



# Ubuntu Development Primer

How to stop monkey patching and start committing



[bit.ly/ubuntu-development](https://bit.ly/ubuntu-development)

Dave Chiluk – [chiluk@ubuntu.com](mailto:chiluk@ubuntu.com)

ubuntu 



# chiluk.

- Dave Chiluk
- Ubuntu Core Developer
- Currently
  - Linux Platform Engineer for Indeed.com
- Previously
  - Canonical – Sustaining Engineering / Engineering Support for Ubuntu Advantage
  - IBM - Linux Technology Center
- <https://wiki.ubuntu.com/chiluk>



# Topics

- Getting support
- Launchpad
- Modifying sources
- Building
- Submitting changes
- stretch Topic – Ubuntu Kernels



# Why you might care!

- Self-maintained packages
- Interested in giving back to the community
- Tired of the maintenance burden of one-off packages
- Mentorship beats reading wiki pages  
(but there will still be plenty of pages)
- Outdated documentation



# Where do you go for support?

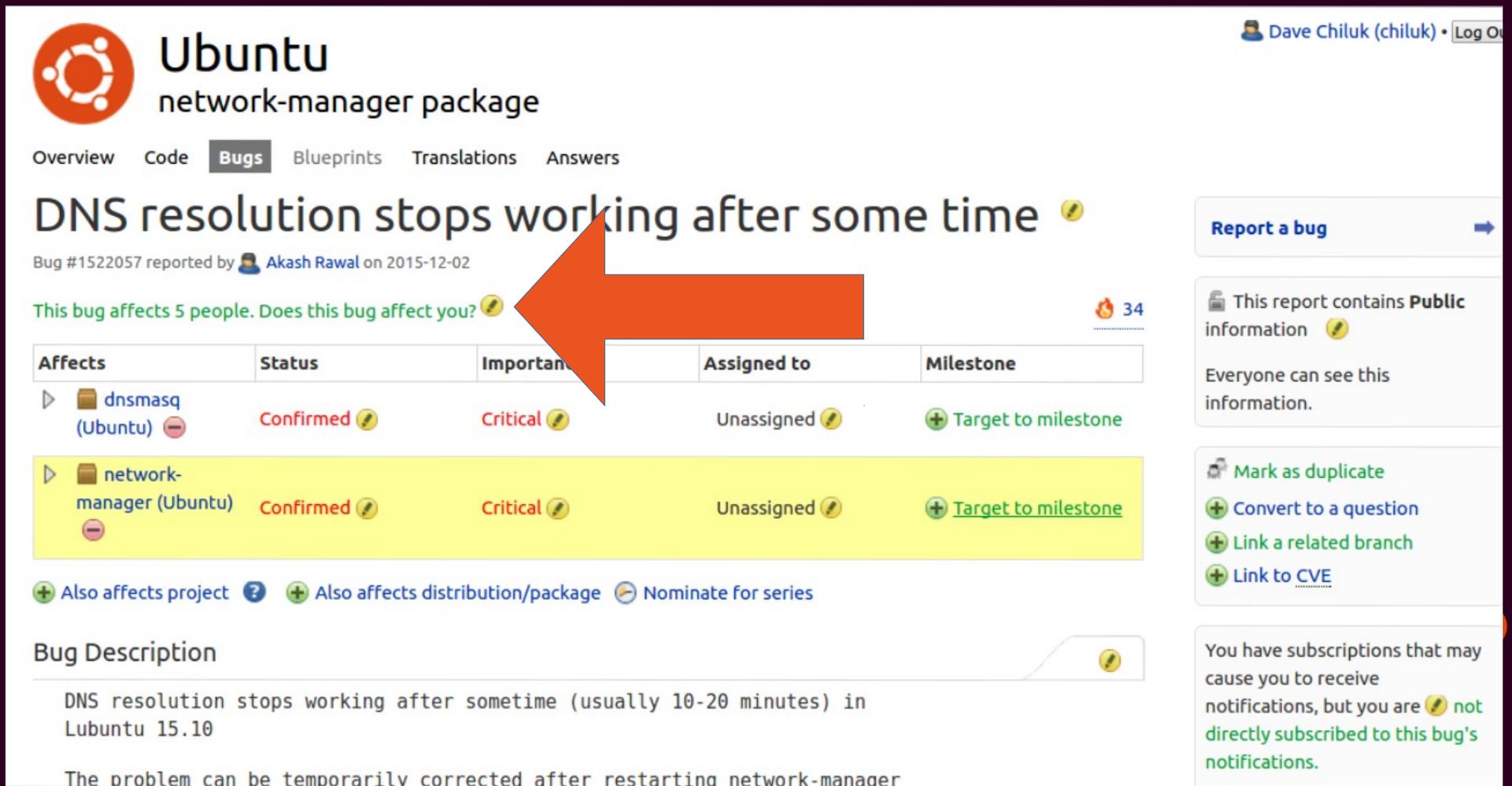


# Where do you go for support?

- [google.com](http://google.com)
- [askubuntu.com](http://askubuntu.com)
- [ubuntuforums.org](http://ubuntuforums.org)
- Ubuntu Advantage – paid support through Canonical
- IRC – Freenode
  - #ubuntu – general user support
  - #ubuntu-devel – if you have a fix and need sponsorship or guidance
  - #ubuntu-bugs – specific bug related discussion
- Launchpad
  - This is not a forum. Keep all conversations technical and on topic.

# Launchpad.net

- So you found your bug on launchpad?
- Click this affects me too.



The screenshot shows the Ubuntu Launchpad interface for a bug report. The bug title is "DNS resolution stops working after some time" (Bug #1522057). The bug is reported by Akash Rawal on 2015-12-02. It affects 5 people. The bug is confirmed and critical. The bug affects two packages: dnsmasq (Ubuntu) and network-manager (Ubuntu). The bug description states: "DNS resolution stops working after sometime (usually 10-20 minutes) in Lubuntu 15.10. The problem can be temporarily corrected after restarting network-manager". A large orange arrow points to the "Affects" column of the table, specifically to the "network-manager (Ubuntu)" row. The "network-manager (Ubuntu)" row is highlighted in yellow. The "Affects" column contains a dropdown arrow and a minus sign. The "Status" column contains "Confirmed" with a lightning bolt icon. The "Important" column contains "Critical" with a lightning bolt icon. The "Assigned to" column contains "Unassigned" with a lightning bolt icon. The "Milestone" column contains "+ Target to milestone".

Ubuntu network-manager package

Overview Code **Bugs** Blueprints Translations Answers

## DNS resolution stops working after some time

Bug #1522057 reported by Akash Rawal on 2015-12-02

This bug affects 5 people. Does this bug affect you?

Affects	Status	Important	Assigned to	Milestone
dnsmasq (Ubuntu)	Confirmed	Critical	Unassigned	+ Target to milestone
network-manager (Ubuntu)	Confirmed	Critical	Unassigned	+ Target to milestone

+ Also affects project ? + Also affects distribution/package Nominate for series

### Bug Description

DNS resolution stops working after sometime (usually 10-20 minutes) in Lubuntu 15.10

The problem can be temporarily corrected after restarting network-manager

Report a bug

This report contains Public information

Everyone can see this information.

Mark as duplicate

+ Convert to a question

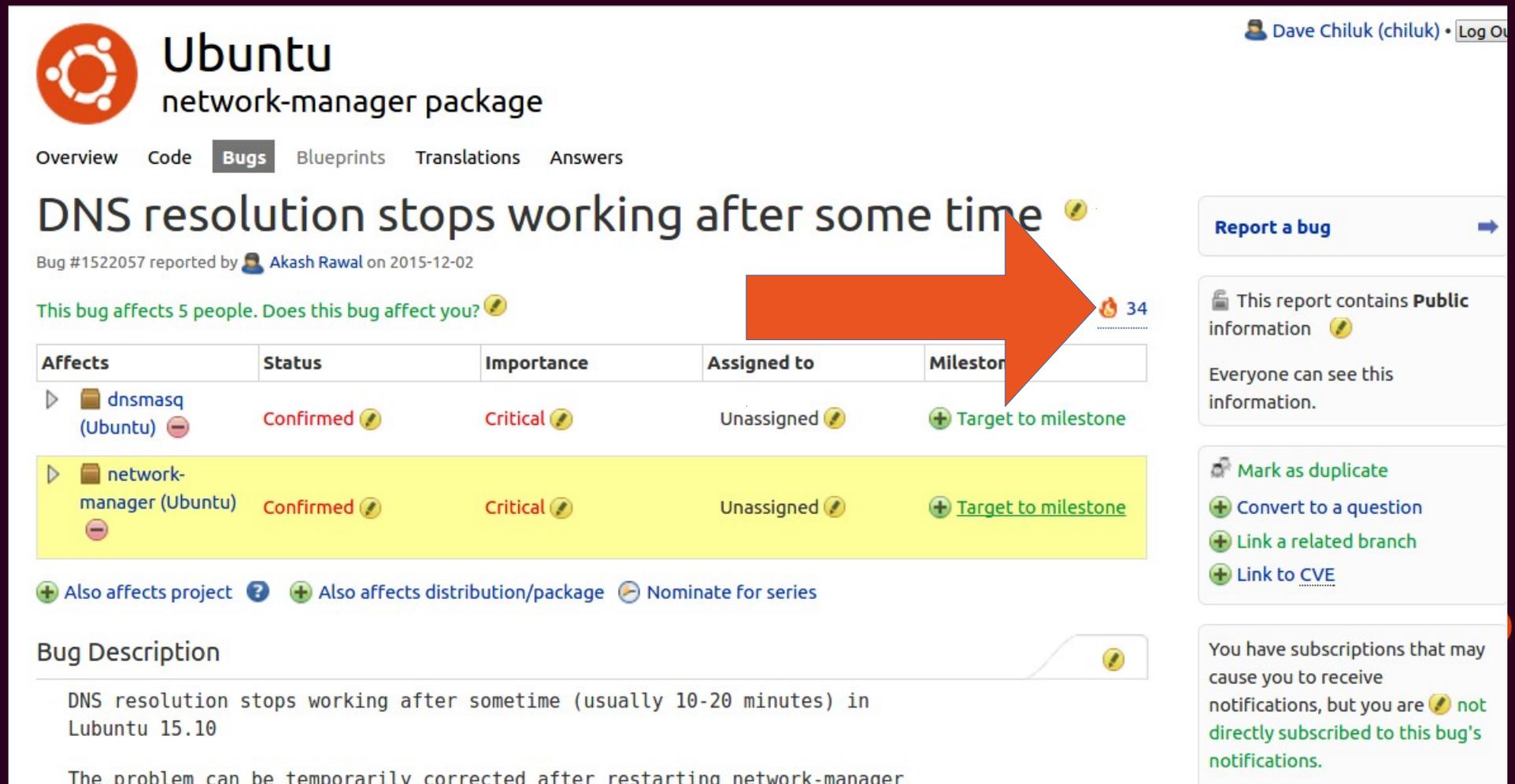
+ Link a related branch

+ Link to CVE

You have subscriptions that may cause you to receive notifications, but you are not directly subscribed to this bug's notifications.

# Launchpad.net

- So you found your bug on launchpad?
- Click this affects me too.



The screenshot shows the Ubuntu Launchpad interface for a bug report. The bug title is "DNS resolution stops working after some time" and it is reported by Akash Rawal. The bug affects 5 people, and there are 34 votes. A large orange arrow points to the "Affects me too" button (represented by a flame icon) next to the vote count. The bug is confirmed and critical, and it affects the dnsmasq and network-manager packages. The bug description states that DNS resolution stops working after some time (usually 10-20 minutes) in Ubuntu 15.10, and the problem can be temporarily corrected after restarting network-manager.

**Ubuntu**  
network-manager package

Overview Code **Bugs** Blueprints Translations Answers

## DNS resolution stops working after some time

Bug #1522057 reported by Akash Rawal on 2015-12-02

This bug affects 5 people. Does this bug affect you?  34

Affects	Status	Importance	Assigned to	Milestone
 dnsmasq (Ubuntu) 	Confirmed 	Critical 	Unassigned 	 Target to milestone
 network-manager (Ubuntu) 	Confirmed 	Critical 	Unassigned 	 Target to milestone

 Also affects project   Also affects distribution/package  Nominate for series

### Bug Description

DNS resolution stops working after sometime (usually 10-20 minutes) in Ubuntu 15.10

The problem can be temporarily corrected after restarting network-manager

Dave Chiluk (chiluk) • Log Out

[Report a bug](#)

This report contains **Public** information  Everyone can see this information.

 Mark as duplicate

 Convert to a question

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You have subscriptions that may cause you to receive notifications, but you are  not directly subscribed to this bug's notifications.

# Launchpad.net

- Subscribe yourself

The screenshot shows the Ubuntu Launchpad interface for a bug report. At the top left is the Ubuntu logo and the text 'Ubuntu network-manager package'. Navigation tabs include 'Overview', 'Code', 'Bugs' (selected), 'Blueprints', 'Translations', and 'Answers'. The bug title is 'DNS resolution stops working after some time' with a yellow bug icon. It was reported by Akash Rawal on 2015-12-02. A notification says 'This bug affects 5 people. Does this bug affect you?' with a yellow bug icon and a '34' notification count. Below is a table with columns: Affects, Status, Importance, Assigned to, and Milestone. Two entries are shown: 'dnsmasq (Ubuntu)' and 'network-manager (Ubuntu)', both with 'Confirmed' status, 'Critical' importance, and 'Unassigned' status. The 'network-manager (Ubuntu)' entry is highlighted in yellow. Below the table are links: '+ Also affects project', '+ Also affects distribution/package', and 'Nominate for series'. The 'Bug Description' section contains the text: 'DNS resolution stops working after sometime (usually 10-20 minutes) in Lubuntu 15.10' and 'The problem can be temporarily corrected after restarting network-manager'. On the right side, there is a 'Report a bug' button, a 'Public information' notice, and a list of actions: 'Mark as duplicate', 'Convert to a question', 'Link a related branch', and 'Link to CVE'. At the bottom right, a notification states: 'You have subscriptions that may cause you to receive notifications, but you are not directly subscribed to this bug's notifications.' A large orange arrow points from the notification area towards the 'Bug Description' section.

Ubuntu network-manager package

Overview Code **Bugs** Blueprints Translations Answers

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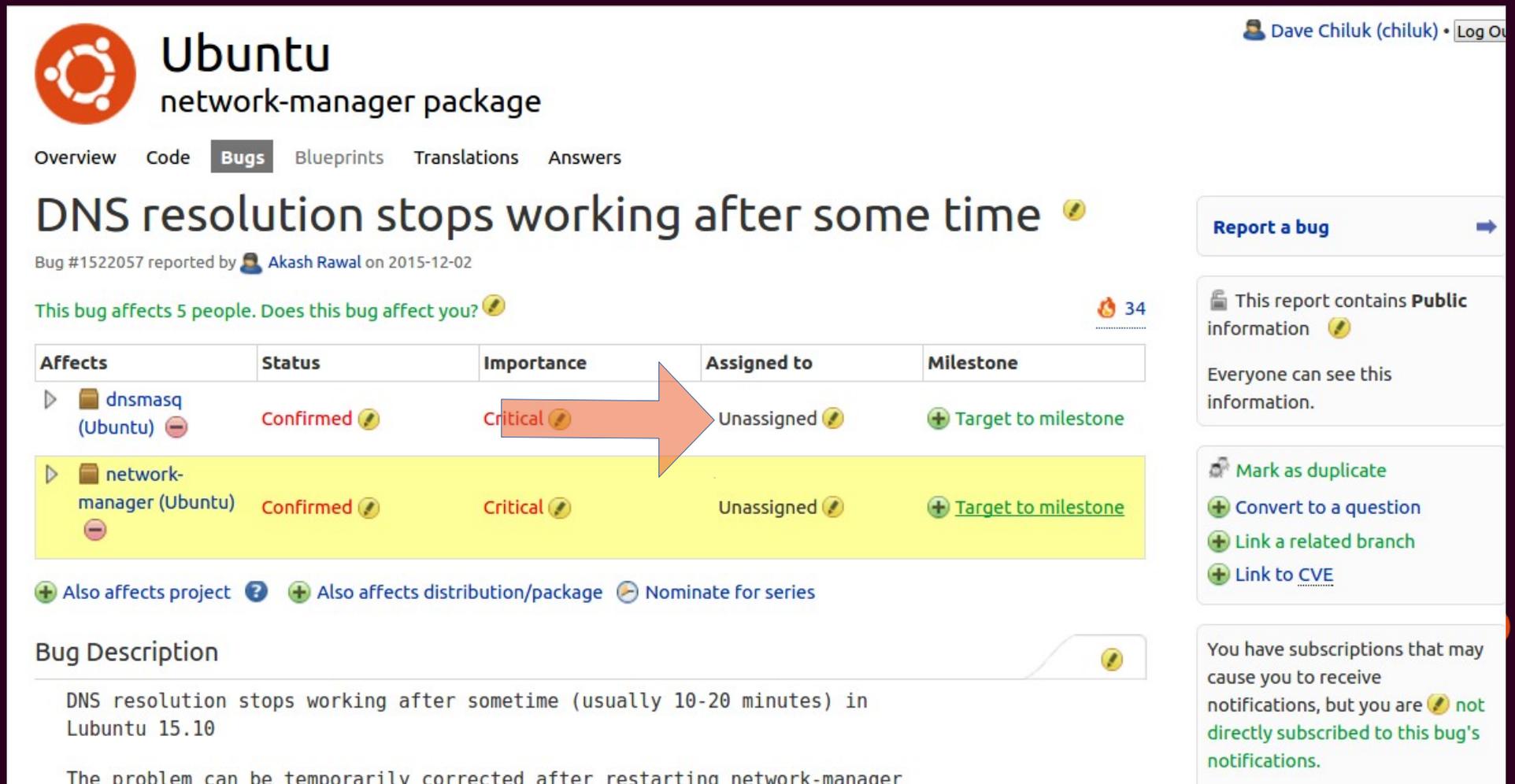
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You have subscriptions that may cause you to receive notifications, but you are not directly subscribed to this bug's notifications.

# Launchpad.net

- Assign yourself if you have a fix or are pretty sure you'll get one. Unassign yourself If you give up.



The screenshot shows the Ubuntu Launchpad interface for a bug report. The bug title is "DNS resolution stops working after some time" (Bug #1522057). The bug is reported by Akash Rawal on 2015-12-02 and affects 5 people. The bug is marked as "Critical" and "Confirmed". The "Assigned to" field is "Unassigned". The "Milestone" is "Target to milestone". A red arrow points to the "Assigned to" field. The bug affects two packages: "dnsmasq (Ubuntu)" and "network-manager (Ubuntu)". The "network-manager (Ubuntu)" package is highlighted in yellow. The "Bug Description" section contains the text: "DNS resolution stops working after sometime (usually 10-20 minutes) in Lubuntu 15.10. The problem can be temporarily corrected after restarting network-manager".

**Ubuntu**  
network-manager package

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# Launchpad.net

- All of these result in karma.



lp Colin Watson in Launchpad x +

Canonical Group L | https://launchpad.net...

**Colin Watson**

Overview Code Bugs Blueprints Translations Answers

Irish Launchpad engineer and Ubuntu developer, living in Cambridge, England.

Contact this user

Related packages Related projects

**User information**

<b>Launchpad Id:</b> cjwtatson	<b>IRC:</b> cjwtatson on irc.canonical.com cjwtatson on irc.freenode.net cjwtatson on irc.oftc.net	<b>OpenPGP keys:</b> AC0A4FF12611B6FCCF01C111393587D97D86500B
<b>Email:</b> cjwtatson@canonical.com cjwtatson+test@chiark.greenend.org.uk cjwtatson@chiark.greenend.org.uk cjwtatson@debian.org cjwtatson@flatline.org.uk cjwtatson@ubuntu.com colin.watson@canonical.com colin.watson@ubuntu.com	<b>Time zone:</b> Europe/London (UTC+0000)	<b>SSH keys:</b> cjwtatson+canonical@niejwein
		<b>Languages:</b> English, English (United Kingdom)
		<b>Karma:</b> 80670 ?





# What if there's no related bug?

- Is your package up to date?
- Include
  - Logs?
  - Debug output (using `--verbose` or `--debug` flags)
  - Memory dump?
- Test Ubuntu development packages?
  - Bisect/backport if it's fixed there.



# What if there's no related bug?

- Create one by using the ubuntu-bug utility:
  - `$ ubuntu-bug <affected package>`
  - This will package up a number of logs, and create a bug for you.



# Fix it

- Check upstream?
  - If fixed
    - Backport the change
  - If not
    - Fix it in the upstream project first
- Submit it back into Ubuntu



# Submitting it to Ubuntu

- 1) Get the sources.
- 2) Create the patch.
- 3) Edit the changelog.
- 4) Build it.
- 5) Test it.
- 6) Submit a debdiff.
- 7) Test it some more.



# Getting the sources

- Get the tools:
  - `$ sudo apt install sbuild debhelper ubuntu-dev-tools devscripts build-essential fakeroot kernel-wedge kernel-package dpatch quilt`
- `rmadison <source package name>`
  - Shows the version of the package in every supported version of Ubuntu
- `mkdir bash`
- `pull-lp-source bash bionic`



# The debian directory

- changelog
- rules – makefile
- control – package definition, including depends, build-depends, recommends, and replaces.
- patches/
  - Patches because Ubuntu is a delta applied on top of Debian, and this helps when new versions need to be brought into Ubuntu
  - From before Git was created
- patches/series
- \$ what-patch
- <https://wiki.debian.org/Packaging>



# Demo

- rmadison
- pull-lp-source
- debian directory



# Create the patch - quilt

- quilt top
  - What is the current patch we are at
- quilt push -a
  - applies all patches
- quilt new+add or quilt import
  - Create a new quilt patch
- quilt refresh
- quilt header -e –dep3
- Update Changelog (dch -i)



# Create the patch - dpkg-source

- Make changes
- Update Changelog (dch -i)
- dpkg-source --commit
  - Creates the debian/patches file
  - Adds it to debian/patches/series
  - Launches text editor for filling out a dep3 Header



# Edit the Changelog

- `dch -i`
  - adds a changelog entry
  - Include description and LP#
  - Follow format of other changes in the changelog
- Double check that patch is listed in `debian/patches/series`



# Demo

- Edit bash
- dch -i
- dpkg-source --commit



# Build the source package

- `debuild -d -S`
  - Signs the package with the key owned by the last editor of the changelog



# Build the binary package

- `sbuild -A -d bionic-amd64 <new.dsc>`
  - <https://wiki.ubuntu.com/SimpleSbuild>
- `debdiff <orig.dsc> <new.dsc> >`  
`lp#.<series>.debdiff`



# Demo

- `dbuild -S`
- `sbuild -A -j 8 -d bionic-amd64 bash_4.4.18-2ubuntu2.dsc`



# Test the Package

- YES YOU!





# Submit the change

- Attach the debdiff to the launchpad bug:
  - `$ debdiff <original.dsc> <fixed.dsc>`
- Is the patch for a released series?
  - Fill out the SRU Template



# Stable Release Updates (SRU)

- <https://wiki.ubuntu.com/StableReleaseUpdates>
- Copy the SRU Template to the top of the bug description and fill it out.
- Helps reviewers understand what's going on without having to wade through the entirety of the bug text



# Sponsorship

- Get Sponsorship – Core dev
  - Subscribe ubuntu-sponsors to the bug
  - Ask on #ubuntu-devel
  - <https://launchpad.net/ubuntu/bionic/+queue>
- Get SRU Sponsorship – SRU Team member
  - Subscribe ubuntu-sru
- Package is built by launchpad and added to the -proposed archive



# Test it again!

- Integration and build test
- The original submitter is expected to test the package as it exists in -proposed.
- verification-needed tag → verification-done
- Wait 2-6 weeks for promotion to -updates



# Submit to Debian

- There's a tool for that too!
  - Submittodebian
- Why?
  - Because we want to be good members of the Debian community,
  - We don't want to have to maintain an Ubuntu the delta indefinitely.





# The Kernel

- gitweb - <https://kernel.ubuntu.com/git/ubuntu>
- git clone --reference ../linux  
[git://kernel.ubuntu.com/ubuntu/ubuntu-bionic.git](https://kernel.ubuntu.com/ubuntu/ubuntu-bionic.git)
- Git Branches
  - master
  - master-next – kernel in -proposed being tested.



# Cherrypicks of Upstream patches

- Test Upstream
  - <https://wiki.ubuntu.com/Kernel/MainlineBuilds>
  - <http://kernel.ubuntu.com/~kernel-ppa/mainline/>
- git bisect to find correct upstream commit.
- git cherry-pick -sex <upstream commit>
- Submit the cherry-picks to linux-stable:
  - Documentation/stable\_kernel\_rules.txt
- This will eventually get included into Ubuntu via linux-stable patch streams
- Consider HWE kernels (linux-\*-hwe\*).



# For New fixes

- Submit to upstream kernel
- Documentation/process/submitting-patches.rst
- Then submit to linux-stable
  - Will be automatically applied to Ubuntu kernels if they cleanly apply



# Building the kernel

- make
  - make oldconfig ; make
  - for quick iteration
  - Not recommended for distributing
- alias fdr='fakeroot debian/rules' in ~/.bashrc
- \$ fdr prepare-generic
  - creates config
- \$ fdr binary-generic
  - build portable deb packages
- Build a portion of the tree
  - make -C debian/build/build-generic M=`pwd`/fs/gfs2



# Other fixes

- Sauce Patches - patches that are not accepted by stable, but are still needed in Ubuntu
- Submit to `kernel-team@lists.ubuntu.com`
- Follow patch submission guidelines
  - <https://wiki.ubuntu.com/Kernel/Dev/KernelBugFixing>

Questions please

Thank you

Dave Chiluk

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