**SUPPLEMENT TABLE S4**

For data tables, “All” column summarizes data from years from to 2005 up through 2018.

Table for data shown in Figure 4: Packages by year updated and optimization framework dependency; only non-zero percentages shown

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | All |
| Packages | 25 | 32 | 66 | 473 | 575 | 787 | 1210 | 1881 | 2934 | 6123 | 14122 |
| Packages w/Dep | 0 | 1 | 2 | 18 | 28 | 101 | 184 | 384 | 723 | 2085 | 3526 |
| Rcpp | 0 | 1 (3) | 0 | 4 (1) | 6 (1) | 42 (5) | 64 (5) | 157 (8) | 312 (11) | 868 (14) | 1454 |
| tictoc | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 4 |
| rbenchmark | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 14 | 20 |
| microbenchmark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 12 | 60 (1) | 77 |
| profr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| profvis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| snow | 0 | 0 | 0 | 4 (1) | 1 | 0 | 1 | 0 | 5 | 10 | 21 |
| doSNOW | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 5 | 8 | 16 |
| parallel | 0 | 0 | 0 | 3 (1) | 14 (2) | 32 (4) | 55 (5) | 109 (6) | 186 (6) | 514 (8) | 913 |
| doParallel | 0 | 0 | 0 | 0 | 1 | 4 (1) | 21 (2) | 39 (2) | 77 (3) | 225 (4) | 367 |
| Rmpi | 0 | 0 | 0 | 2 | 0 | 0 | 7 (1) | 0 | 5 | 9 | 23 |
| foreach | 0 | 0 | 1 (2) | 3 (1) | 5 (1) | 19 (2) | 31 (3) | 62 (3) | 93 (3) | 269 (4) | 483 |
| future | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 30 | 35 |
| future.apply | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 15 |
| SparkR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| sparklyr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 5 | 8 |
| batchtools | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| RcppParallel | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 7 | 23 | 33 |
| parallelDist | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| parallelMap | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 8 | 14 |
| doMC | 0 | 0 | 1 (2) | 1 | 1 | 1 | 3 | 5 | 4 | 9 | 25 |
| doMPI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| partools | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| DSL | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |