

Topics: Servlets, TS, Angular

Key Concepts

Servlet API - *javax.servlet.**

-A package containing interfaces and classes used by a servlet and web container to communicate with a web server.

GenericServlet - Defines a generic, protocol-independent servlet. To write an HTTP servlet for use on the Web, extend [HttpServlet](#) instead.

```
public abstract class GenericServlet extends java.lang.Object
    implements Servlet, ServletConfig, java.io.Serializable
```

HttpServlet - Provides an abstract class to be subclassed to create an HTTP servlet suitable for a Web site.

```
public abstract class HttpServlet extends GenericServlet
```

Servlet lifecycle

init() - once, begin life, called at startup (specified in web.xml) or at first request

service() - zero or more times, called for each request to servlet

destroy() - once, end of life

Web container

- A component of the server, which manages the servlets and maps request and response object from the server to the appropriate servlet through the use of a web.xml file.
- A **web container** (also known as a servlet **container**; and compare "webtainer") is the component of a **web** server that interacts with Java servlets. A **web container** is responsible for managing the lifecycle of servlets, mapping a URL to a particular servlet and ensuring that the URL requester has the correct access-rights.

HTTP methods

- GET - request information from the server (cannot have a body, just sends a uri)
- POST - adding information to the server (can have a body json or text)
- PUT - updating information in the server (can have a body json or text)
- DELETE - durr
- PATCH - update or modify the collection
- OPTIONS - used to describe the communication options for the target resource. The client can specify a URL for the OPTIONS method, or an asterisk (*) to refer to the entire server.
- TRACE - performs a message loop-back test along the path to the target resource, providing a useful debugging mechanism.
- HEAD - Requests headers from resource if obtained via GET method
- CONNECT - starts connection with a resource; Successful response has body

HTTP Status codes - 1XX, 2XX, 3XX, 4XX, 5XX, and important status codes like 200, 201, 404, 402, 403, 401, 418, 502

- 100s - Informational codes

- 200s - success codes

- 300s - redirect codes

- 400s - client side error codes

- 500s - server side errors

- 200 - OK; standard success message

- 201 - CREATED; request fulfilled, new resource created

- 401 - UNAUTHORIZED; same as 401, but used for when authentication is required

- 402 - PAYMENT REQUIRED; used for payment schemes

- 403 - FORBIDDEN; valid request, but server refuses action (permission issues)

- 404 - NOT FOUND; resource could not be found

- 418 - I'm a teapot; April fools :)

- 502 - BAD GATEWAY; The server was acting as a [gateway](#) or proxy and received an invalid response from the upstream server.

Deployment Descriptor (web.xml)

- A **deployment descriptor** (DD) refers to a configuration file for an artifact that is deployed to some container/engine. In the Java Platform, Enterprise Edition, a **deployment descriptor** describes how a component, module or application (such as a web application or enterprise application) should be deployed.

War vs jar packaged apps

- Jar files: contain libraries, resources and accessories files like property files
- War files: contains the web application that can be deployed on any servlet/jsp container. The .war file contains jsp, html, javascript and other files necessary for the development of web applications.

@WebServlet

- Annotation used to declare a servlet. This annotation is processed by the container at deployment time, and the corresponding servlet made available at the specified URL patterns.

HTTP method signatures

Redirect vs forward

- Redirect:
 - Pro: changes the url
 - Con: total of two request/responses
 - redirect sets the response status to 302 [1], and the new url in a `Location` header, and sends the response to the browser. Then the browser, according to the http specification, makes another request to the new url
- Forward:
 - Pro: only one request/response

- Con: Url does not change.
- forward happens entirely on the server. The servlet container just forwards the same request to the target url, without the browser knowing about that. Hence you can use the same request attributes and the same request parameters when handling the new url. And the browser won't know the url has changed (because it has happened entirely on the server)

Method of the request and response objects

- doGet(HttpServletRequest req, HttpServletResponse resp)
- doPost(HttpServletRequest req, HttpServletResponse resp)

Form processing

- Using a name vs id
- getParameter methods
- Submit
- Action tag, etc
- Synchronous requests

Servlet config

- The ServletConfig parameters are specified for a particular servlet and are unknown to other servlets. It is used for initializing purpose.
- This config object is public to a particular servlet only

Servlet context

- The ServletContext parameters are specified for an entire application outside of any particular servlet and are available to all the servlets within that application. It has application scoped and thus globally accessible across the pages.

PrintWriter

- Prints formatted representations of objects to a text-output stream.

Request and response headers

- HTTP headers allow the client and the server to pass additional information with the request or the response in the form of name-value pairs

Servlet filters**Front controller design pattern - Servlet filters are a filter you set up over every request that comes in like cors filter

SPA(Single Page App)

- a web application or web site that interacts with the user by dynamically rewriting the current page rather than loading entire new pages from a server. This approach avoids interruption of the user experience between successive pages, making the application behave more like a desktop application. In an SPA, either all necessary code – HTML, JavaScript, and CSS – is retrieved with a single page load, or the appropriate resources are dynamically loaded and added to the page as necessary, usually in response to user actions.

Using a forward to send html as response

- `request.getRequestDispatcher(html-file-path).forward(request, response);`

Session management

- process of securing multiple requests to a service from the same user or entity. In many cases, a session is initialized by authenticating a user or entity with factors such as a password. Once the user is authenticated, subsequent requests authenticate the session as opposed to the user themselves.

HTTPSession

- Provides a way to identify a user across more than one page request or visit to a Web site and to store information about that user.
 - HttpSession is an interface that allows an instance of a web page to store information relevant to a user's period of activity on the app without requesting it from the server

Cookies

- small piece of stateful information (such as items added in the shopping cart) or record of the user's browsing activity (including clicking particular buttons), sent from a server and stored on the user's web browser

Hidden forms - Forms/fields on the html page not visible to the user, but may contain information that gets sent along with requests

ObjectMapper and the Jackson API

- Provides an object and associated methods for working with JSON in java
- 5/31/18

Typescript

- a superset of JavaScript (JS). This means that any valid JS code is valid TS code. However, TS has additional features that do not exist in the current version of JS. This includes: strong typing (optional, but recommended), object-oriented features (classes, interfaces, enums, access modifiers, generics, etc.), compile-time errors. A transpiled language (translated to JS).

Cli

- command line interface is a way of interacting with a program by issuing commands in successive lines of text

Angular - a JavaScript framework

- A typescript-based framework designed to simplify the development of single-page front end applications. Its compiled into javascript and HTML.

Module

- A module is a collection of services, directives, controllers, filters, and configuration information.

Components

- Components are the most basic building block of angular. They allow us to break down code, html, and styles that make up a website into tightly coupled units. An angular application can be thought of as a tree of these units. And every template can contain only a single instance any one component.

Template

- The actual HTML of our component that will be generated by our component tag. It's the visual display of the component that will appear on the website.

Decorators (@) **(examples)

- Provide metadata about our components and other features

Directives - AngularJS directives are extended HTML attributes with the prefix **ng-** they allow for additional functionality in applications

- AngularJS
- @custom,
- *structural,
- [attribute]

Data binding

- Data-bind in AngularJS apps is the automatic synchronization of data between the model and view components.
- {{interpolation}},
- (event),
- [property],
- Two Way
 - [(ngModel)] → “exposed by FormsModule”

Npm

- npm is the default package manager for the JavaScript runtime environment Node.js. It consists of a command line client and an online database of public private packages, called the npm registry.

Node

- Node.js is a cross-platform JavaScript run-time environment that executes JavaScript code server-side. This lets developers produce dynamic web page content before the page is sent to the user's web browser. Node.js represents a "JavaScript everywhere" paradigm, unifying web application development around a single programming language.

Strict typing

- A strictly typed language requires type specification on all data being interacted with

TypeScript

- TypeScript is an open-source programming language developed and maintained by Microsoft. It is a strict syntactical superset of JavaScript, and adds optional static typing to the language.

ECMAScript - the scripting language specification that typescript and javascript are based from

Webpack

- Webpack is an open-source JavaScript module bundler. Webpack takes modules with dependencies and generates static assets representing those modules. The bundler can be used from the command line, or can be configured using a config file which is named webpack.config.js
- Webpack is a build automation tool, it is responsible for gathering scripts and stylesheets, bundling them, then minifying them for optimization.

Bundling

- module bundling is the process of stitching together a group of modules (and their dependencies) into a single file (or group of files) in the correct order. By grouping related modules together the number of requests to the server is diminished

Access modifiers

- TypeScript only has two (public, private). Classes are implicitly public.

Variable types

- number, boolean, string, void, null, undefined, never, any

Classes

Interfaces

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Attribute directives vs structural directives

- **Structural directives** manipulate the DOM's layout by adding or removing elements.
 - Examples
 - ngIf (Adds/Removes element based on boolean expression)
 - ngFor (Repeater directive)
 - **Attribute directives** change the appearance or behavior of an element.
 - Examples
 - ngModel (binds a formcontrol, such as input, to a property)
 - ngClass (Manipulates multiple predefined classes at once)
 - ngStyle (Updates HTML element styles)

Components

- Most basic building block of a UI in Angular. Components always have a template and only one component can be instantiated per element in a template.
- @Component defined in @angular/core

Modules

- Modules are a way of grouping components, directives, pipes, and services in angular.

Templates

- Templates are the method used in angular to display a module. Templates contain html snippets along with directives and string interpolation that allows for dynamic display of data. And when another template includes the tag for a component, you can think of the other component's template as being inserted in place of the tag.

Data binding

- Data binding is the method used in Angular to display data from the model and transmit changes back to the model. There is string interpolation, which is a common case of data binding that displays the string representation of an expression on the page. But in general, data binding is the synchronization of the model and the view.

Services

- Services are a method of providing code reusability in Angular. They allow you to define a class that can be injected into components. This allows components to use the functionality defined within a service and avoids the need to organize that functionality within a full fledged component.

Routing

- The system angular uses to navigate the website. Every URL is considered a path, and components are associated with paths on the website using the RouterModule. Then in the root display, these components can be shown using the router-outlet tag.

HTTP in angular

- Most front-end applications communicate with backend services over the HTTP protocol, angular uses the XMLHttpRequest object as we've been working with

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HttpClient

- The HttpClient is an HTTP API for Angular applications that rests on the XMLHttpRequest interface exposed by browsers. Additional benefits of HttpClient include testability features, typed request and response objects, request and response interception, Observable apis, and streamlined error handling.

Observables

- A collection of data that arrives asynchronously over time. Observables help manage asynchronous data. To use Observables, import a third party library (rxjs)

Template driven forms

- Template driven forms are a method of breaking down forms into components. It involves creating a template, usually for a specific class, that allows the data to be edited or created by a user. This increases modularity in an angular application by bundling the data display, editing, and validation into a single component.
- The developer places HTML form controls (such as <input> and <select>) in the component template and binds them to data model properties in the component, using directives like ngModel. Angular directives create form control objects for you, handles pushing and pulling data values with ngModel, and updates the mutable data model with user changes as they happen.

Reactive forms

- With reactive forms, you create a tree of Angular form control objects in the component class and bind them to native form control elements in the component template.
(The developer creates form control objects, pushes and pulls data values with ngModel, and updates the mutable data model with user changes.)?

Design patterns - publisher, subscriber MVC,

Questions'

What is a servlet?

- A **servlet** is a Java programming language class used to extend the capabilities of servers that host applications accessed by means of a request-response programming model. Although **servlets** can respond to any type of request, they are commonly used to extend the applications hosted by web servers.

What is dependency injection and how does Angular implement it

- dependency injection is a technique whereby one object (or static method) supplies the dependencies of another object. - You rarely create an Angular injector yourself. Angular creates injectors for you as it executes the app, starting with the root injector

What is a server

- a computer or computer program that manages access to a centralized resource or service in a network.

What is a client

- a desktop computer or workstation that is capable of obtaining information and applications from a server.

What is HTTP

- HyperText Transfer Protocol
- HTTP is the underlying protocol used by the www and this protocol defines how messages are formatted and transmitted, and what actions web servers and browsers should take in response to various commands
- HTTP is a stateless protocol because each command is executed independently, without any knowledge of the commands that came before it.

Why is HTTP used over other transfer protocols

- Because it's the most powerful and most secure, provides specific methods for get,post,put,delete. Also due to being most popular, at this point you deal in http in order to work with what an end user expects.

How is a request to a servlet processed?

- Servlet mapping is used to redirect it to an individual servlet, and the servlet will process the doGet or doPost and send a response back to the client.

What are some exceptions you've encountered working with servlets

- (In Java) ServletException, IOException, NumberFormatException
- (Status Codes) 400, 403, 404, 500

How can i create an angular app with the CLI

- Ng new appNameHere

What is a module

- Collection of services, directives, controllers, filters, and configuration information.

What is the root module

- “The root module is the app.module.ts and it is the... base module that is required to have in every angular application”-Nate the tank

Why use angular/routes

- Angular provides a modular design pattern that allows us to create large more stable applications than we could normally do in just javascript and html. By using typescript, we also provide structure for the code of our application that facilitates much better error detection and typing than we find in just javascript.

Explain observables and why we subscribe to them

- Observables are declarative—that is, you define a function for publishing values, but it is not executed until a consumer subscribes to it. Observables are also a key that we do not necessarily find any information.

