

External Tables Automation Step by Step Demo Script

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Recommended Implementation Pattern

There were errors rendering macro:

- An unknown error occurred.

Scripts

Preparation script

```
1  use role sysadmin;
2
3
4  create or replace database unified;
5
6  use database unified;
7
8  create or replace schema sales with managed access;
9
10 create or replace schema master_data with managed access;
11
12
13 create or replace schema unified_stages with managed access;
14
15
16 use schema unified_stages;
17
18 create or replace stage f1_unification URL = 's3://demo-ext-tables-f1-unified'
19 CREDENTIALS = (AWS_KEY_ID = '*****' AWS_SECRET_KEY = '*****')
20
21 DIRECTORY=(ENABLE=TRUE AUTO_REFRESH=FALSE)
22
23 FILE_FORMAT = ( FORMAT_NAME = unified_stages.f1_parquet)
24
25 ;
26
27 list @unified_stages.f1_unification;
28
29 create or replace file format f1_parquet
30 type = parquet;
31
```

```

32 use warehouse demo_wh;
33
34 alter warehouse set warehouse_size = 'LARGE';
35
36 copy into @unified_stages.f1_unification/sales/orders/ from snowflake_sample_data.tpch_sf100.orders
37 PARTITION BY date_trunc(month,0_ORDERDATE)::string
38 MAX_FILE_SIZE = 250000000 DETAILED_OUTPUT = TRUE HEADER = TRUE;
39
40
41 copy into @unified_stages.f1_unification/sales/lineitem/ from snowflake_sample_data.tpch_sf100.LINEITEM
42 PARTITION BY date_trunc(month,L_SHIPDATE)::string
43 MAX_FILE_SIZE = 250000000 DETAILED_OUTPUT = TRUE HEADER = TRUE;
44
45
46 copy into @unified_stages.f1_unification/master_data/customer/ from snowflake_sample_data.tpch_sf100.customer
47 PARTITION BY C_MKTSEGMENT
48 MAX_FILE_SIZE = 250000000 DETAILED_OUTPUT = TRUE HEADER = TRUE;
49
50
51 copy into @unified_stages.f1_unification/master_data/nation/ from snowflake_sample_data.tpch_sf100.nation
52 MAX_FILE_SIZE = 250000000 DETAILED_OUTPUT = TRUE HEADER = TRUE;
53
54 copy into @unified_stages.f1_unification/master_data/part/ from snowflake_sample_data.tpch_sf100.PART
55 MAX_FILE_SIZE = 250000000 DETAILED_OUTPUT = TRUE HEADER = TRUE;
56
57 copy into @unified_stages.f1_unification/master_data/region/ from snowflake_sample_data.tpch_sf100.REGION
58 MAX_FILE_SIZE = 250000000 DETAILED_OUTPUT = TRUE HEADER = TRUE;
59
60 copy into @unified_stages.f1_unification/master_data/partsupp/ from snowflake_sample_data.tpch_sf100.PARTSUPP
61 MAX_FILE_SIZE = 250000000 DETAILED_OUTPUT = TRUE HEADER = TRUE;
62
63 copy into @unified_stages.f1_unification/master_data/supplier/ from snowflake_sample_data.tpch_sf100.SUPPLIER
64 MAX_FILE_SIZE = 250000000 DETAILED_OUTPUT = TRUE HEADER = TRUE;
65
66 alter warehouse set warehouse_size = 'XSMALL';
67
68 alter warehouse suspend;
69
70 alter stage unified_stages.f1_unification refresh;
71
72
73 select * from directory(@unified_stages.f1_unification);
74
75 create or replace database refinement_commercial;
76
77 use database refinement_commercial;
78
79 create or replace schema sales with managed access;
80
81

```

Demo script

```

1
2
3 /*

```

```

4  A. Understanding the basic concepts
5  */
6  /*
7  1. External tables in Snowflake with Variant data type
8
9  */
10
11 use role sysadmin;
12
13 use unified.sales;
14
15 use warehouse demo_wh;
16
17
18 select $1
19 from @unified_stages.f1_unification/sales/orders/
20 limit 1000
21 ;
22
23
24 select $1:O_CLERK::string O_CLERK,
25 $1:O_COMMENT::string O_COMMENT,
26 $1:O_CUSTKEY::number O_CUSTKEY,
27 $1:O_ORDERDATE::date O_ORDERDATE,
28 $1:O_ORDERKEY::number O_ORDERKEY,
29 $1:O_ORDERPRIORITY::string O_ORDERPRIORITY,
30 $1:O_ORDERSTATUS::string O_ORDERSTATUS,
31 $1:O_SHIPPRIORITY::number O_SHIPPRIORITY,
32 $1:O_TOTALPRICE::number O_TOTALPRICE
33 from @unified_stages.f1_unification/sales/orders/
34 limit 1000
35 ;
36
37
38
39 create or replace external table orders
40 file_format = (format_name = 'unified_stages.f1_parquet')
41 location = @unified_stages.f1_unification/sales/orders/
42 ;
43
44
45 select * from orders
46 limit 1000;
47
48
49 select $1:O_CLERK::string O_CLERK,
50 $1:O_COMMENT::string O_COMMENT,
51 $1:O_CUSTKEY::number O_CUSTKEY,
52 $1:O_ORDERDATE::date O_ORDERDATE,
53 $1:O_ORDERKEY::number O_ORDERKEY,
54 $1:O_ORDERPRIORITY::string O_ORDERPRIORITY,
55 $1:O_ORDERSTATUS::string O_ORDERSTATUS,
56 $1:O_SHIPPRIORITY::number O_SHIPPRIORITY,
57 $1:O_TOTALPRICE::number O_TOTALPRICE
58 from orders
59 limit 1000
60 ;
61

```

```

62
63
64 /*
65 2. INFER_SCHEMA Function
66
67 */
68
69
70 select *
71   from table(
72     infer_schema(
73       location=>'@unified_stages.f1_unification/sales/orders/'
74       , file_format=>'unified_stages.f1_parquet'
75     )
76   );
77
78
79
80
81 select *
82   from table(
83     infer_schema(
84       location=>'@unified_stages.f1_unification/'
85       , file_format=>'unified_stages.f1_parquet'
86     )
87   )
88   order by filenames
89   ;
90
91
92 select SPLIT_PART(filenames,'/',1) data_domain, SPLIT_PART(filenames,'/',2) entity_table_name, *
93   from table(
94     infer_schema(
95       location=>'@unified_stages.f1_unification/'
96       , file_format=>'unified_stages.f1_parquet'
97     )
98   )
99   order by filenames
100   ;
101
102
103
104
105
106
107 select generate_column_description(array_agg(object_construct(*)), 'external_table') as columns
108   from table (
109     infer_schema(
110       location=>'@unified_stages.f1_unification/sales/orders/'
111       , file_format=>'unified_stages.f1_parquet'
112     )
113   );
114
115
116 create or replace external table orders
117   ("O_TOTALPRICE" NUMBER(12, 2) AS ($1:O_TOTALPRICE::NUMBER(12, 2)),
118   "O_ORDERPRIORITY" TEXT AS ($1:O_ORDERPRIORITY::TEXT),
119   "O_ORDERSTATUS" TEXT AS ($1:O_ORDERSTATUS::TEXT),

```

```

120 "O_ORDERDATE" DATE AS ($1:O_ORDERDATE::DATE),
121 "O_CUSTKEY" NUMBER(38, 0) AS ($1:O_CUSTKEY::NUMBER(38, 0)),
122 "O_ORDERKEY" NUMBER(38, 0) AS ($1:O_ORDERKEY::NUMBER(38, 0)),
123 "O_CLERK" TEXT AS ($1:O_CLERK::TEXT),
124 "O_SHIPPRIORITY" NUMBER(38, 0) AS ($1:O_SHIPPRIORITY::NUMBER(38, 0)),
125 "O_COMMENT" TEXT AS ($1:O_COMMENT::TEXT) )
126 file_format = (format_name = 'unified_stages.f1_parquet')
127 location = @unified_stages.f1_unification/sales/orders/
128 ;
129
130
131 select * from orders limit 1000;
132
133
134 select generate_column_description(array_agg(object_construct(*)), 'view') as columns
135 from table (
136 infer_schema(
137 location=>'@unified_stages.f1_unification/sales/orders/'
138 , file_format=>'unified_stages.f1_parquet'
139 )
140 );
141
142
143 /*
144 3. Create table using Template
145 */
146
147
148 select generate_column_description(array_agg(object_construct(*)), 'table') as columns
149 from table (
150 infer_schema(
151 location=>'@unified_stages.f1_unification/sales/orders/'
152 , file_format=>'unified_stages.f1_parquet'
153 )
154 );
155
156
157 create table orders_int
158 using template (
159 select array_agg(object_construct(*))
160 from table(
161 infer_schema(
162 location=>'@unified_stages.f1_unification/sales/orders/'
163 , file_format=>'unified_stages.f1_parquet'
164 )
165 ));
166
167 select * from orders_int;
168
169
170
171
172
173
174
175
176 /* External table creation automation */
177

```

```

178
179
180 select * from directory(@unified_stages.f1_unification);
181
182 select distinct
183 split_part(RELATIVE_PATH,'/',1) domain_name,
184 split_part(RELATIVE_PATH,'/',2) table_name
185 from directory(@unified_stages.f1_unification)
186
187 where domain_name = 'master_data'
188 ;
189
190
191
192 with cte_table_list as (
193
194 select distinct
195 split_part(RELATIVE_PATH,'/',1) domain_name,
196 split_part(RELATIVE_PATH,'/',2) table_name
197 from directory(@unified_stages.f1_unification)
198 where domain_name = 'master_data'
199
200 )
201
202 select 'create or replace external table ' || table_name || $$ file_format = (format_name = 'unified_stages.f1
203 location = @unified_stages.f1_unification$$ || '/' || domain_name || '/' || table_name || ';;' "DDL"
204
205 from cte_table_list
206
207 ;
208
209 use unified.master_data;
210
211 create or replace external table nation file_format = (format_name = 'unified_stages.f1_parquet') location = @u
212 create or replace external table part file_format = (format_name = 'unified_stages.f1_parquet') location = @uni
213 create or replace external table customer file_format = (format_name = 'unified_stages.f1_parquet') location =
214 create or replace external table supplier file_format = (format_name = 'unified_stages.f1_parquet') location =
215 create or replace external table region file_format = (format_name = 'unified_stages.f1_parquet') location = @u
216 create or replace external table partsupp file_format = (format_name = 'unified_stages.f1_parquet') location =
217
218 select * from nation limit 1000;
219 select * from part limit 1000;
220 select * from customer limit 1000;
221 select * from supplier limit 1000;
222 select * from region limit 1000;
223 select * from partsupp limit 1000;
224
225
226
227
228
229 select listagg('VALUE:' || column_name || ':' || type || ' ' || column_name, ',') as "EXPRESSION"
230 from table (
231 infer_schema(
232 location=>'@unified_stages.f1_unification/master_data/nation/'
233 , file_format=>'unified_stages.f1_parquet'
234 )
235 );

```

```

236
237
238
239
240
241 set var_table_domain = 'master_data';
242 set var_table_name = 'nation';
243 set var_table_location = (select '@unified.unified_stages.f1_unification/' || $var_table_domain || '/' || $var_
244
245 select $var_table_location;
246
247 select
248
249 'create or replace view ' || $var_table_name || ' as select ' ||
250
251 listagg('VALUE:' || t.column_name || '::' || t.type || ' ' || t.column_name, ',')
252 || ' from unified.master_data.' || $var_table_name || ';';
253
254
255 as "DDL"
256 from table (
257     infer_schema(
258         location=>$var_table_location
259         , file_format=>'unified.unified_stages.f1_parquet'
260     )
261 ) t;
262
263
264
265
266 use refinement_commercial.sales;
267 create or replace view nation as select VALUE:N_NATIONKEY::NUMBER(38, 0) N_NATIONKEY,VALUE:N_NAME::TEXT N_NAME,
268
269
270 select * from refinement_commercial.sales.nation;
271
272 select
273
274 'create or replace materialized view ' || $var_table_name || '_mv as select ' ||
275
276 listagg('VALUE:' || t.column_name || '::' || t.type || ' ' || t.column_name, ',')
277 || ' from unified.master_data.' || $var_table_name || ';';
278
279
280 as "DDL"
281 from table (
282     infer_schema(
283         location=>$var_table_location
284         , file_format=>'unified.unified_stages.f1_parquet'
285     )
286 ) t;
287
288
289 create or replace materialized view nation_mv as select VALUE:N_NATIONKEY::NUMBER(38, 0) N_NATIONKEY,VALUE:N_NA
290
291
292 select * from refinement_commercial.sales.nation_mv;
293

```

Automation using Snowflake Scripting

External tables creation Automation

```
1 use unified.master_data;
2
3 set var_domain = 'master_data';
4
5 declare
6   c1 cursor for with cte_table_list as (
7
8   select distinct
9     split_part(RELATIVE_PATH,'/',1) domain,
10    split_part(RELATIVE_PATH,'/',2) "TABLE"
11  from directory(@unified_stages.f1_unification)
12  where domain = $var_domain
13
14 )
15
16 select 'create or replace external table ' || "TABLE" || $$ file_format = (format_name = 'unified_stages.f1_parc
17 location = @unified_stages.f1_unification$$ || '/' || domain || '/' || "TABLE" || '/;' as ddl
18
19 from cte_table_list
20
21 ;
22 rs resultset;
23 object_count number(38,0) default 0;
24 begin
25   for record in c1 do
26     rs := (execute immediate record.ddl) ;
27     object_count := object_count + 1;
28   end for;
29   return 'created ' || object_count || ' external table(s)';
30 end;
31
32
```

	anonymous block
1	created 6 external table(s)

```
1 show objects in unified.master_data;
```

	created_on	name	database_name	schema_name	kind	comment	cluster_by	rows	bytes	owner	retention_time
1	2022-03-28 02:49:13.600 -0700	CUSTOMER	UNIFIED	MASTER_DATA	TABLE			null	1,266,784,204	SYSADMIN	1
2	2022-03-28 02:49:12.555 -0700	NATION	UNIFIED	MASTER_DATA	TABLE			null	2,966	SYSADMIN	1
3	2022-03-28 02:49:13.083 -0700	PART	UNIFIED	MASTER_DATA	TABLE			null	645,759,542	SYSADMIN	1
4	2022-03-28 02:49:15.133 -0700	PARTSUPP	UNIFIED	MASTER_DATA	TABLE			null	4,438,942,773	SYSADMIN	1
5	2022-03-28 02:49:14.627 -0700	REGION	UNIFIED	MASTER_DATA	TABLE			null	1,506	SYSADMIN	1
6	2022-03-28 02:49:14.115 -0700	SUPPLIER	UNIFIED	MASTER_DATA	TABLE			null	89,011,896	SYSADMIN	1

```
1 select * from PARTSUPP limit 100;
```


	VALUE
2	{ "PS_AVAILQTY": 4478, "PS_COMMENT": "furiously? thinly ironic deposits eat carefully after the enticing", "PS_PARTKEY": 7820119, "PS_SUPPKEY": 320134, "PS_SUPPLYCOST": 873.39 }
3	{ "PS_AVAILQTY": 5145, "PS_COMMENT": "use quickly. slyly pending packages haggle slyly idle packages. carefully silent accounts on the regular packages haggle furiously across the stealthily bo", "PS_PARTKEY": 7820119, "PS_SUPPKEY": 57014, 'PS_SUPPLYCOST': 873.39 }
4	{ "PS_AVAILQTY": 7992, "PS_COMMENT": "ptotes. final packages wake final accounts. bold instructions sleep. bf", "PS_PARTKEY": 7820120, "PS_SUPPKEY": 820121, "PS_SUPPLYCOST": 443.84 }
5	{ "PS_AVAILQTY": 3073, "PS_COMMENT": "y ironic foxes. slyly unusual foxes sleep fluffily carefully regular packages. furiously express theodolites sleep furiously quickly express orbits. theodolites boost fur", "PS_PARTKEY": 7820120, "PS_SUPPKEY": 320135, "PS_SUPPLYCOST": 873.39 }
6	{ "PS_AVAILQTY": 6903, "PS_COMMENT": "uests run finally. careful packages sleep slyly. unusual requests haggle quietly according to the quickly blithe hockey players. r", "PS_PARTKEY": 7820120, "PS_SUPPKEY": 320135, "PS_SUPPLYCOST": 73.39 }
7	{ "PS_AVAILQTY": 12, "PS_COMMENT": "is are across the silent, unusual requests. furiously bold instructions haggle alongside of the carefully express dependencies. final, regular requests eat f", "PS_PARTKEY": 7820120, "PS_SUPPKEY": 570142, 'PS_SUPPLYCOST': 873.39 }
8	{ "PS_AVAILQTY": 2424, "PS_COMMENT": "ackages. fluffily bold pinto beans wake regularly final instructions. bold requests wake accounts. final, re", "PS_PARTKEY": 7820121, "PS_SUPPKEY": 820122, "PS_SUPPLYCOST": 671.36 }
9	{ "PS_AVAILQTY": 1721, "PS_COMMENT": "ously regular requests hinder over the requests. foxes are slyly according to the requests. bold accounts are furiously. c", "PS_PARTKEY": 7820121, "PS_SUPPKEY": 70129, "PS_SUPPLYCOST": 982.21 }

Views creation Automation

```

1 use refinement_commercial.sales;
2
3 set var_domain = 'master_data';
4
5 declare
6   c1 cursor for select 'create or replace view ' || split_part(filenamees,'/',2) || ' as select ' ||
7
8   listagg('VALUE:' || t.column_name || '::' || t.type || ' ' || t.column_name, ',')
9   || ' from unified.' || split_part(filenamees,'/',1) || '.' || split_part(filenamees,'/',2) ||';'
10
11
12 as ddl
13 from table (
14   infer_schema(
15     location=>'@unified.unified_stages.f1_unification/'
16     , file_format=>'unified.unified_stages.f1_parquet'
17   )
18 ) t
19 where split_part(filenamees,'/',1) = $var_domain
20 group by split_part(filenamees,'/',1), split_part(filenamees,'/',2)
21 ;
22 rs resultset;
23 object_count number(38,0) default 0;
24 begin
25   for record in c1 do
26     rs := (execute immediate record.ddl) ;
27     object_count := object_count + 1;
28   end for;
29   return 'created ' || object_count || ' views(s)';
30 end;
```

	anonymous block
1	created 6 views(s)

```

1 show objects in refinement_commercial.sales;
```

	created_on	name	database_name	schema_name	kind	comment	cluster_by	rows	bytes	owner	retention_time
1	2022-03-28 02:51:05.795 -0700	CUSTOMER	REFINEMENT_COMMERCIAL	SALES	VIEW			0	0	SYSADMIN	1
2	2022-03-28 02:51:05.808 -0700	NATION	REFINEMENT_COMMERCIAL	SALES	VIEW			0	0	SYSADMIN	1
3	2022-03-22 08:14:14.695 -0700	NATIONAL_MV	REFINEMENT_COMMERCIAL	SALES	VIEW			25	3,872	SYSADMIN	1
4	2022-03-28 02:51:05.190 -0700	PART	REFINEMENT_COMMERCIAL	SALES	VIEW			0	0	SYSADMIN	1
5	2022-03-28 02:51:06.420 -0700	PARTSUPP	REFINEMENT_COMMERCIAL	SALES	VIEW			0	0	SYSADMIN	1
6	2022-03-28 02:51:06.237 -0700	REGION	REFINEMENT_COMMERCIAL	SALES	VIEW			0	0	SYSADMIN	1
7	2022-03-28 02:51:06.031 -0700	SUPPLIER	REFINEMENT_COMMERCIAL	SALES	VIEW			0	0	SYSADMIN	1

1 `select * from PARTSUPP limit 100;`

	PS_SUPPKEY	PS_SUPPLYCOST	PS_COMMENT	PS_QUANTITY	PS_PARTKEY
1	999,932	708.72	Its are quickly up the boldly special theodolites! even accounts doubt carefully silent packages. ginto beans sleep regularly. boldly unusual de	4,393	6,999,931
2	249,938	498.04	ironic instructions! quickly final accounts sleep stily. stily express accounts haggle. stily final	5,211	6,999,931
3	499,944	119.95	ironic, ironic theodolites about the pending requests print stily carefully silent courts. furiously even packages cajole about the even accounts	4,919	6,999,931
4	749,950	217.04	dmg dependencies mold stily carefully regular packages. furiously express instructions about the ironic excuses cajole f	5,685	6,999,931
5	999,933	698.88	old, unusual deposits wake fluffily carefully final requests! even courts cajole quickly according to	3,039	6,999,932
6	249,939	905.45	. quickly special ideas sleep furiously. ironic, silent instructions solve blithely even requests. carefully bold ideas alongside of the pending, iron	1,778	6,999,932
7	499,945	160.84	nic theodolites haggle blithely above the quickly site	5,713	6,999,932
8	749,951	220.36	ven, ironic forges sleep among the stily ironic foxes. quickly ironic courts hinder. unusual, express accounts sleep stily according to the regul	4,440	6,999,932
...