

# 1. Testes de Validação

Com o objetivo de garantir que o sistema satisfaz corretamente os critérios definidos, serão realizados testes de validação. Para tal, será executada a script “alter\_os\_data.py”, que simula alterações nos dados dos diferentes sistemas operacionais, de forma a testar o comportamento do processo ETL no tratamento de atualizações e inserções. Após a execução da script e carregamento dos dados para o modelo dimensional, recorrer-se-á ao SQL Server Management Studio para os verificar, assegurando que os resultados estão em conformidade com o esperado.

## 1.1. CSV

### 1.1.1. Inserir registo

```
new_row = {
    'SESSION_CODE': 'SESSION_00001001',
    'USER_CODE': 'USER_00000000001',
    'CONTENT_CODE': 'CONTENT_00000022',
    'TIME': '2024-05-20 14:30:00',
    'WATCHED_DURATION': '120',
    'PLATFORM': 'TV',
    'DEVICE_TYPE': 'Smart TV',
    'OS_FAMILY': 'tvOS',
    'OS_NAME': 'tvOS 14',
    'APP_VERSION': 'version 2.1.0',
    'IS_UP_TO_DATE': '0'
}
```

Verifica-se que o registo foi inserido com sucesso:

	SESSION_ID	USER_ID	CONTENT_ID	DEVICE_ID	TIME_ID	SESSION_CODE	SOURCE	WATCHED_DURATION	WATCHED_PERCENT
1...	1999	745	1731	1668	465883	SESSION_00001000	postgresql1	88	48.8888888888889
2...	2000	1642	1226	762	614923	SESSION_00001000	postgresql2	23	12.7777777777778
2...	2001	2001	43	1899	728071	SESSION_00001001	postgresql1	120	66.6666666666667
2...	2002	2002	44	1899	728071	SESSION_00001001	postgresql2	120	66.6666666666667

	DEVICE_ID	PLATFORM	DEVICE_TYPE	OS_FAMILY	OS_NAME	APP_VERSION
1...	1897	Computer	Laptop	Windows	Windows 11	v2.1.0
1...	1898	Computer	Laptop	Windows	iOS 16	v2.1.0
1...	1899	TV	Smart TV	tvOS	tvOS 14	v2.1.0

### 1.1.2. Atualizar registro

```
if row['SESSION_CODE'] == 'SESSION_00000002':
    row.update({
        'USER_CODE': 'USER_0000000001',
        'CONTENT_CODE': 'CONTENT_00000022',
        'TIME': '2024-05-21 10:00:00',
        'WATCHED_DURATION': '95',
        'PLATFORM': 'Computer',
        'DEVICE_TYPE': 'Laptop',
        'OS_FAMILY': 'Windows',
        'OS_NAME': 'Windows 11',
        'APP_VERSION': 'v2.1.0',
        'IS_UP_TO_DATE': '0'
    })
```

Antes:

3	3	1547	483	1805	723683	SESSION_00000002	postgresql	13	7,22222222222222
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Depois:

	SESSION_ID	USER_ID	CONTENT_ID	DEVICE_ID	TIME_ID	SESSION_CODE	SOURCE	WATCHED_DURATION	WATCHED_PERCENT
1	1	1065	583	1510	711506	SESSION_00000001	postgresql1	13	7,22222222222222
2	2	340	678	41	897210	SESSION_00000001	postgresql2	118	65,55555555555556
3	3	2001	43	1897	729241	SESSION_00000002	postgresql1	95	52,77777777777778
4	4	2002	44	1898	729241	SESSION_00000002	postgresql2	95	52,77777777777778

	DEVICE_ID	PLATFORM	DEVICE_TYPE	OS_FAMILY	OS_NAME	APP_VERSION
1...	1897	Computer	Laptop	Windows	Windows 11	v2.1.0
1...	1898	Computer	Laptop	Windows	iOS 16	v2.1.0
1...	1899	TV	Smart TV	tvOS	tvOS 14	v2.1.0

Verifica-se que os dados foram alterados como esperado.

## 1.2. MySQL

### 1.2.1. Inserir registro

```
INSERT INTO CONTENTS (CONTENT_CODE, TYPE_ID, AGE_RATING_ID, DIRECTOR_ID, TITLE, RELEASE_DATE, DURATION) VALUES
('CONTENT_00001001', 1, 5, 36, 'Fortnite, o filme.', '2024-06-03', 180);
```

```
INSERT INTO CONTENT_GENRES (CONTENT_CODE, GENRE_ID) VALUES
('CONTENT_00001001', 1),
('CONTENT_00001001', 2);
```

Verifica-se que o registo foi inserido com sucesso:

2	2005	CONTENT_00001001	postgresd1	Fornite, o filme	Action/Comedy	2024-06-03 00:00:00.000	Movie	180	NC-17	Gary Martin	2025-06-02 00:17:51.000	NULL	1
2	2006	CONTENT_00001001	postgresd2	Minecraft, o filme 2	Horror/Thriller	2024-02-03 00:00:00.000	Series	180	16+	Robert Brooks	2025-06-02 00:17:51.000	NULL	1

1.2.2. Atualizar registo

```
UPDATE CONTENTS
SET
  TYPE_ID = 4,
  AGE_RATING_ID = 5,
  DIRECTOR_ID = 6,
  TITLE = 'Updated Title',
  RELEASE_DATE = '2024-02-01',
  DURATION = 180
WHERE CONTENT_CODE = 'CONTENT_00000001';
```

```
DELETE FROM CONTENT_GENRES WHERE CONTENT_CODE = 'CONTENT_00000001';

INSERT INTO CONTENT_GENRES (CONTENT_CODE, GENRE_ID) VALUES
('CONTENT_00000001', 7),
('CONTENT_00000001', 8);
```

Antes:

INT_ID	CONTENT_CODE	SOURCE	TITLE	GENRES	RELEASE_DATE	TYPE	DURATION	AGE_RATING	DIRECTOR	INITIAL_DATE	FINAL_DATE	ACTIVE
1	CONTENT_00000001	postgresd1	Tem throw commercial without	Horror	2020-06-02 00:00:00.000	Short Film	180	NC-17	Tammy Johnson	2025-06-01 23:44:35.000	NULL	1
2	CONTENT_00000001	postgresd2	Concern senior among	Comedy/Romance	2023-11-01 00:00:00.000	Series	180	16+	Ashley Lee	2025-06-01 23:44:35.000	NULL	1
3	CONTENT_00000002	postgresd1	Analysis inclusion economic	Horror/Thriller	2020-06-22 00:00:00.000	Short Film	180	NC-17	Ruan Fawen	2025-06-01 23:44:35.000	NULL	1

Depois:

CONTENT_ID	CONTENT_CODE	SOURCE	TITLE	GENRES	RELEASE_DATE	TYPE	DURATION	AGE_RATING	DIRECTOR	INITIAL_DATE	FINAL_DATE	ACTIVE	
1	1	CONTENT_00000001	postgresd1	Tem throw commercial without	Horror	2020-06-02 00:00:00.000	Short Film	180	NC-17	Tammy Johnson	2025-06-01 23:44:35.000	2025-06-02 00:17:51.000	0
2	2001	CONTENT_00000001	postgresd1	Updated Title	Animation/Documentary	2024-02-01 00:00:00.000	Documentary	180	NC-17	Sandra Cook	2025-06-02 00:17:51.000	NULL	1

Verifica-se que os dados foram alterados como esperado, tendo sido criado um novo registo.

# 1.3. PostgreSQL1

## 1.3.1. Inserir registo

```
INSERT INTO USERS (  
    USER_CODE, AGE_GROUP_ID, GENDER_ID, COUNTRY_ID, SUBSCRIPTION_STATUS_ID,  
    NAME, EMAIL, SIGNUP_DATE, DISTRICT, CITY, POSTAL_CODE, STREET_ADDRESS  
) VALUES (  
    'USER_00000001001', 2, 1, 3, 1,  
    'João Silva', 'joao.silva@example.com', '2024-05-01',  
    'Lisboa', 'Lisboa', '1000-001', 'Rua das Flores, 25'  
);
```

Verifica-se que o registo foi inserido com sucesso:

2.	2003	USER_00000001001	postgres1	João Silva	10-14	Male	2024-05-01 00:00:00.000	Active	France	Lisboa	Lisboa	1000-001	Rua das Flores, 25	2025-06-02 00:17:51.000	NULL
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## 1.3.2. Atualizar registo

```
UPDATE USERS  
SET  
    AGE_GROUP_ID = 3,  
    GENDER_ID = 2,  
    COUNTRY_ID = 5,  
    SUBSCRIPTION_STATUS_ID = 2,  
    NAME = 'Updated Name A',  
    EMAIL = 'updateda@example.com',  
    SIGNUP_DATE = '2024-06-01',  
    DISTRICT = 'Porto',  
    CITY = 'Porto',  
    POSTAL_CODE = '4000-123',  
    STREET_ADDRESS = 'Av. da Liberdade, 100'  
WHERE USER_CODE = 'USER_00000000001';
```

Antes:

Messages																
result_id	USER_ID	USER_CODE	SOURCE	NAME	AGE_GROUP	GENDER	SIGNUP_DATE	SUBSCRIPTION_STATUS	COUNTRY	DISTRICT	CITY	POSTAL_CODE	STREET_ADDRESS	INITIAL_DATE	FINAL_DATE	ACTIVE
1	1	USER_00000000001	postgres1	Jessica Wu	0-9	Other	2022-06-17 00:00:00.000	Expired	Netherlands	Maine	Carrollborough	86076	1512 Reyes Harbors Suite 619	2025-06-01 23:45:18.000	NULL	1
2	2	USER_00000000001	postgres2	Taylor Johnson	45-54	Male	2023-02-23 00:00:00.000	Expired	France	Iowa	Vilabury	81360	9213 Jennings Trafficway Suite 961	2025-06-01 23:45:18.000	NULL	1
3	3	USER_00000000002	postgres1	Stephanie Gray	10-14	Female	2025-03-17 00:00:00.000	Active	Venezuela	North Dakota	Hansenside	95321	593 William Mills	2025-06-01 23:45:18.000	NULL	1
4	4	USER_00000000002	postgres2	Rebecca Herman	15-19	Female	2022-02-18 00:00:00.000	Cancelled	Italy	Connecticut	East Bian	87963	61995 Rodriguez Fort	2025-06-01 23:45:18.000	NULL	1

Depois:

USER_ID	USER_CODE	SOURCE	NAME	AGE GROUP	GENDER	SIGNUP_DATE	SUBSCRIPTION_STATUS	COUNTRY	DISTRICT	CITY	POSTAL_CODE	STREET_ADDRESS	INITIAL_DATE	FINAL_DATE	
1	1	USER_00000000001	postgres1	Jessica Wu	0-9	Other	2022-06-17 00:00:00.000	Expired	Netherlands	Maine	Carrollborough	86076	1512 Reyes Harbors Suite 619	2025-06-01 23:45:18.000	2025-06-02 00:17:51.000

2.	2001	USER_00000000001	postgres1	Updated Name A	15-19	Female	2024-06-01 00:00:00.000	Cancelled	Italy	Porto	Porto	4000-123	Av. da Liberdade, 100	2025-06-02 00:17:51.000	NULL
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Verifica-se que os dados foram alterados como esperado, tendo sido criado um novo registo.

## 1.4. PostgreSQL2

### 1.4.1. Inserir registo

```
INSERT INTO CONTENTS (CONTENT_CODE, TYPE_ID, AGE_RESTRICTION_ID, DIRECTOR_ID, TITLE, RELEASE_DATE, DURATION) VALUES ('CONTENT_00001001', 2, 3, 22, 'Minecraft, o filme 2.', '2024-02-03', 180);
```

```
INSERT INTO CONTENT_CATEGORIES (CONTENT_CODE, CATEGORY_ID) VALUES ('CONTENT_00001001', 4), ('CONTENT_00001001', 5);
```

```
INSERT INTO SESSIONS (
    SESSION_CODE, USER_CODE, CONTENT_CODE, TIME_, WATCHED_DURATION,
    PLATFORM, DEVICE_TYPE, OS_FAMILY, OS_NAME, APP_VERSION
) VALUES (
    'SESSION_00001001',
    'USER_000000000001',
    'CONTENT_00000022',
    '2024-05-20 14:30:00',
    120,
    'TV',
    'Smart TV',
    'tvOS',
    'tvOS 14',
    'version 2.1.0'
);
```

```
INSERT INTO USERS (
    USER_CODE, AGE_GROUP_ID, GENDER_ID, COUNTRY_ID, SUBSCRIPTION_STATUS_ID,
    NAME, EMAIL, SIGNUP_DATE, DISTRICT, CITY, POSTAL_CODE, STREET_ADDRESS
) VALUES (
    'USER_00000001001', 2, 1, 3, 1,
    'Maria Abreu', 'maria.abreu@example.com', '2024-05-01',
    'Lisboa', 'Lisboa', '1000-001', 'Rua das Flores, 25'
);
```

Verifica-se que os registos foram inseridos com sucesso:

2...	2006	CONTENT_00001001	postgresql2	Minecraft, o filme 2.	Horror,Thriller	2024-02-03 00:00:00.000	Series	180	16+	Robert Brooks	2025-06-02 00:17:51.000	NULL	1
2...	2002	2002	44	1899	728071	SESSION_00001001	postgresql2	120		66,6666666666667			
1...	1899	TV	Smart TV	tvOS	tvOS 14	v2.1.0							

2.	2004	USER_00000001001	postgres@2	Maria Abreu	10-14	Male	2024-05-01 00:00:00.000	Active	France	Lihoa	Lihoa	1000-001	Rua das Flores, 25	2025-06-02 00:17:51.000	NULL
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1.4.2. Atualizar registo

```
UPDATE CONTENTS
SET
  TYPE_ID = 3,
  AGE_RESTRICTION_ID = 2,
  DIRECTOR_ID = 6,
  TITLE = 'Updated Title 2',
  RELEASE_DATE = '2024-02-04',
  DURATION = 180
WHERE CONTENT_CODE = 'CONTENT_00000001';
```

```
DELETE FROM CONTENT_CATEGORIES WHERE CONTENT_CODE = 'CONTENT_00000001';

INSERT INTO CONTENT_CATEGORIES (CONTENT_CODE, CATEGORY_ID) VALUES
('CONTENT_00000001', 6),
('CONTENT_00000001', 9);
```

```
UPDATE USERS
SET
  AGE_GROUP_ID = 3,
  GENDER_ID = 2,
  COUNTRY_ID = 5,
  SUBSCRIPTION_STATUS_ID = 2,
  NAME = 'Updated Name B',
  EMAIL = 'updatedb@example.com',
  SIGNUP_DATE = '2024-06-02',
  DISTRICT = 'Porto',
  CITY = 'Porto',
  POSTAL_CODE = '4000-123',
  STREET_ADDRESS = 'Av. da Liberdade, 105'
WHERE USER_CODE = 'USER_00000000001';
```

Antes

	CONTENT_ID	CONTENT_CODE	SOURCE	TITLE	GENRES	RELEASE_DATE	TYPE	DURATION	AGE_RATING	DIRECTOR	INITIAL_DATE	FINAL_DATE	ACTIVE
1	1	CONTENT_00000001	postgres@1	Term throw commercial without.	Horror	2020-06-02 00:00:00.000	Short Film	180	NC-17	Tammy Johnson	2025-06-01 23:44:35.000	NULL	1
2	2	CONTENT_00000001	postgres@2	Concern senior among.	Comedy/Romance	2023-11-01 00:00:00.000	Series	180	16+	Ashley Lee	2025-06-01 23:44:35.000	NULL	1
3	3	CONTENT_00000002	postgres@1	Analysis including economic.	Horror/Thriller	2020-06-22 00:00:00.000	Short Film	180	NC-17	Ryan Ewing	2025-06-01 23:44:35.000	NULL	1
4	4	CONTENT_00000002	postgres@2	Along fall occur.	Sci-Fi	2021-11-27 00:00:00.000	Short Film	180	18+	Brian Hawkins	2025-06-01 23:44:35.000	NULL	1

  

	USER_ID	USER_CODE	SOURCE	NAME	AGE_GROUP	GENDER	SIGNUP_DATE	SUBSCRIPTION_STATUS	COUNTRY	DISTRICT	CITY	POSTAL_CODE	STREET_ADDRESS	INITIAL_DATE	FINAL_DATE	ACTIVE
1	1	USER_00000000001	postgres@1	Jessica Wu	0-9	Other	2022-06-17 00:00:00.000	Expired	Netherlands	Manne	Carrollborough	86076	1512 Reyes Harbor Suite 619	2025-06-01 23:45:18.000	NULL	1
2	2	USER_00000000001	postgres@2	Taylor Johnson	45-54	Male	2023-02-23 00:00:00.000	Expired	France	Iowa	Wabury	81360	3213 Jennings Trafficway Suite 961	2025-06-01 23:45:18.000	NULL	1
3	3	USER_00000000002	postgres@1	Stephanie Gray	10-14	Female	2025-02-17 00:00:00.000	Active	Venezuela	North Dakota	Horsenside	55221	553 William Mills	2025-06-01 23:45:18.000	NULL	1
4	4	USER_00000000003	postgres@2	Barbara's Blomman	15-19	Female	2019-07-19 00:00:00.000	Cancelled	Italy	Campania	East Brian	97829	21046 Boulevard East	2025-06-01 23:45:18.000	NULL	1

Depois

4.	2004	USER_00000001001	postgres@2	Updated Name B	Comedy/Romance	2024-02-04 00:00:00.000	Short Film	180	12+	Tanner Wilson	2025-06-02 00:17:51.000	NULL	1
2.	2002	CONTENT_00000001	postgres@2	Updated Title 2	Romance/Sci-Fi	2024-02-04 00:00:00.000	Short Film	180	12+	Tanner Wilson	2025-06-02 00:17:51.000	NULL	1

2.	2002	USER_000000000001	postgres2	Updated Name B	15-19	Female	2024-06-02 00:00:00.000	Cancelled	Italy	Porto	Porto	4000-123	Av. da Liberdade, 105	2025-06-02 00:17:51.000	NULL
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Verifica-se que os dados foram alterados como esperado, tendo sido criados novos registos para a tabela dos utilizadores e dos conteúdos.