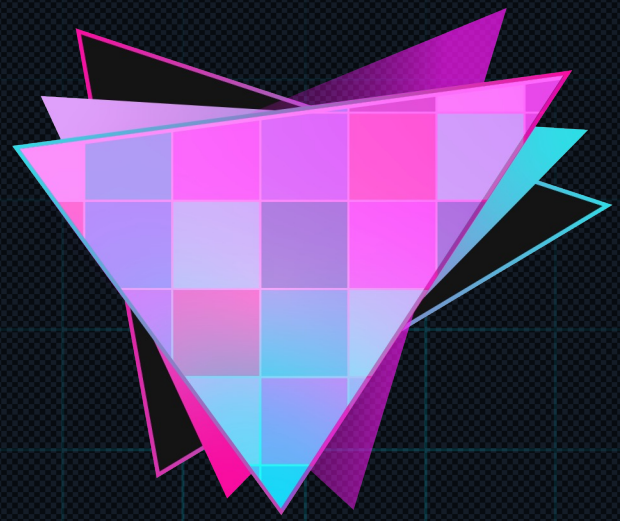


NION NETWORK

Litepaper v1.1

Introduction

Common cloud computing platforms face issues such as location awareness, transparency, and fault tolerance. The idea of "Fog Computing" or "Edge computing" addresses these issues by having resources closer to end–users (i.e. Internet of Things, where billions of devices have a significant amount of unused computing resources). These devices can perform simpler computations and leverage the reduced latency benefit of being geographically close to the end user or service.

Another very important view in Fog computing is the sharing economy, which in its simplest form is a socio–economic system built around the concept of sharing resources. It augments the idea of Fog/Edge computing, as the unused computing resources can be shared to a common resource pool that can be leveraged by the applications and services.

Currently, there isn't an incentive structure in place that sufficiently compensates dormant resource owners, and matches them with their counterparts, the resource consumers. Based on years of academic research, this is precisely what Nion is built to solve.

The distributed nature of blockchains perfectly fits the paradigm of Fog/Edge computing, and could address the challenges such as trust, fault tolerance, and transparent resource allocation.

NION NETWORK ADDRESSES AND SOLVES THESE CHALLENGES

Advantages of common cloud

For the past decade, the cloud Infrastructure changed the way businesses and consumers interact with online services. It has been adopted in every industry with the aim to optimise costs to the lowest possible and the trend does not look to be changing anytime soon.

MOST SIGNIFICANT BENEFITS OF CLOUD INFRASTRUCTURE

Power on demand

The computing power can be easily scaled up or down according to the demand of the hosted service.

Data backup & Recovery

Every business needs a disaster recovery plan. Cloud providers offer recovery solutions and expertise as part of the deal.

Availability

Cloud services run on pooled and redundant infrastructure which provides higher availability.

Low cost

It cuts out the high cost of hardware and maintenance. You simply pay the computing power you use.

Security

Network security, access policies, threat intelligence, data encryption, regular and security patches etc.. Cloud providers offer security out of the box.

Common cloud limitations

Despite all benefits mentioned in the previous section, cloud infrastructure also has its flaws. Cloud service providers are responsible for every advantage but not for disadvantages that may be critical for running a service.

MOST SIGNIFICANT DISADVANTAGES OF CLOUD INFRASTRUCTURE

Cloud deployment
It may take weeks to adapt an application to run on a cloud based infrastructure.

Restrictions and limited flexibility
Cloud services come with restrictions that can limit flexibility for applications and development.

Single point of failure (SPOF)
Centralization of computing power poses a single point of failure which can result in service outage.

Transparency and verifiability
Inability to trustlessly verify the reports of resource consumption, and consequently billing.

Vendor lock-in
Migration to other cloud providers is a very complex process. Compatibility, interoperability and support issues may occur.

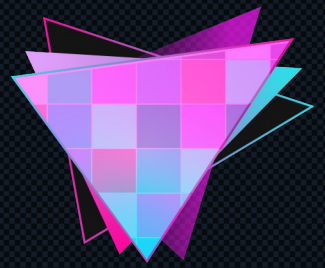
Untapped potential of Edge devices
IoT devices are numerous and can collectively perform computation potentially cover OPEX.

Limited control
End-users usually have no permissions to control the cloud infrastructure as Administrators.

Technical support
Sometimes technical issues need support from the cloud service provider which may not be available 24/7.

Security
The security measures undertaken by cloud service providers are likely to be more robust and powerful than any in-house hosting setup, but are they?

The next generation cloud



NION NETWORK

Nion network is a decentralized, blockchain-based cloud infrastructure for the future of Web3. It is a lightweight protocol that aims to build a decentralized and global network for IoT and Edge computing applications, optimising network's resource allocation in a transparent and verifiable way.

Leading in the decentralized cloud industry with more than six years of steady development with tested deployments in permissioned environment, Nion network will incentivize dormant cloud computing power owners to deliver their unused resources in a way that will allow cloud users to have all of the scalable benefits of current solutions while addressing the glaring industry-wide faults.

Nion network

Nion network is the next generation of cloud infrastructure. A completely open and community driven protocol, providing solutions to the aforementioned issues and limitations of common cloud infrastructures for service providers and service consumers.

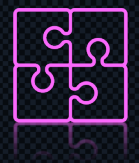
NION NETWORK SOLUTIONS

Migrate computation to edge devices to unlock full potential of IoT

Applications can make use of the decentralized orchestrator to ensure service replication, and migration close to the demand. IoT devices can join the network, contribute their resources and earn rewards for their service.

Decentralizes computing resources

There are many unused computing resources. Nion creates a decentralized, shared pool of computing resources for all devices. It increases fault tolerance, and creates a global marketplace of computing resources.



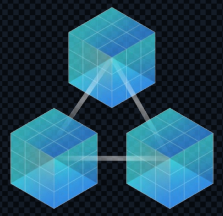
Addresses the heterogenosity of programming languages, and technologies

Nion makes no assumptions on the programming language or tech-stack used. By packing applications and services in containers, Nion is able to secure node operators, and applications by abstracting the operating system layer from developers.

Creates decentralized trust and transparency

Decision making by consensus provides transparency and verifiability in every decision the network makes. The entire history of an application's life-cycle can be recreated from block data.

Nion network – key features



Decentralized cloud

Community driven decentralized, and opensource cloud computing architecture for the Web3.

Developer oriented

Docker containerization enabling support for a variety of tech stacks, environments, and languages.

Transparent and verifiable

Onchain transparency and verifiability of running applications, migrations, and resource allocations.

Stake and Earn

Stake to run a node, and contribute computational underutilized computational power, and bandwidth. Earn rewards.

Deploy and run applications

Package your stateless applications in a docker image, and deploy instance on the network in a frictionless way.

Autonomous orchestration

Configure strategies for the decentralized orchestrator to take care of the life-cycle of your application.

Nion network – protocol overview

Nion protocol was designed from ground up with efficiency and security in mind. With strong ties to academia, the protocol is verified by peer reviewed journal publications.

NION PROTOCOL OVERVIEW

- Proof of stake consensus rewarding service providers
- Innovative Verifiable delay function based mechanism as an entropy pool for role self-election
- Autonomous docker container run-time migrations using CRIU
- Unique geo-sharding solution with privacy considerations for node operators
- Improved and lightning fast gossip protocol for the overlay network
- Built-in redundancy and snapshotting for automatic recovery of applications
- Protocol validation through strong academic presence and peer reviewed articles
- Support for migration policies, and geofencing mechanism

Nion network – use cases

The following uses cases are just a peak overview of what Nion network is capable of.

Autonomous vehicles

Nion supports data exchange between vehicles in close proximity enabling fast computation and decision making based on localized telemetry.

Scientific computing

Nion allows application replication, which is perfectly in line with the general distributed computing paradigm. Nion can solve parallel computing problems by leveraging a high number of computing devices much cheaper then traditional cloud providers.

Internet of Things – IoT

Due to its low complexity, IoT devices can share computing resources and earn rewards that offset operational costs. Moreover, using the currently dormant computational resources would decrease the carbon footprint.

Microservices

Nion's flexible orchestrator allows large scale microservice deployments offering built in features such as geofencing and geo–aware migrations to being services close to end users.

Native GPU computing

Nion effectively utilizes decentralized computing power to achieve optimal performance, enabling efficient execution of resource–intensive algorithms and applications such as distributed computing applications, microservices and artificial Intelligence with access to native hardware.

Contact us


nion.network


info@nion.network


https://t.me/NionNetwork


https://twitter.com/NetworkNion


https://medium.com/@nionnetwork