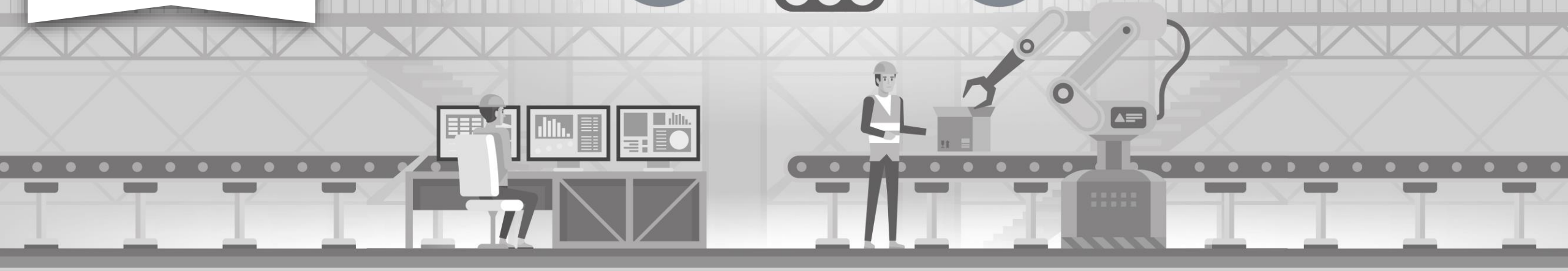




**IIP-Ecosphere**

Next Level Ecosphere for  
Intelligent Industrial Production



# Platform Installation Guide

Gefördert durch:



Bundesministerium  
für Wirtschaft  
und Klimaschutz

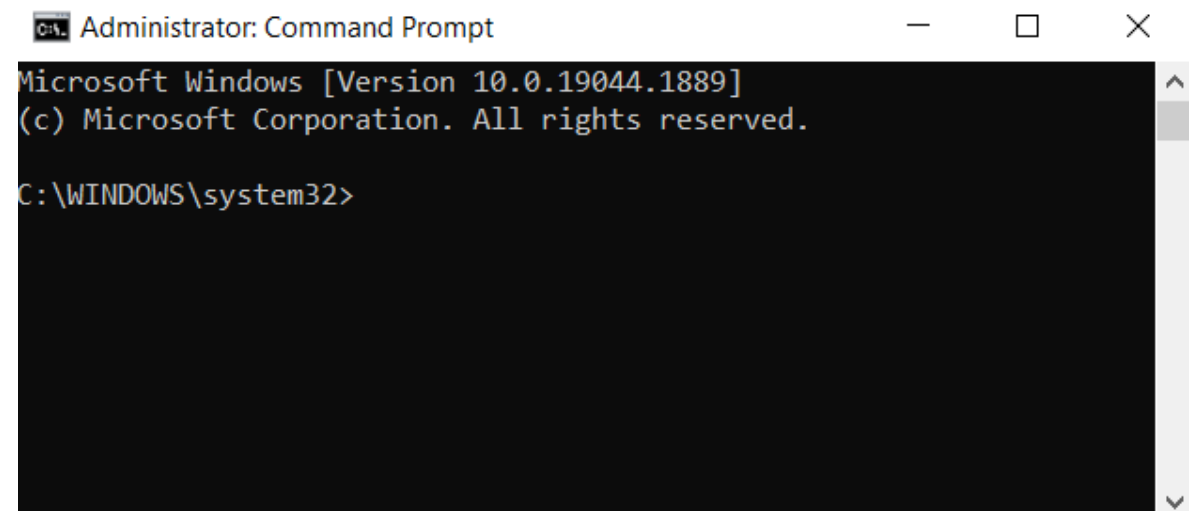
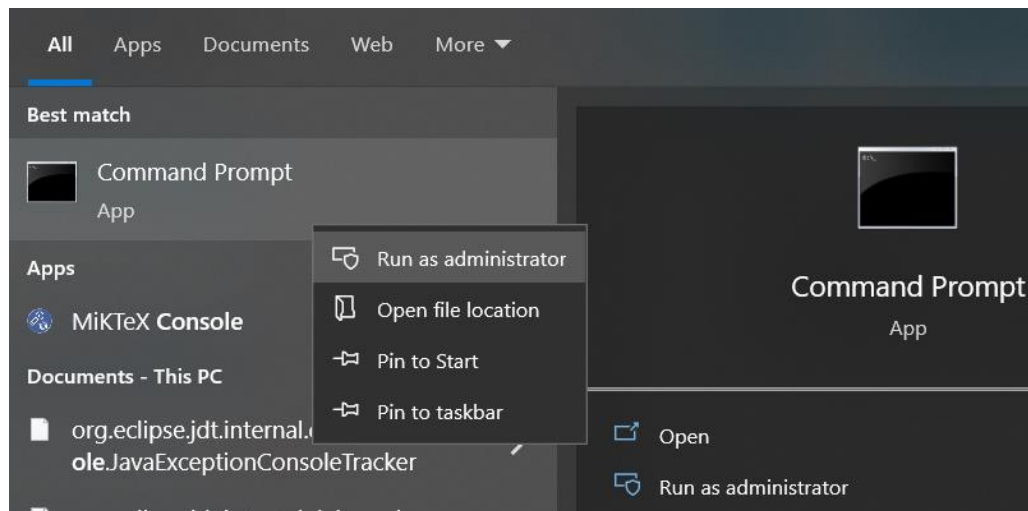
Ahmad Alamoush (UHi)

IIP-Ecosphere Platform Documentation



# Installation steps Windows (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")





# Installation steps Windows (2)

- 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):

```
-r1 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
```



# Installation steps Windows (3)

- **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.**

# Installation steps Windows (4)

- If **Maven 3.6.3** is not installed on your PC, 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`



# Installation steps Windows (5)

- 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 commands into your 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



# Installation steps Windows (6)

- Should your Windows installation not already have a „Windows Sub system for Linux“ (WSL), which Docker for Desktop requires, please see the instructions to install a Linux distribution to Windows here:

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



# Installation steps Windows (7)

- If **Python v3.9** is not installed, then install **Python v3.9** by entering the following command 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.





# Installation steps Windows (8)

- 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`



# Installation steps Windows (9)

```
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
```



# Installation steps Windows (10)

- Install platform dependencies
  - `cd platformDependencies`
  - `mvn install`
  - `cd ..`
- Obtain platform bootstrap packages
  - `mvn package -DskipTests`



# Installation steps Windows (11)

```
C:\Install>cd platformDependencies

C:\Install\platformDependencies>mvn install
[INFO] Scanning for projects...
[INFO]
[INFO] -----< de.iip-ecosphere.platform:InstallDependencies >-----
[INFO] Building InstallDependencies 0.4.0-SNAPSHOT
[INFO] -----[ jar ]-----
Downloading from SSE: https://projects.sse.uni-hildesheim.de/qm/maven/de/iip-ecosph
Downloaded from SSE: https://projects.sse.uni-hildesheim.de/qm/maven/de/iip-ecosphe
```

```
C:\Install\platformDependencies>cd..

C:\Install>mvn package -DskipTests
[INFO] Scanning for projects...
[INFO]
[INFO] -----< de.iip-ecosphere.platform:Install >-----
[INFO] Building Install 0.4.0-SNAPSHOT
[INFO] -----[ jar ]-----
Downloading from SSE: https://projects.sse.uni-hildesheim.de/qm/maven/de/iip-ecosph
Downloaded from SSE: https://projects.sse.uni-hildesheim.de/qm/maven/de/iip-ecosphe
Downloading from SSE: https://projects.sse.uni-hildesheim.de/qm/maven/de/iip-ecosph
Downloaded from SSE: https://projects.sse.uni-hildesheim.de/qm/maven/de/iip-ecosphe
```



# Installation steps Windows (12)

- 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 your 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
```



# Installation steps Windows (13)

- Instantiate the platform: Execute these commands in the “Install” folder (the folder you installed the platform in)

- `mvn exec:java`

```
C:\Install>mvn exec:java
[INFO] Scanning for projects...
[INFO]
```

- 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.



# Installation steps Windows (14)

- Open a new console (another one, next to the one you used so far)
- 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
```



# Installation steps Windows (15)

- 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
```





# Installation steps Windows (16)

- 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
  - ecsServiceMgr.bat // this is easier
- 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>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
```

```
C:\Install\gen>cli

C:\Install\gen>java -cp "plJars/*;common/*" -Dio.nett
--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.
>
```



# Add a Windows device to the platform

- Do the installation steps for Windows from slides from (1) to (11) on the Device/PC you want to add to the platform, Don't change the IP address (slide 12) this time – so you are not changing the IP Address this time on the machine to add to the platform.
- 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)



# Add a Windows device to the platform

- 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 (all in one of the above two scripts)
  - `ecsServiceMgr.bat`

If everything worked your 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

- 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



# Add a Windows Edge device to the platform

- The difference between a PC/ pc like device and an Edge devices is
  - Edge devices should install Java 8
  - Copy the following files **(not the files from slide 20)** 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



# Setup the IDE Eclipse environment

- To setup the IDE Eclipse environment, follow the guideline in the following link  
<https://github.com/iip-ecosphere/platform/blob/main/platform/documentation/Guideline.pdf>
- The Zip file contains the Eclipse IDE and the workspace with most of the required projects



IIP-Ecosphere

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