Scaling Out SAP HANA In Memory DB with Hecatonchire

Many shared-memory parallel applications do not scale beyond a few tens of cores. However, they may benefit from large amounts of memory:

- In-memory databases
- Datamining
- VM
- Scientific applications
- etc

Moreover, memory in the nodes of current clusters are often Overscaled in order to fit the requirements of “any” application and remains unused most of the time. One of the objective we try to achieve with project Hecatonchire is to unleash your memory-constrained application by using the memory in the rest of nodes. In this post we demonstrate how Hecatonchire enables users to have memory that grows with their business or applications, not before. While using high-volume components to build high-value systems and eliminating physical limitation of Cloud / Datacenter or servers.

The application: SAP HANA

SAP HANA DB takes advantage of the low cost of main memory (RAM), data processing abilities of multi-core processors and the fast data access of solid-state drives relative to traditional hard drives to deliver better performance of analytical and transactional applications. It offers a multi-engine query processing environment which allows it to support both relational data (with both row- and column-oriented physical representations in a hybrid engine) as well as graph and text processing for semi- and unstructured data management within the same system. HANA DB is 100% ACID compliant.

The Benchmark, hardware and Methodology

- Application: SAP HANA (In memory Database)
- Workload: OLAP (TPC-H Variant)
  - Data size
    - For Mall and Medium Instance: ~600 GB uncompressed (~30 GB compressed in RAM)
    - For Large: 300 GB compressed Data (2 TB of uncompressed data)
  - 18 different Queries (TPC-H Variant)
  - 15 iteration of each query set
- Virtual Machine:
  - Small Size: 64 GB Ram - 32 vCPU
  - Medium Size: 128 GB RAM - 40 vCPU
  - Large Size: 1 TB RAM 40 vCPU
- Hypervisor: KVM
• Hardware:
  • Server with Intel Xeon West Mere
    • 4 socket
    • 10Core
    • 1 TB or 512 GB RAM
  • Fabric:
    • Infiniband QDR 40Gbps Switch + Mellanox ConnectX2

Results

The results demonstrate the scalability and performance of the Hecatonchire solution, for small and large instance we only notice an average of 3% overhead compare to non-scale out benchmark.

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