**What’s XcalableMP?**

- XcalableMP(XMP) is a directive-based PGAS language based on C99 and Fortran95.
- XMP supports typical parallelization under “global-view model” programming and enables parallelizing the original sequential code.
- XMP also includes coarray features for “local-view model” programming.

**Execution Model**

- SPMD as a basic execution model

Communication occurs when a directive is encountered (global-view model)
- One-sided communication occurs when a coarray is referred (local-view model)

**Global-view Model**

- `a[12]` is distributed onto 4 nodes

```c
int a[12];
#pragma xmp nodes p(4)
#pragma xmp template t(0:11)
#pragma xmp distribute t(block) onto p
#pragma xmp align a[i] with t(i)

for(int i=0; i<12; i++)
    a[i] = func(i);
```

**Local-view Model**

- Extends C for array section and codimension

```
array_name[start:length]:[node_number]
```

Above code means length elements from `array_name[start]` to `array_name[start+length-1]` located on a node specified by `node_number`.

- Coarray adapted for C

```
double a[5]:[*], b[5]:[*]; // Declare
if(me==2) b[0:2]:[1] = a[3:2]; // Put
```

**Performance**

- The K computer
  - SPARC64 VIIIfx 2.0GHz, 8Cores, 128GFlops
  - DDR3 SDRAM 16GB, 64GB/s
  - Torus fusion six-dimensional mesh/torus network, 5GB/s x10

- HIMENO Benchmark
  - 1348.3 GFlops (~82,944 Nodes)

- FFT
  - 160.7 TFlops, 1.8% of peak (82,944 Nodes)

- STREAM
  - 1415.3 TB/s, 67.5% of peak (32,768 Nodes)