# Team Cerberus Final Report

E6156 - Topics in SW Engineering Management: Cloud Computing Focal point: Cheng-Yu Liu, cl4294 Team Members: Cheng-Yu Liu (cl4294), Tangwen Zhu (tz2570), Christopher Demirjian (cjd2186), Christopher Martin (cam2405), Linh Bui (ltb2128), Beza Amsalu (baa2159), Dariel Espinal (doe2102)

### 1. Demo Video

Link to demo video: https://drive.google.com/drive/folders/1C9A8\_GIPSPmbR2rXQox2W3Bmf0VjTdE-

## 2. Status Report

#### 1. Introduction: Description of your service.

Our cloud-based application NFL FanZone is built and designed for NFL fans' casual interaction and NFL-related information lookup. It offers three features that will enhance fans' NFL experience:

1. NFL searching: fans can find information (eg. player stats, player basic information.) in HTML format or JSON format regarding their favorite players. The microservice also has operations to add/modify/delete players.

2. Team management: management personnel with different clearance levels can modify team/player information to keep fans updated.

Users can access general information about coaches, as well as the team that they coach. Users can use the management person's information with their id.

3. Fan post-game reviews forum: fans can share their insights and comments on the games they watched with other fans in our interactive forum.

#### 2. Personas and Roles: Potential Users and Roles in your service.

There are two personas in our application.

- **Users:** This persona makes up the bulk of accounts registered with our microservices. They're the fans of NFL teams.
- **Management personnel:** These are a minority of accounts registered with our microservices. There are three possible sub-roles for this persona.
  - General manager
  - Head coach
  - Assistant coaches
- 3. Key Features: Main features of your application
  - A fan can:
    - Look up information using NFL searching.
    - Post reactions/comments regarding games. (requires registration)
    - Reply to other people's posts/comments. (requires registration)
    - Rate teams/players/games. (requires registration)
  - A general manager can:
    - Change players' salary information.
    - Make transactions of players trading, adding, and dropping players. (Must be in agreement with the head coach)
  - A head coach can:
    - Set the game/season roster and depth charts (who will start each game, who is a backup, who is on the bench)
    - Reports player injury status (out, doubtful, active)
  - An assistant coach can:
    - input and update player stats (insert and delete information within the Player and Team Statistics Query database using a microservice)

## 4. Domain Model Diagram

Here's a visualization of our data in our microservices. We've indicated what microservice each model belongs to by surrounding the models in the same box.



### 5. Resource Paths

Here are the API Paths for our application for each of the three microservices:

- OpenAPI documentation:
  - $\circ$  /api/docs
- Users:
  - o /api/users
  - o /api/users/{user\_id}/
- Posts:
  - o /api/posts/{user\_id}/{post\_id}
  - /api/posts/author/{user\_id}/{post\_id}
  - o /api/posts/all
  - /api/posts/create/{user\_id}/{post\_id}
  - o /api/posts/edit/{user\_id}/{post\_id}
  - /api/posts/delete/{user\_id}/{post\_id}
- Players:
  - o /api/players
  - o /api/players/{player-id}
  - /api/players/{player-id}/stat
  - /api/players/{player-id}/news
- Stats:
  - /api/stats
  - o /api/stats/{stat-id}/
  - /api/stats/{stat-id}/player
- Team:
  - o /api//team/graphql
- Managements:
  - o /api/v1/{table\_name}/{item\_id}/info
  - o /api/v1/{table\_name}
  - o /api/{table\_name}
  - o /api/{table\_name}/{item\_id} (PUT operation)
  - /api/{table\_name}/{item\_id} (DELETE operation)

### 6. Logical View

Here's a high-level visualization of how each microservice will be deployed and functioning.



### 7. Physical View

Here's how each microservice instance will be deployed on the Cloud Infrastructure.



### 8. Your Codebase

Linked to repositories for each microservice and GitHub Project Board.

<u>Microservice</u>	Github Repo Link
Microservice 1 on EC2 - NFL searching query:	https://github.com/ICAcap/NFLsearching.git
Microservice 2 (Team Management) on GCP App Engine	https://github.com/darieloespinal/Team-Management
Microservice 3 (Post/Review) Docker on EC2	https://github.com/harry881218/microservice_post/tree/master
S3 Frontend	https://github.com/linhtbui/NFLApplicationReact
Aggregator Service:	https://github.com/Beza4598/NFLCompositeSvc
Pub/Sub Lambda function:	https://github.com/cjd2186/Pub-Sub
Infrastructure as a service	https://github.com/harry881218/laaS_terraform
Project Board:	https://github.com/users/cjd2186/projects/1/views/4

#### 9. Links to your deployment

Links to your Frontend deployed on S3 and 3 microservices on different cloud services.

#### S3: Front end for SSO

- Console:<u>https://s3.console.aws.amazon.com/s3/buckets/nflapplicationcloudcomputing?region</u> =us-east-2&tab=objects#
- Frontend deployment: http://nflapplicationcloudcomputing.s3-website.us-east-2.amazonaws.com/

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Amazon S3 ×	Amazon S3 > Buckets > nflapplicationcloudcomputing						<u>ن</u>
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Block Public Access settings for this account Storage Lens	C     □     Copy S3 URI     □     Copy URL     ⊡     Download     Open     ☑     Delete     Actions       Q. Find objects by prefix	Create fold	der	<mark>Ռ Up</mark> < 1	load		
Dashboards	Name     ▲     Type     ▼     Last modified     ▼     Size	▽	Storage of	class		~	
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	Image: November 26, 2023, 21:22:07 (UTC-05:00)	9.4 KB	Standard				
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#### API gateway: Wrapper for our EC2 service with authentication & authorization

• AWS API Gateway:

https://us-east-1.console.aws.amazon.com/apigateway/main/develop/routes?api=nxyk7pmix6 &authorizer=user%20rq3hrq&integration=md0vb1h&region=us-east-1&routes=exslre7

#### • Cognito:

https://us-east-1.console.aws.amazon.com/cognito/v2/idp/user-pools/us-east-1\_x0RaBm8xc/ users?region=us-east-1\_

• API Gateway Deployment: <u>https://nxyk7pmix6.execute-api.us-east-1.amazonaws.com/dev</u>

→ C == us-east-1.consol	e.aws.amazon.com/cognito/v2/idp/user-pools/us-east-1_x0RaBm8xc/users?region=us-east-1	·····································
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er pools	Amazon Cognito > User pools > adminnflcloud adminnflcloud Info	Delete user pool
	User pool overview User pool name adminnflcloud User pool ID User pool ID User ast-1_x0RaBm8xc 3	Created time December 21, 2023 at 14:49 EST Last updated time December 21, 2023 at 16:09 EST
	<ul> <li>▶ Getting started</li> <li>Users Groups Sign-in experience Sign-up experience Messaging App integrat</li> <li>Users (3) Info</li> </ul>	tion User pool properties
	View, edit, and create users in your user pool.         Property:       User name         User name       Q. Search users by attribute         User name       Email address         Email verified       C.	Confirmation status





## 3. Entire Code Zip

Google drive link to zip file:

https://drive.google.com/drive/folders/1wkgbr06B2DrLyduzDghACx3fgwbCKi5t?usp=drive\_link

### New Technologies Since Sprint 2:

#### Middleware

	-2		@app.	midu deware ( http /
4	3	$\sim$	asyno	<pre>c def log_request_and_response_details(request: Request, call_next):</pre>
4	4		r	nethod_name = request.method
4	5		ŀ	bath = request.url.path
4	6			
4	7		;	# Log incoming request details
4	8		١	vith open("log.txt", mode="a") as log:
4	9			content = f"Incoming Request - Method: {method_name}, Path: {path}, Received at: {datetime.now()}\n"
5	0			log.write(content)
5	1			
5	2		\$	<pre># Process the request</pre>
5	3			response = await call_next(request)
5	4			
5	5		\$	# Log outgoing response details
5	6		١	<pre>vith open("log.txt", mode="a") as log:</pre>
5	7			content = f"Outgoing Response – Method: {method_name}, Path: {path}, Status Code: {response.status_code}, Sent at: {date
5	8			log.write(content)
5	9			
6	i0			return response
6	51			
6	i2		API_	<pre>KEY = os.getenv("ADMIN_KEY")</pre>
6	i3			
6	i4		# See	cond Middleware: API key authentication; adds a new persona
6	5		@app	.middleware("http")
6	i6	~	asyno	<pre>c def api_key_authentication(request: Request, call_next):</pre>
6	57		á	api_key = request.headers.get("X-Api-Key")
6	i8			if api_key != API_KEY:
6	i9			raise HTTPException(status_code=401, detail="Unauthorized: Invalid API Key")
7	0			
7	1			response = await call_next(request)
7	2			return response
In	C	om	iing	Request - Method: GET, Path: /docs, Received at: 2023-12-21 22:58:29.500360
Ou	t	go	ing	Response - Method: GET, Path: /docs, Status Code: 200, Sent at: 2023-12-21 22
In	C	om	ing	Request - Method: GET, Path: /openapi.json, Received at: 2023-12-21 22:58:29.
Ou	to	go	ing	Response - Method: GET, Path: /openapi.json, Status Code: 200, Sent at: 2023-
Tn	c	om	ing	Request - Method: GET, Path: /players/4/stat, Received at: 2023-12-21 22:58:3

Incoming Request - Method: GET, Path: /openapi.json, Received at: 2023-12-21 22:58:29.577588 Outgoing Response - Method: GET, Path: /openapi.json, Status Code: 200, Sent at: 2023-12-21 22:58:37.289431 Outgoing Response - Method: GET, Path: /players/4/stat, Received at: 2023-12-21 22:58:37.289431 Outgoing Response - Method: GET, Path: /players/4/stat, Status Code: 200, Sent at: 2023-12-21 22:58:37.302946 Incoming Request - Method: GET, Path: /players/5/stat, Received at: 2023-12-21 22:58:42.27839 Outgoing Response - Method: GET, Path: /players/5/stat, Received at: 2023-12-21 22:58:42.27839 Outgoing Response - Method: GET, Path: /players/5/stat, Status Code: 200, Sent at: 2023-12-21 22:58:42.278572 Incoming Request - Method: POST, Path: /players, Received at: 2023-12-21 22:58:55.924868 Outgoing Response - Method: POST, Path: /players, Status Code: 200, Sent at: 2023-12-21 22:58:66.263095 Incoming Request - Method: PUT, Path: /players/modify/4, Received at: 2023-12-21 22:59:16.778243 Outgoing Response - Method: PUT, Path: /players/modify/4, Status Code: 200, Sent at: 2023-12-21 22:59:16.792836

:58:29.500676

#### • CI/CD

				Q Type		+ • 💿 🖪	<b>e</b> 🕥
<> Code 💿 Issues 👬 Pull requests 🕑 A	ctions 🖽 Projects 🕕 Security 🗠 Insight	ts 🔅 Settings					
<ul> <li>← Test-and-Deploy</li> <li>✓ Merge pull request #2 from Beza4</li> </ul>	1598/ci/cd #2					Re-run all jol	os
G Summary	Triggered via push 7 minutes ago ो Beza4598 pushed	Status Success	Total duration <b>31s</b>	Billable time 1m			
Deploy to EC2 on master branch Run details	test_deploy.yaml						
ି Usage ି ି Workflow file	Deploy to EC2 on master b 208						
							- +
	Annotations 1 warning						ps://_
Files NFLC	ompositeSvc / .github / workflows / test_deploy.ya	ml 🗘					View Runs

₽° master - + Q	Beza4598 cl/cd pipeline	1d17d04 · yesterday 🕚 History
<ul> <li>github/workflows</li> </ul>	Code Blame 37 Lines (38 Loc) - 894 Bytes S Code 55% faster with OltHub Copilot	Raw 🗘 🕹 🖉 🝷 😳
🗋 test_deploy.yaml	1 name: Test-and-Deploy	
>pycache	3 # Trigger deployment only on push to master branch	
B pri pur aut		
	5 push:	
Composite_svc.py	6 branches:	
C composite svc svnc.pv	/ - master	
	•	
C requirements.txt	10 deploy:	
🗅 tests.py	11 name: Deploy to EC2 on master branch push	
	12 runs-on: ubuntu-latest	
	14 steps:	
	15 - name: Checkout the files	
	16 uses: actions/checkout@v2	
	18 - name: Set up Python	
	19 uses: actions/setup-python@v2	
	20 With:	
	21 python-version: "3.9"	
	23 _ name: Install dependencies	
	25 python3 -m pip installupgrade pip	
	26 pip install -r requirements.txt	
	28 - name: Run unit tests	
	29 run: python3 -m unittest tests.py	
	31 - name: Deploy to Server 1	
	32 uses: easingthemes/ssh-deploy@main	
	33 env:	
	34 SSH_PRIVATE_KEY: \${{ secrets.EC2_SSH_KEY }}	
	35 REMOTE_HOST: \${{ secrets.HOST_DNS }}	
	36 REMOTE_USER: \${{ secrets.USERNAME }}	
	3/ IARGEI: \${{ secrets.IARGEI_DIR }}	

• Infrastructure As Code

```
🔰 main.tf
     terraform {
 1
       required_providers {
         aws = {
          source = "hashicorp/aws"
          version = "~> 4.16"
        }
     required_version = ">= 1.2.0"
     provider "aws" {
     region = "us-east-2"
     resource "aws_instance" "app_server" {
       ami = "ami-037358fd4ec7033a4"
       instance_type = "t2.micro"
       tags = {
       Name = "ExampleAppServerInstance"
       }
     }
```

• GraphQL

GraphiQL Prettify History						
<pre>1 # Welcome to GraphQL # GraphQL is an in-browser tool for writing, validating, and # testing GraphQL queries. # 5 # 5 # 5 # 5 # 5 # 5 # 5 # 5 # 5 #</pre>	<pre>' data": {     ''data": {         ''data": {             ''data": {</pre>					