CDP Public Cloud / Data Catalog

Profilers in Compute Cluster Enabled Environments

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Contents

Cloudera Data Catalog Profilers..... 4
The Data Compliance Profiler..... 5
The Statistics Collector Profiler..... 29
The Activity Profiler..... 31

Profiler data testing..... 32

Cloudera Data Catalog Profilers

Profilers create metadata annotations that summarize the content and shape characteristics of the data assets (such as distribution of values in a box plot or histogram).

Note:

The VM-based architecture (using the Cluster) is deprecated from the 3.0.0 release but remains available until 7.2.18 is supported (Sept 2025). Therefore, based profilers will also not be available in versions after 7.2.18. Only Compute Cluster enabled environment will be able to run profilers after version 7.2.18.

For more information, see Cloudera Support lifecycle policy.

Warning: Delete launched profilers before upgrading to on 1.5.5 SP2.

Cloudera Data Catalog supports different environments:

- When using the VM-based environment, you can create a Cloudera Data Hub cluster for a profiler engine to run data profiling operations as a pipeline on data located in one of your Data Lakes. You can install the profiler agent in a Data Lake and set up a specific schedule to generate various types of data profiles.
- When using the Compute Cluster enabled environment, after launching a profiler cluster, an internal service provisions new Kubernetes pods, scheduling and running profiler jobs on-demand.

Profiler Name	Description
Data Compliance Profiler	The profiler automatically classifies your data with preconfigured tags, such as, PII, PCI, HIPAA and others.
Activity Profiler Profiler	A Ranger audit log summarizer.
Statistics Collector Profiler	Provides summary statistics like Maximum, Minimum, Mean, Unique, and Null values at the Hive column level.

Limitations

- In Compute Cluster enabled environments, profilers only support tables which are stored on AWS S3 storage.
- Supported file formats:
  - Compute Cluster enabled environments:
    - Statistics Collector profilers and Data Compliance profilers
      - CSV
      - Parquet
      - Iceberg tables
      - ORC
      - Avro

    Note: When trying to profile any unsupported assets, the status SKIPPED is shown in Profiler Details Job History Job Summary Profiled Assets .
- Compute Cluster based profilers might hang if the underlying AWS cloud provider environment cannot provide the necessary memory for the executor instances. In this case, reconfigure your executors with 4-5 GB memory in Profiler Details Configuration .

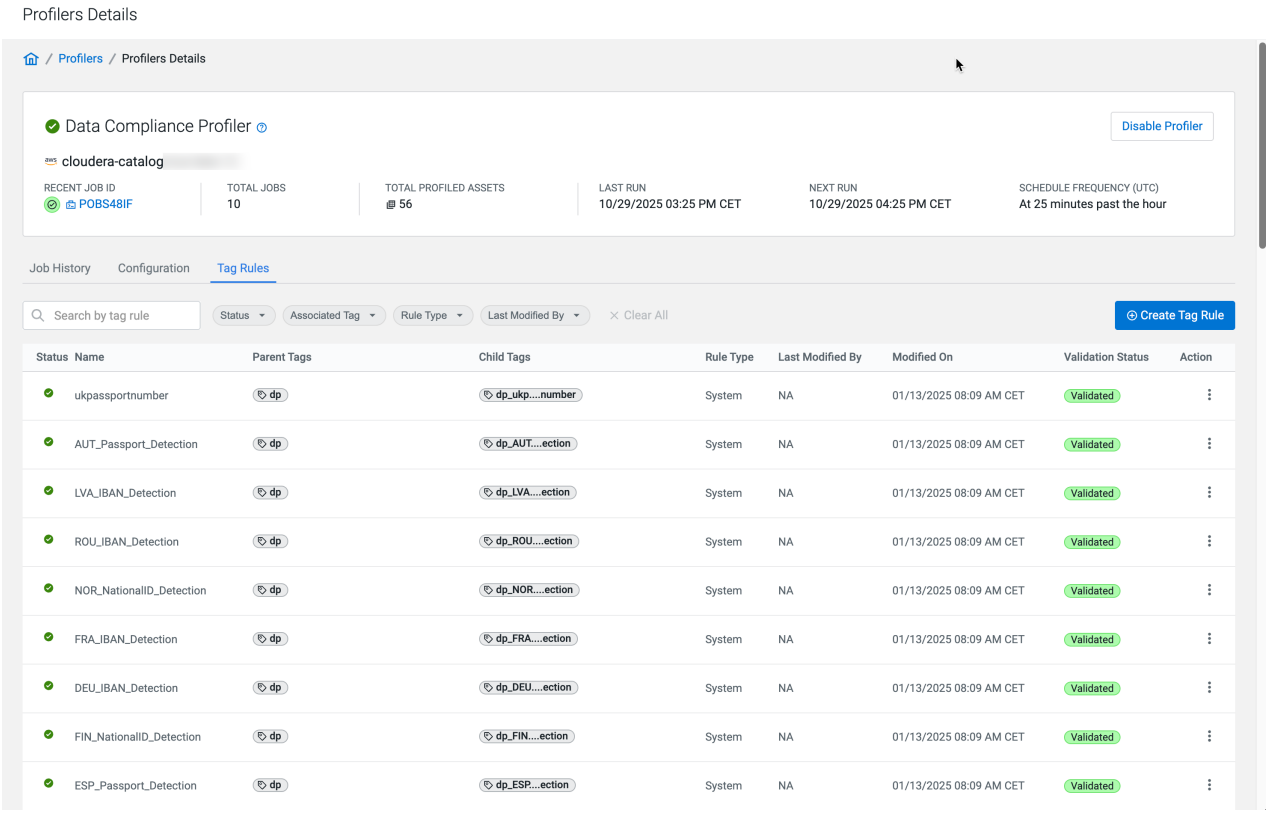
  Note: Is your infrastructure is deployed completely in AWS, profilers might hang if the underlying AWS cloud provider environment cannot provide the necessary memory for the executor instances. In this case, reconfigure your executors with 4-5 GB memory in Profiler Details Configuration .

The Data Compliance Profiler

The Data Compliance automatically performs context and content inspection to detect various types of sensitive data and suggest suitable classifications or tags based on the type of sensitive content detected or discovered.

Tag Rules

The Data Compliance Profiler have system-defined and user-defined tags that identify data types based on regular expressions or a set of similar values .



Auto-detected data types and system-defined regular expressions

The system-defined tag rules identify the following data types:

Bank account, credit card, email

- Bank account
- Credit card
- Driver number (UK)
- Email
- Name: **bankaccount**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:
    - ```
      (\s|,|;|\A)(AD)\d{2}\d{8}[a-zA-Z0-9]{12}|(AE|IL)\d{2}\d{19}|(AL|CY)\
      d{2}\d{8}[a-zA-Z0-9]{16}|(PL)\d{2}\d{24}|(AT|BA|EE|LT)\d{2}\d{16}|(B
      E)\d{2}\d{12}|(BG)\d{2}[A-Z]{4}\d{6}[a-zA-Z0-9]{8}|(BH)\d{2}[A-Z]{4}
      ```
      ```

```
[a-zA-Z0-9]{14}|(CH)\d{2}\d{5}[a-zA-Z0-9]{12}|(CZ|ES|SE|SK|TN)\d{2}\
d{20}|(DE|ME|RS)\d{2}\d{18}|(DK|FI|FO|GL)\d{2}\d{14}|(DO)\d{2}[A-Z]{
4}\d{20}|(FR|MC)\d{2}\d{10}[a-zA-Z0-9]{11}\d\d|(GB)\d{2}[A-Z]{4}\d{1
4}|(IE)\d{2}[a-zA-Z0-9]{4}\d{14}|(GE)\d{2}[a-zA-Z0-9]{2}\d{16}|(GI)\
d{2}[A-Z]{4}[a-zA-Z0-9]{15}|(GR)\d{2}\d{7}[a-zA-Z0-9]{16}|(HR)\d{2}\
d{17}|(HU)\d{2}\d{24}|(IS)\d{2}\d{22}|(IT|SM)\d{2}[A-Z]\d{10}[a-zA-Z
0-9]{12}|(KW)\d{2}[A-Z]{4}[a-zA-Z0-9]{22}|(KZ)\d{2}\d{3}[a-zA-Z0-9]{
3}\d{10}|(LU)\d{2}\d{3}[a-zA-Z0-9]{13}|(LB)\d{2}\d{4}[a-zA-Z0-9]{20}
|(LI)\d{2}\d{5}[a-zA-Z0-9]{12}|(LV)\d{2}[A-Z]{4}[a-zA-Z0-9]{13}|(MK)
\d{2}\d{3}[a-zA-Z0-9]{10}\d\d|(MR)\d{2}\d{23}|(MT)\d{2}[A-Z]{4}\d{5}
[a-zA-Z0-9]{18}|(MU)\d{2}[A-Z]{4}\d{19}[A-Z]{3}|(NL)\d{2}[A-Z]{4}\d{
10}|(NO)\d{2}\d{11}|(PT)\d{2}\d{21}|(RO)\d{2}[A-Z]{4}[a-zA-Z0-9]{16}
|(SA)\d{2}\d{2}[a-zA-Z0-9]{18}|(SI)\d{2}\d{15}|(TR)\d{2}\d{5}[a-zA-Z
0-9]{17}(\s|,|;|\z)
```

- Match Type: **Column name**
  - Confidence: 15
  - Regular expression:

```
is_in_ci("bankaccount","account","accountnumber")
```

- Name: **creditcard**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
"\b((5[1-5][0-9]{2}[0-9]{4}[0-9]{4}[0-9]{4})|((633(3|4)|67(67|59)|49
(36|11|05|03))[0-9]{4}[0-9]{4}[0-9]{4}(([0-9]{3}|[0-9]{2}))?)|(4[0-9
]{3}[0-9]{4}[0-9]{4}[0-9]{4}|4[0-9]{3}[0-9]{4}[0-9]{4}[0-9]{1})|((60
11)[0-9]{4}[0-9]{4}[0-9]{4})|((622)[0-9]{1}[0-9]{4}[0-9]{4}[0-9]{4})
|((65)[0-9]{2}[0-9]{4}[0-9]{4}[0-9]{4})|((64)[0-9]{2}[0-9]{4}[0-9]{4
}[0-9]{4})|(((3[47][0-9]{2})|2014|2149)[0-9]{4}[0-9]{4}[0-9]{3})|(3(
0[0-5]|[68][0-9])[0-9][0-9]{4}[0-9]{4}[0-9]{2})|((3528)[0-9]{4}[0-9]
{4}[0-9]{4})|((3529)[0-9]{4}[0-9]{4}[0-9]{4})|((35)[3-8][0-9][0-9]{4
}[0-9]{4}[0-9]{4})|(63[789][0-9][0-9]{4}[0-9]{4}[0-9]{4})|(5610[0-9]
{4}[0-9]{4}[0-9]{4})|(56022[1-5][0-9]{2}[0-9]{4}[0-9]{4}))\b|\b((589
3|0604|6304|6759|676[1-3]|50(18|20|38))[0-9]{4}[0-9]{4}([0-9]{0,4})?
([0-9]{0,3})?)\b|\b(67(06|71|09)[0-9]{4}[0-9]{4}[0-9]{4}([0-9]{0,3})
?)\b|\b((633110|564182)[0-9]{2}[0-9]{4}[0-9]{4}([0-9]{3}|[0-9]{2})?)
\b","\b((5[1-5][0-9]{2}[ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4})|((633(3|4)|
67(67|59)|49(36|11|05|03))[ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4}([ ]([0-9]
{3}|[0-9]{2}))?)|(4[0-9]{3}[ ][0-9]{4}[ ][0-9]{4} ][0-9]{4}|4[0-9]{3}
[ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{1})|((6011)[ ][0-9]{4}[ ][0-9]{4}[ ][0
-9]{4})|((622)[0-9]{1}[ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4})|((65)[0-9]{
2}[ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4})|((64)[0-9]{2}[ ][0-9]{4}[ ][0-9
]{4}[ ][0-9]{4})|(((3[47][0-9]{2})|2014|2149)[ ][0-9]{4}[ ][0-9]{4}[
 ][0-9]{3})|((3[47][0-9]{2})[ ][0-9]{6}[ ][0-9]{5})|(3(0[0-5]|[68][0
-9])[0-9][ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{2})|(3(0[0-5]|[68][0-9])[0-9
][ ][0-9]{6}[ ][0-9]{4})|((3528)[ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4})|(
(3529)[ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4})|((35)[3-8][0-9][ ][0-9]{4}[
 ][0-9]{4}[ ][0-9]{4})|(63[789][0-9][ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4
})|(5610[ ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4})|(5602[ ]2[1-5][0-9]{2}[ ]
[0-9]{4}[ ][0-9]{4}))|((5893|0604|6304|6759|676[1-3]|50(18|20|38))[
][0-9]{4}[ ][0-9]{4}([ ][0-9]{0,4})?([ ][0-9]{0,3})?)|(67(06|71|09)[
 ][0-9]{4}[ ][0-9]{4}[ ][0-9]{4}([ ][0-9]{0,3})?)|((6331[ ]10|5641[
]82)[0-9]{2}[ ][0-9]{4}[ ][0-9]{4}([ ][0-9]{3}|[ ][0-9]{2})?)\b","\b
((5[1-5][0-9]{2}-[0-9]{4}-[0-9]{4}-[0-9]{4})|((633(3|4)|67(67|59)|49
(36|11|05|03))-[0-9]{4}-[0-9]{4}-[0-9]{4}(-([0-9]{3}|[0-9]{2}))?)|(4
[0-9]{3}-[0-9]{4}-[0-9]{4}-[0-9]{4}|4[0-9]{3}-[0-9]{4}-[0-9]{4}-[0-9
]{1})|((6011)-[0-9]{4}-[0-9]{4}-[0-9]{4})|((622)[0-9]{1}-[0-9]{4}-[0
-9]{4}-[0-9]{4})|((65)[0-9]{2}-[0-9]{4}-[0-9]{4}-[0-9]{4})|((64)[0-9
```

```
]{2}-[0-9]{4}-[0-9]{4}-[0-9]{4})|(((3[47][0-9]{2})|2014|2149)-[0-9]{
4}-[0-9]{4}-[0-9]{3})|((3[47][0-9]{2})-[0-9]{6}-[0-9]{5})|(3(0[0-5]|
[68][0-9])[0-9]-[0-9]{4}-[0-9]{4}-[0-9]{2})|(3(0[0-5]|[68][0-9])[0-9
]-[0-9]{6}-[0-9]{4})|((3528)-[0-9]{4}-[0-9]{4}-[0-9]{4})|((3529)-[0-
9]{4}-[0-9]{4}-[0-9]{4})|((35)[3-8][0-9]-[0-9]{4}-[0-9]{4}-[0-9]{4})
|(63[789][0-9]-[0-9]{4}-[0-9]{4}-[0-9]{4})|(5610-[0-9]{4}-[0-9]{4}-[
0-9]{4})|(5602-2[1-5][0-9]{2}-[0-9]{4}-[0-9]{4}))|((5893|0604|6304|6
759|676[1-3]|50(18|20|38))-[0-9]{4}-[0-9]{4}(-[0-9]{0,4})?(-[0-9]{0,
3})?)|(67(06|71|09)-[0-9]{4}-[0-9]{4}-[0-9]{4}(-[0-9]{0,3})?)|((6331
-10|5641-82)[0-9]{2}-[0-9]{4}-[0-9]{4}(-[0-9]{3}|-[0-9]{2})?)\b"
```

- Match Type: **Column name**
  - Confidence: 15
  - Regular expression:

```
is_in_ci("creditcard","ccnumber")
```

- Name: **ukdrivernumber**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
\b([A-Z0-9]{5}[0-9][0156][0-9]([0][1-9]|[1-2][0-9]|[3][01])[0-9][A-Z
0-9]{3}[A-Z]{2})\b
```

- Name: **email**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
\b(([a-zA-Z0-9_\-\.]+)@((\[[0-9]{1,3}\.[0-9]{1,3}\.[0-9]{1,3}\.)|(([
a-zA-Z0-9\-]+\.)+))([a-zA-Z]{2,4}|[0-9]{1,3})(\]?))\b
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("emailaddress","emailaddr","email")
```

  - Match Type: **Table name**
    - Confidence: 100
    - Regular expression:

```
(?i)\w*email\w*
```

IBAN numbers

- Austria (AUT)
- Belgium (BEL)
- Bulgaria (BGR)
- Switzerland (CHE)
- Cyprus (CYP)
- Czech Republic (CZE)
- Germany (DEU)
- Denmark (DNK)

- Spain (ESP)
- Estonia (EST)
- Finland (FIN)
- France (FRA)
- United Kingdom (GBR)
- Greece (GRC)
- Croatia (HRV)
- Hungary (HUN)
- Ireland (IRL)
- Iceland (ISL)
- Italy (ITA)
- Liechtenstein (LIE)
- Lithuania (LTU)
- Latvia (LVA)
- Luxembourg (LUX)
- Malta (MLT)
- Netherlands (NLD)
- Norway (NOR)
- Poland (POL)
- Portugal (PRT)
- Romania (ROU)
- Slovakia (SVK)
- Slovenia (SVN)
- Sweden (SWE)

- Name: **LVA_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)LV[0-9]{2}[A-Z]{4}[A-Z0-9]{13}(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Latvia IBAN","Latvia International Bank Account Number")
      ```
- Name: **ROU_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)RO[0-9]{2}[A-Z]{4}[A-Z0-9]{16}(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Romania IBAN","Romania International Bank Account Number")
      ```
- Name: **FRA_IBAN_Detection**

    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)(FR[0-9]{12}[A-Z0-9]{11}[0-9]{2})(\s|,|;|\z)
          ```
    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("France IBAN","France International Bank Account Number")
          ```
- Name: **DEU_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)(DE[0-9]{2}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?
          [0-9]{0,2})(\s|,|;|\z)
          ```
    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Germany IBAN","Germany International Bank Account Number")
          ```
- Name: **CYP_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)CY[0-9]{2}[0-9]{8}[A-z0-9]{16}(\s|,|;|\z)
          ```
    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Cyprus IBAN","Cyprus International Bank Account Number")
          ```
- Name: **AUT_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)AT[0-9]{18}(\s|,|;|\z)
          ```
    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Austria IBAN","Austria International Bank Account Number")
          ```
- Name: **BEL_IBAN_Detection**

- Match Type: **Column value**
  - Confidence: 85
  - Regular expression:

```
(\s|,|;|\A)BE[0-9]{14}(\s|,|;|\z)
```

- Match Type: **Column name**
  - Confidence: 15
  - Regular expression:

```
is_in_ci("Belgium IBAN","Belgium International Bank Account Number")
```

- Name: **EST_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)EE[0-9]{18}(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Estonia IBAN","Estonia International Bank Account Number")
```

- Name: **CHE_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)CH[0-9]{7}[A-Z0-9]{12}(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Switzerland IBAN","Switzerland International Bank Account
Number")
```

- Name: **ESP_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)ES[0-9]{22}(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Spain IBAN","Spain International Bank Account Number")
```

- Name: **ITA_IBAN_Detection**

- Match Type: **Column value**
  - Confidence: 85
  - Regular expression:

    ```
    (\s|,|;|\A)(IT[0-9]{2}[A-Z]{1}[0-9]{10}[A-Z0-9]{12})(\s|,|;|\z)
    ```
- Match Type: **Column name**
  - Confidence: 15
  - Regular expression:

    ```
    is_in_ci("Italy IBAN","Italy International Bank Account Number")
    ```
- Name: **SVK_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)(SK[0-9]{2}[0-9]{20})(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Slovakia IBAN","Slovakia International Bank Account Number
      ")
      ```
- Name: **SWE_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)(SE[0-9]{22})(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Sweden IBAN","Sweden International Bank Account Number")
      ```
- Name: **NOR_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)(NO[0-9]{13})(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Norway IBAN","Norway International Bank Account Number")
      ```
- Name: **GRC_IBAN_Detection**

- Match Type: **Column value**
  - Confidence: 85
  - Regular expression:

```
(\s|,|;|\A)(GR[0-9]{9}[A-Z0-9]{16})(\s|,|;|\z)
```

- Match Type: **Column name**
  - Confidence: 15
  - Regular expression:

```
is_in_ci("Greece
 IBAN","Greece International Bank Account Number")
```

- Name: **IBAN_Detection**
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("IBAN","International Bank Account Number")
```

- Name: **GBR_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(GB[0-9]{2}[A-Z]{4}[0-9]{14})(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("United Kingdom IBAN","United Kingdom International Bank Ac
count Number")
```

- Name: **IRL_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(IE[0-9]{2}[A-Z]{4}[0-9]{14})(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Ireland IBAN","Ireland International Bank Account Number")
```

- Name: **FIN_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85

        - Regular expression:

          ```
          (\s|,|;|\A)(FI[0-9]{2}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{2})(
          \s|,|;|\z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Finland IBAN","Finland International Bank Account Number")
          ```

- Name: **NLD_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)(NL[0-9]{2}\s?[A-Z]{4}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{2})(
          \s|,|;|\z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Netherlands IBAN","Netherlands International Bank Account
          Number")
          ```

- Name: **BGR_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)(BG[0-9]{2}\s?[A-Z]{4}\s?[0-9]{4}\s?[A-Z0-9]{4}\s?[A-Z0-9]
          {4}\s?[A-Z0-9])(\s|,|;|\z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Bulgaria IBAN","Bulgaria International Bank Account Number
          ")
          ```

- Name: **SVN_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)(SI[0-9]{17})(\s|,|;|\z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Slovenia IBAN","Slovenia International Bank Account Number
          ")
          ```

- Name: **LIE_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(LI[0-9]{2}\s?[0-9]{4}\s?[0-9]{1}[A-Z0-9]{3}\s?[A-Z0-9]{4
}\s?[A-Z0-9]{4}\s?[A-Z0-9]{1})(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Liechtenstein IBAN","Liechtenstein International Bank Acco
unt Number")
```

- Name: **POL_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(PL[0-9]{2}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?
[0-9]{4}\s?[0-9]{4})(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Poland IBAN","Poland International Bank Account Number")
```

- Name: **PRT_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(PT[0-9]{2}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?
[0-9]{4}\s?[0-9]{1})(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Portugal IBAN","Portugal International Bank Account Number
")
```

- Name: **LTU_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(LT[0-9]{2}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4})(
\s|,|;|\z)
```

  - Match Type: **Column name**

        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Lithuanian IBAN","Lithuania International Bank Account Num
          ber")
          ```

- Name: **HRV_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)(HR[0-9]{2}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?[0-9]{4}\s?
      [0-9]{1})(\s|,|;|\z)
      ```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Croatian IBAN","Croatia International Bank Account Number")
      ```

- Name: **LUX_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)(LU[0-9]{2}\s?[0-9]{3}[A-Z0-9]{1}\s?[A-Z0-9]{4}\s?[A-Z0-9]
      {4}\s?[A-Z0-9]{4})(\s|,|;|\z)
      ```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Luxembourg IBAN","Luxembourg International Bank Account Nu
      mber")
      ```

- Name: **DNK_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)(DK\d{2}([ ]?)\d{4}\3\d{4}\3\d{4}\3\d{2})(\s|,|;|\Z)
      ```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Denmark IBAN","Denmark International Bank Account Number")
      ```

- Name: **HUN_IBAN_Detection**
  - Match Type: **Column value**
    - Confidence: 85

        - Regular expression:

```
(\s|,|;|\A)(HU\d{2}([ ]?)\d{4}\3\d{4}\3\d{4}\3\d{4}\3\d{4}\3\d{4})(\
s|,|;|\Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Hungary IBAN","Hungary International Bank Account Number")
```

- Name: **CZE_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

```
(\s|,|;|\A)(CZ\d{2}([ ]?)\d{4}\3\d{4}\3\d{4}\3\d{4}\3\d{4})(\s|,|;|\
Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Czech Republic IBAN","Czechia IBAN","Czech Republic Intern
ational Bank Account Number","Czechia International Bank Account Num
ber")
```

- Name: **ISL_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

```
(\s|,|;|\A)(IS\d{2}([ ]?)\d{4}\3\d{4}\3\d{4}\3\d{4}\3\d{4}\3\d{2})(\
s|,|;|\Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Iceland IBAN","Iceland International Bank Account Number")
```

- Name: **MLT_IBAN_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

```
\A(MT\d{2}([ ]?)[A-Z]{4}\3\d{4}\3\d{1}[A-Z0-9]{3}\3[A-Z0-9]{4}\3[A-Z
0-9]{4}\3[A-Z0-9]{4}\3[A-Z0-9]{3})\Z
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Malta IBAN","Malta International Bank Account Number")
```

IP addresses, NPI, names

- IP address
- NPI
- Name

Regular expressions:

- Name: **ipaddress**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(((25[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)\.(25[0-5]|2[0-4]
[0-9]|[01]?[0-9][0-9]?)\.(25[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)\.(25
[0-5]|2[0-4][0-9]|[01]?[0-9][0-9]?)))(\s|,|;|\Z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("ipaddress","ipaddr","ip")
```

- Name: **npi**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)((([12]\d{9}))|(((80840)[12]\d{9})))(\s|,|;|\Z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("npi")
```

National ID numbers

- Bulgaria (BGR)
- Switzerland (CHE)
- Czech Republic (CZE)
- Denmark (DNK)
- Spain (ESP)
- Estonia (EST)
- Finland (FIN)
- Greece (GRC)
- Ireland (IRL)
- Iceland (ISL)
- Italy (ITA)
- Lithuania (LTU)
- Latvia (LVA)
- Norway (NOR)
- Poland (POL)
- Portugal (PRT)

- Romania (ROU)
- Slovakia (SVK)
- Sweden (SWE)

Regular expressions:

- Name: **NOR_NationalID_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)((0[1-9]|[12][0-9]|3[01])([0][1-9]|[1][012])\d{2}\d{3}\d{
2})(\s|,|;|\Z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Norway National ID","Norway National identification number
")
```

- Name: **FIN_NationalID_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)((0[1-9]|[12][0-9]|3[01])([0][1-9]|[1][012])\d{2}[+\-A](0
0[2-9]|[0][1-9]\d|[1-9]\d{2})[A-Za-z0-9])(\s|,|;|\Z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Finland National ID","Finland National identification numb
er")
```

- Name: **GRC_NationalID_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)([ABEZHIKMNOPTYX]{2}\-\d{6})(\s|,|;|\Z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Greece National ID","Greece National identification number
")
```

- Name: **CHE_NationalID_Detection**
  - Match Type: **Column value**
    - Confidence: 85

        - Regular expression:

          ```
          (\s|,|;|\A)(756([ -.]?)\d{4}\3\d{4}\3\d{2})(\s|,|;|\Z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Switzerland National ID","Switzerland National identificat
          ion number")
          ```

- Name: **PRT_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)(\d{8}([ -]?)\d[0-9a-zA-Z]{2}\d)(\s|,|;|\Z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Portugal
           National ID","Portugal National identification number")
          ```

- Name: **LTU_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)([3-6]\d{2}([0][1-9]|[1][012])(0[1-9]|[12][0-9]|3[01])\d{
          3}\d)(\s|,|;|\Z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Lithuania
           National ID","Lithuania National identification number")
          ```

- Name: **POL_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)(\d{2}([0][1-9]|[1][012])(0[1-9]|[12][0-9]|3[01])\d{3}\d{
          1}\d{1})(\s|,|;|\Z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Poland National ID","Poland National identification number
          ")
          ```

- Name: **LVA_NationalID_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)((0[1-9]|[12][0-9]|3[01])([0][1-9]|[1][012])\d{2}\-?[012]
\d{3}\d)(\s|,|;|\Z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Latvia National ID","Latvia National identification number
")
```

- Name: **DNK_NationalID_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(([0][1-9]|[12][0-9]|[3][01])([0][1-9]|[1][012])\d{2}[ -]?
\d{4})(\s|,|;|\Z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Denmark National ID","Denmark National identification numb
er")
```

- Name: **CZE_NationalID_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(\d{4}(0[1-9]|[12][0-9]|3[01])\/?\d{4})(\s|,|;|\Z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("Czech Republic National ID","Czechia National ID","Czech R
epublic National identification
 number","Czechia National identification number")
```

- Name: **SWE_NationalID_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)((19|20)?\d{2}(0[1-9]|1[012])([06][1-9]|[12]\d|3[01])[-+]
\d{4})(\s|,|;|\Z)
```

  - Match Type: **Column name**

        - Confidence: 15
        - Regular expression:

```
is_in_ci("Sweden
 National ID","Sweden National identification number")
```

- Name: **ISL_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

```
(\s|,|;|\A)((0[1-9]|[12][0-9]|3[01])([0][1-9]|[1][012])\d{2}\-\d{2}\
d[09])(\s|,|;|\Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Iceland National ID","Iceland National identification numb
er")
```

- Name: **ESP_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

```
(\s|,|;|\A)(\d{8}([ -]?)[A-Z])(\s|,|;|\Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Spain National ID","Spain National identification number")
```

- Name: **EST_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

```
(\s|,|;|\A)([1-6]\d{2}([0][1-9]|[1][012])(0[1-9]|[12][0-9]|3[01])\d{
3}\d)(\s|,|;|\Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Estonia National ID","Estonia National identification numb
er")
```

- Name: **ITA_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85

        - Regular expression:

```
(\s|,|;|\A)([A-Z]{3}[A-Z]{3}\d{2}[A-EHLMPRST]([04][1-9]|[1256]\d|[37]
[01])[A-Z]\d{3}[A-Z])(\s|,|;|\Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Italy National ID","Italy National identification number")
```

- Name: **NationalID_Detection**
    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("National ID","National identification number")
```

- Name: **ROU_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

```
(\s|,|;|\A)([1-9]\d{2}([0][1-9]|[1][012])(0[1-9]|[12][0-9]|3[01])([0
1234]\d|5[012]|99)\d{4})(\s|,|;|\Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Romania National ID","Romania National identification numb
er")
```

- Name: **BGR_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

```
(\s|,|;|\A)(\d{2}([024][1-9]|[135][012])(0[1-9]|[12][0-9]|3[01])\d{3
}\d{1})(\s|,|;|\Z)
```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

```
is_in_ci("Bulgaria National ID","Bulgaria National identification nu
mber")
```

- Name: **IRL_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85

        - Regular expression:

          ```
          (\s|,|;|\A)(\d{7}[A-Za-z]{1,2})(\s|,|;|\Z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Ireland National ID","Ireland National identification numb
          er")
          ```

- Name: **SVK_NationalID_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)(\d{4}(0[1-9]|[12][0-9]|3[01])\/\d{4})(\s|,|;|\Z)
          ```

    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Slovakia National ID","Slovakia National identification nu
          mber")
          ```

National insurance number (UK)

Regular expressions:

- Name: **uknationalinsurancenumber**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)[A-CEGHJ-NOPR-TW-Z]{1}[A-CEGHJ-NPR-TW-Z]{1}[0-9]{6}[A-D\s]
          {1}(\s|,|;|\Z)
          ```

Passport numbers

- Austria (AUT)
- Belgium (BEL)
- Switzerland (CHE)
- Germany (DEU)
- Spain (ESP)
- Finland (FIN)
- France (FRA)
- Greece (GRC)
- Ireland (IRL)
- Italy (ITA)
- Poland (POL)
- United Kingdom (UK)

Regular expressions:

- Name: **AUT_Passport_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)[A-Za-z]\d{7}$(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Austria Passport Number")
      ```
- Name: **ESP_Passport_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)[A-z0-9]{2,3}[0-9]{6}(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Spain Passport Number")
      ```
- Name: **DEU_Passport_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)([0-9CF-HJ-NPRTV-Z]{9})(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Germany Passport Number")
      ```
- Name: **FIN_Passport_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)([A-Za-z]{2}\d{7})(\s|,|;|\z)
      ```
  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Finland Passport Number")
      ```
- Name: **POL_Passport_Detection**

    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)([A-Za-z]{2}\d{7})(\s|,|;|\z)
          ```
    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Poland Passport Number")
          ```
- Name: **CHE_Passport_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)([A-Z]\d{7})(\s|,|;|\z)
          ```
    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Switzerland Passport Number")
          ```
- Name: **Passport_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)([A-Z][A-Z0-9][0-9]{7})(\s|,|;|\z)","(\s|,|;|\A)([A-Za-z]
          {2}\d{7})(\s|,|;|\z)","(\s|,|;|\A)([A-Z][ ]?\d{7})(\s|,|;|\z)","(\s|
          ,|;|\A)([A-Z]{2}[0-9]{7})(\s|,|;|\z)","(\s|,|;|\A)([A-Za-z]{2}\d{7})
          (\s|,|;|\z)","(\s|,|;|\A)([A-Z]{2}[0-9]{7})(\s|,|;|\z)","(\s|,|;|\A)
          ([0-9CF-HJ-NPRTV-Z]{9})(\s|,|;|\z)","(\s|,|;|\A)([A-Za-z]{2}\d{6})(\
          s|,|;|\z)","(\s|,|;|\A)([A-Z]{2}[ -]?\d{6})(\s|,|;|\z)","(\s|,|;|\A)
          ([A-Z]\d{7})(\s|,|;|\z)","(\s|,|;|\A)(\d{2}[A-Z]{2}\d{5})(\s|,|;|\z)
          ```
    - Match Type: **Column name**
        - Confidence: 15
        - Regular expression:

          ```
          is_in_ci("Passport Number")
          ```
- Name: **GRC_Passport_Detection**
    - Match Type: **Column value**
        - Confidence: 85
        - Regular expression:

          ```
          (\s|,|;|\A)([A-Z]{2}[0-9]{7})(\s|,|;|\z)
          ```
    - Match Type: **Column name**
        - Confidence: 15

        - Regular expression:

          ```
          is_in_ci("Greece Passport Number")
          ```

- Name: **BEL_Passport_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)([A-Za-z]{2}\d{6})(\s|,|;|\z)
      ```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Belgium Passport Number")
      ```

- Name: **FRA_Passport_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)(\d{2}[A-Z]{2}\d{5})(\s|,|;|\z)
      ```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("France Passport Number")
      ```

- Name: **ITA_Passport_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)([A-Z]{2}[0-9]{7})(\s|,|;|\z)
      ```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

      ```
      is_in_ci("Italy Passport Number")
      ```

- Name: **IRL_Passport_Detection**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

      ```
      (\s|,|;|\A)([A-Z][A-Z0-9][0-9]{7})(\s|,|;|\z)
      ```

  - Match Type: **Column name**
    - Confidence: 15

- Regular expression:

```
is_in_ci("Ireland Passport Number")
```

Miscellaneous identifications: bank, passport, social security

- SWIFT code
- UK passport number
- Bank Routing Number
- US Social Security Number
- Society for Worldwide Interbank Financial Telecommunication (SWIFT)
- Telephone

Regular expressions:

- Name: **swiftcode**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)([a-zA-Z]{4}(AF|AX|AL|DZ|AS|AD|AO|AI|AQ|AG|AR|AM|AW|AU|AT|
AZ|BS|BH|BD|BB|BY|BE|BZ|BJ|BM|BT|BO|BQ|BA|BW|BV|BR|IO|BN|BG|BF|BI|KH|
CM|CA|CV|KY|CF|TD|CL|CN|CX|CC|CO|KM|CG|CD|CK|CR|CI|HR|CU|CW|CY|CZ|DK|
DJ|DM|DO|EC|EG|SV|GQ|ER|EE|ET|FK|FO|FJ|FI|FR|GF|PF|TF|GA|GM|GE|DE|GH|
GI|GR|GL|GD|GP|GU|GT|GG|GN|GW|GY|HT|HM|VA|HN|HK|HU|IS|IN|ID|IR|IQ|IE|
IM|IL|IT|JM|JP|JE|JO|KZ|KE|KI|KP|KR|KW|KG|LA|LV|LB|LS|LR|LY|LI|LT|LU|
MO|MK|MG|MW|MY|MV|ML|MT|MH|MQ|MR|MU|YT|MX|FM|MD|MC|MN|ME|MS|MA|MZ|MM|
NA|NR|NP|NL|NC|NZ|NI|NE|NG|NU|NF|MP|NO|OM|PK|PW|PS|PA|PG|PY|PE|PH|PN|
PL|PT|PR|QA|RE|RO|RU|RW|BL|SH|KN|LC|MF|PM|VC|WS|SM|ST|SA|SN|RS|SC|SL|
SG|SX|SK|SI|SB|SO|ZA|GS|ES|LK|SD|SR|SJ|SZ|SE|CH|SY|TW|TJ|TZ|TH|TL|TG|
TK|TO|TT|TN|TR|TM|TC|TV|UG|UA|AE|GB|US|UM|UY|UZ|VU|VE|VN|VG|VI|WF|EH|
YE|ZM|ZW)[a-zA-Z0-9]{2}([a-zA-Z0-9]{3})?)(\s|,|;|\z)
```

  - Match Type: **Column name**
    - Confidence: 15
    - Regular expression:

```
is_in_ci("swiftcode")
```

- Name: **ukpassportnumber**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)([A-Z0-9]{1}[0-9]{4}[A-Z0-9]{1})(\s|,|;|\z)
```

- Name: **telephone**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)(((\+)?(1|7|2([07]|1[12368]|[2-6][0-9]|9[01789])|3([57][0
-9]|8[0125679]|[0123469])|4([013456789]|2[013])|5([1-8]|39(9)?|[09][
0-9])|6([0-6]|[78][0-9]|9[0-2])|(758)|8([1246]|0[089]|5[02356]|7(8|[
0-4])|8(1[01236789]|21[36]|[016]))|9(6[0-8]|7[0-7]|[0123458]|9(8|[2-
6]))|(1-(68|2(4[16]|6[48])|(34[05])|4(41|73)|6(49|64|7[01]|84)|7(58|
```

```
67|8[47])|8(0|6[89]|[24]9|76)|(939)))|(7-7))(\s)?)?([2-9][0-9]{9}))\
b|\b(((\+)?(1|7|2([07]|1[12368]|[2-6][0-9]|9[01789])|3([57][0-9]|8[0
125679]|[0123469])|4([013456789]|2[013])|5([1-8]|39(9)?|[09][0-9])|6
([0-6]|[78][0-9]|9[0-2])|(758)|8([1246]|0[089]|5[02356]|7(8|[0-4])|8
(1[01236789]|21[36]|[016]))|9(6[0-8]|7[0-7]|[0123458]|9(8|[2-6]))|(1
-(68|2(4[16]|6[48])|(34[05])|4(41|73)|6(49|64|7[01]|84)|7(58|67|8[47
])|8(0|6[89]|[24]9|76)|(939)))|(7-7))(\s))?([2-9][0-9]{2}[ ][0-9]{3}
[ ][0-9]{4}))\b|\b(((\+)?(1|7|2([07]|1[12368]|[2-6][0-9]|9[01789])|3
([57][0-9]|8[0125679]|[0123469])|4([013456789]|2[013])|5([1-8]|39(9)
?|[09][0-9])|6([0-6]|[78][0-9]|9[0-2])|(758)|8([1246]|0[089]|5[02356
]|7(8|[0-4])|8(1[01236789]|21[36]|[016]))|9(6[0-8]|7[0-7]|[0123458]|
9(8|[2-6]))|(1-(68|2(4[16]|6[48])|(34[05])|4(41|73)|6(49|64|7[01]|84
)|7(58|67|8[47])|8(0|6[89]|[24]9|76)|(939)))|(7-7))[-\s])?([2-9][0-9
]{2}-[0-9]{3}-[0-9]{4}))\b|\b(((\+)?(1|7|2([07]|1[12368]|[2-6][0-9]|
9[01789])|3([57][0-9]|8[0125679]|[0123469])|4([013456789]|2[013])|5(
[1-8]|39(9)?|[09][0-9])|6([0-6]|[78][0-9]|9[0-2])|(758)|8([1246]|0[0
89]|5[02356]|7(8|[0-4])|8(1[01236789]|21[36]|[016]))|9(6[0-8]|7[0-7]
|[0123458]|9(8|[2-6]))|(1-(68|2(4[16]|6[48])|(34[05])|4(41|73)|6(49|
64|7[01]|84)|7(58|67|8[47])|8(0|6[89]|[24]9|76)|(939)))|(7-7))[.\s])
?([2-9][0-9]{2}\.[0-9]{3}\.[0-9]{4}))\b|((\+)?(1|7|2([07]|1[12368]|[
2-6][0-9]|9[01789])|3([57][0-9]|8[0125679]|[0123469])|4([013456789]|
2[013])|5([1-8]|39(9)?|[09][0-9])|6([0-6]|[78][0-9]|9[0-2])|(758)|8(
[1246]|0[089]|5[02356]|7(8|[0-4])|8(1[01236789]|21[36]|[016]))|9(6[0
-8]|7[0-7]|[0123458]|9(8|[2-6]))|(1-(68|2(4[16]|6[48])|(34[05])|4(41
|73)|6(49|64|7[01]|84)|7(58|67|8[47])|8(0|6[89]|[24]9|76)|(939)))|(7
-7))[\s]?)?(\([2-9][0-9]{2}\)[\s][0-9]{3}-[0-9]{4})|((\+)?(1|7|2([07
]|1[12368]|[2-6][0-9]|9[01789])|3([0123469]|[57][0-9]|8[0125679])|4(
2[013]|[013456789])|5([1-8]|399|[09][0-9]|39)|6([0-6]|[78][0-9]|9[0-
2])|(758)|8(0[089]|5[02356]|7([0-4]|8)|8([016]|1[01236789]|21[36])|[
1246])|9(6[0-8]|7[0-7]|9([2-6]|8)|[0123458])|(1-(68|2(4[16]|6[48]|84
)|(34[05])|4(41|73)|6(49|64|7[01]|84)|7(58|67|8[47])|8(0[89]|[24]9|6
[89]|76)|(939)))|(7-7))\.)?(\([2-9][0-9]{2}\)[.][0-9]{3}\.[0-9]{4})|
((\+)?(1|7|2([07]|1[12368]|[2-6][0-9]|9[01789])|3([57][0-9]|8[012567
9]|[0123469])|4([013456789]|2[013])|5([1-8]|39(9)?|[09][0-9])|6([0-6
]|[78][0-9]|9[0-2])|(758)|8([1246]|0[089]|5[02356]|7(8|[0-4])|8(1[01
236789]|21[36]|[016]))|9(6[0-8]|7[0-7]|[0123458]|9(8|[2-6]))|(1-(68|
2(4[16]|6[48])|(34[05])|4(41|73)|6(49|64|7[01]|84)|7(58|67|8[47])|8(
0|6[89]|[24]9|76)|(939)))|(7-7)))?(\([2-9][0-9]{2}\)[0-9]{3}-[0-9]{4
})|((\+)?(1|7|2([07]|1[12368]|[2-6][0-9]|9[01789])|3([0123469]|[57][
0-9]|8[0125679])|4(2[013]|[013456789])|5([1-8]|399|[09][0-9]|39)|6([
0-6]|[78][0-9]|9[0-2])|(758)|8(0[089]|5[02356]|7([0-4]|8)|8([016]|1[
01236789]|21[36])|[1246])|9(6[0-8]|7[0-7]|9([2-6]|8)|[0123458])|(1-(
68|2(4[16]|6[48]|84)|(34[05])|4(41|73)|6(49|64|7[01]|84)|7(58|67|8[4
7])|8(0[89]|[24]9|6[89]|76)|(939)))|(7-7))\.)?(\([2-9][0-9]{2}\)\.[0
-9]{3}\.[0-9]{4})(\s|,|;|\z)
```

- Match Type: **Column name**
  - Confidence: 15
  - Regular expression:

```
is_in_ci("telephone","tel")
```

- Name: **routingnumber**
  - Match Type: **Column value**
    - Confidence: 85
    - Regular expression:

```
(\s|,|;|\A)([^459][0-9]{8})(\s|,|;|\z)
```

- Name: **ssn**

- Match Type: **Column value**
  - Confidence: 85
  - Regular expression:

```
(\s|,|;|\A)((0[1-8][0-9]{2}|[1-8][0-9]{2})(-|)?(0[1-9]|[1-9][0-9])(-|)?([1-9][0-9]{3}|0001-9999)|987-65-432[0-9])(\s|,|;|\z)
```

- Match Type: **Column name**
  - Confidence: 15
  - Regular expression:

```
is_in_ci("ssn","ssnnumber","ssnno")
```

The Statistics Collector Profiler

You can view the shape or distribution characteristics of the columnar data within a Hive table based on the Statistics Collector.

Categorical Data

The Statistics Collector Profiler can categorize your Hive tables according to their data type. Datatypes are received from Atlas. These include the following:

- array
- bigint
- binary
- boolean
- char
- date
- decimal
- double
- float
- int[1]
- map
- smallint
- string
- struct
- timestamp
- tinyint
- varchar

Note: The Statistics Collector Profiler can profile Iceberg tables.

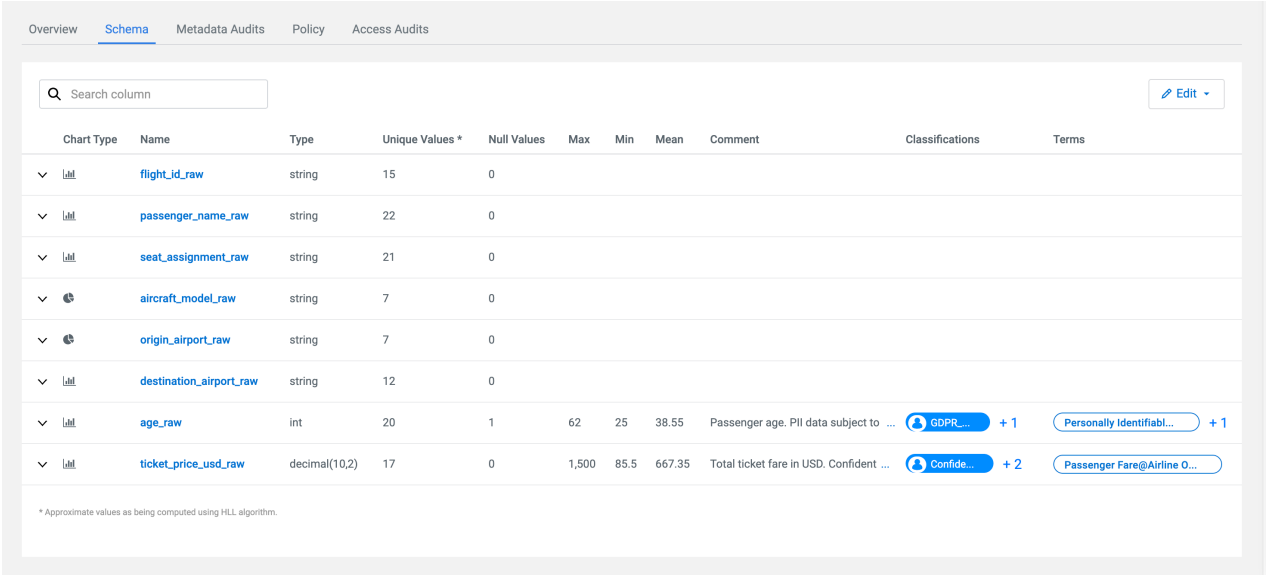
Numerical Data

Note: Non-primitive data types are not supported. Only basic data types such as numbers, string, boolean, floating point numbers and so on are supported

[1] These rows will receive the boxplot graphs and the min, max mean values after profiling.

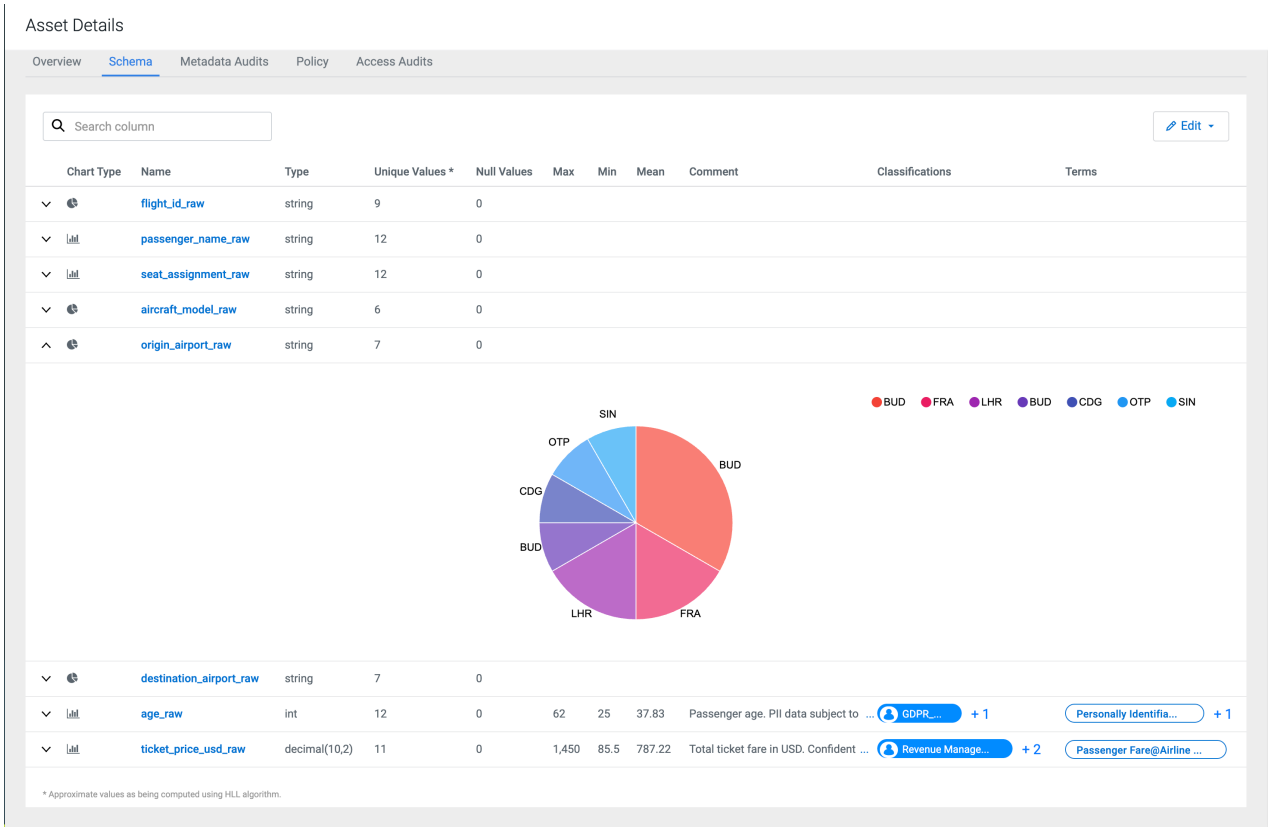
There are different charts available to help visualize the shape and distribution of the data within the column as well as summary statistics for a column with numerical data. These include the following:

- Unique Values
- Null Values
- Max
- Min
- Mean



The profiler computes column univariate statistics that are displayed using an appropriate chart in the **Schema** tab.

Pie charts are presented for categorical data with limited number of categories or classes. Examples include data such as eye colors that only have a fixed list of values (categories or labels).



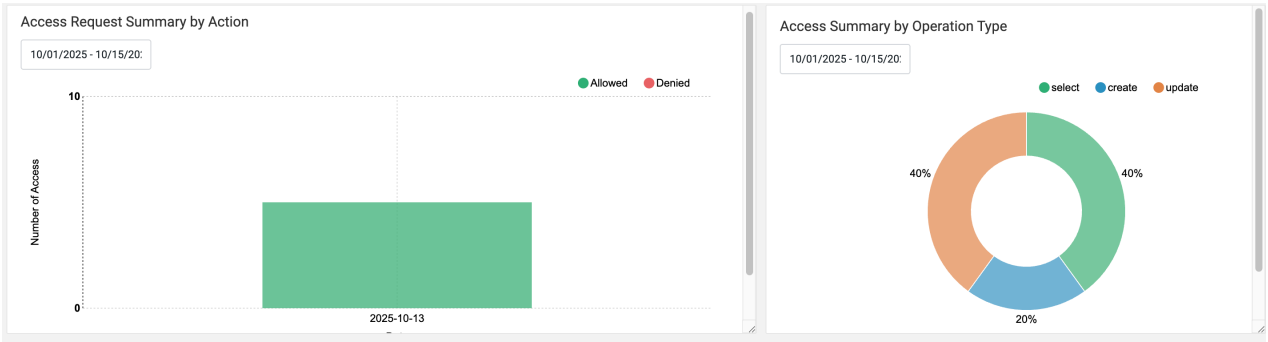
When the data within columns is numeric, a histogram of the distribution of values organized into 10 groups (decile frequency histogram) and a box plot with a five-number summary (mean, median, quartiles, maximum, and minimum values) are shown for the column, if there are more than 10 elements available.

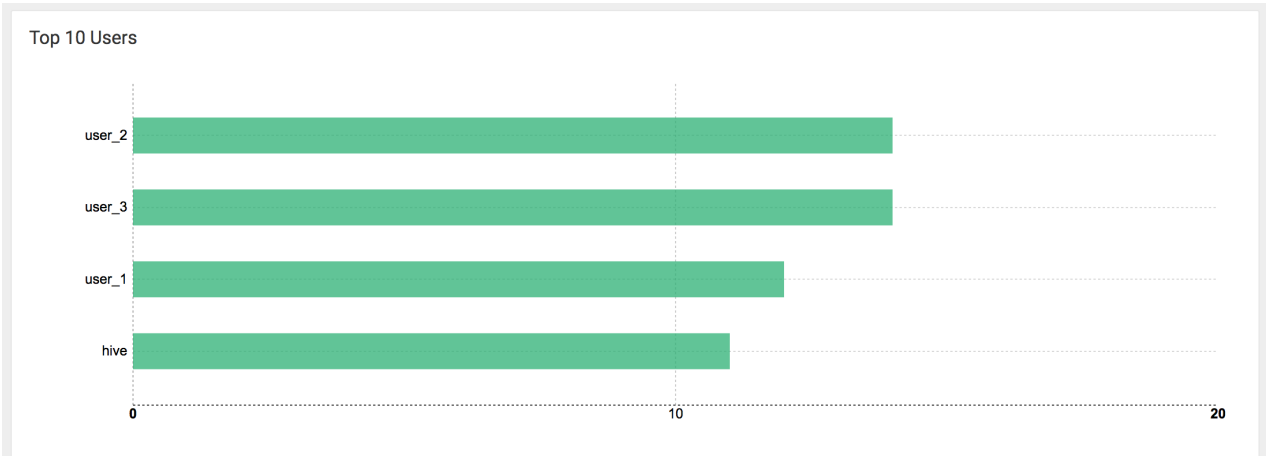


The Activity Profiler

You can view who has accessed which data from a forensic audit or compliance perspective, visualize access patterns, and identify anomalies in access patterns using the Activity Profiler.

The Activity Profiler uses the Apache Ranger logs to show the most recent raw event data as well as summarized views of event by type of access and access outcomes (allowed/denied). These views are obtained by profiling the records in the data lake.





Profiler data testing

You must note the important information about profiler services.

Note: The Cloudera Data Catalog profilers are not tested at par with the Hive scale.

Test data for Compute Cluster enabled environments

The following dataset has been validated and works as expected for Compute Cluster enabled environments.

- Supported asset types:
  External Tables:
  - CSV
  - Parquet
  - Iceberg
  - Avro
  - ORC

  Managed Tables:
  - CSV
  - Parquet
  - Iceberg
  - Avro
  - ORC
- Scheduled profiling results:
  - Total data tested:

- Total of 5 TB of data

  Note: Testing the total 5 TB data took approximately three days.

- Total table count: 7700

- Tested tables:
  - 600 Parquet tables
  - 6500 CSV tables
  - 300 Iceberg tables
  - 150 Avro tables
  - 150 ORC tables

  Note: When trying to profile any unsupported assets, the status SKIPPED is shown in Profiler Details Job History Job Summary Profiled Assets .

- On-demand profiling results:
  - Parquet table: 250 GB, sample (17 GB)
    - Statistics Collector profiler:
      - 30 Executors / 9 mins
      - 20 executors / 14 mins
      - 10 executors / 30 mins
    - Data Compliance profiler:
      - 30 Executors / 13 mins
      - 20 executors / 18 mins
      - 10 executors / 35 mins
  - CSV table: 430 GB, sample (28 GB)
  - • Statistics Collector profiler:
      - 30 Executors / 23 mins
      - 20 executors / 40 mins
      - 10 executors / 86 mins
    - Data Compliance profiler:
      - 30 Executors / 42 mins
      - 20 executors / 63 mins
      - 10 executors / 70 mins