R1

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1 Introduction to R

1.1 Overview

- What is R?
- Why R?
- Installation of R & RStudio
- R language
  - Basic Types
  - Functions
  - Loops
  - Lists
  - Reading Files
- IDE

- R at the CHPC
- How to install your own packages
- Interesting sites

1.2 What is R?

- Implementation of S (**statistical** programming language developed at Bell Labs)
- Original authors: **R**oss Ihaka & **R**obert Gentleman (Auckland, NZ) (started around *1992*)
- Two facets:
  - Scripting language (vs. compiled language)
  - Free & Open-Source Software Environment for Statistical Computing
- R-code can run on different OSs (Linux, Windows, MacOs)
- Under the hood: rely on C/C++, Fortran for computationally expensive tasks

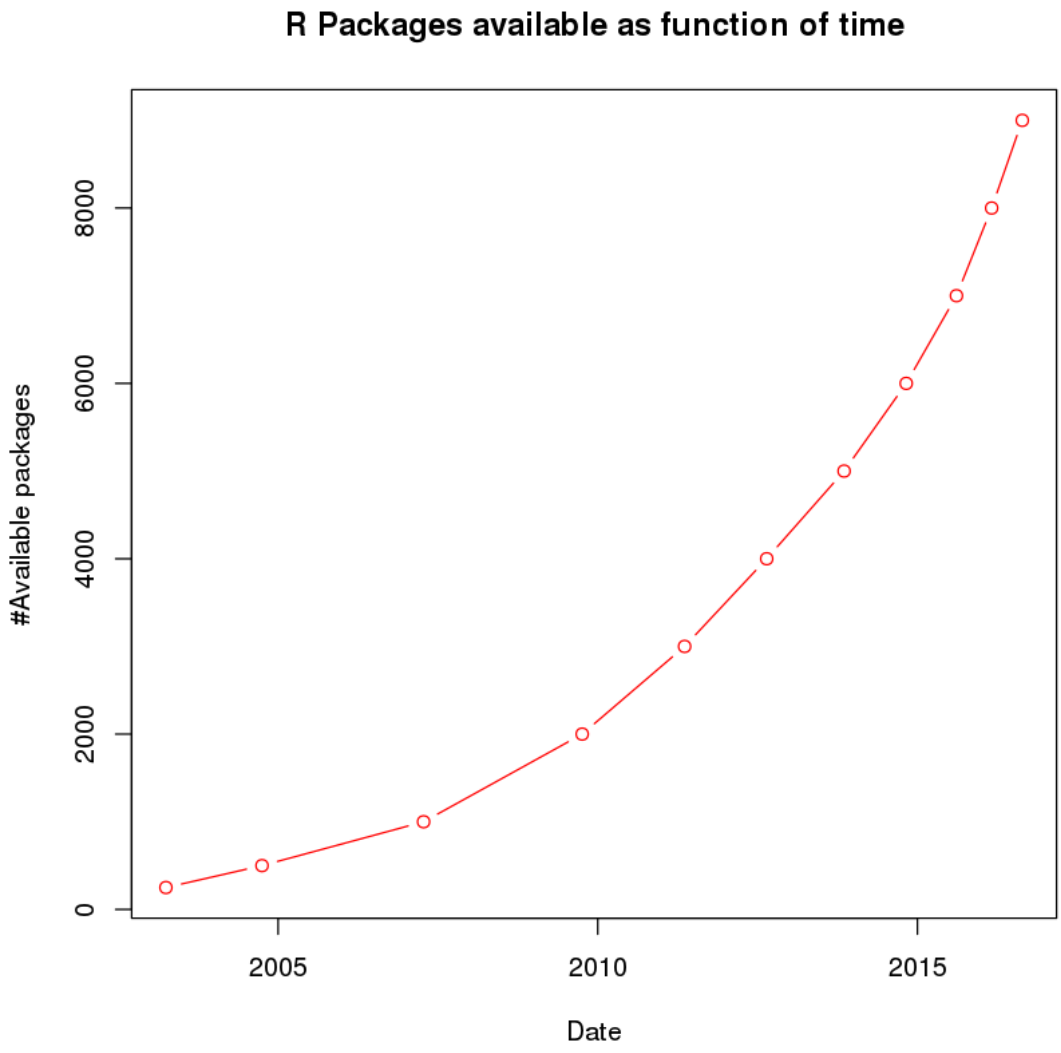
1.3 Why R?

- Scripting language -> fast development to test out new ideas
- A lot of precanned packages (libraries)
- Relatively easy to add new libraries

- Large community (including mailing list)
- Free

```
In [1]: # Data Source : R-devel mailing list (Henrik Bengtsson - 08/22/106)
        myX <- as.Date(c("2016-08-22", "2016-02-29", "2015-08-12",
                         "2014-10-29", "2013-11-08", "2012-08-23",
                         "2011-05-12", "2009-10-04", "2007-04-12",
                         "2004-10-01","2003-04-01"))
        myY <- c(9000,8000,7000,6000,5000,
                 4000,3000,2000,1000,500,250)

        plot(myX,myY,type="b",col="red",xlab="Date",ylab="#Available packages",
             main="R Packages available as function of time")
```



1.4 Installation of R:

- Download R binary or source code from https://cran.r-project.org/ (the **C**omprehensive **R** **A**rchive **N**etwork)
- Install the binary on your laptop
- Download RStudio Desktop from https://www.rstudio.com/ (IDE)
- Microsoft R Open (MRO): Enhanced Distribution of R (Freely available for WinOs, Linux and MacOS)
  - https://mran.revolutionanalytics.com/open/
  - Advantages:
    - Multi-threaded math library (MKL)
    - **checkpoint** package -> replicate + share R code