



Cloud Mercato

Renewal benchmark

For Open Cloud Telekom

S2 to S3

C3 to C4



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I. Context

Open Telekom Cloud recently released new types of Virtual Machine in the continuity of former series which C3 (Dedicated CPU) and S2 (General Purpose). As an independent Cloud testing company, Cloud Mercato has been mandated to evaluate the gain obtained for user by using the new product lines C4 and S3.

All the data used for this report are available in our Projector:

<https://projector.cloud-mercato.com/projects/open-telekom-cloud-2020>

This link above points to private resources available only for T-Systems and Cloud Mercato. The web interface proposes more data with a larger panel of tests. We summarize result data by picking the most representative values.

Sharing of the web interface is possible with the private link.

II. Inventory

CPU specifications give a first representation of which changes we should expect from the renewal.

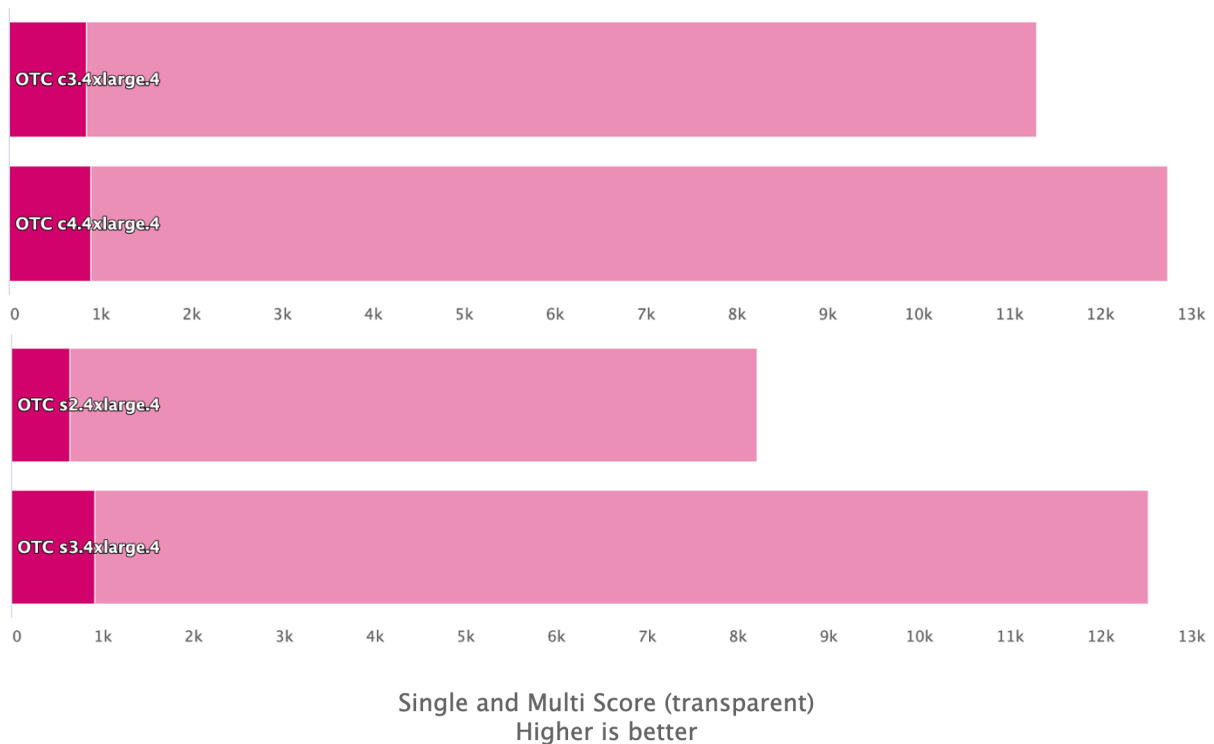
	Model	Frequency	Released	L1d	L1i	L2	L3
C3	Intel® Xeon® Gold 6151	3.00GHz	N/A	32KB	32KB	1MB	25MB
C4	Intel® Xeon® Gold 6266C	3.00GHz	N/A	32KB	32KB	1MB	30MB
S2	Intel® Xeon® Gold 6161	2.20GHz	2017	32KB	32KB	1MB	30MB
S3	Intel® Xeon® Gold 6278C	2.60GHz	N/A	32KB	32KB	1MB	35MB

Despite they seem similar on paper, C4 benefits from Intel's innovation and delivers better performance for almost the same specifications. S3 obtains a huge gain of 400MHz which should heavily impact performance.

III. Benchmarks

1. CPU

Several testing tools has been used to compare the different series. As it represents well the whole analysis, we selected Geekbench 5 to express the difference between machine types. The Geekbench score is a synthesis of different micro-benchmarks in Integer, Floating Point and Cryptography realms. It runs different tasks such as encryption, computer vision or compression and emits a score comparable across machines.



In terms of multi-thread computing, we observe a performance increasement of 10% from C3 to C4 and 45% from S2 to S3.

S3 single thread performance also benefits from the CPU renewal with +45% of compute score.

2. RAM bandwidth

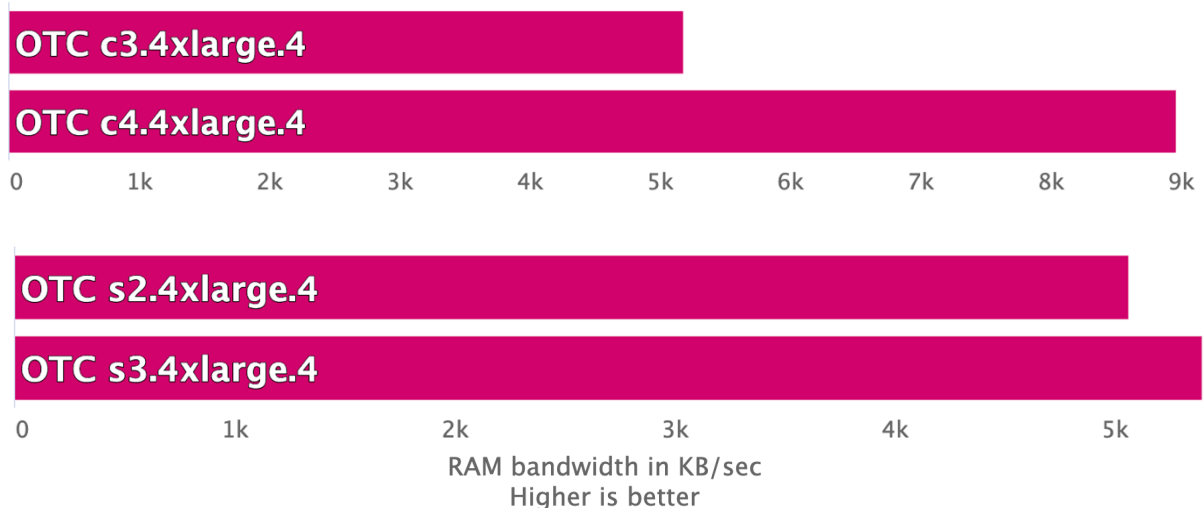
At first glance, volatile memory testing is useful to get an idea of what could give a memory-intensive workload such as management of in-memory databases. But aside of the maximum value that application can reach, memory bandwidth is a good indicator for CPU occupation.

Below virtualization, the connection between CPU and RAM is mandatorily shared with other tenants. In other words, RAM bandwidth is a resource shared between all VMs on a hypervisor and except in case of dedicated resource, the availability of this resource directly depends of your neighborhood's usage.

Read:



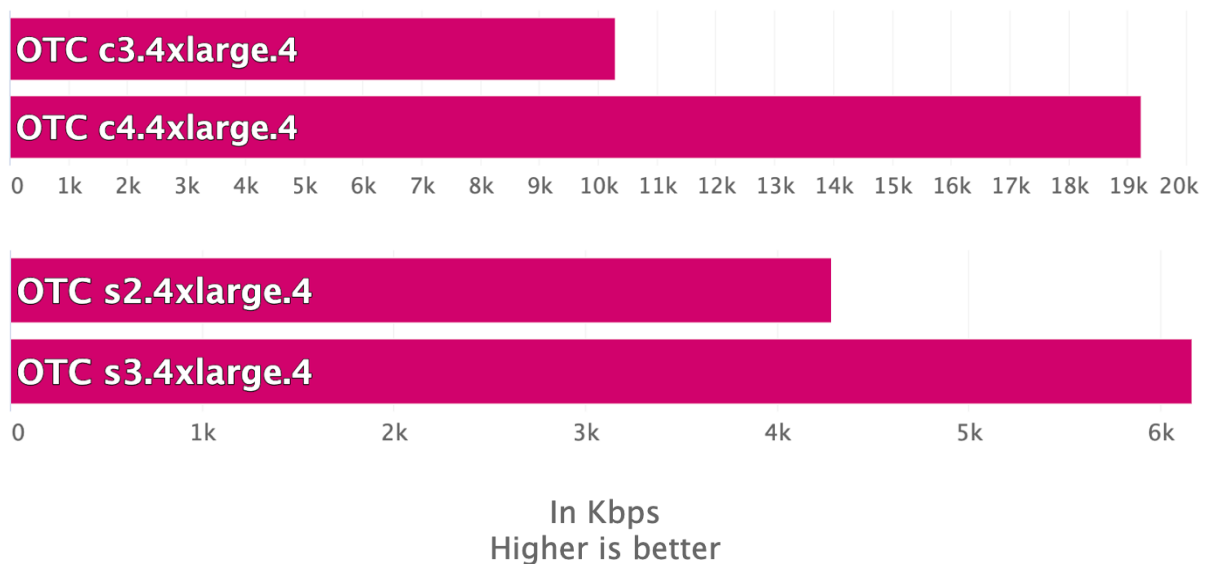
Write



For Dedicated CPU series, we can assert that there's a gain of 30% in read and 75% in write. The General-purpose series show a gain of 35% in read mode.

3. Network

T-Systems announced the new generation with an increase of the maximum network bandwidth capacity. As this performance is virtually throttled by hypervisors, Cloud Mercato tests if the maximum value is effectively reachable. The benchmark tool used is iPerf, it allows us to test the TCP throughput in upload and download modes.



Our tests reached the maximum possible performance and show that the theoretical values of +100% from C3 to C4 and +50% for S2 to S3 are effectively available for users.

IV. Test methodology

1. CPU

Geekbench 5 provides a command line tool with a simple usage:

```
geekbench5 --no-upload --export-json
```

This command will launch close to 60 micro-benchmarks and summarize results in JSON format. Geekbench outputs each performance with its score but we focus on the aggregation: Single and Multi-Score

2. RAM bandwidth

Sysbench is an opensource benchmark tool available on GitHub. The memory testing is launched by the following commands:

- `sysbench --threads=<cpu_number> --time=30 memory --memory-oper=read run`
- `sysbench --threads=<cpu_number> --time=30 memory --memory-oper=write run`

This C program stresses RAM by reading or writing small block of 1KB. The outputted values could not represent the maximum bandwidth but the capacity to CPU and RAM to communicate.

3. Network

Iperf 3 requires to be launched as client and as server, here's the command line used:

- `iperf3 --client <ip> --interval 30 --parallel <cpu_number> --time 30 --format M -json`
- `iperf3 --server --version4 --interval 30`

These commands will fill the bandwidth with the goal is to capture the maximum TCP throughput between 2 hosts.

V. About Cloud Mercato



Cloud Mercato is a neutral research and consulting firm dedicated to the study of the Cloud Market. Our goal is to bring transparency to the Cloud Market by the study and analysis of the different products and services.