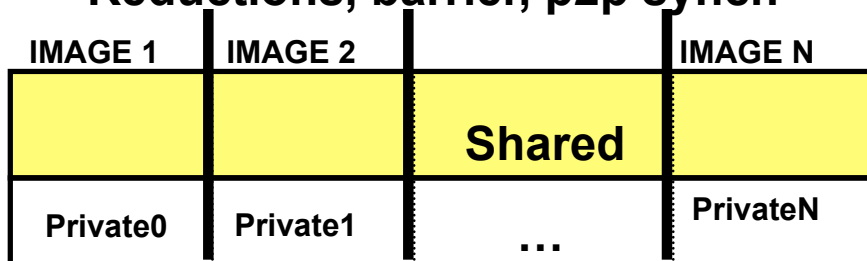


## Programming Model

- SPMD programming model
- Local vs. remote memory
- Reductions, barrier, p2p synch



## Implementation

- Cray implementation: X1
- Rice's cafc prototype for clusters
  - GASNet or ARMCI comm layer
  - Source-to-source (Fortran)
- cafc is relatively faithful to source
- Performance tools: HPCToolkit
- Proposed Fortran 2008 Standard

## Language Features

- Multi-dimensional arrays
- One-sides shared-memory communication
  - GET/PUT of F90 array sections
 

```
real :: x(n,n)[*]
x(:,1) = x(:,n)[me + 1]
```
- Image teams for collectives

## Codes

- EPIC: elastic-plastic impact calculations (AHPARC)
- NAS parallel benchmarks
- Sweep3D
- HPC Challenge benchmarks
- Parts of applications on X1
  - e.g. LANL's POP