

acontis technologies GmbH

SOFTWARE

Hypervisor-RTOS-32-Remote-Debug-Guide

acontis Real-time Hypervisor and RTOS-32 Remote Debug

Version 8.x

Edition: November 21, 2023

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Table of Contents

1	Step by Step Hypervisor Host and RTOS-32 Configuration with System Manager and						
	Shell Scripts	4					
	1.1 Introduction	4					
	1.2 Default values:	4					
	1.3 Prerequisites	4					
2	Part A - Development PC Configuration	5					
3	Part B - Hypervisor Host Configuration	10					
4	Part C - guest folder	11					
	4.1 Recommended	11					
	4.2 Copy the Debug Monitor	12					
	4.3 Visual Studio Project Settings	13					
5	Part D - Hypervisor Host Configuration	15					
6	Part E - Development Host Configuration	17					
7	Important hints 18						



1 Step by Step Hypervisor Host and RTOS-32 Configuration with System Manager and Shell Scripts

1.1 Introduction

It is recommended to carry out the steps in *the order described* so that you get the remote debugging running. Steps, which are marked with <optional>, can be skipped.

Important: The steps are grouped in parts **A-E** over Hypervisor Host and RTOS-32. Each part **depends** on the previous part!

On the development PC our classic EC-Win(RTOS-32) is used. On the Hypervisor Host the steps must be done by the shell and/or supplied shell scripts.

1.2 Default values:

This tutorial assumes the following default values. Adjust it accordinly to your needs on the places of occurence.

- \$Target_HV_IP\$ = 172.17.10.53 IP address of Hypervisor Host network adapter and the bridge.
- \$Target_IP\$ = 172.17.10.5 Remote IP address of the RTOS part.
- \\172.17.10.53\debug Default network share (adjust share name 'debug' at /etc/ samba/smb.conf if needed)
- enp2s0 default name of the Hypervisor Host network adapter.

1.3 Prerequisites

- EC-Win(RTOS-32) 7.1 or newer
- acontis Hypervisor package
- Development PC
- Hypervisor Host (PC/IPC)
- Visual Studio (2005-2019) with C/C++ workload

On Development PC: Visual Studio + EC-Win(RTOS-32)

On Hypervisor Host (PC/IPC): installed acontis Hypervisor package



2 Part A - Development PC Configuration

• Start the System Manager

Hint: If it's the first launch of the System Manager a dialog to enter a workspace directory opens.

• Select My Computer node on the tree view and add a RTOS to the configuration.

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Fig. 2.1: Select Rtos in SysMgr.

• Select the Application node of the RTOS #1 section and push the Create New Application Project (Debug Only) button.



Fig. 2.2: Select source application in SysMgr.

• Select for ex. RealtimeDemo and push OK button.



Add New Realtime Application	-		×
New Project			
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ECMasterDemo *]		
ECMasterDemo)		
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RTOS-32Demo			
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Fig. 2.3: Select for ex. RealtimeDemo as source application in SysMgr.

• Scroll to <Development | Debugging> section and push the Settings button.

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Fig. 2.4: Select debugging settings.

• Edit DEBUG Connection Settings dialog will pop up.



Fig. 2.5: Debugging settings dialog.

• Select Remote Debugging and enter the IP address of the Hypervisor Host. Please note, this IP address must **not be** in use by other computers in your network and it has to fit into your company's IP environment. You may have to ask your System Administrator to get a free IP address for that purpose. Both, Hypervisor Host and Development PC *must be* in the **same** network. In following steps this IP address will be called \$Target-IP\$

Arr DEBUG Connection Settings -	×
Edit DEBUG Connection Settings	
 Local Debugging Remote Debugging 172.17.10.5 	
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Fig. 2.6: Debugging settings dialog. Remote IP entered.

- Push the OK button.
- Check if remote debugging and changed \$Target-IP\$ has been saved.



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Fig. 2.7: Debugging settings changed to remote IP.

• Push Open Project with Visual Studio button.

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Fig. 2.8: Push button to open Visual Studio and automatically create the source project. Project will be created and all required settings are set.

• Adjust \$Target-IP\$ in generated Visual Studio Loader project.

Select the file Vmftarget.cfg in the *Visual Studio Loader* project and edit the setting COMPort Ethernet \$Target-IP\$.





Fig. 2.9: Edit Visual Studio Loader project file Vmftarget.cfg.

• Press F7 to compile the project, if first time compiled. Otherwise a **rebuild all** (ALT + F7) is required!



Fig. 2.10: Visual Studio contains the generated source project.



3 Part B - Hypervisor Host Configuration

The following shell scripts are available on the Hypervisor Host to setup and establish a remote debug connection:

- command hv_brvnetset *creates* a virtual network bridge on Hypervisor Host to forward debugger TCP/IP/UDP packets from LAN1 to the RTOS-32 VM. It is required to start this script if you need to perform *remote* debugging of a RTOS-32 app from another machine.
- command hv_brvnetclr deletes bridge, after the RTOS-32 VM has been stopped.
- the /hv/config/brvnetconfig.sh file contains the configuration values for the bridge.

Hint: The configuration file /hv/config/brvnetconfig.sh must be adjusted, at least the \$IP\$ address needs to fit to the environment.

Hint: See chapter "Bridge virtual and physical network" in the Hypervisor Manual for details how to configure the bridge.



4 Part C - guest folder

The debug monitor and the compiled debug files of the RTOS-32 project need to be available on the Hypervisor Host.

4.1 Recommended

It is recommended to create a network share for the guest folder (e.g. /hv/guests/examples/ rtos-32 directory on the Hypervisor Host.

Note: Every time a DLM project is changed and rebuilt on the Development PC it is **required** to copy it into the Hypervisor Host again! Therefore it's recommended to use the network share as *output* directory of the *Visual Studio* project.

As the Hypervisor Host is based on XUBUNTU, a SMB server is needed to accomplish this.

The Hypervisor Host includes such SMB server (SAMBA), this server must be properly configured for this specific task.

Hint: The **default** user in this document is rtv. You may have to change this to your respective user. This user must also be a valid user on the Hypervisor Host. If it is missing, you may run the following command:

```
\ sudo adduser rtv
```

To create a file share which is accessible from a remote Windows computer, go to the SAMBA configuration file:

\$ sudo gedit /etc/samba/smb.conf

Add the following section to the end of the smb.conf file (if not yet available) and save:

```
[debug]
  comment = Remote debug
  path = /hv/guests/examples/rtos-32
  browseable = yes
  valid users = rtv
  guest ok = yes
  read only = no
```

Allow the user rtv to access the SAMBA share:

\$ sudo smbpasswd -a rtv

Restart the SAMBA service:

\$ sudo systemctl restart smbd.service nmbd.service

To check, if the share is active, try to access the SAMBA share from the Windows explorer. You may have to use the IP address of the hypervisor.



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Desktop	A		RealtimeDemo.dlm	31/03/2021 08:55	DLM File	113 KE
🕹 Downloads	*					
Documents	А.					
Pictures	*					



4.2 Copy the Debug Monitor

In the following, the IP address 172.17.10.53` is used for the Hypervisor Host computer. Copy the whole *Debug Monitor* directory <host>\%WORKSPACE%\projects\monvmf*.* to \\172. 17.10.53\debug*.* and override the existing files. Do not remove any existing folders!

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8 Elemente 8 Elemente ausgewählt (553 KB)						

Fig. 4.2: Copy *Debug Monitor* directory.

Hint: Some of the files will be updated after rebuild of VS project.



4.3 Visual Studio Project Settings

The following screenshot shows how to set the output directory to the Hypervisor Host with IP address 172.17.10.53 and the network share name debug. This setting is required for **both** projects within the Visual Studio solution (*Loader* as well as the *DLM/DLL* project).

Caution: Adjust the IP address accordingly to your needs.

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Fig. 4.3: Visual Studio Loader Project Settings.



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Fig. 4.4: Visual Studio RealtimeDemo Project Settings.



5 Part D - Hypervisor Host Configuration

Adjust the guest configuration setting to prepare starting the RTOS-32 Debug Monitor:

\$ cd /hv/guests/examples/rtos-32
\$ gedit usr_guest_config.sh

and add the following line:

export osImage=\$HV_ROOT/guests/examples/rtos-32/Monvmf.bin

Start the RTOS-32 Debug Monitor:

```
$ cd /hv/guests/examples/rtos-32
$ hv_guest_start -view
```

The output of the RTOS-32 Debug Monitor should be similar to:

```
RTTarget-32 Debug Monitor 6.29 Evaluation Version
Copyright (c) 1996,2022 On Time Informatik GmbH
Monitor Header at: 04037A3C, Current CPL: 0
Ethernet: RTOS32Win VNet, MAC: AA-BB-CC-DD-EE-03, IP: 172.17.10.5
```

Open a new terminal window (right click on desktop and select 'Open Terminal here' or press CRTL + ALT + T)

Configure a bridge which connects the external network (where the Development PC is located) with the virtual network (where RTOS-32 is connected to). See section Bridge virtual and physical network in the Hypervisor manual for details.

Create bridged network connection:

\$ sudo hv_brvnetset

Output of successful bridge creation:

```
rtv@rtv-TEST:/hv/guests/examples/rtos-32$ sudo hv_brvnetset
[sudo] password for rtv:
load vnet bridge configuration
add enp2s0 and vnet0 to bridge vnetbr
bridge name bridge id STP enabled interfaces
vnetbr 8000.0060c8000000 no enp2s0
vnet0
ifconfig vnetbr 172.17.10.53 netmask 255.255.0.0
ip route add default via 172.17.5.2
RTNETLINK answers: No such process
```

Important: Remove the bridged network connection after debugging!



\$ sudo hv_brvnetclr

Hint: See chapter "Bridge virtual and physical network" in the Hypervisor Manual for details how to configure the bridge.



6 Part E - Development Host Configuration

• Scroll to <Development | Debugging> section and push the Test Connection button.

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- Fig. 6.1: Push Test Connection button.
- Successful

Test DEBUG Connection	×
Test target IP address for debugging successful!	
OK	

Fig. 6.2: Test Connection successful.

- Failed



- Fig. 6.3: Test Connection NOT successful.
- Pressing F5 in Visual Studio will start the debugging.



7 Important hints

Important: After changing the *STarget-IPS* on Hypervisor Host side, the steps C - E have to be repeated **always**! Furthermore, a running instance of Visual Studio with the current project **must** be restarted and then the project **must** be recompiled with rebuild all command.

Caution: Do not re-launch the debug monitor in an on-going debug session!