PACS-CS Performance Evaluation

Linpack Performance

P×Q	N	Rmax (Tflops)	Efficiency (%)	3D routing
16×160	706560	10.33	72.05	No
32×80	722944	10.35	72.20	Yes

- 10.35 TFLOPS with 2560 nodes #86 at 2007/June TOP500 list (#3 as Japanese manufactured machine)
- Performance differs by 2-D array configuration on HPL with routing overhead on 3-D HXB
- 6.7 hours of running time

## Performance of PM/Ethernet-HXB network layer
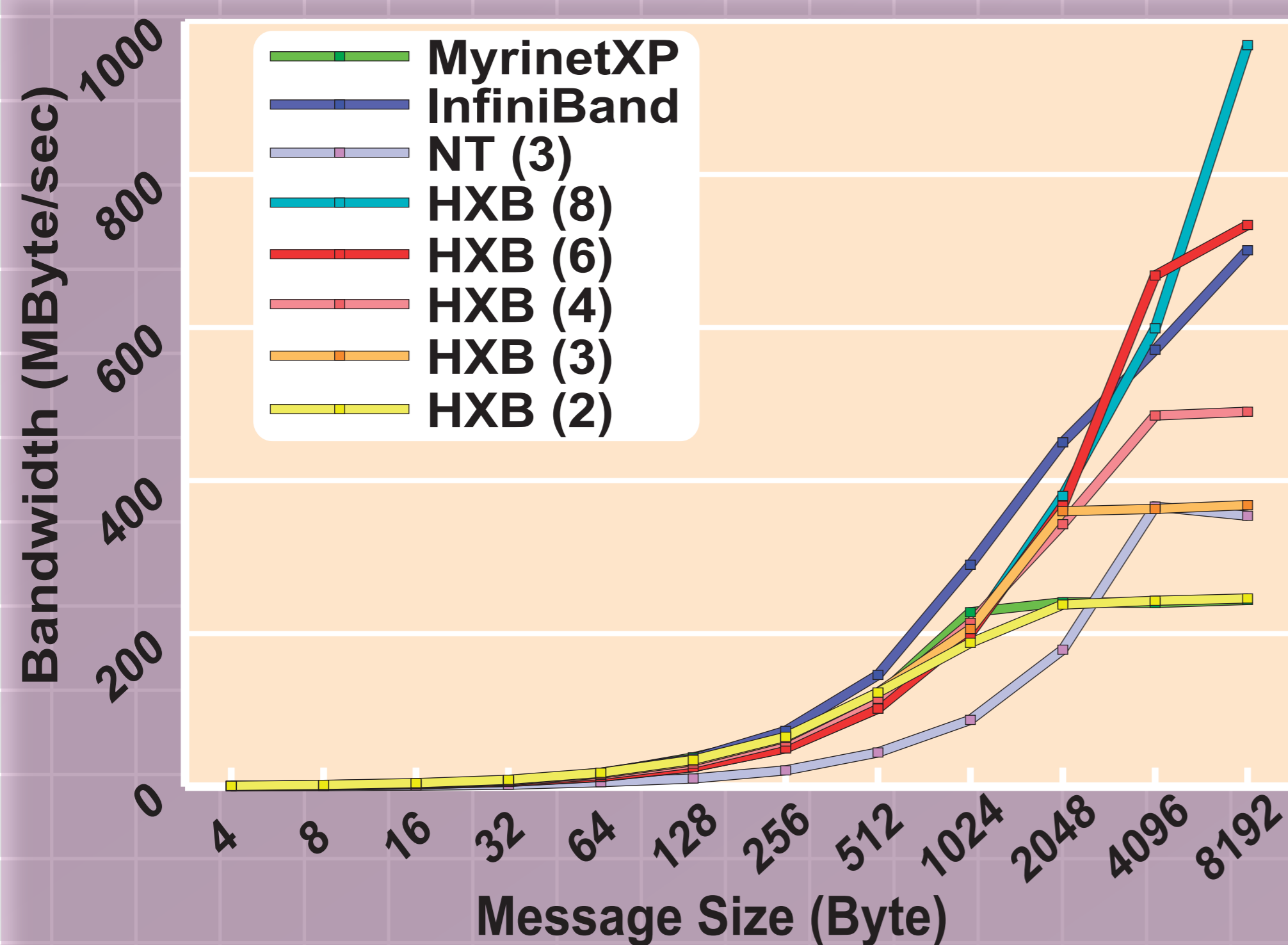
- HXB(n) = Sustained bandwidth with n links of GbE in PM/Ethernet-HXB communication layer
- Aggregated bandwidth with 6 GbE links is much wider than MyrinetXP and comparable with InfinibandSX
- High performance with low-latency software technology by PM/Ethernet-HXB
- Trunk network technology is applicable for wide variety of networks including 10GbE and Infiniband

3-D Simultaneous Burst Transfer Performance

Bandwidth/node [MB/s]	256 node	512 node
average	586.8 (78.2%)	582.0 (77.6%)
max.	619.3 (82.6%)	629.6 (84.0%)
min.	559.2 (74.6%)	434.0 (57.9%)

Bisection bandwidth on a single dimension
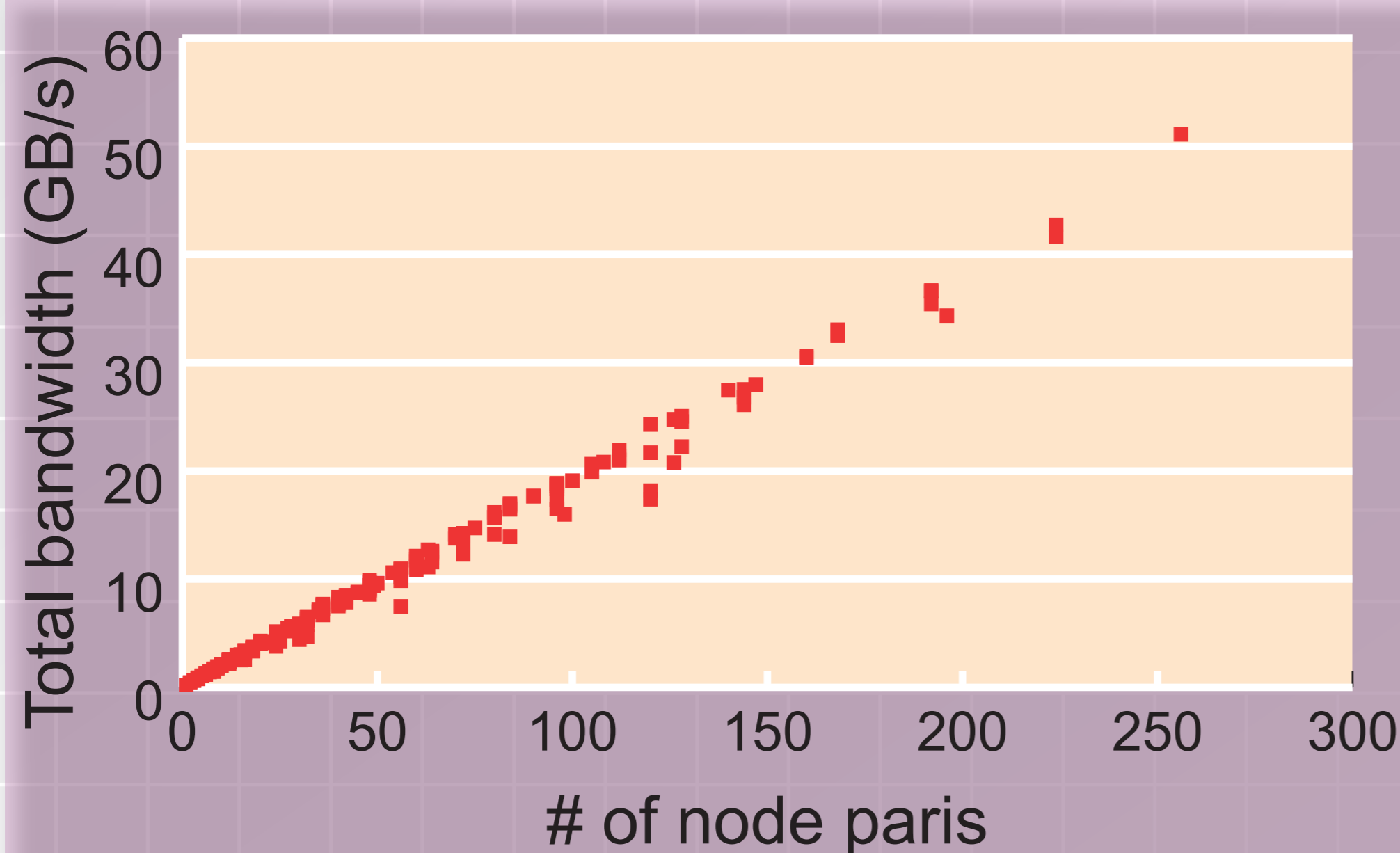
- Single-sided simultaneous burst transfer between two groups of nodes separated by the half point on one dimension
- MPICH user level sustained bandwidth
- Bisection bandwidth scales with the number of node pairs and it is never degraded
- The same performance on any dimension of 3-D Hyper-Crossbar network