Abstract

Imagine you are Netflix. You have one of the biggest OTT service that exists in the modern world. You currently stream thousands of Movies and TV Series. Everyday there are millions of people who sit on their couch with a popcorn bucket and stream their favorite content.

Now all of this has to be stored somewhere right? We have to be clear on this thought, that cloud is a myth (just like clean energy). There are physical datacenters (close to your location) which store your data on hard drives and use server grade computers which compute the data ingress and egress (incoming and outgoing). All of your data is stored with AWS which they claim is secured with the most advanced algorithms. They keep your data secure, readily available and you pay a hefty amount for that. $1 Billion to be exact.

Now imagine you are an AI engineer. You are working with the government to develop the most advanced generative AI. You need tons and tons of Graphical power (as deep learning requires GPUs to train their model on). The only solution you have is to hire a cloud computing company (like AWS, GCP , Azure etc) or setup an on-premises datacenters; which would require millions of dollars and get it started. Both of the solutions are expensive and would require huge amount of funds.

Lastly, imagine you are a tech nerd. You need a high end instance (a virtual computer) to start coding, start developing games, start deep learning, build websites, start designing, start video editing or even make a website like YouTube of your own.

The above mentioned scenarios are the clear use case of a modern traditional cloud computing service. They emphasize on the use of storage, graphical power and computational power respectively. However traditional giants are doing their part of serving the internet properly (as AWS now owns more than 40% of the internet), it still needs a slight improvement.

Vision

To make every house a datacenter. Every computer a node and every person holding a bit of internet. Rather than centralized organization owning all of the internet, let it be distributed and incentivized.

Introduction to Distributed Cloud

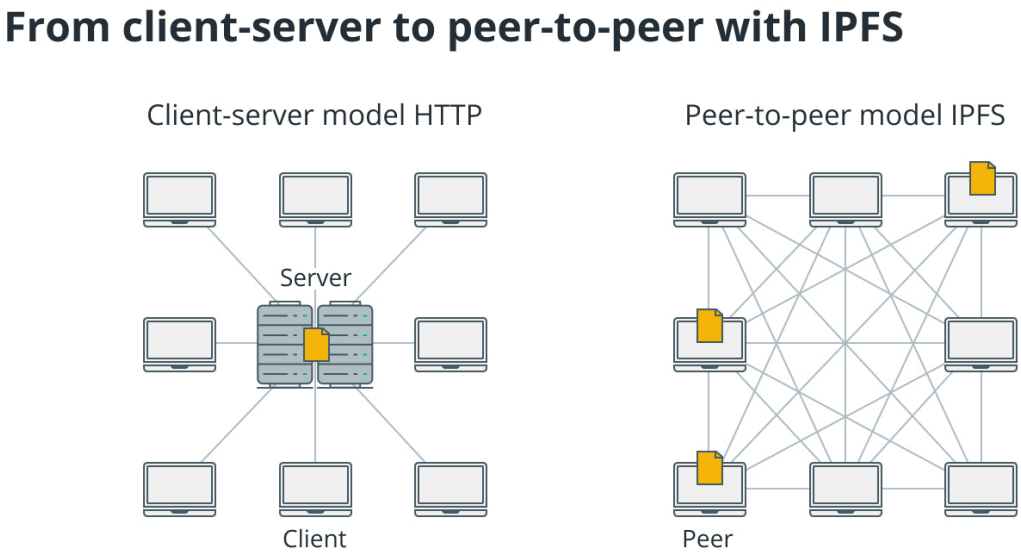
Distributed cloud computing is a new way of using the internet to store and process data. Instead of using one big data center, it connects many smaller ones (also known as nodes) that are spread out in different locations. This makes it faster and cheaper to access data and run programs. It also makes it more reliable because if one data center fails, there are others that can take over. This approach has many potential uses, such as analyzing big data and collaborating on projects.

In simplest terms:

I have a 1 TB file. Earlier I used to store that 1 TB file with AWS and pay them $10 per month. If that file is confidential, there are always chances it might get hacked or tampered with. AWS can always see the contents of the file (digital privacy is a myth), and by any reason the datacenter decides to shutdown, my file gets vanished. And, lets not ignore the fact that I am paying a lot for the file to be stored which is all going to AWS.

How about I divide that 1 TB file into 10000 pieces (~0.1 MB each) and store them into nodes all over the world. While I was paying $10 to AWS, I now pay $1 and let the 10000 nodes (pieces) take their share.

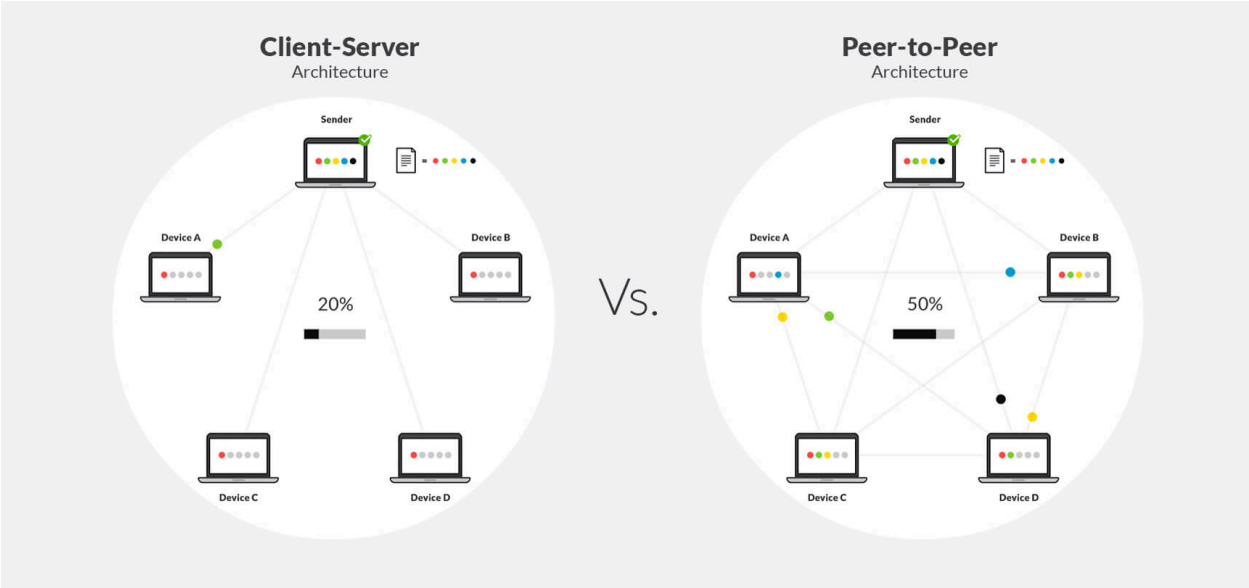
This is just with storage, which can be extended to computational power (with CPUs, like Intel i5,i7) and Graphical Power in no time. Nowadays, where we are depended on a single centralized server to fulfill our digital needs we can be connected to a P2P (peer to peer) network where different nodes join together in the network to do a specific task.



Hosts and Clients

The P2P computing isn't new. It dates back to the launch of torrent and bitcoin. However they were all designed to serve a singular purpose. Either to store movies (that too when the node is online; for torrent) or to compute transactions (in bitcoin).

Each network has two major components ; i.e the Hosts and Clients. In the context of distributed computing, hosts are the computers or devices that provide resources such as processing power, storage, and network bandwidth to other computers or devices on the network. Clients, on the other hand, are the computers or devices that request and use these resources from the hosts.

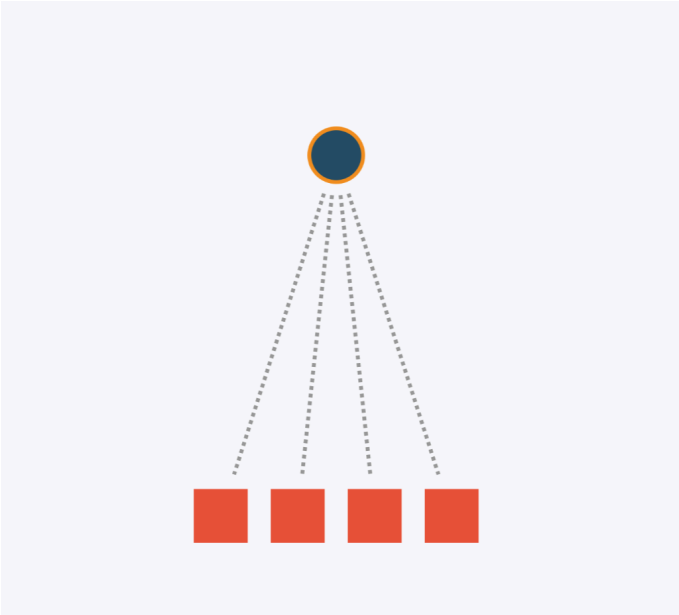


Security and Blockchain

A fair question that arises, is my data / compute secure? How do anyone trust that now that the data is stored / compute that is occurring in a node (which might be sitting in Afghanistan) is secure? Can anyone not just open up their computer and access the file.

The integration of blockchain allows us to answer most of the questions. To understand how we prioritize security there are two concepts that need to be addressed.

1. SHA 256 Algorithm - Without going to the depths of digital cryptography, one must understand the SHA 256 is an algorithm that is used by Bitcoin to manage its transactions. Post modifying it with IPFS and Filecoin, we have achieved a remarkable solution to security. When a file of 1 GB is stored into the distributed network, it is broken down into data blocks of 256 KiB. Which means a 1 GB file can be stored around hundreds of thousands different nodes. These nodes are spread globally which does not put a load on a single location. These nodes are also unaware of the data that they are storing and can store many such blocks (but not of the same content).



2. A blockchain is used to connect these nodes together and make the task / data uploadable and downloadable. A blockchain is a chain of block / data. It consist of three main components. Namely; the data (in 256 Kib, the block address & previous blocks address). Note, every block is assigned a unique address.

Whenever someone tries to tamper with any block/node, the address of that particular block changes automatically. Post which, the next block cannot verify one component (i.e the previous blocks address) and it changes its address. This continues to go one and it makes it tamper proof.

Note that, every node is a block. Every block is a peer, and every peer is a physical computer sitting on some place of the globe.

Node = Block = Peer = Physical Computer

With the integration of a cryptographic security system, the decentralized peer to peer computing is more secure than traditional data centers.

Is The Technology Affordable ?

When we pay $10 for a service of cloud computing. We pay it directly to the service provider / central authority. With the emergence of a distributed cloud computing, a client when using a node would be paying to that particular peer and not to any third party.

Lets compare prices

Provider	Instance Name	vCPU	RAM	Price (per hour)
AWS	c6g.8xlarge	32	64	`$1.088`
GCP	n1-standard	32	64	`$1.933`
Azure	B32-als-v2	32	64	`$1.065`

Note: These prices are all for a linux based instance for the current date in February 2024.

Zansoc Instance Price

With the below configuration (having 32 vCPU, 64GB RAM)

CPU	Intel Core i3-13100
GPU	Intel UHD Graphics 750
SSD	Adata XPG SX8200 Pro NVMe PCIe M.2 256GB
HDD	Seagate Barracuda 1TB
RAM	Corsair Vengeance LPX DDR4 3200 C16 2x16GB

With this configuration the instance cost can conclude at somewhere around `$0.072 to $0.091.`

Note that, the calculations of the pricing are still at an early stage. However the current calculations after extensive market research showcase that the cost can be 13 to 15 times less than the lowest centralized cloud computing service provider.

Which would mean, Netflix would have to pay only $100 Million dollars and not $1 Billion dollars.

How do the Peers/Hosts Make money.

To recall how Ethereum 1.0 Mining worked and how Bitcoin Mining worked. It was based on a PoW model. Also known as Proof of Work model. Which is the backbone of most cryptocurrencies. Since bitcoin and ethereum do not have a physical datacenter of their own, they completely rely on worker nodes (or nodes in this case) to contribute these services in the network. In return of that they are incentivized with the similar coin they are mining for.

Opting the same method. The Hosts would be paid to rent out there computers to the network. There are rules monitoring them. Based on the computational power, graphical power and bandwidth they bring on board they would be incentivized.

In full potential, when a node is completely being used by the network; a host can expect an ROI within 10 months.

How do we make money?

We as providers make money through two different methods:

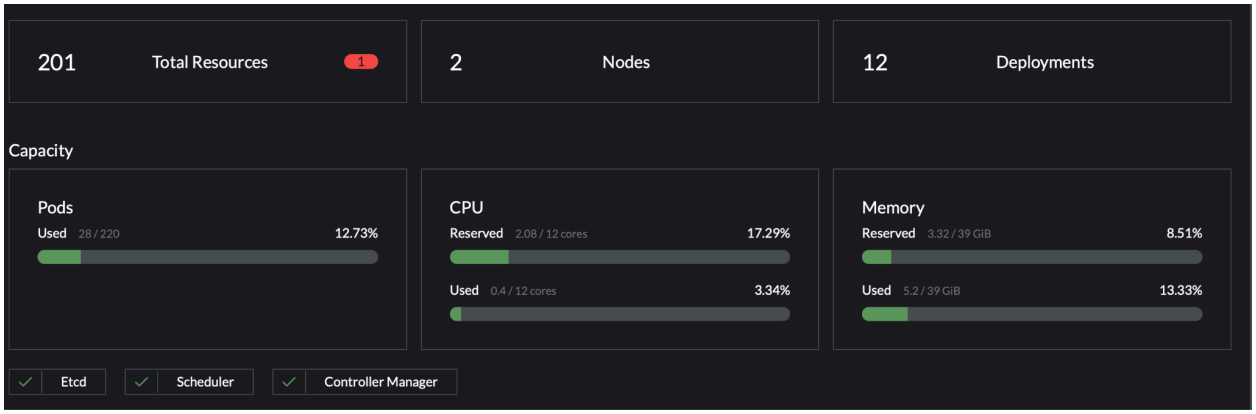
1. Through commission. Once the client has opted for an instance. 10% of the cost is reserved for the provider, that is us.
2. All transactions would happen in a proprietary crypto currency (yet to be developed). The coin can also be traded on through a crypto exchange. The exchange would also act as a form of revenue for the provider.

Where are we?

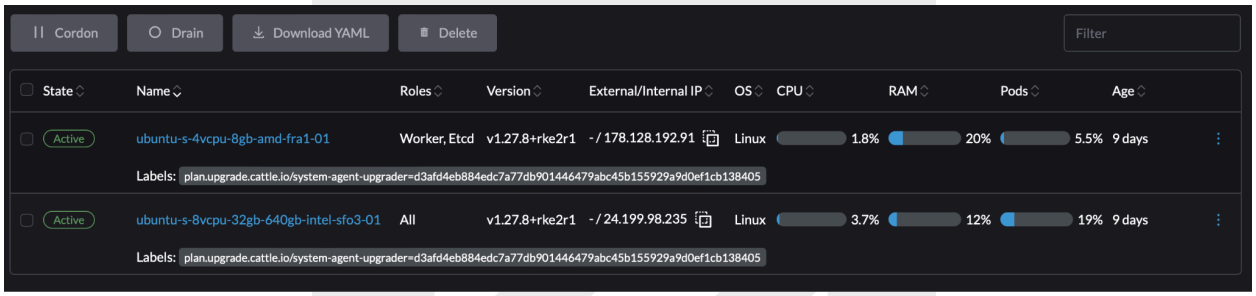
The entire plan acts in four stages.

1. Making nodes enroll as a host in a smooth manner.
2. Interlinking of the nodes to form a network.
3. Deploying machines for the clients and allowing them to connect onto it.
4. Inaugurating a form of exchange (enabling cryptocurrency and smart contracts) for the transaction to take in place.

We have accomplished the first 3 stages (in CLI format). We have a working prototype of the entire host to client journey. We are yet to design a UI/UX which would make it more interactive. We also are yet to develop a form of exchange.



Dashboard Showing Total Nodes, Total CPU/Memory Resource Available



Detailed Information on each note and resource sharing

```
[INFO]  Value from https://143.244.130.83/cacerts is an x509 certificate
[INFO]  Successfully tested Rancher connection
[INFO]  Downloading rancher-system-agent binary from https://143.244.130.83/assets/rancher-system-agent-amd64
[INFO]  Successfully downloaded the rancher-system-agent binary.
[INFO]  Downloading rancher-system-agent-uninstall.sh script from https://143.244.130.83/assets/system-agent-uninstall.sh
[INFO]  Successfully downloaded the rancher-system-agent-uninstall.sh script.
[INFO]  Generating Cattle ID
[INFO]  Successfully downloaded Rancher connection information
[INFO]  systemd: Creating service file
[INFO]  Creating environment file /etc/systemd/system/rancher-system-agent.env
[INFO]  Enabling rancher-system-agent.service
Created symlink /etc/systemd/system/multi-user.target.wants/rancher-system-agent.service → /etc/systemd/system/rancher-system-agent.service.
[INFO]  Starting/restarting rancher-system-agent.service
```

Connecting different nodes in no time (using CLI)

Market Research

Although this is an innovation and there is no competitors yet in the current market. We can conclude that the traditional Public Cloud is nearly $494.7 Billion USD [1] globally. Since Zansoc, itself is a new product and an innovation, it completely aims to be independent and not compete or relate with any of public cloud and nomenclate itself as a distributed cloud service.

Competitors

Although there are websites like Aleph.im and Tensordock who are providing such decentralized computing concept. We stand out from them. They must be decentralized but not distributed. In simpler terms, they allow a client to access only one node. There is no load sharing and interlinking between multiple nodes that are available.

RoadMap

With every node registered into the network, we enable them to make an average profit of 3000 INR per month. We comply with a set of rules which would allow only a specific configuration nodes to enter the network. In case they do not have one; there are always ways to configure your system with a minimum investment and get your node running.

As a service provider we are a commission based business. Every transaction between the node is chargeable of 10% of the total amount. Within six months of the launch of the product we aim to onboard at least 1000 small clients who can readily use the service.

Future of Distributed Networks

This is Web3. Everything that is seen around can be migrated to this technology. It is affordable, scalable, Highly available and secure. The only thing that makes it a no-no is its complex nature and hard to implement features. Zansoc makes it easy, by bringing a ready solution to everyone who wants to enroll into the network (consider it as a business investment by setting up such node farms) and developers / designers who want to work on decentralized / distributed application.

Final Words

It all started with an aim to play a game in a computer, during the college days. With a little configuration in my laptop, I had to learn how I can join my friends computers in a network to make a cluster and use their computers combined to play that game. At that time the idea was very personal and raw. Cut down to today, something is there to be called as a “prototype”.

With the right guidance and funds, we can build a team. Make the concept of the “next generation internet” a reality. I am an innovator. It is hard to simply put together years of work in a document and make it presentable yet meaningful. I have done my best to explain it, in the most simplest terms.

I am Ashutosh Mondal, Maker of Zansoc Distibuted Networks. This is my project of a Distributed Cloud Computing.