

## **1 User Lands on Platform (ENTRY POINT)**

### **What Happens**

- User opens the web application
- Public landing page is shown

### **User Options**

- Login
- Register

### **Why This Comes First**

- Security
- Personal workspace
- Access control

### **Modules Involved**

- Frontend Auth UI
  - Backend Auth API
- 

## **2 User Authentication (SECURITY GATE)**

### **Flow**

User → Login/Register → JWT Issued → Session Created

### **What Happens**

- Credentials validated
- JWT token issued
- Token stored in browser
- Token attached to all future requests

### **Important Rule**

No user can access documents without authentication

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## **3 User Dashboard (CONTROL CENTER)**

### **What User Sees**

- List of their documents
- Create new document button
- Recent activity

## What Happens in Backend

- Fetch documents by `user_id`
- Activity logged

### Purpose

- Central navigation point
- Ownership clarity

## Document Creation / Selection (WORKSPACE SETUP)

### Two Paths

#### A) Create New Document

- User enters title & category
- Document metadata saved

#### B) Open Existing Document

- Latest version fetched

### Key Point

Document content is loaded from the **latest saved version**

## Join Real-Time Collaboration Session (CORE STEP)

### Flow

```
User opens document
↓
Joins SignalR Group (doc_id)
↓
Real-time channel established
```

### What Happens

- SignalR connection starts
- User added to document group
- Other users notified of presence

#### ✦ Why This Is Critical

- Enables live collaboration
  - Isolates document sessions
- 

## 6 Real-Time Editing (MAIN FUNCTIONALITY)

### Flow

```
User edits content
↓
Editor generates delta
↓
SignalR Hub
↓
Broadcast to other users
```

### What Happens

- Local editor updates instantly
- Other users see changes live
- Typing indicators shown

#### ✦ Design Principle

No full document reload — only delta sync

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## 7 Inline Commenting (COLLABORATION SUPPORT)

### Flow

```
User selects text
↓
Adds inline comment
↓
Comment stored with offsets
↓
Visible to collaborators
```

### Why This Exists

- Context-based discussion

- No external chat needed
- 

## **8 Versioning (SAFETY NET)**

### **Two Triggers**

- Auto-save every 10 minutes
- Manual “Finalize Document”

### **Flow**

```
Live document
↓
Snapshot saved
↓
New version created
```

### **Explain to Team**

Live edits are temporary; versions are permanent.

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## **9 Version History & Revert (RECOVERY)**

### **Flow**

```
User opens version history
↓
Selects version
↓
Document restored
```

### **Important Rule**

- Revert creates a **new version**, not overwrite

### Prevents data loss

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## **10 Activity Logging (BACKGROUND PROCESS)**

### **What Is Logged**

- Login

- Document creation
- Edits
- Comments
- Version saves

## Why

- Audit
- Debugging
- Admin tracking



## Logout / Session End

### What Happens

- JWT cleared
- SignalR disconnected
- User removed from document group