



DEVELOPING AN ASSISTING SYSTEM FOR STUDENTS TO FIND INTERNSHIPS

THESIS COMMITTEE: 10-OISP-SOFTWARE ENGINEER

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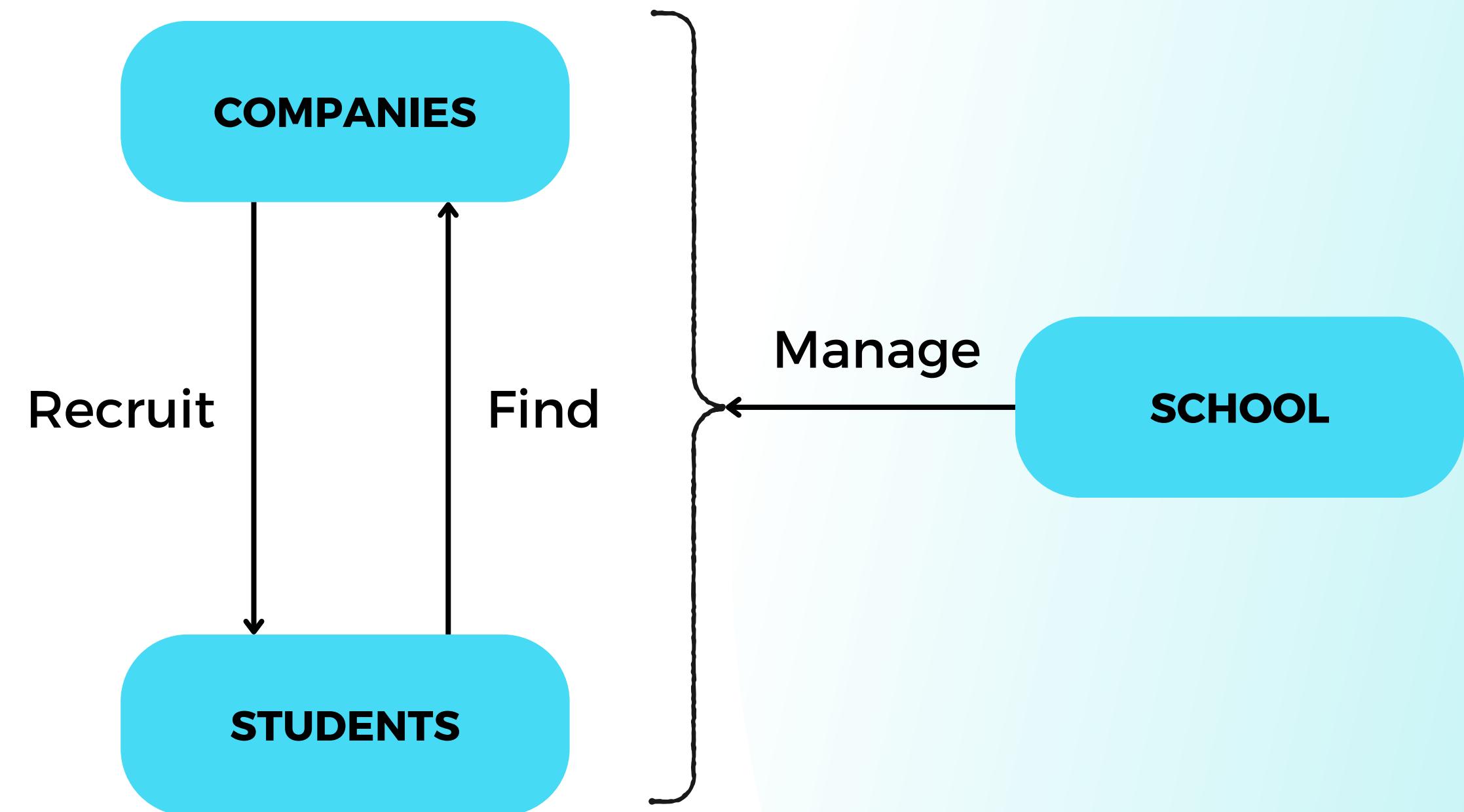
CONCLUSION



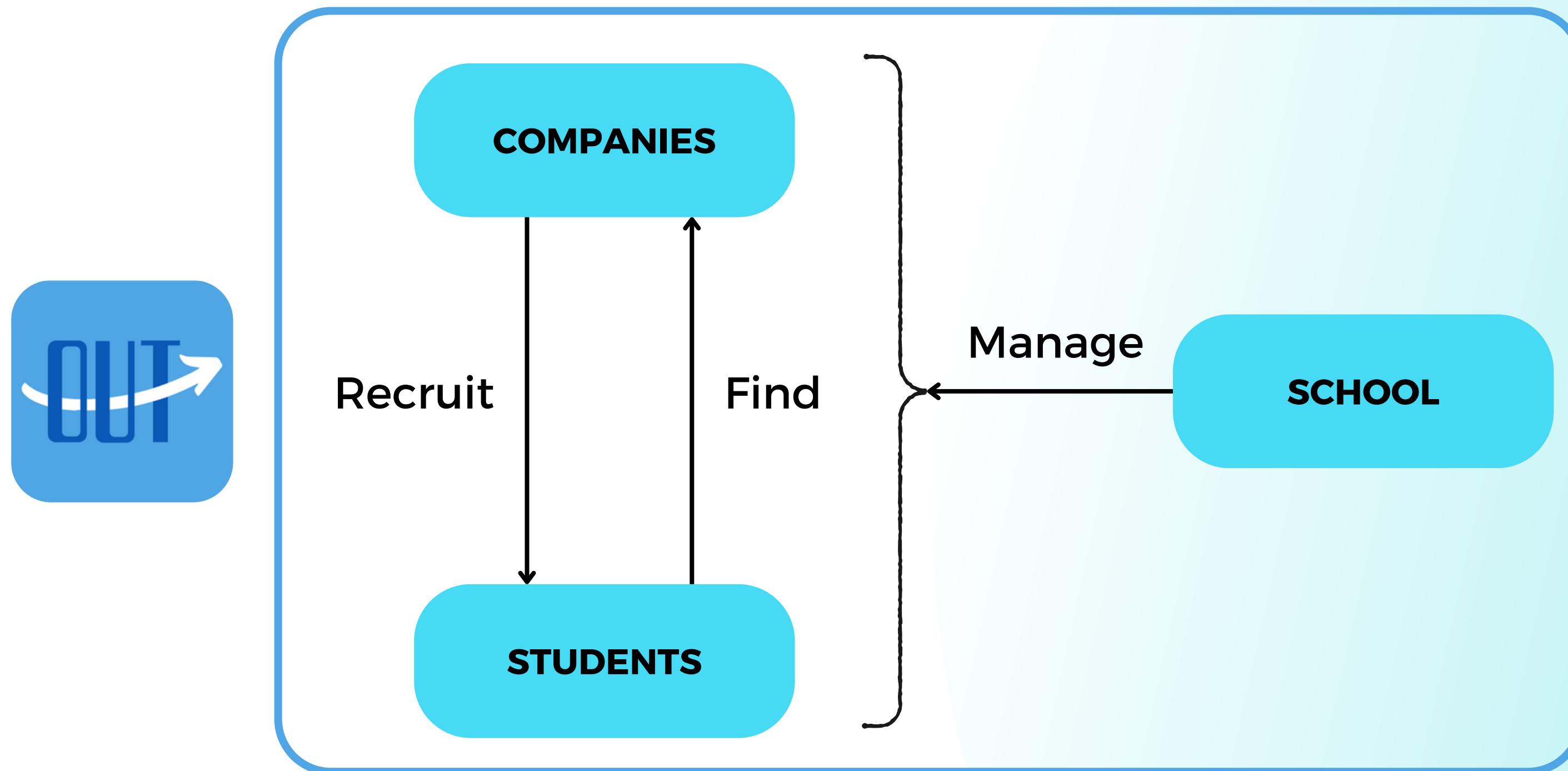
01. INTRODUCTION



MOTIVATION



MOTIVATION



PROJECT GOAL



- Ensure connections between students, faculty, and businesses in the context of internships
- Optimizing the internship acknowledgment process
- Automate administrative processes
- Assist students in discovering internship opportunities
- Benefit to businesses in intern recruitment and hiring processes
- Help faculty members in effectively managing students' internship

PROJECT SCOPE

Deliverables

A user-friendly web application, a database for storing relevant information and associated documentations.

Features

- Student portal for browsing and applying for internships.
- Faculty portal for managing student internships
- Business portal for posting jobs and reviewing applicants.
- Automated procedures for streamlining recruitment, approval, and acknowledgment processes.



02. ANALYZE CURRENT SYSTEMS



**01 INTERNSHIP WEBSITE
OF CSE FACULTY**

**02 UEH - DSA
CAREER SITE**

03 LINKEDIN

Internship website of CSE Faculty

- The platform for CSE students to find internship opportunities and view internship recruiting results.
- This website is also the platform for companies to upload internship jobs in order to find the suitable candidates
- The website is managed by CSE faculty staff.



Current internship process

Student	Company	Faculty staff
Register internship course	Register an account	Create accounts
Browse for internships	Write internship program	Verify companies information
Personally contact companies	Program verified	Verify internship programs
Register position on website	Open position	Update recruiting results
View the recruiting results	Complete the recruitment	Update internship results
Attend internship course	Verify students' registration	Receive internship reports
Make report	Send recruiting results	
	Send internship results	

Current internship process with CSE Internship website

Pros

- Reliable reference
- Closely monitored and managed
- Show real-time recruitment status

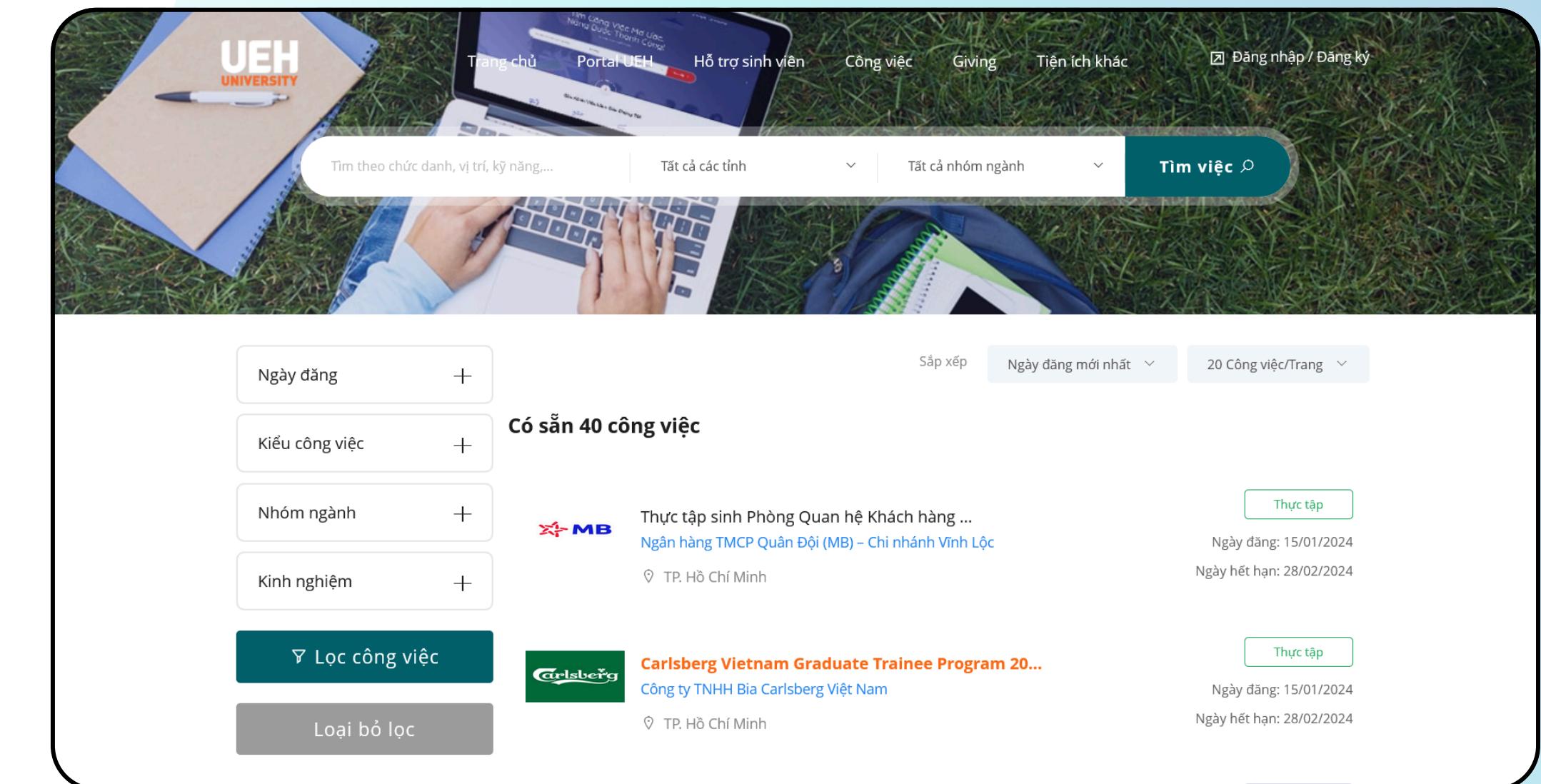
Cons

- Many tasks need a staff
- Not ideally a job-finding platform
- Results are handled separately in a folder outside of the website



UEH - DSA Career site

- The Department of Student Affairs (DSA) at University of Economics HCMC (UEH) is a comprehensive support and information website for students
- Providing academic and career guidance
- “Career site” is a subpage of DSA website, where job postings from various companies are posted



The screenshot shows the UEH DSA Career site interface. At the top, there's a navigation bar with links to 'Trang chủ', 'Portal UEH', 'Hỗ trợ sinh viên', 'Công việc', 'Giving', and 'Tiện ích khác'. There's also a 'Đăng nhập / Đăng ký' button. Below the navigation is a search bar with dropdowns for 'Tìm theo chức danh, vị trí, kỹ năng...' and filters for 'Tất cả các tỉnh' and 'Tất cả nhóm ngành'. A prominent green button labeled 'Tìm việc' is visible. The main content area features a background image of a person working on a laptop outdoors. On the left, there are filtering options: 'Ngày đăng', 'Kiểu công việc', 'Nhóm ngành', and 'Kinh nghiệm', each with a '+' sign. In the center, it says 'Có sẵn 40 công việc'. Two job listings are shown:

- Thực tập sinh Phòng Quan hệ Khách hàng ...**
Ngân hàng TMCP Quân Đội (MB) – Chi nhánh Vĩnh Lộc
TP. Hồ Chí Minh
Thực tập
Ngày đăng: 15/01/2024
Ngày hết hạn: 28/02/2024
- Carlsberg Vietnam Graduate Trainee Program 20...**
Công ty TNHH Bia Carlsberg Việt Nam
TP. Hồ Chí Minh
Thực tập
Ngày đăng: 15/01/2024
Ngày hết hạn: 28/02/2024

<https://vieclam.ueh.edu.vn>



UEH - DSA Career site

Pros

- Jobs are displayed for easy skimming
- Job positions accumulate over years
- Mostly suitable for find jobs

Cons

- Not be fully controlled
- No recruitment status tracking
- Management requires a lot of personnel

LinkedIn

- A professional networking platform that connects individuals and businesses worldwide
- Has become an essential tool for career development and networking
- With millions of jobs posted on the website, this is one of the best channels for every employee to find the most suitable jobs
- Provided job management tools



LinkedIn

Pros

- A powerful platform for world-wide connections
- Numerous opportunities for users and for companies
- Efficiently manage the recruitment process

Cons

- Platform management require an enormous team
- Lack of transparency
- Excessive amount of information can lead to information overload

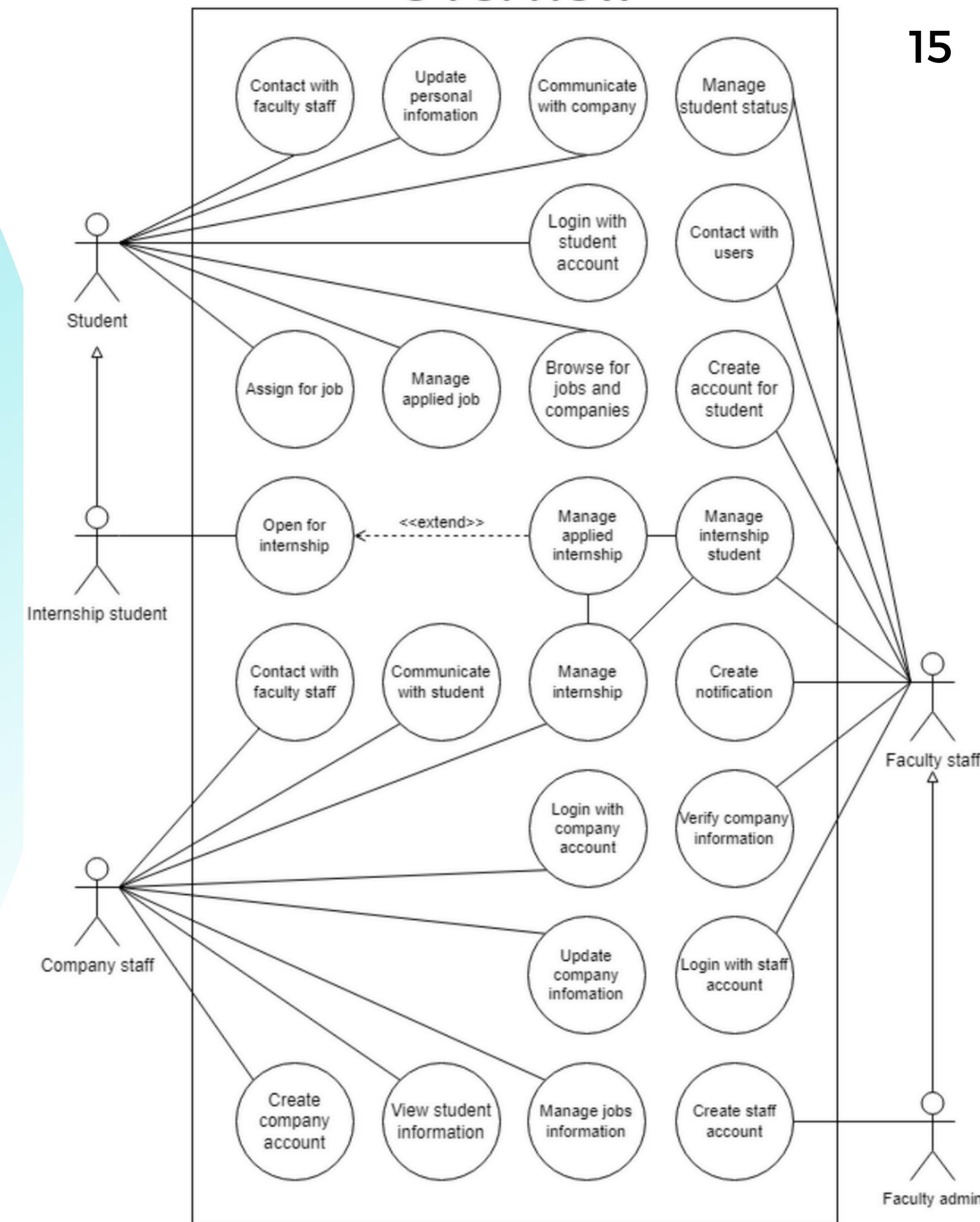
03. **REQUIREMENT ELICITATION**



USE-CASE DIAGRAM

Relevant stakeholders

- Faculty Staff
- Company Staff/HR
- Students



FUNCTIONAL REQUIREMENT

Faculty staffs

- View the information of students and companies.
- Login by Google.
- Adjust and modify the information of students and companies.
- View the statistics of jobs in the system.
- View the detailed information of each job in the system.
- Get the information of each company, student and job.
- Send notifications to students and companies.
- Adjust and modify the process of students when applying for internships.



FUNCTIONAL REQUIREMENT

University students

- Get the information about each job.
- Login by Google.
- Get the information of each company.
- Apply for the job position.
- Get the overview of the application process.
- Register an internship approval process to staff.



FUNCTIONAL REQUIREMENT

Company human resources

- Create a new account on the system.
- Create a new job position on the system.
- Get the overview information of potential students.
- Get the overview of each job.
- Export the information of the job into a PDF file

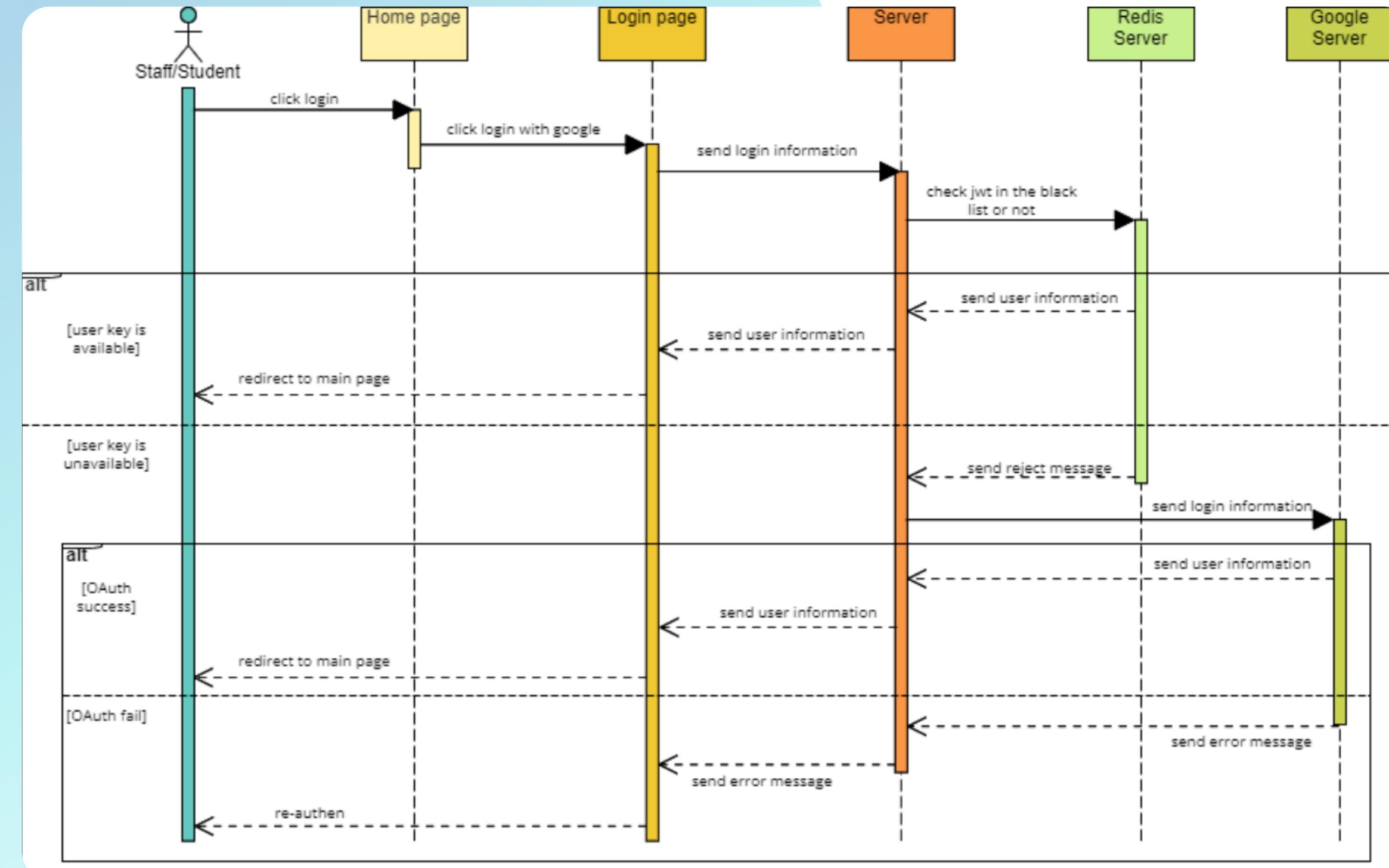


NON-FUNCTIONAL REQUIREMENT

- The system can handle 100 concurrent visits without any effect on the system efficiency.
- The system must respond in less than 30 seconds. After 30 seconds, the system will notify the user.
- The system should not be down more than 5 minutes continuously, maximum 30 minutes a day.
- Encryption with BCRYPT.
- Authentication based on JWT (Java Web Token).

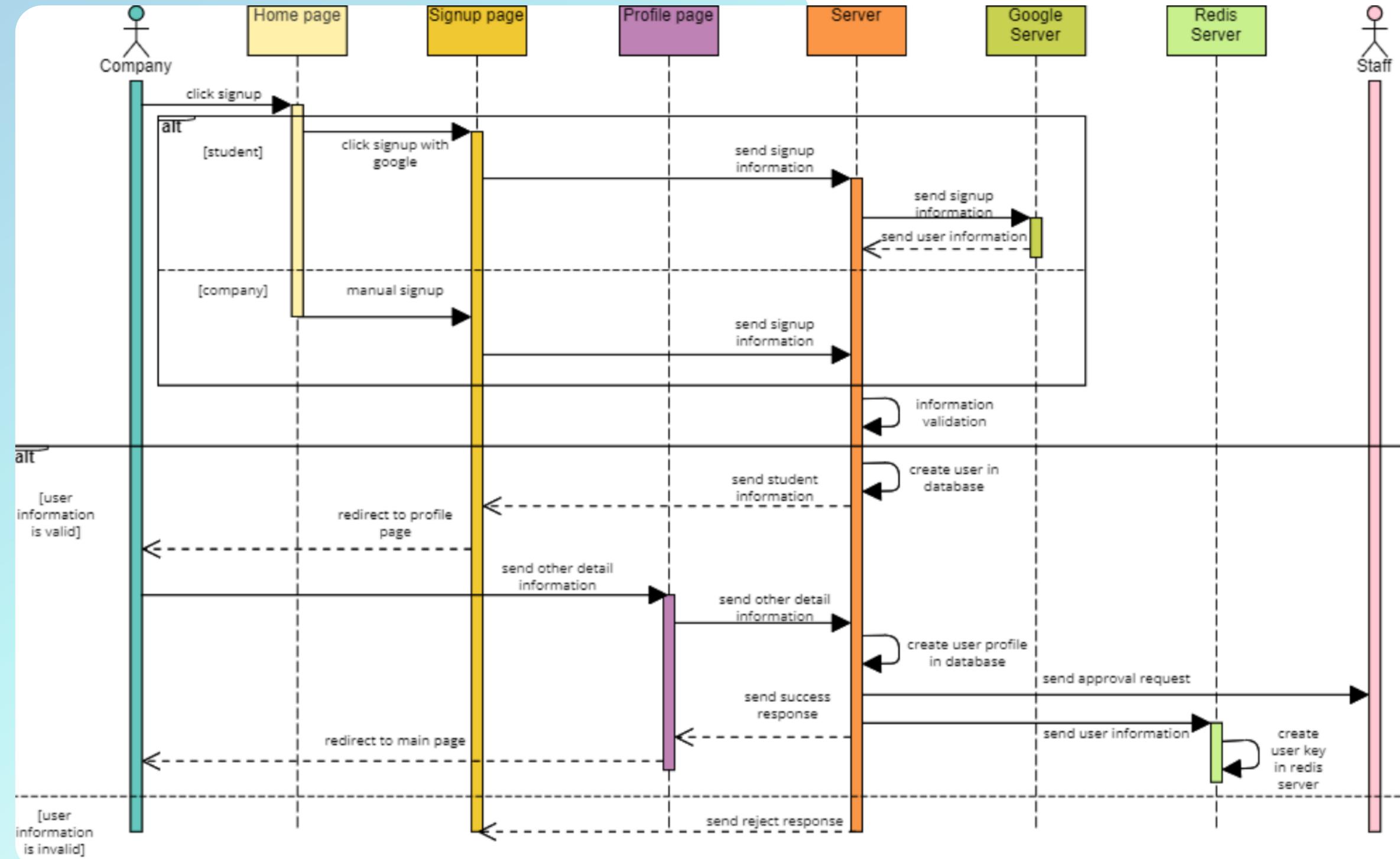


SEQUENCE DIAGRAMS



Staff and student login sequence diagram

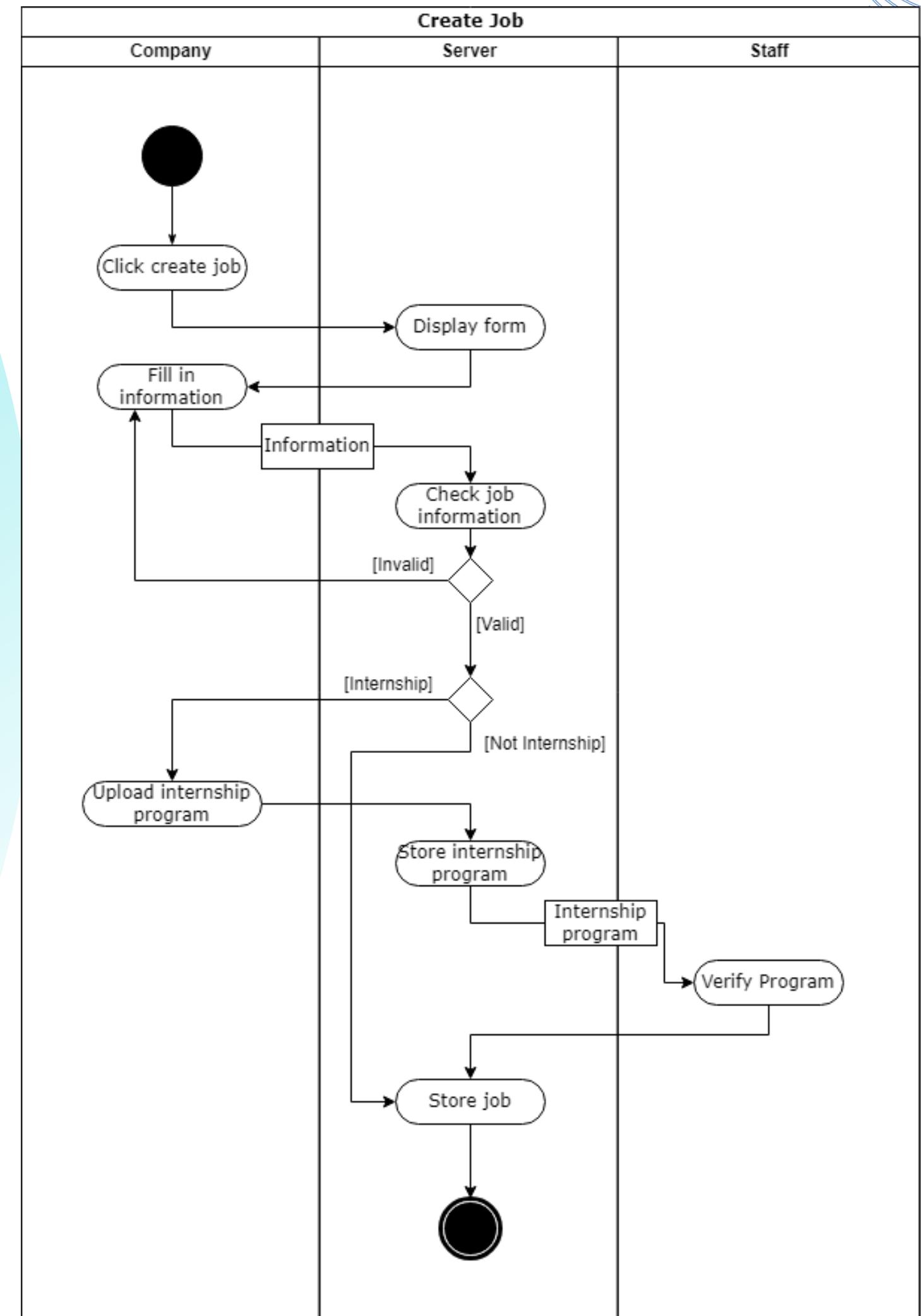
SEQUENCE DIAGRAMS



Company signup process sequence diagram

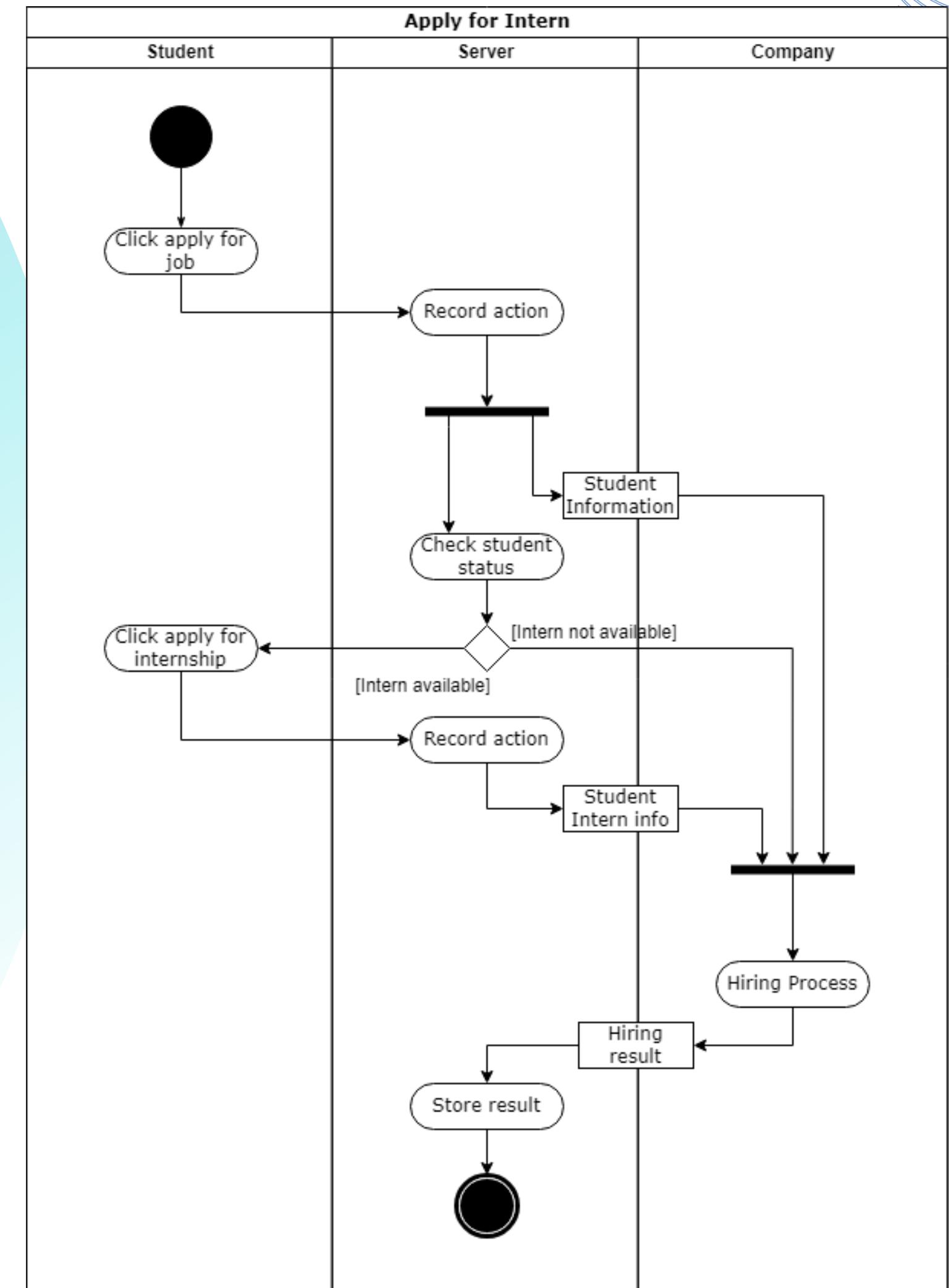
ACTIVITY DIAGRAMS

Create job activity diagram

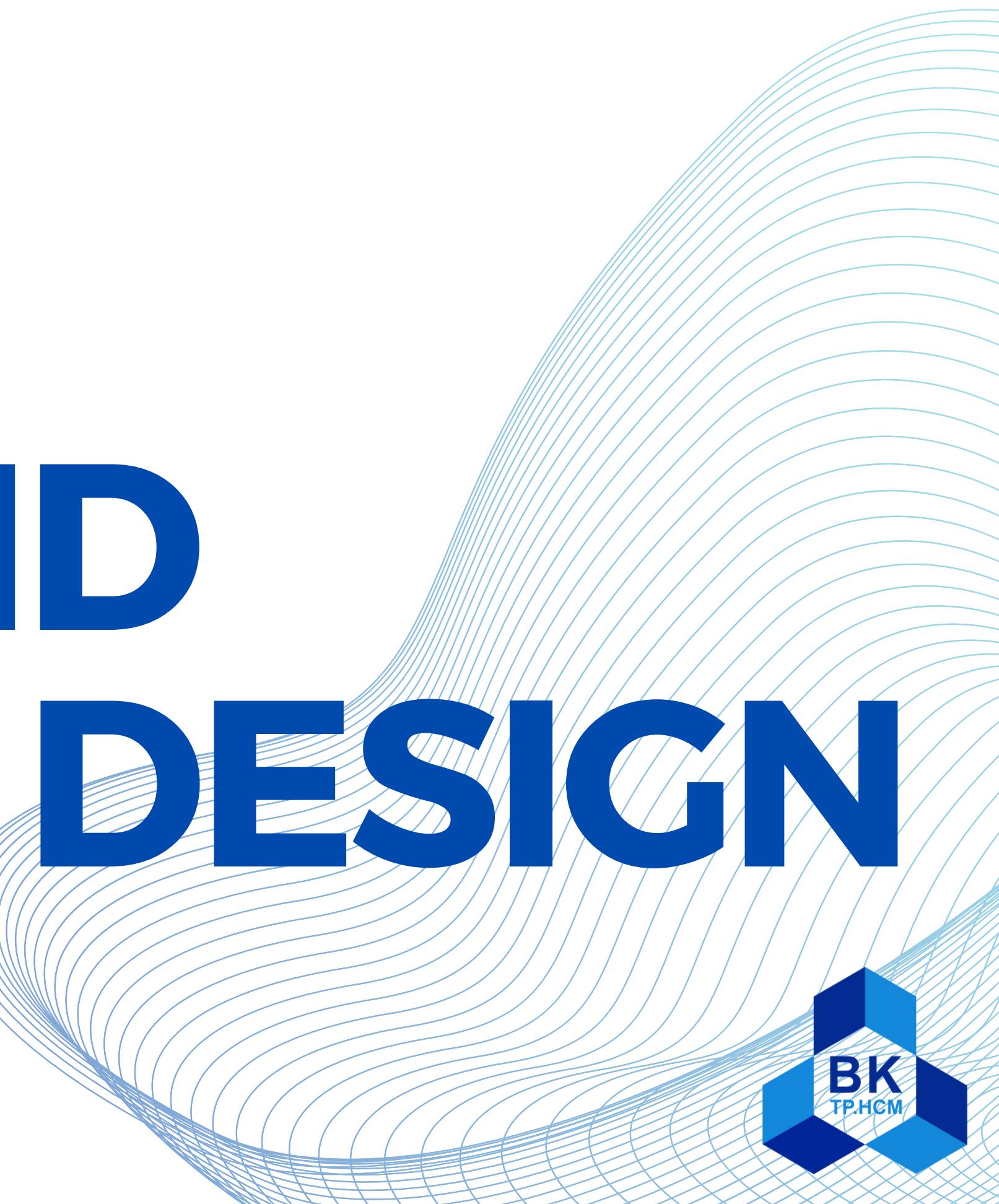


ACTIVITY DIAGRAMS

Apply for Intern Program activity diagram



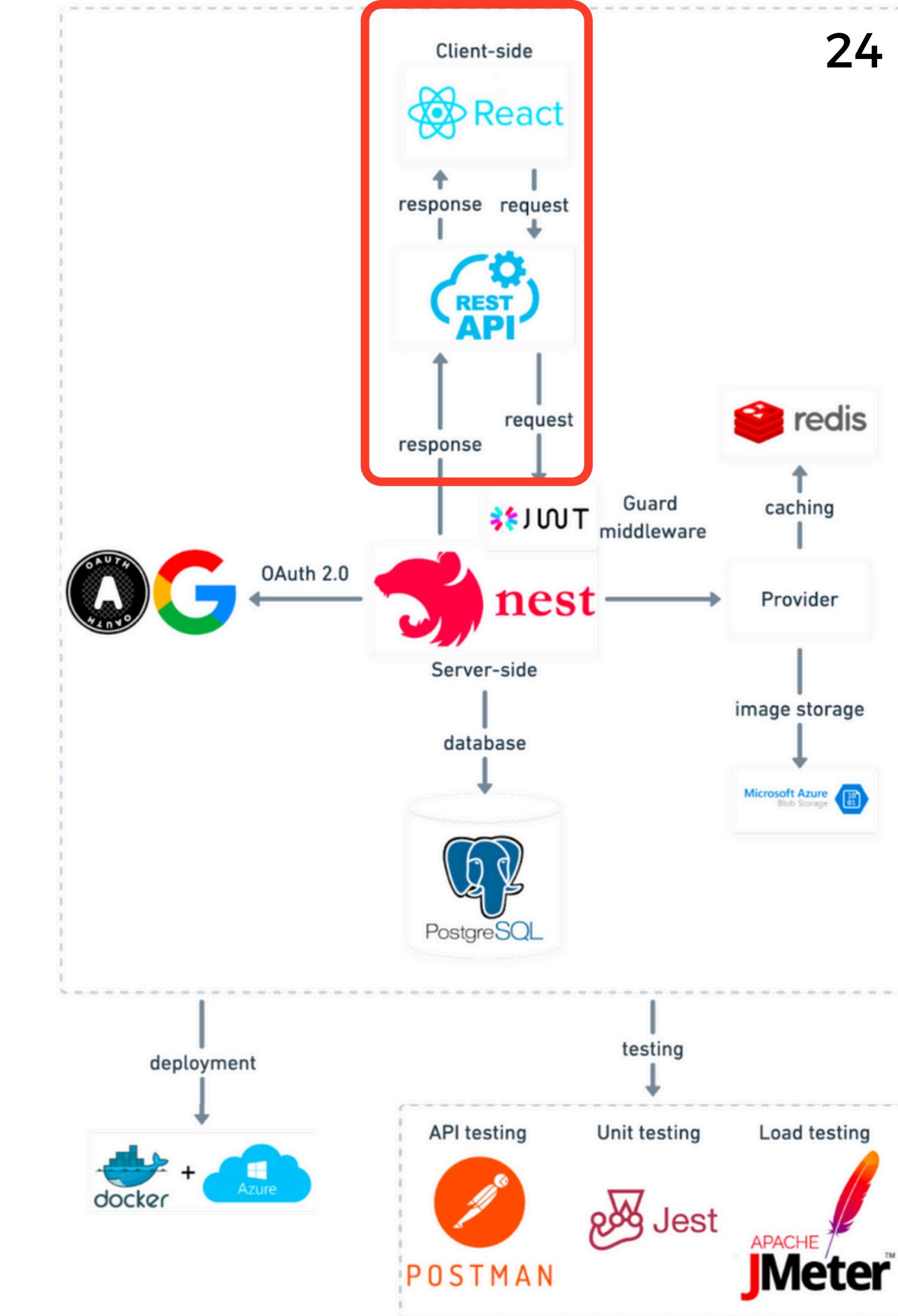
04. **SYSTEM AND DATABASE DESIGN**



SYSTEM DESIGN

Client-side Tier

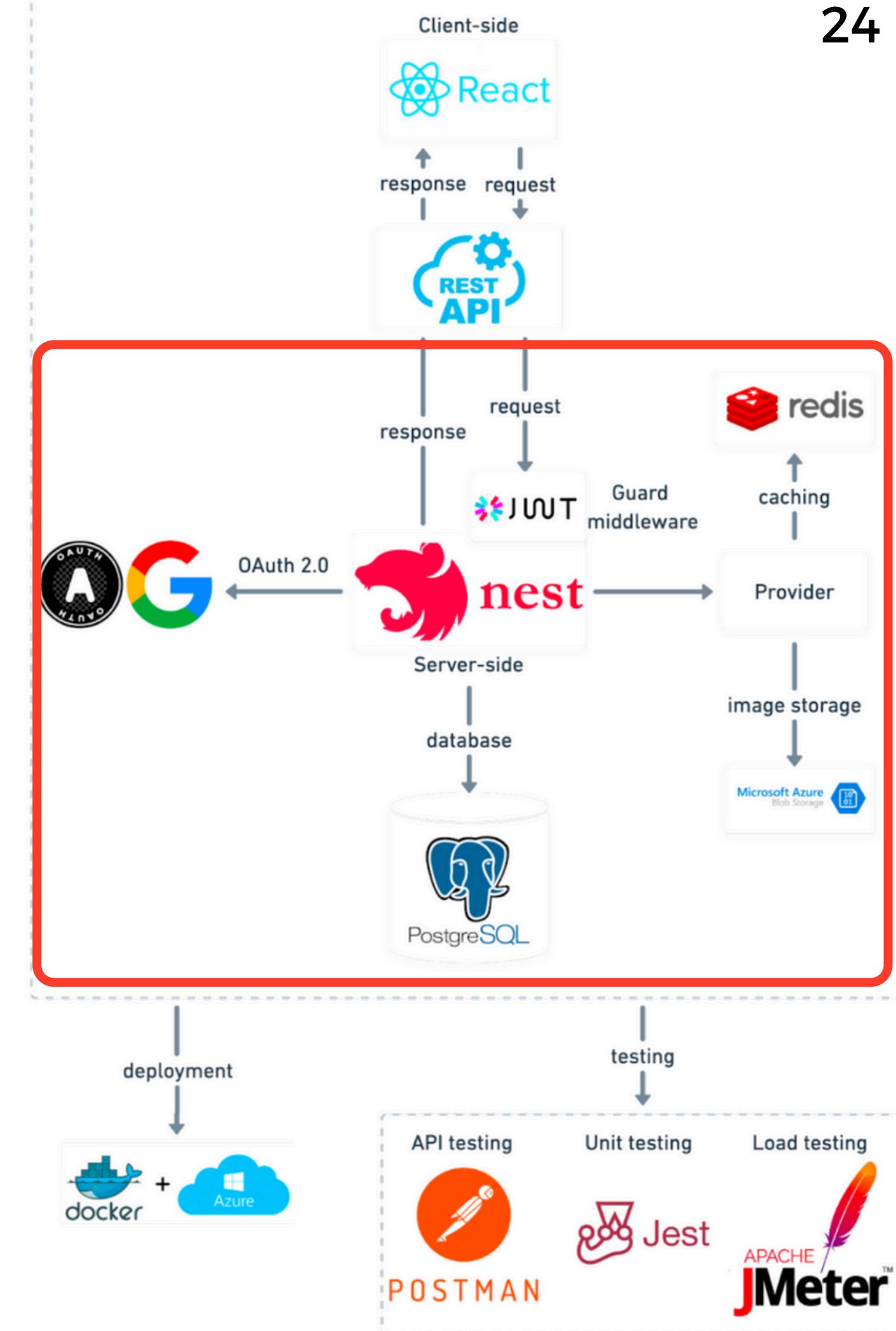
- Components:
 - User Interface: Implements the visual elements and functionality that users interact with, leveraging React components and libraries.
 - Data Access Layer: Handles communication with the server-side tier through the REST API, leveraging HTTP requests.



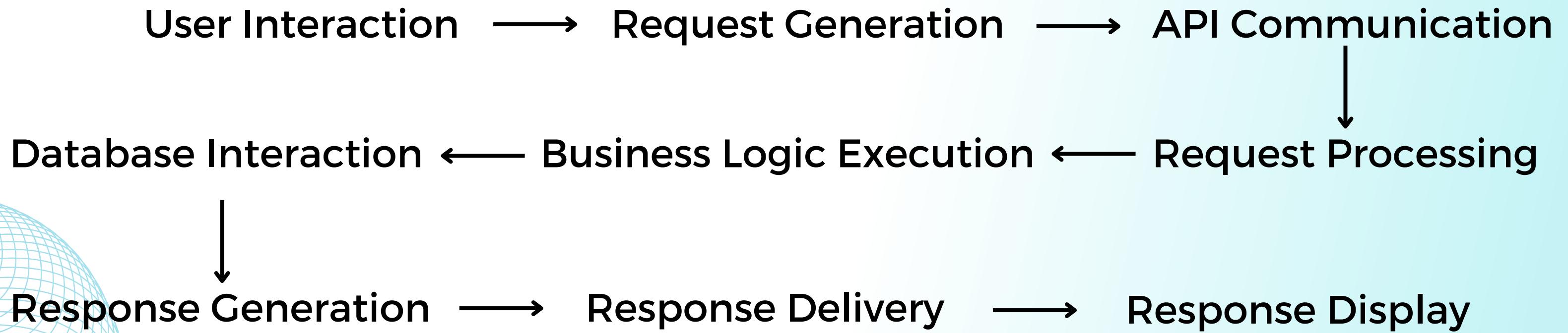
SYSTEM DESIGN

Server-side Tier

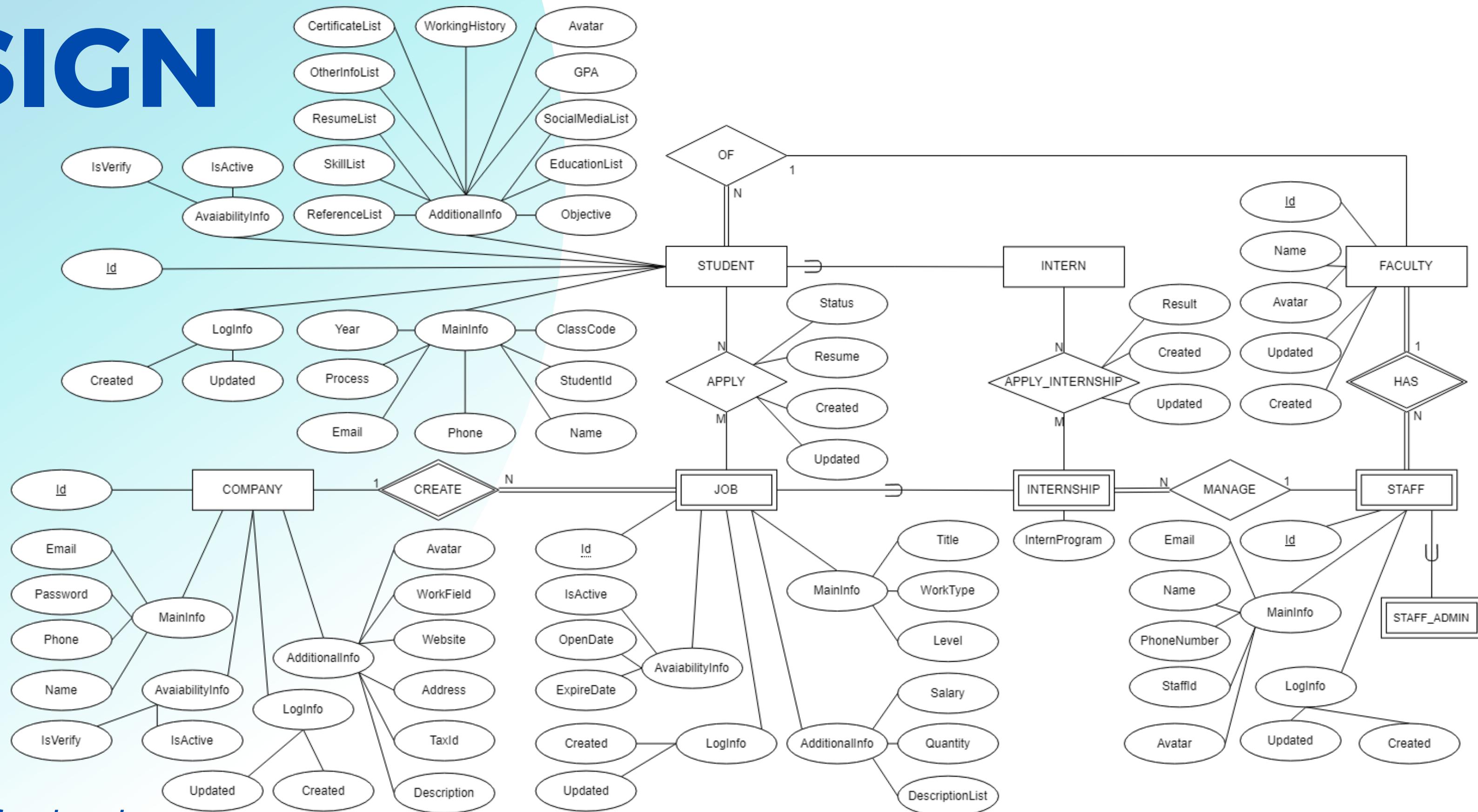
- Components:
 - REST API
 - Data Access Layer
 - Storage with Microsoft Blob Storage
 - Caching with Redis
 - Authentication with Google OAuth



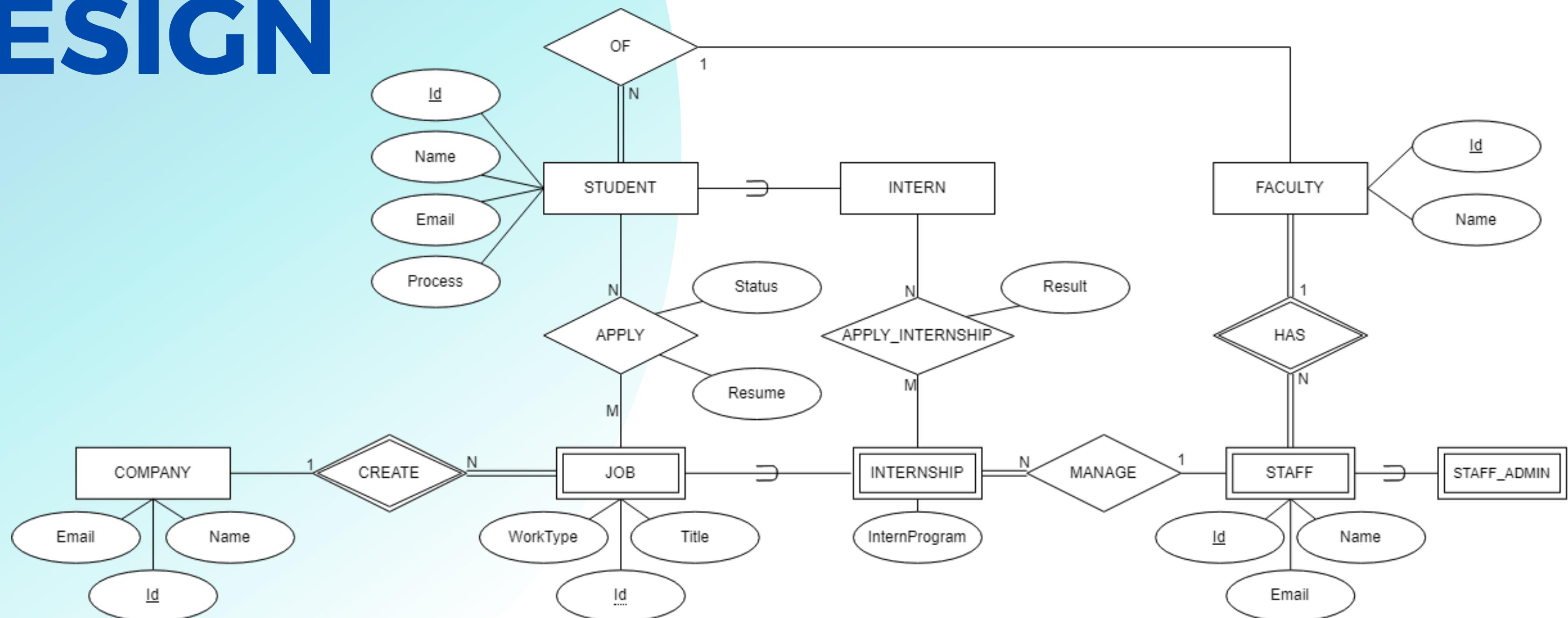
COMPONENT INTERACTIONS



DATABASE DESIGN



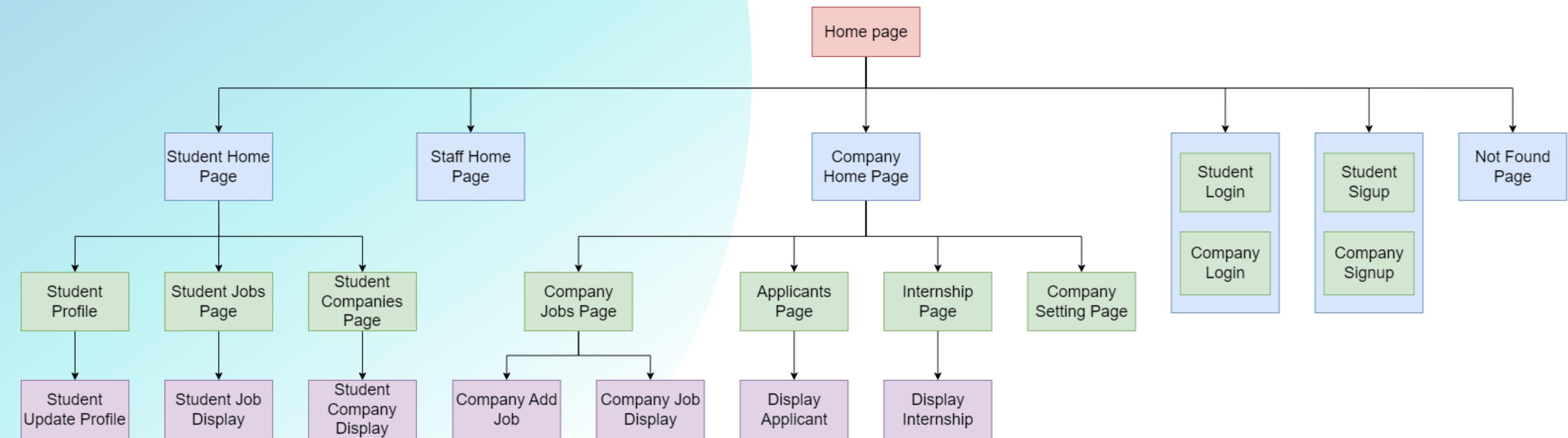
DATABASE DESIGN



DATABASE DESIGN



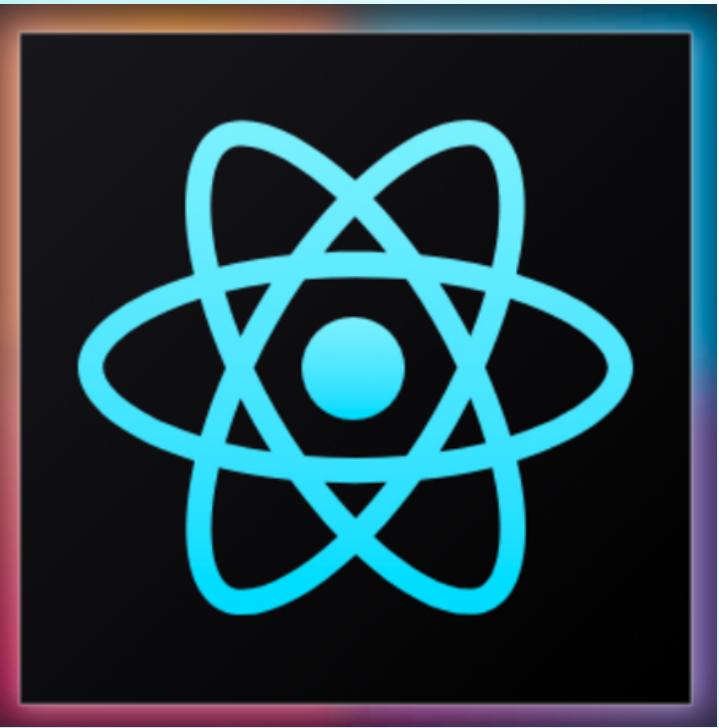
WEBSITE HIERARCHICAL MODEL



05. TECHNOLOGIES



FRONT-END

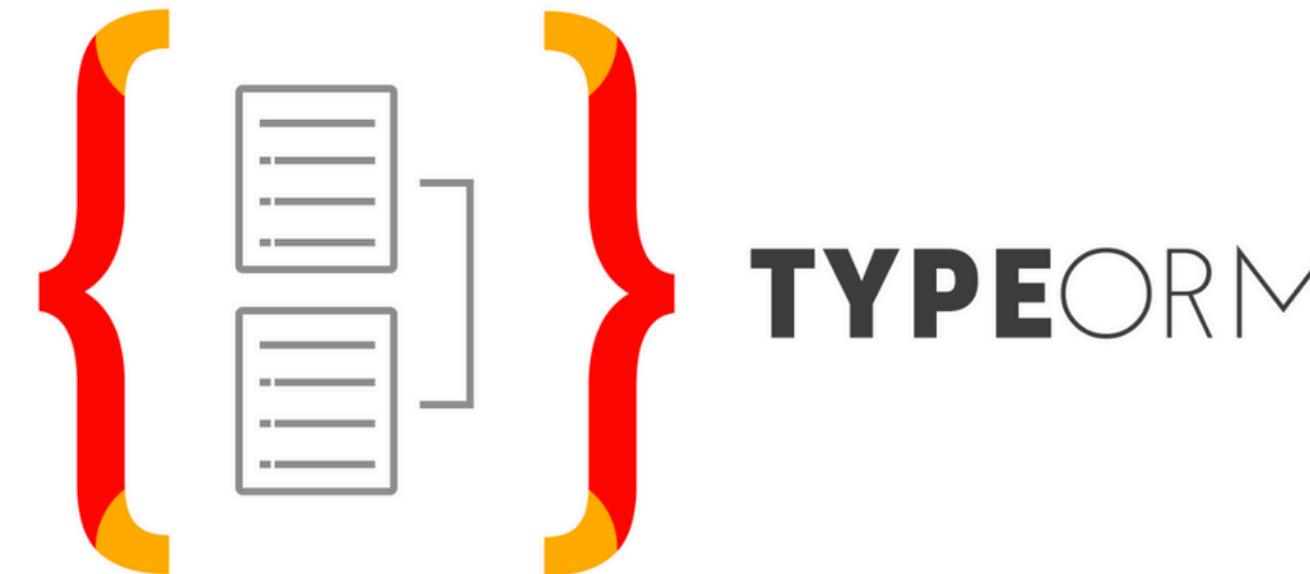


A X I O S

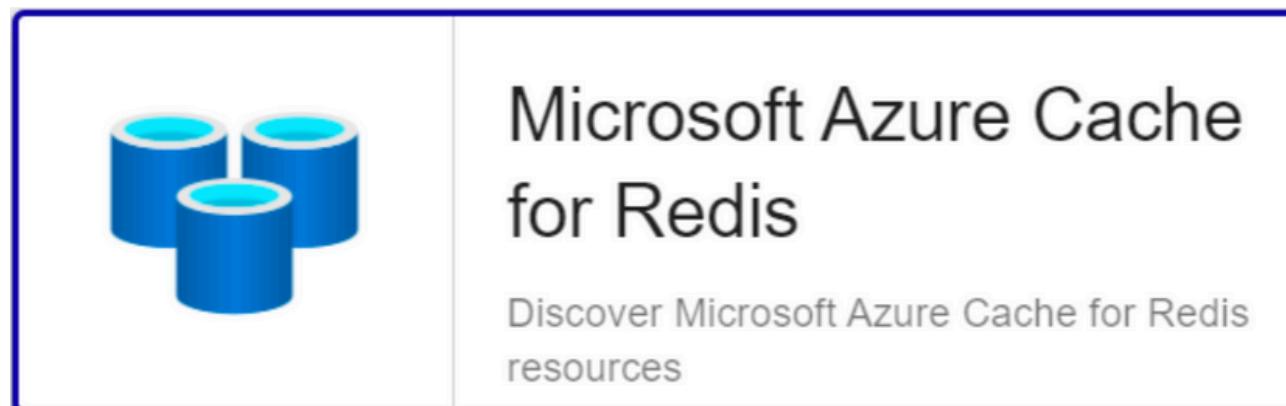
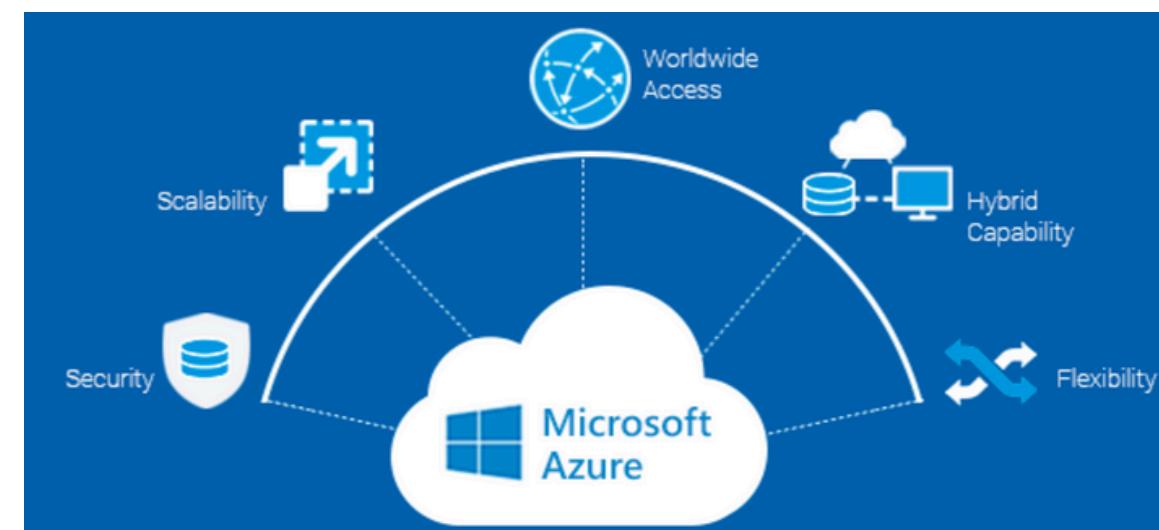
BACK-END AND DATABASE



nest



CLOUD AND DEPLOYMENT



Microsoft Azure
Blob Storage



06. **IMPLEMENT**



PAGES IMPLEMENTATION

linkedout-hcmut.feedme.io.vn/student

The screenshot shows a web browser displaying the student home page. At the top, there is a header with a search bar, a verified badge, and a user email (emches1976@gmail.com). Below the header, there are two main sections: 'Jobs Applied' and 'All company'.

Jobs Applied:

- Aramark**: C Developer. Aramark is a global leader in providing food services, facilities management, and uniform services to a variety of industries including education, healthcare, business, and sports. Education: Bachelor's degree in Computer Science, Software Engineering, or a related field. Develop: Design, develop, and maintain high-quality C++ applications and components, ensuring they meet performance, reliability, and scalability requirements.
- INTERG**: IOS Developer. Entergy Corporation is a Fortune 500 integrated energy company engaged primarily in electric power production and retail distribution operations. With a commitment to delivering safe, reliable, and sustainable energy, Entergy serves millions of customers across the southern United States. Education: Bachelor's degree in Computer Science, Software Engineering, or a related field. Develop: Design, develop, and maintain high-quality iOS applications that meet user needs and business requirements.

All company:

- Avnet
- Twenty-First Century Fox
- Lennar
- Stryker
- ABM Industries
- Raymond James Financial
- Entergy
- Aramark

Student Home Page

PAGES IMPLEMENTATION

 **LinkedOut** HOME JOBS APPLICANTS INTERNSHIPS Aramark 

Students may match you


Mai Hữu Nghĩa
emches1976@gmail.com
0942262713

I am a final-year Computer Science student with a fervent enthusiasm for technology and system architectures. Proficient in programming languages like C++, Python, Javascript, and NodeJS, I bring experience in both Agile/Scrum and Waterfall methodologies. My agility as a learner and my adept problem-solving skills make me a valuable team member, as I relish collaborative efforts towards shared objectives. In my leisure, I delve into emerging technologies and engage in personal coding projects, consistently advancing my skills. I am enthusiastic about the prospect of applying my knowledge to tackle real-world challenges and am eager to thrive in an innovative work environment.

Skills: Automation testing


Le Chi Hung
dat.trantri2002@hcmut.edu.vn
+84987654321

Pursuing the role Cloud Engineer with a focus on using AWS or Microsoft Azure to solve complex business problems. As a third-year Computer Science student, with some knowledge in cloud computing, using AWS or Microsoft Azure.

Skills: Azure, AWS

Company Home Page

PAGES IMPLEMENTATION

 Admin Portal < Dashboard Staff Admin

- Dashboard
- Students
- Company

Action ^

Verify

Job ^

All jobs

Internship ^

Internship Program

Recruitment Result

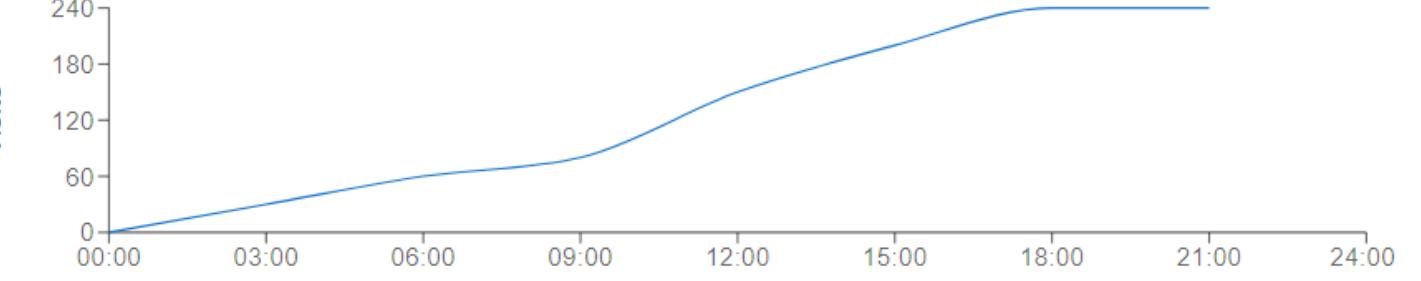
Internship Result

Report

Documents ^

All documents

Today



Time	Visits
00:00	0
03:00	~15
06:00	~45
09:00	~65
12:00	~120
15:00	~180
18:00	~240
21:00	~240
24:00	~240

Students 7

Companies 8

Jobs 13

Pending verification

Student ID	Student Name	Email	Phone Number	Quick action
2052443	TrnTrDt	nartirtadt@hcmut.edu.vn	0987654321	✓ ✕
2052612	Nguyễn Huỳnh Minh Hải	yphg1006@gmail.com	+84942262713	✓ ✕
2052612	Trương Văn Tèo	teo1221@ssgamil.com	+84942262713	✓ ✕

[See all pending verification](#)

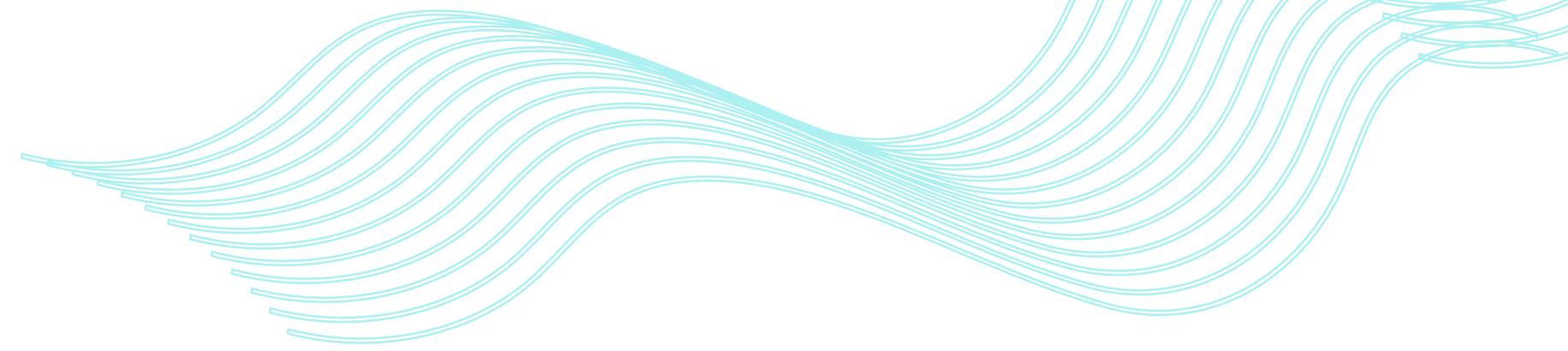
Staff Home Page

ROUTES

Route	Page
/	Home Page
/student	Student Home Page
/student/profile	Student Profile
/student/jobs	Student Jobs Page
/student/company	Student Companies Page
/staff	Staff Home Page
/company	Company Home Page
/company/jobs	Company Jobs Page
/company/jobs/add	Company Add Job
/company/applicant	Applicants Page
/company/internship	Company Internships Page



ENDPOINTS

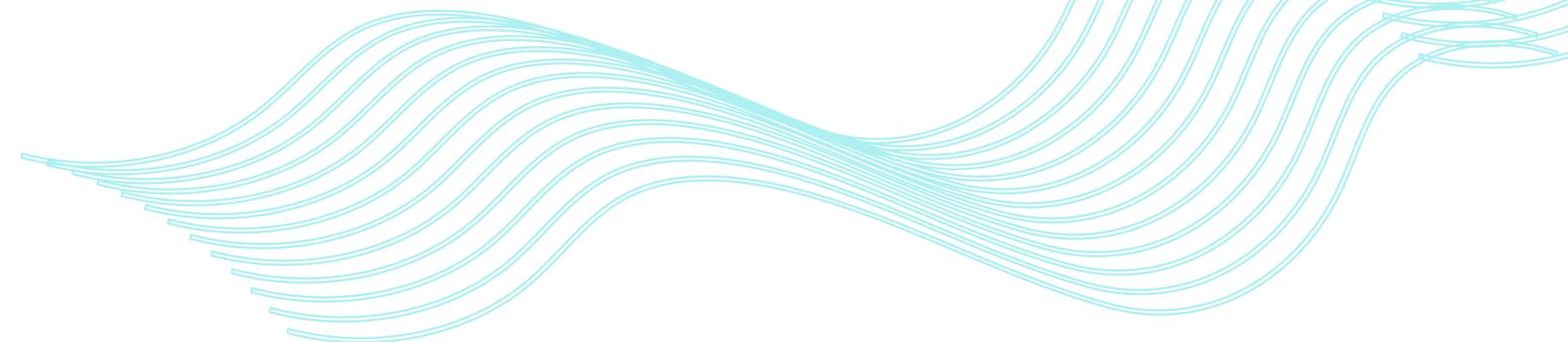


Staff endpoints

Method	Endpoint	Description
GET	api/v1/staff/me	Get current login staff
GET	api/v1/staff/	Get all staff account
GET	api/v1/staff/<str:uid>	Get staff account by user's id
POST	api/v1/staff/	Create a new staff's account
POST	api/v1/staff/login	Login to the staff's account
POST	api/v1/staff/logout	Logout of the staff account
PUT	api/v1/staff/<str:uid>	Edit staff information
DELETE	api/v1/staff/<str:uid>	Delete a staff account



ENDPOINTS



Internship endpoints

Method	Endpoint	Description
GET	api/v1/internship/<str: id>	Get an internship by internship's id
GET	api/v1/internship/candidate/<str: id>	Get all internship by candidate's id
GET	api/v1/internship	Get all internship
POST	api/v1/internship/<str: id>	Apply for an internship
PUT	api/v1/internship/<str: id>	Update for an internship

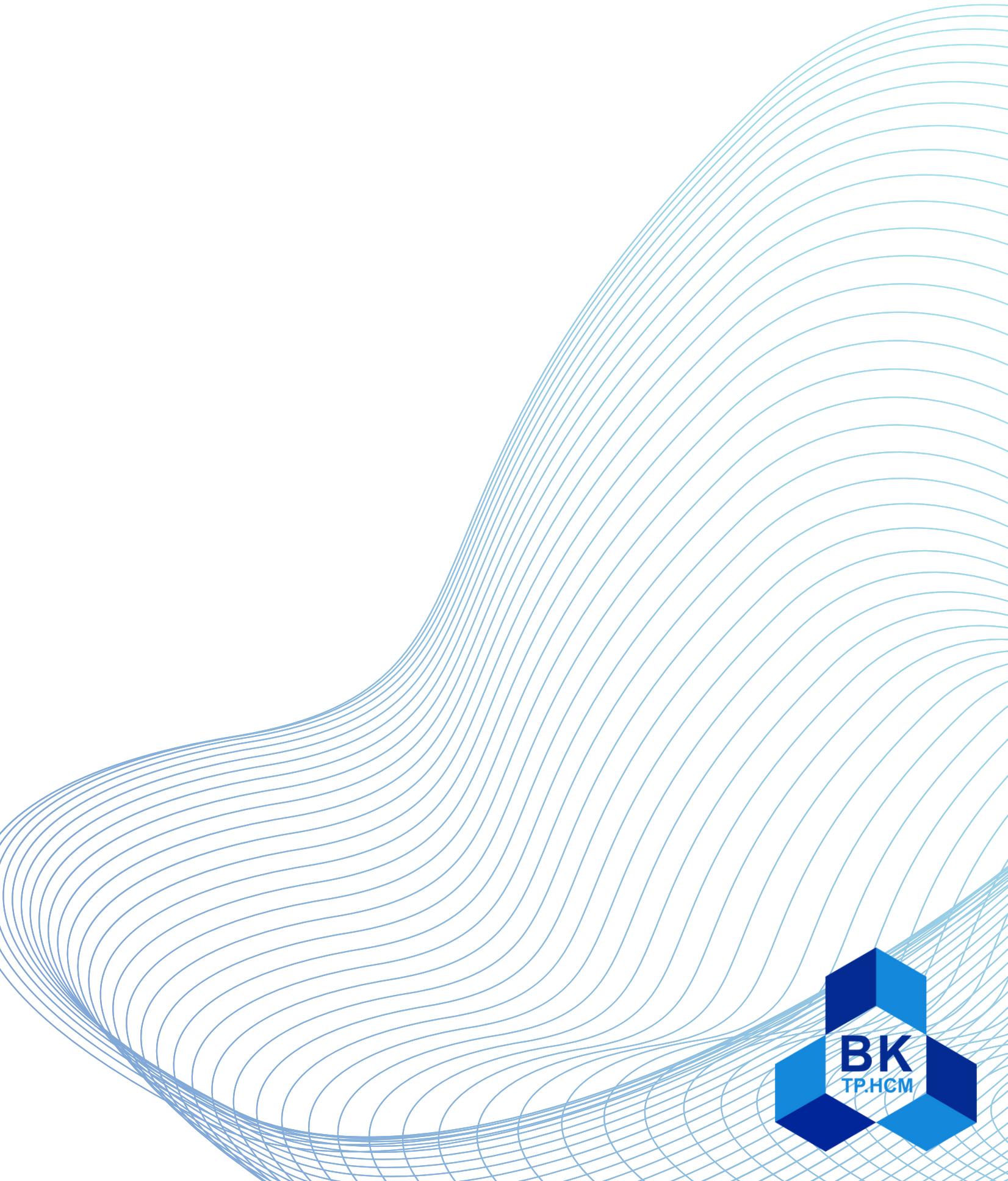


CI/CD BY GITHUB ACTION

The screenshot shows a GitHub Actions run summary for a merge pull request. The top navigation bar includes links for Code, Issues, Pull requests, Actions (which is active), Projects, Wiki, Security, and Insights. The main title is "Merge pull request #32 from TravisMai/main-fix #74". On the left, there's a sidebar with "Summary" and "Jobs" sections, and tabs for "Usage" and "Workflow file". A large callout box highlights the "Run and billable time" section, which displays two jobs: "frontend-deploy" and "backend-deploy" with their respective run times and billable times.

Job	Run time	Billable time
frontend-deploy	1m 28s	2m
backend-deploy	2m 3s	3m
	3m 31s	5m

07. **TESTING**



UNIT TESTING FOR BACKEND

```
> linkedout-backend@0.0.1 test
```

```
> jest
```

```
PASS  test/unit_test/service/jobService.spec.ts (6.742 s)
PASS  test/unit_test/service/internshipService.spec.ts (6.745 s)
PASS  test/unit_test/service/jobApplicantService.spec.ts (6.748 s)
PASS  test/unit_test/controller/authController.spec.ts (6.768 s)
PASS  test/unit_test/service/studentService.spec.ts (7.125 s)
PASS  test/unit_test/controller/jobApplicantsController.spec.ts (7.317 s)
PASS  test/unit_test/controller/jobController.spec.ts (7.492 s)
PASS  test/unit_test/controller/internshipController.spec.ts (7.545 s)
PASS  test/unit_test/controller/studentController.spec.ts (7.716 s)
PASS  test/unit_test/controller/staffController.spec.ts (7.722 s)
PASS  test/unit_test/service/authService.spec.ts
PASS  test/unit_test/service/azureBlobService.spec.ts
PASS  test/unit_test/service/redisService.spec.ts
PASS  test/unit_test/controller/companyController.spec.ts (7.92 s)
PASS  test/unit_test/service/companyService.spec.ts
PASS  test/unit_test/service/appService.spec.ts
PASS  test/unit_test/service/staffService.spec.ts
PASS  test/unit_test/service/databaseInitializeService.spec.ts
PASS  test/unit_test/controller/appController.spec.ts
```

Test Suites: 19 passed, 19 total

Tests: 228 passed, 228 total

Snapshots: 0 total

Time: 8.288 s, estimated 10 s

Ran all test suites.



TEST COVERAGE FOR BACKEND

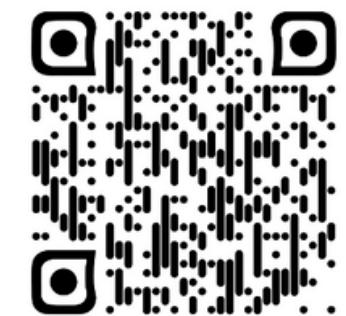
All files

97.2% Statements 938/965

95.34% Branches 246/258

95.48% Functions 127/133

97.18% Lines 896/922



Press *n* or *j* to go to the next uncovered block, *b*, *p* or *k* for the previous block.

Filter:

File		Statements	Branches	Functions	Lines
app	<div style="width: 100%;"><div style="width: 100%;"></div></div>	100%	30/30	100%	8/8
common/service	<div style="width: 100%;"><div style="width: 100%;"></div></div>	100%	29/29	100%	6/6
module/auth	<div style="width: 92.45%;"><div style="width: 100%;"></div></div>	92.45%	49/53	85.71%	8/9
module/company	<div style="width: 98.22%;"><div style="width: 100%;"></div></div>	98.22%	166/169	98.03%	18/19
module/internship	<div style="width: 93.98%;"><div style="width: 100%;"></div></div>	93.98%	125/133	90.24%	15/18
module/job	<div style="width: 94.52%;"><div style="width: 100%;"></div></div>	94.52%	138/146	90.69%	17/18
module/jobApplicants	<div style="width: 100%;"><div style="width: 100%;"></div></div>	100%	87/87	100%	15/15
module/redis	<div style="width: 100%;"><div style="width: 100%;"></div></div>	100%	10/10	100%	4/4
module/staff	<div style="width: 100%;"><div style="width: 100%;"></div></div>	100%	144/144	100%	17/17
module/student	<div style="width: 97.56%;"><div style="width: 100%;"></div></div>	97.56%	160/164	96%	19/19

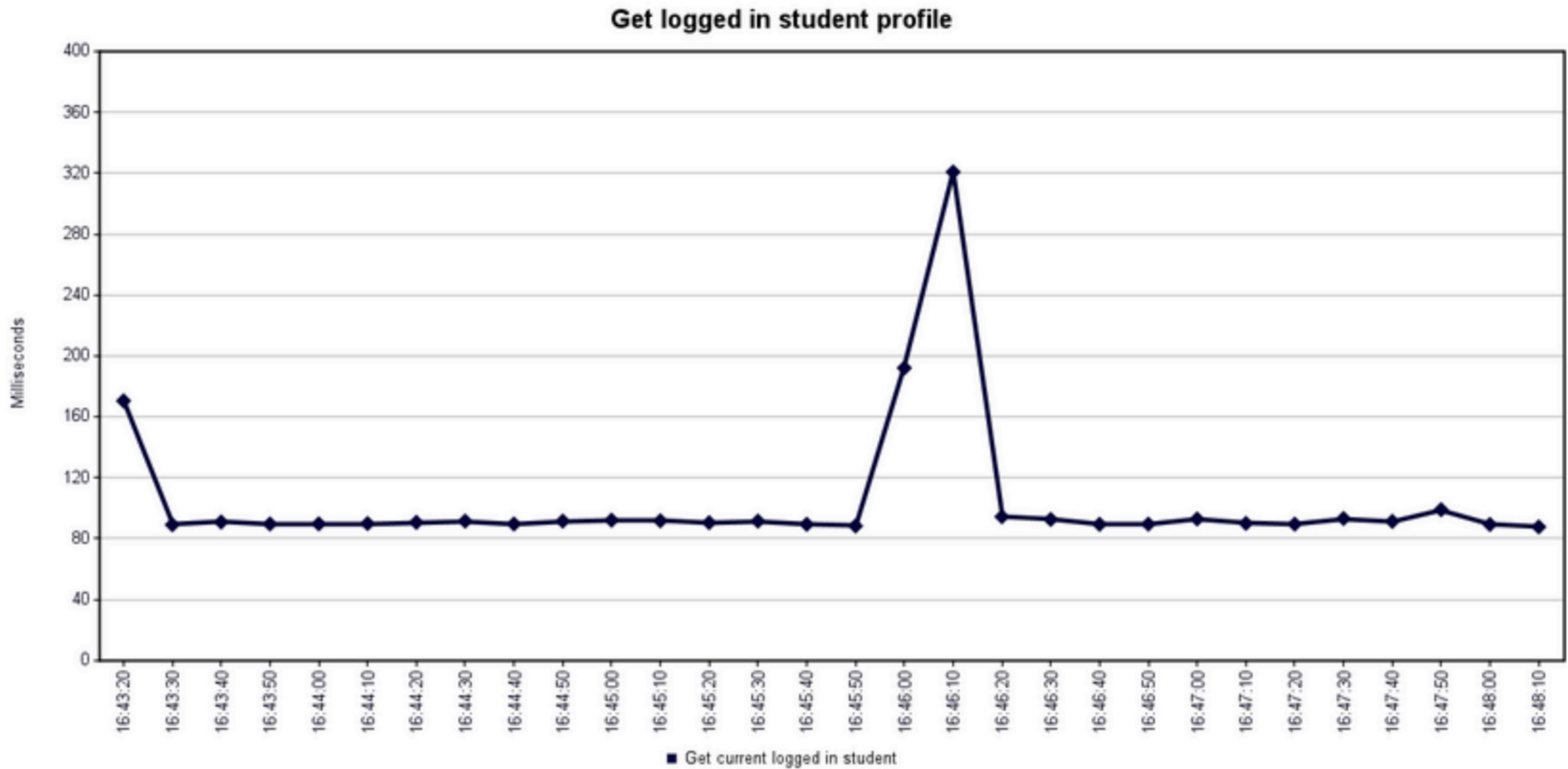


API LOAD TEST BY JMETER

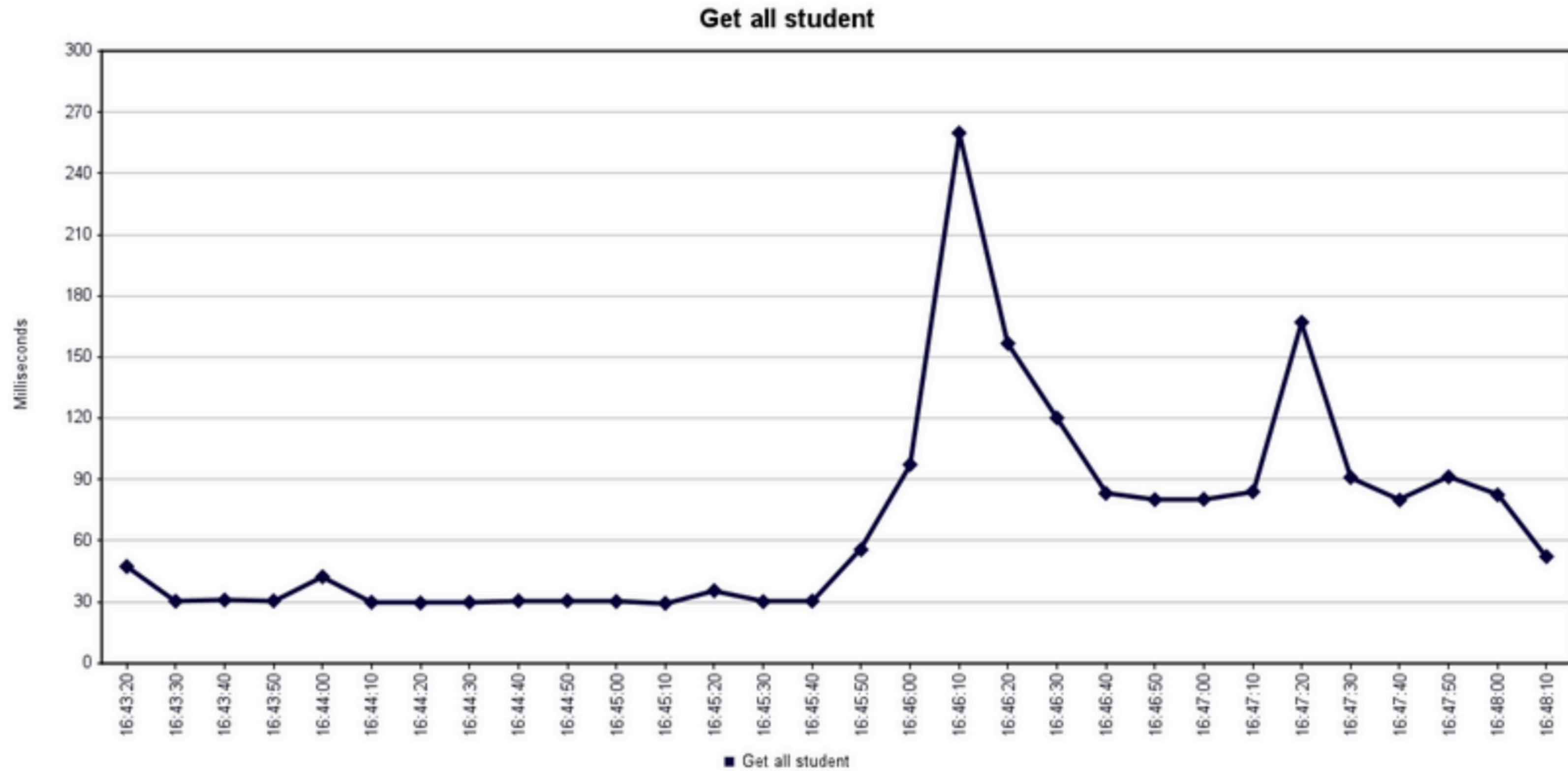
Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
Get current logged in student	300	102	0	2048	129.91	0.00%	1.00304	1.13	0.45	1154
Get all student	300	68	0	937	95.38	0.00%	1.00433	34.04	0.44	34703.5
TOTAL	300	85	0	1492.5	112.645	0	1.003685	17.585	0.445	17928.75



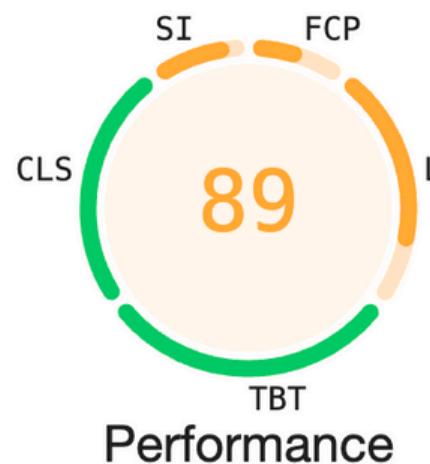
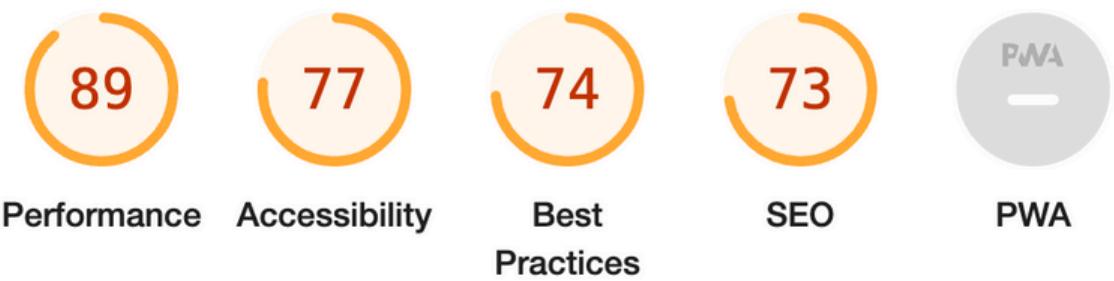
API LOAD TEST BY JMETER



API LOAD TEST BY JMETER



PERFORMANCE TESTING



Values are estimated and may vary. The [performance score](#) is calculated directly from these metrics. [See calculator.](#)

▲ 0–49 ■ 50–89 ● 90–100

METRICS

■ First Contentful Paint

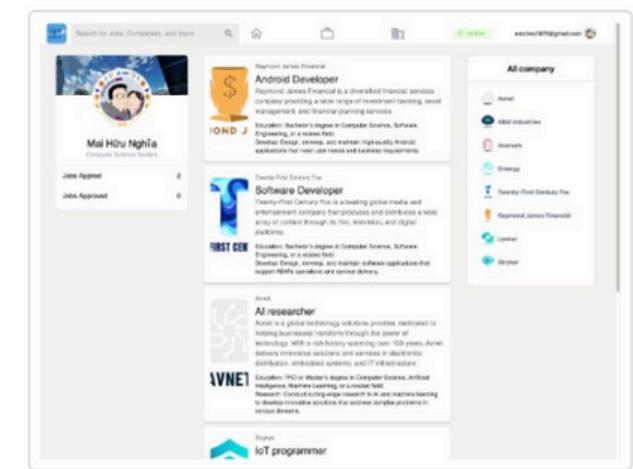
1.5 s

● Total Blocking Time

0 ms

■ Speed Index

1.5 s



Performance

Values are estimated and may vary. The [performance score](#) is calculated directly from these metrics. [See calculator.](#)

▲ 0–49 ■ 50–89 ● 90–100

Expand view

METRICS

■ Largest Contentful Paint

1.6 s

● Cumulative Layout Shift

0.015

▲ First Contentful Paint

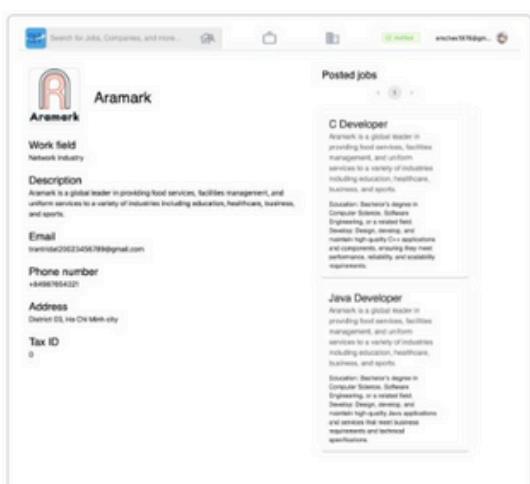
1.8 s

● Total Blocking Time

0 ms

■ Speed Index

1.8 s



Performance

Values are estimated and may vary. The [performance score](#) is calculated directly from these metrics. [See calculator.](#)

▲ 0–49 ■ 50–89 ● 90–100

Expand view

■ Largest Contentful Paint

2.4 s

● Cumulative Layout Shift

0.063



MANUAL TEST FRONTEND

Conducted 52 manual tests for Frontend

Test Case ID	Test Description
STD-01	Verify successful login with valid credentials
STD-02	Verify failed login with invalid credentials
STD-03	Verify successful signup with valid information
STD-04	Verify signup with already existing email address
STD-05	Verify signup with empty mandatory fields
...	...

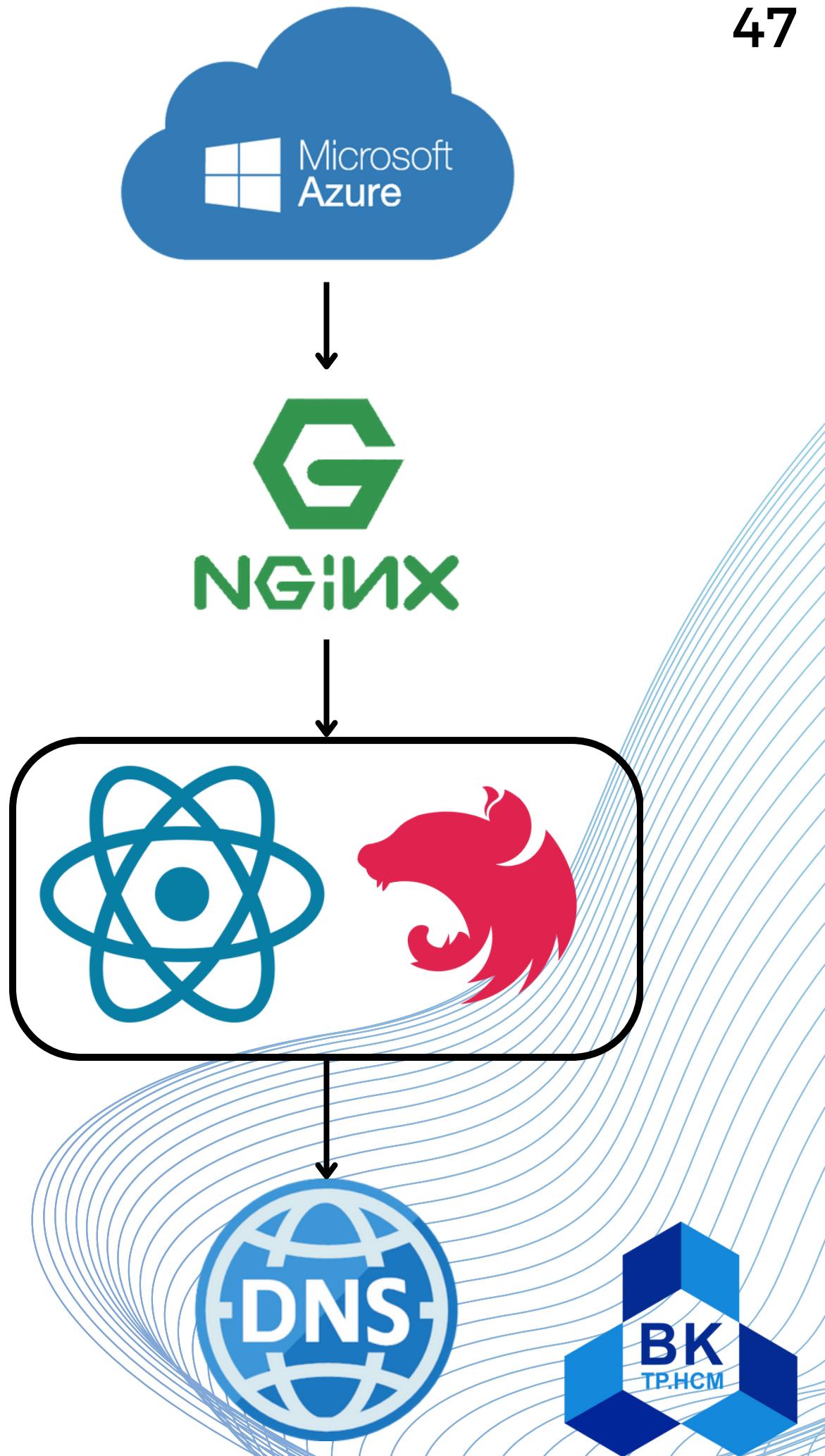


08. **DEPLOYMENT**

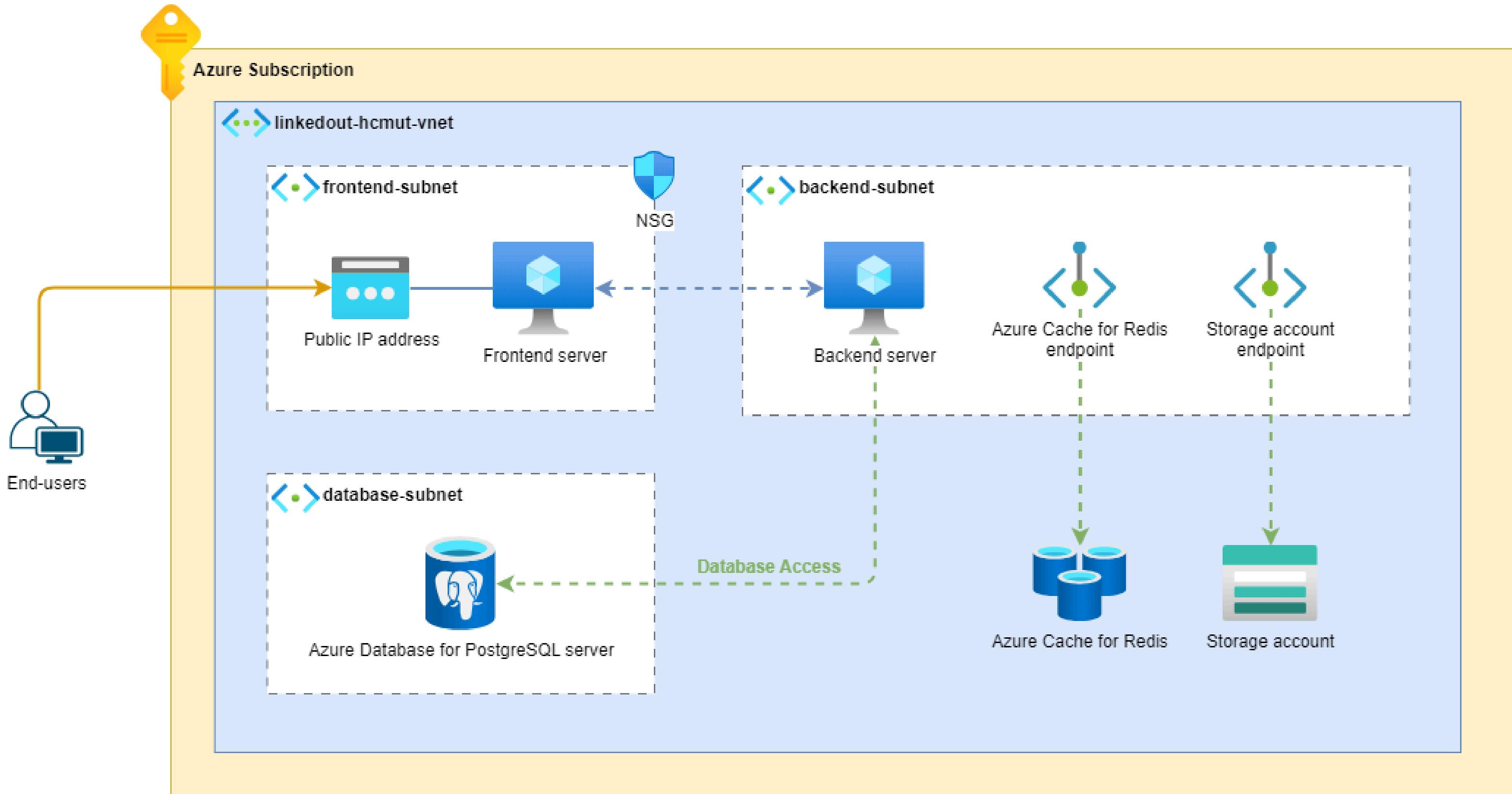


DEPLOYMENT PROCESS

1. Set up Azure resources
2. Configure Nginx server
3. Deploy frontend and backend applications
4. Configure domain name



INFRASTRUCTURE ARCHITECT



DOMAIN NAME SETTING

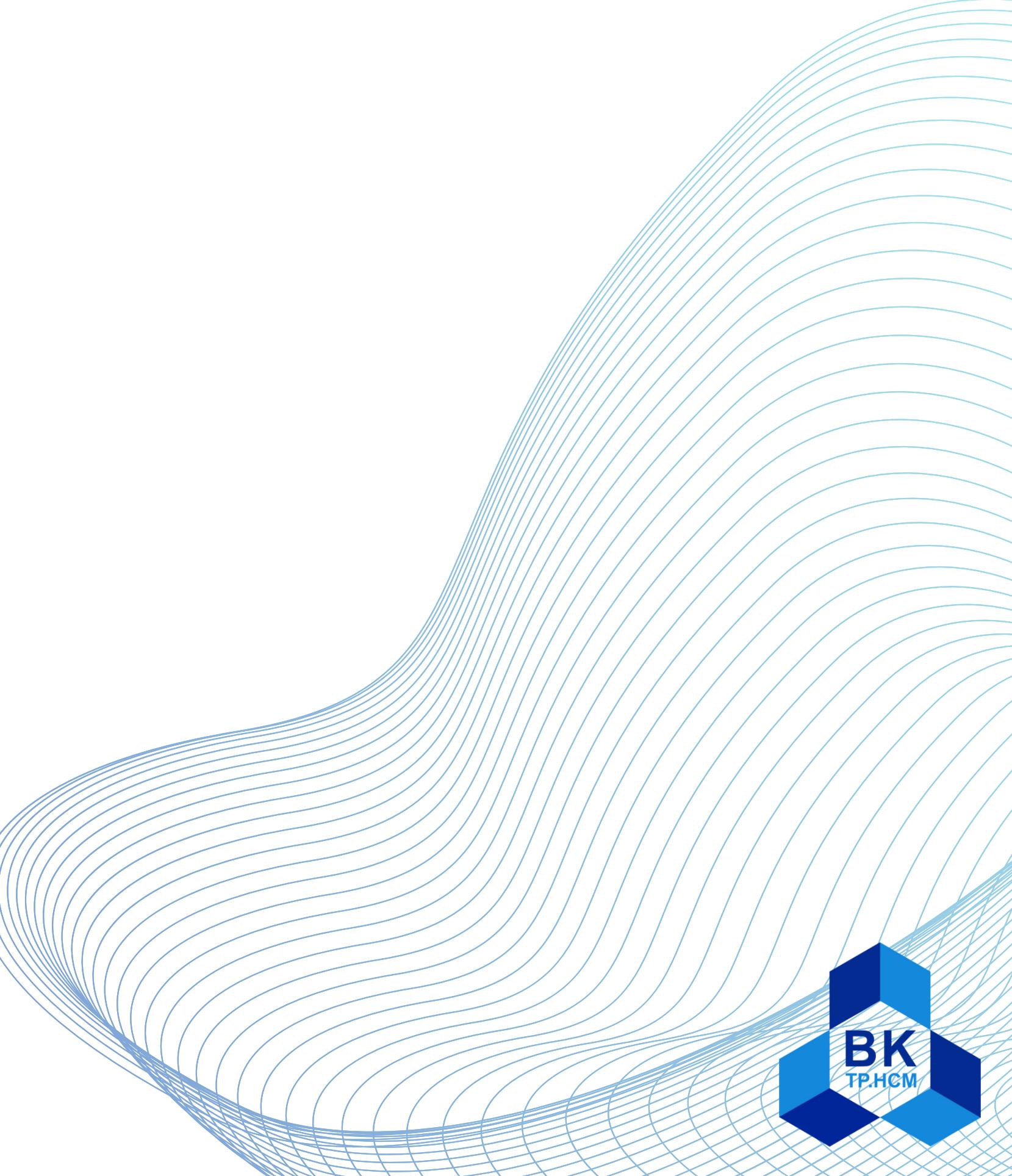
Domain name: feedme.io.vn

Subdomain name: linkedout-hcmut

DNS record

Host	Type	Value	TTL
linkedout-hcmut	A	<public ip address of frontend VM>	3600

09. **DEMO**



10. CONCLUSION



CONCLUSION

What we have archived about

- Investigated current internship processes and systems
- Identified key inefficiencies and improvement areas
- Examined recruitment and management procedures for students, companies, and faculty
- Analyzed existing internship platforms:
 - Faculty of Computer Science and Engineering's site
 - UEH DSA Career site
 - LinkedIn
- Found significant gaps and opportunities in the internship ecosystem
- Proposed a more efficient, user-friendly system to connect students, faculty, and businesses
- Deployed a prototype server to demonstrate reality usage of the system
- Aimed to enhance the overall internship experience for all parties involved



CONCLUSION

To improve and further development

- Optimize and develop more features
- Improve user experience
- Support multi-screen
- Leverage Azure's hosting infrastructure



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THANKS FOR LISTENING

Q&A

