New benchmarking studies reveal how users can get up to 60 per cent more performance from any existing infrastructure

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Bare metal cloud provider Bigstep debunks a number of infrastructure myths, such as more CPUs equal more performance and that OS choice has only minimal impact on performance

30 July 2014 – Bare metal cloud IaaS (http://bigstep.com/) Bigstep has announced the findings of new benchmarking studies that reveal how users can get up to 60 per cent more performance from any infrastructure.

The studies sought to assess areas of potential performance improvement in infrastructure and used the Linpack (http://www.top500.org/project/linpack/), SysBench (https://launchpad.net/sysbench) and TPC-DS (http://www.tpc.org/tpcds/) standard hardware benchmarking tools to do so. The findings can be applied to any infrastructure and Bigstep commercial director Ioana Hreninciuc believes many IT directors are not seeing the best performance from their infrastructure:

"We operate tens of thousands of servers and constantly test performance, so we know that an infrastructure is the heartbeat of any IT environment," she said. "Some findings from the benchmarking are hugely surprising – who would've thought that deactivating one of two CPUs would increase performance by up to 15 per cent? Many users are not seeing the performance they could and, with just a few tweaks, any server could perform by up to 60 per cent better, avoiding costly upgrades or migrations."

The benchmarking addressed four main areas:

1. Deactivating one of two CPUs can improve database performance by up to 15 per cent
In benchmarks performed on several databases, as well as in SysBench and TPC-DS tests, Bigstep found that single processor bare metal instances can generate better performance than dual processor machines, all other things being equal. This means that adding a second processor to a machine can actually lower a database's performance. According to Hreninciuc, this is caused by the two processors using each other's memory, which takes longer as opposed to each CPU accessing only its own: "A way to counteract this limitation of existing hardware infrastructure is to configure the OS to use only Local Memory Access for each processor."

2. OS choice can improve the performance of applications by up to 20 per cent
In its Linpack benchmarks, Bigstep found that CentOS 6.4 can yield up to 16-20 per cent better performance, when paired against Ubuntu 12 LTS. The tests were done using default options and kernel settings. "By checking the differences between kernel versions and settings and configuring the OS to match those of the better performing system, users can achieve a significant improvement in performance, without any upgrade to the underlying hardware," said Hreninciuc.

3. Improving memory frequency can increase performance by more than 20 per cent
Memory frequency is often overlooked as RAM is generally expected to be 'fast enough'. However, the impact memory can have on computing performance is underestimated. In Linpack benchmarks, Bigstep found

that replacing 1333 MHz DIMMs with 1866 MHz DIMMs from the same provider increased overall computing performance (total no. of GigaFLOPs) by 20 per cent.

Applications that are heavily impacted by memory access time, such as NoSQL databases, can be greatly affected by this metric. "If possible, memory frequency should always be checked – as two bare metal machines with otherwise identical specs, can register differences in performance of up to 40 per cent, solely based on this metric," advised Hreninciuc.

The physical placement of memory in slots can also greatly impact performance. With the wrong placement, memory chips will not make use of their maximum frequency and could even function at half their intended performance. Some vendors provide online configurators for optimum memory placement inside the bare metal server. Just by changing the distribution of memory across their machines, users could achieve a significant increase in frequency and performance.

4. Hyper-Threading can decrease performance for CPU intensive applications
Intel's Hyper-Threading technology is meant to accelerate CPU performance and in most cases it does that very well. However, in applications that are very CPU intensive, deactivating Hyper-Threading can yield 5-10 per cent better performance. In bare metal environments, deactivating Intel Virtualization Technology (Intel VT-x) can also yield an extra performance boost of up to 5 per cent.

"Additional performance is always valuable and applying these tips based on our benchmarking could help any IT director obtain up to 60 per cent more performance from their existing infrastructure," concluded Hreninciuc.

Bigstep's product manager Alex Bordei will be discussing the benchmarking in more detail during an exclusive O'Reilly (http://www.oreilly.com/) webcast]'Getting the Most Out of Your NoSQL DB - Best Practices for Optimizing Infrastructure Performance and Budget'|http://www.oreilly.com/pub/e/3143] on 7 August.

The webcast is hosted by O'Reilly's Chief Data Scientist and Director of Content Strategy for Data, Ben Lorica, and anyone interested in attending can register for free here (https://event.on24.com/eventRegistration/EventLobbyServlet?target=registration.jsp&eventid=816924&sessionid=1&key=EF4

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* Bigstep extensively benchmarked its Full Metal Cloud in Q2 2014 using a number of industry standard tools. The findings summarised here have been observed and confirmed over a number of benchmarks. Their aim is to serve as guidelines for infrastructure optimisation but end results depend on both the hardware and the software used.

About Bigstep

Bigstep is an Infrastructure as a Service (IaaS) provider founded by Lucas Roh, serial entrepreneur and founder of Hostway Corp. (www.hostway.com) and Affinity (www.affinity.com). Headquartered in London, with its infrastructure based in Reading, Bigstep combines full hardware

performance with the flexibility of the cloud to create the world's most powerful public computing infrastructure. In February this year Bigstep won the newcomer of the year award at UK Cloud Awards 2014.

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