
YouTube Platform

Reverse Engineering

Requirements Analysis & System Documentation

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Summary

Executive

Document Overview

This document presents a comprehensive reverse engineering analysis of the YouTube platform, detailing both functional and non-functional requirements across eight major categories.

The analysis encompasses core functionalities including:

Account Management

Social Interactions

Video Playback Systems

Playlist Management

Content Discovery

System Performance

Upload Management

Exception Handling

Methodology: The requirements documented herein are based on systematic observation, testing, and analysis of YouTube's current implementation as of October 2025, complemented by official documentation from YouTube Help Center, Creator Academy, and API documentation.

1 1

& Authentication

Account

Category Overview: This category encompasses all requirements related to user account creation, authentication mechanisms, password management, and account configuration settings.

1.1 Registration

REQ-AA-F-001

YouTube shall allow the user to create an account by clicking on "sign in" then "create an account" options.

REQ-AA-F-002

YouTube shall give the user the option to use the guest mode if he was not using his own device.

REQ-AA-F-003

YouTube shall give the user the option to choose creating a personal or a business account.

REQ-AA-F-004

YouTube shall allow the user to enter his personal information (in the personal account).

REQ-AA-F-005

YouTube shall verify if the user's age was over 13.

REQ-AA-F-006

YouTube shall show a message saying that the user can not create an account because he does not meet the minimal age requirement if he enters an age under 13.

REQ-AA-F-007

YouTube shall give two options to create a business account: using a professional email with a monthly subscription or a personal account.

1.2 Logging In / Password Reset

REQ-LIPR-F-001

YouTube shall ask the user to enter his email, then his password with an option to try another way (passkey, sending a confirmation email).

REQ-LIPR-F-002

YouTube shall give the user the option to update his password if he did not sign in with password by creating a new one and confirming it.

REQ-LIPR-F-003

YouTube shall decline any old password (the created password should not be used before).

REQ-LIPR-F-004

YouTube shall ask the user to enter a recovery phone number and a recovery email to not lose the account.

REQ-LIPR-F-005

YouTube shall ask the user to verify that he is the one who's signing in by sending an email where he should match the number and confirm that it is him.

1.3 Account Settings

REQ-AS-F-001

YouTube shall give the user the option to create a channel.

REQ-AS-F-002

YouTube shall allow the user to control the Channel status and features.

REQ-AS-F-003

YouTube shall offer advanced settings containing options such as user and channel ID, moving channel to a Brand Account, deleting the channel, and other features dedicated to premium accounts.

2 1

Video

Playback & Player Controls

Category Overview: This category defines all requirements related to video playback functionality, player interface controls, and user interactions with the video player.

2.1 Video Playback

REQ-VPPC-F-001

YouTube shall allow the user to pause the video by clicking the video, the pause sign, or by clicking on the space bar, and play it the same way.

REQ-VPPC-F-002

YouTube shall allow the user to seek the video by clicking on timeline at the bottom of the video, or the left and right arrow keys to seek 5 seconds.

REQ-VPPC-F-003

YouTube shall allow the user to control the video quality, subtitles and video speed by clicking the setting icon at the bottom of the video.

REQ-VPPC-F-004

YouTube shall allow the user to increase the video speed to 2x by holding the space bar.

REQ-VPPC-F-005

YouTube shall allow the user to control the volume using the speaker icon or arrow up and arrow down to increase and decrease the volume.

REQ-VPPC-F-006

YouTube shall allow the user to choose the screen mode from Fullscreen, Theater Mode, or Miniplayer.

REQ-VPPC-F-007

YouTube shall show a replay icon instead of play or pause icon by the end of the video.

3 1 & Discovery

Search

Category Overview: This category covers the search functionality and content discovery mechanisms that enable users to find videos and channels.

REQ-SD-F-001

YouTube shall allow the user to search for anything he desires.

REQ-SD-F-002

YouTube shall not do anything if the user did an empty search.

REQ-SD-F-003

YouTube shall return search results for any input entered in the search bar.

REQ-SD-F-004

YouTube shall recommend different videos to the user in Home page based on collected data about what the user prefers to watch.

4 1

Video

Upload & Management

Category Overview: This category encompasses all requirements related to uploading videos, managing uploaded content, and post-upload editing capabilities.

4.1 Functional Requirements

REQ-VU-F-001

YouTube shall allow authenticated users to upload video files in formats MP4, MOV, AVI, WMV, FLV, 3GP, MPEG-PS, WebM, DNxHR, ProRes, CineForm, and HEVC (h265).

REQ-VU-F-002

YouTube shall reject video uploads exceeding 256 GB or 12 hours in duration for unverified accounts.

REQ-VU-F-003

During upload, the system shall display a progress bar showing percentage completed and estimated time remaining, with the ability to pause or cancel the upload at any point.

REQ-VU-F-004

The system shall require users to provide a video title (maximum 100 characters) before publishing, with the option to add a description (maximum 5,000 characters) and tags.

REQ-VU-F-005

Users shall be able to select from three visibility options: Public (anyone can search and view), Unlisted (only people with the link can view), or Private (only the uploader and specified users can view).

REQ-VU-F-006

After upload completion, the system shall provide a basic editor allowing users to trim video start/end points and blur regions.

REQ-VU-F-007

Users shall be able to schedule video publishing for a future date and time, with the video remaining private until the scheduled release.

REQ-VU-F-008

The system shall allow users to permanently delete uploaded videos, displaying a warning that the action cannot be undone and all associated comments, views, and likes will be lost.

REQ-VU-F-009

The system shall reject uploads of non-video files (e.g., .exe, .zip, .docx) and display an error message specifying supported video formats.

REQ-VU-F-010

When a user attempts to upload a video that violates content policies (detected through a built-in automated scanning), the system shall block the upload and provide specific reasons for rejection.

5 1

Social

Features & Interactions

Category Overview: This category defines requirements for social engagement features including comments, likes, subscriptions, notifications, and content sharing.

5.1 Functional Requirements

REQ-SF-F-001

YouTube shall allow authenticated users to post comments on videos where commenting is enabled, with a maximum length of 10,000 characters per comment.

REQ-SF-F-002

YouTube shall allow users to edit their own comments within any timeframe after posting, with an "(edited)" label appearing next to the timestamp.

REQ-SF-F-003

The system shall allow users to delete their own comments, removing all replies to that comment as well.

REQ-SF-F-004

The system shall allow users to reply to existing comments, creating threaded conversations that can be expanded or collapsed.

REQ-SF-F-005

The system shall provide like and dislike buttons on videos, incrementing the visible like count when clicked, but not displaying the dislike count publicly (as of current YouTube policy).

REQ-SF-F-006

When a user clicks the Subscribe button on a channel, the system shall add that channel to their subscriptions list and optionally send notifications about new uploads based on notification settings (All, Personalized, or None).

REQ-SF-F-007

The system shall provide a notification panel accessible from the bell icon, showing recent activity such as new uploads from subscribed channels, replies to comments, and community posts.

REQ-SF-F-008

Users shall be able to share videos through a Share button that provides options for copying the URL, embedding the video, or sharing directly to social platforms like Facebook, Twitter, WhatsApp, and email.

REQ-SF-F-009

Channels meeting eligibility requirements (typically 500+ subscribers) shall have access to the Community tab where they can post text, images, polls, and GIFs to engage their audience.

REQ-SF-F-010

When users unsubscribe from a channel, the system shall immediately remove that channel from their subscriptions feed and stop sending notifications about new content.

6 1 & Library Management

Playlists

Category Overview: This category covers playlist creation, management, and the automatic library features that organize user content.

6.1 Functional Requirements

REQ-PL-F-001

Authenticated users shall be able to create playlists by clicking "Save" on any video and selecting "Create new playlist," providing a playlist name (maximum 150 characters).

REQ-PL-F-002

Users shall be able to set playlist visibility to Public, Unlisted, or Private, with the option to change this setting at any time after creation.

REQ-PL-F-003

The system shall allow users to add videos to existing playlists from the video player page, search results, or the Library section, with the ability to add the same video to multiple playlists.

REQ-PL-F-004

Users shall be able to reorder videos within a playlist by dragging and dropping them, or by using "Move to top" and "Move to bottom" options.

REQ-PL-F-005

The system shall automatically create and maintain special playlists including "Watch Later," "Liked Videos," and "Watch History" that users cannot delete but can clear.

REQ-PL-F-006

When a user clicks "Watch Later" on a video, the system shall add it to the dedicated Watch Later playlist, which can be accessed from the Library menu.

REQ-PL-F-007

The Watch History shall chronologically record all videos a user has watched, with the ability to pause or clear history, and remove individual videos from the list.

REQ-PL-F-008

Users shall be able to remove videos from any playlist they created.

REQ-PL-F-009

When a video in a playlist is deleted by its uploader, the system shall display "[Deleted video]" in that position within the playlist.

REQ-PL-F-010

The system shall allow users to delete entire playlists they created, displaying a confirmation message before permanent removal.

7 1 Functional Requirements

Non-

Category Overview: This category specifies quality attributes, system constraints, and performance characteristics that define how the system should behave.

7.1 Security Requirements

REQ-NF-SEC-001

The system shall enforce password requirements including minimum 8 characters for new accounts, and strongly recommend combinations of letters, numbers, and symbols, while checking against common compromised passwords.

REQ-NF-SEC-002

All data transmission between users and YouTube servers shall be encrypted using HTTPS protocol (TLS 1.2 or higher) to prevent interception of sensitive information.

REQ-NF-SEC-003

Users shall have access to granular privacy settings controlling who can see their subscriptions, saved playlists, and liked videos (options: Public, Unlisted, Private).

REQ-NF-SEC-004

The system shall filter and hide comments flagged by automated systems or reported by users as spam, containing inappropriate language, or including suspicious links.

7.2 Usability Requirements

REQ-NF-USA-001

The system shall support keyboard-only navigation, allowing users to play/pause (K), skip forward/backward (J/L), toggle fullscreen (F), and access other core functions without requiring a mouse.

REQ-NF-USA-002

YouTube shall provide closed captions and auto-generated subtitles in multiple languages, with adjustable text size, font, color, and background opacity to accommodate users with hearing impairments or language barriers.

7.3 Reliability Requirements

REQ-NF-REL-001

When a user's internet connection drops during video upload, the system shall save the upload draft and provide a resume option for up to 24 hours, minimizing data loss and user frustration.

REQ-NF-REL-002

If a video fails to load or playback is interrupted, the system shall display a specific error message like "An error occurred. Please try again later" and offer troubleshooting steps or retry options.

7.4 Performance Requirements

REQ-NF-PERF-001

If a user posts multiple comments in rapid succession (more than 5 within 30 seconds), the system shall temporarily block further commenting and display a message asking them to slow down.

7.5 Performance & Compatibility

REQ-NFPC-NF-001

YouTube shall load the homepage in less than 4 seconds.

REQ-NFPC-NF-002

YouTube shall start the selected video in less than 3 seconds.

REQ-NFPC-NF-003

YouTube shall have the same performance in different browsers.

REQ-NFPC-NF-004

YouTube shall return search results in less than 2 seconds.

8 1

Exception

Cases Requirements

Category Overview: This category addresses edge cases, error handling, and system behavior under unusual or unexpected conditions.

REQ-EX-001

If a user attempts to upload a video file containing malware or suspicious code, the system shall block the file upload, and notify the user that the file was rejected for security reasons.

REQ-EX-002

When a user tries to post a comment containing blacklisted words, excessive caps, or repeated characters (spam patterns), the system shall either auto-filter the comment or require manual approval before it appears publicly.

REQ-EX-003

If a scheduled video's publish time arrives but the user's channel has been terminated or suspended, the system shall not publish the video and send a notification explaining the channel status.

REQ-EX-004

When a user attempts to create a playlist with a name that contains prohibited words or excessively long special characters, the system shall reject the creation and suggest a valid name.

REQ-EX-005

If storage limit is exceeded during upload (free accounts have limits), the system shall limit the upload, display remaining storage space, and suggest upgrading or deleting old content.

Documentation Sources

- [1] **YouTube Help Center** - Upload video files
<https://support.google.com/youtube/answer/57407>
- [2] **YouTube Creator Academy**
Best practices documentation and creator resources
- [3] **YouTube Community Guidelines**
<https://youtube.com/howyoutubeworks/policies/community-guidelines>
- [4] **YouTube API Documentation**
Video resource properties and technical specifications
- [5] **Content Violation Guidelines**
<https://support.google.com/youtube/answer/2802008>
- [6] **Personal Testing and Observation**
YouTube platform behavior analysis (October 2025)

End of Document

This requirements specification represents a comprehensive analysis of the YouTube platform's functional and non-functional characteristics.