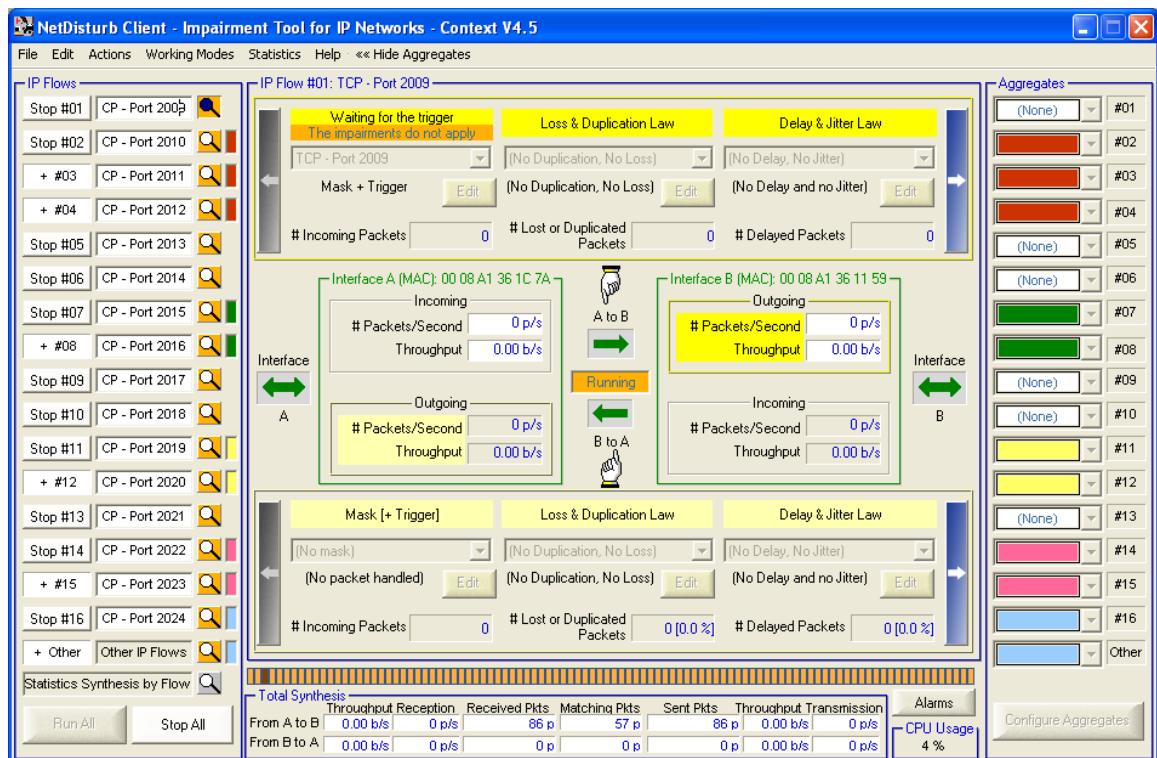




NetDisturb

Version 4.5

Impairment Emulator Software for IP Networks (IPv4 & IPv6)



Read Me First

Summary

PART 0	PREFACE.....	3
0.1	ORGANIZATION OF THIS MANUAL	3
0.2	MINIMUM SYSTEM REQUIREMENTS.....	4
0.3	TECHNICAL SUPPORT	4
PART 1	NETDISTURB OVERVIEW	5
1.1	PRODUCT REQUIREMENTS.....	6
1.2	CONFIGURATIONS.....	6
1.3	PRODUCTS FEATURES	7
1.3.1	<i>Key features.....</i>	7
1.3.2	<i>How does it work?</i>	10
1.3.3	<i>Introduction of a Trigger for the Mask.....</i>	10
1.3.4	<i>Packet impairments</i>	12
1.3.5	<i>Working modes.....</i>	13
1.3.6	<i>IP Flows and Aggregates.....</i>	14
1.3.7	<i>Statistics & Alarms.....</i>	15
1.4	PERFORMANCES	18
1.5	CUSTOMER REFERENCES	21
1.6	CONDITIONS OF USE	21
1.7	DELIVERY.....	21
PART 2	WHAT'S NEW IN NETDISTURB VERSION 4.5	22
2.1	NEW FEATURES IN NETDISTURB V4.5 (FROM NETDISTURB V4.4)	22
2.2	UPGRADING FROM VERSIONS 4.2, 4.3 AND 4.4	23
2.3	UPGRADING FROM VERSIONS 4.1 AND OLDER.....	23
2.4	ACROBAT READER VERSION COMPATIBILITY	23
PART 3	INSTALL NETDISTURB	24
3.1	HOW TO INSTALL THE SOFTWARE DOWNLOADED FROM THE INTERNET	24
3.1.1	<i>NetDisturb Driver Installation.....</i>	25
3.1.2	<i>Start Menu Shortcuts Created</i>	26
3.2	HOW TO INSTALL THE SOFTWARE FROM THE CD-ROM	26
PART 4	SOFTWARE LICENSE CONFIGURATION	27
4.1	HOW TO CONFIGURE A LICENSE	27
4.2	LICENSE TRANSFERS.....	30
4.2.1	<i>Direct Transfer: move the license from one local directory to another.....</i>	30
4.2.2	<i>Transfer by Media (floppy disk or USB key) from a source PC to a target PC</i>	31
PART 5	UNINSTALL NETDISTURB	37
PART 6	RUN NETDISTURB.....	38
6.1	FIRST RUN	38
6.2	DETAILED DESCRIPTION OF THE SERVER AND CLIENT STARTUP	45
6.2.1	<i>The NetDisturb Server Startup Modes.....</i>	45
6.2.2	<i>The NetDisturb Client Startup Options</i>	45
6.2.3	<i>Windows XP SP2, Windows Server 2003 and later versions</i>	47

Part 0 Preface

0.1 Organization of this manual

This user guide is aimed at helping you to discover and use **NetDisturb**. This manual 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 4.5**

This part is a general overview of new features and main corrections provided with **NetDisturb** version 4.5 and important information to upgrade from previous versions.

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

Product requirements and how to install the software downloaded from the Internet or from the CD-ROM.

- **Part 4: Software License Configuration**

Describes how to configure the license and 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:



Warning



Zoom or Advice



Note or Remark

0.2 Minimum System Requirements

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

- Windows 2000, XP or Server 2003
- Pentium processor with 256 MB memory at least
- Two identical Ethernet NICs: Ethernet, Fast Ethernet, or Gigabit Ethernet network interface card.
- 1024 x 768 display, DPI setting = Normal size (96 DPI) and Font size = Normal.
- 15 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 **NetDisturb** is available but without the help file.*



PC multiprocessors and hyper-threading are also supported.

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.
- Demo version or licensed product.
- System configuration.
- Problem details: settings, error messages...
- If the problem is persistent, give the details of how to create the problem.

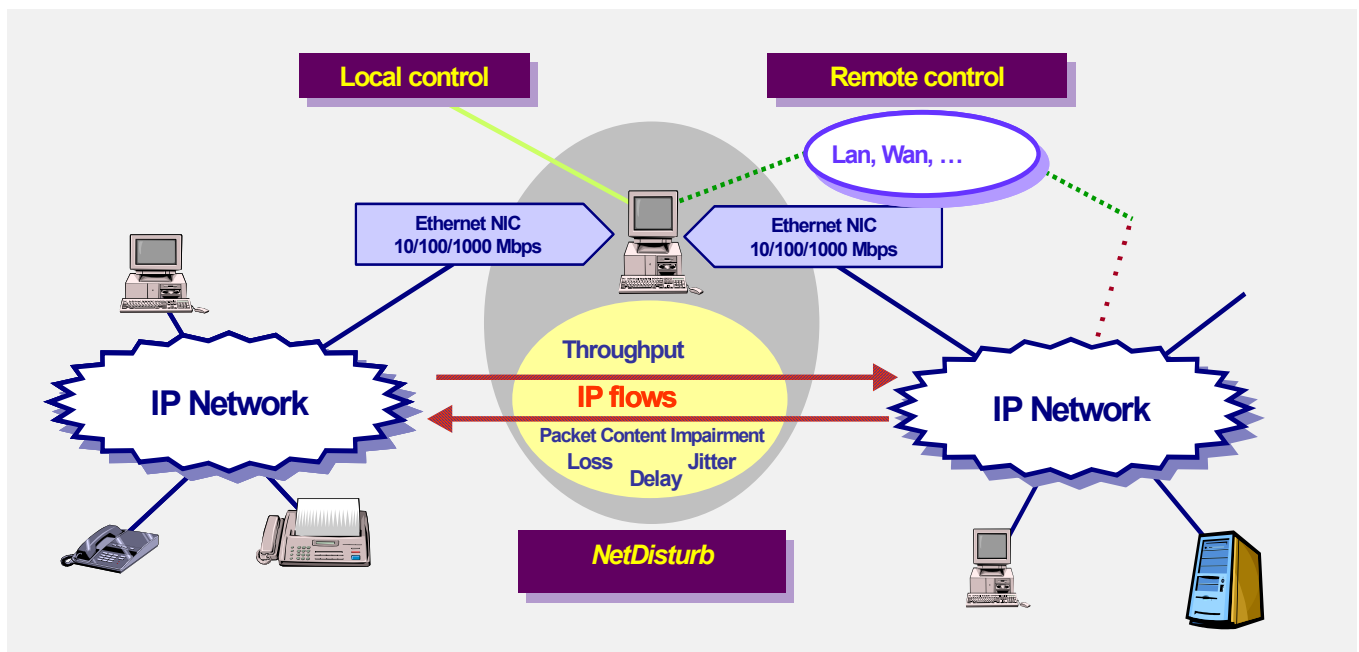
You can contact Technical Support by:

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 96 48 14 85
Telephone	Telephone support is available from 09:00 am to 06:00 pm (GMT Time +1 or +2), Monday to Friday. Call +33 2 96 48 43 43

Part 1 NetDisturb Overview

NetDisturb is an IP network emulator software which can generate impairments like: latency, delay, jitter, bandwidth limitation, lost, duplicate packets and impaired the content over the IP networks (IPv4 and IPv6). **NetDisturb** allows the user to disturb flows on an IP network and so to study the behavior of applications, devices or services in a disturbed network environment.

NetDisturb is inserted between two Ethernet segments (on the same IP network or two different IP networks) and operates bi-directional packet transfer on Ethernet, Fast Ethernet and Gigabit network interface cards.



1.1 Product Requirements

- * Platform: Pentium PC running Windows 2000, XP or Server 2003 with Microsoft TCP/IP installed and at least 256 MB Ram.
- * Hyper-threading and PC multiprocessors are also supported.
- * Two Identical Network Interfaces Cards (NIC): Ethernet, Fast Ethernet, or Gigabit Ethernet network interface card.
- * 1024 x 768 display , DPI setting = Normal size (96 DPI) and Font size = Normal.

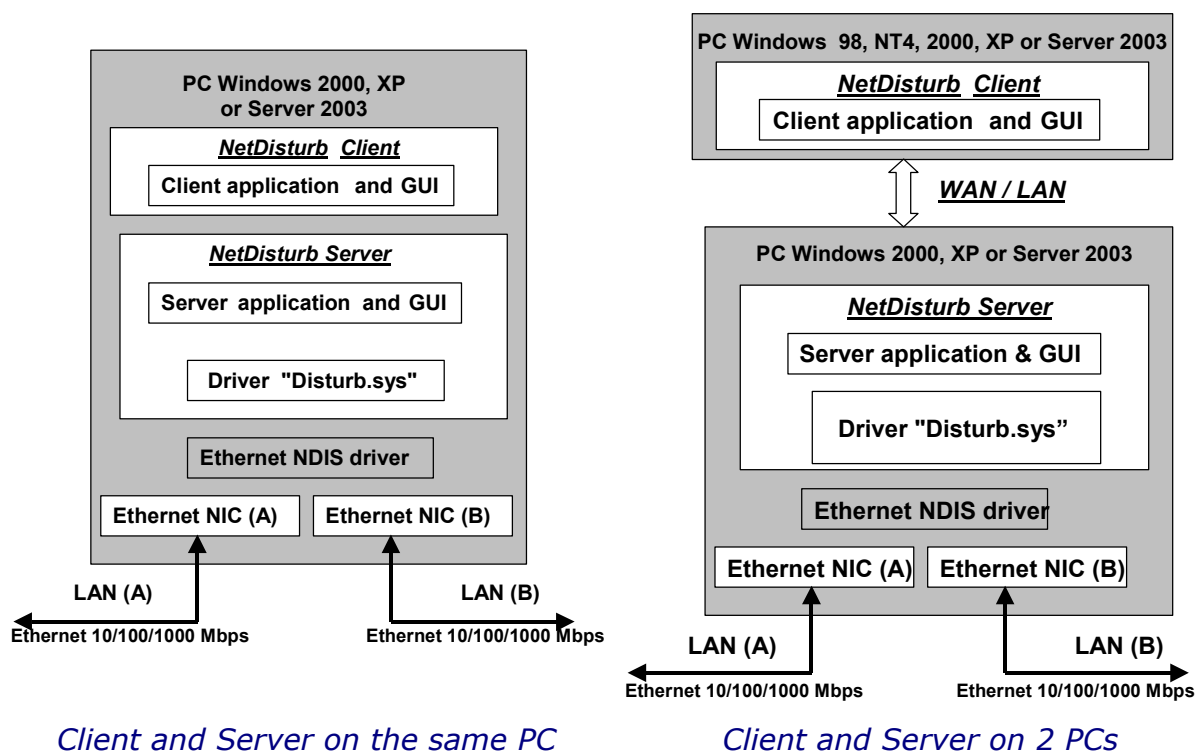


1.2 Configurations

Based on a Client-Server architecture, the **NetDisturb** software is made of two parts: a Server and a Client. The Server handles the impairment characteristics and the Client manages the Server using a simple graphical interface.

This allows two configurations where the Server and the Client parts may be installed on the same PC host (local control), or the Server part is located on one PC and the Client part is located on a second PC (remote control). In this second configuration, the Client dialogs with the Server by using a Wan (for example: PSTN or ISDN) or a LAN link.

Both configurations require two identical Ethernet Cards for the Server.



The "Disturb.sys" driver is located in the kernel of the operating system and is installed above the NIC drivers. This driver is used by **NetDisturb** to handle the exchanges with the NICs.

1.3 Products features

What are the major features of **NetDisturb** V4.5?

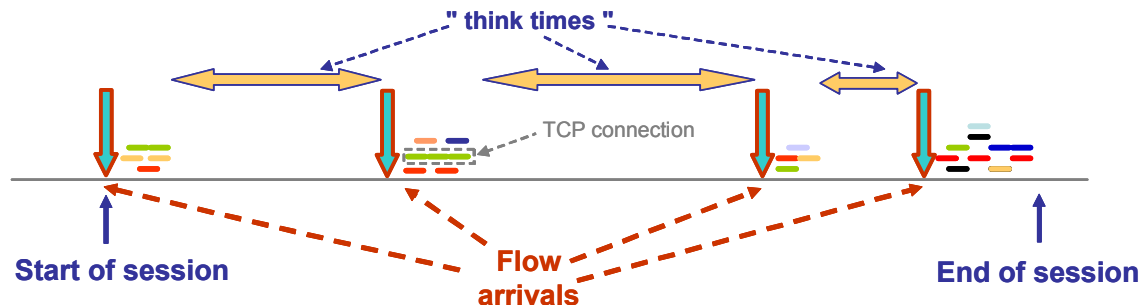
1.3.1 Key features

- Client-Server Architecture
- Impairments: Latency, Loss, Duplication, bandwidth limitation, Delay and Jitter, Content Impairment (mathematical laws and user-defined files)
- 16 configurable IP flows per direction with optional trigger condition
- Aggregates of IP flows can be defined (set of IP flows sharing the same Delay & Jitter Law)
- Unidirectional or bi-directional packet impairments
- Connections per IP flow: impairments are applied to the IP flow or to each connection of the IP flow
- Ethernet / Internet modes (desequencing of the packets)
- Easy to use and intuitive Graphical User Interface
- Statistics display and export detailed statistics into a file

NetDisturb is based on the notion of IP flows.

A flow is a set of packets with a set of common packet properties, and can be unidirectional or bi-directional.

Flows are part of sessions (successions of flows and "think times") related to some homogeneous user activity (e-commerce, mail, MP3 file, web, etc.).



An IP flow is described by using a n-tuple.

In the typical case, the following 5-tuple is used: IP addresses, protocol and port numbers.

An IP flow is composed of connections (such as TCP connections to make FTP transfer by example).

To define the n-tuple for an IP flow, **NetDisturb** uses the notion of mask.

A mask is the combination of the following optional parameters:

Frame Type (ARP Frame or IP Frame:IPv4, IPv6 or IPv4 & IPv6)

Ethernet header

- MAC destination address
- MAC source address

List of VLAN-ID (Ethernet frames 802.1Q)

IP Header

- Destination IP address
- Source IP address
- Protocol (ICMP, TCP, UDP, SIP, ...)
- Differentiated services (TOS)

List of Ports (for TCP or UDP packets)

- Destination port list
- Source port list

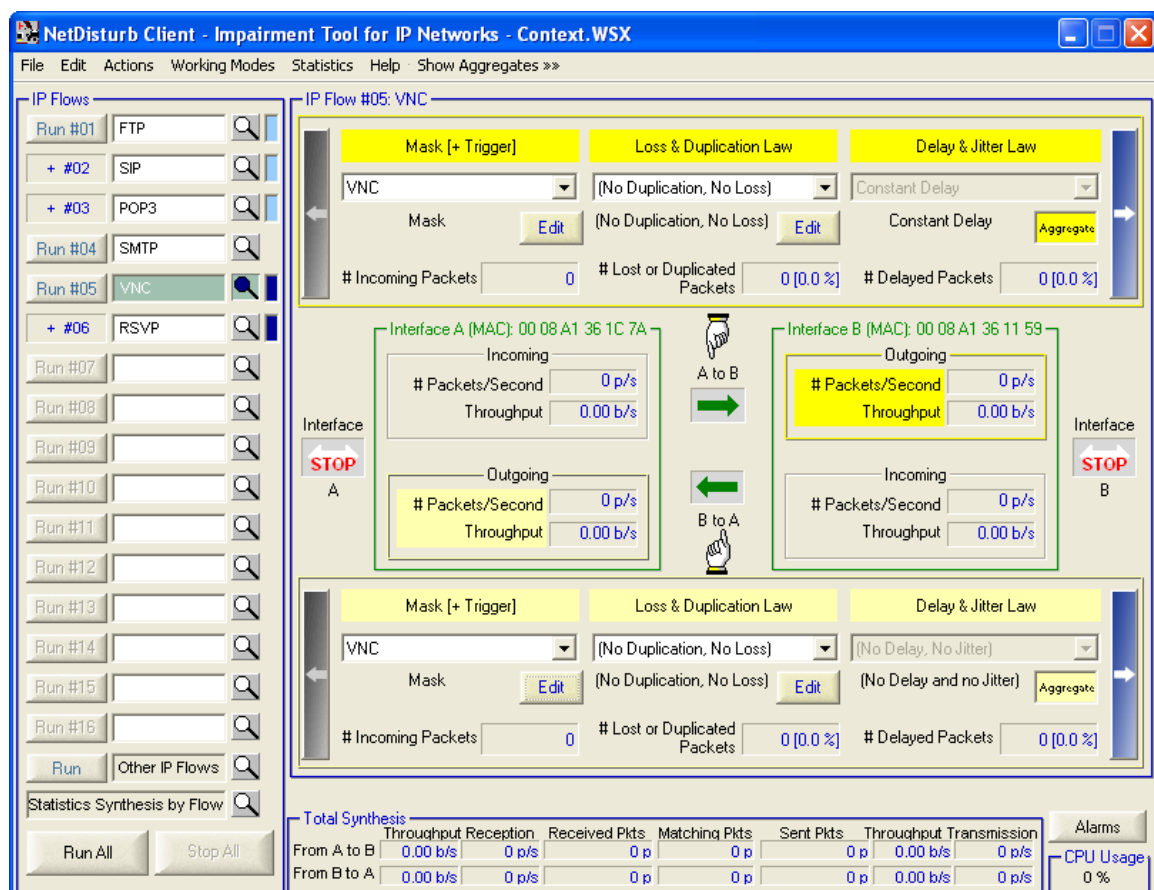


A trigger can be associated optionally with the mask.

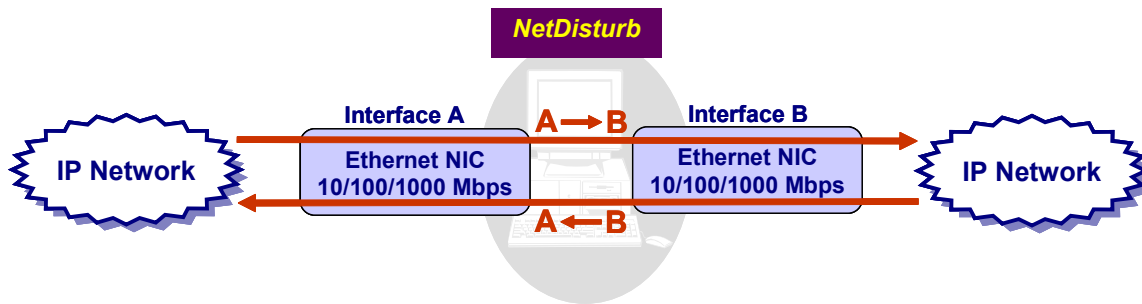
With **NetDisturb** you can define up to 16 masks, i.e. 16 IP flows. An additional item named "Other IP Flows" is in charge to handle all IP flows that have not been user defined. For this item no mask can be defined, but impairments can be applied.

NetDisturb manages up to 10,000 connections – all flows included.

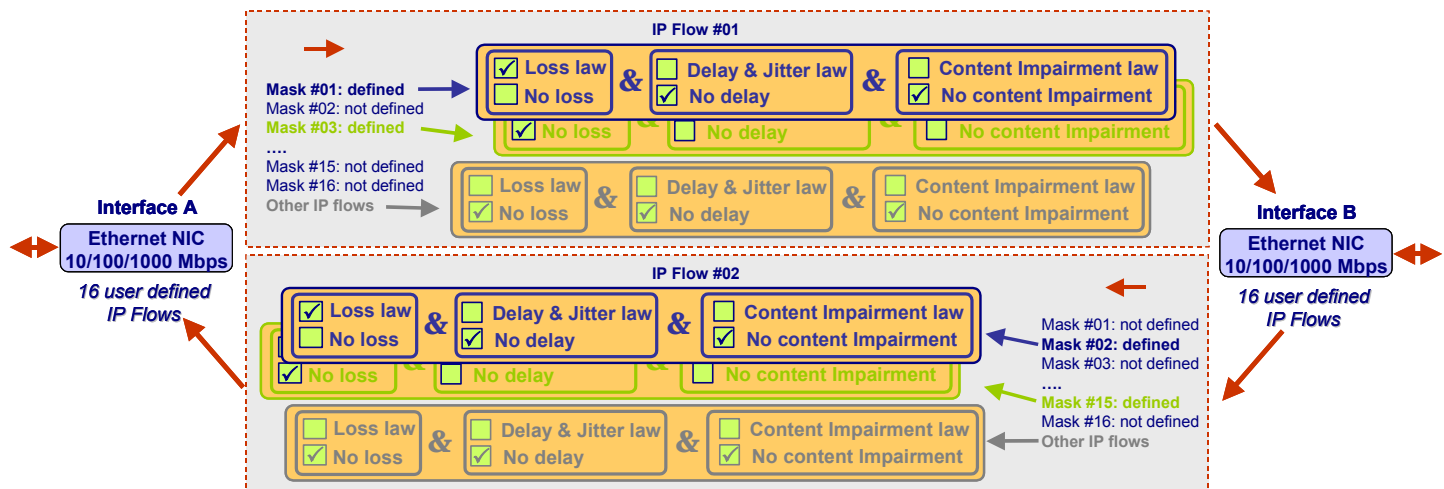
The client window below illustrates the management of IP flows by **NetDisturb**.



The graphical user interface represents the NIC cards as "Interface A" and "Interface B" as illustrated below.



For each direction $A \rightarrow B$ or $B \rightarrow A$, 16 flows can be defined by the user. And for each IP flow, loss & duplication and / or delay and / or content impairment laws can be applied as shown in the figure below.



In the above example, **NetDisturb** has been configured with the following parameters:

Direction $A \rightarrow B$

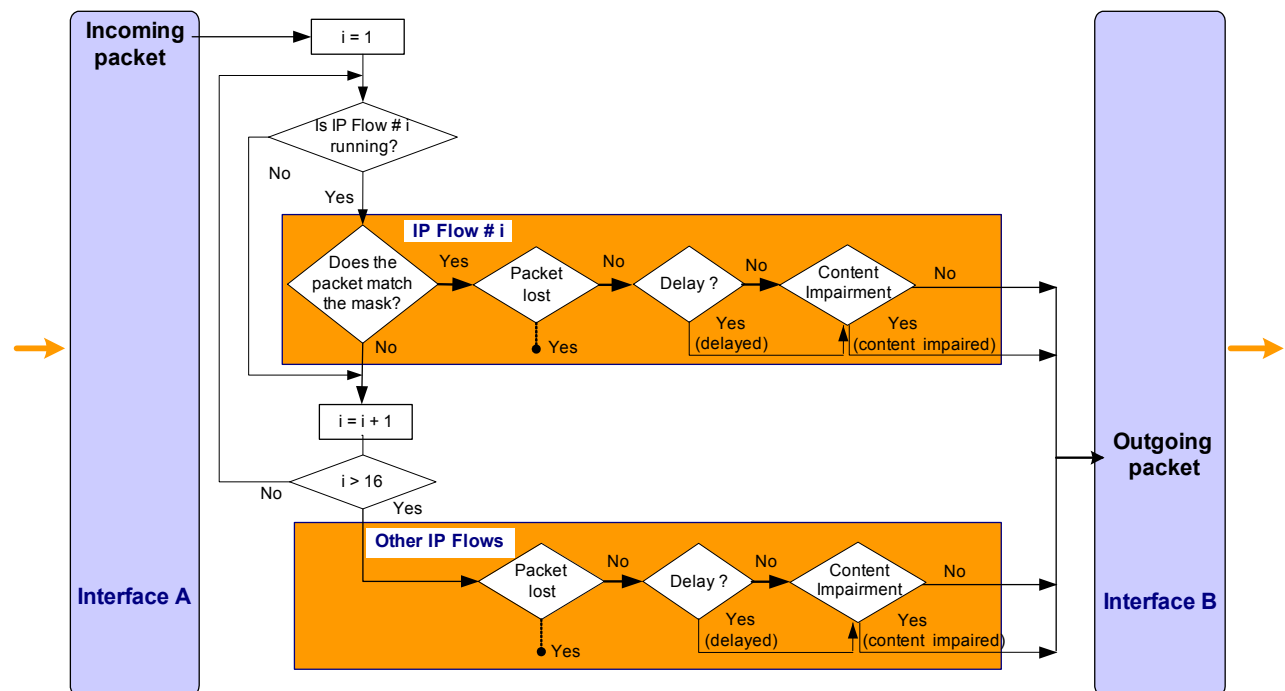
- the Mask #01 defines the "IP Flow #01", and a loss law is applied to the packets of this flow,
- the Mask #03 defines the "IP Flow #03", a delay law and a content impairment law are applied to the packets of this flow,
- As no loss, no delay and no content impairment law is applied to the 'Other IP flows', all non-matching packets with the masks #01 and #03 are relayed directly from A to B.

Direction $B \rightarrow A$

- the Mask #02 defines the "IP Flow #02", and a loss law is applied to the packets of this flow,
- the Mask #15 defines the "IP Flow #15", a delay law and a content impairment law are applied to the packets of this flow,
- As no loss and delay law is applied to the 'Other IP flows', all non-matching packets with the masks #02 and #15 are relayed directly from B to A.

1.3.2 How does it work?

We illustrate how **NetDisturb** handles incoming packets with the following figure from the A interface to the B interface.



Depending on the active user-defined IP flows, **NetDisturb** identifies if the incoming packet belongs to an IP flow before applying loss, delay or content impairment treatments.

If this packet matches with the mask of an IP Flow (IP Flow #i for example), then **NetDisturb** identifies if this packet must be lost/duplicated and/or delayed and/or if its content must be impaired.

If this packet does not match any mask (a mask defines an IP flow), then **NetDisturb** applies the treatments for the 'Other IP Flows' and identifies if this packet must be lost/duplicated and/or delayed and/or if its content must be impaired. For each packet received on an interface, **NetDisturb** analyzes in order the masks from 1 to 16 before considering this packet to belong to the "Other IP Flows".

So **NetDisturb** can apply impairments on the IP flows defined by the user either unidirectional ($A \rightarrow B$ or $B \rightarrow A$) or bi-directional (the same impairments are being applied for both directions: $A \rightarrow B$ and $B \rightarrow A$).

1.3.3 Introduction of a Trigger for the Mask

One of the features of **NetDisturb** is the use of a trigger to link the launch of the impairments with an event.

The Trigger is an intermediate step after the frame has been classified into an IP Flow and before the frame is impaired.

The Trigger includes various parameters:

- The **activation condition** based on the Ethernet frame content.
- The **delay before applying the impairments**
- The **impairment duration** (0 = no limit).

- The **number of cycles** for the trigger (0=unlimited) if the impairment duration is not null.

Thus two main categories of triggers are defined:

- the Trigger time-limited to be applied on the impairments
- the Trigger time-unlimited to be applied on the impairments (a loop counter can be used)

As soon as the activation condition is performed, the impairment on the IP flow can be immediate or delayed with a duration expressed in milliseconds (delay of impairment).

If the impairment is immediate, the frame that has triggered can be included or not (if the delay before impairment is null).

The impairment can be time limited according to a duration expressed in milliseconds.

When **NetDisturb** is running an IP flow with a defined trigger, four states are possible:

- ⇒ **Waiting for the Trigger**: the impairments do not apply. This state is the initial state of the Trigger.
- ⇒ **The Trigger was found**: the impairments still do not apply because a delay is defined before the impairments. This state changes to the next state when the activation condition is reached.
- ⇒ **The Trigger is active**: the impairments are applied.
- ⇒ **The Trigger is finished**: the impairments do not apply any more. This is the final state of the Trigger.



A Trigger can remain active permanently if no duration limit was defined.

1.3.4 Packet impairments

Pre-defined Loss and Duplication laws:

- Loss: Constant Law
Parameter: number of packets
- Loss: Uniform Law
Parameters: alpha, beta, threshold
- Loss: Burst Uniform Law
Parameters: alpha, beta, threshold(n), threshold(n + x), depth
- Loss: File (Loss Values)
Parameters: file name, threshold
- Loss: Percentage
Parameter: percentage
- Loss: 1 Packet out of N
Parameter: range(N)
- Loss: Percentage & Duration (time-limited losses percentage)
Parameter: percentage, duration
- Loss: File (Percentage & Duration)
Parameter: file name
- Duplication: Percentage (send n times the received packet)
Parameters: percentage, $\text{Min} \leq n \leq \text{Max}$
- Duplication: 1 Packet out of M (duplicate 1 packet n times every M received packets). Parameters: range(M), $\text{Min} \leq n \leq \text{Max}$
- Duplication: Uniform Law
Parameters: alpha, beta, threshold
- Loss (1 out of N) then Duplication (1 out of M): the loss law (1 Packet out of N) is used first before the duplication law (1 Packet out of M)

Pre-defined Delay & Jitter laws:

- Constant Delay
Parameter = constant delay
- Constant Delay & Exponential Jitter
Parameters: constant delay, λ
- Constant Delay & Uniform Jitter
Parameters: constant delay, alpha, beta
- Constant Delay & File (Jitter)
Parameters: constant delay, user file
- File (Packet Sending Minimum Cadences)
Parameter: user file
- Router Simulation & Constant Delay
Parameters: IP throughput, max memory, constant delay

- Router Simulation & File (Packet Sending Minimum Cadences)
Parameters: IP throughput, max memory, user file
- Constant Delay & File (Throughput & Duration)
Parameters: constant delay, user file

Pre-defined Content impairment laws:

- 1 Packet out of N
Parameter: range(N)
- Percentage
Parameter: percentage
- Normal Law (Laplace-Gauss)
Parameters: average, standard deviation, threshold
- Uniform Law
Parameters: alpha, beta, threshold

1.3.5 Working modes

NetDisturb offers two working modes by applying impairments:

- Enable/Disable desequencing of the packets in a flow,
- Impairment laws apply to the IP flow or to each TCP/UDP connection of the IP flow.

These modes are used together.

For example, **NetDisturb** is set with the following modes:

- Enable desequencing of the packets in a flow
- Impairment laws apply to the IP flow

to simulate the Internet network with disturbed flows.

Another example is to use the following modes:

- Disable desequencing of the packets in a IP flow
- Impairment laws apply to each TCP/UDP connection of the IP flow

to disturb VoIP communications in the same way on an Ethernet network.

Enable/Disable Desequencing Packets

Impairment may introduce changes in the packet sequence – for example by introducing different delays for the packets of a flow.

One of the Ethernet characteristics is to keep packets received in order. Internet hasn't got this constraint regarding the packet order: some packets can use one route while others use another one, with the consequence the receiver may get packets unordered.

NetDisturb can simulate the Internet network (enable desequencing packets) or can react as Ethernet does (disable desequencing packets).

Impairment laws apply to the IP flow or to each TCP/UDP connection of the IP flow

NetDisturb can analyze IP packets to dispatch them into the TCP or UDP connection they belong to. This mode makes possible to apply the same impairment values to each packet of each connection. For instance if the impairment has been defined with a loss law: lose the third packet for 10 packets received.

- *Impairment laws to be applied to the IP flow*

When this option is selected, every received packet matching the mask for this flow is considered to belong to the same flow. Processing is carried out in "continue". With the previous example of loss law (lose the 3rd packet on 10 received), **NetDisturb** will lose the 3rd packet for ten received packets whatever the TCP/UDP connection belongs to.

- *Impairment laws to be applied to each TCP/UDP connection of the IP flow*

When this option is selected, **NetDisturb** analyses each received packet in order to associate this packet to a TCP or UDP connection already existing by using these parameters: protocol, IP addresses and port numbers. If the connection doesn't exist, a new one is created. With the previous example of loss law (lose the 3rd packet on 10 received), **NetDisturb** will lose the 3rd packet for ten received packets of each TCP or UDP connection. Up to 10,000 connections can be handled simultaneously by **NetDisturb**.

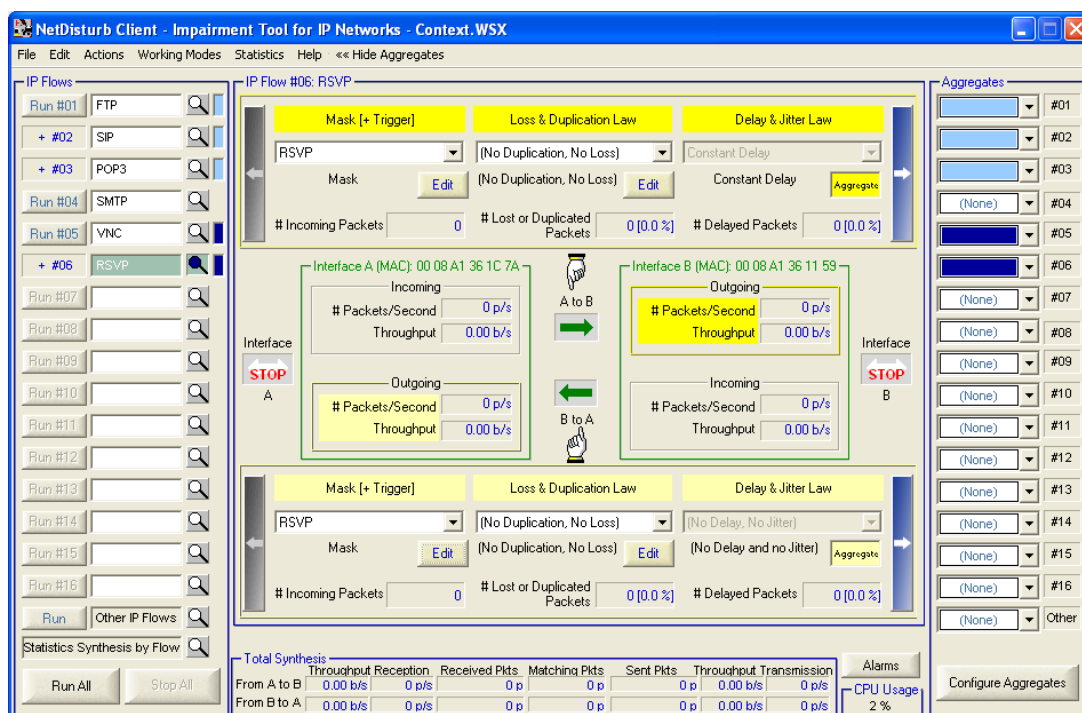
1.3.6 IP Flows and Aggregates

Up to 8 aggregates of IP flows can be defined. An aggregate is a consecutive set of IP flows sharing the same Delay & Jitter Laws. All IP flows of an aggregate share only one aggregate's Delay & Jitter law (with one law per direction).

The IP flow order in the aggregate defines the priority of packets to delay. While the top IP flow packets get the highest priority, the other IP flow packets are queuing until there are no higher priority packets.

In the example illustrated below, two aggregates have been defined:

- the dark blue colored aggregate collects three IP flows (#01, #02 et #03)
- and the light blue aggregate collects the IP flows #05 and #06.



1.3.7 Statistics & Alarms

Different statistics are calculated and displayed by **NetDisturb**:

- for each IP Flow (and for both directions)
- Statistics synthesis by Flow
- Total synthesis & Alarms

These statistics can be saved into a file for a later use.

Statistics for each IP Flow

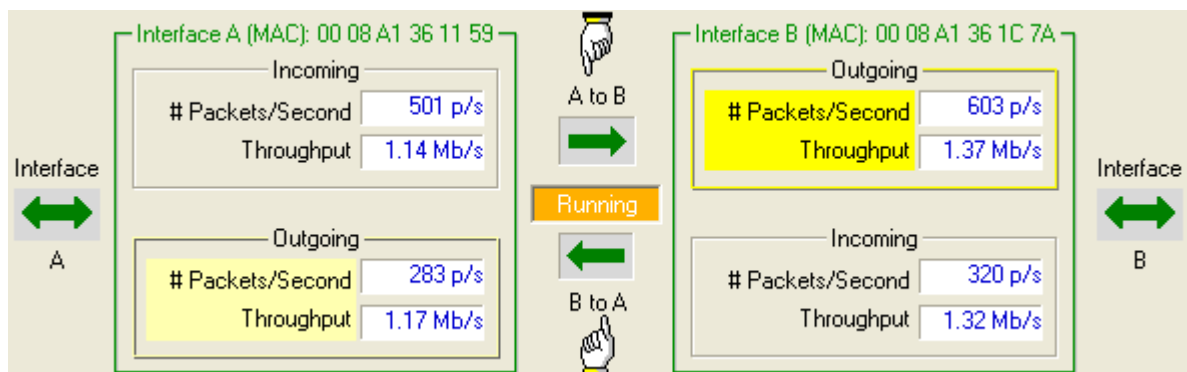
For each direction ($A \rightarrow B$ or $B \rightarrow A$) **NetDisturb** displays:

- The number of packets matching the mask
- The number and the percentage of lost or duplicated packets
- The number and the percentage of delayed packets
- The number and the percentage of the packets where the content has been impaired

Mask (+ Trigger)	Loss & Duplication Law	Delay & Jitter Law
TCP - Port 2009	Percentage Loss	Constant Delay
Mask <input type="button" value="Edit"/>	Percentage Loss <input type="button" value="Edit"/>	Constant Delay <input type="button" value="Edit"/>
# Incoming Packets: 249	# Lost or Duplicated Packets: 35 [14 %]	# Delayed Packets: 214 [86 %]

Loss & Duplication Law	Delay & Jitter Law	Content Impairment Law
Percentage Loss	Constant Delay	Percentage
Percentage Loss <input type="button" value="Edit"/>	Constant Delay <input type="button" value="Edit"/>	Percentage <input type="button" value="Edit"/>
# Lost or Duplicated Packets: 37 [14 %]	# Delayed Packets: 220 [86 %]	# Modified Packets: 220 [86 %]

and a complete view of traffic statistics (number of packets and throughput) over the **A** and **B** interfaces as shown below:



Statistics Synthesis by Flow

The synthesis for all IP Flows displays for each flow and for each direction:

- The incoming throughput and number of received packets per second
- The number of packets matching the mask
- The number of lost packets
- The number of delayed packets
- The number of modified packets
- The outgoing throughput and the number of sent packets per second

NetDisturb Client - Impairment Tool for IP Networks - context UDP 2009-2024.WSX

File Edit Actions Working Modes Statistics Help Show Aggregates >>

IP Flows

- Stop #01 UDP/Port 2009
- Run #02 UDP/Port 2010
- Stop #03 UDP/Port 2011
- Run #04 UDP/Port 2012
- Stop #05 UDP/Port 2013
- Run #06 UDP/Port 2014
- Stop #07 UDP/Port 2015
- Run #08 UDP/Port 2016
- Stop #09 UDP/Port 2017
- Run #10 UDP/Port 2018
- Stop #11 UDP/Port 2019
- Run #12 UDP/Port 2020
- Stop #13 UDP/Port 2021
- Run #14 UDP/Port 2022
- Stop #15 UDP/Port 2023
- Run #16 UDP/Port 2024
- Stop Other IP Flows
- Statistics Synthesis by Flow
- Run All
- Stop All

	%	INCOMING THR...	INCOMI...	LOST PACKETS	DELAYED PAC...	MODIFIED PA...	OUT...	OUTGOING THROU...
#01 A to B	6	587 Kb/s	50 p/s	4352	2613 [60 %]	1739 [40 %]	173	214 Kb/s 18 p/s
#01 B to A	2	193 Kb/s	17 p/s	1565	0 [0.0 %]	1565 [100 %]	0	193 Kb/s 17 p/s
#02 A to B	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#02 B to A	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#03 A to B	6	589 Kb/s	51 p/s	4354	524 [12 %]	0 [0.0 %]	3830	519 Kb/s 45 p/s
#03 B to A	6	519 Kb/s	45 p/s	3830	2297 [60 %]	0 [0.0 %]	1533	210 Kb/s 18 p/s
#04 A to B	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#04 B to A	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#05 A to B	6	587 Kb/s	50 p/s	4351	524 [12 %]	3827 [88 %]	0	3826 506 Kb/s 43 p/s
#05 B to A	6	506 Kb/s	43 p/s	3826	190 [5.0 %]	0 [0.0 %]	363	485 Kb/s 41 p/s
#06 A to B	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#06 B to A	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#07 A to B	6	583 Kb/s	50 p/s	4353	0 [0.0 %]	4353 [100 %]	0	4352 583 Kb/s 50 p/s
#07 B to A	7	587 Kb/s	50 p/s	4352	522 [12 %]	0 [0.0 %]	383	511 Kb/s 44 p/s
#08 A to B	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#08 B to A	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#09 A to B	6	587 Kb/s	50 p/s	4352	2556 [59 %]	0 [0.0 %]	1796	219 Kb/s 19 p/s
#09 B to A	3	219 Kb/s	19 p/s	1796	0 [0.0 %]	0 [0.0 %]	5	219 Kb/s 19 p/s
#10 A to B	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#10 B to A	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#11 A to B	6	587 Kb/s	50 p/s	4351	219 [5.0 %]	0 [0.0 %]	4132	558 Kb/s 48 p/s
#11 B to A	7	558 Kb/s	48 p/s	4132	206 [5.0 %]	0 [0.0 %]	3926	531 Kb/s 46 p/s
#12 A to B	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#12 B to A	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#13 A to B	6	587 Kb/s	50 p/s	4353	0 [0.0 %]	0 [0.0 %]	4353	587 Kb/s 50 p/s
#13 B to A	7	587 Kb/s	50 p/s	4353	0 [0.0 %]	0 [0.0 %]	4353	587 Kb/s 50 p/s
#14 A to B	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#14 B to A	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#15 A to B	6	593 Kb/s	51 p/s	4352	0 [0.0 %]	4352 [100 %]	218	593 Kb/s 51 p/s
#15 B to A	7	568 Kb/s	49 p/s	4133	0 [0.0 %]	4133 [100 %]	413	565 Kb/s 48 p/s
#16 A to B	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
#16 B to A	0	0.00 b/s	0 p/s	0	0 [0.0 %]	0 [0.0 %]	0	0.00 b/s 0 p/s
..... A to B	50.458	Mb/s	400 p/s	34845	0 [0.0 %]	0 [0.0 %]	34845	4.58 Mb/s 400 p/s
..... B to A	55.458	Mb/s	400 p/s	34849	0 [0.0 %]	0 [0.0 %]	34849	4.58 Mb/s 400 p/s

Total Synthesis

	Throughput Reception	Received Pkts	Matching Pkts	Sent Pkts	Throughput Transmission
From A to B	9.17 Mb/s	800 p/s	69664 p	63224 p	8.27 Mb/s
From B to A	8.23 Mb/s	719 p/s	62837 p	59620 p	7.81 Mb/s

Alarms

CPU Usage 61 %

Statistics Synthesis by Flow - example

Total synthesis

At the bottom of the Client window, the total synthesis displays the following parameters for both directions (A → B or B → A):

- Throughput and number of packets per second received
- Number of packets received
- Number of matching packets
- Number of packets sent
- Throughput and number of packets per second transmitted

Total Synthesis						Alarms
	Throughput Reception	Received Pkts	Matching Pkts	Sent Pkts	Throughput Transmission	
From A to B	1.16 Mb/s	491 p/s	28675 p	28675 p	1.12 Mb/s	487 p/s
From B to A	4.16 Mb/s	745 p/s	81630 p	81504 p	4.16 Mb/s	745 p/s

CPU Usage 18 %

Alarms

The alarms encountered by the **NetDisturb** driver can be displayed by the user and are classified per direction for both interfaces:

<i>Incoming direction</i>	<i>Outgoing direction</i>
<ul style="list-style-type: none"> • Number of lost packets • Number of lost bytes • Number of errors returned by the Driver at the Interface • Number of missing buffers to keep packets • Number of ignored flows (when the multi-flows option is active). 	<ul style="list-style-type: none"> • Number of lost packets • Number of lost bytes • Number of errors returned by the Driver at the interface

NetDisturb Client - Alarms Summary

Alarms Linked to the Direction from Interface A to Interface B

Incoming from A

Lost Packets: 0

Lost Bytes: 0

Driver Errors: 0

Missing Buffer Errors: 0

Lost TCP/UDP Connections: 0

A to B

Outgoing to B

Lost Packets: 0

Lost Bytes: 0

Driver Errors: 0

Details

Alarms Linked to the Direction from Interface B to Interface A

Outgoing to A

Lost Packets: 0

Lost Bytes: 0

Driver Errors: 0

B to A

Incoming from B

Lost Packets: 0

Lost Bytes: 0

Driver Errors: 0

Missing Buffer Errors: 0

Lost TCP/UDP Connections: 0

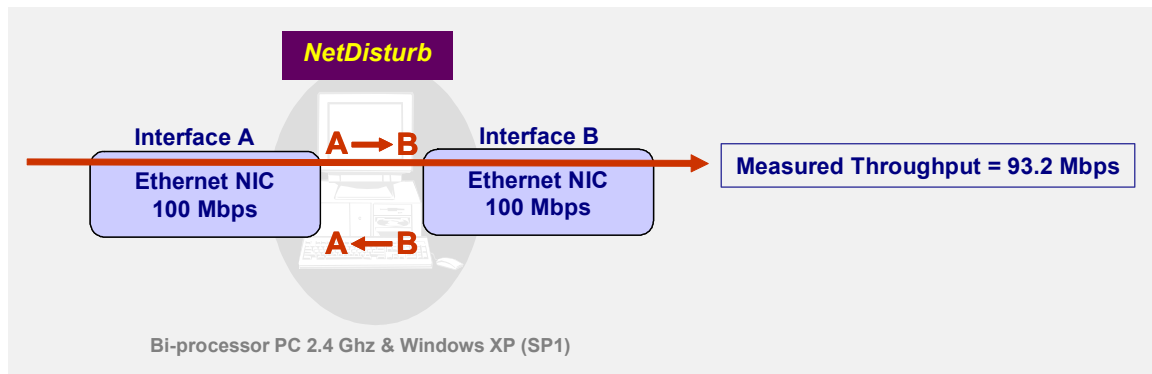
Details

OK Clear Alarms Update Alarms Summary

1.4 Performances

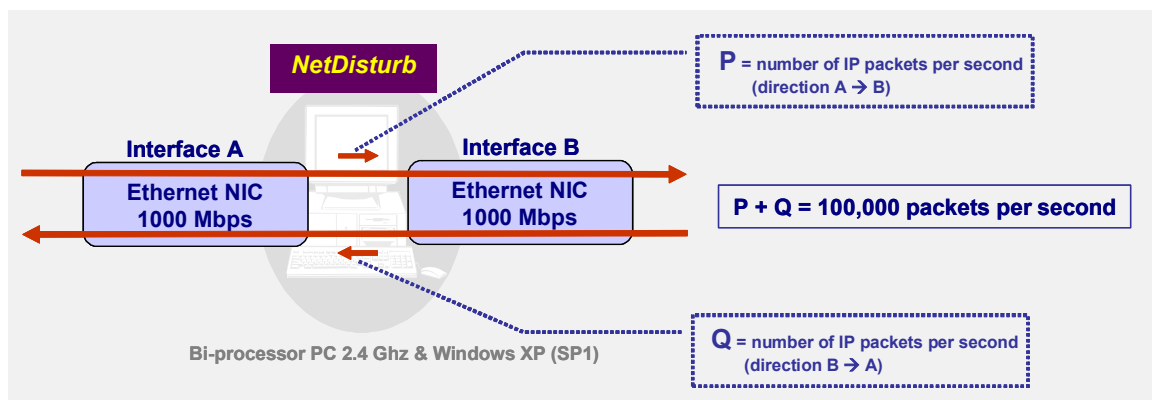
To illustrate the key performances of **NetDisturb**, 2 examples are presented hereafter (by using a bi-processor PC 2.4 Ghz with windows XP SP1).

Example 1: use of 2 Fast Ethernet NICs



NetDisturb is configured with 16 IP flows (no loss and no delay for each flow). With Fast Ethernet NICs, the throughput measured is 93.2 Mbps in one direction.

Example 2: use of 2 Gigabit Ethernet NICs



By using 2 Gigabit NICs, **NetDisturb** can handle up to 100,000 packets per second with 16 IP flows defined (for both directions).

These two examples show some performances of **NetDisturb**. This will avoid heavy investments in expensive hardware solutions.

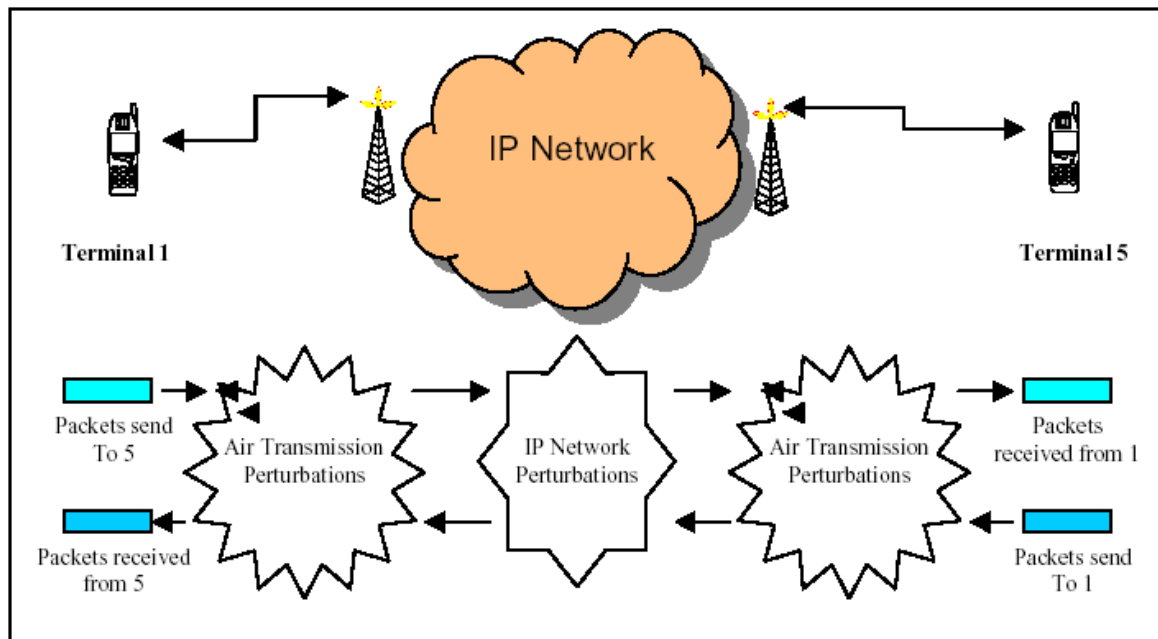
Applications

- *Performance & Acceptance Tests:* Qualify and evaluate the behavior of IP equipments (phone, fax, gateway, etc.) and applications (audio and video streaming, etc.) on IP networks.
- *Configuration and control of IP Equipments for product verification and test:* Define different QoS levels in an Intranet or 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 testing applications such as Voice over IP, streaming audio and video, and other distributed applications.
- *Emulation of symmetric or asymmetric network conditions (LAN, MAN, WAN):* latency, jitter, packet loss, bandwidth limitations, etc. to test IP applications (VoIP, streaming audio & video, etc.), services and products sensitive to various real conditions.

*Some publications mentioning the use of **NetDisturb***

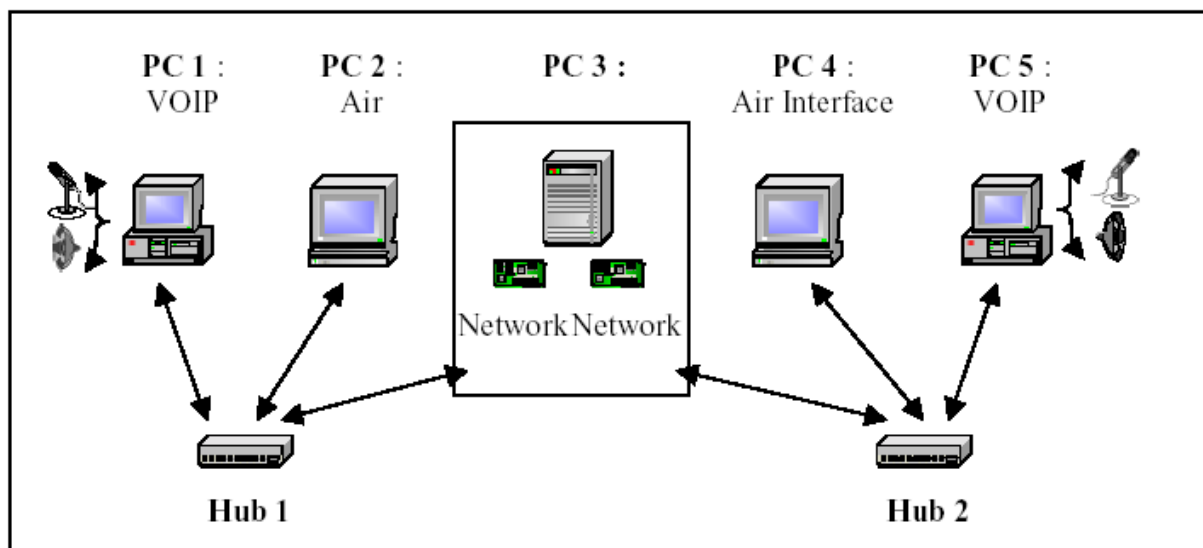
- The Communications and Information network Association of Japan (CIAJ) which represents manufacturers supplying network devices and terminals has published a report on 2002: Report on speech quality investigation of VoIP Terminals (gateways and IP phones): http://www.ciaj.or.jp/tusin/pressrelease/voip_1e.html "We adopted **NetDisturb**, ... as a network simulator because of its ease of installation and operation in Windows".
- 3GPP Technical Specification Group Services and System Aspects TSG-S4
 - Test Plan for the Adaptive Multi-Rate Wide-Band (AMR-WB) and Narrow-Band (AMR-NB) in packet switched networks.
 - Test Plan for 3G packet switched conversation tests (comparison of quality offered by different speech coders over packet switched networks)
NetDisturb is used as the simulated network.

The following illustrations describe the system that is simulated for these tests.



Packet switch audio communication simulator

This is simulated by using 5 PCs as shown below, with PC# 3 using **NetDisturb** as network simulator.



Simulation platform

1.5 Customer references

Present on the market since 1998, **NetDisturb** is used in more than 40 countries.

See some worldwide references of satisfied customers:

Alcatel, ANZ Bank, AT&T, Bell Canada, Cisco, Commtech Wireless, Department of Defense, Equant, France Telecom, Gensight, Global Crossing, Iwatsu, Juniper, Motorola, Nortel Networks, NEC, NTT, Panasonic, Philips, PIKA Technologies, Polycom, Psytechnics, Raytheon, Schlumberger, Scopus, Tekelec, TF1, Toshiba, UTStarcom, WL Gore, Xerox, etc. as well as many universities and telecom institutes.

1.6 Conditions of use

NetDisturb is licensed on a per workstation basis. You will need to purchase a separate license for each machine that you install it on.

Each licensed copy of the software installed on a workstation has a unique Site Code that requires the corresponding unique Site Key to be entered before being operational.

1.7 Delivery

Includes CD with documentation, printed installation guide, technical support and software maintenance (including major and minor software upgrades) for a period of twelve months from the date of purchase.

To download the trial version of **NetDisturb** please visit us at:
<http://www.zti-telecom.com/pages/main-ip.htm>

Part 2 What's new in NetDisturb version 4.5

This part is a general overview of new features and improvements provided with **NetDisturb** version 4.5 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\NetDisturb).

2.1 New features in NetDisturb v4.5 (from NetDisturb v4.4)

- ⇒ New impairment type modifying the content of the packets. Two steps have been created for this new impairment:
 - First step: choose one of the four pre-defined laws (1 Packet out of N, Percentage, Normal Law or Uniform law).
 - Second step: define the parameters to be applied for the content impairment as the specification of the impairment type (invert x bits for each of the bytes, invert bits per pair, One bit randomly selected and modified for each of the bytes or invert bytes per pair or use a pattern to replace the content of the bytes that should be impaired).
- ⇒ Two new loss laws:
 - Percentage and Duration: it allows to define a percentage of loss on a limited duration (up to 50 couples of values)
 - Percentage and Duration (user-defined file): same as above, but here, the values are defined in a text file (up to 200 couples of values)
- ⇒ User interface reviews with for example the new "Statistics Synthesis by Flow" window which now offers the selection of the statistical columns, and the possibility to reorder these columns.
- ⇒ Easy-to-use GUI to manage the parameters of the impairments laws.
- ⇒ Units in accordance with IEEE Std 260.1-2004. The user can select amongst two units: Kibi = 1,024 or Kilo = 1,000 (IEEE 260.1).
- ⇒ Support Windows Server 2003



The contexts created with version 4.2, version 4.3 RC3 and version 4.4 are reused automatically. When saved, they get the new NetDisturb v4.5 file format.

2.2 Upgrading from versions 4.2, 4.3 and 4.4

You don't need to uninstall the previous version of **NetDisturb** to keep your license scheme.

By upgrading from a version 4.2, 4.3 or 4.4, you keep your existing user-defined files and the new contexts you created.

NetDisturb version 4.5 requires Acrobat Reader. Please see paragraph 2.4 for more details.

2.3 Upgrading from versions 4.1 and older

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 4.5**, because the license date of version 4.1 and previous is too old.

⇒ For any question or further information regarding the license upgrade, please contact ZTI:

Email: contact@zti-telecom.com or contact@zti.fr
Phone: +33 2 96 48 43 43
Fax: +33 2 96 48 14 85

2.4 Acrobat Reader version compatibility

To access the **NetDisturb's** help, Acrobat Reader is required. **NetDisturb** supports Acrobat Reader version 4.01 to 7, that have been tested successfully.

If your Acrobat Reader's version is too old, you can use the Acrobat Reader's version from the **NetDisturb's** CR-ROM or download it straight from the Adobe web site: www.adobe.com.

Part 3 Install NetDisturb

NetDisturb is supported on the following platforms: Windows Server 2003, Windows XP Home or Professional, Windows 2000 Professional or Server.

The minimum screen resolution is 1024 x 768, the DPI setting should be "Normal size (96 DPI)" and the Font size should be "Normal".

If you have the **NetDisturb** CD-ROM version, please refer directly to paragraph 3.2.



*** To run NetDisturb your computer's screen resolution must be at least 1024 X 768, 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 for Windows 2000 XP, Server 2003, you must log on with your administrators rights.**

The default settings of **NetDisturb** come with a 15-day limited license. When it reaches the deadline, **NetDisturb** stops running. Go to Part 4 for more information about the license program.

3.1 How to install the software downloaded from the Internet

The installation procedure is a standard installation program.



*Please note that the **NetDisturb** installation procedure will be different in the last part, depending on the target Operating System: Windows 2000, Windows XP or Windows Server 2003*

- Before starting the **NetDisturb** Setup, please ensure your system does meet the following minimum requirements:
 - ⇒ OS supported: Windows 2000, XP or Server 2003.
 - ⇒ Minimum screen resolution: 1024 x 768
 - ⇒ Your PC needs at least 2 NIC already installed, configured and fully operational.
- If you have downloaded the file **NetDisturb.zip** from our website, you must first unzip this file in a temporary directory. It contains the [Setup_NetDisturb.exe](#) file and the related documentation.



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

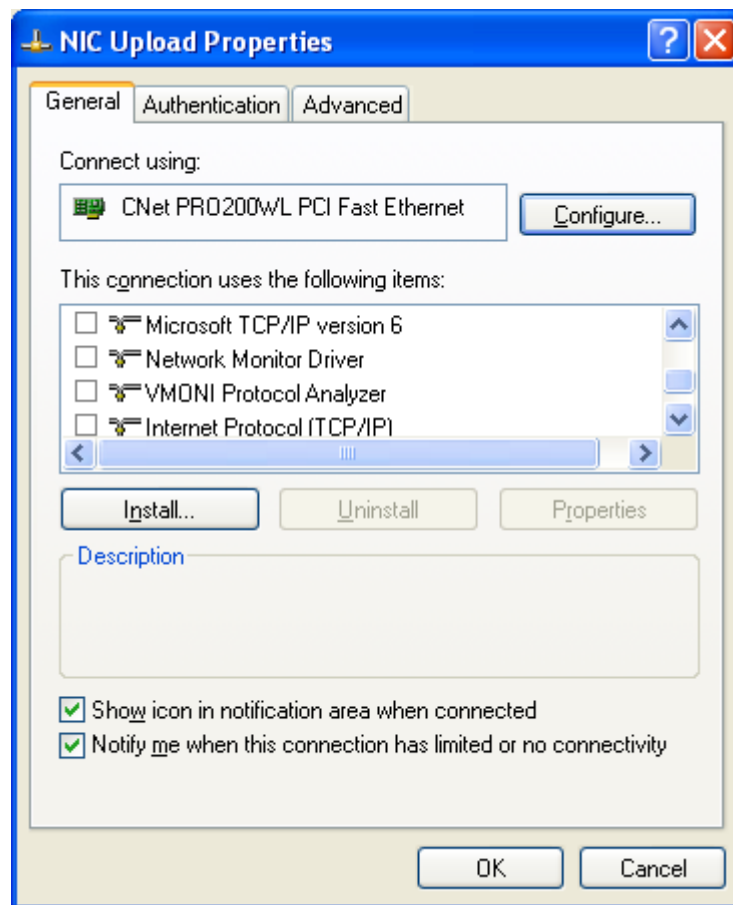
- Then run "[Setup_NetDisturb.exe](#)" from the temporary directory to launch the setup procedure. Follow the instructions on the screen.

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

C:\Program Files\NetDisturb with the following subdirectories:

- C:\Program Files\NetDisturb
- C:\Program Files\ NetDisturb \Client
- C:\Program Files\ NetDisturb \Driver
- C:\Program Files\ NetDisturb \Server
- C:\Program Files\ NetDisturb \Server\Script

Otherwise, the only necessary operation is to uncheck protocols from NICs used with **NetDisturb**.



Example of NIC with all unticked protocols boxes

3.1.1 NetDisturb Driver Installation

The setup procedure realizes the installation of the **NetDisturb** driver transparently. It will be installed positioned on top of each Ethernet or wireless NIC if the driver of the NIC is NDIS compatible. The **NetDisturb** driver sets in the kernel of Windows 2000, XP or Server 2003 and handles the exchanges between two NICs.

The **NetDisturb** driver linked to the selected NICs is available and transparent. It doesn't appear in the protocol list.

Now there is an important manual operation to do before using NetDisturb:

1. In order to avoid unexpected traffic generated by the protocol stack on the NICs, you should unselect all protocols first (TCP/IP, Client or Microsoft Networks, etc.).
2. To unselect protocols from a NIC used by **NetDisturb**, use the "Control Panel/Network and Dial-up Connections" or the "Control Panel/Network Connections" program and uncheck all protocols.

3.1.2 Start Menu Shortcuts Created

Start > All Programs > **NetDisturb**

⇒ **1) NetDisturb Server**

⇒ **2) NetDisturb Client**

⇒ **License help**

⇒ **Uninstall NetDisturb**

⇒ **Read Me First**

⇒ **User Guide**

When launching a **NetDisturb** trial version for the first time, a message is displayed showing the remaining days of use (for example, 15 days left out of 15 in the following example):



To enter your unlimited license,

please refer to Part 4 (Software License Configuration)

3.2 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.exe](#)" file.

This setup will install the **NetDisturb Client and the **NetDisturb** Server on the same machine.**

Run this setup and follow the instructions as described in the previous paragraph. On the CD-ROM, a second setup allows installing the **NetDisturb** Client on a machine. This is useful if you want to install the **NetDisturb** Server and the **NetDisturb** Client on two different machines.

To install the **NetDisturb** Client on a machine (Windows 95, 98, NT4, 2000, XP or Server 2003), run "[Setup_NetDisturbClient.exe](#)" and follow the setup instructions to proceed with the installation.

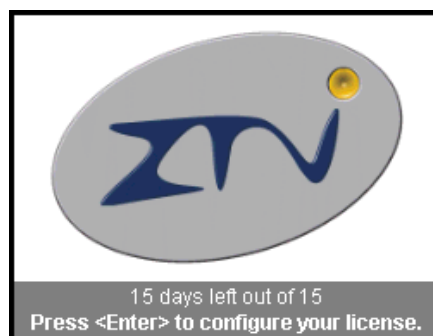
Part 4 Software License Configuration

4.1 How to configure a license

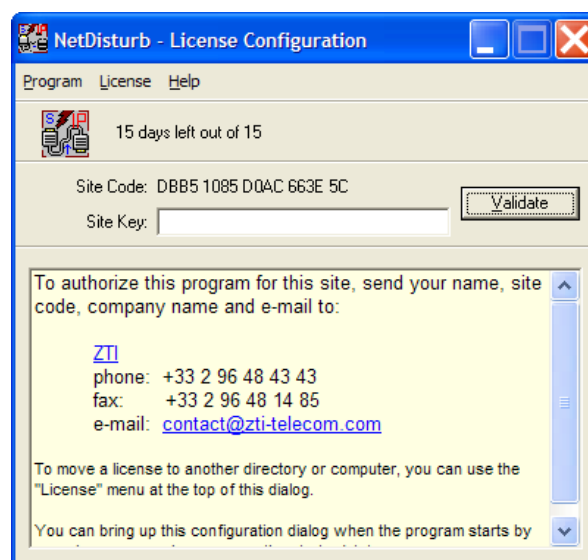


*This software is licensed on a per workstation basis. This means that you will need to get a separate license for each machine you will install it on. Each licensed copy of the software installed on a system has a unique **Site Code** which requires a corresponding unique **Site Key** to be entered before the tool is operational except for trial versions. A period of 15 days is automatically enabled at the first installation of the software. If you try to install the software again, the license program will disable the trial period.*

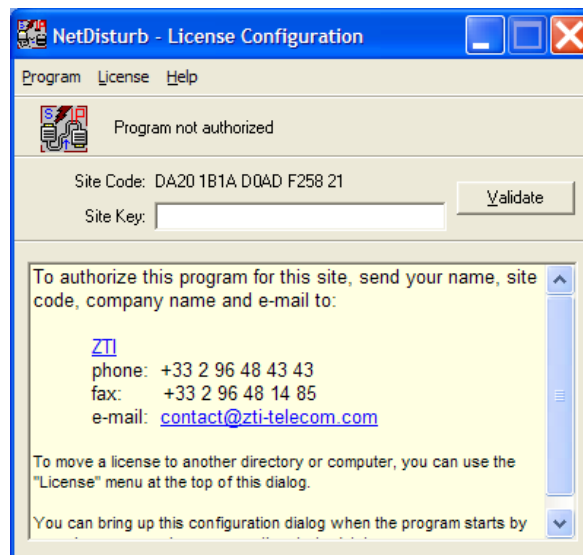
If you need to configure your license before the trial period ends, press **Enter** just after launching the **NetDisturb** Server when the following message is displayed:



You will then see the following license configuration window:



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



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

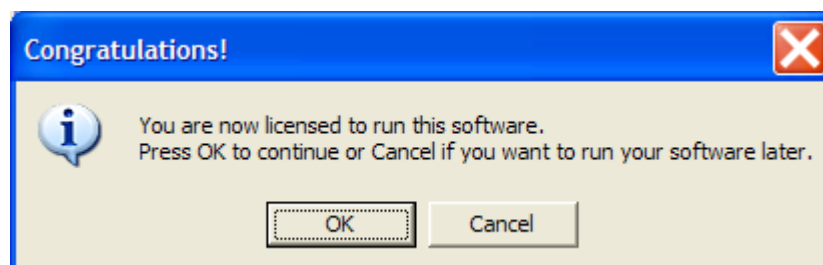
- The **Site Code** (you can copy and paste the Site Code displayed in the license window)
- The name of the software: **NetDisturb**
- The OS used
- Your company's name
- Your name and phone number
- The purchase order's number and date of purchase

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 license 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 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 96 48 43 43

Fax: +33 2 96 48 14 85

*When you launch **NetDisturb** Server with an unlimited license, you will see the following window:*



4.2 License Transfers



A license transfer is not a duplication of any type.

Please contact ZTI or your authorized distributor for site license information and for several licenses purchase.

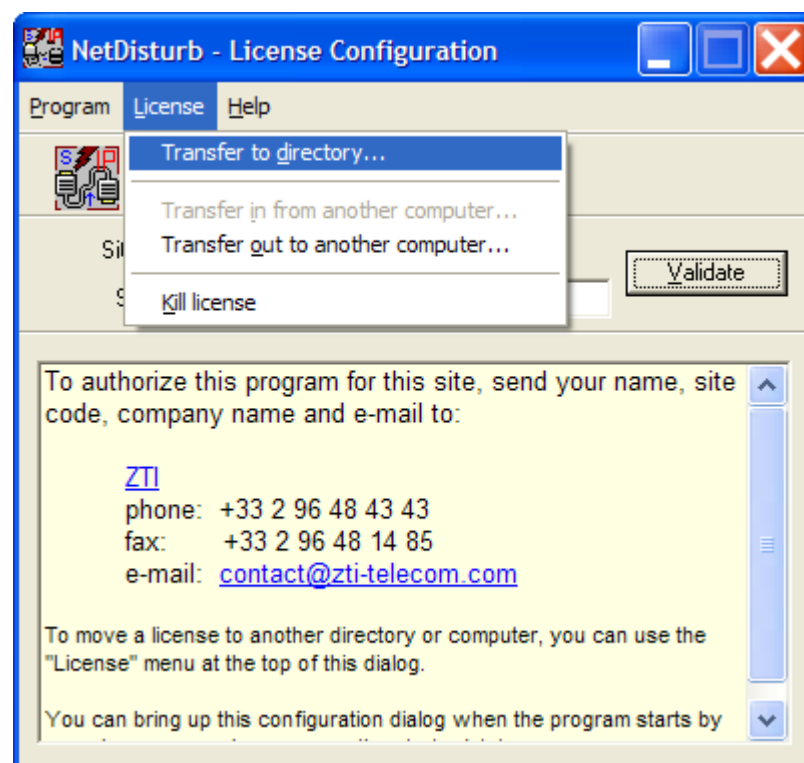
Licenses can be transferred using one of the following methods:

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

4.2.1 Direct Transfer: move the license from one local directory to another

This transfer mechanism must be used to move a license 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**'s folder) to the target directory.
For example from "C:\Program Files\ NetDisturb" to "C:\Temp\NetDisturb"
 - Then run the program from its original directory (from "C:\Program Files\NetDisturb").
When the license 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:\Program Files\NetDisturb\NetDisturbServer.exe).
The license is now transferred to the new directory.

4.2.2 Transfer by Media (floppy disk or USB key) from a source PC to a target PC



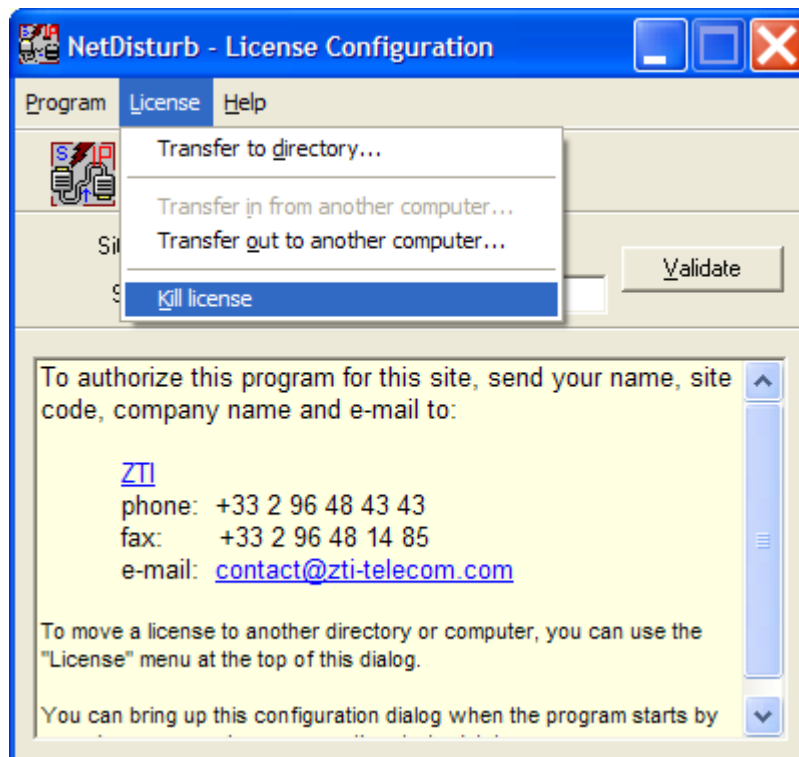
A floppy disk or USB key is needed for this kind of transfer.

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

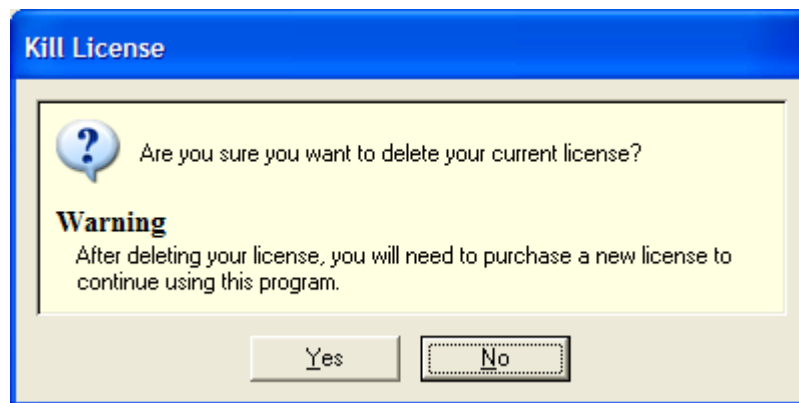
- 1) First install the program on the target PC (PC #2).
- 2) Run the software on PC # 2 and delete the trial license in order to get an unauthorized license on this PC.
If the "Transfer in from another computer ..." item of the license menu is disabled, you must kill the license.

How to kill a license?

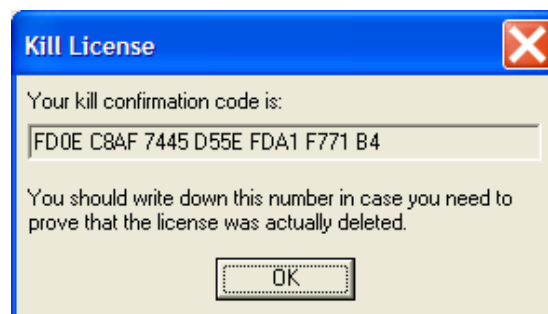
When the license configuration window appears, press **Enter** and select "License > Kill license" in the license menu.



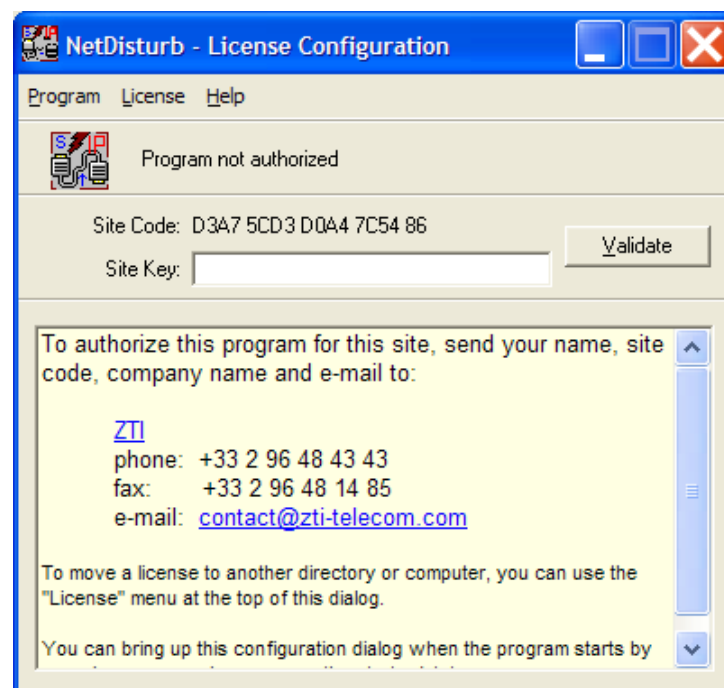
A message box will appear:



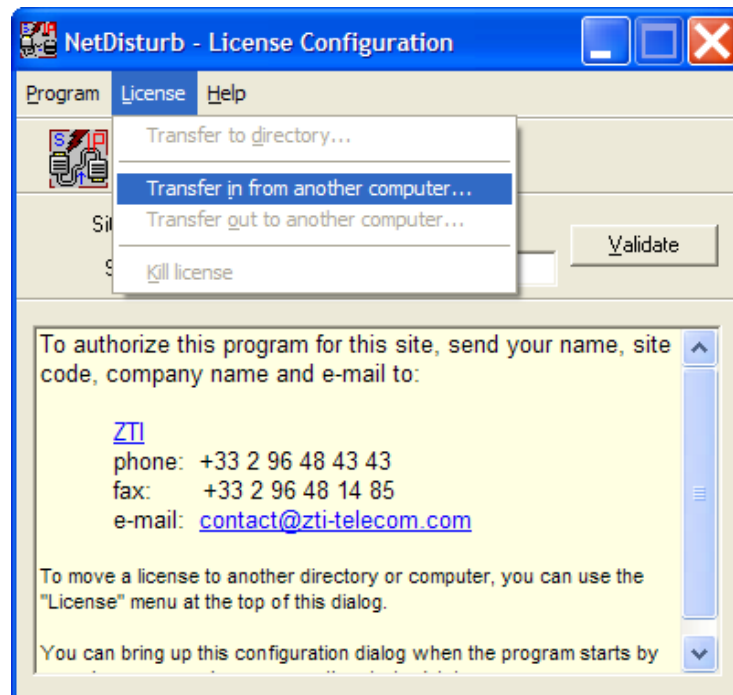
Press 'Yes' to kill the license and a confirmation code is displayed:



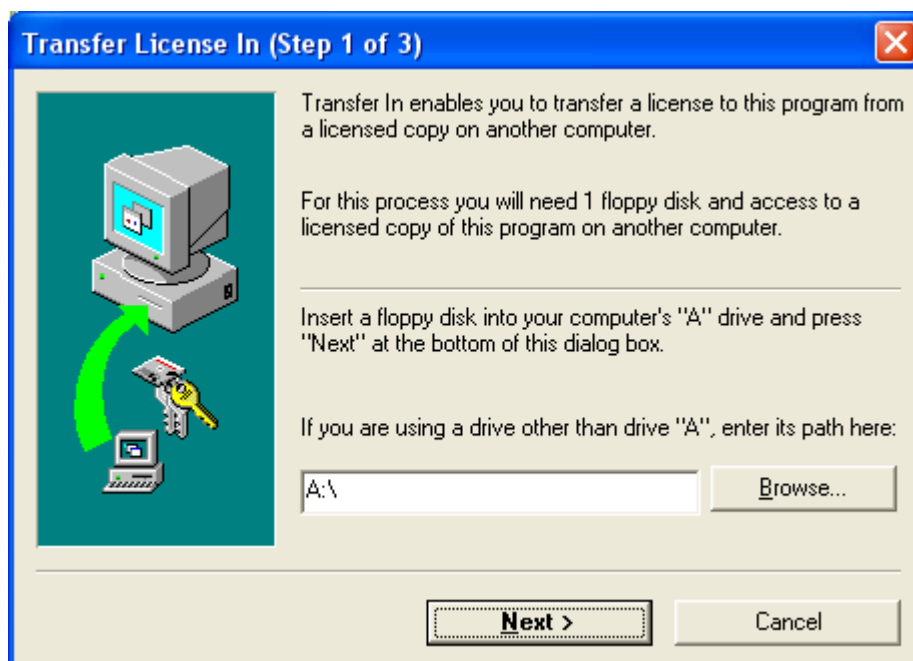
Click 'OK' and the license window displays now "Program not authorized":



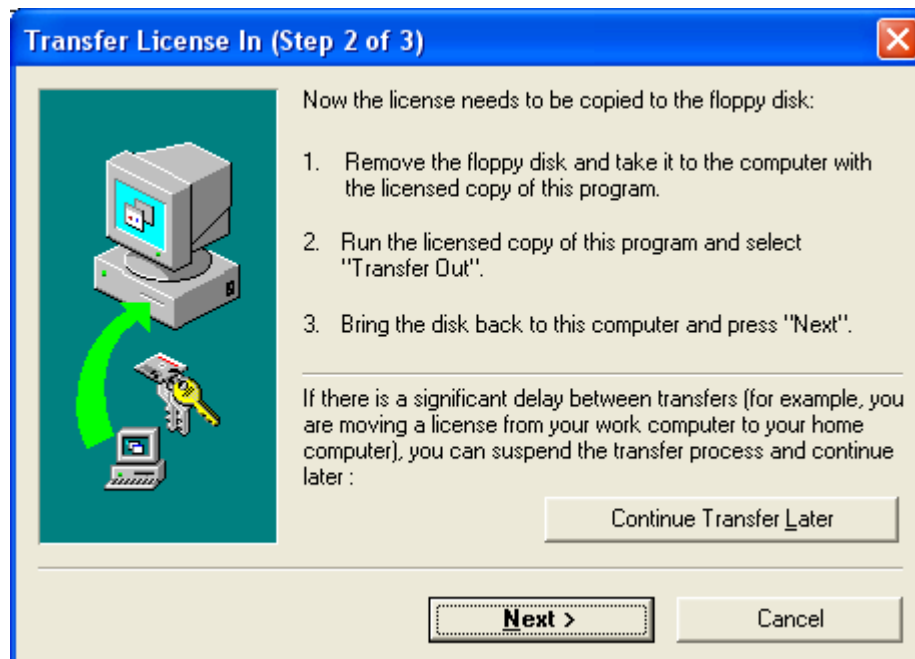
3) Select "License > Transfer in from another computer ..." from in the license menu:



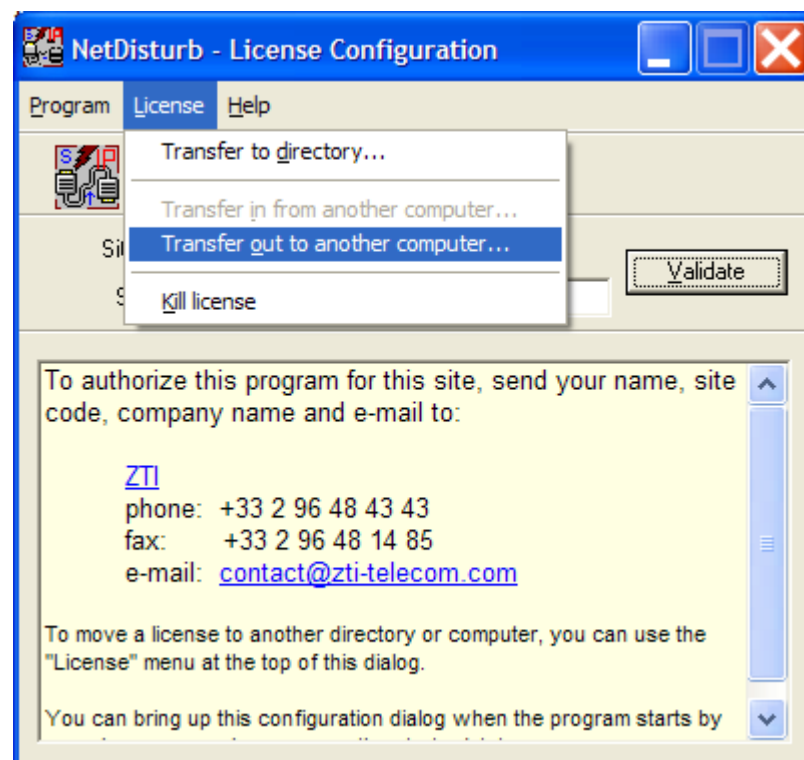
The "Transfer License In (Step 1 of 3)" window is displayed:



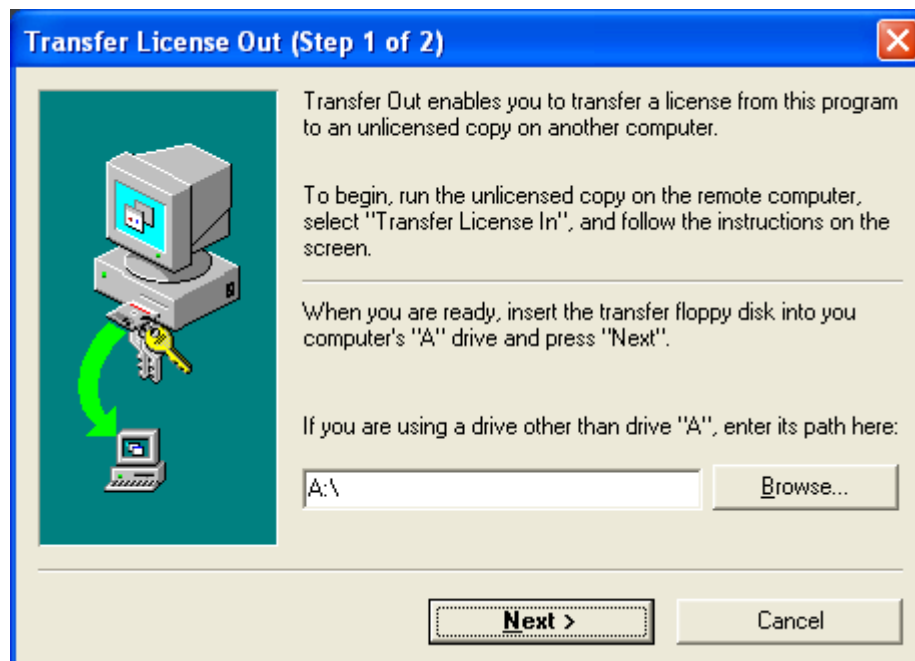
4) Insert a floppy disk or use a USB key as requested in step 1 of 3 and specify the path. Then press "Next >": the "Transfer License In (Step 2 of 3)" window is displayed:



5) Go to the source PC (PC #1) and insert the media (floppy disk or USB key). 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:

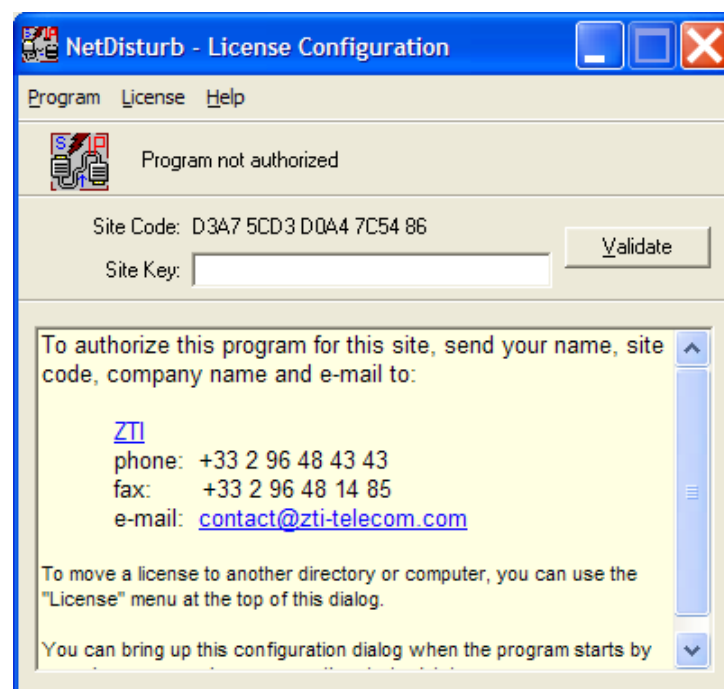


The following window is displayed:



Input the media path (floppy disk or USB key) and then press "Next >".

When the license is put on the media, you get the "Program not authorized" message:



*You can check that the license is not available anymore on the source PC since the **NetDisturb** software license is on a workstation basis.*

Contact us to get information on site license (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 unlimited license key is now transferred from the source PC to the target PC, and you get the following message:



Click Finish to continue.

Part 5 Uninstall NetDisturb

The uninstall procedure is a standard uninstall program.

To uninstall **NetDisturb** select “Uninstall NetDisturb” in the “Start > Programs > NetDisturb” menu.

All software components installed by the installation procedure are removed during the uninstall procedure including the **NetDisturb** driver.

Part 6 Run NetDisturb

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

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

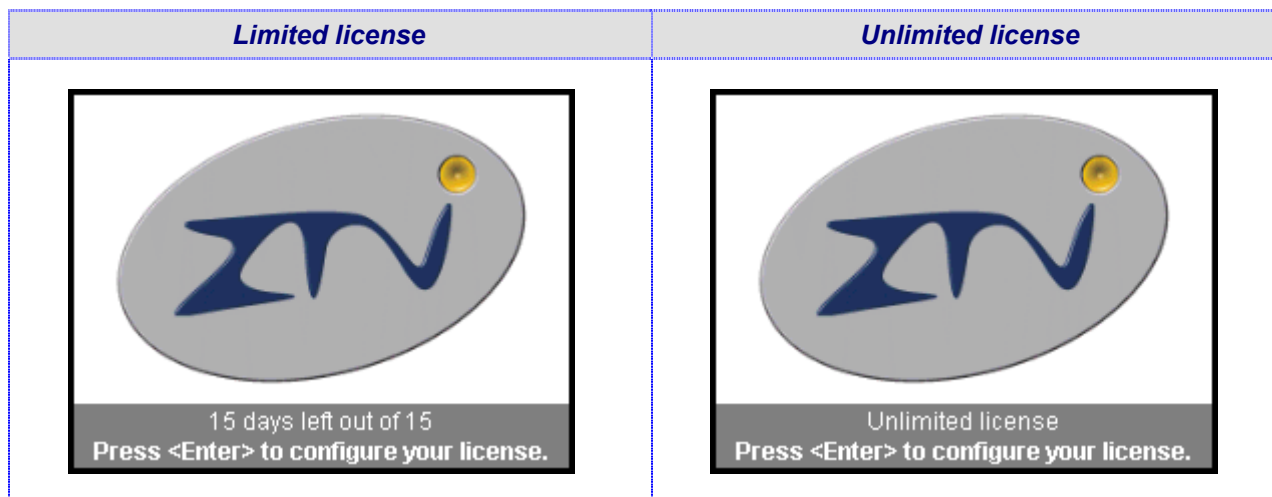
6.1 First Run

1) Run first the NetDisturb Server

Use the Windows start menu:

Start ► Programs ► **NetDisturb** ► 1) **NetDisturb Server**

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



Press **Enter** only if you need to configure your license,

If you don't, wait for a few seconds for the opening of the NetDisturb main window.

When you run the **NetDisturb** Server for the first time, the default window is displayed:

NetDisturb Server - Version 4.5

Impairment Interface Configuration and Statistics

Interface A : not selected

Handled Packets:

Lost Packets:

Delayed Packets:

Desequenced:

Fragmented packets:

Incoming on A **Outgoing on A**

Packets per Second

Packets

Throughput

No transmission

Interface B : not selected

Handled Packets:

Lost Packets:

Delayed Packets:

Desequenced:

Fragmented packets:

Incoming on B **Outgoing on B**

Packets per Second

Packets

Throughput

No transmission

Current Parameters

Refresh Period (in second): # Buffers: Interface Mode: Application of Laws:

Sampling to Compute Throughputs: Traces: Desequencing:

Current Client Connection

Client:

Context:

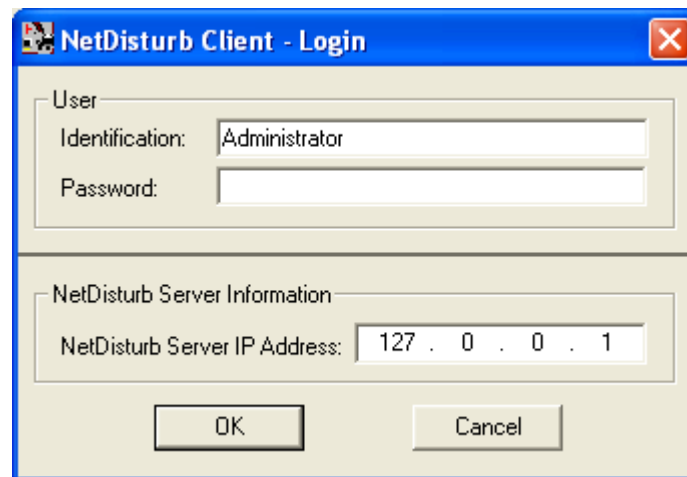
No board (or NIC) has been selected: the **NetDisturb** Client must be used to select the network interfaces (or NICs).

2) Then run the NetDisturb Client

Use the Windows start menu:

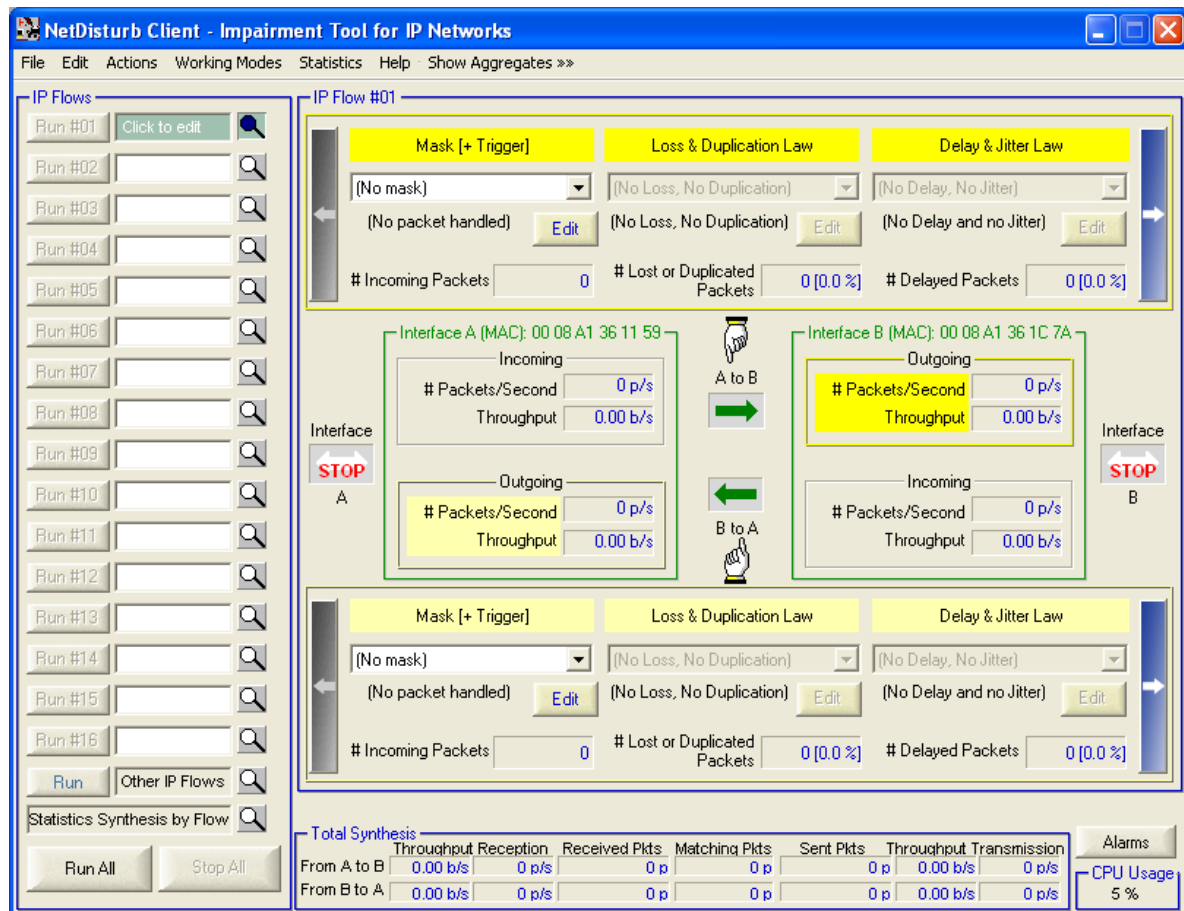
Start ► Programs ► NetDisturb ► 2) NetDisturb Client

And the **NetDisturb** Client will ask you then to input parameters:

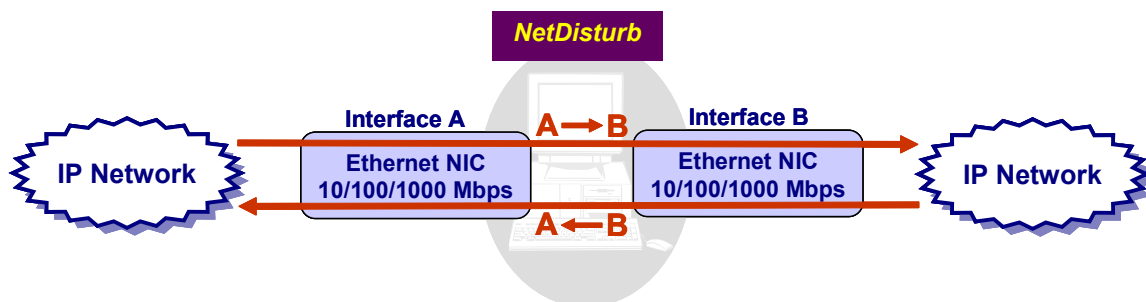
A screenshot of the 'NetDisturb Client - Login' dialog box. The dialog has a blue title bar with the text 'NetDisturb Client - Login' and a red close button. It contains two main sections. The first section is labeled 'User' and contains two text input fields: 'Identification:' with the text 'Administrator' and 'Password:' which is empty. The second section is labeled 'NetDisturb Server Information' and contains a text input field for 'NetDisturb Server IP Address:' with the value '127 . 0 . 0 . 1'. At the bottom of the dialog are two buttons: 'OK' and 'Cancel'.

- **User Identification** = Administrator
- **User Password** = (no password needed)
- **NetDisturb Server IP address** = 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).

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



You need then to select the NICs (interface A and interface B) that the **NetDisturb** Server is going to use.



Select "Configuration" in the Actions menu. The Parameters configuration window is displayed:

NetDisturb Client - Parameters Configuration

Display Configuration

Refresh Period: (from 1 s to 60 s)

Sampling period for the throughput calculation: (from 0 s to 60 s)

☐ Instant Throughput ☒ Average Throughput using Sampling Mechanism

☐ Use compression when exchanging data with the NetDisturb Server

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 Apply to each TCP/UDP Connections of the IP Flow' Menu Selection

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

When the Working Mode 'Laws Apply to each TCP/UDP Connection of the IP Flow' is selected, each TCP/UDP connection found in the IP 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 IP Flow, that is 5,440 Kbytes due to the 17 IP Flows.

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

Select the Application to Display Traces

...

Interface Selection

Interface A:

Interface B:

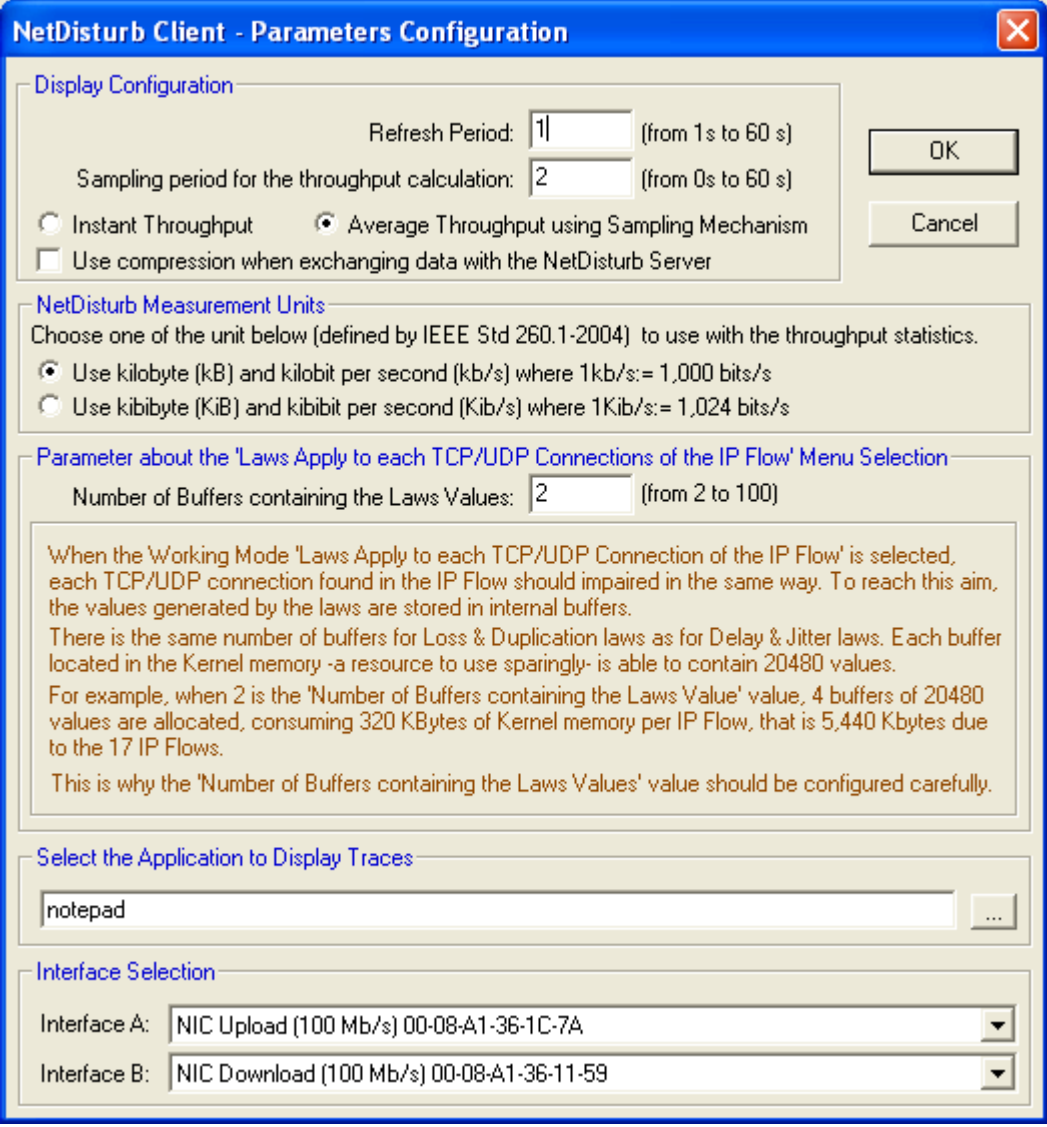
At the bottom of this window in the "Interface Selection" part, select one NIC for Interface A and another NIC for Interface B, and then validate with "OK".

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

- 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):

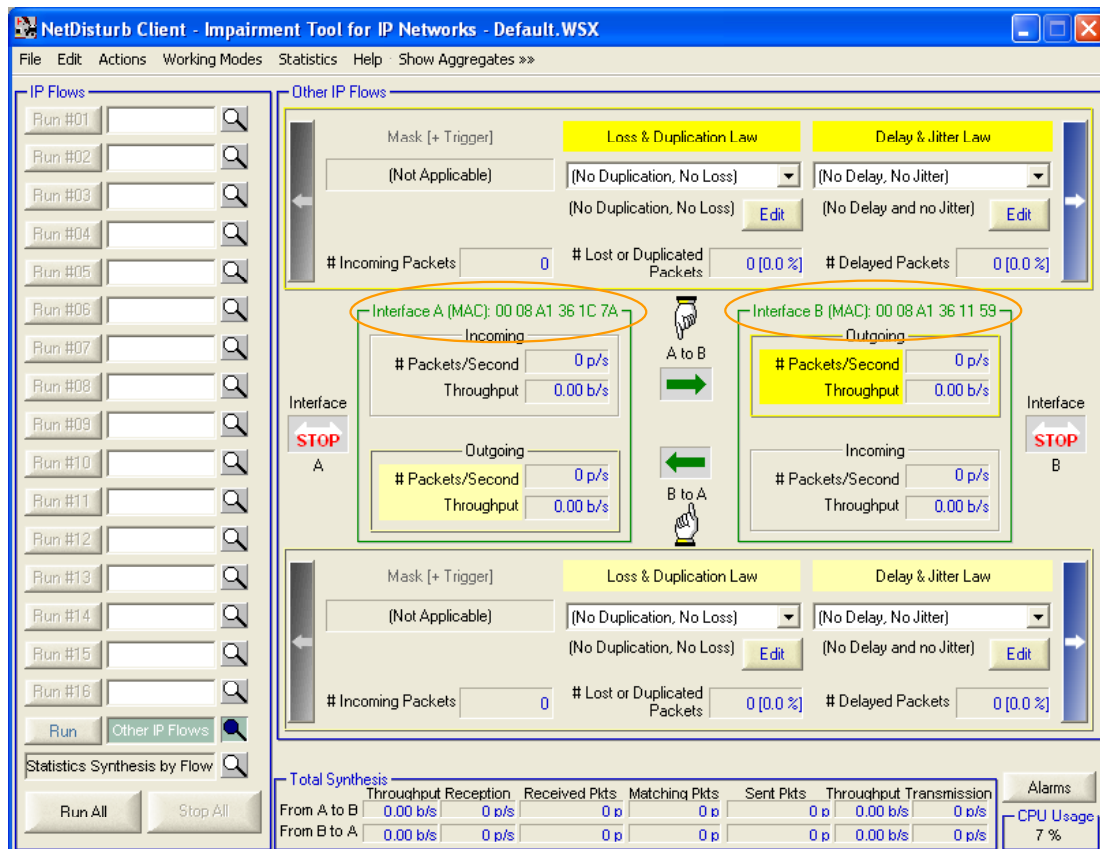


The image shows the 'NetDisturb Client - Parameters Configuration' dialog box. It has a blue title bar with a close button. The dialog is divided into several sections:

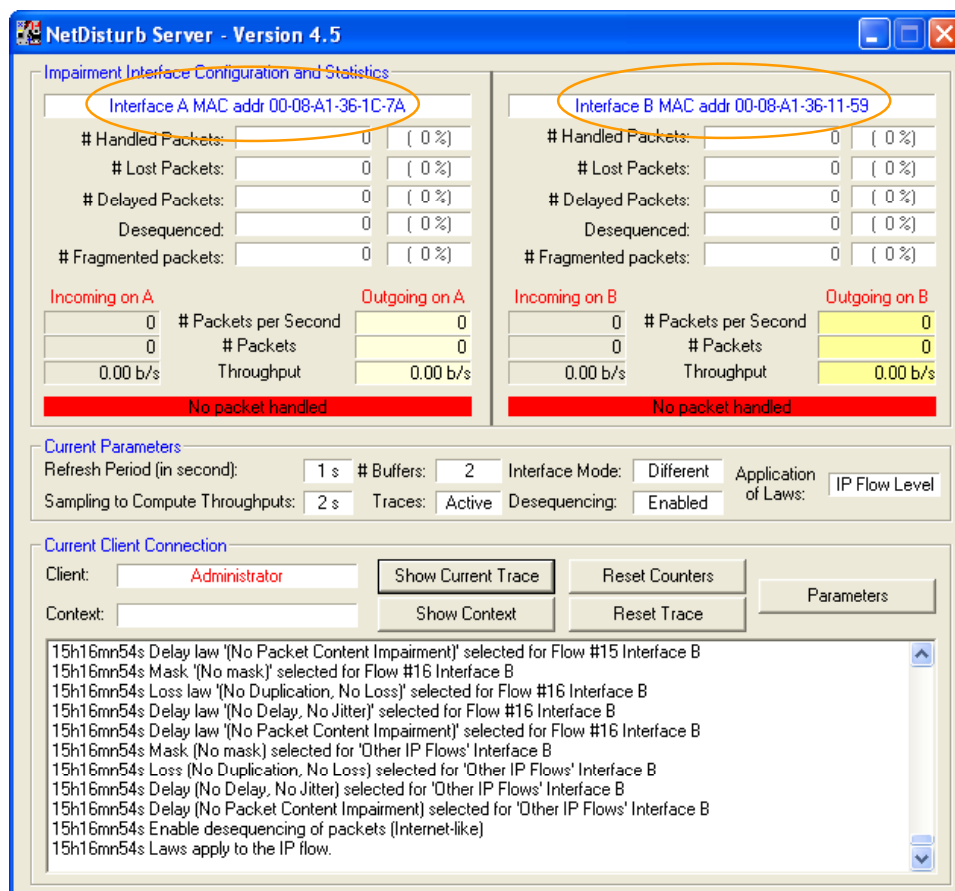
- Display Configuration:** Contains 'Refresh Period' (set to 1, range 1s to 60s) and 'Sampling period for the throughput calculation' (set to 2, range 0s to 60s). There are radio buttons for 'Instant Throughput' and 'Average Throughput using Sampling Mechanism' (selected). A checkbox for 'Use compression when exchanging data with the NetDisturb Server' is unchecked. 'OK' and 'Cancel' buttons are on the right.
- NetDisturb Measurement Units:** A text box says 'Choose one of the unit below (defined by IEEE Std 260.1-2004) to use with the throughput statistics.' There are two radio buttons: 'Use kilobyte (kB) and kilobit per second (kb/s) where 1kb/s:= 1,000 bits/s' (selected) and 'Use kibibyte (KiB) and kibibit per second (Kib/s) where 1Kib/s:= 1,024 bits/s'.
- Parameter about the 'Laws Apply to each TCP/UDP Connections of the IP Flow' Menu Selection:** Contains 'Number of Buffers containing the Laws Values' (set to 2, range 2 to 100). Below this is a text box with orange text explaining the buffer allocation and memory usage.
- Select the Application to Display Traces:** A text box contains 'notepad' and a browse button (...).
- Interface Selection:** Two dropdown menus. 'Interface A' is set to 'NIC Upload (100 Mb/s) 00-08-A1-36-1C-7A'. 'Interface B' is set to 'NIC Download (100 Mb/s) 00-08-A1-36-11-59'.

As soon as the configuration is done, the **NetDisturb** Server recognizes “Interface A” and “Interface B”.

The MAC Addresses of the selected interfaces are displayed in the **NetDisturb** Client and **NetDisturb** Server windows:



Graphical user interface for the NetDisturb Client with two Ethernet NICs configured



Graphical user interface for the NetDisturb Server with two Ethernet NICs configured

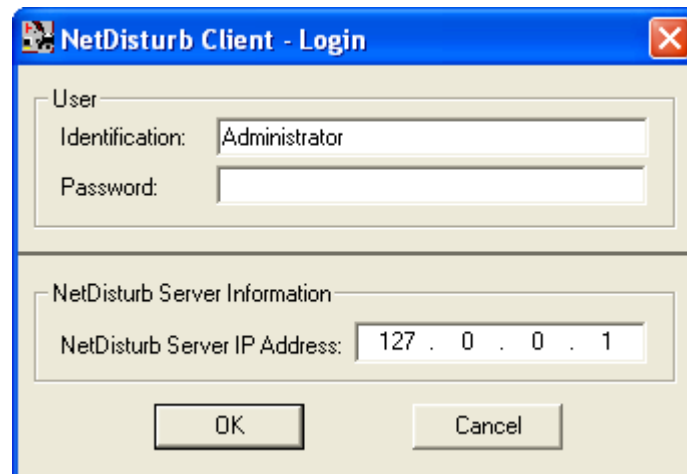
6.2 Detailed Description of the Server and Client Startup

6.2.1 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.

6.2.2 The NetDisturb Client Startup Options

When starting the **NetDisturb Client**, the User identification and Server parameters window is displayed.



This parameter window is composed of two sections:

- **User section**

This section allows the user identification. The identification could be either any user name (User mode) or the ‘Administrator’ (Administrator mode). A password is required only with the Administrator mode.

- ⇒ ADMINISTRATOR mode

To be connected as Administrator, **NetDisturb** Client must provide the corresponding password. With this mode the **NetDisturb** Client functionalities are fully available: **NetDisturb** Client can modify laws, stop or activate the relaying process and change the context.

- ⇒ USER mode

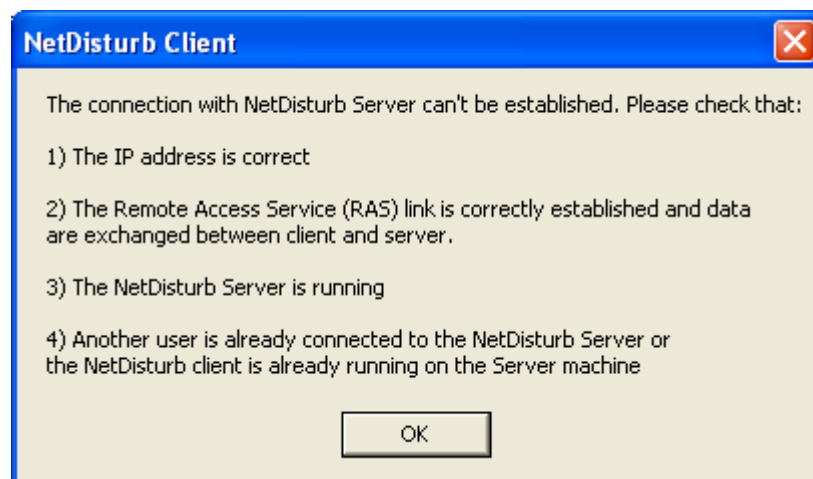
To be connected as User, **NetDisturb** Client provides a different identification than Administrator and a password is not necessary. **NetDisturb** Client functionality is reduced to the use of contexts located on the PC Server. With this mode, the masks and laws can’t be defined.

- **Server Information section**

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

1. The path to the remote **NetDisturb** Server folder
This path is composed of two parts:
 - The drive, the virtual drive or the name of the **NetDisturb** Server machine.
 - The directory location of the **NetDisturb** Server where the script subdirectory (containing **NetDisturb.tst**) can be found.
2. The **NetDisturb** Server IP address

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.



6.2.3 Windows XP SP2, Windows Server 2003 and later versions



The installation procedure of NetDisturb version 4.5 creates the Registry entry if needed and set the value as explained below.

The **NetDisturb** Client and the **NetDisturb** Server use the RPC (Remote Procedure Call) mechanism to dialog.

Windows XP and Windows Server 2003 may disable the RPC service. To activate it and allow the dialog between the **NetDisturb** Client and the **NetDisturb** Server, you need to modify the Registry.

The registry key is:

HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Microsoft\Windows NT\RPC

The value is:

RestrictRemoteClients REG_DWORD 0x00000000

If the value doesn't exist, you should create it. The result looks like the following figure:

