

Impala Iceberg REST Catalog (Preview)

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Using Impala with Iceberg REST Catalog

Overview

Impala supports the Apache Iceberg REST Catalog, which enables Impala to connect directly to Iceberg REST Catalog servers. This feature has the following benefits:

- Running Impala without Hive Metastore (HMS) or a catalogd dependency.
- Connecting to multiple REST catalog endpoints simultaneously.
- Deploying hybrid environments that use both HMS and REST catalogs.
- Integrating with open-source REST catalog implementations.

For more information on the Apache Iceberg REST Catalog specification, see the official [Iceberg REST Catalog documentation](#).

REST Catalog overview

The Iceberg REST Catalog is a standardized HTTP API for managing Iceberg table metadata. Unlike traditional Hive Metastore (HMS) deployments, REST Catalog provides a lightweight, cloud-native approach to catalog management that works seamlessly across different compute engines.

REST Catalog configuration

REST Catalog configuration in Impala uses Java property files that specify connection details and authentication settings. Configuration files must be placed in a directory specified by the `--catalog_config_dir` flag.

Configuration file format

Configuration files use the standard Java Properties format, with `key=value` pairs. Each file represents a separate REST Catalog.

Required properties

The following properties are required in every REST Catalog configuration file:

- `connector.name` – Must be set to `iceberg`.
- `iceberg.catalog.type` – Must be set to `rest`.
- `uri` or `iceberg.rest-catalog.uri` – Must be set to the REST Catalog endpoint URL.

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Example

The following properties are required in every REST Catalog configuration file:

```
None
connector.name=iceberg
iceberg.catalog.type=rest
uri=http://rest-catalog-server:9084
```

Optional properties

Warehouse location

```
None
warehouse=hdfs://namenode:8020/warehouse/iceberg
or
iceberg.rest-catalog.warehouse=hdfs://namenode:8020/warehouse/i
ceberg
```

Catalog prefix

```
None
prefix=my_catalog
or
iceberg.rest-catalog.prefix=my_catalog
```

OAuth configuration

```
None
iceberg.rest-catalog.security=OAUTH2
iceberg.rest-catalog.oauth2.credential=client_secret
iceberg.rest-catalog.oauth2.server-uri=http://localhost:7070/re
alms/lakekeeper-realm/protocol/openid-connect/token
```

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Environment variable substitution

Impala supports environment variable substitution in `.properties` files to securely manage credentials and environment-specific settings. This feature is particularly useful for storing secrets outside of configuration files.

Syntax

```
${ENV:VARIABLE_NAME}
```

Example

```
None
iceberg.rest-catalog.oauth2.credential=${ENV:OAUTH_CLIENT_SECRET}
connection-password=${ENV:DB_PASSWORD}
```

Requirements

Variable names must match the `[a-zA-Z][a-zA-Z0-9_-]*` pattern.

Environment variables must be set before starting Impala. Undefined variables will cause the Impala startup to fail.

Deployment modes

Impala supports the following deployment modes for REST Catalog, each suited to different use cases:

Mode 1: Standalone REST Catalog (No HMS/Catalogd)

This mode runs Impala without HMS or catalogd, connecting directly to a REST Catalog server. It provides the simplest architecture for pure Iceberg deployments.

Example Use case

New deployments that only need Iceberg tables and want minimal operational complexity.

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Configurations

- **impalad flags**

None

```
--use_local_catalog=true  
--catalogd_deployed=false  
--catalog_config_dir=/path/to/config/directory
```

- **Configuration file** (/path/to/config/directory/rest.properties)

None

```
connector.name=iceberg  
iceberg.catalog.type=rest  
iceberg.rest-catalog.uri=http://rest-catalog-server:9084
```

Mode 2: Multi-Catalog (REST Catalog(s) + HMS)

This hybrid mode connects to both REST Catalogs and HMS simultaneously, allowing access to both Iceberg tables in the REST Catalog and traditional HMS tables.

Example use case

Migration scenarios or environments that need both new Iceberg tables and legacy HMS tables.

Configurations

- **impalad flags**

```
None
--use_local_catalog=true
--catalog_config_dir=/path/to/config/directory
```

- **catalogd flags**

```
None
--catalog_topic_mode=minimal
```

- **Configuration file** (/path/to/config/directory/rest.properties)

```
None
connector.name=iceberg
iceberg.catalog.type=rest
iceberg.rest-catalog.uri=http://rest-catalog-server:9084
```

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Ambiguous table names

If a table with the same name exists in multiple catalogs, queries will fail with an ambiguity error. The error message will indicate which catalogs contain the table.

Limitations and unsupported features

The following Iceberg REST Catalog features are not currently supported:

- **Vended Credentials** – The `vended-credentials-enabled` property must be set to `false`. Impala does not support delegated credential management from the REST Catalog server.
- **User Sessions** – Only `NONE` session type is supported. Per-user session isolation is not available.
- **Nested Namespaces** – The `nested-namespace-enabled` property must be set to `false`. Only flat namespace hierarchies are supported.
- **Write Operations** – Write operations such as `INSERT`, `UPDATE`, `DELETE`, or `MERGE` are not supported.
- **DDL Operations** – DDL operations such as `CREATE`, `ALTER`, or `DROP` are not supported.
- **Views** – Iceberg views are not supported through the REST Catalog.

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Iceberg REST catalog support in Cloudera Data Warehouse Impala

Impala 2025.0.21.0 supports integration with the Iceberg REST catalog as a Technical Preview feature. This allows Cloudera Data Warehouse Impala to connect to REST catalogs, such as Apache Polaris.

Note: This preview supports the read path only and is available only in CDP CLI versions.

Before you begin

- You must obtain your `<CLUSTER_ID>` and `<DBC_ID>`.
- If using OAuth2, you must register your credentials as an external secret (Azure KeyVault or AWS Secret Manager) in Cloudera Data Warehouse.
- Impala must have explicit storage permissions configured for the metadata and data file locations, as vended cloud credentials are not yet supported. For more information on limitations, see [Limitations and unsupported features](#).

Configuring the REST connector

The REST connector configurations can be supplied using one of the following parameters in the `create-vw` command:

- `--impala-rest-catalog-connectors`
- `--cli-input-json`

For a complete list of configuration parameters, see [CDP CLI document](#).

For complex setups, using the `--cli-input-json` parameter with a file is the primary method.

1. Create a file named `create-vw-input.json` with the following structure:

```
None
{
  "impalaRestCatalogConnectors": [
    {
      "name": "connector-polaris",
      "description": "Polaris connector",
      "config": [
        { "key": "connector.name", "value": "iceberg" },

```

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```
    { "key": "iceberg.catalog.type", "value": "rest" },
    { "key": "iceberg.rest-catalog.uri", "value":
"http://example.com:8080/api/catalog"
    },
    { "key": "iceberg.security", "value": "read_only" },
    { "key": "iceberg.rest-catalog.warehouse", "value":
"quickstart_catalog" },
    { "key": "iceberg.rest-catalog.security", "value":
"OAUTH2" },
    { "key": "iceberg.rest-catalog.oauth2.scope", "value":
"PRINCIPAL_ROLE:ALL" },
    { "key": "iceberg.rest-catalog.oauth2.credential",
"value": "dwx-secret:polaris-secret" }
  ]
}
]
```

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Creating the Virtual Warehouse

1. Run the CDP CLI command to create the Impala Virtual Warehouse and connect it to your catalog, for example, Apache Polaris.

None

```
cdp --profile local dw create-vw \
  --cluster-id <CLUSTER_ID> \
  --dbc-id <DBC_ID> \
  --vw-type impala \
  --name impala-rest-catalog \
  --cli-input-json
file:///<PATH_TO_CREATE_VW_INPUT_FILE>/create-vw-input.json
```

Handling secrets

The configuration uses the following special prefix to reference security credentials:

- The `dwx-secret:polaris-secret` value acts as a pointer to an external secret stored in Azure KeyVault or AWS Secret Manager that you registered in Cloudera Data Warehouse.
- When you prefix a configuration parameter with `dwx-secret:`, Cloudera Data Warehouse interprets the remaining string as a reference to a Cloudera Data Warehouse secret and resolves it to the actual secret value in the final configuration.

If you update or rotate the external secret in your cloud provider, you must rebuild the Virtual Warehouse to fetch the new value. For instructions about registering an external secret in Cloudera Data Warehouse , see [Secrets management](#).