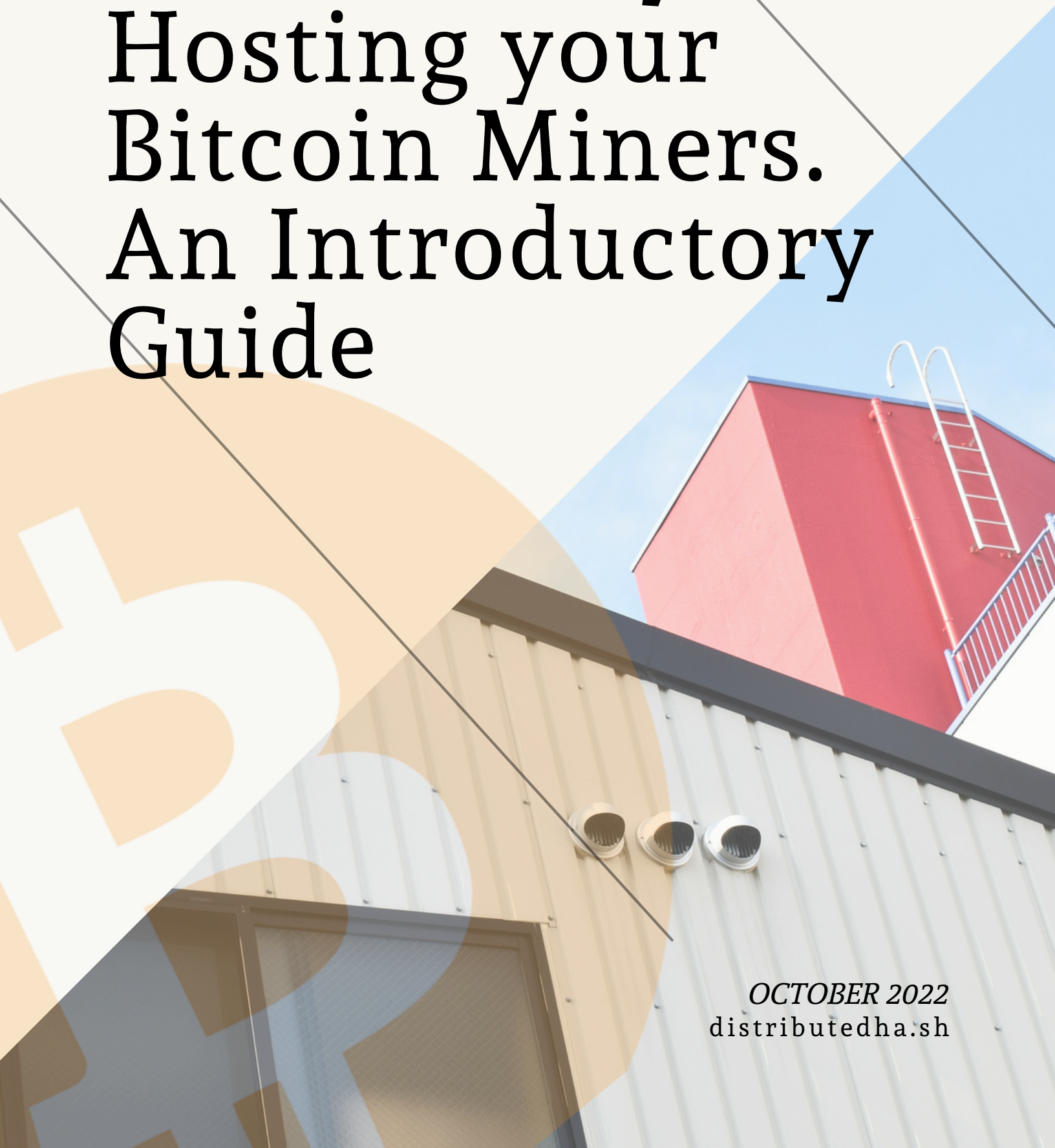
Successfully Hosting your Bitcoin Miners. An Introductory Guide



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distributedha.sh

Bitcoin Mining is not for everyone.

Yet, the clickbait taglines persist:

Bitcoin Mining Made Simple, Mining is for All, The Easiest Way to Mine Bitcoin!

This language has led many to believe bitcoin mining is a purely transactional interaction. Cash goes in to purchase miners; you sign a contract with an available host; you profit in sats and pay your bill every month. The reality has been far more nuanced as a slew of mega miners have begun offering hosting, regional facilities have emerged, and even 'green' mining hosts have entered the market.

We believe these distinctions, while valuable to the broader market, have obscured the core questions that every aspiring miner should be asking of their hosts.

In the following pages we will tease out the process of identifying the best host for your particular goals, and assist in negotiating terms that will allow you to hedge or eliminate your greatest risks as a miner looking for a hosting service. Ultimately, we believe that knowledge is power, and that by educating our industry we allow greater innovation to flourish.

We structure the following as a series of questions and responses, divided into three main domains, Hosting Terms, Facility, and Monitoring & Maintenance. We believe these are the three most immediate domains within which hosts interact with miners, and as a result, should be interrogated thoroughly.

-the distributed hash team

hosting terms

The hosting contract is the legal basis of your arrangement with a provider. While every hosting agreement will vary based on the particular provider, there are questions you must ask to ensure there will be no surprises when the first bill comes. A brief (non-comprehensive) list with explanations follows below:

- **Can I send you my machines, or do I have to buy through you?**
  - Many hosting providers will allow you to send your own ASICs to their facilities, others will insist that you only buy ASICs of certain types through them. Negotiating directly with a broker is often the best way to find the lowest cost machines, and you can avoid the markup hosts often attach to ASIC buys if they insist you buy from them.
- **Will you provide serial numbers and MAC addresses for my machines?**
  - A liability to hosted miners is the risk of 'cloud mining'. This is when a hosting provider contracts with you and points hashpower towards you, but does not actually procure machines that are under your direct ownership. Cloud mining is a serious issue in the mining space and you should go to great efforts to ensure your hosting arrangement includes discrete, physically present machines that are tied to your contract and have specific serial numbers and MAC addresses. This will also ensure you receive the correct machines should you ever need to send them to another facility or take custody of them yourself.
- **What is your availability of hosting slots, and are they currently electrified?**
  - A bitcoin miner is only valuable if it is running. When you contract for hosting space, be sure to verify whether your slots are currently electrified or are merely 'scheduled' to go online at a later date. Contracting for currently electrified facilities is always the preferred arrangement and will save you from having to wait 'just one more week' for your machines to go hot.
- **How long will my machines take to be electrified?**
  - Once your machines arrive on site, be sure to clarify expectations around electrification. Any time within the same week of facility arrival is reasonable, any time over one week and your facility may be understaffed or not have available, electrified spots.

hosting terms (2)

- **How am I billed?**
  - Billing is of incredible importance and must be clearly expressed prior to any contract signature. There are various methods of billing that increase or decrease liability on behalf of the miner and maintain incentive alignment between parties.
    - **Flat rate billing**, while often set at a very favorable kWh rate, often becomes a problem as hosts become simple electricity brokers, and uptime and facility maintenance go by the wayside. Try to avoid flat rate billing.
    - **Consumption billing** is an option that better aligns host and miner incentives. The host only makes money on the electrical spread (The difference between their purchase and sale price), and is only billing the miner when machines are running. This simple method of billing allows miners and hosts to easily track performance, while allowing the miner to participate in the greatest upside during bull markets.
    - **Profit-share billing** is another option where host and miner share machine profits over the base cost of electricity and only make money when the machine is running and optimizing for efficiency. These arrangements are typically more complex and allow the greatest incentive alignment between miner and host to maximize both uptime and machine efficiency. The trade-off for miners is that your upside during mining bull markets is shared with your host, whereas in the consumption billing model the host upside is fixed by their spread on the electricity.
- **What, if any, ancillary charges will I see on my bill?**
  - Surcharges can destroy even the most favorable kWh rate. Prior to signing a hosting agreement, you must clarify what the sum of the initial contract will be, as well as the expected monthly invoice with an all-in cost per kWh.
    - **For initial setup,** it is common and reasonable for facilities to charge a deposit, first month payments, and racking fees in the facility. These pay for their labor costs and liabilities when onboarding new customers.
    - **For monthly billing,** ask to see a template invoice and check for any taxes, service charges, or facility fees that may occur on a recurring basis. These taxes and fees will change your effective kWh and must be considered as part of your effective electricity rate in your profitability models.

hosting terms (3)

- **What additional services are included in the base rate?**
  - Does your host or facility practice any preventative maintenance, monitoring, or repairs as a function of the base rate? Some hosts will include monitoring and basic machine adjustments or resets as a part of the contract. Be wary of hosts that overbill for simple machine interventions as this will change your effective kWh rate dramatically.
- **What is the average cost per month for my model ASIC?**
  - Your host should have a rough sense of the costs associated with the various machines they are hosting. If you are avoiding fixed rate contracts (as you should), expect your host to have a clear sense of the various ways to run and optimize your model of machine.
- **How do you handle machine downtime?**
  - Machine downtime is the largest miner risk and must be clarified explicitly with your host. Machine downtime on fixed rate contracts must be avoided at all costs as the miner incurs all of the risk in this arrangement. Your host should have a plan for any machine downtime which may include resets, error code monitoring, and even repair facilities or additional bench stock in house to replace broken machine parts.

facility

The hosting facility is the most under-interrogated aspect of the hosting arrangement. Miners are typically happy to have a location to place their machines in, and don't often have the experience to ask important questions around host facility setup. The hosting facility is often the determining factor for machine longevity and efficiency, so knowing the right questions to ask will save you trouble over the course of your contract.

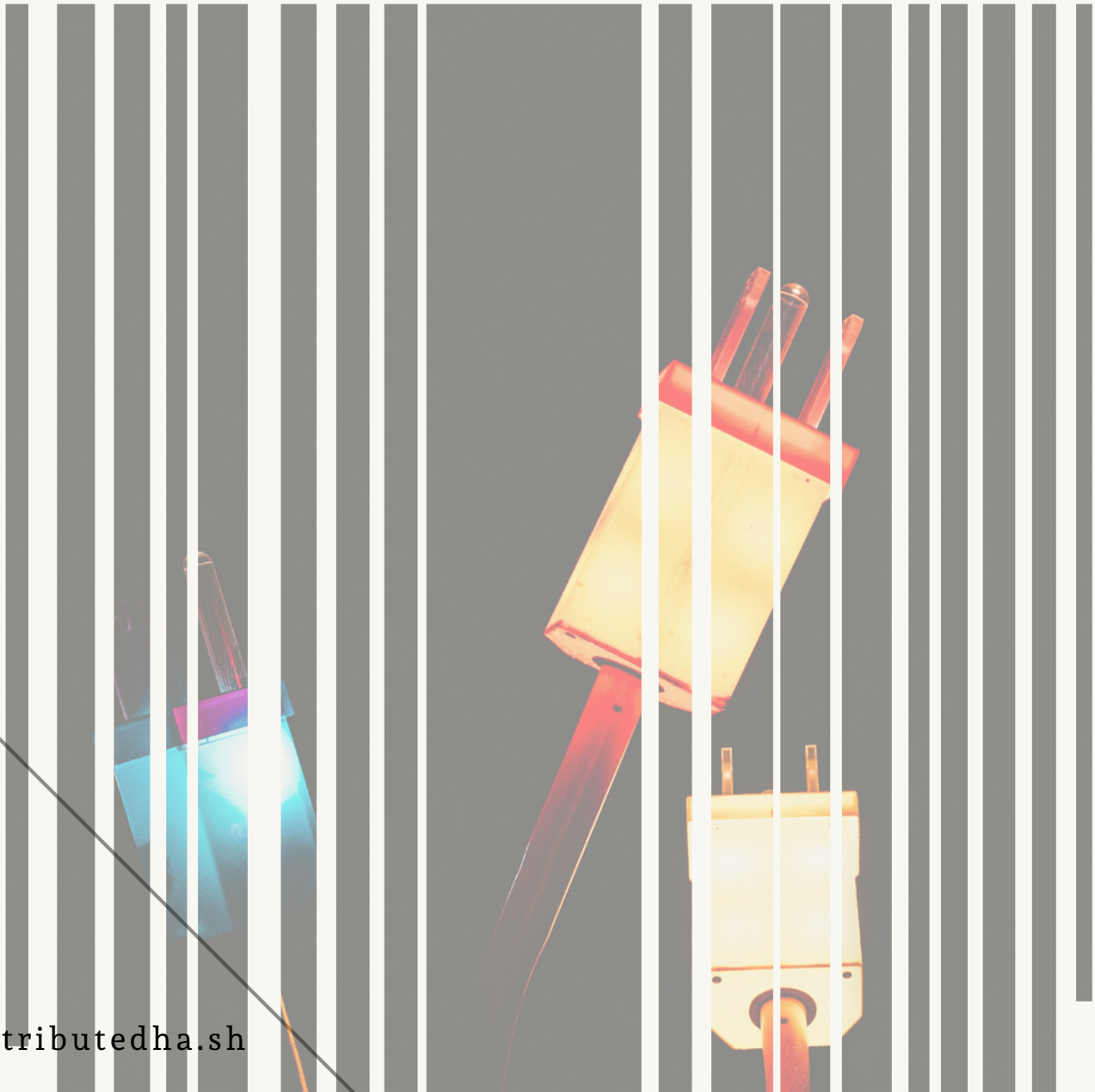
- **What is your regional environment and elevation?**
  - You should know the **rough location** of your hosting facility and the various environmental concerns associated with that region. Seasonal temperatures in the US Gulf South are wildly different from the Pacific Northwest or an Alberta oilfield.
  - **Summer temperatures** are the most likely culprits for machine downtime, but additional factors such as hurricanes, floods, dust-storms or hail/windstorms should be considered as regional downtime risks.
  - **Elevation**, while often forgotten entirely, should be considered, as it influences both effective machine cooling as well as ambient humidity. Both of which have effects on machine efficiency and longevity. This risk can effectively be mitigated via facility air handling, and typically will not be a concern as most facilities are located under the rated machine maximum of 2,000 meters (6,561ft).
- **What is your average facility uptime and how do you handle outages?**
  - Every facility will tout their incredible uptime. Ask to see specific uptime reports from your provider across a full year of hashing. There may be some variations in uptime based on seasonality as a function of both the ambient temperature and electrical curtailments. Clarify what procedures the host follows for both planned and unplanned outages.
- **How do you acquire your facility power?**
  - It is appropriate for a miner to understand how their facility both acquires and contracts for power. There are various arrangements, whether it is metered or managed via a power purchasing agreement. The most important questions to ask regarding facility power acquisition are whether your host has any curtailment agreements in place that would cause expected downtime. Additionally, it is reasonable for a miner to understand the terms under which a host acquires their power. What is the duration of their electricity contract and what tariffs or fees will they be subject to over the upcoming years?

facility (2)

- **How do you cool the ASICs in your facility and protect them from the environment?**
  - We have addressed environmental risks above. Most ASIC cooling is currently air based, as immersion mining requires additional machine preparation and costs, and water cooling is very early in the industry. The vast majority of air cooled facilities will be either containerized, or modified warehouses.
  - **Containerized facilities** are generally smaller than warehouse facilities and present their own issues in machine maintenance and uptime. You should understand the location in which your container is placed, the source of power, and the cooling technology of that particular container provider (passive, active fans, evaporation walls, etc.). While outside of the scope of this document, containerized cooling and machine protection are an immense topic and you should have clarity around machine placement and expected uptime and maintenance.
  - **Modified warehouse facilities** are typically much larger than containerized solutions and present their own unique issues for machine maintenance and uptime. Some warehouses utilize custom center aisle exhausts or room-within-a-room setups. There are no hard and fast rules around ideal warehouse setups, but it is important to ask your facility the rationale behind their particular setup and how they manage the unique challenges that setup brings.
  - **Intake temperatures** are contingent on your facility location and the season. Your facility should have methods of minimizing the impacts of high heat during mid-Summer, as well as options for heat recirculation during deep Winter. Cold facility intake temperatures can damage ASIC boards more easily than heat, so ask if your facility has hot air recirculation capabilities, and what their cold start protocol is in the case of facility downtime during low temperatures. **NOTE:** Cold start protocols are extremely important for containerized hosting in cold Winter environments.

facility (3)

- **How do you manage physical security of the facility?**
  - Every host should have basic safeguards in place to ensure physical security of the facility. For smaller sites, this may be limited to cameras, alarms, and heavy gating and door access to a site. For larger sites it is common to have full time staffed security on site. Location is also an important aspect of physical security. A rural hosting location is a much smaller target than a mega facility in the proximity of a major metropolitan area.
- **How do you handle data uptime and redundancy in your facility?**
  - Data redundancy is to be expected from any professional provider. While you do not need to know their exact connectivity, it is important to know that they are using a stable provider and at minimum some form of backup connectivity in the case of system failure.



monitoring and maintenance

Once you are up and hashing with your hosting provider, the relationship transitions to maintenance and monitoring. In the best of all possible worlds your hosting provider will work actively with you to help optimize your operation, in the worst of all possible worlds you will intermittently receive Sats while paying a fixed bill. The following questions are a gateway to understanding how your host will manage your continued relationship and help you to achieve your goals.

- **How do you monitor ASICs?**
  - The ideal monitoring situation is one in which you have secure access to your discrete machines over VPN or Tor on an isolated network. The weakest option is one in which you only 'see' your hash through your pool. Note that a pool view of your hash is not a machine level view, let alone a view of your specific machines. If at all possible, you want a direct view into the operation of each machine in your total mining farm as any other viewing situation creates the risk of cloud mining.
  - **If your host only allows pool level monitoring.** Ask to have your machines separated by worker, so you can at minimum see the pool reported hash of each machine and better understand performance on a per machine basis. This will also ensure you know of any machine downtime or seasonal underperformance.
- **How do you manage ASICs?**
  - ASIC management is variable by host. Some hosts will simply plug your machines in and monitor that they are running or not, others will work to help tune and maximize per machine performance. What works best for you will depend on your long term goals as a miner. We recommend, at minimum, that hosts have an understanding of how to identify machine level errors, troubleshoot those errors (intermittently in the case of weather or routinely in the case of a failing machine), and communicate those errors to the miner for additional resolution.
- **Do you routinely clean machines?**
  - All ASICs will require periodic cleaning. This will vary based on the hosting setup (containerized versus warehouse), and the regional environment (Midwest Pollen versus Pacific Northwest rain). Your host should be able to communicate if and when they clean, how often they recommend cleaning, and what additional costs that may incur to the miner.

monitoring and maintenance (2)

- **Do you have bench stock available for my ASIC?**
  - Bench stock are available machine parts that your host may have on hand. This may include fans, chipsets, PSUs or control boards that match the make and model of your ASIC. Bench stock is the best solution for quick miner repairs, and while you will likely pay a premium for any parts that you may need in an ASIC failure situation, it is typically more than made up by the uptime you maintain by not having to send a machine out for warranty or repair.
- **Can you help me optimize my machine performance?**
  - Assisting miners in machine optimization is an early field. Most hosts are concerned enough with maintaining uptime and expansion that they rarely have the bandwidth to invest time in assisting miners in better understanding and honing their operations. While not expected, any host that will assist you in data collection, monitoring, and interpretation, in service to the better functioning of your machines, is going above and beyond in the current hosting environment. We hope the trend of assisting miners in machine optimization will take hold and expand.

summary

We hope the above helps to equip you with some of the tools needed to successfully identify and contract with a bitcoin miner host. Our belief at distributed hash is that customer education is the most valuable tool in our early market. Our goal is to help operators determine their particular goals, so that they are able to grow a business that works for them. Whether you are home mining, setting up your own on grid operation, sending your machines to a host, or partnering with an oil and gas operator to buy stranded natural gas, you should work hard to fully understand the implications of each of those models and how they fit into your long term goals as a bitcoin miner.

Knowledge is power.