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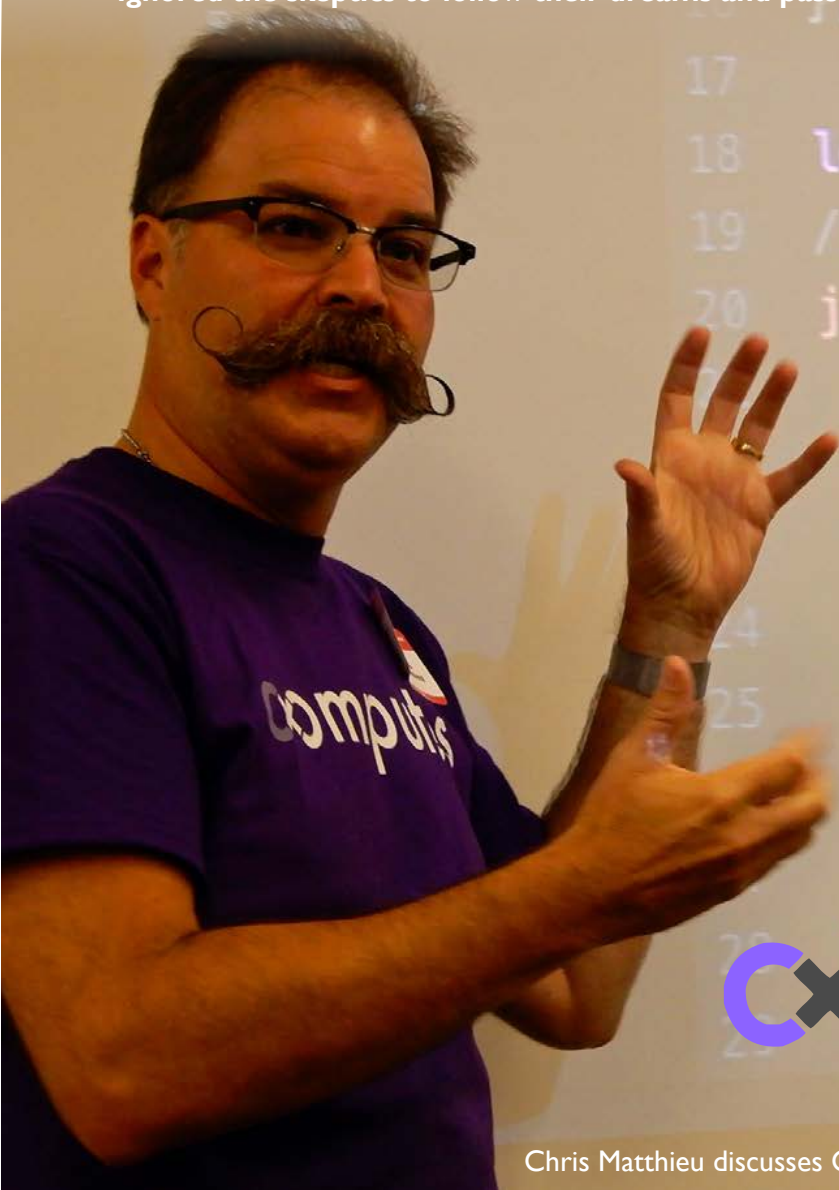
...inspiring positive change in the world

ARIZONA'S 21ST CENTURY PIONEERS ARE DISRUPTIVE ENTREPRENEURS

Tempe, Arizona's Computes is Poised to Bring Supercomputing to the Masses

DAVID AIELLO

During the early territorial years of Arizona, the development of rich gold mines along the lower Colorado River and the discovery of copper and silver bonanzas in Bisbee and Jerome and other districts, attracted both people and capital to Arizona. This was truly a disruptive lot—these pioneers went against the grain of conventional thinking; exposed themselves to unprecedented risks. They ignored the skeptics to follow their dreams and passions in an effort to strike it rich.



```

17
18 let received = 0
19 // Fired as cores return result
20 job.on("result", function(msg)
    const result = msg.response
    console.log(result, ++received)
    if (received >= TIMES) {
        console.log("DONE!")
        job.terminate()
        process.exit(0)
    }

```

computes

Today Arizona still attracts risk takers, but they are not miners, ranchers or railroaders. Instead they are imaginative high-tech entrepreneurs. And some like Chris Matthieu, President & CEO of Computes, inc., want to be disruptive but with a social conscious. While many of his peers are working to advance our ability to shop, travel or even find a parking spot in a busy city, Chris has higher goals such as fighting disease, improving the environment and addressing other social issues.

THE NEEDS OF CUSTOMERS AND SOCIETY DEMAND A CHANGE TO THE SCALE OF COMPUTING

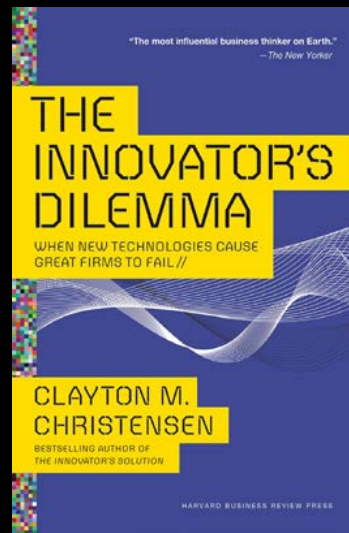
Today computationally intensive tasks such as developing algorithms for molecular modeling, quantum mechanics, or weather forecasting, have been reserved for supercomputers. With price tags starting around \$100 million for design and assembly, not to mention a \$6 to \$7 million dollar annual electric bill and maintenance, supercomputers generally reside within government facilities or large universities. But with more businesses requiring advanced computing capabilities to understand and solve increasingly complex problems, it is clear a change is necessary.

Matthieu and his disruptive team at Computes in Tempe, Arizona, believe they can solve this problem by creating a mass market for inexpensive supercomputers.

WHAT IS COMPUTES?

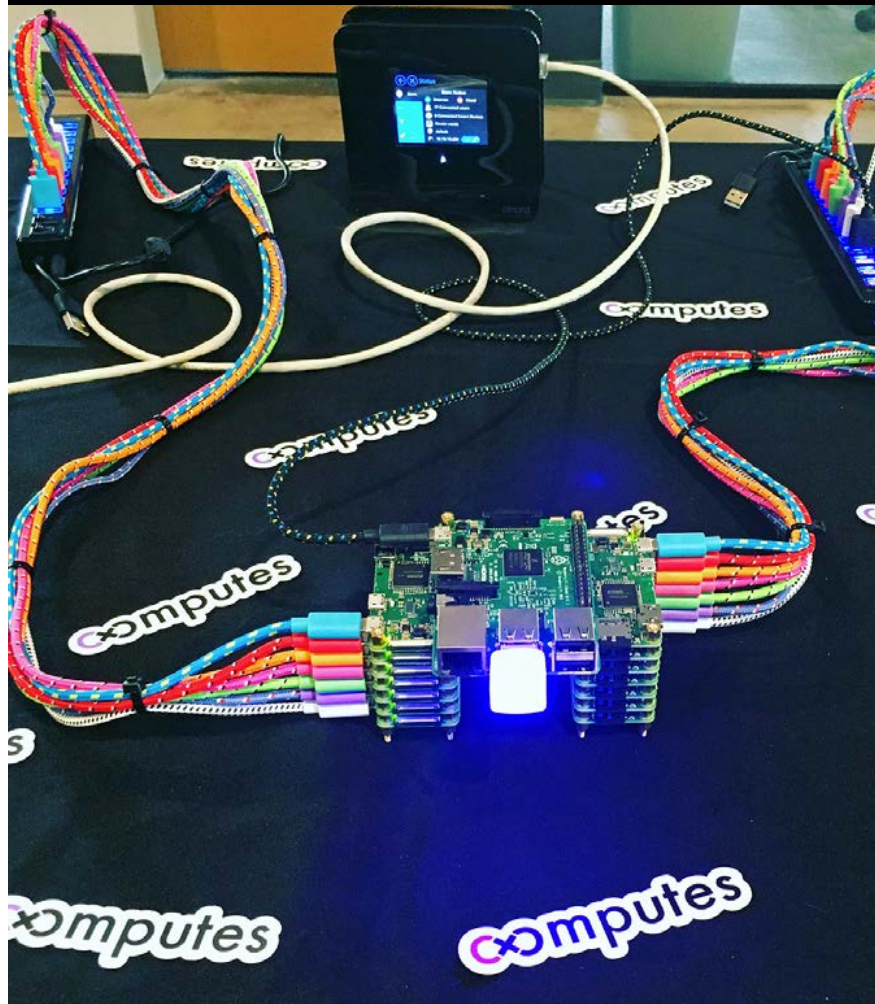
“My ‘ah-ha’ moment occurred when I started to think that there are hundreds of millions if not billions of PCs, servers, and mobile devices in the world. And no matter how hard I push my computer the CPU is still 80% idle,” explains Matthieu. Adding to this is an assessment by Gartner, a leading research and advisory company, that estimates there could be 50 billion devices connected to the Internet by 2020—all having processors that are idle a great deal of the time.

“I asked myself,” said Matthieu, “what if people and companies could donate or rent their idle CPUs for humanitarian-related causes such as curing cancer or fighting terrorism? What if companies could harness their idle computers and put them to work collectively as a private supercomputer without purchasing any additional hardware? What if we all could contribute to meaningful efforts like this by simply checking a box on our web browser?”



What is Disruptive?

In his book *The Innovator's Dilemma*, Clayton Christensen, of the Harvard Business School, defines disruptive technology as not only harnessing new technologies but also developing new business models and exploiting old technologies in new ways. For example, personal computers were disruptive innovations because they created a new mass market for computers.



Chris' solution is Computes, a software-defined, supercomputer. Matthieu explains, “It’s all software. There is no infrastructure. It does not need a server or database in a datacenter to run. It’s like a private mesh network that forms.” A mesh network allows all the devices or nodes connected to it to communicate and distribute data amongst each other. These devices could be personal computers, cell phones, or printers—anything that has a CPU, and if on the internet, an IP address.



Computes can dynamically distribute or move computations to or from any node where computing resources are available. This is a new kind of supercomputer limited only by the number of devices you connect. Further Matthieu adds, "It would not consume any extra electricity! It would be the greenest supercomputer in the world."

CORES FOR CURES

Computes is not a concept or a dream, it's operating now at the University of Wisconsin. "At a conference recently I talked to a group of professors from the University of Wisconsin who are conducting research on Parkinson's disease. Their issues, which is typical, was that they did not have funds or computing power to do the research they wanted." Matthieu beams, "With Computes, they were able to connect all the computers in their lab and their personal computers to create a mini-supercomputer. This provided them the computational power, with very little overhead, to conduct their research."

Indeed there seems to be a trend in the medical research regarding the need for computing power. "A

member of my team coined the phrase, 'Cores for Cures™'. Just think about a campaign around bio medical research using Computes for the greater good. We could attack cancer, Parkinson's, genomics all sorts of bio medical research. It's mind boggling."

THE SKY IS THE LIMIT

Matthieu is eager to note that the network you create doesn't have to consist of idle machines. He says, "You could certainly dedicate specific machines or server racks to be linked via Computes to enhance your computing capability. This could be an 'always on' mini supercomputer resource available to researchers or students."

He also notes, Computes could be used to link Internet of Things (IoT) devices. The IoT is any electronic device that has a processor that is connected to the internet. This could be anything from your electric toothbrush, refrigerator, to a jet engine or your car.

As an example, Matthieu explains that electric utilities are placing smart electric meters on your home. "Each smart meter has the computing power of a cell phone. They are on

24/7. And they are idle 99% of the time. They wake up every 15 minutes to check your electrical consumption, send that information wirelessly to the utility, then they turn off." If Computes was installed on all the smart meters in the greater Phoenix area, he calculates the nearly 1 million smart meters would create about 2 petaflops (you are on your own to look that up) of computing speed. "That would make this example the 61st largest supercomputer in the world. And that is just smart power meters. If you include the city's smart parking meters, it just scales up."

As Chris understands, disruption is part of high-tech life and a critical part of a businesses' success or failure. "If an electric utility, or any organization was to do this, they would have a supercomputer they could open to the public who could rent out processor cycles for research or business purposes." These new points of profit could compete very aggressively against not only institutional supercomputers but the likes of Google, Amazon and Microsoft who also rent out computer nodes. "Maybe the electric utility would use those profits to lower your electric bill!"

“Further,” Matthieu adds, “this could be a cloud disruptive technology as well. Companies might not need to use the cloud anymore if they have all this unused, or idle processing power within their company. They could reuse old machines or repurpose older machines instead of buying new ones and use Computes to build an economical supercomputer. They could probably then say ‘I have enough computing power, I do not have to go to the cloud or buy new computers.’”

EASY AND SAFE FOR EVERYONE TO HELP

What makes Computes really disruptive is how easy it is to join a Computes network. Let’s say Facebook wanted to help fight breast cancer. They could post a small promotion on their website inviting visitors to simply check a box to donate their idle CPU processing power to breast cancer research. That’s it! Checking this box would allow your device, when idle, to become part of the breast cancer research supercomputer. And with

Facebook quickly closing in on nearly 2 billion users, the size and potential processing power of this theoretical supercomputer is immense.

Matthieu stresses it’s a safe process for those who wish to opt in. “The work is performed using JavaScript which we chose for security purposes. JavaScript will create a work area or sandbox within your browser that it will run in. Only Computes JavaScript and data have access to the sandbox for the duration of the job and then the sandbox is destroyed at the end of the computation. This process cannot access your hard drive or memory. That way your web browser can surf any website and you are essentially safe.”

THERE IS A SUPERCOMPUTER ALL AROUND US

The scale of computing requirements today is necessitating a change. As Matthieu smiles at the tattoo of an infinity symbol he spies on the inside of my ring finger, he expresses,

“I’ve always been fascinated with the infinity symbol. When I started thinking about what is now Computes, I thought the opportunity was bigger than a supercomputer. It’s infinite computing.”

As more and more devices are built with microprocessors and are being connected to the internet, it’s now possible to harness the unused computer power of all these computerized devices. The whole world could become a supercomputer (think about that “[Hitchhiker’s Guide to the Galaxy](#)” fans!). What would that mean for mankind?

Matthieu is positive. “Using Computes to connect these devices would allow us to do grander things. It’s beyond the supercomputer. If used for the greater good, I honestly believe we could have a seriously positive impact on our future.”

more info:
www.computes.com

