The LockManager App Case Study: Server Structure & Functionality (Part 1)

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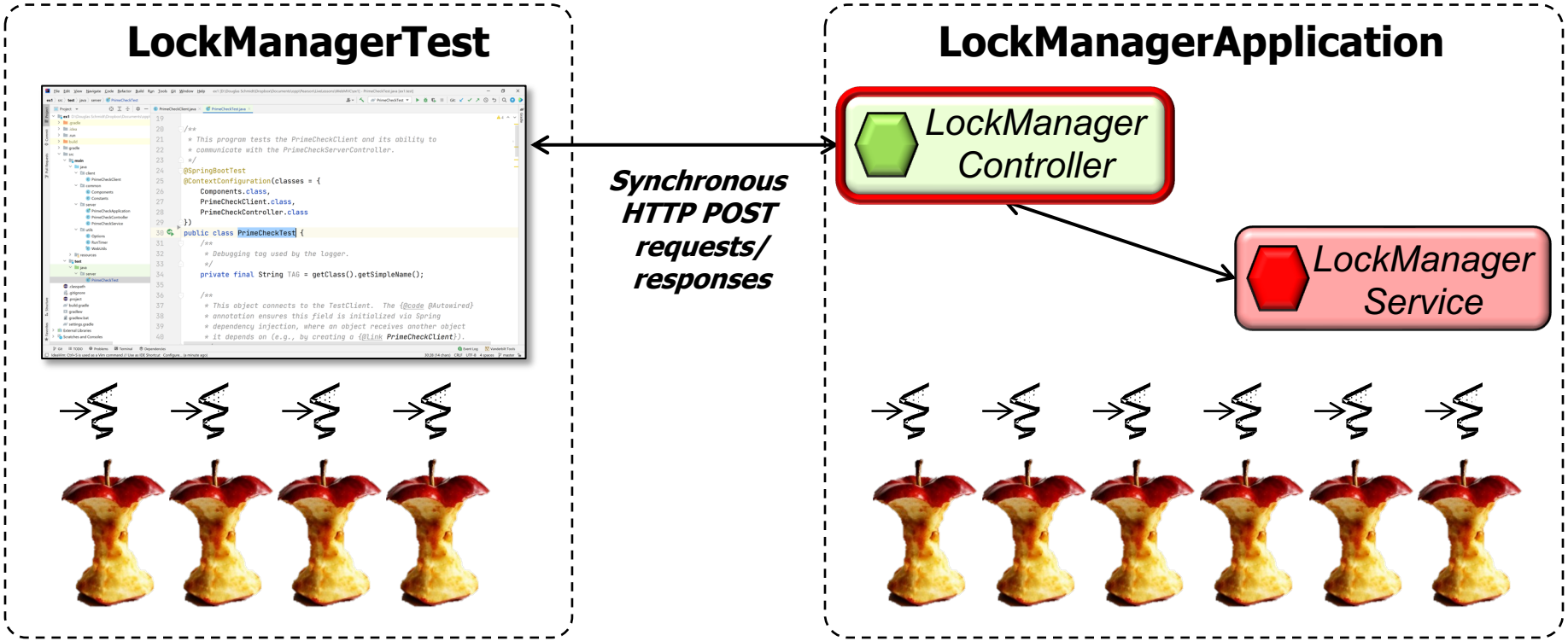
Learning Objectives in this Part of the Lesson

- This lesson shows the structure & functionality of the controller class for the LockManager microservice developed using Spring WebMVC



See WebMVC/ex5/src/main/java/edu/vandy/lockmanager/server

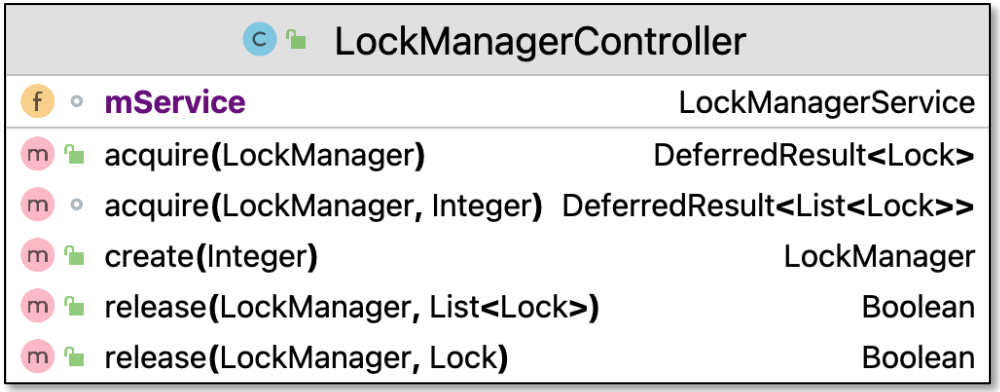
Structure & Functionality of the LockManagerController

Structure & Functionality of the LockManagerController

- LockManagerController maps HTTP POST requests to endpoint handlers

```
@RestController
public class LockManagerController {
   @Autowired
   LockManagerService mService;

   ...
```



See WebMVC/ex5/src/main/java/edu/vandy/lockmanager/server/LockManagerController.java

Structure & Functionality of the LockManagerController

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```

This annotation ensures request handling methods in the controller class automatically serialize return objects into HttpResponse objects

See www.baeldung.com/spring-controller-vs-restcontroller

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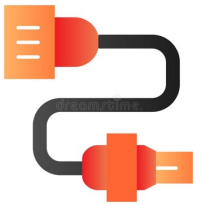

This field is auto-wired by Spring's dependency injection framework

See www.baeldung.com/spring-autowire

Structure & Functionality of the LockManagerController

- LockManagerController maps HTTP POST requests to endpoint handlers

```
@RestController
public class LockManagerController {
   ...
   @PostMapping(CREATE)
   public LockManager create(@RequestParam Integer permits)
   ...
   @PostMapping(ACQUIRE_LOCK)
   public DeferredResult<Lock> acquire
            (@RequestParam LockManager lockManager) ...

   @PostMapping(RELEASE_LOCK)
   public Boolean release
            (@RequestParam LockManager lockManager,
             @RequestBody Lock lock) ...
```

These endpoint handler methods forward to the LockManagerService methods that fulfill the requests

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These annotations map HTTP POST requests to endpoint handler methods

See www.baeldung.com/spring-new-requestmapping-shortcuts

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HTTP POST requests are used since server state is modified

See www.baeldung.com/cs/http-get-vs-post

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These strings identify & route to endpoint handler methods from incoming HTTP POST requests

See www.baeldung.com/spring-new-requestmapping-shortcuts

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This annotation maps the one-&-only Http Request body to a Java object

See www.baeldung.com/spring-request-response-body

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This annotation can extract query parameters, form params, & files from an HTTP request

See www.baeldung.com/spring-request-param

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This Java class enables the microservice to generate the result via a background thread the service choses

See springframework/web/context/request/async/DeferredResult.html

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@RestController
public class LockManagerController {
  @PostMapping(ACQUIRE_LOCK)
  public DeferredResult<Lock> acquire()
           (@RequestParam LockManager lockManager) {
    var result = new DeferredResult<Lock>();

    var callback = new Callback() {
      public void onSuccess(Lock lock)
      {result.setResult(lock);}
      public void onError(Throwable error)
      { result.setErrorResult(error); }};

    mService.acquire(lockManager, callback);
    return result; ...
```
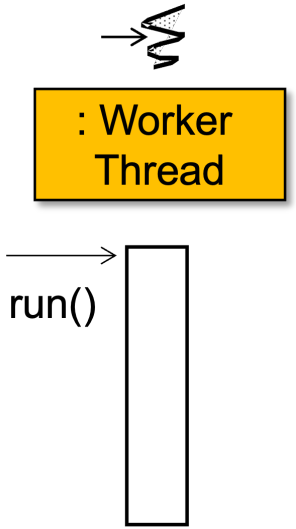

Acquire a Lock via Spring's DeferredResult mechanism



The LockManagerController acquire() method runs in an HTTP worker thread

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Helps offload a long-running operation from an HTTP worker thread to a (virtual) thread

See springframework/web/context/request/async/DeferredResult.html

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Handles completion or failure of an asynchronous operation

See WebMVC/ex5/src/main/java/edu/vandy/lockmanager/common/Callback.java

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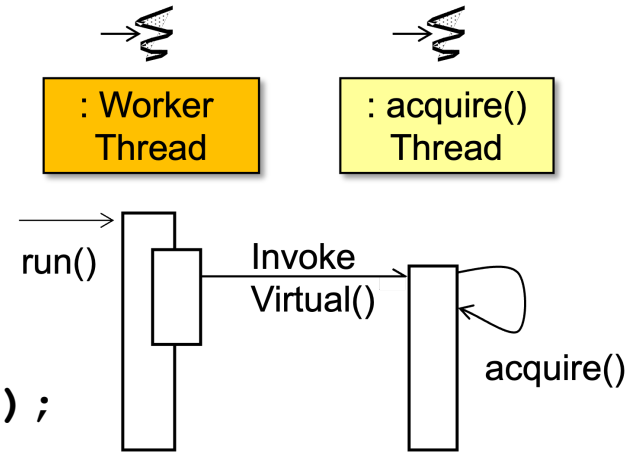

Run acquire() & associated callback in a virtual thread

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Return the Deferred Result immediately

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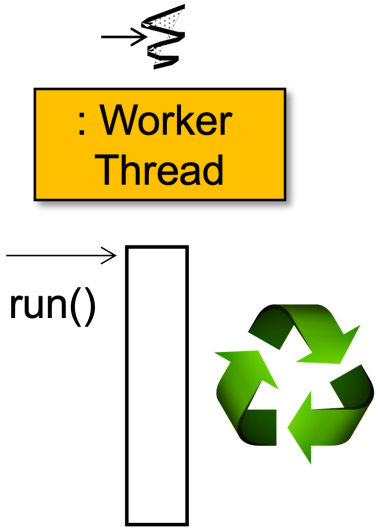

The HTTP worker thread can be recycled after acquire() returns

End of the LockManager App Case Study: Server Structure & Functionality (Part 1)