

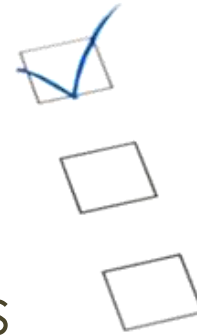
Thin Client Configuration and Setup

PxPlus 2017 (v14) & PxPlus 2018 (v15)

Agenda

Thin Client Configuration and Setup

- What is WindX?
- Types of connections supported
- Terminal emulations supported
- Accessing local resources
- Security concerns
 - Keeping end-users safe
- Performance considerations
 - WindX and System Parameters
- PxPlus enhanced downloads
- Licensing and Installation



What is WindX?

- Graphical workstation interface
 - Original design was to bring graphical interface to Unix/Linux
 - Goal was to allow both Unix and Windows systems to run consistent graphical applications
 - Connected as a terminal (RS232 and Telnet)
 - Provided Text terminal emulation integrated with graphical controls
 - Enhanced to provide remote file access and processing

WindX is **NOT** a
Window cleaner



Supported Terminal Emulations

- Limited terminal emulations provided
 - Wyse50
 - ANSI, VT100/200
- Designed to allow some native OS processing
 - Allows users to sign-on and run shell commands
- Provided automatic recognition for **'ansi'** terminal type
 - Device driver for TERM=ansi detects WindX
 - Native terminal type is "winterm"

Supported Connection Types

- Multiple methods to connect
 - Terminal (RS232) and Telnet over TCP/IP
 - Native "raw" TCP/IP Used by thin client interfaces
 - NTHost/Slave brought "terminal" style connectivity to Windows NT
 - Application server added security, single port, and structure
 - Simple CS provided single port access and now additional security
 - Native connection much faster than telnet

PxPlus 2016 added SSH

- Ships with 'plink' command (part of the putty terminal emulator)

Accessing Local Resources

- Provides access to workstation for server to



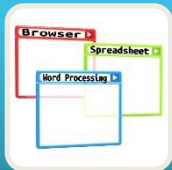
Access Workstation files

Allow file Read, Write, Create and Delete



Route data to workstation printer

Windows spooler and direct device connectivity



Run Windows Application

Server can launch local processes such as Word/Excel



Execute PxPlus logic/programs locally

Server can Execute PxPlus code or call local objects/subroutines

Accessing Local Resources

- Dynamic redirection of request using prefix
 - Prefix file pathname or command with "[WDX]"
 - Forces request to be sent to workstation
 - PxPlus allows "[LCL]" which redirects, if possible
 - Assures resource on Workstation not server

Examples

```
OPEN (nn) "[LCL]C:\User\JohnSmith\data"  
OPEN (nn) "[LCL]*WINPRT*"  
INVOKE "[LCL]notepad"  
myObj = NEW("[LCL]MyObj")
```

OPEN CREATE (nn) "[LCL]C:\User\JohnSmith\data"

2018

Launching WindX

- Launching WindX to connect manually
 - Based on starting directory of WindX

`C:\...\pxplus.exe windx`

- Launches WindX to display connection options
- Can have `-arg file` to load options from a file

`C:\...\pxplus.exe launcher`

- Allows connection using Telnet, SSH, or any of the native TCP/IP connections
- Load and Save connection options provided

Launching WindX

- Launching WindX with preset connection
 - Starting directory can be anything

```
C:\...\pxplus.exe *plus/cs/client -arg server;port [program]
```

- Connects to Simple CS at 'server' on specified 'port' and runs 'program'
- Add ';secure' following port to specific secure connection using SSL

```
C:\...\pxplus.exe *ntslave -arg server program port [-SSL]
```

- Connects to NTHost as 'server' on specified 'port' and runs 'program'
- Add '-SSL' following port to specific secure connection using SSL

```
C:\...\pxplus.exe *client -arg server port application
```

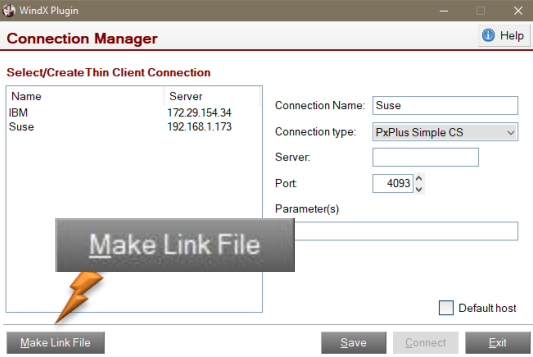
- Connects to Application server as 'server' on specified 'port' and runs 'application'

```
C:\...\pxplus.exe *ssh -arg server port [user] [password]
```

- Connects to specified server using secure SSH connection (port defaults to SSH standard)

WindX Shortcuts

- The ".windx" file suffix "link" file
 - Text file containing program and arguments
 - Allows connections to be easily exchanged
 - Email attachment, web download
 - Will use the most recently installed WindX
 - No need to change links during upgrade
 - Starts connection in the directory where .windx file exists
 - Can create Windows Shortcut for desktop



WindX Connection manager has option to create these link files

WindX Shortcuts

- The ".windx" file suffix examples

```
C:\...\pxplus.exe *plus/cs/client -arg Server1;4093 Menu
```

- .windx file contents:
*plus/cs/client
Server1;4093
Menu

```
C:\...\pxplus.exe *ntslave -arg Server1 Menu 10000
```

- .windx file contents:
*ntslave
Server1
Menu
10000

WindX and Security



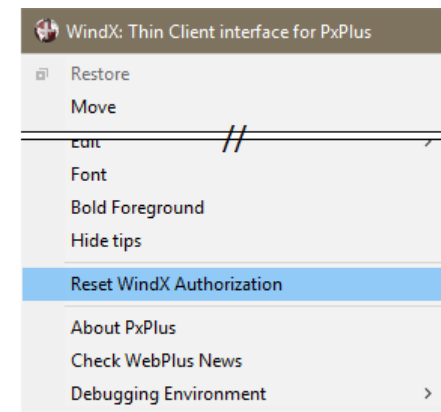
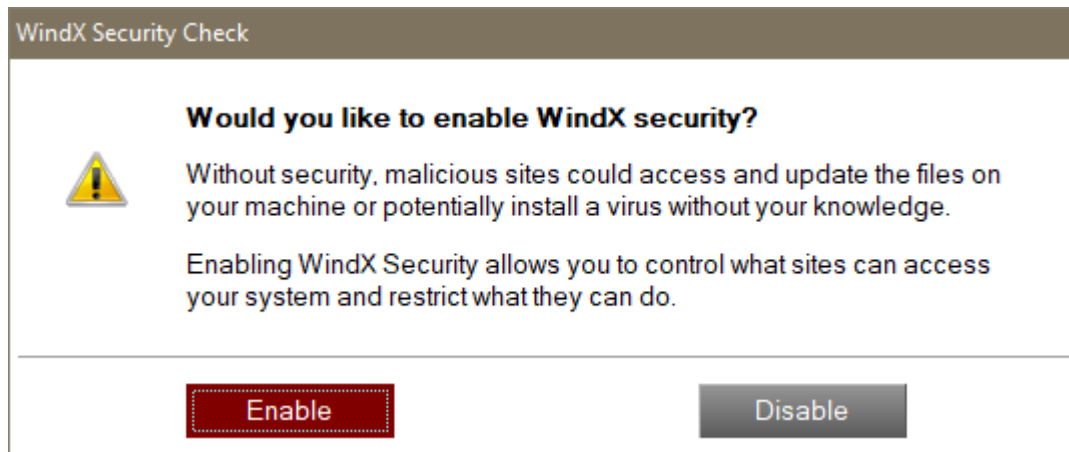
WindX and Security

- Industry-wide problem
 - A few bad apples ...
 - Approaches based on Canadian law CASL
- Two areas of concern
 - Controlling access to the workstation
 - Restricting what the server can do to workstation
 - What it can read/write
 - What it can run
 - Assure end user acknowledges access rights
 - Assuring **secure** connection to **proper** host
 - Networks can be compromised
 - Public networks can 'spooft' servers

Controlling Workstation Access

- On initial launch of WindX system confirms if user wants access controls enabled.

WindX System menu allows user to change their mind



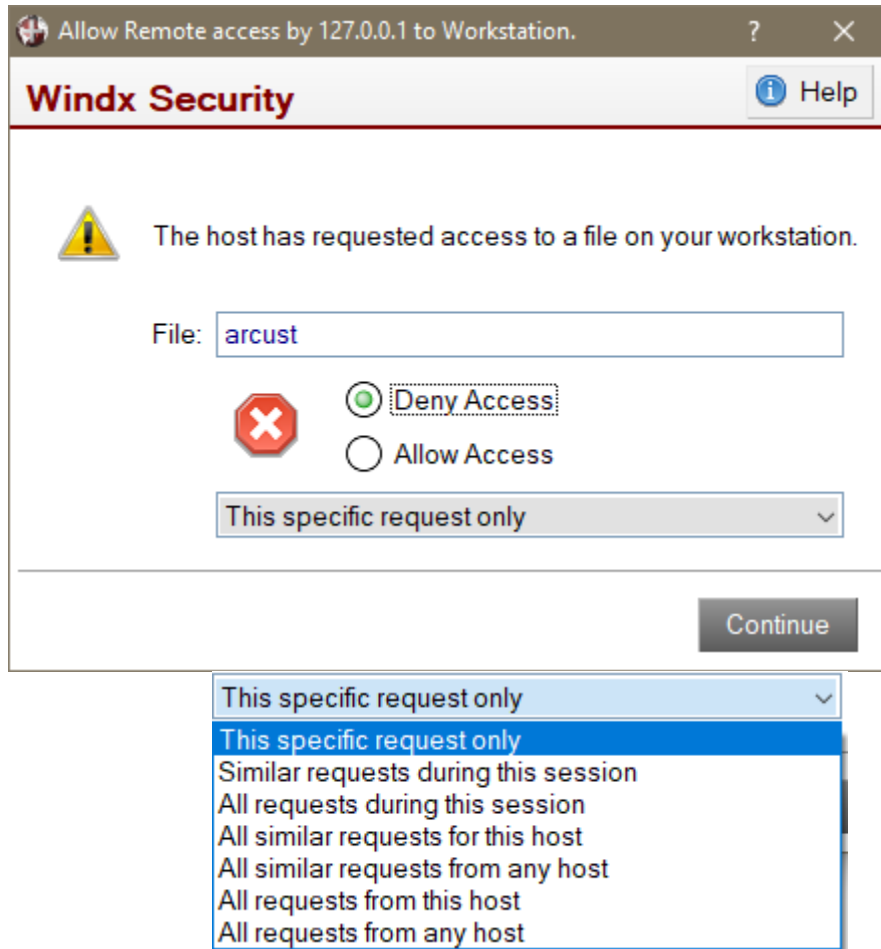
- If they Disable security, no further question asked regardless of what server they connect to and regardless of what the server tries to do to their workstation

WindX System menu allows user to change their mind

Controlling Workstation Access

WindX confirms access with user

- User CAN **deny** or **allow**
 - Local file reading
 - Local file updates
 - Running local Windows programs
 - Executing PxPlus logic locally
- Drop box provides user to set option for
 - Specific request
 - Current session
 - Similar requests
 - Based on host



Assuring Connection to Host

Options only available with Simple CS

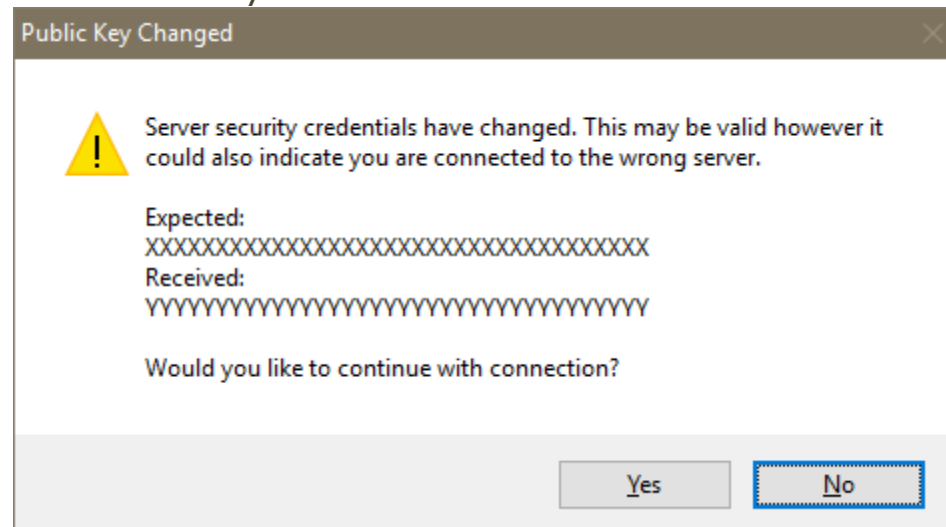
- Two major concerns
 - Is this connection secure enough?
 - SSL has multiple encryption algorithms and protocol versions
 - You should disable old protocols and ciphers on the server by including
 - NoSSLV2, NoSSLV3
 - CIPHERS=HIGH:MEDIUM:!ADH
 - Does server have proper certificate?
 - Option following 'secure'
 - CERTIFICATE=VALIDATE | TRUST
 - Checks host name, expiry date
 - Optionally certificate came from **TRUSTED** source

See SSL PDF for
more info

Assuring Connection to Host

Option only available with Simple CS

- Host has a unique "Public" encryption key
 - Used to encrypt SSL communication
 - Simple CS with WindX can check this
 - Can be specified on the command line
 - Follows the SECURE option in argument 1
 - Default is to save on 1st connect and reports differences should they occur



Assuring Connection to Host

Option only available with Simple CS

- PUBKEY options

```
...\pxplus.exe *plus/cs/client -arg server;port;pubkey=XXXX...
```

- Only allows connection if public key matches

```
...\pxplus.exe *plus/cs/client -arg server;port;pubkey=check
```

- Ask user on first connection to manually validate public key

- Can be included in a .WINDX file

Improving WindX Speed



Performance Concerns

- Performance affected by number of exchanges
 - Less exchanges of information faster performance
 - An exchange occurs by default on every:
 - Reference to a property on a control
 - Directive that access a control
 - Execution of a remote CALL or Method
 - Remote file IO operation
 - Try to minimize exchanges to improve performance
 - Also avoid Telnet due to protocol overhead

Performance Concerns

- Turbo mode assumes operations succeed and don't wait for reply
 - Most directives and setting of properties work
 - Why wait for workstation to acknowledge?
 - Setting system parameter 'TU' enables this
 - You can set local reporting of errors if needed
 - This is set in Nomads by default

Typical Performance Pitfalls

- Avoid reading properties from controls
 - Each read involves an exchange

Avoid	Preferred	Reason
<pre>WHILE N < id'ItemCount ... WEND</pre>	<pre>Mx = id'ItemCount WHILE N < MX</pre>	Re-reading a static control property causes multiple exchanges
<pre>FOR N = 1 TO id'ItemCount Id'Item=N X\$=Id'ItemText\$</pre>	<pre>LIST_BOX FIND id,0,List\$ N=0 FOR X\$ FROM List\$ N++ ... </pre>	Instead of an exchange reading each item, use the FIND to read the complete contents
Referencing properties in a loop such as 'Sep\$, 'Lock	Read these outside of loop and save value	Each property read causes an exchange with Workstation

Performance Concerns



- Use Pseudo properties to read multiple properties in one exchange
 - Created by merging multiple property names separated and terminated by period

Example: `grid.ctl'colno.row.value.$`

- Reading this property returns string containing values with \$00\$ separator
- Writing this property allows update using similar string
- Reduces multiple exchanges to a single exchange

Downloading Files

Auto Downloads



- PxPlus provides automatic download for
 - Images needed in 'PICTURE' mnemonic
 - Will cache these locally
 - Images updated if host image changes
 - Programs found in *plus/wdx/user directory
 - Copied to workstation when called
 - Optionally extended to entire system library

Controlled by System Parameter

'+U' Setting	Effect
0	Disables auto-download
1 (Default)	Downloads images and *plus/wdx/user programs
2	Downloads images and any "[lcl]" requested program
3	Downloads images and any system library program

Static Downloads



- Provides download during connect to workstation for 'static' files
 - Typically used for:
 - Images
 - Programs
 - Data files
 - Configured on host end
 - Configuration file declares what to send
 - Option to FORCE download before connection
 - Can be used to update WindX to new version
 - NOT RECOMMENDED FOR THIS PURPOSE

Licensing and Installation

Licensing Requirements

- WindX is **NOT** sold separately

WindX standalone licenses have not been offered for **many** years

- WindX Plug-in can be used to connect to any PxPus server running a
 - Professional license
 - E-Commerce license
 - Base license with a WindX Plugin Add-on (Pkg 20013)
- WindX will get its license from the host
 - Includes version and enabled packages as per the server license
 - Session will terminate if not connected to a properly licensed server within 5 minutes

Installing WindX

- Installs on Windows Vista thru Windows 10
 - Not supported on XP or Server 2003
 - Download from www.pvxplus.com
 - Bottom of download page
 - Runs as a standard Windows install
 - **No Activation key needed**
 - Key is provided by the host it connects to

When Updating PxPlus we recommend you update all
WindX workstations **first** and then the server

Thin Client Review

- Learned what WindX is and what it does
- Identified connection types supported
 - Terminal, Telnet, Raw TCP/IP
 - NTHost/Slave, App Server, Simple CS, SSH
- Terminal emulations supported
 - ANSI and Wyse
- How to access local resources
- What types of security are provided
- Improving WindX performance
- Automatic/Static downloads
- Licensing requirements



Additional Resources

The help link(s) below refer to the current on-line help pages. The functionality may have been further updated since the PxPlus 2018 (version 15) release.

- [WindX Overview](#)
- [Thin Client Environment](#)
- [WindX Connection Manager](#)
- [Launching WindX From a Browser](#)