Installing R and CRAN Binaries on Ubuntu

Compounding Many Small Changes for Larger Effects

Dirk Eddelbuettel

- *In general* installation on Linux is from source, which can present an additional hurdle for those less familiar with package building, and/or compilation and error messages, and/or more general (Linux) (sys-)admin skills
- *That said* there have always been some binaries in some places; Debian has a few hundred in the distro itself; and there have been at least three distinct 'cran2deb' automation attempts
- (Also of note is that Fedora recently added a user-contributed repo pre-builds of all 15k CRAN packages, which is laudable. I have no first- or second-hand experience with it)
- I have written about this at length (see previous R^4 posts and videos) but it bears repeating

Three different ways

- Barebones empty Ubuntu system, discussing the setup steps
- Using r-ubuntu container with previous setup pre-installed
- The new kid on the block: r-rspm container for RSPM

One Important Point

- We show container use here because Docker allows us to "simulate" an empty machine so easily
- But nothing we show here is limited to Docker
- *I.e.* everything works the same on a corresponding Ubuntu system: your laptop, server or cloud instance
- It is also transferable between Ubuntu releases (within limits: apparently still no RSPM for the now-current Ubuntu 20.04)

In a nutshell

- We run *one* command, a shell script (in the repo)
- It does four things:
    - prepare for addition of a PPA
    - add the c2d4u ("CRAN-to-Deb-For-Ubuntu") PPA
    - add R Ubuntu binaries via CRAN mirror repo
    - install package 'tidyverse'
- Details on the next package and in t4 repo

fromBasicUbuntuToTidyverse/usingDebBinaries.sh

```bash
#!/bin/bash

## this assumes we run as root, so run the script under sudo or use sudo on each command here
##
## for more details on this consult https://cloud.r-project.org/bin/linux/ubuntu/README.html

## Step One: turn of interactive install, affects only one question for default timezone
export DEBIAN_FRONTEND=noninteractive

## Step Two:  update listings and install helper for PPAs
apt update && apt install -y software-properties-common

## Step Three: add 'c2d4u' ie the 'cran2deb4ubuntu' PPA, using the the R 4.0 variant
add-apt-repository -y ppa:c2d4u.team/c2d4u4.0+

## Step Four: also install R itself via CRAN mirror: add apt entry and key
## note we select Ubuntu 20.04 (aka "focal") here, adjust for other releases
echo "deb https://cloud.r-project.org/bin/linux/ubuntu focal-cran40/" > /etc/apt/sources.list.d/cran.list
apt-key adv --keyserver keyserver.ubuntu.com --recv-keys E298A3A825C0D65DFD57CBB651716619E084DAB9

## Step Five: update listing again and install e.g. tidyverse which will also install R itself
apt update && apt install -y r-cran-tidyverse
```

In a nutshell

- The `r-ubuntu` Rocker container already contains all the setup
- It also already contains base R
- So we just install r-cran-tidyverse

fromRUbuntuToTidyverse/usingDebBinaries.sh

```bash
#!/bin/bash

## this assumes we run as root, so run the script under sudo or use sudo on each command here
##
## this script runs inside the _pre-made_ rocker/r-ubuntu:20.04 container so the previous
## steps one to four are already taken care of

## Step One: update listing and install e.g. tidyverse which will also install R itself
apt update && apt install -y r-cran-tidyverse
```

In a nutshell

- RStudio now offers RSPM
- Probably fair to say that this is primarily a paid service
- I can definitely see a market for this
- With proper setup, we can use it too
- Rocker container `r-rspm:18.04` does so for Ubuntu 18.04
- As of now, no word about RSPM & Ubuntu 20.04

fromRSPMtoTidyverse/usingRSPMBinaries.sh

```
#!/bin/bash

## this assumes we run as root, so run the script under sudo or use sudo on each command here
##
## this script runs inside the _pre-made_ rocker/r-rspm:18.04 container so the RSPM backend
## is already setup

## Step One: use littler wrapper 'install.r' to call install.packages() for us
install.r tidyverse

## alternatively, in R, say   install.packages("tidyverse")
##
## note, though, that RSPM is _not_ connected to the system package manager so some
## system level libraries may be missing -- here we already loaded libxm2 to ensure
## tidyverse and its sub-packages can be loaded; for other packages other libraries
## may be needed.  our (nascent) chshshli package tries to help here.
```
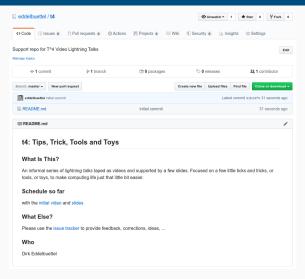
Maybe Emacs, at last?

- A few more topics especially for Emacs in mind
- But we may also take a break and come back later
- Fall is a teaching term for me so limited Sunday time...

SERIES RESOURCE

Source: https://github.com/eddelbuettel/t4

Thank you!

slides http://dirk.eddelbuettel.com/presentations/

web http://dirk.eddelbuettel.com/

mail dirk@eddelbuettel.com

github @eddelbuettel

twitter @eddelbuettel

repo https://github.com/eddelbuettel/t4

The Docker aliases I currently use

```
## docker run and mount
## use  -u `id -u`:`id -g`  if unclear what uid:gid to use
alias dkrr='docker run --rm -ti -u1000:1000 -v$(pwd):/work -w /work'
alias dkrrr='docker run --rm -ti -v$(pwd):/work -w /work'
alias dkrrx='docker run --rm -it -u1000:1000 -e DISPLAY=$DISPLAY -v /tmp/.X11-unix:/tmp/.X11-unix'
```