

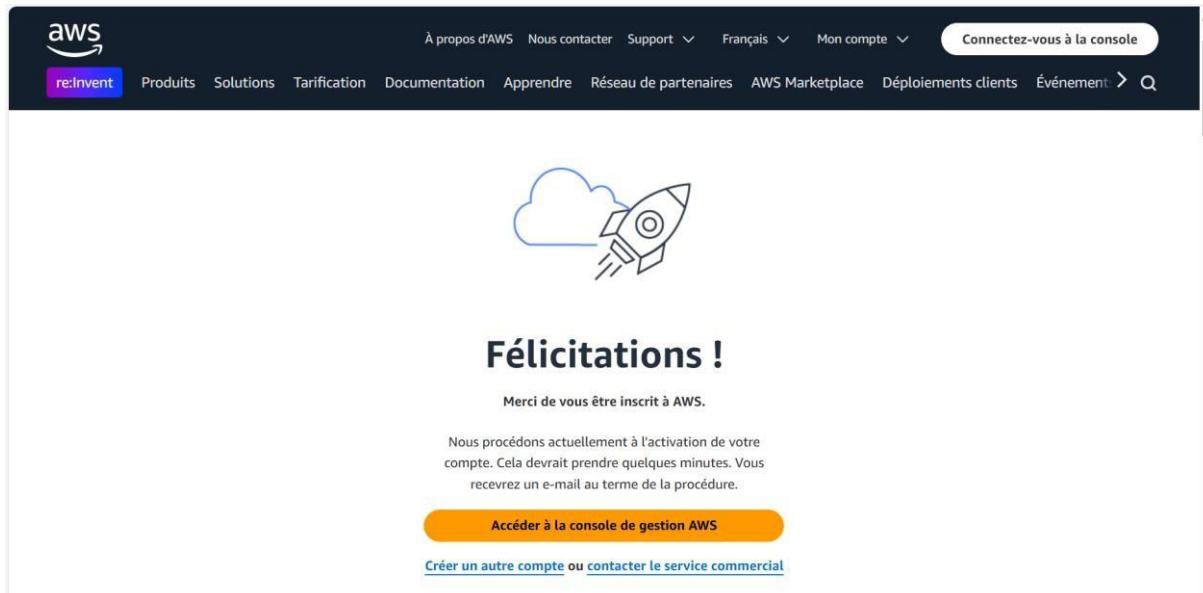
Auteur : Fode Mangane

Guide de déploiement d'une application web sur AWS EC2

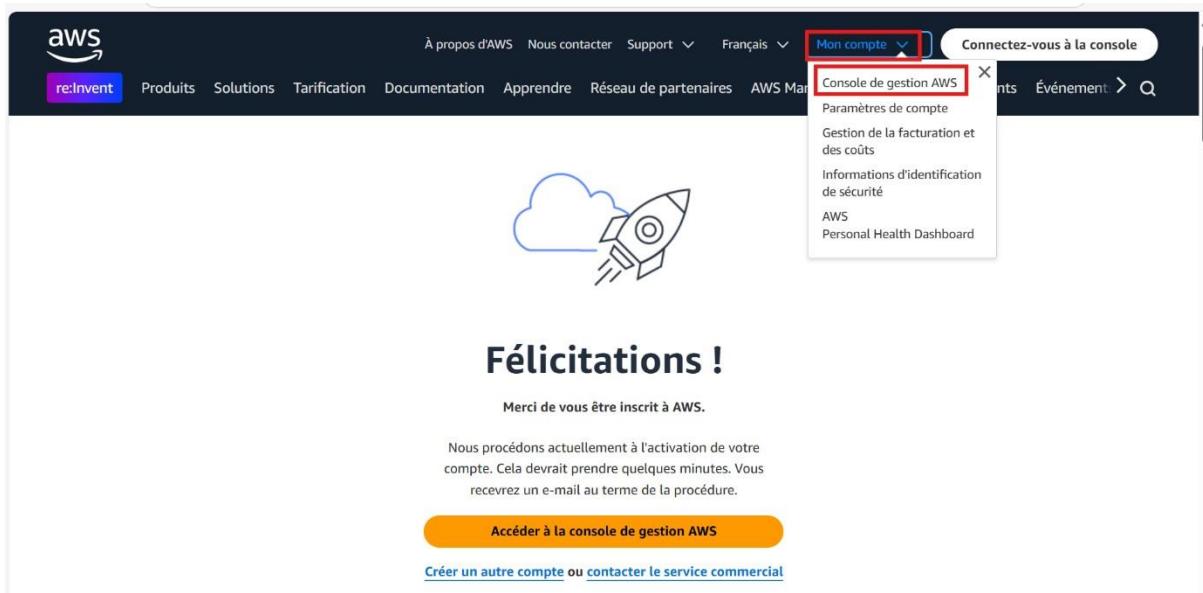
I. Accès et configuration initiale :

1. Connexion à AWS Console :

Pour commencer le déploiement, nous devons accéder à la console AWS :



Après avoir créé votre compte AWS, connectez-vous à la console principale :



Selectionnez le service EC2 depuis le menu des services AWS :

The screenshot shows the AWS CloudFront dashboard. At the top, there is a search bar with the placeholder "instances". Below the search bar, there are two main sections: "Récemment visité" (Recently visited) and "Applications". The "Applications" section shows a message: "Aucune application. Commencez par créer une application." with a "Créer une application" button. The bottom of the screen features a navigation bar with links for CloudShell, Commentaires, and various AWS services.

This screenshot is identical to the one above, but it includes a red arrow pointing from the left margin towards the "EC2" service entry in the search results list. The "EC2" entry is highlighted with a red box.

2. Configuration de l'instance :

Cliquez sur le bouton "Lancer une instance" pour démarrer le processus de création :

The screenshot shows the AWS EC2 Global View dashboard. On the left sidebar, under the 'Instances' section, there is a red box around the 'Lancer une instance' button. The main panel displays various EC2 resources with their counts: Instances (0), Capacity Reservations (0), Groupes Auto Scaling (0), Groupes de sécurité (1), Instances (0), Paires de clés (0), Adresses IP Elastic (0), Équilibreurs de charge (0), Groupes de placement (0), Hôtes dédiés (0), Instantanés (0), and Volumes (0). To the right, there are sections for 'Niveau EC2 gratuit' (Free tier), 'Offres de niveau EC2 gratuit en cours d'utilisation' (Free tier offers in use), 'Prévisions de fin de mois' (Month end forecasts), 'Dépasse le niveau gratuit' (Exceeding the free tier), and 'Attributs du compte' (Account attributes). A large orange button labeled 'Lancer une instance' is highlighted with a red box.

Sélectionnez l'image Ubuntu Server, qui offre un excellent support pour les applications web :

The screenshot shows the 'Launch an instance' wizard. In the 'Images d'applications et de systèmes d'exploitation (Amazon Machine Image)' section, the 'Ubuntu' option is selected and highlighted with a red box. Below it, the 'Ubuntu Server 24.04 LTS (HVM), SSD Volume Type' AMI is shown with its details: ami-0e2c8caa4b6378d8c (64 bits (x86)) / ami-0932fb546ea84d48 (64 bits (Arm)). The 'Explorer plus d'AMI' link is also visible. On the right side, there is a 'Récapitulatif' (Summary) section where the user has selected '1' instance. The summary includes: 'Image logicielle (AMI)' (Canonical, Ubuntu, 24.04, amd64...en savoir plus), 'Type de serveur virtuel (type d'instance)' (t2.micro), 'Pare-feu (groupe de sécurité)' (Nouveau groupe de sécurité), and 'Stockage (volumes)' (1 volume(s) - 8 GiO). At the bottom, there are buttons for 'Annuler' (Cancel), 'Lancer l'instance' (Launch instance), and 'Code de prévisualisation' (Preview code).

Créez une nouvelle paire de clés pour sécuriser l'accès à votre instance :

The screenshot shows the AWS EC2 'Launch an instance' wizard. In the 'Paire de clés (connexion)' section, a key pair named 'Fode Mangane' is selected, highlighted with a red box. A button labeled 'Créer une paire de clés' is visible next to it. The 'Paramètres réseau' section shows a single VPC network. On the right, the 'Récapitulatif' panel shows the instance configuration: Canonical, Ubuntu 24.04 AMI, t2.micro instance type, and a new security group. Buttons for 'Annuler', 'Lancer l'instance', and 'Code de prévisualisation' are at the bottom.

Configurez les règles de sécurité en autorisant le trafic HTTP et HTTPS :

The screenshot shows the AWS EC2 'Launch an instance' wizard. In the 'Attribuer automatiquement l'adresse IP publique' section, the 'Autoriser le trafic HTTPS depuis l'Internet' checkbox is checked and highlighted with a red box. Below it, a note about allowing traffic from 0.0.0.0/0 is shown. The 'Récapitulatif' panel on the right shows the same configuration as the previous screenshot, including the newly created security group. Buttons for 'Annuler', 'Lancer l'instance', and 'Code de prévisualisation' are at the bottom.

Vérifiez vos paramètres et lancez l'instance :

The screenshot shows the AWS EC2 'Launch an instance' configuration interface. On the left, under 'Configurer le stockage', there's a note about EBS volumes and a 'Ajouter un volume' button. Below it, a note says 'Actualiser pour afficher les informations de sauvegarde'. A section for 'Systèmes de fichiers' is shown with a 'Modifier' button. On the right, the 'Récapitulatif' panel shows '1' instance selected. It includes fields for 'Image logicielle (AMI)', 'Type de serveur virtuel (type d'instance)' (set to t2.micro), 'Pare-feu (groupe de sécurité)' (set to 'Nouveau groupe de sécurité'), and 'Stockage (volumes)' (set to 1 volume(s) - 8 Gio). A large orange button labeled 'Lancer l'instance' is highlighted with a red box. At the bottom, there are links for CloudShell, Commentaires, and various legal notices.

3. Connexion à l'instance :

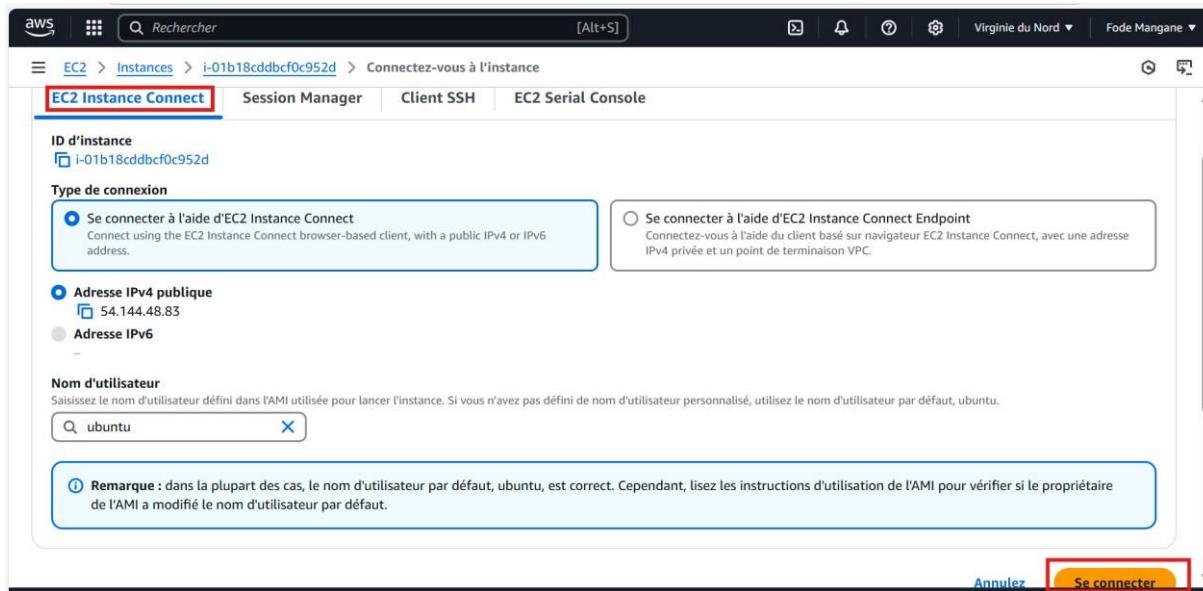
Attendez que l'instance soit en état "running"

The screenshot shows the AWS EC2 instance launch progress bar. A blue header bar indicates the task is 'Lancement d'une instance' and 'Début du lancement'. A progress bar shows 80% completion. Below the bar, a message reads: 'Veuillez patienter pendant que nous lançons votre instance. Ne fermez pas votre navigateur pendant ce chargement.' A red arrow points to the 'Détails' link next to the progress bar.

A screenshot of the AWS EC2 "Launch an instance" success page. At the top, there's a green banner with the text "Succès" and "Lancement de l'instance réussi (i-01b18cddbcf0c952d)". Below the banner, there's a link to "Journal de lancement". A red arrow points to the success message banner. The main content area is titled "Étapes suivantes" and contains three sections: "Créer des alertes de facturation et d'utilisation de l'offre gratuite", "Connectez-vous à votre instance", and "Connecter une base de données RDS". The "Connectez-vous à votre instance" section has a red box around the "Connectez-vous à l'instance" button.

Utilisez EC2 Instance Connect ou SSH pour accéder à votre instance :

A screenshot of the "Connectez-vous à l'instance" page for instance i-01b18cddbcf0c952d. The "Client SSH" tab is highlighted with a red box. Below it, there's an "ID d'instance" field containing "i-01b18cddbcf0c952d" and a list of connection steps. An example command "ssh -i "Fode Mangane.pem" ubuntu@ec2-54-144-48-83.compute-1.amazonaws.com" is shown in a red box, along with a note about the user name. The page also includes tabs for "EC2 Instance Connect", "Session Manager", and "EC2 Serial Console".



II. Installation et configuration :

1. Préparation du serveur :

```
aws | Rechercher [Alt+S] | Virginie du Nord | Fode Mangane
Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-29-45:~$
```

i-01b18cddbcf0c952d
PublicIPs: 54.144.48.83 PrivateIPs: 172.31.29.45

Mettez à jour les paquets du système :

```
aws | Rechercher [Alt+S] | Virginie du Nord | Fode Mangane
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-29-45:~$ sudo apt update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://security.ubuntu.com/ubuntu noble/main amd64 Packages [572 kB]
```

Installez les dépendances nécessaires :

```
Building dependency tree... Done
Reading state information... Done
58 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-172-31-29-45:~$ sudo apt install python3-pip python3-dev nginx
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
binutils binutils-common binutils-x86-64-linux-gnu build-essential bztp2 cpp cpp-13 cpp-13-x86-64-linux-gnu cpp-x86-64-linux-gnu
dpkg-dev fakeroot fontconfig-config fonts-dejavu-core fonts-dejavu-mono g++ g++-13 g++-13-x86-64-linux-gnu g++-x86-64-linux-gnu gcc
gcc-13 gcc-13-base gcc-13-x86-64-linux-gnu gcc-x86-64-linux-gnu javascript-common libalgorithm-diff-perl libalgorithm-diff-xs-perl
libalgorithm-memoize perl libncurses5 libatomic libbinutils libc-dev libc-dev-tools libcurl4 libcurl4-openssl-dev libexpat1-dev
```

2. Configuration de MySQL :

Installez et sécurisez MySQL

```
No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-172-31-29-45:~$ sudo apt install mysql-server mysql-client
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
libcgifast-perl libcgipm-perl libclone-perl libenctype-perl libevent-pthreads-2.1-7t64 libfcgi-bin libfcgi-perl libfcgi0t64
libhtml-parser-perl libhttp-tunnel-perl libhttp-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl
liblwp-mediatypes-perl libmemcached2 libprotoobuf-lite32t64 libtime-utc-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils
mysql-client-8.0 mysql-client-core-8.0 mysql-common mysql-server-8.0 mysql-server-core-8.0
Suggested packages:
libdata-dump-perl libipc-sharedcache-perl libio-compress-brotli-perl libbusiness-isbn-perl libregexp-ipv6-perl libwww-perl mailx tinyca
```

Installez PHP et ses extensions

```
ubuntu@ip-172-31-29-45:~$ sudo apt install apache2 mysql-server php libapache2-mod-php php-mysql php-curl php-gd php-json php-mbstring php-xml unzip -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
mysql-server is already the newest version (8.0.40-0ubuntu0.24.04.1).
The following additional packages will be installed:
apache2-bin apache2-data apache2-utils libapache2-mod-php8.3 libapr1t64 libaprutil1-db-dbd-sqlite3 libaprutil1-ldap libaprutil1t64
liblua5.4-0 php-common php8.3 php8.3-cli php8.3-common php8.3-curl php8.3-gd php8.3-mbstring php8.3-mysql php8.3-opcache
php8.3-readline php8.3-xml ssl-cert
```

Activez les services au démarrage

```
ubuntu@ip-172-31-29-45:~$ sudo systemctl start apache2
sudo systemctl enable apache2
sudo systemctl start mysql
sudo systemctl enable mysql
```

Configurez la base de données

```
ubuntu@ip-172-31-29-45:~$ sudo mysql -u root -p
Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.40-0ubuntu0.24.04.1 (Ubuntu)

Copyright (c) 2000, 2024, Oracle and/or its affiliates.

Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE portal_db;
Query OK, 1 row affected (0.05 sec)

mysql> CREATE USER 'portal_user'@'localhost' IDENTIFIED BY 'votre mot de passe fort';
Query OK, 0 rows affected (0.05 sec)

mysql> GRANT ALL PRIVILEGES ON portal_db.* TO 'portal_user'@'localhost';
Query OK, 0 rows affected (0.00 sec)

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.01 sec)

mysql> EXIT;
Bye
```

3. Déploiement de l'application :

Transférez et configurez votre application

```
cd /var/www/html/
ubuntu@ip-172-31-29-45:/var/www/html$ sudo nano /var/www/html/index.html
ubuntu@ip-172-31-29-45:/var/www/html$ sudo vim /var/www/html/index.html
ubuntu@ip-172-31-29-45:/var/www/html$ sudo vim /var/www/html/index.html
ubuntu@ip-172-31-29-45:/var/www/html$ sudo mkdir /var/www/html/css
sudo vim /var/www/html/css/style.css
ubuntu@ip-172-31-29-45:/var/www/html$ sudo mkdir /var/www/html/backend
sudo vim /var/www/html/backend/submit.php
ubuntu@ip-172-31-29-45:/var/www/html$ sudo vim /var/www/html/schema.sql
```

Le contenu des fichiers nécessaires à la création de l'application web se trouve ci-dessous :

Pour (index.html):

```
<!DOCTYPE html>

<html lang='fr'>
<head>

<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
<title>Portail Professionnel - Fode Mangane</title>
<link rel="stylesheet" href="css/style.css">

</head>
<body>

<nav class="navbar">
<div class="logo">FM</div>
<ul class="nav-links">
<li><a href="#accueil">Accueil</a></li>
<li><a href="#services">Services</a></li>
<li><a href="#contact">Contact</a></li>
</ul>
</nav>

<header id="accueil" class="hero">
<div class="hero-content">
<h1>Bienvenue sur mon Portail Professionnel</h1>
<p>Solutions innovantes pour vos projets</p>
<button class="cta-button">Commencer</button>
</div>
</header>
```

```

<main>

<section id="services" class="services">
    <h2>Nos Services</h2>
    <div class="services-grid">
        <div class="service-card">
            <h3>Service 1</h3>
            <p>Description du service 1</p>
        </div>
        <div class="service-card">
            <h3>Service 2</h3>
            <p>Description du service 2</p>
        </div>
        <div class="service-card">
            <h3>Service 3</h3>
            <p>Description du service 3</p>
        </div>
    </div>
</section>

<section id="contact" class="contact">
    <h2>Contacbez-nous</h2>
    <div class="contact-info">
        <p>Email: Fodemangane@gmail.com</p>
        <p>Téléphone: +221 787388292</p>
        <p>Nom: Fode Mangane</p>
    </div>
    <form id="contact-form" action="backend/submit.php" method="POST">
        <input type="text" name="name" placeholder="Votre nom" required>
        <input type="email" name="email" placeholder="Votre email" required>
        <textarea name="message" placeholder="Votre message" required></textarea>
    </form>
</section>

```

```

<button type="submit" class="submit-button">Envoyer</button>
</form>
</section>
</main>

<footer>
<p>&copy; 2024 Fode Mangane. Tous droits réservés.</p>
</footer>

<script src='js/main.js'></script>
</body>
</html>

```

Pour (style.css) :

```

:root {
    --primary-color: #2c3e50;
    --secondary-color: #3498db;
    --accent-color: #e74c3c;
    --text-color: #333;
    --background-color: #f5f6fa;
}

```

```

* {    margin: 0;
padding: 0;    box-sizing:
border-box; }

```

```

body {

```

```
font-family: 'Arial', sans-serif; line-
height: 1.6; color: var(--text-color);
background-color: var(--background-color);
}
```

```
.navbar {
background-color: var(--primary-color);
padding: 1rem 2rem; display: flex;
justify-content: space-between; align-
items: center; position: fixed; width:
100%; z-index: 1000;
}
```

```
.logo {
color: white; font-size:
1.5rem; font-
weight: bold;
}
```

```
.nav-links {
display: flex; list-
style: none;
}
```

```
.nav-links li a {
color: white; text-decoration:
none; padding: 0.5rem
1rem; transition: color
0.3s ease;
}
```

```
.nav-links li a:hover { color:  
var(--secondary-color);  
}  
  
.hero { height:  
100vh;  
background: linear-gradient(rgba(0,0,0,0.7), rgba(0,0,0,0.7)),  
url('images/background.jpg'); background-size: cover;  
background-position: center; display: flex; align-items:  
center; justify-content: center; text-align: center; color:  
white;  
}  
  
.hero-content {  
padding: 2rem;  
}  
  
.hero h1 { font-  
size: 3rem;  
margin-bottom:  
1rem;  
}  
  
.cta-button {  
background-color: var(--secondary-color);  
color: white; padding: 1rem 2rem;  
border: none; border-radius: 5px; font-  
size: 1.1rem; cursor: pointer;  
transition: background-color 0.3s ease;  
}
```

```
.cta-button:hover { background-color: #2980b9; }

.services { padding: 5rem 2rem; }

.services h2 { text-align: center; margin-bottom: 3rem; }

.services-grid {
  display: grid;
  grid-template-columns: repeat(auto-fit, minmax(250px, 1fr)); gap: 2rem; padding: 0 2rem;
}

.service-card { background-color: white; padding: 2rem; border-radius: 10px; box-shadow: 0 4px 6px rgba(0,0,0,0.1); transition: transform 0.3s ease; }

.service-card:hover {
  transform: translateY(-5px);
}
```

```
.contact { padding: 5rem  
2rem; background-color:  
white;  
}
```

```
.contact h2 { text-  
align: center; margin-  
bottom: 3rem;  
}
```

```
.contact-info { text-  
align: center; margin-  
bottom: 2rem;  
}
```

```
#contact-form { max-  
width: 600px; margin:  
0 auto; display: flex;  
flex-direction: column;  
gap: 1rem;  
}
```

```
#contact-form input,  
#contact-form textarea {  
padding: 0.8rem; border:  
1px solid #ddd; border-  
radius: 5px;  
}
```

```
#contact-form textarea {  
height: 150px;  resize:  
vertical;  
}  
  
.submit-button {  
background-color: var(--secondary-color);  
color: white;  padding: 1rem;  border:  
none;  border-radius: 5px;  cursor:  
pointer;  transition: background-color 0.3s  
ease;  
}
```

```
.submit-button:hover {  background-  
color: #2980b9;  
}
```

```
footer {  
background-color: var(--primary-color);  
color: white;  text-align: center;  
padding: 1rem;  
}
```

```
@media (max-width: 768px) {  
.hero h1 {  
font-size: 2rem;  
}
```

```
.nav-links {  
display: none;  
}
```

```
.services-grid {      grid-template-  
columns: 1fr;  
}  
}
```

Pour (submit.php) :

```
<?php  
// Paramètres de connexion à la base de données $host = 'localhost';  
$dbname = 'portal_db';  
$username = 'your_username';  
$password = 'your_password';  
  
try {  
    // Connexion à la base de données  
    $pdo = new PDO("mysql:host=$host;dbname=$dbname", $username, $password);  
    $pdo->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);  
  
    // Récupération des données du formulaire  
    $name = $_POST['name'];  
    $email = $_POST['email'];  
    $message = $_POST['message'];  
    $date = date('Y-m-d H:i:s');  
  
    // Préparation de la requête SQL  
    $stmt = $pdo->prepare("INSERT INTO messages (name, email, message, created_at)  
VALUES (?, ?, ?, ?)");  
  
    // Exécution de la requête  
    $stmt->execute([$name, $email, $message, $date]);
```

```

// Envoi d'un email de notification

$to = "Fodemangane@gmail.com";
$subject = "Nouveau message du portail web";
$email_content = "Nom: $name\nEmail: $email\nMessage: $message";
$headers = "From: $email";

mail($to, $subject, $email_content, $headers);

// Réponse en JSON

header('Content-Type: application/json');
echo json_encode(['success' => true, 'message' => 'Message envoyé avec succès']);

} catch(PDOException $e) {

// Gestion des erreurs

header('Content-Type: application/json');
echo json_encode(['success' => false, 'message' => 'Erreur lors de l\'envoi du message']);
}

?>

```

Pour (schema.sql) :

-- Crédation de la base de données

CREATE DATABASE IF NOT EXISTS portal_db;

USE portal_db;

-- Table des messages

CREATE TABLE messages (

id INT AUTO_INCREMENT PRIMARY KEY,
name VARCHAR(100) NOT NULL, email
CHAR(255) NOT NULL, message TEXT

```

NOT NULL,    created_at DATETIME NOT
NULL,
status ENUM('new', 'read', 'replied') DEFAULT 'new'
 $\text{);}$ 

-- Table des utilisateurs (pour une future authentification) CREATE
TABLE users (
    id INT AUTO_INCREMENT PRIMARY KEY,
    username VARCHAR(50) NOT NULL UNIQUE,
    email VARCHAR(255) NOT NULL UNIQUE,
    password_hash VARCHAR(255) NOT NULL,
    created_at DATETIME NOT NULL,    last_login
    DATETIME,
    is_admin BOOLEAN DEFAULT FALSE
);

```

```

-- Index pour optimiser les recherches
CREATE INDEX idx_messages_email ON messages(email);
CREATE INDEX idx_messages_status ON messages(status);
CREATE INDEX idx_messages_created_at ON messages(created_at);

```

Après les priviléges nécessaires

```

ubuntu@ip-172-31-29-45:/var/www/html$ sudo mysql -u root -p portal_db < /var/www/html/schema.sql
Enter password:
ubuntu@ip-172-31-29-45:/var/www/html$ sudo chown -R www-data:www-data /var/www/html/
sudo chmod -R 755 /var/www/html/

```

III. Vérification et tests

1. Vérification du serveur Apache :

Vérifiez que Apache fonctionne correctement

```
ubuntu@ip-172-31-29-45:/var/www/html$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/apache2.service; enabled; preset: enabled)
   Active: active (running) since Wed 2024-12-25 04:50:56 UTC; 15s ago
     Docs: man:apache2(8)
           https://httpd.apache.org/docs/2.4/
  Process: 22795 ExecStart=/usr/sbin/apachectl start (code=exited, status=0/SUCCESS)
 Main PID: 22798 (apache2)
    Tasks: 6 (limit: 1130)
   Memory: 13.5M (peak: 13.7M)
      CPU: 55ms
     CGroup: /system.slice/apache2.service
             └─22798 /usr/sbin/apache2 -k start
                  ├─22800 /usr/sbin/apache2 -k start
                  ├─22801 /usr/sbin/apache2 -k start
                  ├─22802 /usr/sbin/apache2 -k start
                  ├─22803 /usr/sbin/apache2 -k start
                  └─22804 /usr/sbin/apache2 -k start

Dec 25 04:50:56 ip-172-31-29-45 systemd[1]: Starting apache2.service - The Apache HTTP Server...
Dec 25 04:50:56 ip-172-31-29-45 systemd[1]: Started apache2.service - The Apache HTTP Server.
ubuntu@ip-172-31-29-45:/var/www/html$
```

i-01b18cddbcf0c952d

PublicIPs: 54.144.48.83 PrivateIPs: 172.31.29.45

```
ubuntu@ip-172-31-29-45:/var/www/html$ sudo systemctl status mysql.service
● mysql.service - MySQL Community Server
   Loaded: loaded (/usr/lib/systemd/system/mysql.service; enabled; preset: enabled)
   Active: active (running) since Tue 2024-12-24 21:57:57 UTC; 6h ago
     Main PID: 9098 (mysqld)
       Status: "Server is operational"
      Tasks: 38 (limit: 1130)
     Memory: 382.6M (peak: 383.8M)
        CPU: 1min 39.923s
       CGroup: /system.slice/mysql.service
               └─9098 /usr/sbin/mysqld

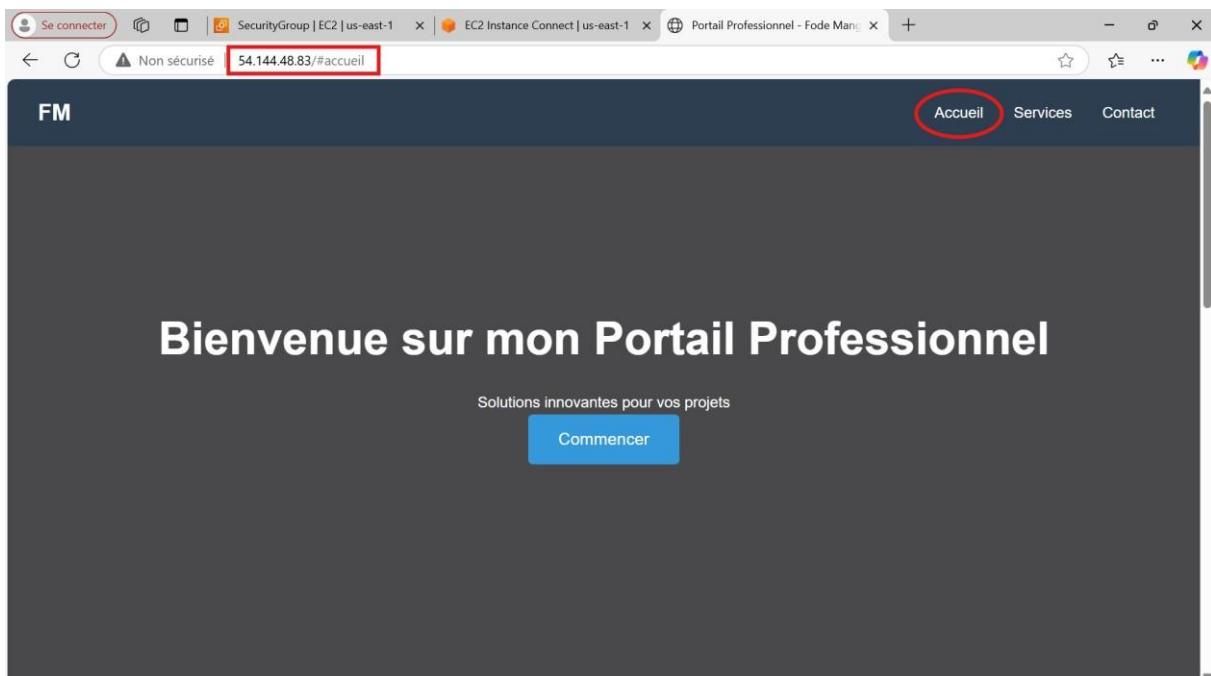
Dec 24 21:57:56 ip-172-31-29-45 systemd[1]: Starting mysql.service - MySQL Community Server...
Dec 24 21:57:57 ip-172-31-29-45 systemd[1]: Started mysql.service - MySQL Community Server.
ubuntu@ip-172-31-29-45:/var/www/html$
```

i-01b18cddbcf0c952d

PublicIPs: 54.144.48.83 PrivateIPs: 172.31.29.45

2. Test de l'application :

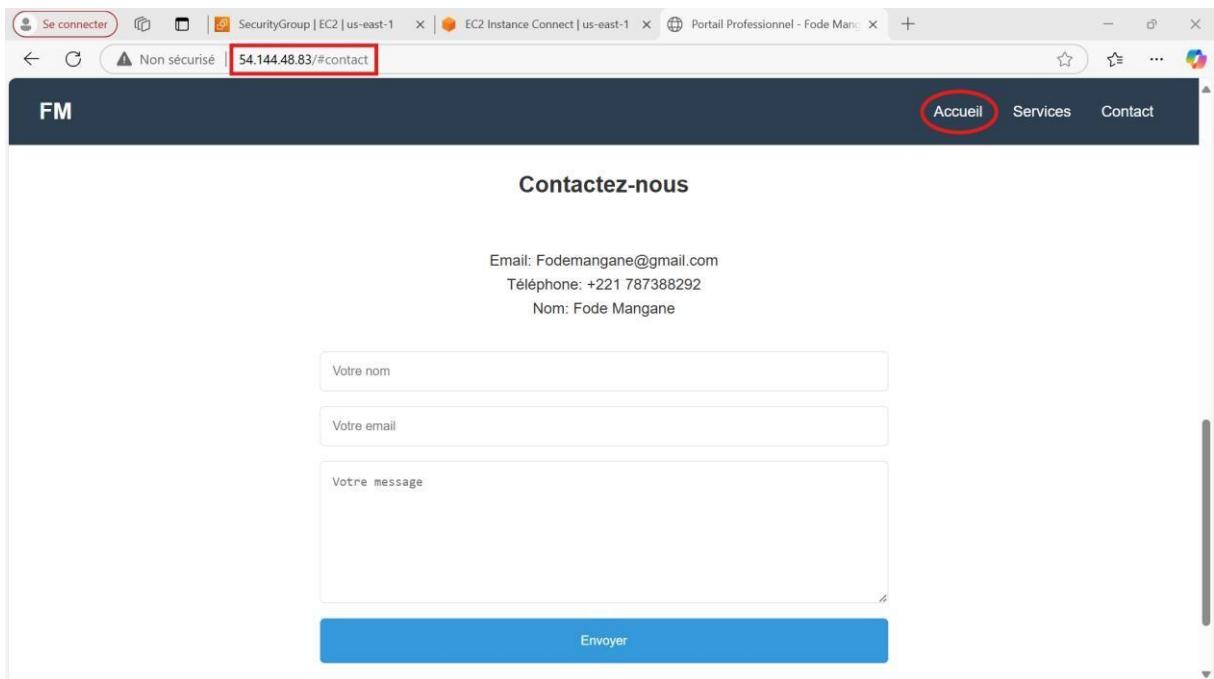
Accédez à votre application via l'adresse IP publique



Teste des fonctionnalités de l'application

The screenshot shows a web browser window with the following details:

- Address Bar:** Non sécurisé | 54.144.48.83/#services
- Page Title:** Portail Professionnel - Fode Mangane
- Header:** FM (Logo), Accueil, Services (circled in red), Contact
- Section:** Nos Services
- Services:**
 - Service 1:** Description du service 1
 - Service 2:** Description du service 2
 - Service 3:** Description du service 3
- Contact Section:** Contactez-nous
 - Email: Fodemangane@gmail.com
 - Téléphone: +221 787388292
 - Nom: Fode Mangane



Conclusion :

L'application web est maintenant déployée et fonctionnelle sur AWS EC2. Assurez-vous de :

- Maintenir les mises à jour de sécurité
- Surveiller les performances