



# Installation Support for Large Scale Deployments

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# Introduction

- Anaconda Information
- Fedora and RHEL Information
- Large Scale Deployment Topics
- Tools Available
- Kickstart Overview
- Advanced Installation Topics
- Trigger Scripts
- Modifications to the Installer
- Development

# Presenter

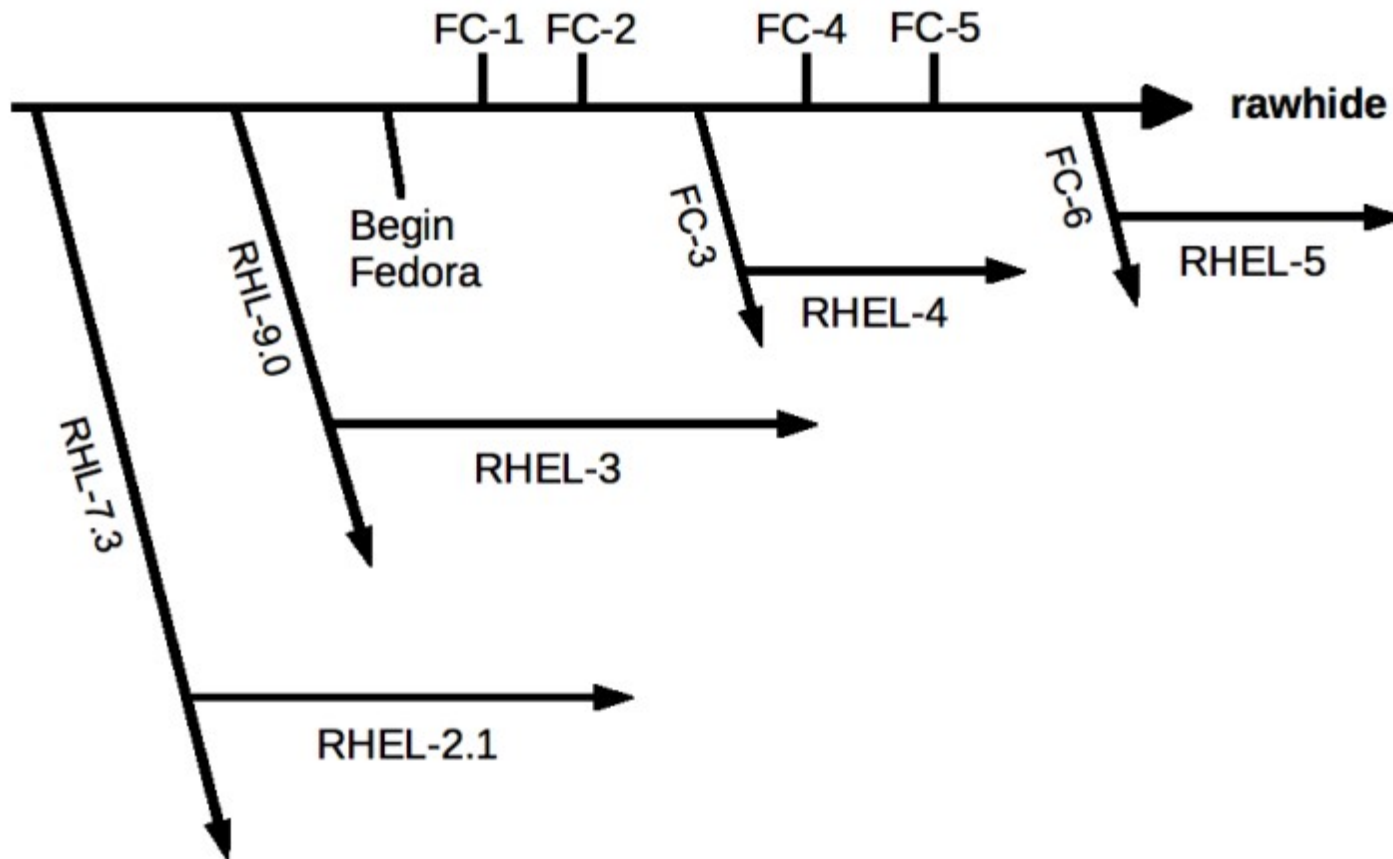
David Cantrell

- Software Engineer at Red Hat
- Projects include anaconda, dhcp, and dhcpv6
- Primary focus is network software
- Currently involved with RHEL 4, RHEL 5, and Fedora
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# What is Anaconda?

- Operating system installer
- Interfaces provided in GUI and text modes
- Unattended installs provided by Kickstart
- System setup for storage, network, services, and accounts
- Used by RHEL and Fedora (and others)
- Forms first impression of the product
- “First tool to run, first tool to uninstall”

# How is Fedora related to RHEL?



# Large Scale Deployment Problems

- Reproducible installations
- Ability to deploy to new hardware quickly
- Complex storage setup
- Hundreds of network interfaces
- Site-specific tuning and final configuration
- Minimal installation complexity

# Solutions That Do Not Scale

- Imaging
  - With the exception of LiveCD or LiveUSB
- Interactive installs

# Tools Available

- Anaconda and Kickstart
  - <http://fedoraproject.org/wiki/Anaconda/Kickstart>
- **ksvalidator**
- **system-config-kickstart**
- **yum** and **createrepo**
  - yum plugins for added functionality
  - createrepo to generate site-specific package repos
- Cobbler (<http://cobbler.et.redhat.com/>)
  - Experimental provisioning software

# Kickstart Basics

- Need a valid install command
- Interactive installs create **/root/anaconda-ks.cfg**
- Any number of **%pre** and **%post** scripts
- Components listed in the **%packages** section
- Defaults for many settings if not specified
- Required settings not specified will cause user prompting

# Kickstart Advantages

- Easily reproducible installs
- Eliminates the need for interactive setup
- Can run unattended
- Not architecture dependent
- Can be defined per system or per task

# Kickstart Disadvantages

- Kickstart file management
  - SOLUTION: version control
- Initial file creation and testing
  - SOLUTION: unpaid intern
- New RHEL or Fedora releases can deprecate or remove Kickstart commands
  - SOLUTION: use ksvalidator or check install.log for deprecation warnings, update your ks files
- Difficult to see what's going on
  - SOLUTION: vnc

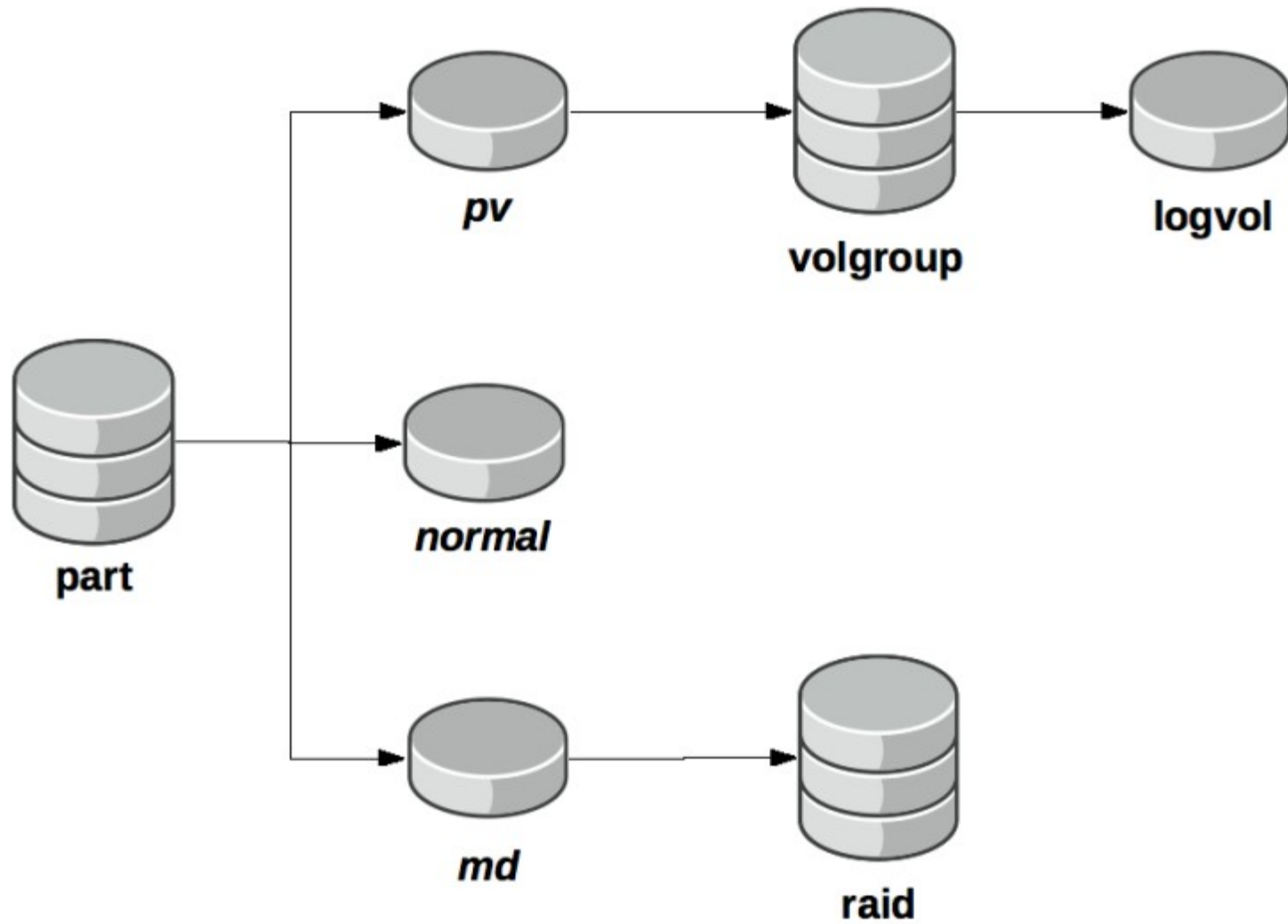
# Boot Arguments

- Kickstart specification
  - ks= argument
- Network configuration
  - ip= argument
- Boot CDs or DVDs
- Network boot
  - Automatic search using just the 'ks' option
- Driver disks

# Disk Provisioning

- **part** command creates partitions (normal, raid, or pv)
- **raid** command creates software RAID volumes
- **volgroup** command binds pv partitions in to a vg
- **logvol** command creates LVM volumes
- All partitions are formatted unless you specify `–noformat`
- Alternatives:
  - Use a `%pre` script and invoke `parted` or `sfdisk` manually to partition the disk.

# Disk Provisioning (cont.)



# Network Configuration

- During installation, anaconda will bring up all network devices listed in the ks file
- Prevent device configuration during installation by using the **-onboot=no** switch
- Use **ksdevice=** to specify the network device to use during installation
  - **ksdevice=BOOTIF** means the boot interface
  - **ksdevice=ethX** to use a specific interface
  - **ksdevice=link** to use first interface found with active link
  - **ksdevice=XX:XX:XX:XX:XX:XX**

## Network Configuration (cont.)

- Use **network** command to configure the interface, set onboot to no, use a %post script to flip ONBOOT back to yes at end of install.

```
%post --log=/root/finish.log
SCRIPTS=/etc/sysconfig/network-scripts
if [ -d ${SCRIPTS} ]; then
    cd ${SCRIPTS}
    for cfg in ifcfg-* ; do
        sed -i -e 's|ONBOOT=no|ONBOOT=yes|g' \
            ${cfg}
    done
else
    echo "${SCRIPTS} not found"
fi
```

# Other System Configuration

- Time zone
- Root password (now with SHA-256 and SHA-384 encryption options...only in Kickstart)
- User accounts
- Enabled and disabled services
- Keyboard layout and language settings
- SELinux

# Package Selection

- Add additional repositories with the **repo** command
- Packages and groups can be listed in **%packages** section
- Groups specified with **@groupname**
- Prevent a package from installing with **-packagename**
- Wildcards supported: **\*-devel**
- Install all packages available: **\***
- Only install core set of packages: **-\***
  - Don't do this

## Package Selection (cont.)

- Added repositories need to be local collections or URLs
  - Repositories must be yum repos
  - Use **createrepo** to generate repodata
- Multiple **%packages** sections are combined in to one for dependency resolution
- Anaconda uses yum to do dependency resolution
  - More packages == more resolution time
  - Dependency resolution overrides minus sign

## Package Selection (cont.)

- Packages are organized in to groups
- Groups have three categories for packages:
  - Mandatory
  - Default
  - Optional
- Use **yum grouplist** and **yum groupinfo** to see groups

## Package Selection (cont.)

- Options for **%packages**:
  - --default
    - Install Mandatory and Default packages
- Options to **@groupname**:
  - --nodefaults
    - Install only Mandatory packages
  - --optional
    - Install Mandatory, Default, and Optional packages

# Trigger Scripts

- Kickstart offers pre-installation and post-installation scripts
- You can have as many as you want
- Default interpreter is bash, but you can change that with the **--interpreter** option
- Trigger scripts can log output with the **--log** option

# Trigger Scripts - %pre

- **%pre** runs before installation begins
- They are executed in the installer's environment
- Uses:
  - Examine or configure hardware before anaconda runs
  - Manual disk partitioning
  - Advanced disk configuration
  - Advanced network configuration
- Multiple **%pre** scripts can be specified and are executed in the order they appear in the file.

## Trigger Scripts - %post

- Also called finishing scripts
- **%post** scripts run after installation has completed
- They use the newly installed system as a chroot environment (compared to where %pre runs)
- Pass **--nochroot** to %post if you do not want it to run in the newly installed environment

## Trigger Scripts – Interactive %post

- Prompt for user input with the **zenity** command
- Only available for GUI installs, not text mode (use VNC!)
- Be careful when prompting users and perform input validation

```
%post
zenity -question --text \
    "Install corporate VPN client?"
if [ $? -eq 0 ]; then
    # install vpn client
fi
```

# Supplementing the Installer Environment

- **updates.img** can provide anaconda updates, or tools you want to use for installation
- Contents of updates.img gets copied to **/tmp/updates** in the installer environment
- Use it to supply additional tools you need to complete your installation
- These tools will be available to you during %pre and %post operations
- **NOTE:** For %post, be sure to use --nochroot, otherwise you won't be able to access /tmp/updates

## Supplementing the Install Environment (cont.)

- Making an **updates.img** file:

```
dd if=/dev/zero of=updates.img bs=1k count=4096  
mke2fs updates.img  
mkdir u  
mount -o loop updates.img u
```

- Use **updates=** boot parameter to supply updates at boot time
- If making a custom CD, put updates.img in the **images/** subdirectory and anaconda will automatically find it

# Customizing the Installer Environment

- Custom welcome graphic, create a new **splash.png** file and place it in your updates.img
- Custom header graphic, create a new **anaconda\_header.png** and place it in your updates.img
- Be sure to use the ones found in **/usr/share/anaconda/pixmaps** to make sure you get the sizes right

# Development

- <http://fedoraproject.org/wiki/Anaconda>
- [anaconda-devel-list@redhat.com](mailto:anaconda-devel-list@redhat.com)
- #anaconda on irc.freenode.net
- Report bugs at <http://bugzilla.redhat.com/>

# Questions