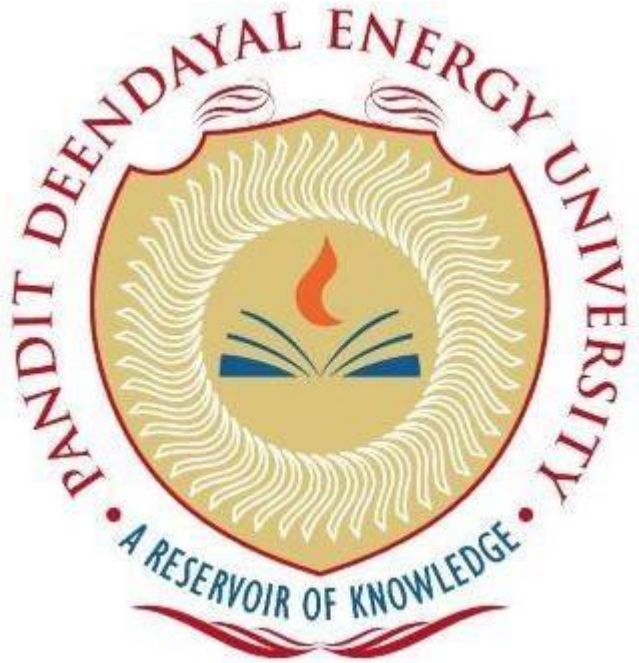
# PANDIT DEENDAYAL ENERGY UNIVERSITY

# SCHOOL OF TECHNOLOGY




## Course: Cyber Security Lab

## Course Code: 23CP310P

## B.Tech. (Computer Engineering)

## Semester 6(G9)

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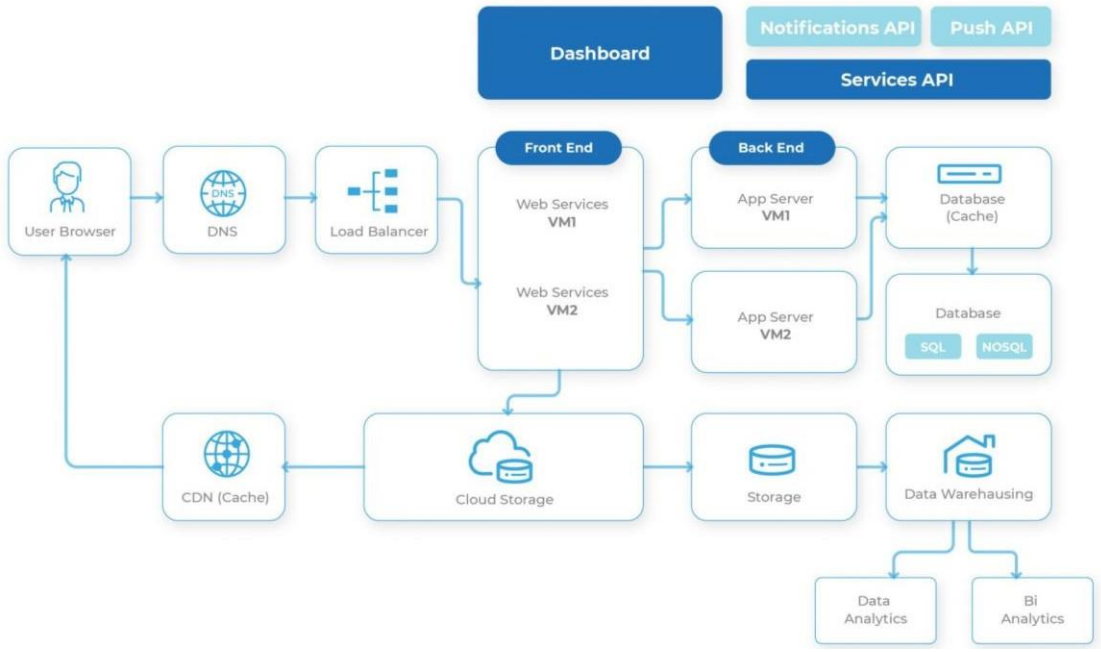
22BCP327

## 1.Architecture of Web Services and the Role of Servers

Web services are software systems designed to support interoperable machine-to-machine interaction over a network. They typically use standardized protocols like HTTP, XML, SOAP, WSDL, and REST to facilitate communication between different systems.

## Key Components of Web Services Architecture:

1. **Client**: The application or system that initiates a request to the web service.
2. **Server**: The system that hosts the web service and processes client requests.
3. **Protocols**: Standards like HTTP, HTTPS, SOAP, REST, etc., used for communication.
4. **Data Formats**: XML, JSON, or other formats used to structure the data being exchanged.
5. **Service Description**: WSDL (Web Services Description Language) for SOAP-based services or OpenAPI for RESTful services, which describe how to interact with the service.




## Role of Servers:

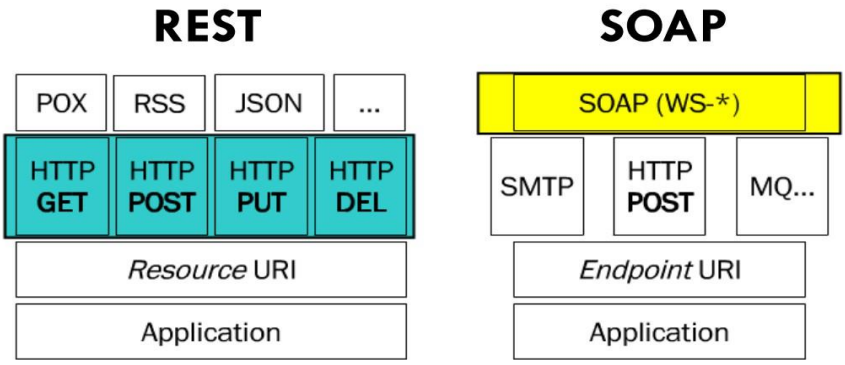
- **Hosting**: Servers host the web service, making it accessible over the internet or an intranet.
- **Request Handling**: Servers receive client requests, process them, and return appropriate responses.
- **Scalability**: Servers can be scaled horizontally (adding more servers) or vertically (increasing server resources) to handle increased load.
- **Security**: Servers implement security measures like SSL/TLS encryption, authentication, and authorization to protect the service.

## 2.RESTful vs. SOAP-Based Services

RESTful and SOAP-based services are two prominent web service architectures. REST (Representational State Transfer) is known for its simplicity, statelessness, and use of standard HTTP methods. It is widely adopted for web APIs due to its lightweight nature and ease of integration with web technologies. RESTful services use JSON or XML for data exchange and can be easily scaled.

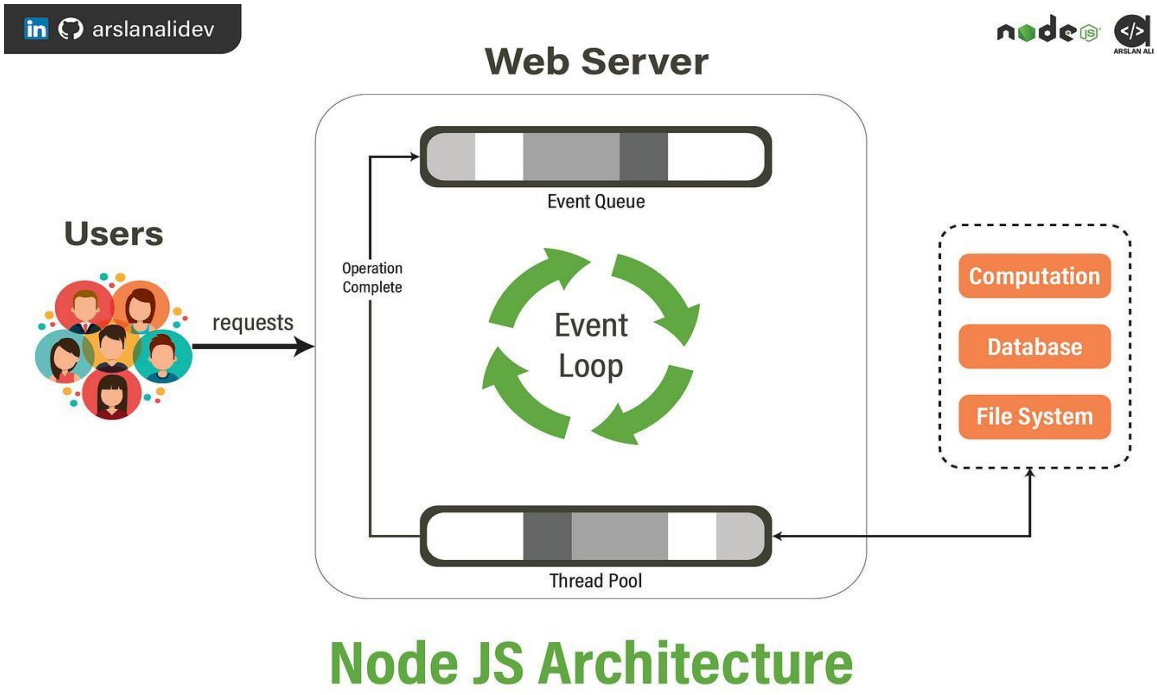
SOAP (Simple Object Access Protocol), on the other hand, is a protocol that relies on XML-based messaging. It provides more rigid standards for security, transactions, and error handling, making it suitable for enterprise-level applications that require high security and reliability. However, SOAP can be more complex and resource-intensive compared to REST.

- Protocol Layering




## 2. Implementing a Simple HTTP-Based Web Service

### 1. Using Node.js (Express)

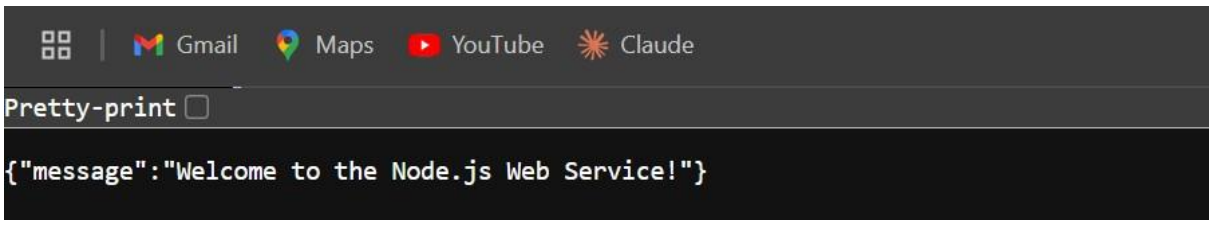


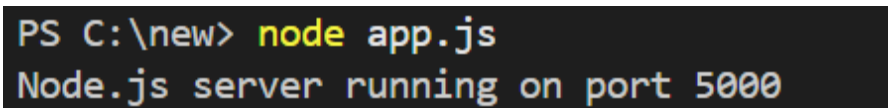
## Code:

```
const express = require('express');
const bodyParser = require('body-parser');
const app = express();
const port = 5000;

app.use(bodyParser.json());
app.get('/', (req, res) => {
  res.json({ message: "Welcome to the Node.js Web Service!" });
});
app.get('/greet', (req, res) => {
  const name = req.query.name || 'Guest';
  res.json({ greeting: `Hello, ${name}!` });
});
app.post('/data', (req, res) => {
  res.json({ received: req.body });
});
app.listen(port, () => {
  console.log(`Node.js server running on port ${port}`);
});
```

## Output:



# Deploying the Web Service

## 1. Deploying with Node.js

- Install dependencies: npm install express
- Run the app: node app.js
- Use a process manager like **PM2**: pm2 start app.js
- Deploy to a cloud platform like **Heroku**, **AWS**, or **Google**

## **Cloud**. **Example: Deploying to Heroku**

1. Install the Heroku CLI.
2. Login: heroku login
3. Create a new app: heroku create
4. Push your code: git push heroku main
5. Open the app: heroku open

## 3.Dockerfile for Node.js

- FROM node:14
- WORKDIR /app
- COPY . .
- RUN npm install
- CMD ["node", "app.js"]