular source IP address or network.
4. Do the following in the new row:
   - If you selected **Address/Network**, enter the IP address or network of the source of the query. The feature supports IPv4 or IPv6 values.
   - Click the Add icon beside the source IP address to add the preferred IP addresses or networks for the source. You can add as many IP addresses as necessary. However, if the DNS Cache Acceleration license is installed on the appliance, you can add a maximum of 50 IP addresses per sort list. When you add multiple IP addresses, you can change the order of the IP addresses. Select an IP address and drag it to its new position, or click the up or down arrow, as show in *Figure 1.*

Figure 1. Sort List

Click this Add icon to enter a new source IP address.

Click to expand/hide the sortlist of each source address.

Click + to enter the preferred IP address or network for the specified source address. Click - to remove an address from the list.

Click the arrow to move an address up or down on the list.

5. Enter the IP address or network in the **Prioritized Networks** field.
6. You can add additional information about the source address or network in the **Comment** field.
7. To add another source IP address or network, click the Add icon again. You can create a separate sort list for each source IP address or network. Note that if the DNS Cache Acceleration license is installed on an IB-4030 or IB-4030-10GE appliance, you can configure a maximum of 200 sort lists.
8. Save the configuration and click **Restart** if it appears at the top of the screen.
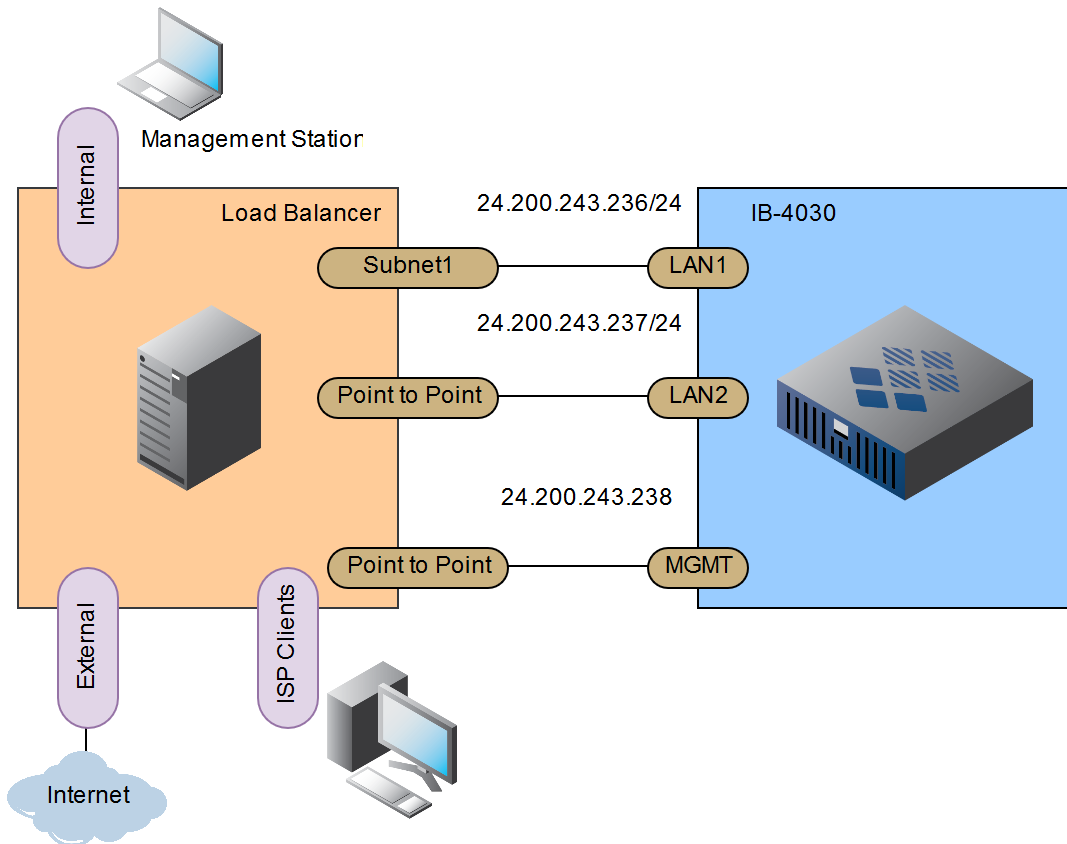
Configuring Multi-Interface Networks

The IB-4030 and IB-4030-10GE are high performance appliances capable of achieving over 1M qps performance. To configure LAN1, LAN2 and MGMT interfaces to the same IPv4 or IPv6 subnet, provide the same netmask for IPv4, or a CIDR prefix for IPv6, as the LAN1 interface. The appliance can replace three DNS cache servers that are active on the same network.

Note: If the LAN1 interface fails, the outgoing traffic will not be re-directed to any other interface and access to LAN2 and MGMT also fails.

Queries cached in an accelerator receive responses from the same port the query arrived on. These DNS queries are resolved at the acceleration layer of the IB-4030 or IB-4030-10GE without server interaction.
Figure 2 shows an IB-4030 or IB-4030-10GE appliance behind a load balancer and the usage of three interfaces, LAN1, LAN2 and MGMT, to support DNS requests. The three interfaces are configured on the same subnet using the /24 netmask.

Figure 2. Multiple Interfaces Configured on the Same Subnet on an IB-4030 or IB-4030-10GE Appliance

Management Station

Internal

Load Balancer

24.200.243.236/24

IB-4030

Subnet1 — LAN1

24.200.243.237/24

Point to Point — LAN2

24.200.243.238

Point to Point — MGMT

External

ISP Clients

Internet

To configure multiple interfaces on the same subnet on an IB-4030 or IB-4030-10GE appliance:

1. From the **Grid** tab, click the **Grid Manager** tab -> **Members** tab -> *member* check box, and then click **Edit**.
2. In the *Grid Member Properties Editor*, click **Toggle Advanced Mode**.
3. When the additional tabs appear, click the **Basic** subtab of the **Network** tab.
4. **Required Ports and Addresses:** Enter information for the interfaces. Some fields are pre-populated by Grid Manager based on the existing configuration of the appliance. All fields are required. Click the empty fields and complete the following information:
   - **Interface:** Displays the name of the interface. You cannot modify this.
   - **Address:** Displays the IP address of the LAN1 port. You can apply an IPv4 and IPv6 address for the network settings. Ensure that you know the gateway IP address for either protocol type.
   - **Subnet Mask (IPv4) or Prefix Length (IPv6):** Displays the subnet mask for IPv4 address and the prefix length for IPv6 address of the LAN1 port.
   - **Gateway:** Displays the IP address of the gateway of the subnet on which the LAN1 port is set.
   - **VLAN Tag**: Displays the VLAN tag ID if the port is configured for VLANs. You can enter a number from 1 to 4095.
   - **Port Settings:** The default value is **Automatic**. Select the port settings from the drop-down list. The list contains all settings supported by the hardware model. The appliance automatically detects port settings.
   - **DSCP Value:** Displays the Grid DSCP value. To modify, click **Override** and enter the DSCP value. You can enter a value from 0 to 63.
5. **Enable Port Redundancy on LAN1/LAN2:** Select this check box to allow port failover between LAN1 and LAN2. Based on the port configuration, one port remains inactive during operation, available for failover operation should the primary port stop working.For more information about port redundancy, refer to the *Infoblox NIOS Administrator Guide*.
6. **Additional Ports and Addresses:** Click the Add icon and select the additional port that you want to configure:
   - **MGMT (IPv4):** Select this to configure IPv4 address for MGMT port. Note that the Infoblox-4030 appliance supports a /32 configuration for IPv4 on MGMT and supports multi-interface only when both LAN1 and MGMT are on the same subnet.
   - **MGMT (IPv6):** Select this to configure IPv6 address for MGMT port. Note that Infoblox-4030 appliance supports a /128 prefix configuration for IPv6 on MGMT and supports multi-interface only when both LAN1 and MGMT are on the same subnet.
   - **LAN2 (IPv4):** Select this to configure IPv4 address for the LAN2 port for DHCP or DNS. Note that Infoblox-4030 appliance supports a /32 configuration for IPv4 on LAN2 and supports multi-interface only when both LAN1 and LAN2 are on the same subnet.
   - **LAN2 (IPv6):** Select this to configure IPv6 address for the LAN2 port for DHCP or DNS. Note that Infoblox-4030 appliance supports a /128 prefix configuration for IPv6 on LAN2 and supports multi-interface only when both LAN1 and LAN2 are on the same subnet.
   - **Additional Address (loopback) (IPv4)**: Select this to add a non-anycast IPv4 address to the loopback interface. Note that you can configure this for IPv4 and dual mode Grid member.
   - **Additional Address (loopback) (IPv6)**: Select this to add a non-anycast IPv6 address to the loopback interface. Note that you can configure this for IPv6 and dual mode Grid member.
   - **LAN1 (VLAN) (IPv4)**: Select this to add a VLAN to the LAN1 interface. You can add up to 10 IPv4 VLAN addresses. Note that you can configure this for IPv4 and dual mode Grid member. This feature is currently supported on the following Infoblox

appliances: Trinzic 1405, 1410, 1415, 1420, 1425, 2205, 2210, 2215, 2220, 2225, 4005, Infoblox-4010, Infoblox-4030-Rev1, Infoblox-4030-Rev2, Infoblox-4030-10GE, PT-1400, PT-1405, PT-2200, PT-2205, PT-4000, PT-4000-10GE, CP-VM-800, CP-VM-1400, and CP-VM-2200. It is also supported on all the Trinzic virtual appliances. VLAN tagging is not supported on TE-100, TE-805, ND-805, TR-805, TE-810, TE-815, TE-820, and TE-825.

- **LAN1 (VLAN) (IPv6)**: Select this to add a VLAN to the LAN1 interface. You can add up to 10 IPv4 and 10 IPv6 VLAN addresses. Note that you can configure this for IPv6 and dual mode Grid member. This feature is currently supported on the following Infoblox appliances: Trinzic 1405, 1410, 1415, 1420, 1425, 2205, 2210, 2215, 2220, 2225, 4005, Infoblox-4010, Infoblox-4030-Rev1, Infoblox-4030-Rev2, Infoblox-4030-10GE, PT-1400, PT-1405, PT-2200, PT-2205, PT-4000, PT-4000-10GE, CP-VM-800, CP-VM-1400, and CP-VM-2200. It is also supported on all the Trinzic virtual appliances. VLAN tagging is not supported on TE-100, TE-805, ND-805, TR-805, TE-810, TE-815, TE-820, and TE-825.
- **LAN2 (VLAN) (IPv4)**: Select this to add a VLAN to the LAN2 interface. You can add up to 10 IPv4 VLAN addresses. Note that you can configure this for IPv4 and dual mode Grid member. This feature is currently supported on the following Infoblox appliances: Trinzic 1405, 1410, 1415, 1420, 1425, 2205, 2210, 2215, 2220, 2225, 4005, Infoblox-4010, Infoblox-4030-Rev1, Infoblox-4030-Rev2, Infoblox-4030-10GE, PT-1400, PT-1405, PT-2200, PT-2205, PT-4000, PT-4000-10GE, CP-VM-800, CP-VM-1400, and CP-VM-2200. It is also supported on all the Trinzic virtual appliances. VLAN tagging is not supported on TE-100, TE-805, ND-805, TR-805, TE-810, TE-815, TE-820, and TE-825.
- **LAN2 (VLAN) (IPv6)**: Select this to add a VLAN to the LAN2 interface. You can add up to 10 IPv6 VLAN addresses. Note that you can configure this for IPv6 and dual mode Grid member. This feature is currently supported on the following Infoblox appliances: Trinzic 1405, 1410, 1415, 1420, 1425, 2205, 2210, 2215, 2220, 2225, 4005, Infoblox-4010, Infoblox-4030-Rev1, Infoblox-4030-Rev2, Infoblox-4030-10GE, PT-1400, PT-1405, PT-2200, PT-2205, PT-4000, PT-4000-10GE, CP-VM-800, CP-VM-1400, and CP-VM-2200. It is also supported on all the Trinzic virtual appliances. VLAN tagging is not supported on TE-100, TE-805, ND-805, TR-805, TE-810, TE-815, TE-820, and TE-825.

    When you select **Additional Address (loopback) (IPv4)**, or **Additional Address (loopback) (IPv6)** you can only enter the IP address you want to add to the loopback interface. You cannot configure the subnet mask, prefix length, gateway, or port settings.
    Complete the following:
- **Interface**: Displays the name of the interface. You cannot modify this.
- **Address:** Type the IPv4 or IPv6 address depending on the type of interface. An IPv6 address is a 128-bit number in colon hexadecimal notation. It consists of eight 16-bit groups of hexadecimal digits separated by colons (example: 2001:db8:0000:0123:4567:89ab:0000:cdef or 2001:db8::123:4567:89ab:0:cdef). For Infoblox-4030 appliance, use a /128 CIDR for IPv6 while configuring multiple interfaces.
- **Subnet Mask (IPv4) or Prefix Length (IPv6):** Specify an appropriate subnet mask for IPv4 interface or prefix length for IPv6 interface. The prefix length ranges from 2 to 127. Note that the Infoblox-4030 supports the same netmask as the LAN1 interface or a /128 prefix. You cannot configure subnet mask or prefix length for Additional Address (loopback) (IPv4) and Additional Address (loopback) (IPv6).
- **Gateway:** Type the IPv4 or IPv6 address of the default gateway depending on the type of interface. For IPv6 interface, you can also type **Automatic** to enable the appliance to acquire the IPv6 address of the default gateway and the link MTU from router advertisements. You cannot configure gateway for Additional Address (loopback) (IPv4) and Additional Address (loopback) (IPv6).
- **VLAN Tag**: For a VLAN, enter the VLAN tag or ID. You can enter a number from 1 to 4094. Ensure that you configure the corresponding switch accordingly.
- **Port Settings:** From the drop-down list, choose the connection speed that you want the port to use. You can also choose the duplex setting. Choose **Full** for concurrent bidirectional data transmission or **Half** for data transmission in one direction at a time. Select **Automatic** to instruct the NIOS appliance to negotiate the optimum port connection type (full or half duplex) and speed with the connecting switch automatically. This is the default setting. You cannot configure port settings for vNIOS appliances.
- **DSCP Value**: Displays the Grid DSCP value, if configured. To modify, click **Override** and enter the DSCP value. You can enter a value from 0 to 63.
7. Save the configuration and click **Restart** if it appears at the top of the screen.

Guidelines for Configuring Multiple Interfaces

- You have to configure a LAN1 interface for IPv6 prior to the LAN2 and MGMT IPv6 configuration. This ensures that LAN2 and MGMT reside on the same subnet as LAN1.
- You can configure the MGMT interface using CLI commands. However, LAN2 can be configured only through Grid Manager.
- The MGMT and LAN2 IP addresses (IPv4 or IPv6) must be the same as the IP subnet of the LAN1 interface. The appliance verifies the MGMT and LAN2 IP address with the LAN1 netmask or prefix and displays an error message if there is a mismatch.
- You can use the link-local address as the default gateway only for the LAN1 and LAN2 interfaces.

Clearing DNS Cache

The IB-4030 or IB-4030-10GE appliance allows you to clear certain information from the DNS cache. You can do the following:

- *Clearing DNS Cache*
- *Clearing Cache for DNS Views*
- *Clearing Domains and Subdomains from DNS Cache*

The appliance saves audit log entries for all the three clear cache operations. For information about audit logs, refer to the *Infoblox NIOS Administrator Guide.*

Clearing DNS Cache

On the IB-4030 or IB-4030-10GE appliance, you can clear all entries from the accelerator cache and the name server recursive cache.
To clear DNS cache:

1. From the **Data Management** tab, select the **DNS** tab -> **Members** tab -> *member* check box.
2. Expand the Toolbar, click **Clear** -> **Clear DNS Cache**.
3. Click **Yes** in the confirmation dialog box to clear DNS cache.

Clearing Cache for DNS Views

This feature clears cache entries of a specific DNS view that is associated with the selected member. To clear cache of a DNS view:

1. From the **Data Management** tab, select the **DNS** tab -> click the **Members** tab.
2. Expand the Toolbar, click **Clear** -> **Clear View's Cache**.
3. Specify the following in the *Clear View's Cache* dialog box:
   - **Member**: Click **Select Member** to select a member. If there are multiple members, the *Member Selector* dialog box is displayed, from which you can select a member. Click the required member name in the dialog box. You can also click **Clear** to clear the displayed member and select a new one.
   - **DNS View**: Select a DNS view from the drop-down list. This list box appears only when there are multiple DNS views in the network view.
   - Click **Clear Cache** to clear the cache entries of the corresponding DNS View.

Clearing Domains and Subdomains from DNS Cache

You can use this feature to clear specific domain and its subdomains from the DNS cache. To clear a domain name:

1. From the **Data Management** tab, select the **DNS** tab -> click the **Members** tab.
2. Expand the Toolbar, click **Clear** -> **Clear Domain Name**.
3. Specify the following in the *Clear Domain Name from Cache* dialog box:
   - **Domain Name**: Enter a domain name you want to delete.
   - **Clear entire domain (including subdomains):** Select the check box to clear the specified domain and its subdomains from the DNS cache. For example, if you enter corp100.com in the **Domain Name** field, then selecting this check box clears the entire domain including its subdomains such as www.xyz.com, xyz.com, x.xyz.com, etc. This check box is deselected by default.
   - **Member**: Click **Select Member** to select a member. If there are multiple members, the *Member Selector* dialog box is displayed, from which you can select a member. Click the required member name in the dialog box. You can also click **Clear** to clear the displayed member and select a new one.
   - **DNS View**: Select a DNS view from the drop-down list. This list box appears only when there are multiple DNS views in the network view.
   - Click **Clear Domain Name** to clear the domain name from the cache.

Viewing the DNS Accelerator Cache

You can view the cached contents of the DNS accelerator. The NIOS appliance temporarily disables the cache to obtain the current cache data. During this time, the non-accelerated name server on the appliance responds to all incoming DNS queries. Depending on the size of the cached data, it may take 40-50 seconds to compile information before the cache is re-activated.
Your browser may need to be set to allow popup windows from the IP address of the appliance.

The DNS Cache Acceleration processes incoming EDNS0 packets that contains the local ID, matches it with the DNS server as part of the RADIUS accounting message and populates the subscriber cache in DNS Cache Acceleration with the parental control policy information. For more information, refer *Configuring Infoblox Subscriber Insight and Subscriber Policy Enforcement*.

The cache data appears in plain text format, showing the following DNS response information:

- DNS View Number (0-5)
- Query question,Query type, and Query class
- Original TTL in seconds
- Remaining TTL in Seconds
- Cache Entry Usage Count
- Number of Seconds since the cache entry was last addressed
- Recursion
- Resource Record section, Type, Name, TTL, and Data
- Rcode indicates Response Code and displays 0 if there are no errors.
- Debug<1> and Debug<2> codes are used for debug purpose.
- PCP word - valid for subscriber services.

- Data based on the type of resource record(s) attached to the response:
    - A type and AAAA Filtered – IP address
    - CNAME, SOA, PTR – Domain Name
    - MX – Preference, Domain Name

To view the contents of the DNS Accelerator's cache, do the following:

1. From the **Data Management** tab, select the **DNS** tab and click the **Members** tab -> *member* check box.
2. Choose **View** -> **View Acceleration Cache**.
3. Click **Yes** in the *View Acceleration Cache* dialog.
   The system displays a *File Download was Successful* message and the cache data is displayed in table format in a new browser tab or browser window.

Configuring Forward and Stub Zones

You can configure forward and stub zones on an IB-4030 or IB-4030-10GE appliance. A forward zone is where queries are sent before being forwarded to other remote name servers. A stub zone contains records that identify the authoritative name servers in another zone. For information about configuring forward and stub zones, refer to the **Configuring Delegated, Forward, and Stub Zones** section in the *Infoblox NIOS Administrator Guide*.

Infoblox DNS Firewall

Infoblox DNS Firewall employs DNS RPZ (Response Policy Zones), a technology developed by ISC (Internet System Consortium) for allowing reputable sources to dynamically communicate reputation domain names so you can implement policy controls for DNS lookups.
You can configure RPZs on an IB-4030 or IB-4030-10GE member and define RPZ rulesets to block DNS resolutions for malicious or unauthorized domain names. For information about Infoblox DNS Firewall, refer to the *Infoblox NIOS Administrator Guide*.
To configure Response Policy Zones, you must install a valid RPZ Enablement license.

Note: To downgrade an IB-4030 or IB-4030-10GE member that has RPZ license enabled to a version earlier than 6.7.0, you must first delete the RPZ license.

To configure local RPZ and RPZ feed, refer to the *Infoblox NIOS Administrator Guide*. You can assign an IB-4030 or IB-4030-10GE member that has DNS cache acceleration enabled as a Grid primary or secondary for the local RPZ. For an RPZ feed, you can assign an IB-4030 or IB-4030-10GE member as a Grid secondary or Grid lead secondary.
The Local RPZs or RPZ feeds do not support DDNS updates. For more information about RPZ rulesets, refer to the *Infoblox NIOS Administrator Guide*.

VLAN Tagging support
The IB-4030 or IB-4030-10GE appliance supports VLAN (Virtual Local Area Network) interfaces on LAN1, LAN2, and HA ports. Only the DNS service can listen on the VLAN interfaces. You can define default route on VLAN, LAN1 and LAN2 interfaces. For more information about configuring VLAN interface, refer to the **Configuring VLANs** section in the *Infoblox NIOS Administrator Guide*.
You can use the `set network` command to set the primary IPv4 and IPv6 LAN1 networks as a tagged or an untagged VLAN interface. To view the VLANs on each port, use the show interface command. The appliance allows you to use the VLAN interface from LAN1 to be used as an advertising interface for OSPF. For more information about VLAN, refer to the *Infoblox NIOS Administrator Guide*.

Limitations of VLAN on IB-4030 or IB-4030-10GE
Following are the limitations of VLAN interface on an IB-4030 or IB-4030-10GE appliance:

- The appliance does not support overlap of addresses or networks across VLANs.
- You cannot update member network properties when a scheduled upgrade is in progress.
- The appliance does not support SNMP interface statistics and traffic report statistics for accelerated DNS traffic over tagged VLANs as this may lead to performance overheads.

Enabling VLAN Support Using CLI Commands

You can use the set network command to set the primary IPv4 and IPv6 LAN1 networks as a tagged or an untagged VLAN interface.
Example:

```
Infoblox > set network
NOTICE: All HA configuration is performed from the GUI. This interface is
        used only to configure a standalone node or to join a Grid.
Enter IP address: 10.35.1.120
Enter netmask [Default: 255.255.0.0]: 255.255.0.0
Enter gateway address [Default: 10.35.0.1]: 10.35.0.1
Enter VLAN tag [Default: Untagged]: 110
Configure IPv6 network settings:
Enter IPv6 address [Default: 2620:10a:6000:2400::178]:
2620:010A:6000:2400:0000:0000:0000:6508
Enter IPv6 Prefix Length [Default: 64]: 64
```

```
Enter IPv6 gateway [Default: 2620:10a:6000:2400::1]:
2620:010A:6000:2400:0000:0000:0000:0001
Enter VLAN tag [Default: Untagged]: 110
NOTE: Configure of IPv4/IPv6 pure mode can be performed only via GUI.
Become grid member? (y or n):
```

You can execute the `show network` command to view the VLAN ID and tagged networks.
Example:

```
Infoblox > show network
Current LAN1 Network Settings:

     IPv4 Address:             10.35.1.154
     Network Mask:             255.255.0.0
     Gateway Address:          10.35.0.1
     VLAN Tag:                 Untagged
     IPv6 Address:             2620:10a:6000:2400::19a/64
     IPv6 Gateway Address:     2620:10a:6000:2400::1
     IPv6 VLAN Tag:            Untagged
     HA enabled:               false
     Grid Status:              Master of Infoblox Grid

Current Management Network Settings:

     Management Port enabled:        true
     Management IPv4 Address:        10.36.1.154
     Management Netmask:             255.255.0.0
     Management Gateway Address:     10.36.0.1
     Management IPv6 Address:        2620:10a:6000:2500::19a/64
     Management IPv6 Gateway Address:2620:10a:6000:2500::1
     Restrict Support and remote console access to MGMT port:    false

Current LAN2 Network Settings:

     LAN2 Port enabled:                     true
     NIC failover for LAN1 and LAN2 enabled: false
     LAN2 IPv4 Address:                     10.34.71.188
     LAN2 Netmask:                          255.255.255.0
     LAN2 Gateway:                          10.34.71.1
     LAN2 VLAN Tag:                         Untagged
     LAN2 IPv6 Address:                     2620:10a:6000:22a3::bc/64
     LAN2 IPv6 Gateway:                     2620:10a:6000:22a3::1
     LAN2 IPv6 VLAN Tag:                    Untagged
```

To view VLANs for each port, you can use the show interface command. It displays the VLAN ID, tagged networks, and additional IP addresses that are configured for the network.

```
Infoblox > show interface
LAN1:

     IP Address:  10.35.1.154      MAC Address: F4:87:71:00:07:05
     Mask:        255.255.0.0      Broadcast: 10.35.255.255
     MTU:         1500             Metric: 1
     IPv6 Address:        2620:10a:6000:2400::19a/64
     IPv6 Link:           fe80::f687:71ff:fe00:705/64
     IPv6 Status:         Enabled
     Negotiation: unknown
     Speed:       1000M            Duplex: Full
     Status:      UP BROADCAST RUNNING MULTICAST
     SFP Type:    Fiber SX
     SFP Model:   Finisar(FTLF8519P2BCL)

     Statistics   Information

      Received

         packets:  4715756 bytes:   287346518 (274.0 MiB)
         errors:   0        dropped: 549
         overruns: 0        frame:   0

     Transmitted

         packets:  21677    bytes:   15193301 (14.4 MiB)
```

```
            errors:   0          dropped: 0
            overruns: 0          carrier: 0

      Collisions:  0       Txqueuelen: 1000
```

It displays the VLAN details as follows:

```
LAN1 (VLAN Tag: 273):

      IP Address: 10.34.80.188 MAC Address: F4:87:71:00:07:05
      Mask: 255.255.255.0 Broadcast: 10.34.80.255
      MTU: 1500 Metric: 1
      IPv6 Address: 2620:10a:6000:22ac::bc/64
      IPv6 Link: fe80::f687:71ff:fe00:705/64
      IPv6 Status: Enabled
      Negotiation: unknown
      Speed: 1000M Duplex: Full
      Status: UP BROADCAST RUNNING MULTICAST

      Statistics Information

        Received

          packets:  2964        bytes: 159373 (155.6 KiB)
          errors:   0           dropped: 0
          overruns: 0           frame: 0

        Transmitted

          packets:  2272        bytes:   111809 (109.1 KiB)
          errors:   0           dropped: 0
          overruns: 0           carrier: 0

      Collisions: 0     Txqueuelen: 0

   Enter <return> for next page or q<return> to cancel the command.
```

You can use the **set default_route** command to specify an optional VLAN address and make it the default route. For more information about CLI commands, refer to the Infoblox CLI Guide.

DSCP support

The IB-4030 or IB-4030-10GE appliance supports the configuration of DSCP (Differentiated Services Code Point) value for LAN1, LAN2, HA, MGMT, and VLAN interfaces. When the IB-4030 or IB-4030-10GE appliance is a member of an Infoblox Grid, the DSCP value for all interfaces is inherited from the Grid and you can override the DSCP value at the member level and at interface level. When you configure the DSCP value at the Grid or member level, all outgoing IP traffic on all interfaces uses the same value.
You can set the DSCP value for the primary LAN1 interface using the set network CLI command. For information about the CLI command, refer to the *Infoblox CLI Guide*. The DSCP values for all other interfaces and VLANs must be set through Grid Manager. For more information about configuring DSCP value, refer to the **Configuring the DSCP Value** section in the *Infoblox NIOS Administrator Guide*. You can use the ping (-Q tos) and traceroute (-t tos) expert mode CLI commands, to prioritize all outgoing packets based on the DSCP value.

Configuring DSCP Value using CLI Commands

You can use the set network CLI command to set the DSCP value for the primary LAN1 interface.
Example:

```
Infoblox > set network
NOTICE: All HA configuration is performed from the GUI. This interface is used only to
configure a standalone node or to join a grid.
Enter IP address:10.35.1.104
Enter netmask [Default: 255.255.255.0]:255.255.255.0
Enter gateway address [Default: 10.35.0.1]:10.35.0.1
Enter VLAN tag [Default: Untagged]:110
Enter DSCP value [Default: Inherited from Grid: 0]:25
Configure IPv6 network settings? (y or n):y
Enter IPv6 address [Default: none]: 2620:10A:6000:2400::168
Enter IPv6 Prefix Length [Default: none]: 64
Enter IPv6 gateway [Default: none]: 2620:10A:6000:2400::1
```

```
Enter VLAN tag [Default: Untagged]:110
Enter DSCP value [Default: Inherited from Grid: 0]:25
Become grid member? (y or n):
```

You can execute the `show network` command to view the DSCP values set for the primary LAN 1 interface.
Example:

```
Infoblox > show network
Current LAN1 Network Settings:
IP Address: 10.35.0.4
Network Mask: 255.255.0.0
Gateway Address: 10.35.0.1
VLAN Tag: 110
DSCP Value: 40
IPv6 Address: 2620:10A:6000:2400::4/64
IPv6 Gateway Address: 2620:10A:6000:2400::1
IPv6 VLAN Tag: 110
IPv6 DSCP Value: 40
HA enabled: false
Grid Status: Master of Infoblox Grid

Current Management Network Settings:
 Management Port enabled:           true
 Management IPv4 Address:           10.35.15.104
 Management Netmask:                255.255.255.0
 Management Gateway Address:        10.35.0.1
 Restrict Support and remote console access to MGMT port:      false

 Note: Additional addresses configured can be viewed through "show interface" command
```

Monitoring Cache Acceleration Statistics

The IB-4030 and IB-4030-10GE provides tools for monitoring cache acceleration statistics. You can use the following features to monitor and manage your appliance:

DNS Statistics for Cache Acceleration

DNS Statistics for Cache Acceleration

The *DNS Statistics* widget on the Dashboard provides member-specific statistics or zone-specific statistics. The widget displays the totals for each type of DNS response as well as a line graph that tracks the responses per second.
You can add a *DNS Statistics* widget to your Dashboard for the appliance acting as a Grid member. To configure the *DNS Statistics* widget, click the Configure icon and do the following:

- Click **Select Member**. In the *Member Selector* dialog box, choose the IB-4030 or IB-4030-10GE Grid member to display statistics for all its zones.

The widget displays only the option that you selected on your subsequent logins. When you click **Select Member**, the widget displays the **Select Member** option only, when you log in again.

- **Graph Configuration**: Select which DNS messages you want to track in the **Responses per Second** graph.

  Note: If you have configured Unbound as the DNS resolver, the appliance collects the following information using unbound statistics.

  - **Success**: The number of successful queries.
  - **NXDOMAIN**: The number of queries for domain names that did not exist in the database.
  - **Referral**: The number of queries that became referrals. Note that this information is not available if you configure Unbound as the DNS resolver.
  - **NXRRSET**: The number of queries for domain names that did not have the requested records.
  - **Failure:** The number of queries that failed due to reasons other than nonexistent domain names or records in a domain.
  - **Recursion**: The number of recursive queries for which the name server sent queries to other name servers.

The widget displays the following information in three tabs:

- **DNS Responses** tab: Displays a pie chart and the total number of each type of message. If you enable DNS Cache Acceleration service on an IB-4030 or IB-4030-10GE appliance and if the appliance is active, then the data throughput from this service is displayed in this tab.
- **Responses per Second** tab: Displays a line graph that tracks the DNS responses received per second, within an hour. The displayed time is based on the time zone specified in the User Profile. If you enable the auto-detect time zone option in NIOS and Grid Manager

cannot determine the browser time zone, the time is displayed in UTC format. You can mouse over the graph to display the coordinates of any point in the graph. If you configure the Grid member on an IB-4030 or IB-4030-10GE appliance with the DNS Cache Acceleration service enabled, then the data throughput from DNS Cache Acceleration service is displayed in this tab.

- **Cache Hit Ratio** tab: Displays a bar chart showing the cumulative cache hit ratio performance for the Grid DNS member. The widget measures BIND traffic cache hits, and combines with results from caching when the Grid member is an IB-4030 or IB-4030-10GE appliance, or another caching server. The cache hit ratio (measured in percentage) is the total number of cache hits divided by the total number of cache lookups. The higher the ratio, the more effective the cache is at improving query performance. To maintain optimum performance when the cache hit ration drops below 95%, you can configure the appliance to use Unbound as the DNS resolver. For information about Unbound DNS, see *Using Unbound DNS Resolution* .

Reports for IB-4030 and IB-4030-10GE

The IB-4030 or IB-4030-10GE displays a list of predefined reports that you have selected when you set up your Grid or member reporting properties. You can modify user-defined reports, but you cannot modify or delete predefined reports or the search criteria of predefined reports. To view all available reports, from the **Reporting** tab, select the **Reports** tab. *Table* lists all supported reports for IB-4030 and IB-4030-10GE. For information about how to create and manage user-defined reports, refer to *Chapter 38 Infoblox Reporting Solution* in the *Infoblox NIOS Administrator Guide*.

Note: All DNS reports are supported on the IB-4030 and IB-4030-10GE . Some of these reports also include data collected from the caching hardware.

Supported Reports for IB-4030 and IB-4030-10GE

DNS Reports	Security (DNS) Reports	System Reports
- DNS Response Latency Trend - DNS Replies Trend[1] - DNS Cache Hit Rate Trend[2] - DNS Query Rate by Query Type[2] - DNS Query Rate by Server/Server Group[2] - DNS Daily Peak Hour Query Rate by Server/Server Group[2] - DNS Query Trend Per IP Block Group[2] - DNS Top SERVFAIL Errors Sent[2] - DNS Top SERVFAIL Errors Received[2] - DNS Top Timed-Out Recursive Queries[2] - DNS Top Requested Domain Names[2] - DNS Top Clients[2] - DNS Top Clients Per Domain[2] - DNS Top NXDOMAIN/No ERROR (no data)[2]	- DNS Top RPZ Hits - DNS Top RPZ Hits by Client - FireEye Alerts Report - Threat Protection Event Count by Time - Threat Protection Event Count by Severity Trend - Threat Protection Event Count by Rule - Threat Protection Event Count by Member - Threat Protection Event Count by Member Trend - Threat Protection Event Count by Category	- CPU Utilization Trend - Memory Utilization Trend - Traffic Rate Trend

Note the following if you have configured Unbound as the DNS resolver on the IB-4030 or IB-4030-10GE:

1. This report and its corresponding search use data from unbound statistics data (SUCCESS, REFER- RAL, NXRRSET, NXDOMAIN, FAILED and OTHER), where REFERRAL and OTHER always return zero because these fields are not available for Unbound DNS.
2. These reports and their corresponding searches will not reflect any data updates or changes after you switch to Unbound DNS because no data is generated from the source. Current data for these reports is generated from the top query module of the standard DNS resolution.

DNS Cache Acceleration CLI Commands

The NIOS-based IB-4030 or IB-4030-10GE appliance provides several commands to change settings in the system. To use these commands, you must connect through SSH or connect through the serial console port to the IB-4030 or IB-4030-10GE and login with the appropriate admin account.
The IB-4030 or IB-4030-10GE appliance supports the standard NIOS command-line interface for communicating with the device. For more information, refer to the *Infoblox CLI Guide.*

Supported IB-4030 and IB-4030-10GE CLI commands include the following:

- **set dns transfer**–Schedules zone transfers. Note that **set dns transfer** is not used by IB-4030 or IB-4030-10GE with an active DNS Cache Acceleration license.
- **set monitor dns** –Activates DNS monitoring in NIOS. This command is disabled on IB-4030 or IB-4030-10GE with an active DNS Cache Acceleration license.
- **show monitor dns** –Displays DNS network monitoring data. This command is disabled on IB-4030 or IB-4030-10GE with an active DNS Cache Acceleration license.

- **set interface**–Defines port speed and duplex settings for all supported interfaces.
- **show interface**–Shows the status and configuration of a chosen port.
- **show smartnic**–Shows the cusrrent status of the appliance. This command applies only to IB-4030 or IB-4030-10GE appliances.
- **show smartnic-cache**–You can view the current accelerator cache contents or view the prior cache dump file. This command may affect DNS query response performance for around 15 seconds during execution. This command applies only to IB-4030 and IB-4030-10GE appliances with DNS cache acceleration license enabled.
- **set smartnic log**–Specify the log level for the DNS Cache Acceleration service on the appliance.
- **set temp_license**–Generates and installs a temporary DNS cache acceleration license. You can add a temporary DNS cache acceleration license for up to one million qps. Note that you cannot add a temporary license if a permanent license already exists.
- **show license**–Displays the capacity of the applicable DNS cache acceleration license type.
- **show smartnic-cache existing-file**–Displays the existing cache data file of IB-4030 and IB-4030-10GE.

The CLI commands listed below are frequently used on the appliance. For detailed information about the supported CLI commands, refer to the *In foblox CLI Guide.*

set dns

The `set dns` command enables you to control the DNS cache. You can flush the cache of a DNS view or flush a particular entry from the cache.

Syntax

```
set dns flush all [dns_view]
set dns flush name name [dns_view]
```

Argument	Description
all	Flushes the cache file from the default view.
dns_view	Specifies a particular DNS view.
name	Flushes the specific entry from the cache.

Example

```
Infoblox > set dns flush name accounting.corp100.com
Infoblox > set dns flush all
```

show dns

The `show dns` command displays DNS query statistics for all DNS views in the IB-4030 or IB-4030-10GE appliance. It also displays the recursive cache for the specified DNS views.

Syntax

```
show dns {stats | cache [wait_time ntime][dns_view...]}
```

Argument	Description
stats	Displays DNS query statistics for all DNS views. If the DNS Cache Acceleration service is enabled, **show dns stats** will show the combined statistics for BIND and DNS Cache Acceleration service.
ntime	The maximum time (from 1 to 600 seconds) to wait for the cache file to be ready.

Example

```
Infoblox > show dns stats
success 6718810
referral 0
nxrrset 0
```

```
       nxdomain 0
       recursion 257
       failure 0
```

set smartnic log

Sets the logging level for the DNS Cache Acceleration service on the IB-4030 or IB-4030-10GE appliance, where the level is between 0 being the least verbose and 7 being the most verbose.

Syntax

```
set smartnic log {level]
```

Argument	Description
level	The logging level (from 0 to 7) of messages.

Example

```
Infoblox > set smartnic log 7
```

show smartnic

Checks the status and settings of the DNS Cache Acceleration service.

Note: When you use this command on a specific appliance, the configuration applies only to that appliance. When using this command for an HA pair, you must run the command separately on both the active and passive nodes to ensure consistent behavior.

Show smartnic displays the following operating characteristics of the IB-4030 or IB-4030-10GE:

• Firmware version	• DNS query statistics
• Cache status, enabled/disabled	• DNS per-port packet count
• Cache hit count	• Log level
• Cache miss count	• Failed cores (if any)
• DNS minimum cached TTL	

Syntax

```
show smartnic
```

Example

```
Infoblox > show smartnic
Firmware version:     1.3.19, Nov 08, 2011
Cache:                Enabled
Cache hit count:      109397
Cache miss count:     3008
Minimum cached TTL:   10
DNS query stats:      SUCCESS=109380 NXDOMAIN=0 NXRRSET=0 FAILURE=0 REFERRAL=0
DNS UDP packet count: port0=299339 port1=93408 port2=0 port3=0
Log level:            6
Failed cores:         None
```

show interface

This command displays details about interfaces and SFPs that are connected to the IB-4030 or IB-4030-10GE platform.

Syntax

```
show interface
```

Example

```
Infoblox > show interface

LAN:
IP Address: 10.35.2.40    MAC Address:  00:0F:B7:24:10:15
Mask:       255.255.0.0   Broadcast:    10.35.255.255
MTU:        1500          Metric:       1
IPv6 Address: 2001:db8:a23::228/64
IPv6 Link: fe80::20f:b7ff:fe24:1015/64
Status: UP BROADCAST RUNNING MULTICAST
SFP Type: Fiber SX
SFP Model: Finisar(FTLF8519P2BCL)
Statistics Information

Received

     packets:  6895339    bytes:   444006210 (423.4 MiB)
     errors:   0          dropped: 14
     overruns: 0          frame:   0

Transmitted

     packets:  14832      bytes:   14599721 (13.9 MiB)
     errors:   0          dropped: 0
     overruns: 0          carrier: 0

Collisions: 0               Txqueuelen: 1000
```

You can view information about the SFPs on the IB-4030 or IB-4030-10GE application. To view the details:
From the **Grid** tab, select the **Grid Manager** tab and click the **Members** tab -> *member* check box -> *Detailed Status* icon.
You can also use this command to view the VLAN ID, tagged networks, and additional IP addresses that are configured for the network when you enable VLAN on an IB-4030 or IB-4030-10GE appliance. For more information, see *Enabling VLAN Support Using CLI Commands*.