

# Paragon NTFS for Linux Solution Approach



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## Table of Contents

<b>1</b>	<b>INTRODUCTION.....</b>	<b>3</b>
<b>2</b>	<b>FILE SYSTEMS (BACKGROUND) .....</b>	<b>3</b>
<b>3</b>	<b>PARAGON NTFS FOR LINUX .....</b>	<b>4</b>
<b>4</b>	<b>POSSIBLE APPLICATIONS .....</b>	<b>5</b>
<b>5</b>	<b>CONCLUSION .....</b>	<b>6</b>

## 1 Introduction

At the end of the 20<sup>th</sup> century the world of operating systems gave green light to two implacable foes, i.e. open-source Linux and commercial Microsoft Windows. The Windows family is a crucial player on the software market. Its time-proved solutions are well known to PC users for several generations already. It's managed to penetrate people's lives all over the world. Today you can hardly find a person who has no idea what Windows is.

On the other hand there is Linux, the successor of UNIX. Several years ago some people predicted a bright future for Linux, pointing out its open-source nature, applications getting more mainstream, the GUI pretty much like Windows, high quality and bullet proof resistance to the thousands of Windows viruses and worms. As we can see now that forecast was worth listening to. Although Linux has not yet obtained so much popularity as Windows has, little by little it increases its market place.

A lot of people nowadays prefer Linux and Windows together to successfully use strong sides of both of them. But as it often happens, the two opponents have a real communication problem based on differences between Windows and Linux's file systems.

## 2 File Systems (Background)

Since MS-DOS and later the first versions of Windows, Microsoft OS's have used FAT (File Allocation Table) file system. Evolving over the years the FAT file system has managed to retain its crucial quality, i.e. simplicity. Without going into details, that means that any present-day operating system can work with it. Unfortunately, it has its drawbacks too: there are certain limitations on file (4GB) and partition size that make it rather problematic in today's computing environment. Besides the FAT file system cannot boast acceptable level of security.

The market demanded something new and up-to-date. Thus Microsoft announced NTFS (New Technology File System). It is much more complicated providing the possibility to use the so-called metadata (info on individual files, read/write permissions, etc). That enabled to solve the number of issues, such as file-size limitations, but gave rise to a new big one. Since NTFS is a proprietary file system (there's no released data on the way it works), it is rather difficult to support.

In the other camp is Linux with a number of its own native file systems. The default file system for Linux used to be Ext2 (second extended file system), now it is typically Ext3, though there are several alternative systems in use, such as Reiser, XFS, etc. Ext3 can process files up to 4 terabytes and also includes metadata, but its work concept differs greatly from that of FAT and NTFS.

As for crossing over, Linux can read/write FAT16 and FAT32 file systems. Some Linux distributions can also read NTFS partitions, but due to the mentioned above restriction, there is very little support for writing to those partitions. On its own, Windows cannot process partitions formatted with any Linux file system.

## Paragon NTFS for Linux

By that time several programs have attempted to fill that gap of incompatibility, mostly to no avail.

### 3 Paragon NTFS for Linux

Paragon NTFS for Linux hits the mark. By writing its own NTFS driver from scratch, the company has managed to overcome incompatibility of the two opposing operating systems. It is a unique solution on the market so far, providing full read/write access to any version of the NTFS file system (Windows NT 4.0, 2000, XP, 2003, Vista) under Linux.

The core of the product is a kernel NTFS for Linux driver that enables fast and transparent access to NTFS partitions as Linux-native through the mount function. Direct access to NTFS partitions enables to achieve an unprecedented high level of performance (the same as for native systems and in some cases even better). Linux programs can process such partitions without any restrictions – browse contents, read and modify files, copy and create new files and folders, etc. By using a handy installation script, you can automatically compile the driver for a particular Linux kernel, install it and then mount all existing NTFS partitions. The driver runs on any version of Linux with kernel 2.4.x or 2.6.x. and provides support of the following architectures:

- Intel x86/x86\_64 bit or compatible;
- ARM (XScale, Marvell);
- MIPS.

NTFS for Linux also includes a multipurpose bootable CD with a built-in driver that can be used as a Linux-based disaster recovery tool to retrieve data off an injured PC, to modify configuration files to rescue the system or as a powerful anti-virus tool to repair infected systems.

The product is being released in two editions, Personal and Professional, which vary in price and provided functionality. Additional to the features supported by the Personal version, the Professional version provides the following advanced functionality:

- An LDM (Logical Disk Manager) driver, which adds support for all types of Microsoft Dynamic Volumes under Linux (simple, spanned, striped, mirrored and RAID5);
- A number of useful tools to perform many NTFS file system related tasks:
  - Backup/restore of an NTFS volume or separate files/directories keeping all streams and attributes intact (**cpntfs** utility);
  - Formatting of partitions to the NTFS file system under Linux (**mkntfs** utility);
  - Getting in-depth information on NTFS partitions (**infntfs** utility);
  - The NTFS file system integrity check and errors fixing (**chkntfs** utility);
  - Defragmentation of NTFS partitions to increase the speed of access and retrieval of data (**dfntfs** utility);
  - Shrinking of the Master File Table (**mftpack** utility);
  - Wiping of NTFS partitions to irreversibly destroy the data that even advanced forensic tools should not ever be able to recover, thus providing maximum level of security;
  - Enumeration of hard-links on NTFS (**hdlink** utility);

## Paragon NTFS for Linux

- ❑ Junction utility to show reparse points on NTFS;
  - ❑ Control of the file system behavior, volume dirty bit, hard-link, streams and compression management, sparse file control, etc. (**fsutil** utility – for advanced users only).
- Complimentary support and one-year bonus free of charge upgrade protection.

## 4 Possible Applications

While the communication between Linux and Windows may seem of little use at first, there are many reasons for it. Paragon NTFS for Linux driver has already proved its market value by finding a wide application in various spheres of life.

### Multi-System Bootable Recovery CD

Nowadays lots of enterprises prefer to use several OSs to successfully accomplish specific tasks. Due to certain incompatibility issues, in case of a system malfunction, damage or infection, IT personnel is faced with the daunting challenge of having a bunch of bootable recovery CDs for each particular system to rescue valuable information or recover the system after a virus attack.

With NTFS for Linux you can minimize manual labor and time costs and make a system administrator job more efficient.

### NAS Servers Integration

The growth in network traffic within most companies, and across the Internet, means that network administrators have to deal with new storage requirements. They need manageable, cost effective capacity. They want minimal disruption to users. And they want storage solutions that integrate cleanly into existing networks.

The desire for low-cost, highly integrated, easily managed network storage is the reason that network attached storage (NAS) servers are the choice of more and more small and medium-sized companies.

With NTFS for Linux you can obtain cost effective and easy-to-manage Linux Network-Attached Storage server providing the ability to access, besides FAT and Linux-native systems (Ext2, Ext3, Reiser), NTFS partitions as well.

### PVR Integration

Linux is a highly configurable OS that can both scale up to big enterprise iron and down to handheld devices, it can do almost anything. It even powers highly popular now PVRs (Personal Video Recorder).

Modern PVR stations, based mostly on Windows and Linux platforms, provide the ability to process video data from a camcorder, DVD or a satellite device real-time and store it onto external media. Until recently, due to certain incompatibility issues, Linux multimedia stations, for instance, could work only with FAT or Linux-native systems. To use an NTFS hard disk with a Linux PVR was out of question.

With NTFS for Linux you can enjoy a Linux multimedia station with a built-in NTFS for Linux driver to write data onto external media of any file system.

## Paragon NTFS for Linux

That's just few of the possible applications Paragon NTFS for Linux may be used for. Actually, its potential is far beyond the bounds of a human being imagination. It is out there, waiting for you...

## 5 Conclusion

By reading this document you have learned more about Paragon brand-new product NTFS for Linux. There is no doubt that the problem of bridging between Windows and Linux is of high priority, because at the present time the market is in extreme need of solutions of this kind. So what is it that makes NTFS for Linux unique and worth buying? Piece of cake:

- It is the only product on the market providing full read/write NTFS support under Linux;
- The performance level is comparable to that of Linux native systems, thus you can work with NTFS partitions under Linux without any discomfort;
- An unprecedented level of functionality abundance (a bunch of powerful utilities will make your job easy and efficient);
- And last but not least it is its price. The Personal version of the product costs give-away \$29.95. The professionally oriented version can be purchased for \$149.95, but it certainly pays the credit, isn't it?

No matter who you are and what needs you may have, Paragon solutions recognize those unique needs and help you address them.