HPC-R Workshop Prerequisites

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Pre-Requisites

Attendee Background

The attendee should ideally have some familiarity with working with R. Service providers looking for information to better support R users need not have direct experience with R, provided they have a strong programming background, and some familiarity with a high-level language such as Python or Matlab.

Tutorial Outline and Goals

The tutorial will be roughly an hour and a half, and is intended to give a

The tutorial is divided into 4 1-hour modules, consisting of 45 minutes of instruction and 15 minutes of hands-on exercises. The general structure of the tutorial will be:

1. Basics
   - Instruction (45 minutes)
     1. Introduction
     2. Debugging
     3. Profiling
     4. Benchmarking
   - Exercises (15 minutes)
2. Improving R Performance
   - Instruction (45 minutes)
     1. Free improvements
     2. Vectorization, loops, and *plys
   - Exercises + break (30 minutes)
3. Interfacing to Compiled Code
   - Instruction (45 minutes)
     1. Interfacing to Compiled Code
   - Exercises (15 minutes)
4. Parallelism
   - Instruction (45 minutes)
     1. Shared memory parallelism
     2. Distributed parallelism

Software

Software Requirements

In order to complete the exercises, you will need to have R as well as some R packages installed. You can download R here. The packages you will need are:

- Rcpp
- rbenchmark
- microbenchmark

To install a package named `pkg`, start up an R session and enter

```r
install.packages("pkg")
```

I would strongly encourage you to install the RStudio Desktop editor. RStudio is the most popular editor used in the R community, so even if you prefer another editor/ide, it is still useful to get a sense for the tools that R users find most appealing.

Finally, in order to follow along with the examples and exercises of the Rcpp section, you will need to be able to build packages from source, the requirements for which are detailed below by operating system.

Windows

Install Rtools.

Mac

First, you will need to install XCode from the Mac App Store. Then, open XCode and choose "Preferences", "Downloads", then "Install Command Line Tools".

Linux, FreeBSD, etc.

You're probably good.