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# Desktop Multiplier™ for SUSE™ Linux Enterprise Desktop

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## SETUP GUIDE



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## This Guide

Welcome to **Desktop Multiplier™ for SUSE Linux Enterprise Desktop**, a software add-on that allows up to 10 workstations, consisting of a monitor, keyboard and mouse, to run at the same time on a single Linux desktop PC. This is accomplished by adding dual-head video cards, keyboards, mice and a USB hub to a single PC system and then installing the Desktop Multiplier.

Desktop Multiplier, powered by Useful® ([www.userful.com](http://www.userful.com)), delivers a compelling “10-to-1” value proposition on hardware, software and maintenance costs for schools, universities, governments and businesses.

Desktop Multiplier is compatible with the following Linux distributions:

### *RPM-based*

- **SUSE Linux Enterprise Desktop 10 (New)**
- SUSE Linux 9.3 and 9.1
- Novell Linux Desktop 9
- Fedore Core 2, 3 and 4
- Mandrake 10.0 and 10.1
- Red Hat Enterprise Linux WS
- CentOS 4.0

### *DEB-based*

- Ubuntu 5.04
- Linspire 5.0
- Xandros v3
- Debian 3.1 (Sarge)

In this Setup Guide, you will find the following information:

- Trial Version
- Requirements for Desktop Multiplier
- Installing Desktop Multiplier
- Initialising Desktop Multiplier
- Support for Desktop Multiplier

### Utilities Package

This package includes programs, scripts and config files for system configuration, keyboard/mouse assignment and device hotplug capabilities. The file is named as:

- 1box-utils-k26-<version>.i386.rpm (for RPM package based systems)
- 1box-utils-k26-<version>.i386.deb (for DEB package based systems)

## Multistation X Server Package

This package contains the Useful MultiStation XServer, which supports multiple simultaneous local users. Files are named:

- 1boxserverxorg<version>.i386.rpm

## DualView Functionality

Desktop Multiplier's DualView functionality enables each station to support up to five users with each user having an individual desktop that spans two monitors. You can configure monitors to use DualView during the Desktop Multiplier installation process. Note that the two monitors that display a DualView desktop must be connected to the same video card.

## Trial Version

Desktop Multiplier will operate as a trial version until you purchase an appropriate licence. You may purchase a licence by calling Omni at +1 780.423.4200 or by emailing [licensing@omni-ts.com](mailto:licensing@omni-ts.com).

## Limitations of Trial Version

The Desktop Multiplier trial software supports up to 10 concurrent stations (depending on your specific hardware) and will typically display a brief registration reminder on all attached screens every 20 minutes or so.

## Recommended System Specifications

For a 6-user Desktop Multiplier system, we recommend the following:

- **Processor:** Intel Pentium 4 2.8 GHz+ (or similar AMD computer)
- **Operating System:** SUSE Linux Enterprise Desktop 10 or Novell Linux Desktop 9 SP2
- **RAM:** 1.5 GB of RAM
- **Video Cards:** 3 dual-head PCI video cards
- **USB Hub:** Powered USB hub to connect USB keyboards and mice
- **Monitors:** 6 VGA monitors (flat panel or CRT)
- **Keyboards:** 6 USB keyboards (ideally with integrated USB hub to connect mouse)
- **Mice:** 6 USB mice
- **Cabling:** USB cables and well-shielded VGA cables (VGA cable extensions may be required depending on physical arrangement of user desktops)
- **Software:** Desktop Multiplier software

The minimum processor specification will depend on the number of users and types of applications they will be running.

## Choosing a Graphics Card

Desktop Multiplier is designed to support all single and dual-headed video cards, supported by X.Org/XFree86. Any video card combinations where you can start X in multi-headed mode (i.e. multi-monitor, multi-display) should work with Desktop Multiplier. Xinerama extensions are not used, so any standard single-head or multi-head video card should work.

We recommend **disabling onboard video in the BIOS** if your motherboard includes an onboard video chipset. If the onboard video is not disabled, boot messages will be displayed on that video output. If no monitor is connected to the onboard video output, these boot messages will not be visible.

**Note:** Although heterogeneous (mixed) combinations do often work, to ensure a simple and manageable computing environment, we recommend using a consistent model and revision of graphics cards and monitors for your Desktop Multiplier system. We suggest searching the following third-party database for heterogeneous graphics card combinations that should work under Linux:

- [www.realtimesoft.com/multimon/search.asp](http://www.realtimesoft.com/multimon/search.asp)

## Recommended Graphics Cards

We recommend the following low-cost, dual-head graphics cards, which are available in both AGP and PCI cards from a variety of manufacturers:

- ATI Radeon 7000, 7500, 9000, 9200 series and X300
- Matrox G400, G450, G550 (see Note below)
- NVIDIA GeForce MX 440, FX5200 and 6600 GT. Quadro FX 500/600 (see Note below)

If you are **using Matrox or NVIDIA dual-head cards, you need to upgrade the driver**, as the default mga/nv driver from Xorg does not fully support the dual-head feature. You can download the latest driver from their web site.

- <http://www.matrox.com/mga/support/drivers/latest/home.cfm>
- <http://www.nvidia.com/content/drivers/drivers.asp>

## Supported Video Cards for DualView

The following video cards have been successfully tested with DualView in our lab. Note that DualView is only **supported on ATI and nVidia cards at this time**. If you require DualView support for specific ATI / NVIDIA cards not in the list, please contact us at [support@omni-ts.com](mailto:support@omni-ts.com).

- ATI Radeon 7000, 7500, 9200, X300 (PCI-E)
- NVIDIA GeForce MX440, FX5200, 6600 (PCI-E) and Quadro FX 500/600

## Installing Desktop Multiplier

Prior to installing Desktop Multiplier on your existing Linux system, you will need to add enough video cards and USB ports to provide a video head for each station.

We recommend using USB keyboards with an integrated USB hub to easily connect each station's mouse (and other USB devices) and minimise the number of devices connected to the central system.

If a USB hub is required, be sure to use a powered hub. Non-powered hubs may not provide sufficient power for all connected devices. Similarly, if you need to use extension cables, ensure that the distance between keyboard or other USB device and computer / powered hub is not greater than 3 m (10 ft).

### Installation Steps

To install the Desktop Multiplier for Novell Linux Desktop, follow the steps below:

**Step 1:** Install your dual-head AGP or PCI video cards. Download and install the latest version of Novell Linux Desktop on your computer. **Disable onboard video** (if your motherboard includes an onboard video chipset) and USB 2.0 support (sometimes referred to as "Enhanced USB" or "High Speed USB" in the BIOS).

**Step 2:** Position one USB keyboard and mouse combination for each workstation. (Note: The built-in system PS/2 keyboard and mouse connections can be used to connect one station). Do not attach multimedia USB devices or USB flash memory keys.

Then connect all the cables to the back of the Desktop Multiplier computer, including Ethernet, monitors, USB keyboards and mice, printers and so on. Power on all monitors and reboot the machine.

**Step 3:** Download and install the latest version of the Desktop Multiplier at [www.omni-ts.com/download/novell-linux-desktop-multiplier.html](http://www.omni-ts.com/download/novell-linux-desktop-multiplier.html). Unzip the demo software on the target computer (i.e., *unzip Desktop-Multiplier.zip*).

**Step 4:** Run the INSTALL script as "root" (i.e., **bash [path/]INSTALL**) and reboot the machine.

### Installation Steps for Multimedia and USB Storage Device Support

The package for USB multimedia and storage device support is included in the **multistation-devices-support** folder in the Desktop Multiplier download zip file from Omni. To install this support package, follow the steps below:

**Step 1:** Ensure that your SLED 10 host computer meets the minimum requirements (UDEV version 085 or higher, and HAL version 0.5.6 or higher are required).

**Step 2:** Change directory to the **multistation-devices-support** folder

**Step 3:** Run the INSTALL script as "root" (i.e., **bash INSTALL**) and reboot the machine.

**Step 4:** Attach the USB multimedia and/or storage devices to the individual workstation positions.

## USB Device Assignment

Multimedia and storage devices will be assigned to the same station as the keyboard automatically if you connect them to: a) the same powered USB hub as the keyboard, or, b) a USB port built into the keyboard.

It is recommended each station use its own powered USB hub to connect one keyboard/mouse pair, a USB audio device and USB storage devices, which will all be assigned to same station automatically.

Any devices plugged directly into the USB keyboard (if the keyboard has USB port in it) will also be assigned to the same station as the keyboard. In this scenario, some devices may not function correctly due to insufficient power provided by the USB ports. Please refer to the "Multistation-Device-Support-README.txt" file for more information.

Multistation storage devices are secured by permissions. Every storage devices will appear on all stations. For example, if there are four flash memory devices plugged in, all four will appear on all user sessions. However, if a user tries to open storage devices assigned to another station, he/she will receive an error that says "Permission denied."

## Setting Screen Resolution

The first time Desktop Multiplier starts, a text mode configuration tool enables you to set screen resolutions. If you need to later change the screen resolution, delete the */etc/X11/userful.Mxorg.conf* file and restart X. The text mode configuration tool will once again activate, enabling you to set a new screen resolution, and create a new *userful.Mxorg.conf* file. The Desktop Multiplier supports resolutions of 640x480, 800x600, 1024x768 and 1280x1024.

## Assigning Keyboards and Mice

Once the system has started, each workstation display will prompt you to press a function key (F1 through F10) on the keyboard in front of the monitor in order to link the correct keyboard to the specific monitor. Both a keyboard and a mouse are required in order to create a station.

If the mouse is plugged into the USB keyboard (via an integrated hub in the keyboard) the mouse will be automatically assigned along with the keyboard when you press the correct function key. If you have the mouse plugged into a separate USB port, you will be prompted to press a button on the mouse in order to link it with the correct monitor and keyboard combination.

After setting up mice and keyboards, you may login to your desktop normally. You may reassign keyboards and mice at any point by simply pressing the Ctrl+Alt+Break key combination or reconnecting the device by unplugging and reconnecting it to the USB port while the system is running. The assignment screen will automatically appear on top of your current desktop. No work will be lost, simply press the correct function key and return to your desktop.

**Note:** You can identify unassigned keyboards by examining their LEDs. The LEDs on a unassigned keyboard will blink until the keyboard is assigned to a station.

**Warning:** Logging in concurrently to more than one station as the same user is not advised and may cause unintended consequences to your system (e.g. corruption of your user settings). Most Linux distributions will warn you if you attempt to login as the same user on more than one station simultaneously such as "this user is already currently logged into the system."

## Uninstallation Steps

The INSTALL script will not overwrite your existing X.Org / XFree86 configuration files. Uninstalling the Desktop Multiplier from your system should fully restore the original system configuration. To perform an uninstall, run the UNINSTALL script as the "root" user, (e.g. `sh [/full path/] UNINSTALL`).

## Recommended BIOS Settings

- Enable all USB ports
- Enable Legacy USB support (sometimes called "USB keyboard support"). Otherwise, only the PS/2 keyboard will work during the Linux boot process. Disabling unnecessary integrated peripherals (e.g., serial ports, parallel ports, etc.) in the BIOS can improve performance and compatibility.
- Disable on-board video

## Licensing Desktop Multiplier

To enable the full version of the Desktop Multiplier, you need to purchase a valid licence for the desired number of stations on each Desktop Multiplier system. Contact Omni at [licensing@omni-ts.com](mailto:licensing@omni-ts.com) or +1 780.423.4200 to get a licence based on your system's unique MAC address. You need to manually copy your licence file - "###:###:###:###:###:###.1box.info" or just "1box.info" – to the /etc/X11 folder on your Novell Linux Desktop system and restart the computer.

## Using Desktop Multiplier

### Special Key Combinations

Two useful key combinations are available to users:

- **Ctrl+Alt+Backspace:** This key combination resets the current station, returning it to the login screen.
- **Ctrl+Alt+Break:** Pressing this key combination on a keyboard unlinks the keyboard (and any connected mice) from the station to which it was assigned. Once the link is broken, the station to which it was formerly assigned will prompt for the assignment of a keyboard.

### Toggle Between the Regular X and Multi-station X

You can toggle between the regular X and multi-station X by updating */etc/sysconfig/xtype*, Set the "XTYPE" to "MULTI" or "SINGLE" to enable multi-station X, or regular X, respectively. The change will take effect from next reboot.

- **For multistation X:** XTYPE=MULTI
- **For regular X:** XTYPE=SINGLE

## Known Limitations (Inherent to Simultaneous, Multi-station Users)

### Blank Screen Saver Recommended

Some graphical screen savers can consume 99% of CPU resources. Since the Desktop Multiplier is a multi-user system and other users may be working, we highly recommend using only a blank screen or a very simple screen saver.

### Audio & USB Storage Keys

Multi-station enabled USB devices (e.g., USB sound, USB storage keys, USB CD-drives, USB floppy drives, etc.) are currently not available for each user on the system. This functionality will be built into future product releases. If you require multi-user sound on your system, contact us at [sales@omni-ts.com](mailto:sales@omni-ts.com).

## Internal Device Permissions

Permissions and access control for internal devices (e.g., audio, CDs, floppies, etc.) are handled completely by your underlying Linux distribution. Several examples follow:

- The auto-mounter works differently for different distributions. Typically it will display a dialog on just one screen when you insert a CD.
- For audio, the default Gnome behavior is to give ownership of all audio devices to the first user to login to the system. Subsequent users to login will not have access to any audio devices unless the first user has logged out.

## Homogeneous Set of Graphic Cards Recommended

While it is possible to support a heterogeneous mix of video chipsets within a single computer box (e.g., mixing ATI, NVIDIA and Matrox cards), such a configuration is not recommended. It is not possible for us to directly test and support all possible combinations. Using multiple video cards and monitors that do not share all the same characteristics and X drivers creates additional and unnecessary complexity. Therefore, we recommend keeping your evaluation and production environments as simple as possible and using a single graphics chipset for all video cards within the Desktop Multiplier computer.

## 3D Acceleration Not Supported on Multiple Graphics Cards

Using multiple and / or dual-head graphics cards in Linux prevents software such as video games from using 3D acceleration properly. This is not a Desktop Multiplier specific issue, but a limitation of the Direct Rendering Infrastructure (DRI) within the current X server system. XFree86 does not support DRI acceleration on multiple graphic cards. XFree86 extensions not dependent on DRI should work, for example 2D acceleration is supported.

## VT Switching

Switching between virtual terminals in X (pressing Ctrl-Alt +F) is disabled by default in the Desktop Multiplier for Novell Linux Desktop. This prevents a user from interfering with users working on other stations.

## Reboot and Shutdown Permissions

Users cannot shutdown the Desktop Multiplier system. If a user clicks the shutdown option, it will log him or her out. The "root" user can shut down the Multiplier by opening Terminal and running the command: **poweroff -f**.

To restart the machine, login as the root user and in the Terminal window, type: **reboot; reboot**. You can restart an individual workstation by pressing **Ctrl+Alt+Backspace**. This will logout the user and kill all processes running only for that user.

## ATI Radeon Cards with SMP Kernel

Certain combinations of Linux distributions and motherboards have known issues with multiple Radeon graphics cards using the 2.6 SMP (Symmetric Multi-Processing) Linux Kernel. If you are using SMP with Radeon chipsets and encounter problems, we recommend switching to a non-SMP kernel. This is a bug with the Radeon driver and is not specific to the Desktop Multiplier software.

**Note:** Intel P4 hyperthreading systems also use the SMP kernel and Novell/SUSE Linux will install the SMP kernel by default if a hyperthreading P4 processor is detected. In this case,

you must manually install the standard (nonSMP) kernel should issues arise using the SMP kernel.

### **Boot Messages Only Display on Primary Video Display**

BIOS and Linux boot messages will only display on the primary video adapter. On some dual-head cards this is two monitors, but for the most part it will only display on a single monitor. It is important to connect a monitor to this primary head to display these messages. On motherboards with on-board video (video hardware built into the motherboard), typically the BIOS will be set to use the on-board video head by default. We generally recommend that on-board video be disabled in the BIOS for Desktop Multiplier systems.

### **CPU Architecture Support**

This binary distribution only supports the x86 architecture. Contact us if you need support for additional architectures.

### **Multimedia Keys on Keyboards Not Supported**

Utilities that enable multimedia keys in Linux may not be reliable when multiple keyboards are connected to the system.

### **Additional Keyboard Map Support**

The kernel layout map for individual keyboards is ignored by Desktop Multiplier. Hence the X configuration and/or keyboard mappings created by hardware detection and configuration tools such as Kudzu are ignored. At the greeter screen, all keyboards are mapped to the default system language which is usually the language you selected when installing Linux. Most greeters allow login language selection and most desktop sessions (Gnome, KDE, etc) have tools to change keyboard layouts. Using a greeter to change language and keyboard layout selections behaves as expected.

### **XVidMode Extension Support**

Single-chip dual-head ATI video cards are not compatible with the XVidMode extension. XVidMode extension is disabled on ATI video cards by default when using Desktop Multiplier. Unstable USB 2 support in Linux Kernel We recommend disabling USB 2 support (sometimes referred to as "Enhanced USB" or "High Speed USB") in the BIOS since the current USB 2 Kernel module is unstable under some circumstances. USB 2 devices may be used in Desktop Multiplier, but only at USB 1 speeds.

### **Unstable USB 2 support in Linux Kernel**

We recommend disabling USB 2 support (sometimes referred to as "Enhanced USB" or "High Speed USB") in the BIOS since the current USB 2 Kernel module is unstable under some circumstances. USB 2 devices may be used in Desktop Multiplier, but only at USB 1 speeds.

### **No Output from Second Head of NVIDIA Cards**

Ensure a monitor is connected to each video head before turning on the computer, and optionally that the monitors are turned on. Some NVIDIA cards will not display to the second head if there is no monitor connected at boot time.

### **System Instability with NVIDIA Driver**

There is a known issue regarding system instability using NVIDIA video drivers with kernel

2.6.11rc3 or lower. If you experience random reboot or kernel panics using the NVIDIA driver, please ensure that your kernel version is 2.6.11rc3 or higher.

## Known Issues (To be addressed in future releases)

### Both Keyboard and Mouse Required for Station Assignment

Currently it is not possible to link just a mouse to a screen. Hence, a keyboard is required even for touch-screen or mouse-only kiosks. Mouse-only assignment will be supported in a future release. Keyboard-only stations are currently possible, as the mouse can be removed after a station has been assigned without unlinking the keyboard.

### No Support for Third-Party X Configuration File Editing Tools

The Desktop Multiplier software uses a default screen resolution of 1024 x 768 pixels at a standard color depth of 16 bits for all stations. Lower resolutions are automatically used for monitors that do not support this level of resolution. This default configuration may be changed by manually editing the Desktop Multiplier's X config file (/etc/X11/userful.Mxorg.conf for both X.Org and XFree86 based systems). Only edit config files if you fully understand what you are doing. Omni does not provide support related to user-edited X config files. This config file is automatically regenerated whenever changes are made to the graphics cards, hence if you add or remove graphics cards, you will need to re-apply your customizations.

Note: Some dual-head graphic cards do not support using different resolutions on each head. It is recommended to use the same resolution and color depth settings for all stations on your Desktop Multiplier system.

### DVI Support

The default Desktop Multiplier multi-station configuration will set all outputs of a video card to VGA. A DVI->VGA adapter will be required for using DVI ports. Changing the X.Org or XFree86 configuration manually to use DVI output may be possible depending on your hardware, but this is not currently a supported feature.

### Monitors on DualView stations must be connected to the same video card.

Both monitors that form a DualView station must be connected ports on the same video card. This is a limitation with some chipsets which may be addressed with workarounds in drivers in a future release.

### No Support for Xinerama Info in NVIDIA Dual View

XineramaInfo is not supported in the NVIDIA Dual View configuration. Without this support, X will treat two screens as a single big screen, which will cause some unintended results, such as:

- showing login message on the center of display (half on the left screen and the other half on the right screen)
- maximising a window over two screens

### Virtualisation

Some X Server operations have not yet been fully "virtualised". This means not all aspects of X's functionality work the same in the multi-user environment as they would in a single

user environment. The X Resize and Rotate extension (RandR) which allows users to change monitor resolutions has been disabled. Display power management system (DPMS) is not currently supported. And the Gnome screen magnifier does not yet work.

#### **X stability issues using multiple DualView configuration**

If you are using more than two graphics cards and configure them as DualView, X server may crash at the end of the startup procedure. This is caused by incorrect probing of RAM size for the graphic cards. In this case, you will need to specify the correct ram size of your graphic card by adding a "VideoRam" line to the device section of the `/etc/X11/userful.Mxorg.conf` file.

For example, if the RAM size of graphic card is 16 Megabytes, add following line into device section in `/etc/X11/userful.Mxog.conf` :

- VideoRam 16384

## Support for the Desktop Multiplier

Most problems result from using unsupported hardware. Please record any error message that may appear before contacting Omni technical support.

### Support and Maintenance Agreements

Full email and telephone support is available Monday to Friday between 8:00 a.m. and 5:00 p.m. Mountain Standard Time (UTC -7) for customers who have a valid support and maintenance agreement. Limited email support may be available during extended hours. Email and telephone support is also available to customers who are evaluating the Desktop Multiplier for Novell Linux Desktop. If required, support will be provided to resellers, then customers with valid support and maintenance agreements, and finally to customers evaluating products.

Before contacting Omni support for assistance, please consult the product documentation and FAQ available from our website: [www.omni-ts.com/documentation/linux/](http://www.omni-ts.com/documentation/linux/)

You can contact support using any of the following methods (please make sure you provide as many details as possible so we can provide the best possible support):

**Technical support:** [support@omni-ts.com](mailto:support@omni-ts.com)

**License support:** [licensing@omni-ts.com](mailto:licensing@omni-ts.com)

**Product documentation:** [www.omni-ts.com/documentation/linux/](http://www.omni-ts.com/documentation/linux/)

**Product FAQ:** [www.omni-ts.com/linux-desktop/questions.html](http://www.omni-ts.com/linux-desktop/questions.html)

**Phone:** 1-780-423-4200

**Fax:** 1-780-423-4711

## Free Help

Free support is available for customers who purchase licences without support and maintenance agreements and for customers using a freeware product distributed by Omni. Free support is limited to information available from the product documentation in .pdf format that is available for public download, online documentation, and online web forum. Telephone and email support can be provided on a fee-per-incident or fee-per-hour basis, whichever is greater.

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