GenMAC 2.2

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Using not supported NICs

with GenMAC

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Introduction

- GenMAC is a universal network card driver that emulates parts of MS Windows to be able to use standard 32-bit Windows network card drivers on OS/2.

- This "wrapper" called function translates some Windows-APIs to the corresponding OS/2-APIs and implements a lot of other Windows-APIs that does not exist in OS/2. This allows also to use very time critical routines in Win-drivers.

- It is not possible to support really every Windows-API, so there always will be some nics that can not be supported by GenMAC at all.

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Supported Hardware

- GenMAC only supports 32-bit nics that are connected via PCI, MiniPCI, PCI-express or MiniPCI-express.

- 32-bit CardBus-cards may also work if they are correctly integrated with Veits CBEnabler.

- ISA- or PCMCIA/PC-Card-Adapter and old MiniPCI-cards (16 bit) are NOT supported, mostly 11MBit/s

- No support of USB network adapters, because the implementation of USB in OS/2 has some design flaws that make it hard to get it working.

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Command line tools

- The command line tools are located in the bin-directory of GenMAC and are very useful for debugging.
  - scan.exe: Activates the radio of a wireless nic, scans for available, not hidden wireless access points.

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Command line tools

- ssid.exe: Sets the SSID and if necessary the WEP-key.
- link.exe: Shows you more detailed informations about the current link-status of you nic.

```
Command Prompt (Window)                          X  □  ⊡
[D:\ecs\system\genmac\bin]link
Device-Name      : W8086x109A.nif
Lan-Number       : lan2
Link-Status      : 0x4001000b
Link-Status-CHG  : 1
Media-Connect    : CONNECTED
LinkSpeed        : 1000 MBit/s

Device-Name      : W8086x4227.nif
Lan-Number       : lan1
Link-Status      : 0x4001000c
Link-Status-CHG  : 1547
Media-Connect    : DISCONNECTED
LinkSpeed        : 54 MBit/s


[D:\ecs\system\genmac\bin]_
```

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Command line tools

- dis.exe: Disconnects the nic from the access point, may turn of the radio on some nics.
- default.exe: Resets the WLAN device to default.
- wpa_supplicant.exe: Sets the SSID and the key for the WPA/WPA2-encryption.

After you are connected with an access point you also have to configure TCP/IP for your wireless nic.

Please use XWLAN for standard configuration if you are not debugging. For further information about this, read the GenMAC-/XWLAN-documentation.

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Wireless LAN Monitor XWLAN

- The Wireless LAN Monitor is a comfortable

  GUI-application for:

  - Status of your WLAN connection.

  - Managing WLAN profiles.

  - Setting encryption for WLAN.

  etc.

  Please use always WPA/WPA2

  if setting up a wireless LAN, WEP

  is totally useless as encryption and

  can be cracked in minutes!
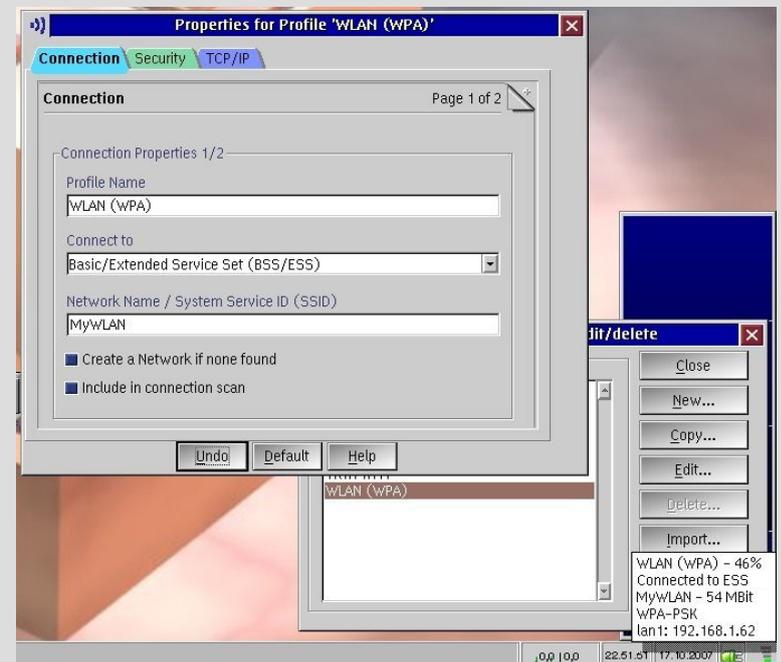
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Advanced use for testing

- PROTOCOL.INI:

  - The settings will be done during installation and only have
    to be changed by experienced users for debugging
    purpose!

  - Example for Intel PRO/1000 PL Gigabit nic:

    ```
    [W8086x109A_nif]
        DriverName = WRND32$ (1st), WRND322$ (2nd)
        VENDOR = 0x8086
        DEVICE = 0x109A
        NDIS_SYS = "E1E5132.SYS"
        NDIS_INF = "E1E5132.REG"
        DEBUGLEVEL = "NONE"
        OPTIONS = "NONE"
    ```

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Advanced use for testing

- `DEBUGLEVEL`:

  - `"NONE"` or `"NO"`: For no debugging (default).

  - `"ALL"`: For creating a debug-log that can be copied to a textfile with "`type wrnddb$ >genmac.log`" after finished booting.

  - `"ALL,VIDEO1"`: The debug-informations will be written on the screen.

  - `"ALL,PORT"`: With "`CALL=\os2\mode.com COM1 ...`" in the CONFIG.SYS the debug-output will be written to first serial port.

  Use the parameters "VIDEO1" or "PORT" if the system traps before finishing loading the os, all debug-parameters may reduce the network performance!

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Advanced use for testing

- `OPTIONS:`

  - `"NONE"` or `"NO"`: For no options (default).

  - `"LOADONLY"`: The driver will only be loaded without initialising any hardware, useful for pre-testing.

  - `"UNSUPPORTED"`: Sets the driver in a special mode where you can enter custom vendor-/device-id and Windows-driver/reg-file.

  Other options will be obsolete in future, so please don't use them anymore!

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Advanced use for testing

- Usefull log-files from OS/2 and GenMAC:

  - Informations if the driver(s) and protocols loaded successfully:

    ```
    type lantran.log
    ```

  - Status-informations for the loaded GenMAC-drivers:

    `type wrnd32$` (for the first nic)

    or

    `type wrnd322$` (for the second nic)

  You will get informations for the loaded driver like `PciVendor`, `PciDevice`, `SysName`, `InfName`, `PciBus`, `PciSlot`, `InterruptLevel` and other.

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Advanced use for testing

- Create a debug-log with GenMAC:

  - In PROTOCOL.INI set DEBUGLEVEL = "ALL" for the nic you have problems with, then reboot your system.

  - BEFORE generating any network traffic (logon, ping etc.) open a OS/2-command-line and enter:

    `type wrnddb$ >genmac.log` (for the first nic)

    or

    `type wrnddb2$ >genmac.log` (for the second nic)

    Check these log-files to get an idea why the adapter is not working, you may send the RELEVANT parts also to the genmac-user-group to get more help.

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Support new adapter

- Using new, not supported network cards with GenMAC

  - Preparation:

    - The nic has to be installed as valid PCI-device.

    - You need Windows XP with a working and updateted driver for the nic on your system.

    - It makes testing MUCH easier if you use your WLAN without any encryption during your test, but you should disconnect all systems containing data from your network and don't forget to reenable WPA/WPA2 after your connection

GenMAC 2.2
Support new adapter

- Get vendor-id, device-id and nic-name PCI.EXE, update

  the "pcidevs.txt" before using it.

  - Open a OS/2-command-line and type:

    ```
    pci.exe >pci.txt
    ```

  - Only two lines are needed:

    ```
    Vendor 8086h Intel Corporation
    Device 109Ah PRO/1000 PL Network Conn..
    ```

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Support new adapter

- Get the Windows SYS- and INF-file for the nic from your
  Windows-installation, you can determine the name of these
  files in the driver-properties under the driver-tab selecting
  the driver-details, e.g. "`E1E5132.SYS`".
  The location typically is:
  ```
  C:\WINDOWS\SYSTEM32\DRIVERS
  ```

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Support new adapter

- Create a registry-export for the new nic:

  - In the Windows-registry search for the nic-name (e.g. "PRO/1000") under the following directory:
    `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet,`
    there are registry-keys and entries like these:

    ```
    ComponentId,"pci\\ven_8086&dev_109a&..."
    ProviderName,"Intel"
    DriverDate,"4-20-2006"
    DriverVersion,"9.2.50.0"
    MatchingDeviceId,"pci\\ven_8086&dev_109a"
    DriverDesc,"Intel(R) PRO/1000 PL Network"
    ```

    Export this tree to a file named like the SYS-file but with the extension ".REG", e.g. "`E1E5132.REG`".

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Using unsupported adpaters

- These files (SYS, INF and REG) are the base to use new adapters with GenMAC, the INF is not needed by the driver, but may help you to understand different settings.

- Pre-testing new nics with the "UNSUPPORTED"-option:

  - Preliminary note:
    GenMAC only supports a small set of the Windows-APIs under special conditions, so if a new driver comes out it probably will use different, not supported APIs and/or different timing-parameters and will fail with the current GenMAC-driver!

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Using unsupported adpaters

- Include a new, unsupported device in GenMAC:

  - GenMAC 2.2 has to be installed correctly.

  - Get the Windows-driver and registry-export from your Windows XP/2000-installation on the same machine.

  - Use an existing WNNNNxMMMM.NIF mostly similar to your adapter, rename it while NNNN is the vendor-id and MMMM the device-id of your adapter, adjust all values acording to your new nic and driver.

  - Create needed directories similar to the available ones and put the SYS-, REG- and NIF-files in there.

  - Install the new adapter using MPTS or install it manually.

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Using unsupported adpaters

- In `PROTOCOL.INI` set `DEBUGLEVEL = "NONE"` or `"ALL"`, set `OPTIONS = "UNSUPPORTED"`.

- Reboot your system and hope ...

- If it works be happy and please report it in the genmac-user-group, if not "bad luck" and don't expect any support for this feature!

- If the adapter works partly, you can check the Windows-registry for energy-saving settings related to the adapter, disable all of them and check the driver again with a new registry export.

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Using unsupported adpaters

IMPORTANT: This mode even can make your system unusable, so use it only if you have a backup of your system, if you have a different boot-system (CD, recovery-partition etc.) and if you know what are you doing!

And please don't blame us if it is not working - this a "NOT supported" feature ONLY for experienced users!

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Using unsupported adpaters

- Pre-testing Windows-SYS with "petest.exe":

  - This is a small utility that tells you which functions are not implemented for a specific Windows-driver. It is available ONLY on request and MUST NOT be distributed.

  - With the informations about the unimplemented functions, experienced users may estimate if it's worth to try the unsupported mode at all.

  - Usage: `petest.exe <Windows-SYS-file>`

    ```
    > petest.exe netw4x32.sys

    ➔UNIMPLEMENTED FUNCTIONS OF NDISWRAPPER ...
     for "netw4x32.sys" ... ntoskrnl :
     KeBugCheckEx ---- [1] unimplemented
     functions
    ```

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Testing the throughput

- Simple benchmarking with NetIO from Kai Uwe Rommel:

    - Install NetIO on a systems that will run the server side of the benchmark. This system should be as fast as possible including the network connection, at least it has to be faster than the client you want to test!

    - Start the NetIO-server on this system:

        ```
        > netio.exe -s

        ➔NETIO - Network Throughput Benchmark,v1.26

              (C) 1997-2005 Kai Uwe Rommel

          TCP server listening.

          UDP server listening.
        ```

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Testing the throughput

- Start the NetIO-client on the system to test with:

  `netio <protocol> -a <adapter> <server-ip>`

  For the first nic with TCP (UDP does not work yet) as protocol and ip 192.168.1.10 you will get s.th. like this:

  `> netio.exe -t -a 0 192.168.1.10`

  ```
  ➔NETIO - Network Throughput Benchmark,v1.26
        (C) 1997-2005 Kai Uwe Rommel
   TCP connection established.
   Packet size  1k bytes:  10904 KByte/s Tx,
     10791 KByte/s Rx.
   ...
   Packet size 32k bytes:  10911 KByte/s Tx,
     10406 KByte/s Rx.
   Done.
  ```

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Testing the throughput

- Some benchmark-results:

  - Server:
    IBM NetFinity 3500-M20, Intel PRO/1000 PCI-X, ACP2R

  - Client 1:
    IBM ThinkPad T40,
    Intel PRO/1000 MT Mobile (8086:101E, OS/2-driver),
    Intel PRO/Wireless 2915ABG MiniPCI (8086:4223,
    GenMAC 2.1), MCP2R

  - Client 2:
    IBM ThinkPad T40,
    Intel PRO/1000 PL Gigabit (8086:109A, GenMAC 2.1),
    Intel PRO/Wireless 3945ABG MiniPCI-E (8086:4227,
    GenMAC 2.1), eCS20rc1

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Testing the throughput

- Client 1, LAN 100 Mbit/s-connection:

  ```
  Packet size 1k bytes: 10904 KByte/s Tx, 10791 Kbyte/s Rx
  ...
  Packet size 32k bytes: 10911 KByte/s Tx, 10406 Kbyte/s Rx
  ```

- Client 1, LAN 1000 Mbit/s-connection:

  ```
  Packet size 1k bytes: 32995 KByte/s Tx, 35319 KByte/s Rx
  ...
  Packet size 32k bytes: 39550 KByte/s Tx, 42394 KByte/s Rx
  ```

- Client 1, WLAN 54 MBit/s-connection, 30%-50% signal:

  ```
  Packet size 1k bytes: 1824 KByte/s Tx, 777 KByte/s Rx
  ...
  Packet size 32k bytes: 1272 KByte/s Tx, 550 KByte/s Rx
  ```

- Client 1, WLAN 54 MBit/s-connection, >80% signal:

  ```
  Packet size 1k bytes: 2458 KByte/s Tx, 2224 KByte/s Rx
  ...
  Packet size 32k bytes: 2444 KByte/s Tx, 2624 KByte/s Rx
  ```

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Testing the throughput

- Client 2, LAN 1000 Mbit/s-connection:

  ```
  Packet size 1k bytes: 34707 KByte/s Tx, 34402 KByte/s Rx
  Packet size 2k bytes: 35713 KByte/s Tx, 37282 KByte/s Rx
  Packet size 4k bytes: 36505 KByte/s Tx, 38717 KByte/s Rx
  Packet size 8k bytes: 37538 KByte/s Tx, 41230 KByte/s Rx
  Packet size 16k bytes: 35655 KByte/s Tx, 41792 KByte/s Rx
  Packet size 32k bytes: 35290 KByte/s Tx, 40352 KByte/s Rx
  ```

- Client 2, WLAN 54 MBit/s-connection, >80% signal:

  ```
  Packet size 1k bytes: 2621 KByte/s Tx, 1929 KByte/s Rx
  Packet size 2k bytes: 2625 KByte/s Tx, 2283 KByte/s Rx
  Packet size 4k bytes: 2252 KByte/s Tx, 2642 KByte/s Rx
  Packet size 8k bytes: 1270 KByte/s Tx, 1901 KByte/s Rx
  Packet size 16k bytes: 1972 KByte/s Tx, 1503 KByte/s Rx
  Packet size 32k bytes: 2616 KByte/s Tx, 1289 KByte/s Rx
  ```

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Future of GenMAC

- Future development of GenMAC:

  - In the past Willibald always was able to get working all hardware he got provided or sponsored quite fast and will do so also in the future!

  - Most of the supported (Mini)PCI-cards (at about 30 nics) Willibald owns and bought by himself - so if you really need support for a new card, you may ask if it makes sense that he get hands on the hardware!

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Future of GenMAC

- It is mostly NOT possible to support hardware Willibald does not have physical access to.
  A good example was the 3945abg where it was not possible to get it running over month with tons of log-files and really cooperative users - he send me a first e-mail using this nic 2 days after he installed it in his laptop!

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Future of GenMAC

- Further development:
  - It is important that we get feedback from the users, please don't expect that you always will get any reaction from us, GenMAC is a spare time project and sometimes there just is NO spare time!
  - In the past we often send a new driver to users and never got any response if they had success or not. This makes bug-fixing or enhancement impossible!

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Links/Contact

- GenMAC is maintained and distributed by netlabs.org:

  http://genmac.netlabs.org/

  - If you need help for GenMAC itself please check the

    GenMAC-mailing-list at Netlabs.org:

    http://news.gmane.org/gmane.org.netlabs.genmac.user/

  - If you can't find any solution for your problem subscribe

    the list "genmac-user@netlabs.org" and ask there.

    Please DO NOT write an e-mail to the developer or to me

    if you need personal support!

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Links

- If you have problems with connecting to a WLAN, with TCP/IP-configuration, encryption etc. the WLAN-mailing-list might be the better place to search and ask for: http://news.gmane.org/gmane.org.netlabs.wlan.general/

- The listname for this group is "wlan-user@netlabs.org".

- Wireless LAN Monitor by Christian Langanke (netlabs.org): http://wlan.netlabs.org/

- WPA Security with Wireless LAN Monitor by C. Langanke: http://www.clanganke.de/os2/pres/wse2006/lan01/index.html

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Links

- Craig Hart's PCI+AGP bus sniffer for OS/2 (compiled by Veit Kannegieser), up-to-date pcidevs.txt:
  http://kannegieser.net/veit/programm/pci104vka.arj
  http://members.datafast.net.au/dft0802

- Support for 32-bit CardBus-nics with OS/2 by Veit Kannegieser:
  http://kannegieser.net/veit/test/pciconf_test.zip
  http://kannegieser.net/veit/test/cbenable_test.zip

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Credits

I would like to thank Willibald Meyer very much

for the great work he is doing with

the GenMAC-driver for OS/2

giving it away for free!

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Thanks

for your attention!