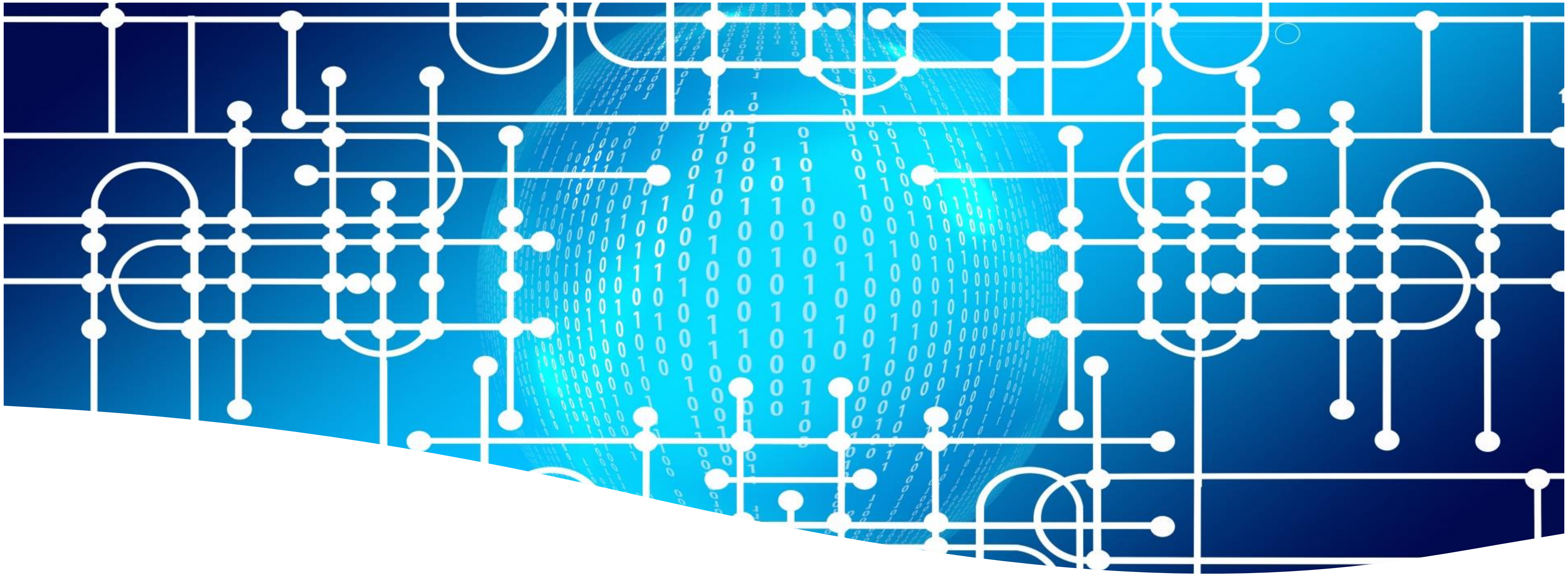


Full-stack Application Development

ExpressJS

Where to Find The Code and Materials?

https://github.com/iproduct/fullstack-typescript-react

TS

What Is Express?

- Express is fast, unopinionated, minimalist web framework for Node.js

npm install express –save

- Allows to build:
  - **Web Applications** - Express is a minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications.
  - **APIs** - with a myriad of HTTP utility methods and middleware at your disposal, creating a robust API is quick and easy.
- **Performance** - Express provides a layer of fundamental web application features, without obscuring Node.js features that you know and love.
- **Frameworks** - many popular frameworks are based on Express.

Express with TypeScript Simple HTTP Server Example

```
import * as express from 'express';
import { Request, Response } from 'express';


const app = express();
app.get("/", (req:Request, res:Response) => {
    res.send("Hello World")
})


const PORT = process.env.PORT || 3000;
app.listen(PORT, () => {
     console.log(`Server is running in http://localhost:${PORT}`)
})
```

Basic Routing

- ***Routing*** refers to determining how an application responds to a client request to a particular endpoint, which is a URI (or path) and a specific HTTP request method (GET, POST, and so on).
- Each route can have one or more handler functions, which are executed when the route is matched.
- **Route** definition takes the following structure:

`app.METHOD(PATH, HANDLER),` where:

  - app is an instance of express.
  - METHOD is an HTTP request method, in lowercase.
  - PATH is a path on the server.
  - HANDLER is the function executed when the route is matched.

- Ex: Respond to POST request on the root route (/), the application's home page:

```
app.post('/', function (req, res) { res.send('Got a POST request')})
```

Serving Static Files

- To serve static files such as images, CSS files, and JavaScript files, use the express.static built-in middleware function in Express:

```
express.static(root, [options])
```

- The root argument specifies the root directory from which to serve static assets. For more information on the options argument, see express.static.

- Example – serve images, CSS/JS/HTML/etc. files from a directory named public:

```
app.use(express.static('public'))
```

- To create a virtual path prefix (where the path does not actually exist in the file system) for files that are served by the express.static function, specify a mount path for the static directory, as shown below:

```
app.use('/static', express.static(path.join(__dirname, 'public')))
```

Route Parameters

- Route parameters are named URL segments that are used to capture the values specified at their position in the URL.
- The captured values are populated in the req.params object, with the name of the route parameter specified in the path as their respective keys - Ex:

Route path: /users/:userId/books/:bookId Request URL: http://localhost:3000/users/34/books/8989 req.params: { "userId": "34", "bookId": "8989" }

- To define routes with route parameters, simply specify the route parameters in path:

```
app.get('/users/:userId/books/:bookId', function (req, res) {
res.send(req.params) })
```

- The name of route parameters must be made up of “word characters” ([A-Za-z0-9_]). Since the hyphen (-) and the dot (.) are interpreted literally, they can be used along with route parameters for useful purposes.

Route path: /flights/:from-:to Request URL: http://localhost:3000/flights/LAX-SFO req.params: { "from": "LAX", "to": "SFO" }

Route path: /plantae/:genus.:species Request URL: http://localhost:3000/plantae/Prunus.persica req.params: { "genus": "Prunus", "species": "persica" }

Route Parameters - I

- Route parameters are named URL segments that are used to capture the values specified at their position in the URL.
- The captured values are populated in the req.params object, with the name of the route parameter specified in the path as their respective keys - Ex:

Route path: /users/:userId/books/:bookId
Request URL: http://localhost:3000/users/34/books/8989
req.params: { "userId": "34", "bookId": "8989" }

- To define routes with route parameters, simply specify the route parameters in path:

```
app.get('/users/:userId/books/:bookId', function (req, res) {
   res.send(req.params)
})
```

Route Parameters - II

- The name of route parameters must be made up of “word characters” ([A-Za-z0-9_]). Since the hyphen (-) and the dot (.) are interpreted literally, they can be used along with route parameters for useful purposes.

Route path: /flights/:from-:to
Request URL: http://localhost:3000/flights/LAX-SFO
req.params: { "from": "LAX", "to": "SFO" }

Route path: /plantae/:genus.:species
Request URL: http://localhost:3000/plantae/Prunus.persica
req.params: { "genus": "Prunus", "species": "persica" }

- To have more control over the exact string that can be matched by a route parameter, you can append a regular expression in parentheses (()):

Route path: /user/:userId(\d+)
Request URL: http://localhost:3000/user/42
req.params: {"userId": "42"}

Response methods

Method	Description
res.download()	Prompt a file to be downloaded.
res.end()	End the response process.
res.json()	Send a JSON response.
res.jsonp()	Send a JSON response with JSONP support.
res.redirect()	Redirect a request.
res.render()	Render a view template.
res.send()	Send a response of various types.
res.sendFile()	Send a file as an octet stream.
res.sendStatus()	Set the response status code and send its string representation as the response body.

app.route()

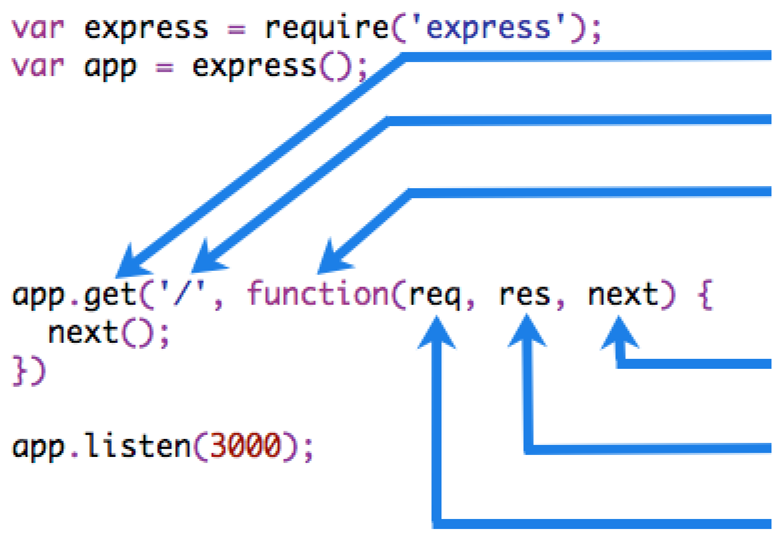
```
app.route('/book')
    .get(function (req, res) {
        res.send('Get a random book') })
    .post(function (req, res) {
        res.send('Add a book') })
    .put(function (req, res) {
        res.send('Update the book')
    })
```

express.Router

```
var express = require('express')
var router = express.Router()

// middleware that is specific to this router
router.use(function timeLog (req, res, next) {
    console.log('Time: ', Date.now())
    next()
})
// define the home page route
router.get('/', function (req, res) {
    res.send('Birds home page')
})
// define the about route
router.get('/about', function (req, res) {
    res.send('About birds')
})
module.exports = router
```

Writing Middleware for Express



```
var express = require('express');
var app = express();


app.get('/', function(req, res, next) {
  next();
})

app.listen(3000);
```

- HTTP method for which the middleware function applies.
- Path (route) for which the middleware function applies.
- The middleware function.
- Callback argument to the middleware function, called "next" by convention.
- HTTP response argument to the middleware function, called "res" by convention.
- HTTP request argument to the middleware function, called "req" by convention.

Error Handling

- For errors returned from asynchronous functions invoked by route handlers and middleware, you must pass them to the next() function, where Express will catch and process them:

```
app.get('/', function (req, res, next) {
    fs.readFile('/file-does-not-exist', function (err, data) {
        if (err) {
            next(err) // Pass errors to Express.
        } else {
            res.send(data)
        }
    })
})
```

- Writing custom error handlers:

```
function errorHandler (err, req, res, next) {
    if (res.headersSent) {
        return next(err)
    }
    res.status(500)
    res.render('error', { error: err })
}
```

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Thank's for Your Attention!

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