

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is a light greenish-blue. They are positioned diagonally, with the blue one in front of the green one.

REST api with Express & MySQL

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Example Github repository and workshopper

A few things to install or clone before we start:

- expressworks workshopper:

```
> npm install -g expressworks
```

(see the rest of the very interesting workshopers at: <https://nodeschool.io/#workshoppers>)

After install you run it with:

```
> expressworks
```

- Example express mysql app:

```
> git clone https://github.com/quadrofolio/techgrounds-api.git
```



Agenda

- Introduction to REST, CRUD and request - response cycle
- HTTP methods/verbs
- Setting up Express
- Testing API routes
- Path & query parameters
- Retrieving data with your API
- Getting Hands-On with expressworks workshopper and example git repository



REST in express: Setting up

Representational State Transfer (REST)

HTTP verbs: GET, HEAD, POST, PUT, PATCH, DELETE, CONNECT, OPTIONS and TRACE

CRUD = CREATE READ UPDATE DELETE

GET = READ retrieve a resource

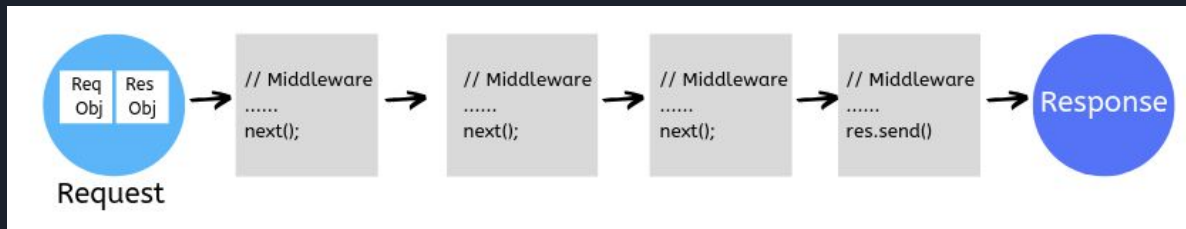
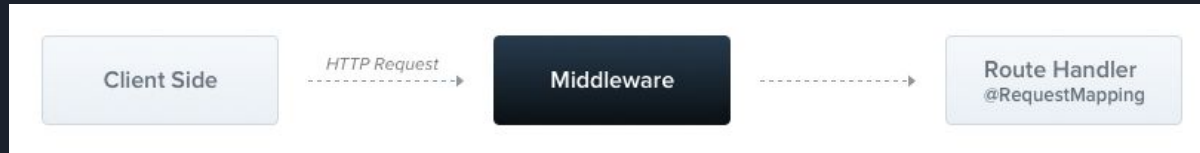
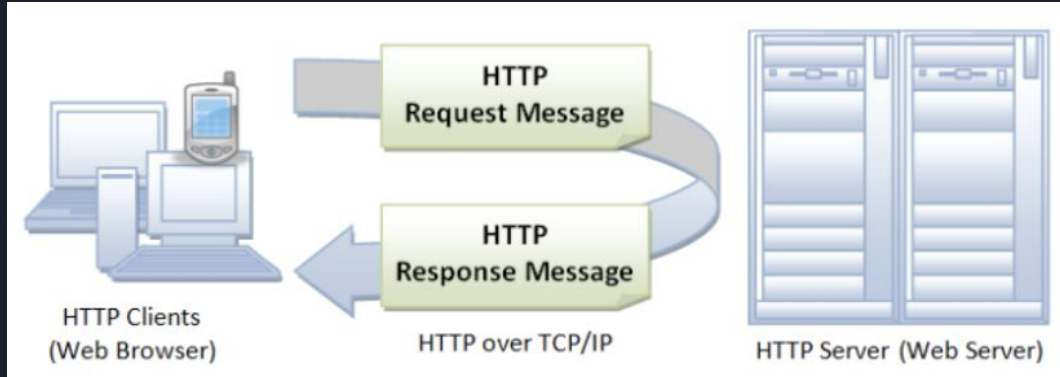
POST = CREATE insert new resource

PUT = UPDATE update by replacing complete resource

DELETE = DELETE remove a resource

(PATCH = update by patching certain properties of the resource)

Request → Middleware → Response cycle





REST in express: Setting up 1/2

You can use 2 methods:

1. create your own files, we'll do this one together
2. generate express app:

```
npx express-generator  
express --view=pug express-api
```



REST in express: Setting up 2/2

```
> mkdir express-api && cd express-api
> touch server.js
> npm init && npm i express -S && npm i nodemon -D
> code .
```

in server.js add:

```
import express from 'express';
const app = express();

app.get('/', (req, res) => {
  return res.send('Received a GET HTTP method');
});
app.post('/', (req, res) => {
  return res.send('Received a POST HTTP method');
});
app.put('/', (req, res) => {
  return res.send('Received a PUT HTTP method');
});
app.delete('/', (req, res) => {
  return res.send('Received a DELETE HTTP method');
});
app.listen(process.env.PORT, () =>
  console.log(`Example app listening on port ${process.env.PORT}!`),
);
```

```
> nodemon server.js
```



REST in express: testing with CURL

```
app.get('/', (req, res) => {  
  return res.send('Received a GET HTTP method');  
});  
app.post('/', (req, res) => {  
  return res.send('Received a POST HTTP method');  
});  
app.put('/', (req, res) => {  
  return res.send('Received a PUT HTTP method');  
});  
app.delete('/', (req, res) => {  
  return res.send('Received a DELETE HTTP method');  
});  
app.listen(3000, () =>  
  console.log(`Example app listening on port 3000!`),  
);
```

In terminal:

```
> curl http://localhost:3000 -> Received a GET HTTP method  
> curl -X POST http://localhost:3000 -> Received a POST HTTP method  
> curl -X PUT http://localhost:3000 -> Received a PUT HTTP method  
> curl -X DELETE http://localhost:3000 -> Received a DELETE HTTP method
```



REST in express: URI's & Resources

```
app.get('/users', (req, res) => {  
  return res.send('GET HTTP method on user resource');  
});  
app.post('/users', (req, res) => {  
  return res.send('POST HTTP method on user resource');  
});  
app.put('/users', (req, res) => {  
  return res.send('PUT HTTP method on user resource');  
});  
app.delete('/users', (req, res) => {  
  return res.send('DELETE HTTP method on user resource');  
});
```



REST in express: path/route & query parameters

Path/Route parameters:

```
app.put('/users/:userId', (req, res) => {  
  return res.send(  
    `PUT HTTP method on user/${req.params.userId} resource`,  
  );  
});
```

Query parameters:

```
app.delete('/users?userId=1', (req, res) => {  
  return res.send(  
    `DELETE HTTP method on user/${req.query.userId} resource`,  
  );  
});
```



REST in express: retrieving data

There are several ways to store data:

1. in memory JS objects (array, object), we'll do this one together
2. json or JS files with data (`jsondata = require('jsonfile.json')`
don't do this when your data needs to change)
3. databases:
 - a. SQLite
 - b. MySQL
 - c. Mongo
 - d. Postgress
 - e. etc.

REST in express: data from JS objects

```
let users = {
  1: {
    id: '1',
    username: 'Joost Klaver',
  },
  2: {
    id: '2',
    username: 'Guido Carucci',
  },
};
let messages = {
  1: {
    id: '1',
    text: 'Hello World',
    userId: '1',
  },
  2: {
    id: '2',
    text: 'Ciao World',
    userId: '2',
  },
};
```

```
let users = { ... };
let messages = { ... };

app.get('/users', (req, res) => {
  return res.send(Object.values(users));
});
app.get('/users/:userId', (req, res) => {
  return res.send(users[req.params.userId]);
});
```



REST in express: data from JS objects

To get a specific object you need to be able to find it.

So the Objects need a unique identifier = ID to be found on

In our data:

```
let messages = {  
  1: {  
    id: '1',  
    text: 'Hello World',  
    userId: '1',  
  },  
}
```

```
const message = messages[messageId];
```




REST in express: data from JS objects

```
> npm install uuid
```

```
// In server.js:
```

```
import uuidv4 from 'uuid/v4';
```

```
app.post('/messages', (req, res) => {  
  const id = uuidv4();  
  const message = {  
    id,  
    text: req.body.text,  
    userId: req.body.userId  
  };  
  messages[id] = message;  
  return res.send(message);  
});
```

But how do we create new ID's (POST http verb) ?



REST in express: data from JS objects

```
curl -X POST -H "Content-Type:application/json" http://localhost:3000/messages -d '{"text":"Hi again, World", "userId": 1}'
```

```
let messages = {  
  1: {  
    id: '1',  
    text: 'Hello World',  
    userId: '1',  
  },  
  2: {  
    id: '2',  
    text: 'By World',  
    userId: '2',  
  },  
  'df3f785c-57d2-11ea-82b4-0242ac130003': {  
    id: 'df3f785c-57d2-11ea-82b4-0242ac130003',  
    text: 'Hello again, World',  
    userId: '1',  
  },  
};
```




REST in express: data from JS objects

Remove a message from the messages object:

```
app.delete('/messages/:messageId', (req, res) => {  
  const {  
    [req.params.messageId]: message,  
    ...otherMessages  
  } = messages;  
  messages = otherMessages;  
  return res.send(message);  
});
```

```
curl -X DELETE http://localhost:3000/messages/1
```

```
let messages = {  
  2: {  
    id: '2',  
    text: 'By World',  
    userId: '2',  
  },  
  'df3f785c-57d2-11ea-82b4-0242ac130003': {  
    id: 'df3f785c-57d2-11ea-82b4-0242ac130003',  
    text: 'Hi again, World'  
  },  
};
```



REST in express: better solution is data from MySQL

```
> npm i mysql
```

```
var mysql = require('mysql')
var connection = mysql.createConnection({
  host: 'localhost',
  user: 'root',
  password: 'root',
  database: 'techgrounds'
})


// message model:
const Message = function(message) {
  this.text = message.text;
  this.userId = message.userId;
};
```

Create a database: techgrounds

Create 2 tables:

- users:
 - id,
 - username
- messages:
 - id,
 - text,
 - userId

(See: techgrounds.sql included in repository)



REST in express: better solution is data from MySQL

```
// inside GET route:
...
var messageId = req.param.messageId;
connection.connect()
connection.query(`SELECT * FROM messages WHERE id = ${messageId}`, function (err,res) {
  if (err) throw err;
  console.log('The found message: ', res[0]);
})
connection.end()

// inside POST route:
...
var newMessage = new Message({
  text: req.body.text,
  userId: req.body.userId
});
connection.connect()
connection.query('INSERT INTO messages SET ?', newMessage, function (err,res) {
  if (err) throw err;
  console.log('The new message: ', { id: res.insertId, ...newMessage });
})
connection.end()
```



REST in express: further reading

- Express: <https://expressjs.com/>
- Node: <https://nodejs.org/>
- Nodeschool: <https://nodeschool.io/#workshoppers>
- Express MySQL tutorial: <https://bezkoder.com/node-js-rest-api-express-mysql/>
- Express MySQL tutorial async: <https://time2hack.com/creating-rest-api-in-node-js-with-express-and-mysql/>
- Nodeschool workshoppers: <https://nodeschool.io/#workshoppers>
- Understanding express middleware by example:
<https://developer.okta.com/blog/2018/09/13/build-and-understand-express-middleware-through-examples>