

Administrators Guide

Wyse ThinOS™

Products: C10LE, S10, V10L, V10LE

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WYSE
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Ordering Information

For availability, pricing, and ordering information in the United States and Canada, call 1-800-GET-WYSE (1-800-438-9973) or visit us at <http://www.wyse.com>. In all other countries, contact your sales representative.

FCC Statement

This equipment has been tested and found to comply with the limits for either Class A or Class B digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded interconnect cables and shielded AC power cable must be employed with this equipment to insure compliance with the pertinent RF emission limits governing this device. Changes or modifications not expressly approved by the system's manufacturer could void the user's authority to operate the equipment.



Caution

Modifications made to the product, unless expressly approved by Wyse Technology, could void the user's authority to operate the equipment.

Regulatory Compliance for Thin Clients

Basic EMC and Safety Requirements

Wyse thin clients are compliant with the regulatory requirements in the regions listed below.

U.S.A. - FCC Part 15 (class B), cUL 60950

Canada - IC ICES-003, CAN/CSA-C22 No. 60950

Europe - EN 55022 (class B), EN 55024

Canadian DOC Notices

Class A - This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Class B - This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

Device Power Supply

For use with external power supply included in the shipping carton.



Caution

Replace power adapter with the same or a certified equivalent model supplied by the manufacturer.

Model Cx0 Thin Client, Product C10LE

For use with External Power Supply Model PA-1031-0, or DA-30E12 or certified equivalent model supplied by the manufacturer, output rated 12Vdc, 2.5A.

Model SX0 Thin Client, Product S10

For use with External Power Supply Model DSA-0421S-12 3 30, or certified equivalent model supplied by the manufacturer, output rated 12Vdc, 2.5A.

Model VX0 Thin Client, Products V10L and V10LE

For Use with External Power Supply Model PA-1051-01, or certified equivalent model supplied by the manufacturer, output rated 12Vdc, 4.16A or minimum 4.0A.

Battery Information

Models Cx0 and VX0 contain an internal button cell battery replaceable by Wyse or one of our Authorized Service Centers. For service, visit <http://www.wyse.com/serviceandsupport/service/service.asp>.



Warning

There is a risk of explosion if the battery is replaced by an incorrect type. Always dispose of used batteries according to the instructions accompanying the battery.



Warning

Perchlorate Materials – Special Handling May Be Required under California Code of Regulations, title 22. (Only required within the U.S.A.)

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Summary of Revisions

Wyse Technology Inc. 883682-08 Rev. T

The following changes were made to this document since revision S

Reference	Description
Model Cx0 Thin Client, Product C10LE	Addition of Model Cx0 Thin Client, Product C10LE to the guide.
Model VX0 Thin Client, Product V10LE	Addition of Model VX0 Thin Client, Product V10LE to the guide.

Wyse Technology Inc. 883682-08 Rev. S

The following changes were made to this document since revision R

Reference	Description
New documentation references	General rewrite of the guide to include references to the new titles of the Wyse ThinOS documentation (<i>1 Series</i> is no longer used).
Windows Server 2008	Addition of Windows Server 2008 support and information to the guide.
802.11n wireless support	Addition of 802.11n wireless support and information to the guide.
"Accessing Thin Client BIOS Settings"	Addition of new section to provide instructions on accessing the BIOS settings of a thin client.

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1

Introduction

Wyse® thin clients running Wyse ThinOS™ are highly optimized thin clients that provide ultra-fast access to applications, files, and network resources made available on machines hosting Citrix™ ICA and Microsoft™ RDP session services. Locally installed software permits remote administration of the thin clients and provides local maintenance functions.

Session and network services available on enterprise networks may be accessed through a direct intranet connection, a dial-up server, or an ISP which provides access to the Internet and thus permits the thin client to connect to an enterprise virtual private network (VPN) server.

About this Guide

This guide is intended for administrators of Wyse thin clients running Wyse ThinOS. It provides information and detailed system configurations to help you design and manage a Wyse ThinOS environment.

The information and instructions in this guide are intended to be used in conjunction with other documentation for Wyse ThinOS and for future reference. For example, while you are following the *Getting Started Guide: Wyse ThinOS™* to set up and configure your Wyse ThinOS system, you can use the detailed instructions in this guide (as well as the *Users Guide: Wyse ThinOS™* and the *Reference Guide: Wyse ThinOS™ INI Files*) to help you get your Wyse ThinOS environment up and running quickly and easily.

Although this guide discusses similar information to that contained in the *Users Guide: Wyse ThinOS™*, refer to the *Users Guide: Wyse ThinOS™* for detailed information on configuring the thin client (locally) to manage the connections and applications available to users.

Organization of this Guide

This guide is organized as follows:

Chapter 2, "Establishing a Server Environment," contains information on the network architecture and enterprise server environment needed to provide network and session services for Wyse thin clients running Wyse ThinOS. It also includes information to help you address important considerations when configuring access to the server environment and when configuring the services to be provided by the server environment.

Chapter 3, "Remote System Administration," provides remote system administration information to help you perform the routine tasks needed to maintain your Wyse ThinOS environment.

Chapter 4, "Local System Administration," provides local system administration information to help you perform the routine tasks needed to maintain your Wyse ThinOS environment.

Wyse Technical Support

To access Wyse technical resources, visit <http://www.wyse.com/support>. If you still have questions, you can submit your questions using the [Wyse Self-Service Center](#) (on the Wyse.com home page, go to **Support | Knowledge Base | Home** tab) or call Customer Support at 1-800-800-WYSE (toll free in U.S. and Canada). Hours of operation are from 6:00 A.M. to 5:00 P.M. Pacific Time, Monday through Friday.

To access international support, visit <http://www.wyse.com/global>.

Related Documentation and Services

Wyse thin client features can be found in the datasheet for your specific thin client model. Datasheets are available on the Wyse Web site. Go to <http://www.wyse.com/products>, click the *Wyse Thin Clients* link, click the link for your thin client, and then click the *Download Datasheet* link.

Sample User INI files are intended for administrators of Wyse thin clients running Wyse ThinOS. These files are available from the Wyse Web site (go to <http://www.wyse.com/manuals>, search for sample.ini, click the reference guide link, and then click the sample ini link to open and use the file download dialog box to save the compressed file to a folder you want). These sample files are annotated to allow you to use them as a “starter set” (that you can modify for your users needs) to quickly get your file server up and running. For information on using the sample files, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

Reference Guide: Wyse ThinOS™ INI Files is intended for administrators of Wyse thin clients running Wyse ThinOS. It provides the detailed information you need to help you understand and use the Wyse ThinOS INI files. It contains information on the different Wyse ThinOS INI files you can use and the rules for constructing the files. It also provides the parameter details you need (with working examples) to get the most out of your Wyse ThinOS INI files. In addition, this guide also includes an appendix that contains all of the supported connect parameters you can use for ICA and RDP connections. It is available at: <http://www.wyse.com/manuals>.

Getting Started Guide: Wyse ThinOS™ is intended for administrators of the Wyse ThinOS system. It provides a setup and configuration overview of the entire Wyse ThinOS system to help you get your Wyse ThinOS environment up and running quickly and easily. It is available at: <http://www.wyse.com/manuals>.

Users Guide: Wyse ThinOS™ is intended for users of Wyse thin clients running Wyse ThinOS. It provides detailed instructions on using the thin client to manage the connections and applications available to users from a network server. It is available at: <http://www.wyse.com/manuals>.

Wyse Thin Computing Software is available on the Wyse Web site at: <http://www.wyse.com/products/software>.

Wyse Online Community

Wyse maintains an online community where users of our products can seek and exchange information on user forums. Visit the Wyse Online Community forums at: <http://community.wyse.com/forums/>.



2

Establishing a Server Environment

This chapter contains information on the network architecture and enterprise server environment needed to provide network and session services for Wyse thin clients running Wyse ThinOS. It also includes information to help you address important considerations when configuring access to the server environment and when configuring the services to be provided by the server environment. Use this chapter in conjunction with the *Getting Started Guide: Wyse ThinOS™* and the *Reference Guide: Wyse ThinOS™ INI Files* to set up and configure your Wyse ThinOS server environment.

Setting Up Access to Enterprise Servers

There are five basic methods of access to the enterprise server environment available to the thin client. Except for Ethernet Direct, all of the access methods require that some local settings be made on the thin client. These settings cannot be automated because the thin client has not yet accessed user profiles. For certain privileges, these local settings are retained and are available for the next thin client system start. Activating these local settings and the defined connections can also be automated at thin client system start.

Methods of access include:

- **Ethernet Direct** - This is a connection from the thin client Ethernet port directly to the enterprise intranet. No additional hardware is required. In this configuration all network services can be used, including an enterprise DHCP server. A DHCP server on the network can provide not only the thin client IP address, but also the location of the file server containing the user profiles and software updates
- **Wireless Direct** - An 802.11b/g/n USB Wireless Adapter can be used to access the enterprise intranet. The adapter connects to a USB port on the thin client and uses short-range wide-band radio to communicate with a wireless access point. Typically, wireless access points are located at several locations in the enterprise within range of the 802.11b/g/n USB Wireless Adapters and directly connected to the enterprise intranet. Contact Wyse for available wireless network devices.

Service Set Identification (SSID), channel, authentication, and encryption configurations must be entered in the **Wireless Setup** dialog box on the thin client. Corresponding entries must also be made in the enterprise access point.

- **PPPoE** - Thin client support for PPPoE is intended for devices which connect to the Internet directly from remote locations. PPPoE is used as an alternative to providing DHCP support or static IP addresses on all high speed lines. PPPoE is compatible with the use of PPTP, FTP, and/or PNAgent/PNLite.

To enable the PPPoE Manager, the **No local LAN, invoke PPPoE only** option must be selected in the **Network Setup** dialog box (for information on the **Network Setup** dialog box, refer to the *Users Guide: Wyse ThinOS™*). After being enabled, the PPPoE Manager can then be used and is available from the desktop to configure and invoke a PPPoE connection to WAN. Once connected, all WAN packets go through a

PPP connection over Ethernet to the DSL modem. The PPPoE Manager is not accessible for users with privileges set to *None*. However, access to the PPPoE Manager is not necessary if the connection is to be established at startup. And unless the unit is locked down, establishing the PPPoE connection would take place before reading an INI file. Therefore any thin client which is not locked down would have the default privilege (high) at this boot stage.

Open the PPPoE Manager by selecting it from the desktop menu. The PPPoE Manager can also be set to open automatically on system start-up. For information on the PPPoE Manager, refer to the *Users Guide: Wyse ThinOS™*.

The PPPoE Manager allows configuration for the following ISP login properties:

- **Login Username** - A login username up to 43 characters.
- **Login Password** - A login password up to 15 characters.
- **Auto-Connect** - A check box to allow an automatic connection on system startup.
- **Use default gateway on remote (PPPoE) network** - A check box to use the default gateway on system startup.
- **Dial-up Modem** - A USB dial-up modem or a USB-to-Serial adapter connected to a serial modem can be used with the thin client to access a dial-up server.

The dial-up server can provide either of two methods of access to the enterprise intranet:

- An enterprise dial-up server will directly connect to the enterprise intranet.
- An Internet Service Provider (ISP) dial-up server simply provides access to the Internet, from which the thin client must access an enterprise PPTP VPN server that connects to the enterprise intranet.



Note

The dial-up server must be a Microsoft Remote Access Server or another server that supports industry-standard protocols.

- **PPTP VPN** - PPTP (Point-to-Point Tunneling Protocol) is a network protocol that enables the secure transfer of data between a remote client (in this case the thin client) and an enterprise server environment by creating a virtual private network (VPN) across TCP/IP-based data networks such as the Internet. It provides a password-protected path through the enterprise firewall to the enterprise server environment in which the network and session services required by thin clients reside. An Internet Service Provider (ISP) must be available to provide access to the Internet. Any of the standard means of connecting to the ISP may be used, such as a dial-up modem, cable modem, and DSL modem. The connection to the ISP must be established first, before contacting the enterprise PPTP VPN server. This includes dial-up access as well as direct access through the cable modem and DSL modem paths.



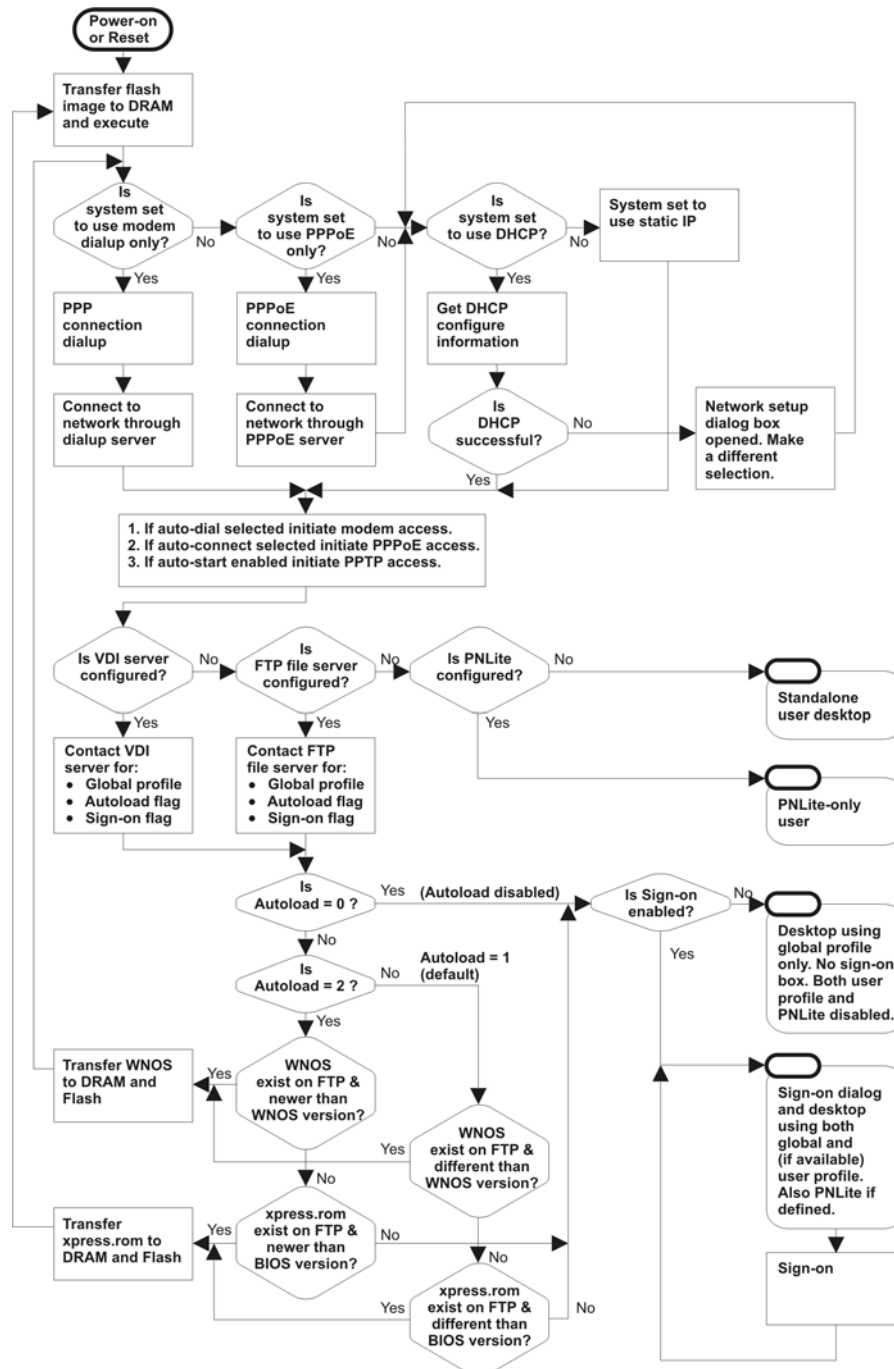
Note

For more information on these methods of access (and configuring the thin client locally), refer to the *Users Guide: Wyse ThinOS™*.

Understanding How to Configure Your Network Services

Network services used by the thin client can include DHCP, FTP file services, Virtual Desktop file services, DNS, and so on. How you configure your network services depends on what you have available in your Wyse ThinOS environment and how you want to design and manage it. To help you understand how a thin client can “fit” into an environment, Figure 1 shows the thin client boot flow process.

Figure 1 Boot flow process



The following topics in this section provide important overview information on the supported service situations you may have when configuring the network services for your Wyse ThinOS environment (after becoming familiar with your environment requirements, refer to "Configuring Network Services" for detailed instructions):

- "DHCP and FTP Servers Available"
- "FTP Server Available (DHCP Server Unavailable)"
- "DHCP and Virtual Desktop Servers Available"
- "Virtual Desktop Server Available (DHCP Server Unavailable)"
- "FTP and Virtual Desktop Servers Unavailable (Stand-alone User or PNAgent/PNLite-only User)"



Caution

If a thin client accesses the enterprise intranet through Dial-up, PPPoE, or PPTP VPN and the thin client is locked-down, a non-privileged or low-privileged user attempting to reboot to Stand-alone user mode will disable the **Network Setup** dialog box and system reset capabilities. The user will not be able to re-access the enterprise intranet through this path. If this happens, the thin client must be moved to a location where it can access the enterprise intranet directly (Ethernet cable) and reboot so that you as an administrator can make any required changes to the thin client operating configurations through the user profiles (for example, set the user profile to unlock the thin client).

If the thin client is configured for Dial-up access, there must be an RAS server answering the configured telephone number. Otherwise, the thin client will require factory attention to recover it.

DHCP and FTP Servers Available

As a network administrator in an environment where DHCP and FTP servers are available, you can set up both DHCP and FTP network services and create "global" and "user" INI files as described in the *Reference Guide: Wyse ThinOS™ INI Files*.



Note

A thin client is initially (new-thin client or reset thin client to default configurations) configured to obtain its IP address and the location of the FTP server from a DHCP server. DHCP can only be used for the Ethernet Direct access and Wireless Direct access configurations.

A wnos.ini file contains the "global" parameters you want that will affect all thin clients accessing the file server. A {username}.ini file contains the user-specific or "user profile" parameters you want that will comprise the connection profile for an individual user. For information on constructing these INI files, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

If Wireless Direct access is used, the **Wireless Setup** dialog box must also be configured locally (see the *Users Guide: Wyse ThinOS™* for wireless configuration instructions).

After DHCP and FTP servers are configured and available, simply connect the thin client to the network (either directly through a network cable or through a wireless network device), turn it on, and begin using the thin client. A sign-on name and password may be required for access to the session services. If applications (published by Citrix PNAgent/PNLite services) are available, a Domain name must be entered or selected from the list. Connections or applications may start automatically if they are configured to automatically start in the INI files.

**Note**

If session connections or published applications are designated to open automatically on start-up, upon accessing the enterprise server environment you will see a session server log-in or server application window instead of the thin client desktop. Use CTRL+ALT+UPARROW to toggle between window display modes. Use CTRL+ALT+DOWNARROW to open a selection box for toggling between the desktop, the Connect Manager, and currently-active connections.

If the thin client accesses the enterprise server environment through a manually initiated Dial-up, PPPoE, and/or PPTP VPN, the automation provided by a DHCP server is not available. In such cases, refer to "FTP Server Available (DHCP Server Unavailable)" and "FTP and Virtual Desktop Servers Unavailable (Stand-alone User or PNAgent/PNLite-only User)" for configuration information.

**Note**

If Dial-up, PPPoE, and/or PPTP VPN are automatically started, FTP server services can be accessed through these connections.

FTP Server Available (DHCP Server Unavailable)

In an environment where a DHCP server is not available but an FTP server is available, the thin client user must locally enter (using the **Network Setup** dialog box) network information that would otherwise be supplied by the DHCP server.

If the thin client is configured for DHCP (new-thin client or reset thin client to default configurations) but DHCP is not detected on the network, the **Network Setup** dialog box automatically opens when the thin client is started. You can also open the **Network Setup** dialog box manually by clicking on the desktop background, selecting **System Setup** from the desktop menu, and then clicking **Network**. In the **Network Setup** dialog box, select the **Statically specified IP Address** option and configure the dialog box for the following information (any remaining information will be automatically populated from the INI files when the FTP server is contacted):

- Static IP address of the thin client
- Subnet Mask
- Default Gateway
- DNS Domain Name (not necessary if DNS is not used)
- DNS Server Address (not necessary if DNS is not used)
- File Server IP address or DNS name of the FTP server on which the INI files reside and the FTP path on the server to /wnos.
- PNAgent/PNLite Servers list (If PNAgent/PNLite is deployed on the network environment, enter the IP address or Host name with optional TCP port number of one or more PNAgent/PNLite servers that will provide published applications on the network)
- Ethernet Speed
- WINS Server Address (not necessary if WINS is not used)
- Username and Password for login to the FTP server
- Rapport Server Address (not necessary if Rapport server is not used)
- Time Server

**Note**

A wnos.ini file contains the “global” parameters you want that will affect all thin clients accessing the file server. A {username}.ini file contains the user-specific or “user profile” parameters you want that will comprise the connection profile for an individual user. For information on constructing these INI files, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

After the network settings are configured, reboot the thin client before using it. A sign-on name and password may be required for access to the session services. If applications (published by Citrix PNAgent/PNLite services) are available, a Domain name must be entered or selected from the list. Connections or applications may start automatically if they are configured to automatically start in the INI files.

DHCP and Virtual Desktop Servers Available

A thin client is initially (new-thin client or reset thin client to default configurations) configured to obtain its IP address and the location of the Virtual Desktop server from a DHCP server. DHCP can only be used for the Ethernet Direct access and Wireless Direct access configurations.

As a network administrator in an environment where DHCP and Virtual Desktop servers are available, you can set up both DHCP and Virtual Desktop network services and create “global” and “user” INI files (in the Virtual Desktop Broker) as described in the *Reference Guide: Wyse ThinOS™ INI Files*.

**Note**

A thin client is initially (new-thin client or reset thin client to default configurations) configured to obtain its IP address and the location of the Virtual Desktop server from a DHCP server. DHCP can only be used for the Ethernet Direct access and Wireless Direct access configurations. A wnos.ini file contains the “global” parameters you want that will affect all thin clients accessing the file server. A {username}.ini file contains the user-specific or “user profile” parameters you want that will comprise the connection profile for an individual user. For information on constructing these INI files, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

If Wireless Direct access is used, the **Wireless Setup** dialog box must also be configured locally (see the *Users Guide: Wyse ThinOS™* for wireless configuration instructions).

After DHCP and Virtual Desktop servers are configured and available, simply connect the thin client to the network (either directly through a network cable or through a wireless network device), turn it on, and begin using the thin client. A sign-on name and password may be required for access to the session services. If applications (published by Citrix PNAgent/PNLite services) are available, a Domain name must be entered or selected from the list. Connections or applications may start automatically if they are configured to automatically start in the INI files.

**Note**

If session connections or published applications are designated to open automatically on start-up, upon accessing the enterprise server environment you will see a session server log-in or server application window instead of the thin client desktop. Use CTRL+ALT+UPARROW to toggle between window display modes. Use CTRL+ALT+DOWNARROW to open a selection box for toggling between the desktop, the Connect Manager, and currently-active connections.

If the thin client accesses the enterprise server environment through a manually initiated Dial-up, PPPoE, and/or PPTP VPN, the automation provided by a DHCP server is not available. In such cases, refer to "Virtual Desktop Server Available (DHCP Server Unavailable)" for configuration information.

**Note**

If Dial-up, PPPoE, and/or PPTP VPN are automatically started, Virtual Desktop server services can be accessed through these connections.

Virtual Desktop Server Available (DHCP Server Unavailable)

In an environment where a DHCP server is not available but an Virtual Desktop server is available, the thin client user must locally enter (using the **Network Setup** dialog box) network information that would otherwise be supplied by the DHCP server.

If the thin client is configured for DHCP (new-thin client or reset thin client to default configurations) but DHCP is not detected on the network, the **Network Setup** dialog box automatically opens when the thin client is started. You can also open the **Network Setup** dialog box manually by clicking on the desktop background, selecting **System Setup** from the desktop menu, and then clicking **Network**. In the **Network Setup** dialog box, select the **Statically specified IP Address** option and configure the dialog box for the following information (any remaining information will be automatically populated from the INI files when the Virtual Desktop server is contacted):

- Static IP address of the thin client
- Subnet Mask
- Default Gateway
- DNS Domain Name (not necessary if DNS is not used)
- DNS Server Address (not necessary if DNS is not used)
- Ethernet Speed
- WINS Server Address (not necessary if WINS is not used)
- Username and Password for login to the FTP server
- Rapport Server Address (not necessary if Rapport server is not used)
- Time Server
- VDI Server

**Note**

A wnos.ini file contains the "global" parameters you want that will affect all thin clients accessing the file server. A {username}.ini file contains the user-specific or "user profile" parameters you want that will comprise the connection profile for an individual user. For information on constructing these INI files, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

After the network settings are configured, reboot the thin client before using it. A sign-on name and password may be required for access to the session services. If applications (published by Citrix PNAgent/PNLite services) are available, a Domain name must be entered or selected from the list. Connections or applications may start automatically if they are configured to automatically start in the INI files.

FTP and Virtual Desktop Servers Unavailable (Stand-alone User or PNAgent/PNLite-only User)

In an environment where FTP and Virtual Desktop Broker servers are not available (for example, Stand-alone User or PNAgent/PNLite-only User situations), configuration files are not available and network information must be entered locally at the thin client as follows:

- **Stand-alone User** - This user does not access user profiles or PNAgent/PNLite-published applications. **New** and **Settings** command buttons appear in the Connect Manager for use (if the Connect Manager does not open automatically, open it from Desktop menu). These command buttons are also available to low-privileged and non-privileged users. Locally entered connection definitions (using these command buttons) are preserved for the next thin client use after the thin client is powered off and restated (automatic software updates, however, are not available when the thin client is powered on again).
- **PNAgent/PNLite-only User** - This user does not access user profiles, but applications (published by Citrix PNAgent/PNLite services) are available (the IP address of a PNAgent/PNLite server and Domain are entered into the **Network Setup** dialog box or available through DHCP options 181 and 182). A log-on dialog box (similar to the standard log-on dialog box) opens for logging on to the PNAgent/PNLite server. Applications published by PNAgent/PNLite are listed in the Connect Manager (Published applications that add a shortcut to the client desktop will have an icon on the desktop which you can double-click to open). Locally entered connection definitions are not preserved for the next thin client use after the thin client is powered off and restated.

Configuring Network Services

Before you use the information in this section to configure your network services, be sure you have read "Understanding How to Configure Your Network Services" and remember the following important issues:

- **Restrictions to Network Services can Exist** - Thin client network services reside on the enterprise intranet. When setting up thin client network services, remember that if thin clients are to access the enterprise intranet through Dial-up, PPPoE, or PPTP VPN, restrictions imposed by these access paths must be considered.
- **Know How Your Environment Works** - Either the FTP server or the Virtual Desktop server (depending on your environment) holds the INI files, while the FTP server (if available) holds the current and upgrade versions of the thin client software.

The thin client software is acquired from either local flash memory or the FTP server. During the boot process, the local image is transferred to RAM and executed far enough for the thin client to check the image and the INI files on the file servers. Under direction of the INI files and the version of the remote image, the image in RAM can be replaced with the remote image; and separately, the remote image can update the local flash-memory.

- **Functionality Depends on You** - The Wyse ThinOS INI files contain the parameters and associated values necessary for the various functionality you want. The INI files (wnos.ini file and {username}.ini file) are constructed and maintained by you and are stored on the file server for use with thin clients running Wyse ThinOS.



Note

The INI files contain connection definitions and thin client settings. These text-based files must be created and maintained by using an ASCII text editor. If the INI files are omitted or they cannot be accessed because a file

server is not used, the thin client user must enter connection definitions locally (or for FTP servers, use what is published by PNAgent/PNLite servers residing on the network).

You can also define connections in the INI files which are to be stored in local NV-RAM and used in cases where the file server fails.

A `wnos.ini` file contains the "global" parameters you want that will affect all thin clients accessing the file server. A `{username}.ini` file contains the user-specific or "user profile" parameters you want that will comprise the connection profile for an individual user. The thin client accesses the `wnos.ini` file upon thin client initialization and accesses any individual `{username}.ini` file when the user logs on (if user logon is required, the `{username}.ini` file must exist *before* that user can log on). For information on constructing these INI files, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

To configure network services, use the information in the following sections:

- "Configuring FTP Servers"
- "Configuring Virtual Desktop Infrastructure Servers"
- "Configuring DHCP"
- "Configuring DNS"
- "Configuring WINS"
- "Configuring Wyse Device Manager Servers"
- "Configuring Wireless Access"

Configuring FTP Servers

Before you use the information in this section to configure your FTP server, be sure you understand and use the following guidelines:

- **General Guidelines** - When the thin client boots, it accesses the software update images and INI files from the FTP server. The FTP server and path to the software update files are available through DHCP vendor options 161 and 162 (see "Configuring DHCP"). If these are not specified, the default FTP server is the DHCP server from which the thin client receives its IP address and the default directory (`\wyse\wnos` for Windows FTP servers, or `/wyse/wnos` for Linux FTP servers).

The FTP server and path to the software update files can also be specified locally on the thin client. DHCP options 184 and 185 can be used to provide the User ID and Password for non-anonymous access to the FTP server in Wyse ThinOS version 4.3 and later. For Wyse ThinOS versions earlier than 4.3, the file server must have anonymous login capability and provide at least file read privilege for the anonymous user (it must also provide file write privilege if users are allowed to change their passwords).

- **Non-Anonymous Access Guidelines** - You must first create a local account (name the account so that you remember it is a non-anonymous account) on the FTP server defined between the DHCP vendor options 161 and 162 (DHCP server). Then, add DHCP options 184 and 185 to provide the User ID and Password for non-anonymous access to the FTP server. Ensure that option 184 is the account User ID and that option 185 is the account Password, and that you keep consistency with FTP server DHCP vendor options (for example, ensure that the 184 and 185 options are string parameters). Then provide the non-anonymous account with read-only permissions through the entire FTP server path. Be sure to modify these guidelines according to your specific security environment and configuration.
- **Windows FTP Server Guidelines** - You can use the FTP tools available on the Windows server. For Wyse ThinOS versions earlier than 4.3, be sure the Windows server supports the anonymous log-in capability. For Wyse ThinOS version 4.3 and later, this support is not necessary because of the User Interface (UI)/DHCP feature to specify the login ID and password.

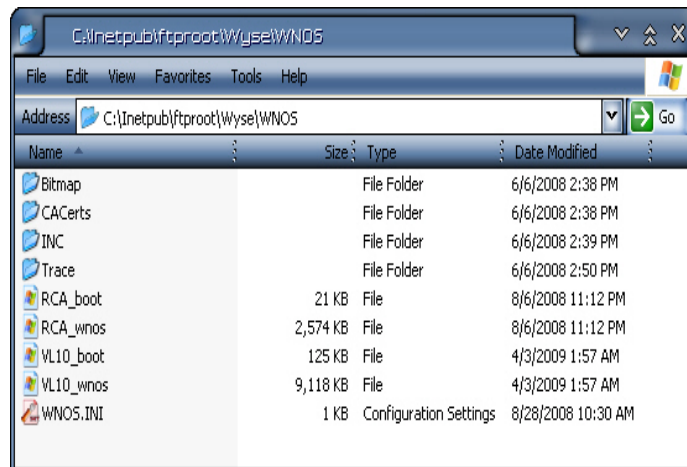
- **Linux FTP Server Guidelines** - Be aware of the following:
 - The FTP server must be configured to offer FTP services (by adding the following line or equivalent to the `/etc/inetd.conf` file, if it is not already present):

```
ftp stream tcp nowait root /usr/sbin/tcpd in.proftpd
```
 - The FTP server must be configured to support anonymous FTP. For most FTP servers, this requires establishment of an FTP login account by adding the following line or equivalent to the `/etc/passwd` file:

```
ftp:x:17:1:Anonymous FTP directory:/home/ftp:/dev/null/ftp-shell
```

The shell file `/dev/null/ftp-shell` need not exist, but some FTP servers require that it be listed in the `/etc/shells` file to allow FTP connections on this account.
 - Depending on which Linux distribution you are using, additional modifications to a central configuration file for the FTP daemon may be necessary to enable anonymous FTP. You can try `man proftpd`, `man wuftp`, or `man ftpd` to access information applicable to your particular FTP daemon.
 - A Linux server used for FTP must support passive FTP.
- **FTP Folder Structure Guidelines** - The FTP folder structure that is required by thin clients running Wyse ThinOS is `\wyse\wnos` and must be placed under the FTP root folder (if DHCP option tag 162 is not used) or under the folder which has been specified by DHCP option 162. For example, if DHCP option tag 162 has been configured with the name *ThinClients* and DHCP option tag 161 has been configured with IP address 192.168.1.1, then the thin client will check the folder `<FTPRoot>\ThinClients\wyse\wnos` for a `wnos.ini` and firmware on the FTP server with the IP address (192.168.1.1). The sub-folder `\bitmap` must be placed under the `\wnos` folder and can contain graphical images for icons and background images. The sub-folder `\cacerts` can be placed under the `\wnos` folder and can contain your CA certificates. The sub-folder `\inc` can be placed under the `\wnos` folder and can contain the `mac.ini` files (note that the use of the parameter `Include=$mac.ini` will load `"/wnos/inc/mac-address.ini"` so that you can use `inc` in the folder structure and use `$MAC.ini`). The sub-folder `\trace` can be placed under the `\wnos` folder and can contain the trace files that you can capture and play back (be sure to enable the parameter, `EnableTrace=yes`). Figure 2 shows an example of the folder structure of an FTP server for Wyse ThinOS.

Figure 2 Example of the folder structure of an FTP server for Wyse ThinOS



To configure an FTP server, complete the following procedures:

1. Create the following directory structure on your FTP server:

```
<path from anonymous user FTP root>\wyse\wnos\  
<path from anonymous user FTP root>\wyse\wnos\bitmap\  
<path from anonymous user FTP root>\wyse\wnos\cacerts\  
<path from anonymous user FTP root>\wyse\wnos\inc\  
<path from anonymous user FTP root>\wyse\wnos\trace\  

```



Note

There is a difference between a path obtained from the DHCP server and a path entered in the UI. If the path is obtained from DHCP, /wyse/wnos are appended. If the path is obtained from the UI, the /wyse portion is not appended; only /wnos is automatically inserted. As written in this first step, the configuration procedure will only work in conjunction with a DHCP server.

2. If you need to upgrade the firmware for your thin client, you must have a Software Maintenance agreement to download the files (for details, go to <http://www.wyse.com/products/software/os/index.asp>). Copy the RCA_boot and RCA_wnos (if you have an S10) or V10L_boot and V10L_WNOS (if you have a V10L) and place it in the wnos subdirectory of your FTP server.
3. Obtain the Sample User INI files (go to <http://www.wyse.com/manuals>, search for sample.ini, click the reference guide link, and then click the sample ini link to open and use the file download dialog box to save the compressed file to a folder you want) and unpack them into a directory from which they can be examined and modified using an ASCII text editor. These sample files are annotated to allow you to use them as a starter set on your FTP server and can be modified to suit your needs. The compressed file includes:
- **wnos.kiosk** - Example wnos.ini file for a kiosk configuration
 - **wnos.login** - Example wnos.ini file to enable multiple user accounts
 - **user.ini** - Template for {username}.ini for individual user profiles
4. Determine whether all the thin clients served by this FTP server will be used as kiosks or will support individual user accounts. You must rename the downloaded files so that there will be one wnos.ini file available to all users globally; and for a multiple user account configuration there will be a unique {username}.ini file for each user. In addition:
- **If the kiosk configuration is to be used** - Change the name of wnos.kiosk to wnos.ini. Otherwise, for multiple user accounts, change the name of wnos.login to wnos.ini.
 - **If the individual user account configuration is to be used** - Make a copy of the user.ini file for each user name as {username}.ini (where {username} is the name of the user) and place the files in the subdirectory ini of wnos. The files must have read permission enabled, and if users are to be allowed to change their passwords, the files also must have write permission enabled (so that the thin clients can write the encrypted user passwords to them). **For Linux servers**, use the chmod command to set the read/write permissions. **For Microsoft servers**, use the Properties dialog box to set read/write permissions.
5. If desired, you can customize the INI files to match the local environment using the instructions in the *Reference Guide: Wyse ThinOS™ INI Files*. If you modify the INI files to include icons and logos, be sure to place the images in the FTP server /wnos/ bitmap subdirectory.

Configuring Virtual Desktop Infrastructure Servers

When the thin client boots, it accesses the INI files from a Virtual Desktop Infrastructure (VDI) server. VDI servers are available through DHCP vendor option 188 (see "Configuring DHCP").

The thin client communicates with a Virtual Desktop Broker server by the `sysinit`, `signon`, `signoff`, and `shutdown` commands. When the thin client boots and successfully connects in a Virtual Desktop environment, it sends the `sysinit` command to the Virtual Desktop Broker, which then sends back the `wnos.ini` file (if a broker connection cannot be made, the thin client will attempt to connect to an FTP or PNLite server). After the thin client successfully receives the `wnos.ini` from the Virtual Desktop Broker, a sign-on window displays, prompting the user for username and password credentials. The thin client then sends the `signon` command to the Virtual Desktop Broker with the username and password as its parameter. If the sign-on is successful, the Virtual Desktop Broker server will send back the `{username}.ini` file (if the sign-on is unsuccessful, the user is prompted again for username and password credentials). The `signoff` command will be sent when a user disconnects from the connection. The `shutdown` command will be sent when a user turns off the thin client power.

Configuring XenDesktop Support

XenDesktop is supported in Wyse ThinOS versions 6.2 and later without the need to use a Web browser. To connect to XenDesktop, do not use the `VDI Broker` parameter. Instead, use the same parameter and configuration that is used when connecting to a PNAgent/Lite server.

Configuring DHCP

Before you use the information in this section to configure your DHCP server, be sure you understand and use the following guidelines:

- **General Guidelines** - The DHCP service provides all thin clients on the network with their IP addresses and related network information when the thin clients boot. DHCP also supplies the IP address and directory path to the thin client software images and user profiles located on the file servers.

Use of DHCP is recommended. However, if a DHCP server is not available, fixed IP addresses can be assigned (this does, however, reduce the stateless functionality of the thin clients) and the fixed IP addresses must be entered locally for each device using the thin client **Network Setup** dialog box as described in "FTP Server Available (DHCP Server Unavailable)" and "Virtual Desktop Server Available (DHCP Server Unavailable)").

Many DHCP options correspond to places in the network configuration UI where the thin client user can enter information manually. Be aware that wherever there is information in the UI and the thin client receives information about the same function from one or more DHCP options, the information received from the DHCP server will replace the information contained in the UI. However, if the thin client does not receive information from the DHCP server about a particular function, the information manually entered in the UI will remain and will be used.

- **LPD Print Server Guidelines** - If a particular thin client is to function as an LPD print server, it can be assigned a fixed IP address. However, you can also guarantee that an LPD server will always have the same IP address by making a reservation for that thin client in the DHCP server. In that way, you can preserve the stateless nature of the thin client and still guarantee a fixed address for the server. In fact, you can assign a symbolic name to the reservation address so that other thin clients can reference the LPD server by name rather than by static IP address (the symbolic name must be

registered with a DNS server before other thin clients will be able to locate this LPD server). The thin client does not dynamically register its name and the DNS registration must be manual.

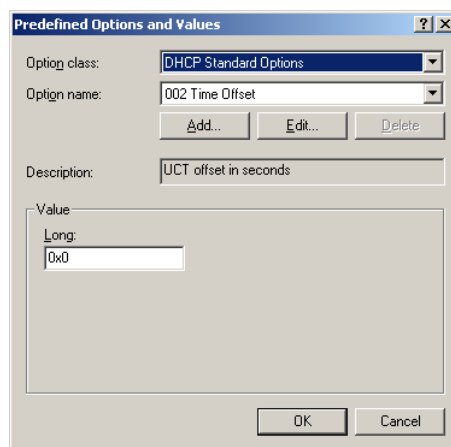
- **Wyse Device Manager™ (WDM) Guidelines** - If you use WDM, the thin client uses port 80 as the default to access a WDM server (formerly known as Rapport server). If a port other than 80 is used to access a WDM server, use option 187 in the list of DHCP options in Table 1 (option for a WDM server is option 186 in the list of DHCP options in Table 1). WDM options are the only options used by the thin client that are not in text form.
- **PNAgent/PNLite Server Guidelines** - If you use a PNAgent/PNLite server, the thin client uses port 80 as the default to access a PNAgent/PNLite server. If a port other than 80 is used to access a PNAgent/PNLite server, the port number must be specified explicitly with the server location in the form *IP:port or name:port* (option for a PNAgent/PNLite server is option 181 in the list of DHCP options in Table 1).
- **Windows DHCP Server Guidelines** - You can use the DHCP tools available on the Windows server.
- **Linux DHCP Server Guidelines** - For Linux servers, enter DHCP options 161 and 162 (described in Table 1) in `/etc/dhcpd.conf` (refer to the manual page `man dhcpd.conf` for more information on DHCP and the syntax of this file). For example, if you want the computer to search `ftp://132.237.16.157/pub/serversoftware/wnos`, add the following line to `/etc/dhcpd.conf`:

```
option option-161 132.237.16.157;option option-162 "pub/serversoftware$";
```

As mentioned in Table 1, the `/wnos` suffix is automatically appended to the FTP path, so you should not specify it explicitly. In this case, the actual directory searched will be `pub/serversoftware/wnos`.

- **DHCP Options Guidelines** - Wyse ThinOS uses several DHCP option tags. These option tags must be created, activated within the DHCP scope(s), and then added for the thin clients to use them. Figure 3 shows the Windows DHCP Server **Predefined Options and Values** dialog box that is displayed when right-clicking the DHCP server and selecting **Set Predefined Options**. The most commonly used tags are 161 and 186. Depending on the Terminal Server environment, more options can be added using the **Predefined Options and Values** dialog box.

Figure 3 Predefined Options and Values dialog box



Use the guidelines shown in Table 1 when creating and adding the DHCP option tags you need for your thin clients.

**Note**

Ensure that within the DHCP scope these new DHCP option tags you create are activated (this can be done using the **Configure Options** command), before you add them.

Table 1 DHCP Options

Option	Description	Notes
1	Subnet Mask	Required. However, it is not required unless the thin client must interact with servers on a different subnet (MS DHCP requires a subnet mask and will always send one).
2	Time Offset	Optional.
3	Router	Optional, but recommended. It is not required unless the thin client must interact with servers on a different subnet.
6	Domain Name Server (DNS)	Optional, but recommended.
15	Domain Name	Optional, but recommended. See Option 6.
28	Broadcast Address	Optional.
44	WINS servers IP Address	Optional.
51	Lease Time	Optional, but recommended.
52	Option Overload	Optional.
53	DHCP Message Type	Recommended.
54	DHCP Server IP Address	Recommended.
55	Parameter Request List	Sent by thin client.
57	Maximum DHCP Message Size	Optional (always sent by thin client).
58	T1 (renew) Time	Optional, but recommended.
59	T2 (rebind) Time	Optional, but recommended.
61	Client identifier	Always sent.
161	FTP server list	Optional string. Can be either the name or the IP address of the FTP server. If a name is given, the name must be resolvable by the DNS server(s) specified in Option 6. If the option provided by the server is blank or the server provides no value for the field, the machine on which the DHCP server resides is assumed to also be the FTP server.

Table 1 DHCP Options, Continued

Option	Description	Notes
162	Root path to the FTP files	<p>Optional string. If the option provided by the server is blank and the server provides no value for the field, a null string is used.</p> <p>\wyse\wnos is automatically appended to the search path. For example, if you enter pub\serversoftware, the path searched will be pub\serversoftware\wyse\wnos.</p> <p>Note: You can have the \wyse automatic component of the search path omitted by appending a dollar sign (\$) to the entered path. For example, if you enter pub\serversoftware\$, the path searched will be pub\serversoftware\wnos.</p> <p>Note: The usage or omission of a leading slash (\) on the path is critical on some servers. Some servers limit access to the root path of the user specified at login. For those servers, the usage of the leading slash is optional. Some *NIX servers can be configured to allow the FTP user access to the entire file system. For those servers, specifying a leading slash specifies that access is to start at the root file system. Proper matching of the file specification to the FTP server in use is critical to ensuring proper operation. A secured Windows server requires the slash be specified in order to complete proper access.</p>
181	PNAgent/PNLite server list	<p>Optional string. The thin client uses the server to authenticate the Windows credentials of the user and to obtain a list of ICA published applications valid for the validated credentials. The user supplies those credentials when logging in to the thin client.</p>
182	NT domain list for PNAgent/PNLite	<p>Optional string. The thin client creates a pull-down list of domains from the information supplied in option 182. This list is presented at thin client login in the order specified in the DHCP option (for example, the first domain specified becomes the default). The selected domain is the one which must authenticate the user ID and password. Only the selected domain is used in the authentication process. If the domain list is incomplete and the user credentials must be verified against a domain not in the list (assuming that the server in option 181 is capable of authenticating against a domain not in the list), the user has the option of not using any of the domains specified in option 182 and typing a different domain name at the time of login.</p>

Table 1 DHCP Options, Continued

Option	Description	Notes
184	FTP Username	Optional string. Wyse ThinOS version 4.3 and later only.
185	FTP Password	Optional string. Wyse ThinOS version 4.3 and later only.
186	Wyse Device Manager (WDM) server list (formerly know as Rapport)	Optional binary IP addresses of WDM. This option can specify up to two Wyse Device Manager servers. If two are specified, at boot time the thin client will attempt to check-in to the first server. If it cannot contact the first server it will try to check-in to the second server. Wyse ThinOS version 4.3 and later only.
187	WDM server port (formerly know as Rapport)	Optional number. Byte, word, or two-bytes array. NOTE: The value of this option tag, when not embedded in Vendor Class Specific Information option, is interpreted in reverse order when it is sent as 2 bytes (for example, the value of 0x0050 was interpreted as 0x5000). This option tag was used by old Wyse ThinOS releases. New Wyse ThinOS releases still accept this option tag for backward compatibility.
188	Virtual Desktop Broker port	Optional string.
190	WDM secure port (formerly know as Rapport)	Optional number. Word, or two-bytes array. Specifies to use HTTPS to communicate with WDM instead of HTTP.
192	WDM server port (formerly know as Rapport)	Optional number. Word, or two-bytes array. NOTE: The value of this option tag represents the same information as option tag 187. The difference is that Wyse ThinOS interprets the value of this option tag in correct order (for example, the value of 0x0050 is interpreted as 0x0050). If the DHCP server provides both option tag 192 and 187, option tag 192 takes precedence.

**Note**

The thin client conforms to both RFC-compliant DHCP servers (RFC numbers 2131 and 2132) and RFC-noncompliant Microsoft servers (which NULL terminate strings sent to the thin client). The thin client supports both infinite leases and leases that expire (per RFC 2131 and others).

**Note**

Not all options in the range 128-254 are strings. Options 186, 190, and 192 are employed for all Wyse products that use WDM. Their format and content are determined by the WDM product.

Configuring DNS

Thin clients accept valid DNS names registered on a DNS server available to the enterprise intranet. In most cases, DNS is not required but may be used to allow hosts to be accessed by their registered DNS names rather than their IP addresses. Every Windows DNS server in Windows 2000 and later includes Dynamic DNS (DDNS) and every server registers dynamically with the DNS server. There are also DDNS implementations available for *NIX environments. However, the thin client does not do dynamic registration, and therefore, requires a static or non-variant IP address and manual DNS registration in order to provide LPD support by name (for example, in the case where the thin client is used as an LPD printer server or if DHCP is not available). For DHCP entry of DNS domain and server location information, refer to "Configuring DHCP."

Configuring WINS

The thin client does not do dynamic registration and therefore, requires a static or non-variant IP address and manual Windows Internet Naming Service (WINS) registration. Use the network address of an available WINS name server. WINS allows the thin client user to specify remote systems by their host names rather than IP addresses. If a specific IP address (instead of a name) is entered for a connection, it rather than WINS will be used to make the connection. These entries are supplied through DHCP, if DHCP is used.



Note

You may use two WINS server addresses, separated by a semicolon, comma, or space. The first address is for the primary WINS server and the second address is for a backup WINS server.

Configuring Wyse Device Manager Servers

Wyse Device Manager™ (WDM) servers provide network management services to the thin client (complete user-desktop control—with features such as remote shadow, reboot, shutdown, boot, rename, automatic device check-in support, Wake-On-LAN, change device properties, and so on). Use the IP addresses or host names with optional TCP port number for WDM servers. Each entry with optional port number is specified in the form *IP:port or name:port*, where *:port* is optional (if not specified, port 80 is used).

Configuring Wireless Access

Thin clients running Wyse ThinOS can support 802.11b/g/n wireless connections. WEP is used as the encryption method in 802.11b wireless access. WEP, WPA-Personal, WPA2-Personal, WPA-Enterprise and WPA2-Enterprise are used as the encryption and authentication methods in 802.11g/n wireless access. For a wireless access point, Cisco, TP-Link, and D-Link products are recommended. For a Radius server used in EAP-TLS, the IAS, FreeRadius and Cisco ACS are recommended.



Note

Internet Authentication Service (IAS) is the Microsoft implementation of a Remote Authentication Dial-in User Service (RADIUS) server and proxy. As a RADIUS server, IAS performs centralized connection authentication, authorization, and accounting for many types of network access; including wireless and virtual private network (VPN) connections.

The FreeRADIUS Server is a daemon for unix and unix-like operating systems which allows you to set up a radius protocol server (which can be

used for authentication and accounting for various types of network access). Cisco Secure Access Control Server (ACS) for Windows provides a centralized identity networking solution and simplified user management experience across all Cisco devices and security management applications.

Configuring for Transport Layer Security (TLS) Connections Over a LAN

The IEEE 802.1x standard allows a switch port to remain wired or enabled but not permit traffic to traverse the switch until the identity of the client is confirmed. IEEE 802.1x is a security feature. It defines the process of authenticating a wired or wireless client to allow the client to communicate with the network. Wyse ThinOS supports IEEE 802.1x for thin clients to be authenticated to access an Ethernet network. To enable this connection, you must download certificates from a Certificate Authority (CA), and then install and configure them for the thin client.

To configure the authentication options:

1. Open the **Network Setup** dialog box (click the desktop to open the menu, select **System Setup**, and then click **Network**).
2. Click the **Authentication** tab.
3. Select either the **Wire** or **Wireless Authentication Mode** option (**Wire** is the default mode).
4. Select the **Enable IEEE802.1x Authentication** check box.
5. In the **EAP Type** drop-down list, select an *Extensible Authentication Protocol* option (either **TLS**, **LEAP**, or **PEAP**).



Note

In *Wire* mode, only the **TLS** EAP type is available; in *Wireless* mode, the **TLS**, **LEAP**, and **PEAP** EAP types are available.

6. Use the following guidelines to configure the *EAP Type* option you selected:
 - **TLS** - If you select the **TLS** option, click **Properties** to open and configure the **Authentication Properties** dialog box (you can use **Browse** to find and select the Client Certificate file and Private Key file you want). Note that the CA certificate must be installed in the device.
 - **LEAP** - If you select the **LEAP** option, click **Properties** to open and configure the **Authentication Properties** dialog box (be sure to use the correct Username and Password for authentication). Note that the maximum length for the username or the password is 64 characters.
 - **PEAP** - If you select the **PEAP** option, click **Properties** to open and configure the **Authentication Properties** dialog box (be sure to select either **EAP_GTC** or **EAP_MSCHAPv2**, and then use the correct Username, Password, and Domain, if necessary, for authentication). To configure EAP-GTC, enter the username only, and the password or PIN will be asked when authenticating. To configure EAP-MSCHAPv2, enter the username, password, and domain (domain\username in the username box is supported, but you must leave the domain box blank). Note that the CA certificate must be installed in the device (the server certificate is forced to be validated).
7. In the **Network Setup** dialog box, select an **Import From** option (either **USB Key** -the default - or **File Server**) to configure where a user can import a new certificate, click **Import**, and then use the following guidelines to configure the option you selected:
 - **USB Key**: Select a certificate and click **OK** to import it to local memory.
 - **File Server**: Enter the path to the certificate, and then enter a username and password.

8. (*Wireless Networks Only*) Click **Wireless Setup** to open the **Wireless Setup** dialog box and use the following guidelines:

**Note**

The on-board NIC is “favored” if a valid link is detected, and the USB wireless will not be activated; otherwise, USB wireless becomes the system’s LAN, all configured network settings apply to the wireless network, and the USB wireless controls the NIC and functions such as the local Ethernet. Currently, only the Action Tec USB wireless card is supported.

- **Mode:** Select either the **Infrastructure** or **Ad Hoc** option.
Infrastructure - Select **Infrastructure** for access point wireless networks in which thin clients connect to access points as they move from place to place (for example, from floor to floor) or require a new access point due to traffic congestion.
Ad Hoc - Select **Ad Hoc** for computer-to-computer wireless networks in which thin clients connect to one another directly.
- **SSID:** Enter the name of the wireless network to which the thin client will connect (32 characters maximum).
- **Channel:** Select a channel number from 1 to 14.
- **Encryption:** Select one of eight user-defined WEP/WPA keys.
- **Algorithms:** Select either **Open** or **Shared Key** for WEP encryption.
- **Key:** Depending on which WEP/WPA key you selected, use the following guidelines:
None - Enter no characters.
WEP Key 1-4 - Enter 5 or 13 characters for the 64-bit or 128-bit encryption key, or 10 or 26 hex-decimal digits.
WPA_PSK or **WPA2_PSK** - Enter any value from 8 to 63 characters, or specify the numbers as 128 hex-decimal digits.
WPA_Enterprise or **WPA2_Enterprise** - Enter no characters.

Configuring Session Services

Before you use the information in this section to configure your ICA and RDP session services, be sure you understand and use the following guidelines:

- **General Guidelines** - Be aware of the following:
 - The Thin-client session services are made available by servers hosting Citrix ICA and Microsoft RDP software products.
 - A browser must be available through one of the session services to access any on-line help documentation for users.
 - There can be more connections than desktop space to display them.
 - Connections can be defined in persistent memory (with a statement reading `enablelocal=yes` in the `wnos.ini` file). These connections can be displayed as desktop icons only in Stand-alone mode with a Non-privileged user.
 - Only the connections defined in an INI file and containing an `icon=` clause will be displayed on the desktop (assuming there is adequate desktop space).
 - Connections can be displayed on the desktop without requiring a sign-on (when you define these connections in a `wnos.ini` file or when the `wnos.ini` file does not contain a `SignOn=yes` statement).
- **ICA Guidelines** - Independent Computing Architecture (ICA) is a three-tier, server-based computing technology that separates the logic of an application from its user interface. The ICA client software installed on the thin client allows the user to interact with the application GUI, while all of the application processes are executed on

the server. ICA connects to NT TSE, Windows Server 2003, Windows Server 2008, or Windows 2000 Server hosts that have a Citrix MetaFrame server, Citrix Presentation server, or CDS installed. Load balancing is included. ICA browsing or DNS can be used to resolve the server name. For information on configuring ICA, refer to "Configuring ICA Session Services." For detailed information on the supported parameters (in the INI files) that you can use for ICA connections, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

**Note**

The ICA server must be licensed from Citrix Systems, Inc. You must purchase enough client licenses to support the total concurrent thin client load placed on the Citrix server farm. A failure to connect when all client seats are occupied does not represent a failure of Wyse equipment. The ICA client software is installed on the thin client.

- **RDP Guidelines** - Remote Desktop Protocol (RDP), like ICA, is a network protocol that allows a thin client to communicate with the Terminal Server or Windows 2000/2003/2008 Server with Terminal Services over the network. This protocol is based on the T.120 protocol suite, an international standard multi-channel conferencing protocol. The thin client supports both RDP version 4.x and version 5.x. For information on configuring RDP, refer to "Configuring RDP Session Services." For detailed information on the supported parameters (in the INI files) that you can use for RDP connections, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

About Wyse TCX Software

Wyse® TCX Software™ provides an enrichment layer above ICA and RDP connections that enable multiple monitor awareness, rich multimedia playback, high quality bidirectional audio capabilities, and seamless USB device access for Wyse thin clients. Wyse ThinOS has built-in support for the following Wyse TCX solutions (a license may be required to activate a feature):

- Wyse® TCX Multi-Display™
- Wyse® TCX Multimedia™
- Wyse® TCX Rich Sound™
- Wyse® TCX USB Virtualizer™
- Wyse® TCX Flash Redirection™

For more information about Wyse TCX software and support platforms, visit www.wyse.com/tcx.

About Wyse Virtual Desktop Accelerator Software

Wyse® Virtual Desktop Accelerator (VDA) is a software product that, when used with Wyse thin clients, provides an "accelerated" user experience on remote desktop sessions with high round-trip delay between the server and client. By accelerating the remote desktop protocols by a factor of up to 3 times on certain networks, a Wyse VDA session with a server located thousands of miles from your thin clients "feels" similar to a non-accelerated session with a server located just a few hundred miles from your thin clients.

Built for use on high-bandwidth high-latency networks that are prone to packet loss situations, primary use cases for Wyse VDA include:

- Datacenter Consolidation
- Desktop Cloud Computing
- Remote Off-Shore Desktop Computing

Configuring ICA Session Services

Before you use the information in this section to configure your ICA session services, be sure you have read "Configuring Session Services."

ICA session services can be made available on the network using either Windows 2000, 2003, or 2008 Server with Terminal Services and one of the following installed:

- Citrix MetaFrame XP
- Citrix Presentation Server



Note

If PNAgent/PNLite-published application services are to be made available to the thin clients, refer to "PNAgent/PNLite Installation Guidelines" when installing Citrix MetaFrame XP.

When using the instructions accompanying these products to install them and make sessions and applications available to the thin clients sharing the server environment, be aware of the following:

- If a Windows 2000, 2003, or 2008 Server is used, a Terminal Services Client Access License (TSCAL) server must also reside somewhere accessible on the network. The server will grant a temporary (120-day) license on an individual device basis. Beyond the temporary (120-day) license, you must purchase TSCALs and install them on the TSCAL server (you will not be able to make a connection without a temporary or permanent license).
- It is recommended that any ICA connection which traverses a Dial-up or WAN connection have `Lowband=yes` set in the INI files or the **Optimize for low speed link** option selected in the **Connection Settings (ICA)** dialog box.
- If an ICA connection is created using the Connect Manager and the **Host Names** or **Application Name** text box is left blank, a message appears prompting the user to enter the IP Address or Server Name of the ICA server to which to connect.
- An audio input port is available (Audio can be recorded).

PNAgent/PNLite Installation Guidelines

PNAgent/PNLite is a component of the Citrix XML publishing service. PNAgent/PNLite is an ICA connection mode that enables the thin client to connect to applications available (published) on an ICA server without having to configure connections for individual published applications.

Use the following guidelines during installation:

- **MetaFrame XP** - Installing MetaFrame XP supports XML publishing services. During installation, a series of prompts appear for you to follow. When you are prompted to install the XML Publishing Service, be aware that clicking **Yes** to this option allows you to change the default port (80) used by the service.
- **Citrix Presentation Server** - Installing Citrix Presentation Server supports XML publishing services. During installation, a series of prompts appear for you to follow.

The port to be used for XML publishing services must be known for making appropriate PNAgent/PNLite server location entries required by the operating mode (for related information, refer to "Configuring DHCP," the *Users Guide: Wyse ThinOS™* (for locally configuring the thin client using the **Network Setup** dialog box), and the *Reference Guide: Wyse ThinOS™ INI Files*). The thin client uses port 80 as the default port, but if a port other than 80 is used, the port number must be specified explicitly with the PNAgent/PNLite server location in the form `IP:port or name:port`, where `:port` is optional.

Configuring RDP Session Services

Before you use the information in this section to configure your RDP session services, be sure you have read "Configuring Session Services."

RDP session services can be made available on the network using any of the following:

- Windows 2000, 2003, or 2008 Server with Terminal Services installed
- Windows NT 4.0 Terminal Services (WTS) Edition
- Windows XP

When using the instructions accompanying these products to install them and make sessions and applications available to the thin clients sharing the server environment, be aware of the following:

- If a Windows 2000, 2003, or 2008 Server is used, a Terminal Services Client Access License (TSCAL) server must also reside somewhere accessible on the network. The server will grant a temporary (90-day) license on an individual device basis. Beyond the temporary (90-day) license, you must purchase TSCALs and install them on the TSCAL server (you will not be able to make a connection without a temporary or permanent license).
- It is recommended that any RDP connection which traverses a Dial-up or WAN connection have `Lowband=yes` set in the INI files or the **Optimize for low speed link** option selected in the **Connection Settings (RDP)** dialog box.
- If an RDP connection is created using the Connect Manager and the **Host Names** or **Application Name** text box is left blank, a message appears prompting the user to enter the IP Address or Server Name of the RDP server to which to connect.
- Wyse ThinOS version 4.2 and later supports an RDP connection with no encryption (found in older versions of Microsoft NT4-TSE servers).
- Wyse ThinOS version 4.2 and later supports server browsing over Server Message Block (SMB) when defining an RDP connection. SMB browsing restrictions mean that the server desired may not be listed, in which case the user will need to know either the name or IP address of the target server and enter that information into the text box (as it will not appear in the pull-down list).

3

Remote System Administration

This chapter provides remote system administration information to help you perform the routine tasks needed to maintain your Wyse ThinOS environment. It includes the following remote system administration information:

- "Using Wyse Device Manager Software For Remote Administration"
- "Updating Software"
- "Managing Icons and Logos"
- "Understanding and Using System Lockdown Operations"
- "Configuring Virtual Access Suite Support"

Using Wyse Device Manager Software For Remote Administration

Wyse Device Manager™ (WDM) servers provide network management services to the thin client (complete user-desktop control—with features such as remote shadow, reboot, shutdown, boot, rename, automatic device check-in support, Wake-On-LAN, change device properties, and so on).



Note

Ordering information for WDM is available on the Wyse Web site at: <http://www.wyse.com/products/software/rapport>.

Updating Software

The software version is embedded in both the RAM and flash memory images. This version information is used to compare the images on the FTP server to the currently-loaded flash image on the thin client. A major revision number supersedes a minor revision number when making the comparison. In turn the minor version number takes precedence over the build number. The image names and date-time stamps determine whether or not the update is newer than the version currently installed on the thin client.



Note

The code identifier is split into 4 parts, the major release identifier, the minor release identifier, the build number identifier, and the sub-build number identifier (if the sub-build number is 0, it will not be displayed). Each part is compared against the current code internal identifier in the same format. If the file identifier is greater, the update is performed. If the file identifier is less, the update is abandoned. If the file identifier is equal, the next term is examined until the build identifiers are found to be equal and the update is abandoned. This comparison process using the build number can be important in cases where you are using a beta release, or in cases where you need to reinstall a release with the same major and minor numbers but with an updated build.

After obtaining software updates from Wyse, you must replace the existing software images in the `wnos` subdirectory on the FTP server to allow the thin clients to automatically detect and self-install the new software (upon thin client system start). The FTP server address and exact path to these files are specified in DHCP Options 161 and 162 (if DHCP is not used, the path is specified in the **Network Setup** dialog box on the thin client).

Each time a thin client boots, it checks the software images on the FTP server, and if configured, automatically performs an update if a newer version is detected. Whether or not an update is performed depends on the *AutoLoad* parameter setting in the `wnos.ini` file as described in the *Reference Guide: Wyse ThinOS™ INI Files*.

Be aware that there is a significant distinction between using DHCP and not using DHCP to access the various necessary files as follows:

- If DHCP is used, thin client software automatically inserts the path command `/wyse` following what it receives from the DHCP server (unless the path is terminated by a `$`); this is done only if a value is received from DHCP. The dollar sign character (`$`) acts as a flag that notifies Wyse ThinOS that the absolute path has been given (that is, where it expects to find Wyse ThinOS configuration files inside a “wnos” folder) instead of the relative path (where it expects to find the general “wyse” configuration folder).
- If DHCP is not used and the configuration is done manually, the full path up to the `wnos` component must be inserted; there is no automatic `/wyse` insertion and no `$` processing.
- For users familiar with Wyse 3 series thin clients, the Wyse 3 series equipment does processing on both DHCP and manual input, as well as `$` processing (as `$` is a legal meta-character in manually entered strings). Wyse ThinOS software does not recognize a `$` terminator as a legal meta-character in a locally entered string.



Note

Citrix does not supply an ICA client for the Wyse thin client platforms. Citrix ICA Auto-Update does not function for the ICA client installed on the thin client; the ICA client is fully contained in the thin client system and can only be updated by changing that entire system. The RDP client is also not replaceable.



Caution

Interrupting power during the update process can corrupt the FLASH on the thin client. Thin clients with corrupted FLASH must be shipped to Wyse for service.



Note

Note the following thin client update processes:

Model SX0: (Step 1) If called for, the thin client first searches in the `wnos` directory for `RCA_wnos`. If this file exists with a different internally encoded version number than the image currently in flash memory, and depending on the `wnos.ini` file *AutoLoad* parameter setting, the thin client will load this image into flash and reboot. (Step 2) The thin client will then (regardless of any circumstance in step 1) check for a file named *express.rom* and begin updates, if appropriate. If an update is done, the thin client will again reboot.

Model VX0: (Step 1) If called for, the thin client first searches in the `wnos` directory for a file named `VL10_wnos`. If this file exists with a different internally encoded version number than the image currently in flash memory, and depending on the `wnos.ini` file *AutoLoad* parameter setting, the thin client will load this image into flash and reboot. (Step 2) The thin client will

then (regardless of any circumstance in step 1) check for a file named *express.rom* and begin updates if appropriate. If an update is done, the thin client will again reboot.

Managing Icons and Logos

Icons and logos specified in the INI files must be placed in the file server `/wnos/bitmap` subdirectory. Icons are specified in the *Icon* clause of the connection statement and logos are specified in the *FormURL* statement. Supported image file types include `.ico` (icon), `.bmp` (bitmap), `.jpg` (JPEG), and `.gif` (GIF). Color depth for logos can be up to 256 colors. Color depth for icons can be 16 colors. It is recommended that `.jpg` format not be used for desktop icons.

Use the following guidelines:

- Typical desktop icons are 64 x 48 pixels.
- Typical sign-on logos are 100 x 61 pixels, with transparent background.
- Maximum size for sign-on logos is 352 x 80 pixels (if smaller than this, it will be positioned in the upper-left corner).

Understanding and Using System Lockdown Operations

Lockdown status for a thin client is set or removed using the *LockDown* clause of the *Privilege* statement in the INI files. Lockdown establishes the default privilege level following thin client boot and before any privilege statement is read from an INI file. Access to many facilities is affected by the privilege level.

- **Non-Lockdown Operation** - For normal operation, Low-privileged and Non-privileged users may access the **Network Setup** dialog box by temporarily disconnecting the Ethernet cable from the thin client and rebooting to Stand-alone user mode. The **Network Setup** dialog box can also be accessed after resetting the thin client to factory defaults (by a G-key reset to factory default or using the **Reset the system setting to factory defaults** check box in the Sign-off/Shutdown window of any user with sufficient privilege to the Sign-off/Shutdown window.
- **Lockdown Operation** - In most cases, access to the resources available when the system is not locked down is desirable; however, network environments requiring maximum security should not permit uncontrolled changes to thin client network access. Most facilities would include a *Privilege* with *LockDown* statement in the `wnos.ini` file and might override the privilege in a `{username}.ini` file without modifying the lockdown privilege. Thus, an administrator could log into any unit and have sufficient privilege to modify the configuration of that unit without altering the default privilege at the next reboot.



Caution

If the unit is configured for Dial-up access, there must be an RAS server answering the configured telephone number. Otherwise, the unit will require factory attention to recover it.

Configuring Virtual Access Suite Support

This section explains how to support the Wyse ThinOS with Provision Networks Virtual Access Suite (VAS). To support Wyse ThinOS with VAS, you must do the following:

- Download Wyse ThinOS firmware version 5.3.0_14 or later and store it on all Connection Brokers under the WNOS directory (see “Updating the Wyse ThinOS Firmware (VAS Support)”).
- Download hotfix 5 for VAS 5.8 (Release 8) from the Provision Networks Web site and install the hotfix on all Connection Brokers.

Installing the VAS Hotfix

Hotfix 5 for VAS 5.8 (Release 8) includes: PNCONSOLE.EXE (5.8.208.15), PNBRKSVC.EXE (5.8.200.64), and sample INI files. After you download and install the hotfix, set the DHCP server option tags 161 and 188 to the IP address(es) of the Connection Broker(s) using the following syntax (see "Configuring DHCP"):

```
<protocol>://<iplist>:port>
```

- **protocol**: http or https. This parameter is optional. If omitted, http is automatically used.
- **iplist**: The list of IP addresses corresponding to the Connection Brokers. The specified IP addresses must be separated by commas or semicolons.
- **port**: The TCP port that the Connection Broker(s) is/are configured to listen on. This parameter is optional. If omitted, ports 80 (http) and 443 (https) are automatically used.



Note

Option tag 161 is used to specify the servers from which the Wyse ThinOS firmware updates can be downloaded to the thin client, while option tag 188 is used to specify VDI brokers. Because the VAS Connection Brokers are capable of fulfilling both functions, option tags 161 and 188 may be configured identically.

On each Connection Broker, the hotfix creates a directory named WYSE under the VAS installation directory, a directory named WNOS under the WYSE directory, and two directories named bitmap and ini under the WNOS directory., as follows:

- C:\Program Files\Provision Networks\WYSE
- C:\Program Files\Provision Networks\WYSE\WNOS
- C:\Program Files\Provision Networks\WYSE\WNOS\bitmap
- C:\Program Files\Provision Networks\WYSE\WNOS\ini

The bitmap directory is used to store optional bitmap files (such as a corporate logo to be displayed on the thin client desktop) referenced in a wnos.ini file.

The wnos.ini file in the WNOS directory contains various WYSE commands and parameters. It is sent from the Connection Broker to the thin client upon boot-up. For detailed information on wnos.ini files, refer to the *Reference Guide: Wyse ThinOS™ INI Files*.

Enabling HTTP and HTTPS Support on the Connection Brokers (VAS Support)

The Connection Broker can be configured to accept http and https requests simultaneously. To support https requests, however, you must first obtain a Web server certificate for each Connection Broker.

Installing Connection Broker Web Server Certificates (VAS Support)

For https support, obtain a Web server certificate for each Connection Broker. You can obtain a certificate issued by an external certificate authority (such as Microsoft Certificate Server) or an external certificate authority (such as VeriSign or Entrust). After obtaining the certificates, use the following guidelines to install each certificate:

1. Display the left-hand pane in the Provision Management Console.
2. Expand the **Connection Brokers** node.
3. Right-click the node corresponding to the Connection Broker.
4. On the *General* tab, click **Configuration**, and then click **Server Certificate**.
5. Select the desired certificate from the list for installation.

Configuring the Connection Broker HTTP and HTTPS Ports (VAS Support)

To configure the Connection Broker http and https ports, use the following guidelines:

1. Display the left-hand pane In the Provision Management Console.
2. Expand the **Servers** node.
3. Right-click **Connection Brokers** and select **Properties**.
4. Select one or both protocol options (**http** and/or **https**).
5. Specify the corresponding TCP port numbers.



Warning

If IIS is installed on the same server, be sure to select non-conflicting TCP ports.

Configuring {username}.ini Files and RDP Connection Parameters (VAS Support)

After a user is successfully authenticated, the Connection Broker dynamically generates a user-specific configuration file named {username}.ini and sends it to the thin client. This file is generated entirely in memory and contains a list of RDP connection parameters referencing the authorized published desktop of the user.

The dynamically generated {username}.ini file contains the following list of mandatory RDP connection parameters:

- *Application*: Name of published desktop
- *Description*: Description of published desktop
- *Icon*: The icon displayed on WYSE desktop
- *Username*: User account name
- *Password*: User password
- *Domainname*: Windows domain

To specify additional RDP connection parameters to the dynamically generated {username}.ini file, you must configure a custom RDP. ini file under the WNOS directory (for a list of optional RDP connection parameters that can be used, refer to the *Reference Guide: Wyse ThinOS™ INI Files*). If an RDP. ini file exists under the WNOS directory, the Connection Broker automatically merges its contents into the dynamically generated {username}.ini after authenticating the user. The final {username}.ini file (containing the merged parameters) is then sent to the thin client for use.

**Note**

Optionally, additional parameters can be automatically appended to the dynamically generated {username}.ini. To append additional parameters, manually create {username}.ini files under the ini directory. If a manually created {username}.ini file exists in the ini directory, the Connection Broker merges its contents into the dynamically generated {username}.ini after authenticating the user. The final {username}.ini file (containing the merged parameters) is then sent to the thin client for use.

Updating the Wyse ThinOS Firmware (VAS Support)

To update the thin clients to the latest Wyse ThinOS firmware, obtain the latest Wyse ThinOS firmware file (RCA_wnos) and store it in the WNOS directory. Upon rebooting the thin clients, the firmware will be automatically updated, if necessary.

Option tag 161 must already be configured for the firmware update process to work (see "Configuring DHCP").

4

Local System Administration

This chapter provides local system administration information to help you perform the routine tasks needed to maintain your Wyse ThinOS environment. It includes the following local (at the thin client) system administration information:

- "Resetting to Factory Defaults Using G-Key Reset"
- "Resetting to Factory Defaults Using Shutdown Reset"
- "Resetting Display Settings Using V-Key Reset"
- "Accessing Thin Client BIOS Settings"
- "Enabling a Disabled Network Setup Dialog Box"
- "Configuring ThinPrint"

Resetting to Factory Defaults Using G-Key Reset

High-privileged or Stand-alone users can reset the thin client to factory default settings using the G-key reset feature.

To reset the thin client to factory default settings, restart the thin client and continuously tap the **G** key during the restart process. G-key reset impacts all configuration items, including, but not limited to, both network configuration and connections defined in local NV-RAM.



Note

G-key reset is disabled for Low-privileged and Non-privileged users in Lockdown mode.

Resetting to Factory Defaults Using Shutdown Reset

A High-privileged or Stand-alone user can reset the thin client to factory default settings from the Sign-off/Shutdown window as follows:

1. Select either **Shutdown and Restart the system** or **Shutdown the system**.
2. Select the **Reset the system setting to factory defaults** check box.
3. Click **OK**.

Shutdown reset impacts all configuration items, including, but not limited to, both network configuration and connections defined in local NV-RAM (Terminal name will not change).



Note

Shutdown reset is disabled for Low-privileged and Non-privileged users, regardless of lockdown state.

Resetting Display Settings Using V-Key Reset

If the display settings are inappropriate for the particular monitor that is connected, it is possible that the display will not function properly when the thin client restarts. To correct this, power-on the thin client while continuously tapping the **V** key. This will restart the thin client with a display resolution of 640 x 480 pixels and a 60 Hz refresh rate.

Accessing Thin Client BIOS Settings

While starting a Wyse thin client you will see a Wyse logo for a short period of time. During this start-up you can press **Del** to enter the BIOS of the thin client to make your modifications (enter **Fireport** as the password).

Enabling a Disabled Network Setup Dialog Box

Although there are privileges and user modes associated with user access to thin client resources, access to network setup (using the **Network Setup** dialog box) depends upon privilege level. A Stand-alone user either is by default a user with High privilege or has a thin client that is locked down. A Guest user has an implicit privilege of None and all access is governed by that privilege. A PNAgent/PNLite-only user has whatever privilege was set in the wnos.ini file at thin client boot, whatever privilege was locked down at the last access of a wnos.ini file, or High privilege (by default).

If the *Privilege* parameter is set to *Low* or *None* in the INI files, the thin client **Network Setup** dialog box will be disabled (the user cannot access it). In such a case, there may be occasion to access the **Network Setup** dialog box without wanting to change the INI files. For example, an occasion when you need to change to another FTP or Virtual Desktop file server or add to the PNAgent/PNLite servers list. To access the **Network Setup** dialog box in such a case, disconnect the network cable and reboot the thin client to Stand-alone user mode. The **Network Setup** dialog box displays after the thin client initializes and you can then make the required entries (be sure to reconnect the network cable and reboot when finished).



Caution

If a thin client accesses the enterprise intranet through Dial-up, PPPoE, or PPTP VPN and the thin client is locked-down, a Non-privileged or Low-privileged user attempting to reboot to Stand-alone User mode will disable the **Network Setup** dialog box and *System Reset* capabilities. The user will then be unable to re-access the enterprise intranet through this path. If this happens, the thin client must be moved to a location where it can access the enterprise intranet directly (Ethernet cable) and reboot so that you as an administrator can make any required changes to the thin client operating configurations (for example, set the INI files to unlock the thin client).

If the thin client is configured for Dial-up access, there must be an RAS server answering the configured telephone number. Otherwise, the thin client will require factory attention to recover it.

Configuring ThinPrint

No ThinPrint-specific configuration is available on the thin clients. Thus to be able to use ThinPrint, users must first set up their printers according to the user documentation, and then configure ThinPrint on the thin client (by clicking on the desktop background, selecting **System Setup** from the menu to open the **Network Setup** dialog box, and then clicking **Printer** to open and use the printer configurations).

Use the following guidelines:

- Use the **Printer Identification** field to enter a printer class (you can change the printer name as needed).
- Printer IDs are assigned (depending on the physical port) as follows:
 - COM1 = 1
 - COM2 = 2
 - LPT1 = 3 (USB printers are detected automatically on LPT1)
 - LPT2 = 4
 - LPD0 = 5 (The *LPD Queue name* is transmitted as the printer name; the Printer Identification as class)
 - LPD1 = 6 (The *LPD Queue name* is transmitted as the printer name; the Printer Identification as class)
 - LPD2 = 7 (The *LPD Queue name* is transmitted as the printer name; the Printer Identification as class)
 - LPD3 = 8 (The *LPD Queue name* is transmitted as the printer name; the Printer Identification as class)
 - SMB1 = 9 (In the form `\\host\printershare`)
 - SMB2 = 10
 - SMB3 = 11
 - SMB4 = 12

To install the relevant ThinPrint product on the server use the following guidelines:

- **Printer Object(s) Created Manually by the Administrator** - After you install .print Engine, create a printer object on the server to use the native driver and ThinPort as a printer port. You can use any protocol (TCP, RDP, or ICA) because Wyse ThinOS has .print clients for all of the protocols. The printer object needs to observe ThinPrint naming conventions (for example, *HPLJ5#.:2*, in which case print jobs will be sent to the local printer that has ID number .2) by referring to .print client port ID. If no ID number is present, the .print client sends the print job to the printer set as current.
- **Printer Object(s) Created Automatically by ThinPrint AutoConnect** - When using ThinPrint AutoConnect, the thin client identifies with the thin client ID number 84 (and thus is recognized as a thin client without a local spooler). You can also set up a template on the server that uses a native driver (for example, *HPLJ5*) and ThinPort, and then name this template as you want in the form *_#AnyName*. You can then make sure that the rules (on ThinPrint Autoconnect [1]) have been set to assign the desired local printers to use this server template. The assigned printer will then be shown in the user session using the *HPLJ5* driver and ThinPort; it will be named automatically according to ThinPrint naming convention with the printer name from the client side included. Alternatively, you can also define a template name according to the client printer name (replace *.AnyName.* with printer name 4. and 5. above [for example, *_#HP Laserjet 5*]) so that the local printer object *.HP Laserjet 5.* will be mapped to this template without any rules defined on the ThinPrint Autoconnect.

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Administrators Guide

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