Innomover Software

www.innomover.com

innoDesktop User Guide

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1. Introduction

innoDesktop is a J2ME VNC client for cross-platform mobile computing. By combining innoDesktop with VNC, you can remotely access and control your home or office computers using a Java mobile information device, such as mobile phone or PDA. All the program executions are purely on the server, thus you are no longer restricted by the limited computing power and storage space of the mobile information device. With innoDesktop, the capability of your mobile information device is immediately extended to match a desktop computer, while the reach of your home or office computer is immediately extended to be anywhere at anytime.

Figure 1 innoDesktop

innoDesktop is a J2ME extension of the VNC (Virtual Network Computing) project, an open-source project from AT&T Cambridge Lab. VNC is originally intended for computer-to-computer remote access and control, and innoDesktop extends it to Java-enabled mobile information device. As illustrated, the idea behind it is simple but effective: the server sends its display to innoDesktop, and innoDesktop can send keyboard and mouse events back to the server to control the server if allowed. By this way you could feel just like sitting beside your home or office computer. Even better, the VNC server not only supports Windows 9x/ME/NT/2000/XP/CE, but also Linux, Unix, Solaris, Macintosh, and DEC Alpha OSF1, which makes it a universal remote computer access and control solution.

2. Minimum Device Requirements

✓ Java Supported (CLDC 1.0 and MIDP 1.0 Compatible)
✓ Input (any one below):
  - "One-Handed Keyboard" (ITU-T Phone Keypad), or,
  - "Two-Handed Keyboard" ("QWERTY" Keyboard), or,
  - Touch Screen

Example of Compatible Devices:

Casio, Hitachi, Kyocera, LG, Mitsubishi, Motorola, Nokia, Panasonic, RIM, Samsung, Sanyo, Sharp, Siemens, Sony Ericsson, Toshiba Java phones.

A growing yet not exhaustive list of compatible devices can be found at http://wireless.java.sun.com/device/.

Notes:
- innoDesktop **supports both TCP socket and HTTP connection**. If your device supports TCP socket connection, such as most Motorola phones, you can select "use socket" option, which can improve performance.
- innoDesktop has been tested on Motorola T720/i, Accompli 388c, and Nokia Series 40 phones. If you manage to run innoDesktop successfully on other devices, please let us know. It is expected to be **able to run on most Java phones**. However, mobile network WAP gateway affects the actual HTTP behavior, and implementations may vary between devices. If you encounter problems using innoDesktop on your Java devices, please contact us and state the model of your device at support@innomover.com. You can always test innoDesktop by downloading the trial.

3. Installing innoDesktop and VNC Server

A working innoDesktop system includes:

VNC Server
The VNC server runs on your home or office computers. It accepts connections from innoDesktop and is responsible for transmitting the display to innoDesktop, receiving keyboard and mouse events and making them effective on the computer.

innoDesktop
innoDesktop runs on your personal mobile information device, such as mobile phone or PDA. You can view the remote desktop display and control the remote computer by using innoDesktop.

3.1. Installing VNC Server

VNC server can be downloaded at
http://www.realvnc.com/download.html
where the VNC documentation can also be downloaded. If you are not familiar with VNC, you can find instructions for installing and using VNC server in the documentation. An online version of VNC documentation can be found at
http://www.realvnc.com/documentation.html

Notes:
- In the "Select Additional Tasks" step, it's recommended to select **"Register VNC Server as a system service"**.
  Registering VNC server as a system service has **the advantage that you can connect to a machine even when nobody is logging into it**. It also allows you to send **"Ctrl-Alt-Del"** to the server, which can be very useful, such as unlocking a locked workstation.
- The maximum length for the password is 8 characters. Characters beyond the limit are discarded.
- Refer to the VNC documentation for other settings.

3.2. Installing innoDesktop

You can download the trial version of innoDesktop from
http://www.innomover.com/en/downloads/.
If you want to download and install innoDesktop Trial directly to your mobile and it

supports OTA delivery through the WAP browser, enter our WAP site URL (http://wap.innomover.com) into the browser on the phone.

If you want to obtain the commercial version of innoDesktop, you can go to http://www.innomover.com/en/products/innodesktop/buy.html for details. The commercial version is further optimized and removes the unpleasant behaviors after ten connections.

You should obtain both the .jad and .jar file.

Depending on your device, normally, the program can be installed via OTA (Over-The-Air), cable, infrared or Bluetooth. Refer to the user manual of your device for application installation procedures.

4. Using innoDesktop

After you launch innoDesktop, you can see a splash screen like Figure 2 (left).

Figure 2 Splash screen (left) and login form (right)

After the splash screen is dismissed, a login form shows up, see Figure 2 (right).

4.1. Login Form

The **server address** is often the IP address of your office or home computer, sometimes a domain name if applicable. You can find the IP address if you move your mouse over the VNC tray icon. If your computer is located on a LAN, then you may have to obtain the public address of the LAN and set *port forwarding*[1] for your VNC server. Contact your network administrator for detailed information and instructions. The **VNC display** should be consistent with the VNC server setting. **Password** is the one you have set in your remote VNC server. If you choose to **disconnect other clients**, then all the previously connected VNC clients on that server will be disconnected. If your device supports TCP socket connection, you can select **use socket** option, which can improve performance.

Notes:
- If your VNC server is behind a firewall, make sure that the port in use is not blocked (port 5900 for display 0, 5901 for display 1, 5900 + i for display i).

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[1] *Port forwarding* or *Virtual Server* allows people on the Internet to get to a server on your LAN in a very restricted way - like a single port or range of ports. Using port forwarding, one machine on your LAN can run a web server, another can run a game server, and another a VNC server. From the Internet, it would appear that all these services are on the same IP address.

Press "**CONNECT**" to accept input and connect to the server.
Press "**EXIT**" to exit the application.

4.2. Red Dot – the Local Pointer

After "CONNECT" is pressed, innoDesktop will start connecting to the server. Information about the ongoing connection progress will be displayed, see Figure 3 (left). After successfully connecting to the server, the top-left part of the server display is shown on the screen, see Figure 3 (right).
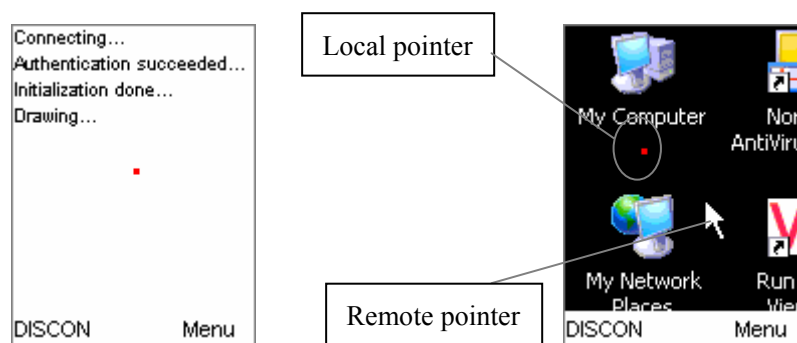

Figure 3 Connection progress (left) and main screen (right)

In the device display, there is a red dot showing. This red dot stands for the local pointer, which is not always at the same position as the actual mouse pointer on the server, see Figure 3 (right). Only when a mouse click happens, the location of the local pointer is then sent to update the server's mouse pointer position (the remote pointer). The separation of local and remote pointer minimizes the network traffic during intermediate pointer movements and improves the response time you perceived.

4.3. Basic Operations

innoDesktop can detect whether the device supports touch screen, and automatically adjust the interface. innoDesktop can be used with either touch screen or ITU-T phone keypad only.

4.3.1 ITU-T Phone Keypad Devices

Move Modes

For ITU-T phone keypad devices, the move mode concept is very important. There are three move modes available: *scroll screen*, *move cursor* and *arrow keys*. You can toggle between them in the command menu.
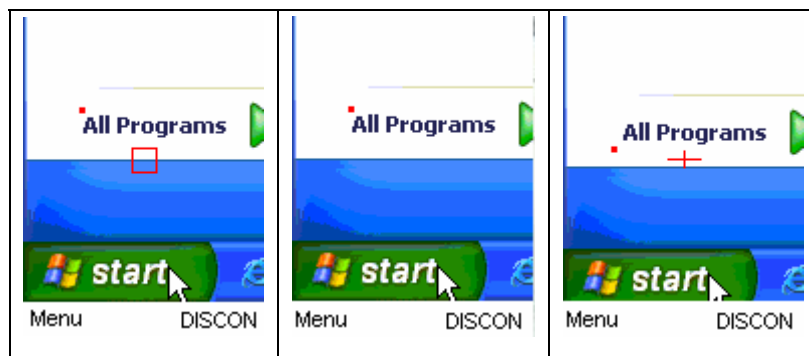

Figure 4 *Scroll screen* (left), *move cursor* (mid) and *arrow keys* (right) move modes

Scroll screen

In this mode, the left/right/up/down arrow key press scrolls the device screen to navigate around the server's desktop screen and shows different parts of it.

In this mode, key "1" is the shortcut to show the top-left of the server's desktop display, and key "2", "3", "4", "6", "7", "8", "9", corresponds to top-middle, top-right, middle-left, middle-right, bottom-left, bottom-middle, bottom-right respectively. Notice that if key "2", "4", "6", "8" are used as arrow keys (e.g. for phones that do not have dedicated left/right/up/down keys), then they are no longer available as shortcuts.

A rectangle will be shown in the middle of the device screen, indicating that the current mode is *scroll screen*, as shown in Figure 4 (left).

Move cursor

In this mode, the left/right/up/down arrow key press causes the corresponding movement of the local pointer (the red dot).

In this mode, press key "1" to move the cursor to the top-left of the device screen, and key "2", "3", "4", "6", "7", "8", "9", corresponds to top-middle, top-right, middle-left, middle-right, bottom-left, bottom-middle, bottom-right respectively. Notice that if key "2", "4", "6", "8" are used as arrow keys, then they are no longer available as shortcuts.

Arrow keys

In this mode, the left/right/up/down arrow key press on your mobile device emulates the corresponding arrow key press on the server keyboard.

A cross will be shown in the middle of the device screen, indicating that the current mode is *arrow keys*, as shown in Figure 4 (right).

Buttons

In any move modes, key "*" emulates the left mouse button, "#" emulates the right mouse button, and "5" switches between move modes. Key "0" scrolls the screen to the local pointer's position, as illustrated in Figure 5 below:

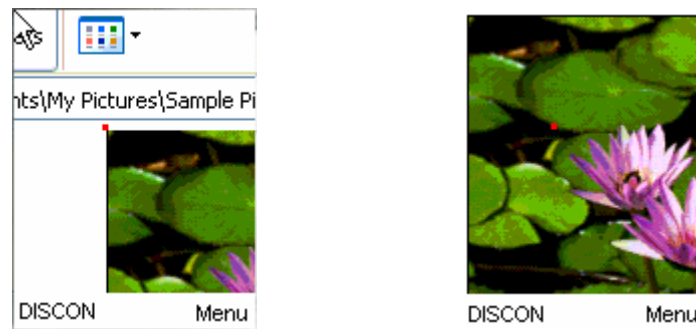
Figure 5 Scroll screen to local pointer position

Tips:

- Positioning your local pointer to the bottom-left of the device screen and pressing key "0" has the same effect as scrolling screen downwards; doing this at the top-right of the screen has the same effect as scrolling screen rightwards; doing this at the bottom-right of the screen has the effect of scrolling the screen right once and down once.

4.3.2 Touch Screen Devices

For touch screen devices, scrolling screen, moving mouse cursors and arrow keys are straight forward. You can do this easily by using the toolbar at the bottom of the screen, see Figure 6.
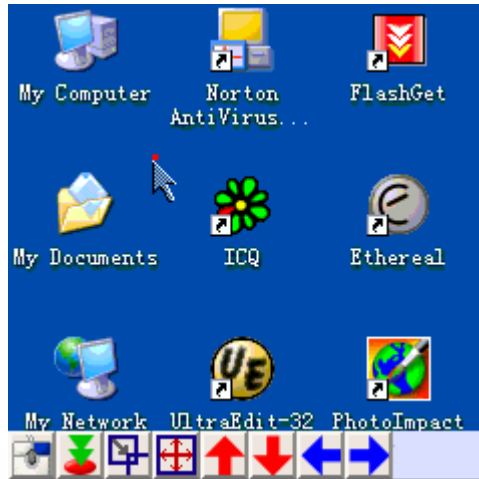
Figure 6 Touch screen device interface

When you **tap** on the screen, it will generate a **single left click by default** at that position. The functions of the toolbar are described as follows:

Set the next tap to a right click.

Set the next tap to a double-click.

Set the next tap to scroll screen to the tapped position, like Figure 5.

Toggle between *scroll screen* and *arrow keys* modes, their differences are shown below.

In *scroll screen* mode, tap the buttons to scroll screen.
In *arrow keys* mode, tap the buttons to emulate arrow key events.

4.4. Commands

Press "**DISCON**" to disconnect from the server and return to the login form.
Press "**MENU**" to bring up a list of available commands, as listed below.

SCROLL SCREEN
Toggle on *scroll screen* mode (not shown in touch screen devices). Refer to section 4.3 for details.

MOVE CURSOR
Toggle on *move cursor* mode (not shown in touch screen devices). Refer to section 4.3 for details.

ARROW KEYS

Toggle on *arrow keys* mode (not shown in touch screen devices). Refer to section 4.3 for details.

TEXT INPUT
Bring up a screen (textbox) for the user to input a text string. This emulates typing the keyboard of the server.

Press "**SEND**" to send the text to the server.
Press "**CANCEL**" to cancel the operation.

FUNCTION KEYS
Bring up a list of functional keys to be sent to the server, as listed below:

CTRL+ALT+DEL, DELETE, ENTER, HOME, END, PAGE UP, PAGE DOWN, BACKSPACE, TAB, ESCAPE, INSERT, F1-F12.

This emulates pressing the selected functional keys on the server.

Press "**SEND**" to send the selected functional key.
Press "**CANCEL**" to cancel the operation.

REFRESH SCREEN
Refresh the main screen.

PRESS CTRL/RELEASE CTRL
Toggle between CTRL-pressed and CTRL-released status.

PRESS ALT/RELEASE ALT
Toggle between ALT-pressed and ALT-released status.

PRESS SHIFT/RELEASE SHIFT
Toggle between SHIFT-pressed and SHIFT-released status.

CONNECTION INFO
Bring up a screen to show some basic information about the server and mobile, including mobile screen size (the canvas size), server name and server display resolution.

HELP
Bring up a screen that shows a brief guide of how to use innoDesktop.

ABOUT
Bring up a screen that shows information about copyright and developers.

5. Technical Specification

- JAR file size: 32.1 KB
- VNC RFB Protocol, version 3.3
- Image encoding supported
  - Raw
  - CopyRect
  - RRE
  - CoRRE
  - Hextile
- Arbitrary disconnect and reconnect without session lost
- Client-driven display update
- Average performance: 0.45 second / 64*64 pixels
  (Test condition: VM speed 100 bytecodes/ms, 8-bit color depth, network throughput 56000 b/s)
- Security
  - challenge-response authentication using 16-bit DES block cipher encryption

6. Frequently Asked Questions

Q1. Can my mobile device use innoDesktop?

Mobile devices supporting Java (MIDP 1.0) should be able to use innoDesktop. You can always test innoDesktop using the free trial.

Q2. The speed of screen refresh in innoDesktop is slow. Why?

The screen refresh rate is largely affected by 1) the speed of the network your mobile device is attaching; 2) the complexity of the screen update; 3) whether your device supports TCP socket.

Unless your device is attaching on a wireless LAN, you can always get innoDesktop faster by using a faster mobile operator. Since the baseline is that you are using the 2.5G mobile network, the speed should be significantly improved if you use innoDesktop with the 2.75G or 3G network.

The more complex is your screen update, the lower is the refresh rate. The speed for updating a screen consisting of a large background in one color is usually faster. This is usually the case for a text document, where the words are surrounded by a sea of white pixels. The contrary is to update a screen showing a photo. You can also remove your desktop wallpaper during your VNC session to speed up the update. This can be done by checking "Remove Desktop Wallpaper" in your VNC server setting.

If your device does not support TCP socket, innoDesktop has to use HTTP connection, which is considerably slower. Refer to Q6. for more information.

Q3. Does my computer need to be previously turned on and stayed online in order to use innoDesktop?

Not necessary, if your computer supports Wake-On-LAN (WOL) or Wake-On-Modem (WOM). Using WOL, your computer can be turned on when the remote network adapter hears a "magic packet" created for its unique MAC address. WOM allows a phone call to the line connecting the modem to turn on the computer. Refer to your computer manual for the support of WOL/WOM.

If you are using a dial up connection, you should also configure your computer to dial up automatically after booting up.

Q4. My IP address is dynamic. How can I know it on the move?

You can use dynamic DNS to create a domain name alias for the changing IP address. Your computer can install a dynamic DNS client to keep updating the alias/IP mapping. Using dynamic DNS, you can use the alias in place of the IP address. Examples of dynamic DNS providers are ZoneEdit, dns.widge.net, TZO, etc. Some of their services are free.

Q5. My phone is Motorola T720i. When I enter the password in the login form, I don't know what is actually spelling out as the characters are always displayed as asterisks.

This is the way that Motorola implement its handsets, and we can do nothing about it. Motorola may do this for security reasons. This doesn't happen in Nokia, which will display a clear text of the password character for 1-2 seconds before it turns into an asterisk.

So the answer is that you need to memorize the number of key-presses to get the desired character. Good news is that you only need to do this once as innoDesktop will save your configuration in the handset.

Q6. When should I select the "use socket" option in the login form?

innoDesktop, by default, uses HTTP for network connectivity. The support of HTTP is mandated in all MIDP 1.0 Java-enabled handsets. However, HTTP is connectionless which in some cases, raises difficulties and inefficiencies in network communication. Some manufacturers, such as Motorola, therefore, optionally supports TCP socket in their handsets. For these handsets, checking the "use socket" option can drastically improve the network performance and reduce latency. Note also that some mobile operators may disallow socket access in their network. In this case, you cannot use socket connectivity.

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