

Figure 6.2 Blocking buffered transfer protocols: (a) in the presence of communication hardware with buffers at send and receive ends; and (b) in the absence of communication hardware, sender interrupts receiver and deposits data in buffer at receiver end.

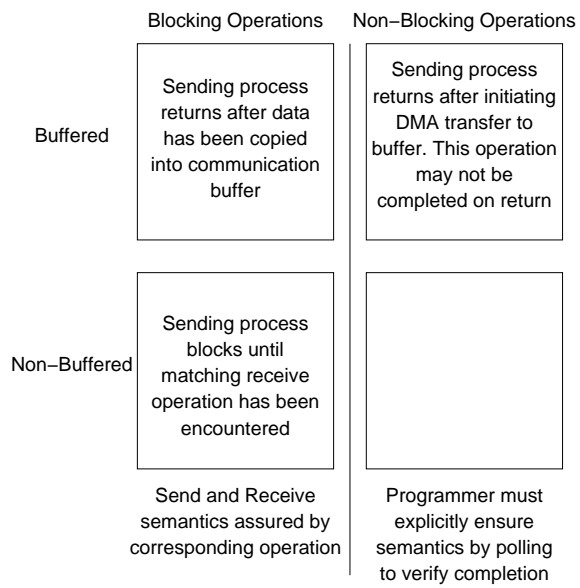


Figure 6.3 Space of possible protocols for send and receive operations.

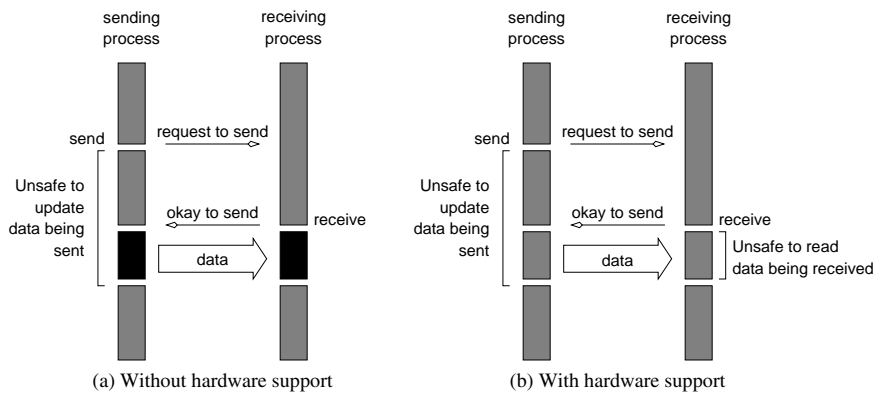


Figure 6.4 Non-blocking non-buffered send and receive operations (a) in absence of communication hardware; (b) in presence of communication hardware.

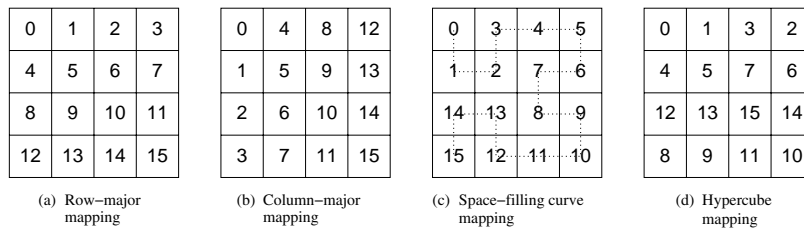


Figure 6.5 Different ways to map a set of processes to a two-dimensional grid. (a) and (b) show a row- and column-wise mapping of these processes, (c) shows a mapping that follows a space-filling curve (dotted line), and (d) shows a mapping in which neighboring processes are directly connected in a hypercube.

Value	15	17	11	12	17	11
Process	0	1	2	3	4	5

`MinLoc(Value, Process) = (11, 2)`

`MaxLoc(Value, Process) = (17, 1)`

Figure 6.6 An example use of the `MPI_MINLOC` and `MPI_MAXLOC` operators.

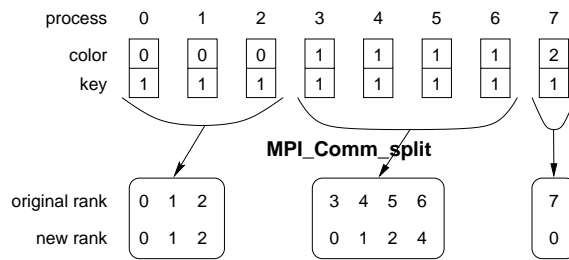


Figure 6.7 Using `MPI_Comm_split` to split a group of processes in a communicator into subgroups.

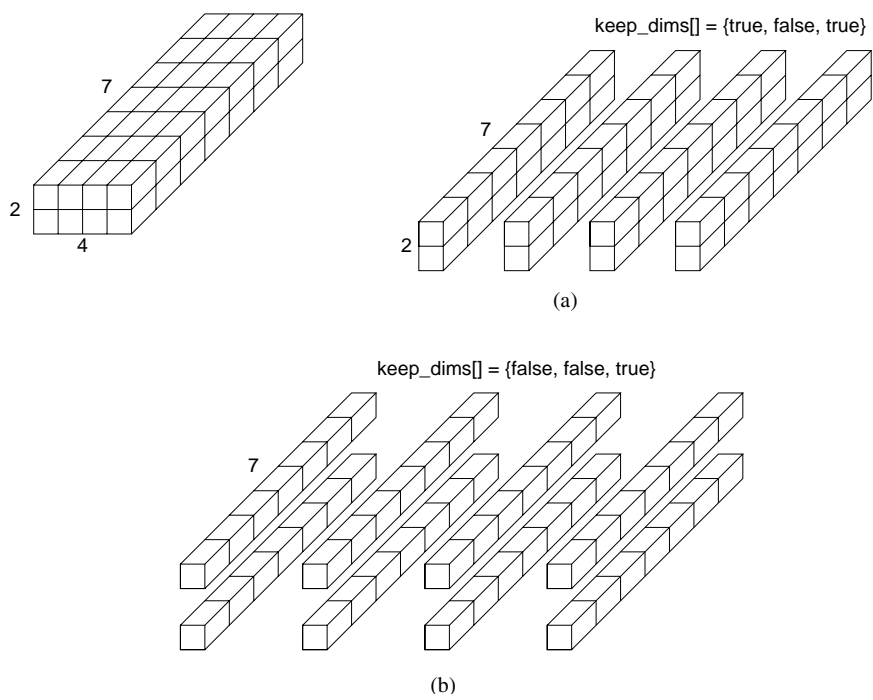


Figure 6.8 Splitting a Cartesian topology of size $2 \times 4 \times 7$ into (a) four subgroups of size $2 \times 1 \times 7$, and (b) eight subgroups of size $1 \times 1 \times 7$.