

# Product Dissection of Netflix

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## Introduction

Netflix, a leader in the streaming industry, has fundamentally changed how we consume content across the globe. With over 230 million subscribers worldwide, it is crucial to dissect Netflix's business model, its technical architecture, and how it solves real-world problems for its users through unique features. In this product dissection, we will look at the core aspects of Netflix's design and functionality, its architecture, and how the system is optimised for scalability and user experience.

## Step 1: Choosing Netflix as the Product for Dissection

Netflix was chosen for dissection because it offers a combination of complex technical features, personalized user experiences, and a global platform with millions of daily active users. The product involves multiple technologies, including big data analytics, machine learning, cloud computing, and content delivery networks (CDNs), all of which work together seamlessly to provide the entertainment experience Netflix is known for.

## Step 2: Key Features of Netflix

Netflix provides the following key features that have revolutionised entertainment consumption:

1. **User Profiles:** Each Netflix user can create a personalized profile, enabling the platform to recommend content tailored to individual preferences based on historical viewing behavior.
2. **Content Library:** Netflix boasts a vast content library that includes movies, TV shows, documentaries, and Netflix Originals (exclusive content produced by Netflix).
3. **Content Recommendations:** Netflix uses advanced algorithms and machine learning to recommend content to users based on their watch history, ratings, and preferences.
4. **Multi-Device Support:** Netflix allows users to stream content across multiple devices, including smart TVs, smartphones, tablets, and laptops.
5. **Offline Viewing:** Netflix supports offline viewing by allowing users to download selected content for later viewing, especially useful when users are traveling or in areas with limited internet access.
6. **Ad-Free Viewing:** Unlike traditional TV, Netflix does not have commercials or ads, creating an uninterrupted viewing experience.
7. **Subscription Tiers:** Netflix offers multiple subscription plans: Basic, Standard, and Premium. These differ in terms of streaming quality (e.g., SD, HD, 4K UHD) and the number of simultaneous streams allowed.

8. **User Engagement:** Features such as "My List," "Continue Watching," and personalised home screens enhance user engagement and make content discovery easier.

### Step 3: Real-World Problems Solved by Netflix

Netflix has solved several real-world problems related to media consumption:

1. **Content Discovery Overload:**
  - **Problem:** With millions of movies and shows available, finding something to watch can be overwhelming.
  - **Solution:** Netflix solves this problem with its personalised recommendation engine, which takes into account users' viewing history, preferences, ratings, and even other users' behaviour to suggest content. The algorithm continuously refines its suggestions, making discovery easier.
2. **Global Accessibility and Localization:**
  - **Problem:** Netflix needs to cater to a global audience with diverse languages, cultures, and preferences. Also, content availability varies from country to country due to licensing and copyright restrictions.
  - **Solution:** Netflix solves this with a comprehensive localization strategy, offering subtitles and dubbed content in multiple languages, and tailoring its content based on regional preferences. It has also expanded globally by negotiating content licences specific to different markets.
3. **Binge-Watching and Engagement:**
  - **Problem:** The issue of binge-watching, where users consume large amounts of content continuously without breaks, is a double-edged sword. While it can lead to high engagement, it can also encourage unhealthy viewing habits.
  - **Solution:** Netflix addresses this with the "Are you still watching?" prompt to remind users to take breaks after watching several episodes, subtly encouraging a more healthy approach.
4. **Affordable Entertainment for Everyone:**
  - **Problem:** Traditional cable TV packages can be expensive, and many users might not need all the channels available in a TV package.
  - **Solution:** Netflix offers an affordable alternative, where users pay for only what they need (streaming access with a variety of pricing options), making it accessible to a wider audience globally.

### Step 4: Case Study on Real-World Problems and Approach to Solving Them

#### Problem 1: Content Discovery Overload

- **Challenge:** With so many options available, users can feel lost or overwhelmed when choosing what to watch.
- **Netflix's Approach:** The algorithm behind Netflix's recommendation engine uses a combination of **collaborative filtering**, **content-based filtering**, and **deep learning**

to predict what a user would like to watch next. It personalises the homepage based on the individual's history and preferences, and it constantly refines recommendations based on ongoing behaviour. It also provides "Trending Now" and "Top Picks for You" sections to make recommendations feel more curated and immediate.

### Problem 2: Global Accessibility & Localization

- **Challenge:** Content needs to be accessible across the world, with localised versions for different regions. Language barriers and varying regional preferences for content pose a significant challenge.
- **Netflix's Approach:** Netflix uses a sophisticated content delivery network (CDN) that adapts to user location, ensuring smooth streaming regardless of geographic location. The content is tailored to meet specific regional preferences, and Netflix's interface supports multiple languages. Localised recommendations ensure that users see content relevant to their region and preferences. Additionally, Netflix invests in regional content creation, producing exclusive shows and films for different markets (e.g., *Money Heist* in Spain or *Sacred Games* in India).

### Problem 3: Binge-Watching Addiction

- **Challenge:** The platform's auto-play feature might encourage excessive consumption of content without breaks, creating a binge-watching culture.
- **Netflix's Approach:** While Netflix does not explicitly discourage binge-watching, it introduces the "Are you still watching?" prompt to remind users to take a break after multiple episodes. Netflix also uses this information to optimize content recommendations for users based on the duration and pattern of their viewing.

## Step 5: Schema Design for Netflix

In terms of database schema, let's create a **relational model** for Netflix that focuses on key user-related features and data entities.

### Entities

- **users**
  - user\_id (PK)
  - email
  - password\_hash
  - first\_name
  - last\_name
  - birth\_date
  - gender
  - phone\_number
  - address
  - payment\_method
  - subscription\_plan
  - created\_at

- updated\_at
- **profiles**
  - profile\_id (PK)
  - user\_id (FK)
  - profile\_name
  - avatar\_image
  - language\_preference
  - parental\_control\_level
  - created\_at
  - updated\_at
- **content**
  - content\_id (PK)
  - title
  - description
  - release\_year
  - genre
  - duration
  - rating
  - language
  - country\_of\_origin
  - type (movie, TV show, etc.)
  - poster\_image
  - trailer\_url
  - created\_at
  - updated\_at
- **episodes** (for TV shows)
  - episode\_id (PK)
  - content\_id (FK)
  - season\_number
  - episode\_number
  - title
  - description
  - duration
  - release\_date
  - created\_at
  - updated\_at
- **devices**
  - device\_id (PK)
  - user\_id (FK)
  - device\_type
  - operating\_system
  - last\_used\_at
  - created\_at
  - updated\_at

- **watch\_history**
  - watch\_history\_id (PK)
  - user\_id (FK)
  - profile\_id (FK)
  - content\_id (FK)
  - episode\_id (FK, nullable)
  - start\_time
  - end\_time
  - progress
  - created\_at
  - updated\_at
- **recommendations**
  - recommendation\_id (PK)
  - user\_id (FK)
  - content\_id (FK)
  - score
  - created\_at
  - updated\_at
- **ratings**
  - rating\_id (PK)
  - user\_id (FK)
  - profile\_id (FK)
  - content\_id (FK)
  - rating (1-5)
  - created\_at
  - updated\_at
- **payments**
  - payment\_id (PK)
  - user\_id (FK)
  - amount
  - payment\_date
  - payment\_method
  - transaction\_id
  - created\_at
  - updated\_at

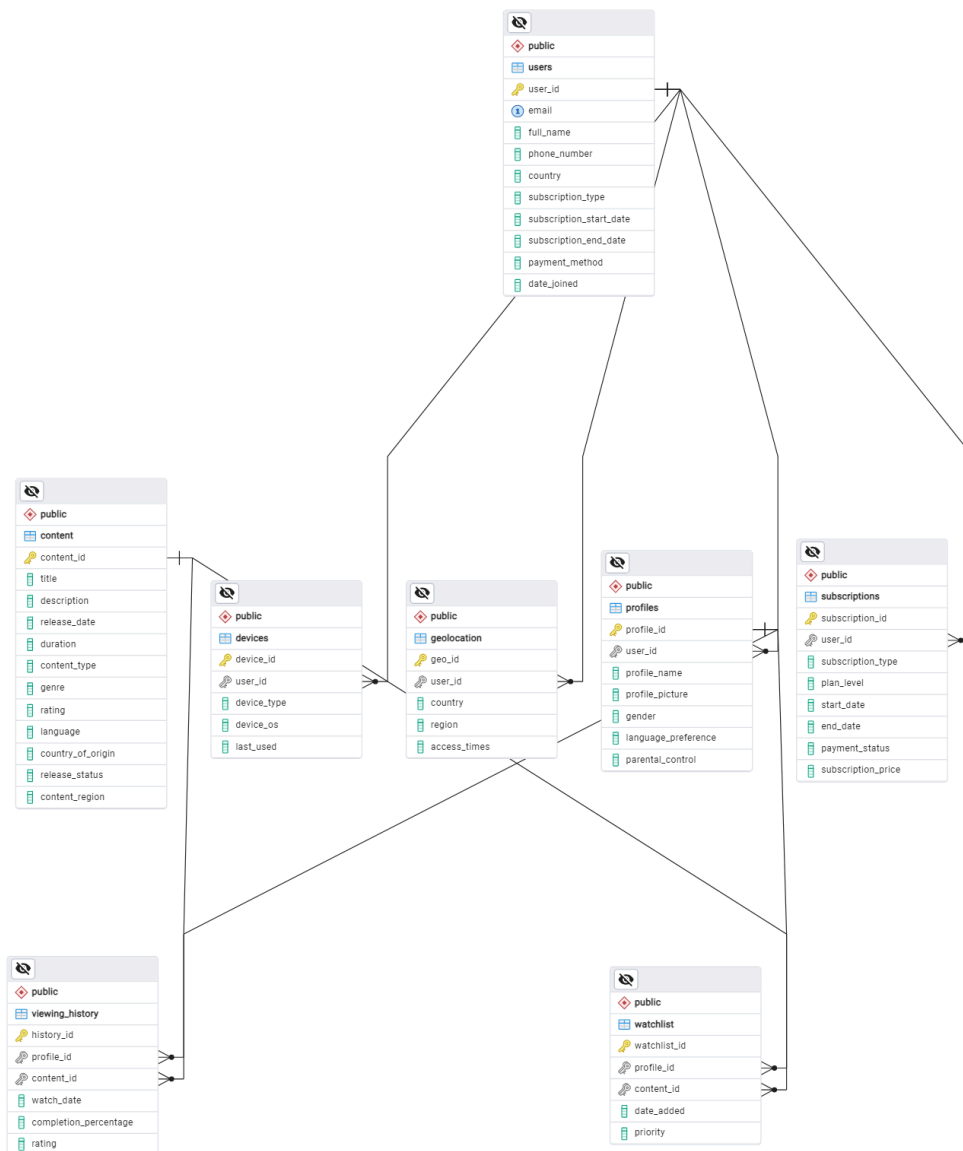
## Relationships

- **Users** have a one-to-many relationship with **profiles**, **devices**, **watch\_history**, **recommendations**, **ratings**, and **payments**.
- **profiles** belong to a **user**.
- **content** has a one-to-many relationship with **episodes** (for TV shows).
- **watch\_history** belongs to a **user**, a **profile**, and a **content** (or **episode**).
- **recommendations** belong to a **user** and a **content**.

- **ratings** belong to a **user**, a **profile**, and a **content**.
- **payments** belong to a **user**.

## Step 6: ER Diagram

Let's construct an **ER diagram** that vividly portrays the relationships and attributes of the entities within the **Netflix schema**. This ER diagram will serve as a visual representation, shedding light on the pivotal components of Netflix's data model. By employing this diagram, you'll gain a clearer grasp of the intricate interactions and connections that define the platform's dynamics, similar to how an Instagram schema would define user interactions and content relationships.



## Step 7: Rationale Behind the Design

- **User Profiles:** The system is built around personalization. Each user gets unique recommendations based on their watch history, preferences, and other behavioural data.
- **Scalability:** Netflix uses a highly scalable cloud infrastructure with CDNs to ensure that content is available globally without interruption, allowing millions of users to stream simultaneously.
- **Efficiency:** The recommendation system leverages big data and machine learning algorithms to ensure that users receive personalised suggestions quickly, enhancing user engagement and satisfaction.
- **Flexibility:** With multiple subscription plans, Netflix allows users to pick the one that best suits their needs, whether it's the number of screens or the streaming quality.

## Conclusion

Netflix has become a global leader by addressing multiple complex real-world problems such as content overload, accessibility across the world, and providing a user-friendly, seamless experience. The backend design uses robust cloud infrastructure, personalised content recommendations, and a scalable relational model to keep users engaged. Through this dissection, we understand how Netflix's architecture and features have revolutionised the media industry and continue to offer personalised experiences to users.