NetworkManager
The ifcfg (But Not) Way

A MUUG Presentation
(c) 2026 Trevor E. Cordes

About Trevor Cordes

- UNIX-head since 1992 (SunOS > AIX > RH > Fedora)

- Fedora, PHP & Perl fan (wanna fight?)

- MUUG Vice-President

- STUG Past-President (defunct Atari ST club)

- Owner, Tecnopolis Enterprises, est. 1999

What Is NetworkManager?

- NetworkManager (NM) is a "network management daemon"

- "Attempts to make networking configuration and operation as painless and automatic as possible"

- Basically: makes your internet work

What Came Before

- NM supersedes and replaces:
- ifcfg files: Red Hat world, et al
- interfaces file: Debian world, et al
- Not happy about losing ifcfg, but here we are...

Modern Competition

- systemd-networkd: Modern competitor aimed at servers/cloud, still a work in progress

- Why learn both?

- You'll use NM on the desktop anyhow

- NM is more mature, more features, more plugins

- systemd: eww!

Why NM?

- Fedora 41 (2024) made NM the default

- And actually removed all legacy ifcfg-style scripts/tools

- Soon RedHat Enterprise Linux will follow suit, I'm sure

- (Oh look: RH created NM)

- Soon other distros will follow suit, they always do

- (except Devuan)

ifcfg Compatibility Layer

- NM claims to have an ifcfg compatibility layer

- Spent a day trying to get it to work

- Never worked properly

- At least with my modestly complex setup

.nmconnection Files

- NM can use files that are a lot like ifcfg files

- .nmconnection suffixes

- Main difference is "Windows Ini File" format

Capital Capital My Dear Chap

- One of the few projects that insists on capitalization of its name

- /etc/NetworkManager – eww

Server Focus

- This presentation focuses on server use of NM

- Desktop/laptop use generally "just works"

- Nice GUIs

Interface Naming Convention

- eth0? enp6s0? eno1? ens2?

- The kernel, systemd, udev, NM all fight to name your interfaces (IFs)

- Pain in the $*@#&

- Fedora forced enp6s0 on us 10 years ago

- So let's continue with that

- Or select the format you like best

Forcing Physical Location IF Names

- By default modern Fedora probably doesn't do what you want

- Force "physical" naming (bus / slot), e.g. enp6s0

- cat >/etc/systemd/network/99-default.link.d/network-interfaces-use-slot-naming.conf

- [Match]

- OriginalName=*

- [Link]

- NamePolicy=slot path

- AlternativeNamesPolicy=slot path

- MACAddressPolicy=persistent

Reboot

- Feb 27 13:07:39 pog kernel: r8169 0000:06:00.0 enp6s0: renamed from eth0

- Feb 27 13:07:39 pog kernel: r8169 0000:09:00.0 enp9s0: renamed from eth1

NetworkManager.conf Magic

- Edit /etc/NetworkManager/NetworkManager.conf

- [main]

- plugins=keyfile

- dns=none

- ignore-carrier=ethernet

- [logging]

- level=INFO

- domains=ALL

Keyfiles

- plugins=keyfile

- Forces the use of .nmconnection files as the controller of configuration

DNS Settings

- dns=none

- Forces NM to leave your /etc/resolv.conf alone

- Almost always desired on a server unless you are managing it via another DHCP server

- NM has strange rules otherwise

- Disable systemd-resolved

Keep My IF Up!

- ignore-carrier=ethernet

- Force an IF to come up at boot even if no cable present

- Keep it up even if unplugged later

- Wyatt can go home now, invoice will be in the mail

Log: It's Big It's Brown It's Wood

- Sometimes hard to get much log output from NM

- Hard to troubleshoot when it won't do what you want

- Tweaks to my previous rsyslog MUUG presentation settings

/etc/rsyslog.conf

- module(load="builtin:omfile" Template="RSYSLOG_TraditionalFileFormat")

- module(load="imuxsock"

- SysSock.Use="on")

- module(load="imjournal"

- StateFile="imjournal.state"

- Ratelimit.Interval="60"

- Ratelimit.Burst="6000")

/etc/systemd/journald.conf

- ForwardToSyslog=yes

- MaxLevelSyslog=info

Show Me The ~~Money~~!

- Er, nmconnection file format

- In /etc/NetworkManager/system-connections/

WAN IF (aka "The Internet")

- >cat enp9s0.nmconnection

- [connection]

- id=enp9s0

- uuid=...

- type=ethernet

- interface-name=enp9s0

- autoconnect=true

- [ethernet]

- mac-address=F0:00:F0:00:F0:00

- [ipv4]

- method=auto

- [ipv6]

- method=ignore

WAN Takeaways

- id will be the string you use to control this IF with nmcli
- interface-name must match what is the final decision during boot process (use dmesg|grep to find it)
- mac-address probably needs to match
- This is how ifcfg used to work
- Maybe not important anymore (MAC spoofing?)
- autoconnect=true must be set for all IFs
- ipv4 method=auto uses DHCP on the WAN

Internal IF (VLAN)

- >cat enp6s0.3.nmconnection
- [connection]
- id=enp6s0.3
- uuid=...
- type=vlan
- interface-name=enp6s0.3
- autoconnect=true
- [vlan]

- flags=1
- id=3
- parent=enp6s0
- [ipv4]
- address1=192.168.9.1/24
- method=manual
- [ipv6]
- method=ignore

I Don't Have A VLAN!

- Omit the [vlan] section

- Change the interface-name to not have a .number in it

- Add the IF mac-address

That Looks Like ifcfg!

- Very similar file formats

- Very similar, but often slightly different, key names

Make NM See Your Changes

- nmcli connection reload

- or

- systemctl restart NetworkManager

- or

- reboot

Helpful Commands

- nmcli is the command line tool to send commands to NM

- Everything(?) you can do with .nmconnection files you can do with nmcli

- nmcli dev

- nmcli con

- nmcli con up ens6p0

Debugging

- nmcli -f TYPE,FILENAME,NAME connection

- Shows what file is controlling each IF

- Try using nmcli syntax to add an interface with the "--offline" option if you're not sure on the keyfile syntax

- Will output the keyfiles syntax you can put in a file

- See the syslog output

Man Pages

- man nm-settings-keyfile

- man nm-settings-nmcli

- man nm-settings

- man nm-system-settings.conf

- man NetworkManager.conf

Final Impression

- Have been using NM for over a year

- Pretty nice, stays out of the way

- Can't think of a single thing it does that ifcfg didn't

- Learning the syntax and a few of the key tweaks was a pain

- Some of the status outputs are nifty

- Can we please now use NM for 25 years so I don't have to do this all over again?