.

1.

1.1

- ·   :   NGINX
- ·   :   Node.js   (API)
- ·   :   Python   FastAPI
- ·   : MongoDB
- ·   :   Amazon S3
- ·   **(CDN}**

1.2

- ·   **SSL**:
- ·   :
- ·   :
- ·   :

2.

2.1   (NGINX)

```
#      NGINX
sudo apt update
sudo apt install -y nginx

#      NGINX
sudo nano /etc/nginx/sites-available/structural-defect-detection

#
server {
  listen 80;
  server_name structural-defect-detection.com www.structural-defect-
```

```
detection.com;

    location / {
        root /var/www/structural-defect-detection/frontend/build;
        index index.html;
        try_files $uri $uri/ /index.html;
    }

    location /api {
        proxy_pass http://localhost:8000;
        proxy_http_version 1.1;
        proxy_set_header Upgrade $http_upgrade;
        proxy_set_header Connection 'upgrade';
        proxy_set_header Host $host;
        proxy_cache_bypass $http_upgrade;
    }

    location /ai {
        proxy_pass http://localhost:8001;
        proxy_http_version 1.1;
        proxy_set_header Upgrade $http_upgrade;
        proxy_set_header Connection 'upgrade';
        proxy_set_header Host $host;
        proxy_cache_bypass $http_upgrade;
        client_max_body_size 20M;
    }
}

#
sudo ln -s /etc/nginx/sites-available/structural-defect-detection /etc/nginx/sites-
enabled/
sudo nginx -t
sudo systemctl restart nginx

#      Certbot              SSL
sudo apt install -y certbot python3-certbot-nginx
sudo certbot --nginx -d structural-defect-detection.com -d www.structural-defect-
detection.com
```

2.2   (Node.js)

```
#      Node.js
curl -sL https://deb.nodesource.com/setup_20.x | sudo -E bash -
sudo apt install -y nodejs

#
sudo mkdir -p /var/www/structural-defect-detection/backend
sudo chown -R $USER:$USER /var/www/structural-defect-detection/

#
```

```
cp -r backend/* /var/www/structural-defect-detection/backend/

#
cd /var/www/structural-defect-detection/backend
npm install

#
cat > .env << EOL
PORT=8000
MONGODB_URI=mongodb://localhost:27017/structural_defect_detection
JWT_SECRET=your_jwt_secret_key
AI_SERVICE_URL=http://localhost:8001
STORAGE_BUCKET=structural-defect-detection
EOL

#        PM2
sudo npm install -g pm2

#
pm2 start app.js --name "structural-defect-detection-api"
pm2 startup
pm2 save
```

2.3   (Python/FastAPI)

```
 #        Python
sudo apt install -y python3-pip python3-dev
sudo pip3 install virtualenv

#
sudo mkdir -p /var/www/structural-defect-detection/ai_service
sudo chown -R $USER:$USER /var/www/structural-defect-detection/

#
cp -r ai_service/* /var/www/structural-defect-detection/ai_service/

#
cd /var/www/structural-defect-detection/ai_service
virtualenv venv
source venv/bin/activate
pip install -r requirements.txt

#
mkdir -p models
#

#
sudo nano /etc/systemd/system/ai_service.service

#
```

```
[Unit]
Description=AI Service for Structural Defect Detection
After=network.target

[Service]
User=ubuntu
WorkingDirectory=/var/www/structural-defect-detection/ai_service
ExecStart=/var/www/structural-defect-detection/ai_service/venv/bin/uvicorn
main:app --host 0.0.0.0 --port 8001
Restart=always

[Install]
WantedBy=multi-user.target

#
sudo systemctl daemon-reload
sudo systemctl enable ai_service
sudo systemctl start ai_service
```

2.4   (MongoDB)

```
#        MongoDB
wget -qO - https://www.mongodb.org/static/pgp/server-6.0.asc | sudo apt-key add
-
echo "deb [ arch=amd64,arm64 ] https://repo.mongodb.org/apt/ubuntu focal/
mongodb-org/6.0 multiverse" | sudo tee /etc/apt/sources.list.d/mongodb-
org-6.0.list
sudo apt update
sudo apt install -y mongodb-org

#              MongoDB
sudo systemctl start mongod
sudo systemctl enable mongod

#
mongo << EOF
use structural_defect_detection
db.createUser({
  user: "admin",
  pwd: "secure_password",
  roles: [{ role: "readWrite", db: "structural_defect_detection" }]
})
EOF

#       MongoDB
sudo nano /etc/mongod.conf
#        bindIp 127.0.0.1
```

```
# MongoDB
sudo systemctl restart mongod
```

2.5 (React)

```
#
sudo mkdir -p /var/www/structural-defect-detection/frontend
sudo chown -R $USER:$USER /var/www/structural-defect-detection/

#
cp -r frontend/* /var/www/structural-defect-detection/frontend/

#
cd /var/www/structural-defect-detection/frontend
npm install
npm run build
```

3.

3.1

```
#
sudo cp -r /var/www/structural-defect-detection/frontend/build/* /var/www/
structural-defect-detection/frontend/build/

#
sudo chown -R www-data:www-data /var/www/structural-defect-detection/
frontend/build/
```

3.2

```
#
cd /var/www/structural-defect-detection/backend
pm2 restart structural-defect-detection-api
```

3.3

```
#
sudo systemctl restart ai_service
```

3.4

```
 #
curl -I https://structural-defect-detection.com

 #
curl -I https://structural-defect-detection.com/api/health

 #
curl -I https://structural-defect-detection.com/ai/health
```

4.

4.1

```
 #        Prometheus
sudo apt install -y prometheus

 #        Prometheus
sudo nano /etc/prometheus/prometheus.yml

 #        Grafana
sudo apt install -y grafana

 #            Grafana
sudo systemctl start grafana-server
sudo systemctl enable grafana-server
```

4.2

```
 #
sudo nano /usr/local/bin/backup.sh

 #
#!/bin/bash
TIMESTAMP=$(date +"%Y%m%d%H%M%S")
BACKUP_DIR="/var/backups/structural-defect-detection"

 #
mkdir -p $BACKUP_DIR

 #
mongodump --out $BACKUP_DIR/mongodb_$TIMESTAMP

 #
```

```
tar -czf $BACKUP_DIR/files_$TIMESTAMP.tar.gz /var/www/structural-defect-
detection

# (      7         )
find $BACKUP_DIR -type d -name "mongodb_*" -mtime +7 -exec rm -rf {} \;
find $BACKUP_DIR -type f -name "files_*.tar.gz" -mtime +7 -exec rm {} \;

#
sudo chmod +x /usr/local/bin/backup.sh

#           cron
echo "0 2 * * * /usr/local/bin/backup.sh" | sudo tee -a /etc/crontab
```

5.

5.1

```
 #
cd /var/www/structural-defect-detection/backend
node << EOF
const mongoose = require('mongoose');
const bcrypt = require('bcrypt');
const User = require('./models/User');

mongoose.connect('mongodb://localhost:27017/structural_defect_detection', {
  useNewUrlParser: true,
  useUnifiedTopology: true
});

async function createAdmin() {
  try {
    const hashedPassword = await bcrypt.hash('admin_password', 10);
    const admin = new User({
      name: 'Admin',
      email: 'admin@example.com',
      password: hashedPassword,
      role: 'admin'
    });
    await admin.save();
    console.log('Admin user created successfully');
  } catch (error) {
    console.error('Error creating admin user:', error);
  } finally {
    mongoose.disconnect();
  }
}
```

```
createAdmin();
EOF
```

5.2

```
 #
sudo mkdir -p /var/www/structural-defect-detection/frontend/build/docs
sudo nano /var/www/structural-defect-detection/frontend/build/docs/index.html

 #
cp -r documentation/* /var/www/structural-defect-detection/frontend/build/docs/
```

5.3

```
 #
cd /var/www/structural-defect-detection/backend
npm install nodemailer

 #          API
nano routes/support.js

 #
nano app.js
 #      : app.use('/api/support', require('./routes/support'));

 #
pm2 restart structural-defect-detection-api
```

6.

6.1

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6.2

1.   :   .
                                .

2.   :   "   "
                                   .   .

3.   :   "   "

4.   :

5.   :

6.   :   PDF

7.   :

6.3

-               :

-               :
-               :
-               :
-               :
-               :

6.4

           :

-            : support@structural-defect-detection.com
-            :   "   "
-     : +1234567890 (5:00 -   9:00   )

7.