

CISC 3120

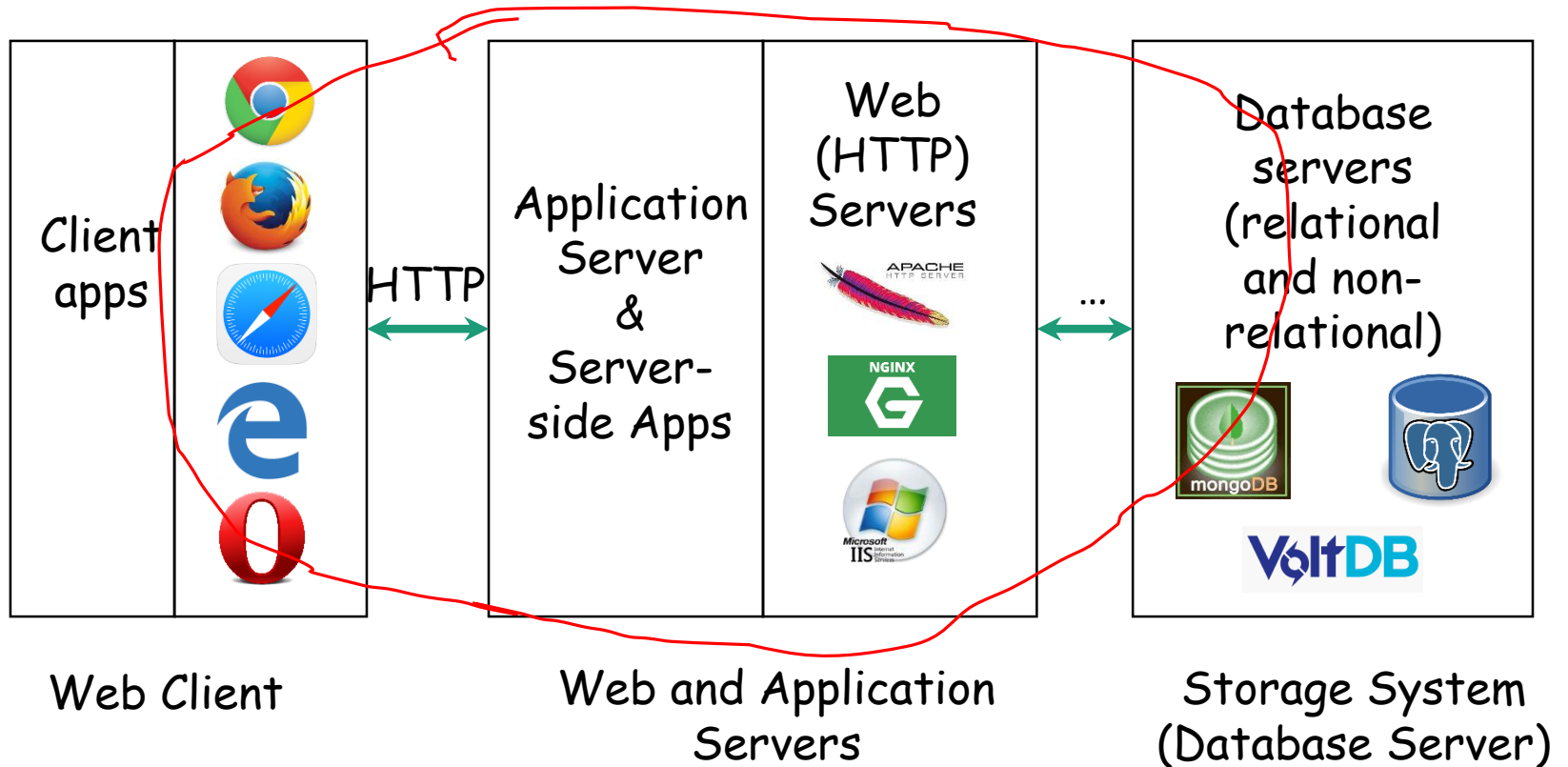
C27: The Spring Framework: A Brief Introduction

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Web Application Architecture



Web Development: Some Challenges

- Browsers may not be compatible or may not completely conform to the standard
- Lots of libraries, technologies, languages, and APIs
- Distributed on the network

Web Application Framework

- Collection of applications, libraries, and APIs to support large web application development
- Example
 - For Java
 - The Spring framework
 - Apache Wicket
 - ...

The Spring Framework

- Aimed at building multiple tier applications in Java
- Incorporate many design patterns
 - Factory pattern
 - MVC pattern
 - ...
- Support automated testing

Main Components

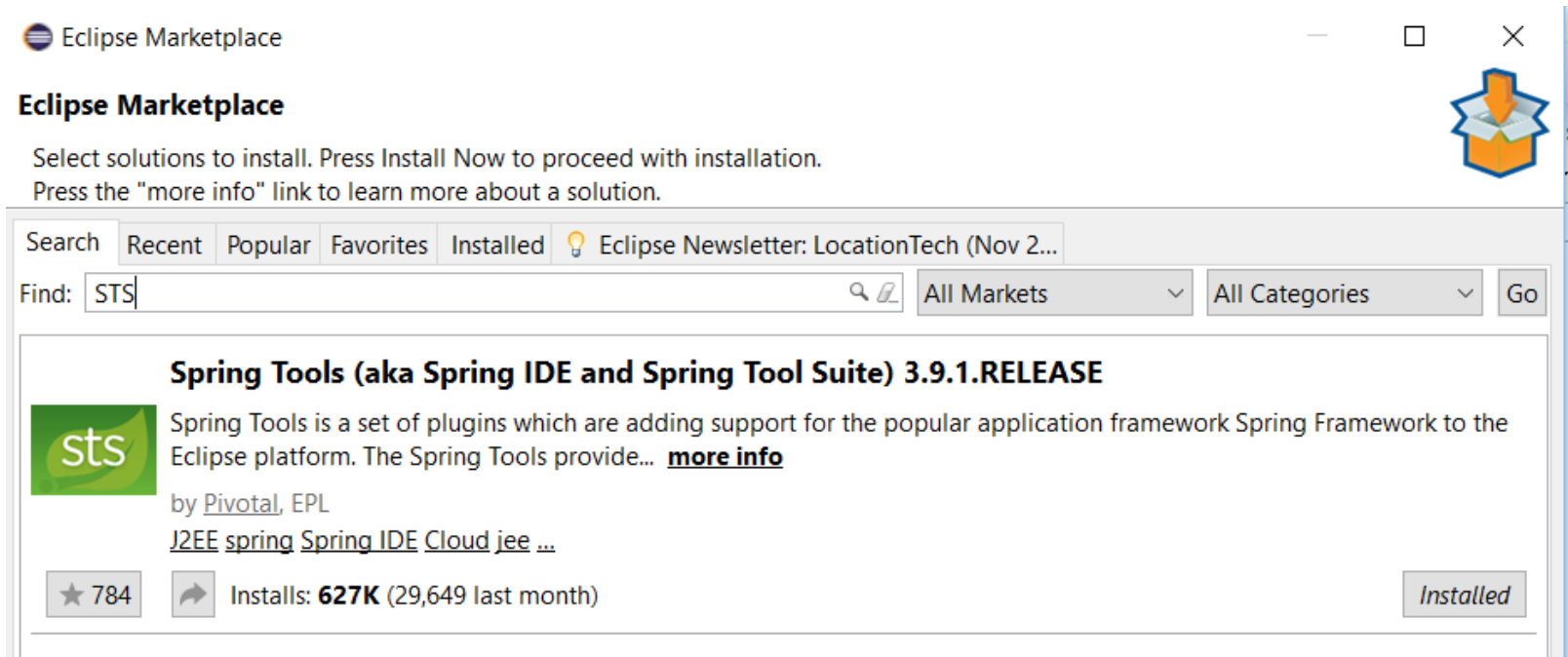
- Core: IoC container, Events, Resources, i18n, Validation, Data Binding, Type Conversion, SpEL, AOP.
- Testing: Mock objects, TestContext framework, Spring MVC Test, WebTestClient.
- Data Access: Transactions, DAO support, JDBC, ORM, Marshalling XML.
- Web Servlet: Spring MVC, WebSocket, SockJS, STOMP messaging.
- Web Reactive: Spring WebFlux, WebClient, WebSocket.
- Integration: Remoting, JMS, JCA, JMX, Email, Tasks, Scheduling, Cache.
- Languages: Kotlin, Groovy, Dynamic languages.

How do we begin?

- Best to experience it by building a simple app with the Spring framework

Spring Tool Suite (STS)

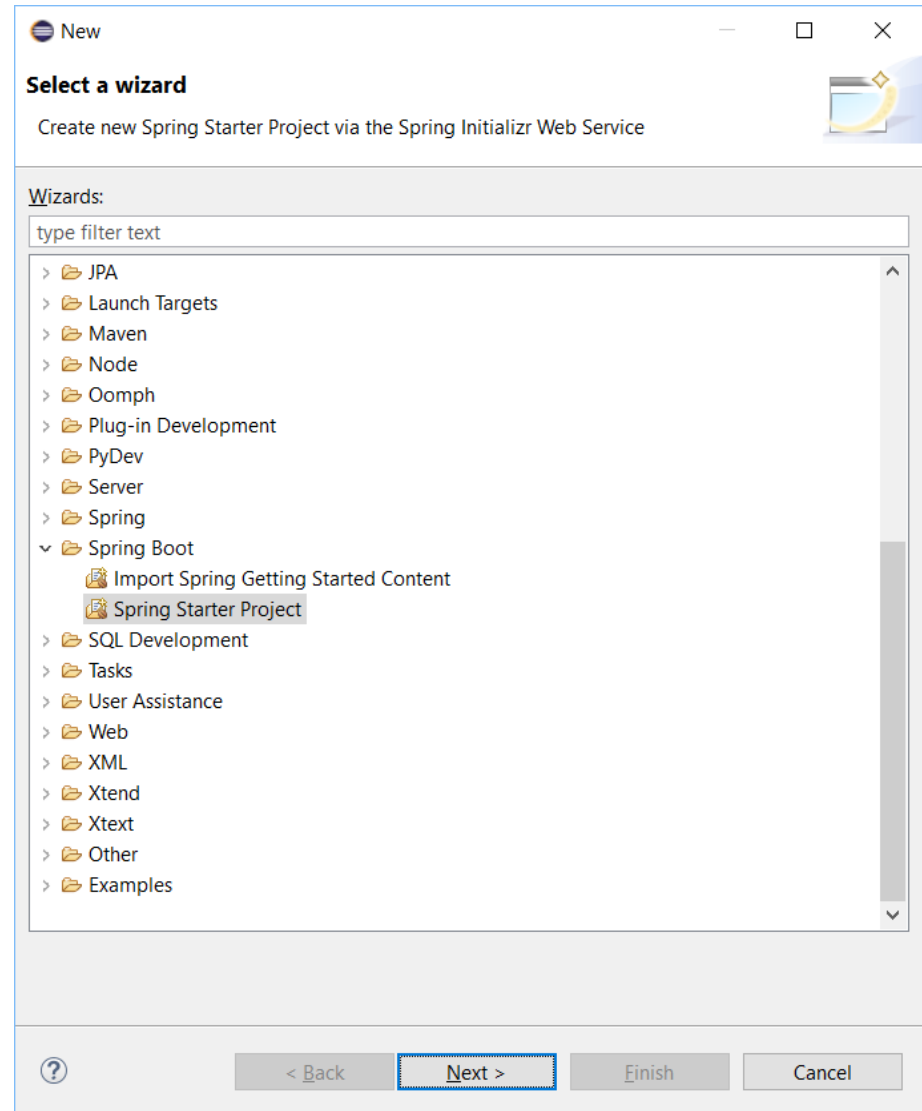
- Eclipse → Help → Eclipse Marketplace → Search "STS" → Install



The screenshot shows the Eclipse Marketplace window. At the top, it says "Eclipse Marketplace" with a close button. Below that, it says "Eclipse Marketplace" and "Select solutions to install. Press Install Now to proceed with installation. Press the 'more info' link to learn more about a solution." There is a search bar with "STS" entered. Below the search bar, there are tabs for "Search", "Recent", "Popular", "Favorites", "Installed", and "Eclipse Newsletter: LocationTech (Nov 2...". The search results show "Spring Tools (aka Spring IDE and Spring Tool Suite) 3.9.1.RELEASE" with a green "sts" logo. The description says "Spring Tools is a set of plugins which are adding support for the popular application framework Spring Framework to the Eclipse platform. The Spring Tools provide... more info". It is by Pivotal, EPL. There are 784 stars and 627K installs (29,649 last month). An "Installed" button is visible.

Hello, Spring

- Create the project
- Spring Boot →
Spring Starter
Project



Set up Maven Project

- In this class (CISC 3120), we use Maven.
- Other choices of build automation system also available, such as, Gradle.

New Spring Starter Project

Service URL:

Name:

Use default location

Location:

Type: Packaging:

Java Version: Language:

Group:

Artifact:

Version:

Description:

Package:

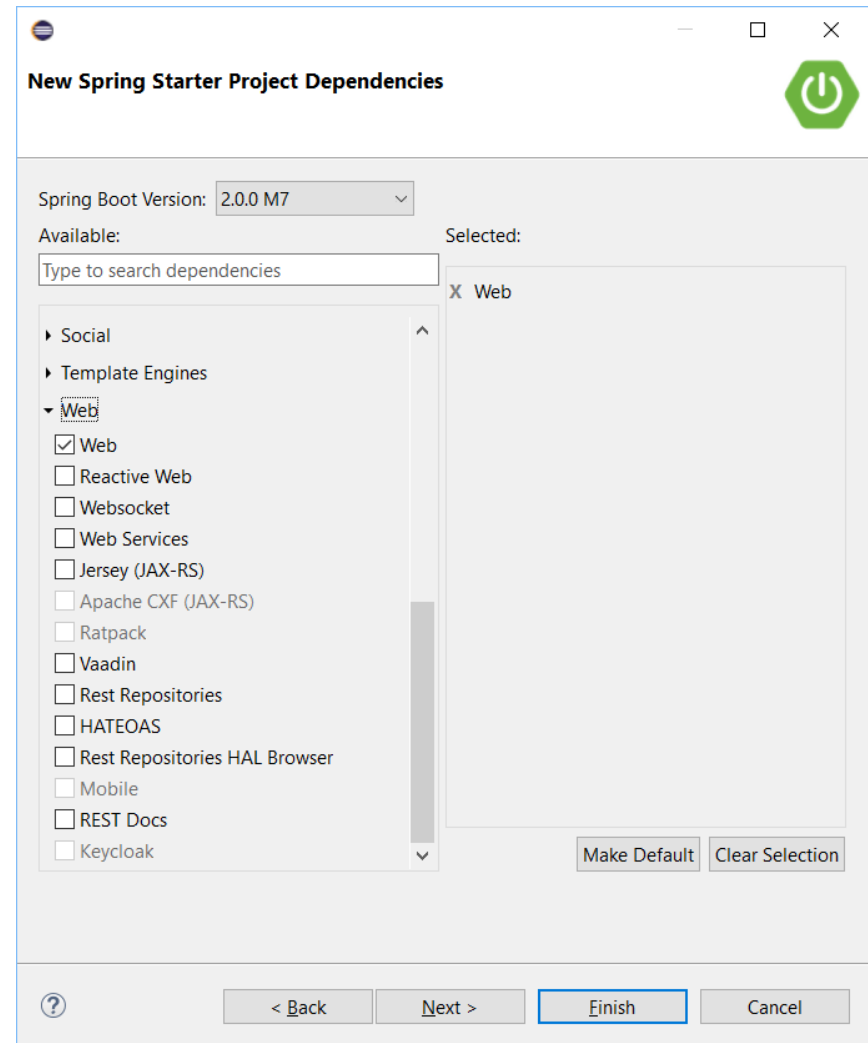
Working sets

Add project to working sets

Working sets:

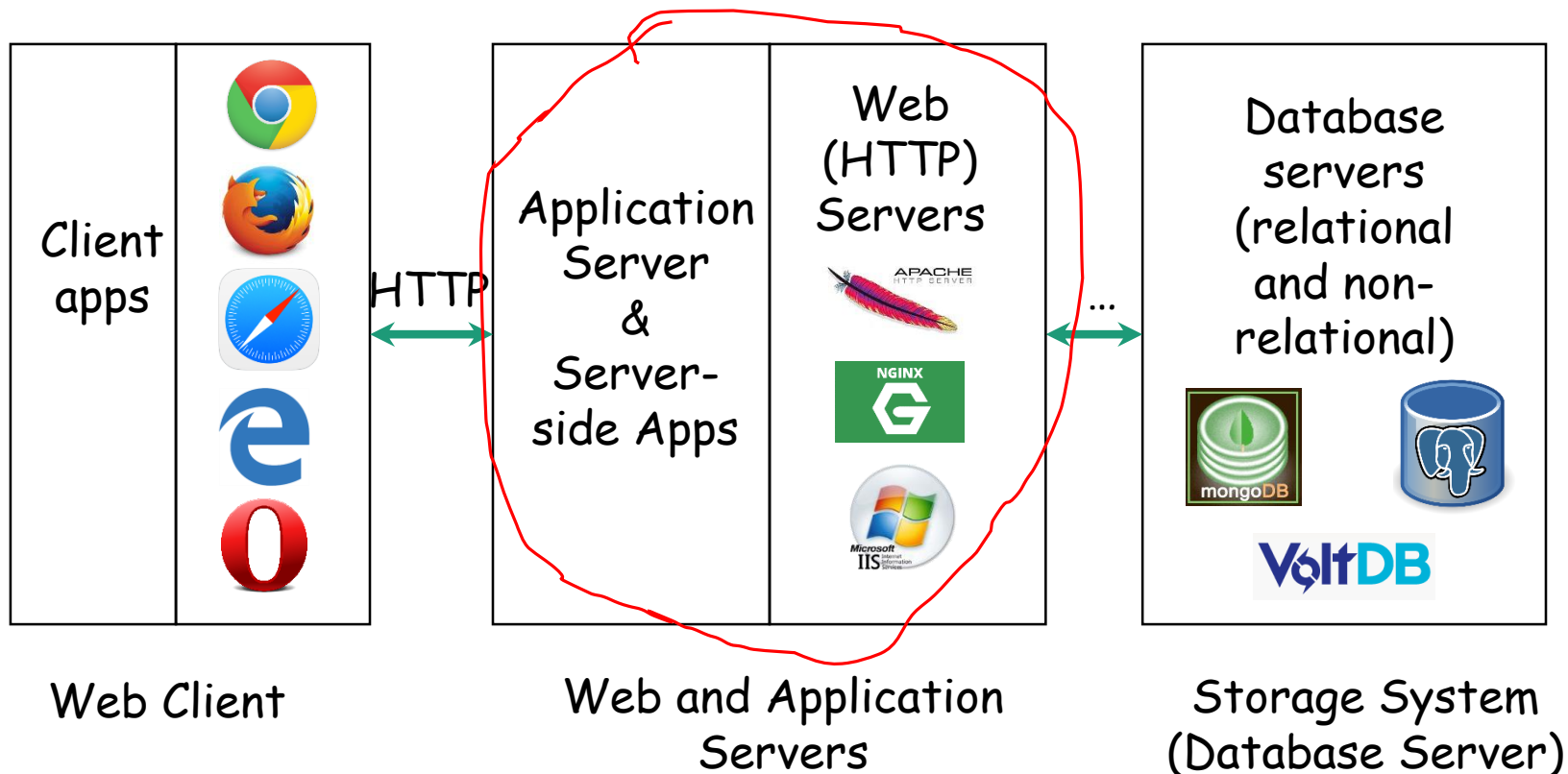
Select Dependencies

- Spring has many components.
- Check "Web" for this simple Web application



Web Service

- It in effect runs as a "Web service"



Controller and Runner

- Refer to the Starter Guide for additional discussion:
<https://spring.io/guides/gs/spring-boot/>
- Add the HelloController class
- Add the CommandLineRunner method to HelloSpringApplication class
 - Not necessary, just to provide the means to investigate the application

Inspect Network State

- Upon running the application, inspect network status on the host

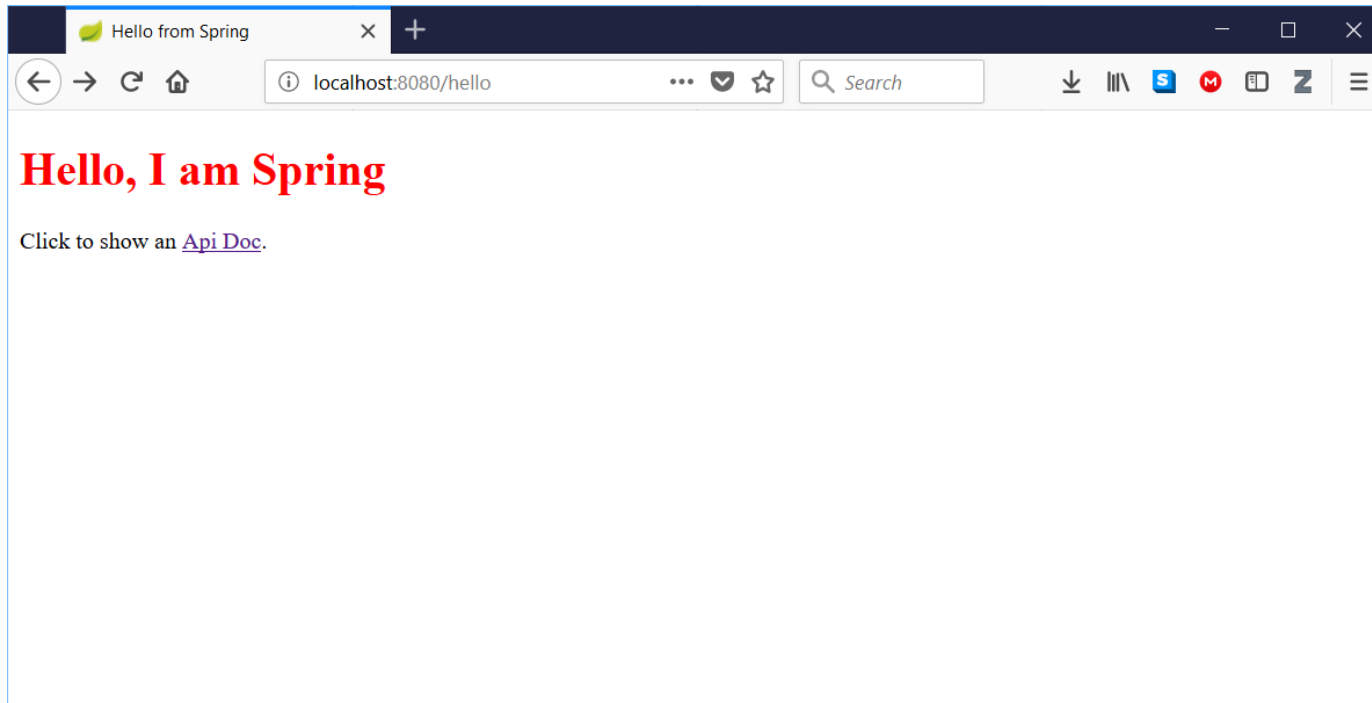
```
C:> netstat -anp tcp
```

```
Active Connections
```

Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:8080	0.0.0.0:0	LISTENING

Invoke the Web Service

- Point your browser the URL:
`http://localhost:8080/hello`



JUnit Test in Spring

- Spring supports unit testing
- See `HelloControllerTest.java`

Questions?

- Hello, World in Spring Framework
 - RESTful web service
 - Request mapping
 - Inspect network status
 - JUnit test setup