Performance Evaluation of MPI Parallel Transfer in Microsoft Azure Cloud

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Subject

- HPC in the Cloud
- Evaluation
  - Multiple Data Centers
    - Communication
    - Exchange Benchmark
  - Differences among Data Centers
  - Differences between day and night allocations

HPC in the Cloud

- Machines are becoming obsolete faster and faster
- Cloud Computing offers
  - Up-to-date hardware and software
  - No extra charges or effort
    - acquisition
    - maintenance
    - **energy consumption**

Motivation

- Performance of the Cloud machines are consistent?
- Data Center load is an issue?

Methodology

- Evaluation of the Azure **G5** instance
  - Microsoft: “The biggest VM in the public cloud”
- Available in 4 Data Centers
  - West Europe
  - East USA
  - SouthEast Asia (Singapore)
  - West USA

Methodology

- Use of a cluster for baseline
  - Econome (from **GRID 5000**)

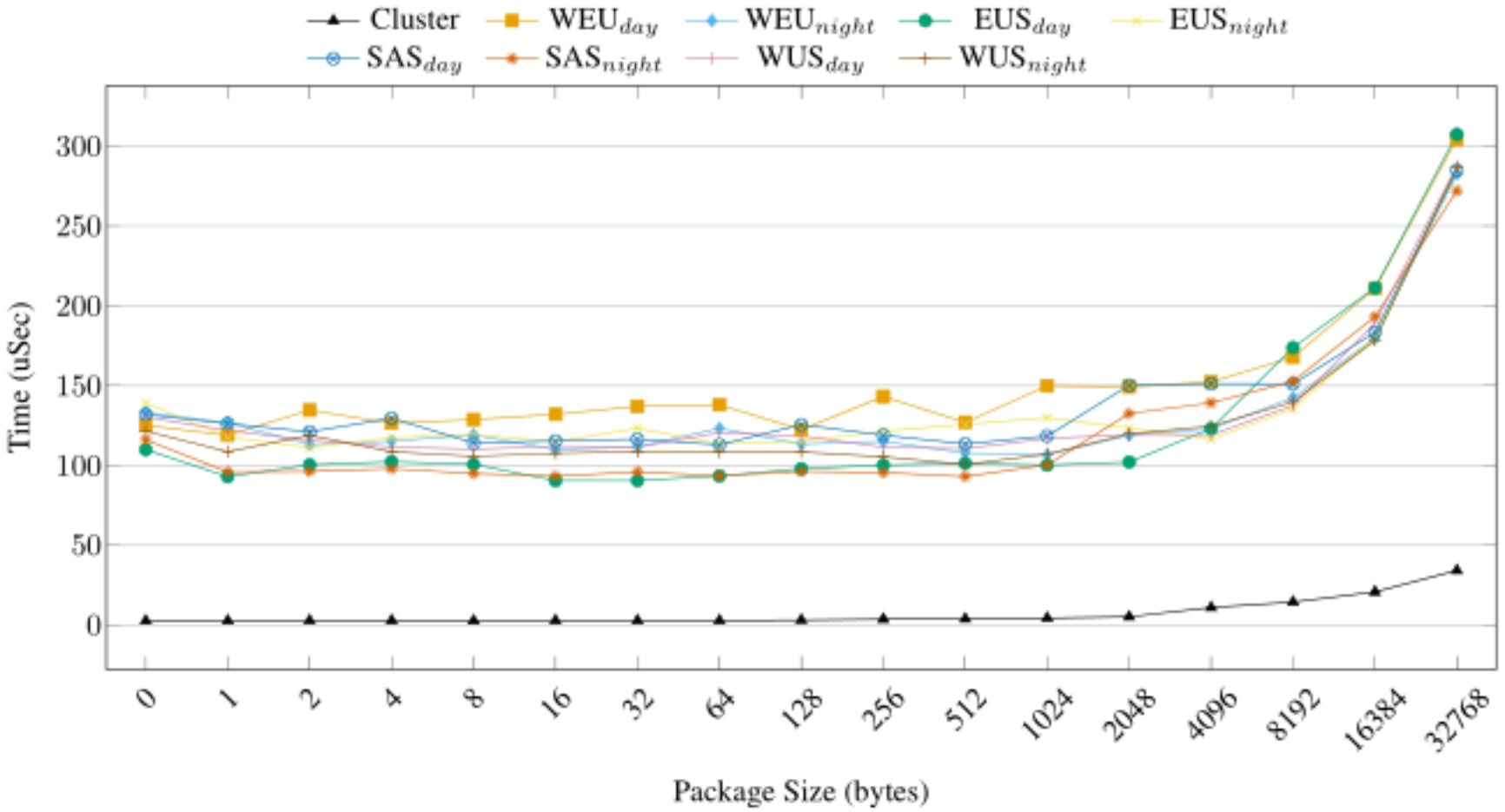
- Configure 128 cores clusters

Machine	Processor	Frequency	Cores/Node	Network	Price/Hour
Econome	E5-2660	2.2 GHz	16	10 Gbit/s	
G5	E5-2698 v3	2.3 GHz	32	---	69.52

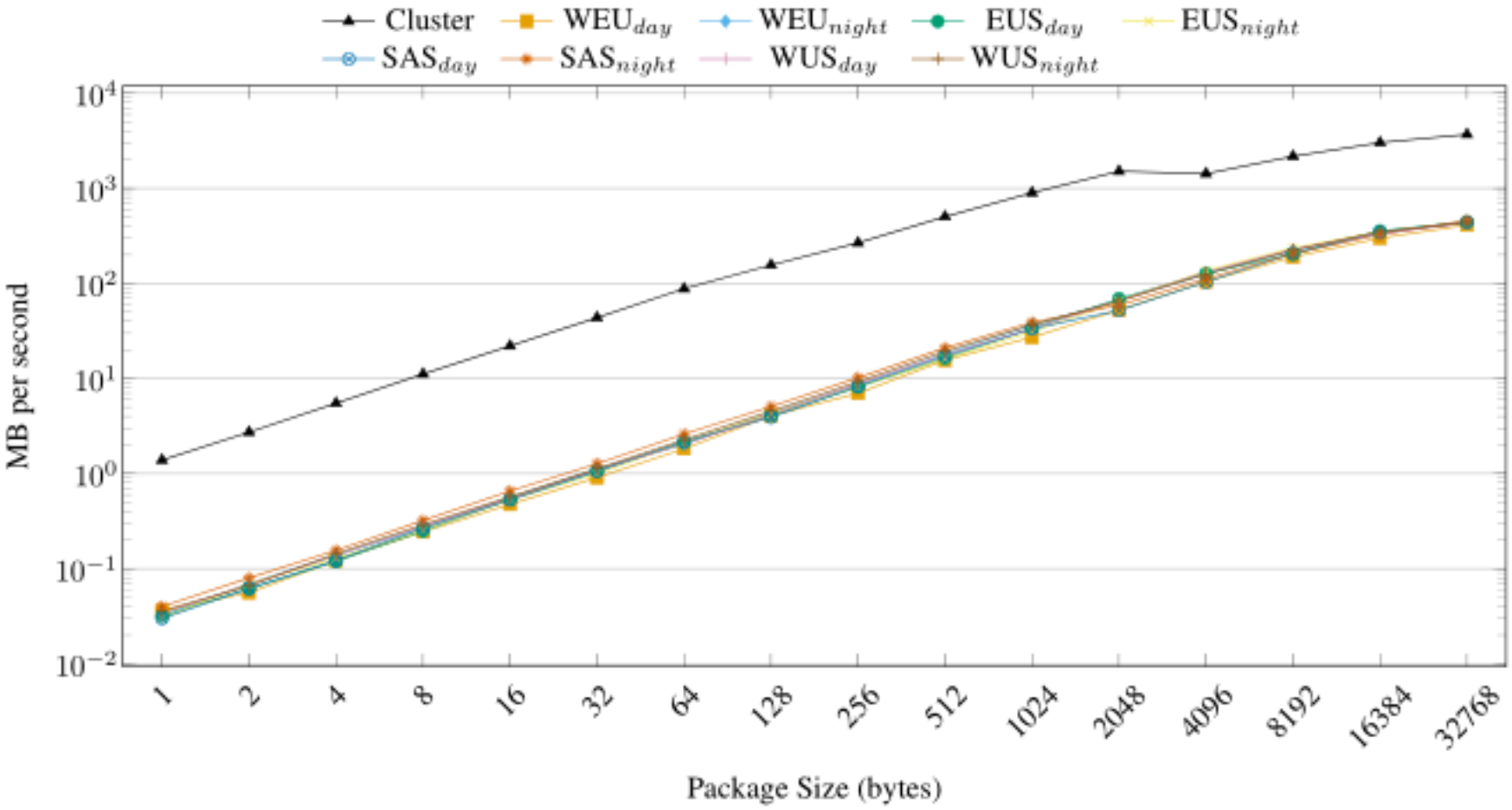
Methodology

- Applications and Benchmarks
  - Intel MPI Benchmarks
    - Single Transfer
    - Parallel Transfer – **Exchange**
    - Collective Communications
    - Package size: From **0** to **32768** Bytes

Results – Latency



Results – Bandwidth



Conclusions and Future Work

- Cloud during day and night? **No difference!**
- Difference among different DC? **No**

- For the future, evaluate other aspects
  - Memory bandwidth, I/O Performance
  - Map the application vs. Clouds

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