

You know, I'm Something of a Decentralized Pool Myself

By: The 256 Foundation

A monthly newsletter

June 2025

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Introduction:

Welcome to the sixth newsletter produced by The 256 Foundation and supported by [Proto](#)! May was an eventful month for the Bitcoin mining industry with events ranging from the second 256 Foundation Telehash to the 2025 Bitcoin Conference in Las Vegas. There are several interesting things developing so dive in and catch up on the latest news, mining industry developments, progress updates on grant projects, Actionable Advice with [OGBTC](#), and the current state of the Bitcoin network.

All the industry seems to be abuzz with the word “decentralization”. But you know this is a market top when the companies who have been building an empire on centralized services show up to the decentralization party and try to fit in. This is where words start to lose their meaning. Centralized pools will never decentralize Bitcoin mining full stop.



[IMG-001] Spiderman Meme

Definitions:

FinCEN = Financial Crimes Enforcement Network

UTXO = Unspent Transaction Output

Th/s = Terahash per second

Ph/s = Petahash per second

T = Trillion

ASIC = Application Specific Integrated Circuit

GUI = Graphical User Interface

FPPS = Full Pay Per Share

News:

May 5, big news broke in the Samurai Wallet case, the single most important issue looming over the future of Bitcoin and freedom tech development. In a [Letter](#) submitted to the court, defense counsel revealed that federal

prosecutors had been suppressing exculpatory evidence for nearly year. Apparently, federal prosecutors approached the agency responsible for Money Services Businesses licensing requirements, FinCEN, and asked them for their opinion on whether or not Samurai Wallet would qualify as a Money Transmitter and be required to obtain a Money Transmitter's License AND FINCEN EXPLICITLY REPLIED “NO”. There are multiple implications of this but to boil it down, this means there were no grounds for bringing the charges against Samurai Wallet in the first place and secondly that federal prosecutors were aware of evidence that pointed to their innocence and decided not to disclose it for almost a year.

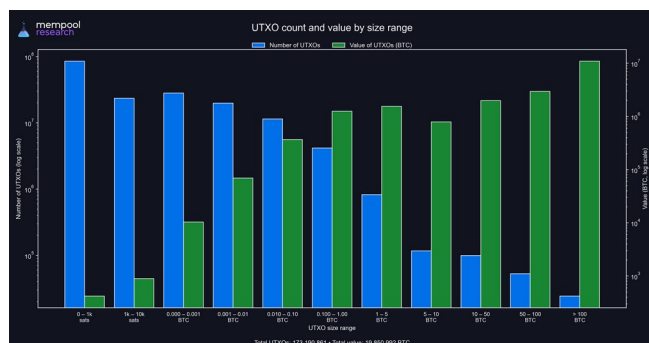
May 9, but alas, the rogue federal prosecutors hell-bent on destroying any semblance of freedom-preserving technology [responded](#) to the defense counsel's letter by minimizing their deceit stating that: “There is no basis for a hearing, nor is there anything to remedy...”. An unfortunate outcome considering this would have been the perfect opportunity for federal prosecutors to submit to the direct orders given by the US Department of Justice, Deputy Attorney General Todd Blanche, in the [April 7 memo](#) titled “Ending Regulation By Prosecution”.

May 14, Judge Berman, after reading both sides of the issue, decides to suggest that defense counsel raise this issue in the pretrial motion. Signaling that Judge Berman finds little to no issue with the prosecution's behavior.

May 29, defense counsel submits a number of motions, including [bringing up the prosecution's failure to disclose exculpatory evidence](#) again. Additional motions included things like bringing on an [additional attorney from Washing DC](#), a [motion](#) for the defendants to have separate trials, and not least of all a compelling [motion to dismiss](#) the case. All signs point to this case going full steam ahead and your support is needed now more than ever, donate to their defense fund through [p2prights.org](#).

May 19, backing up just a bit to capture other news, [OrangeSurf](#) published a UTXO Report, available [here](#), which follows on the heels of the raging OP_RETURN debate that has engulfed the hearts and minds of Bitcoiners far and wide the last couple months. One of the concerns from the pro-filter camp is that the UTXO set will get bloated to the point that running a Bitcoin node on

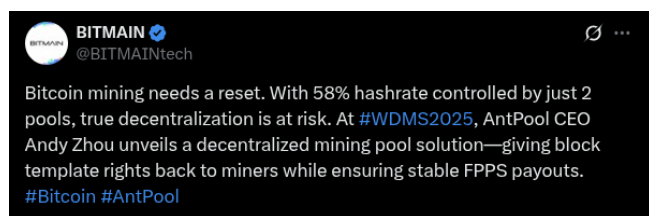
consumer hardware won't be possible any longer. OrangeSurf reports that there are ~173 million UTXOs, half of them are less than 1,000 sats, and most of those are use Taproot. There are several charts and interesting facts in this report, take a look for yourself to see what really goes into the UTXO set.



[IMG-002] UTXO count vs. value bar chart

May 26, [BitcoinVeterans](#) holds a Telehash fundraiser seeking donated hashrate to increase their chance of finding a block to support their many great causes. This is an example of the Telehash idea spreading and enabling people to find new creative ways to incorporate Bitcoin into fundraisers.

May 27, centralized mining company, Bitmain, swoops in to decentralize Bitcoin mining! Leave it to Antpool, Bitmain's mining pool, to jump on the "decentralization" corporate buzz word craze sweeping through the industry lately. At the "World Digital Mining Summit 2025", which looks like it was a cringe Bitmain controlled side event in Las Vegas riding on the coat tails of the Bitcoin2025 conference, the CEO of Antpool apparently [took the stage](#) to unveil their new solution to save the Bitcoin network.



[IMG-003] Bitmain's ridiculous tweet

Following up the groundbreaking announcement with this tweet where Bitmain warns that 58% of hashrate is controlled by just two pools! Failing to mention that Antpool combined with their proxies accounts for roughly 40% of the overall network hashrate. The irony is palpable that Bitmain is saying Bitcoin mining needs a reset and Antpool will decentralize mining by giving miners the ability to make their own mining templates, while still maintaining FPPS payouts.

Let's peel back the layers here and unpack this. FPPS gives miners steady rewards. Block finds on the other hand are

variable. So how do pools pay miners a steady amount of Bitcoin when the rewards filling those coffers are not steady, you may ask. Great question! First of all, it takes a metric shit tonne of bitcoin on their balance sheet to offset the periods of time where the pool is experiencing bad luck and not finding any blocks. Read OrangeSurf's [Pool Survival Analysis](#) for full details on the kinds of reserves needed to operate an FPPS pool.

What can pool operators do if they can't afford the reserves needed? They ask Antpool to bankroll them in agreement to operate as a proxy pool. This is how Antpool absorbed Poolin, Braiins, Ultimus Pool, Binance Pool, SecPool, SigmaPool, Rawpool, Luxor, CloverPool (formerly BTC.com), and Mining Squared.

So what's the big deal, you might be wondering, it sounds like miners get steady payouts and the pool operators have the cushion they need, where is the downside? Well there are a couple big problems driven by FPPS: One is [custody](#) and the other is [templates](#), both lead to increased risk of censorship. The custodian can influence pool operators to behave in certain ways and the pool operator can dictate which transactions are in the templates that miners are hashing on. Another potential issue is increased risk of 51% attacks.

If Antpool is going to continue with the FPPS model then that means, like OCEAN, they will have control over coordinating the payouts but the rest of the transactions in the template can be chosen by the miner. Which brings us to the next layer here and the elephant in the room: is Bitcoin mining really getting decentralized by having miners build templates with a centralized pool?

Enabling miners to build their own templates is a great step in the right direction, don't get me wrong. However, when there is still a centralized pool coordinating the payouts and counting the shares then the impact on centralization really doesn't amount to much.

The idea is that a decentralized mining ecosystem would be more censorship resistant and vise versa as that ecosystem becomes more centralized, the more likely censorship attempts are to succeed. The issue is that while miners building their own templates is a good start, the pool operator can choose to or be coerced to enforce limits on which transactions are included in blocks. Such enforcement measures by the pool operator might look like excluding shares from certain users who have submitted work on a non-conforming template or excluding that user's payout address.

While DATUM and SV2 are good steps toward decentralization, the marketing from companies like OCEAN and their employees/investors has exaggerated the impact of the solutions they have implemented. Suffice it to

say that the Antpool announcement should be met with skepticism and centralized pools will never decentralize Bitcoin mining.

Free & Open Mining Industry Developments:

May 5, on Cinco De Mayo 256 Foundation held Telehash #2, the second hashrate-fueled fundraising event. Expectations were high as 256 Foundation descended upon Austin, TX at the former Bitcoin Commons (now the South Nashville Bitcoin Park campus). All of the grant recipients were there to represent their projects and talk about the whole free and open mining stack that 256 Foundation is building. The Telehash ran for 8-hours and a portion of that time featured a panel on the Ember One hashboard with [Skot](#), a panel on the Libre Board with [Schnitzel](#), a panel on Hydra Pool with [Jungly](#), and a panel on Mujina Firmware with [Ryan](#). There were other guests and topics as well throughout the evening. Shout out to [The Space Denver](#) for bringing dinner!

[Public Pool](#) also joined the effort by running a parallel instance that was mining to the same payout address with roughly 120 Ph/s. In total, at the peaks there were roughly 2,500 workers contributing roughly 245 Ph/s. The best difficulty was 43.5T, achieved by none other than [Mega Watt](#), the same miner who found the golden nonce during Telehash #1.

However, despite all the effort and generous hashrate donations from supporters, unlike Telehash #1, no block was found by any of the miners and 256 Foundation did not raise any money during this fundraiser. The real reward was the frens we made along the way. The Telehash was live-streamed and that feed can be found [here](#).

Grant Project Updates:

The next two days after Telehash #2 there was the TEMS event bringing together industry participants of all shapes and sizes with representatives from mining pools, mining companies, the energy sector, and more. There were several panels covering a wide range of Bitcoin mining related topics. One of the panels featured most of the 256 Foundation grant recipients to discuss a high-level overview of all the projects. That panel was recorded and can be found [here](#).

OpenSats included the 256 Foundation in their eleventh wave of Bitcoin grants, which were [announced](#) on May 14. Even though 256 Foundation didn't find a block at Telehash #2, OpenSats came through in a big way with a grant and generously supports our mission to dismantle the proprietary mining empire. OpenSats is a 501(c)(3) public charity which helps provide sustainable funding for free and open-source contributors working on freedom tech and projects that help bitcoin flourish. Some of the many projects OpenSats has supported in that past include: [GrapheneOS](#), [The Tor Project](#), [Sparrow Wallet](#), [SeedSigner](#),

[Stratum v2](#), and [more](#). If you would like to support OpenSats, please do so [here](#).

Additionally, [HRF](#) has continued their support of 256 Foundation with another grant for 2025, helping provide a generous portion of the funding needed to keep extending work on Ember One and more. HRF is a non-partisan, non-profit organization that promotes and protects human rights globally, with a focus on closed societies. HRF supports a wide range of programs such as the [CCP Disruption Initiative](#), [Combating Kleptocracy](#), and [Impact Litigation](#) to name a few. Within the [Financial Freedom](#) program at HRF is where you will find grants and financial support for software developers, entrepreneurs, and community builders tackling the most pressing issues facing activists, especially around financial surveillance, suppression, and control. This is where 256 Foundation fits in, because dismantling the proprietary mining empire unlocks innovations in Bitcoin mining that enable anyone to gain access to these emerging technologies. In addition to grants, there are a number of other initiatives within the Financial Freedom program like the Financial Freedom Report, the Finney Freedom Prize, and CBDC Tracker. Additionally, there are in-person events hosted throughout the year such as the Global Bitcoin Summit. You can support HRF and their many programs and initiatives [here](#).

Ember One

There is not a whole lot to update on the Ember One project. The first release was published at the end of April, at the conclusion of the first grant cycle, and can be found [here](#). There are a couple of modifications that are going to be made for v4 such as adding a reverse polarity protection circuit and another precautionary circuit that will help protect USB connected devices in the event of a spike in voltage. Once v4 is ready and released, there will be a small batch of Ember Ones produced specifically for testers and developers; more news on this to be announced. Otherwise, Ember One development with the Intel BZM2 chip will resume this fall, the exact timing is still to be determined.

Libre Board

Schnitzel wrote a great thread on the Libre board which can be found [here](#). In it, he explains the reasoning behind building an open-source control board, why 256 Foundation decided not to use the recently open-sourced [Brains Control Board](#), and some of the applications that the Libre Board will unlock. Currently, considerations are being made for exactly which connectors will be included on the Libre Board, how many of each, and what their placement should be. So far, the list of connectors/buttons that will be included on the first Libre Board include:

- Power Button
- Boot mode button
- SD card slot
- LED indicator

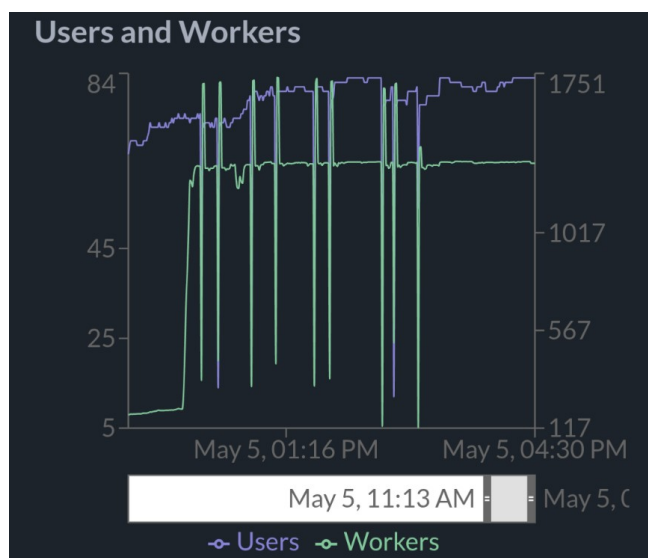
- MIPI
- HDMI
- Ethernet
- USB-C port x1
- 4-pin JST SH connector
- 12-24v power input
- USB-C data-only ports x 4
- Fan connectors for hashboards x4
- Raspberry Pi HAT
- Two 100-pin Compute Module connectors
- Battery
- Control board fan
- NVME SSD connector

Mujina Firmware

Development on Mujina continues to progress, the ability for the firmware to deliver a work payload to the ASICs and get a response is working now; nearly completing one of four primary interfaces that the firmware must handle: delivering work to the ASICs and handling the responses being one, the API interface for things like a GUI being two, retrieving work from the pool and passing back shares being three, and reading on-board systems like temperature sensors being the fourth.

Hydra Pool

The first iteration of Hydra Pool was used for the Cinco De Mayo Telehash, a fork of CK Pool on the back end that used a modified version of the CK Stats interface for the front end. There were some lessons learned through this exercise and some issues with the back end resulted in the server being restarted approximately nine times during the first few hours of the Telehash before a correcting change was made and that particular issue was resolved.



[IMG-004] Hydra Pool Server Performance at Telehash #2

As development continued after the Telehash, the decision was made to not use CK Pool as the code base for Hydra Pool. Both DATUM and Stratum v2 were examined as

potential code bases to start with for the Stratum server however, after review the decision was made instead for Hydra Pool to now be a simple Stratum server built from the ground up in Rust. Going forward, this will be the foundation used to build the rest of Hydra Pool on top of. Most of this foundational stratum server is currently working and passing internal tests. Testing will be opened to the public soon and announcements along with instructions will be provided at that time.

Actionable Advice:

During TEMS, there was a panel titled: “Beating The Texas Heat” featuring mining pro Marshall Long, moderated by econoalchemist. The following is a transcript of that panel which is full of insight from Marshall gained over years of experience. If you prefer to watch the video of this panel, it can be found [here](#).

eco: Marshall, I heard it gets hot in Texas...

Marshall ~ you know, we've got two seasons in Texas. We have first summer and we have second summer, so.

eco: All right. What are the most promising cooling technologies currently being deployed to handle Texas's extreme heat in mining operations?

Marshall: You know, a lot of people still run air mines here. The challenge is not only heat, but also, you know, the upkeep, the maintenance. You know, the guys at Riot do a great job but you know it's a tall order. You know, their new site is... There's a lot of immersion there and it's not necessarily just for cooling efficiency, but it also keeps the machines much cooler and cleaner.

So, you know, longevity of your machines is a big part because in some places in Texas, it's so humid that even if it gets dusty, you can get shorts. So like mining in Houston, pain in the neck just because it is so humid. So there's the heat, there's the humidity, there's dust. You know, a lot of these places are on job sites, construction sites. All that stuff is, you know, reason to seek alternative measures and then when people ask me well, do you want two-phase cooling? Do you want a regular single phase cooling? Do you want hydro? What's the kind of like, what's the take and I ask people: Where do you want your pain and when do you want it? You know, if you want to do hydro your pain is gonna be upfront because it's expensive and the setup is not trivial. It's a little bit different than normal setups. It's gonna cost you a lot but, you know, you're gonna eat it all up front.

Immersion, single phase immersion is a little bit of a longer process. It's less expensive. There's other reasons why you might wanna do it. You can use off the shelf air miners that you retrofit. You know, it's only been very recent that OEMs have been making immersion specific machines. ~ And

then, know, air you can, it's easy to start, but to keep it going, you're gonna get your pain on the back end forever.

So you just got to pick your poison and where you want to deal with it. Have you taken any operations that were like air and then decided to upgrade them to like hydro or immersion or? Yeah, sure. So that's a bit of an easier task. Doing it the other way, much bigger pain in the neck. You got to take apart the machines and do all these kinds of stuff. I mean, if you want to hear, you know, terror and war stories, I mean, you know.

Mr. Schatz and I could sit around a ~ fireplace for many hours and cry many tears about how that works. So it's better you make your choice the right first time and then you never have to make it again. And then just stick with it.

eco: How do air-cooled and liquid-cooled or hydro-cooled, for that matter, systems - how do they compare in performance, cost, long-term reliability ~ specific to the Texas climate?

Marshall: Yeah, sure. So the hydro is just kind of like a newer thing. So it's a bit harder to say long term how that shakes out. It's gotten better. You know, the difficulties there are, you know, if you have to take those machines out, you know, those can be 80 pounds a piece. So it's really hard on the ops guys, ops guys and gals to do that stuff. I mean, it's it's backbreaking to the stores, especially if they go out or they have power supply problems, you know, water and electronics doesn't really mix that well. So there's other additional safety concerns there.

However, you get a benefit if you want to use the heat for other things. like where this beer is made, we have a hydro set up and off the manifold, we preheat the water using the hydro set up. And so, you know, it makes heat reuse much easier. ~ It's just they're heavier, they're more expensive, but they use more power. So they're three phase. So, you know, how your power is set up is a consideration. If you only have single phase power, probably not the right fit.

You know, the, the immersion has a benefit of being able to use immersion specific things or being able to convert air miners to immersion miners as well. So there's that, those are kind of the main considerations there.

eco: Do you find yourself running like a mix of different cooling techniques in one operation, or is it just like across the board, all the, all this whole, this whole setup here is going to be all air, this one's going to be all hydro, etc?

Yeah, you know, usually unless it's like a long lived site, you know, like the Riot site's a great example, you know, that's been a very long standing massive operation and they've iterated with the times and you can kind of see that iteration as they go on, you know, their building design

changed and their infrastructure setup changed a little bit as they got smarter. But if you're just like new getting into it, most setups are going to be just one and done unless, you know, you're a big guy who's got a huge long power contract.

~ You know if you're not trying to go super mega industrial scale and you're having to change as the years go, you know, you're probably just going to have one set up. You're going to make a choice and you're going to stick with it and then what role does facility design play in maximizing cooling efficiency and overall energy sustainability? Yeah, the design is important. It's the most important for, I'll give you a good example, so when you do a immersion right and Cameron will tell you this and all the guys at Shell will tell you this: The fluid you choose, that's a really big consideration. There's a lot of vendors, right? You got Exxon, you got engineered fluids, and they all sell what they claim is different. But as time goes on, you can tell those products are mostly the same or widely different. You can see fluid changing colors, and then it becomes more acidic and maybe eats all your machines, right? So doing work on the chemistry side for immersion is like, huge.

It's less about the price today as it is the price over five years because the fluid is not free. As much as Cameron would like to sell it for free, well, maybe he wouldn't like to sell it for free, but ~ that fluid's expensive.

eco: Yeah, and does it come with guarantees? Like, we guarantee you can run this fluid for 2,000 hours before it needs to be changed. I mean, every vendor's different, right? So what each vendor will say...

Marshall: Most of them will say that their stuff has been signed off by the manufacturer, know, that maybe it doesn't void your warranty, stuff like that. They've done work with the manufacturers, but the chemistry is different and unique between all of them. And so, you know, when we first got into immersion in like 2018, we just use mineral oil. And over time, that stuff breaks down. And I had a host of S9s just get fried because we became conductive. I didn't know that could happen. So like microfluidics engineering is like a whole field.

And you really got to do your diligence before you just buy the cheapest or what they claim is the best. There's a whole bunch of considerations around what pump do I use? Does it change viscosity when it changes temperatures? Like there's a bunch of stuff and every vendor's got different aspects. So another example is, if you got a certain type of fluid, maybe your fire suppression system has to change to meet code, right? Is the flash point of this fluid so high that maybe you don't need fire suppression in your building? There's a lot of give and takes there.

eco: Wow, yeah, so that goes into the design of the facility too. Do they like do them? Are the manufacturers like suggesting or dictating like you've got to use this pump if you're running this fluid or like, you know, we can't get results if you're running this other type of pump.

Marshall: No, not generally. They're not going to really make a recommendation on like infrastructure. They'll tell you what they've used before and maybe try to like guide you. They'll be as helpful as possible. But, you know, most pumps for more or less are just as a reliability thing, you you buy a cheap pump, it's probably going to crap out earlier than a nice pump. They'll give you more guidance around like flow rates and you know, they can, you know, at least show anyway, they've been very helpful. They'll do like a fluid simulation of your design for you and say like, maybe you can optimize here. Maybe this drop of this pipe could be different. It's at scale when you're buying a lot that's more collaborative than just buying stuff off the shelf. So ~ I'll say they'll help you as much as they can, but they're not going to vouch for other companies' equipment.

eco: Can they help you in supporting ways, like doing oil analysis after the fluid's been in use and kind of give you an idea of the metals that are starting to show up and break down?

Marshall: Yeah, so that's a big thing that a good fluid vendor should offer you, where maybe you have a chemist that can do small-scale testing, like voltage breakdown to see at what point does the voltage, does the fluid conduct the electricity or acidity levels. But if you have a good vendor, they should say, like once a quarter or once a month, send us a couple gallons as a sample. And they'll do like full crazy testing. Like Shell's got an FTIR machine, which is like a multi-million dollar machine that can tell you this is how much dissolved silicon from a thermal paste is in there. And this is XYZ, here's your fluid is aged XYZ. They'll give you the whole breakdown. So any good vendor should have a testing facility to do that for you.

eco: And then how many miners are balancing the trade-offs between, or sorry, how are miners balancing the trade-offs between upfront investment and operational savings when selecting cooling infrastructure?

Marshall: Yeah, and I think that's a question that's gonna change based on two things. The public guys are gonna play a different game than the non-public guys. Public guys have a bunch of different considerations. Right now, I ~ would say the majority of public miners is let's grow at all costs. Some of them have chosen different treasury management strategies and that kind of stuff and all those kind of, I would say, take a front row to these kinds of design choices. ~ I think the industry for hydro, and Tyler and I were just talking about this, is evolving rapidly.

Micro BT is putting out stuff that's like single phase power for exclusively for heat reuse. The Auradine guys just got into hydro recently as well. there's a bifurcation between strategies because they're playing different games. So the arbitration between what they're going to do really comes down to scale and how you can do certain things. Because what I do with my little 10 megawatt shack might be OK in downtown Houston.

But if I do those same kind of things inside the city limits somewhere else, fire marshal's going to get involved, like you can't do things the same way. And there's a bunch of trade-offs. Fire suppression being another example, a guy will come in, well, because this fluid XYZ, he's gonna look at like a safety data sheet and he wants to see when does this fluid become flammable and all these other considerations that mid-tier and small-tier guys don't even have to think about. I imagine there's like... the peripherals can just kind of spiral out of control. All it takes is the fire marshal to just say, we're going to revoke your certificate of occupancy. Guess what? You can't work there. Then it becomes illegal, because one guy had a bad day. So there's a lot of considerations. And you've got to be able to point to the fire code, like, no, that's not the case. And that's where having a good vendor for ~ even hydro, because they'll put additives in the water to reduce scaling and fluid.

And also like the infrastructure providers, you you've got to work with them so you know the laws. And so, you know, one guy having a bad day can't shut down a billion dollar operation.

eco: Right. Do you find that like ASIC manufacturers are making suggestions about like what like hydro to run through their miners, like what immersion their miners can go into or like are miner manufacturers and immersion fluid manufacturers working together or do you have to kind of play that role of liaison?

Marshall: Yeah, that's a good question. I can say that there have been OEMs that have worked directly with the fluid providers. If you want details and specifics on that, can definitely ask Cameron. I don't know what's public and what's not. I can say that when they come up with a new fluid, most vendors will reach out to OEMs and say hey, can you like put this on an approved list saying that hey, we've tested this we've tried this? There is some behind-the-scenes like co-development. I would say for, you know, use case specific applications. I know Engineered Fluids does as a little bit, too. So it's not just here's a fluid because what works for Bitcoin miners is not necessarily what works for you know guys running GPUs. You know they want different volumes and different viscosities.

So it's not like a one size fits all thing. So there's a lot of collaboration, I'd say for sure.

eco: All right. What innovations on the horizon could redefine how we approach thermal management in large scale mining under high heat conditions?

Marshall: Yeah, that's you know, what's really interesting is everybody's like AI, HPC, blah, blah. If you go to any HPC conference, these people think that cooling 1000 watts is like cutting edge insane, like nobody can do it.

So I went to Open Compute like a year ago, actually with Cameron, and I walked in and the guys at, I think it was Intel, they had this little mini immersion set up and they had the processor clocked to like 900 watts and everybody there was like, my God, this is so revolutionary. And I'm just like, this is like five years ago. So the fact that Bitcoin has like just blown HPC out of the water from like what we can cool.

When we were talking to vendors, they're like, what flow rates are you pushing? And it's several orders of magnitude beyond what any HPC data center is doing. And it's interesting when you sit down with these people and say, oh, we're moving 1,700 liters a minute. Their face melts off. And you're like, we'd like to be faster, maybe, or whatever. They just never thought that cooling in one small footprint, 5,000 watts, is even thinkable.

So the fact that the AI guys are starting to learn from the Bitcoin guys makes us feel like we're not little boys anymore. We're big guys who are starting to pay attention a little bit. So that's been really cool to see. As far as what's changing, I think the biggest change is the OEMs. MicroBT ~ was the first to come out with an immersion-specific SKU. ~ Riot famously purchased a lot of those. ~ Those are interesting to see. Because before, you got to take the fans off and have special firmware and really do all this bespoke stuff which just takes times away. Bitmain started shipping SKUs without fans. Auradine's got SKUs without fans. So seeing the OEMs kind of tailored to us now instead of us trying to like square peg round hole situation has been good to see. You go into any, if you're a big boy, you buy \$100 million of Microsoft contracts, they're gonna have a guy there to help you make your stuff work for you.

And that's just now becoming the case for Bitcoin. And it's good to see. Because before, everybody's just like, you can't figure it out. You can't hack our firmware or whatever. That's your problem. No, you can't have SSH access to the boards. And it was like pulling teeth up until like three years ago, maybe. But now they're starting to come along and see like, look, we now have the money to hire serious professionals, serious electrical engineers. If you're not going to build it, we'll build it ourselves. So you can either come along or not.

And now to see the OEMs kind of play ball a little bit has been really encouraging. So yeah, I imagine like they're

looking at this like if they don't do it, their competitors are going to do it. Not even that; if they don't do it, we will do it. So like early on, I know, maybe 2020 micro BT wouldn't give you SSH access unless you really begged and pleaded. But the tool that they had, had a sequel injection vulnerability, so we would just give ourselves root access through the Whatsminer tool.

And you know, you can just see through the Whatsminer tool by updating your pool. Okay, cool. And then for like two years, it was cat and mouse. They would patch that. We'd find another one where if you shove an SD card during post, it'll dump the firmware. And now you got the firmware and you can do all these things. This whole adversarial kind of, when I'm spending hundreds of millions of dollars with you, no other vendor would have done that in the professional world, right? And so now it's starting to kind of come back to where it should be, which has been very useful for just running a good operation.

eco: Have you been confronted with like environmental concerns like, you know, cooling Bitcoin miners with hydro uses a lot of water?

Marshall: Yeah.

eco: How do you how do you counter those?

Marshall: There's most of the marketing now. There's a very infamous Bitcoin site that I will leave names out in West Texas where these guys used Bitmain cooling. They had like a cooling tower and the Bitmain hydros and they had to drill wells and they started a reverse osmosis water treatment plant in order to get enough water to run in their cooling tower. And then as the water table depleted, the water got more and more briny and more and more salty, and then their RO system got clogged up. And then their site failed, and then it was like a whole massive thing. And so now anybody doing a tour, their big selling point from these, like let's say Heatcore for example, they'll say you don't have to add any water. Once you fill the system up, that's it. It's a closed system.

That's everybody's marketing point now is we don't use water. ~ Beyond that, you know, it just gets so freaking hot that OEMs are starting to use better components. Like micro BTs and Auradine hydro units can withstand like 65 Celsius degrees or 75 Celsius degree water coming into the machine so that you can use no water. So the, you know, outside of that, it also depends on where you're located. If it was a previously EPA investigated site.

You get one drop of immersion fluid outside the containing wall of your building. It's a whole like EPA shutdown. They gotta come and do soil studies and sampling and all this other crap because somebody before you had messed up the site, right? From like a previous business or whatever. you

know, anything you can do to keep things contained is super important because it just takes you spilling a couple of liters of immersion fluid outside a previously condemned site and then can shut you down for a week while they do this sample study for like a gallon of milk spilling outside basically like rainwater runoff all this kind of crap when you hit scale it's like a huge operational overhead so anybody here that you know that runs a big op they've all got to deal with this crap and it's like it's a very serious time and money sink to do that and so working with the people to make sure that you can limit all those risks long till is super beneficial ~

eco: We've got five minutes left. Are we gonna take questions on this panel? All right, I'm wondering if you've got any funny anecdotes from your experience as it relates to keeping miners cool.

Marshall: Yeah, we used to do this thing where if you start working, I still do this in my current facility, my little test lab. If you come in there and you want a tour, you have to taste the fluid.

eco: No, you don't. Come on.

Marshall: I make people put a little finger in there because the good fluid is all biodegradable. They use it in like make up and stuff.

eco: It's like food grade?

Marshall: Yeah. And so that's like my first like right of passage. If you want to tour at my dojo, you got to taste it. And the feedback, at least for the Shell, I don't know if you guys got in this feedback, but your fluid has a slight buttery taste. So ~ that's the most common feedback we get. I don't know if that's useful, but maybe a selling point. ~

We also, we like to sous vide steaks in there as well. So for lunch, we get out the flamethrower, finish it off. It's the perfect temperature for like a nice, it's a little bit too well done for my taste, but you know, nice like medium. We do a lot of sous vide in the tanks. ~ So yeah, those are just a few of what I can mention publicly. So.

eco: That's awesome. Let's give Marshall a round of applause here.

And then I think we got enough time for two questions before we break for lunch, right? one more panel, okay.

All right, well thanks. Huge round of applause for these gentlemen. You guys crushed it. ~ Note to self, I'll double check the state.

State of the Network:

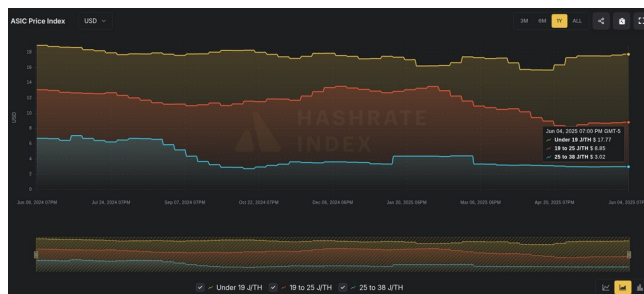
Hashrate on the 14-day MA according to mempool.space increased from ~837 Eh/s at the beginning of May to a new all-time high of ~917 Eh/s by the end of May, marking ~9.5% growth for the month and ~17% year to date.



[IMG-005] 2025 hashrate/difficulty chart from mempool.space

Difficulty was 119.12T at it's lowest in May and 126.98T at it's highest, which is a 6.6% increase for the month. All together for 2025 up to Epoch #446, difficulty has gone up ~15.6%.

According to the [Hashrate Index](#), ASIC prices have increased ever so slightly over the last month. The more efficient miners like the <19 J/Th models are now fetching \$17.77 per terahash, models between 19J/Th – 25J/Th are selling for \$8.85 per terahash, and models >25J/Th are selling for \$3.02 per terahash. You can expect to pay roughly \$4,000 for a new-gen miner with 230+ Th/s.



[IMG-006] Miner Prices from Luxor's Hashrate Index

Hashvalue over the month of May peaked at ~59,000 sats/Ph per day and closed the month out at ~52,000 sats/Ph per day, according to the [Brains Insights](#) dashboard.



[IMG-007] Hashprice from Brains Insights

The next halving will occur at block height 1,050,000 which should be in roughly 1,026 days or in other words ~150,000 blocks from time of publishing this newsletter.

Conclusion:

Thank you for reading the sixth 256 Foundation newsletter. Keep an eye out for more newsletters on a monthly basis in your email inbox by subscribing at 256foundation.org. Or you can download .pdf versions of the newsletters from there as well. You can also find these newsletters published in article form on Nostr.



[IMG-008] FREE SAMOURAI

If you want to continue seeing developers build free and open solutions be sure to support the Samurai Wallet developers by making a tax-deductible contribution to their legal defense fund [here](#). The first step in ensuring a future of free and open Bitcoin development starts with freeing these developers. Also, consider talking to your local representatives about the [Blockchain Regulatory Certainty Act](#) which aims to codify that software developers cannot be held liable for the actions of end-users.



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