NASA's Mining Pool Might Soon be a 'Constellation of Satellites'

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CoinTelegraph spoke with Gabi Dumitriu, the founder of Cryptospaceinitiative.org, an organization that aims to create the first "constellation of satellites" running a grid network in space that would orbit the Earth and help the International Space Station to process large volumes of data much faster.

By harnessing the processing power of a decentralized computer grid and the space environment that's "ideal for spinning disk drives," agencies like NASA can potentially process data more efficiently and less costly than traditional data processing centers, while rewarding and helping its users pursue a career in space exploration, create jobs and open up opportunities for scientists, researches and students.

CoinTelegraph: How did you come up with this idea? What problem does it solve?

Gabi Dumitriu: Ever since I can remember, I had a passion for discovering new things. I have always known that there is much more out there ready for me to be discovered.

It is not a secret anymore that the technology in today's world is shifting from closed to open — closed architecture to open architecture, with everything moving to the cloud; closed networks to open networks; closed systems to open systems.

And just like Disney used to say that "Ideas come from curiosity," I took the same path and started to follow my own curiosity.

So the idea behind the project started with shuttlecoin, an altcoin that could revive the space shuttle program. Reviving the NASA space program would offer jobs and give opportunities current and future potential astronauts allowing others to enter the program as well as provide new jobs and opportunities for students, scientists, researches, developers, technicians, and computer experts working for NASA.

CT: Do you have any competitors? What do you think about Bitnation's Spacechain initiative? How are they similar, different?

GD: The fact is that I see all the companies involved in similar projects not as competitors, but as colleagues, so I am pretty sure that in the near future we will see many new ideas transformed into reality by the actual "competitors" that will work together with a common goal. So, yes, there are companies that are trying to decentralize space exploration using the power and beauty of the blockchain.

As per Bitnation's Spacechain initiative, the idea is great, they are building a decentralized space program that for the future space missions could act as a backbone, so yes, thumbs up to them.

What I like about them is that they are using the technology in a way that a traditional space agency would not even bother or even see the opportunity.

I am planning several space programs as part of the Cryptospaceinitiative that are indeed similar such as: research programs on the effect of cosmic radiation on electronic components and creating communication networks/datacenters in LEO (Low Earth Orbit) that will survive in harsh environment of outer space.

The difference is that I am planning to offer access to the masses to be a part of the project. To be more precise, I want to involve students. The idea is pretty nice as there is a win-win: students interested in developing a career within NASA environment will produce (mine) the shuttlecoins, the power goes to ISS, and with the coins, students can partially or fully pay their studies (space programs, research, aeronautics etc.) or they can exchange the coins and fund their own space experiments: cubesats, LEO communications, etc.

This way, I believe that I could open a niche that would allow many students to implement their experiments much faster.

"Launching servers in space could potentially remedy the energy problem, since they could be powered by free, as in space there is so much solar radiation [...]."

CT: Can you talk about grid computing? Why it's needed by the ISS?

GD: The idea behind grid computing is to make multiple machines that may be in different physical locations, behave like they are one large virtual machine.

This will help ISS to process huge chunks of data (for free) much, much faster: image processing, simulations, 3D rendering, and so on.

CT: How does shuttlecoin solve the problem of needing huge server farms? What type of cryptocurrency is it (PoS/PoW etc.)? Where can we see its market cap?

GD: Launching servers in space could potentially remedy the energy problem, since they could be powered by free, as in space there is so much solar radiation that can be used, basically for free.

Also, if we gather all the CPU power and converge it to multiple mining pools as we currently do with Bitcoin mining pools, this power could be managed much, much easier than a server farm.

One advantage of grid computing is that it allows one to share computer resources across networks. This can both increase the computational power available to programs and reduce the number of machines needed by an organization. It allows for linking a large number of low-cost machines together, rather than spending a large amount of money on a single machine or super-computer with a larger processing capability.

It also allows for applications to be more easily scaled since additional machines can be added to the grid. Not to mention that the space environment is ideal for spinning disk drives. Zero-gravity allows the drives to spin with less resistance, and the extreme cold in space means the servers could process faster without overheating.

"The space environment is ideal for spinning disk drives."

The idea behind the shuttlecoin is a hybrid system between a POS coin, and a BOINC server. BOINC is a system for distributing the workload of scientific simulations. Users of BOINC have a client running that solves work units for the specific projects. A work unit consists of code and specific parameters for which the code is run. After the work unit is completed the BOINC client sends back the results to the BOINC servers, where the results are analyzed.

A CPID [Cross Project Identifier] is a number that links together the participation of a single user in all the different projects with a single common identifier, with a CPID we can see the research done by one user over all the various projects this user participates in.

So the shuttlecoin rewards the holders of the coin (with the POS principle) and the researchers at the same time. Because of this, there is an additional reward depending on the amount of research done (with the BOINC server). At this time, I am still testing those 2 systems and once done, the shuttlecoin would be listed on the major bitcoin trading platforms. The total coin supply would be 418 million shuttlecoins as the ISS is orbiting Earth at an approximate altitude of 418 km.

CT: Who will mine these coins specifically? What kind of rewards can they expect?

GD: At this time, there are multiple entities that are running grid computing networks. For example there is Berkley's BOINC project with 249,241 active volunteers and 782,224 computers with and 24-hour average of 7.200 PetaFLOPS of CPU power. Another game player is IBM's world community grid project with 701.055 active volunteers and 3,065,705 online devices.

Yes, so much CPU/ GPU power from volunteers. For free. It is pretty much self-explanatory how the shuttlecoin would act as an incentive and attract more people/students interested in space research niche to join the program.

"Having a grid computing network in space with a huge amount of free CPU power will surely improve computer modeling of fuel combustion."

CT: How do you plan to work with ISS (or NASA, other agencies etc.)? Are you in contact? Have any such organizations already expressed interest?

GD: There are at least 2 experiments currently running on the ISS that caught my attention:

The recently installed CALorimetric Electron Telescope (CALET) that searches for dark matter. It measures cosmic rays and observes sources of high-energy phenomena in the galaxy. CALET seeks answers for several unknowns, including the origin of cosmic rays, how cosmic rays accelerate and move across the galaxy, and the existence of dark matter and its relation to nearby cosmic ray sources

The second is the Flame Extinguishment Experiment-2 JAXA (FLEX-2J), a study of combustion in microgravity. Fire burns in differently in space, where fuel form spherical droplets and flames burn in a globular shape rather than teardrop. Having a grid computing network in space with a huge amount of free CPU power will surely improve computer modeling of fuel combustion. This will reduce the time of research from months to weeks or even days when we talk about reducing emissions and improving fuel efficiency in space.

In today's world, space exploration technology is so much more accessible so we now see Universities launching Helium balloons, conducting small space experiments, not to mention about the space exploration rights that have been reserved exclusively for governmental organizations with very limited access to citizens. Until now.

The Crypto Space Initiative is opening a door in space explorations where even a sophomore student could leave his idle computer to work for ISS and solve complex CPU tasks, and the best part is that they are earning virtual coins in the process. Coins that would be traded for real local currency.

Since this is only the beginning, only a few venture capitalists expressed their interest, but of course, the proof of work needs to be developed into a working system before it can be taken into consideration for investing.

"[G]rid computing represent an incentive that many space agencies, including NASA, would take into consideration as an alternative. Not to mention that [these resources are] basically for free."

CT: You write that "In the end we will have an encrypted, anonymous financial sector within the research niche." How do you envision organizations like NASA working with you if you plan to have an "anonymous financial sector"? Are you concerned about KYC/AML regulations? How do you approach regulatory compliance?

GD: The amazing web of satellites we now have orbiting the earth lets us understand and better manage everything from communications, weather, to floods, to crops and vegetation rates, to urban impact, and even pollution.

This means datacenters with tens of MW in electricity and billions of dollars/euros invested. As the need of raw processing power is dynamically increasing, the switch to off-site data processing and management capability through

grid computing represent an incentive that many space agencies, including NASA, would take into consideration as an alternative. Not to mention that this is basically for free.

As long as users will point their computer to a traditional BOINC server, and another separate system will convert the processing power into shuttlecoins, creating a separate financial sector, there is not that much concern about the anonymity, as the BOINC server monitors the user's IP address/ location.

So after the testing period, the cryptographic payment system will be adapted to comply with NASA's strict regulations.

CT: What else do you need to make this vision a reality?

GD: As starting such a bold project requires a significant amount of money, the next step after shuttlecoin is ready will be to launch the first seed investment round. I have a lot of big future plans for Crypto Space Initiative so funding is crucial.

I am planning to finish shuttlecoin development and testing by the end of 2015 and by the end of next spring (April-May 2016) to begin live testing here on earth with a BOINC server. The tests will be conducted on a real experiments in order to verify the system's integrity such as astrophysics, astrobiology (SETI@home), medical, environmental and other humanitarian research (World Community Grid), molecular simulations of proteins (GPUGrid.net), physics (LHC@home, CERN OpenLab) etc.

Then, by the end of November 2016 the plan is to move the prototypes to TRL6 in order to begin integration with a spacecraft system (*More information about TRL levels can be found here.)*

This is just the beginning and there are some awesome problems to solve, which to me this presents an opportunity: to be able to do something that I love, that I am passionate about, and that I really deeply know can have dramatic impact in people lives.

Thus, I am looking for amazing people in physics, aerospace, aerodynamics, finance, Bitcoin coding, visualization, web programming to really help me, help us, solve this puzzle together.

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