

Evolution of Linux network management

Pavel Šimerda
pavlix@pavlix.net

Developer Conference 2013, Brno

<http://data.pavlix.net/devconf/2013/>

NetworkManager 0.9.8 released

From: Dan Williams <dcbw@redhat.com>

To: networkmanager-list@gnome.org

Subject: ANN: NetworkManager 0.9.8 released

Date: Wed, 20 Feb 2013 16:40:29 -0600

2013-02-21 00:40:29 +0200 in this part of the world

[http://mail.gnome.org/archives/
networkmanager-list/2013-February/msg00156.html](http://mail.gnome.org/archives/networkmanager-list/2013-February/msg00156.html)

Would you use NetworkManager on servers?

Why would you want to do that?

Unified network configuration API

- Desktops and laptops
- Servers and virtualization
- Embedded and initramfs
- Multipurpose systems
- Event-based D-Bus API
- Runtime and permanent configuration (in planning)

Imagine a development laptop with VPN and virtualized servers, connected to various networks with autoconfiguration.

Independent network interface configuration

- Each interface configuration is handled separately
- Configuration files and runtime information
- Data from configuration protocols – DHCP and RA

Multi-interface dynamic configuration needs a coordination point.

Routing and DNS policy decisions

- All information sources used together
- Link-local and LAN connectivity
- Default outgoing interface selection
- Split DNS support servers with dnsmasq

DNSSEC support is yet to be solved.

Alternatives?

Network configuration scripts

- ifcfg variants – Fedora, openSUSE, Mandriva
- ifupdown – Debian, Ubuntu
- ifnet – Gentoo
- UCI-based network scripts – OpenWRT
- Custom scripts using `iproute` tool

Static-only configuration unless a daemon is involved.

Misused DHCP clients

- Support for multi-interface configuration
- Some configuration daemon features
- Against the UNIX philosophy (if anyone still cares)
- Don't integrate well with other tools
- IPv4-only configuration

Neither fish nor fowl.

Network configuration daemons

- connman – came from Intel's Meego project
- Wicd – a network daemon written in Python
- netcfg – Archlinux
- netifd (based on UCI) – OpenWRT, under development
- wicked – is not Wicd

OpenWRT netifd is not ported to other distributions.

Talk is cheap, show me the features!

Supported connection types

- Wired and wireless Ethernet connections (including 802.1x)
- ADSL connections
- Mobile broadband (including bluetooth DUN)
- Bluetooth PAN
- OLPC mesh
- Wimax connections
- Infiniband

- VLAN interfaces
- Bridges and bonds for wired Ethernet
- Team driver integration (in planning)
- VPN plugin interface + several plugins available

Connection dependencies and autoconnection

- Bridges and bonds works pretty well now
- Mobile broadband autoconnect/reconnect isn't supported
- Physical connection can autoconnect a single VPN
- Generic VPN autoconnect/reconnect is not supported

Address and route configuration

NetworkManager 0.9.8

Server use case

Alternatives

Features

Distributions

...

Questions

- Static IPv4/IPv6 format consolidation
- Dropped support for dhclient 3.x
- Dynamic IPv4 with DHCP
- Dynamic IPv6 configuration with RD and DHCP
- Bridging-friendly dynamic workflow
- Kernel autoconfiguration sucks!

Integration with initramfs

- Important for NetworkManager-enabled network boot
- NetworkManager doesn't have excessive dependencies
- Parts of NetworkManager are already dynamic modules
- We're dropping D-Bus daemon requirement (not merged yet)

Command-line interface and API

- Stable D-Bus API
- CLI under redesign (participate!)
- Connection creation via CLI (not merged yet)
- Guided configuration interface (not merged yet)
- Wireless network scanning

https://bugzilla.gnome.org/show_bug.cgi?id=682056

Things you may not even see

- Refactoring various parts of NetworkManager
- Moving things into their right place
- Cooperating with downstream distributions
- Making the project contributor-friendly

Testing strategy

- New nm-platform layer → 0.9.10
- Kernel and libnl workarounds centralized or removed
- libnl \geq 3.2.7 required

- Tests for the nm-platform, kernel and libnl
- Tests for NetworkManager core behavior (in planning)
- Possible separate library or contribution to libnl

- Possibility of using LNST for network tests

<https://fedoraproject.org/wiki/Features/NetworkManagerTestSuites>

NetworkManager in distributions

NetworkManager 0.9.8

Server use case

Alternatives

Features

Distributions

...

Questions

- Packaged by upstream developers
- Supports ifcfg-style configuration
- We are working on a number of integration issues
- Part of a successful test week December 2012
- Next test week planned for May 2013

Debian and Ubuntu

- Quite a number of contributions
- Read-only support for ifupdown-style configuratoin
- Integration issues with ifupdown and other tools

Pavel Šimerda
pavlix@pavlix.net

NetworkManager 0.9.8

Server use case

Alternatives

Features

Distributions

...

Questions

- Occasional contributions
- Their own ifcfg-style configuration plugin
- Supports DNS setting through SUSE netconfig tool

NetworkManager 0.9.8

Server use case

Alternatives

Features

Distributions

...

Questions

- Occasional contributions
- Good level of integration with OpenRC service manager
- Supports ifnet-style configuration (not tested)
- Includes a live git ebuild (since 2013-01-28)
- Much easier for testing

NetworkManager on other distributions

- Native configuration format (keyfile)
- Builds without special configure options
- Any distribution plugin can be explicitly enabled
- Loopback device is handled generically

Evolution of Linux network management

Pavel Šimerda
pavlix@pavlix.net

NetworkManager 0.9.8

Server use case

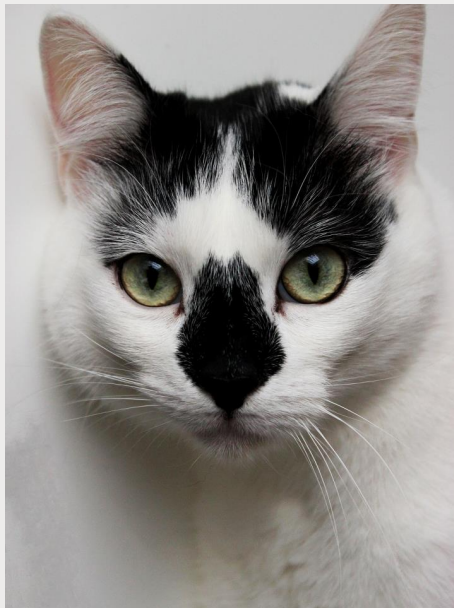
Alternatives

Features

Distributions

...

Questions



Every presentation needs a cat, right?

26/27

Questions?

<http://data.pavlix.net/devconf/2013/>

pavlix@pavlix.net
psimerda@redhat.com

<http://fedoraproject.org/wiki/User:Pavlix>

<http://fedoraproject.org/wiki/Networking>