Ingeniería de software 2

Workshop No. 4 — Full Software Testing, Deployment, and MVP Delivery

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1. Testing

The application includes a test suite implemented using **Cypress**, focusing on the complete CRUD lifecycle of the API'S. These tests validate backend correctness, input validation, state-machine transitions, and error handling. Before each test, the database is reset using cy.resetDB() to ensure deterministic and isolated execution.

1.1. Unit testing
1.1.1. Backend

- Example test: Calls Full Crud
- Command used: *npx cypress run --spec cypress/unit/backend/calls/**/*.cy.ts*
- Source Code:
  https://github.com/Ingesoft2-Talk2/Talk2/tree/main/Final-Project/cypress/unit/backend/calls

```
PS C:\Users\ksno\Desktop\Dev\Ingesoft 2\Final-Project> npx cypress run --spec cypress/unit/backend/calls/**/*.cy.ts

(Run Starting)

  ┌─────────────────────────────────────────────────────────────────────────────────────────────┐
  │ Cypress:        14.5.4                                                                         │
  │ Browser:        Electron 130 (headless)                                                        │
  │ Node Version:   v22.21.1 (C:\Program Files\nodejs\node.exe)                                    │
  │ Specs:          5 found (create-call.cy.ts, delete-call.cy.ts, full-crud-call.cy.ts, read-call │
  │                 .cy.ts, update-call.cy.ts)                                                     │
  │ Searched:       C:\Users\ksno\Desktop\Dev\Ingesoft 2\Final-Project\cypress\unit\backend\calls\ │
  │                 **\*.cy.ts                                                                      │
  └─────────────────────────────────────────────────────────────────────────────────────────────┘


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  Running:  create-call.cy.ts                                                            (1 of 5)


  Call - CREATE
    √ should create a new call (6147ms)
    √ should return 404 for missing callId (3454ms)


  2 passing (10s)


  (Results)

  ┌─────────────────────────────────────┐
  │ Tests:        2                     │
  │ Passing:      2                     │
  │ Failing:      0                     │
  │ Pending:      0                     │
  │ Skipped:      0                     │
  │ Screenshots:  0                     │
  │ Video:        false                 │
  │ Duration:     9 seconds             │
  │ Spec Ran:     create-call.cy.ts     │
  └─────────────────────────────────────┘
```

Call - DELETE
  √ should delete an existing call (5936ms)
  √ should return 404 if call does not exist (5336ms)

2 passing (11s)

(**Results**)

```
Tests:        2
Passing:      2
Failing:      0
Pending:      0
Skipped:      0
Screenshots:  0
Video:        false
Duration:     11 seconds
Spec Ran:     delete-call.cy.ts
```

Call - FULL CRUD FLOW
  √ should perform full CRUD flow for a call (8672ms)

1 passing (9s)

(**Results**)

```
Tests:        1
Passing:      1
Failing:      0
Pending:      0
Skipped:      0
Screenshots:  0
Video:        false
Duration:     8 seconds
Spec Ran:     full-crud-call.cy.ts
```

Call - READ
  √ should return an existing call (6453ms)
>   √ should return 404 if call does not exist (6033ms)

2 passing (13s)

(**Results**)


```
Tests:          2
Passing:        2
Failing:        0
Pending:        0
Skipped:        0
Screenshots:    0
Video:          false
Duration:       12 seconds
Spec Ran:       read-call.cy.ts
```

Call - UPDATE
  √ should update an existing call (7420ms)
  √ should return 404 when updating non-existent call (4821ms)

2 passing (12s)

(**Results**)


```
Tests:          2
Passing:        2
Failing:        0
Pending:        0
Skipped:        0
Screenshots:    0
Video:          false
Duration:       12 seconds
Spec Ran:       update-call.cy.ts
```

Spec		Tests	Passing	Failing	Pending	Skipped
√ create-call.cy.ts	00:09	2	2	-	-	-
√ delete-call.cy.ts	00:11	2	2	-	-	-
√ full-crud-call.cy.ts	00:08	1	1	-	-	-
√ read-call.cy.ts	00:12	2	2	-	-	-
√ update-call.cy.ts	00:12	2	2	-	-	-
√ All specs passed!	00:54	9	9	-	-	-

1.1.2.   Frontend

- Example test: Dashboard Component Test
- Command used: *npx cypress run --spec cypress/unit/frontend/**/*.cy.ts*
- Source Code:
  https://github.com/Ingesoft2-Talk2/Talk2/tree/main/Final-Project/cypress/unit/frontend/dashboard

```
Running:  dashboard.cy.ts                                              (1 of 1)


Dashboard Page
  √ renders header info (5329ms)
  √ shows time and date (4550ms)
  √ shows correct time and date (5038ms)
  √ renders dashboard cards (4895ms)
  √ opens New Meeting modal (4888ms)
  √ opens Join Meeting modal (5352ms)
  √ opens Schedule Meeting modal (4570ms)


7 passing (35s)


(Results)

  ┌────────────────────────────────────────────────────────────────────────┐
  │ Tests:        7                                                          │
  │ Passing:      7                                                          │
  │ Failing:      0                                                          │
  │ Pending:      0                                                          │
  │ Skipped:      0                                                          │
  │ Screenshots:  0                                                          │
  │ Video:        false                                                      │
  │ Duration:     35 seconds                                                 │
  │ Spec Ran:     dashboard.cy.ts                                            │
  └────────────────────────────────────────────────────────────────────────┘


====================================================================================

(Run Finished)


    Spec                                  Tests  Passing  Failing  Pending  Skipped

  √  dashboard.cy.ts          00:35        7        7        -        -        -

  √  All specs passed!        00:35        7        7        -        -        -
```

1.2.   Integration testing

- Example test: Schedule, edit and delete meeting test
- Command used: *npx cypress run --spec cypress/integration/**/*.cy.ts*
- Source Code:
  https://github.com/Ingesoft2-Talk2/Talk2/tree/main/Final-Project/cypress/integration

```
PS C:\Users\ksno\Desktop\Dev\Ingesoft 2\Final-Project> npx cypress run --spec cypress/integration/**/*.cy.ts

(Run Starting)

  ┌────────────────────────────────────────────────────────────────────────────────────────────┐
  │ Cypress:        14.5.4                                                                        │
  │ Browser:        Electron 130 (headless)                                                       │
  │ Node Version:   v22.21.1 (C:\Program Files\nodejs\node.exe)                                   │
  │ Specs:          1 found (schedule_edit_delete_meeting.cy.ts)                                  │
  │ Searched:       C:\Users\ksno\Desktop\Dev\Ingesoft 2\Final-Project\cypress\integration\**\*.cy │
  │                 .ts                                                                           │
  └────────────────────────────────────────────────────────────────────────────────────────────┘


─────────────────────────────────────────────────────────────────────────────────────────────────

  Running:  schedule_edit_delete_meeting.cy.ts                                            (1 of 1)


  Schedule, edit and delete meeting
    √ creates a meeting (10202ms)
    √ edits the meeting (8172ms)
    √ deletes the meeting (7181ms)


  3 passing (26s)


(Results)

  ┌────────────────────────────────────────────────────────────────┐
  │ Tests:        3                                                  │
  │ Passing:      3                                                  │
  │ Failing:      0                                                  │
  │ Pending:      0                                                  │
  │ Skipped:      0                                                  │
  │ Screenshots:  0                                                  │
  │ Video:        false                                              │
  │ Duration:     25 seconds                                         │
  │ Spec Ran:     schedule_edit_delete_meeting.cy.ts                 │
  └────────────────────────────────────────────────────────────────┘


====================================================================================================

(Run Finished)


      Spec                                    Tests  Passing  Failing  Pending  Skipped
  ┌────────────────────────────────────────────────────────────────────────────────────┐
  │ √  schedule_edit_delete_meeting.cy.ts     00:25      3        3        -        -       - │
  └────────────────────────────────────────────────────────────────────────────────────┘
    √  All specs passed!                      00:25      3        3        -        -       -
```

1.3. Acceptance tests

- File name: features/user_registration.feature
- Source Code:
  https://github.com/Ingesoft2-Talk2/Talk2/blob/main/Final-Project/features/user_registration.feature

```gherkin
Talk2 > Final-Project > features > 🥒 user_registration.feature
1    Feature: User Registration
2      As a new user
3      I want to sign up using my email and password
4      So that I can create an account and access the platform
5
6      Background:
7        Given the application is running
8        And I am on the sign-up page
9
10
11     # ------------------------
12     # SCENARIO: Successful sign up
13     # ------------------------
14     Scenario: Successful sign up with valid email and password
15       When I enter a valid email "alejandro@example.com" and password "Str0ngP@ss!"
16       And I click "Sign Up"
17       Then my account must be created
18       And I should be redirected to the dashboard
19       And I should see a welcome message "Welcome, Alejandro"
20
21
22     # ------------------------
23     # SCENARIO: Invalid email format
24     # ------------------------
25     Scenario: Sign up fails due to invalid email format
26       When I enter an invalid email "alejandroexample.com" and password "Str0ngP@ss!"
27       And I click "Sign Up"
28       Then I should see an error message "Invalid email format"
29       And my account must not be created
```

- File name: features/create_instant_meeting.feature
- Source Code:
  https://github.com/Ingesoft2-Talk2/Talk2/blob/main/Final-Project/features/create_inst
  ant_meeting.feature

```gherkin
k2 > Final-Project > features > 🥒 create_instant_meeting.feature
     You, 3 minutes ago | 1 author (You)
1    Feature: Create Instant Meeting
2      As a logged-in user
3      I want to create an instant meeting
4      So that I can start a video call immediately
5
6      Background:
7        Given the application is running
8        And I am logged in as a user "alejandro@example.com"
9        And I am on my dashboard
10
11     # --------------------------
12     # SCENARIO: Successful creation
13     # --------------------------
14     Scenario: Start an instant meeting successfully
15       When I click "Start Meeting"
16       Then the system should generate a unique meeting room
17       And I should be redirected to the meeting room
18       And the meeting URL should match the pattern "/meeting/{meetingId}"
19       And I should see my meeting controls (camera, microphone, participants list)
20
21     # --------------------------
22     # SCENARIO: Meeting service unavailable
23     # --------------------------
24     Scenario: Start meeting fails when meeting service is down
25       Given the meeting service is unavailable
26       When I click "Start Meeting"
27       Then I should see an error message "Unable to start meeting. Please try again later."
28       And I should remain on the dashboard
```

- File name: features/schedule_future_meeting.feature
- Source Code:
  https://github.com/Ingesoft2-Talk2/Talk2/blob/main/Final-Project/features/schedule_future_meeting.feature

```
Talk2 > Final-Project > features > 🟢 schedule_future_meeting.feature
       You, 4 minutes ago | 1 author (You)
1      Feature: Schedule Future Meeting
2        As a user
3        I want to schedule a meeting for a specific date and time
4        So that I can plan events in advance
5
6        Background:
7          Given the application is running
8          And I am logged in as a user "alejandro@example.com"
9          And I am on the scheduling page
10
11         # --------------------------
12         # SCENARIO: Successful scheduling
13         # --------------------------
14         Scenario: Schedule a meeting successfully with date, time and participants
15           When I choose date "2026-01-15" and time "14:00" and duration "60"
16           And I add participants "maria@example.com, juan@example.com"
17           And I click "Schedule"
18           Then the system should save the meeting
19           And invitations should be sent to "maria@example.com" and "juan@example.com"
20           And I should see the meeting on my calendar for "2026-01-15 14:00"
21
22         # --------------------------
23         # SCENARIO: Missing required fields
24         # --------------------------
25         Scenario: Scheduling fails when required fields are missing
26           When I leave the date blank and time blank
27           And I click "Schedule"
28           Then I should see an error message "Date and time are required"
```

- File name: features/enable_disable_camera.feature
- Source Code:
https://github.com/Ingesoft2-Talk2/Talk2/blob/main/Final-Project/features/enable_dis
able_camera.feature


```
Talk2 > Final-Project > features > ● enable_disable_camera.feature
      You, 4 minutes ago | 1 author (You)
  1   Feature: Enable/Disable Camera
  2     As a participant
  3     I want to turn my camera on or off
  4     So that I can control my visibility in the meeting
  5
  6     Background:
  7       Given the application is running
  8       And I have joined an active meeting as "alejandro@example.com"
  9
 10     # -------------------------
 11     # SCENARIO: Toggle camera on and off (happy path)
 12     # -------------------------
 13     Scenario: Toggle camera on then off
 14       Given my camera is initially off
 15       When I click the camera icon
 16       Then my video stream should become active
 17       And the camera icon should show an "on" state
 18       When I click the camera icon again
 19       Then my video stream should become inactive
 20       And the camera icon should show an "off" state
 21
 22     # -------------------------
 23     # SCENARIO: Camera permissions denied
 24     # -------------------------
 25     Scenario: Camera cannot be enabled because browser blocks permission
 26       Given my browser has blocked camera permissions
 27       When I click the camera icon
 28       Then I should see a permissions prompt or an error "Camera access blocked"
```

- File name: features/join_via_link.feature
- Source Code:
  https://github.com/Ingesoft2-Talk2/Talk2/blob/main/Final-Project/features/join_via_li
  nk.feature

```
Talk2 > Final-Project > features > 🟢 join_via_link.feature
  1    Feature: Join via link
 60      Scenario: Join fails when link token is tampered with
 65
 66      # -------------------------
 67      # SCENARIO: Meeting full
 68      # -------------------------
 69      Scenario: Join attempt when meeting has reached maximum capacity
 70        Given the meeting has reached maximum participants
 71        And I have a valid meeting link
 72        When I click the meeting link
 73        Then I should see a message "Meeting is full"
 74        And I should not be admitted
 75
 76      # -------------------------
 77      # SCENARIO: Banned or blocked participant
 78      # -------------------------
 79      Scenario: Join blocked for banned user even with a valid link
 80        Given my account "blocked_user@example.com" is banned from the meeting
 81        And I have a valid meeting link
 82        When I click the meeting link
 83        Then I should see a message "You are not allowed to join this meeting"
 84        And the join attempt should be denied
 85
 86      # -------------------------
 87      # SCENARIO: Link includes passcode / PIN required
 88      # -------------------------
 89      Scenario: Join link requires a passcode embedded or prompted
 90        Given the meeting link requires a passcode
```

2. Deployment

The project uses **Docker** and **Docker Compose** to create a fully containerized environment that includes both the web application and the PostgreSQL database. The docker-compose.yml file defines two services: **web**, which runs the Next.js application along

with Stream and Clerk integrations, and **db**, which provides a PostgreSQL instance managed through Prisma. By containerizing the stack, the entire system can be started, stopped, and reproduced consistently across different machines without manual installations or configuration.

Running the application with **docker-compose up --build** automatically builds the containers, sets up networking between services, and exposes the web application at **http://localhost:3000.** Database migrations and optional seed scripts can be executed directly inside the web container, ensuring the schema stays synchronized.

3. CI/CD Pipeline

This CI/CD pipeline, triggered by code pushes and pull requests to the main branch, is executed in two sequential jobs, all commands being run within the Final-Project directory. The first job, test, handles Continuous Integration by checking out the code, setting up Node.js 22.11.0, installing dependencies via npm install, generating the Prisma client using a dummy database URL, and running a focused Cypress Component Test (dashboard.cy.ts) to validate the frontend component logic. If the tests pass, the second job, build-and-push, handles Continuous Delivery: it securely logs into Docker Hub using GitHub Secrets, initializes Docker Buildx, and then builds the production Docker image, tagging it with the user's repository and pushing it to Docker Hub. The Docker build process uses dummy environment variables (like CLERK_SECRET_KEY) as build arguments, as the real secrets will only be injected when the container is deployed and running.

```
None
name: CI/CD Pipeline

on:
  push:
    branches: [ "main" ]
  pull_request:
    branches: [ "main" ]

defaults:
  run:
    working-directory: Final-Project

jobs:
  test:
    runs-on: ubuntu-latest

    steps:
      - name: Checkout code
        uses: actions/checkout@v4
```

```yaml
      - name: Setup Node.js
        uses: actions/setup-node@v4
        with:
          node-version: '22.11.0'

      - name: Install dependencies
        run: npm install

      - name: Generate Prisma Client
        env:
          PRISMA_DATABASE_URL: ${{ secrets.DATABASE_URL }}
        run: npx prisma generate

      - name: Run Cypress Tests
        env:
          CI: true
          NEXT_PUBLIC_CLERK_PUBLISHABLE_KEY: ${{
secrets.NEXT_PUBLIC_CLERK_PUBLISHABLE_KEY }}
          CLERK_SECRET_KEY: ${{ secrets.CLERK_SECRET_KEY }}
          NEXT_PUBLIC_STREAM_API_KEY: ${{ secrets.NEXT_PUBLIC_STREAM_API_KEY
}}
          STREAM_SECRET_KEY: ${{ secrets.STREAM_SECRET_KEY }}
          PRISMA_DATABASE_URL: ${{ secrets.DATABASE_URL }}
        run: npx cypress run --component --browser chrome --spec
"cypress/unit/**/*.{cy.js,cy.jsx,cy.ts,cy.tsx}"

  build-and-push:
    needs: test
    runs-on: ubuntu-latest

    steps:
      - name: Checkout code
        uses: actions/checkout@v4

      - name: Log in to Docker Hub
        uses: docker/login-action@v3
        with:
          username: ${{ secrets.DOCKER_USERNAME }}
          password: ${{ secrets.DOCKER_PASSWORD }}

      - name: Set up Docker Buildx
        uses: docker/setup-buildx-action@v3

      - name: Build and push Docker image
        uses: docker/build-push-action@v5
        with:
          context: .
          file: ./Dockerfile
```

```
          push: true
          tags: ${{ secrets.DOCKER_USERNAME }}/talk2-app:latest
          build-args: |
            NEXT_PUBLIC_CLERK_PUBLISHABLE_KEY=${{
  secrets.NEXT_PUBLIC_CLERK_PUBLISHABLE_KEY }}
            CLERK_SECRET_KEY=${{ secrets.CLERK_SECRET_KEY }}
            NEXT_PUBLIC_STREAM_API_KEY=${{
  secrets.NEXT_PUBLIC_STREAM_API_KEY }}
            STREAM_SECRET_KEY=${{ secrets.STREAM_SECRET_KEY }}
            DATABASE_URL=${{ secrets.DATABASE_URL }}
```

4. MVP Delivery

- MVP production website*: https://talk2-one.vercel.app/
- Demo:

Talk2

Connect. Talk.
Collaborate with **Talk2**

Talk2 makes video meetings effortless. Whether you're working with your team, meeting clients, or catching up with friends, enjoy secure and reliable video calls anytime, anywhere.

Get Started

Why choose **Talk2**?

HD Video Calls
Enjoy crystal-clear video quality for all your meetings.

Real-Time Chat
Stay connected with instant messaging during calls.

Screen Sharing
Share your screen seamlessly for presentations and reviews.

Sign in to Talk2
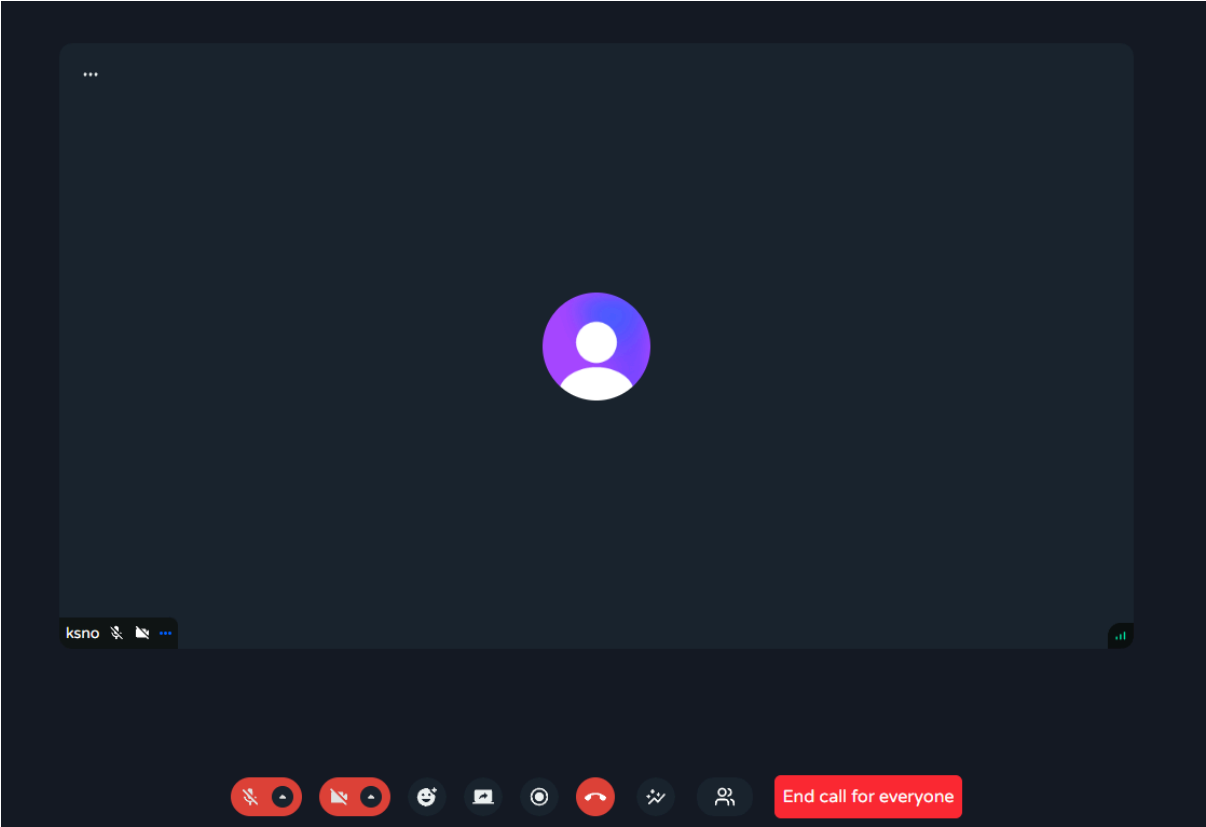Welcome back! Please sign in to continue

GitHub   **G Google**

or

Username   Last used

[   ] [•••]

Continue ▶

Don't have an account? **Sign up**

Talk2

- Dashboard
- **Friends**
- Upcoming
- Previous
- Recordings
- Personal Room

Friends List (3)

Add Friends

| T | Tomas Vallejo | ⋮ |

| A | Alejandro Alejandro Arguello Munoz | ⋮ |

| J | Juan Luis Vergara Novoa | ⋮ |

Pending Friend Requests (1)

| | Juan Diego Velasquez Pinzon | ⋮ |

Talk2

✓ Meeting Scheduled ✕

- Dashboard
- Friends
- **Upcoming**
- Previous
- Recordings
- Personal Room

Upcoming Meetings

📅

Test
01/12/2025, 6:13 pm

Start   Copy Link ⧉

📅

Test 2
02/12/2025, 6:13 pm

Start   Copy Link ⧉

📅

Test 3
04/12/2025, 6:13 pm

Start   Copy Link ⧉

Talk2

Dashboard

Friends

Upcoming

Previous

Recordings

Personal Room

Personal Meeting Room

Topic: **ksno's Meeting Room**

Meeting ID: **user_35FtwjYG51pP9mDrqqz9BfPYoZh**

Invite Link: **https://talk2-one.vercel.app/meeting/user_35FtwjYG51pP9mDrqqz9BfPYoZh...**

Start Meeting   Copy Invitation