



<http://www.stats.uwo.ca/faculty/yu/Rmpi/>

## RMPI FactSheet

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### Background

- The tool R is a free software environment for statistical computing and graphics
- RMPI is an R package and an interface (wrapper) to the Message Passing Interface (MPI)
- MPI is a standardized and portable parallel programming model implemented via libraries

### Benefits through Parallelization (modified from [3])

- Offers a tool for compute-intensive R programs taking advantage of parallelization methods
- Enables the creation of R programs which run in parallel across multiple CPUs/machine
- Provides the functionality to accomplish analysis goals more quickly than running in serial

### RMPI Usage (modified from [3])

- Write R programs using certain RMPI functions: Startup and Shutdown (e.g. `mpi.spawn.Rslaves([nslaves=#])`) or Cluster Information (e.g. `mpi.comm.rank()`)
- Use sending/receiving data/functions to send an R object like a number, string, or a list between different slaves or to all slaves (e.g. `mpi.bcast.Robj2slave(object)`)
- Perform remote executions of R code on all slaves (e.g. `mpi.bcast.cmd("R code")`)

### Technical Short Description

- RMPI ports low level MPI functions into R so that users do not have to know C or Fortran
- MPI libraries supported are LAM-MPI, MPICH(2), and OpenMPI

### RMPI Sample Program (from [3])

```
# Load the R MPI package if it is not already loaded.
if (!is.loaded("mpi_initialize")) {
  library("Rmpi")
}

# Spawn as many slaves as possible
mpi.spawn.Rslaves()

# In case R exits unexpectedly, have it automatically clean up
# resources taken up by Rmpi (slaves, memory, etc...)
.Last <- function(){
  if (is.loaded("mpi_initialize")){
    if (mpi.comm.size(1) > 0){
      print("Please use mpi.close.Rslaves() to close slaves.")
      mpi.close.Rslaves()
    }
    print("Please use mpi.quit() to quit R")
    .Call("mpi_finalize")
  }
}

# Tell all slaves to return a message identifying themselves
mpi.remote.exec(paste("I am",mpi.comm.rank(),"of",mpi.comm.size()))

# Tell all slaves to close down, and exit the program
mpi.close.Rslaves()
mpi.quit()
```

### Download and availability

- RMPI - Version 0.6-3 (2013-03-26)
- Download @ RMPI CRAN Page [1]

### References

[1] RMPI CRAN page with Documentation, Online:

<http://cran.r-project.org/web/packages/Rmpi/index.html>

[2] RMPI Web Page, Online: <http://www.stats.uwo.ca/faculty/yu/Rmpi/>

[3] Acadia Centre for Mathematical Modelling and Computation, RMPI Tutorial, Online:

<http://math.acadiau.ca/ACMMaC/Rmpi/>

Tags: Statistical Computing with R, RMPI Package, Compute-intensive R Programs, Parallel Computing