



Fedora is:

**open**  
**free**  
**innovative**  
**forward-looking**

# The Fedora Project: Foot Prints

Feel The Freedom of Fedora!

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**Free (as in speech and beer) Advice 101:**

**Keep it interactive!**

*Credit:* Based on previous Fedora presentations from Red Hat and various community members.

Using the age old wisdom and Indian, Free software tradition of standing on the shoulders of giants.





# Who the heck is Rahul?

( *my favorite part of this presentation* )

- ✓ Self elected Fedora project monkey and noisemaker
  - ✓ Fedora Project Board Member
- ✓ Fedora Ambassadors steering committee member.
  - ✓ Fedora Ambassador for India..
  - ✓ Editor for Fedora weekly reports.
- ✓ Fedora Websites, Documentation and Bug Triaging projects volunteer and miscellaneous few grunt work.

# Agenda

- Red Hat Linux to Fedora & RHEL - Why?
- What is Fedora ?
- What is the Fedora Project ?
- Who is behind the Fedora Project ?
- Primary Principles.
- What are the Fedora projects?
- Features, Future – Fedora Core 5 ...



# The beginning: Red Hat Linux

- 1994-2003
  - Released about every 6 months
  - More stable “.2” releases about every 18 months
  - Rapid innovation
  - Problems with retail channel sales model
  - Impossible to support long-term
  - Community Participation:
    - Upstream Projects
    - Beta Team / Bug Reporting

# The big split: Fedora and RHEL

- Red Hat had two separate, irreconcilable goals:
  - To innovate rapidly. To provide stability for the long-term
- Red Hat Enterprise Linux (RHEL)
  - Stable and supported for 7 years plus. A platform for 3<sup>rd</sup> party standardization
  - Free as in **speech**
- Fedora Project / Fedora Core
  - Rapid releases of Fedora Core, every 6 months
  - Space to innovate. Fedora Core in the tradition of Red Hat Linux (“FC1 == RHL10”) Free as in **speech**, free as in **beer**, free as in **community support**
  - Built and sponsored by Red Hat
  - **...with increased community contributions.**

# What is Fedora?

- **From Wikipedia, the free encyclopedia, Fedora can mean:**
  - ✓ Fedora, a play by Victorien Sardou
  - ✓ Fedora (hat), a hat named after the play
  - ✓ Fedora (Giordano), an opera from 1898 by Umberto Giordano
  - ✓ Fedora (movie), a 1978 movie
  - ✓ **Fedora Core, a Linux distribution spun off from Red Hat Linux and produced by the Fedora Project**
  - ✓ Fedora Directory Server, an LDAP server produced by the Fedora Project
  - ✓ Fedora (software), open-source repository software, developed jointly by The University of Virginia Library and Cornell University.
  - ✓ Fedora, a Russian female name, from the Greek female name, Theodora

# What is Fedora?

- It is free to use, modify, and distribute now and forever
- It is a operating system and platform based on Linux
- Rapid Release Cycle.
- Robust and Secure.
- Base of over seventy distributions.
- Supported in x86, x86\_64 and PPC (Power PC ) systems.
- Community ports to Sun Sparc(Aurora) and Alpha (Alpha) available.



# What is Fedora?

- A rapidly evolving system.
- New releases every 6-9 months to ensure continuous development.
- You always have the latest packages.
- Enhancements and bug fixes reach the users faster. A vicious positive feedback cycle ensures.
- Can update packages easily using yum.





# What is Fedora?

- It has a large support community and user base packages are constantly updated, and recent.
- Yum(command line tool) and pirut (graphical utility) , which can manage packages.
- Easy to use various graphical administration and system configuration tools, which provides basic functionality.
- Anaconda, an easy to use installer thats fast and has both graphical and text based front ends.



# What is Fedora?

Free from legally encumbered software.

In line with Red Hat patent promise to not use any patents against Free and open source developers.

Fedora Foundation Free and open source patent pool for defense is work in progress funded by Red Hat...



# What is Fedora?

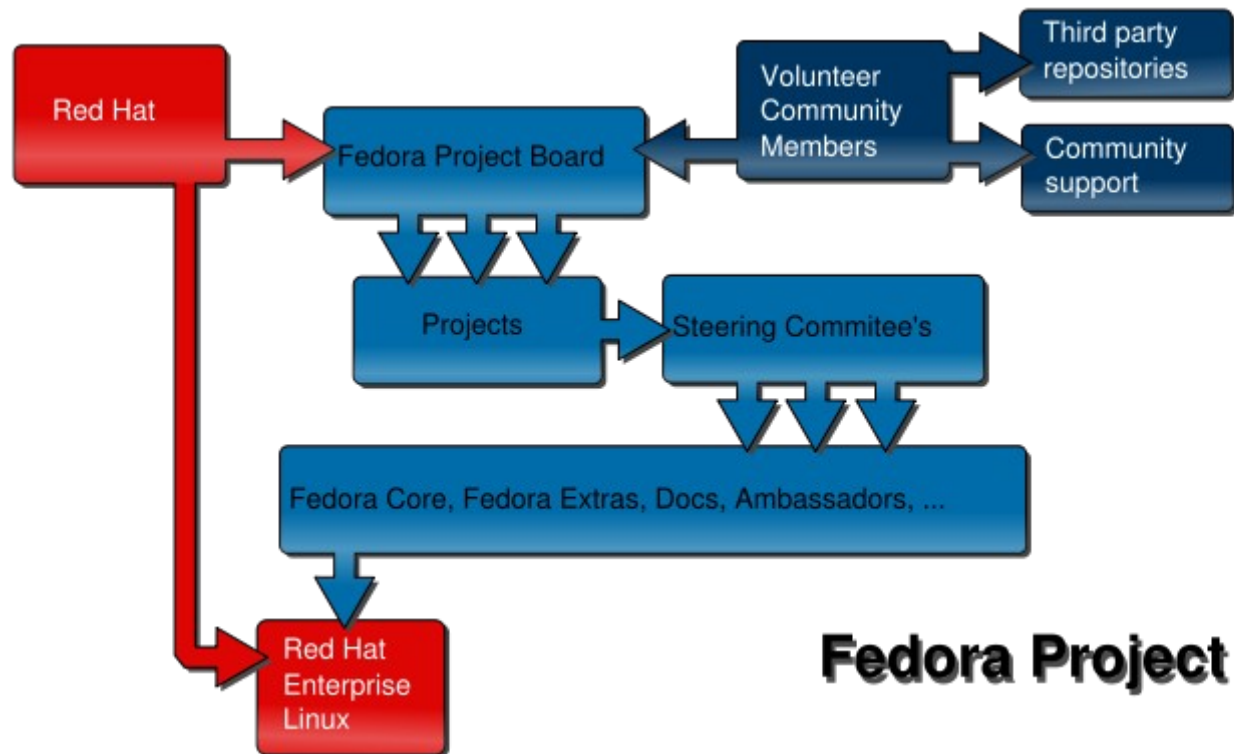
Base and DNA of a strong Linux Distribution - Red Hat Enterprise Linux which itself is Free (as in speech), open source, certified and supported by Red Hat for 7 years.

Red Hat Enterprise Linux is build upon the community focused Fedora Project and provides added value. Red Hat uses its enterprise focused Red Hat Enterprise Linux strength to fund and sponsor Fedora Foundation and the Fedora Project both in money and in kind resources (man power and other services)



# What is the Fedora Project?

Assembling each community into one.



# What is the Fedora Project?

## A collection of communities

- Made from thousands of separate Upstream software projects. Many of them get heavy contributions from Fedora developers.
- The central sub project is Fedora Core. There are many others such as Fedora Extras, Documentation, Ambassadors etc
- Fedora builders enable communication, testing, integration and delivery



# Fedora Project: Who is behind it?

## Every Red Hat Engineer works on Fedora

- Forefront of Company R&D
- Rapid development of technology which Red Hat people and community use.

## Millions of users

- Want the latest Open Source technology, development and software

## Community Contributors

- Hundreds of patch submitters and bug reports
- Roughly 100 Extras packagers resulting in over 1600 packages in addition to over 2000 packages in Fedora Core
- Maybe dozen Legacy contributors
- Hundreds of Translators. Dozens of content creators ....



# Primary Principles of Fedora

**Release Early, Release Often**

**Centralized Collaborative Development**

**Mutual Benefit of Community and Company**

**Importance of Upstream**



# Release Early, Release Often

## Essential in Open Source Development

- Improves Developer/User interaction
- Wider testing exposure and feedback sooner
- Stuff happens faster
- Generates excitement and involvement with Free and open source software





# Collaborative Development

## Just common sense. Do the Right Thing(TM)

- Fedora builders enable communication
- Advantage of distributed development model combined with the testing and integration of centralization collaboration
- Work Together
- Reduce duplication of effort
- Everything in one place
- Provides ease of use through consistent policies and packaging guidelines



# Mutual Benefit

## Community is better at...

- Attention to detail
- Many eyes, wider range of hardware
- Real world situations
- “Fun” things

## Company is better at...

- Long term focus
- certifications
- “Boring” things, Assign someone to do it
- Examples ... GCC 4.0, NPTL, O(1) scheduler, FORTIFY\_SOURCE, exec-shield



# Importance of Upstream

## Common sense: Proprietary is NOT an Advantage in FOSS

- Fedora
  - Uses components made by upstream projects
  - Creates new upstream projects
  - Contributes to and supports development of existing upstream projects
- Whenever possible, get patches into upstream
- Everyone benefits from sharing and collaboration
- We benefit from wider peer review and testing exposure
- Easier long term maintenance
- Allows us to concentrate on future innovation



# Importance of Upstream

Example: Kernel

## diff -urN |wc -l Sizes between Upstream and Fedora kernel

RH9	603249
FC1	560287
FC2	90286
FC3	106153
FC4	104870 (when excluding Xen)

## 2003-Jan. 2005 Kernel Contributions (changeset estimates)

Linus' contributions: 3.900% (1999 out of 50429)  
IBM's contributions: 7.500% (3797 out of 50429)  
SuSE's contributions: 4.500% (2275 out of 50429)  
Conectiva's contributions: 1.200% (640 out of 50429)  
Red Hat's contributions: 11.900% (6045 out of 50429)  
Other contributions: 70.700% (35673 out of 50429)



# Importance of Upstream

- **Red Hat Contributions – Part I**

## **The Core Operating system**

LVM2, md SELinux Kernel 2.6 Audit subsystem

eclipse crypto ext3 vfs usb - patches Kernel 2.6 Virtual Memory manager kernel 2.6 CPU scheduler netdump and netconsole

NPTL Tux several SATA drivers Several network drivers Network stack

## **Freedesktop.org and GNOME technologies**

Cairo, dbus, poppler, HAL

Pango glib, gtk+, Metacity, nautilus gnome-panel, gnome-menus, gnome-session, gnome-keyring. gnome control-center vte, gconf, . Evince, NetworkManager, Sabayon, vino

# Importance of Upstream

- **Red Hat Contributions – Part II**

- **Key Open Source Development Tools**

glibc gcc and gcj binutils elfutils libuser libxml2 and libxslt development gamin - FAM replacement

- **Administration Frameworks**

RPM up2date anaconda firstboot system-config-tools

- **System Clustering**

gfs, gfs2 dlm gulm cman rgmanager ccs

fence system-config-cluster gnbd

dmraid bddraid csnap JFFS2

For more information see <http://sources.redhat.com/cluster>

- **Service Management**

booty chkconfig initscripts kudzu MAKEDEV mkbootdisk mkinitrd ntsysv rhpl rootfiles sysreport

## Emerging Technologies

System Tap, frysk supporting Xen virtualization SELinux MCS

# Fedora Core

## The 'Core' Linux Distribution

- 4 CD's or 1 DVD
- Essentials for Desktop, Server and Software Development
- Tries to avoid duplicate functionality, go to Extras

## Timed Release Cycle

- Roughly every 6 months
- ~~When it's ready~~
- Dates slip, but deadlines promote constant progress



# Fedora Extras project

- More than three years in the making
  - Core but infinite size
  - Same principles and legal guidelines as Fedora Core.
  - Expanding the efforts of the fedora.us community
- Supported by Red Hat
  - Infrastructure: CVS, account system, bandwidth, [fedora.redhat.com](http://fedora.redhat.com)
  - Steering committee: Half Red Hat employees, Half External community packagers
- Driven by the community
  - Infrastructure: build hosts, [fedoraproject.org](http://fedoraproject.org)
  - Steering Committee: half community contributors
  - Real heavy lifting by community: build system code
  - Real output: over 1600 source packages and 2300 binary packages in Fedora Extras repository
  - Real growth: 2+ new packagers per week since February
- Proof of the model: Red Hat Supported, Community Driven



# Fedora Documentation Project

- Community building of content
- Uses the same infrastructure as Fedora Extras
- Boring to many but somebody has to do it
- Good way to for non-coders to get involved without pulling hair with code. Several documentation
  - Release notes
  - Installation guides
  - Yum guide
  - SELinux FAQ and Apache SELinux guide
  - Mirror tutorial
  - Dozens of drafts.

# Fedora Legacy Project

## Why?

- Fedora Development needs to forge ahead
- Volunteer developer interest and time
- But some users want to keep using the old version
- Default repository from Fedora Core 5 onwards.

## Community Development

- Generally for Servers and large deployments
- Developed by mainly OEM, Consultants, Universities
- Security fixes only
- Today RHL7.3, RHL9, FC1, and FC2 supported and FC3 soon...
- <http://www.fedoralegacy.org>



# Fedora Ambassadors Project

- Spread, promote and critique Fedora.
- Over sixty ambassadors in more than 20 countries all over the world and growing rapidly
- Get Free CD/DVDs and goodies.
- Help plan/execute Fedora events (Fedora booth at LWCEs, FUDCons) and other Linux conferences -FOSS .in in Bangalore. Now. Today. Here... Linux Asia
- Advise/argue about logos/naming/other stuff
- Fedora Mentors sub project to bridge potential contributors and long term ones.

# Fedora Directory Server Project

## Originally Netscape Directory Server

- Bought by Red Hat to provide a enterprise class directory system for the Free software world.
- Made completely Free and Open Source now.
- World class, robust, scalable, open source server based on Lightweight Directory Access Protocol (LDAP)
- Work in Progress...
- Has community infrastructure ready at [directory.fedora.redhat.com](http://directory.fedora.redhat.com)
- Will drive more community participation over time

<http://directory.fedora.redhat.com>



# Fedora Live CD Project: Kadischi

- **Not just a Live CD**
- A tool to create any number of custom CD's out of any mix and match of packages within the Fedora repositories or even your packages. Already used by Fedora derivatives such as BlagBlagBlag
- Point and click interface effort.
- Integrated well within Anaconda, the Fedora installer.
- Work in progress.
- Sponsored by Red Hat as a Fedora bounty
- List of bounties available at <http://fedoraproject.org/wiki/FedoraBounties>

# Fedora: Platform for Innovation

- **SELinux** – Mandatory access control security framework developed by Red Hat in partnership NSA (National Security Agency – US department of defense). Enabled by default in Fedora. More on this later...
- **GFS** - GFS is a POSIX compatible cluster filesystem. Originally developed by Sistina, GFS was acquired and open sourced by Red Hat. It is now integrated and available as part of Fedora. Being pushed upstream.
- **Evince** – Document viewer, now part of GNOME.
- **Network Manager** - Automatic network configuration utility
- **Sabayon** - Profile manager for GNOME with support for Openoffice.org, KDE etc.
- **Fedora Directory Server** - robust, scalable open-source directory server designed to manage large directories of users and resources. It is based on an open-systems server protocol called the Lightweight Directory Access Protocol (LDAP).
- **Systemtap and Frysk** - developed and sponsored by Red Hat in partnership with others like IBM and Intel, provide a comprehensive framework to benchmark, analyze and improve system performance. With SystemTap, developers and system administrators can take a deep look into a running kernel. With frysk, developers and system administrators can directly manipulate executables as they run.

# Fedora: Proactive Security

- ***SELinux*** : First mainstream operating system in the world to ship with **mandatory access control security through SELinux by default**. Developed in partnership with NSA and other Gentoo and Debian developers. Protects users and processes by confining access and watching all actions performed on the system.
- ***Exec-shield*** – Blocks many buffer overflow issues using runtime detection. Allows data memory to be moved across random locations.
- ***Position Independent Executables (PIE)***- , PIE allows a programmer to make the executable load at a different memory address each time it starts. Attackers cannot predict where the application will start, making it very hard or impossible to exploit.
- ***Restricted Kernel Memory access*** - Fedora restricts how the kernel memory (/dev/mem) to be overwritten. This prevents several rootkits from functioning resulting in a safer and more secure system. See <http://lwn.net/Articles/160380/> for more details.

# Fedora: Proactive Security – Take 2

- ***ELF (Executable and Linkable Format) Data Hardening*** -- These are changes to the file components that protect the structure of the file itself.
- ***Stack Smash Protection, Buffer Overflow Detection and Variable Reordering*** - From Fedora Core 5 onwards all of the software in the Fedora Core and Fedora Extras software repositories is compiled using a security feature called fstack-protector. fstack-protector puts a canary value on the stack of key functions. Just before the return address and just before returning from that value, that canary value is verified. If there was a buffer overflow, the canary no longer matches and the program aborts. The canary value is random for each time the application is started and makes it impossible to guess remotely. This is a security feature that has been backported from GCC 4.1 to the version of the GCC compiler used in Fedora Core 4. This feature has been written by Fedora developers and provides similar functionality to the IBM propolice/ssp external patches.



# Fedora: Proactive Security – Take 3

- **Compile Time Buffer Checks (FORTIFY\_SOURCE)** - GCC compiler and GLIBC C library from Fedora Core 4 onwards has gained a feature called "FORTIFY\_SOURCE" that will detect and prevent a subset of the buffer overflows before they can do damage. The idea behind FORTIFY\_SOURCE is relatively simple: there are cases where the compiler can know the size of a buffer (if it's a fixed sized buffer on the stack, as in the example, or if the buffer just came from a malloc() function call). With a known buffer size, functions that operate on the buffer can make sure the buffer will not overflow. Refer to <http://www.redhat.com/magazine/009jul05/features/execshield/> for more information.
- **All of the above work has been done by Red Hat through collaboration with the open source community and other Red Hat partners.**
- Refer to <http://fedoraproject.org/wiki/Security> for security policies, security contact, status, features and other references.

# Fedora: Free/Open Source Java Platform

## GCJ and Classpath - Now part of GCC

- Fedora Java development team from Red Hat.
- Success in Fedora Core 4: **Eclipse** – A Free and open source extensible development platform and application frameworks
  - **OpenOffice.org** – The world's most popular open source office suite
  - **Ant** – Java based build system
  - **Apache Tomcat** - Apache Tomcat is the servlet container that is used in the official Reference Implementation for the Java Servlet and JavaServer Pages technologies
  - **Jonas** – Java Open Application Server
  - **Azureus** - Bittorrent client.
  - Refer to <http://fedoraproject.org/wiki/Java>



# Fedora: Xen Virtualisation platform

- The “natural” evolution of computing. Just like a multiprocessing operating system can run multiple applications, Xen will allow you to run multiple versions of the same operating system or multiple operating systems themselves at the same time. Supported today in Fedora and developed by a team of Red Hat developers. Will be able to run other BSD based systems and others too in the future.
- Xen is a high performance and secure open source virtualization framework. Virtualization allows one to run many guest virtual machines on top of a host operating system such as Fedora. Virtualization has been around for some time in products such as VMWare and VirtualPC; however, it has historically been resource intensive, with guest operating systems running at a significant performance hit. Xen uses a different approach; by being both a true hypervisor and a platform, Xen takes virtualization to a new level of performance for guest operating systems through modification of kernels or hardware support and security through isolation of processes.
- Refer to <http://fedoraproject.org/wiki/Tools/xen> for more details.

# Fedora : GFS Cluster filesystem

- Originally a proprietary system owned by Sistina
- Bought and opened by Red Hat
- Free and Open source cluster filesystem
- Provided in Fedora Core 4 and above.
- Growing by leaps and bounds
- Refer to <http://fedoraproject.org/wiki/Tools/GFS> for details

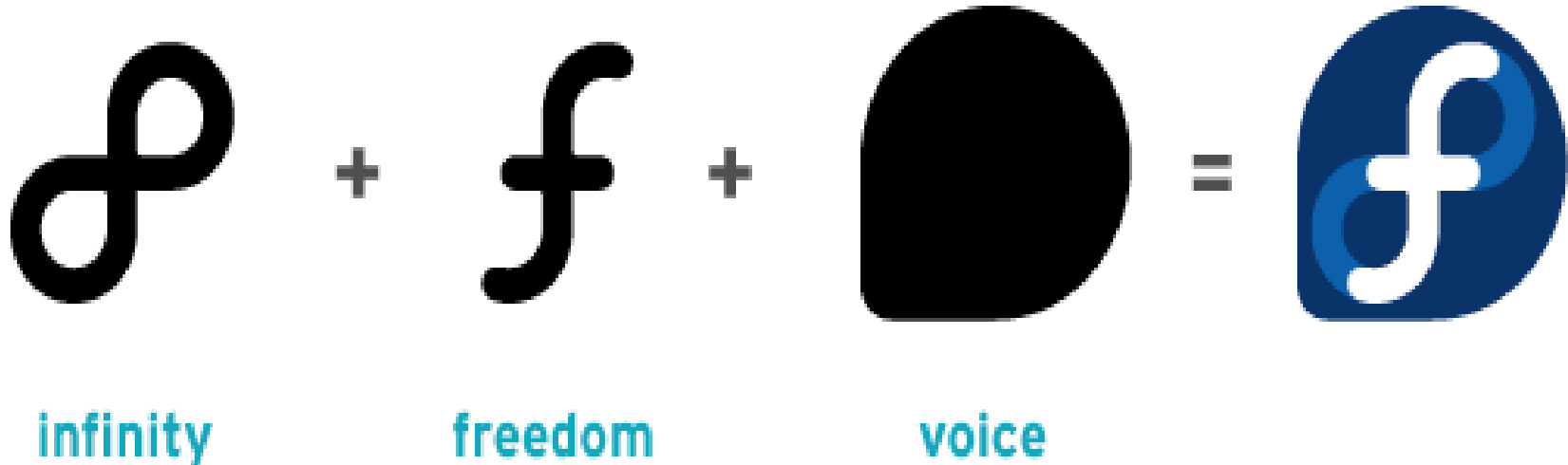
# Fedora: Developer and System administrator's dream

- Not just user friendly but developer and system administrator friendly too.
- Provides a host of development languages such as C, C++, Fortran, Java, Python, Ruby,
- Provides deep analysis capability for system administrators with Systemtap and Frysks
- SystemTap and frysk, developed and sponsored by Red Hat in partnership with others such as IBM and Intel, provide a comprehensive framework to benchmark, analyse, and improve system performance. With SystemTap, developers and sysadmins can take a deep look into a running kernel. With frysk, developers and sysadmins can directly

# The Future of Fedora Core and Linux?

- Fedora Targets – Fedora GNOME, Fedora Server, Fedora KDE, <Community Targets>
- Better OEM (Original Equipment manufacturer) capability for pre-installed Fedora systems.
- Fedora Directory Server integration.
- Free Java stack improvements – Java applet,
- Better SELinux integration, flexibility and manageability using reference policy
- Better Xen functionality
- Availability of yum repositories functionality in Fedora Extras and others during Installation. Installer already uses yum as a backend now.

# Fedora Branding: Visually appealing, bubbly themes, voice , community



# Fedora Wordmark

the Fedora wordmark is structured, friendly, and open  
[like the community]

lowercase "f" is  
less corporate

open shapes are  
friendly and open

fedora

rounded corners are similar  
to the "f" in the symbol

"a" is similar to  
the talk bubble shape  
in the symbol



# Fedora Core 5

- 2.6.16? kernel - Tons of features and fixes
- GCC 4.1 – Better performance and security
- Xen virtualisation platform
- GNOME 2.14 and KDE 3.5
- Pup software updater
- Modular Xorg – faster, leaner and meaner updates
- Better Asian language support through SCIM input method
- SELinux reference policy

# Fedora Core 5 Tour

- <http://fedoraproject.org/wiki/Tours/FedoraCore5>





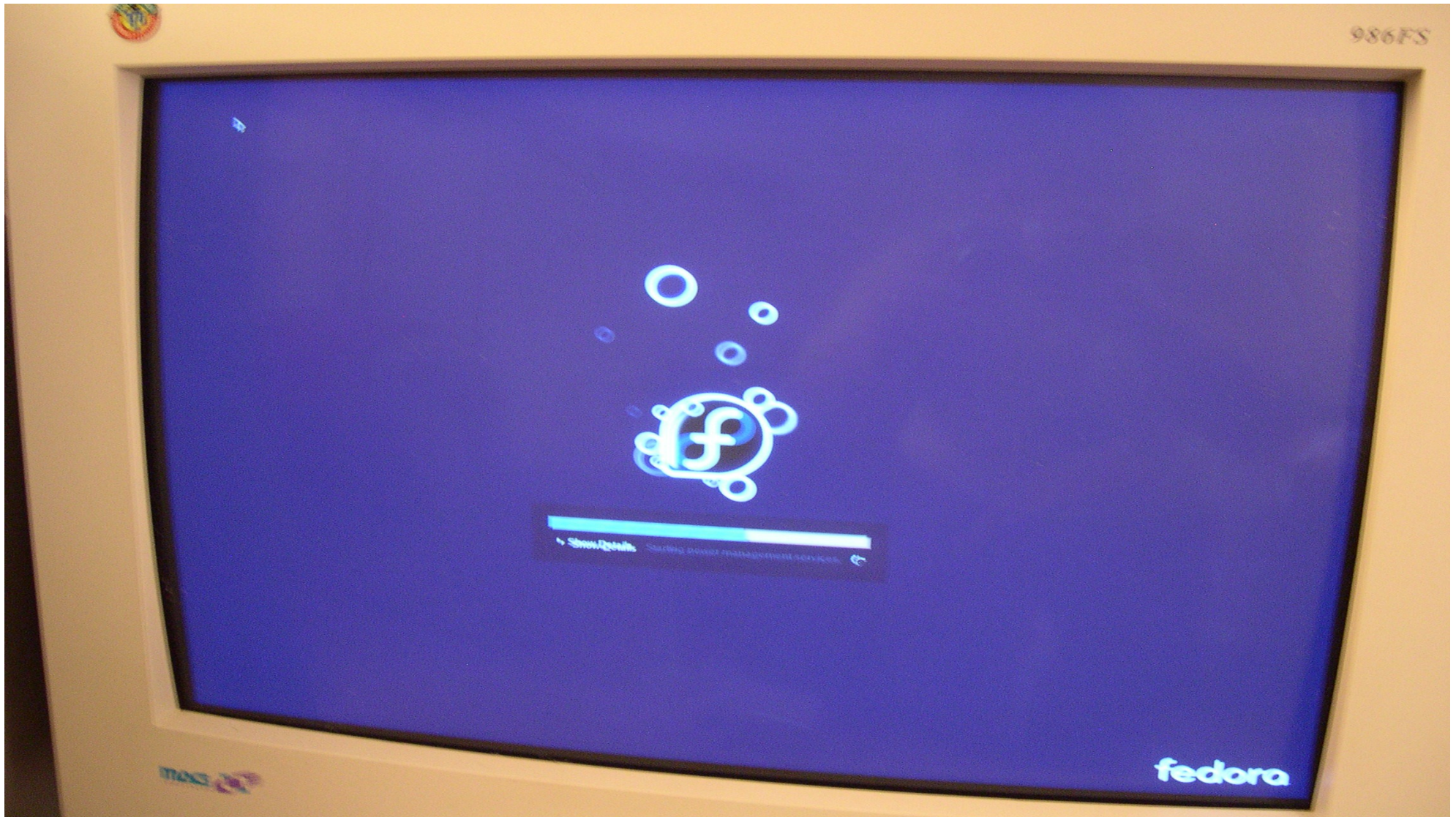
Press any key to enter the menu

Booting Fedora Core (2.6.14-1.1777\_FC5) in 1 seconds...■

fedora<sup>TM</sup>





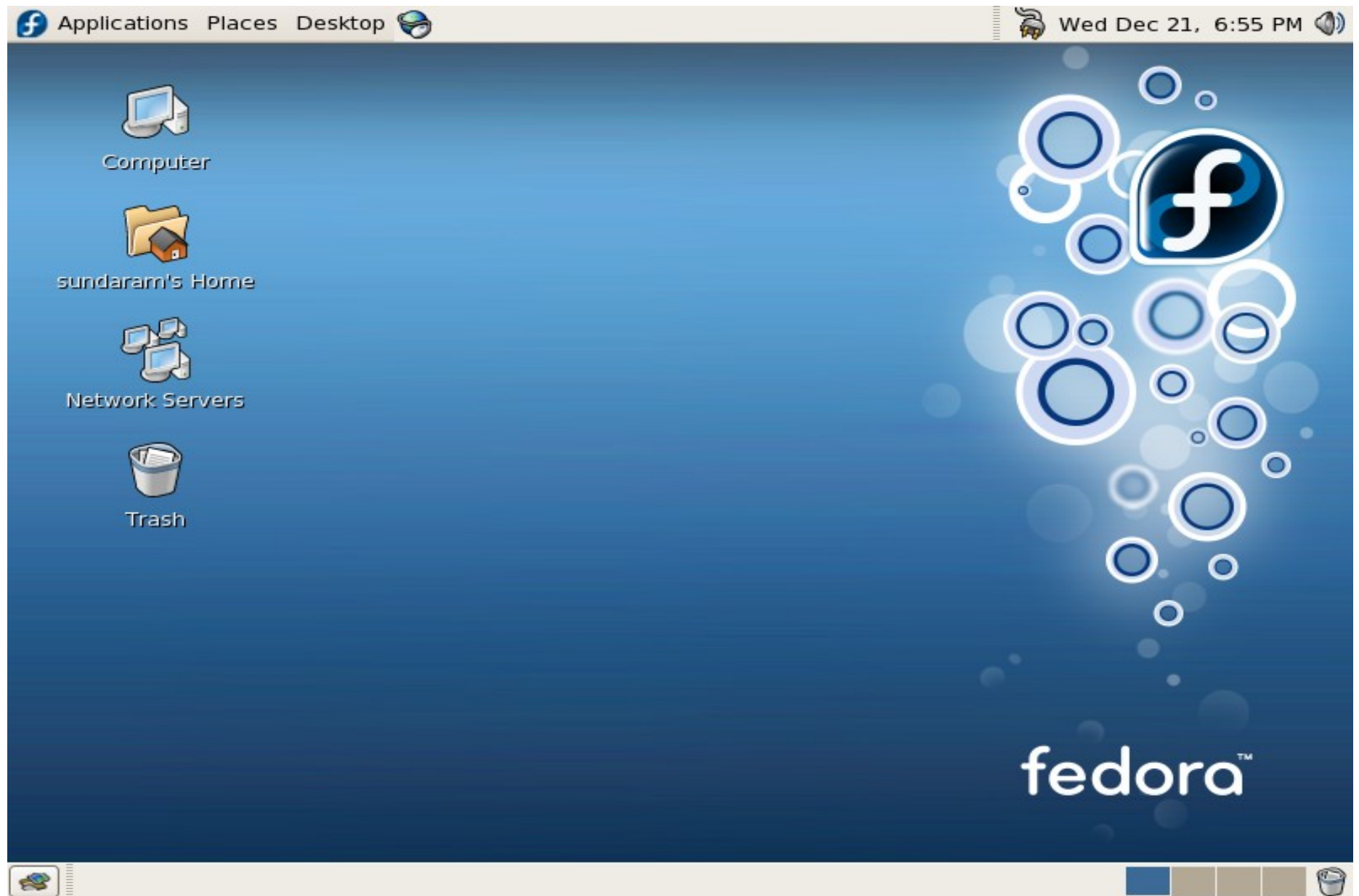


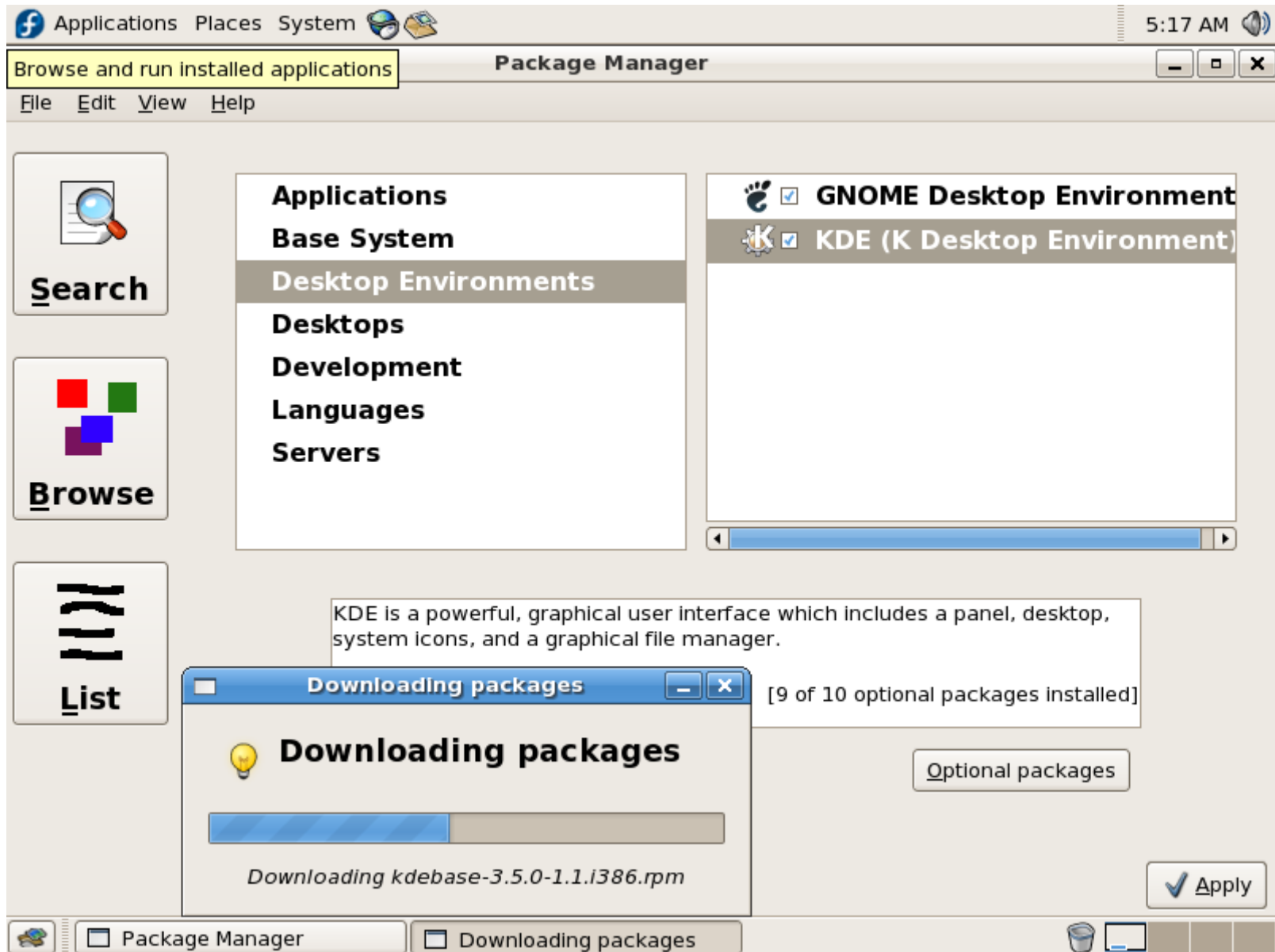














# Fedora : The (somewhat) Short Definition

- *Fedora is an open, innovative, forward looking operating system and platform, based on Linux, that is always free for anyone to use, modify and distribute, now and forever. It is developed by a large community of people who strive to provide and maintain the very best in free, open source software and standards. The Fedora Project is managed and directed by the community and sponsored by Red Hat.*

Thats It Folks.  
More Questions,  
complaints and  
suggestions?



Fedora – Proudly powered by Red Hat

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