



## **Network Protocol Support**

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## **Note**

To obtain the BMC MAC address, refer to the board label affixed to the NVIDIA® BlueField® device.

BMC management network interface can be configured using Redfish or IPMI. By default, BMC comes up with the DHCP network configuration.

Network configuration functions:

- Setting DHCP/Static network mode configuration
- Adding/setting IPv4/IPv6 configuration including IP address, gateway, netmask
- Adding DNS servers
- Adding NTP server
- Setting BMC time with NTP server or system RTC

## **Network Management Redfish Commands**

### **Getting Network Protocol Configuration**

```
curl -k -u root:'<password>' -X GET  
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/NetworkProtocol
```

### **Getting Interface Configuration**

```
curl -k -u root:'<password>' -XGET
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterfac
```

## Enabling/Disabling Interface

```
curl -k -u root:'<password>' -XPATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterfac
-d '{"InterfaceEnabled": <state>'
```

Where `<state>` can be `true` or `false`.

### Note

Disabling the `eth0` interface on the BlueField BMC prevents OOB network functionality on the BMC. This inhibits the ability to execute any Redfish or IPMI commands through the network.

## Configuring Static IPv4 Address

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterfac
-d '{"IPv4StaticAddresses": [{"Address": "
<ip_addr>", "SubnetMask": "<netmask>", "Gateway": "<gw_ip_addr>"}]}'
```

Example:

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterface
-d '{"IPv4StaticAddresses": [{"Address": "10.7.7.7", "SubnetMask":
"255.255.0.0", "Gateway": "10.7.0.1"}]}'
```

## Deleting Static IPv4 Address

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterface
-d '{"IPv4StaticAddresses": [null]}'
```

## Enabling/Disabling IPv4 DHCP

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterface
-d '{"DHCPv4": {"DHCPEnabled": <state>}}'
```

Where `<state>` can be `true` or `false`.

## Configuring Static DNS Server IPv4 and IPv6

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterface
-d '{"StaticNameServers": ["<dns_ip>"]}'
```

## Configuring Static IPv6 Address

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterface
-d '{"IPv6StaticAddresses": [{"Address": "<ip>", "PrefixLength":
<len>}]}'
```

Example:

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterface
-d '{"IPv6StaticAddresses": [{"Address":
"fe80::3eec:efff:fe3b:e02f", "PrefixLength": 64}]}'
```

## Enabling/Disabling IPv6 DHCP

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterface
-d '{"DHCPv6": {"OperatingMode": "<state>"}}'
```

Where `<state>` can be:

- `Enabled` – DHCPv6 is enabled for this interface
- `Disabled` – DHCPv6 is disabled for this interface

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/EthernetInterface
-d '{"StatelessAddressAutoConfig": {"IPv6AutoConfigEnabled": "
<state>"}}'
```

Where `<state>` can be:

- `true` – Indicate IPv6 stateless address autoconfiguration (SLAAC) is enabled for this interface
- `false` – Indicate IPv6 stateless address autoconfiguration is disabled for this interface

## Enabling/Disabling NTP

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/NetworkProtocol
-d '{"NTP": {"ProtocolEnabled": <state>}}'
```

Where `<state>` can be `true` or `false`.

## Configuring Static NTP Server IP

```
curl -k -u root:'<password>' -X PATCH
https://<bmc_ip>/redfish/v1/Managers/Bluefield_BMC/NetworkProtocol
-d '{"NTP": {"NTPServers": ["<ntp_server_ip>"]}}'
```

# Network Management IPMI Commands

The following subsections list the available network IPMI commands.

## Configuring IPv4 Mode

The following command sets LAN channel 1 IP config mode to static or DHCP which corresponds to network interface `eth0`.

```
ipmitool lan set 1 ipsrc <mode>
```

Where `<mode>` can be `static` or `dhcp`.

## Configuring IPv6 Mode

The following command sets LAN channel 1 IP config mode to static or DHCP which corresponds to network interface `eth0`.

```
ipmitool lan6 set 1 rtr_cfg <mode>
```

Where `<mode>` can be `static` or `dynamic`. `both` is unsupported.

## Adding IPv4 Address

The following commands add IPv4 address, default gateway, and netmask to the network interface `eth0`.

- IP address:

```
ipmitool lan set 1 ipaddr <ip-address>
```

- Default gateway:

```
ipmitool lan set 1 defgw ipaddr <ip-address>
```

- Netmask:

```
ipmitool lan set 1 netmask <netmask>
```

### **Note**

IPMI supports only a single static IP address. If multiple static IP addresses are configured on the system, the new netmask will be applied to only one of them.

## Getting IPv4 Config

The following command gets IPv4 network config for channel 1 which corresponds to the network interface `eth0`.

```
ipmitool lan print 1
```

## Setting IPv6 Address

The following command adds IPv6 address to the network interface `eth0`.

```
ipmitool lan6 set 1 nolock static_addr 0 enable <ipv6-address> 64
```

## Getting IPv6 Config

The following command gets IPv6 network config for channel 1 which corresponds to the network interface `eth0`.

```
ipmitool lan6 print 1
```

## Getting DNS Server

```
ipmitool raw 0x32 0x6B
```

Output:

```
0b 31 30 2e 31 35 2e 31 32 2e 36 37
```

This output corresponds to `10.15.12.67`.

## Adding DNS Server

```
ipmitool raw 0x32 0x6C 0x0b 0x31 0x30 0x2e 0x31 0x35 0x2e 0x31
0x32 0x2e 0x36 0x37
```

Output:

```
0x0b 0x31 0x30 0x2e 0x31 0x35 0x2e 0x31 0x32 0x2e 0x36 0x37
```

This output corresponds to `10.15.12.67`.

## Getting NTP Server

```
ipmitool raw 0x32 0xA7
```

Output:

```
01 11 31 2e 69 6e 2e 70 6f 6f 6c 2e 6e 74 70 2e 6f 72 67
```

Where:

- `01` – NTP status enable/disable
- `11` – NTP server length
- `31 2e 69 6e 2e 70 6f 6f 6c 2e 6e 74 70 2e 6f 72 67` – NTP server address byte stream which corresponds to `1.in.pool.ntp.org`

## Adding NTP Server

```
ipmitool raw 0x32 0xA8 0x01 0x31 0x2e 0x69 0x6e 0x2e 0x70 0x6f  
0x6f 0x6c 0x2e 0x6e 0x74 0x70 0x2e 0x6f 0x72 0x67
```

Where:

- `31 2e 69 6e 2e 70 6f 6f 6c 2e 6e 74 70 2e 6f 72 67` – NTP server address byte stream which corresponds to `1.in.pool.ntp.org`

## Enabling NTP Time Sync

The following command enables time sync to NTP server.

```
ipmitool raw 0x32 0xA8 0x02 0x01
```

Where:

- `0x01` – enable NTP

## Disabling NTP Time Sync

The following command disables time sync to NTP server.

```
ipmitool raw 0x32 0xA8 0x02 0x00
```

Where:

- `0x00` – disable NTP

## Configuring Router IPv6 Mode

The following command sets router mode to static or DHCP.

```
ipmitool lan6 set 1 rtr_cfg <mode>
```

Where `<mode>` can be:

- static
- Dynamic

### **Note**

Configuring static mode also requires setting the static router IP and static router MAC address.

### **Note**

Router prefix can only be 0.

## Configuring IPv6 Static Router IP

The following command sets the IPv6 address for the static router.

```
ipmitool raw 0x0c 0x01 0x01 0x41 <ip-hex>
```

Where:

- `<ip-hex>` – the IP address

## Configuring IPv6 Static Router MAC

The following command sets the MAC address for the static router.

```
ipmitool raw 0x0c 0x01 0x01 0x42 <mac-hex>
```

Where:

- `<mac-hex>` – the IP MAC address

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