

1 June 2020

Emilia Wróblewska  
291674

## Databases Task III Report

### Problem Description

Designing a simplified model of a data warehouse including definition of:

- At least 1 table of facts.
- At least 3 tables of dimensions for which facts table has references.

This task assumes that the source database will be that created in Task II, hence I use tables from *VideoStreaming* database.

# 1 Data Warehouse

To create a data warehouse for our *VideoStreaming* database we need to create one more database: *VideoStreaming\_DWH* which will store the facts about our viewing requests. This model is a typical star schema with fact table linked to dimension tables via foreign keys. Hence, I develop one fact table *Requests\_Facts* and its 3 dimension tables: *ViewersInfo*, *ChannelsInfo* and *ServersInfo*.

1. **ViewersInfo** - table with all information from *Viewers* table except for *Server\_id* (which is not needed here).
2. **ChannelInfo** - table with available channels, exactly the same as *Channels*.
3. **ServersInfo** - table with all information about servers from *Servers* table.
4. **Requests\_Facts** - table with facts about requests and requested channels. A basis for this fact table is provided by *Viewing\_Request*. It contains following columns:
  - *Viewer\_id* (dimension 1)
  - *Request\_id*
  - *Channel\_name* (dimension 2)
  - *Category\_id*
  - *Request\_Date*
  - *Request\_Status*
  - *Status\_Date*
  - *Server\_id* (dimension 3)

As we can see, since our tables have very little data, the fact table and corresponding dimension tables are very similar to the original tables they are based on. The fact table *Requests\_Facts* contains one additional field in comparison to the original *Viewing\_Request* - *Category\_id* of the requested channel - to provide more possibilities for grouping channels, determining their popularity, etc. Below I will present sample queries used in this task and show obtained tables with records transferred from the *VideoStreaming* database.

Query used for creation of the fact table *Requests\_Facts*:

```
01 | SELECT
02 |         vr.Request_id,
03 |         vr.Viewer_id,  --> dimension 1 viewer
04 |         c.Channel_name,  --> dimension 2 channel
05 |         c.Category_id,
06 |         vr.Request_Date,
07 |         vr.Request_Status,
08 |         vr.Status_Date,
09 |         vr.Server_id  --> dimension 3 server
10 |
11 | INTO VideoStreaming_DWH.dbo.Requests_Facts
12 | FROM Viewing_Request vr, Channels c
13 | WHERE vr.Channel_name=c.Channel_name
```

Query establishing primary and foreign key constraints for *Requests\_Facts* table:

```

01 | ALTER TABLE VideoStreaming_DWH.dbo.Requests_Facts
02 | ADD CONSTRAINT pk_rf1 PRIMARY KEY (Request_id),
03 | CONSTRAINT fk_dim1 FOREIGN KEY (Viewer_id)
04 | REFERENCES VideoStreaming_DWH.dbo.ViewersInfo(Viewer_id),
05 | CONSTRAINT fk_dim2 FOREIGN KEY (Channel_name)
06 | REFERENCES VideoStreaming_DWH.dbo.ChannelsInfo(Channel_name),
07 | CONSTRAINT fk_dim3 FOREIGN KEY (Server_id)
08 | REFERENCES VideoStreaming_DWH.dbo.ServersInfo(Server_id)

```

All queries responsible for creating the tables can be found in: **Task3.sql**.

Resulting tables:

|   | Viewer_id | Username     | Email               | Viewer_Country |
|---|-----------|--------------|---------------------|----------------|
| 1 | 11        | JohnSmith    | jsmith@us.com       | US             |
| 2 | 12        | flower55     | 12345@pl.pl         | Poland         |
| 3 | 13        | KLauSP       | KLAUS@germany.com   | Germany        |
| 4 | 14        | JackSparrow3 | pirate@pl.pl        | Poland         |
| 5 | 15        | Atlantis     | atlanta@us.com      | US             |
| 6 | 16        | ALFKI        | alf@xx.pl           | Poland         |
| 7 | 17        | misterX      | sdfrusopen@plot.com | Russia         |

Viewers

|   | Channel_name | Category_id | Expiration_Date         |
|---|--------------|-------------|-------------------------|
| 1 | CALENDAR     | NULL        | 2020-11-01 09:30:00.000 |
| 2 | Eurosport    | 1           | 2020-10-01 10:30:00.000 |
| 3 | Master Chef  | 6           | 2019-12-31 09:30:00.000 |
| 4 | MusicTV      | 5           | 2020-12-31 09:30:00.000 |
| 5 | NewsTV       | 2           | 2021-01-30 10:30:00.000 |
| 6 | POP          | NULL        | 2020-01-30 10:30:00.000 |

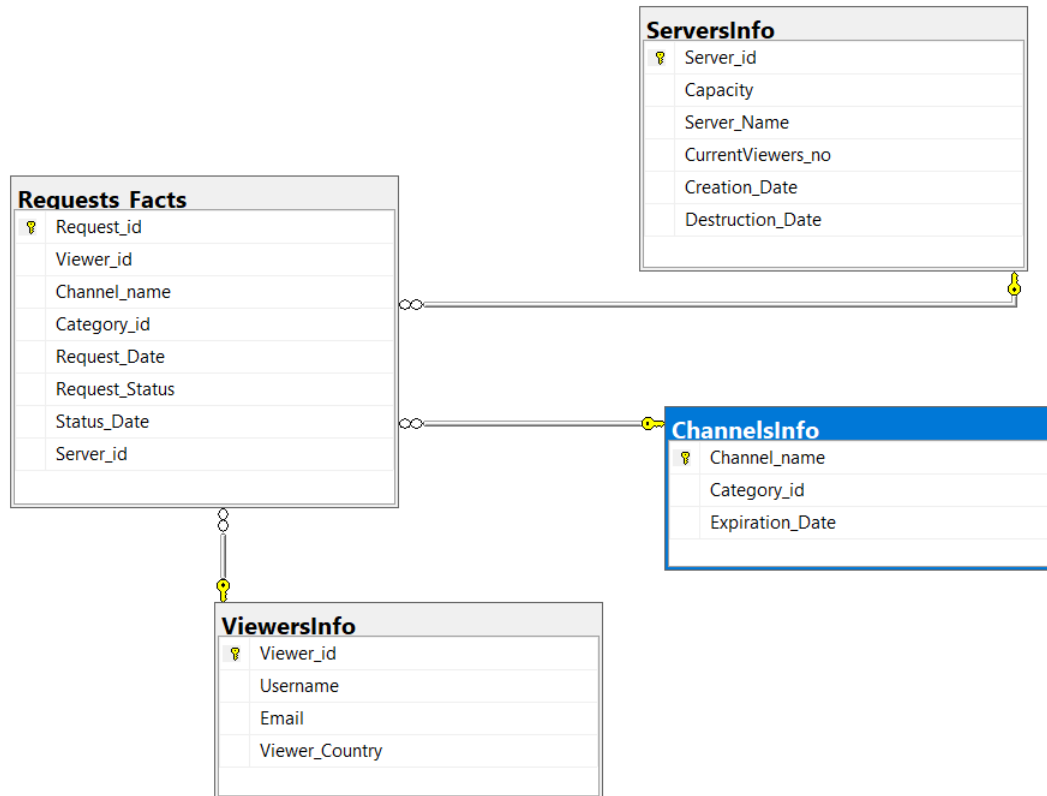
Channels

|   | Server_id | Capacity | Server_Name | CurrentViewers_no | Creation_Date           | Destruction_Date        |
|---|-----------|----------|-------------|-------------------|-------------------------|-------------------------|
| 1 | 101       | 4        | server1     | 2                 | 2016-10-30 13:20:00.000 | NULL                    |
| 2 | 102       | 3        | Server2     | 1                 | 2017-04-07 14:20:00.000 | NULL                    |
| 3 | 103       | 100      | MainServer  | 0                 | 2017-06-10 14:20:00.000 | NULL                    |
| 4 | 104       | 20       | server4     | 0                 | 2017-08-19 12:40:00.000 | 2019-01-01 14:20:13.000 |
| 5 | 105       | 7        | server5     | 1                 | 2018-10-10 13:20:00.000 | NULL                    |
| 6 | 106       | 42       | Server6     | 0                 | 2018-12-30 14:15:00.000 | NULL                    |

Servers

|    | Request_id | Viewer_id | Channel_name | Category_id | Request_Date            | Request_Status | Status_Date             | Server_id |
|----|------------|-----------|--------------|-------------|-------------------------|----------------|-------------------------|-----------|
| 1  | 1          | 11        | POP          | NULL        | 2019-01-01 23:09:22.000 | closed         | 2019-01-02 01:01:04.000 | 105       |
| 2  | 2          | 17        | Eurosport    | 1           | 2019-01-11 14:09:00.000 | closed         | 2019-01-11 16:15:10.000 | 101       |
| 3  | 3          | 12        | Master Chef  | 6           | 2019-02-22 18:07:07.000 | rejected       | 2019-02-22 18:07:38.000 | NULL      |
| 4  | 4          | 14        | CALENDAR     | NULL        | 2019-03-05 22:47:02.000 | closed         | 2019-03-06 02:30:45.000 | 103       |
| 5  | 5          | 11        | CALENDAR     | NULL        | 2019-04-07 19:08:07.000 | closed         | 2019-04-07 23:48:36.000 | 102       |
| 6  | 6          | 11        | MusicTV      | 5           | 2019-04-21 10:06:20.000 | closed         | 2019-04-21 12:06:30.000 | 102       |
| 7  | 7          | 13        | NewsTV       | 2           | 2019-05-01 20:20:09.000 | closed         | 2019-05-02 00:40:09.000 | 103       |
| 8  | 8          | 11        | Master Chef  | 6           | 2019-06-23 19:35:29.000 | closed         | 2019-06-23 23:40:08.000 | 105       |
| 9  | 9          | 14        | Eurosport    | 1           | 2019-07-01 19:45:17.000 | rejected       | 2019-07-01 19:45:34.000 | NULL      |
| 10 | 10         | 11        | NewsTV       | 2           | 2019-08-20 15:17:08.000 | closed         | 2019-08-20 20:11:05.000 | 106       |
| 11 | 11         | 12        | MusicTV      | 5           | 2019-09-07 23:34:08.000 | closed         | 2019-09-07 23:34:20.000 | 105       |
| 12 | 12         | 14        | Master Chef  | 6           | 2019-09-16 19:12:44.000 | closed         | 2019-09-16 19:12:55.000 | 105       |
| 13 | 13         | 11        | Eurosport    | 1           | 2019-10-07 17:45:08.000 | closed         | 2019-10-07 21:58:20.000 | 105       |
| 14 | 14         | 17        | Master Chef  | 6           | 2019-12-06 16:57:34.000 | closed         | 2019-12-06 19:28:14.000 | 105       |
| 15 | 15         | 16        | POP          | NULL        | 2019-12-25 15:06:20.000 | closed         | 2019-12-25 18:47:22.000 | 103       |
| 16 | 16         | 15        | POP          | NULL        | 2020-02-11 20:06:20.000 | rejected       | 2020-02-11 20:06:30.000 | NULL      |
| 17 | 17         | 14        | CALENDAR     | NULL        | 2020-02-22 18:20:05.000 | closed         | 2020-02-22 22:37:00.000 | 102       |
| 18 | 18         | 17        | Master Chef  | 6           | 2020-03-08 20:07:20.000 | rejected       | 2020-03-08 20:07:27.000 | NULL      |
| 19 | 19         | 13        | CALENDAR     | NULL        | 2020-03-25 21:20:05.000 | closed         | 2020-04-25 21:37:00.000 | 103       |
| 20 | 20         | 12        | CALENDAR     | NULL        | 2020-04-05 15:28:05.000 | closed         | 2020-04-05 15:28:14.000 | 102       |
| 21 | 21         | 15        | MusicTV      | 5           | 2020-04-19 20:57:26.000 | closed         | 2020-04-19 20:57:29.000 | 101       |
| 22 | 22         | 16        | NewsTV       | 2           | 2020-04-27 21:48:05.000 | closed         | 2020-04-27 21:37:00.000 | 103       |
| 23 | 23         | 13        | Eurosport    | 1           | 2020-05-25 10:24:30.000 | closed         | 2020-05-25 10:24:40.000 | 105       |
| 24 | 24         | 12        | MusicTV      | 5           | 2020-05-27 13:40:09.000 | closed         | 2020-05-27 18:40:18.000 | 102       |
| 25 | 25         | 17        | NewsTV       | 2           | 2020-05-28 16:17:03.000 | closed         | 2020-05-28 16:39:17.000 | 101       |
| 26 | 26         | 15        | CALENDAR     | NULL        | 2020-05-28 16:40:19.000 | closed         | 2020-05-28 16:40:24.000 | 101       |
| 27 | 27         | 13        | Eurosport    | 1           | 2020-05-28 18:19:03.000 | served         | 2020-05-28 18:19:17.000 | 105       |
| 28 | 28         | 12        | MusicTV      | 5           | 2020-05-28 19:02:12.000 | served         | 2020-05-28 19:02:24.000 | 102       |
| 29 | 29         | 17        | NewsTV       | 2           | 2020-05-28 21:16:05.000 | served         | 2020-05-28 21:16:09.000 | 101       |
| 30 | 30         | 15        | CALENDAR     | NULL        | 2020-05-28 23:44:12.000 | served         | 2020-05-28 23:44:24.000 | 101       |
| 31 | 31         | 16        | NewsTV       | 2           | 2020-05-30 18:46:53.000 | open           | 2020-05-30 18:46:53.000 | NULL      |
| 32 | 32         | 11        | Eurosport    | 1           | 2020-05-30 18:48:22.000 | open           | 2020-05-30 18:48:22.000 | NULL      |

Requests\_Facts



The diagram of presented data structure generated in SQL Server Management Studio