



Version 5.0

Impairment Emulator Software for IP Networks (IPv4 & IPv6)

NetDisturb Client - Impairment Tool for IP Networks - NetDisturb v5.0.WSX

File Edit Actions Working Modes Statistics Help « Hide Aggregates

ENHANCED EDITION

Unfiltered - Flows, Frames & Packets (All)

Impairments to apply on packets going from A to B

Loss & Duplication Delay & Jitter Content Impairment

Percentage of Loss Throughput Limit with Delay Normal Law Impairment

Loss: Percentage Define Throughput Limit & Constant Delay Define Normal Law (Laplace-Gauss) Define

Incoming on A

Packets 0

Packets/s 0 p/s

Throughput 0.00 b/s

Application Rules

Impairments on A to B

Lost/Duplic. Pkts 0 [0.0%]

Delayed Pkts 0 [0.0%]

Modified Pkts 0 [0.0%]

Outgoing on B

Packets 0

Packets/s 0 p/s

Throughput 0.00 b/s

A Interface B Interface

Outgoing on A

Packets 0

Packets/s 0 p/s

Throughput 0.00 b/s

Application Rules

Impairments on B to A

Lost/Duplic. Pkts 0 [0.0%]

Delayed Pkts 0 [0.0%]

Modified Pkts 0 [0.0%]

Incoming on B

Packets 0

Packets/s 0 p/s

Throughput 0.00 b/s

Impairments to apply on packets going from B to A

Loss & Duplication Delay & Jitter Content Impairment

Burst Uniform Loss Jitter & Duration Percentage

Loss: Burst Uniform Law Define Uniform Jitter & Duration Define Percentage Define

Unfiltered - Flows, Frames & Packets

View All Run w/Log

Automatically Start with filtered Flow(s)

View Per-Flow Statistics

Run All Stop All

Dashboard

Alarms: View Alarms ...

CPU Usage: 3 %

Cumulative Statistics of the Interfaces (based on Network Interface Cards level)

	Throughput Reception	Received Pkts	Filtered Pkts	Sent Pkts	Throughput Transmission
From A to B	0.00 b/s	0 p/s	0 p	0 p	0.00 b/s
From B to A	0.00 b/s	0 p/s	0 p	0 p	0.00 b/s

Aggregates Panel

#01 #02 #03 #04 #05 #06 #07 #08 #09 #10 #11 #12 #13 #14 #15 #16 Other

Configure Aggregates

Help

The aggregate is a consecutive set of Flows sharing the same Delay & Jitter laws. All Flows of an aggregate share only one aggregate's Delay & Jitter law. There is one aggregate Delay & Jitter law per direction.

Read Me First

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Part 0 Preface

0.1 Organization of this manual

This document is aimed at helping you to discover and use **NetDisturb**. It is organized as follows:

- **Part 1: Product Overview**

Briefly describes the key features of the **NetDisturb** software.

- **Part 2: What's new in **NetDisturb** version 5.0**

Is a general overview of new features, main improvements provided with **NetDisturb** version 5.0.

- **Part 3: Install **NetDisturb****

Presents the product requirements, how to install the software downloaded from the Internet or from the CD-ROM, provides important information to upgrade from previous versions and explains how to choose the most suitable **NetDisturb** package.

- **Part 4: How to handle your license?**

Describes how to proceed for the license transfer

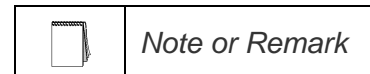
- **Part 5: Uninstall **NetDisturb****

Describes how to uninstall the software.

- **Part 6: Run **NetDisturb****

Describes how to run the **NetDisturb** Server and **NetDisturb** Client.

In this document, you will find the following symbols: They mean:



0.2 Minimum System Requirements

To appropriately operate **NetDisturb** you need the following minimum system requirements:

- Windows XP, Vista, Seven, Server 2003 or Server 2008 (32-bit or 64-bit version)
- Pentium processor with 1 GB memory at least
- Two identical Ethernet NICs are recommended: Ethernet, Fast Ethernet, or Gigabit Ethernet network interface card.
- 1024 x 768 display, DPI setting = Normal size (96 DPI) and Font size = Normal
- 75 MB free hard disk space



*Acrobat Reader is needed to display the **NetDisturb** Help. If Acrobat reader hasn't been installed, a warning message is displayed to inform that the help file can't be opened.*

0.3 Technical Support

ZTI Technical Support can assist you with all your technical problems from installation to troubleshooting.

Before contacting our Technical Support, please read the relevant sections of the product documentation and the "Read Me First" file.

Before contacting our technical support, make sure you record the following information:

- Product name and version.
- Trial License or unlimited licensed product.
- System configuration.
- Problem details: settings, error messages...
- If the problem is persistent, give the details of how to create the problem.

You can contact Technical Support by:

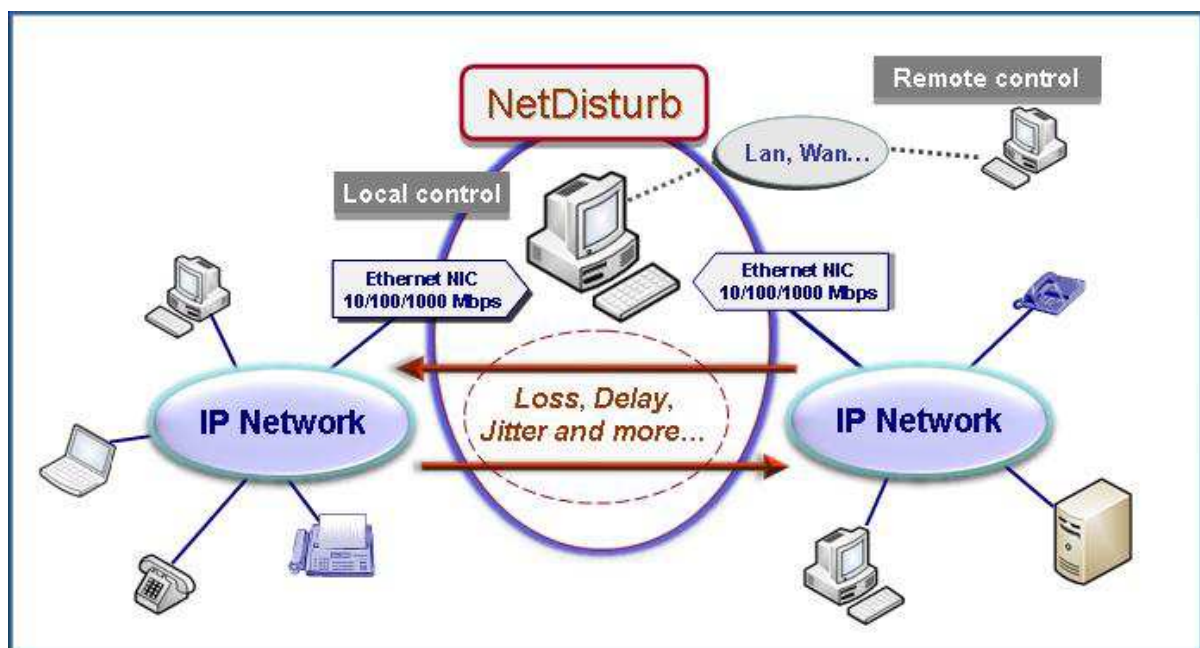
Email	Send as many details as possible to support@zti-telecom.com or support@zti.fr
Fax	Send as many details as possible to +33 2 9648 1485
Telephone	Telephone support is available from 09:00 am to 07:00 pm (GMT Time +01:00 or +02:00), Monday to Friday. Call on +33 2 9648 4343

Part 1 NetDisturb Overview

NetDisturb is an IP network emulator software that can generate impairments over IP networks (IPv4 and IPv6) such as: latency, delay, jitter, bandwidth limitation, loss, duplication and modification of the packets.

NetDisturb allows you to disturb flows over an IP network helping to study the behavior of applications, devices or services in a disturbed network environment.

NetDisturb is inserted between two Ethernet segments acting as a bridge and operates bi-directional packet transfer on Ethernet, Fast Ethernet and Gigabit network interface cards.



1.1 Product Requirements



- * Platform: Pentium PC running 32-bit or 64-bit version of Windows XP⁽¹⁾, Vista, Seven, Server 2003 or Server 2008 with Microsoft TCP/IP installed and at least 1 GB Ram. 75 MB free hard disk space.
- * Hyper-threading, multi core and PC multiprocessors are also supported.
- * Two Identical Network Interfaces Cards (NIC) are recommended: Ethernet, Fast Ethernet, or Gigabit Ethernet.
- * Display resolution: at least 1024 x 768 (more readable: 1152 x 768 and sup.), DPI setting = Normal size (96 DPI) and Font size = Normal.

(1) Windows XP 32-bit only

1.2 Typical Applications

No need to buy expensive hardware, use **NetDisturb** software as hundreds customers around the world!

- *Development assistance and debug of automatons for IP equipments:* particularly on Set-Top Boxes operating in cable or telecom environments.
- *Performance & Acceptance Tests:* Qualify and evaluate the behavior of IP equipments (phone, fax, gateway, set-top box, IMS core, call server, application server, residential gateway, ADSL wireless router, and more...) and applications (audio and video streaming) on IP networks.
- *Configuration and control of IP Equipments for product verification and test:* Define different QoS levels in an Intranet or the Internet environment to configure terminals, gateways and routers.
- *Test Laboratories:* **NetDisturb** provides repeatable QoS on different flows using configuration mode and values (loss, duplicate, delay, packet content impairment) defined by the user, and so re-create real world problems in the lab.
- *Applications test:* **NetDisturb** allows you to test applications such as Voice over IP, Fax over IP, streaming audio and video, IPTV, VoD, real time applications and services, and other distributed applications.
- *Emulation of symmetric or asymmetric network conditions found on the Internet and enterprise networks (LAN, MAN, WAN):* latency, jitter, packet loss, bandwidth limitations, and more... to test IP applications (VoIP, streaming audio & video, etc.), services and products sensitive to various real conditions.

1.3 Key Features

Two software editions are available: **Standard** and **Enhanced**. What are the major features of **NetDisturb** version 5.0?

Common Key features for Standard and Enhanced Editions

- Latest 32-bit and 64-bit Windows operating systems – Vista, Seven, Server 2003 and Server 2008.
- Simultaneous support of **IPv4** and **IPv6**
- Client-Server Architecture based on the SOAP mechanism which uses the HTTP protocol and the XML format for the exchanges between the client and the server.
- Use of standard Ethernet Network Interface Cards up to **1 Gbps or WiFi card** to make impairment.
- **NetDisturb** is an **Ethernet Bridge** to avoid any network configuration for Ethernet configuration.
- **NetDisturb** is an IP Router for WiFi NICs
- **Automatic start mode for new users with a set of predefined contexts (PING, TCP, UDP, HTTP, Video, etc.)**
- **Automatic discovery and configuration the NICs to use with NetDisturb.**
- Symmetric or Asymmetric **Bandwidth limitation** with Throughput Limitation laws.
- Very easy to use and intuitive Graphical User Interface.
- 16 configurable Flows per direction.
- **Aggregates** of Flows can be defined (set of Flows sharing the same Delay & Jitter Law)
- User-defined rules for disturbances: pattern trigger, starting time after delay or number of packets received, stop impairments after number of received packets or elapsed time, loops, and more...
- Predefined filter parameters based on the main protocol header fields (MAC, MPLS, VLAN, IP, TCP and UDP headers) or user-defined pattern filter
- **Unidirectional** or **bi-directional** packet impairments
- Impairments: Latency, Loss, Duplication, bandwidth limitation, Delay and Jitter, Content Impairment (mathematical laws and user-defined files)
- Change the impairment law **on-the-fly** for a flow,
- Change of law parameters on the fly for a given flow (Percentage laws, Uniform Law parameters, etc.).



- Ability to **impair the remaining network traffic** that could be either only the IP packets or all the Ethernet frames.
- **Connections per IP flow**: impairments are applied to the IP flow or to each connection of the IP flow
- Ethernet / Internet modes (out-of-sequence packets)
- Command Line Interface (CLI) to use NetDisturb in test beds
- Ability to handle Ethernet Jumbo frames (payload up to 17976 bytes)
- Statistics display and export detailed statistics into a file
- Accuracy = **1 millisecond resolution**

Specific Key features for the Enhanced Edition

- Impairments based on protocol primitives:
 - **ARP** (ARP Operation Code)
 - **DHCP** (DHCP Message Type)
 - **DNS** (DNS Message Type, DNS message Operation)
 - **FTP** (FTP Command, FTP Returned Status)
 - **FTP-DATA**
 - **HTTP** (HTTP Method, HTTP Returned Status)
 - **NTP**
 - **RTP** (Audio Payload Type, Video Payload Type, DTMF)
 - **SIP** (SIP Method, SIP From, SIP To, SIP Returned status)
- **RTP** and **FTP** data flow automatic discovery.
- **MOS** impairment laws
- Detailed event log window per flow viewing the events and application of the impairments according to the user-defined rules.

1.4 Comparison between Standard and Enhanced Editions

The table below summarizes the main differences between NetDisturb Standard edition and NetDisturb Enhanced edition.

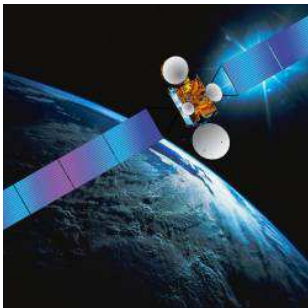
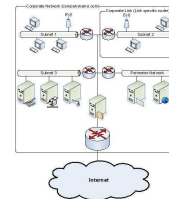
Features		
Impairment of IPv4 and IPv6 packets, ARPs and Ethernet frames	Yes	Yes
Automatic NIC configuration and Automatic Sample start mode	Yes	Yes
Filter parameters to define a flow: <ul style="list-style-type: none"> Activity rules: <ul style="list-style-type: none"> Start/Stop after a time limit or a packet counter or a pattern trigger Loop to reapply the rule with delay between each iteration Packet filters: source address, destination address, source port, destination port, protocol, DSCP DiffServ (ToS), MPLS, VLAN, , MAC address... User-defined pattern filter based on Ethernet packet content 	Yes	Yes
16 user-defined flows to impair using filters and unfiltered flows, frames and packets to impair without using filters	Yes	Yes
Dynamically modify impairments on-the-fly per flow in each direction when running	Yes	Yes
Aggregates of flows (set of flows sharing the same delay and/or jitter laws)	Yes	Yes
View Per-Flow statistics and NICs statistics	Yes	Yes
Accuracy = 1 millisecond	Yes	Yes
Standard impairments: drop/loss, duplicate, delay (latency), jitter, bandwidth limiting, congestion, packet error, bit error, reorder, burst errors Delay from 1 millisecond up to 10 sec in each direction Emulate bandwidth up to 1Gbps	Yes	Yes
Impairments by using the IP protocol field	Yes	Yes
Definition of flows to disturb based on protocol primitives:		
• ARP (ARP Operation Code)	No	Yes
• DHCP (DHCP Message Type)	No	Yes
• DNS (DNS Message Type, DNS Message Operation)	No	Yes
• FTP (FTP Command, FTP Returned Status)	No	Yes
• FTP-DATA	No	Yes
• HTTP (HTTP Method, HTTP Returned Status,)	No	Yes
• NTP	No	Yes
• RTP (Audio Payload Type, Video Payload Type, DTMF)	No	Yes
• SIP (SIP Method, SIP From, SIP To, SIP Returned Status)	No	Yes
• MOS impairment	No	Yes
Detailed events log per flow	No	Yes

1.5 Examples of Use

The following examples illustrate a subset of use cases implemented in various projects.

Simulation of packet loss rate for a corporate network

The modeling of packet loss rate of a banking network has generated a loss rate file with 1.3 million values. Before the deployment of new applications on the network, **NetDisturb** Standard Edition simulates the network to test these applications by using this external file containing loss rates to recreate the actual conditions of exploitation.

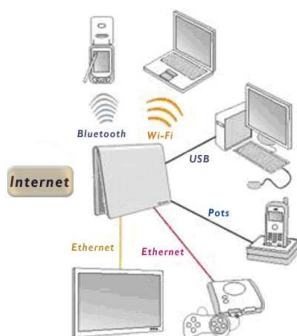
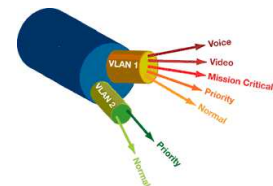


Simulation of a satellite link (with a 2 Mbps downlink and a 512 Kbps uplink throughput) for workstations of a branch office that generate TCP and UDP flows.

NetDisturb Standard Edition simulates the satellite link with limited uplink and downlink bandwidth. An aggregate is defined to submit all TCP and UDP flows to a function of delay - to reflect the delay of several hundreds of milliseconds introduced with the satellite link.

Application of disturbances on VLANs encapsulated over MPLS frames.

NetDisturb Standard Edition generates losses and delays of packets for specific VLANs implemented in a very large MPLS core network.



Tests of robustness for application protocols used in Triple Play Set-Top Box over DSL with NetDisturb Enhanced Edition

VoIP use case: for example, verify that the SIP REGISTER or the SIP INVITE message is retransmitted in case of no answer and then apply a loss and delay for RTP packets of the SIP session.

DHCP use case: for example, check that the OFFER message is lost following a transmitted DISCOVER message to validate automatic DHCP retransmission.



Test Video over IP using RTP with NetDisturb Enhanced Edition

NetDisturb generates impairments (loss, delay, duplication, modification of packets...) for the testing of codecs integrated in gateways, servers, STB and more...

Part 2 What's new in NetDisturb version 5.0?

This part is a general overview of new features and improvements provided with **NetDisturb** version 5.0 and important information to upgrade from previous versions.

More details regarding features and improvements included in the different versions of **NetDisturb** can be found in the version.txt file located in the installation directory (default settings: C:\Program Files\NetDisturbv5.0).

The new features and improvements provided with **NetDisturb** v5.0 are listed below:

- ⇒ New automatic NIC configuration: after selection of the NICs to be used by NetDisturb, the two NICs are automatically configured and then restored in their previous configuration after use by NetDisturb (there is no need to manually configure the NICs to unselect all protocols as in previous versions).
- ⇒ New automatic start mode with a set of predefined contexts for easy-to-use tests (Ping, HTTP, UDP TCP, Video, etc.)
- ⇒ New impairment law allowing you to have a variable jitter according to time.
- ⇒ New impairment law offering a variable jitter and a variable throughput depending on time.
- ⇒ Possibility to change on-the-fly the parameters of an impairment law currently in use.
- ⇒ Automatic Start of 'Unfiltered Flows, Frames, Packets...' by default when another flow is started.
- ⇒ Improvement of the WiFi packet handlers ensuring WiFi management in Ad-hoc mode and Infrastructure mode.
- ⇒ New setup procedure allowing you to test NetDisturb v5.0 without removing a previous installed version.



The contexts created with versions 4.2, 4.3 RC3, 4.4 to 4.9 are reused automatically. When saved, they get the new NetDisturb version 5.0 file format.

Part 3 Install NetDisturb

NetDisturb requires less than 75 MB of free disk-space. The installation procedure is a standard installation program for Windows XP, Vista, Seven, Windows Server 2003 and Server 2008.



** To run **NetDisturb** your computer's screen resolution must be at least 1024x768 (more readable: 1152 x 768 and sup.), the DPI setting should be set up with the "Normal size (96 DPI)" value and the Font size should be set up with the "Normal" value.*

** To install **NetDisturb**, you must log on with administrators rights.*

3.1 Forewords before upgrading from versions 4.9 to version 5.0



*When upgrading from a previous version of **NetDisturb** and if you don't have the USB license dongle, do not uninstall the previous version to keep your existing license.*

When upgrading from **NetDisturb** version 4.9, the installation procedure of **NetDisturb** 5.0 keeps the previous version to allow you to use **NetDisturb** 5.0 or the previous version installed.

3.2 Forewords before upgrading from versions 4.2 to version 4.8



*When upgrading from a previous version of **NetDisturb** and if you don't have the USB license dongle, do not uninstall the previous version to keep your existing license.*

When upgrading from an older **NetDisturb** version, the installation procedure of **NetDisturb** moves the user's files and the context files, located in the previous default **NetDisturb Server** directory, into **NetDisturb Client** directory. All files related to a context (defined using the extension .txt and .wsx) are copied, but the files installed with **NetDisturb** version 5.0 will overwrite those files.

3.3 Forewords before upgrading from versions 4.1 and under

You don't need to uninstall the previous version of **NetDisturb** to keep your license scheme. However, this license will not enable you to use **NetDisturb** version 5.0, because the license date of version 4.1 and under is too old. You should contact ZTI (contact@zti-telecom.com) to get back a new unlimited license when upgrading to version 5.0.

3.4 How to install the software downloaded from the Internet

The installation procedure is a standard installation program.

- If you have downloaded the **NetDisturb_Standard.zip** or **NetDisturb_Enhanced.zip** file from the website, you must first unzip this file in a temporary directory. It contains the **setup file** "[Setup_NetDisturb_Standard_Edition-v5.0.exe](#)" or "[Setup_NetDisturb_Enhanced_Edition-v5.0.exe](#)" file and the related documentation.
- Then run the **setup file** from the temporary directory to launch the setup procedure.



***NetDisturb** is made of two parts: **NetDisturb Client** and **NetDisturb Server**. This setup will install both Client and Server parts on the same system.*

3.5 How to install the software from the CD-ROM

The installation procedure is a standard installation program. On the CD-ROM, you will find the “[Setup_NetDisturb_Standard_Edition-v5.0.exe](#)” or “[Setup_NetDisturb_Enhanced_Edition-v5.0.exe](#)” file.



NetDisturb is made of two parts: **NetDisturb Client** and **NetDisturb Server**. This setup will install both Client and Server parts on the same system.

3.6 How to install the NetDisturb Client only (from the CD-ROM)

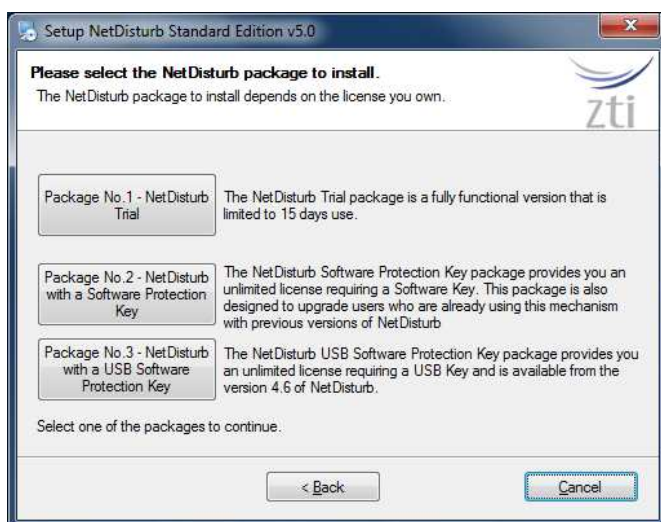
On the CD-ROM, a second setup allows you to install the **NetDisturb** Client on a machine. This is useful when you need to install the **NetDisturb** Server and the **NetDisturb** Client on two different machines.

To install the **NetDisturb** Client (Windows XP, Vista, Seven, Server 2003 or Server 2008), run the **setup file** and follow the setup instructions to proceed with the installation.

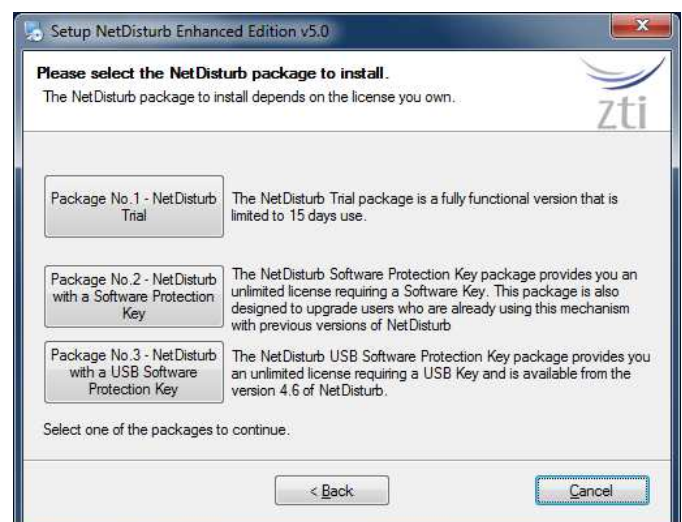
3.7 During the installation

Follow the instructions until reaching the **NetDisturb** package selection window.

NetDisturb Standard Edition



NetDisturb Enhanced Edition



3.7.1 NetDisturb packages in a few words

To use the **NetDisturb** software, there are 3 license schemes:

Package No.1 - NetDisturb Trial: the Trial package allows you to use **NetDisturb** during 15 days after the first run. When the trial period has expired, the license should be purchased.

Package No.2 - NetDisturb with a Software Protection Key: this package is for users owning a Software License key and for the users of the previous versions of **NetDisturb**. It keeps your current installation and files, without additional requirement. This package is not available on 64-bit Windows versions.

Package No.3 - NetDisturb with a USB Software Protection Key: this package requires a USB dongle containing the **NetDisturb** license. The USB Software Protection Key is provided with **NetDisturb** from version 4.6. This package allows you to install **NetDisturb** on several PCs but the only PC able to run **NetDisturb** is the one having the USB dongle plugged in.



As previous user, you may be interested to move to a USB Software Protection Key: please contact your distributor or ZTI to get more details about the license migration program (see paragraph 4.3 NetDisturb & USB Software Protection Key for more details).



This software is licensed on a per workstation basis. This means that you will need to get a separate license for each machine you will run it on. The license may be a software license key or the USB Software Protection key.



The USB Software Protection key contains only the license information.
The **NetDisturb** software is available on a separate CD-ROM.

3.7.2 Which package should I install?

Depending on your needs, please find here below the package most suitable for you.

3.7.2.1 I want to evaluate NetDisturb

In that case, choose the Package No.1 *“NetDisturb Trial”*.
You will be able to use **NetDisturb** during 15 days only.

3.7.2.2 I already use NetDisturb...



*This paragraph is dedicated to the users owning a previous version of **NetDisturb**.*

... and I want to upgrade and keep my permanent license

In that case, choose the Package No.2 *“NetDisturb with a Software Protection Key”*. Your installation will be upgraded and your existing permanent Software Protection Key will be kept.

... and I want to upgrade and use the USB Software Protection Key I bought

In that case, choose the Package No.3 *“NetDisturb with a USB Software Protection Key”*. Plug the USB dongle before launching **NetDisturb**.

3.7.2.3 I just bought NetDisturb...



This paragraph is related to the users purchasing **NetDisturb version 5.0**

... and I chose the Electronic Software Delivery (ESD) – **Only available for 32-bit Windows versions**

In that case, choose the Package No.2 “**NetDisturb with a Software Protection Key**”. When you launch the software for the first time, press the “Enter” key when the ZTI logo appears. Then, get the site code and email it to us with your details and your purchase order reference at contact@zti-telecom.com. We will send you back the site key enabling your permanent license. More details about the way to proceed are available in paragraph “4.2.1 Installation of the Software Protection Key”.

... and I received the CD-ROM & USB Software Protection Key

In that case, choose the Package No.3 “**NetDisturb with a USB Software Protection Key**”. Plug the USB dongle before running **NetDisturb**.

... and I will receive CD-ROM & USB Software Protection Key in a few days

In that case, choose the Package No.2 “**NetDisturb with a Software Protection Key**”. You will get a fully functional but time-limited Software Protection Key. **It is only available with 32-bit Windows versions.**

3.8 What has been installed on my computer?

The default settings install **NetDisturb** software components in the following directory:

C:\Program Files**NetDisturbv5.0** with the following subdirectories:

C:\Program Files**NetDisturbv5.0**\Client
C:\Program Files**NetDisturbv5.0**\Driver
C:\Program Files**NetDisturbv5.0**\Server

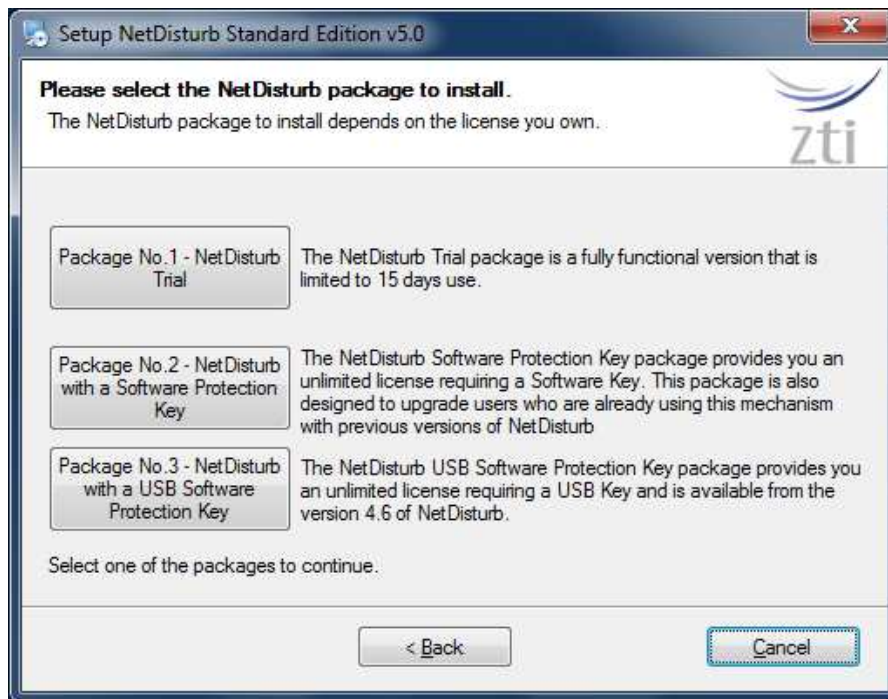
And the following Shortcuts are created:

Start ► All Programs ► **NetDisturb v5**

- **NetDisturb** (start both Server and Client)
- **NetDisturb Client Only**
- **NetDisturb Server Only**
- **Read Me First**
- **Uninstall NetDisturb**
- **User Guide**
- **USB Key Viewer** (USB Software Protection Key version only)

3.9 How to reinstall another package?

If you already have installed one of the **NetDisturb V5.0** packages, click [Setup_NetDisturb_Standard_Edition-v5.0.exe](#) or [Setup_NetDisturb_Enhanced_Edition-v5.0.exe](#) and select, in the window below, the new package you want to install.



(Example NetDisturb Standard edition)

3.10 How to transfer the software to another computer?

For the users having the NetDisturb USB dongle: install the software on the target machine by using the Package No.3 ("NetDisturb with a USB Software Protection Key"), and then plug the USB dongle before running the software on this machine.

For the users having only the Software Protection Key, install the software on the target machine by using the Package No.2 ("NetDisturb with a Software Protection Key"), and then refer to paragraph **"4.2.2 Software Protection Key Transfers"** to know how to transfer the Software Protection Key.

Part 4 How to handle your license?

4.1 NetDisturb Trial

You don't need any license to install the **NetDisturb Trial package**. After the first run of **NetDisturb Server**, the **NetDisturb Trial package** can be used during 15 days.

4.1.1 NetDisturb Server License Information window

When you run **NetDisturb Server**, the information about your trial license is displayed, as shown below.



You are now able to use **NetDisturb** during the next 15 days.

4.1.2 End of the fifteen-day trial period

Once the trial period is over, you can't use **NetDisturb** anymore, see below:



When you press the **OK** button, **NetDisturb** will stop running.

To continue to use **NetDisturb** please contact you local distributor or **ZTI** to get an unlimited license.

4.2 NetDisturb & Software Protection Key (Windows 32-bit versions)

Licensed users of **NetDisturb** that are already using the Software Protection Key should not need to refer to the section 4.2.1. To transfer the owned Software Protection Key to another PC or to another directory, please go directly to section 4.2.2.

4.2.1 Installation of the Software Protection Key



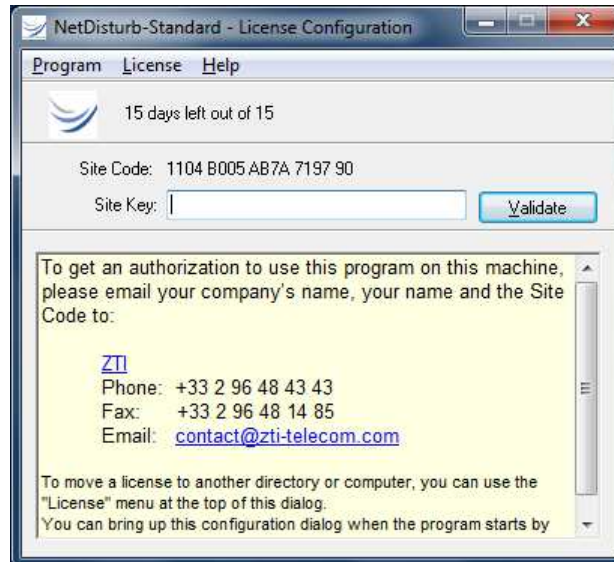
*This software is licensed on a per workstation basis. This means that you will need to get a separate license for each machine you will install it on. Each licensed copy of the software installed on a system has a unique **Site Code** that requires a corresponding unique **Site Key** to work.*

A period of 15 days is automatically enabled at the first installation of the software. If you try to install the software again, the Software Protection Key will disable the trial period.

If you want to configure your Software Protection Key before the time-limited period end, press **Enter** just after launching the **NetDisturb** when the following message is displayed:



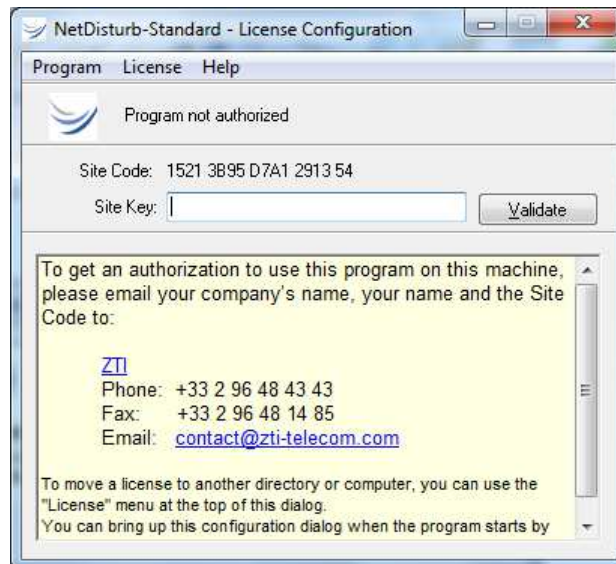
Then, you will see the following Software Protection Key configuration window:



*At the end of the trial period when you launch **NetDisturb**, the same Software Protection Key configuration window appears, but saying "Program not authorized" instead of showing the remaining days of use.*

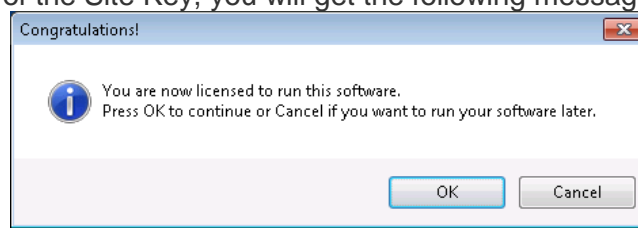
To get the **Site Key** and obtain a permanent license, please send an email to contact@zti-telecom.com or contact@zti.fr with the following information:

- The **Site Code** (you can copy and paste the Site Code displayed in the license window)
- The name of the software: **NetDisturb Standard edition or NetDisturb Enhanced edition**
- The OS used
- Your details
- The purchase order's number and date of purchase



We will then email you the **Site Key**. You can now close the license's window.

After you have received the email with the **Site Key**, open the Software Protection Key configuration window again by pressing the Enter key as explained before. Copy the Site Key in and then click "Validate". After validation of the Site Key, you will get the following message:



- ⇒ **Important:** one **Site Code** is associated with one **Site Key**, and only one. A **Site Code** is unique for each PC installed. For security reasons, as soon as you validate a **Site Key** (trial or unlimited), the Software License program generates a new **Site Code** automatically.
- ⇒ For any question or further information, please contact our technical support:
Email: support@zti-telecom.com or support@zti.fr
Phone: +33 2 9648 4343
Fax: +33 2 9648 1485

When you launch **NetDisturb** with a permanent Software Protection Key, you will see the following window:



4.2.2 Software Protection Key Transfers



A Software Protection Key transfer is not a duplication of any type. Please contact ZTI or your authorized distributor for site Software Protection Key information and for several Software Protection Keys purchase.

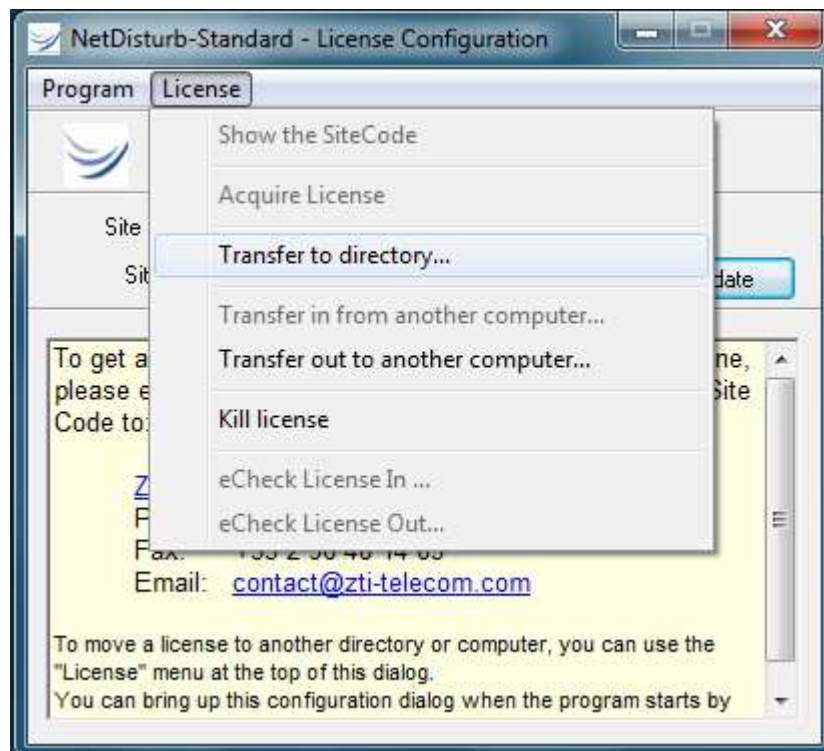
Software Protection Keys can be transferred using one of the following methods:

- ⇒ **Direct transfer:** move the Software Protection Key to another directory of the same PC or between two PCs linked to the same network.
- ⇒ **Transfer by media:** move the Software Protection Key from a source PC to a target PC by using a floppy disk or USB key.

4.2.2.1 Direct Transfer: move the Software Protection Key from one local directory to another


This transfer mechanism must be used to move a Software Protection Key in two cases:

- From a source to a target directory of the same PC
 - From a source to a target directory of networked PCs
- First, copy the program (copy the **NetDisturb** folder) to the target directory.
For example from "C:\Program Files\NetDisturb\Server" to "C:\Temp\NetDisturb"
 - Then run the program from its original directory (from "C:\Program Files\NetDisturb\Server"). When the Software Protection Key configuration window appears, press **Enter** and select "License > Transfer to directory ..." in the License menu as shown below:



- Provide the path name of the target program (for example C:\Temp\NetDisturb\Server\NetDisturbServer.exe)
- The Software Protection Key is now transferred to the new directory.

4.2.2.2 Transfer by Media (USB key) from a source PC to a target PC

 A USB key or a floppy disk is needed for this kind of transfer.

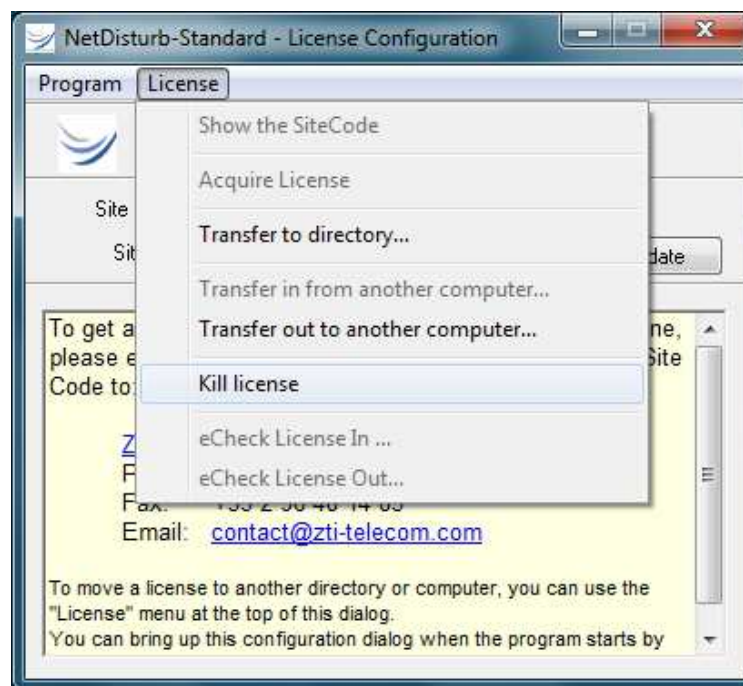
To transfer the Software Protection Key from the source PC (PC #1) to the target PC (PC #2), proceed as described in the following order:

- 1) First install the program on the target PC (PC #2).
- 2) Run the software on PC # 2 and kill the time-limited Software Protection Key in order to get an unauthorized license on this PC.

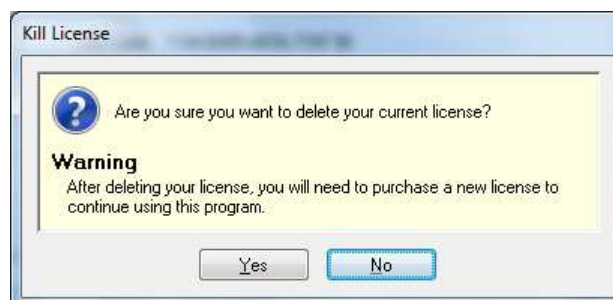
If the "Transfer in from another computer ..." item of the license menu is disabled, you must kill the Software Protection Key.

How to kill the Software Protection Key?

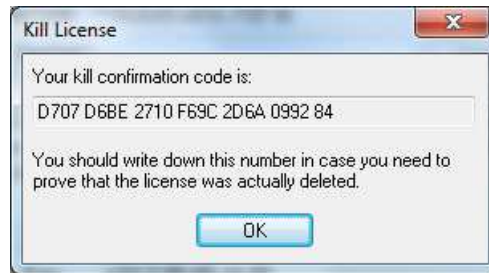
When the Software Protection Key configuration window appears, press **Enter** and select "License > Kill license" in the license menu.



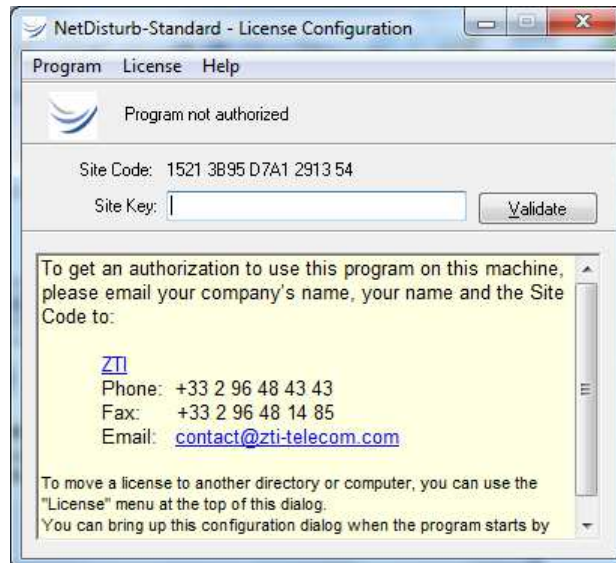
A message box will appear:



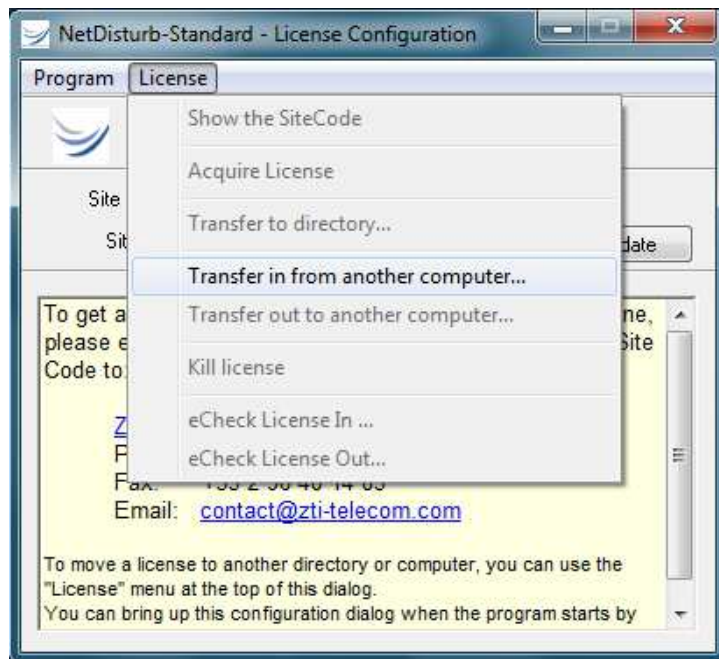
Press 'Yes' to kill the Software Protection Key and a confirmation code is displayed:



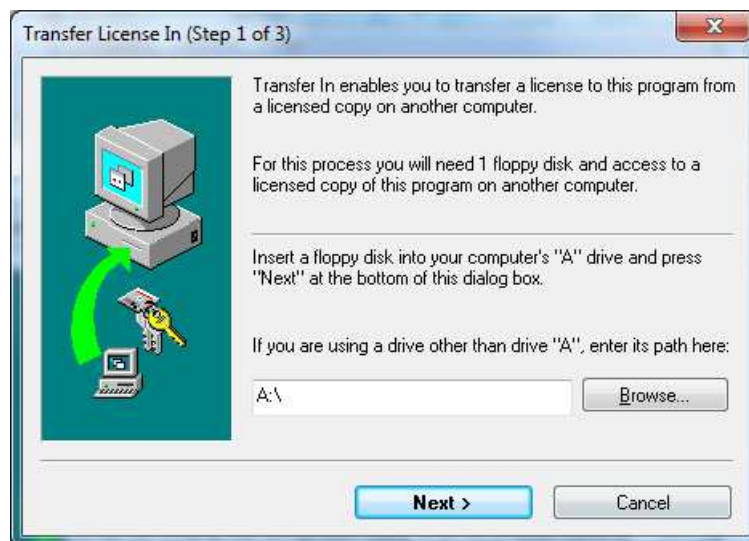
Click 'OK' and the Software Protection Key window displays now "Program not authorized":



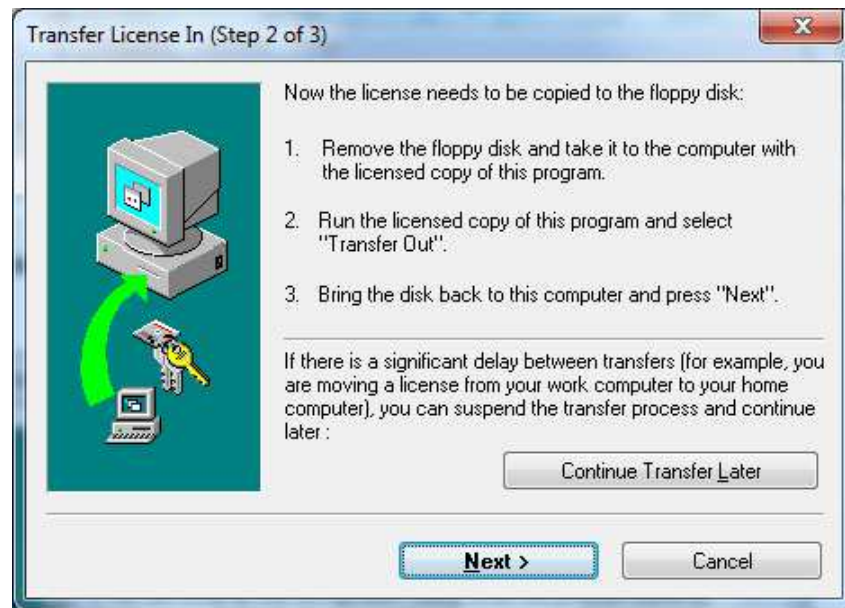
3) Select "License > Transfer in from another computer ..." from in the Software Protection Key License menu:



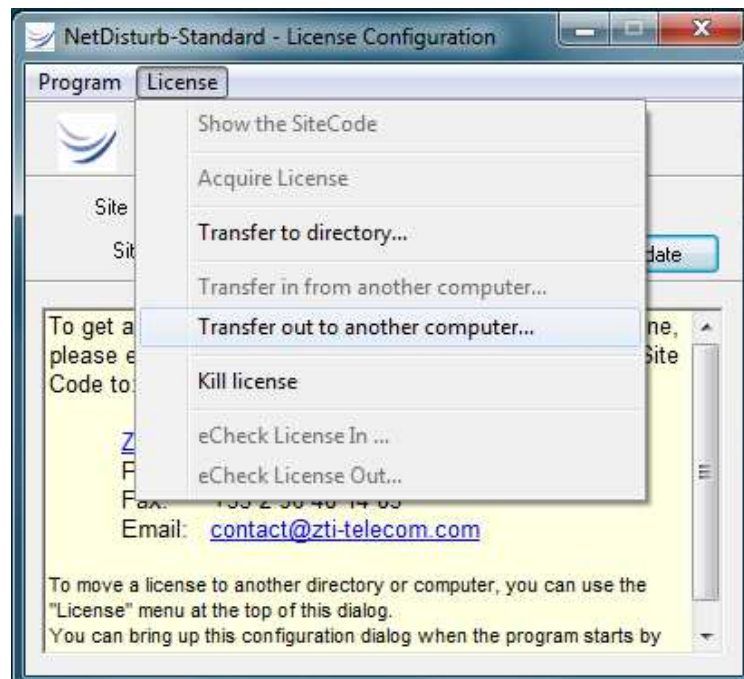
The "Transfer License In (Step 1 of 3)" window is displayed:



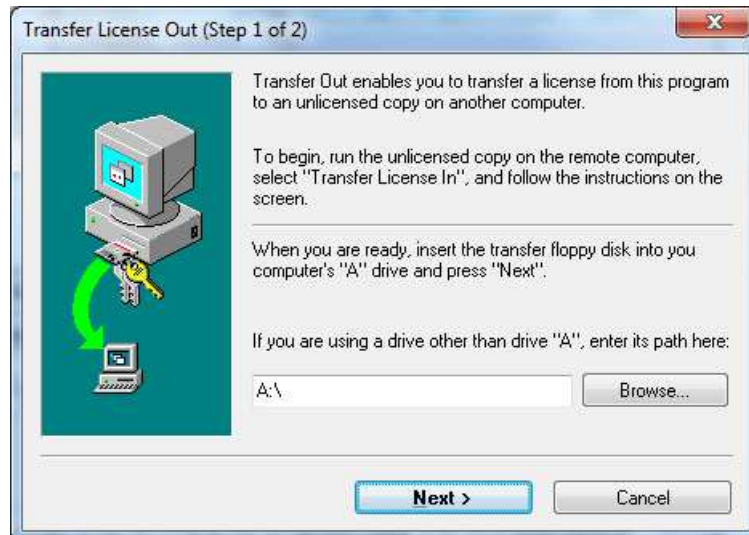
4) Insert a floppy disk or use a USB key as requested in step 1 of 3 and specify the path. Then press "Next >": the "Transfer License In (Step 2 of 3)" window is displayed:



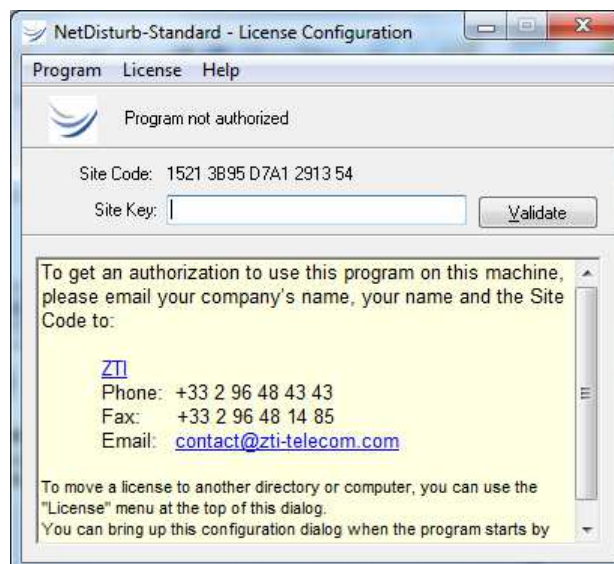
5) Go to the source PC (PC #1) and insert the media (USB key or floppy disk). Then start the program on PC #1. When the license configuration window appears, press **Enter** and select "License > Transfer out to another computer ..." as shown below:



The following window is displayed:



Input the media path (USB key or floppy disk) and then press "Next >". When the license is put on the media, you get the "Program not authorized" message:



You can check that the Software Protection Key is not available anymore on the source PC since the **NetDisturb** software license is on a workstation basis. Contact us to get information for a Site Software Protection Key (contact@zti.fr or contact@zti-telecom.com).

6) Remove the media from PC #1 and return to PC #2.

Click the 'Next' button on the step 2 of 3 of the "Transfer license in" window (on PC #2) to complete the transfer.

The permanent Software Protection Key is now transferred from the source PC to the target PC, and you get the following message:



Click Finish to continue.

4.3 NetDisturb & USB Software Protection Key

The USB Software Protection Key is the most flexible way to transfer your license to any other PC. Plug it in the computer you want to use **NetDisturb** on.

If you are a user of a previous version of **NetDisturb (version 4.5 and under)** and if you are interested with the USB Software Protection Key, please contact ZTI Sales Offices (Email: sales@zti-telecom.com).

Part 5 Uninstall NetDisturb

To uninstall **NetDisturb**, please select "Uninstall NetDisturb" by using the shortcut:

Start ► All Programs ► NetDisturb v5

All installed components of **NetDisturb** will be removed including the **NetDisturb** driver.

Part 6 Run NetDisturb

6.1 NetDisturb and NIC cards

With **NetDisturb** version 5.0, the NIC configuration is done transparently. **NetDisturb** configures the two selected NICs to handle the Ethernet traffic without the noise of the other installed protocols. When NetDisturb stops, the previous protocols are reselected.

6.2 NetDisturb and Wifi NIC

The WiFi NICs change the way **NetDisturb** version 5.0 handles the frames. When a WiFi NIC is selected as an Interface to be used by **NetDisturb** version 5.0, **NetDisturb** runs like an IP router to exchange the frames from the Wifi. From your devices expecting to use the **NetDisturb** WiFi Interface, you should route your IP flows to this Wifi NIC manually i.e. you create a route that uses the **NetDisturb** WiFi NIC as the gateway for the flow.

Example: when the IP address of WiFi NIC used by **NetDisturb** is **192.168.0.156**, the route command for traffic to the target **192.168.0.26** through the **NetDisturb** WiFi NIC is:

route add 192.168.0.26 mask 255.255.255.255 192.168.0.156

The list of routes can be checked via the route print command. Here is an example of the resulting routes:

```
C:\NetDisturb v5.0\>route print
=====
Interface List
0x1 ..... MS TCP Loopback interface
0x2 ...00 11 43 4c 62 90 ... Intel(R) PRO/100 VE Network Connection - Packet Scheduler Miniport
0x3 ...00 12 f0 19 5d 60 .. Intel(R) PRO/Wireless 2200BG Network Connection - Packet Scheduler Miniport
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          192.168.0.1      192.168.0.177    25
0.0.0.0                    0.0.0.0          192.168.0.1      192.168.0.147    20
127.0.0.0                  255.0.0.0        127.0.0.1        127.0.0.1        1
192.168.0.0                255.255.255.0    192.168.0.147    192.168.0.147    20
192.168.0.0                255.255.255.0    192.168.0.177    192.168.0.177    25
192.168.0.26              255.255.255.255  192.168.0.156    192.168.0.147    1
192.168.0.147             255.255.255.255  127.0.0.1        127.0.0.1        20
192.168.0.177             255.255.255.255  127.0.0.1        127.0.0.1        25
192.168.0.255             255.255.255.255  192.168.0.147    192.168.0.147    20
192.168.0.255             255.255.255.255  192.168.0.177    192.168.0.177    25
192.168.1.0               255.255.255.0    192.168.1.147    192.168.0.147    20
192.168.1.147             255.255.255.255  127.0.0.1        127.0.0.1        20
192.168.1.255             255.255.255.255  192.168.1.147    192.168.0.147    20
224.0.0.0                 240.0.0.0        192.168.0.147    192.168.0.147    20
224.0.0.0                 240.0.0.0        192.168.0.177    192.168.0.177    25
255.255.255.255           255.255.255.255  192.168.0.147    192.168.0.147    1
255.255.255.255           255.255.255.255  192.168.0.177    192.168.0.177    1
Default Gateway:          192.168.0.1
=====
Persistent Routes:
None
```

When you don't need **NetDisturb**, you may delete the route as following:

route delete 192.168.0.26

6.3 Launch NetDisturb

As **NetDisturb** is made of 2 parts (**NetDisturb** Server and **NetDisturb** Client), you need to run these two programs in the following order:

1. **NetDisturb** Server
2. **NetDisturb** Client

To run the software in this order, click on:

Start ► All Programs ► NetDisturb v5 ► NetDisturb (start both Server and Client)

6.4 First Run

6.4.1 The NetDisturb Server startup

NetDisturb Server is started automatically when using the **NetDisturb** shortcut (start both Server and Client).





You may also start the server independently, for instance when you are using a remote configuration where **NetDisturb** Server doesn't run on the same PC as **NetDisturb** Client.

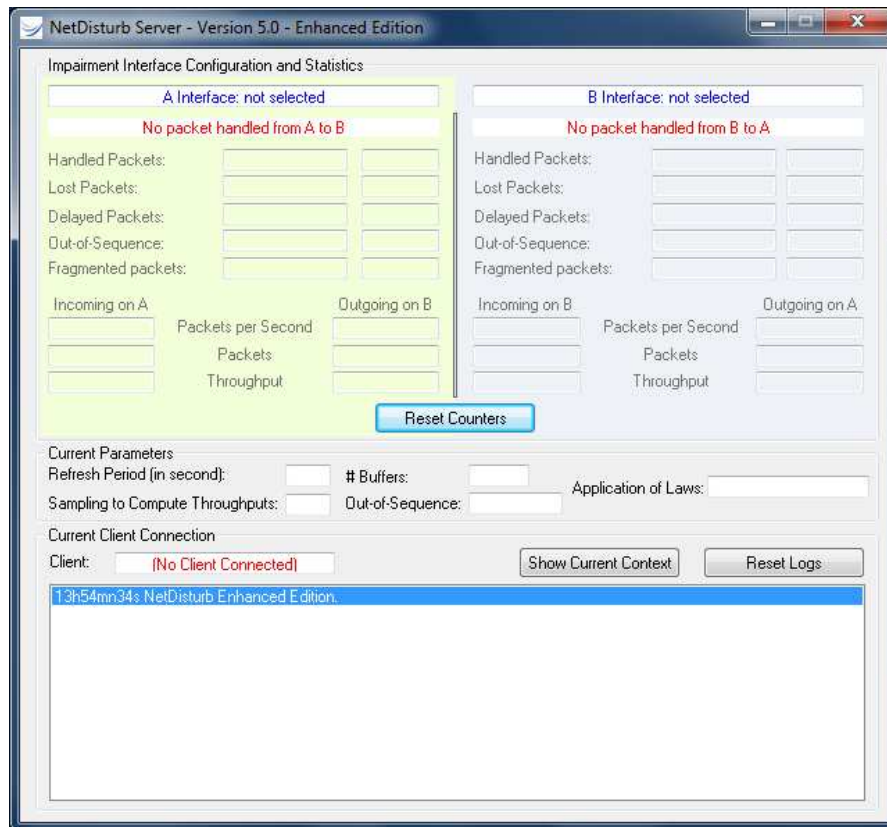
To start the **NetDisturb** Server alone, use the Windows start menu:

Start ► All Programs ► NetDisturb v5 ► NetDisturb Server

After a few seconds and depending on your license, you will get one of the following license windows:

15-day trial version license	Permanent Software License
	
USB Software Protection key	
When you use a USB Software Protection key, there is no window displayed!	

The next window displayed is **NetDisturb Server**



We recommend closing **NetDisturb Server** and then to configure the NICs usable by **NetDisturb** as described in paragraph 6.1 if you didn't configure the NICs before.

6.4.2 NetDisturb Client startup

NetDisturb Client is started automatically when using the **NetDisturb** shortcut.

There are 2 modes to start **NetDisturb Client**:

- **NetDisturb Client** Automatic Sample mode (default installation):

The **NetDisturb Client** Automatic Sample mode is the new starting mode introduced in **NetDisturb** version 5.0. It is designed for simplify the **NetDisturb** usage for new users. **NetDisturb Client** Automatic Sample mode presents a list of predefined context files. The user selects one of this file, selects the 2 NICs to use and **NetDisturb Client** automatically starts the impairments based on the laws defined in the samples. The user should generate the traffic to see the impairments from **NetDisturb**.

- **NetDisturb Client** Manual mode:

The **NetDisturb Client** manual mode is designed for users with knowledge of **NetDisturb**. At startup, **NetDisturb Client** loads the most recent context file. The user may be required to select the 2 NICs. Then he is able to start the impairments, to handle context files, filters and laws, aggregate, etc. The Manual mode was the only mode available in previous versions of **NetDisturb**.

To switch from Automatic Mode to Manual Mode at startup, the user press the button 'Cancel' from the Automatic Mode dialog box: more details are shown in next 2 paragraphs.

6.4.2.1 NetDisturb Client startup in Automatic Mode

The default connection parameters used to exchange between **NetDisturb Client** and **NetDisturb Server** are:

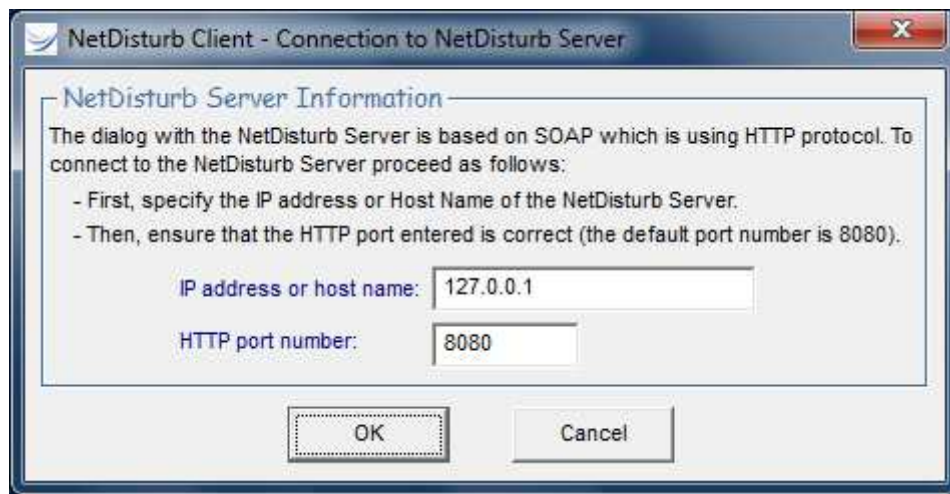
- **NetDisturb Server IP address or Host Name = 127.0.0.1**
(127.0.0.1 = default local IP address if the **NetDisturb Server** and the **NetDisturb Client** are installed on the same machine).
- **HTTP Port Number = 8080**

You may also start the **NetDisturb Client's** part alone, to connect to a remote **NetDisturb Server**.

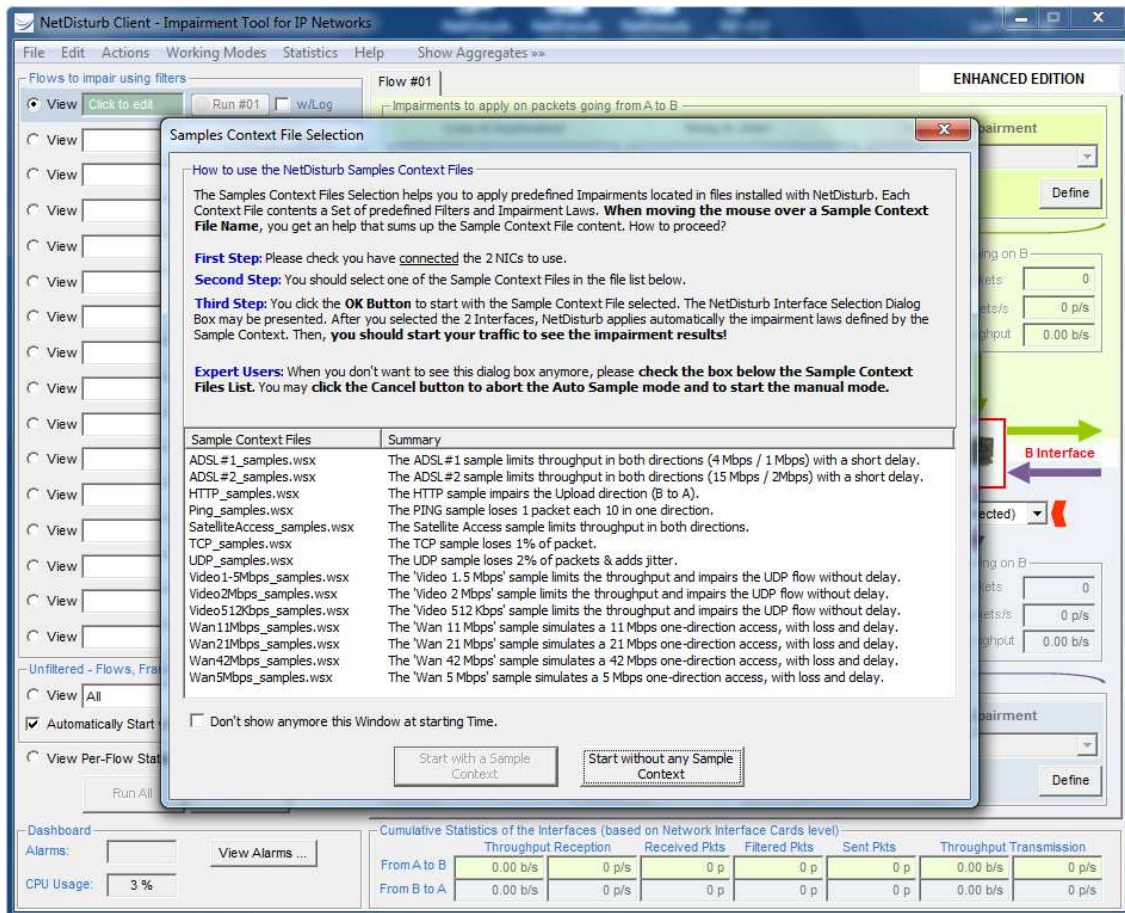
To start the **NetDisturb Client** alone, use the Windows start menu:

Start ► All Programs ► **NetDisturbv5.0** ► **NetDisturb Client**

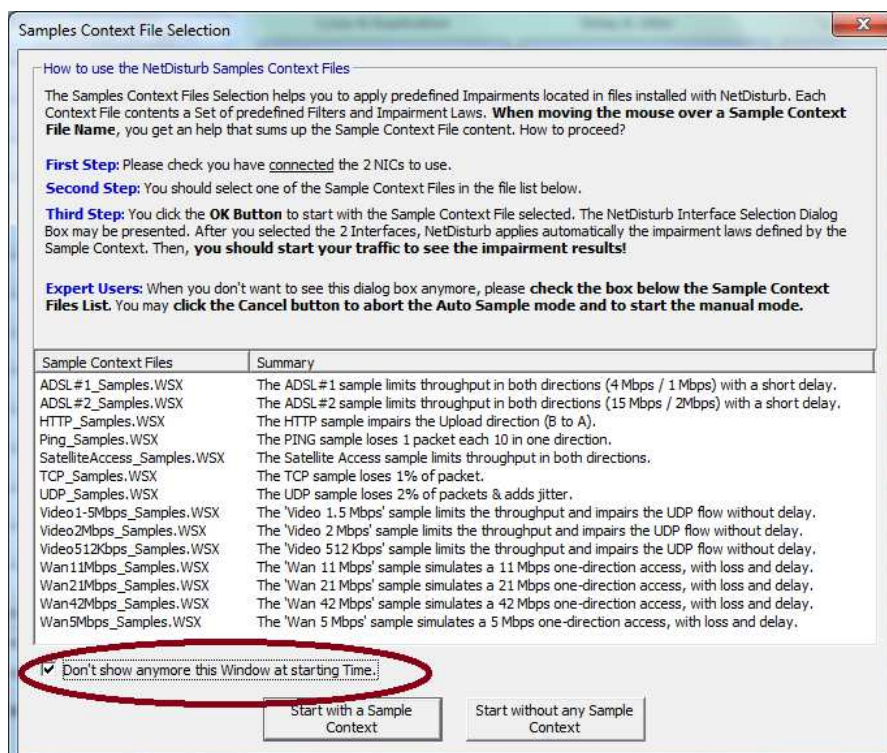
When **NetDisturb Client** starts, it will ask you to enter the parameters to connect to the **NetDisturb Server** machine:



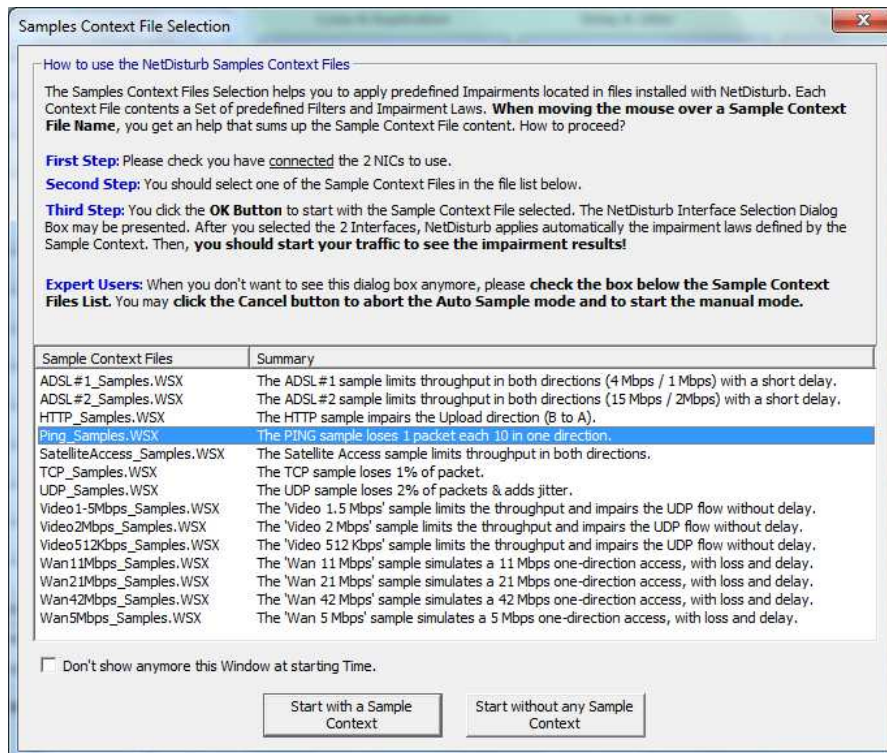
Click “OK” and the **NetDisturb Client** Automatic Sample mode main window will appear:



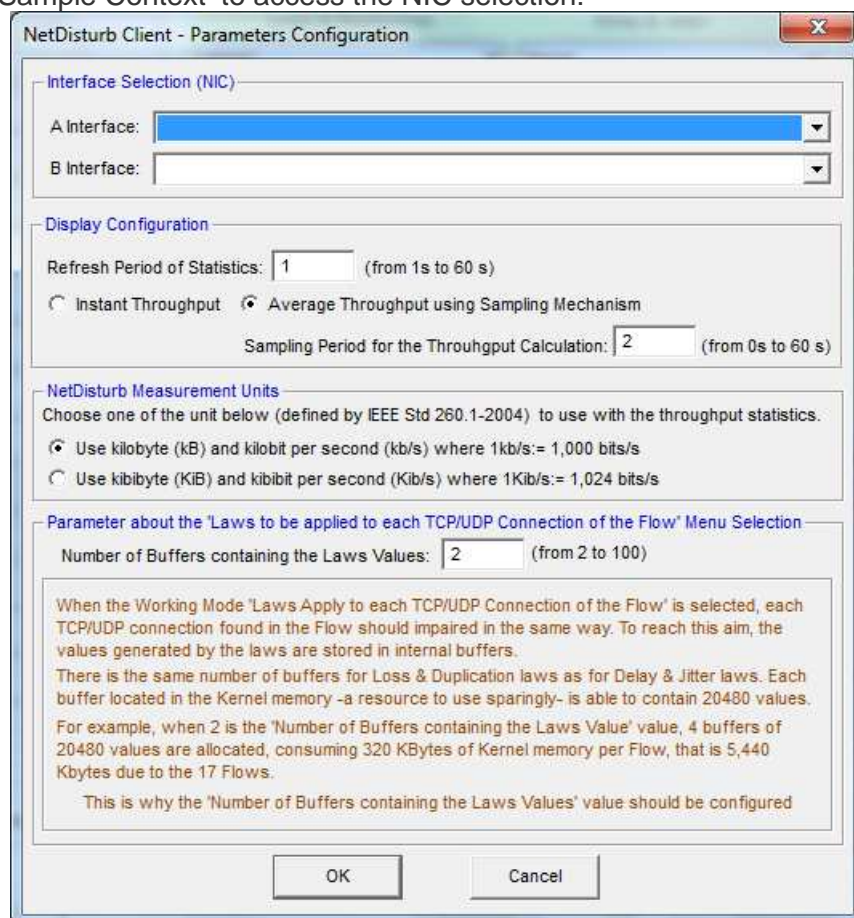
For **NetDisturb Expert Users**: to avoid the Automatic Sample mode dialog at startup, select the box on the bottom of the window and click ‘Cancel’.



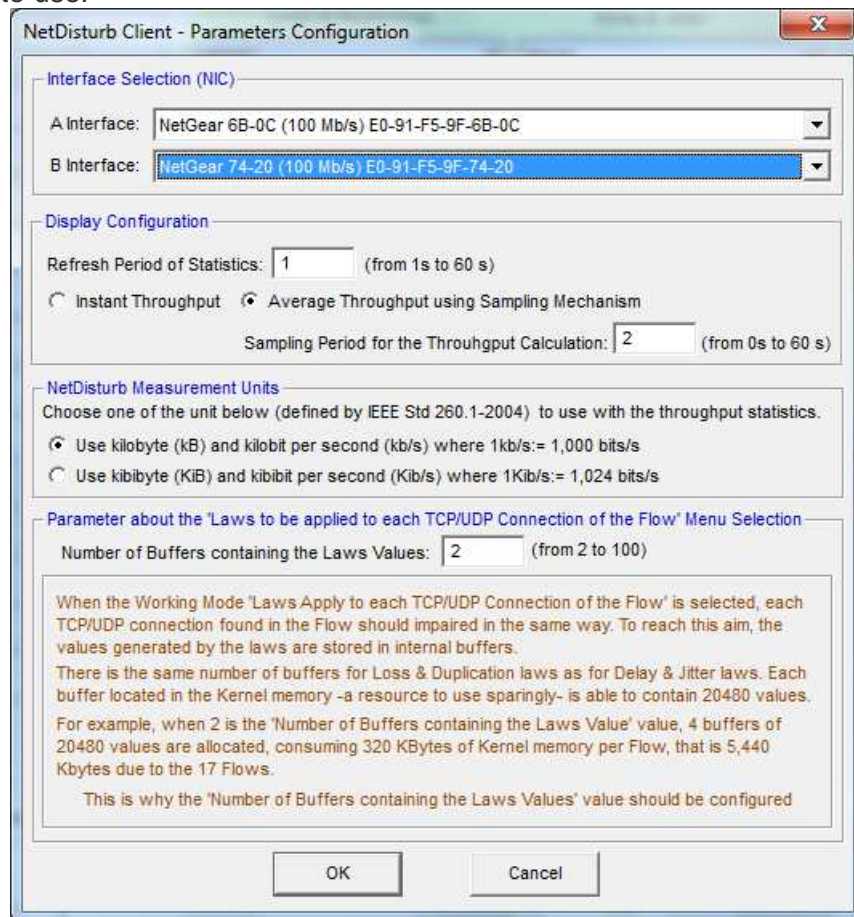
Select the sample context file that fulfills your traffic. For first time users, it is recommended to select the Ping_Samples.



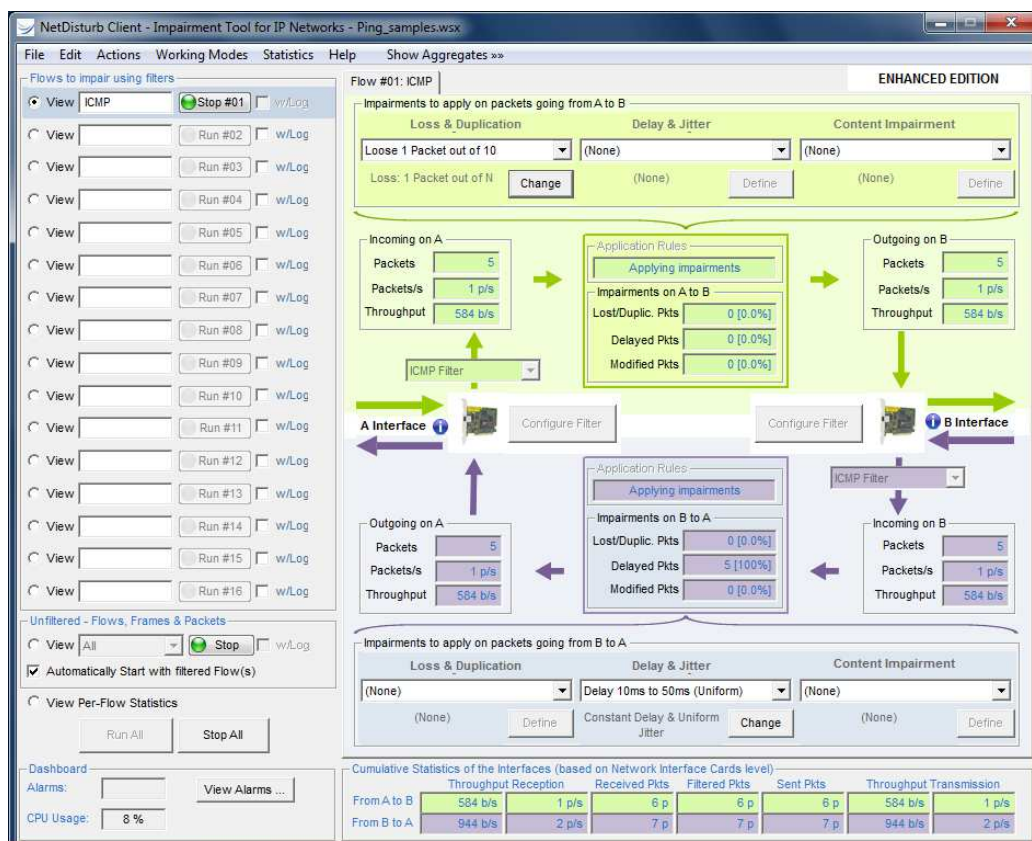
Click 'Start with a Sample Context' to access the NIC selection:



Select the 2 NICs to use:



Click OK to start the impairment:



6.4.2.2 NetDisturb Client startup in Manual Mode

The default connection parameters used to exchange between **NetDisturb Client** and **NetDisturb Server** are:

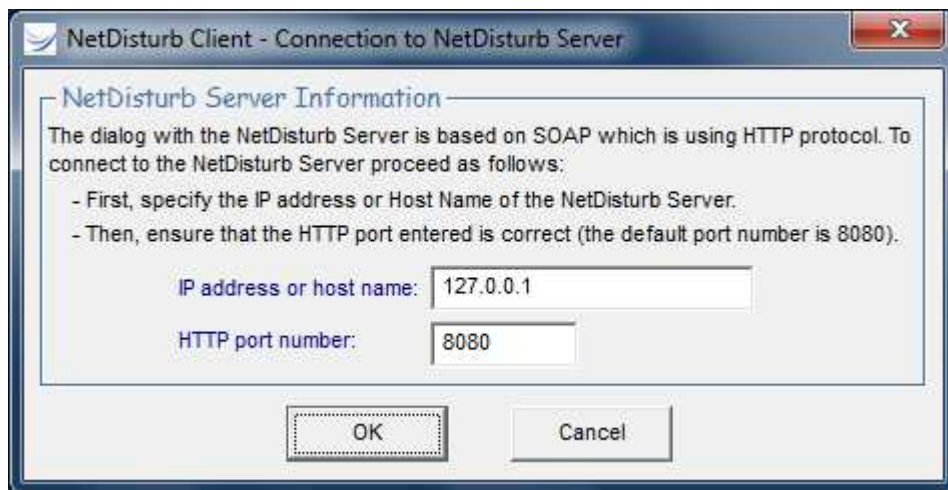
- **NetDisturb Server IP address or Host Name = 127.0.0.1**
(127.0.0.1 = default local IP address if the **NetDisturb Server** and the **NetDisturb Client** are installed on the same machine).
- **HTTP Port Number = 8080**

*You may also start the **NetDisturb Client's** part alone, to connect to a remote **NetDisturb Server**.*

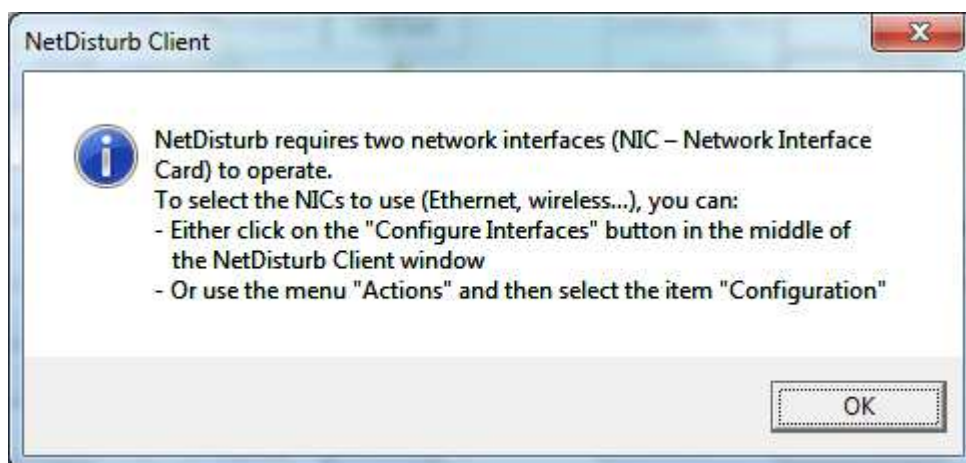
*To start the **NetDisturb Client** alone, use the Windows start menu:*

Start ► All Programs ► NetDisturbv5.0 ► NetDisturb Client

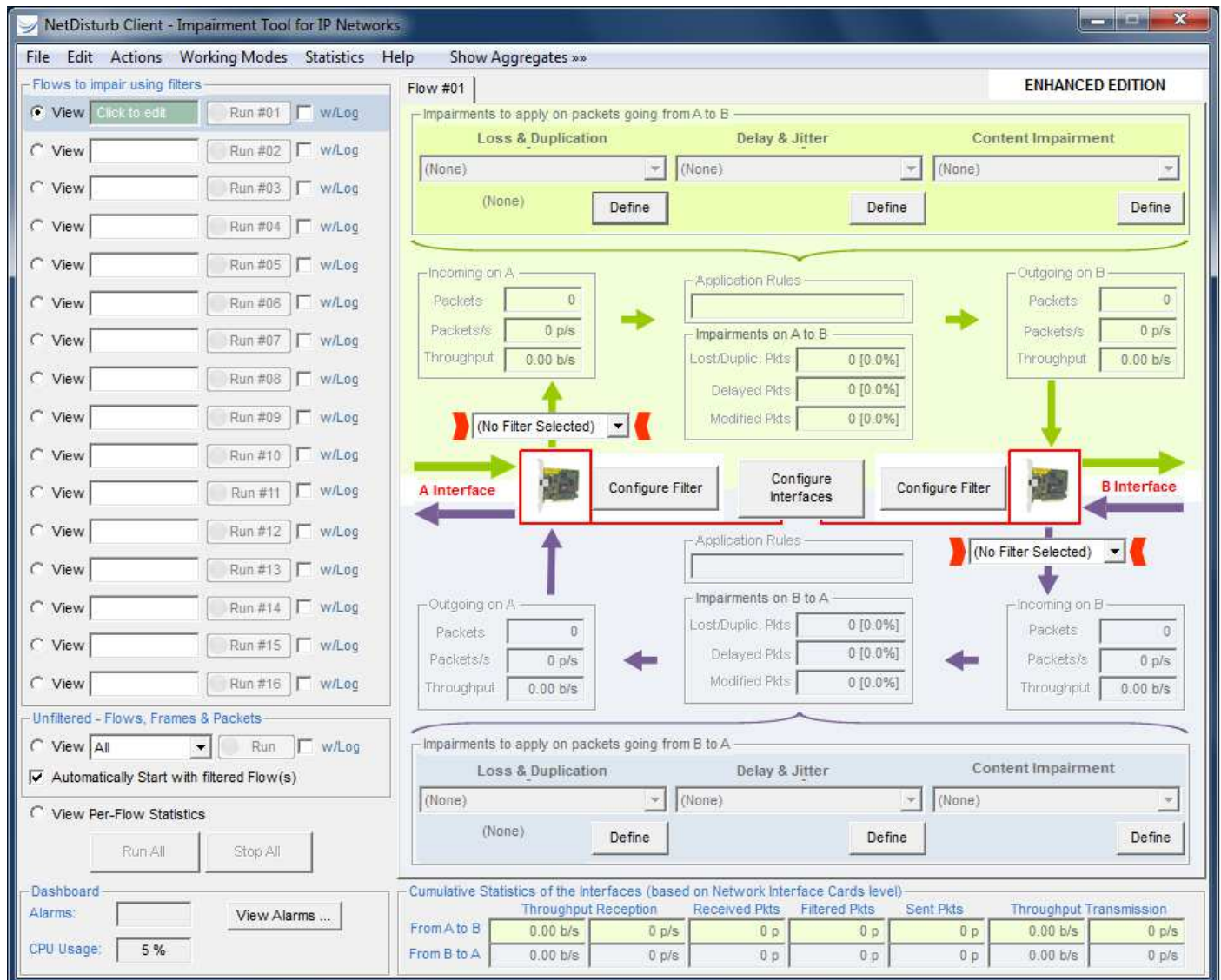
*When **NetDisturb Client** starts, it will ask you to enter the parameters to connect to the **NetDisturb Server** machine:*



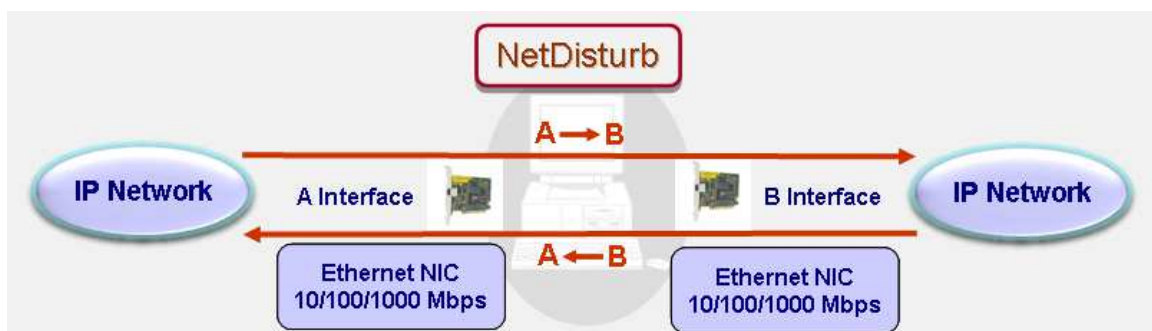
*On the first run, there is no Interface defined. **NetDisturb Client** will tell you how to configure those 2 interfaces.*



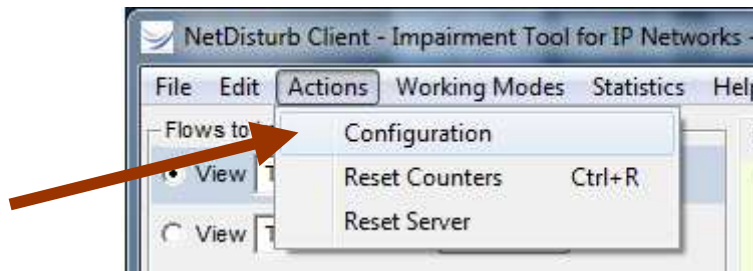
Click “OK” and the **NetDisturb Client** main window will appear:



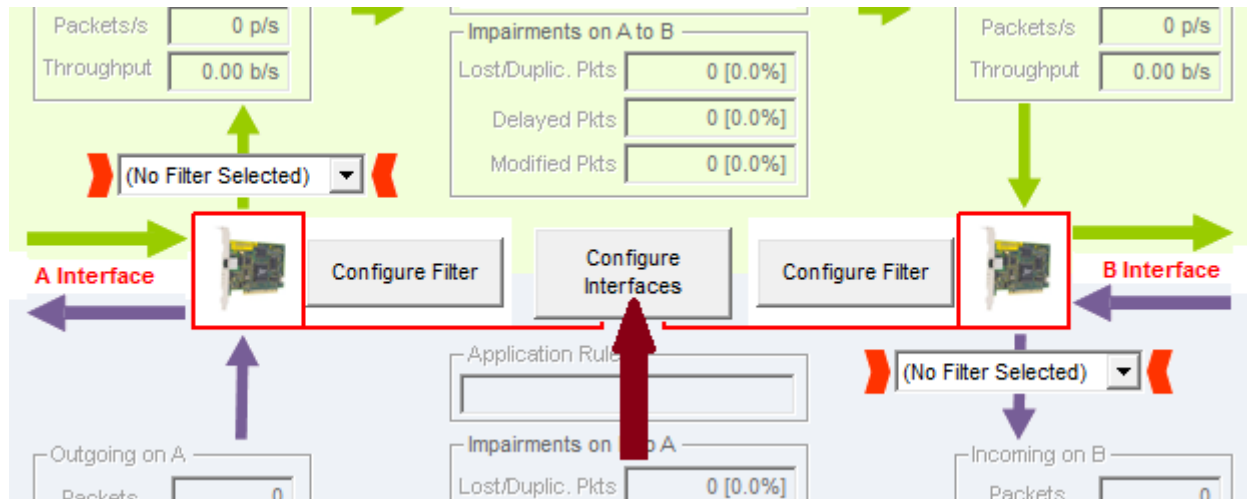
Then, you need to select the NICs (interface A and interface B) that the **NetDisturb** Server is going to use.



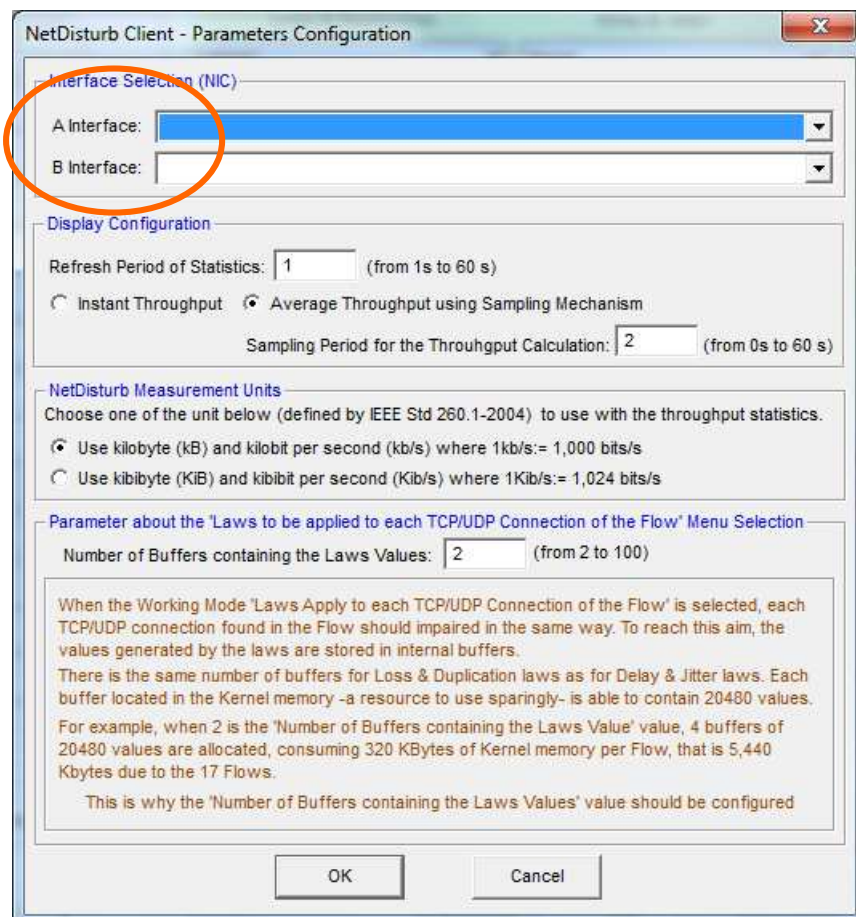
Select "Configuration" in the Actions menu:



or click on the "Configure Interfaces" button located in the main window:



Then the parameters configuration window is displayed:



At the bottom of this window in the "Interface Selection" part, select one NIC for Interface A and another NIC for the Interface B, and then confirm with "OK".

You should see in the combo-box (Interface A or Interface B) all available and operational NICs. If you don't see any NICs, please follow the steps below:



- Verify that your NICs are installed and operational.
- Enable the needed NICs.
- Stop the **NetDisturb Client**.
- Stop the **NetDisturb Server**.
- Reboot your system if necessary.
- Start the **NetDisturb Server**.
- Start the **NetDisturb Client**.

Then you should see your installed NICs in the Interface A and B combo-boxes (see the example below):

NetDisturb Client - Parameters Configuration

Interface Selection (NIC)

A Interface: NetGear 6B-0C (100 Mb/s) E0-91-F5-9F-6B-0C

B Interface: NetGear 74-20 (100 Mb/s) E0-91-F5-9F-74-20

Display Configuration

Refresh Period of Statistics: 1 (from 1s to 60 s)

☐ Instant Throughput ☒ Average Throughput using Sampling Mechanism

Sampling Period for the Throughgput Calculation: 2 (from 0s to 60 s)

NetDisturb Measurement Units

Choose one of the unit below (defined by IEEE Std 260.1-2004) to use with the throughput statistics.

☒ Use kilobyte (kB) and kilobit per second (kb/s) where 1kb/s:= 1,000 bits/s

☐ Use kibibyte (KiB) and kibibit per second (Kib/s) where 1Kib/s:= 1,024 bits/s

Parameter about the 'Laws to be applied to each TCP/UDP Connection of the Flow' Menu Selection

Number of Buffers containing the Laws Values: 2 (from 2 to 100)

When the Working Mode 'Laws Apply to each TCP/UDP Connection of the Flow' is selected, each TCP/UDP connection found in the Flow should impaired in the same way. To reach this aim, the values generated by the laws are stored in internal buffers.

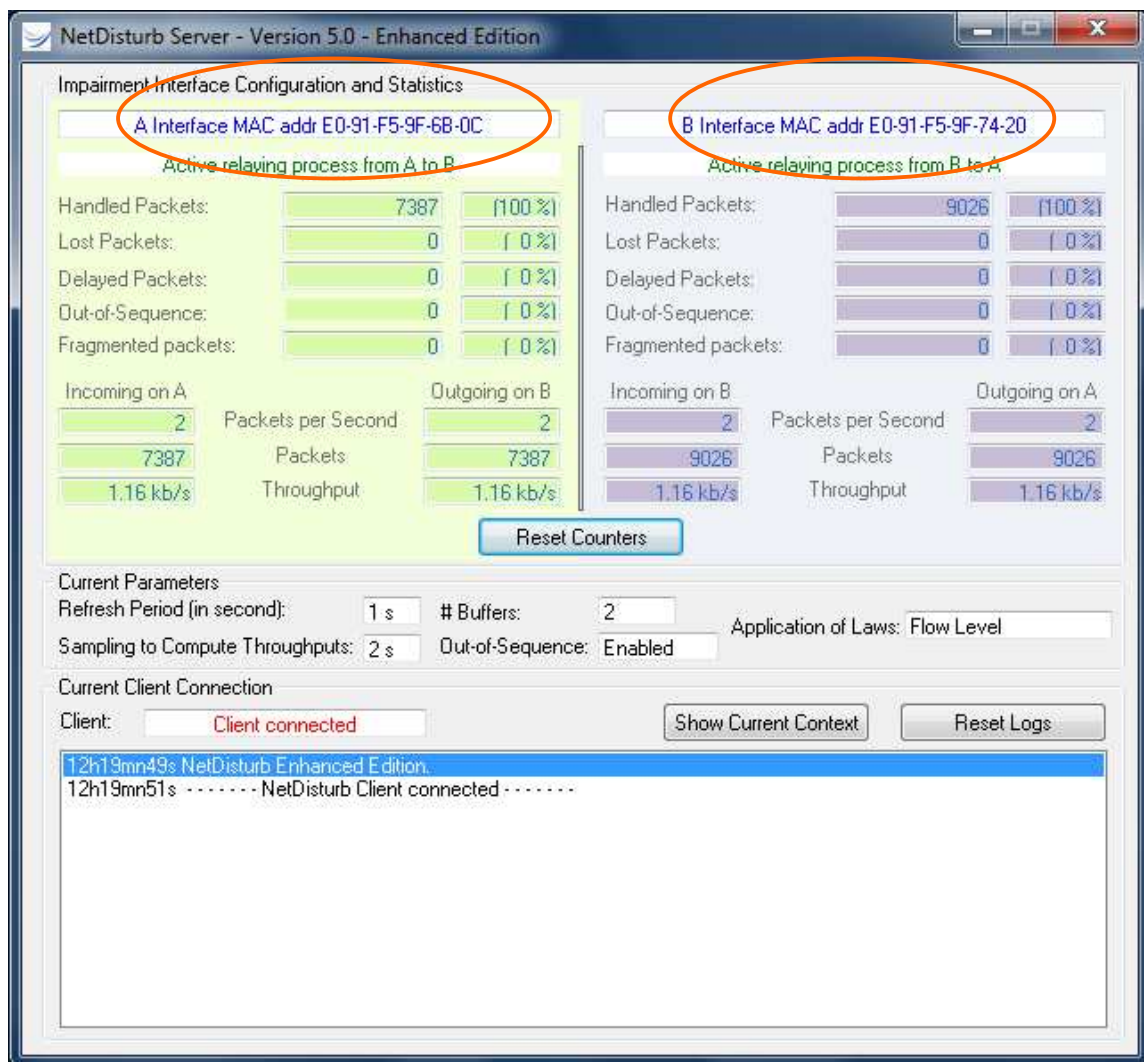
There is the same number of buffers for Loss & Duplication laws as for Delay & Jitter laws. Each buffer located in the Kernel memory -a resource to use sparingly- is able to contain 20480 values.

For example, when 2 is the 'Number of Buffers containing the Laws Value' value, 4 buffers of 20480 values are allocated, consuming 320 KBytes of Kernel memory per Flow, that is 5,440 Kbytes due to the 17 Flows.


This is why the 'Number of Buffers containing the Laws Values' value should be configured

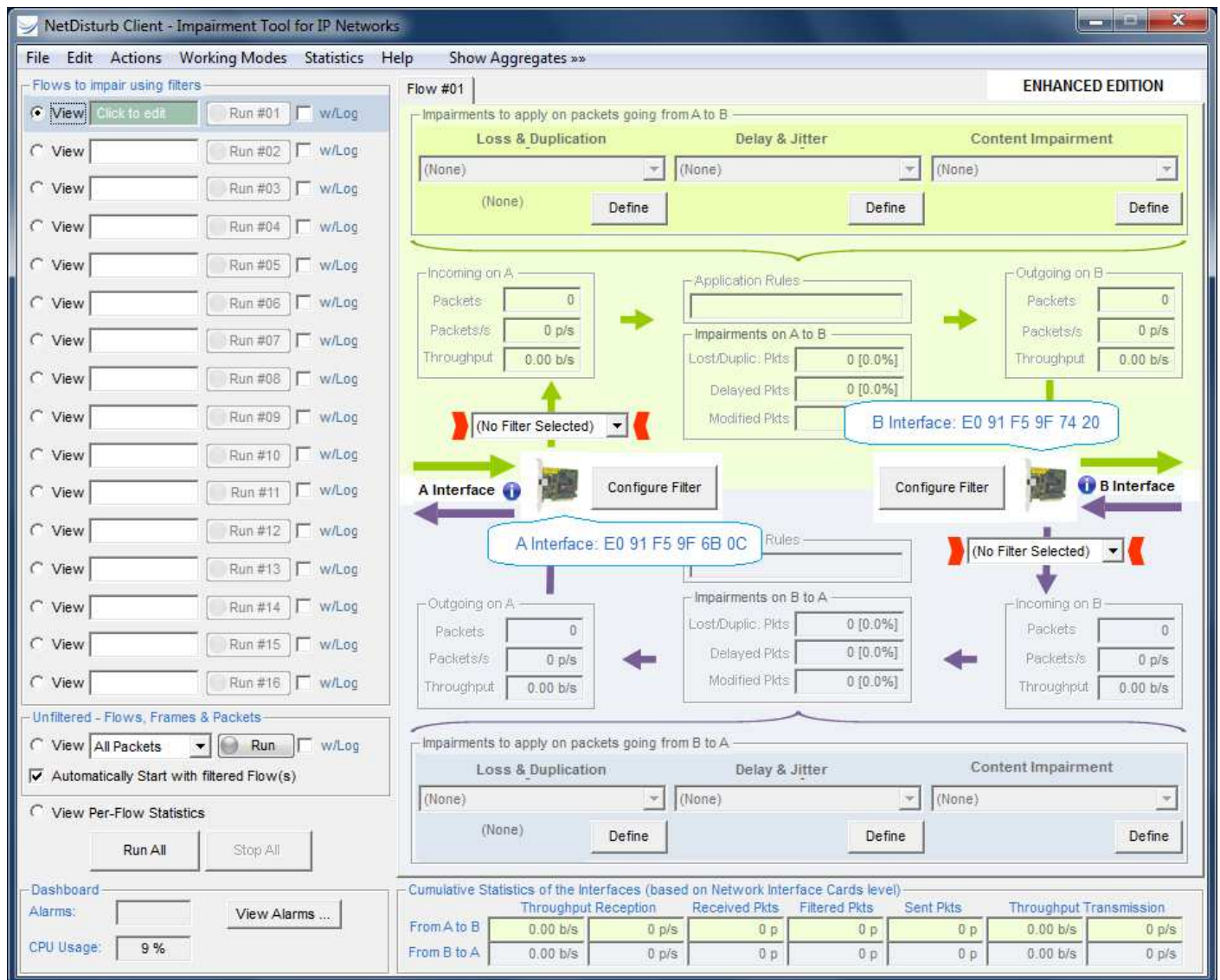
OK Cancel

As soon as the configuration is done, the **NetDisturb** Server recognizes "Interface A" and "Interface B" as shown below.



NetDisturb Server configured with two Ethernet NICs (A and B)

The MAC Addresses of the selected interfaces are also displayed in the **NetDisturb Client** window by clicking on the  symbol of each interface:

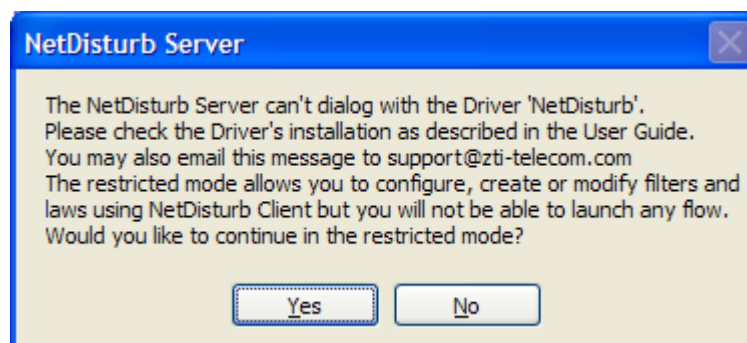


NetDisturb Client with two Ethernet NICs configured

6.5 Detailed Description of the Server and Client Startup

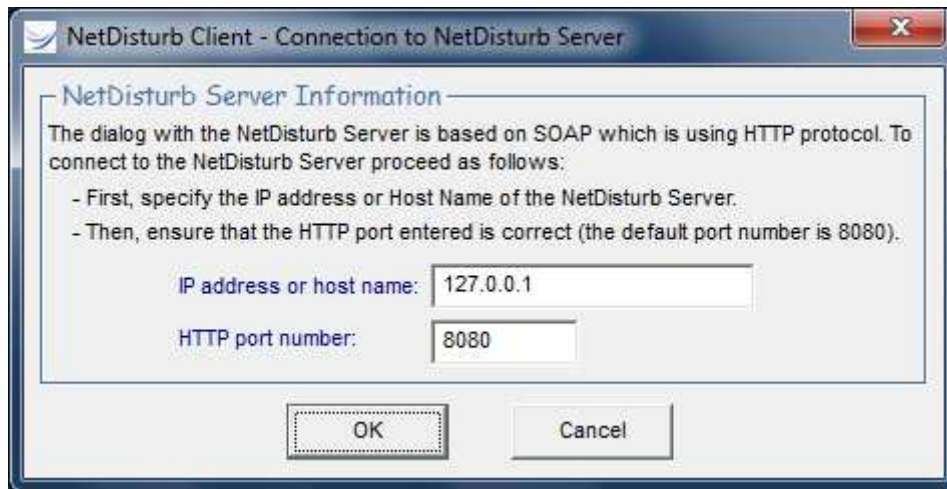
6.5.1 The NetDisturb Server Startup Modes

The level of provided functionalities depends on the availability or not of the **NetDisturb** driver. If the **NetDisturb** driver is lacking, a message warns the user. In that case it is possible to continue in the "restricted mode" where only a few functions are available.



6.5.2 The NetDisturb Client Startup Options

When starting the **NetDisturb Client**, the Connection to Server parameters window is displayed.



This parameters window is made of two sections:

The **NetDisturb** Client needs the following information in order to connect to the **NetDisturb** Server:

- The **NetDisturb** Server IP address
- The **NetDisturb** Server HTTP port number

In case of a connection failure (if one of the parameters is invalid), an error window pops up. To go back to the identification window, just click on the OK button.

