Deploy virtual grid nodes (Ubuntu or Debian)

StorageGRID software

NetApp
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Create node configuration files for Ubuntu or Debian deployments

Node configuration files are small text files that provide the information the StorageGRID host service needs to start a node and connect it to the appropriate network and block storage resources. Node configuration files are used for virtual nodes and aren't used for appliance nodes.

Location for node configuration files

Place the configuration file for each StorageGRID node in the `/etc/storagegrid/nodes` directory on the host where the node will run. For example, if you plan to run one Admin Node, one Gateway Node, and one Storage Node on HostA, you must place three node configuration files in `/etc/storagegrid/nodes` on HostA.

You can create the configuration files directly on each host using a text editor, such as vim or nano, or you can create them elsewhere and move them to each host.

Naming of node configuration files

The names of the configuration files are significant. The format is `node-name.conf`, where `node-name` is a name you assign to the node. This name appears in the StorageGRID Installer and is used for node maintenance operations, such as node migration.

Node names must follow these rules:

- Must be unique
- Must start with a letter
- Can contain the characters A through Z and a through z
- Can contain the numbers 0 through 9
- Can contain one or more hyphens (-)
- Must be no more than 32 characters, not including the `.conf` extension

Any files in `/etc/storagegrid/nodes` that don't follow these naming conventions will not be parsed by the host service.

If you have a multi-site topology planned for your grid, a typical node naming scheme might be:

```
site-nodetype-nodenumber.conf
```

For example, you might use `dc1-adm1.conf` for the first Admin Node in Data Center 1, and `dc2-sn3.conf` for the third Storage Node in Data Center 2. However, you can use any scheme you like, as long as all node names follow the naming rules.

Contents of a node configuration file

A configuration file contains key/value pairs, with one key and one value per line. For each key/value pair, follow these rules:

- The key and the value must be separated by an equal sign (=) and optional whitespace.
- The keys can contain no spaces.
- The values can contain embedded spaces.
- Any leading or trailing whitespace is ignored.

The following table defines the values for all supported keys. Each key has one of the following designations:

- **Required**: Required for every node or for the specified node types
- **Best practice**: Optional, although recommended
- **Optional**: Optional for all nodes

Admin Network keys

ADMIN_IP

Value	Designation
Grid Network IPv4 address of the primary Admin Node for the grid to which this node belongs. Use the same value you specified for GRID_NETWORK_IP for the grid node with NODE_TYPE = VM_Admin_Node and ADMIN_ROLE = Primary. If you omit this parameter, the node attempts to discover a primary Admin Node using mDNS. How grid nodes discover the primary Admin Node **Note**: This value is ignored, and might be prohibited, on the primary Admin Node.	Best practice

ADMIN_NETWORK_CONFIG

Value	Designation
DHCP, STATIC, or DISABLED	Optional

ADMIN_NETWORK_ESL

Value	Designation
Comma-separated list of subnets in CIDR notation to which this node should communicate using the Admin Network gateway. Example: `172.16.0.0/21,172.17.0.0/21`	Optional

ADMIN_NETWORK_GATEWAY

Value	Designation

IPv4 address of the local Admin Network gateway for this node. Must be on the subnet defined by ADMIN_NETWORK_IP and ADMIN_NETWORK_MASK. This value is ignored for DHCP-configured networks.
 	
Examples:
 	
`1.1.1.1`
 	
`10.224.4.81`
	Required if `ADMIN_NETWORK_ESL` is specified. Optional otherwise.

ADMIN_NETWORK_IP

Value	Designation

IPv4 address of this node on the Admin Network. This key is only required when ADMIN_NETWORK_CONFIG = STATIC; don't specify it for other values.
 	
Examples:
 	
`1.1.1.1`
 	
`10.224.4.81`
	Required when ADMIN_NETWORK_CONFIG = STATIC.
	
	Optional otherwise.

ADMIN_NETWORK_MAC

Value	Designation
The MAC address for the Admin Network interface in the container. This field is optional. If omitted, a MAC address will be generated automatically. Must be 6 pairs of hexadecimal digits separated by colons. Example: `b2:9c:02:c2:27:10`	Optional

ADMIN_NETWORK_MASK

Value	Designation

IPv4 netmask for this node, on the Admin Network. Specify this key when ADMIN_NETWORK_CONFIG = STATIC; don't specify it for other values.
 	
Examples:
 	
`255.255.255.0`
 	
`255.255.248.0`
	Required if ADMIN_NETWORK_IP is specified and ADMIN_NETWORK_CONFIG = STATIC.
	
	Optional otherwise.

ADMIN_NETWORK_MTU

Value	Designation

The maximum transmission unit (MTU) for this node on the Admin Network. Don't specify if ADMIN_NETWORK_CONFIG = DHCP. If specified, the value must be between 1280 and 9216. If omitted, 1500 is used.
 	
If you want to use jumbo frames, set the MTU to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value.
 	
IMPORTANT: The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.
 	
Examples:
 	
`1500`
 	
`8192`
	Optional

ADMIN_NETWORK_TARGET

Value	Designation

Name of the host device that you will use for Admin Network access by the StorageGRID node. Only network interface names are supported. Typically, you use a different interface name than what was specified for GRID_NETWORK_TARGET or CLIENT_NETWORK_TARGET.
 	
Note: Don't use bond or bridge devices as the network target. Either configure a VLAN (or other virtual interface) on top of the bond device, or use a bridge and virtual Ethernet (veth) pair.
 	
Best practice:Specify a value even if this node will not initially have an Admin Network IP address. Then you can add an Admin Network IP address later, without having to reconfigure the node on the host.
 	
Examples:
 	
`bond0.1002`
 	
`ens256`
	Best practice

ADMIN_NETWORK_TARGET_TYPE

Value	Designation
Interface (This is the only supported value.)	Optional

ADMIN_NETWORK_TARGET_TYPE_INTERFACE_CLONE_MAC

Value	Designation
True or False Set the key to "true" to cause the StorageGRID container use the MAC address of the host host target interface on the Admin Network. **Best practice:** In networks where promiscuous mode would be required, use the ADMIN_NETWORK_TARGET_TYPE_INTERFACE_CLONE_MAC key instead. For more details on MAC cloning: • Considerations and recommendations for MAC address cloning (Red Hat Enterprise Linux) • Considerations and recommendations for MAC address cloning (Ubuntu or Debian)	Best practice

ADMIN_ROLE

Value	Designation
Primary or non-primary This key is only required when NODE_TYPE = VM_Admin_Node; don't specify it for other node types.	Required when NODE_TYPE = VM_Admin_Node Optional otherwise.

Block device keys

BLOCK_DEVICE_AUDIT_LOGS

Value	Designation

Path and name of the block device special file this node will use for persistent storage of audit logs.
 	
Examples:
 	
`/dev/disk/by-path/pci-0000:03:00.0-scsi-0:0:0:0`
 	
`/dev/disk/by-id/wwn-0x600a09800059d6df000060d757b475fd`
 	
`/dev/mapper/sgws-adm1-audit-logs`
	Required for nodes with NODE_TYPE = VM_Admin_Node. Don't specify it for other node types.

BLOCK_DEVICE_RANGEDB_nnn

Value	Designation

Path and name of the block device special file this node will use for persistent object storage. This key is only required for nodes with NODE_TYPE = VM_Storage_Node; don't specify it for other node types.
 	
Only BLOCK_DEVICE_RANGEDB_000 is required; the rest are optional. The block device specified for BLOCK_DEVICE_RANGEDB_000 must be at least 4 TB; the others can be smaller.
 	
Don't leave gaps. If you specify BLOCK_DEVICE_RANGEDB_005, you must also specify BLOCK_DEVICE_RANGEDB_004.
 	
Note: For compatibility with existing deployments, two-digit keys are supported for upgraded nodes.
 	
Examples:
 	
`/dev/disk/by-path/pci-0000:03:00.0-scsi-0:0:0:0`
 	
`/dev/disk/by-id/wwn-0x600a09800059d6df000060d757b475fd`
 	
`/dev/mapper/sgws-sn1-rangedb-000`
	Required:
	
	BLOCK_DEVICE_RANGEDB_000
	
	Optional:
	
	BLOCK_DEVICE_RANGEDB_001
	
	BLOCK_DEVICE_RANGEDB_002
	
	BLOCK_DEVICE_RANGEDB_003
	
	BLOCK_DEVICE_RANGEDB_004
	
	BLOCK_DEVICE_RANGEDB_005
	
	BLOCK_DEVICE_RANGEDB_006
	
	BLOCK_DEVICE_RANGEDB_007
	
	BLOCK_DEVICE_RANGEDB_008
	
	BLOCK_DEVICE_RANGEDB_009
	
	BLOCK_DEVICE_RANGEDB_010
	
	BLOCK_DEVICE_RANGEDB_011
	
	BLOCK_DEVICE_RANGEDB_012
	
	BLOCK_DEVICE_RANGEDB_013
	
	BLOCK_DEVICE_RANGEDB_014
	
	BLOCK_DEVICE_RANGEDB_015

BLOCK_DEVICE_TABLES

Value	Designation

Path and name of the block device special file this node will use for persistent storage of database tables. This key is only required for nodes with NODE_TYPE = VM_Admin_Node; don't specify it for other node types.
 	
Examples:
 	
`/dev/disk/by-path/pci-0000:03:00.0-scsi-0:0:0:0`
 	
`/dev/disk/by-id/wwn-0x600a09800059d6df000060d757b475fd`
 	
`/dev/mapper/sgws-adm1-tables`
	Required

BLOCK_DEVICE_VAR_LOCAL

Value	Designation

Path and name of the block device special file this node will use for its `/var/local` persistent storage.
 	
Examples:
 	
`/dev/disk/by-path/pci-0000:03:00.0-scsi-0:0:0:0`
 	
`/dev/disk/by-id/wwn-0x600a09800059d6df000060d757b475fd`
 	
`/dev/mapper/sgws-sn1-var-local`
	Required

Client Network keys

CLIENT_NETWORK_CONFIG

Value	Designation
DHCP, STATIC, or DISABLED	Optional

CLIENT_NETWORK_GATEWAY

Value	Designation

IPv4 address of the local Client Network gateway for this node, which must be on the subnet defined by CLIENT_NETWORK_IP and CLIENT_NETWORK_MASK. This value is ignored for DHCP-configured networks.
 	
Examples:
 	
`1.1.1.1`
 	
`10.224.4.81`
	Optional

CLIENT_NETWORK_IP

Value	Designation

IPv4 address of this node on the Client Network.
 	
This key is only required when CLIENT_NETWORK_CONFIG = STATIC; don't specify it for other values.
 	
Examples:
 	
`1.1.1.1`
 	
`10.224.4.81`
	Required when CLIENT_NETWORK_CONFIG = STATIC
	
	Optional otherwise.

CLIENT_NETWORK_MAC

Value	Designation
The MAC address for the Client Network interface in the container. This field is optional. If omitted, a MAC address will be generated automatically. Must be 6 pairs of hexadecimal digits separated by colons. Example: `b2:9c:02:c2:27:20`	Optional

CLIENT_NETWORK_MASK

Value	Designation

IPv4 netmask for this node on the Client Network.
 	
Specify this key when CLIENT_NETWORK_CONFIG = STATIC; don't specify it for other values.
 	
Examples:
 	
`255.255.255.0`
 	
`255.255.248.0`
	Required if CLIENT_NETWORK_IP is specified and CLIENT_NETWORK_CONFIG = STATIC
	
	Optional otherwise.

CLIENT_NETWORK_MTU

Value	Designation

The maximum transmission unit (MTU) for this node on the Client Network. Don't specify if CLIENT_NETWORK_CONFIG = DHCP. If specified, the value must be between 1280 and 9216. If omitted, 1500 is used.
 	
If you want to use jumbo frames, set the MTU to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value.
 	
IMPORTANT: The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.
 	
Examples:
 	
`1500`
 	
`8192`
	Optional

CLIENT_NETWORK_TARGET

Value	Designation

Name of the host device that you will use for Client Network access by the StorageGRID node. Only network interface names are supported. Typically, you use a different interface name than what was specified for GRID_NETWORK_TARGET or ADMIN_NETWORK_TARGET.
 	
Note: Don't use bond or bridge devices as the network target. Either configure a VLAN (or other virtual interface) on top of the bond device, or use a bridge and virtual Ethernet (veth) pair.
 	
Best practice: Specify a value even if this node will not initially have a Client Network IP address. Then you can add a Client Network IP address later, without having to reconfigure the node on the host.
 	
Examples:
 	
`bond0.1003`
 	
`ens423`
	Best practice

CLIENT_NETWORK_TARGET_TYPE

Value	Designation
Interface (This is only supported value.)	Optional

CLIENT_NETWORK_TARGET_TYPE_INTERFACE_CLONE_MAC

Value	Designation
True or False Set the key to "true" to cause the StorageGRID container to use the MAC address of the host target interface on the Client Network. **Best practice:** In networks where promiscuous mode would be required, use the CLIENT_NETWORK_TARGET_TYPE_INTERFACE_CLONE_MAC key instead. For more details on MAC cloning: • Considerations and recommendations for MAC address cloning (Red Hat Enterprise Linux) • Considerations and recommendations for MAC address cloning (Ubuntu or Debian)	Best practice

Grid Network keys

GRID_NETWORK_CONFIG

Value	Designation
STATIC or DHCP Defaults to STATIC if not specified.	Best practice

GRID_NETWORK_GATEWAY

Value	Designation
IPv4 address of the local Grid Network gateway for this node, which must be on the subnet defined by GRID_NETWORK_IP and GRID_NETWORK_MASK. This value is ignored for DHCP-configured networks. If the Grid Network is a single subnet with no gateway, use either the standard gateway address for the subnet (X.Y.Z.1) or this node's GRID_NETWORK_IP value; either value will simplify potential future Grid Network expansions.	Required

GRID_NETWORK_IP

Value	Designation

IPv4 address of this node on the Grid Network. This key is only required when GRID_NETWORK_CONFIG = STATIC; don't specify it for other values.
 	
Examples:
 	
`1.1.1.1`
 	
`10.224.4.81`
	Required when GRID_NETWORK_CONFIG = STATIC
	
	Optional otherwise.

GRID_NETWORK_MAC

Value	Designation
The MAC address for the Grid Network interface in the container. Must be 6 pairs of hexadecimal digits separated by colons. Example: `b2:9c:02:c2:27:30`	Optional If omitted, a MAC address will be generated automatically.

GRID_NETWORK_MASK

Value	Designation

IPv4 netmask for this node on the Grid Network. Specify this key when GRID_NETWORK_CONFIG = STATIC; don't specify it for other values.
 	
Examples:
 	
`255.255.255.0`
 	
`255.255.248.0`
	Required when GRID_NETWORK_IP is specified and GRID_NETWORK_CONFIG = STATIC.
	
	Optional otherwise.

GRID_NETWORK_MTU

Value	Designation

The maximum transmission unit (MTU) for this node on the Grid Network. Don't specify if GRID_NETWORK_CONFIG = DHCP. If specified, the value must be between 1280 and 9216. If omitted, 1500 is used.
 	
If you want to use jumbo frames, set the MTU to a value suitable for jumbo frames, such as 9000. Otherwise, keep the default value.
 	
IMPORTANT: The MTU value of the network must match the value configured on the switch port the node is connected to. Otherwise, network performance issues or packet loss might occur.
 	
IMPORTANT: For the best network performance, all nodes should be configured with similar MTU values on their Grid Network interfaces. The **Grid Network MTU mismatch** alert is triggered if there is a significant difference in MTU settings for the Grid Network on individual nodes. The MTU values don't have to be the same for all network types.
 	
Examples:
 	
`1500`
 	
`8192`
	Optional

GRID_NETWORK_TARGET

Value	Designation

Name of the host device that you will use for Grid Network access by the StorageGRID node. Only network interface names are supported. Typically, you use a different interface name than what was specified for ADMIN_NETWORK_TARGET or CLIENT_NETWORK_TARGET.
 	
Note: Don't use bond or bridge devices as the network target. Either configure a VLAN (or other virtual interface) on top of the bond device, or use a bridge and virtual Ethernet (veth) pair.
 	
Examples:
 	
`bond0.1001`
 	
`ens192`
	Required

GRID_NETWORK_TARGET_TYPE

Value	Designation
Interface (This is the only supported value.)	Optional

GRID_NETWORK_TARGET_TYPE_INTERFACE_CLONE_MAC

Value	Designation
True or False Set the value of the key to "true" to cause the StorageGRID container to use the MAC address of the host target interface on the Grid Network. **Best practice:** In networks where promiscuous mode would be required, use the GRID_NETWORK_TARGET_TYPE_INTERFACE_CLONE_MAC key instead. For more details on MAC cloning: • Considerations and recommendations for MAC address cloning (Red Hat Enterprise Linux) • Considerations and recommendations for MAC address cloning (Ubuntu or Debian)	Best practice

Installation password key (temporary)

CUSTOM_TEMPORARY_PASSWORD_HASH

Value	Designation
For the primary Admin Node, set a default temporary password for the StorageGRID Installation API during installation. **Note**: Set an installation password on the primary Admin Node only. If you attempt to set a password on another node type, validation of the node configuration file will fail. Setting this value has no effect when installation has completed. If this key is omitted, by default no temporary password is set. Alternatively, you can set a temporary password using the StorageGRID Installation API. Must be a `crypt()` SHA-512 password hash with format `$6$<salt>$<password hash>` for a password of at least 8 and no more than 32 characters. This hash can be generated using CLI tools, such as the `openssl passwd` command in SHA-512 mode.	Best practice

Interfaces key

INTERFACE_TARGET_nnnn

Value	Designation
Name and optional description for an extra interface you want to add to this node. You can add multiple extra interfaces to each node. For *nnnn*, specify a unique number for each INTERFACE_TARGET entry you are adding. For the value, specify the name of the physical interface on the bare-metal host. Then, optionally, add a comma and provide a description of the interface, which is displayed on the VLAN interfaces page and the HA groups page. Example: `INTERFACE_TARGET_0001=ens256, Trunk` If you add a trunk interface, you must configure a VLAN interface in StorageGRID. If you add an access interface, you can add the interface directly to an HA group; you don’t need to configure a VLAN interface.	Optional

Maximum RAM key

MAXIMUM_RAM

Value	Designation

The maximum amount of RAM that this node is allowed to consume. If this key is omitted, the node has no memory restrictions. When setting this field for a production-level node, specify a value that is at least 24 GB and 16 to 32 GB less than the total system RAM.
 	
Note: The RAM value affects a node's actual metadata reserved space. See the description of what Metadata Reserved Space is.
 	
The format for this field is *numberunit*, where *unit* can be `b`, `k`, `m`, or `g`.
 	
Examples:
 	
`24g`
 	
`38654705664b`
 	
Note: If you want to use this option, you must enable kernel support for memory cgroups.
	Optional

Node type keys

NODE_TYPE

Value	Designation
Type of node: • VM_Admin_Node • VM_Storage_Node • VM_Archive_Node • VM_API_Gateway	Required

STORAGE_TYPE

Value	Designation
Defines the type of objects a Storage Node contains. For more information, see Types of Storage Nodes. This key is only required for nodes with NODE_TYPE = VM_Storage_Node; don't specify it for other node types. Storage types: • combined • data • metadata **Note**: If the STORAGE_TYPE is not specified, the Storage Node type is set to combined (data and metadata) by default.	Optional

Port remap keys

PORT_REMAP

Value	Designation
Remaps any port used by a node for internal grid node communications or external communications. Remapping ports is necessary if enterprise networking policies restrict one or more ports used by StorageGRID, as described in Internal grid node communications or External communications. **IMPORTANT**: Don't remap the ports you are planning to use to configure load balancer endpoints. **Note**: If only PORT_REMAP is set, the mapping that you specify is used for both inbound and outbound communications. If PORT_REMAP_INBOUND is also specified, PORT_REMAP applies only to outbound communications. The format used is: *network type/protocol/default port used by grid node/new port*, where *network type* is grid, admin, or client, and *protocol* is tcp or udp. Example: `PORT_REMAP = client/tcp/18082/443` You can also remap multiple ports using a comma-separated list. Example: `PORT_REMAP = client/tcp/18082/443, client/tcp/18083/80`	Optional

PORT_REMAP_INBOUND

Value	Designation
Remaps inbound communications to the specified port. If you specify PORT_REMAP_INBOUND but don't specify a value for PORT_REMAP, outbound communications for the port are unchanged. **IMPORTANT**: Don't remap the ports you are planning to use to configure load balancer endpoints. The format used is: *network type/protocol/remapped port /default port used by grid node*, where *network type* is grid, admin, or client, and *protocol* is tcp or udp. Example: `PORT_REMAP_INBOUND = grid/tcp/3022/22` You can also remap multiple inbound ports using a comma-separated list. Example: `PORT_REMAP_INBOUND = grid/tcp/3022/22, admin/tcp/3022/22`	Optional

How grid nodes discover the primary Admin Node

Grid nodes communicate with the primary Admin Node for configuration and management. Each grid node must know the IP address of the primary Admin Node on the Grid Network.

To ensure that a grid node can access the primary Admin Node, you can do either of the following when deploying the node:

- You can use the ADMIN_IP parameter to enter the primary Admin Node's IP address manually.
- You can omit the ADMIN_IP parameter to have the grid node discover the value automatically. Automatic discovery is especially useful when the Grid Network uses DHCP to assign the IP address to the primary Admin Node.

Automatic discovery of the primary Admin Node is accomplished using a multicast domain name system (mDNS). When the primary Admin Node first starts up, it publishes its IP address using mDNS. Other nodes on the same subnet can then query for the IP address and acquire it automatically. However, because multicast IP traffic is not normally routable across subnets, nodes on other subnets can't acquire the primary Admin Node's IP address directly.

If you use automatic discovery:

- You must include the ADMIN_IP setting for at least one grid node on any subnets that the primary Admin Node is not directly attached to. This grid node will then publish the primary Admin Node's IP address for other nodes on the subnet to discover with mDNS.
- Ensure that your network infrastructure supports passing multi-cast IP traffic within a subnet.

Example node configuration files

You can use the example node configuration files to help set up the node configuration files for your StorageGRID system. The examples show node configuration files for all types of grid nodes.

For most nodes, you can add Admin and Client Network addressing information (IP, mask, gateway, and so on) when you configure the grid using the Grid Manager or the Installation API. The exception is the primary Admin Node. If you want to browse to the Admin Network IP of the primary Admin Node to complete grid configuration (because the Grid Network is not routed, for example), you must configure the Admin Network connection for the primary Admin Node in its node configuration file. This is shown in the example.

> In the examples, the Client Network target has been configured as a best practice, even though the Client Network is disabled by default.

Example for primary Admin Node

Example file name: `/etc/storagegrid/nodes/dc1-adm1.conf`

Example file contents:

```
NODE_TYPE = VM_Admin_Node
ADMIN_ROLE = Primary
TEMPORARY_PASSWORD_TYPE = Use custom password
CUSTOM_TEMPORARY_PASSWORD = Passw0rd
BLOCK_DEVICE_VAR_LOCAL = /dev/mapper/dc1-adm1-var-local
BLOCK_DEVICE_AUDIT_LOGS = /dev/mapper/dc1-adm1-audit-logs
BLOCK_DEVICE_TABLES = /dev/mapper/dc1-adm1-tables
GRID_NETWORK_TARGET = bond0.1001
ADMIN_NETWORK_TARGET = bond0.1002
CLIENT_NETWORK_TARGET = bond0.1003

GRID_NETWORK_IP = 10.1.0.2
GRID_NETWORK_MASK = 255.255.255.0
GRID_NETWORK_GATEWAY = 10.1.0.1

ADMIN_NETWORK_CONFIG = STATIC
ADMIN_NETWORK_IP = 192.168.100.2
ADMIN_NETWORK_MASK = 255.255.248.0
ADMIN_NETWORK_GATEWAY = 192.168.100.1
ADMIN_NETWORK_ESL = 192.168.100.0/21,172.16.0.0/21,172.17.0.0/21
```

Example for Storage Node

Example file name: `/etc/storagegrid/nodes/dc1-sn1.conf`

Example file contents:

```
NODE_TYPE = VM_Storage_Node
ADMIN_IP = 10.1.0.2
BLOCK_DEVICE_VAR_LOCAL = /dev/mapper/dc1-sn1-var-local
BLOCK_DEVICE_RANGEDB_00 = /dev/mapper/dc1-sn1-rangedb-0
BLOCK_DEVICE_RANGEDB_01 = /dev/mapper/dc1-sn1-rangedb-1
BLOCK_DEVICE_RANGEDB_02 = /dev/mapper/dc1-sn1-rangedb-2
BLOCK_DEVICE_RANGEDB_03 = /dev/mapper/dc1-sn1-rangedb-3
GRID_NETWORK_TARGET = bond0.1001
ADMIN_NETWORK_TARGET = bond0.1002
CLIENT_NETWORK_TARGET = bond0.1003

GRID_NETWORK_IP = 10.1.0.3
GRID_NETWORK_MASK = 255.255.255.0
GRID_NETWORK_GATEWAY = 10.1.0.1
```

Example for Gateway Node

Example file name: `/etc/storagegrid/nodes/dc1-gw1.conf`

Example file contents:

```
NODE_TYPE = VM_API_Gateway
ADMIN_IP = 10.1.0.2
BLOCK_DEVICE_VAR_LOCAL = /dev/mapper/dc1-gw1-var-local
GRID_NETWORK_TARGET = bond0.1001
ADMIN_NETWORK_TARGET = bond0.1002
CLIENT_NETWORK_TARGET = bond0.1003
GRID_NETWORK_IP = 10.1.0.5
GRID_NETWORK_MASK = 255.255.255.0
GRID_NETWORK_GATEWAY = 10.1.0.1
```

Example for a non-primary Admin Node

Example file name: `/etc/storagegrid/nodes/dc1-adm2.conf`

Example file contents:

```
NODE_TYPE = VM_Admin_Node
ADMIN_ROLE = Non-Primary
ADMIN_IP = 10.1.0.2
BLOCK_DEVICE_VAR_LOCAL = /dev/mapper/dc1-adm2-var-local
BLOCK_DEVICE_AUDIT_LOGS = /dev/mapper/dc1-adm2-audit-logs
BLOCK_DEVICE_TABLES = /dev/mapper/dc1-adm2-tables
GRID_NETWORK_TARGET = bond0.1001
ADMIN_NETWORK_TARGET = bond0.1002
CLIENT_NETWORK_TARGET = bond0.1003

GRID_NETWORK_IP = 10.1.0.6
GRID_NETWORK_MASK = 255.255.255.0
GRID_NETWORK_GATEWAY = 10.1.0.1
```

Validate the StorageGRID configuration

After creating configuration files in `/etc/storagegrid/nodes` for each of your StorageGRID nodes, you must validate the contents of those files.

To validate the contents of the configuration files, run the following command on each host:

```
sudo storagegrid node validate all
```

If the files are correct, the output shows **PASSED** for each configuration file, as shown in the example.

When using only one LUN on metadata-only nodes, you might receive a warning message that can be ignored.

```
Checking for misnamed node configuration files… PASSED
Checking configuration file for node dc1-adm1… PASSED
Checking configuration file for node dc1-gw1… PASSED
Checking configuration file for node dc1-sn1… PASSED
Checking configuration file for node dc1-sn2… PASSED
Checking configuration file for node dc1-sn3… PASSED
Checking for duplication of unique values between nodes… PASSED
```

For an automated installation, you can suppress this output by using the `-q` or `--quiet` options in the `storagegrid` command (for example, `storagegrid --quiet…`). If you suppress the output, the command will have a non-zero exit value if any configuration warnings or errors were detected.

If the configuration files are incorrect, the issues are shown as **WARNING** and **ERROR**, as shown in the example. If any configuration errors are found, you must correct them before you continue with the installation.

```
Checking for misnamed node configuration files…
  WARNING: ignoring /etc/storagegrid/nodes/dc1-adm1
  WARNING: ignoring /etc/storagegrid/nodes/dc1-sn2.conf.keep
  WARNING: ignoring /etc/storagegrid/nodes/my-file.txt
Checking configuration file for node dc1-adm1…
  ERROR: NODE_TYPE = VM_Foo_Node
         VM_Foo_Node is not a valid node type.  See *.conf.sample
  ERROR: ADMIN_ROLE = Foo
         Foo is not a valid admin role.  See *.conf.sample
  ERROR: BLOCK_DEVICE_VAR_LOCAL = /dev/mapper/sgws-gw1-var-local
         /dev/mapper/sgws-gw1-var-local is not a valid block device
Checking configuration file for node dc1-gw1…
  ERROR: GRID_NETWORK_TARGET = bond0.1001
         bond0.1001 is not a valid interface.  See `ip link show`
  ERROR: GRID_NETWORK_IP = 10.1.3
         10.1.3 is not a valid IPv4 address
  ERROR: GRID_NETWORK_MASK = 255.248.255.0
         255.248.255.0 is not a valid IPv4 subnet mask
Checking configuration file for node dc1-sn1…
  ERROR: GRID_NETWORK_GATEWAY = 10.2.0.1
         10.2.0.1 is not on the local subnet
  ERROR: ADMIN_NETWORK_ESL = 192.168.100.0/21,172.16.0foo
         Could not parse subnet list
Checking configuration file for node dc1-sn2… PASSED
Checking configuration file for node dc1-sn3… PASSED
Checking for duplication of unique values between nodes…
  ERROR: GRID_NETWORK_IP = 10.1.0.4
         dc1-sn2 and dc1-sn3 have the same GRID_NETWORK_IP
  ERROR: BLOCK_DEVICE_VAR_LOCAL = /dev/mapper/sgws-sn2-var-local
         dc1-sn2 and dc1-sn3 have the same BLOCK_DEVICE_VAR_LOCAL
  ERROR: BLOCK_DEVICE_RANGEDB_00 = /dev/mapper/sgws-sn2-rangedb-0
         dc1-sn2 and dc1-sn3 have the same BLOCK_DEVICE_RANGEDB_00
```

Start the StorageGRID host service

To start your StorageGRID nodes, and ensure they restart after a host reboot, you must enable and start the StorageGRID host service.

Steps

1. Run the following commands on each host:

```
sudo systemctl enable storagegrid
sudo systemctl start storagegrid
```

2. Run the following command to ensure the deployment is proceeding:

```
sudo storagegrid node status node-name
```

3. If any node returns a status of "Not Running" or "Stopped," run the following command:

```
sudo storagegrid node start node-name
```

4. If you have previously enabled and started the StorageGRID host service (or if you are unsure if the service has been enabled and started), also run the following command:

```
sudo systemctl reload-or-restart storagegrid
```

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