

I. Installation Apache Hive

```
hive@308c6f6d87dc:/opt/hive$ hadoop fs -ls
Found 16 items
drwxr-xr-x  - root root      4096 2023-05-02 18:52 data
-rw-r--r--  1 hive hive     19957 2025-10-31 22:09 derby.log
drwxr-xr-x  - root root      4096 2023-05-02 18:52 examples
drwxr-xr-x  - root root      4096 2023-05-02 18:52 hcatalog
drwxr-xr-x  - root root      4096 2023-05-02 18:52 jdbc
drwxr-xr-x  - root root     20480 2023-05-02 18:52 lib
drwxr-xr-x  - hive hive      4096 2025-10-31 22:09 metastore_db
drwx-wx-wx  - hive hive      4096 2025-10-31 22:09 scratch_dir
drwxr-xr-x  - root root      4096 2023-05-02 18:52 scripts
hive@308c6f6d87dc:/opt/hive$
```

```
hive@308c6f6d87dc:/opt/hive$ cat /opt/hive/conf/hive-site.xml
<?xml version="1.0" encoding="UTF-8"?>
<!--
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contributor license agreements. See the NOTICE file distributed with
this work for additional information regarding copyright ownership.
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(the "License"); you may not use this file except in compliance with
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distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

-->
</-->

INFO : Starting task [stage=0:DDL] in serial mode
INFO : Completed executing command(queryId=hiv
+-----+
| database_name |
+-----+
| default       |
+-----+
1 row selected (9.959 seconds)
0: jdbc:hive2://localhost:10000>
```

III. Analyse de données de réservation d'hôtels

1. Créer la base de données

```
0: jdbc:hive2://localhost:10000> CREATE DATABASE hotel_booking;
INFO : Compiling command(queryId=hive_20251101000048_6d3dcb07-a2ce-42bd-92da-53c2dd8021a4): CREATE DATABASE hotel_booking
INFO : Semantic Analysis Completed (retrial = false)
INFO : Created Hive schema: Schema(fieldSchemas:null, properties:null)
INFO : Completed compiling command(queryId=hive_20251101000048_6d3dcb07-a2ce-42bd-92da-53c2dd8021a4); Time taken: 0.192 seconds
INFO : Concurrency mode is disabled, not creating a lock manager
INFO : Executing command(queryId=hive_20251101000048_6d3dcb07-a2ce-42bd-92da-53c2dd8021a4): CREATE DATABASE hotel_booking
INFO : Starting task [Stage=0:DDL] in serial mode
INFO : Completed executing command(queryId=hive_20251101000048_6d3dcb07-a2ce-42bd-92da-53c2dd8021a4); Time taken: 0.459 seconds
No rows affected (1.041 seconds)
0: jdbc:hive2://localhost:10000> USE hotel_booking;
INFO : Compiling command(queryId=hive_20251101000056_06942fa2-1ffc-47e4-9dd2-40de24303ff8): USE hotel_booking
INFO : Semantic Analysis Completed (retrial = false)
INFO : Created Hive schema: Schema(fieldSchemas:null, properties:null)
INFO : Completed compiling command(queryId=hive_20251101000056_06942fa2-1ffc-47e4-9dd2-40de24303ff8); Time taken: 0.194 seconds
INFO : Concurrency mode is disabled, not creating a lock manager
INFO : Executing command(queryId=hive_20251101000056_06942fa2-1ffc-47e4-9dd2-40de24303ff8): USE hotel_booking

PS C:\Users\ahmed> docker exec -it hiveserver2-standalone bash -c "ls -l /opt/hive/data/warehouse || true"
>>
total 4
drwxr-xr-x 2 hive hive 4096 Nov  1 00:00 hotel_booking.db
PS C:\Users\ahmed>
```

- Après CREATE DATABASE, Hive crée un dossier nommé hotel_booking.db dans le répertoire warehouse « /opt/hive/data/warehouse/hotel_booking.db ».

2. Créer les tables

```
0: jdbc:hive2://localhost:10000> set hive.exec.dynamic.partition=true ;
No rows affected (1.176 seconds)
0: jdbc:hive2://localhost:10000> set hive.exec.dynamic.partition.mode=nonstrict ;
No rows affected (0.029 seconds)
0: jdbc:hive2://localhost:10000> set hive.exec.max.dynamic.partitions=20000 ;
No rows affected (0.048 seconds)
0: jdbc:hive2://localhost:10000> set hive.exec.max.dynamic.partitions.pernode=20000 ;
No rows affected (0.025 seconds)
0: jdbc:hive2://localhost:10000> set hive.enforce.bucketing = true ;
No rows affected (0.017 seconds)
0: jdbc:hive2://localhost:10000> CREATE TABLE clients ( client_id INT, nom STRING, email ST
. . . . .> telephone STRING )
. . . . .> ROW FORMAT DELIMITED FIELDS TERMINATED BY ','
. . . . .> STORED AS TEXTFILE;
```

Création de la table client

```
0: jdbc:hive2://localhost:10000> CREATE TABLE clients ( client_id INT, nom STRING, email STRING,
. . . . .> telephone STRING )
. . . . .> ROW FORMAT DELIMITED FIELDS TERMINATED BY ','
. . . . .> STORED AS TEXTFILE;
INFO : Compiling command(queryId=hive_20251101001121_7159d921-9325-4758-9fee-5e8fb8a451bd): CREATE TABLE clients ( client_id INT, nom STRING,
mail STRING,
telephone STRING )
ROW FORMAT DELIMITED FIELDS TERMINATED BY ','
STORED AS TEXTFILE
INFO : Semantic Analysis Completed (retrial = false)
INFO : Created Hive schema: Schema(fieldSchemas:null, properties:null)
INFO : Completed compiling command(queryId=hive_20251101001121_7159d921-9325-4758-9fee-5e8fb8a451bd); Time taken: 0.91 seconds
INFO : Concurrency mode is disabled, not creating a lock manager
INFO : Executing command(queryId=hive_20251101001121_7159d921-9325-4758-9fee-5e8fb8a451bd): CREATE TABLE clients ( client_id INT, nom STRING,
mail STRING,
telephone STRING )
```

De même pour la table des reservations et hotels

```
0: jdbc:hive2://localhost:10000> CREATE TABLE reservations (
. . . . .> reservation_id INT,
. . . . .> client_id INT,
. . . . .> hotel_id INT,
. . . . .> date_fin DATE,
. . . . .> prix_total DECIMAL(10,2)
. . . . .> )
. . . . .> PARTITIONED BY (date_debut STRING)
. . . . .> ROW FORMAT DELIMITED
. . . . .> FIELDS TERMINATED BY ','
. . . . .> STORED AS TEXTFILE;
INFO : Compiling command(queryId=hive_20251101001605_462bbdd6-d464-418f-b94f-be5dd22e170f): CREATE TABLE reservations (
reservation_id INT,
```

3. Charger les données dans les tables

Pour clients et hotel

```
0: jdbc:hive2://localhost:10000> LOAD DATA LOCAL INPATH '/shared_volume/hive_data/clients.txt' INTO TABLE clients;
INFO : Compiling command(queryId=hive_20251101002601_1740ae10-c93f-4b08-a4c4-fe7fd08d1724): LOAD DATA LOCAL INPATH '/shared_volume/hive_data/cl
ients.txt' INTO TABLE clients
INFO : Semantic Analysis Completed (retrial = false)
INFO : Created Hive schema: Schema(fieldSchemas:null, properties:null)
INFO : Completed compiling command(queryId=hive_20251101002601_1740ae10-c93f-4b08-a4c4-fe7fd08d1724); Time taken: 0.837 seconds
INFO : Concurrency mode is disabled, not creating a lock manager
INFO : Executing command(queryId=hive_20251101002601_1740ae10-c93f-4b08-a4c4-fe7fd08d1724): LOAD DATA LOCAL INPATH '/shared_volume/hive_data/cl
ients.txt' INTO TABLE clients
INFO : Starting task [Stage-0:MOVE] in serial mode
INFO : Loading data to table default.clients from file:/shared_volume/hive_data/clients.txt
INFO : Starting task [Stage-1:STATS] in serial mode
INFO : Executing stats task
INFO : Table default.clients stats: [numFiles=1, numRows=0, totalSize=1579, rawDataSize=0, numFilesErasureCoded=0]
INFO : Completed executing command(queryId=hive_20251101002601_1740ae10-c93f-4b08-a4c4-fe7fd08d1724); Time taken: 1.99 seconds
No rows affected (3.267 seconds)
0: jdbc:hive2://localhost:10000>
```

On insere les données dans une table de staging « raw_reservations »

```
ervations.txt' INTO TABLE raw_reservations
INFO : Starting task [Stage-0:MOVE] in serial mode
INFO : Loading data to table default.raw_reservations from file:/shared_volume/hive_data/reservations.txt
INFO : Starting task [Stage-1:STATS] in serial mode
INFO : Executing stats task
INFO : Table default.raw_reservations stats: [numFiles=1, numRows=0, totalSize=1228, rawDataSize=0, numFilesErasureCoded=0]
INFO : Completed executing command(queryId=hive_20251101003940_869e1a62-278a-49e8-aea4-cc7d2b0e4669); Time taken: 0.381 seconds
No rows affected (0.602 seconds)
0: jdbc:hive2://localhost:10000> SET hive.exec.dynamic.partition=true;
No rows affected (0.041 seconds)
0: jdbc:hive2://localhost:10000> SET hive.exec.dynamic.partition.mode=nonstrict;
No rows affected (0.021 seconds)
```

4. Utiliser des partitions et des buckets

Charger dans les tables

- remplir hotels_partitioned à partir de la table hotels (dynamic partition) :

VERTICES	MODE	STATUS	TOTAL	COMPLETED	RUNNING	PENDING	FAILED	KILLED
Map 1	container	SUCCEEDED	1	1	0	0	0	0
Reducer 2	container	SUCCEEDED	1	1	0	0	0	0
Reducer 3	container	SUCCEEDED	1	1	0	0	0	0

VERTICES	MODE	STATUS	TOTAL	COMPLETED	RUNNING	PENDING	FAILED	KILLED
Map 1	container	SUCCEEDED	1	1	0	0	0	0
Reducer 2	container	SUCCEEDED	1	1	0	0	0	0
Reducer 3	container	SUCCEEDED	1	1	0	0	0	0

VERTICES: 03/03 [=====>>>] 100% ELAPSED TIME: 7.44 s

INFO : Time taken to load dynamic partitions: 0.379 seconds

INFO : Time taken for adding to write entity : 0.002 seconds

INFO : Starting task [Stage-3:STATS] in serial mode

- remplir reservations_bucketed à partir d'une table de staging raw_reservations

INFO : Starting task [Stage-0:MOVE] in serial mode-----

INFO : Loading data to table default.reservations_bucketed from file:/opt/hive/data/warehouse/reservations_bucketed/.hive-staging_hive_2025-11-01_00-46-04_980_1800327031563457623-2/-ext-10000 4 0 0 0 0

INFO : Starting task [Stage-3:STATS] in serial mode 0 0 1 0 0

INFO : Executing stats task-----

VERTICES	MODE	STATUS	TOTAL	COMPLETED	RUNNING	PENDING	FAILED	KILLED
Map 1	container	SUCCEEDED	1	1	0	0	0	0
Reducer 2	container	SUCCEEDED	4	4	0	0	0	0
Reducer 3	container	SUCCEEDED	1	1	0	0	0	0

VERTICES: 03/03 [=====>>>] 100% ELAPSED TIME: 10.03 s

INFO : Completed executing command(queryId=hive_20251101004604_41d7be87-4cca-415c-9fdb-fa33abd2c9ae); Time taken: 11.578 seconds

31 rows affected (14.54 seconds)

0: jdbc:hive2://localhost:10000> █

RAM 4.22 GB, CPU 27.53%, Disk: 32.12 GB used / limit 100.00 GB

5. Utilisation de requêtes simples

- Lister tous les clients

```
0: jdbc:hive2://localhost:10000> select * from clients
> ;
INFO : Compiling command(queryId=hive_20251101011441_dd540941-695b-4521-a0bc-fba5dcc47f35): select * from clients
INFO : No Stats for default@clients, Columns: telephone, nom, client_id, email
INFO : Semantic Analysis Completed (retrial = false)
INFO : Created Hive schema: Schema(fieldSchemas:[FieldSchema(name:clients.client_id, type:int, comment:null), FieldSchema(name:clients.nom, type:string, comment:null), FieldSchema(name:clients.email, type:string, comment:null), FieldSchema(name:clients.telephone, type:string, comment:null)], properties:null)
INFO : Completed compiling command(queryId=hive_20251101011441_dd540941-695b-4521-a0bc-fba5dcc47f35); Time taken: 2.798 seconds
INFO : Concurrency mode is disabled, not creating a lock manager
INFO : Executing command(queryId=hive_20251101011441_dd540941-695b-4521-a0bc-fba5dcc47f35): select * from clients
INFO : Completed executing command(queryId=hive_20251101011441_dd540941-695b-4521-a0bc-fba5dcc47f35); Time taken: 0.006 seconds
```

clients.client_id	clients.nom	clients.email	clients.telephone
NULL	nom	email	telephone
1	John Doe	john.doe@example.com	1234567890

- Lister tous les hôtels à Paris

```
0: jdbc:hive2://localhost:10000: SELECT * FROM hotels WHERE ville = 'Paris';
INFO : Compiling command(queryId=hive_20251101011637_78b89243-37a3-40af-82b9-e98667d86d98): SELECT * FROM hotels WHERE ville = 'Paris'
INFO : No Stats for default@hotels, Columns: ville, etoiles, hotel_id, nom
INFO : Semantic Analysis Completed (retrial = false)
INFO : Created Hive schema: Schema(fieldSchemas:[FieldSchema(name:hotels.hotel_id, type:int, comment:null), FieldSchema(name:hotels.nom, type:string, comment:null), FieldSchema(name:hotels.etoiles, type:int, comment:null), FieldSchema(name:hotels.ville, type:string, comment:null)], properties:null)
INFO : Completed compiling command(queryId=hive_20251101011637_78b89243-37a3-40af-82b9-e98667d86d98); Time taken: 2.923 seconds
INFO : Concurrency mode is disabled, not creating a lock manager
INFO : Executing command(queryId=hive_20251101011637_78b89243-37a3-40af-82b9-e98667d86d98): SELECT * FROM hotels WHERE ville = 'Paris'
```

- Lister toutes les réservations avec les informations sur les hôtels et les clients

```
INFO : Completed executing command(queryId=hive_20251101011859_13b5ab6b-808d-4892-bb06-2274eaa9d3ed); Time taken: 6.434 seconds
```

r.reservation_id	c.client_id	client_nom	h.hotel_id	hotel_nom	r.date_debut	r.date_fin	r.prix_total
23	23	Bruce Wayne	23	Oceanic Hotel	2024-12-10	2024-12-13	2400.00
12	12	David Miller	12	Forest Escape	2024-12-10	2024-12-12	1800.00
2	2	Sarah Connor	2	Beach Resort	2024-12-10	2024-12-15	800.00
1	1	John Doe	1	Grand Hotel	2024-12-01	2024-12-05	1500.00
6	6	Alex Dupont	6	Sea Breeze	2024-12-01	2024-12-03	1200.00
13	13	Laura Wilson	13	Spa Paradise	2024-12-01	2024-12-03	1600.00
7	7	Sophie Martin	7	Country Retreat	2024-12-15	2024-12-20	1000.00
26	26	Tony Stark	26	Urban Stay	2024-12-15	2024-12-18	1300.00
4	4	Lara Croft	4	Budget Inn	2024-12-15	2024-12-18	300.00
9	9	Emily Davis	9	City Center Lodge	2024-12-20	2024-12-22	700.00
27	27	Natasha Romanoff	27	Heritage Hotel	2024-12-20	2024-12-23	1400.00
3	3	James Bond	3	Mountain Lodge	2024-12-20	2024-12-25	600.00
16	16	Oscar Wilde	16	Château Bellevue	2024-12-02	2024-12-06	1300.00

6. Requêtes avec jointures

- Afficher le nombre de réservations par client

```
SELECT c.client_id, c.nom, COUNT(*) AS nb_reservations
```

```
FROM reservations r
```

```
JOIN clients c ON r.client_id = c.client_id
```

```
GROUP BY c.client_id, c.nom
```

```
ORDER BY nb_reservations DESC;
```

c.client_id	c.nom	nb_reservations
1	John Doe	1
2	Sarah Connor	1
3	James Bond	1
4	Lara Croft	1
5	Maria Gonzalez	1
6	Alex Dupont	1
7	Sophie Martin	1
8	Paul Durand	1
9	Emily Davis	1
10	Robert Brown	1
11	Alice Cooper	1
12	David Miller	1
13	Laura Wilson	1

- Afficher les clients qui ont réservé plus que 2 nuitées

```
SELECT r.client_id, c.nom, SUM(datediff(CAST(r.date_fin AS DATE), CAST(r.date_debut AS DATE))) AS total_nuits
FROM reservations r JOIN clients c ON r.client_id = c.client_id
GROUP BY r.client_id, c.nom HAVING total_nuits > 2;
```

r.client_id	c.nom	total_nuits
1	John Doe	4
2	Sarah Connor	5
3	James Bond	5
4	Lara Croft	3
7	Sophie Martin	5
8	Paul Durand	4
10	Robert Brown	3
11	Alice Cooper	5
14	Chris Evans	3
15	Megan Fox	3
16	Oscar Wilde	4
17	Rachel Green	4
18	Ryan Gosling	4
19	Emma Watson	4

- Afficher les Hôtels réservés par chaque client

```
SELECT r.client_id, c.nom AS client_nom, concat_ws(',', collect_set(h.nom)) AS hotels_reserves
FROM reservations r
JOIN clients c ON r.client_id = c.client_id
JOIN hotels h ON r.hotel_id = h.hotel_id
GROUP BY r.client_id, c.nom;
```

r.client_id	client_nom	hotels_reserves
1	John Doe	Grand Hotel
2	Sarah Connor	Beach Resort
3	James Bond	Mountain Lodge
4	Lara Croft	Budget Inn
5	Maria Gonzalez	Luxury Palace
6	Alex Dupont	Sea Breeze
7	Sophie Martin	Country Retreat
8	Paul Durand	Riverside Hotel
9	Emily Davis	City Center Lodge
10	Robert Brown	Eco Stay
11	Alice Cooper	Hotel de Ville

- Afficher les noms des hôtels dans lesquels il y a plus qu'une réservation.

```
SELECT h.nom, COUNT(*) AS cnt
FROM reservations r
JOIN hotels h ON r.hotel_id = h.hotel_id
GROUP BY h.nom
HAVING cnt > 1;
```

- Afficher les noms des hôtels dans lesquels il y a pas de réservation.

```
SELECT h.nom
FROM hotels h
LEFT JOIN reservations r ON h.hotel_id = r.hotel_id
WHERE r.reservation_id IS NULL;
```

7. Requêtes imbriquées

- Afficher les clients ayant réservé un hôtel avec plus de 4 étoiles

```
SELECT DISTINCT c.client_id, c.nom
FROM clients c
WHERE c.client_id IN ( SELECT r.client_id
FROM reservations r JOIN hotels h ON r.hotel_id = h.hotel_id
WHERE h.etoiles > 4);
```

- Afficher le Total des revenus générés par chaque hôtel

```
SELECT h.hotel_id, h.nom, SUM(r.prix_total) AS revenu_total
FROM reservations r JOIN hotels h ON r.hotel_id = h.hotel_id
GROUP BY h.hotel_id, h.nom
ORDER BY revenu_total DESC;
```

```
VERTICES: 04/04 [=====>>>] 100% ELAPSED TIME: 7.47 s
INFO : Completed executing command(queryId=hive_20251101013102_ca94f81d-06eb-4e10-81a-
+-----+
| h.hotel_id | h.nom | revenu_total |
+-----+
| 11 | Hotel de Ville | 2500.00 |
| 23 | Oceanic Hotel | 2400.00 |
| 24 | Hilltop Inn | 2200.00 |
| 15 | Lakeview Resort | 2100.00 |
| 25 | Cloud Nine | 2000.00 |
| 5 | Luxury Palace | 2000.00 |
| 22 | Golden Sands | 1800.00 |
| 12 | Forest Escape | 1800.00 |
| 19 | Horizon Hotel | 1700.00 |
| 29 | Springfield Inn | 1600.00 |
| 13 | Spa Paradise | 1600.00 |
+-----+
```

8. Utilisation de fonctions d'agrégation avec partitions et buckets

- Revenus totaux par ville (partitionnée)

```
SELECT h.ville, SUM(r.prix_total) AS revenu_par_ville
FROM reservations r JOIN hotels h ON r.hotel_id = h.hotel_id
GROUP BY h.ville
ORDER BY revenu_par_ville DESC;
```

```

-----
INFO : Completed executing command(query)
+-----+-----+
| h.ville | revenu_par_ville |
+-----+-----+
| 5       | 14500.00         |
| 4       | 12600.00         |
| 3       | 8500.00          |
| 2       | 5500.00          |
+-----+-----+
4 rows selected (17.159 seconds)
0: jdbc:hive2://localhost:10000>

```

- Nombre total de réservations par client (bucketed)

```

SELECT client_id, COUNT(*) AS nb_reservations
FROM reservations_bucketed
GROUP BY client_id
ORDER BY nb_reservations DESC;

```

```

-----
INFO : Completed executing command(query)
+-----+-----+
| client_id | nb_reservations |
+-----+-----+
| 1         | 1               |
| 2         | 1               |
| 3         | 1               |
| 4         | 1               |
| 5         | 1               |
+-----+-----+

```

9. Nettoyage et suppression des données

Supprimer les tables créés précédemment.

10. Script hql

Mis en place des scripts qui créent les tables et font l'affaire.

Pour le loading, la suite des mapreduce est mis en place comme processus de Hive.

```

-----
VERTICES    MODE      STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
-----
Map 1 ..... container  SUCCEEDED    1         1         0         0         0         0
-----
VERTICES    MODE      STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
-----
VERTICES    MODE      STATUS  TOTAL  COMPLETED  RUNNING  PENDING  FAILED  KILLED
-----
Map 1 ..... container  SUCCEEDED    1         1         0         0         0         0
Reducer 2 ..... container  SUCCEEDED    1         1         0         0         0         0
Reducer 3 ..... container  SUCCEEDED    1         1         0         0         0         0
-----
VERTICES: 03/03 [=====>>>] 100% ELAPSED TIME: 37.91 s
-----

```

De même pour l'exécution du code de queries.hql.

HiveServer2

Active Sessions

User Name	IP Address	Operation Count	Active Time (s)	Idle Time (s)
anonymous	127.0.0.1	0	3849	758
scott	127.0.0.1	0	6827	6541

Total number of sessions: 2

Open Queries

User Name	Query	Execution Engine	State	Opened Timestamp	Opened (s)	Latency (s)	Drilldown Link
-----------	-------	------------------	-------	------------------	------------	-------------	----------------

Total number of queries: 0

Last Max 25 Closed Queries

User Name	Query	Execution Engine	State	Opened (s)	Closed Timestamp	Latency (s)	Drilldown Link
scott	SELECT client_id, COUNT(*) AS nb_reservations FROM reservations_bucketed GROUP BY client_id ORDER BY nb_reservations DESC	tez	FINISHED	1	Sat Nov 01 01:58:15 UTC 2025	1	Drilldown
scott	SELECT h.ville, SUM(r.prix_total) AS revenu_par_ville FROM reservations r JOIN hotels h ON r.hotel_id = h.hotel_id GROUP BY h.ville ORDER BY revenu_par_ville DESC	tez	FINISHED	3	Sat Nov 01 01:58:13 UTC 2025	3	Drilldown
scott	SELECT h.hotel_id, h.nom, SUM(r.prix_total) AS revenu_total FROM reservations r JOIN hotels h ON r.hotel_id = h.hotel_id GROUP BY h.hotel_id, h.nom ORDER BY revenu_total DESC	tez	FINISHED	3	Sat Nov 01 01:58:09 UTC 2025	3	Drilldown
scott	SELECT DISTINCT c.client_id, c.nom FROM clients c WHERE c.client_id IN (SELECT r.client_id FROM reservations r JOIN hotels	tez	FINISHED	19	Sat Nov 01 01:58:05 UTC	18	Drilldown