

Assignment-01

Group ID – MTIT-110
Year 4 Semester 2

IT4020 - Modern Topics in IT

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(A) Scenario

We developed a producer-consumer plugin project using eclipse Equinox OSGI Framework for an inventory management system which is a private institute where students can learn music by enrolling in a preferred course as per their wish. Admin can manage inventories, orders, invoices services as well as cases. Customer can manage cases (view canceled cases, view case response, create new case, delete case), search order by shipping date and view my invoices by order ID. Supplier can add new items and view all items in inventory and supplier can create new orders and invoice according to the order ID. Furthermore suppliers also can create cases. Today transporters can view items to transport, return invoices, approved invoices and create cases. Middle service publisher acts as a common interface for all the publisher services. Altogether 4 consumer bundles and 4 publisher bundles were implemented to cater to this scenario.

The 4 main clients/ consumers who will be using this system for multiple different purposes associated with the academy are as follows:

- Administrator
- Customer
- Supplier
- Transporter

The services provided by the 4 publishers to all the above-mentioned consumers are as follows:

Administrator

- Add new item for inventory.
- View all inventory items.
- Create new order.
- View all available orders.
- Create new Invoice.
- View all invoices.
- View all cases.

Customer

- View Canceled cases.
- View case response
- Create new Case.
- Search order by shipping date
- View my invoice by order ID.
- Delete case by ID.

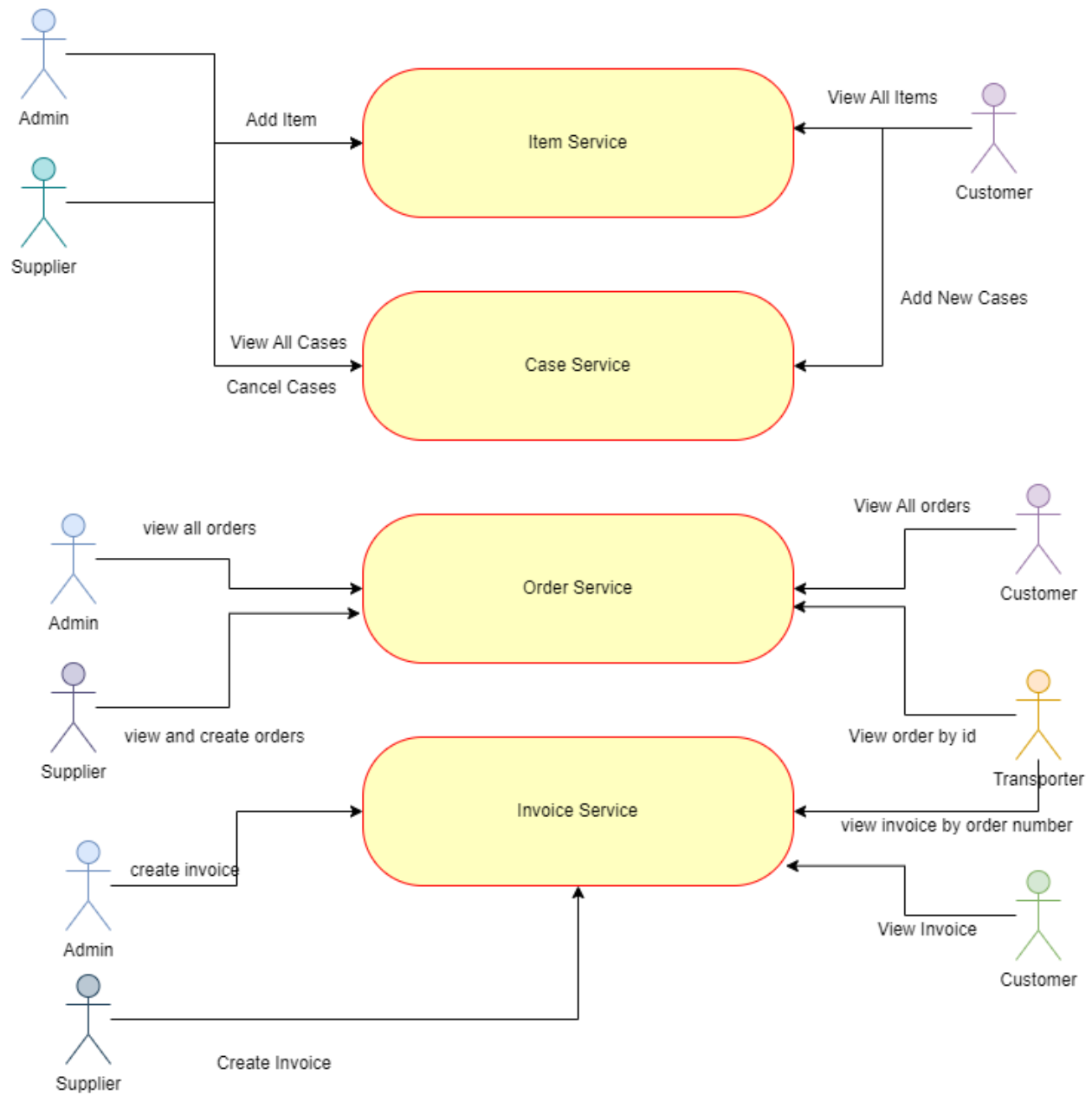
Supplier

- Add new item for inventory.
- View all inventory items.
- Create new order.
- Invoice according to the order ID
- Create new cases.

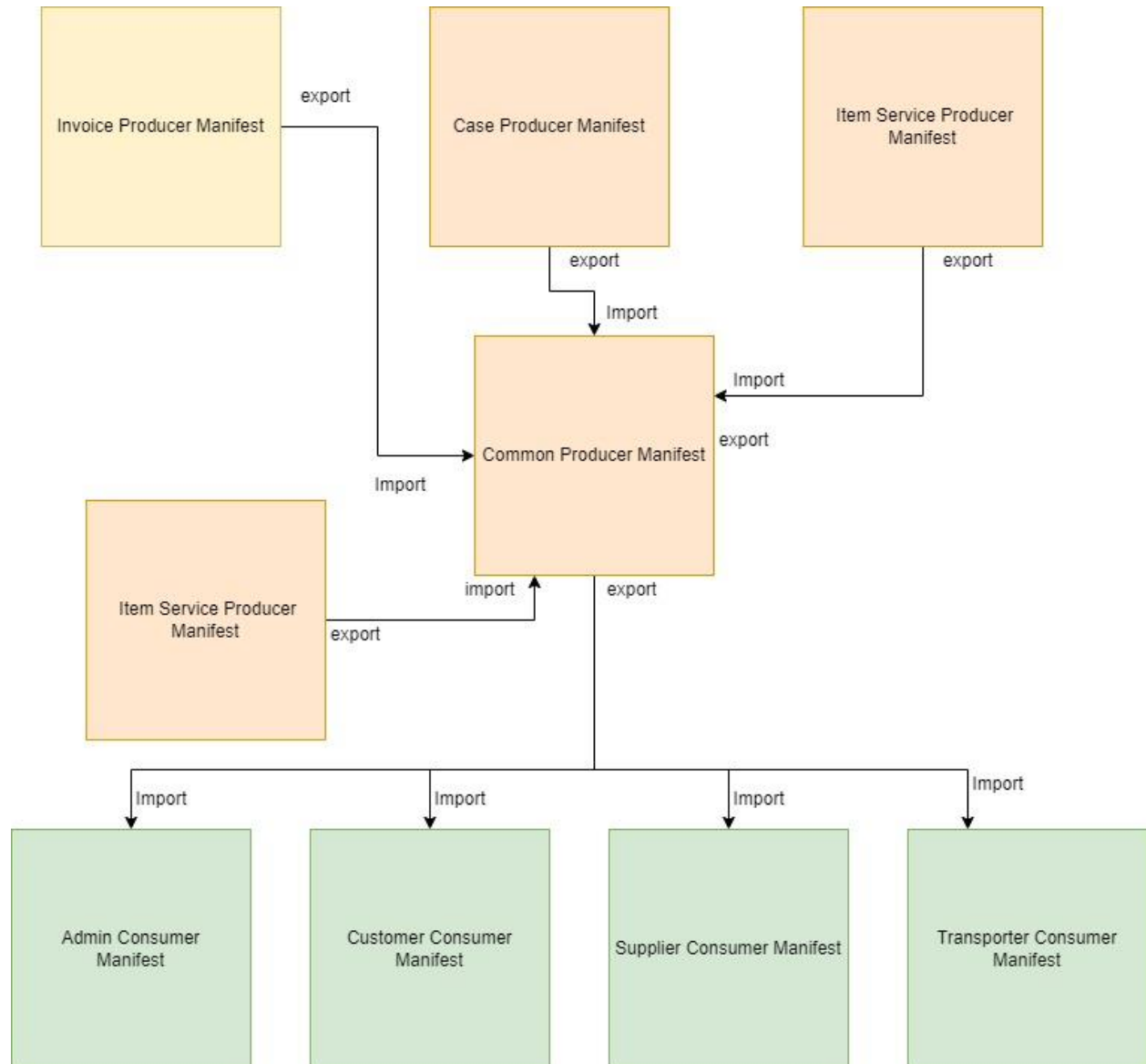
Transporter

- View today inventory Item to transport.
- View return invoices
- View approved invoices.
- Create new Case.

System diagram



Manifest files of all publishers and consumers



Consumer Manifest

```
AdminConsumer x
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: AdminConsumer
4 Bundle-SymbolicName: AdminConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: adminconsumer.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-16
8 Automatic-Module-Name: AdminConsumer
9 Import-Package: caseservice,
10 invoiceproducer,
11 itemservice,
12 middlepiplineservice,
13 orderpublisher,
14 org.osgi.framework;version="1.3.0"
15 Bundle-ActivationPolicy: lazy
16
```

```
CustomerConsumer x
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: CustomerConsumer
4 Bundle-SymbolicName: CustomerConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: customerconsumer.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-16
8 Automatic-Module-Name: CustomerConsumer
9 Import-Package: caseservice,
10 invoiceproducer,
11 itemservice,
12 middlepiplineservice,
13 orderpublisher,
14 org.osgi.framework;version="1.3.0"
15 Bundle-ActivationPolicy: lazy
16
```

```
TransporterConsumer x
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: TransporterConsumer
4 Bundle-SymbolicName: TransporterConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: transporterconsumer.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-16
8 Automatic-Module-Name: TransporterConsumer
9 Import-Package: caseservice,
10 invoiceproducer,
11 itemservice,
12 middlepiplineservice,
13 orderpublisher,
14 org.osgi.framework;version="1.3.0"
15 Bundle-ActivationPolicy: lazy
16
```

```
SupplierConsumer X
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: SupplierConsumer
4 Bundle-SymbolicName: SupplierConsumer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: supplierconsumer.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-16
8 Automatic-Module-Name: SupplierConsumer
9 Import-Package: caseservice,
10 invoiceproducer,
11 itemservice,
12 middlepiplineservice,
13 orderpublisher,
14 org.osgi.framework;version="1.3.0"
15 Bundle-ActivationPolicy: Lazy
16
```

Publisher Manifest

```
InvoiceProducer X
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: InvoiceProducer
4 Bundle-SymbolicName: InvoiceProducer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: invoiceproducer.Activator
7 Bundle-RequiredExecutionEnvironment: JavaSE-16
8 Automatic-Module-Name: InvoiceProducer
9 Import-Package: org.osgi.framework;version="1.3.0"
10 Bundle-ActivationPolicy: lazy
11 Export-Package: invoiceproducer
12
```

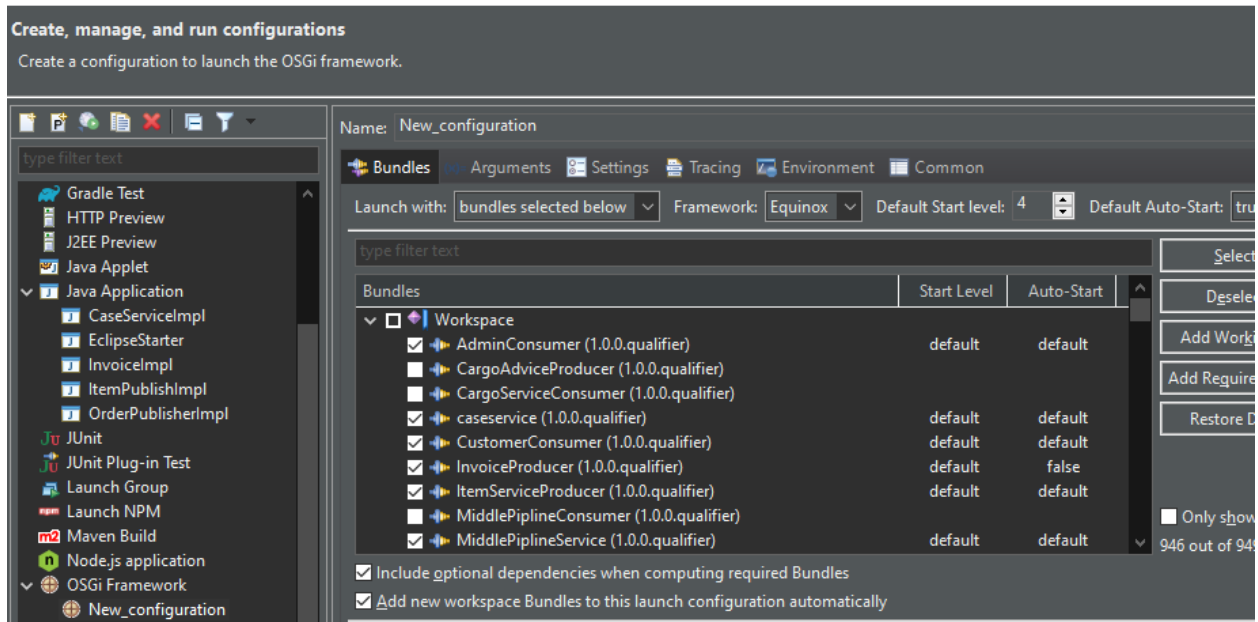
```
OrderPublisher X
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: OrderPublisher
4 Bundle-SymbolicName: OrderPublisher
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: orderpublisher.OrderPublisherActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-1.8
8 Automatic-Module-Name: OrderPublisher
9 Import-Package: org.osgi.framework;version="1.3.0"
10 Bundle-ActivationPolicy: lazy
11 Export-Package: orderpublisher
12
```

```
ItemServiceProducer X
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: ItemService
4 Bundle-SymbolicName: ItemServiceProducer
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: itemservice.ItemActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-16
8 Automatic-Module-Name: ItemService
9 Import-Package: org.osgi.framework;version="1.3.0"
10 Bundle-ActivationPolicy: lazy
11 Export-Package: itemservice
12
```

```
caseservice X
1 Manifest-Version: 1.0
2 Bundle-ManifestVersion: 2
3 Bundle-Name: CaseService
4 Bundle-SymbolicName: caseservice
5 Bundle-Version: 1.0.0.qualifier
6 Bundle-Activator: caseservice.CaseActivator
7 Bundle-RequiredExecutionEnvironment: JavaSE-16
8 Automatic-Module-Name: caseservice
9 Import-Package: org.osgi.framework;version="1.3.0"
10 Bundle-ActivationPolicy: lazy
11 Export-Package: caseservice
12
```


Run configuration file.

Initially the Invoice service publisher & Admin consumer will be started once the program is run in the OSGi framework.



Run all publishers and consumers.

Checked the status of this bundle using **lb** command.

```
gogo: CommandNotFoundException: Command not found: er
osgi> ss
"Framework is launched."

id      State      Bundle
0       ACTIVE    org.eclipse.osgi_3.16.300.v20210525-1715
        Fragments=718
1       ACTIVE    org.eclipse.equinox.simpleconfigurator_1.4.0.v20210315-2228
2       ACTIVE    AdminConsumer_1.0.0.qualifier
3       ACTIVE    CustomerConsumer_1.0.0.qualifier
4       ACTIVE    InvoiceProducer_1.0.0.qualifier
5       ACTIVE    ItemServiceProducer_1.0.0.qualifier
6       ACTIVE    MiddlePipelineService_1.0.0.qualifier
7       ACTIVE    OrderPublisher_1.0.0.qualifier
8       ACTIVE    SupplierConsumer_1.0.0.qualifier
9       ACTIVE    TransporterConsumer_1.0.0.qualifier
10      ACTIVE    biz.aqute.bndlib_5.5.0.v20210222-1510
11      ACTIVE    caseservice_1.0.0.qualifier
12      ACTIVE    ch.qos.logback.classic_1.2.3.v20200428-2012
        Fragments=607
13      ACTIVE    ch.qos.logback.core_1.2.3.v20200428-2012
14      RESOLVED ch.qos.logback.slf4j_1.2.3.v20200428-2012
        Master=938
15      ACTIVE    com.google.gson_2.8.6.v20201231-1626
```

1. Consuming the Invoice service by Admin, Customer, Transporter

```
nscli> start 2
Admin Consumer Started...
==== Welcome to the Invent HUB ====
==== Login As Admin ====
==== Select an option to operate ====

===== Import Item section =====
Enter 1 - Add New Item for Inventory
Enter 2 - View All Inventory Items

===== Order section =====
Enter 3 - Create New Order
Enter 4 - View All Available Orders

===== Invoice section =====
Enter 5 - Create New Invoice
Enter 6 - View All Invoices
===== Cases Section =====
Enter 7 - View All Cases
Enter 8 - Go to the menu
Enter -1 - Exit
Please Select an Option
|
```

Creating the Invoice by Admin

```
===== Invoice section =====
Enter 5 - Create New Invoice
Enter 6 - View All Invoices
===== Cases Section =====

Enter 7 - View All Cases
Enter 8 - Go to the menu
Enter -1 - Exit
Please Select an Option
5
===== Please Create New Invoice =====
Enter Invoice No : ==>
INV200
Enter Customer ID : ==>
CI200
Enter Order ID : ==>
OI221
Enter Invoice Date : ==>
2023-2-2
Enter InvoiceorderAmount : ==>
2000
Is this return ? : ==>
YES
Invoice Created Successfully..
Do you want to create another invoice (Y/N)
```

Admin can view all invoice List.

```
===== Cases Section =====  
  
Enter 7 - View All Cases  
Enter 8 - Go to the menu  
Enter -1 - Exit  
Please Select an Option  
6  
|===== Invoice List =====  
  
===== Invoice ID : INV200  
===== Customer ID : CI200  
===== Order ID : OI221  
===== Invoice Amount ID : 2000.0
```

Customer can View Invoice by Order ID

```
-1  
Customer Consumer Started...  
==== Login As Customer ====  
Enter 1 - View Canceled Cases  
Enter 2 - View Case response  
Enter 3 - Create new Case  
Enter 4 - Search Order by Shipping date  
Enter 5 - View My Invoice by Order ID  
Enter 6 - Delete Case by ID  
Enter 7 - go to menu  
Enter -1 - Exit  
Please Select an Option  
5  
Enter Order No : ==>  
OI221  
|===== Invoice for the OrderOI221  
  
===== Invoice ID : INV200  
===== Customer ID : CI200  
===== Order ID : OI221  
===== Invoice Amount ID : 2000.0
```

Transporter can view return invoice list for reference.

```
-1
Transporter Consumer Started...
==== Login As Trasportor====
Enter 1 - View Today Inventory Item to Trasport
Enter 2 - View Return Invoices
Enter 3 - View Approved Invoices
Enter 4 - Create new Case
Enter 5 - Go to the menu
Enter -1 - Exit
Please Select an Option
2
|===== Return Invoice List =====|
|
|===== Invoice ID : INV200
|===== Customer ID : CI200
|===== Order ID : OI221
|===== Invoice Amount ID : 2000.0
|===== Is Return : YES
```

2. Consuming the Case service by Admin, Customer

Customer can create the Case

```
Customer Consumer Started...
==== Login As Customer ====
Enter 1 - View Canceled Cases
Enter 2 - View Case response
Enter 3 - Create new Case
Enter 4 - Serach Order by Shipping date
Enter 5 - View My Invoice by Order ID
Enter 6 - Delete Case by ID
Enter 7 - go to menu
Enter -1 - Exit
Please Select an Option
3
Enter case id: 221
Case Description: 323
Enter the Case Type Enter 1, if Customer;
Enter 2, if Importer;
Enter 3, if Supplier;
Enter 4,if Transport:
1
Case Date(DD/MM/YY): 5-3-2023
Enter the Case Response state Enter 1, if Active;
Enter 2, if Sorted;
Enter 3, if Hold:
1
|'221' Case added successfully...
```

Admin can view all cases

```
osgi> start 2
Admin Consumer Started...
==== Welcome to the Invent HUB ====
==== Login As Admin ====
==== Select an option to operate ====

===== Import Item section =====
Enter 1 - Add New Item for Inventory
Enter 2 - View All Inventory Items

===== Order section =====
Enter 3 - Create New Order
Enter 4 - View All Available Orders

===== Invoice section =====
Enter 5 - Create New Invoice
Enter 6 - View All Invoices
===== Cases Section =====

Enter 7 - View All Cases
Enter 8 - Go to the menu
Enter -1 - Exit
Please Select an Option
7
Cases Received
caseId: 22
caseDescription: 44434
caseType: Customer
caseDate: 5-3-2023
caseResponseStatus: Active
-----
```

Customer can delete the case by ID

```
945 ACTIVE org.w3c.dom.svg_1.1.0.v
osgi> stop 3
Customer Consumer Stopped...

osgi> start 3
Customer Consumer Started...
==== Login As Customer ====
Enter 1 - View Canceled Cases
Enter 2 - View Case response
Enter 3 - Create new Case
Enter 4 - Serach Order by Shipping date
Enter 5 - View My Invoice by Order ID
Enter 6 - Delete Case by ID
Enter 7 - go to menu
Enter -1 - Exit
Please Select an Option
6
Enter Case Id to delete: 22
Case Deleted
```

Customer can view the deleted case and case response

```
7
==== Login As Customer ====
Enter 1 - View Canceled Cases
Enter 2 - View Case response
Enter 3 - Create new Case
Enter 4 - Search Order by Shipping date
Enter 5 - View My Invoice by Order ID
Enter 6 - Delete Case by ID
Enter 7 - go to menu
Enter -1 - Exit
Please Select an Option
2

Enter Case id to check the response 22
|
Case Not found
```

```
==== Login As Customer ====
Enter 1 - View Canceled Cases
Enter 2 - View Case response
Enter 3 - Create new Case
Enter 4 - Search Order by Shipping date
Enter 5 - View My Invoice by Order ID
Enter 6 - Delete Case by ID
Enter 7 - go to menu
Enter -1 - Exit
Please Select an Option
1
Enter the case id deleted:
22
Deleted Case Details
Case Id: 22
Case Description: 44434
Case Status: Active
```

3. Consuming the Import Item service by Supplier, Customer, Transporter

Supplier can add new import item.

```
Supplier Consumer Started...
==== Login As Supplier ====
Enter 1 - Add New Item for Inventory
Enter 2 - View All Inventory Items
Enter 3 - Create New Order
Enter 4 - Invoice according to the order ID
Enter 5 - Create new Case
Enter 6 - Go to the menu
Enter -1 - Exit
Please Select an Option
1
-----Add new Item-----
Enter item ID: 111
Enter item name: item1
Enter item quantity: 2
Enter imported date: 2023-3-5
Enter availability
true
'item1' Item added successfully...
Do you want to add another item? (y/n)
```

Transporter can view today imported items.

```

-1
Transporter Consumer Started...
==== Login As Trasportor====
Enter 1 - View Today Invetory Item to Trasport
Enter 2 - View Return Invoices
Enter 3 - View Approved Invoices
Enter 4 - Create new Case
Enter 5 - Go to the menu
Enter -1 - Exit
Please Select an Option
1
Item ID: 111
Item Name: item1
Item Quantity: 2
Date: 2023-3-5
-----
```

Admin can see all Imported item and available items

```

osgi> start 2
Admin Consumer Started...
==== Welcome to the Invent HUB ====
==== Login As Admin ====
==== Select an option to operate ====

===== Import Item section =====
Enter 1 - Add New Item for Inventory
Enter 2 - View All Inventory Items

===== Order section =====
Enter 3 - Create New Order
Enter 4 - View All Availble Orders

===== Invoice section =====
Enter 5 - Create New Invoice
Enter 6 - View All Invoices

===== Cases Section =====
Enter 7 - View All Cases
Enter 8 - Go to the menu
Enter -1 - Exit
Please Select an Option
2
Item ID: 111
Item Name: item1
Item Quantity: 2
Date: 2023-3-5
Availabilitytrue
-----|
```

4. Consuming the Order service by Admin, Customer, Transporter

Admin can create order.

```
Admin Consumer Started...
==== Welcome to the Invent HUB ====
==== Login As Admin ====
==== Select an option to operate ====

===== Import Item section =====
Enter 1 - Add New Item for Inventory
Enter 2 - View All Inventory Items

===== Order section =====
Enter 3 - Create New Order
Enter 4 - View All Available Orders

===== Invoice section =====
Enter 5 - Create New Invoice
Enter 6 - View All Invoices

===== Cases Section =====
Enter 7 - View All Cases
Enter 8 - Go to the menu
Enter -1 - Exit
Please Select an Option
3
-----Add new order details-----
Enter Order Number:
o12212
Enter Shipping Date(yyyy-MM-dd):
2023-3-5
Enter To Be Delivered Date (yyyy-MM-dd):
2023-3-7
Enter Shipping Address:
Nuwara
.....Order added successfully.....
Do you want to add another Order? (y/n) |
```

Admin can view all order list.

```
|=====All Orders=====
Order Number -----> o12212

Order Shipping Date -----> 2023-3-5
Order To Be Delivered Date -----> 2023-3-7

Shipping Address -----> Nuwara

=====
```


Customer can view order by shipping date.

```
Customer Consumer Started...
==== Login As Customer ====
Enter 1 - View Canceled Cases
Enter 2 - View Case response
Enter 3 - Create new Case
Enter 4 - Serach Order by Shipping date
Enter 5 - View My Invoice by Order ID
Enter 6 - Delete Case by ID
Enter 7 - go to menu
Enter -1 - Exit
Please Select an Option
4
Enter the shipping date (yyyy-MM-dd):
2023-3-5
Matching orders:
=====All Orders=====
Order Number -----> o123
Order Shipping Date -----> 2023-3-5
Order To Be Delivered Date -----> 2023-3-5
Shipping Address -----> Colombo
=====
```

We can start and stop consumer separately as well.

Admin Consumer

```
osgi> stop 2
Admin Consumer Stopped...

osgi> start 2
Admin Consumer Started...
==== Welcome to the Invent HUB ====
==== Login As Admin ====
==== Select an option to operate ====

===== Import Item section =====
Enter 1 - Add New Item for Inventory
Enter 2 - View All Inventory Items

===== Order section =====
Enter 3 - Create New Order
Enter 4 - View All Availble Orders

===== Invoice section =====
Enter 5 - Create New Invoice
Enter 6 - View All Invoices

===== Cases Section =====

Enter 7 - View All Cases
Enter 8 - Go to the menu
Enter -1 - Exit
Please Select an Option
```

Customer Consumer

```
osgi> stop 3
Customer Consumer Stopped...

osgi> start 3
Customer Consumer Started...
==== Login As Customer ====
Enter 1 - View Canceled Cases
Enter 2 - View Case response
Enter 3 - Create new Case
Enter 4 - Serach Order by Shipping date
Enter 5 - View My Invoice by Order ID
Enter 6 - Delete Case by ID
Enter 7 - go to menu
Enter -1 - Exit
Please Select an Option
```

Supplier Consumer

```
osgi> stop 8
Supplier Consumer Stopped...

osgi> start 8
Supplier Consumer Started...
==== Login As Suplier ====
Enter 1 - Add New Item for Inventory
Enter 2 - View All Inventory Items
Enter 3 - Create New Order
Enter 4 - Invoice according to the order ID
Enter 5 - Create new Case
Enter 6 - Go to the menu
Enter -1 - Exit
Please Select an Option
```

Transporter Consumer

```
osgi> stop 9
Transporte Consumer Stopped...

osgi> start 9
Transporter Consumer Started...
==== Login As Trasportor====
Enter 1 - View Today Invetory Item to Trasport
Enter 2 - View Return Invoices
Enter 3 - View Approved Invoices
Enter 4 - Create new Case
Enter 5 - Go to the menu
Enter -1 - Exit
Please Select an Option
```

Workload Distribution

Registration Number	Workload
IT19958620	Import item service
IT19966618	Invoice Service
IT19965550	Case Service
IT19964010	Transporter Service

End