

npm start Init OUTPUT

```
PS C:\Users\apham\Assignment4> npm start Init
```

```
> Assignment4@0.0.1 start
> ts-node src/index.ts Init

    Connecting to source & target databases...
Connected to MySQL
Connected to SQLite

Initializing Analytics Database...

Verifying MySQL connection...
MySQL connection verified

Initializing SQLite database...
Creating analytics tables...
Analytics tables created successfully

Pre-populating date dimension...
Loaded 7670 dates
Date dimension populated

Preparing sync state tracking...
Sync state table ready (0 entries)
```

```
INITIALIZATION COMPLETE
Analytics database is ready for data loading.
Next step: Run 'npm start full-load' to import data.
```

```
Closing connections
Connections closed
PS C:\Users\apham\Assignment4>
```

npm start Full-Load OUTPUT

```
> Assignment4@0.0.1 start
> ts-node src/index.ts Full-Load
```

```
    Connecting to source & target databases...
Connected to MySQL
Connected to SQLite
```

 Starting Full Load (Initial)...

Transaction started

Loading Dimensions...

Loaded 7670 dates
Fetching all stores (initial load)
Loaded 2 stores
Fetching all customers (initial load)
Loaded 599 customers
Fetching all films (initial load)
Loaded 1000 films into DimFilm
Fetching all actors (initial load)
Loaded 200 actors
Fetching all categories (initial load)
Loaded 16 categories

Loading Bridges...

==== BRIDGE FILM-ACTOR DEBUG ===

Source film_actor records: 5462
Target dim_film records: 1000
Target dim_actor records: 200

First 5 source film_actor records:

actor_id: 1, film_id: 1
actor_id: 1, film_id: 23
actor_id: 1, film_id: 25
actor_id: 1, film_id: 106
actor_id: 1, film_id: 140

First 5 dim_film records:

film_id: 1, film_key: 1
film_id: 2, film_key: 2
film_id: 3, film_key: 3
film_id: 4, film_key: 4
film_id: 5, film_key: 5

First 5 dim_actor records:

actor_id: 1, actor_key: 1
actor_id: 2, actor_key: 2
actor_id: 3, actor_key: 3
actor_id: 4, actor_key: 4
actor_id: 5, actor_key: 5

Map sizes:

filmKeyMap: 1000 entries
actorKeyMap: 200 entries

Test lookups from first source record:

Looking up film_id 1: 1
Looking up actor_id 1: 1

==== RESULTS ===

Successful mappings: 5462
Missing film keys: 0
Missing actor keys: 0
Bridge records created: 5462
Loaded 5462 film-actor relationships
Loaded 1000 film-category relationships

Loading Facts...

Fetching all rentals (initial load)
Loaded 16044 rental facts

Fetching all payments (initial load)
Loaded 16044 payment facts

All operations completed
Transaction committed - Full load completed!

Creating indexes...
Creating dimension indexes...
Creating fact table indexes...
Creating bridge table indexes...
All indexes created successfully

Running Data Validation...

| | |
|---|--|
| <input checked="" type="checkbox"/> Films | Source: 1000 Target: 1000 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Actors | Source: 200 Target: 200 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Categories | Source: 16 Target: 16 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Customers | Source: 599 Target: 599 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Stores | Source: 2 Target: 2 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Rentals | Source: 16044 Target: 16044 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Payments | Source: 16044 Target: 16044 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Film-Actor Links | Source: 5462 Target: 5462 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Film-Category Links | Source: 1000 Target: 1000 Diff: +0 (0.00%) |

Validating Aggregates:

Aggregate Validation Summary:

VALIDATION PASSED - All checks successful!

Closing connections
Connections closed

npm start Validate OUTPUT

> Assignment4@0.0.1 start
> ts-node src/index.ts Validate

⚡ Connecting to source & target databases...
Connected to MySQL
Connected to SQLite

Running Data Validation...

| | |
|--|--|
| <input checked="" type="checkbox"/> Films | Source: 1000 Target: 1000 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Actors | Source: 200 Target: 200 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Categories | Source: 16 Target: 16 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Customers | Source: 599 Target: 599 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Stores | Source: 2 Target: 2 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Rentals | Source: 16044 Target: 16044 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Payments | Source: 16044 Target: 16044 Diff: +0 (0.00%) |
| <input checked="" type="checkbox"/> Film-Actor Links | Source: 5462 Target: 5462 Diff: +0 (0.00%) |

Validating Aggregates:

Aggregate Validation Summary:

VALIDATION PASSED - All checks successful!

Closing connections
Connections closed

npm start Incremental OUTPUT

> Assignment4@0.0.1 start
> ts-node src/index.ts Incremental

⌚ Connecting to source & target databases...
Connected to MySQL
Connected to SQLite

Starting Incremental Sync...
Sync started at: 2025-11-15T05:56:57.945Z

Syncing Dimensions...

Film:
Fetching all films (initial load)
Loaded 1000 films into DimFilm

Actor:
Fetching all actors (initial load)
Loaded 200 actors

Category:
Fetching all categories (initial load)
Loaded 16 categories

Customer:
Fetching all customers (initial load)
Loaded 599 customers

Store:
Fetching all stores (initial load)
Loaded 2 stores

Syncing Bridges...

Film-Actor:

==== BRIDGE FILM-ACTOR DEBUG ====
Source film_actor records: 5462
Target dim_film records: 1000
Target dim_actor records: 200

First 5 source film_actor records:

```
actor_id: 1, film_id: 1
actor_id: 1, film_id: 23
actor_id: 1, film_id: 25
actor_id: 1, film_id: 106
actor_id: 1, film_id: 140
```

First 5 dim_film records:

```
film_id: 1, film_key: 1
film_id: 2, film_key: 2
film_id: 3, film_key: 3
film_id: 4, film_key: 4
film_id: 5, film_key: 5
```

First 5 dim_actor records:

```
actor_id: 1, actor_key: 1
actor_id: 2, actor_key: 2
actor_id: 3, actor_key: 3
actor_id: 4, actor_key: 4
actor_id: 5, actor_key: 5
```

Map sizes:

```
filmKeyMap: 1000 entries
actorKeyMap: 200 entries
```

Test lookups from first source record:

```
Looking up film_id 1: 1
Looking up actor_id 1: 1
```

==== RESULTS ===

```
Successful mappings: 5462
Missing film keys: 0
Missing actor keys: 0
Bridge records created: 5462
Loaded 5462 film-actor relationships
```

Film-Category:

```
Loaded 1000 film-category relationships
```

Syncing Facts...

Rentals:

```
Fetching all rentals (initial load)
Loaded 16044 rental facts
```

Payments:

```
Fetching all payments (initial load)
Loaded 16044 payment facts
```

Updating sync state...

Incremental sync completed successfully!

```
Sync finished at: 2025-11-15T05:57:00.308Z
```

Running Data Validation...

| | |
|------------|--|
| Films | Source: 1000 Target: 1000 Diff: +0 (0.00%) |
| Actors | Source: 200 Target: 200 Diff: +0 (0.00%) |
| Categories | Source: 16 Target: 16 Diff: +0 (0.00%) |
| Customers | Source: 599 Target: 599 Diff: +0 (0.00%) |
| Stores | Source: 2 Target: 2 Diff: +0 (0.00%) |
| Rentals | Source: 16044 Target: 16044 Diff: +0 (0.00%) |

Rentals Source: 16044 | Target: 16044 | Diff: +0 (0.00%)
 Payments Source: 16044 | Target: 16044 | Diff: +0 (0.00%)
 Film-Actor Links Source: 5462 | Target: 5462 | Diff: +0 (0.00%)
 Film-Category Links Source: 1000 | Target: 1000 | Diff: +0 (0.00%)

Validating Aggregates:

Aggregate Validation Summary:

VALIDATION PASSED - All checks successful!

Closing connections
Connections closed

Test Output

File | %Stmts | %Branch | %Funcs | %Lines | Uncovered Line #s

| File | %Stmts | %Branch | %Funcs | %Lines | Uncovered Line #s |
|---------------------------|--------|---------|--------|--------|-------------------|
| All files | 74.43 | 48.16 | 85.5 | 73.53 | |
| src | 32.03 | 0 | 0 | 32.03 | |
| data-source.ts | 100 | 100 | 100 | 100 | |
| data-target.ts | 100 | 100 | 100 | 100 | |
| index.ts | 0 | 0 | 0 | 0 | 1-181 |
| src/entity | 0 | 100 | 100 | 0 | |
| User.ts | 0 | 100 | 100 | 0 | 1-16 |
| src/entity/source | 100 | 100 | 100 | 100 | |
| Actor.ts | 100 | 100 | 100 | 100 | |
| Address.ts | 100 | 100 | 100 | 100 | |
| Category.ts | 100 | 100 | 100 | 100 | |
| City.ts | 100 | 100 | 100 | 100 | |
| Country.ts | 100 | 100 | 100 | 100 | |
| Customer.ts | 100 | 100 | 100 | 100 | |
| Film.ts | 100 | 100 | 100 | 100 | |
| FilmActor.ts | 100 | 100 | 100 | 100 | |
| FilmCategory.ts | 100 | 100 | 100 | 100 | |
| Inventory.ts | 100 | 100 | 100 | 100 | |
| Language.ts | 100 | 100 | 100 | 100 | |
| Payment.ts | 100 | 100 | 100 | 100 | |
| Rental.ts | 100 | 100 | 100 | 100 | |
| Staff.ts | 100 | 100 | 100 | 100 | |
| Store.ts | 100 | 100 | 100 | 100 | |
| src/entity/target | 100 | 100 | 100 | 100 | |
| BridgeFilmActor.ts | 100 | 100 | 100 | 100 | |
| BridgeFilmCategory.ts | 100 | 100 | 100 | 100 | |
| DimActor.ts | 100 | 100 | 100 | 100 | |
| DimCategory.ts | 100 | 100 | 100 | 100 | |
| DimCustomer.ts | 100 | 100 | 100 | 100 | |
| DimDate.ts | 100 | 100 | 100 | 100 | |
| DimFilm.ts | 100 | 100 | 100 | 100 | |
| DimStore.ts | 100 | 100 | 100 | 100 | |
| FactPayment.ts | 100 | 100 | 100 | 100 | |
| FactRental.ts | 100 | 100 | 100 | 100 | |
| SyncState.ts | 100 | 100 | 100 | 100 | |
| src/load | 89.67 | 65.55 | 100 | 91 | |
| loadBridgeFilmActor.ts | 95.16 | 60 | 100 | 95 | 60,63,73 |
| loadBridgeFilmCategory.ts | 96.42 | 66.66 | 100 | 96.15 | 29 |
| loadDimActor.ts | 90 | 80 | 100 | 89.47 | 22-23 |
| loadDimCategory.ts | 80 | 60 | 100 | 78.94 | 14-15,23-24 |
| loadDimCustomer.ts | 80 | 63.63 | 100 | 78.94 | 22-23,31-32 |
| loadDimDate.ts | 100 | 83.33 | 100 | 100 | 27 |
| loadDimFilm.ts | 100 | 80 | 100 | 100 | 40 |
| loadDimStore.ts | 80 | 55.55 | 100 | 78.94 | 24-25,33-34 |

| | | | | | | | | | | |
|---------------------|--|-------|--|-------|--|-------|--|-------|--|---|
| loadFactPayment.ts | | 85.41 | | 60 | | 100 | | 90.69 | | 21-22,30-31 |
| loadFactRental.ts | | 87.5 | | 66.66 | | 100 | | 92 | | 23-24,31-32 |
| src-sync | | 52.25 | | 31.86 | | 68.18 | | 52.66 | | |
| createIndexes.ts | | 0 | | 0 | | 0 | | 0 | | 1-188 |
| incrementalSync.ts | | 0 | | 0 | | 0 | | 0 | | 3-93 |
| initAnalytics.ts | | 84.84 | | 50 | | 100 | | 84.84 | | 40-44 |
| syncStateManager.ts | | 38.88 | | 25 | | 37.5 | | 43.75 | | 30-57 |
| validateData.ts | | 86.98 | | 50 | | 100 | | 89.13 | | 134-136,138-139,146-147,162,164,199,201,248,250,300,302 |
| src-utilities | | 100 | | 100 | | 100 | | 100 | | |
| dateUtils.ts | | 100 | | 100 | | 100 | | 100 | | |

Test Suites: 5 failed, 5 total

Tests: 3 failed, 9 passed, 12 total

Snapshots: 0 total

Time: 14.047 s

Ran all test suites.