# MPMD with Coarray Fortran:
# TS 18508 Events - Example Program

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## TS-18508 Events – Example Program

Our original example program did use Fortran 2008 language elements exclusively to accomplish a MPMD-like programming style. Nevertheless, OpenCoarrays/GFortran [1] does already support TS-18508 *Events*, a fairly flexible one-sided synchronization mechanism. We did modify our example program only slightly to try out this new feature successfully. The modifications are:

- The IIimma_SYNC_CheckActivityFlag routine of our purely local ImageManager Abstract Data Type (ADT) does use the EVENT WAIT statement by now.
- The IIinma_ActivateTeamManagerImage routine of our purely local InitialManager ADT does use the EVENT POST statement by now.
- Also, the IItema_ActivateTeamMemberImage routine of our purely local TeamManager ADT does use the EVENT POST statement by now.
- We use the specification part of our OOOPimsc_admImageStatus_CA standalone coarray wrapper to declare the required EVENT_TYPE coarray object. (We did not try out another way, but assume that coarrays of EVENT_TYPE do also require coarray correspondence to successfully establish a remote communication channel. Thus, we do access that coarray by USE association exclusively.)

Compared to the original example program, the compilation process itself is unaffected by these modifications. No changes or further commands are required with OpenCoarrays/GFortran.
Execution of the program, using TS-18508 *Events*, does give the same results as our original version did.

Initially, we did also develop another very simple example program to try out TS-18508 *Events*, shown below:

```
program event_example
  use iso_fortran_env
  implicit none
  type(event_type) :: ev[*]
  integer :: a [*]
  integer :: b
  if (this_image() == 1) then
    event wait (ev)
    b = a[2]
    write(*,*) "image 1, b ==", b
  elseif (this_image() == 2) then
    write(*,*) "image 2"
    a = 77
    event post (ev[1])
  end if
end program event_example
```

## References

[1] Fanfarillo, A., Burnus, T., Cardellini, V., Filippone, S., Nagle, D., & Rouson, D. (2014, October). OpenCoarrays: open-source transport layers supporting coarray Fortran compilers. In *Proceedings of the 8th International Conference on Partitioned Global Address Space Programming Models* (p. 4). ACM.