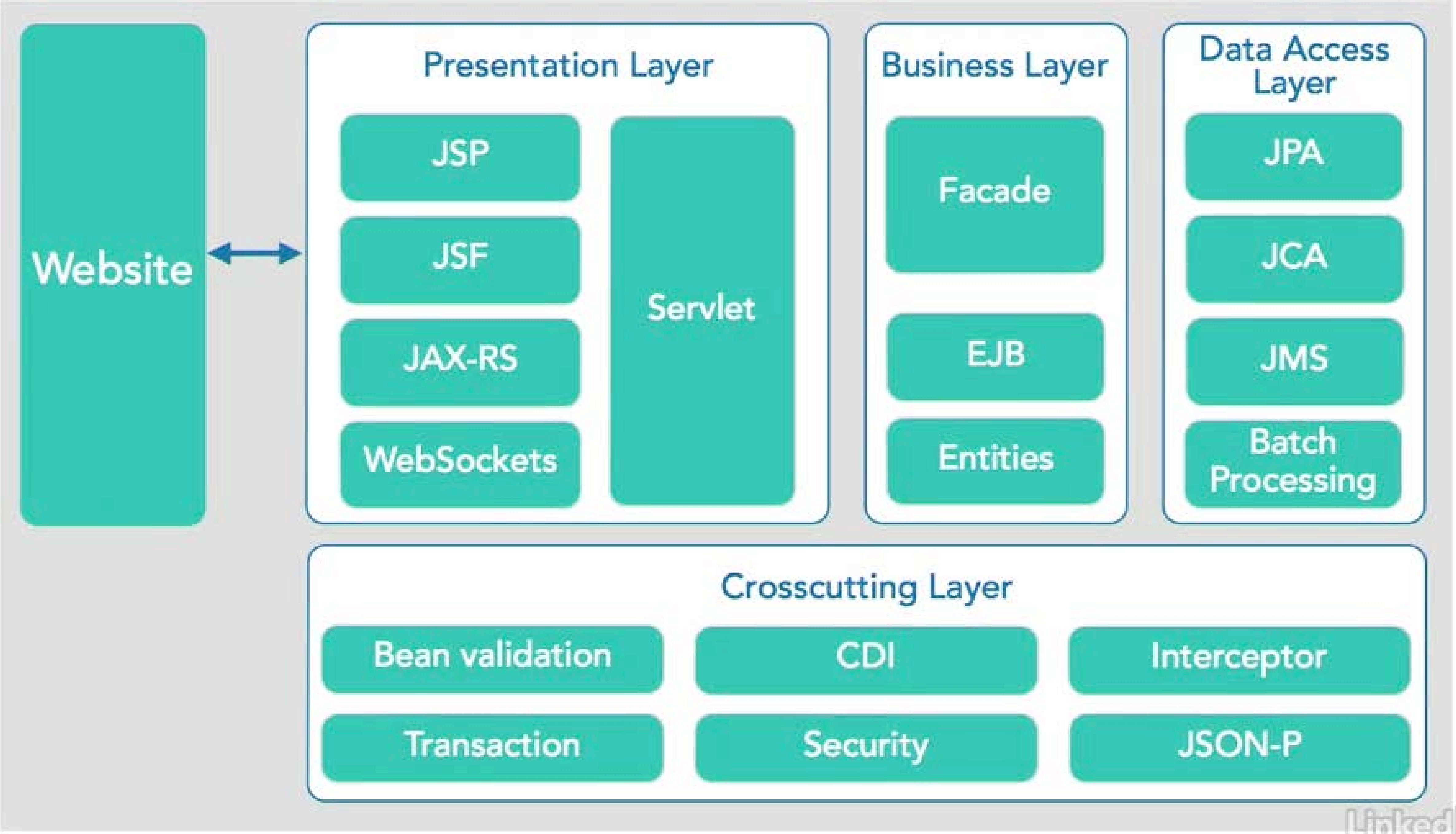
EJB3 Introduction

New programming model

- Convention over configuration
- Dependency injection
- Simple POJO no class hierarchy



Website

Presentation Layer

JSP

JSF

JAX-RS

WebSockets

Servlet

Business Layer

Facade

EJB

Entities

Data Access Layer

JPA

JCA

JMS

Batch Processing

Crosscutting Layer

Bean validation

CDI

Interceptor

Transaction

Security

JSON-P

Container Services

- Thread safety
- Bandwidth throttled
- Monitoring
- Transactional and pooling

Enterprise Java Beans

Business logic

- @Stateless, @Stateful, @Singleton

Workflow logic

- @MessageDriven

Three Access Modes

- Local (default) – from within the container only
- Remote – by an external application
- Web service – by the client using web service as the protocol
- Session: @Local, @Remote, @LocalBean, @WebService
- Message Driven: @WebService

Management Mode

- Container – container uses convention over configuration
- Bean managed – developer manages behaviour of beans

Service Annotations

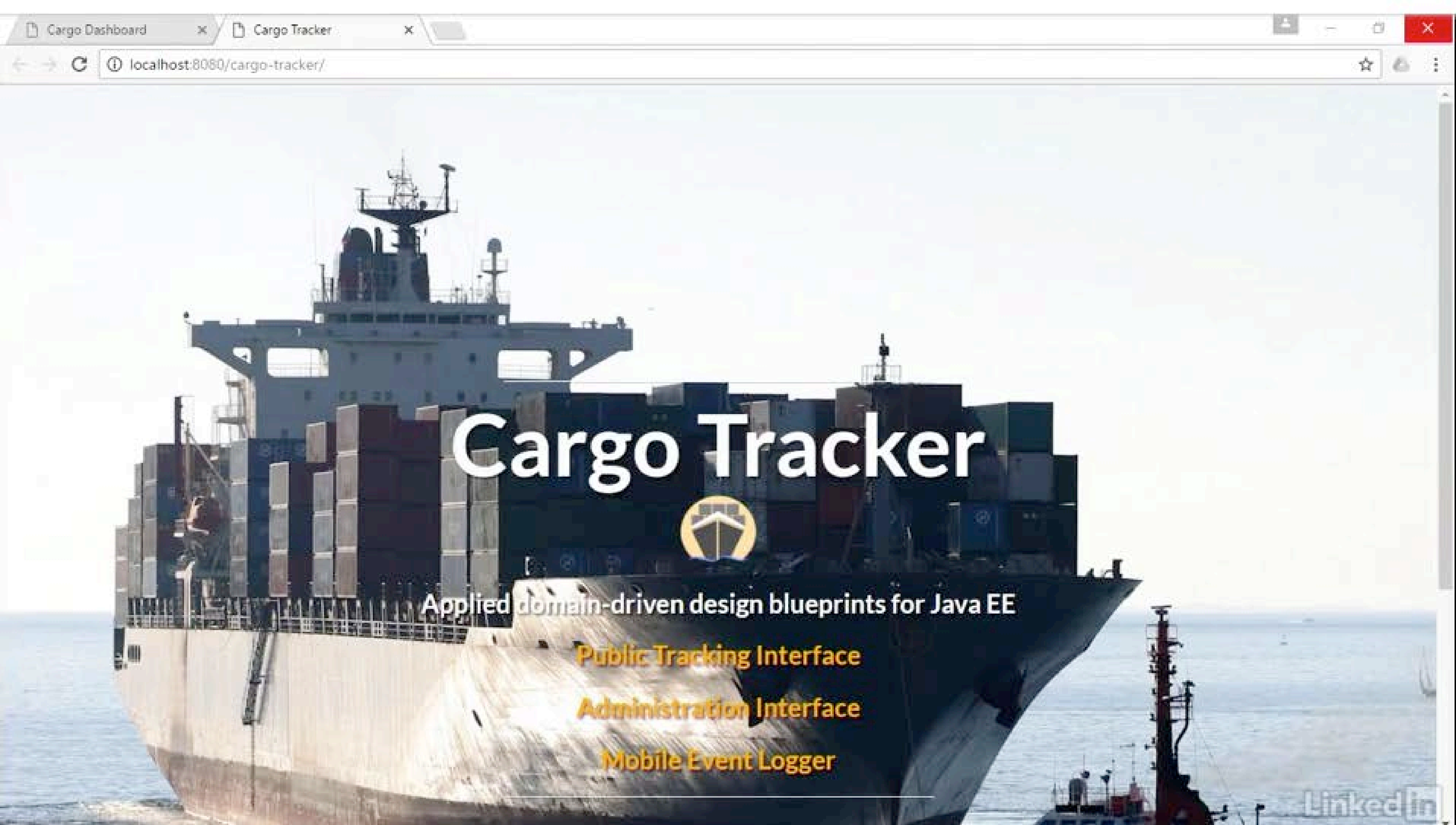
- Concurrency: @Lock, @AccessTimeout

Service Annotations

- Concurrency: @Lock, @AccessTimeout
- Transactions: @Transactional, @TransactionAttribute
- Security: @PermitAll, @RolesAllowed
- Access: @Remote, @Local
- Behaviour: @Schedule, @Asynchronous

EJB3 Introduction

	@Stateless	@Stateful	@Singleton
Remote Client Access	✓	✓	✓
Local Client Access	✓	✓	✓
Concurrent Client Access	X	X	X
Unique Per Client	✓	✓	X
Client-bean Instances	Pooled	1:1	Many:1



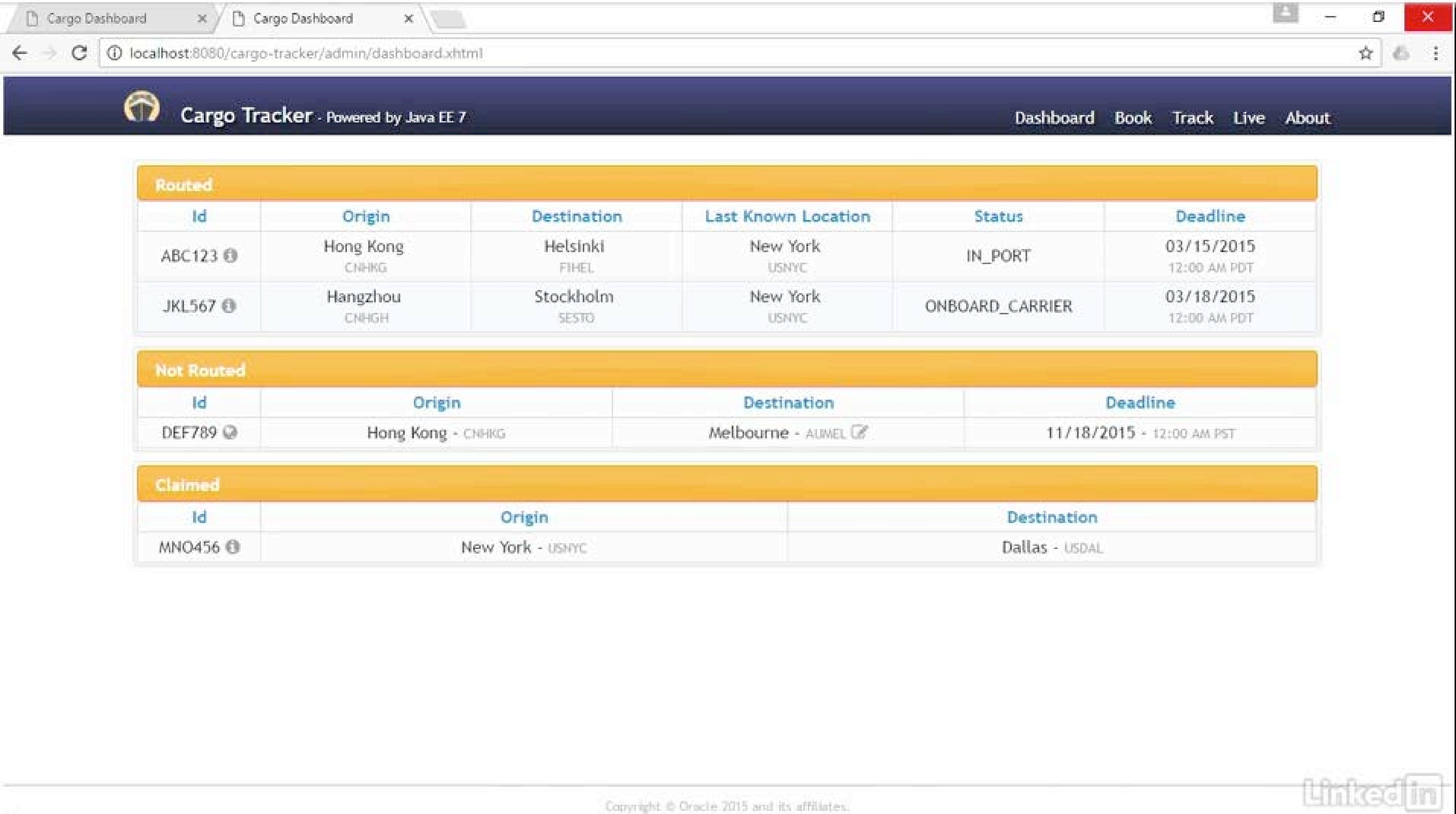
Cargo Tracker

Applied domain-driven design blueprints for Java EE

Public Tracking Interface

Administration Interface

Mobile Event Logger


Cargo Dashboard
Cargo Dashboard
localhost:8080/cargo-tracker/admin/dashboard.xhtml
Cargo Tracker - Powered by Java EE 7
Dashboard
Book
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Live
About

Routed

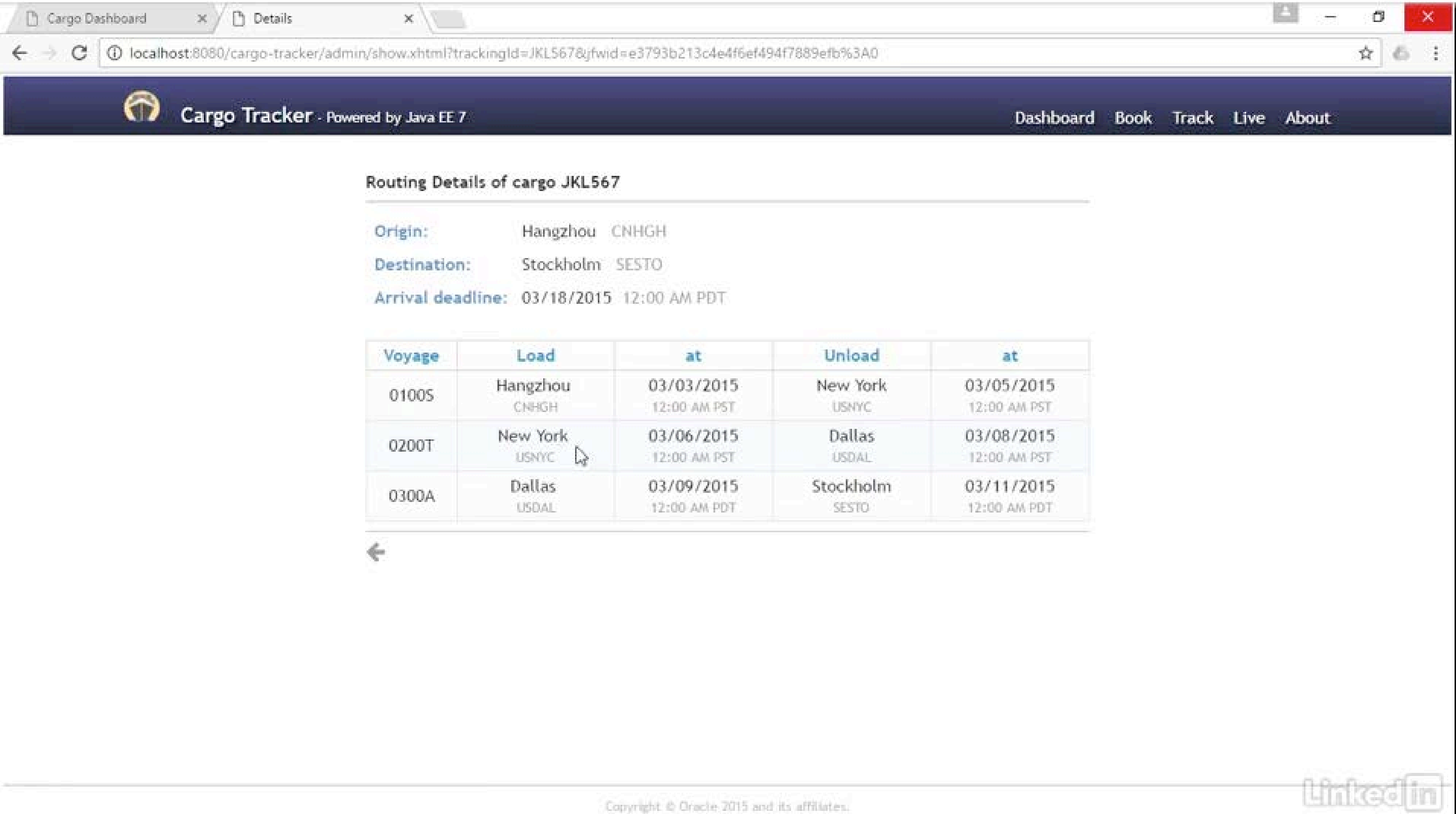
Id	Origin	Destination	Last Known Location	Status	Deadline
ABC123	Hong Kong CNHKG	Helsinki FIHEL	New York USNYC	IN_PORT	03/15/2015 12:00 AM PDT
JKL567	Hangzhou CNHGH	Stockholm SESTO	New York USNYC	ONBOARD_CARRIER	03/18/2015 12:00 AM PDT

Not Routed

Id	Origin	Destination	Deadline
DEF789	Hong Kong - CNHKG	Melbourne - AUMEL	11/18/2015 - 12:00 AM PST

Claimed

Id	Origin	Destination
MNO456	New York - USNYC	Dallas - USDAL



Cargo Dashboard
Details
localhost:8080/cargo-tracker/admin/show.xhtml?trackingId=JKL567&jfwid=e3793b213c4e4f6ef494f7889efb%3A0
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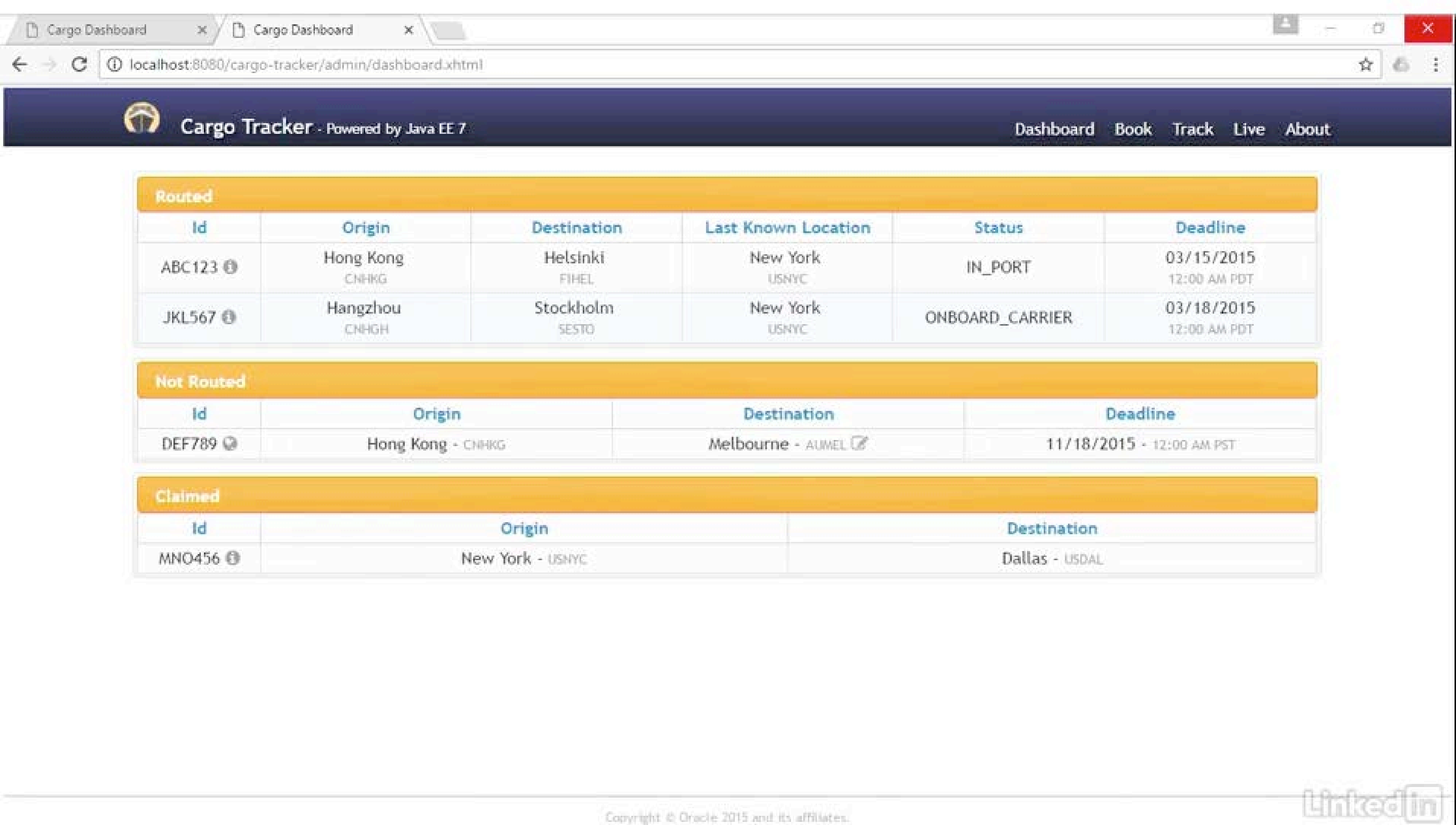
Routing Details of cargo JKL567

Origin:	Hangzhou CNHGH
Destination:	Stockholm SESTO
Arrival deadline:	03/18/2015 12:00 AM PDT

Voyage	Load	at	Unload	at
0100S	Hangzhou CNHGH	03/03/2015 12:00 AM PST	New York USNYC	03/05/2015 12:00 AM PST
0200T	New York USNYC	03/06/2015 12:00 AM PST	Dallas USDAL	03/08/2015 12:00 AM PST
0300A	Dallas USDAL	03/09/2015 12:00 AM PDT	Stockholm SESTO	03/11/2015 12:00 AM PDT



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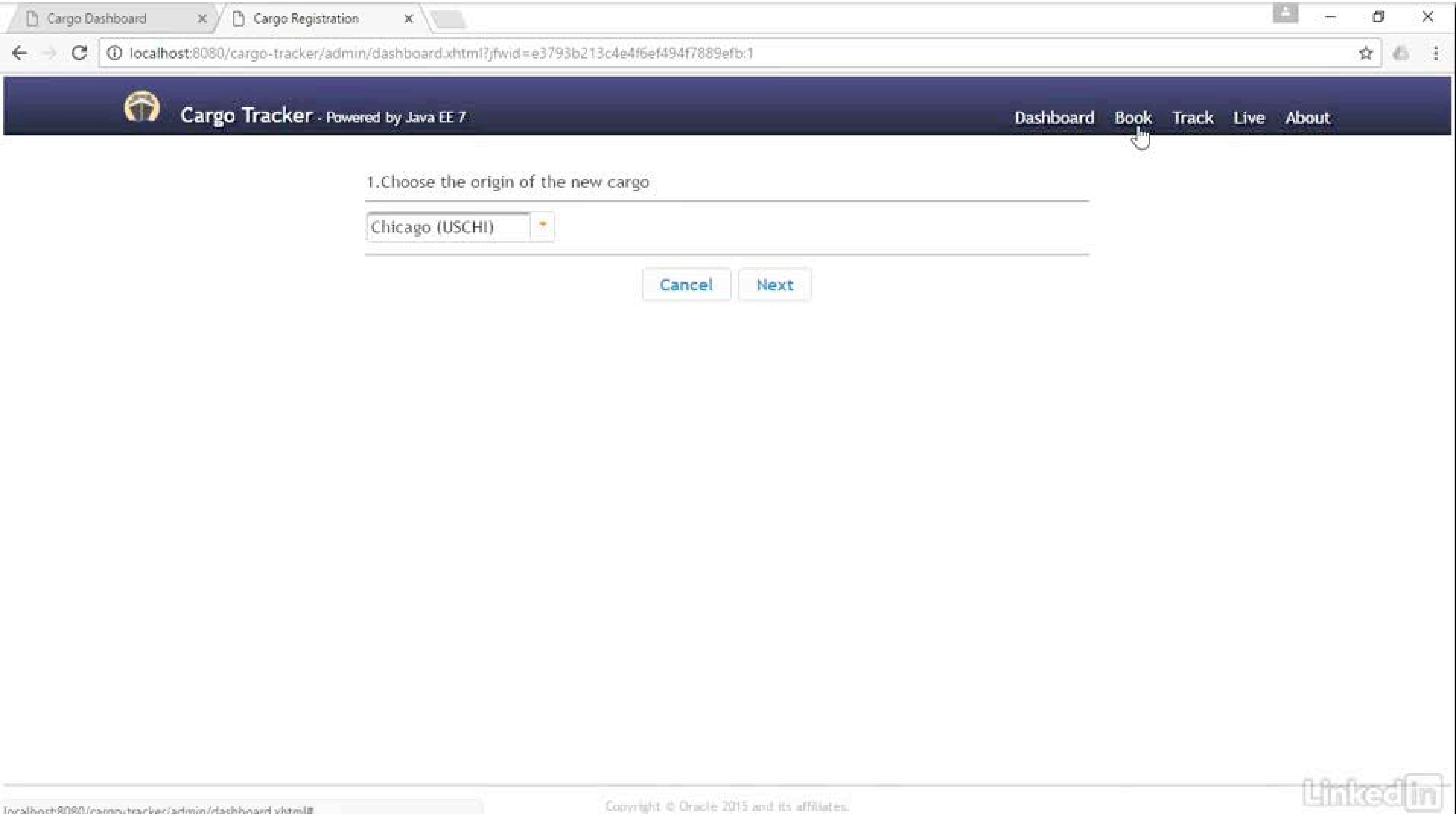
Cargo Dashboard
Cargo Registration
localhost:8080/cargo-tracker/admin/dashboard.xhtml?jfwid=e3793b213c4e4f6ef494f7889efb:1
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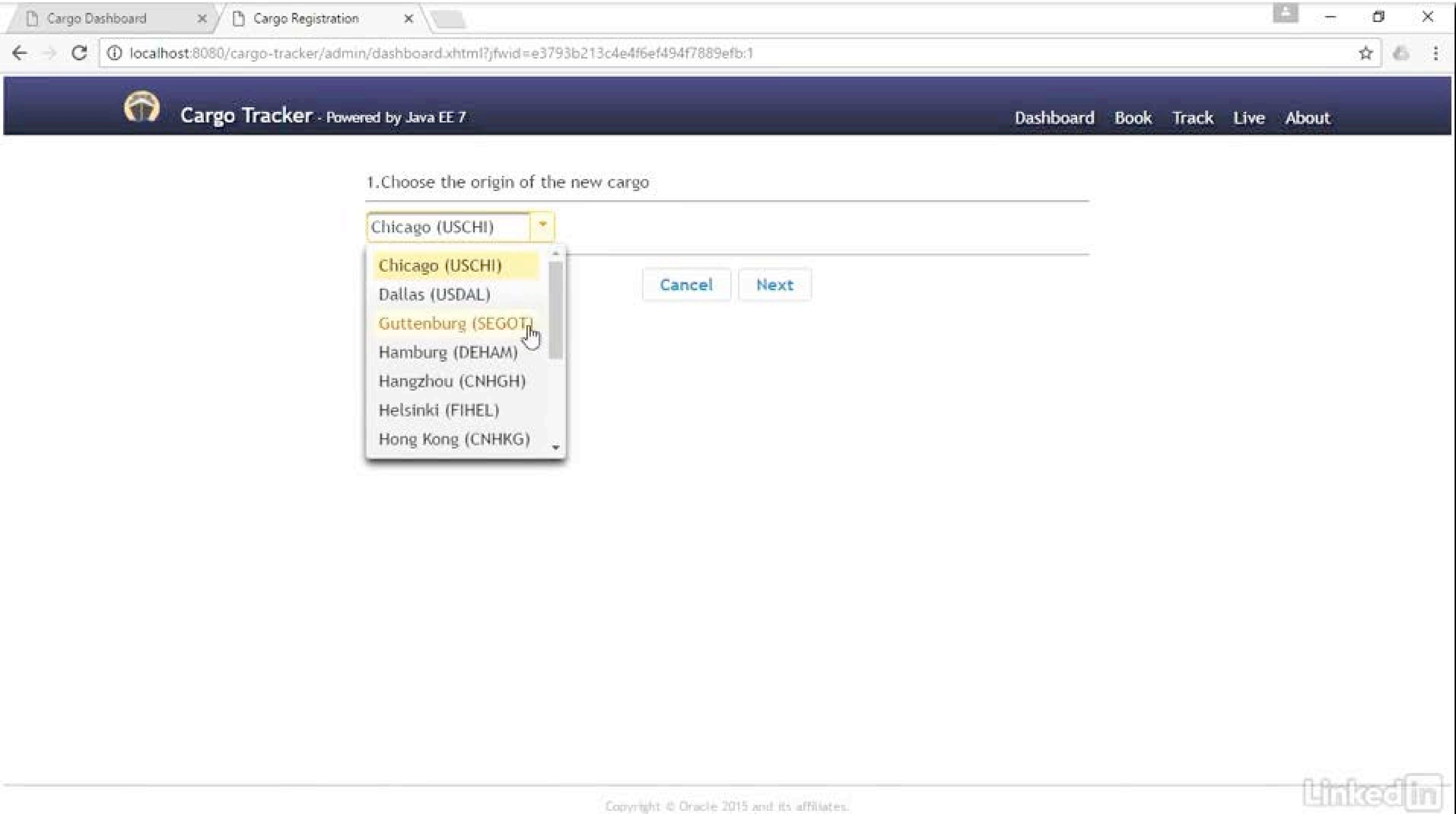
1.Choose the origin of the new cargo

Chicago (USCHI)

Cancel
Next
localhost:8080/cargo-tracker/admin/dashboard.xhtml#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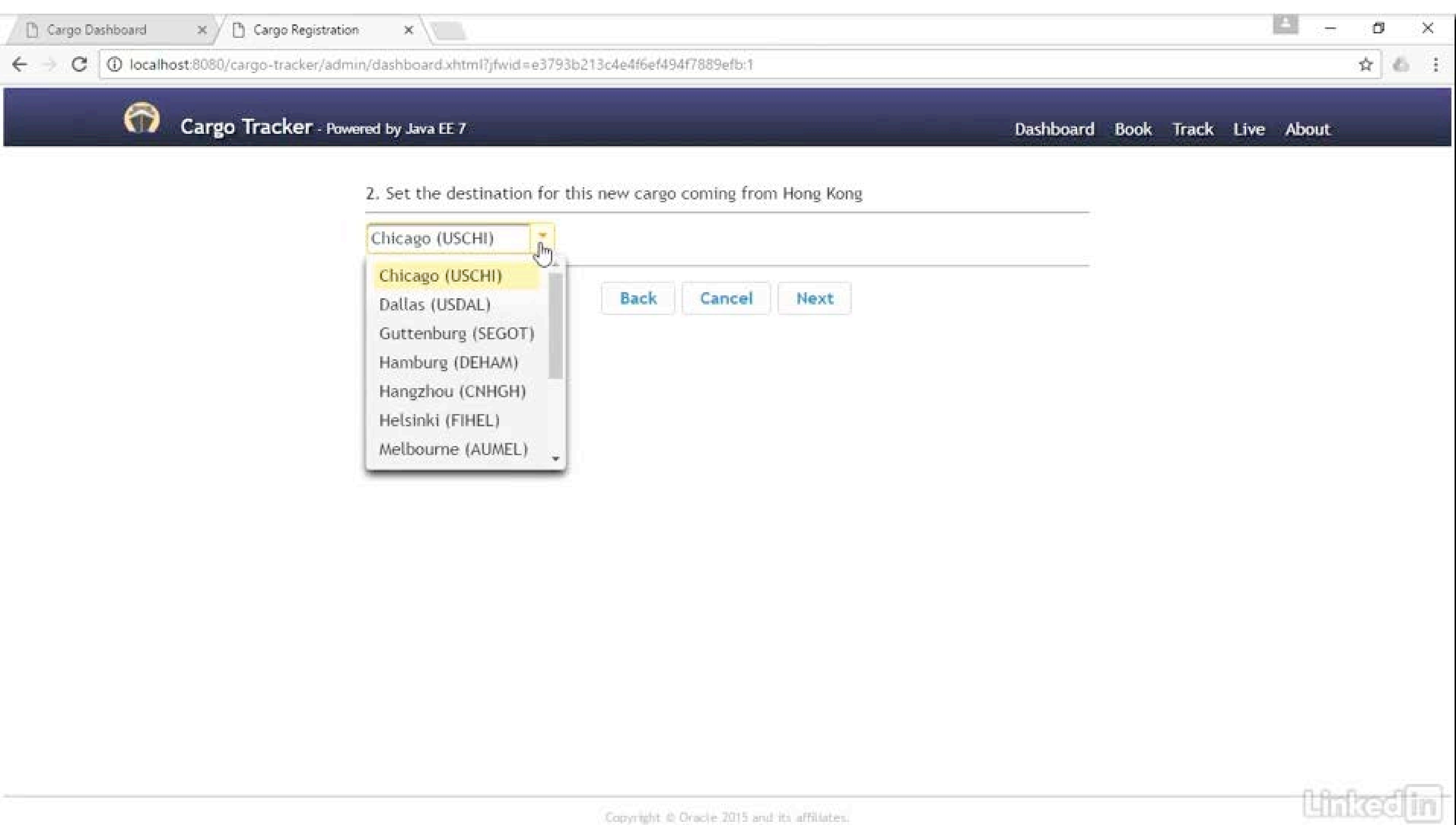
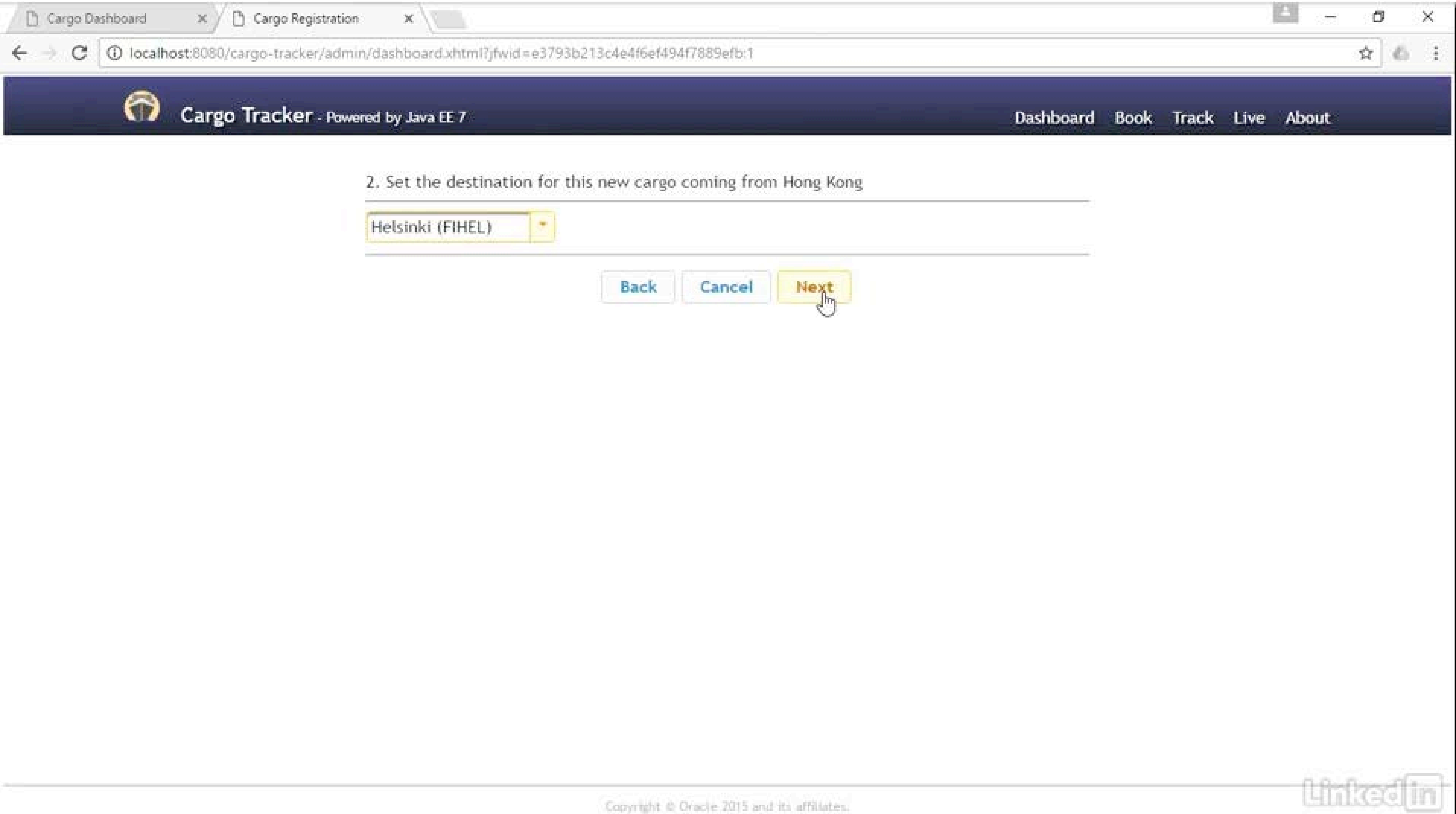
1.Choose the origin of the new cargo

Chicago (USCHI)



2. Set the destination for this new cargo coming from Hong Kong

Chicago (USCHI)



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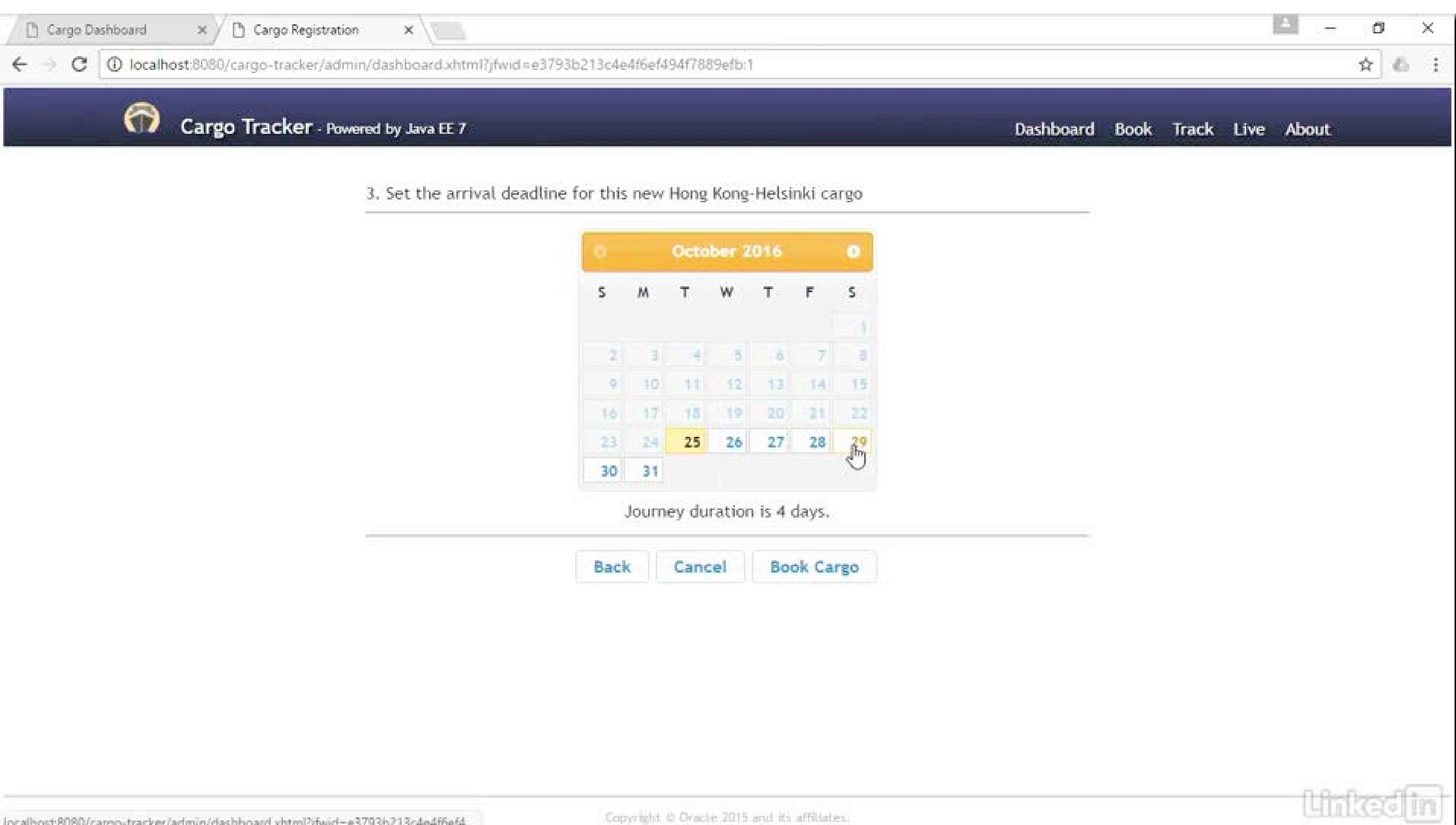
2. Set the destination for this new cargo coming from Hong Kong

Helsinki (FIHEL)



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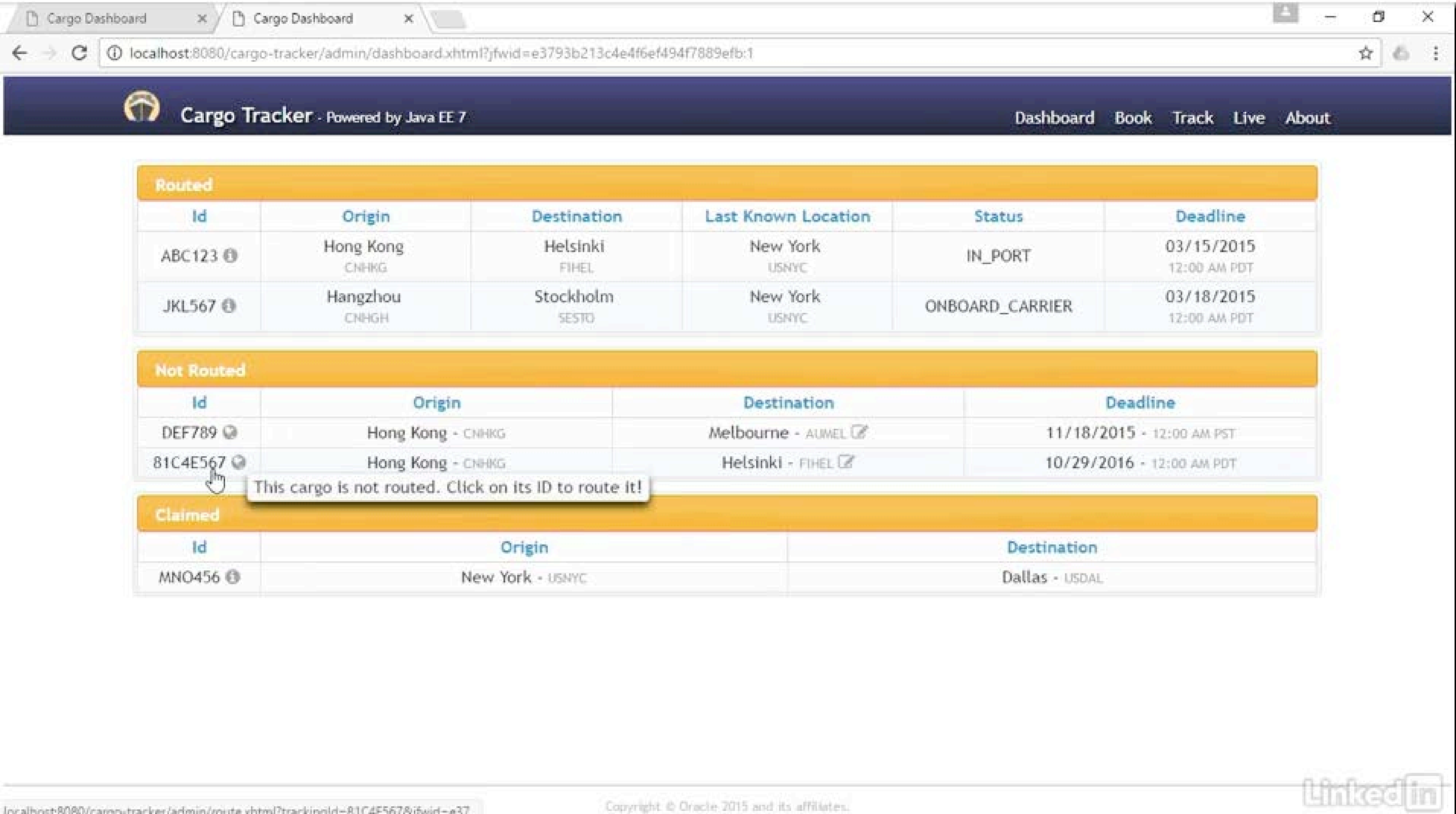
3. Set the arrival deadline for this new Hong Kong-Helsinki cargo

October 2016

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Journey duration is 4 days.

localhost:8080/cargo-tracker/admin/dashboard.xhtml?jfwid=e3793b213c4e4f6ef4



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Routed

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JKL567	Hangzhou CNHGH	Stockholm SESTO	New York USNYC	ONBOARD_CARRIER	03/18/2015 12:00 AM PDT

Not Routed

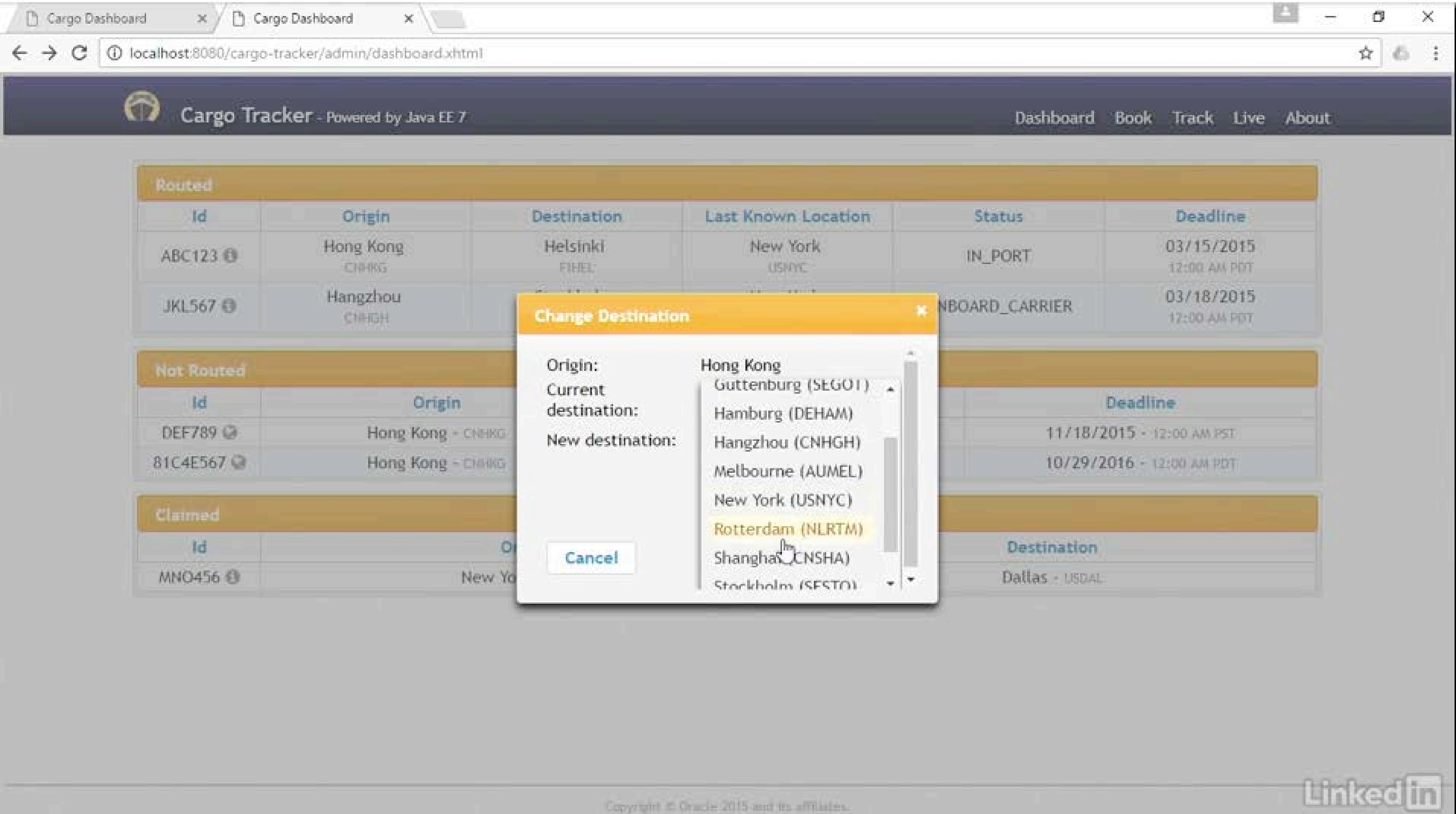
Id	Origin	Destination	Deadline
DEF789	Hong Kong - CNHKG	Melbourne - AUMEL	11/18/2015 - 12:00 AM PST
81C4E567	Hong Kong - CNHKG	Helsinki - FIHEL	10/29/2016 - 12:00 AM PDT

This cargo is not routed. Click on its ID to route it!

Claimed

Id	Origin	Destination
MNO456	New York - USNYC	Dallas - USDAL

localhost:8080/cargo-tracker/admin/route.xhtml?trackingId=81C4E567&jfwid=e37



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Routed

Id	Origin	Destination	Last Known Location	Status	Deadline
ABC123	Hong Kong CNHKG	Helsinki FIHEL	New York USNYC	IN_PORT	03/15/2015 12:00 AM PDT
JKL567	Hangzhou CNHGH			NBOARD_CARRIER	03/18/2015 12:00 AM PDT

Not Routed

Id	Origin	Deadline
DEF789	Hong Kong - CNHKG	11/18/2015 - 12:00 AM PST
81C4E567	Hong Kong - CNHKG	10/29/2016 - 12:00 AM PDT

Claimed

Id	Or	Destination
MNO456	New Yo	Dallas - USDAL

Change Destination

Origin: Hong Kong

Current destination:

New destination:

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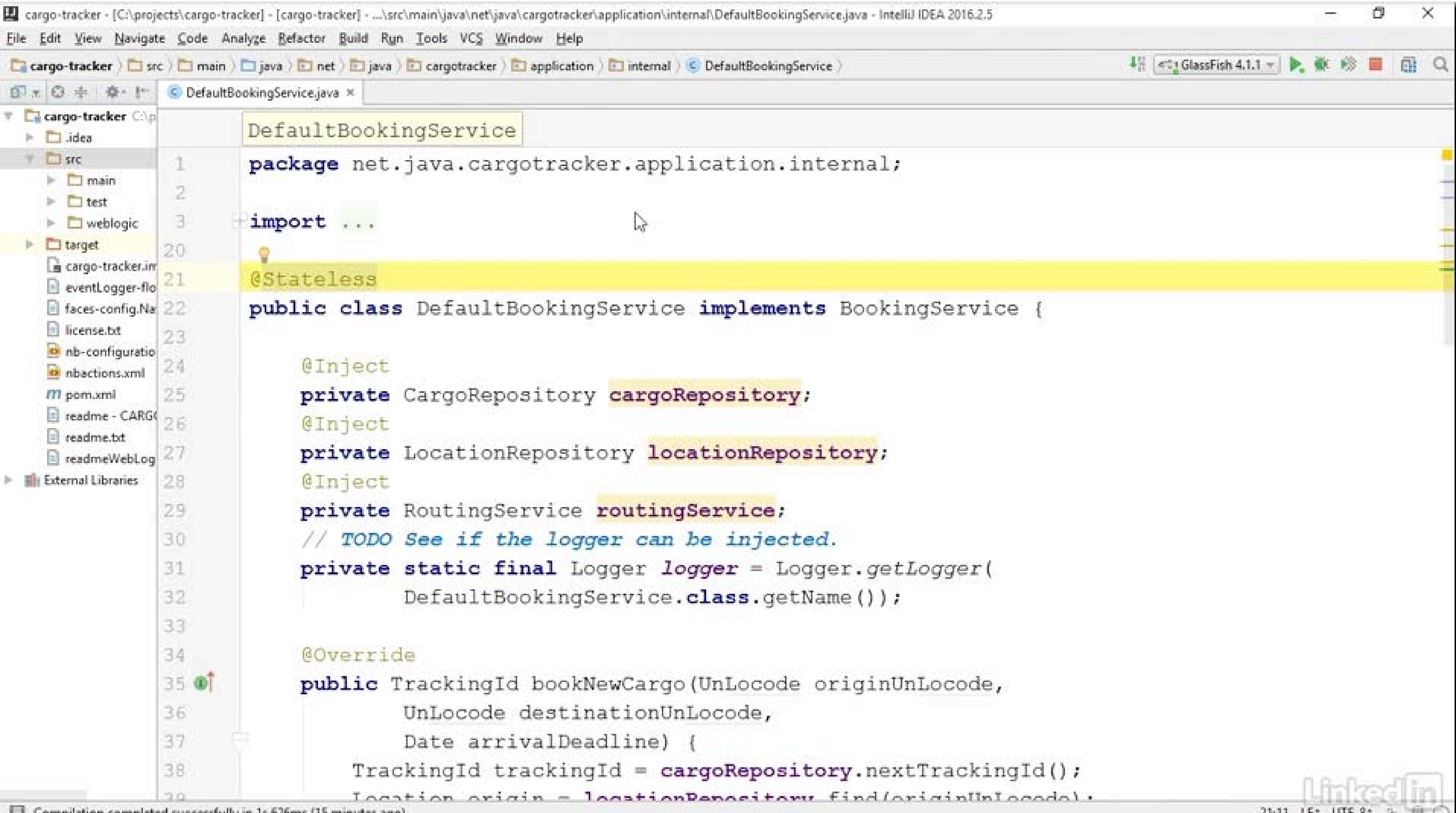
cargo-tracker - [C:\projects\cargo-tracker] - [cargo-tracker] - ...\src\main\java\net\java\cargotracker\application\internal\DefaultBookingService.java - IntelliJ IDEA 2016.2.5
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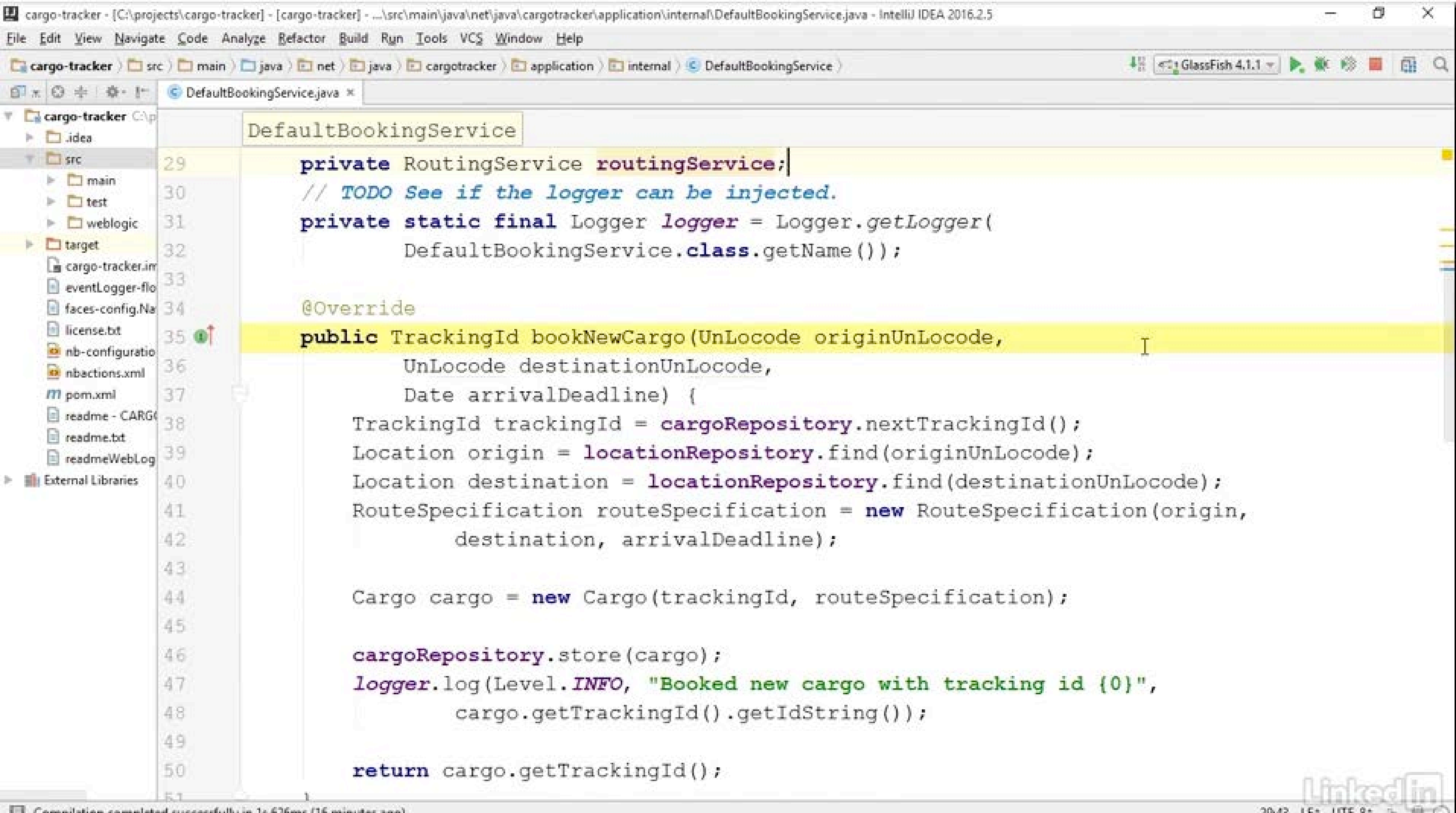
readme.txt
readmeWebLog
External Libraries
DefaultBookingService

```
package net.java.cargotracker.application.internal;

import ...

@Stateless
public class DefaultBookingService implements BookingService {

    @Inject
    private CargoRepository cargoRepository;
    @Inject
    private LocationRepository locationRepository;
    @Inject
    private RoutingService routingService;
    // TODO See if the logger can be injected.
    private static final Logger logger = Logger.getLogger(
            DefaultBookingService.class.getName());

    @Override
    public TrackingId bookNewCargo(UnLocode originUnLocode,
            UnLocode destinationUnLocode,
            Date arrivalDeadline) {
        TrackingId trackingId = cargoRepository.nextTrackingId();
        Location origin = locationRepository.find(originUnLocode);
```

Compilation completed successfully in 1s 626ms (15 minutes ago)



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DefaultBookingService

```java
    private RoutingService routingService;
    // TODO See if the logger can be injected.
    private static final Logger logger = Logger.getLogger(
            DefaultBookingService.class.getName());

    @Override
    public TrackingId bookNewCargo(UnLocode originUnLocode,
            UnLocode destinationUnLocode,
            Date arrivalDeadline) {
        TrackingId trackingId = cargoRepository.nextTrackingId();
        Location origin = locationRepository.find(originUnLocode);
        Location destination = locationRepository.find(destinationUnLocode);
        RouteSpecification routeSpecification = new RouteSpecification(origin,
                destination, arrivalDeadline);

        Cargo cargo = new Cargo(trackingId, routeSpecification);

        cargoRepository.store(cargo);
        logger.log(Level.INFO, "Booked new cargo with tracking id {0}",
                cargo.getTrackingId().getIdString());

        return cargo.getTrackingId();
    }
```

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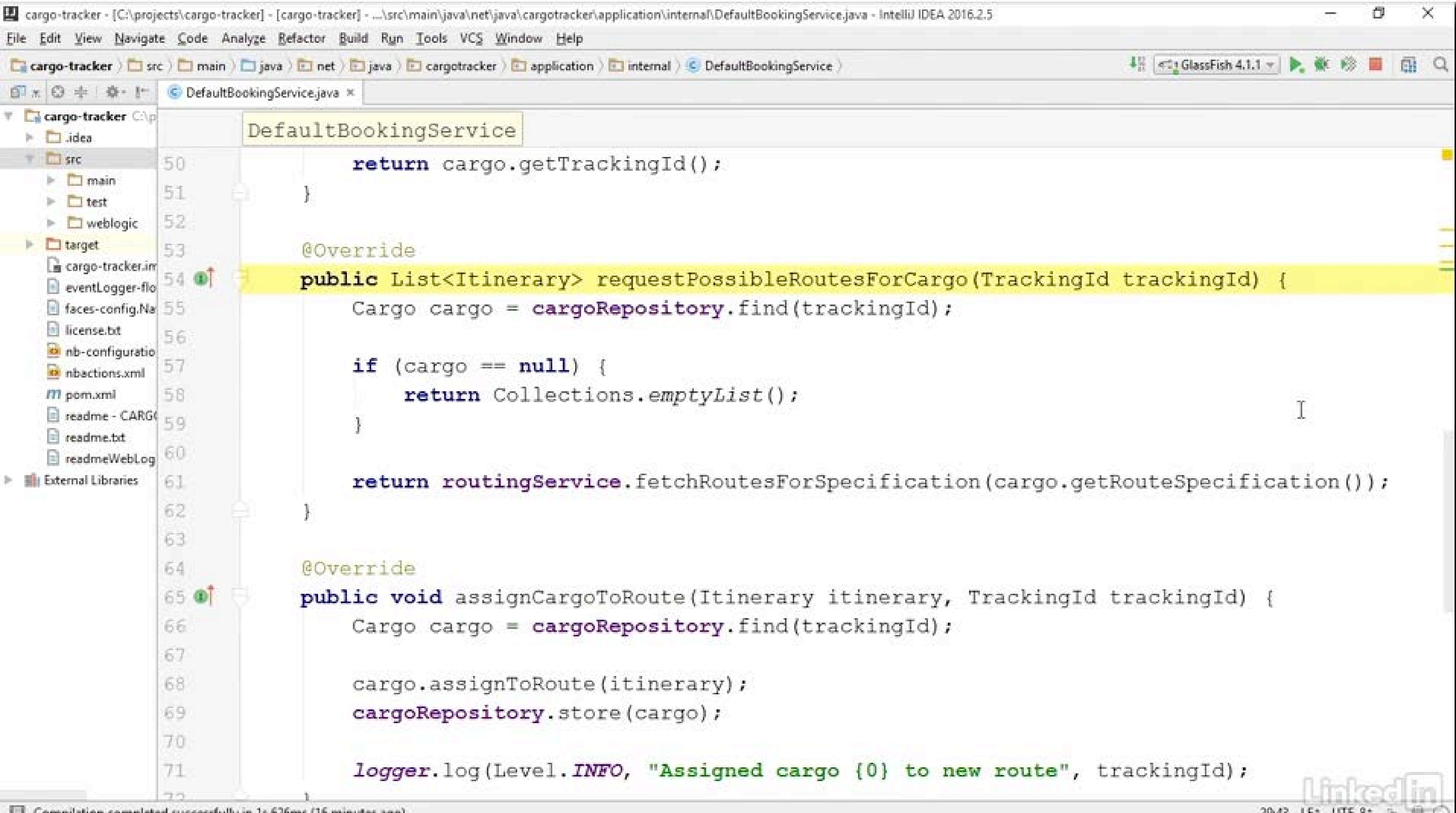

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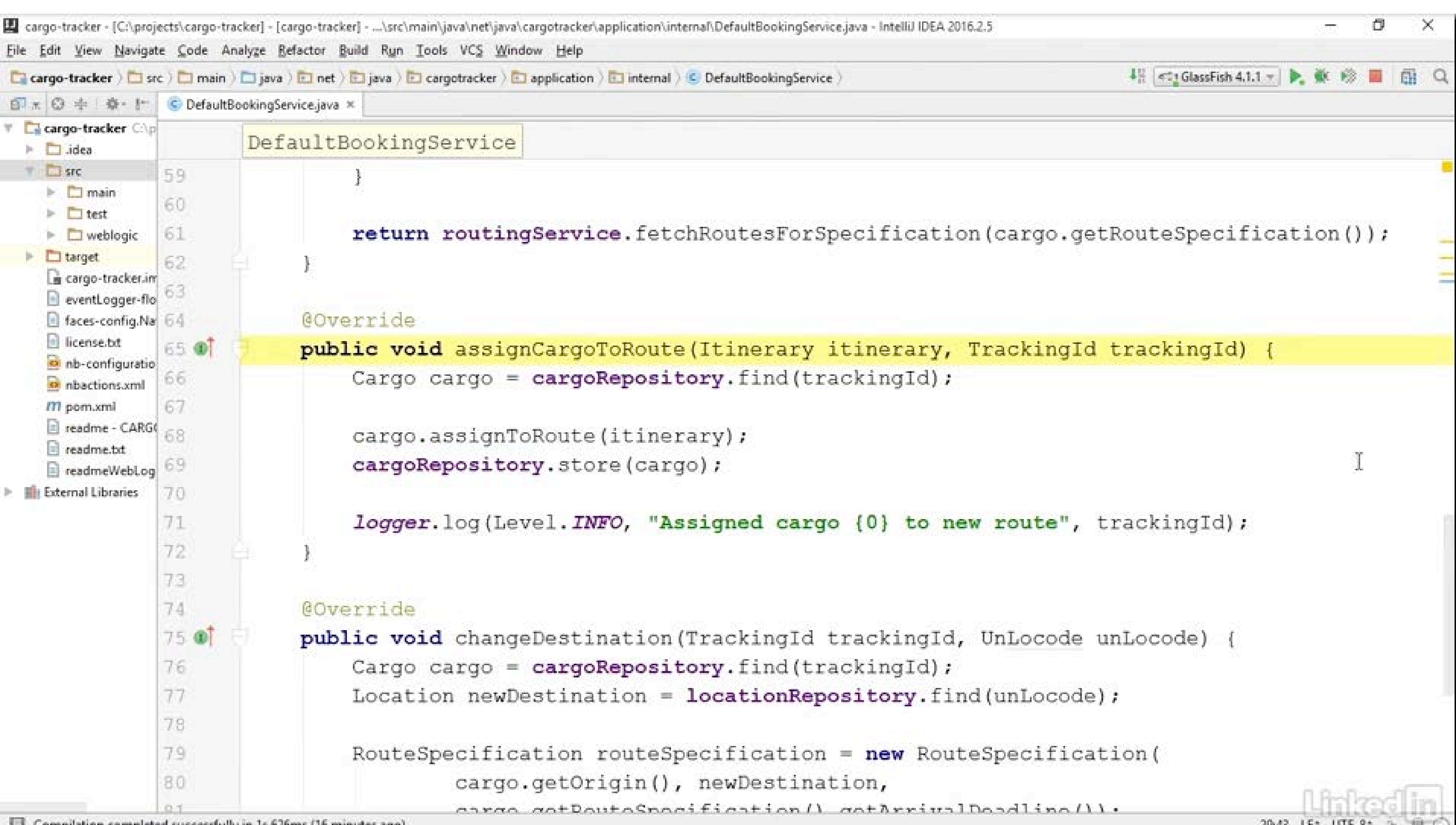
External Libraries
DefaultBookingService

```java
        return cargo.getTrackingId();
    }

    @Override
    public List<Itinerary> requestPossibleRoutesForCargo(TrackingId trackingId) {
        Cargo cargo = cargoRepository.find(trackingId);

        if (cargo == null) {
            return Collections.emptyList();
        }

        return routingService.fetchRoutesForSpecification(cargo.getRouteSpecification());
    }

    @Override
    public void assignCargoToRoute(Itinerary itinerary, TrackingId trackingId) {
        Cargo cargo = cargoRepository.find(trackingId);

        cargo.assignToRoute(itinerary);
        cargoRepository.store(cargo);

        logger.log(Level.INFO, "Assigned cargo {0} to new route", trackingId);
    }
```

Compilation completed successfully in 1s 626ms (16 minutes ago)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readme - CARG
readme.txt
readmeWebLog
External Libraries
DefaultBookingService

```java
        }

        return routingService.fetchRoutesForSpecification(cargo.getRouteSpecification());
    }

    @Override
    public void assignCargoToRoute(Itinerary itinerary, TrackingId trackingId) {
        Cargo cargo = cargoRepository.find(trackingId);

        cargo.assignToRoute(itinerary);
        cargoRepository.store(cargo);

        logger.log(Level.INFO, "Assigned cargo {0} to new route", trackingId);
    }

    @Override
    public void changeDestination(TrackingId trackingId, UnLocode unLocode) {
        Cargo cargo = cargoRepository.find(trackingId);
        Location newDestination = locationRepository.find(unLocode);

        RouteSpecification routeSpecification = new RouteSpecification(
                cargo.getOrigin(), newDestination,
                cargo.getRouteSpecification().getArrivalDeadline());
```

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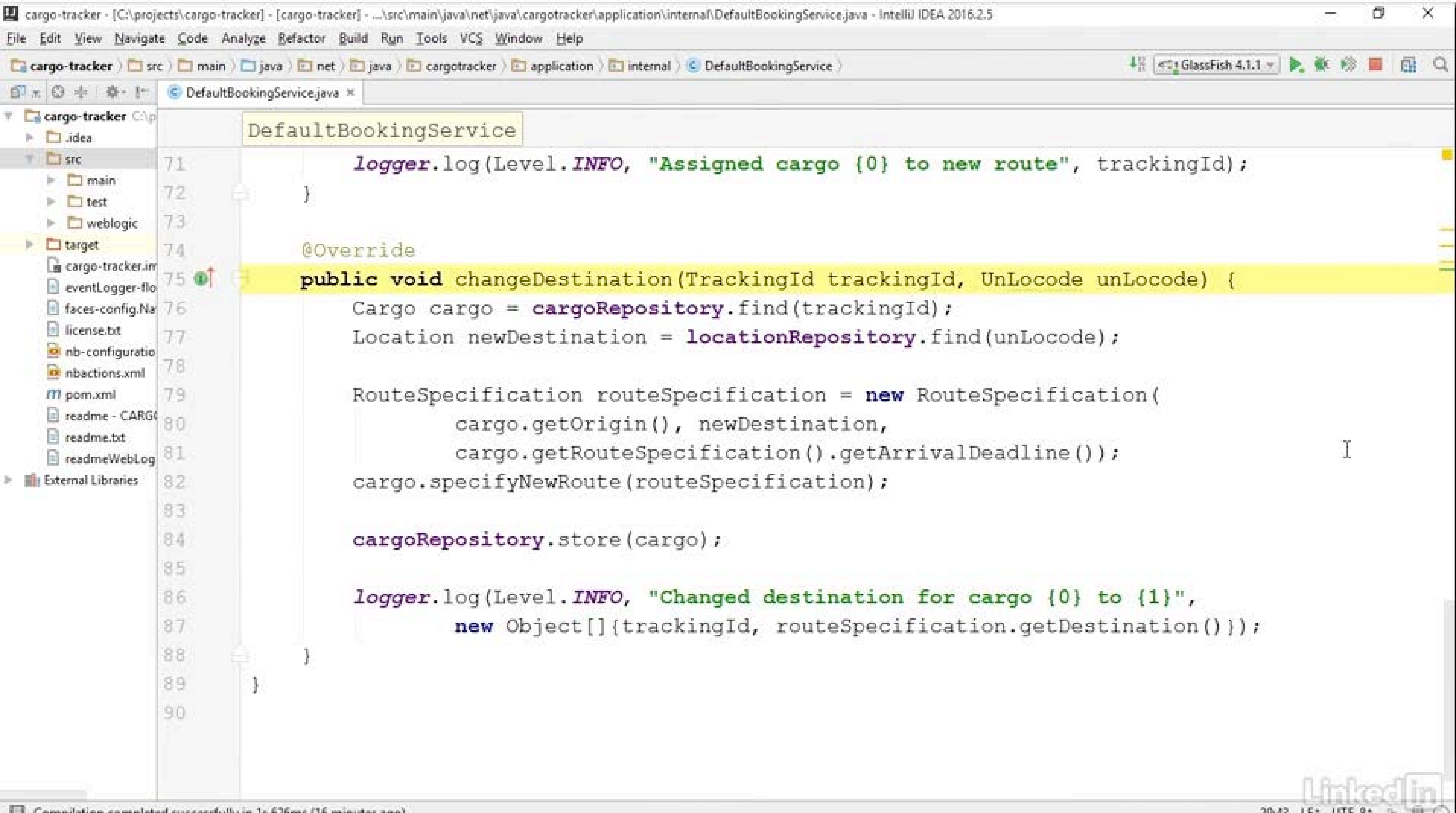
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readme.txt
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External Libraries
DefaultBookingService
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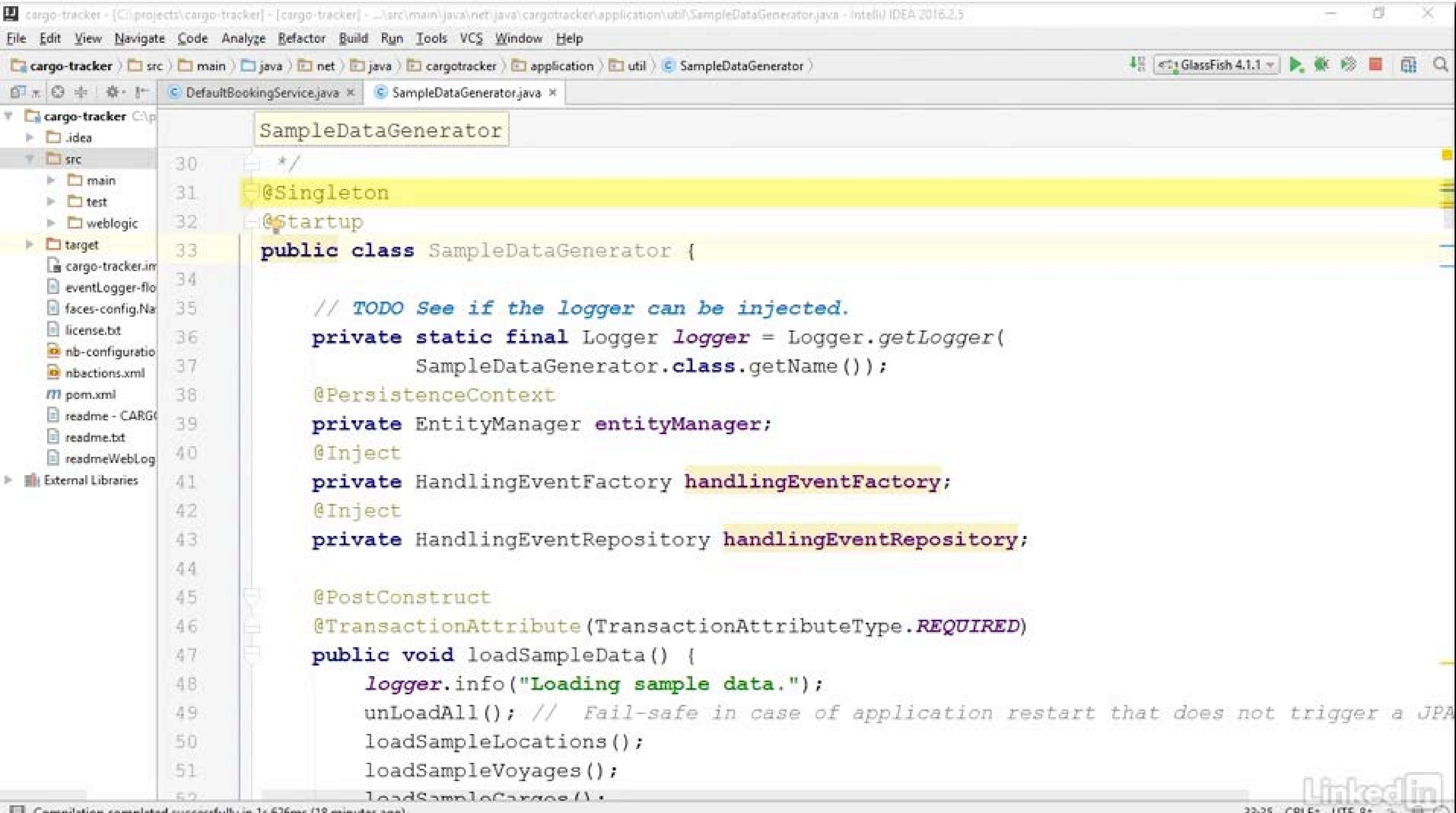
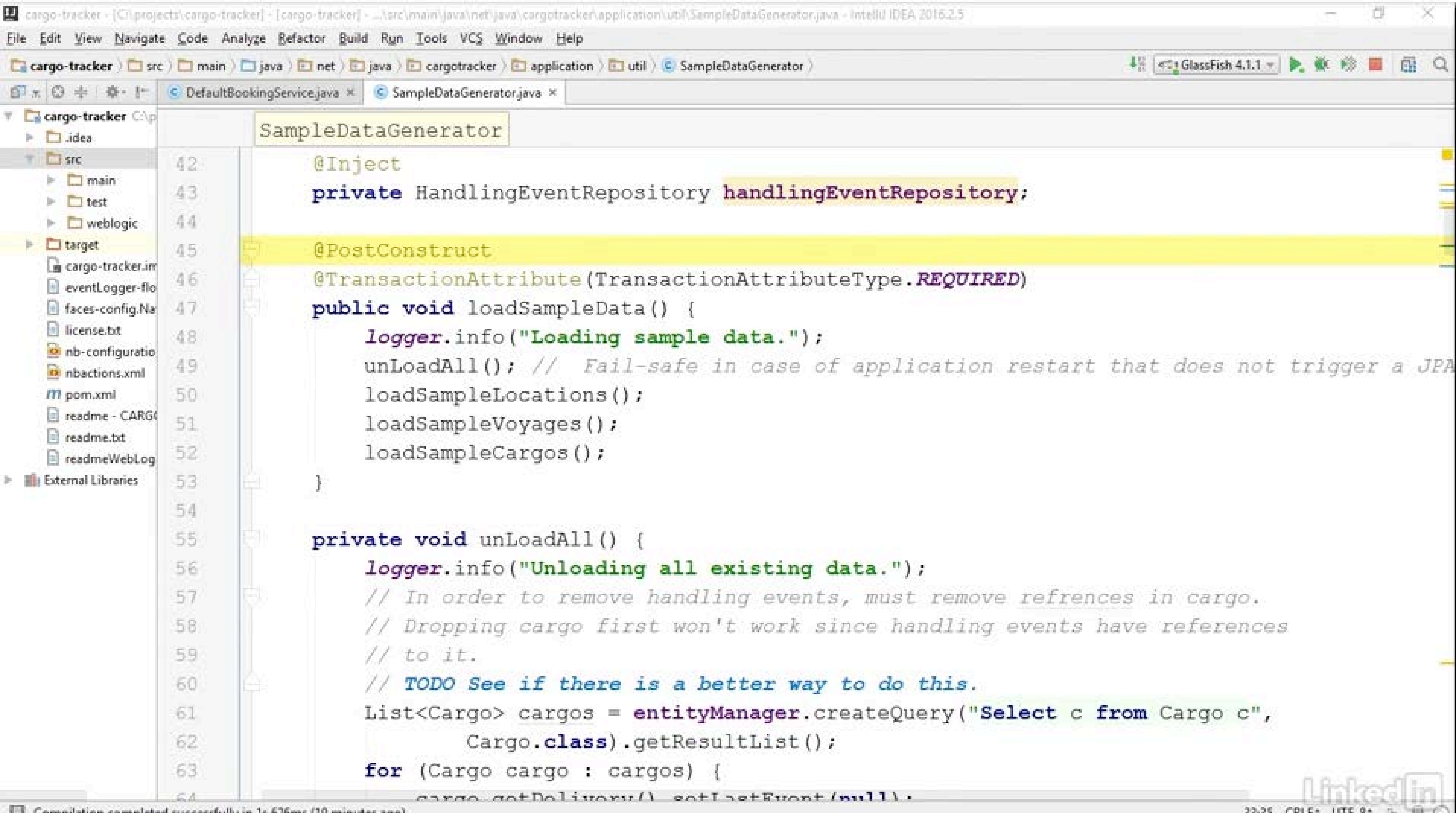
```java
        logger.log(Level.INFO, "Assigned cargo {0} to new route", trackingId);
    }

    @Override
    public void changeDestination(TrackingId trackingId, UnLocode unLocode) {
        Cargo cargo = cargoRepository.find(trackingId);
        Location newDestination = locationRepository.find(unLocode);

        RouteSpecification routeSpecification = new RouteSpecification(
                cargo.getOrigin(), newDestination,
                cargo.getRouteSpecification().getArrivalDeadline());
        cargo.specifyNewRoute(routeSpecification);

        cargoRepository.store(cargo);

        logger.log(Level.INFO, "Changed destination for cargo {0} to {1}",
                new Object[]{trackingId, routeSpecification.getDestination()});
    }
}
```



```java
 */
@Singleton
@Startup
public class SampleDataGenerator {

    // TODO See if the logger can be injected.
    private static final Logger logger = Logger.getLogger(
            SampleDataGenerator.class.getName());
    @PersistenceContext
    private EntityManager entityManager;
    @Inject
    private HandlingEventFactory handlingEventFactory;
    @Inject
    private HandlingEventRepository handlingEventRepository;

    @PostConstruct
    @TransactionAttribute(TransactionAttributeType.REQUIRED)
    public void loadSampleData() {
        logger.info("Loading sample data.");
        unLoadAll(); //  Fail-safe in case of application restart that does not trigger a JPA
        loadSampleLocations();
        loadSampleVoyages();
        loadSampleCargos();
```



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readme.txt
readmeWebLog
External Libraries
SampleDataGenerator

```java
    @Inject
    private HandlingEventRepository handlingEventRepository;

    @PostConstruct
    @TransactionAttribute(TransactionAttributeType.REQUIRED)
    public void loadSampleData() {
        logger.info("Loading sample data.");
        unLoadAll(); //  Fail-safe in case of application restart that does not trigger a JPA
        loadSampleLocations();
        loadSampleVoyages();
        loadSampleCargos();
    }

    private void unLoadAll() {
        logger.info("Unloading all existing data.");
        // In order to remove handling events, must remove refrences in cargo.
        // Dropping cargo first won't work since handling events have references
        // to it.
        // TODO See if there is a better way to do this.
        List<Cargo> cargos = entityManager.createQuery("Select c from Cargo c",
                Cargo.class).getResultList();
        for (Cargo cargo : cargos) {
            cargo.getDelivery().setLastEvent(null);
```

Compilation completed successfully in 1s 626ms (10 minutes ago)