Isilon
OneFS

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HDFS Reference Guide

EMC²

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CHAPTER 1

Overview of how HDFS works with OneFS

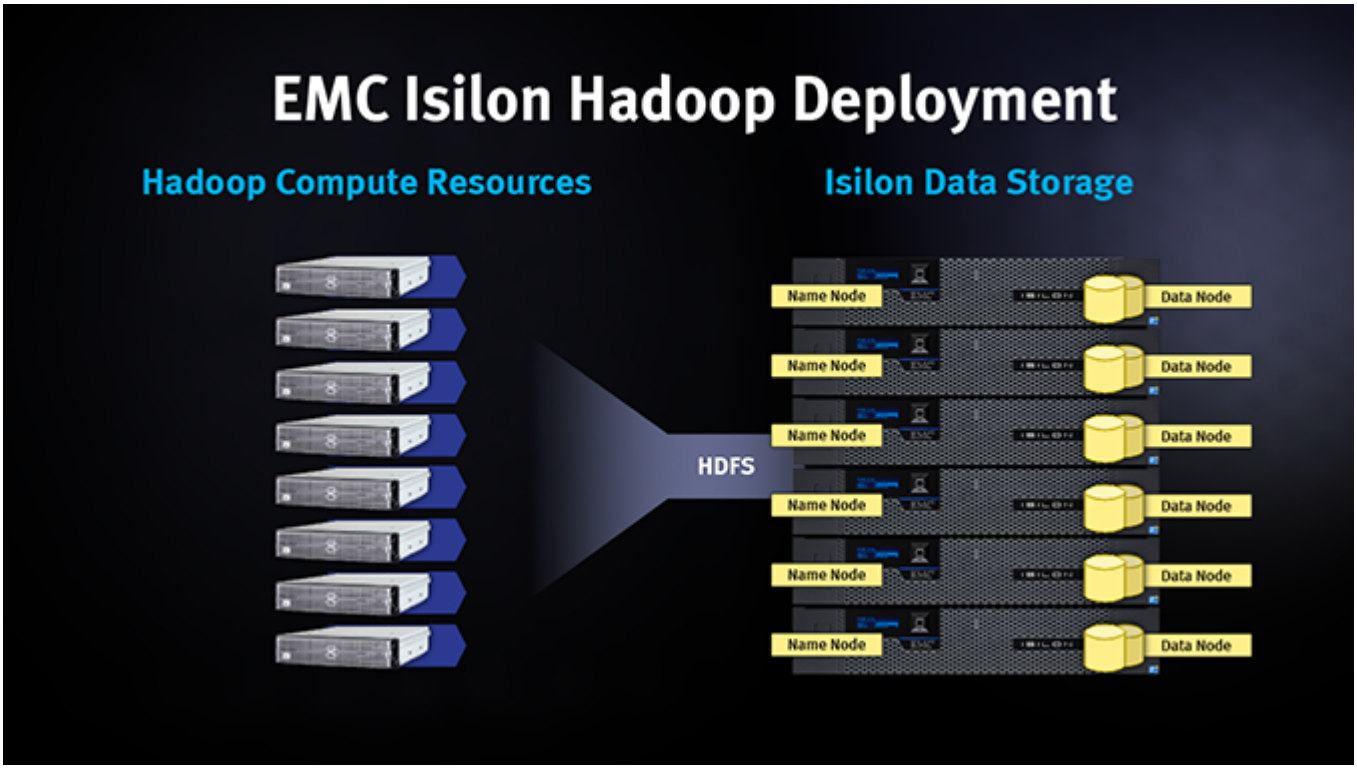
This chapter provides information about how the Hadoop Distributed File System (HDFS) can be implemented with Isilon OneFS.

How Hadoop is implemented on OneFS

In a Hadoop implementation on an Isilon cluster, Isilon OneFS serves as the file system for Hadoop compute clients. The Hadoop distributed file system (HDFS) is supported as a protocol, which is used by Hadoop compute clients to access data on the HDFS storage layer.

Hadoop compute clients can access the data that is stored on an Isilon cluster by connecting to any node over the HDFS protocol, and all nodes that are configured for HDFS provide NameNode and DataNode functionality as shown in the following illustration.

Figure 1 EMC Isilon Hadoop Deployment



Each node boosts performance and expands the cluster's capacity. For Hadoop analytics, the Isilon scale-out distributed architecture minimizes bottlenecks, rapidly serves Big Data, and optimizes performance.

How an Isilon OneFS Hadoop implementation differs from a traditional Hadoop deployment

A Hadoop implementation with OneFS differs from a typical Hadoop implementation in the following ways:

- The Hadoop compute and HDFS storage layers are on separate clusters instead of the same cluster.
- Instead of storing data within a Hadoop distributed file system, the storage layer functionality is fulfilled by OneFS on an Isilon cluster. Nodes on the Isilon cluster function as both a NameNode and a DataNode.

- The compute layer is established on a Hadoop compute cluster that is separate from the Isilon cluster. The Hadoop MapReduce framework and its components are installed on the Hadoop compute cluster only.
- Instead of a storage layer, HDFS is implemented on OneFS as a native, lightweight protocol layer between the Isilon cluster and the Hadoop compute cluster. Clients from the Hadoop compute cluster connect over HDFS to access data on the Isilon cluster.
- In addition to HDFS, clients from the Hadoop compute cluster can connect to the Isilon cluster over any protocol that OneFS supports such as NFS, SMB, FTP, and HTTP. Isilon OneFS is the only non-standard implementation of HDFS offered that allows for multi-protocol access. Isilon makes for an ideal alternative storage system to native HDFS by marrying HDFS services with enterprise-grade data management features.
- Hadoop compute clients can connect to any node on the Isilon cluster that functions as a NameNode instead of being routed by a single NameNode.

Hadoop distributions supported by OneFS

You can run most common Hadoop distributions with the Isilon cluster.

OneFS supports many distributions of the Hadoop Distributed File System (HDFS). These distributions are updated independently of OneFS and on their own schedules.

For the latest information about Hadoop distributions that OneFS supports, see the Hadoop Distributions and Products Supported by OneFS page on the Isilon Community Network.

HDFS files and directories

You must configure one HDFS root directory in each OneFS access zone that will contain data accessible to Hadoop compute clients. When a Hadoop compute client connects to the cluster, the user can access all files and sub-directories in the specified root directory. The default HDFS directory is `/ifs`.

Note the following:

- Associate each IP address pool on the cluster with an access zone. When Hadoop compute clients connect to the Isilon cluster through a particular IP address pool, the clients can access only the HDFS data in the associated access zone. This configuration isolates data within access zones and allows you to restrict client access to the data.
- Unlike NFS mounts or SMB shares, clients connecting to the cluster through HDFS cannot be given access to individual folders within the root directory. If you have multiple Hadoop workflows that require separate sets of data, you can create multiple access zones and configure a unique HDFS root directory for each zone.
- When you set up directories and files under the root directory, make sure that they have the correct permissions so that Hadoop clients and applications can access them. Directories and permissions will vary by Hadoop distribution, environment, requirements, and security policies.

For more information about access zones, refer to the OneFS CLI Administration Guide or OneFS Web Administration Guide for your version of OneFS.

Hadoop user and group accounts

Before implementing Hadoop, ensure that the user and groups accounts that you will need to connect over HDFS are configured on the Isilon cluster.

Additionally, ensure that the user accounts that your Hadoop distribution requires are configured on the Isilon cluster on a per-zone basis. The user accounts that you need and the associated owner and group settings vary by distribution, requirements, and security policies. The profiles of the accounts, including UIDs and GIDS, on the Isilon cluster should match the profiles of the accounts on your Hadoop compute clients.

OneFS must be able to look up a local Hadoop user or group by name. If there are no directory services, such as Active Directory or LDAP, that can perform a user lookup, you must create a local Hadoop user or group. If directory services are available, a local user account or user group is not required.

HDFS and SmartConnect

You can configure a SmartConnect DNS zone to manage connections from Hadoop compute clients.

SmartConnect is a module that specifies how the DNS server on an Isilon cluster handles connection requests from clients. For each IP address pool on the Isilon cluster, you can configure a SmartConnect DNS zone which is a fully qualified domain name (FQDN).

For more information on SmartConnect, refer to the OneFS CLI Administration Guide or OneFS Web Administration Guide for your version of OneFS.

Note the following:

- Hadoop compute clients can connect to the cluster through the SmartConnect DNS zone name, and SmartConnect evenly distributes NameNode requests across IP addresses and nodes in the pool.
- When a Hadoop compute client makes an initial DNS request to connect to the SmartConnect zone, the Hadoop client is routed to the IP address of an Isilon node that serves as a NameNode. Subsequent requests from the Hadoop compute client go the same node. When a second Hadoop client makes a DNS request for the SmartConnect zone, SmartConnect balances traffic and routes the client connection to a different node than that used by the previous Hadoop compute client.
- If you specify a SmartConnect DNS zone that you want Hadoop compute clients to connect though, you must add a Name Server (NS) record as a delegated domain to the authoritative DNS zone that contains the Isilon cluster.
- On the Hadoop compute cluster, you must set the value of the `fs.defaultFS` property to the SmartConnect DNS zone name in the `core-site.xml` file.

CHAPTER 2

Configuring OneFS with HDFS

The following sections are steps you need perform to configure OneFS with HDFS.

Activate the HDFS and SmartConnect Advanced licenses

Before you can use OneFS with HDFS, you must confirm that licenses for HDFS and SmartConnect Advanced are active.

Procedure

1. To confirm that HDFS and SmartConnect Advanced are installed, run the following commands:

```
isi license licenses list
isi license licenses view HDFS
isi license licenses view "SmartConnect Advanced"
```

2. If your modules are not licensed, obtain a license key from your Isilon sales representative. To activate the license, type the following command:

```
isi license activate --key <key>
```

Configuring the HDFS service

You can configure HDFS service settings on your Isilon cluster to improve performance for HDFS workflows.

HDFS service settings overview

HDFS service settings affect the performance of HDFS workflows.

You can configure the following HDFS service settings:

Setting	Description
Block size	The HDFS block size setting on the Isilon cluster determines how the HDFS service returns data on read requests from Hadoop compute client. You can modify the HDFS block size on the cluster to increase the block size from 4 KB up to 1 G. The default block size is 128 MB. Increasing the block size enables the Isilon cluster nodes to read and write HDFS data in larger blocks and optimize performance for most use cases. The Hadoop cluster maintains a different block size that determines how a Hadoop compute client writes a block of file data to the Isilon cluster. The optimal block size depends on your data, how you process your data, and other factors. You can configure the block size on the Hadoop cluster in the `hdfs-site.xml` configuration file in the dfs.block.size property.
Checksum type	The HDFS service sends the checksum type to Hadoop compute clients, but it does not send any checksum data, regardless of the checksum type. The default checksum type is set to `None`. If your Hadoop distribution requires sending a checksum type other than `None` to the client, you can set the checksum type to `CRC32` or `CRC32C`.

Enable or disable the HDFS service (Web UI)

Enable or disable the HDFS service on a per-access zone basis using the OneFS web administration interface (Web UI).

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Settings**.
2. From the **Current Access Zone** list, select the access zone that you want to enable or disable the HDFS service for.
3. From the **HDFS Service Settings** area, select or clear the **Enable HDFS service** check box.
4. Click **Save Changes**.

Enable or disable the HDFS service (CLI)

Enable or disable the HDFS service on a per-access zone basis using the OneFS command-line interface (CLI).

Procedure

1. Run the `isi hdfs settings modify` command.

   The following command enables the HDFS service in zone3:

   ```
   isi hdfs settings modify --service=yes --zone=zone3
   ```

   The following command disables the HDFS service in zone3:

   ```
   isi hdfs settings modify --service=no --zone=zone3
   ```

Configure HDFS service settings (Web UI)

Configure HDFS service settings in each access zone using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Settings**.
2. From the **Current Access Zone** list, select the access zone in which you want to configure service settings.
3. From the **HDFS Service Settings** area, select the HDFS block size you want from the **Default Block Size** list.

   The HDFS block size determines how the HDFS service returns data upon read requests from Hadoop compute client.

4. Select the checksum type from the **Default Checksum Type** list.

   The HDFS service does not send any checksum data, regardless of the checksum type.

5. Click **Save Changes**.

Configure HDFS service settings (CLI)

Configure HDFS service settings in each access zone using the OneFS command-line interface.

Procedure

1. Run the `isi hdfs settings modify` command.

   The following command sets the block size to 256 KB in the zone3 access zone:

   ```
   isi hdfs settings modify --default-block-size=256K --
   zone=zone3
   ```

   You must specify the block size in bytes. Suffixes K, M, and G are allowed.

   The following command sets the checksum type to crc32 in the zone3 access zone:

   ```
   isi hdfs settings modify --default-checksum-type=crc32 --
   zone=zone3
   ```

View HDFS settings (Web UI)

View the HDFS settings for an access zone using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Settings**.
2. From the **Current Access Zone** list, select the access zone that you want to view the HDFS settings for.

   The **Settings** tab displays the current HDFS options in the following areas:

   - **HDFS Service Settings**
   - **HDFS Protocol Settings**
   - **Ambari Server Settings**

View HDFS settings (CLI)

View the HDFS settings for an access zone using the command-line interface.

Procedure

1. Open a secure shell (SSH) connection to any node in the cluster and then log in.
2. Run the `isi hdfs settings view` command.

   The following command displays the HDFS settings in the zone1 access zone:

   ```
   isi hdfs settings view --zone=zone1
   ```

Modify HDFS log levels (CLI)

You can set the default logging level of HDFS service events for any node on the Isilon cluster.

This procedure is available only through the command-line interface.

Procedure

1. Open a secure shell (SSH) connection to a node in the cluster and log in.
2. Run the `isi hdfs log-level modify` command.

   The following command sets the HDFS log level to trace on the node:

   ```
   isi hdfs log-level modify --set=trace
   ```

View HDFS log levels (CLI)

You can view the default logging level of HDFS services events for any node in the Isilon cluster.

This procedure is available only through the OneFS command-line interface.

Procedure

1. Open a secure shell (SSH) connection to a node in the cluster and log in.
2. Run the `isi hdfs log-level view` command.

Set the HDFS root directory (Web UI)

Configure one HDFS root directory in each access zone using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Settings**.
2. From the **Current Access Zone** list, select the access zone for which you want to specify the root directory.
3. From the **HDFS Protocol Settings** area, n the **HDFS Root Directory** field, type or browse to directory that you want to use for the HDFS root directory.

   The root directory must be within `/ifs`.
4. Click **Save Changes**.

Set the HDFS root directory (CLI)

Configure one HDFS root directory in each access zone using the command-line interface.

Before you begin

The directory structure that you want to set as the root path must exist first on the OneFS file system.

Procedure

- Run the `isi hdfs settings modify` command.

The following command specifies that Hadoop compute clients connecting to the zone3 access zone are provided access to the `/ifs/data/hadoop` directory:

```
isi hdfs settings modify --root-directory=/ifs/zone3/hadoop --
zone=zone3
```

Configuring HDFS authentication methods

You can configure an HDFS authentication method on a per-access zone basis.

When a Hadoop compute client connects to the Isilon cluster through an access zone, the client must authenticate with the method that is specified for that access zone.

Note

If you want Hadoop compute clients running Hadoop 2.2 and later to connect to an access zone through Kerberos, you must configure HDFS authentication properties on the Hadoop client.

Supported HDFS authentication methods

The authentication method determines the credentials that OneFS requires to establish a Hadoop compute client connection.

An HDFS authentication method is specified for each access zone. OneFS supports the following authentication methods for HDFS:

Authentication method	Description
Simple only	Requires only a username to establish client connections.
Kerberos only	Requires Kerberos credentials to establish client connections. **Note** You must configure Kerberos as an authentication provider on the Isilon cluster, and you must modify the `core-site.xml` file on clients running Hadoop 2.2 and later.
All (default value)	Accepts both simple authentication and Kerberos credentials. If Kerberos settings and file modifications are not completed, client connections default to simple authentication. **⚠ CAUTION** **To prevent unintended access through simple authentication, set the authentication method to `Kerberos only` to enforce client access through Kerberos.**

Set the HDFS authentication method (Web UI)

Configure the HDFS authentication method in each access zone using the OneFS web administration interface.

Before you begin

If you want to Hadoop clients to connect to an access zone through Kerberos, a Kerberos authentication provider must be configured and added to the access zone.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Settings**.
2. In the **Current Access Zone** list, select the access zone that you want to specify the authentication method for.
3. In the **HDFS Protocol Settings** area, in the **Authentication Type** list, select one of the following authentication methods:
   - Both Simple and Kerberos authentication
   - Simple authentication
   - Kerberos authentication
4. Click **Save Changes**.

Set the HDFS authentication method (CLI)

Configure the HDFS authentication method in each access zone using the command-line interface.

Before you begin

If you want to Hadoop clients to connect to an access zone through Kerberos, a Kerberos authentication provider must be configured and added to the access zone.

Procedure

1. Run the `isi hdfs settings modify` command.

   The following command specifies that Hadoop compute clients connecting to the zone3 must be identified through the simple authentication method:

   ```
   isi hdfs settings modify  --authentication-mode=simple_only --
   zone3
   ```

   The following command specifies that Hadoop compute clients connecting to zone3 must be identified through the Kerberos authentication method:

   ```
   isi zone zones modify zone3 --authentication-
   mode=kerberos_only
   ```

After you finish

To ensure that users can authenticate through Kerberos, you must modify the `core-site.xml` file on clients running Hadoop 2.2 and later.

Configure Kerberos authentication for Hadoop clients (CLI)

If you want Hadoop compute clients running Hadoop 2.2 and later to connect to an access zone through Kerberos, you must modify the `core-site.xml` and `hdfs-site.xml` files on the Hadoop clients.

Before you begin

Kerberos must be set as the HDFS authentication method in the access zone and a Kerberos authentication provider must be configured and assigned to the access zone.

Procedure

1. Go to the `$HADOOP_CONF` directory on your Hadoop client.
2. Open the `core-site.xml` file in a text editor.
3. Set the value of the hadoop.security.token.service.use_ip property to **`false`** as shown in the following example:

```
<property>
  <name>hadoop.security.token.service.use_ip</name>
  <value>false</value>
</property>
```

4. Save and close the `core-site.xml` file.
5. Open the `hdfs-site.xml` file in a text editor.
6. Set the value of the dfs.namenode.kerberos.principal.pattern property to the Kerberos realm configured in the Kerberos authentication provider as shown in the following example:

```
<property>
  <name>dfs.namenode.kerberos.principal.pattern</name>
  <value>hdfs/*@storage.company.com</value>
</property>
```

7. Save and close the `hdfs-site.xml` file.

Creating a local Hadoop user

OneFS must be able to look up local Hadoop users by name. If there are no directory services in an access zone that can perform a user lookup, you must create a local Hadoop user that maps to a user on a Hadoop compute client for that access zone. If directory services are available, a local user account is not required. You can create a local Hadoop user using either the OneFS web administration interface (Web UI) or the command-line interface (CLI).

Create a local Hadoop user (Web UI)

Create a local Hadoop user using the OneFS web administration interface.

Procedure

1. Click **Access** > **Membership & Roles** > **Users**.
2. From the **Current Access Zone** list, select the access zone that you want to create a local Hadoop user for.
3. From the **Providers** list, select **LOCAL**.

4. Click **Create User**, and then type a name for the Hadoop user in the **Username** field.
5. Click **Create User**.

Create a local Hadoop user (CLI)

Create a local Hadoop user using the command-line interface.

Procedure

1. Run the `isi auth users create` command.

   The following command creates a user who is named hadoop-user1 and assigns the user to the local authentication provider in the zone3 access zone:

   ```
   isi auth users create --name=hadoop-user1 --provider=local --
   zone=zone3
   ```

Enabling the WebHDFS REST API

OneFS supports access to HDFS data through WebHDFS REST API client applications.

WebHDFS is a RESTful programming interface based on HTTP operations such as GET, PUT, POST, and DELETE that is available for creating client applications. WebHDFS client applications allow you to access HDFS data and perform HDFS operations through HTTP and HTTPS.

- WebHDFS is supported by OneFS on a per-access zone basis and is enabled by default.
- WebHDFS supports simple authentication or Kerberos authentication. If the HDFS authentication method for an access zone is set to `All`, OneFS uses simple authentication for WebHDFS.
- To prevent unauthorized client access through simple authentication, disable WebHDFS in each access zone that should not support it.

You can specify whether access to HDFS data through WebHDFS client applications is supported in each access zone using either the OneFS web administration interface or the command-line interface.

Enable or disable WebHDFS (Web UI)

Configure access to HDFS data through WebHDFS client applications using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Settings**.
2. From the **Current Access Zone** list, select the access zone that you want to enable or disable WebHDFS for.
3. From the **HDFS Protocol Settings** area, select or clear the **Enable WebHDFS Access** checkbox.
4. Click **Save Changes**.

Enable or disable WebHDFS (CLI)

Configure access to HDFS data through WebHDFS client applications using the command-line interface.

Procedure

1. Run the `isi hdfs settings modify` command.

   The following command enables WebHDFS in zone3:

   ```
   isi hdfs settings modify --webhdfs-enabled=yes --zone=zone3
   ```

   The following command disables WebHDFS in zone3:

   ```
   isi hdfs settings modify --webhdfs-enabled=no --zone=zone3
   ```

Configuring secure impersonation

Secure impersonation enables you to create proxy users that can impersonate other users to run Hadoop jobs.

You might configure secure impersonation if you use applications, such as Apache Oozie, to automatically schedule, manage, and run Hadoop jobs. For example, you can create an Oozie proxy user that securely impersonates a user called HadoopAdmin, which allows the Oozie user to request that Hadoop jobs be performed by the HadoopAdmin user.

You configure proxy users for secure impersonation on a per–zone basis, and users or groups of users that you assign as members to the proxy user must be from the same access zone. A member can be one or more of the following identity types:

- User specified by user name or UID
- Group of users specified by group name or GID
- User, group, machine, or account specified by SID
- Well-known user specified by name

If the proxy user does not present valid credentials or if a proxy user member does not exist on the cluster, access is denied. The proxy user can only access files and sub-directories located in the HDFS root directory of the access zone. It is recommended that you limit the members that the proxy user can impersonate to users that have access only to the data the proxy user needs.

Note

Names cannot contain the following invalid characters:
" / \ [ ] : ; | = , + * ? < >

Create a proxy user (Web UI)

Create a proxy user using the OneFS web administration interface.

Before you begin

Add the users that you want to designate as proxy users or members to the Isilon cluster. The proxy user and its members must belong to the same access zone.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Proxy Users**.
2. From the **Current Access Zone** list, select the access zone in which you want to add a proxy user.
3. Click **Create a Proxy User**.
4. In the **Name** field, type or browse for the user that you want to designate as a new proxy user.

   If you browse for a user, you can search within each authentication provider that is assigned to the current access zone in the **Select a User** dialog box.
5. Click **Add a Member**. The **Select a User, Group, or Well-known SID** dialog box appears.
6. In the **Search for** area, select the type of member that you want to search for.

   Members can be individual users or groups. You can search for a user or group by name or by well-known SID.
7. (Optional) Click **Search** to display the search results based on the search criteria.
8. Select the member that you want from the **Search Results** list, and then click **Select**.

   The **Select a User, Group, or Well-known SID** dialog box closes.
9. Click **Create a Proxy User**.

Create a proxy user (CLI)

Create a proxy user using the command-line interface.

Before you begin

Add the users that you want to designate as proxy users or members to the Isilon cluster. The proxy user and its members must belong to the same access zone.

Procedure

1. Run the `isi hdfs proxyusers create` command.

   The following command designates hadoop-user23 in zone1 as a new proxy user:

   ```
   isi hdfs proxyusers create hadoop-user23 --zone=zone1
   ```

   The following command designates hadoop-user23 in zone1 as a new proxy user and adds the group hadoop-users to the list of members that the proxy user can impersonate:

   ```
   isi hdfs proxyusers create hadoop-user23 --zone=zone1 --add-
   group=hadoop-users
   ```

   The following command designates hadoop-user23 in zone1 as a new proxy user and adds UID 2155 to the list of members that the proxy user can impersonate:

   ```
   isi hdfs proxyusers create hadoop-user23 --zone=zone1 --add-
   UID=2155
   ```

Modify a proxy user (Web UI)

Modify the list of members that a proxy user securely impersonates using the Isilon web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Proxy Users**.
2. From the **Current Access Zone** list, select the access zone for which you want to modify a proxy user.
3. From the **Proxy Users** list, select the checkbox next to the proxy user that you want to modify, and then click **View/Edit**.
4. From the **View Proxy User Details** dialog box, click **Edit Proxy User**.
5. Add or remove members, and then click **Save Changes**.

Modify a proxy user (CLI)

Modify the list of members that a proxy user securely impersonates using the command-line interface.

Procedure

1. Run the `isi hdfs proxyusers modify` command.

   The following command removes a user with the user ID 2155 and adds a well-known user who is named LOCAL to the list of members for proxy user hadoop-user23 in zone1:

   ```
   isi hdfs proxyusers modify hadoop-user23 --zone=zone1 --add-
   wellknown=LOCAL --remove-uid=2155
   ```

View proxy users (Web UI)

View a list of all proxy users in an access zone and view individual proxy user details using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Proxy Users**.
2. From the **Current Access Zone** list, select the access zone in which you want to view a proxy user.

   The **Proxy Users** list displays all proxy users who are configured in the access zone.
3. From the **Proxy Users** list, select the checkbox next to the proxy user that you want to view, and then click **View/Edit**.

   The **View Proxy User Details** dialog box appears.
4. Click **Close** when you are finished viewing proxy user details.

View proxy users (CLI)

View a list of all proxy users in an access zone and view individual proxy user details using the command-line interface.

Procedure

1. Open a secure shell (SSH) connection to any node in the cluster and log in.
2. To view a list of all proxy users configure in a specific access zone, run the `isi hdfs proxyusers list` command.

   The following command displays a list of all proxy users configured in zone1:

   ```
   isi hdfs proxyusers list --zone=zone1
   ```

3. To view the configuration details for a specific proxy user, run the `isi hdfs proxyusers view`command.

   The following command displays the configuration details for the hadoop-user23 proxy user in zone1:

   ```
   isi hdfs proxyusers view hadoop-user23 --zone=zone1
   ```

View the member list of a proxy user (CLI)

Display the list of users and groups, known as members, assigned to a proxy user. The proxy user can securely impersonate any user in the member list.

This procedure is available only through the command-line interface.

Procedure

1. Run the `isi hdfs proxyusers members list` command.

   The following command displays a detailed list of the users and groups of users that are members of proxy user hadoop-user23 in zone1:

   ```
   isi hdfs proxyusers members list hadoop-user23 --zone=zone1 -v
   ```

Delete a proxy user (Web UI)

Delete a proxy user from an access zone using the OneFS web administration interface.

Deleting a proxy user deletes the user from the list of users that can perform secure impersonation. The user is not deleted from the system.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Proxy Users**.
2. From the **Current Access Zone** list, select the access zone that has the proxy user that you want to delete.
3. From the **Proxy Users** list, select the checkbox next to the proxy user that you want to delete, and then click **Delete**.
4. In the confirmation dialog box, click **Delete**.

Delete a proxy user (CLI)

Delete a proxy user from an access zone using the command-line interface.

Deleting a proxy user deletes the user from the list of users that can perform secure impersonation. The user is not deleted from the system.

Procedure

1. Run the `isi hdfs proxyusers delete` command.

   The following command deletes the proxy user hadoop-user23 from the zone1 access zone:

   ```
   isi hdfs proxyusers delete hadoop-user23 --zone=zone1
   ```

Configuring virtual HDFS racks

You can create a virtual HDFS rack of nodes on your Isilon cluster to optimize performance and reduce latency when accessing HDFS data.

OneFS enables you to specify a group of preferred HDFS nodes on your Isilon cluster and an associated group of Hadoop compute clients as a virtual HDFS rack. Virtual HDFS racks allow you to fine-tune client connectivity by directing Hadoop compute clients to go through quicker, less-busy switches or to faster nodes, depending on your network topology.

When a Hadoop compute client from the specified group connects to the cluster, OneFS returns at least two IP addresses from the group of preferred HDFS nodes. You specify the preferred HDFS nodes by IP address pool. Virtual HDFS racks do not support IP address pools in the IPv6 family.

Create a virtual HDFS rack (Web UI)

Create a virtual HDFS rack of nodes on your Isilon cluster using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Virtual Racks**.
2. From the **Current Access Zone** list, select the access zone in which you want to add a virtual HDFS rack.
3. Click **Create a Virtual Rack**.
4. In the **Name** field, type a name for the new virtual rack.

   A rack name must begin with a forward slash—for example, `/hdfs-rack2`.

5. In the **Client IP Ranges** fields, specify the IP address range of Hadoop compute clients to be associated with the virtual HDFS rack.

   You can associate multiple IP ranges.

6. From the **IP Pools** area, select the IP address pool that you want from the **Available Pools** table and click **Add**.
7. Click **Create Virtual Rack**.

Create a virtual HDFS rack (CLI)

Create a virtual HDFS rack of nodes on your Isilon cluster using the command-line interface.

Procedure

1. Run the `isi hdfs racks create` command.

   A rack name begins with a forward slash—for example, `/hdfs-rack2`.

   The following command creates a rack named `/hdfs-rack2` in the zone5 access zone:

   ```
   isi hdfs racks create /hdfs-rack2 --zone=zone5
   ```

   The following command creates a rack named `/hdfs-rack2` in the zone5 access zone, specifies 120.135.26.10-120.135.26.20 as the IP address range of Hadoop compute clients associated with the rack, and specifies subnet0:pool0 as the IP address pool of Isilon nodes assigned to the rack:

   ```
   isi hdfs racks create /hdfs-rack2 --zone=zone5 --client-ip-
   ranges=120.135.26.10-120.135.26.20 --ip-pools=subnet0:pool0
   ```

Modify a virtual HDFS rack (Web UI)

Modify the settings of a virtual HDFS rack using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Virtual Racks**.
2. From the **Current Access Zone** list, select the access zone in which you want to modify a virtual HDFS rack.
3. From the **Virtual Racks** list, select the checkbox next to the virtual HDFS rack that you want to modify, and then click **View/Edit**.
4. From the **View Virtual Rack Settings** dialog box, click **Edit Virtual Rack**.
5. Modify virtual rack settings, and then click **Save Changes**.

Modify a virtual HDFS rack (CLI)

Modify the settings of a virtual HDFS rack using the command line interface.

Procedure

1. Run the `isi hdfs racks modify` command.

   A rack name begins with a forward slash—for example, `/hdfs-rack2`.

   The following command renames a rack that is named `/hdfs-rack2` in the zone3 access zone to /hdfs-rack5:

   ```
   isi hdfs racks modify /hdfs-rack2 --new-name=/hdfs-rack5 --
   zone=zone3
   ```

The following command adds 120.135.26.30-120.135.26.40 to the list of existing Hadoop compute client IP addresses assigned to `/hdfs-rack2` in the zone3 access zone:

```
isi hdfs racks modify /hdfs-rack2 --add-client-ip-
ranges=120.135.26.30-120.135.26.40 --zone=zone3
```

In addition to adding a range to the list of existing ranges, you can modify the client IP address ranges by replacing the current ranges, deleting a specific range or deleting all ranges.

The following command replaces the existing IP pools with subnet1:pool1 and subnet2:pool2 assigned to /hdfs-rack2 in the zone3 access zone:

```
isi hdfs racks modify /hdfs-rack2 --ip-
pools=subnet1:pool1,subnet2:pool2 --zone=zone3
```

In addition to replacing the list of existing pools with new pools, you can modify the IP pools by adding pools to the list of current pools, deleting a specific pool or deleting all pools.

View virtual HDFS racks (Web UI)

View a list of all the virtual HDFS racks in an access zone and view individual virtual rack details using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Virtual Racks**.
2. From the **Current Access Zone** list, select the access zone in which you want to view a virtual HDFS rack.

   The **Virtual Racks** list displays all virtual HDFS racks that are configured in the access zone.
3. From the **Virtual Racks** list, select the checkbox next to the virtual HDFS rack that you want to view, and then click **View/Edit**.

   The **View Virtual Rack Settings** dialog box appears.
4. Click **Close** when you are finished viewing virtual HDFS rack details.

View virtual HDFS racks (CLI)

View a list of all virtual HDFS racks in an access zone and view individual virtual rack details using the command line interface.

Procedure

1. Open a secure shell (SSH) connection to any node in the cluster and log in.
2. To view a list of all virtual HDFS racks configured in an access zone, run the `isi hdfs racks list` command.

   The following command lists all HDFS racks configured in the zone1 access zone:

```
isi hfds racks list --zone=zone1
```

The following command displays setting details for all virtual HDFS racks configured in the zone1 access zone:

```
isi hdfs racks list --zone=zone1 -v
```

3. To view the setting details for a specific virtual HDFS rack, run the `isi hdfs racks view` command:

   Each rack name begins with a forward slash—for example `/hdfs-rack2`.

   The following example command displays setting details for the virtual HDFS rack named /hdfs-rack2 that is configured in the zone1 access zone:

```
isi hdfs racks view /hdfs-rack2 --zone=zone1
```

Delete a virtual HDFS rack (Web UI)

Delete a virtual HDFS rack from an access zone using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Virtual Racks**.
2. From the **Current Access Zone** list, select the access zone in which you want to delete a virtual HDFS rack.
3. From the **Virtual Racks** list, select the checkbox next to the virtual HDFS rack that you want to delete, and then click **Delete**.
4. In the confirmation dialog box, click **Delete**.

Delete a virtual HDFS rack (CLI)

Delete a virtual HDFS rack from an access zone using the command-line interface.

Procedure

1. Run the `isi hdfs racks delete` command.

   A rack name begins with a forward slash—for example, `/hdfs-rack2`.

   The following command deletes the virtual HDFS rack that is named `/hdfs-rack2` from the zone1 access zone:

```
isi hdfs racks delete /hdfs-rack2 --zone=zone1
```

2. At the prompt, type **`yes`**.

Configuring HDFS wire encryption

You can configure HDFS wire encryption using either the OneFS web administration interface or the command-line interface.

If you are using OneFS 8.0.1.0 or later, you can protect data that is transmitted between an HDFS client and OneFS through data-in-flight encryption, also known as HDFS wire encryption. In a Kerberos-enabled Hadoop environment, you can enable this feature on all of the HDFS clients and on OneFS. Wire encryption manages the negotiations between an HDFS client and OneFS to encrypt and decrypt data.

HDFS wire encryption enables OneFS to encrypt data that is transmitted between OneFS and HDFS to meet regulatory requirements. Wire encryption uses Advanced

Encryption Standard (AES) to encrypt the data. 128-bit, 192-bit, and 256-bit key lengths are available.

HDFS wire encryption that is supported by OneFS is different than the Apache HDFS Transparent Data Encryption technology. For more information, refer to Enhanced Hadoop security with OneFS 8.0.1 and Hortonworks HDP.

Note

When HDFS wire encryption is enabled, there is a significant impact on the HDFS protocol throughput and I/O performance.

Configure HDFS wire encryption (Web UI)

You can configure HDFS wire encryption using the OneFS web administration interface.

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Settings**.
2. In the **Data Transfer Cipher** list box, select one of the following options.

Option	Description
To enable HDFS wire encryption	Select one of the Advanced Encryption Standard (AES) ciphers, **AES/CTR/NoPadding with 128 bit key**, **AES/CTR/NoPadding with 192 bit key**, or **AES/CTR/NoPadding with 256 bit key**.
To disable HDFS wire encryption	Select **Do not encrypt data.**

3. Click **Save Settings**.

Configure HDFS wire encryption (CLI)

You can configure HDFS wire encryption using the command-line interface.

Before you begin

Perform the task "Configure Ranger plugin settings" before configuring HDFS wire encryption.

Procedure

1. To configure HDFS wire encryption, run `isi hdfs settings modify --data-transfer-cipher` *encryption_argument*.

Option	Description
To enable HDFS wire encryption	Set the *encryption_argument* to one of the Advanced Encryption Standard (AES) ciphers, `aes_128_ctr`,`aes_192_ctr` , or `aes_256_ctr`.
To disable HDFS wire encryption	Set the *encryption_argument* to `none`

```
isi hdfs settings modify --data-transfer-cipher aes_128_ctr
```

CHAPTER 3

OneFS with HDFS command reference

You can access and configure the HDFS service through the OneFS command-line interface. These commands perform the same operations as the OneFS web administration interface. These commands in this section are provided as a reference.

HDFS commands

The following list of OneFS commands will help you to manage your Isilon and Hadoop system integration.

isi hdfs log-level modify

Modifies the log level of the HDFS service on the node.

Syntax

```
isi hdfs log-level modify
  [--set {always|error|warning|info|verbose|debug|trace|default}  ]
  [--verbose|  -v]
```

Options

`--set {always | error | warning | info | verbose | debug | trace | default}`

Sets the default logging level for the HDFS service on the cluster. The default value is `default`.

`--verbose | -v`

Displays more detailed information.

isi hdfs log-level view

Displays the current log level of the HDFS service on the node.

Syntax

```
isi hdfs log-level view
```

Options

There are no options for this command.

isi hdfs proxyusers create

Creates a proxy user that can securely impersonate another user or group.

Syntax

```
isi hdfs proxyusers create <proxyuser-name>
  [--zone <zone-name>]
  [--add-group <group-name>...]
  [--add-gid <group-identifier>...]
  [--add-user <user-name>...]
  [--add-uid <user-identifier>...]
  [--add-sid <security-identifier>...]
  [--add-wellknown <well-known-name>...]
  [--verbose]
```

Options

<proxyuser-name>

Specifies the user name of a user currently configured on the cluster to be designated as a proxy user.

--zone ***<zone-name>***

Specifies the access zone the user authenticates through.

--add-group ***<group-name>*****...**

Adds the group specified by name to the list of proxy user members. The proxy user can impersonate any user in the group. The users in the group must authenticate to the same access zone as the proxy user. You can specify multiple group names in a comma-separated list.

--add-gid ***<group-identifier>*****...**

Adds the group by specified by UNIX GID to the list of proxy user members. The proxy user can impersonate any user in the group. The users in the group must authenticate to the same access zone as the proxy user. You can specify multiple UNIX GIDs in a comma-separated list.

--add-user ***<user-name>*****...**

Adds the user specified by name to the list of members the proxy user can impersonate. The user must authenticate to the same access zone as the proxy user. You can specify multiple user names in a comma-separated list.

--add-uid ***<user-identifier>*****...**

Adds the user specified by UNIX UID to the list of members the proxy user can impersonate. The user must authenticate to the same access zone as the proxy user. You can specify multiple UNIX UIDs in a comma-separated list.

--add-sid ***<security-identifier>*****...**

Adds the user, group of users, machine or account specified by Windows SID to the list of proxy user members. The object must authenticate to the same access zone as the proxy user. You can specify multiple Windows SIDs in a comma-separated list.

--add-wellknown ***<well-known-name>*****...**

Adds the well-known user specified by name to the list of members the proxy user can impersonate. The well-known user must authenticate to the same access zone as the proxy user. You can specify multiple well-known user names in a comma-separated list.

{ --verbose | -v}

Displays more detailed information.

Examples

The following command designates hadoop-user23 in zone1 as a new proxy user:

```
isi hdfs proxyusers create hadoop-user23 --zone=zone1
```

The following command designates hadoop-user23 in zone1 as a new proxy user and adds the group of users named hadoop-users to the list of members that the proxy user can impersonate:

```
isi hdfs proxyusers create hadoop-user23 --zone=zone1 \
--add-group=hadoop-users
```

The following command designates hadoop-user23 in zone1 as a new proxy user and adds UID 2155 to the list of members that the proxy user can impersonate:

```
isi hdfs proxyusers create hadoop-user23 --zone=zone1 --add-UID=2155
```

isi hdfs proxyusers modify

Modifies a proxy user that can securely impersonate another user or group.

Syntax

```
isi hdfs proxyusers modify <proxyuser-name>
  [--zone <zone-name>]
  [--add-group <group-name>...]
  [--add-gid <group-identifier>...]
  [--add-user <user-name>...]
  [--add-uid <user-identifier>...]
  [--add-sid <security-identifier>...]
  [--add-wellknown <well-known-name>...]
  [--remove-group <group-name>...]
  [--remove-gid <group-identifier>...]
  [--remove-user <user-name>...]
  [--remove-uid <user-identifier>...]
  [--remove-sid <security-identifier>...]
  [--remove-wellknown <well-known-name>...]
  [--verbose]
```

Options

<proxyuser-name>

Specifies the user name of the proxy user to be modified.

--zone ***<zone-name>***

Specifies the access zone that the proxy user authenticates through.

--add-group ***<group-name>*...**

Adds the group specified by name to the list of proxy user members. The proxy user can impersonate any user in the group. The users in the group must authenticate to the same access zone as the proxy user. You can specify multiple group names in a comma-separated list.

--add-gid ***<group-identifier>*...**

Adds the group specified by UNIX GID to the list of proxy user members. The proxy user can impersonate any user in the group. The users in the group must authenticate to the same access zone as the proxy user. You can specify multiple UNIX GIDs in a comma-separated list.

--add-user ***<user-name>*...**

Adds the user specified by name to the list of members the proxy user can impersonate. The user must authenticate to the same access zone as the proxy user. You can specify multiple user names in a comma-separated list.

--add-uid *<user-identifier>*...

Adds the user specified by UNIX UID to the list of members the proxy user can impersonate. The user must authenticate to the same access zone as the proxy user. You can specify multiple UNIX UIDs in a comma-separated list.

--add-sid *<security-identifier>*...

Adds the user, group of users, machine or account specified by Windows SID to the list of proxy user members. The object must authenticate to the same access zone as the proxy user. You can specify multiple Windows SIDs in a comma-separated list.

--add-wellknown *<well-known-name>*...

Adds the well-known user specified by name to the list of members the proxy user can impersonate. The well-known user must authenticate to the same access zone as the proxy user. You can specify multiple well-known user names in a comma-separated list.

--remove-group *<group-name>*...

Removes the group specified by name from the list of proxy user members so that the proxy user can no longer impersonate any user in the group. You can specify multiple group names in a comma-separated list.

--remove-gid *<group-identifier>*...

Removes the group specified by UNIX GID from the list of proxy user members so that the proxy user can no longer impersonate any user in the group. You can specify multiple UNIX GIDs in a comma-separated list.

--remove-user *<user-name>*...

Removes the user specified by name from the list of members the proxy user can impersonate. You can specify multiple user names in a comma-separated list.

--remove-uid *<user-identifier>*...

Removes the user specified by UNIX UID from the list of members the proxy user can impersonate. You can specify multiple UNIX UIDs in a comma-separated list.

--remove-sid *<security-identifier>*...

Removes the user, group of users, machine or account specified by Windows SID from the list of proxy user members. You can specify multiple Windows SIDs in a comma-separated list.

--remove-wellknown *<well-known-name>*...

Removes the well-known user specified by name from the list of members the proxy user can impersonate. You can specify multiple well-known user names in a comma-separated list.

{--verbose | -v}

Displays more detailed information.

Examples

The following command adds the well-known local user to, and removes the user whose UID is 2155 from, the list of members for proxy user hadoop-user23 in zone1:

```
isi hdfs proxyusers modify hadoop-user23 --zone=zone1 \
--add-wellknown=local --remove-uid=2155
```

isi hdfs proxyusers delete

Deletes a proxy user.

Syntax

```
isi hdfs proxyusers delete <proxyuser-name>
  [--zone <zone-name>]
  [--force]
  [--verbose]
```

Options

<proxyuser-name>

Specifies the user name of the proxy user to be deleted.

--zone *<zone-name>*

Specifies the access zone that the proxy user authenticates through.

{ --force | -f}

Deletes the specified proxy user without requesting confirmation.

{ --verbose | -v}

Displays more detailed information.

Examples

The following command deletes hadoop-user23 in zone1 from the list of proxy users:

```
isi hdfs proxyusers delete hadoop-user23 --zone=zone1
```

isi hdfs proxyusers members list

Displays the users and groups of users, known as members, that can be impersonated by a proxy user.

Syntax

```
isi hdfs proxyusers members list <proxyuser-name>
  [--zone <zone-name>]
  [--format {table | json | csv | list}]
  [--no-header ]
  [--no-footer ]
  [--verbose]
```

Options

<proxyuser-name>

Specifies the name of the proxy user.

--zone ***<zone-name>***

Specifies the access zone the proxy user authenticates through.

--format {table | json | csv | list}

Displays output in table (default), JavaScript Object Notation (JSON), comma-separated value (CSV), or list format.

--no-header

Displays table and CSV output without headers.

--no-footer

Displays table output without footers.

{ --verbose | -v}

Displays more detailed information.

Examples

The following command displays a detailed list of the users and groups that are members of proxy user hadoop-user23 in zone1:

```
isi hdfs proxyusers members list hadoop-user23 --zone=zone1 -v
```

The system displays output similar to the following example:

```
Type: user
Name: krb_user_005
  ID: UID:1004
--------------------------------------------------------------------------
----------
Type: group
Name: krb_users
  ID: SID:S-1-22-2-1003
--------------------------------------------------------------------------
----------
Type: wellknown
Name: LOCAL
  ID: SID:S-1-2-0
```

isi hdfs proxyusers list

Displays all proxy users that are configured in an access zone.

Syntax

```
isi hdfs proxyusers list
  [--zone <zone-name>]
  [--format {table | json | csv | list}]
  [--no-header ]
  [--no-footer ]
  [--verbose]
```

Options

--zone ***<zone-name>***

Specifies the name of the access zone.

--format {table | json | csv | list}

Displays output in table (default), JavaScript Object Notation (JSON), comma-separated value (CSV), or list format.

--no-header

Displays table and CSV output without headers.

--no-footer

Displays table output without footers.

{ --verbose | -v}

Displays more detailed information.

Examples

The following command displays a list of all proxy users that are configured in zone1:

```
isi hdfs proxyusers list --zone=zone1
```

The system displays output similar to the following example:

```
Name
-------------
hadoop-user23
hadoop-user25
hadoop-user28
-------------
Total: 3
```

isi hdfs proxyusers view

Displays the configuration details of a specific proxy user.

Syntax

```
isi hdfs proxyusers view <proxyuser-name>
  [--zone <zone-name>]
```

Options

<proxyuser-name>

Specifies the user name of the proxy user.

--zone *<zone-name>*

Specifies the access zone the proxy user authenticates through.

Examples

The following command displays the configuration details for the hadoop-user23 proxy user in zone1:

```
isi hdfs proxyusers view hadoop-user23 --zone=zone1
```

The system displays output similar to the following example:

```
Name: hadoop-user23
Members: krb_users
```

```
        LOCAL
        krb_user_004
```

isi hdfs racks create

Creates a new virtual HDFS rack.

Syntax

```
isi hdfs racks create <rack-name>
  [--client-ip-ranges <low-ip-address>-<high-ip-address>]...
  [--ip-pools <subnet>:<pool>]...
  [--zone <string>]
  [--verbose]
```

Options

<rack-name>

Specifies the name of the virtual HDFS rack. The rack name must begin with a forward slash—for example, **/example-name**.

--client-ip-ranges *<low-ip-address>-<high-ip-address>*...

Specifies IP address ranges of external Hadoop compute clients assigned to the virtual rack.

--ip-pools *<subnet>:<pool>*...

Assigns a pool of Isilon cluster IP addresses to the virtual rack.

--zone *<string>*

Specifies the access zone that will contain the virtual rack.

{--verbose | -v}

Displays more detailed information.

isi hdfs racks modify

Modifies a virtual HDFS rack.

Syntax

```
isi hdfs racks modify <rack-name>
  [--name <rack-name>]
  [--client-ip-ranges <low-ip-address>-<high-ip-address>]...
  [--add-client-ip-ranges <low-ip-address>-<high-ip-address>]...
  [--remove-client-ip-ranges <low-ip-address>-<high-ip-address>]...
  [--clear-client-ip-ranges]
  [--ip-pools <subnet>:<pool>]...
  [--add-ip-pools <subnet>:<pool>]...
  [--remove-ip-pools <subnet>:<pool>]...
  [--clear-ip-pools]
  [--zone <string>]
  [--verbose]
```

Options

<rack-name>

Specifies the virtual HDFS rack to be modified. Each rack name begins with a forward slash—for example **/example-name**.

--name *<rack-name>*

Assigns a new name to the specified virtual rack. The rack name must begin with a forward slash—for example **/example-name**.

--client-ip-ranges *<low-ip-address>-<high-ip-address>*...

Specifies IP address ranges of external Hadoop compute clients assigned to the virtual rack. The value assigned through this option overwrites any existing IP address ranges. You can add a new range through the `--add-client-ip-ranges` option.

--add-client-ip-ranges *<low-ip-address>-<high-ip-address>*...

Adds a specified IP address range of external Hadoop compute clients to the virtual rack.

--remove-client-ip-ranges *<low-ip-address>-<high-ip-address>*...

Removes a specified IP address range of external Hadoop compute clients from the virtual rack. You can only remove an entire range; you cannot delete a subset of a range.

--clear-client-ip-ranges

Removes all IP address ranges of external Hadoop compute clients from the virtual rack.

--ip-pools *<subnet>:<pool>*...

Assigns pools of Isilon node IP addresses to the virtual rack. The value assigned through this option overwrites any existing IP address pools. You can add a new pool through the `--add-ip-pools` option.

--add-ip-pools *<subnet>:<pool>*...

Adds a specified pool of Isilon cluster IP addresses to the virtual rack.

--remove-ip-pools *<subnet>:<pool>*...

Removes a specified pool of Isilon cluster IP addresses from the virtual rack.

--clear-ip-pools

Removes all pools of Isilon cluster IP addresses from the virtual rack.

--zone *<string>*

Specifies the access zone that contains the virtual rack you want to modify.

{--verbose | -v}

Displays more detailed information.

isi hdfs racks delete

Deletes a virtual HDFS rack.

Syntax

```
isi hdfs racks delete <rack-name>
  [--zone <string>]
```

```
  [--force]
  [--verbose]
```

Options

<rack-name>

Deletes the specified virtual HDFS rack. Each rack name begins with a forward slash—for example, **/example-name**.

--zone ***<string>***

Specifies the access zone that contains the virtual rack you want to delete.

{--force | -f}

Suppresses command-line prompts and messages.

{--verbose | -v}

Displays more detailed information.

isi hdfs racks list

Lists the HDFS racks in an access zone.

Syntax

```
isi hdfs racks list
  [--zone <string>]
  [--format {table | json | csv | list}]
  [--no-header]
  [--no-footer]
  [--verbose]
```

Options

--zone ***<string>***

Specifies the access zone. The system displays all virtual racks in the specified zone.

--format {table | json | csv | list}

Display HDFS racks in table, JSON, CSV, or list format.

{--no-header | -a}

Do not display headers in CSV or table output format.

{--no-footer | -z}

Do not display table summary footer information.

{--verbose | -v}

Displays more detailed information.

isi hdfs racks view

Displays information for a specific virtual HDFS rack.

Syntax

```
isi hdfs racks view <rack-name>
  [--zone <string>]
```

Options

<rack-name>

Specifies the name of the virtual HDFS rack to view. Each rack name begins with a forward slash—for example, **/example-name**.

--zone *<string>*

Specifies the access zone that contains the virtual rack you want to view.

isi hdfs ranger-plugin settings modify

Modify Apache Ranger plug-in settings for HDFS.

Syntax

```
isi hdfs ranger-plugin settings modify
  [--enabled <boolean>]
  [--policy-manager-url <string>]
  [--repository-name <string>]
  [--zone <string>]
  [--verbose]
```

Options

--enabled *<boolean>*

Enable the HDFS Ranger plug-in.

--policy-manager-url *<string>*

The scheme, host name, and port of the Apache Ranger server (for example, `http://ranger.com:6080`).

--repository-name *<string>*

The HDFS repository name hosted on the Apache Ranger server.

--zone *<string>*

The access zone containing the HDFS repository.

{--verbose | -v}

Display more detailed information.

isi hdfs ranger-plugin settings view

View Apache Ranger plug-in settings for HDFS.

Syntax

```
isi hdfs ranger-plugin settings view
  [--zone <string>]
```

Options

--zone *<string>*

The access zone containing the HDFS repository.

isi hdfs settings modify

Modifies the HDFS settings for an access zone.

Syntax

```
isi hdfs settings modify
  [--service {yes | no}]
  [--default-block-size <size>]
  [--default-checksum-type {none | crc32 | crc32c}]
  [--authentication-mode {all | simple_only | kerberos_only}]
  [--root-directory <path>]
  [--webhdfs-enabled {yes | no]
  [--ambari-server <string>]
  [--ambari-namenode <string>]
  [--ambari-metrics-collector <string>]
  [--odp-version <string>]
  [--data-transfer-cipher {none | aes_128_ctr | aes_192_ctr |
aes_256_ctr}]
  [--zone <string>]
  [--verbose]
```

Options

--service {yes | no}

Enables or disables the HDFS service in the specified access zone. The HDFS service is enabled by default.

--default-block-size *<size>*

The block size (in bytes) reported by the HDFS service. K, M, and G; for example, 64M, 512K, 1G, are valid suffixes. The default value is 128 MB.

--default-checksum-type {none | crc32 | crc32c}

The checksum type reported by the HDFS service. The default value is `none`

--authentication-mode {all | simple_only | kerberos_only}

The authentication method used for HDFS connections through the specified access zone. The default value is `all`.

--root-directory *<path>*

Root path that contains HDFS data in the access zone that can be accessed by Hadoop compute client connections. The root directory must be within the access zone base directory.

--webhdfs-enabled {yes | no}

Enables or disables the WebHDFS in the specified access zone. WebHDFS is enabled by default.

--ambari-server *<string>*

The Ambari server that receives communication from an Ambari agent. The value must be a resolvable hostname, FQDN, IPv4 or IPv6 address.

--ambari-namenode *<string>*

A point of contact in the access zone that Hadoop services managed through the Ambari interface should connect through. The value must be a resolvable IPv4 address or a SmartConnect zone name.

--ambari-metrics-collector *<string>*

The host name for the metrics collector. The value must be a resolvable hostname, FQDN, IPv4 or IPv6 address.

--odp-version *<string>*

The version of the Open Data Platform (ODP) stack repository, including build number if one exists, installed by the Ambari server. This is required to support ODP upgrades on other systems that are part of the Hadoop cluster.

--data-transfer-cipher {none | aes_128_ctr | aes_192_ctr | aes_256_ctr}

The Advanced Encryption Standard (AES) cipher to use for wire encryption.

--zone *<string>*

The access zone to which the HDFS settings apply.

{--verbose | -v}

Display more detailed information.

isi hdfs settings view

Displays the HDFS settings in an access zone.

Syntax

```
isi hdfs settings view
  [--zone <string>]
```

Options

--zone *<string>*

Specifies the access zone. The system will display the HDFS settings for the specified zone.

CHAPTER 4

Additional resources

This chapter includes information about configuring third-party HDFS components like Ambari. Links to additional content resources about how to implement Hadoop on an Isilon cluster are also provided.

Third-party HDFS components

Ambari

Ambari agent

The Apache Ambari client and server framework, as part of the Hortonworks Data Platform (HDP), is an optional third-party tool that enables you to configure, manage, and monitor a Hadoop cluster through a browser-based interface.

The OneFS Ambari agent is configured per access zone. You can configure the Ambari agent in any access zone that contains HDFS data. To start the Ambari agent in an access zone, you must specify the IPv4 address of the external Ambari server and the address of a NameNode. The NameNode acts as the point of contact for the access zone.

The Apache Ambari server receives communications from the Ambari agent. Once the Ambari agent is assigned to the access zone, it registers with the Ambari server. The agent then provides heartbeat status to the server. The Ambari server must be a resolvable hostname, FQDN, or IPv4 address and must be assigned to an access zone.

The NameNode is the designated point of contact in an access zone that Hadoop services manage through the Ambari interface. For example, if you manage services such as YARN or Oozie through the Ambari agent, the services connect to the access zone through the specified NameNode. The Ambari agent communicates the location of the designated NameNode to the Ambari server and to the Ambari agent. If you change the designated NameNode address, the Ambari agent updates the Ambari server. The NameNode must be a valid SmartConnect zone name or an IP address from the IP address pool that is associated with the access zone.

Note

The specified NameNode value maps to the NameNode, secondary NameNode, and DataNode components on the OneFS Ambari agent.

The OneFS Ambari agent is based on the Apache Ambari framework and is compatible with multiple Ambari server versions. For a complete list of supported versions, see the Supported Hadoop Distributions and Products page on the EMC Community Network (ECN).

Configuring Ambari agent settings

You can configure Ambari agent support in each access zone that contains HDFS data using either the OneFS web administration interface or the command-line interface.

Configure Ambari agent settings (Web UI)
Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Settings**.
2. From the **Current Access Zone** list, select the access zone in which you want to enable Ambari server settings.
3. From the **Ambari Server Settings** area, in the **Ambari Server** field, type the name of the external Ambari server that communicates with the Ambari agent.

   The value must be a resolvable hostname, FQDN, IPv4, or IPv6 address.

4. In the **Ambari NameNode** field, designate the SmartConnect FQDN or IP address of the access zone where the HDFS data resides on the cluster.

   The IP address must belong to an IP address pool that shares access zone. IPv6 addresses are not supported.

5. In the **ODP Version** field, specify the version of the Open Data Platform (ODP) stack repository, including build number if one exists, installed by the Ambari server.

   The ODP version is required to support ODP upgrades on other systems that are part of the Hadoop cluster.

6. In the **Ambari Metrics Collector** field, specify the name of the external Ambari host where the Ambari Metrics Collector component is installed.

   The value must be a resolvable hostname, FQDN, IPv4, or IPv6 address.

7. Click **Save Changes**.

Configure Ambari agent settings (CLI)
Procedure

1. Run the `isi hdfs settings modify` command.

   The following command specifies company.ambari.server.com as the external Ambari server that receives communication from the Ambari agent running in the zone3 access zone.

   ```
   isi hdfs settings modify \
   --ambari-server=company.ambari.server.com \
   --ambari-metrics-collector string  \
   --zone=zone3
   ```

   The following command designates 192.168.205.5 as the point of contact in the zone3 access zone for Hadoop services that are managed through the Ambari interface.

   ```
   isi hdfs settings modify  \
   --ambari-namenode=192.168.205.5 \
   --ambari-metrics-collector http://ambari-metrics-collector-
   host.com  \
   --zone=zone3
   ```

Ambari metrics and alerts

In a Hadoop deployment with OneFS 8.0.1.0 or later releases, a node in a Isilon cluster can monitor, collect, and push metrics data at 1 minute intervals to the Ambari Metrics Collector, which is one of the components of the Ambari Metrics System from Hortonworks.

All of the OneFS metrics and alert data that are provided to Ambari are cluster-wide. For example, for a three-node Isilon cluster, the network NDFS traffic aggregated across all three nodes is reported to Ambari. **Note**: OneFS metrics for specific access zones that contain HDFS data sets is not currently supported.

To view the Ambari metrics, follow the steps that are outlined in Ambari metrics and alerts with EMC Isilon OneFS.

Apache Ranger support

OneFS supports Apache Ranger as part of a Hadoop deployment with an Isilon cluster.

The Apache Ranger console provides a centralized security framework to manage access control over Hadoop data access components such as Apache Hive and Apache HBase. These policies can be set for both individual users or groups and then enforced consistently on files, folders, and databases.

Only Ranger's HDFS authorization policies with Deny conditions are supported by OneFS. Documentation for Apache JIRA RANGER-606 describes how to use Deny conditions, which were added to Apache Ranger 0.6.0. For more information on Apache Ranger and specific HDP components, refer to the Apache Ranger pages on the Hortonworks site.

- AD, Kerberos, and local authentication are supported.
- Apache Ranger audit of HDFS access is not currently supported.
- Tag policies are not currently supported.

Editing Apache Ranger HDFS plugin settings

You can enable the Apache Ranger HDFS plugin to allow additional oversight of HDFS protocol authentication using either the OneFS web administration interface or the command-line interface (CLI).

You can enable Apache Ranger on Isilon clusters and then check for new authorization policies, receive HDFS requests from clients, and apply authorization policies to the HDFS requests, which can be one of DENY, ALLOW, or UNDETERMINED. Enable the Apache Ranger HDFS plugin using the steps that are outlined in the Hortonworks Security Guide.

Enabling the Apache Ranger plugin allows the authorization policies that are defined in the Ranger HDFS service instance, also called a repository, prior to Apache Ranger 0.6.0. The policies must first allow users or groups access to resources and then deny specific users or groups from access. If a user is not included in the allow list, they are denied access by default. For more information about creating a DENY policy, see Apache Ranger deny policies with OneFS 8.0.1.0

Note

A poorly formed policy can have an unintended impact, for example, blocking access.

The repository name is a setting within Apache Ranger. The minimum supported version of Apache Ranger is 0.6.0 because the Ranger DENY policy is supported only in 0.6.0 and later versions. In version 0.6.0, Apache Ranger changed the name of this feature to service instance. The service instance is the name of the HDFS service instance within the Apache Ranger Admin UI used as the repository name.

If you have a Kerberos-enabled cluster, follow the instructions in the Hortonworks Security Guide to enable the Ranger HDFS plugin on the cluster.

Edit Apache Ranger HDFS plugin settings (Web UI)

The policy manager URL is found on the Ambari server at **Ambari** > **Ranger** > **Configs** as the **policymgr_external_url**. This URL is created by combining `http://`, followed by the host name where Ranger Admin is installed, followed by the *`ranger.service.http.port`*, which is usually 6080, followed by `/`

Procedure

1. Click **Protocols** > **Hadoop (HDFS)** > **Ranger Plugin Settings**.
2. In the **Ranger Plugin settings** area, select **Enable Ranger Plugin**
3. In the **Policy manager URL** field, type the URL that points to the location of the Policy Manager.
4. In the **Repository name** field, type the name of the HDFS repository.
5. Click **Save Changes**.

Edit Apache Ranger HDFS plugin settings (CLI)

The policy manager URL is found on the Ambari server at **Ambari** > **Ranger** > **Configs** as the **policymgr_external_url**. This URL is created by combining `http://`, followed by the hostname where Ranger Admin is installed, followed by the *`ranger.service.http.port`*, which is usually 6080, followed by `/`

Procedure

1. To configure Ranger plugin settings, run the `isi hdfs ranger-plugin settings modify` command.

   The *--policy-manager-url* is created by combining `http://`, followed by the hostname where Ranger Admin is installed, followed by the *`ranger.service.http.port`*, which is usually 6080, followed by `/`.

   The following command configures the Ranger plugin settings.

   ```
   isi hdfs ranger-plugin settings modify --policy-manager-url
   http://resolvable_name:6080/ --repository-name
   repository_name --enabled true --zone zone_name
   ```

Using Hadoop with Isilon

In addition to this HDFS administration guide, use the following resources to implement your Isilon OneFS and HDFS system integration.

Compatibility information

- Hadoop Distributions and Products Supported by OneFS

Information specific to Isilon

- Using Hadoop with Isilon - Isilon Info Hub
- Overview of Isilon and Hadoop (video)
- Hadoop Distributions and Products Supported by OneFS
- Prepare an Isilon for Hadoop Cheat Sheet
- Isilon and Hadoop Local UID Parity
- Getting Isilon - Hadoop UID/GID parity
- OneFS and Hadoop Proxy Users
- Considerations for Active Directory based on Kerberos with Hadooop
- Backing Up Hadoop To Isilon
- Troubleshooting a Permissions Issue between Hadoop and Isilon
- Using HTTPFS & Knox with Isilon OneFS to Enhance HDFS Access Security

- Creating a Bi-Directional HDFS Mirror Across HDP/Isilon Clusters with Falcon

Hortonworks and Ambari

- EMC Isilon OneFS with Hadoop and Hortonworks Installation Guide
- Configuring Ambari Hive View with OneFS
- Apache Ranger deny policies with OneFS 8.0.1.0
- Ambari Metrics and Alerts with EMC Isilon
- Enhanced Hadoop Security with OneFS 8.0.1 and Hortonworks HDP
- Ever better HDP upgrades with OneFS
- OneFS, Ambari, and Accumulo Tracer
- Configuring a single database instance for Ambari, Hive, and Oozie on Hortonworks/Isilon Hadoop Cluster

Hortonworks and Ambari with Kerberos

- Ambari Automated Kerberos Configuration with Isilon OneFS
- Ambari HDP with Isilon 8.0.0.1 and Active Directory Kerberos Implementation
- Duplicate SPN's with Isilon AD Kerberos and Hortonworks prevent services from starting
- KDC Kerberized Yarn Service Fail to Start on 8.0.1 with Ambari via WebHDFS curl calls
- The infamous '401 Authorization Required' error when starting Kerberized services

Cloudera

- EMC Isilon OneFS with Hadoop and Cloudera Installation Guide
- Cloudera and Isilon Implementation - Part 1
- Cloudera and Isilon Implementation - Part 2
- Get Cloudera 5.7 Impala starting with Isilon

Cloudera with Kerberos

- Cloudera 5.7 with Isilon 8.0.0.1 and Active Directory Kerberos Implementation

Known issues and workarounds

- Attempts to use the Apache Hadoop YARN node label feature fail
- Customer Troubleshooting - Isilon Info Hub

Let us know what you think

Your suggestions help us to improve the accuracy, organization, and overall quality of the documentation. Send your feedback to https://www.research.net/s/isi-docfeedback. If you cannot provide feedback through the URL, send an email message to docfeedback@isilon.com.

Where to go for support

If you have any questions about Isilon products, contact Isilon Technical Support.

Online Support	• Live Chat • Create a Service Request
Telephone Support	• United States: 1-800-SVC-4EMC (1-800-782-4362) • Canada: 1-800-543-4782 • Worldwide: 1-508-497-7901 • Local phone numbers for a specific country are available at EMC Customer Support Centers.
Support registration or access	For questions about accessing EMC Customer Support, email support@emc.com.
Isilon Info Hubs	For the list of Isilon info hubs, see the Isilon Info Hubs page on the Isilon Community Network. Isilon info hubs organize Isilon documentation, videos, blogs, and user-contributed content into topic areas, making it easy to find content about subjects that interest you.

Support for IsilonSD Edge

If you are running a free version of IsilonSD Edge, support is available through the Isilon Community Network. If you purchased one or more IsilonSD Edge licenses, support is available through Isilon Technical Support, provided you have a valid support contract for the product.