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Profiling and Monitoring Tools for Software Developers

Alexander Gounares
CEO

About Concurix Corporation
Concurix is on a mission to build software that understands software. We apply leading edge visual and analytical tools and apply them to understanding how modern software works.

Our profiling and monitoring tools provide unprecedented insight into the inner workings of programs. Software developers can literally see exactly how their program is behaving in production, over time. This helps developers spot bottlenecks, find and resolve anomalies, and gives confidence that their code is behaving properly.

We invite you to join us in our journey to break through in this new world of computing. Along the way we will be releasing the results of our work to the open source community and as Concurix products.

Interview conducted by: Lynn Fosse, Senior Editor, CEOCFO Magazine

CEOCFO: *Mr. Gounares, what is the concept behind Concurix?*
Mr. Gounares: We provide a monitoring and profiling service for a technology called Node.js. In laymen's terms, we basically help developers build better and faster cloud services for websites, mobile devices and the Internet of things.

CEOCFO: *What is the standard way and what are you able to add to the mix?*
Mr. Gounares: The general concept of monitoring has been around for a while. Take something like Facebook or Google or any website that you might use on a regular basis. You want that website to be up and available for all of your customers. If you are the creator of that website, if you are the company that runs it, you want to know if there are any technical issues with that website that makes it go down for the customers. I am sure that everyone has tried to reach a website and it gives you a 404 error or it does not show up or it is very, very slow and so on. It is a frustrating experience for the customer. Existing technologies will tell you, the developer, that your website or your mobile app is having trouble. What they do not tell you is exactly why it is having trouble. A breakthrough that we have done at Concurix is that we will automatically instrument an entire application, even when that is millions of lines of code. We will monitor the entire application and profile the entire application in production, in the data center. This is something that previously was just impossible to do and we figured out how to do it.

CEOCFO: *Would you tell us what you have figured out so that people could understand?*
Mr. Gounares: We have applied what is known in the industry as big data analytics. In essence, we use a ton of very sophisticated mathematics to look for fundamental patterns in the code. We take those fundamental patterns and turn them into a condensed format and send that in turn to our servers and our cloud servers for further analysis. It is a very mathematical process.

CEOCFO: *Has that approach been tried previously?*
Mr. Gounares: The closest are technologies known as profilers and these have been around for a while. A profiler is a tool used by a developer to study the performance of code in a laboratory environment and through a very controlled setting. Therefore, although those concepts and those tools have been around for quite some time, this is the first time that we have been able to take that approach and apply it to a live production running system, so you can actually see what has happened with your website. You can even look historically. You can actually rewind time, go back to when your customers where having problems and see what was going in your application.

CEOCFO: ***Where are you in the process?***
Mr. Gounares: It is quite heavily in use. We have had over one hundred and ten million usages of the product. We just recently launched our version three, literally seven days ago now. Because version three is in early deployment, we are ramping that up as rapidly as we can.

CEOCFO: ***What is different about version three?***
Mr. Gounares: Version three, said very simply, is almost one thousand times faster than our previous generation. We took on a very, very hard mathematical problem to understand. We are looking at the inside of a computer as it is running. Maybe a non-technical analogy would be that we are taking Olympic athletes and watching what is going on with their hearts, what is going with their muscles, what is going on with their eyeballs and what is going on with their fingers. We can watch every part of the athletes as they are running around the track, which is kind of cool. Now we can do that a thousand times faster.

CEOCFO: ***Who is your typical customer?***
Mr. Gounares: Our customers are all developers and software engineers who are building out complex websites, mobile apps and the Internet of things.

CEOCFO: ***How could a developer resist?***
Mr. Gounares: That is our business plan! You got it!

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CEOCFO: ***How are you getting people to see what you have done, to try it and to use it?***
Mr. Gounares: We use a very traditional go to market approach. We present at many conferences. We have a pre-trial version that developers can download and use themselves just to see it in action and see whether or not it helps them. We want to make it very, very easy for people to get hold of this technology, use it and get some benefit.

CEOCFO: ***What is involved in using it in implementation?***
Mr. Gounares: About fifteen to thirty seconds of work, depending on how fast you type. Literally, all you have to do is add one command line in your computer and add one line of code to your program and we take care of the rest. It is fully automatic.

CEOCFO: ***When you are talking with a prospective customer do they believe? Is there an aha moment when they realize that it really can be done or is that strictly after they have tested it?***
Mr. Gounares: Both. Our number one bit of our customer feedback is one word; "Wow!" Then of course people want more and more features and so forth and we have people working hard to get those new features in. However, we really do cause eye opening moments when people use the product.

CEOCFO: ***What do people want to see that they are not able to today, when you say new features?***
Mr. Gounares: We are doing many more in depth analytics. As I said, we do a lot of mathematics and build statistical models of the application. Therefore, once you have gained insight into what is going on in your app, you very quickly want to be more predictive about it -- not just knowing if you have had an issue in the past, but are you going to have an issue in the future? That is a set of capabilities that we are working hard on that will be rolled out sometime in the future here. That predictive ability is derived from the same mathematics we use that essentially allows us to be able to do this at all. It is all about building these statistical models.

CEOCFO: ***In addition to mathematic expertise, what else went into creating this?? What was that aha moment that it can be done for yourselves?***
Mr. Gounares: This gets to the story of the company. We actually got into this in a very traditional, backwards startup fashion. Concurix as a company was founded about two and a half years ago. We started off with a thesis of building what we called a multi-core operating system. The short version is that we saw that the modern hardware that was being put in today's data centers was way more capable than what people were taking advantage of. Many big companies are doing

many things on the Internet, but there is literally hundreds of millions of dollars of wasted computing power and data centers. That is hundreds of millions of dollars per company at large companies. Therefore, it is a tremendous opportunity to create some value if you can figure out how to improve the efficiency of data center software. That is still the space that we are in. That's why there are so many folks that are excited by the product. Our initial technical thesis was too tackle this at a very fundamental level: the operating system. Therefore, we spent our first year building a new operating system. As a classically trained computer scientist, I will tell you that was a ton of fun! We were writing new memory managers, new schedulers and all of the kind of uber geeky things that computer scientists drool over. We built a very, very slick operating system that showed a 40x speed improvement in our in-lab benchmarks. Therefore, we were quite pleased with ourselves as an early stage startup might be. Then we took it to customers. Our beautiful laboratory experiment hit the real world and as it turns out, the real world is very messy. We found that our operating system, instead of getting a 40x speed improvement, in the real world was only getting a twenty five percent improvement. This is really a factor of one hundred and sixty difference, which needless to say, made us scratch our heads and say, "What in the heck is going on here?" Our early customers were phenomenal. I cannot thank them enough. They gave us access to their source code for their products. So, here we were, a tiny startup team, pouring over millions of lines of code trying to figure out why this thing was going slow or going slower than it should have been. Quite frankly, the existing technology of tools were not good enough, so we had to invent our profiling technology that enabled us to figure out what was happening in these very, very large and complex code bases. Fast-forward a little bit to a year ago when we shipped our operating system and our tools. We threw the tools into the mix because they were quite helpful for us. We were able to get our customers back up to that 40x speed improvement through using our tools. Within a month of shipping, we found that our tools had been used a million times and we had sold two copies of our operating systems. Being a scrappy startup, we looked at that customer data and said, "Hmmm… one million sales to two. I wonder what is more popular?" We have been focusing on furthering our tool set ever since. It started off as kind of a Gen 1 product, but these tools that we literally just did for ourselves that we threw into the OS as a courtesy to our customers, ended up being the real winner. We have now moved into our third generation of the technology as we have gotten better and better at solving this problem.

CEOCFO: ***How is business?***
Mr. Gounares: Great! We are quite happy with our customers. We are ecstatic about the growth. I have been in the business a long time and I have funded many projects and invested in many companies. Every project within a big company and every startup always puts the hockey stick in front of you and says, "Trust me, trust me, in a few years it is going to be great and we will get this hockey stick growth." Therefore, it is kind of cool to actually have that hockey stick growth with Concurix. We are very happy about that.

CEOCFO: ***What is the plan for the next year or so?***
Mr. Gounares: Profitability and growing the company. We think we have got a great technology in this space. We are going to expand out to new languages. Right now, we cover this technology called Node.js which, depending on how you count it, is either the second or third most popular technology for building internet services. We will expand out and take our mathematical approach and apply that to the other popular technologies used for building out Internet products, mobile apps and so forth.

CEOCFO: ***Other than the initial surprise of finding what you really have, what has over the last year or year and a half that you have shared you discovery?***
Mr. Gounares: Probably that the world is messier and more complex and crazier than you could ever possibly imagine. We have had over one hundred and ten million usages of our product. We have analyzed literally over one billion lines of source code. One of the reasons that we are on our generation three is that we have studied billions of lines of code and found that there is some brilliant code out there and then some really, really bad code. As I said, the world is just very messy and it is kind of surprising that anything works at all, but it does despite itself. Therefore, we really worked hard this past year at handling much messier code, much buggier code and things that just have much more fragility to them and we can still handle those scenarios.

CEOCFO: ***It sounds like you are thoroughly enjoying what you are doing.***
Mr. Gounares: Definitely!

CEOCFO: ***Why pay attention to Concurix today?***
Mr. Gounares: If you are running a cloud service for websites, mobile phones or Internet of things, we will help you build a faster, more reliable product.

BIO:
Alex Gounares is the founder and CEO of Concurix Corporation.

Prior to Concurix, Alex served as AOL's Chief Technology Officer. In this role, he led all aspects of AOL's technology strategy, platform development and external technology partnerships. He was responsible for all of AOL's global engineering, IT, and operations functions. In addition, he served as a member of the company's Global Executive Operating Committee.

Alex joined AOL from Microsoft, where he was Corporate Vice President and Chief Technology Officer for the company's Online Services Division. During his tenure at Microsoft, Gounares led significant strategic and technical operations for some of the company's most important projects including Microsoft's global advertising platform, Bing search, MSN and Microsoft Virtual Earth. Alex also served for three years as Technology Advisor to Microsoft Chairman and founder Bill Gates, as well as Corporate Vice President of Corporate Strategy in Microsoft's Finance Department.

Prior to joining Microsoft in 1993, Alex worked at Los Alamos National Laboratory. He has founded four startups and is also an inventor on more than 150 U.S. patents filed and pending. Alex holds a bachelor's degree cum laude in Computer Science from Princeton University.

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