Dynamic Kernel Module Support

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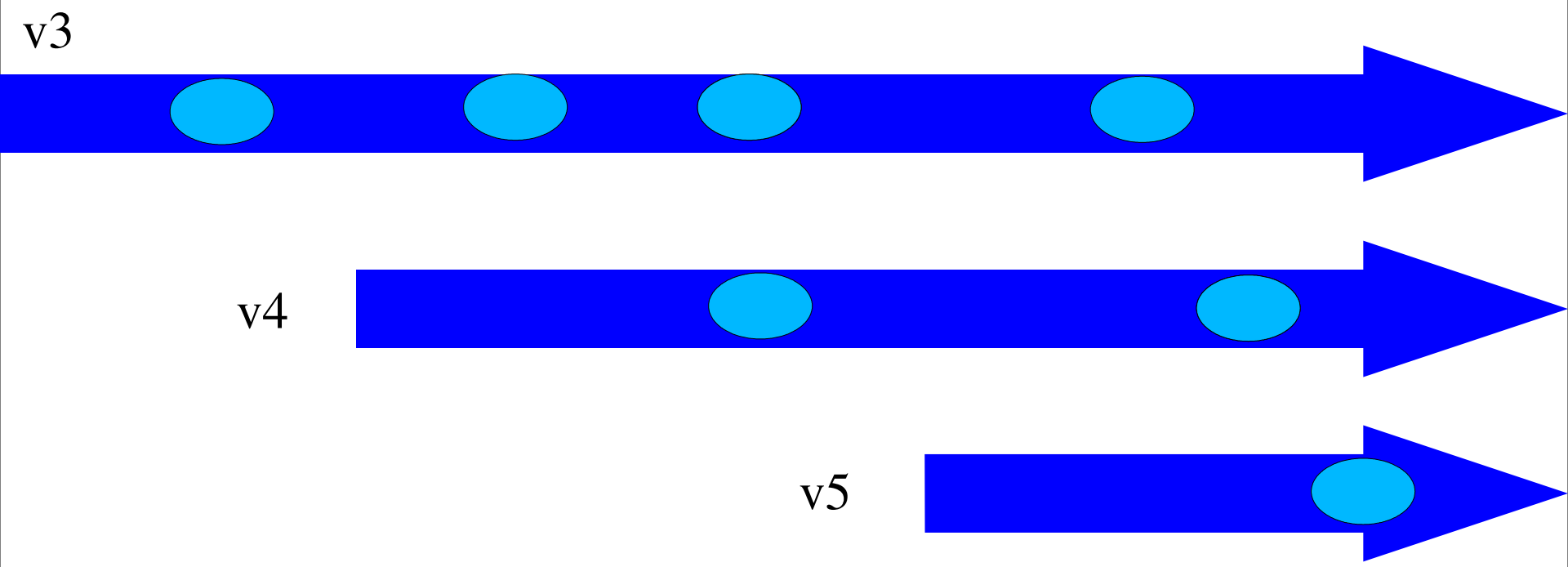
Product Timelines



Which one(s) are your customers using today?

Scheduled Updates / Service Pack

Linux Driver Management Challenges

- Most of the time, device drivers you need are packaged with the distribution version you want to run. Except:
  - Older OS/kernel, new hardware
  - Current OS/kernel, newer driver fixes critical bugs
  - Current OS/kernel, newer driver for features
- Non-Kernel Driver Management
- Driver RPMs
- Kernel Upgrades

Dynamic Kernel Module Support (DKMS)

- Offers a Framework for Holding Driver Module Source
- Provides a Command Structure for Handling Drivers
- Provides a Database of Module Versions
- Extends RPM Capabilities to Handle Multiple Kernels

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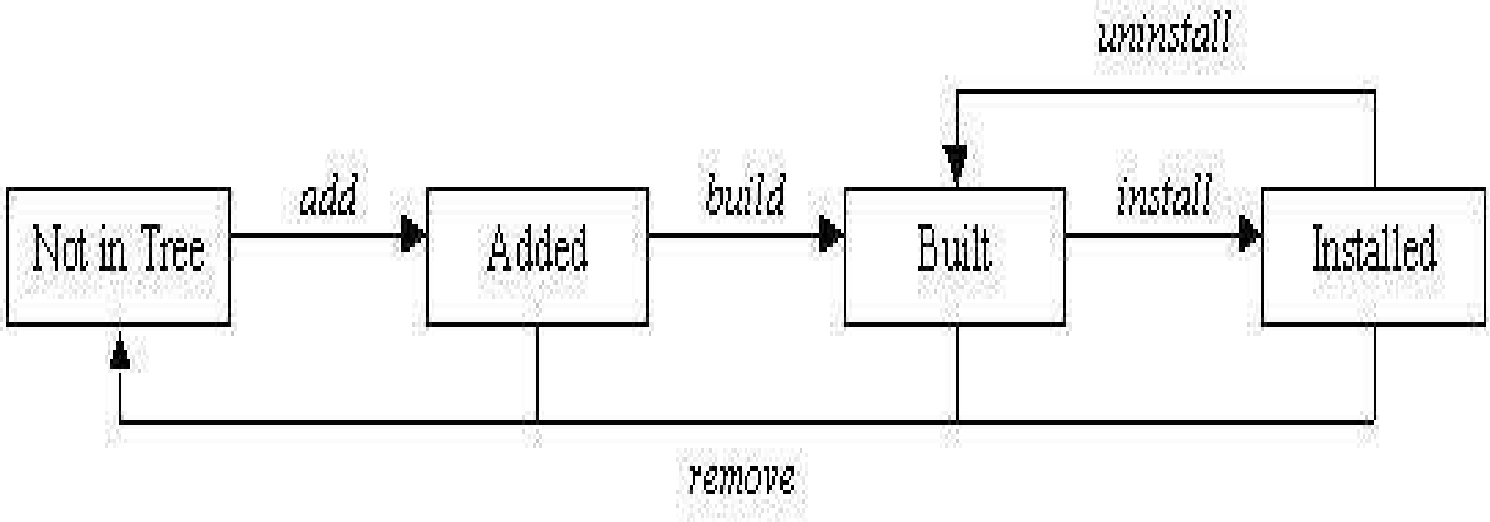
DKMS Command Overview

- add
- build
- install
- uninstall
- remove



- status
- match
- mktarball
- ldtarball
- mkdriverdisk
- mkrpm

- autoinstaller

Example DKMS usage

```
# dkms add -m megaraid2 -v 2.10.7
# dkms build -m megaraid2 -v 2.10.7 –k 2.4.21-27.EL
# dkms build -m megaraid2 -v 2.10.7 –k 2.4.21-27.ELsmp
# dkms build -m megaraid2 -v 2.10.7 –k 2.4.21-27.Elhugemem
# dkms build -m megaraid2 -v 2.10.7 –k 2.4.21-27.EL –a x86_64
# dkms build -m megaraid2 -v 2.10.7 –k 2.4.21-27.ELsmp –a x86_64
# dkms mkrpm -m megaraid2 -v 2.10.7 –k 2.4.21-27.ELsmp
# dkms mkdriverdisk -m megaraid2 -v 2.10.7 –k 2.4.21-27.ELsmp \
      –k 2.4.21-27.EL –k 2.4.21-27.ELBOOT  -d redhat
# dkms remove -m megaraid2 -v 2.10.7 –all
# dkms status
```

How Does DKMS Benefit the System Administrator?

- Driver Version Visibility & Management
- Simplified Driver Installation
- Kernel Upgrade Support
- Build on one system, deploy to many systems
- Works with existing deployment mechanisms – PXE, kickstart, Red Hat Network Satellite Server, local yum repositories

How does DKMS Benefit the Driver Developer?

- Driver Update Mechanism
- Driver Rollback Mechanism
- Driver Installation Framework
- Driver Disk Creation

How DKMS Benefit System / OS Vendors?

- Asynchronous Driver Delivery Model
- Support for Pre-Compiled Binaries and Source Builds
- Extension of RPM Model

Is / Is Not

IS	IS NOT
Mechanism	Policy
Distro-agnostic	Tied to specific distro
Architecture agnostic	x86-only
A backport helper	A way to maintain your drivers outside of kernel.org forever
Makes use of Kbuild	Kbuild replacement
2.4 and 2.6 kernels	<= 2.2 kernels

Sample dkms.conf

```
PACKAGE_VERSION="2.10.7"

PATCH[0]="rhel21.patch"
PATCH_MATCH[0]="2\.4\.9\-e\."

# Items below here should not change between
  driver versions

PACKAGE_NAME="megaraid2"
BUILT_MODULE_NAME[0]="megaraid2"
DEST_MODULE_LOCATION[0]="/kernel/drivers/scsi/"
REMAKE_INITRD="yes"
MODULES_CONF_ALIAS_TYPE="scsi_hostadapter"
```

The dkms_autoinstaller Service

- Boot time script which builds and installs DKMS-enabled modules for a kernel, if this has not been done already
  - Specify `AUTOINSTALL="yes"` in dkms.conf
- Cannot be relied upon for modules which are needed in order to boot a kernel (Example: storage drivers)

Suggested Policy

- When to use DKMS
  - Driver releases intended for testers
  - Backports for your kernel.org-merged driver intended for users
- Autoinstaller
  - Use MODULE_VERSION() in your code
- Distro use / scheduled updates

Call to Action

- Submit your driver to kernel.org

- Include dkms.conf file with your driver releases
- Include trivial Makefile and RPM spec with your driver releases
- Include DKMS in your distribution
- Send patches to handle distro quirks

Status / For more information

- Available as a GPL open-source project from:**http://linux.dell.com/dkms**
- Mailing list: **dkms-devel@lists.us.dell.com**
- Extensively tested on Red Hat Enterprise Linux and Novell SuSE Linux Enterprise Server; included on Mandrake 10.1 CDs.
- Multiple architectures: Intel x86, AMD64/EM64T, Itanium
- Shipping on every Dell server with Linux.