



**IIP-Ecosphere**

Next Level Ecosphere for  
Intelligent Industrial Production



# Windows Platform Installation Guide Service Workshop

Gefördert durch:



Bundesministerium  
für Wirtschaft  
und Klimaschutz

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IIP-Ecosphere Platform Documentation



# Introduction

- These slides are used to do the Service Workshop setup in Linux OS.
- The slides are divided into:
  1. Using pre-defined Docker image.
    - a) Install Docker.
    - b) Running the container.
    - c) Using the pre-defined development environment.
  2. Full manual Installation of the platform
    - a) Install the required setup (Prerequisites).
    - b) Download and install the IDE Eclipse development environment.
    - c) Install the IIP-Ecosphere platform.
    - d) Start the IIP-Ecosphere platform.
    - e) Stop the IIP-Ecosphere platform.



# Introduction

- For the sake of the Service Workshop you might use the pre-defined Docker image OR you should follow this order to manually prepared your machine:
  1. Install prerequisites that should be use by the IIP-Ecosphere platform and IDE development environment.
  2. Download the IDE Eclipse + Workspace for the Workshop.
  3. Install the IIP-Ecosphere platform to test the App developed in the Workshop.
  4. Start and Stop the IIP-Ecosphere platform to validate the installation, and use it in the Workshop (more details in the Workshop).



# The pre-defined Docker image

## Install Docker



# Docker Engine Installation - step (1)

- If **Docker Engine v20.10.7** is not installed, then Install **Docker Desktop 3.4.0** which uses **Docker Engine v20.10.7** and all the prerequisites it may needs.

Please enter the following comands into zour console:

- curl

```
https://desktop.docker.com/win/main/amd64/65384/Docker%%20Desktop%%20Installer.exe
```

- O DockerDesktopInstaller.exe

- rename "Docker%%20Desktop%%20Installer.exe" DockerDesktopInstaller.exe

- start /w "" "DockerDesktopInstaller.exe" install



# Docker Engine Installation - step (2)

- You should install **Windows Sub system for Linux (WSL)**, which is required for Docker in Windows, please see the Instructions to install **WSL** in Windows:

<https://ubuntu.com/tutorials/install-ubuntu-on-wsl2-on-windows-10#1-overview>



# The pre-defined Docker image

## Running the container



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# Running The Container

- Use the following command to pull the image and run it on your machine
  - `docker run -p 6080:80 -v /dev/shm:/dev/shm iipecosphere/dev-container:0.1`





# The pre-defined Docker image

Using the pre-defined development  
environment

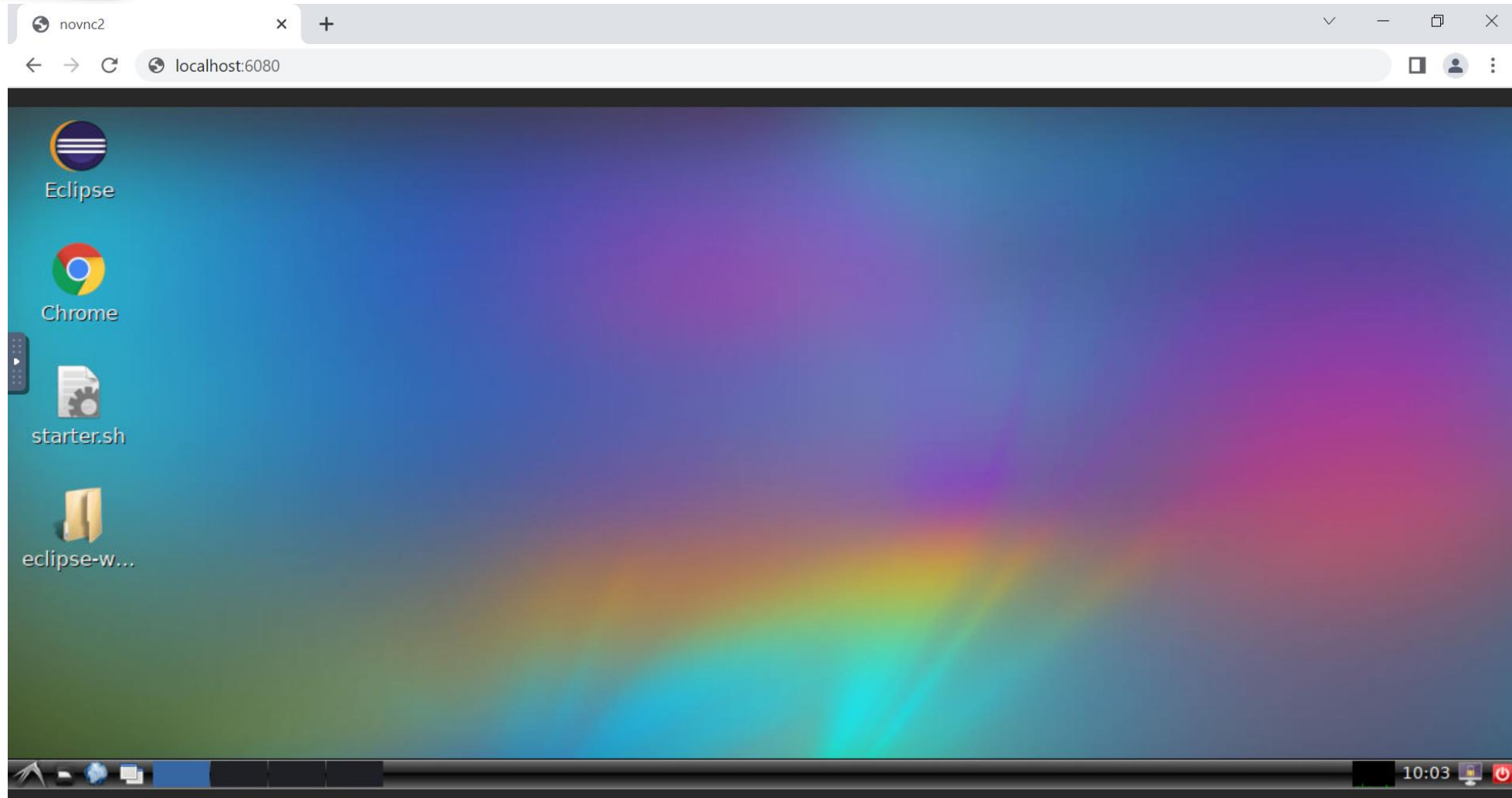
# Development Environment

- To access the pre-defined working environment use any browser with the URL: **localhost:6080** OR replace the **localhost** with the **IP address** of the machine that run the container.
- You should have the following screen.
- You have IDE Eclipse environment install and ready to use with a workspace (**eclipse-workspace**) that has Impl.model project.
- You have platform install and running (the logs are in /root/platform/logs)



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# Development Environment





# Full manual Installation of the platform

Install the required setup (Prerequisites)

# Required Setup

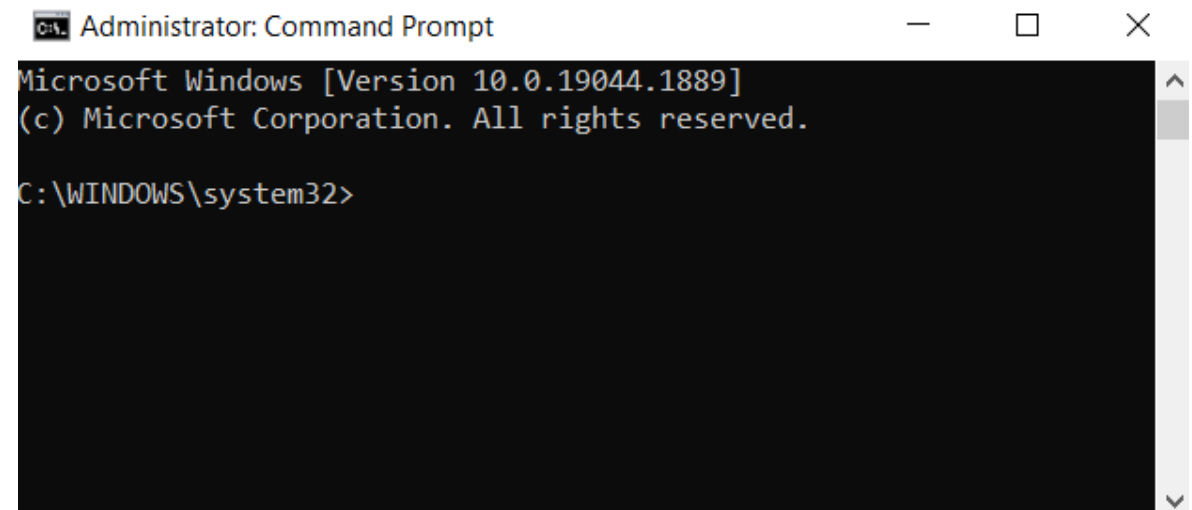
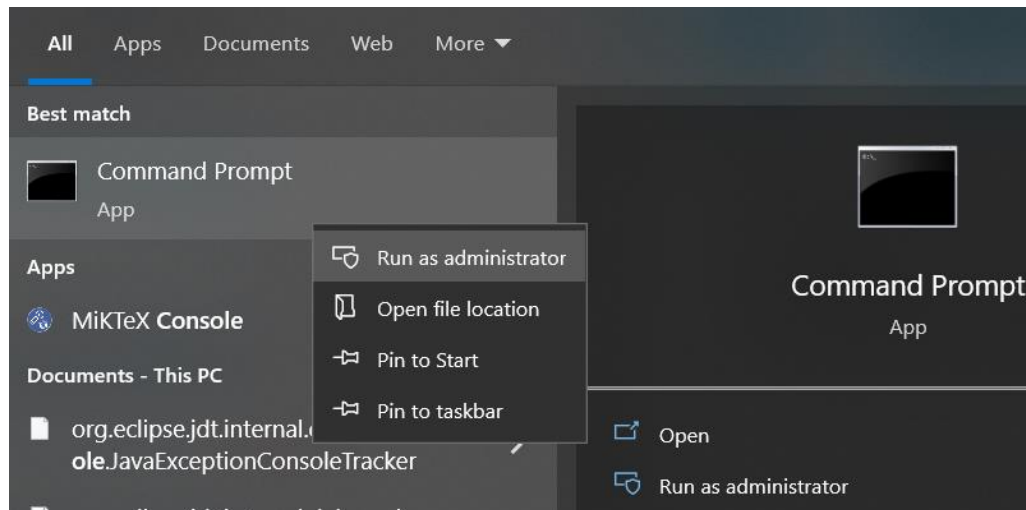
## Notes:

- Please ensure that you use the exact version numbers given for every software in this guide.
- Please do not use "the latest" version of a given software, as these later versions maybe incompatible with the current IIP-Ecosphere platform build.



# Required Setup - step (1)

- For the installation we will use the command line interface (CLI) or console.
- To open the console search for @Console@ in the Start menu.
- Please ensure that you run the console with Administrator rights (right/click and select "Run as administrator")



## Required Setup - step (2)

- Please note that the current IIP-Ecosphere platform required Java **JDK 8, 11 or 13**, no other. In this guide we are installing **JDK 13**.
- If Java **JDK 13** is not installed, then install Java **JDK 13**, using the following CLI commands (enter the following lines in the console and after each press return):

## Required Setup - step (3)

- `curl https://download.java.net/openjdk/jdk13/ri/openjdk-13+33_windows-x64_bin.zip -O openjdk-13+33_windows-x64_bin.zip`
- `tar xzpvf openjdk-13+33_windows-x64_bin.zip`
- `setx /M JAVA_HOME "%cd%\jdk-13"`
- `SET JAVA_HOME=%cd%\jdk-13`
- `setx /M Path "%Path%;%JAVA_HOME%\bin"`
- `SET Path=%Path%;%JAVA_HOME%\bin`



## Required Setup - step (4)

- If **Maven 3.6.3** is not installed, then install Maven **3.6.3** by entering the following commands in your console:
  - `curl https://archive.apache.org/dist/maven/maven-3/3.6.3/binaries/apache-maven-3.6.3-bin.zip -O apache-maven-3.6.3-bin.zip`
  - `tar xzpvf apache-maven-3.6.3-bin.zip`
  - `setx /M MAVEN_HOME "%cd%\apache-maven-3.6.3"`
  - `SET MAVEN_HOME=%cd%\apache-maven-3.6.3`
  - `setx /M Path "%Path%;%MAVEN_HOME%\bin"`
  - `SET Path=%Path%;%MAVEN_HOME%\bin`

## Required Setup - step (5)

- If **Python v3.9** is not installed, then Install **Python v3.9** by entering the following comand into your console:
  - `curl https://www.python.org/ftp/python/3.9.6/python-3.9.6-amd64.exe -O python-3.9.6-amd64.exe`
  - `start /w "" "python-3.9.6-amd64.exe" install`
- If you want to use a UI (User Interface), there are several applications like Angular, JavaScript... etc. Please check the handbook for more information.

## Required Setup - step (6)

- If **Python v3.9** is installed add the requirements by running:
  - python -m pip install scikit-learn==0.23.2
  - python -m pip install numpy==1.20.1
  - python -m pip install pickle==4.0
  - python -m pip install pyflakes



# Setup the IDE Eclipse environment



# Setup the IDE Eclipse environment

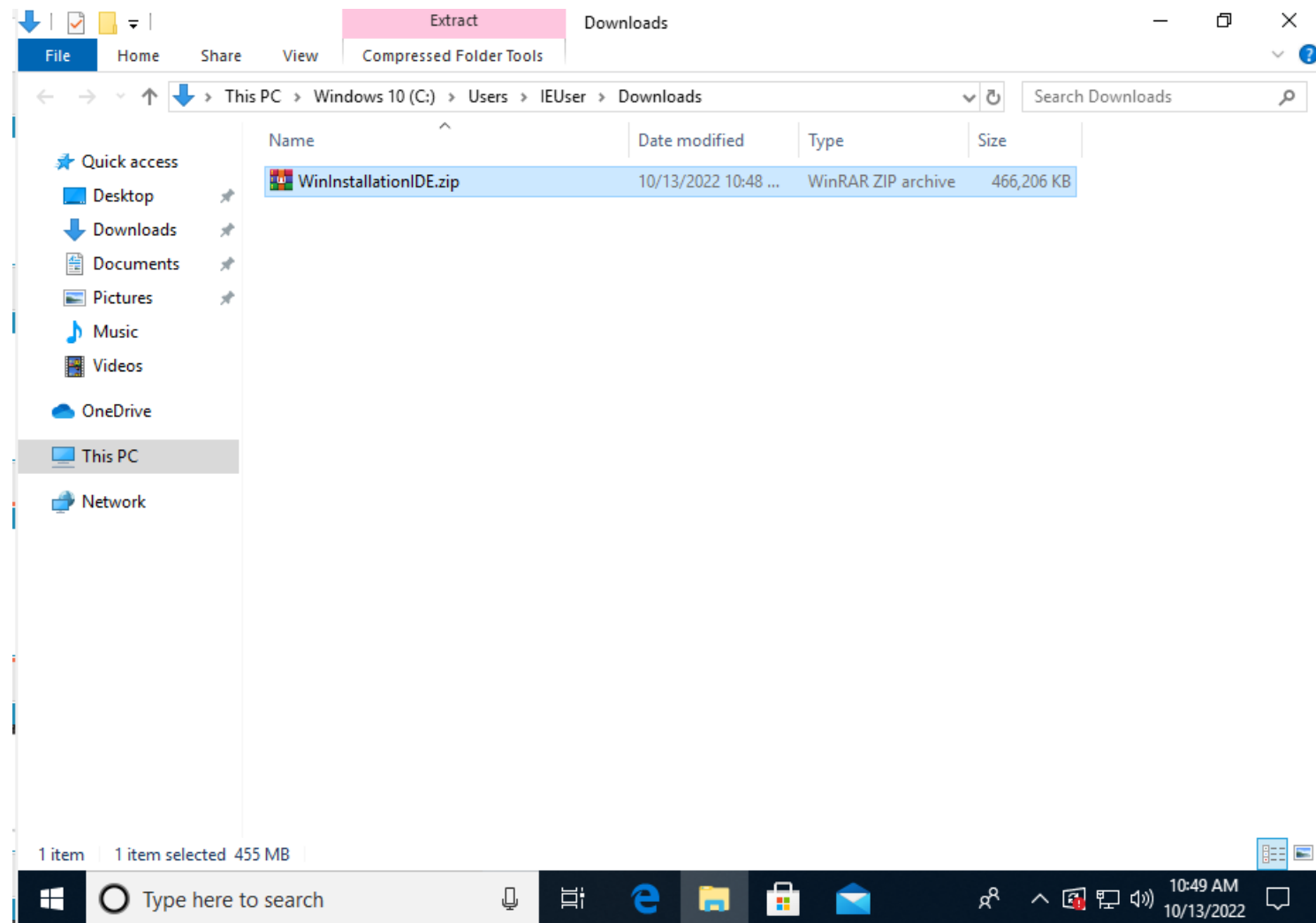
- For the purpose of the Service Workshop, we have prepared the projects and the examples for Eclipse IDE - with exact Eclipse version (**Eclipse 2021-03, version 4.19.0**) provided by the link in next slide.
- Any other Java-enabled IDE like Netbeans may do, but this requires manual work.
- The Eclipse provided by the link in next slide is compiled one with the required plugins (like checkstyle) fitting the required JDK for the platform.



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# Setup the IDE Eclipse environment

- Click the following link to download a tar file (**WinInstallationIDE.tar.gz**) that contains the IDE Eclipse with the workspace to use:
  - <https://sync.academiccloud.de/index.php/s/yBCo2ZAkP8ZB4vd>
- Extract the Zip file.

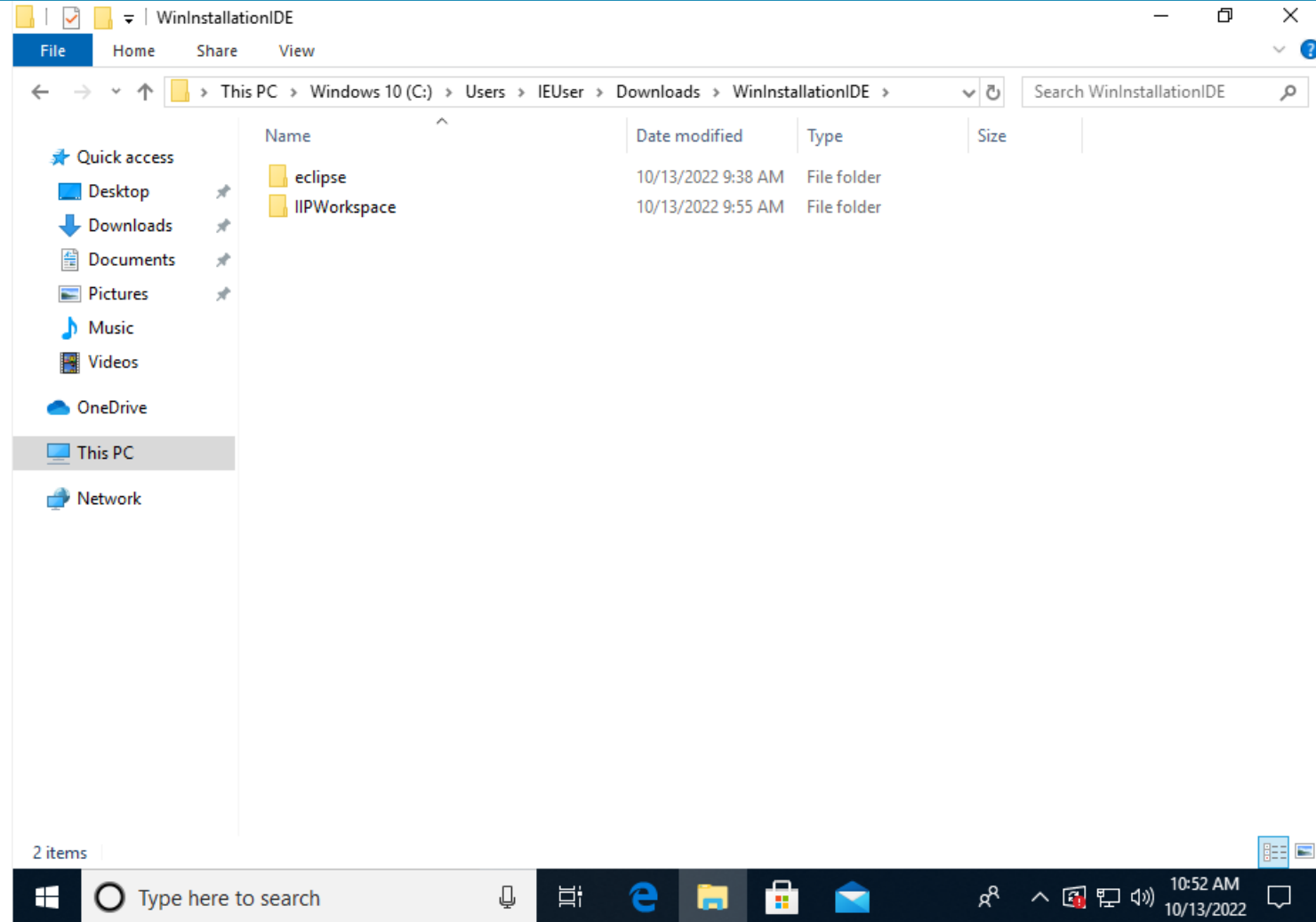




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# Setup the IDE Eclipse environment

- There are two folders.
  - Eclipse (folder)
  - IIPWorkspace (folder)

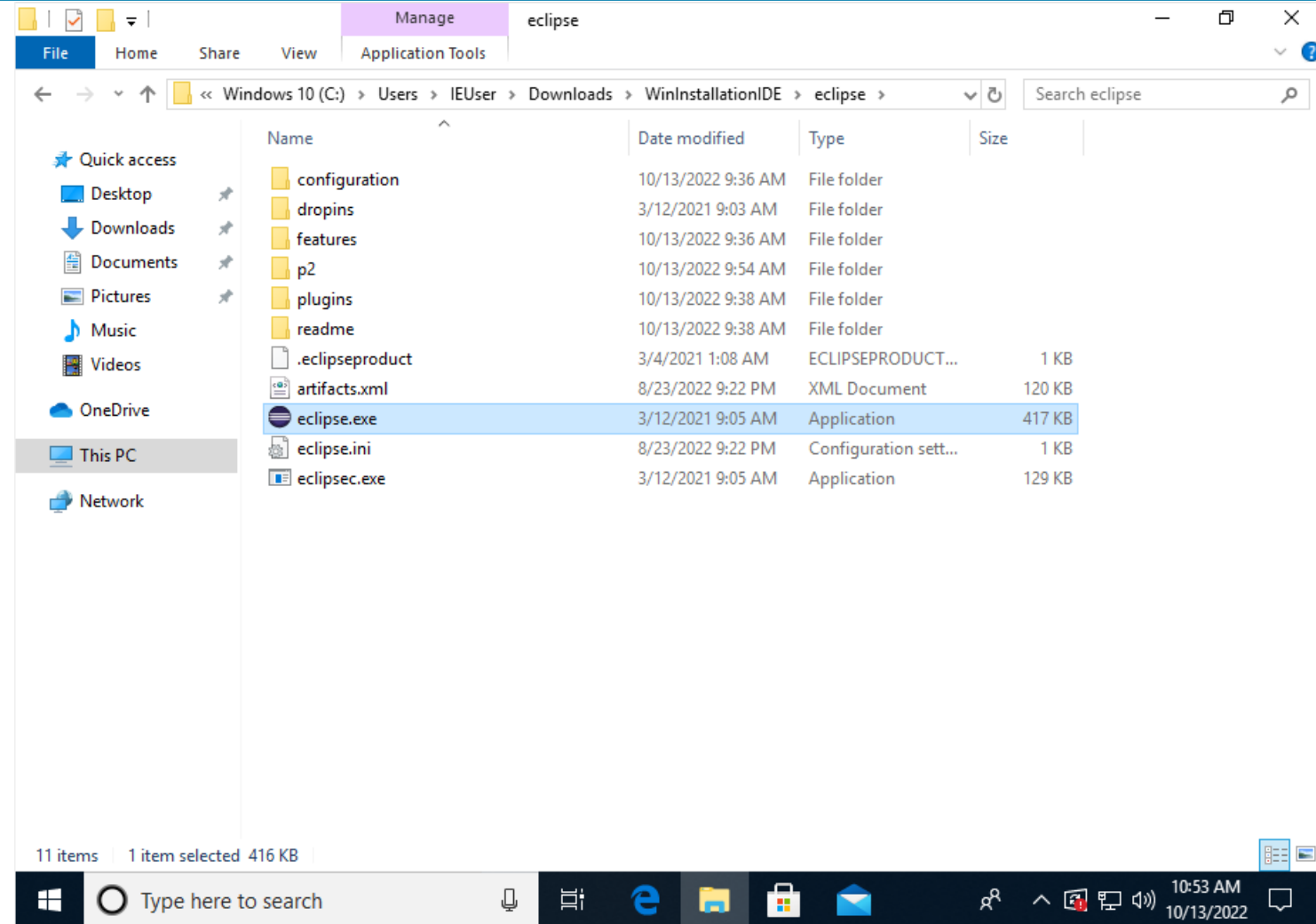




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# Setup the IDE Eclipse environment

- Inside eclipse folder, open eclipse application.



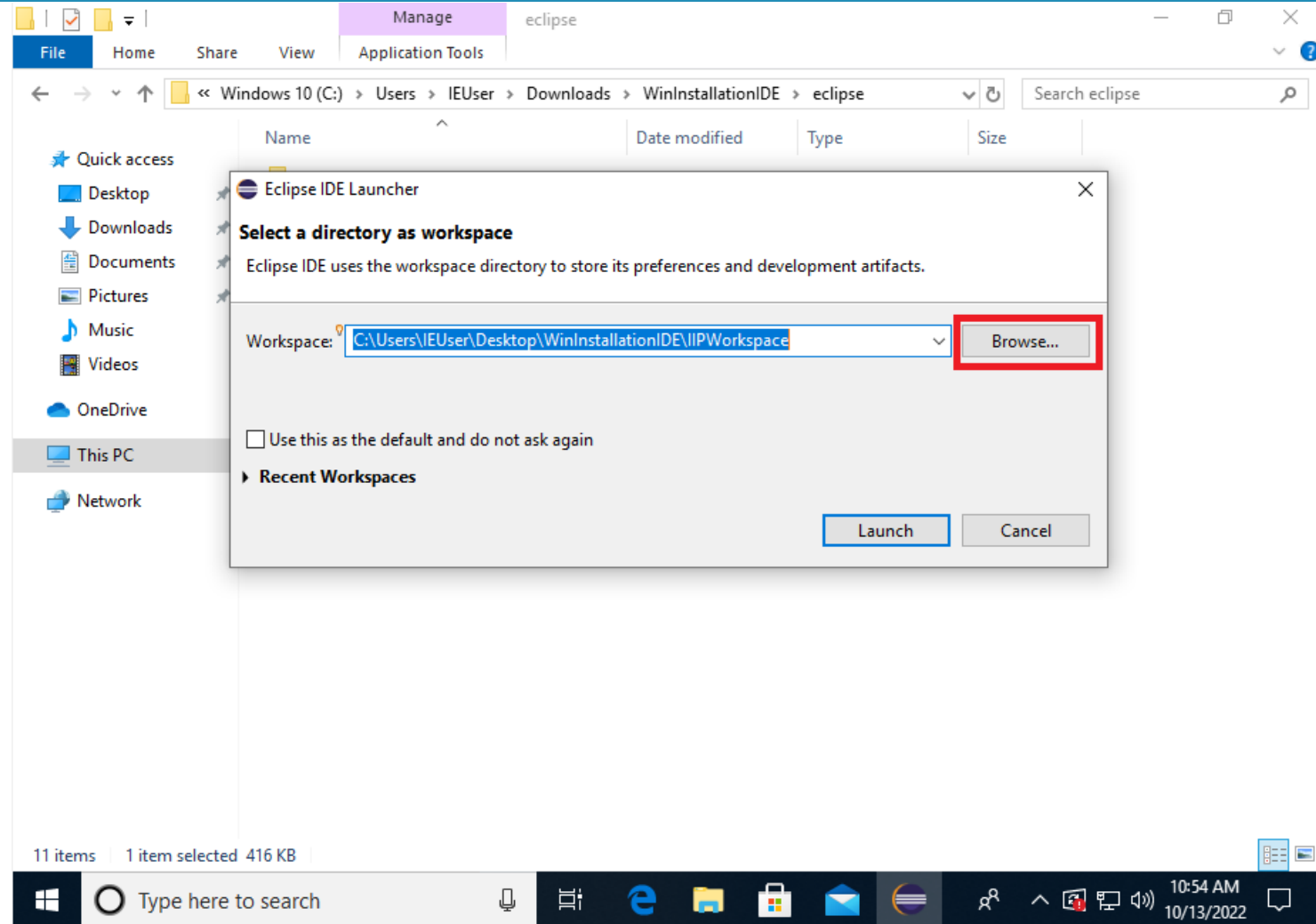




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# Setup the IDE Eclipse environment

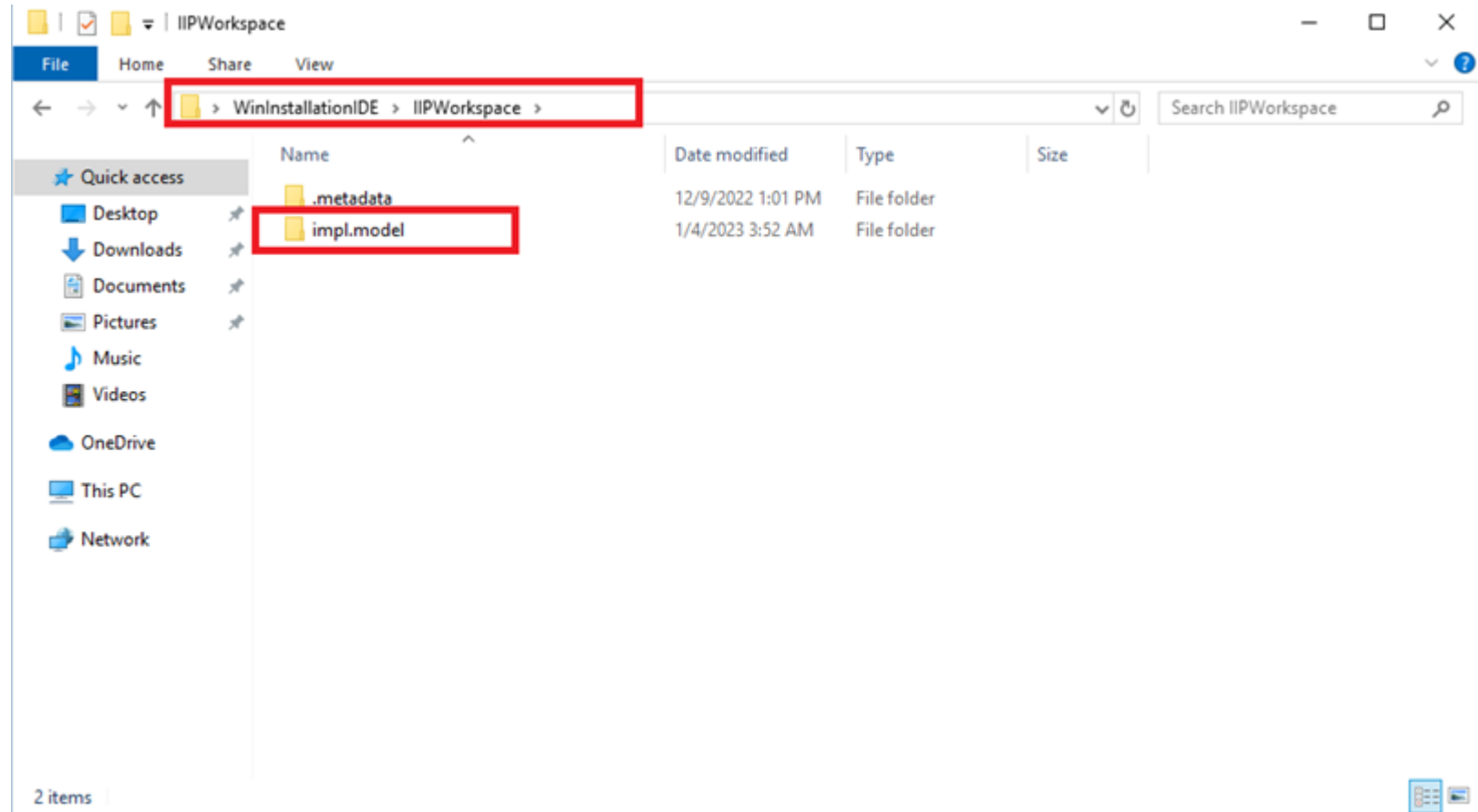
- Browse to IIPWorkspace in downloaded folder.





# Setup the IDE Eclipse environment

- You should see the following projects in that directory.
- Click open.

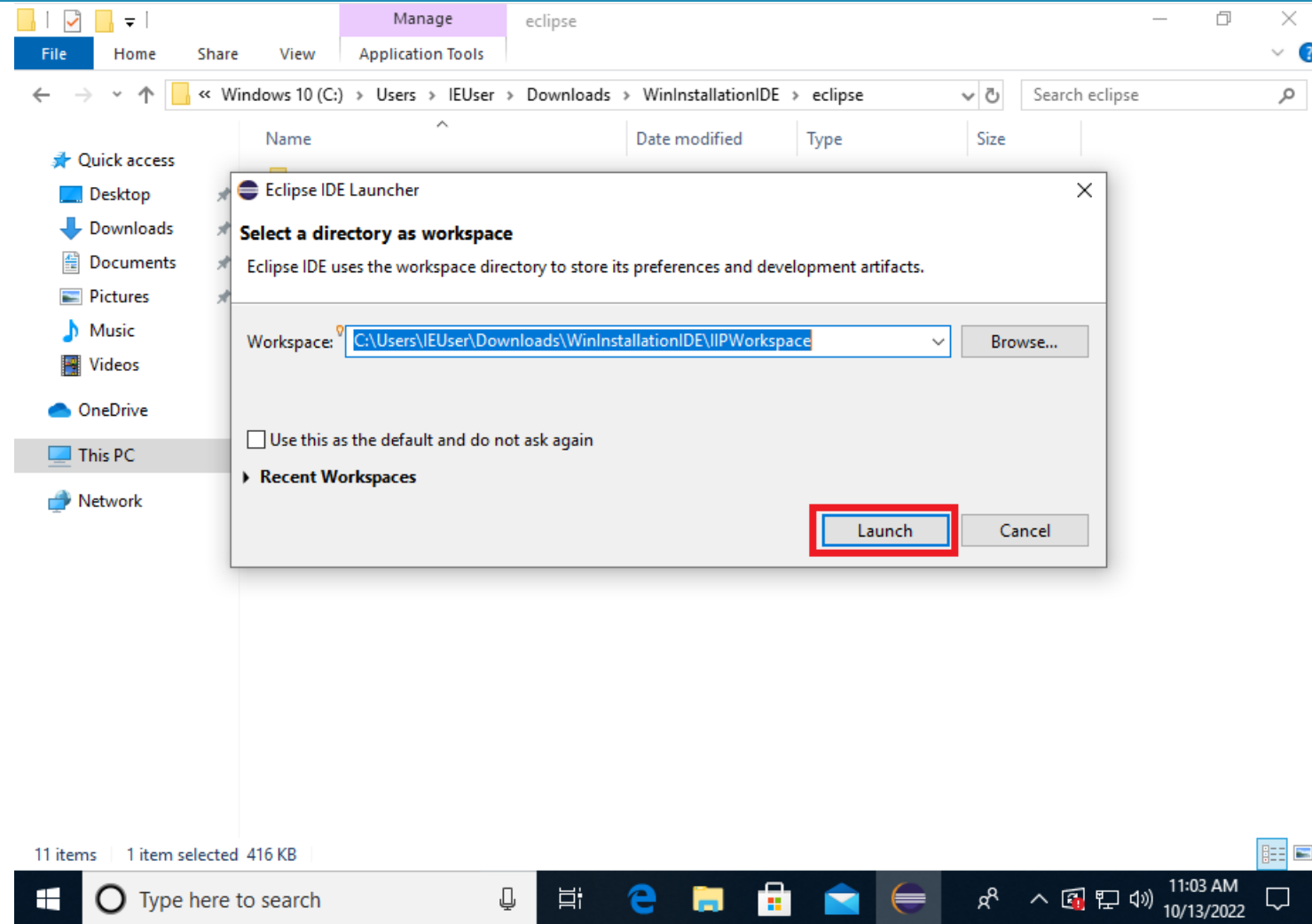




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# Setup the IDE Eclipse environment

- Click Launch.

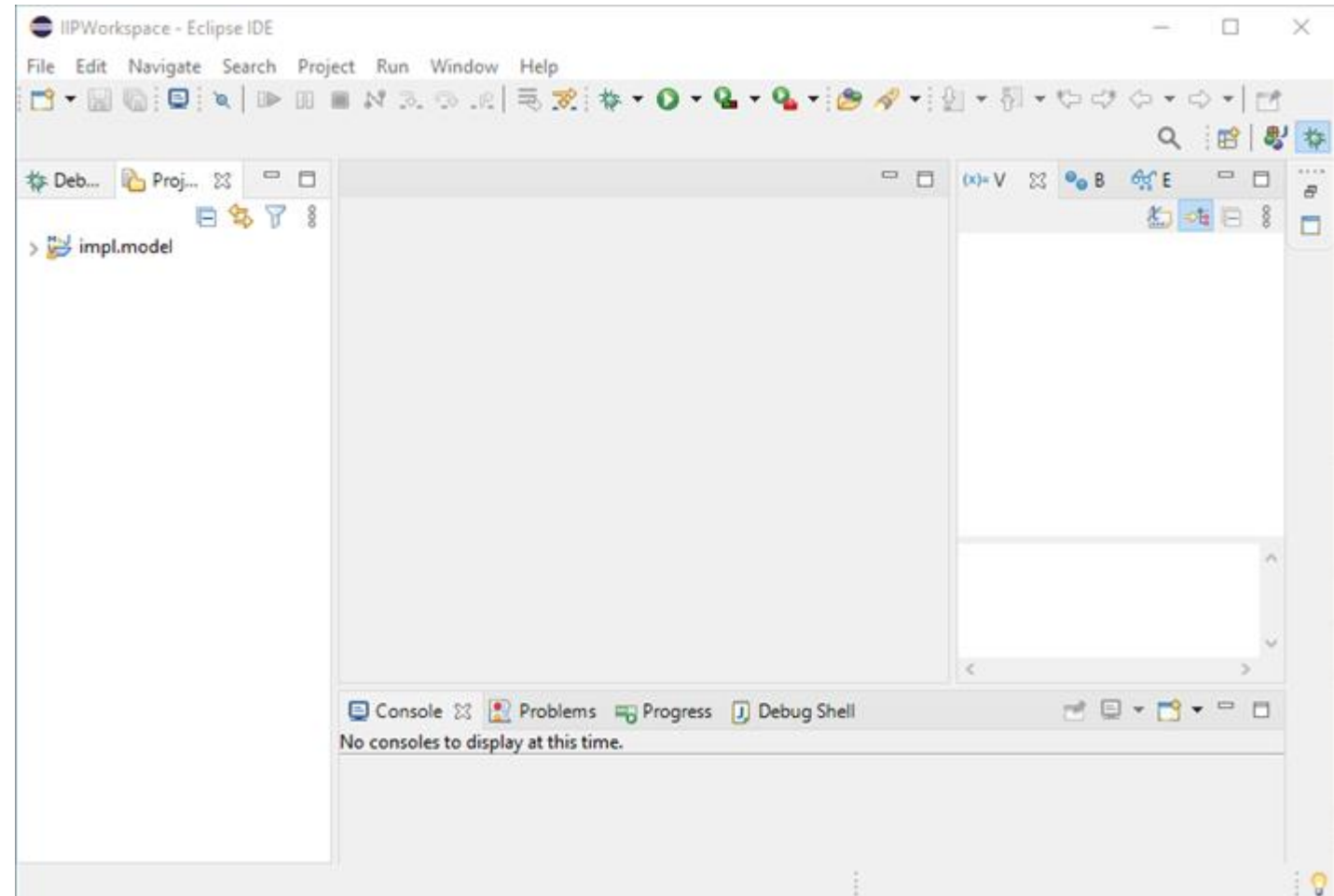




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# Setup the IDE Eclipse environment

- Wait until all projects are build and ready to use.





# Install the platform



# Platform Installation - step (1)

- Create an empty folder and name it (for example) “Install”, as usual via entering the following commands into your console:
  - `mkdir Install`
  - `cd Install`
- Download the Install-Package and unpack it (again, via Console)
  - `curl https://jenkins-2.sse.uni-hildesheim.de/view/IIP-Ecosphere/job/IIP\_Install/lastSuccessfulBuild/artifact/install.tar.gz -O install.tar.gz`
  - `tar xzpvf install.tar.gz`



# Platform Installation - step (1)

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19044.1889]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>cd..

C:\Windows>cd..

C:\>mkdir Install

C:\>cd Install

C:\Install>curl https://jenkins-2.sse.uni-hildesheim.de/view/IIP-Ecosphere/job/IIP_Install/lastSuccessfulBuild/artifact/install.tar.gz -O install.tar.gz
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left   Speed
100 101k  100 101k    0     0  1358k      0 --:--:-- --:--:-- --:--:-- 1376k
curl: (6) Could not resolve host: install.tar.gz

C:\Install>tar xzpvf install.tar.gz
x container/EdgeEcsSvc/wrapper_script.sh
x container/EdgeServiceMgr/wrapper_script.sh
x container/createAppContainer.sh
x container/createEcsContainer.sh
x container/createEdgeEcsRuntimeContainer.sh
x container/createEdgeEcsSvcContainer.sh
x container/createEdgeServiceMgrContainer.sh
x container/fullPlatform/platform/wrapper_script.sh
x container/runAppContainer.sh
x container/runEcsContainer.sh
x container/saveAppContainer.sh
x container/saveEcsContainer.sh
x container/saveEdgeEcsRuntimeContainer.sh
```



# Platform Installation - step (2)

- Modify the IP address for the platform in the configuration file (src/main/easy/InstallTest.ivml) to the IP address of your PC (where you have installed the Platform)
- You can type “ipconfig” in the console to see you PC’s IP address

```
1 project InstallTest {
2
3     import IIP-Ecosphere;
4     import DataTypes;
5
6     annotate BindingTime bindingTime = BindingTime::compile to .;
7
8     String platformServer = "147.172.177.142";
9
10    // ----- component setup -----
11
12    serializer = Serializer::Json;
13    // serviceManager, containerManager are already defined
14
15    aasServer = {
16        schema = AasSchema::HTTP,
```

```
C:\Install>ipconfig
```

```
Windows IP Configuration
```

```
Ethernet adapter Ethernet 2:
```

```
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix  . :
```

```
Ethernet adapter Ethernet 3:
```

```
Connection-specific DNS Suffix  . : sse.local
Link-local IPv6 Address . . . . . : fe80::808:886d:366:400c%19
IPv4 Address. . . . . : 147.172.177.142
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 147.172.177.254
```





# Platform Installation - step (3)

- Instantiate the platform: Execute these commands in the “Install” folder (the folder you installed the platform in)
  - `mvn install`
- This will take a while, once finished it looks like this:

```
-----  
BUILD SUCCESS  
-----  
Total time: 24.955 s  
Finished at: 2022-09-01T15:27:11+02:00  
Final Memory: 51M/188M  
-----  
execute generateServiceContainer(Path,Configuration,Application,sequenceOf(MeshE  
cations::ServiceMesh::sources {0}))  
C:\Install>
```

- Now the platform is installed, the script files are created and ready to start.



# Start The Platform

# Start The Platform

- There are two possible ways to the run the platform:
  - Local: One machine working as platfrom and device at the same time.
  - Distributed: One machine working as platform, another mahine(s) working as device(s)

# Start The Platform Local - Step (1)

- Open a new console
- You can do so by holding shift and clicking on your console icon in the windows task bar
- The broker scripts and files are in “Install/gen/broker” folder, change to this path and run the following batch script to start it>
  - broker.bat

```
C:\Install>
C:\Install>cd gen

C:\Install\gen>cd broker

C:\Install\gen\broker>broker.bat
[Broker] BRK-1006 : Using configuration : N/A
[Broker] BRK-1001 : Startup : Version: 8.0.2 Build: 22840e
[Broker] BRK-1010 : Platform : JVM : Oracle Corporation ve
[Broker] BRK-1011 : Maximum Memory : Heap : 8,543,797,248
[Broker] BRK-1017 : Process : PID : 11052
[Broker] BRK-1002 : Starting : Listening on TCP port 8883
[Broker] BRK-1004 : Qpid Broker Ready
```



# Start The Platform Local - Step (2)

- Now return to your previous console and start the actual platform.
- The platform scripts and files are in the “Install/gen/” folder, run the following script to start it:

- platform.bat

```
Administrator: Command Prompt - platform.bat
SHOT\SimpleMeshTestingApp-0.1.0-SNAPSHOT-test-sources.jar
  Installing C:\Install\gen\SimpleMeshTestingApp\target\SimpleMeshTestingApp
impleMeshTestingApp-0.1.0-SNAPSHOT-spring.zip
  Installing C:\Install\gen\SimpleMeshTestingApp\target\SimpleMeshTestingApp
leMeshTestingApp-0.1.0-SNAPSHOT-bin.jar
-----
BUILD SUCCESS
-----
Total time: 24.955 s
Finished at: 2022-09-01T15:27:11+02:00
Final Memory: 51M/188M
-----
execute generateServiceContainer(Path,Configuration,Application,sequenceOf(
cations::ServiceMesh::sources {0}))
C:\Install>cd gen
C:\Install\gen>platform.bat
C:\Install\gen>java -cp "plJars/*;common/*" -Dio.netty.tryReflectionSetAccessible=t
AMED de.iip_ecosphere.platform.support.LifecycleHandler$WaitingStarter
15:40:45.572 [main] INFO d.i.p.support.LifecycleHandler - Starting de.iip_ecospher
15:40:45.652 [main] INFO d.i.p.c.ConfigurationLifecycleDescriptor - EASy-Producer
15:40:46.993 [main] INFO d.i.p.support.LifecycleHandler - Starting de.iip_ecospher
```



# Start The Platform Local - Step (3)

- To make the platform machine working as resource run the following scripts in yet another new console:
  - ecs.bat
  - serviceMgr.bat
- Or just run the following script (share the same memory)
  - ecsServiceMgr.bat

```
C:\Install\gen>ecsServiceMgr.bat

C:\Install\gen>java -cp "ecsSvcJars/*;common/*" -Dio.netty.try
-UNNAMED de.iip_ecosphere.platform.support.LifecycleHandler$Wa
15:57:17.569 [main] INFO d.i.p.support.LifecycleHandler - Sta
15:57:17.571 [main] INFO d.i.p.support.LifecycleHandler - Sta
15:57:18.013 [background-preinit] INFO o.h.validator.internal
15:57:18.036 [main] INFO d.i.p.s.LifecycleHandler$WaitingStar
.aas-0.4.0-SNAPSHOT.jar started by sauer in C:\Install\gen)
15:57:18.037 [main] INFO d.i.p.s.LifecycleHandler$WaitingStar
15:57:19.487 [main] INFO d.i.p.s.LifecycleHandler$WaitingStar
15:57:19.490 [main] INFO d.i.p.s.resources.ResourceLoader - R
15:57:19.491 [main] INFO d.i.p.s.resources.ResourceLoader - R
```



# Start The Platform Local - Step (4)

- To start the command line interface for the platform run the following script  
`-cli.bat`
- Again, the above scripts are in the “Install/gen” folder

```
C:\Install\gen>cli

C:\Install\gen>java -cp "plJars/*;common/*" -Dio.netty
--add-opens java.base/jdk.internal.misc=ALL-UNNAMED -
m.platform.Cli
16:01:20.524 [main] INFO d.i.p.s.resources.ResourceL
16:01:20.529 [main] INFO d.i.p.s.resources.ResourceL
16:01:20.561 [main] INFO d.i.p.s.s.SemanticIdResolve
16:01:20.563 [main] INFO d.i.p.s.resources.ResourceL
16:01:20.568 [main] INFO d.i.p.s.s.SemanticIdResolve
16:01:20.572 [main] INFO d.i.p.s.resources.ResourceL
IIP-Ecosphere, interactive platform command line 0.4.
AAS server: http://147.172.177.142:9001
AAS registry: http://147.172.177.142:9002/registry
Type "help" to see commands and their description.
>
```



# Start The Platform Distributed - Step (1)

- Copy the following files and folders from the platform server (the PC you installed the platform on) to the PC/Device that is to be added to the platform as a resource:
  - gen\ecsJars (folder)
  - gen\ecsSVCJars(folder)
  - gen\broker (folder)
  - gen\svcJars (folder)
  - gen\ecs.bat (file)
  - gen\serviceMgr.bat (file)
  - gen\ecsServiceMgr.bat (file)





# Start The Platform Distributed - Step (2)

- To add the new device/pc as resource in the platform run the following scripts on the new device/pc
  - ecs.bat
  - serviceMgr.bat
- Or just run the following script (share the same memory)
  - ecsServiceMgr.bat
- If everything worked fine, then PC/device should be listed as a platform resource

```
resources> list
Resource a86C5A6AA2F26
Storage_Capacity: 10998212841472 (byte)
runtimeVersion: 1 (Software version)
Case_Temperature: -274,000000 (°C)
Storage_Free: 1467308376064 (byte)
containerSystemName: none (Software name)
Memory_Free: 21191258112 (byte)
Allocated_Memory: 0,379741 (Percent)
CPU_Architecture: amd64
Memory_Used: 12973924352 (byte)
managedId: a86C5A6AA2F26
deviceAas: http://147.172.177.142:9001/shells/urn%3A%3A%3AAAS%3A%3A%3Adevicea86C5A6AA2F26%23/aas
CPU_Temperature: -274,000000 (°C)
OS: Windows 10 (Software name)
ip: 147.172.177.142
Storage_Usable: 1467308376064 (byte)
Memory_Capacity: 34165182464 (byte)
Allocated_Storage: 9530904465408 (byte)
runtimeName: defaultEcsRuntime (Software name)
CPU_Capacity: 8
GPU_Capacity: 0
resources>
```



# Add a Windows Edge device to the platform

- The difference between a PC/ pc like device and an Edge devices is (in case that Edge device only supports Java 8)
  - Copy the following files **(not the files from slide 31)** from the platform server to the Edge device and run them
    - gen\ecs8.bat instead of gen\ecs.bat
    - gen\serviceMgr8.bat instead of gen\serviceMgr.bat
    - gen\ecsServiceMgr8.bat instead of gen\ ecsServiceMgr.bat



# Stop The Platform



# Stop The Platform

- Stopping the platform:
- Type Ctrl-C on all the open shells (CLIs) to stop them and clean the resources in the reverse order we opened (started) them.
- If asked to quit (Y/N), type Y



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# Kontakt



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