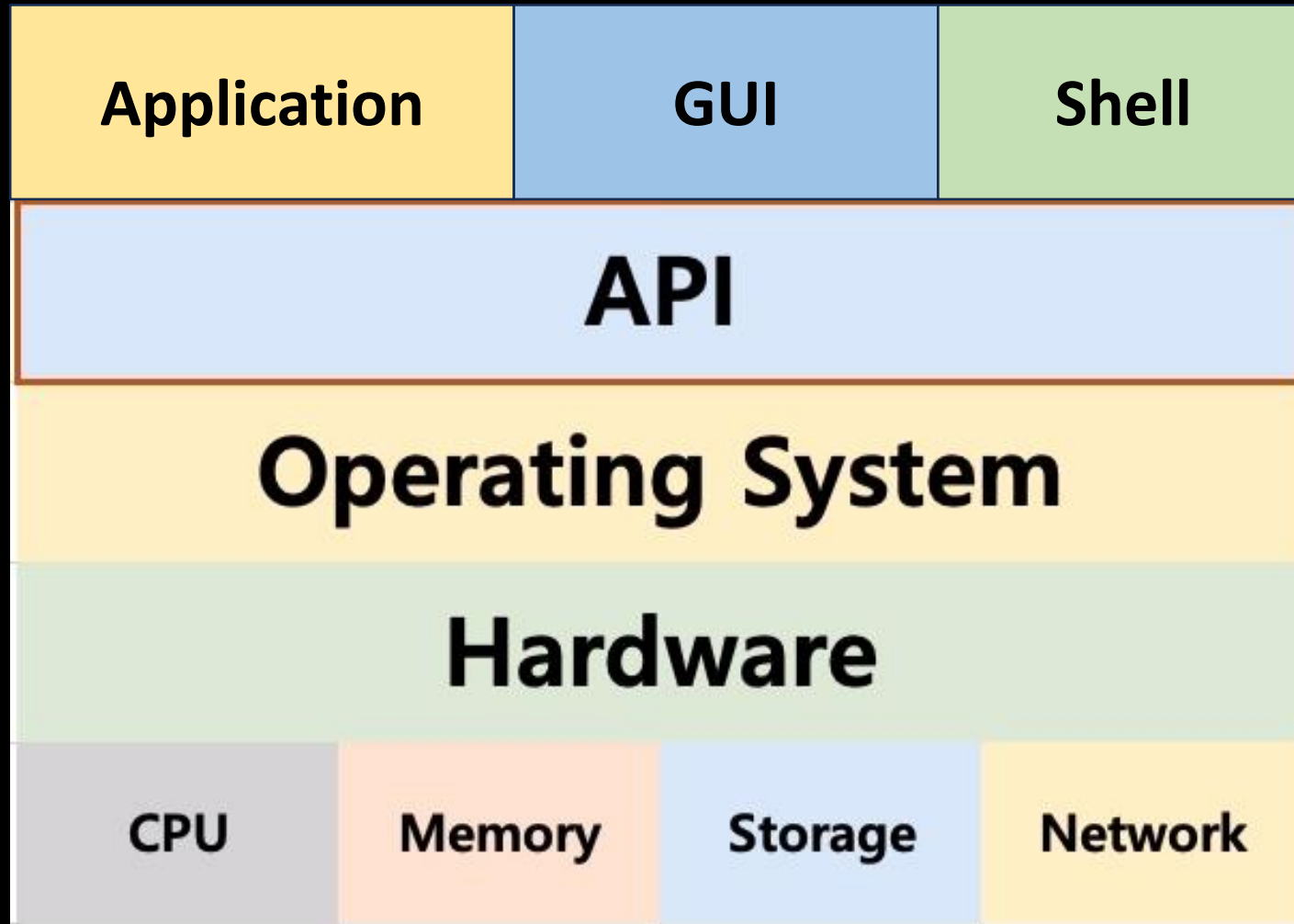
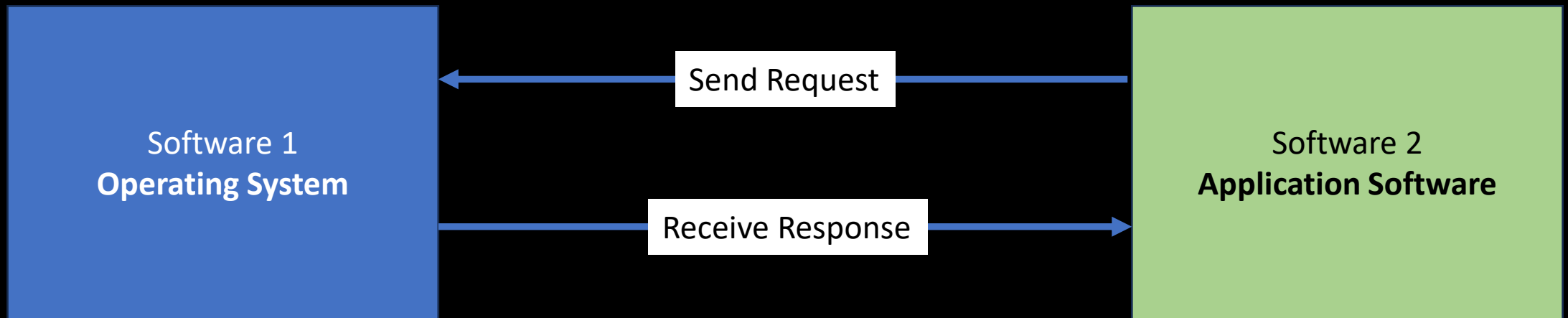




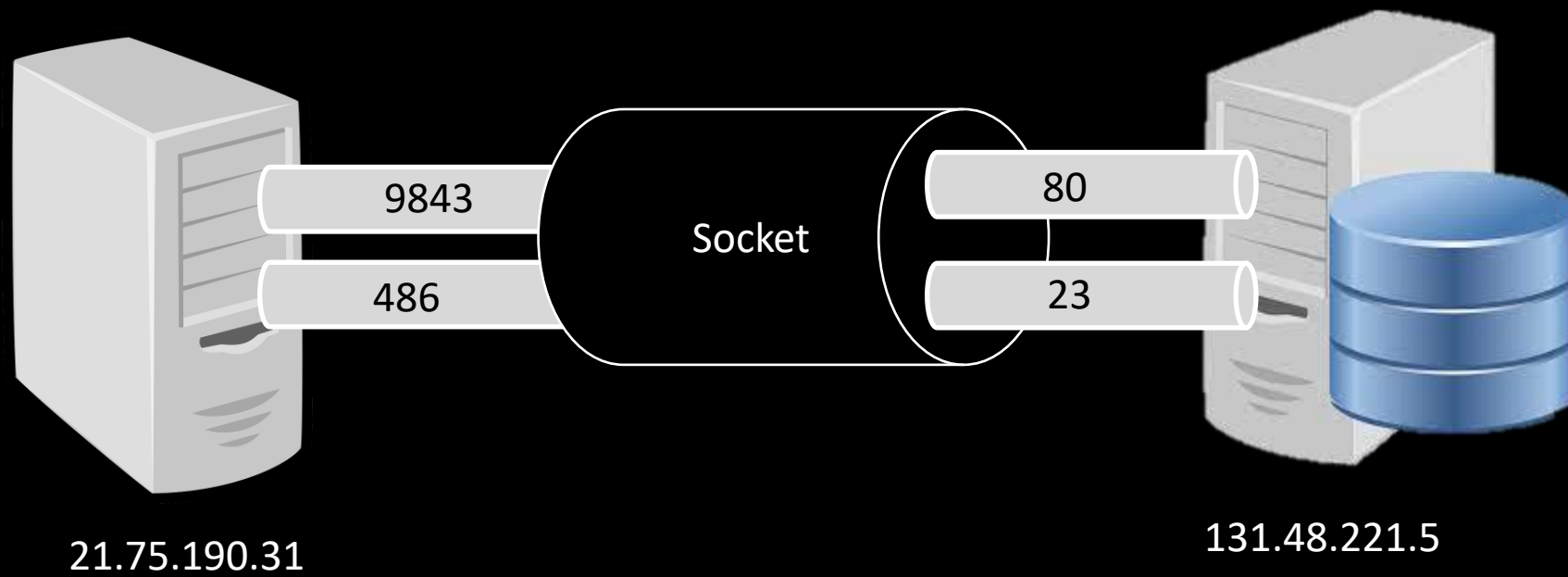
API

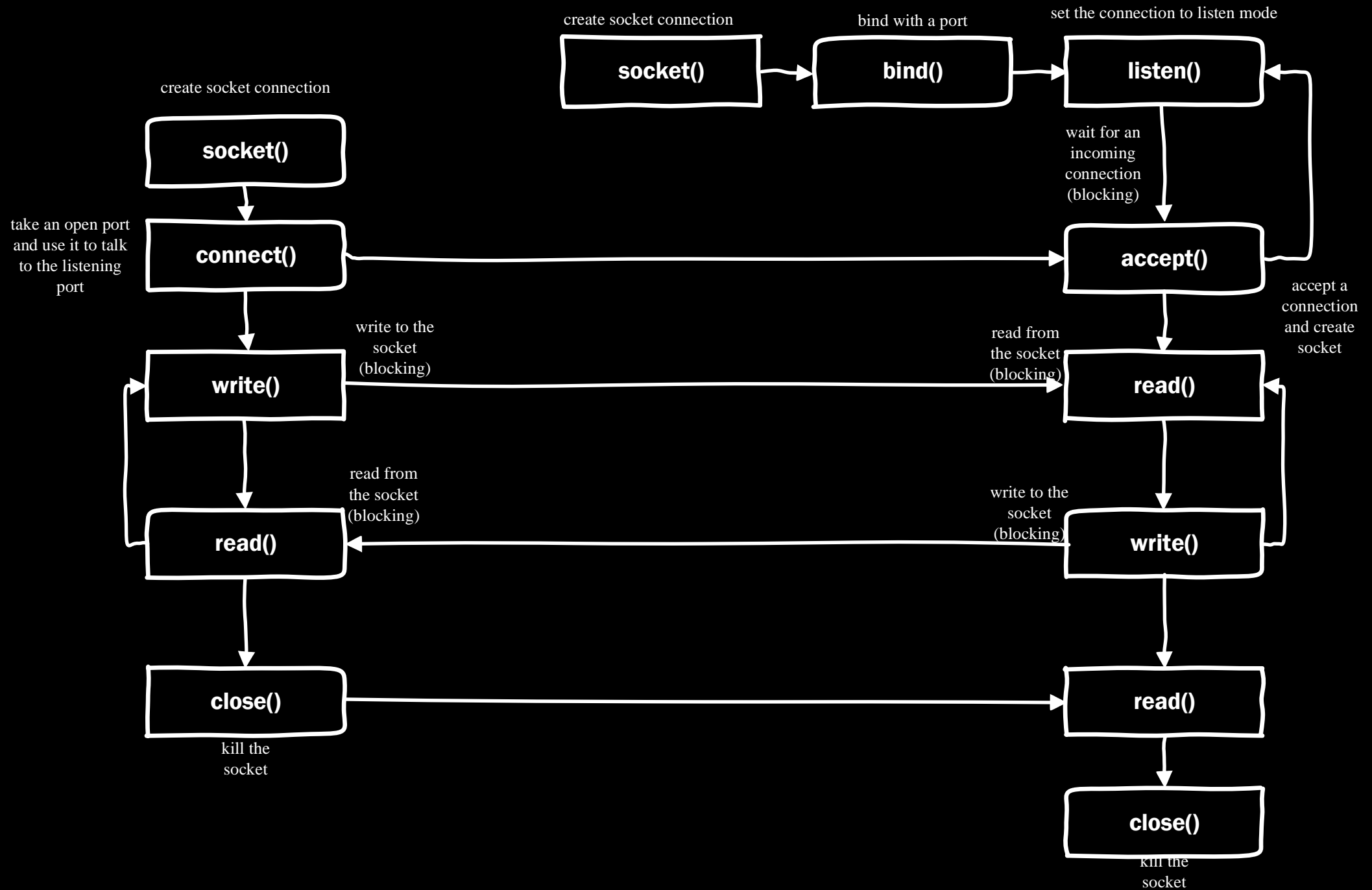
Application Programming
Interface



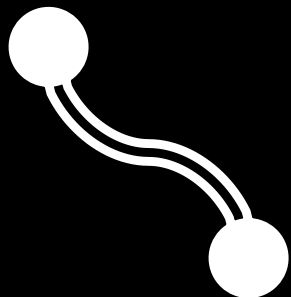


Socket Programming

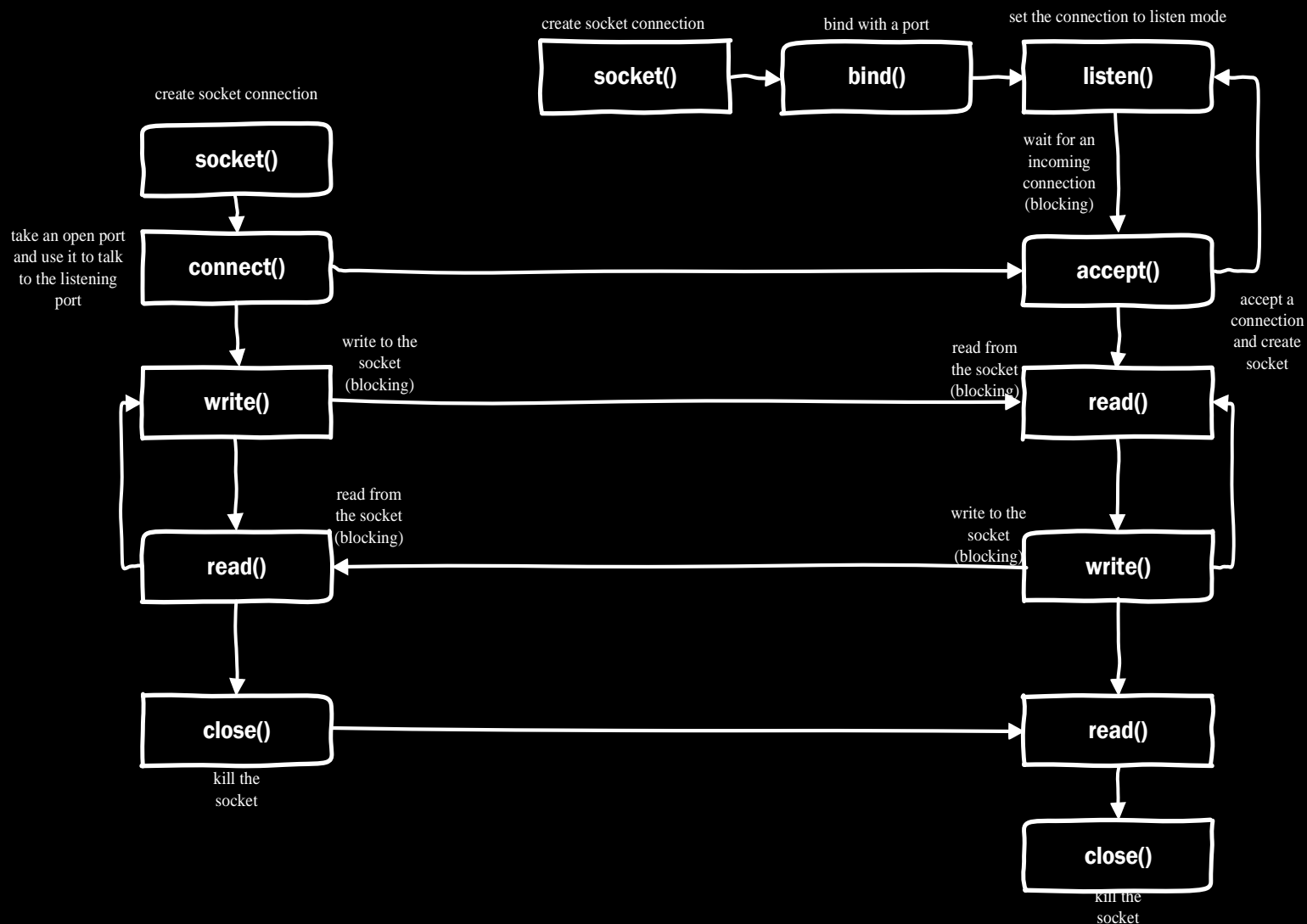




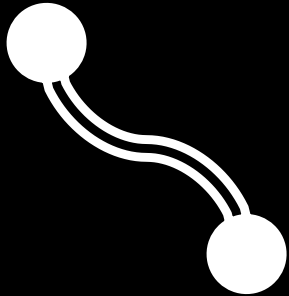
212.31.143.45: 2893



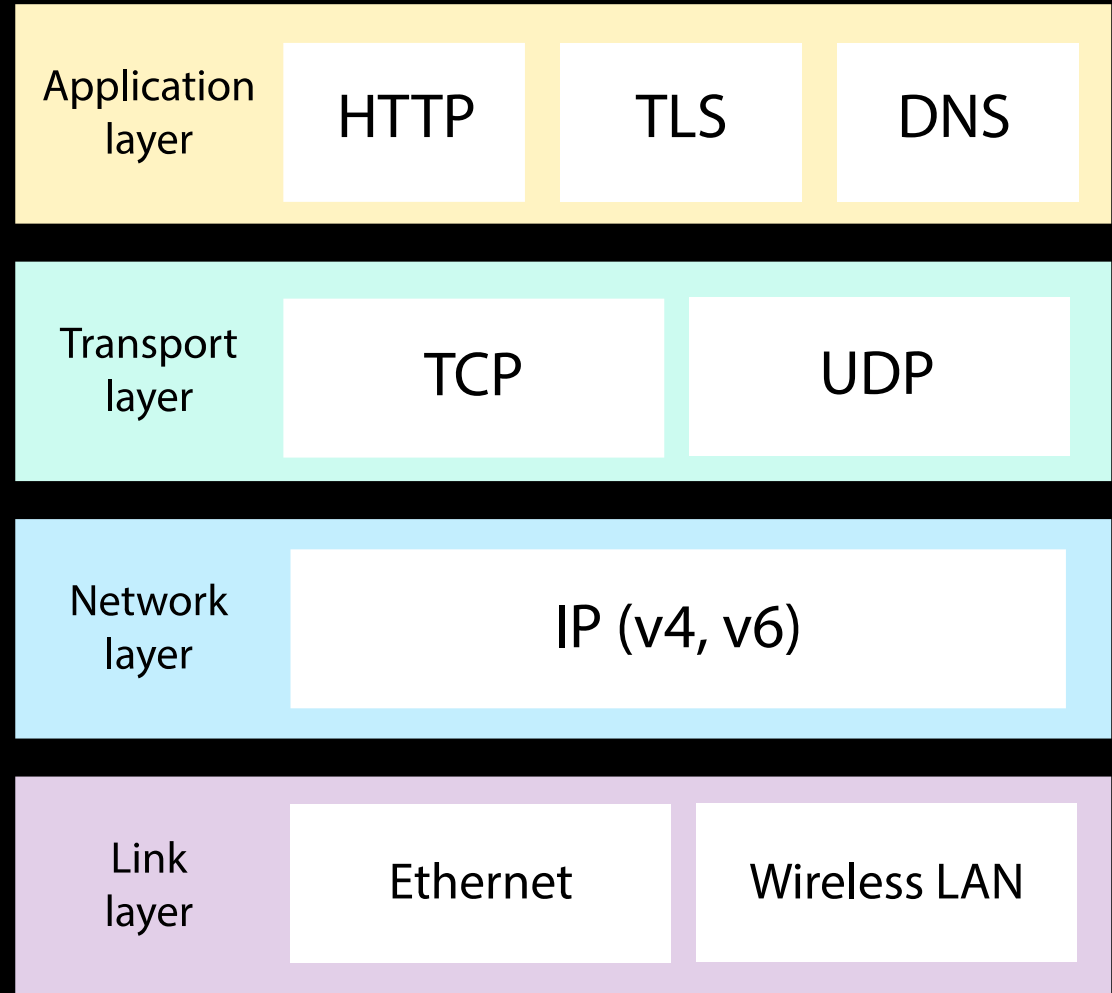
22.131.14.51: 8986



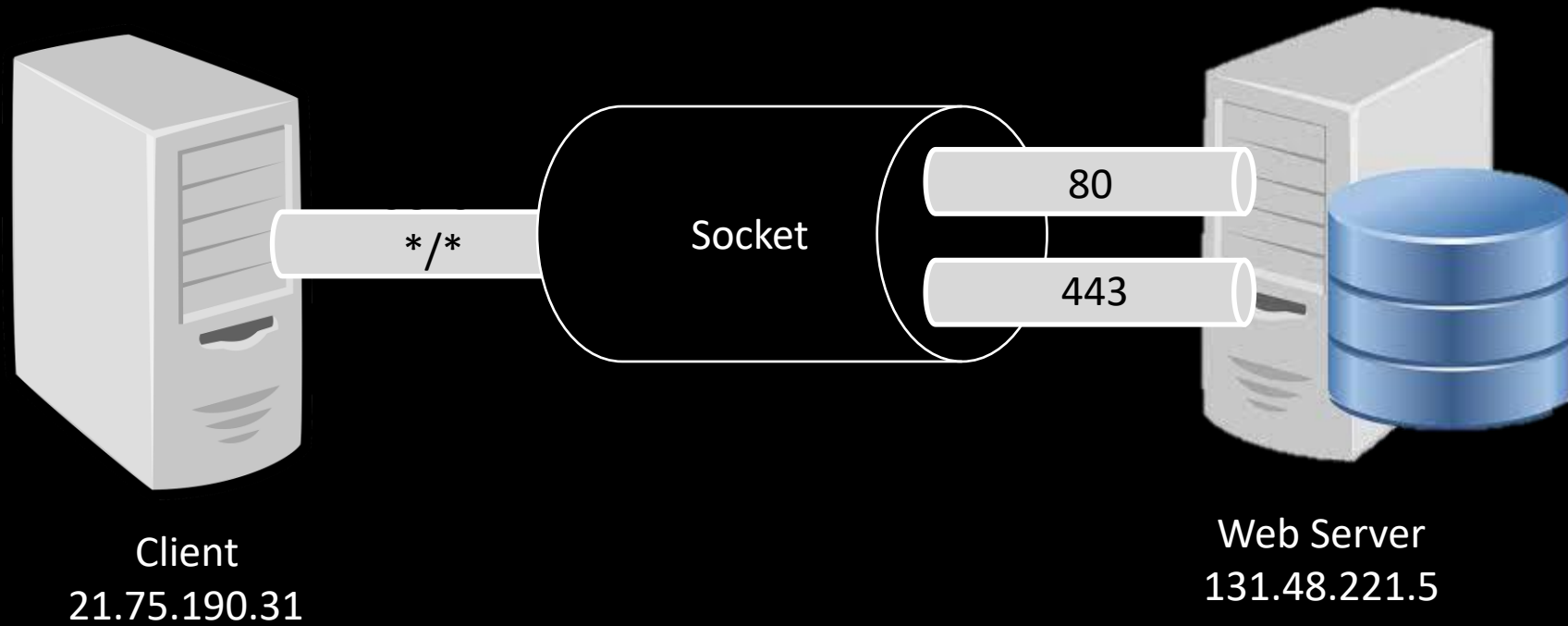
212.31.143.45: 2893



22.131.14.51: 8986



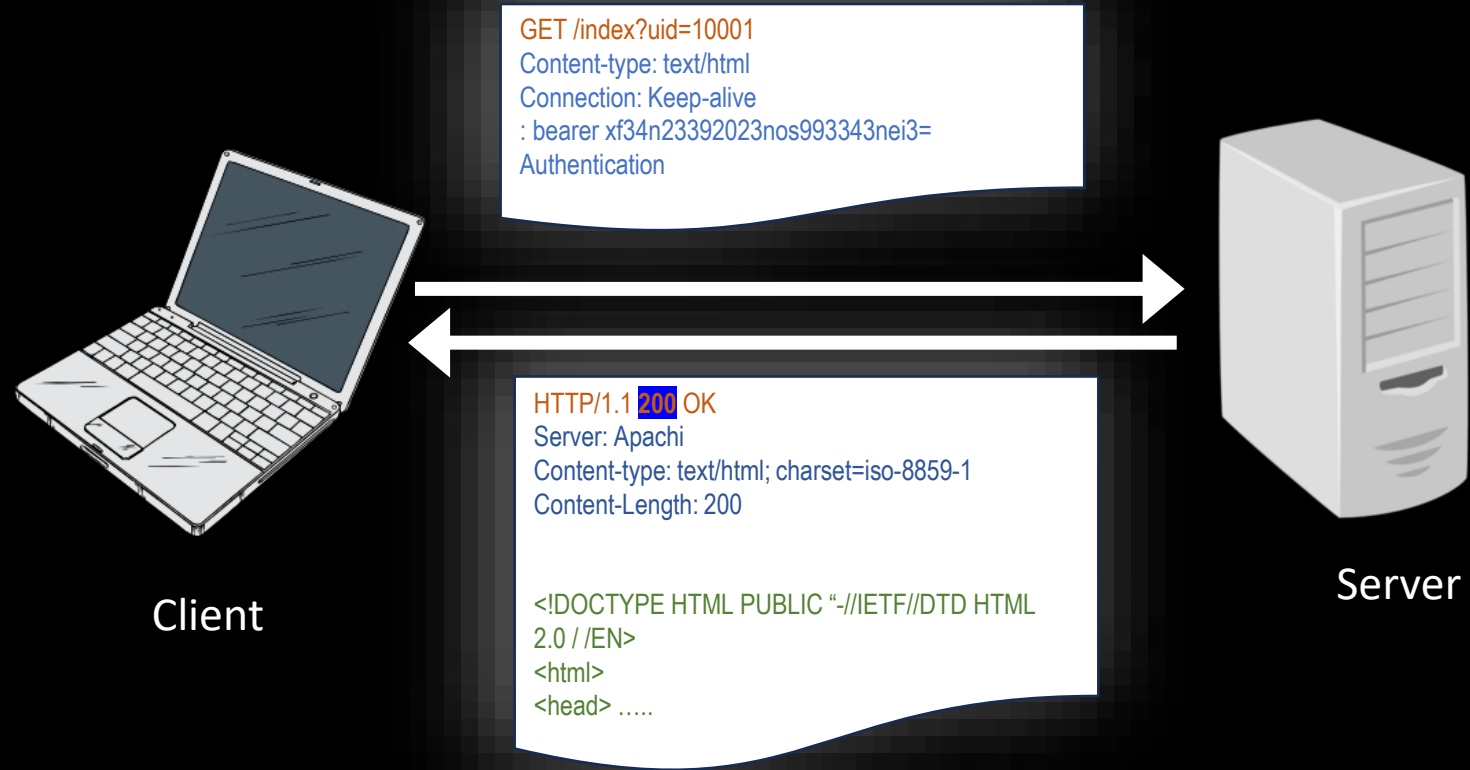
Internet Browse/ Web Server/ HTTP(s) Protocol



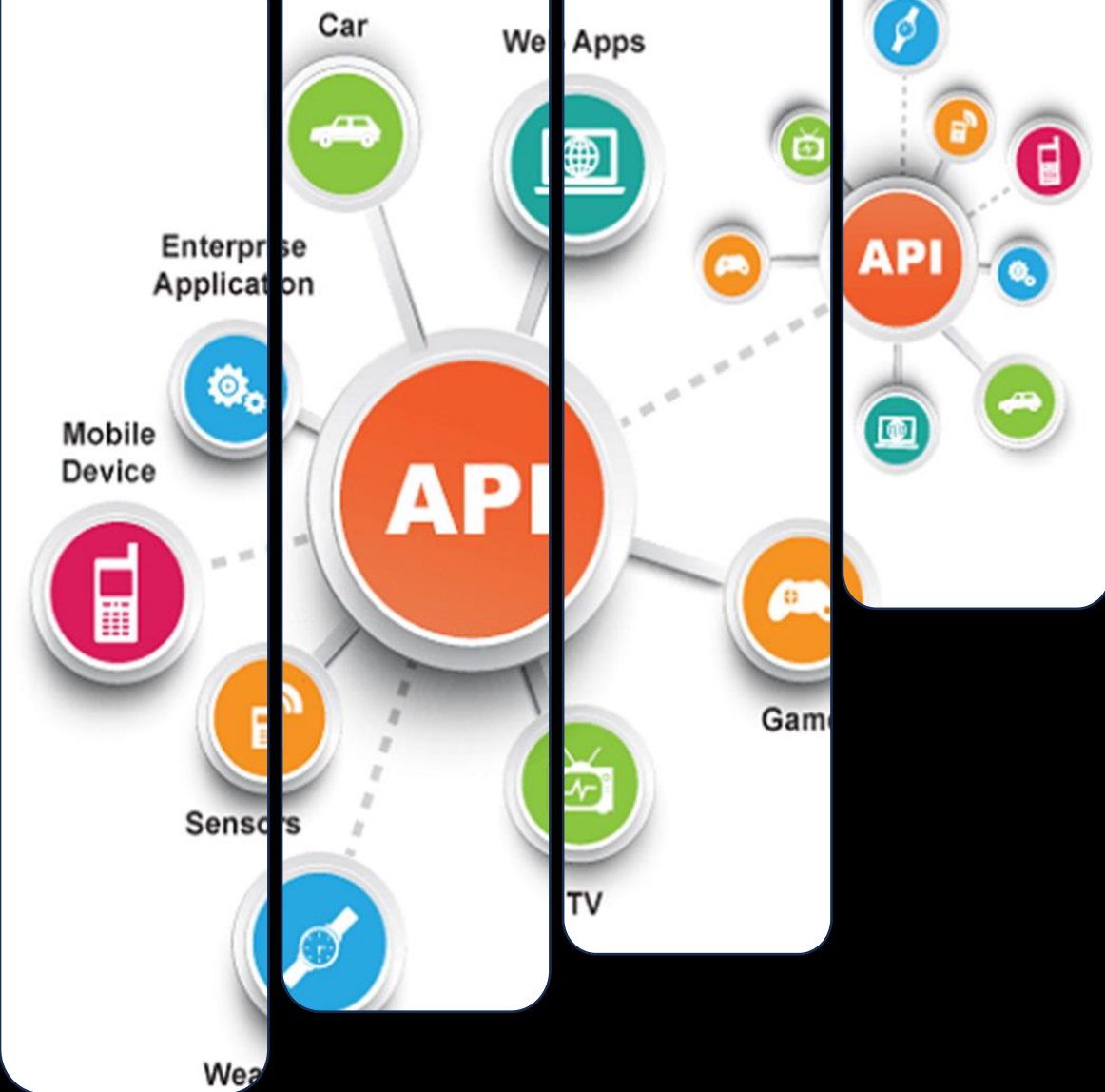
Internet Browse/ Web Server/ HTTP(s) Protocol



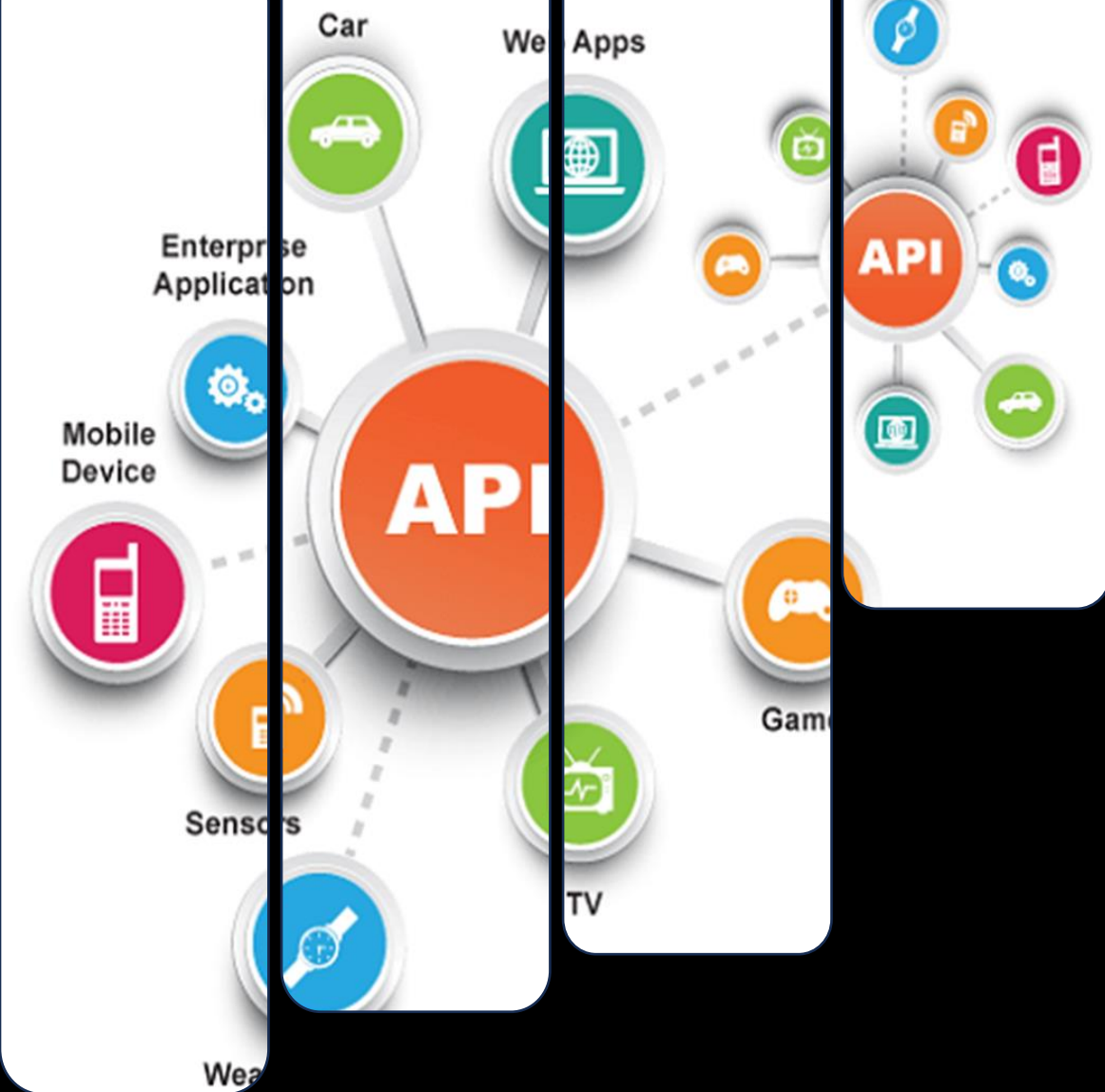
Internet Browse/ Web Server/ HTTP(s) Protocol



XMLHttpRequest



RESTful
API
(REST API)



**Frontend
&
Backend**



Client

```
GET /index?uid=10001
Content-type: text/html
Connection: Keep-alive
: bearer xf34n23392023nos993343nei3=
Authentication
```



Server

```
HTTP/1.1 200 OK
Server: Apache
Content-type: text/html; charset=iso-8859-1
Content-Length: 200

<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML
2.0//EN>
<html>
<head> .....
```

GET
HTTP Verb

/student
Resource and Location

[?uid=10001]
Filter (Optional)

GET /student[?uid=10001]

Content-type: text/html
Connection: Keep-alive
: bearer xf34n23392023nos993343nei3=
Authentication

AN Action
To a Resource

GET
HTTP Verb

/student
Resource and Location

[?uid=10001]
Filter (Optional)

GET /student[?uid=10001]

Content-type: text/html
Connection: Keep-alive
: bearer xf34n23392023nos993343nei3=
Authentication

HTTP/1.1 **200** OK

Server: Apache/2.4.6-2ubuntu2.1
Content-type: application/json; charset=iso-8859-1
Content-Length: 200

```
<!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML  
2.0//EN>  
<html>  
<head> .....
```

HTTP Response Code

200 OK : Successful with a Response body

204 OK : Successful with no Response body

401 OK : Not authorized

404 OK : Resource Not found

1XX 2XX 3XX 4XX 5XX

GET
HTTP Verb

/student
Resource and Location

[?uid=10001]
Filter (Optional)

FIVE HTTP Verbs

Five Different Action To Resources

GET

POST

PUT

PATCH

DELETE

GET

POST

PUT

PATCH

DELETE

Get me resources (Voters)

GET /voter

Content-type: text/html

Connection: Keep-alive

Authentication: bearer xf34n23392023nos993343nei3=

GET /voter&order=name&type=asc

Content-type: text/html

Connection: Keep-alive

Authentication: bearer xf34n23392023nos993343nei3=

```
HTTP/1.1 200 OK
Server: Apache/2.4.6-2ubuntu2.1
Content-type: application/json; charset=iso-8859-1
Content-Length: 200
```

```
[
  {
    "id": 1292671
    "name": "Abdus Salam"
    "Address":
      {
        "village": ".."
        "district": ".."
        ..
      }
  },
  {
    "id": 39266710
    "name": "Belal Hosen"
    "Address":
      {
        "village": ".."
        "district": ".."
        ..
      }
  },
  ... ..
]
```

GET

POST

PUT

PATCH

DELETE

Get me one specific resources (Voter)

GET /voter?id=1292671

Content-type: text/html

Connection: Keep-alive

Authentication: bearer

xf34n23392023nos993343nei3=

HTTP/1.1 200 OK

Server: Apache

Content-type: application/json; charset=iso-8859-1

Content-Length: 200

```
[
  {
    "id": 1292671
    "name": "Abdus Salam"
    "Address":
    {
      "village": ".."
      "district": ".."
      ..
    }
  }
]
```

GET

POST

PUT

PATCH

DELETE

Give me a specific resource (Voter)

GET /voter?id=00000

Content-type: text/html

Connection: Keep-alive

Authentication: bearer xf34n23392023nos993343nei3=

HTTP/1.1 **404 Not Found**

Server: Apache

Content-type: application/json; charset=iso-8859-1

Content-Length: 50

```
[  
  "message": "Voter id 00000 not found"  
]
```

GET

POST

PUT

PATCH

DELETE

Create a new resource (Voter)

POST /voter

Content-type: text/html

Connection: Keep-alive

Authentication: bearer xf34n23392023nos993343nei3=

```
{
  "name": "Abdus Salam"
  "Address":
  {
    "village": ".."
    "district": ".."
    ..
  }
}
```

HTTP/1.1 200 OK

Server: Apache

Content-type: application/json; charset=iso-8859-1

Content-Length: 200

```
[
  {
    "id": 1292671
    "name": "Abdus Salam"
    "Address":
    {
      "village": ".."
      "district": ".."
      ..
    },
    "status": "active"
  }
]
```

GET

POST

PUT

PATCH

DELETE

Update a specific resource (Voter)

PUT /voter?id=1292671

Content-type: text/html

Connection: Keep-alive

Authentication: bearer xf34n23392023nos993343nei3=

```
{
  "name": "Abdus Salam"
  "Address":
  {
    "village": "pahartali"
    "district": "Chittagong"
    ..
  }
}
```

HTTP/1.1 200 OK

Server: Apache

Content-type: application/json; charset=iso-8859-1

Content-Length: 200

```
[
  {
    "id": 1292671
    "name": "Abdus Salam"
    "Address":
    {
      "village": "pahartali"
      "district": "Chittagong"
      ..
    },
    "status": "active"
  }
]
```

GET

POST

PUT

PATCH

DELETE

Update a specific resource (Voter)

PUT /voter?id=00000

Content-type: text/html

Connection: Keep-alive

Authentication: bearer xf34n23392023nos993343nei3=

```
{
  "name": "Abdus Salam"
  "Address":
  {
    "village": "pahartali"
    "district": "Chittagong"
    ..
  }
}
```

HTTP/1.1 **404 Not Found**

Server: Apache

Content-type: application/json; charset=iso-8859-1

Content-Length: 50

```
[
  "message": "Voter id 00000 not found"
]
```

GET

POST

PUT

PATCH

DELETE

Patch (Update Special Field) of a specific resource (Voter)

PATCH /voter/status/deactive?id=1292671

Connection: Keep-alive

Authentication: bearer xf34n23392023nos993343nei3=

```
HTTP/1.1 200 OK
Server: Apache/2.4.6-2ubuntu2.1
Content-type: application/json; charset=iso-8859-1
Content-Length: 200
```

```
[
  {
    "id": 1292671
    "name": "Abdus Salam"
    "Address":
    {
      "village": "pahartali"
      "district": "Chittagong"
      ..
    },
    "status": "deactive"
  }
]
```


GET

POST

PUT

PATCH

DELETE

Delete a specific resource (Voter)

HTTP/1.1 204 OK

DELETE /voter?id=1292671

Connection: Keep-alive

Authentication: bearer xf34n23392023nos993343nei3=

Design

A software architect is
responsible to design the API.

This includes the:

Path | Request variables | Request
Body | Response Code |
Response Body | Data Objects



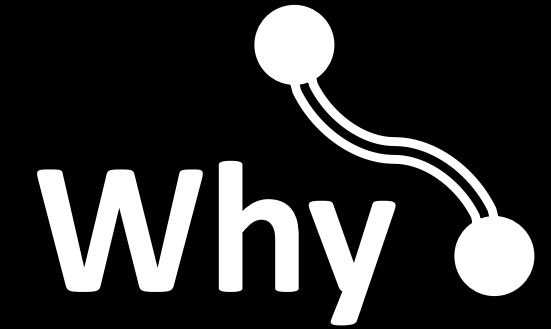
Development

Understand the requirement from
the architect | Help improve the architecture

Why 

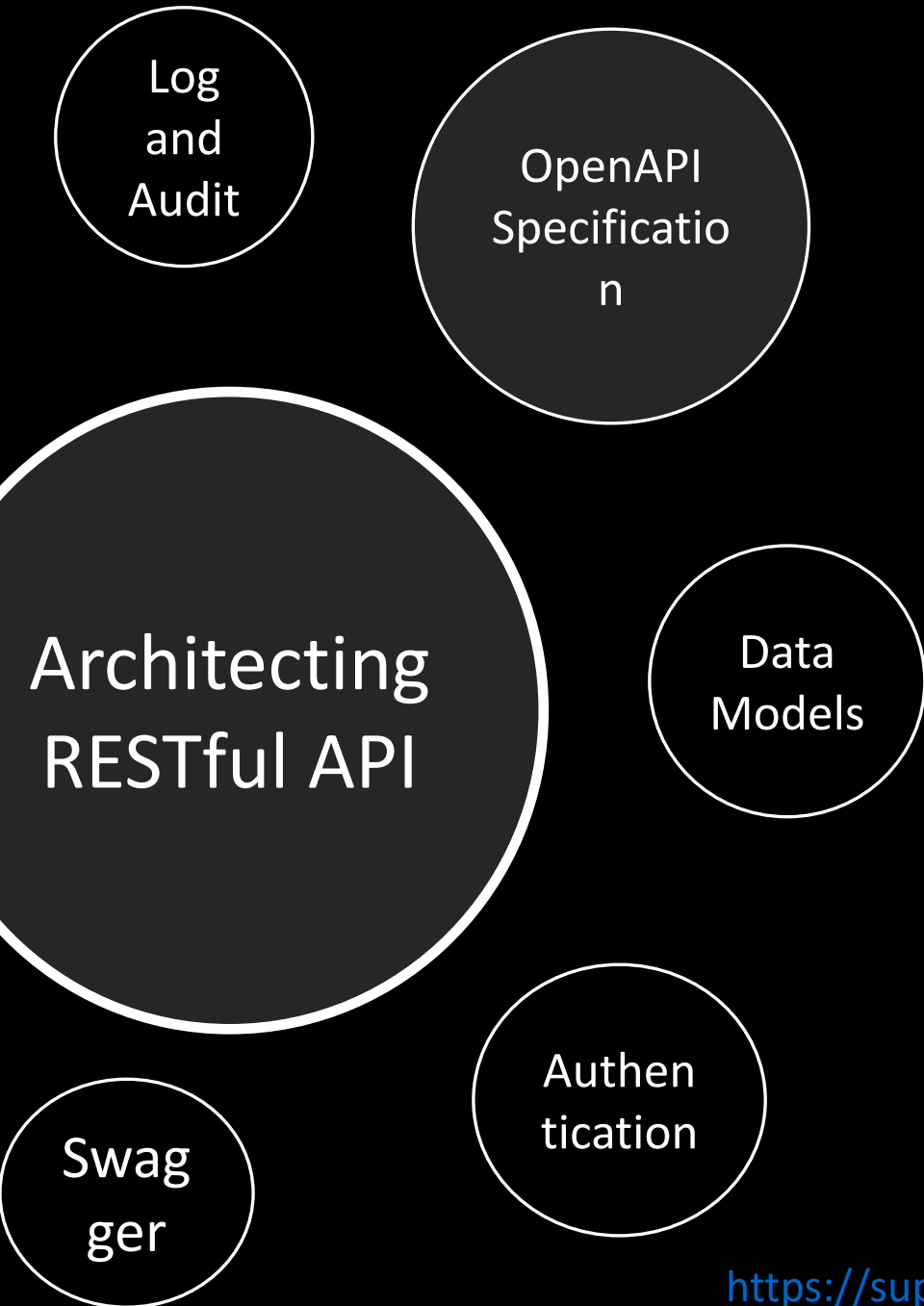
Maintenance

Understand the existing architecture |
Extend the application by maintaining the
same architecture | Fix issues





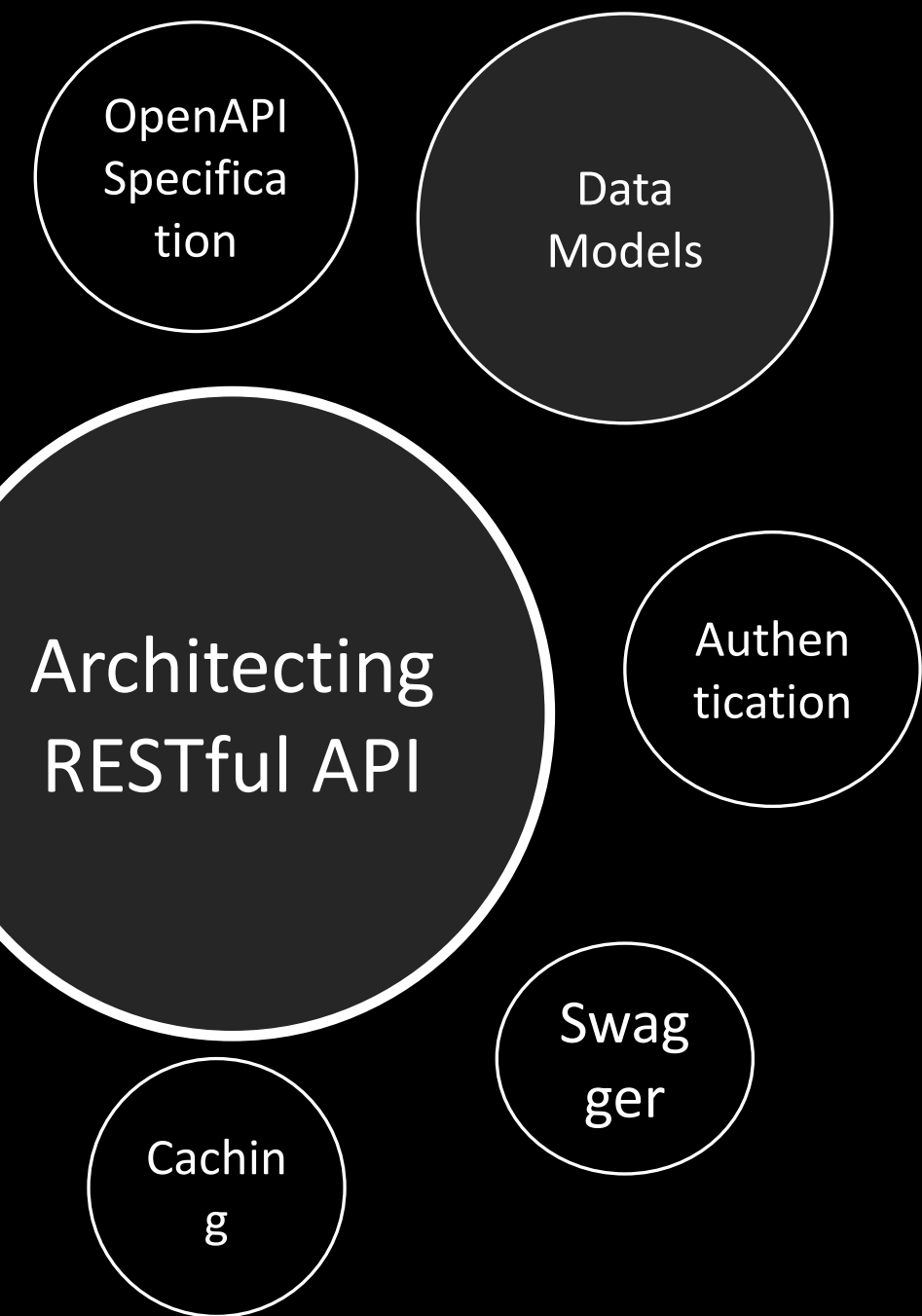
Architecting RESTful API



A standard for defining and describing
RESTful APIs.

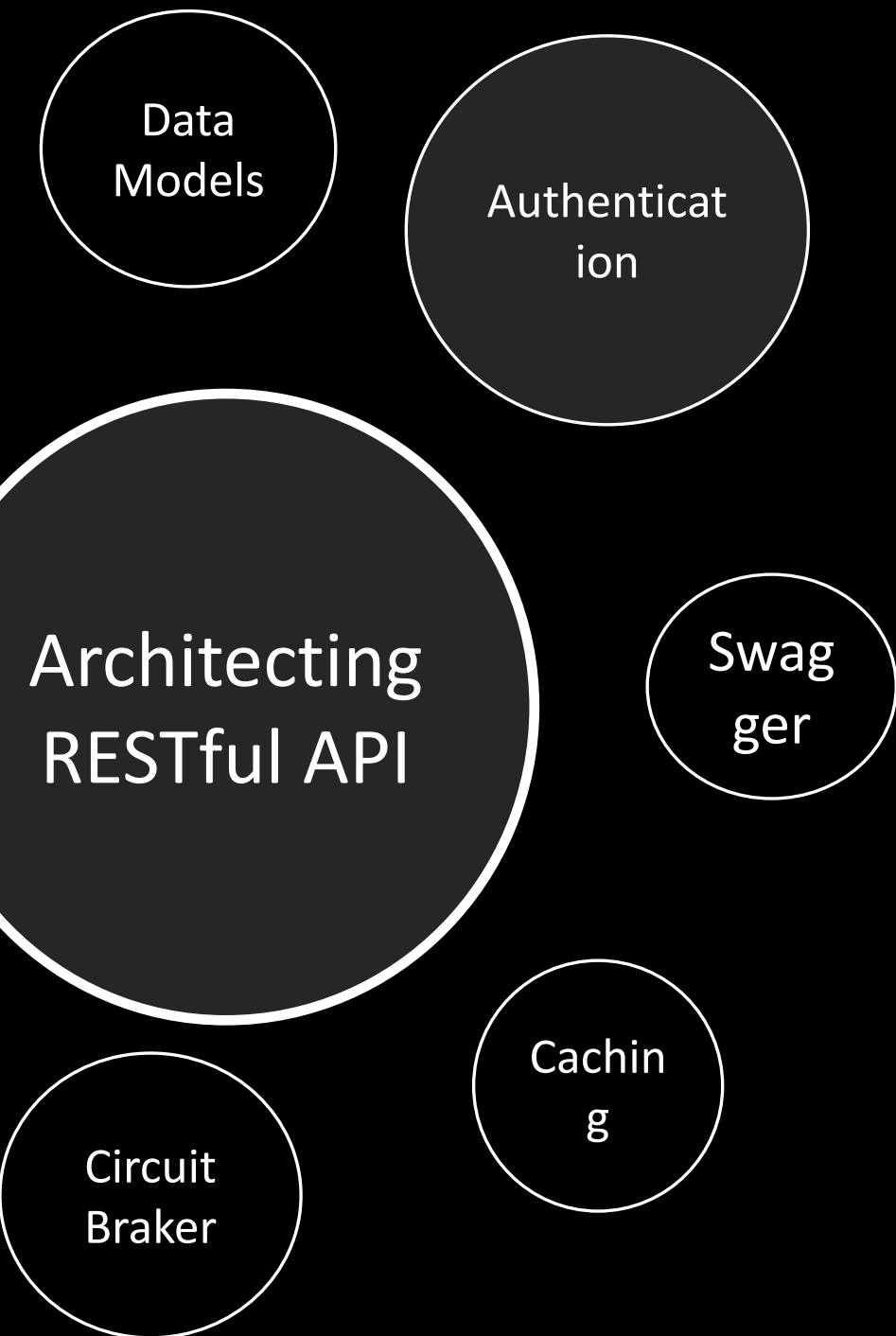
Defines:
End Points | Operations | Data Models |
Authentication

<https://support.smartbear.com/swaggerhub/docs/en/get-started/openapi-3-0-tutorial.html>



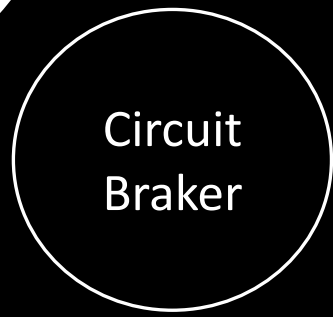
Modeling the Resource(s)

Mapping Field with End points
Mapping models with input and output



Protecting End points

Authentication Protocol | Endpoints
Scope | Authorization | Privilege
Escalation | SQL Injection



Interactive Documentation

Automatic Documentation | Testing



Swagg
er

Caching

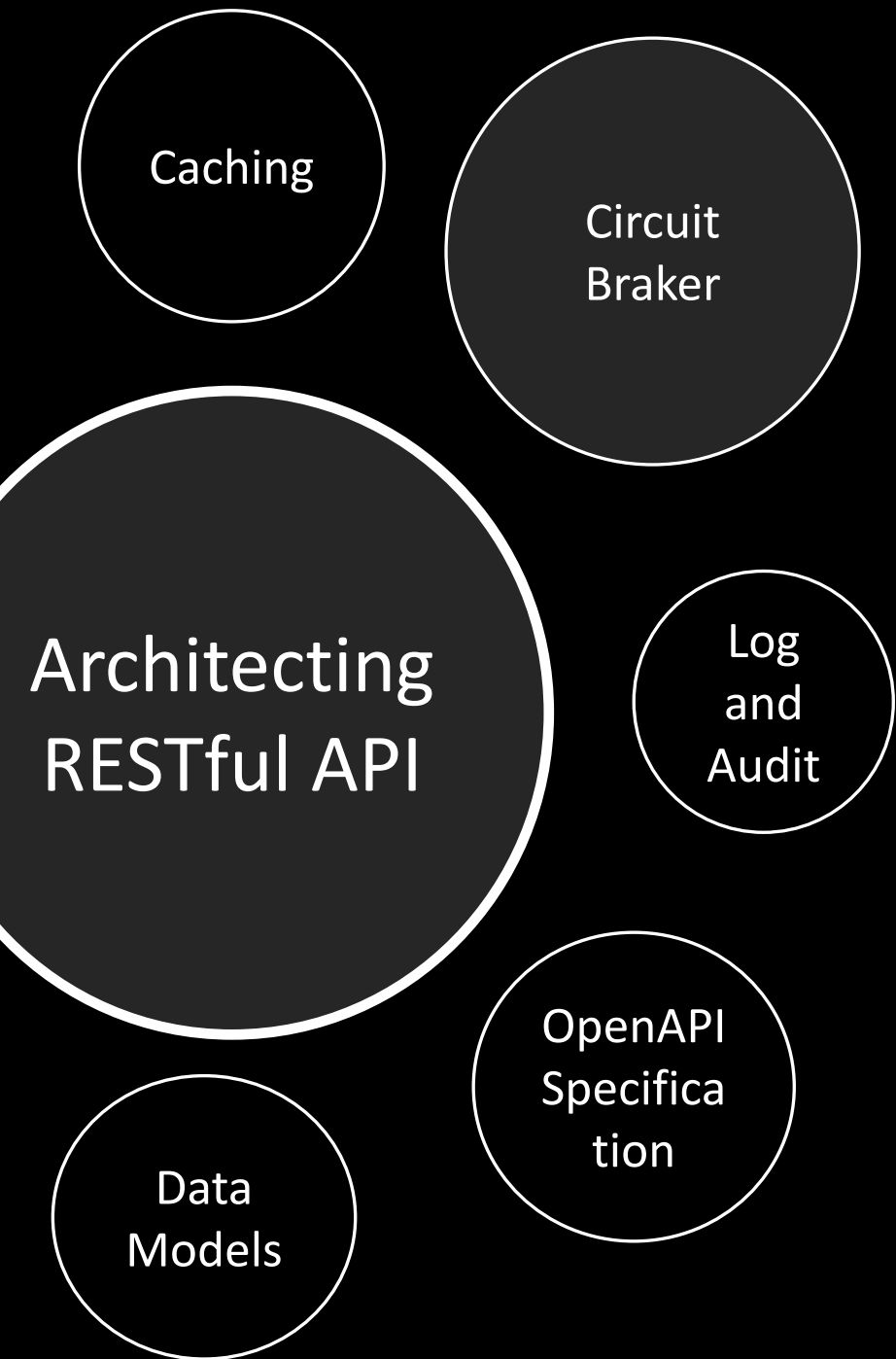
Circuit
Braker

Log
and
Audit

OpenAPI
Specifica
tion

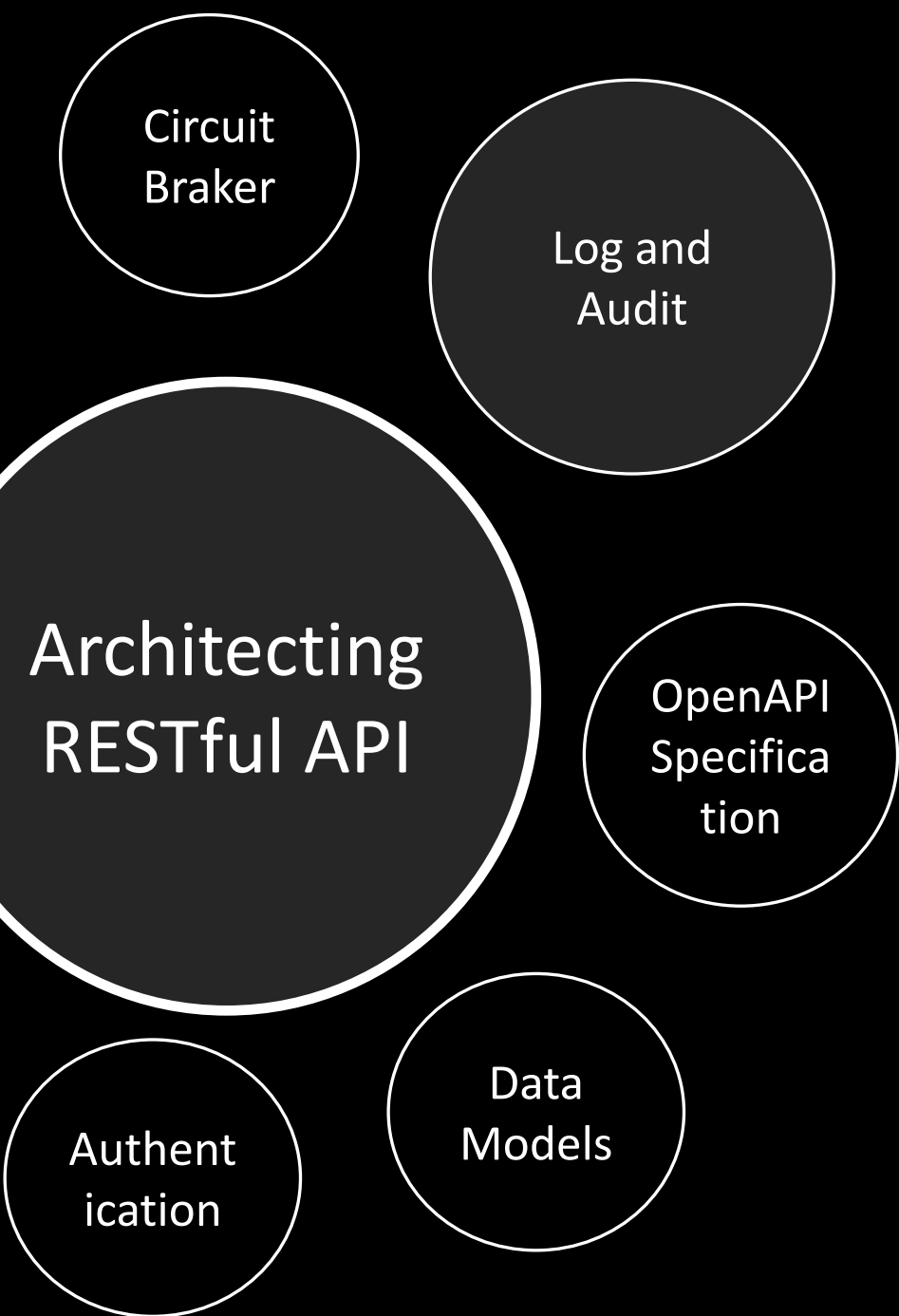
Caching

Idempotent | Caching Database | Built-in
Caching (Cloud)



Circuit Braker

Robustness | Fail-safe (Retry) | Fault Tolerance | Fail-fast



Debugging and Security Audit

Internal State | Monitoring and Alert |
Event Logging | Liveness | Readiness Check