

News & Analysis

CORNAMI's sea-of-cores solution may defuse data explosion

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A couple of years ago, I wrote about a company called SVIRAL that appeared to have cracked one of the toughest problems in computing today -- that of creating software programs that can effectively use multiple processing cores and threads without requiring programmers to have PhDs in computer science (see [Startup Cracks MultiCore, Thread Programming Problem](#)).

Of course, persuading anyone to do things differently to the way they currently do them is always a hard sell, which may go some way to explain why SVIRAL has undergone a metamorphosis and reappeared as high-performance computing company **CORNAMI**. In turn, CORNAMI recently announced that it closed Series B financing in the amount of \$3 million led by Impact Venture Capital.

The reason CORNAMI is of interest to us here is the ongoing data explosion, which includes messages, photos, videos, log files, sensor data, the IoT... the list goes on. We are now firmly in the era of "Big Data." It is estimated that 90% of the world's data was created in the past two years, and 90% of *this* data is of the unstructured variety, which demands compute-intensive processing and analytics.



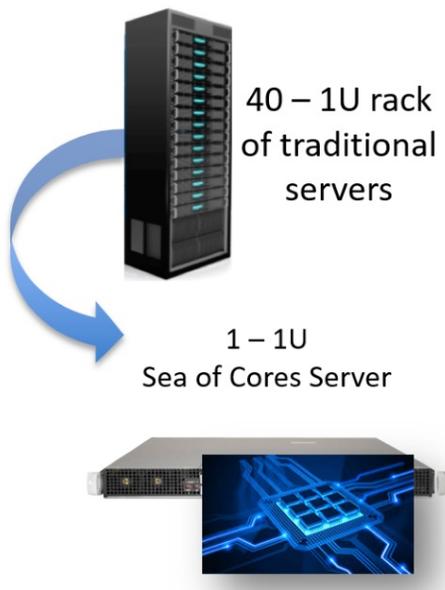
What is a zettabyte?
1,000,000,000,000 gigabytes
1,000,000,000,000 terabytes
1,000,000,000,000 petabytes
1,000,000,000,000 exabytes
1,000,000,000,000 zettabyte

(Source: CORNAMI)

There is a tremendous need to be able to process this data in real-time, but systems based on current CPU architectures are struggling to meet the demand. The problem is that application performance has not scaled with the deployment of multiple cores due to the overhead associated with managing the parallelism of data between the cores. As a result, processor cores are often idle (“dark”), overloaded, or wasting cycles in the OS, as opposed to performing actual work.

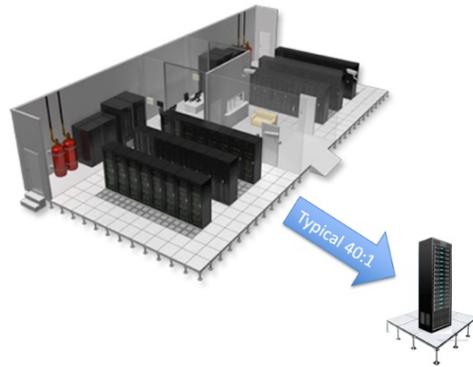
CORNAMI has a patented programming technology called TruStream, whose apps run on bare metal -- there's no software stack, no virtual machine, no operating system, no context switching, no task dispatching, and no caching. This may sound a bit scary at first, but CORNAMI also provides a software development kit (SDK) that allows apps to be programmed in C/C++.

Where things get really exciting is the fact that CORNAMI has embedded its TruStream technology in a massively scalable multicore chip. This allows a 1U sea-of-cores server to provide the equivalent processing capability of a 40 x 1U rack of traditional servers.



(Source: CORNAMI)

Using this technology means that data centers can be created for a fraction of the construction costs and run at a fraction of the ongoing power and maintenance costs, thereby resulting in millions of dollars in savings and a greener environment. The alternative of course, is to keep the same data center footprint and to dramatically boost its processing performance and capabilities.



(Source: CORNAMI)

Of course, it's easy to make exciting claims while gesticulating furiously, but "*The proof of the pudding is in the eating,*" as the old saying goes. Take a look at [this video](#), which is narrated by my old chum, CORNAMI founder and CTO, Paul Master.

[CORNAMI Benchmark for Mobile Ads](#)

Well, color me impressed. As you'll see, this video starts by showing the Yahoo Streaming Benchmark being run on a traditional 1U Intel Xeon-based server with 16 processor cores. This benchmark generates, and then serves, a database of 1 million adverts. This takes about two minutes to run on the traditional server. Next, the same benchmark is run on CORNAMI 1U sea-of-cores server boasting 1,000 processor cores. This new iteration runs so fast you might miss it if you aren't watching closely.

On a related note, I'd like to give a quick shout-out to the folks at [Equus Computer Systems](#), who recently developed a 60-drive server with a total storage capacity of more than half a petabyte in a 4U form factor. This equates to more than five petabytes per 42U rack, thereby enabling data centers to store more data in their valuable floor space.

The important thing here is that it's not the number of cores you have that's important -- it's what you do with them that counts. Paradoxically, throwing 1,000 Xeon cores at this problem could actually end up slowing things down due to all of the inter-core communication. This is where embedding CORNAMI's TruStream technology on their sea-of-cores chip comes into play.

In order to provide a more understandable comparison -- one even I can wrap my feeble brain around -- Paul ends by performing a simultaneous side-by-side

comparison with the results being presented in graphical form. The key metric here is the number of ads that can be served per second. In the case of the Xeon-based server, the answer is 7,753 ads per second; by comparison, CORNAMI's sea-of-cores system serves 2,668,368 ads per second, which equates to a 344X increase in speed/performance.

This could be a game-changer. CORNAMI's technology is obviously of interest to companies like Amazon and Google with their humongous data centers, but it also means that smaller entities can afford to deploy big data-capable systems. This is certainly a technology I shall be keeping an eye on in the months and years to come. What say you?