

Send/Receive Buffer (Sending/Receiving)

- Arrays of “send (sending) buffer” and “receive (receiving) buffer” often appear in MPI.
- Addresses of “send (sending) buffer” and “receive (receiving) buffer” must be different.

Send/Receive Buffer (1/4)

A: Scalar

```
call MPI_REDUCE  
(A, recvbuf, 1, datatype, op, root, comm, ierr)
```

```
MPI_Reduce  
(A, recvbuf, 1, datatype, op, root, comm)
```

Send/Receive Buffer (2/4)

A: Array

```
call MPI_REDUCE  
(A, recvbuf, 3, datatype, op, root, comm, ierr)
```

```
MPI_Reduce  
(A, recvbuf, 3, datatype, op, root, comm)
```

- Starting Address of Send Buffer
 - $A(1)$: Fortran, $A[0]$: C
 - 3 (continuous) components of A ($A(1) - A(3)$, $A[0] - A[2]$) are sent

| | | | | | | | | | | |
|-------------|---|---|---|---|---|---|---|---|---|----|
| A(:) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-------------|---|---|---|---|---|---|---|---|---|----|

| | | | | | | | | | | |
|-------------|---|---|---|---|---|---|---|---|---|---|
| A[:] | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------------|---|---|---|---|---|---|---|---|---|---|

Send/Receive Buffer (3/4)

A: Array

```
call MPI_REDUCE
(A(4), recvbuf, 3, datatype, op, root, comm, ierr)
```

```
MPI_Reduce
(A[3], recvbuf, 3, datatype, op, root, comm)
```

- Starting Address of Send Buffer
 - $A(4)$: Fortran, $A[3]$: C
 - 3 (continuous) components of A ($A(4) - A(6)$, $A[3] - A[5]$) are sent

| | | | | | | | | | | |
|-------------|---|---|---|---|---|---|---|---|---|----|
| A(:) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A[:] | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Send/Receive Buffer (4/4)

A, B: Array

```
call MPI_REDUCE  
(A(4), B(5), 3, datatype, op, root, comm, ierr)
```

```
MPI_Reduce  
(A[3], B[4], 3, datatype, op, root, comm)
```

| | | | | | | | | | | |
|--------------|---|---|---|---|---|---|---|---|---|----|
| A (:) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| B (:) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A [:] | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| B [:] | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |