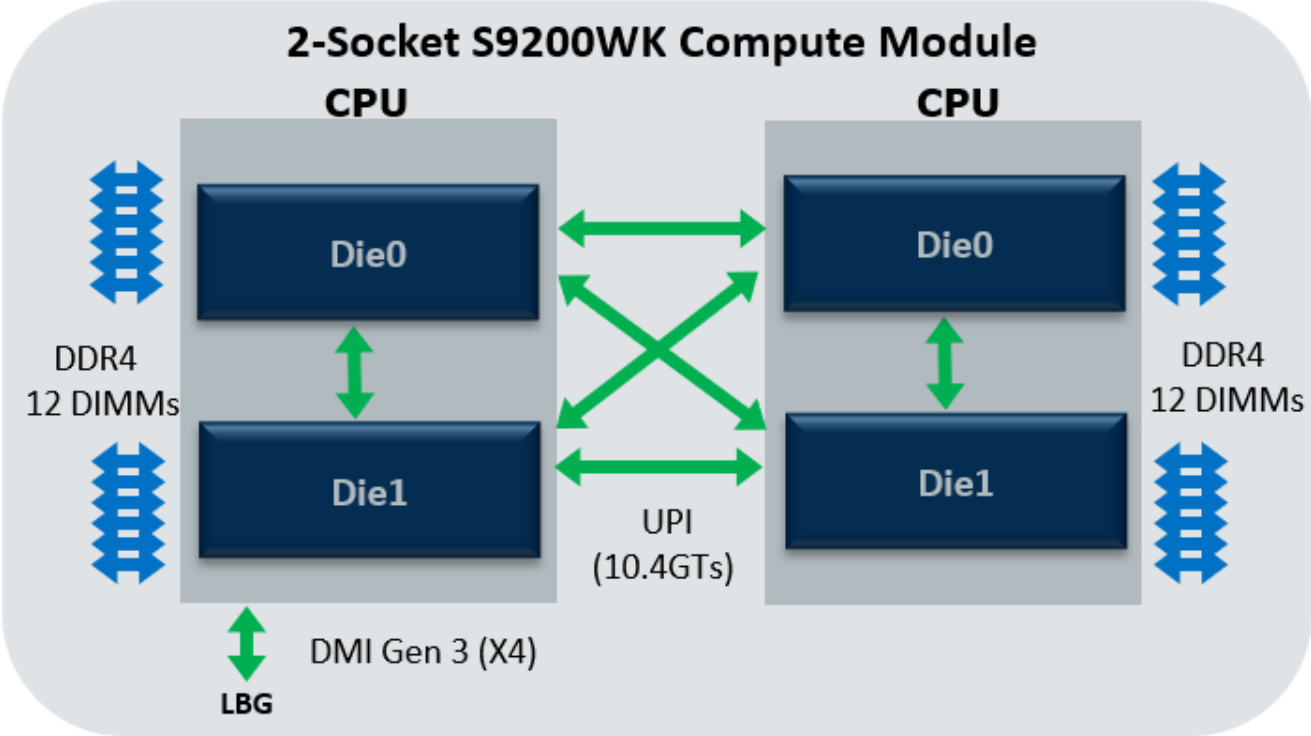


# Binding with SLURM wrt OPA

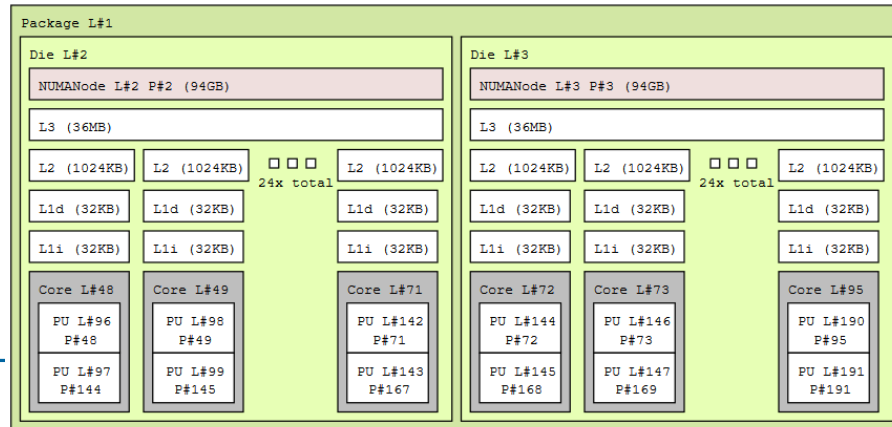
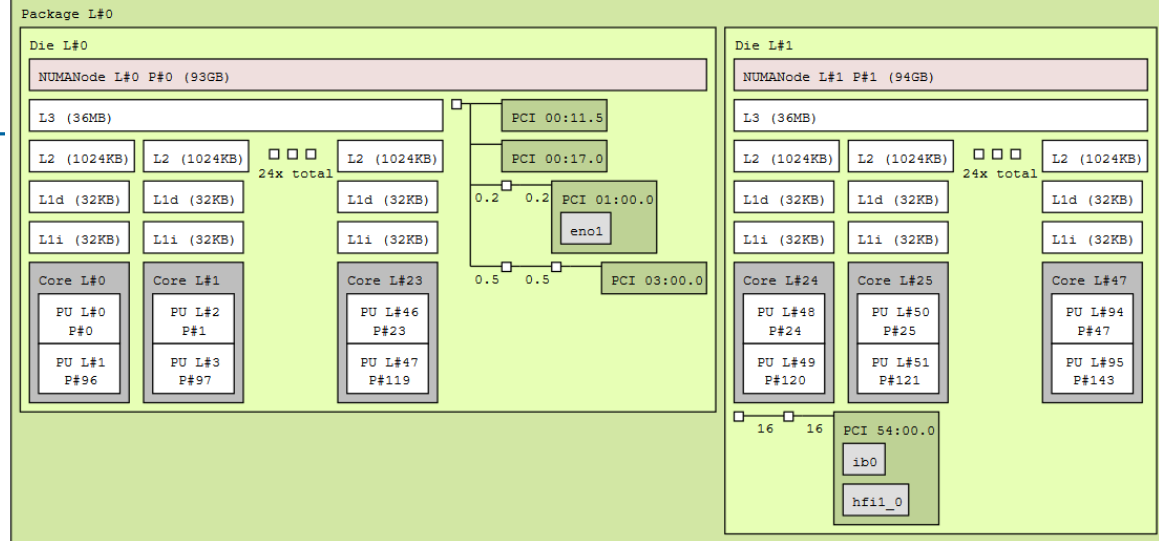
2020

# CLX-AP Architecture



# hwloc-ls --of svg

Machine (377GB total)



# MPI communication

---

- ▶ Ranks on Die 1 have direct access to the Omni-path Adapter
- ▶ MPI communication for the ranks on other dies also passes the UPI bridge.
  - This increases latency for MPI communication
  - MPI traffic over the UPI bridge competes with traffic between NUMA domains.
  
- ▶ Ranks with more MPI communication than other ranks should preferentially be placed on the cores of Die/NUMA node 1.

# Does my application benefit?

---

- ▶ Some applications concentrate MPI communication on rank 0
  - MPI\_Bcast from rank 0
  - MPI\_Reduce to rank 0
  
- ▶ The first ranks on each node have increased MPI communication
  - PALMfft uses Alltoall between the first ranks on all nodes
  
- ▶ Put the first ranks somewhere on rank 24-47 (NUMANode1)

# How to change binding of the first rank to NUMA node 1?

---

- ▶ Using CPU map (only the first hyperthread)

```
map=$(seq -s, 24 95),$(seq -s, 0 23)
srun --cpu-bind=map_cpu:$map
```

- ▶ Using CPU masks (includes both hyperthreads)

```
module load hwloc/2.1.0
mask=$(for n in {24..95} {0..23};do echo -n $(hwloc-calc --
taskset core:$n),;done)
srun --cpu-bind=mask_cpu:$mask
```

# What if I use Intel's mpirun/mpiexec?

---

- ▶ By default, it will put the first rank of each node on core 24
  - No further action required
  - Make sure that SLURM binding is disabled.

# Impact on PALMfft

---

	Benchmark time (s)
First rank on core 0	181.4
First rank on core 24	170.1

Improvement is 6.2%



# Thanks for your attention

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The Atos logo is displayed in a bold, white, sans-serif font. The letter 'o' is stylized with a horizontal line through its center. The background of the slide features large, overlapping, semi-transparent blue circles.