acontis technologies GmbH

EC-Win (RT-Linux) Integration in EC-Engineer

Tutorial

V3.3.2

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Content

1 Introduction

Using EC-Engineer, it is possible to execute scripts before and after scanning or switching between the configuration and diagnosis modes.
EC-Win (RT-Linux) brings along prepared scripts. This tutorial will explain how to integrate them to simplify the workflow.

2 Tutorial

2.1 Prerequirements

Following components should be installed on the PC:

- LxWin V7.1.0.01 or above
- EC-Win (RT-Linux) V3.1.0.18 or above
- EC-Engineer V3.3.1 or above
- plink.exe

LxWin is a Windows Real-time extension based on Real-time Linux. Without real-time it is not possibly to bring EtherCAT network in operational mode. Default installation path is "C:\Program Files\acontis_technologies\LxWin.

EC-Win (RT-Linux) package contains the EC-Master master libraries and demo applications compiled for LxWin platform. It is delivered as archive and could be extracted into some location on you drive. In this document it is assumed that packet is extracted into "C:\Program Files\acontis_technologies\EC-WinRT-Linux" folder.

EC-Engineer is EtherCAT Configurator Tool. Default installation path is C:\Program Files (x86)\acontis_technologies\EC-Engineer

plink.exe is a command-line tool which used to start EC-Master demo application on Linux remotely using SSH protocol. You can get latest version from the official download page. For batch script simplification it is assumed that plink.exe is available without absolute path. plink.exe location should be added to PATH environment variable.

2.2 Prepare real-time environment

You should prepare real-time environment according to LxWin manual. Please follow Tutorials chapters:

3.2 Running the shipped Linux image
3.5 Add a physical Ethernet adapter to Linux

The Ethernet adapter added to Linux will be used for EtherCAT network.

Note: System Manager will force you to restart PC several times.

System Manager creates workspace at the directory
C:\Users**\<User>**\AppData\Roaming\acontis_technologies\workspaces\default
where <User> is your user name.
If you create workspace at some other location, please finish additional steps described at "3.1 Export scripts from the System Manager".

2.3 Copy the demo application

Copy all files in the Bin\Linux\x86 folder of the EC-Win (RT-Linux) package into the RtFiles folder of your LxWin workspace.
Example:

```
xcopy
"C:\Program Files\acontis_technologies\EC-WinRT-Linux\Bin\Linux\x86\*"
%HOMEDRIVE%%HOMEPATH%\AppData\Roaming\acontis_technologies\workspaces\defau
lt\RtFiles
```

2.4 Verify scripts manually

EC-Win (RT-Linux) package contains script files templates located at Bin\Linux folder.
Directory:

C:\Program Files\acontis_technologies\EC-WinRT-Linux\Bin\Linux

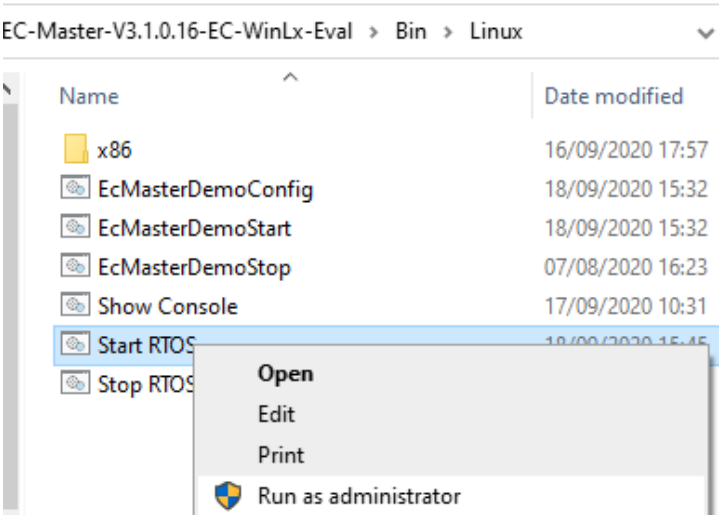
Files:

EcMasterDemoConfig.cmd
EcMasterDemoStart.cmd
EcMasterDemoStop.cmd
Show Console.bat
Start RTOS.bat
Stop RTOS.bat

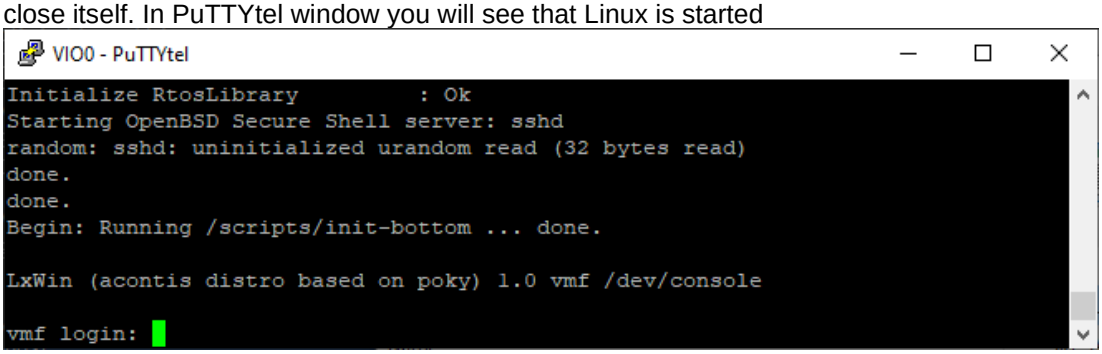
It is assumed that you have only one network card connected to EtherCAT slave and it is an Intel card.

Following steps shows that the system is properly configurated.

1. Run “Show Console.cmd”. You will get an empty PuTTYtel console.
2. Run “Start RTOS.cmd” as administrator.



You will see “User Account control” message. Press yes. After several seconds the windows close itself. In PuTTYtel window you will see that Linux is started

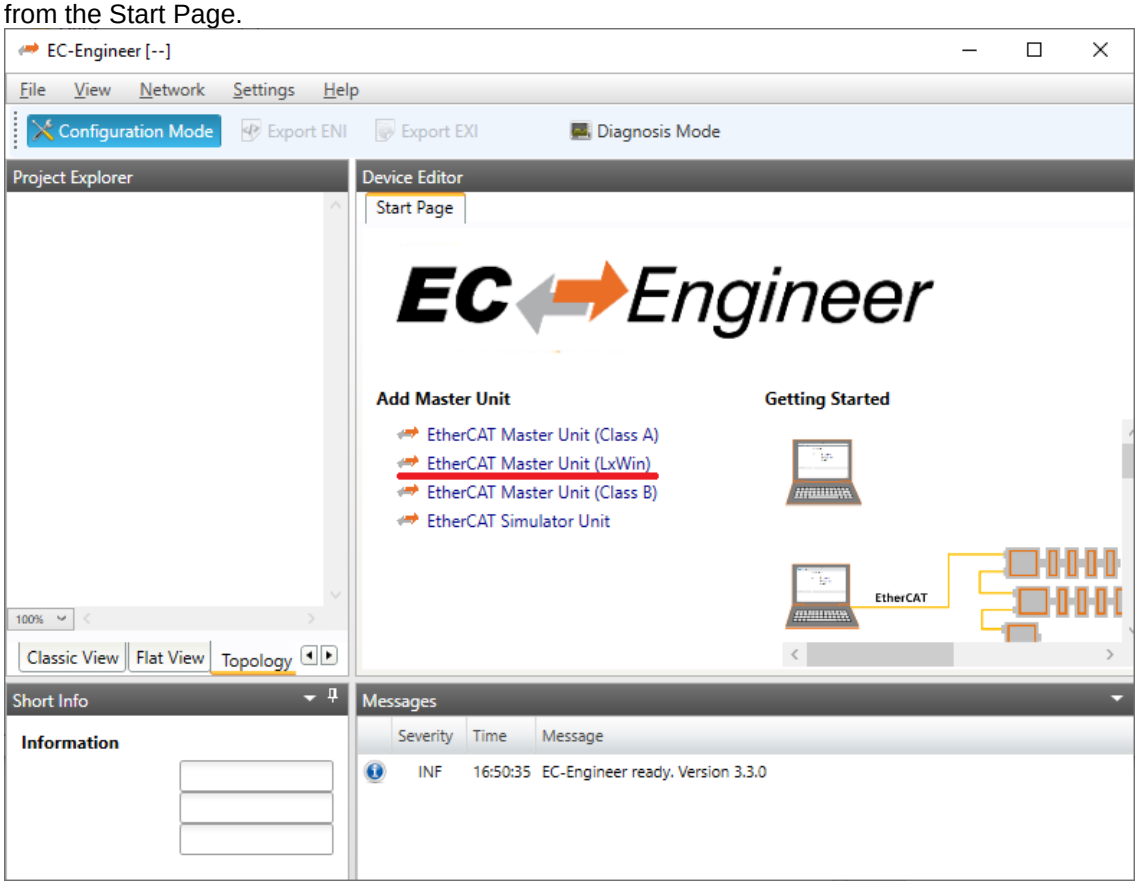


3. Run Command Prompt (cmd.exe) and execute the command:
   `plink.exe -ssh root@192.168.157.2 -pw root`
   It will ask to add SSH key in its cache. Press y, ENTER key and close the window.
4. Run “EcMasterDemoConfig.cmd”. On EtherCAT slave device you should see communication started.
5. Using “EcMasterDemoStop.cmd” you can stop EcMasterDemo.

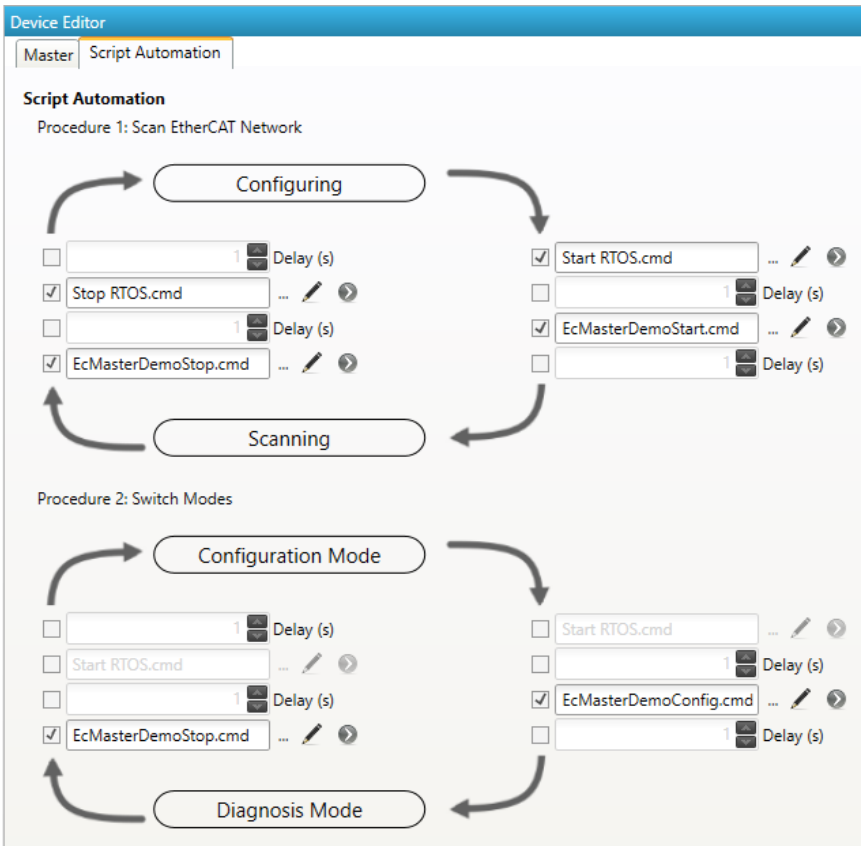
Log file could be found at workspace\rtfiles folder.

2.5 EC-Engineer integration

Open the EC-Engineer (with Administrator rights!!!) and select the “EtherCAT Master Unit (LxWin)” from the Start Page.



Switch to the Script tab. The path to each file has to be adjusted using “...” button.



For more information about the tab, please take a look into the EC-Engineer manual.

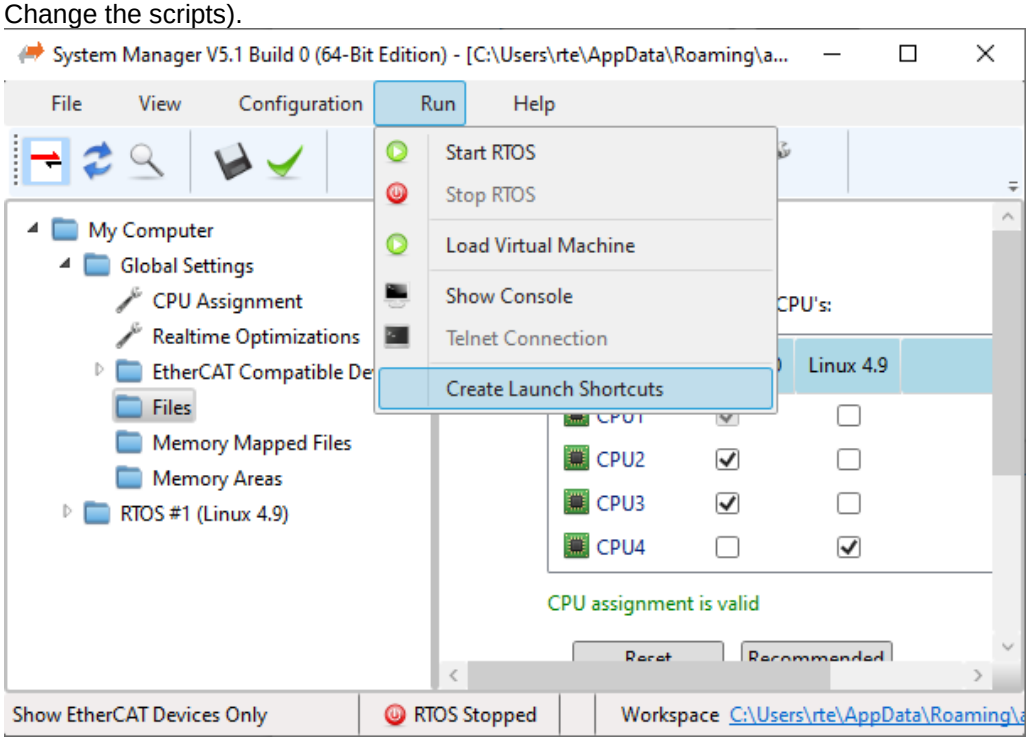
Hint: Please make sure to add some delay between the Start RTOS script and the EcMasterDemo start or configure, because if the RTOS is not running it takes some time until it is ready to start the demo application.

More information can be found in the EC-Engineer manual chapter ***"5.2.10 Scripts"*** and ***"8.2.2 Supported Entries"***

3 Howtos

3.1 Export scripts from the System Manager

In System Manager, select “Run→Create Launch Shortcuts” in the main file menu. Now, the script for starting and stopping the RTOS are created (more info’s about the content can be found in chapter 3.2 Change the scripts).



Copy these shortcut script files into the Bin\Linux folder of the EC-Win (RT-Linux) package. By default, these scripts are located in the shortcuts folder of your LxWin workspace.
Example:

```
xcopy D:\PROJ\workspaces\default\shortcuts\* "C:\Program
Files\acontis_technologies\EC-WinRT-Linux\Bin\Linux"
```

You must overwrite existing script files with the same name.

3.2 Change the scripts

The Bin\Linux folder of the EC-Win (RT-Linux) package contains several scripts which can be used to for optimizing the workflow between EC-Engineer and LxWin.

NOTE: You should edit script files “as administrator”, because they are located at “Program Files” folder. If you use notepad.exe, you should start it as administrator, before editing.

3.2.1 Start RTOS.bat

This script file is generated by the LxWin System Manager and has to be copied into the Bin\Linux folder manually (see chapter 3.1). It has to be adjusted before it can be used for EC-Engineer automation.
In a first step, you need to remove the section which checks the admin rights:

```
rem Check if admin rights are required...
call net session >nul 2>&1
```

```
if not %ERRORLEVEL% == 0 (
        echo.
        echo ########## ERROR: ADMINISTRATOR PRIVILEGES REQUIRED ############
        echo # This script must be run as administrator to work properly!  #
        echo # Right click on the script and select 'Run As Administrator' #
        echo ##############################################################
        echo.
        pause > nul
        goto ExitWithErrorLevel
    )
)
```

Check if the WORKSPACE variable is set correctly.
Also add “pause > nul” at the error handling sections:

```
:ExitError
pause > nul
exit /B 1

:ExitWithErrorLevel
pause > nul
exit /B %ERRORLEVEL%
```

The main part of this script is the following line:

```
start "" /B  "%RTE_ROOT%rtosupload.exe" -config '"%WORKSPACE%\config\startup.config' -vmf
'%RTE_ROOT%vmf.bin'"  "C:\Program Files\acontis_technologies\LxWin\Bin\linux\x86\lxwinboot.bin"
```

It starts the rtosupload.exe with the path to the config, the vmf.bin and to the lxwinboot.bin files. Make sure that all paths are correct.

3.2.2 EcMasterDemoConfig.cmd

This script starts the EcMasterDemo demo application without an ENI file. This is required for scanning the network and to create the ENI file using the EC-Engineer.

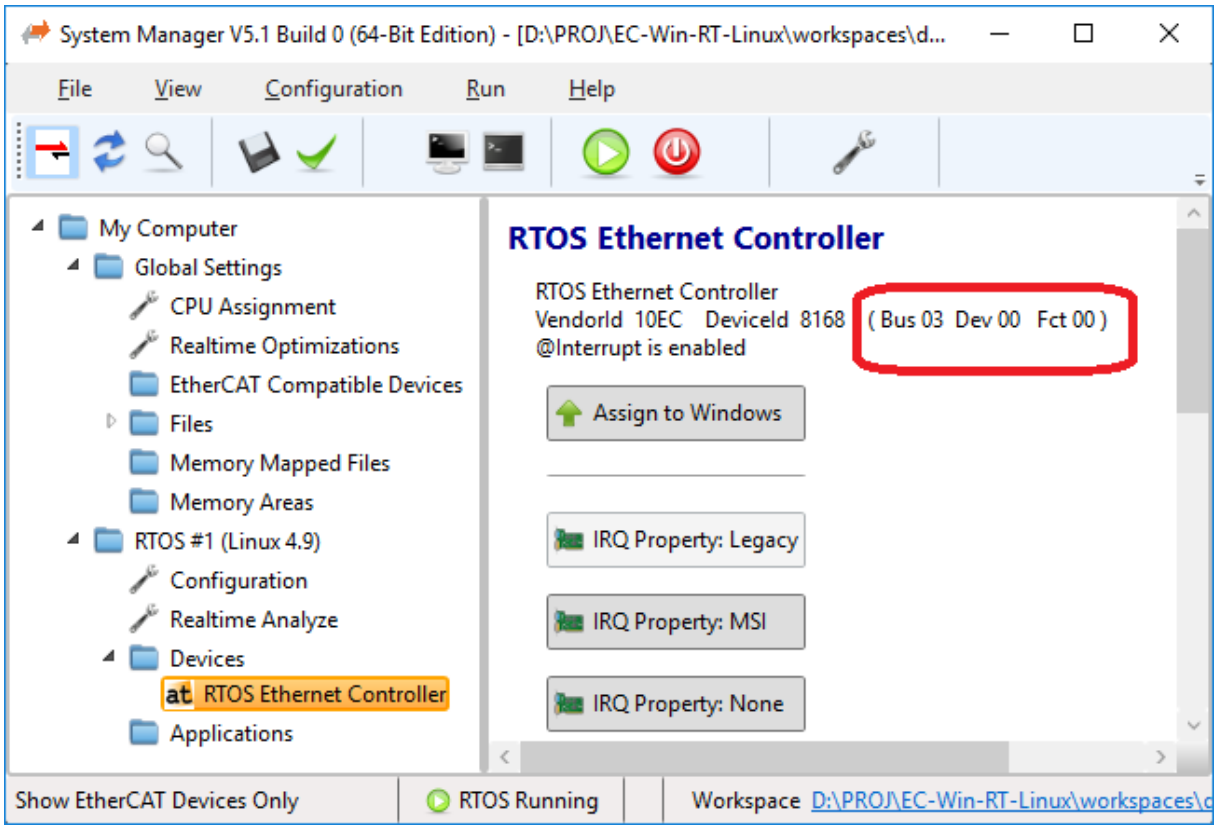
```
start "" /B plink.exe -ssh root@192.168.157.2 -pw root -batch "cd /mnt/rtfiles; ./EcMasterDemo -t 0 -sp
-i8254x 1 1"
```

The plink.exe is started with the LxWin default IP address and the password. The rtfiles folder is mounted and the /EcMasterDemo demo application is started.

If you have several network cards, you should explicitly specify network card path and use command like:

```
start "" /B plink.exe -ssh root@192.168.157.2 -pw root -batch "cd /mnt/rtfiles; ./EcMasterDemo -t 0 -sp
-i8254x 0x01bbddff 1"
```

where bbddff is a Bus, Device, Function. You can find the BDF value in the System Manager:



For more information on how to start the EcMasterDemo please read the manual of the EC-Master. The EcMasterDemo and the link layer have to be in the %WORKSPACE%\RtFiles folder.

3.2.3 EcMasterDemoStart.cmd

This script is the same as EcMasterDemoConfig.cmd but starts the master with an ENI file:

```
start "" /B plink.exe -ssh root@192.168.157.2 -pw root -batch "cd /mnt/rtfiles; ./EcMasterDemo -t 0 -sp -i8254x 0x01bbddff 1 -f ENI.xml"
```

Please replace ENI.xml with your ENI filename.

3.2.4 EcMasterDemoStop.cmd

This script stops the EcMasterDemo:

```
start "" /B plink.exe -ssh root@192.168.157.2 -pw root -batch "killall EcMasterDemo"
```

3.2.5 Stop RTOS

Calls rtosupload.exe with -x to stop the RTOS.