# COMPLEX BUSINESS RULES

The IMDb-style database is a large-scale, multi-module system that manages titles (movies, series, episodes), people associated with those titles, companies, streaming availability, awards, user interactions, and metadata. Because of this complexity, the system requires **strict business rules** to ensure integrity, avoid contradictions, and maintain the correctness of relationships across all 27+ tables.

These business rules operate at a **logical and conceptual level**, independent of the physical implementation. They define how data is allowed to behave, how entities interact, and what conditions must remain true at all times to preserve consistency.

# COMPLEX BUSINESS RULES

## 1. TITLE-RELATED BUSINESS RULES

### 1.1 Each Title must have exactly one Rating Summary

A title's RatingSummary holds aggregated information (average rating, number of votes).

Because aggregation must remain unique:

- A title **must not** have multiple rating summaries.

- A rating summary **must belong to only one title**.

This rule guarantees there is a single source of truth for a title's ratings.

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## 1.2 Titles can have many metadata records (Genres, Keywords, Media, Companies)

A title may have:

- multiple genres,

- multiple keywords,

- multiple companies (production, distribution),

- many media files (images, posters, stills),

- multiple streaming availability entries.

This rule enforces the well-known IMDb principle of rich metadata.

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## 1.3 A non-adult title cannot be assigned an adult-only genre

If is_adult = 0, then the genres assigned must not be adult-restricted.

This avoids metadata inconsistencies and user-interface issues.

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## 1.4 Titles cannot be released before their start year

release_date ≥ start_year.
This ensures timeline correctness.

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## 1.5 End year is NULL for ongoing series

For TV shows:

- If a show is still airing → end_year = NULL.

- If end_year is provided, it must be ≥ start_year.

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## 2. EPISODE-RELATED BUSINESS RULES

## 2.1 Every Episode must belong to exactly one parent Title

An episode is also a title record, but it must link to its parent series:

- title_id references the episode itself.

- parent_series_title_id references the series.

This ensures hierarchical integrity.

## 2.2 Season and episode numbers must be unique within the same series

Prevents duplicate episodes.

## 3. PERSON-RELATED BUSINESS RULES

### 3.1 Every Person must have one birth country

A mandatory FK ensures biographical completeness.

### 3.2 Birth and death dates must follow chronological rules

- death_date ≥ birth_date
- If person is alive, death_date should be NULL.

### 3.3 A person may have multiple credits across many titles

Ensures the many-to-many structure between Person and Title through the Credit entity.

# 4. CREDIT & CHARACTER BUSINESS RULES

## 4.1 A credit must reference both a title and a person

No credit can exist without both references.

## 4.2 A person cannot have duplicate character ordering within the same title

IMDb uses **ordering** (credit order).
Duplicate ordering must not occur.

## 4.3 If a character_id is provided, character_name must not be NULL

Prevents incomplete character entries.

# 5. USER AND INTERACTION RULES (Ratings, Reviews, Lists)

## 5.1 A user can rate a title only once

Enforced via unique constraint (user_id, title_id) in UserRating.

## 5.2 A user can review a title only once

Prevents spamming and over-representation.

## 5.3 A user's rating must automatically update the title's RatingSummary

This rule enforces:

- Recalculation of average rating

- Incrementing or decrementing total votes

- Updating "as_of_date"

## 5.4 A user can have unlimited lists but only one watchlist

Enforced using the (user_id, is_watchlist) unique rule.

## 5.5 A title cannot appear twice in the same list

ListItem must have no duplicates for (list_id, title_id).

## 5.6 ListItem position must be unique within a list

Prevents position conflicts inside a user's list.

# 6. STREAMING AVAILABILITY BUSINESS RULES

## 6.1 A title cannot have overlapping streaming availability periods for the same provider

For example:

Netflix cannot have two availability periods like:

- Jan–March

- Feb–April (overlap)

## 6.2 A title cannot be listed in a region where the provider does not operate

Regions must be validated according to provider restrictions.

# 7. AWARD / NOMINATION RULES

## 7.1 An award category belongs to exactly one event

No mixing categories between events.

## 7.2 A nomination must be for either a title or a person

But **not both NULL**.

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## 7.3 Only one winner per category per event

If multiple nominations are marked winner, it violates reality and IMDb practices.

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## 7.4 A nomination cannot have conflicting references

A nomination must not simultaneously point to unrelated categories or titles.

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## 8. LANGUAGE AND COUNTRY BUSINESS RULES

### 8.1 A title must belong to exactly one primary language

Ensures metadata completeness.

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### 8.2 A person must belong to one birth country

This rule supports demographic reporting.

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## 9. DATA INTEGRITY RULES (Soft Delete + Versioning)

## 9.1 Soft delete must prevent further modification

If is_deleted = 1, the record must not be editable.

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## 9.2 Every update increases version number

Used for auditing and contributor tracking.

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## 9.3 No FK should reference a deleted row

Referential integrity must apply even during soft deletes.

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## 10. TIMESTAMP AND AUDIT RULES

### 10.1 created_at is fixed once set

Cannot be altered.

### 10.2 updated_at updates automatically on edit

Ensures trackability.

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## CONCLUSION

These business rules:

- Guarantee **data correctness**,

- Maintain **referential integrity**,

- Prevent **invalid or contradictory records**,

- Reflect **real-world IMDb behavior**,

- Support **professional-level database implementation**,

- Allow proper **trigger and stored logic support**.