

MPI-2 get/put

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Editions:

~~November 2020,~~

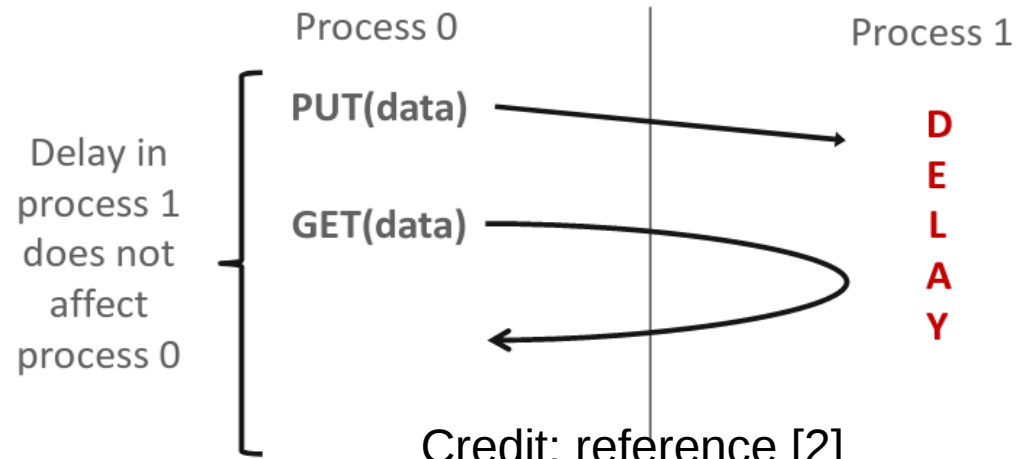
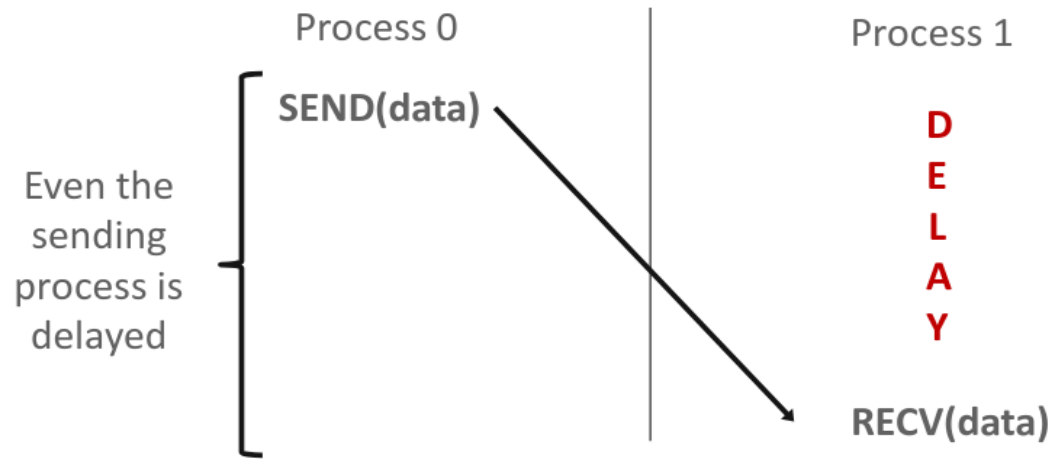
December 2022

- MPI-2 was released in 2000
- MPI-3 was released in 2012
- MPI-4 2020 – draft.
- MPI-4.1, MPI-5.0, ...
- The MPI Standard: <http://www.mpi-forum.org>

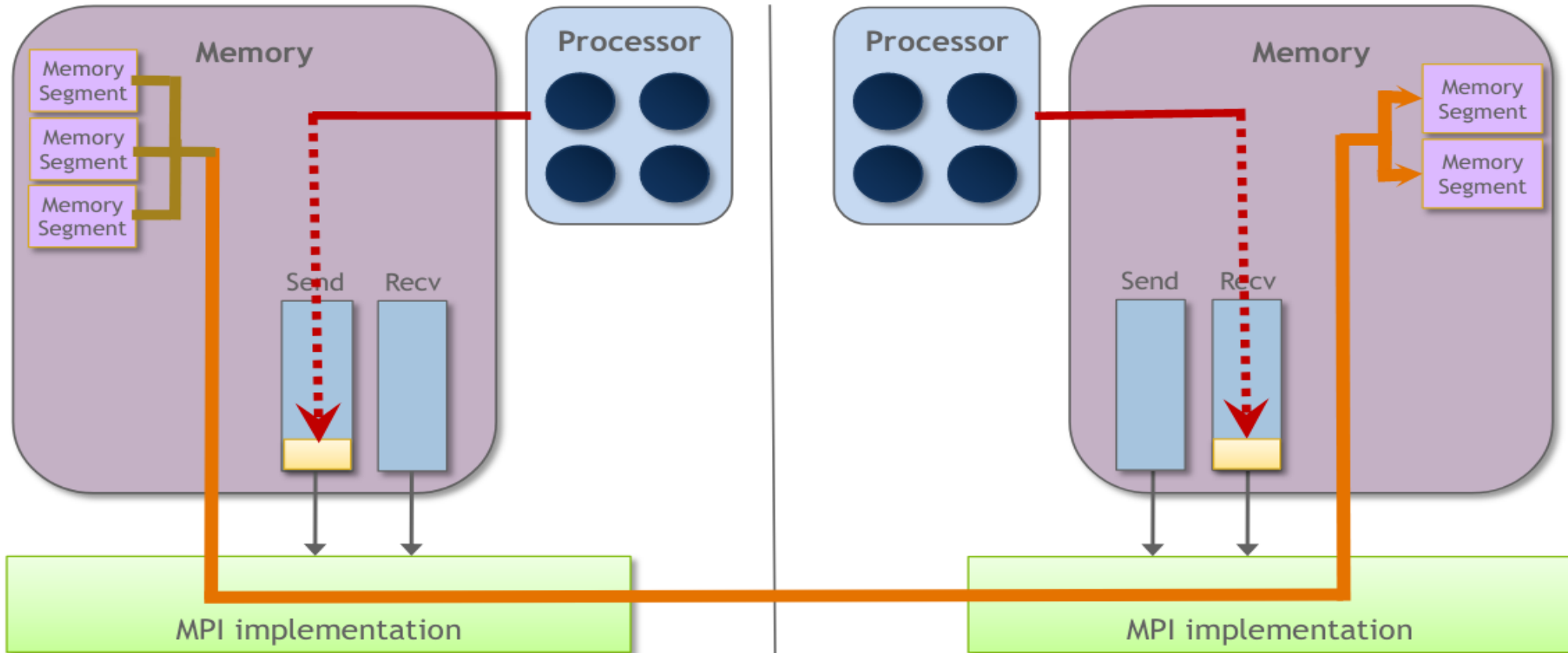
One-sided Communication

- Decouple data movement from process synchronization.
- Each process exposes a part of its memory to other processes
- Other processes can directly read from or write to this memory

Comparing One-sided and Two-sided Programming

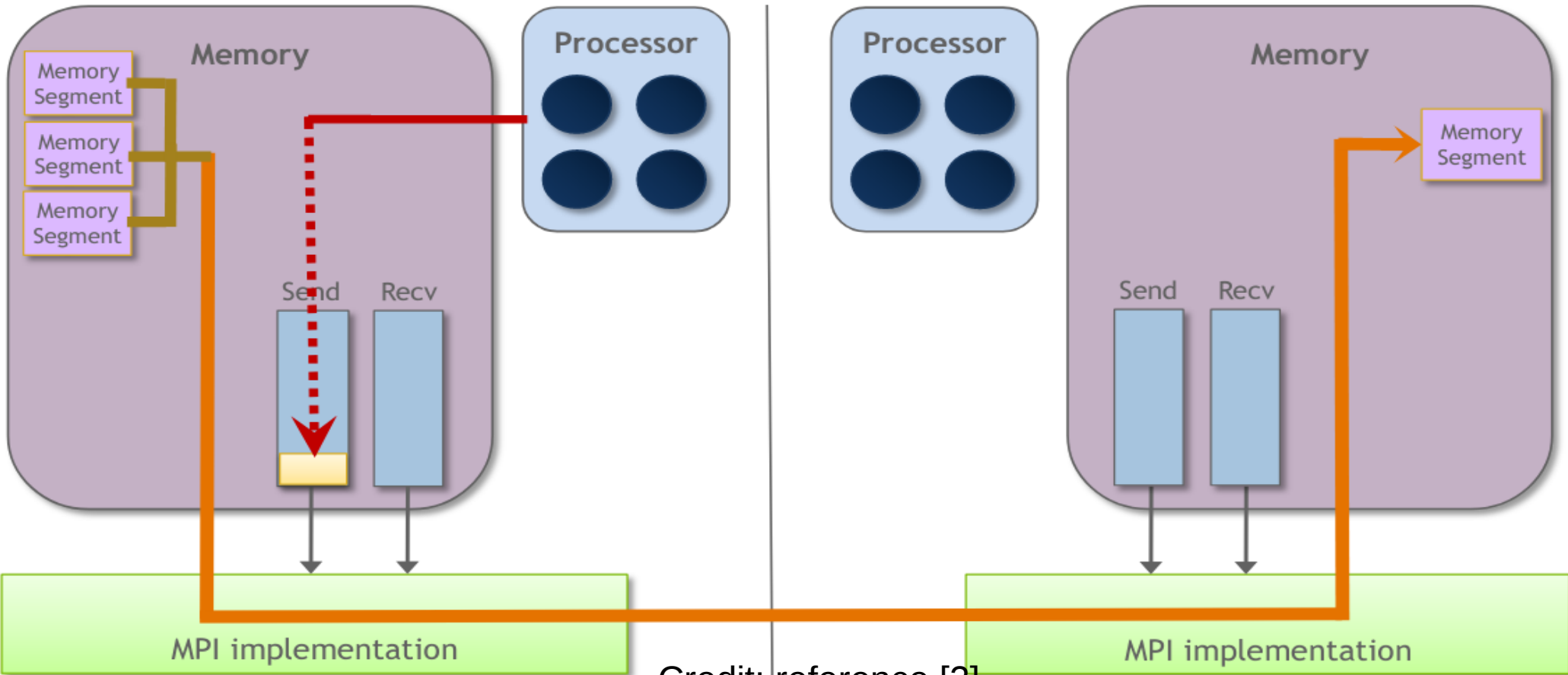


Two-sided Communication Example



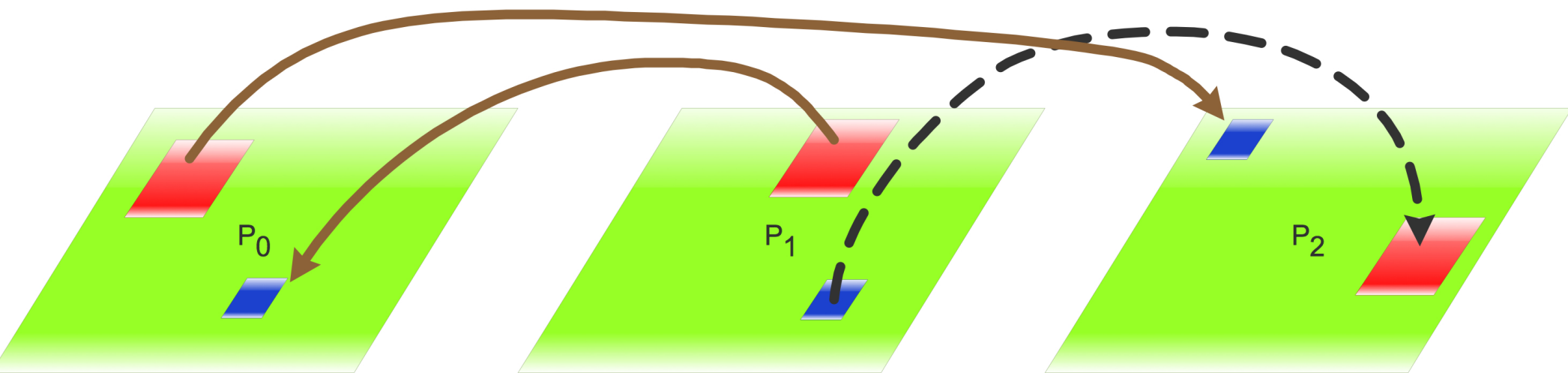
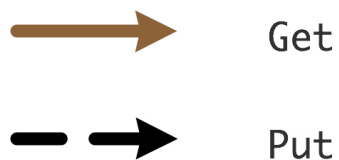
Credit: reference [2]

One-sided Communication Example



Credit: reference [2]

הדגמת העברת מסרים חד-כיוונית בין 3 תהליכים

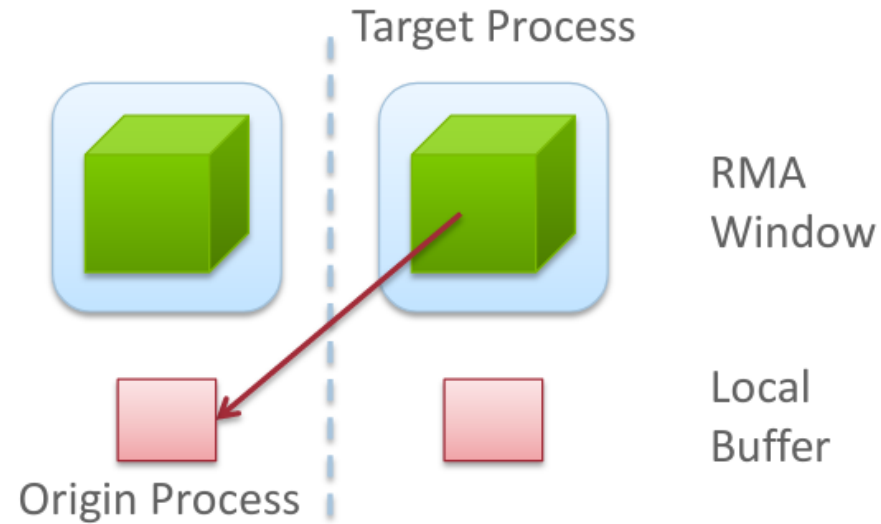


Data movement: *Get*

```
MPI_Get(origin_addr, origin_count,  
origin_datatype, target_rank, target_disp,  
target_count, target_datatype, win)
```

- Move data to origin, from target
- Separate data description triples

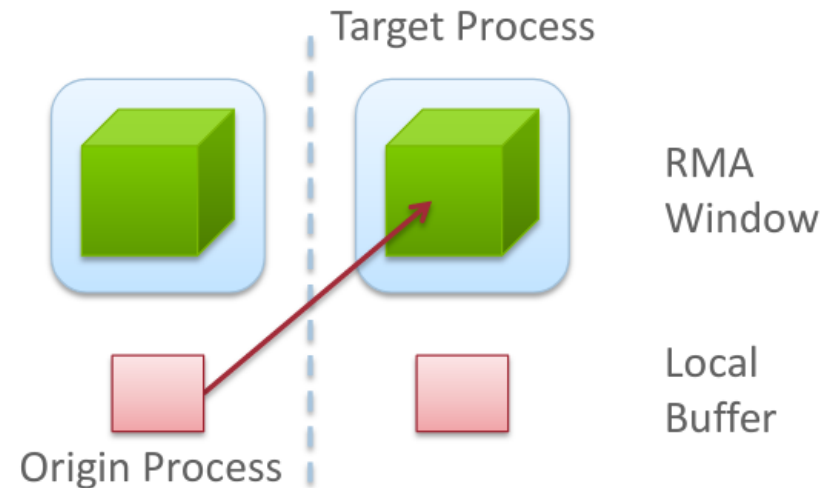
RMA = Remote Memory Access



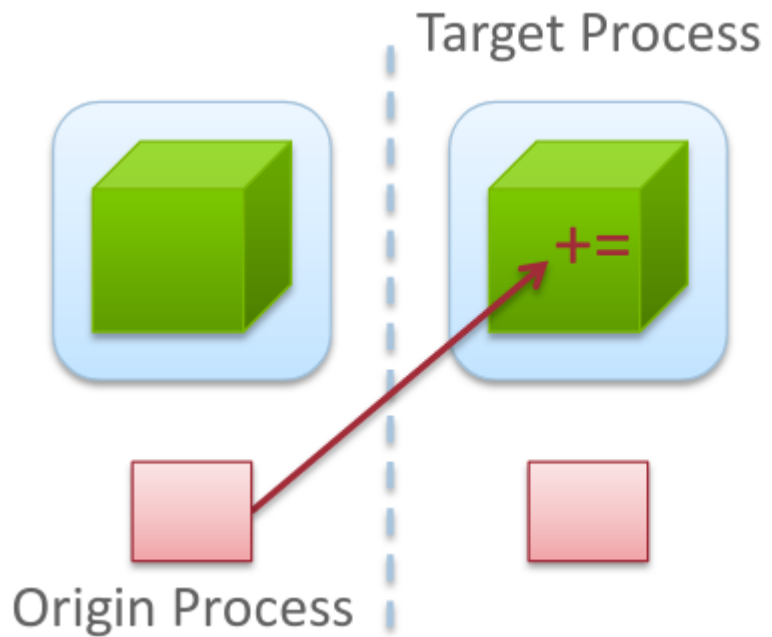
Data movement: *Put*

```
MPI_Put(origin_addr, origin_count,  
origin_datatype, target_rank, target_disp,  
target_count, target_datatype, win)
```

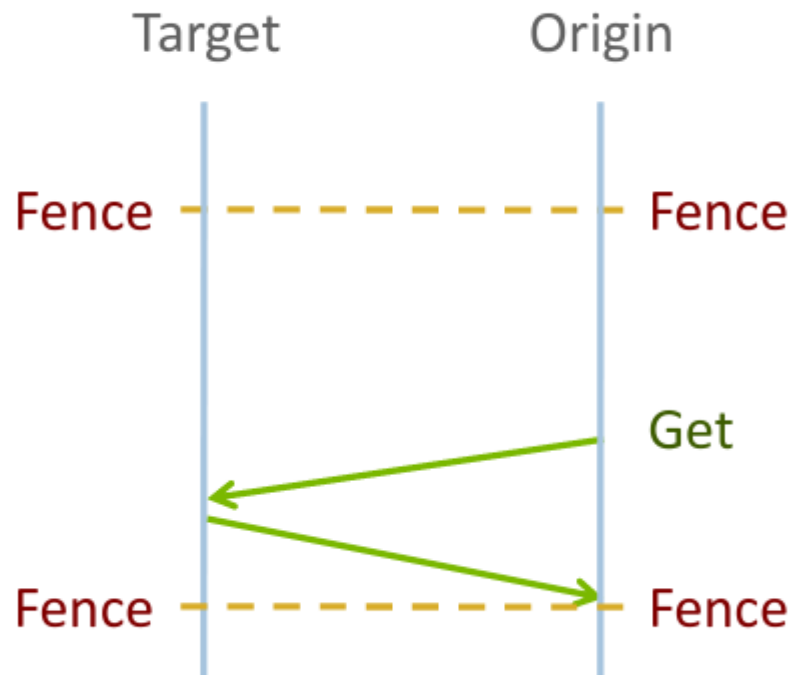
- Move data from origin, to target
- Same arguments as MPI_Get



Accumulate



Fence



Compute π with RMA

Get the cpi code:

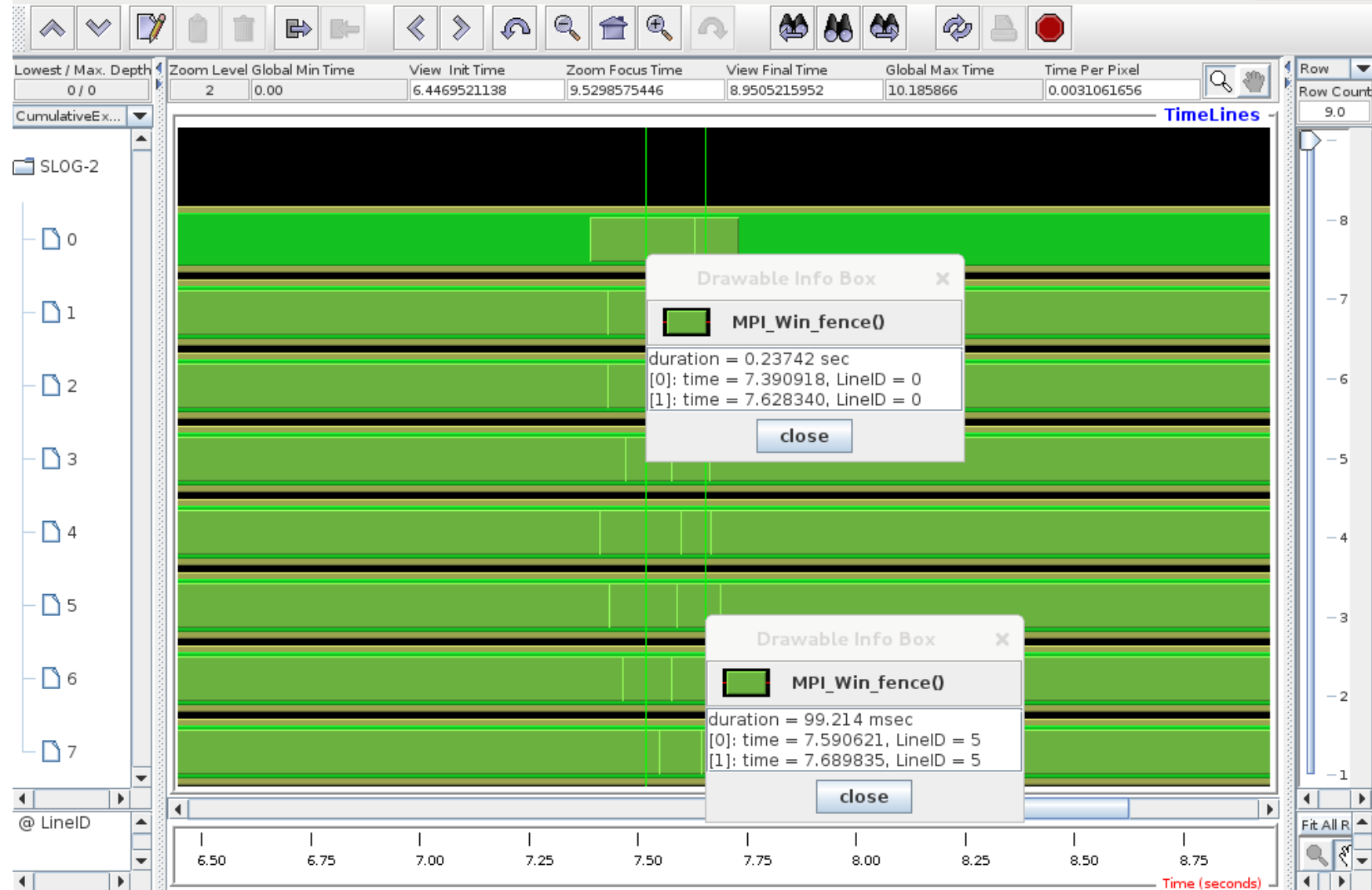
<https://www.mcs.anl.gov/research/projects/mpi/usingmpi2/examples/starting/main.htm>

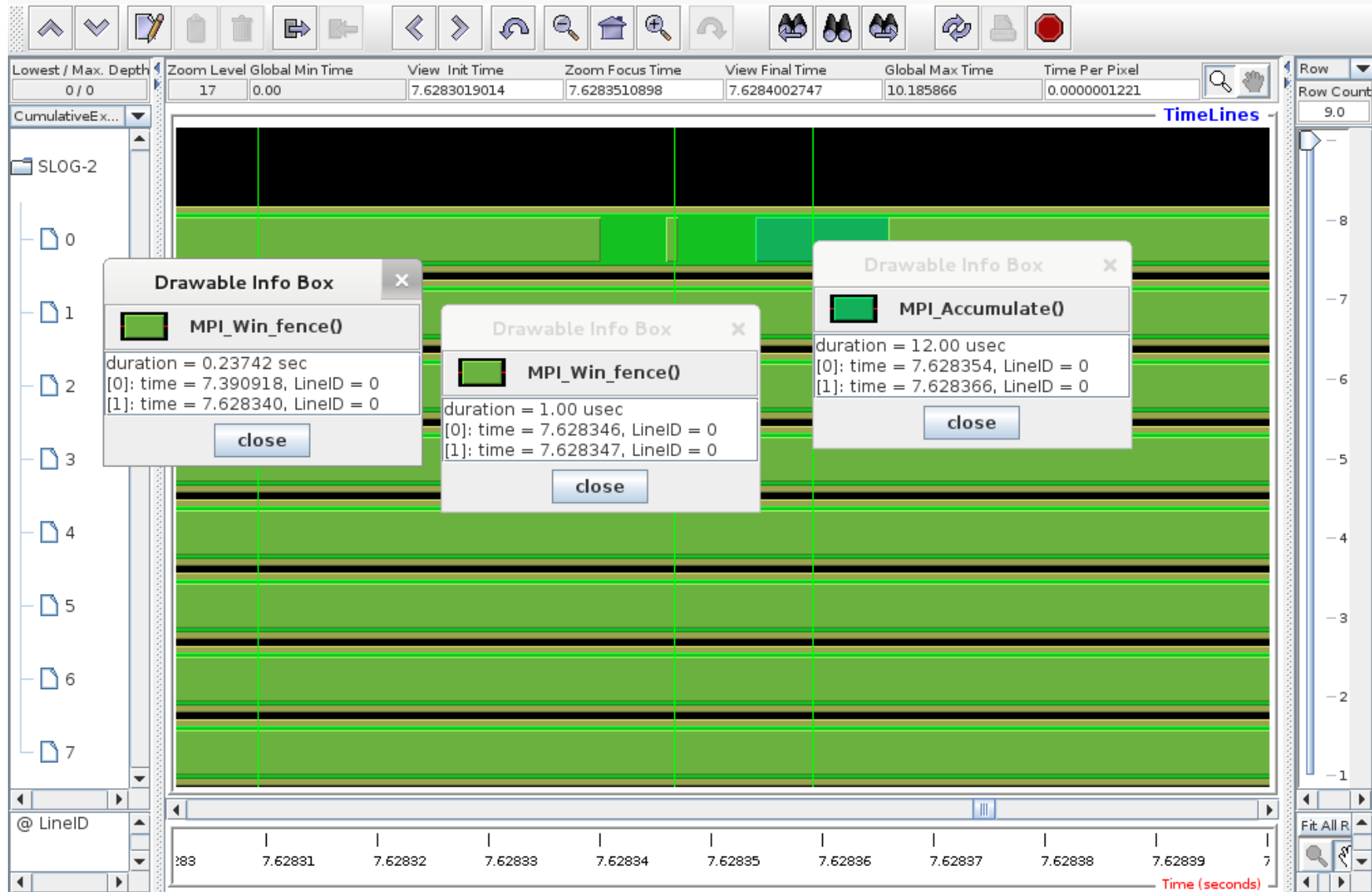
Or from the course website:

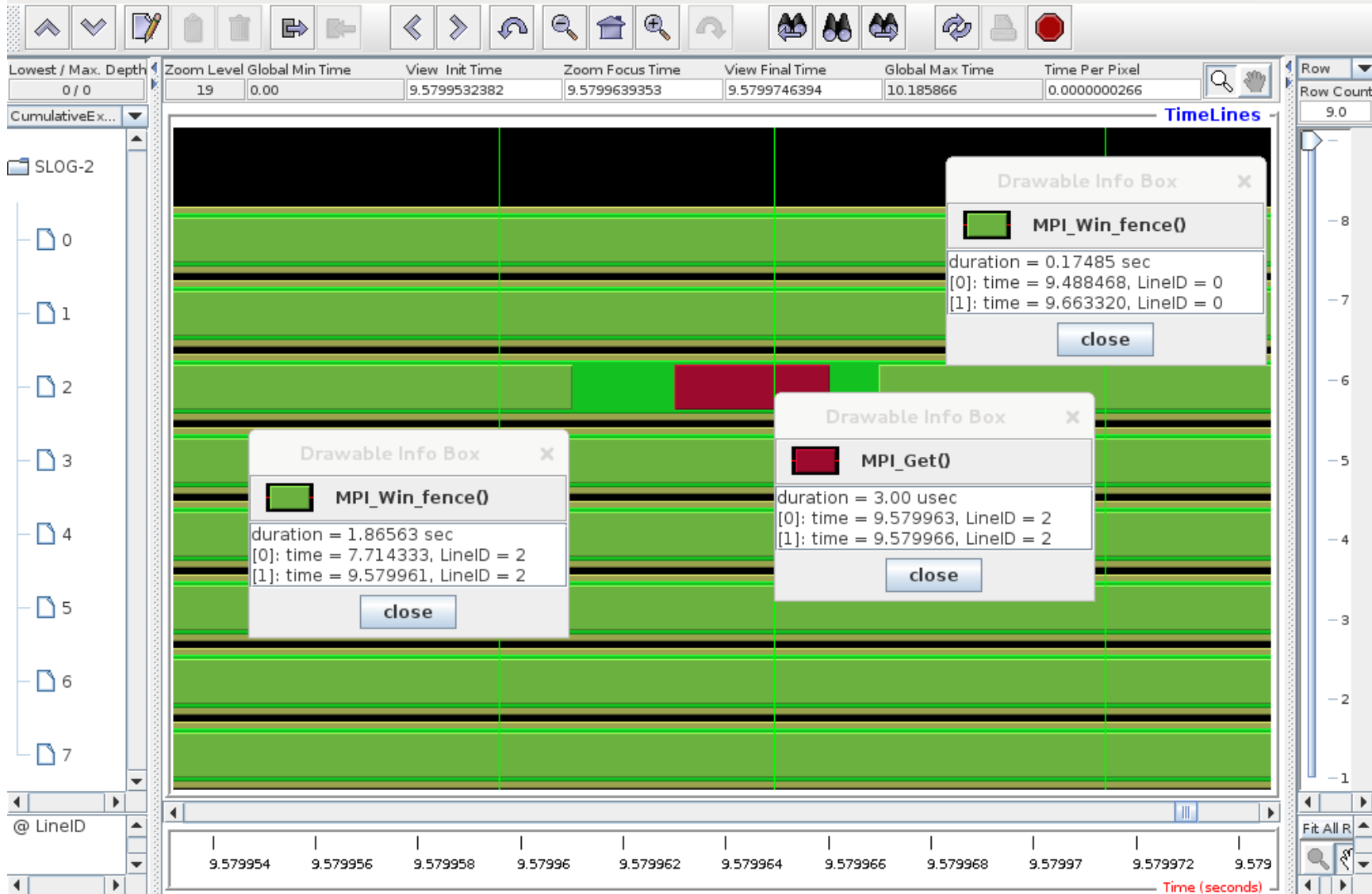
<http://tel-zur.net/teaching/bgu/pp/cpi2.c>

Demo on my laptop:

`/home/telzur/science/Teaching/PP/lectures/07/code/cpi_mpi2`







References

[1] W. Gropp, E. Lusk and R. Thakur. "Using MPI-2",
<https://mitpress.mit.edu/books/using-mpi-2> and
<https://www.mcs.anl.gov/research/projects/mpi/usingmpi2/>

[2] P. Balaji and T. Hoefler, "Advanced Parallel Programming with MPI-1, MPI-2, and MPI-3",
https://hlor.inf.ethz.ch/teaching/mpi_tutorials/ppopp13/2013-02-24-ppopp-mpi-advanced.pdf

[3] V.Eijkhout's, "Introduction to High-Performance Scientific Computing",
<https://pages.tacc.utexas.edu/~eijkhout/pcse/html/mpi-onesided.html>