RAM-ASP platform software

HOW-TO-USE AND CONFIGURATION

3DPRN-WALL: Centralized software

3DPRN-WALL is the software that manage and orchestrate the actions made by the robot and distribute or redistribute the workload on the printers.

It is called "WALL" because it manage a wall of printer, an ordered set of printers that make up a production plant.

Configuration

The 3DPRN-WALL software has a configuration file called "WALL.INI". You can find it in the root directory of the software.

Example of configuration

```
[SYSTEM]
dbName=db.db
NSecWaitTryingConnection=10
NSecWaitUpdateStausPrinter=20

[EmptyPlateWarehouse]
Name=Magazzino piatti puliti
Position.X=1611
Position.Y=270
Position.Z=0
DeltaY=80
DeltaZ=650

[FullPlateWarehouse]
Name=Magazzino piatti pieni
Position.X=1611
Position.Y=950
Position.Z=0
DeltaY=100
DeltaZ=650

[ErrorPlateWarehouse]
Name=Magazzino piatti non conformi
Position.X=1611
Position.Y=760
Position.Z=0
DeltaY=100
DeltaZ=647

[FinalCheck3DWarehouse]
Name=Camera controllo finale piatti
Position.X=1611
Position.Y=20
Position.Z=0
DeltaY=80
DeltaZ=650

[PRINTERS]
NTot=4

[PRINTER-1]
Present=1
Active=1
Position.X=245
Position.Y=693
Position.Z=0
DeltaY=20
DeltaZ=650
DeltaYPhoto=-52
Ip=192.168.0.188
Port=13000

[PRINTER-2]
Present=1
```

```
Active=1
Position.X=977
Position.Y=693
Position.Z=0
DeltaY=20
DeltaZ=650
DeltaYPhoto=-46
Ip=192.168.0.186
Port=13000

[PRINTER-3]
Present=1
Active=1
Position.X=245
Position.Y=54
Position.Z=0
DeltaY=20
DeltaZ=650
DeltaYPhoto=-44
Ip=192.168.0.189
Port=13000

[PRINTER-4]
Present=1
Active=1
Position.X=977
Position.Y=54
Position.Z=0
DeltaY=20
DeltaZ=650
DeltaYPhoto=-50
Ip=192.168.0.187
Port=13000

[ROBOT]
Present=1
IP=192.168.0.137
PORT=13000
MoveSpeed=29000
TakePlaceSpeed=4000
CameraTakePictureCmd=ffmpeg.exe
CameraTakePicturePar=-y -i rtsp://admin:admin@192.168.0.158:554/ch01/0 -vframes 1
CameraPicturesDir=Imm/
CheckLastPhoto=1
TakePeriodicPhoto=1
PeriodicPhotoIntervalInsSec=40
CheckPeriodicPhoto=1
NRows=2
NCols=2
CheckPlateIsPresentOnRobotActive=1
CheckEmpityPlateIsPresentOnStorageActive=1
CheckFullPlateIsPresentOnStorageActive=1
CheckPlateIsPresentOnPrinterActive=1

[CHECK3D]
Active=1
Match_Shape_Error=0.2
Match_Area_ErrorPerc=15
Match_Template_Distance=60

[CHECK3D FINAL]
Active=1
Match_Shape_Error=0.2
Match_Area_ErrorPerc=15
Match_Template_Distance=60
```

Parameters reference

[SYSTEM]
dbName:
Path to the internal sqlite database storing processing informations
Default: db.db

NSecWaitTryingConnection:
timeout for connection to printers or robot
Default: 10

NSecWaitUpdateStausPrinter:
maximum timeout to wait for a status update
Default: 20

[EmptyPlateWarehouse]
Name:
Front end name for the empty plate warehouse

Position.X:
Absolute X coordinate of this warehouse (mm)

Position.Y:
Absolute Y coordinate of this warehouse (mm)

Position.Z:
Absolute Z coordinate of this warehouse (mm)

DeltaY:
Relative Y movement for the robot to take a plate from this warehouse (relative to warehouse y position)

DeltaZ:
Relative Z movement for the robot to take a plate from this warehouse (relative to warehouse y position)

[FullPlateWarehouse]
Name:
Front end name for the full plate warehouse

Position.X:
Absolute X coordinate of this warehouse (mm)

Position.Y:
Absolute Y coordinate of this warehouse (mm)

Position.Z:
Absolute Z coordinate of this warehouse (mm)

DeltaY:
Relative Y movement for the robot to place a plate in this warehouse (relative to warehouse y position)

DeltaZ:
Relative Z movement for the robot to place a plate in this warehouse (relative to warehouse y position)

[ErrorPlateWarehouse]
Name:
Front end name for the error plate warehouse

Position.X:
Absolute X coordinate of this warehouse (mm)

Position.Y:
Absolute Y coordinate of this warehouse (mm)

Position.Z:
Absolute Z coordinate of this warehouse (mm)

DeltaY:
Relative Y movement for the robot to place a plate in this warehouse (relative to warehouse y position)

DeltaZ:
Relative Z movement for the robot to place a plate in this warehouse (relative to warehouse y position)

[FinalCheck3DWarehouse]
Name:
Front end name for the final check area

Position.X:
Absolute X coordinate of this warehouse (mm)

Position.Y:
Absolute Y coordinate of this warehouse (mm)

Position.Z:
Absolute Z coordinate of this warehouse (mm)

DeltaY:
Relative Y movement for the robot to place a plate in this warehouse (relative to warehouse Y position)

DeltaZ:
Relative Z movement for the robot to place a plate in this warehouse (relative to warehouse Y position)

[PRINTERS]
NTot:
Number of printers connected to the system

[PRINTER-1]
Present:
A value indicating whether this printer is phisically present or not.
Value: 0|1

Active:

A value indicating whether this printer is active or not. A non active printer will not receive workings from centralized software.
Value: 0|1

Position.X:
Absolute X coordinate of this printer (mm)

Position.Y:
Absolute Y coordinate of this printer (mm)

Position.Z:
Absolute Z coordinate of this printer (mm)

DeltaY:
Relative Y movement for the robot to place a plate on this printer (relative to warehouse Y position).

DeltaZ:
Relative Z movement for the robot to place a plate on this printer (relative to warehouse Z position).

DeltaYPhoto:
Relative Y movement for the robot to take a photo to the printing on this printer (relative to warehouse Y position).

Ip:
Ip address of this printer.

Port:
Port of the printer's connection.

OctopiHash:
Hash of this printer's Octoprint instance.

[PRINTER-n]
Put a number of instances of printer equal to the *PRINTERS NTot* value indicated.

[ROBOT]
Present:
A value indicating whether this printer is phisically present or not.
Value: 0|1

Ip:
Ip address of this robot.

Port:
Port of the robot's connection.

MoveSpeed:
Speed used by the robot to execute movements (mm/min).

Default: 60000

TakePlaceSpeed:
Speed used by the robot to execute movements while loading and unloading (mm/min).
Default: 4000

CameraTakePictureCmd
Component used by the software to take videos and pictures from a camera.
Default: ffmpeg.exe

CameraTakePicturePar:
Parameters to be passed to the video component to take videos or pictures.
Default: -y -i rtsp://admin:admin@192.168.0.158:554/ch01/0 -vframes 1

CameraPicturesDir:
Directory where to store images taken by the camera.
Default: Imm/

TakePeriodicPhoto:
A value indicating whether to take periodic photos on printers or not.
Value: 0|1

PeriodicPhotoIntervalInsSec:
Interval in seconds to take periodic photos from printers.
Default: 40

CheckPeriodicPhoto:
A value indicating whether to check through vision control software the periodic photos made on printers or not.
Value: 0|1

CheckLastPhoto:
A value indicating whether to check through vision control software the photo made on printers at the end of the printings.
Value: 0|1

NRows:
Value indicating the number of rows phisically composed by the printers. NRows*NCols should be equal to the *PRINTERS NTot* value indicated.

NCols:
Value indicating the number of columns phisically composed by the printers. NRows*NCols should be equal to the *PRINTERS NTot* value indicated.

CheckPlateIsPresentOnRobotActive:
Value indicating whether the presence control for the plate on the robot is activated or not
Value: 0|1

CheckEmpityPlateIsPresentOnStorageActive:
Value indicating whether the presence control for the empty plates on warehouse is activated or not
Value: 0|1

CheckFullPlateIsPresentOnStorageActive:
Value indicating whether the presence control for the full plates on warehouse is activated or not
Value: 0|1

CheckPlateIsPresentOnPrinterActive:
Value indicating whether the presence control for plates on printers is activated or not
Value: 0|1

[CHECK3D]
Internal parameters for vision control software
Active=1
Match_Shape_Error=0.2
Match_Area_ErrorPerc=15
Match_Template_Distance=60

[CHECK3D FINAL]
Internal parameters for vision control software
Active=1
Match_Shape_Error=0.2
Match_Area_ErrorPerc=15
Match_Template_Distance=60

3DPRN-Fiware: Printer NGSI Agent

This software is needed to let your printer communicate with the IoT platform powered by fiware.

Once you have compiled the software you will have to copy this to the pc or raspberry of the specific printer you want to update in IoT.

Configuration:

The 3DPRN-WALL software has a configuration file called "3DPRN_Fiware.exe.config". You can find it in the root directory of the software.

Example of configuration:

```
<_3DPRN_Fiware.Properties.Settings>
<setting name="prn_ip" serializeAs="String">
  <value>127.0.0.1</value>
</setting>
<setting name="prn_port" serializeAs="String">
      <value>13000</value>
</setting>
<setting name="fiware_hash" serializeAs="String">
  <value ABCDEFG123/>
</setting>
<setting name="fiware_address" serializeAs="String">
  <value>http://192.168.0.100:1026/</value>
</setting>
<setting name="octopi_hash" serializeAs="String">
  <value ABCDEFG123/>
</setting>
</_3DPRN_Fiware.Properties.Settings>
```

Parameters reference:

prn_ip:

Ip of the printer. Usually local host 127.0.0.1 if the NGSI Agent runs locally.

prn_port:

Used from 3DPRN-ONBOARD Gui which can replace Octoprint. Usually 13000.

fiware_hash:

Hash of the Orion Context Broker running in LAN. To be found in Docker on the centralized server.

fiware_address:

Http-based address of the Orion Context Broker.

octopi_hash:

Hash code of the Octoprint instance running on the printer. To be found on octoprint API settings.

3DPRN_Fiware: Printer NGSI Agent

This software is needed to let your printer communicate with the IoT platform powered by fiware.

Once you have compiled the software you will have to copy this to the pc or raspberry of the specific printer you want to update in IoT.

Configuration:

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The 3DPRN_Fiware software has a configuration file called "3DPRN_Fiware.exe.config". You can find it in the root directory of the software.

Example of configuration:

```
<_3DPRN_Fiware.Properties.Settings>
<setting name="prn_ip" serializeAs="String">
  <value>127.0.0.1</value>
</setting>
<setting name="prn_port" serializeAs="String">
      <value>13000</value>
</setting>
<setting name="fiware_hash" serializeAs="String">
  <value ABCDEFG123/>
</setting>
<setting name="fiware_address" serializeAs="String">
  <value>http://192.168.0.100:1026/</value>
</setting>
<setting name="octopi_hash" serializeAs="String">
  <value ABCDEFG123/>
</setting>
</_3DPRN_Fiware.Properties.Settings>
```

Parameters reference:

prn_ip:

Ip of the printer. Usually local host 127.0.0.1 if the NGSI Agent runs locally.

prn_port:

Used from 3DPRN-ONBOARD Gui which can replace Octoprint. Usually 13000.

fiware_hash:

Hash of the Orion Context Broker running in LAN. To be found in Docker on the centralized server.

fiware_address:

Http-based address of the Orion Context Broker.

octopi_hash:

Hash code of the Octoprint instance running on the printer. To be found on octoprint API settings.

3DPRN_Fiware_Houston: Centralized software NGSI Agent

This software is needed to let the centralized software communicate with the IoT platform powered by fiware.

Once you have compiled the software you will have to copy this to the pc running the centralized software.

Configuration:

The 3DPRN_Fiware_Houston software has a configuration file called "3DPRN_Fiware_Houston.exe.config". You can find it in the root directory of the software.

Example of configuration:

```
<_3DPRN_Fiware.Properties.Settings>
  <setting name="prn_ip" serializeAs="String">
    <value>127.0.0.1</value>
  </setting>
  <setting name="prn_port" serializeAs="String">
    <value>13000</value>
  </setting>
  <setting name="OCB_ip" serializeAs="String">
    <value>http://127.0.0.1:1026/</value>
  </setting>
  <setting name="OCB_token" serializeAs="String">
    <value ABCDE/>
  </setting>
</_3DPRN_Fiware.Properties.Settings>
```

Parameters reference:

prn_ip:

Ip of the pc running the software. Usually local host 127.0.0.1 if the NGSI Agent runs locally.

prn_port:

Port for the communication with centralized software. Usually 13000.

fiware_hash:

Hash of the Orion Context Broker running in LAN. To be found in Docker on the centralized server.

fiware_address:

Http-based address of the Orion Context Broker.