Tutorials for ReactOS

ReactOS Development Team

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Chapter 1. The why and how of ReactOS

Abstract

As an introduction to ReactOS. The chapter is about how the project came about and what the developers hope to achieve.

Running Windows applications on an Open Source Operating System

Since Microsoft Windows has a monopoly on the desktop, many projects have been started to get Windows applications to run on other operating systems. This is because if you have a fantastic OS, but no or little applications, your OS will probably see little growth or die. This is the story of many OSs, that while technically superior to Windows at the time, died off or have seen little growth.

Ever since OS/2, people have been trying to get Windows applications to run on other OSs. Linux has at least two projects towards this end, WINE (more popular) and TWIN.

ReactOS beginnings

Around about 1996 some people decided to create an OS from scratch that would run Windows applications. It would be called FreeWin95. These people were dissatisfied with the Linux/WINE solution and wanted an OS that was dedicated to running Windows applications, without having to pay Microsoft money and being Open Source (source code available to all). Unfortunately, this project did not take off because people could not agree on exactly what the project should be or how it should be designed.

In early 1998, Jason Filby volunteered to become project coordinator of the almost abandoned project. After some initial discussion it was decided that the project would be mostly a Windows NT clone. The project was renamed to ReactOS to reflect the change in direction and the fact that Microsoft's desktop monopoly had prompted this reaction from developers around the world. Since NT was far superior to the then Windows 95, it was the obvious choice. It was also decided that instead of just being application compatible, ReactOS would also be driver compatible with NT.

ReactOS today

ReactOS still has a long way to go, but the developers are confident that ReactOS will one day be a viable alternative to Microsoft desktop operating systems. Some are even considering using ReactOS as a server, as it is based on NT. We look forward to the future of ReactOS with great expectation!

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Chapter 2. ReactOS License: GNU
General Public License

Chapter 2. ReactOS License: GNU General Public License

Abstract

Describes the ReactOS license.

GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

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Chapter 3. Organizational structure

Abstract

A description of the organization of people within the ReactOS project.

Teams and Coordinators

ReactOS consists of several teams, including the Kernel, Applications and Media teams. Each team has a coordinator and there is an overall project coordinator.

Coordinators

The coordinators are more facilitators than instructors of the teams. They are those who organize and assist the team where needed and are usually developers as well. Each coordinator has authority to make an overruling decision in any argument that may occur. This is exceptionally rare as ReactOS coordinators and developers always try to find the best solution that everyone is happy with.

Table 3.1. Coordinators

Position	Name	Email
Project Coordinator	Jason Filby	jasonfilby at yahoo dot com
Kernel Team Coordinator	Rex Jolliff	rex at lvcablemodem dot com
Applications Team Coordinator	Brian Palmer	brianp at sginet dot com
Media Team Coordinator	Eric Cayer	ecayer at mail dot cgocable dot ca

Team definitions

Table 3.2. Teams

Team	Description
Kernel Team	Responsible for designing and implementing the ReactOS kernel and its system libraries. This is the most active team.
Applications Team	Responsible for designing and implementing common applications for ReactOS. Initial shell and small application discussions.
Media Team	Responsible for websites, graphics and everything media related

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Chapter 4. About ReactOS

Chapter 5. Download and install the latest ReactOS ISO-CD image

Abstract

Where to get the latest ReactOS ISO-CD image and how to install it.

Where to download from

ReactOS ISO-CD images are physically stored on ReactOS' SourceForge development site. You can download an image directly from the SourceForge site, but some users may prefer to go via ReactOS.com.

Obtaining the latest images via reactos.com

- Visit reactos.com which is the ReactOS portal site. This site will always point to the latest binaries.
- Click on the link, on the opening page of reactos.com that points to the latest "ISO-CD Image".
- On the Latest Release page, click on the "Download ReactOS x.x.xx ISO-CD Image" (eg. "Download ReactOS 0.1.0 ISO-CD Image") link.

Obtaining the latest binaries via SourceForge

- Visit sourceforge.net/projects/reactos which is ReactOS' development site, hosted by SourceForge.
- Scroll down to the "Latest File Releases"
- Click on the "Download" link for the reactos package.
- Scroll down to the reactos package (should be hilighted purple) and click on the xxxx_iso.zip (eg. 010_iso.zip) link to download the binaries.

Creating the ReactOS-CD

- Use your favourite zip utility to open the downloaded image file.
- Extract the CD-Image "reactos.iso" into a temporary directory.
- Use your favorite CD writing software (WinOnCD, Nero burning ROM, etc.) to write the "reactos.iso" image file onto a CD-R or CD-RW.

Note: Have a look at the documentation of your CD writing software if you do not know how to write ISO-Images onto a CD-R.

Supported hardware and Setup limitations

ReactOS does not support all available hardware. It can only be booted from IDE CD-Drives and IDE Harddisks. USB-, Firewire- and SCSI-Drives or non-standard IDE controllers (eg. IDE-RAID controllers)are not supported yet.

The setup utility is also limited in several ways:

- Disk partition can not be created, deleted or modified.
- Disk partitions can not be formatted.
- ReactOS can only be installed on FAT16 or FAT32 partitions.
- The active partition must be a FAT16 or FAT32 partitions.
- Filesystem integrity can not be checked.
- It does not stop the user from doing stupid things.

Installing ReactOS from the CD

- Insert the ReactOS-CD into a CD-Drive and reboot your computer. ReactOS will boot from the CD and enter its setup program.
- Follow the instructions on the screen to install ReactOS on your computer.
- After the installation has finished, remove the CD from the CD-Drive and press "Return" to reboot your computer. Now, you can start ReactOS by selecting it from the boot menu.

Note: Have a look at the documentation of computers motherboard if your computer does not boot from the CD. Search the BIOS settings for "boot sequence" and change it to "CDROM A: C:".

What happens to the Harddisk, especially the Bootsector?

- If the Windows NT/2000/XP boot manager NTLDR (and BOOT.INI) is found on the active partition nothing will happen to the bootsector of the partition. The FreeLoader-Bootcode is written to the file "BOOTSECT.ROS" and an entry is added to "BOOT.INI" which points to "BOOTSECT.ROS". FreeLoader becomes a secondary Boot-Manager.

  To remove FreeLoader you will only have to delete the files FREELDR.SYS, FREELDR.INI, BOOTSECT.ROS and remove the "ReactOS" entry from the hidden "BOOT.INI" file.

- If MS-DOS or Windows 9x is found on the active partition (MSDOS.SYS and IO.SYS) the original bootsector will be saved to the file "BOOTSECT.DOS". The FreeLoader-Bootcode will then be written to the Partiton-Bootsector and FreeLoader becomes the primary Boot-Manager. Finally a "DOS/Win9x"-Entry will be added to "FREELDR.INI" which points to "BOOTSECT.DOS".

  To remove FreeLoader you will have to boot DOS from a floppy disk and run "SYS C:" to replace the FreeLoader-Bootcode by the original DOS-Bootcode.

- If none of the Operating-Systems mentioned above is found on the active partition the original Bootsector is written to the file "BOOTSECT.OLD". The FreeLoader-Bootcode will then be

written to the Partition-Bootsector. FreeLoader becomes the primary Boot-Manager. If you are using another Boot-Manager you will have to add "BOOSECT.OLD" to the boot menu in "FREELDR.INI".

To remove FreeLoader you will have to write "BOOTSECT.OLD" back to the bootsector. You can use "dd" to do this on Linux and other *nix-compatible Operating-Systems.

Note: If the active partition uses a FAT32 filesystem the bootcode does not fit into a single sector but occupies two sectors. Microsoft uses Sector 0 (bootsector) and Sector 12. FreeLoader uses sector 0 and Sector 14. So, there should not be any conflicts with existing implementations.

Note: The implementation for non-Microsoft Operating-Systems is not as good as it should be. It will become more flexible in the future.

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Chapter 6. Download and install the latest ReactOS release binaries

Abstract

Where to get the latest ReactOS binaries and how to install them.

Where to download from

ReactOS binaries are physically stored on ReactOS' SourceForge development site. You can download ReactOS directly from the SourceForge site, but some users may prefer to go via ReactOS.com.

Obtaining the latest binaries via reactos.com

- Visit reactos.com which is the ReactOS portal site. This site will always point to the latest binaries.
- Click on the link, on the opening page of reactos.com that points to the latest "Kernel Release".
- On the Latest Release page, click on the "Download kernel x.x.xx binaries" (eg. "Download kernel 0.0.18 binaries") link.

Obtaining the latest binaries via SourceForge

- Visit sourceforge.net/projects/reactos which is ReactOS' development site, hosted by SourceForge.
- Scroll down to the "Latest File Releases"
- Click on the "Download" link for the reactos package.
- Scroll down to the reactos package (should be hilighted purple) and click on the xxxx_binary.zip (eg. 0018_binary.zip) link to download the binaries.

Installing the binaries

- Use your favourite zip utility to open the downloaded binary file.
- Extract the binaries to c:\ (the archive has path information to extract under c:\reactos).
- Check that the binaries are installed under c:\reactos (not c:\reactos\reactos!).

Note: You must extract the binaries to c:\reactos (first partition of first hard drive) if you wish to boot ReactOS under real hardware (DOS or boot loader).

Note: If you are going to use emulation software (we recommend Bochs; see Bochs documentation) to test ReactOS, then it does not matter where you extract to.

Chapter 7. Testing ReactOS

Abstract

How to test the installed ReactOS binaries.

Booting ReactOS

Reboot your system in plain DOS Change directory to C:\reactos Type "boot" or "aboot" at the command prompt (aboot.bat is the boot script with ACPI support). You should observe a few messages as drivers load. Wait until the prompt reappears (the screen should turn blue while ReactOS boots). Go on to next section.

Testing ReactOS

Reporting Problems

If you encounter problems with either booting or running your application, please send a email to ros-general@reactos.com with a subject of "BUG REPORT: Problem run foo while booting on bar". Foo being your application and bar being the release of ReactOS you are running, (0.0.19-Release). Please Include in the body of your email, a detailed discription of the hardware you are running on, application you are having problems with and all debug output.

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Chapter 1. ReactOS: Where it is and where its going - Wineconf 2002

Abstract

This is the transcript of the presentation and speech given by Jason Filby and Steven Edwards at Wineconf 2002 for the lindows.com and Wine Project Developers.

ReactOS Beginnings

Opening speech by Jason on the history of ReactOS.

ReactOS Mission and Goals

Disscussion on the original goal of compatibility with NT 4 applications and drivers. Further discussion looking at 2K/XP compatibility, short discussion on .NET plan by Casper Hornstrup.

Console Application Support Overview

Short Disscussion on Console Application support followed by demos.
- ReactOS cmd.exe (ported from FreeDOS)
- GNU Midnight commander for win32
- DFlat based editor
- Registry Explorer

Discussion on plans to Stabilize win32 console applications
- Self-hosted building of ReactOS using Mingw32
- Fix and separate DFlat in to dll for other console applications.

Win32 Graphical Application Support

Demo of gditest and discussion on future windowing support.

Winsock Support

Discussion on present limited winsock2 support. Overview of IP, lack of TCP and ne2000 network card driver. Demo of current winsock applications.
- finger

- ncftp
- ping
- telnet (2)
- roshttp
- whois

All winsock applications except the C++ telnet can load under ReactOS, but crash due to lack of TCP support in ws2_32.dll

NTOSKRNL design and drivers

Overview of ReactOS Kernel Architecture
- Hardware Abstraction Layer
- Device Drivers (Structured Exception Handling Discussion)
- Installable filesystem drivers
- Registry (Discussion on Binary windows registry compatibility)
- PowerPC and Alpha port
- Drivers

Subsystems

Subsystems allow ReactOS, as they do WinNT, to run applications designed for other systems. The original goal of win32 support has not been dropped. Developers who work on subsystems other than win32 are those who would never have contributed to the win32 system. This means that we are NOT dispersing our existing win32 developers. Instead, we are attracting developers that work on other subsystems and could bring more developers to the kernel.

Win32 Subsystem

Win32k.sys is the kernel mode portion of the win32 subsystem that is being implemented by the ReactOS project. All of the previous demonstrations are defendant upon win32k.sys. Win32k.sys is the primary windowing system, all other subsystems must route through it to display graphics.

ReactOS currently has a unusable fork of the wine code base. This fork will make up the majority of the user mode portion of the win32 subsystem.

- Most NTUSER APIs
- Default Windows Procedure
- Messaging

POSIX Subsystem

Initial POSIX 2 substem work started, implemented as psx.dll. Initial POSIX application headers are detected by kernel32 and invoke the posix subsystem. POSIX subsystem crashes after this point. POSIX subproject is in its first year.

Future plans for POSIX subsystem:
- Adapting LibW11 to ReactOS GDI for easy porting of X11 Applications.
- Demo showing rxvt/msys ported with LibW11.dll
- Discussion on Certifying KDE and GNOME with our POSIX subsystem
- Adapt LINE (Line is Not a Linux Emulator) to load linux/bsd elf binary programs.
- Certify GNU software library.

Java Subsystem

JOS (Java Operating System) project has agreed to use ReactOS for their kernel. JOS will be written in JAVA and use a snapshot of a JVM in memory saved to disk to bootstrap the JVM. Libraries are already under development.

Discussion on future plans to adapt ReactOS/JOS for embedded market.

OS/2 Subsystem

Marat Khalil is interested in developing an OS/2 subsystem for ReactOS. After announcing his intent to develop this subsystem, two others expressed interested in assisting with development. Since WinNT originally came with an OS/2 subsystem, our OS/2 subsystem is a natural development for ReactOS. An LX loader is being currently in development.

Other Subsystems

Discussion of possible subsystems include:
- DOS/Win16
- BeOS
- VMS
- Other experimental subsystems for Research purposes.

WINE Integration

Overview of ReactOS wine port for user space win32 support. Discussion on Header File Licensing and organization is currently a problem for ReactOS due to the usage of three groups of header files. ReactOS uses it own private, Mingw32 and Wine Headers. A Solution for this problem may lie in creating a header hile database that is shared by the 3 projects.

ReactOS Foundation

Overview of the The ReactOS development teams researching in creating a non-profit organization to provide legal defense for the ReactOS and releated project developers.