networkunits whitepaper

Decentralized Multiplayer

The Network Unit or Nu Token is the cryptocurrency that drives the economy of our decentralized multiplayer infrastructure

Contents

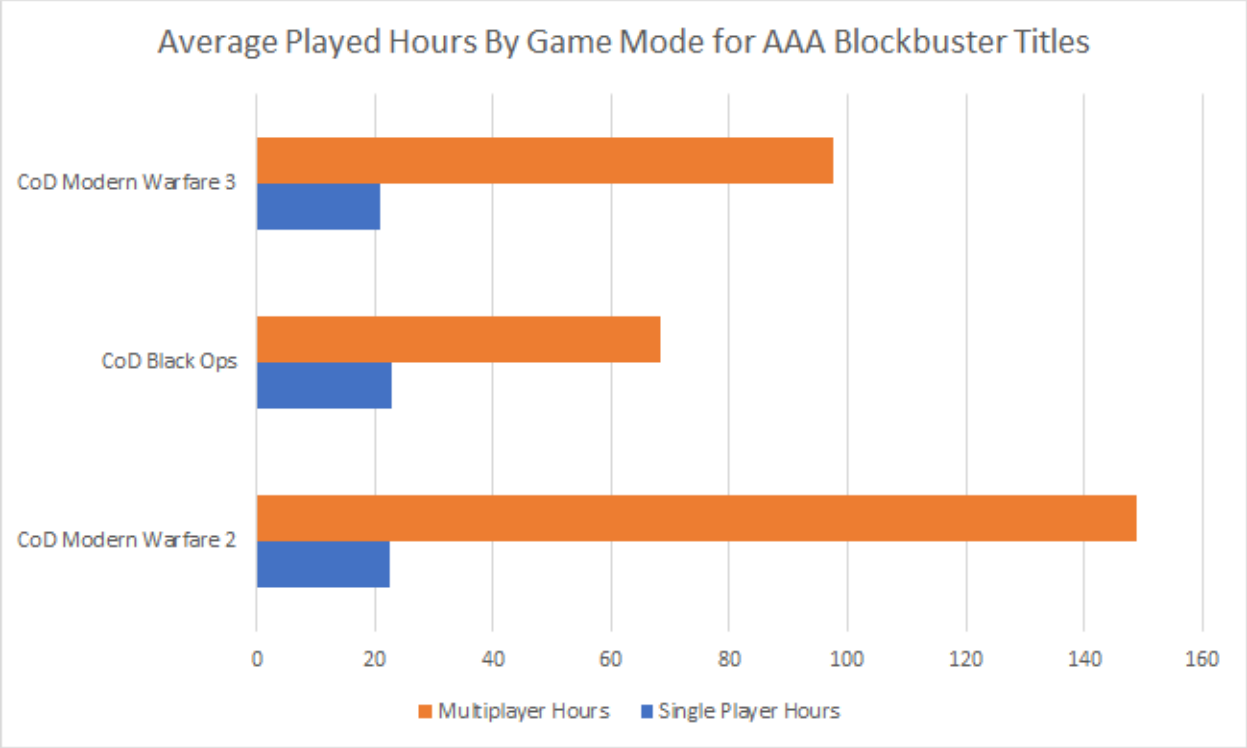
Please note this whitepaper is constantly being updated and improved, ensure you perform a hard refresh when loading this whitepaper if you have loaded it before.

Network Units

Network units is a way to Decentralize multiplayer gaming and to provide developers an easy way to integrate multiplayer functionality. We will use the Ethereum blockchain and its smart contract functionality to create a platform that will allow hardware owners (service providers) to share their unused Bandwidth and CPU resources with developers who would traditionally require their own servers to drive their multiplayer functionality and earn tokens for doing so. Gamers can mine tokens from the platform by connecting their wallets to their gaming accounts to become active clients. Therefore Network Units has a unique mining process with two very different but interesting ways to mine tokens.

Why Multiplayer Gaming?

Games with multiplayer aspects keep gamers engaged longer. Realtime First Person Shooters generally have single player and multiplayer modes and the addition of multiplayer modes can increase average game hours played by up to a factor of 7.



The Global Gaming Market is currently worth 100 Billion Dollars and increased gaming time leads to more revenue by way of purchasable content (over 50% of HD console owners have purchased content) or extension of pay to play licenses. If you have played a game for a very long time you are more likely to maintain your 'elite' status even if it means you have to pay every now and then.

Lastly, increased and extended popularity reinforces the network effect of referrals, leading to increased sales. In other words, if players are more likely to recommend your game it will lead to increased sales and revenue.

Multiplayer Gaming Requires Servers

Servers are required to provide multiplayer features. These are typically provided by cloud providers or dedicated host providers. Network Units will offer developers another means of multiplayer functionality that is not only easier to integrate but is more resilient and robust due to its decentralized nature.

Providing developers with an easy to integrate multiplayer framework

The Network Units framework can be harnessed by developers quickly and easily. By integrating our plugin into their game with ease, developers can be assured that they will not only save time and money but also incentivize gamers who connect their wallets to their gaming accounts. This will also bring in more players who want to earn tokens as they play. Developers can also harness the reputation system in their games to provide their players with a fair fight.

The Problems

Wasted Computing Resources

A large portion of personal computers and leased servers' computing power and bandwidth are not utilized to its full potential. Server plans that are not exactly suitable, requiring you to subscribe to a higher plan than necessary, or the average overpowered computer owner who uses it for browsing the web, writing documents and the occasional game of candy crush are particular examples of this.

Multiplayer functionality can be a pain and expensive to integrate

Writing your own network code can be complicated and time consuming. Managing your own servers can be equally as complex and also expensive. As game developers we understand that the more time you have to work on the creative aspect of the game the better.

Incentivizing gamers can be tricky

Without proper incentivization gamers can quickly get bored of a potentially great game. Integration of multiplayer will help but another level of incentivization especially regarding revenue generation could take it a lot further. Unfortunately this could be a very expensive feature as the developers would have to fund it.

It isn't a fair fight

Gamers expect a fair match and a good challenge. Sadly, most of them aren't getting it. Cheating or broken matchmaking mechanics ruin entire gaming communities. Gamers become demotivated, stop spending on content and the full economic potential of the game is missed.

Massive games require massive Infrastructure

Limited infrastructure at game launch can turn a good game into a failure. Network latency or down-time kills gaming experience and optimizing resource efficiency makes game development increasingly costly. The subsequent loss of turnover and reputation damage is significant. The 2014 Xmas DDOS attack on Sony is a particularly infamous example of this.

Our Solution

All of the problems mentioned above can be solved or greatly improved by the Network Units platform.

Turning trash into treasure

There is a lot of unused processing power and bandwidth out there, Network Units intends to leverage it into a decentralized, blockchain controlled infrastructure used for multiplayer gaming that is cost effective and reliable.

Multiplayer functionality can be easier and cheaper to integrate

With our easy to integrate Unity Asset developers can be freed of having to write complicated network code and the infrastructure that drives it. It will be available on the Unity Asset Store which is a highly popular third-party marketplace for the Unity Engine. This allows faster time to market and savings regarding development costs. Additionally, because Network Units relies on processing power and bandwidth that would otherwise be wasted, we can ensure a cost-effective solution that is cheaper than cloud services or dedicated hosting providers.

Gamers can mine tokens by playing

Network units is unique in the sense that its verification process rewards gamers that connect their wallets to their gaming accounts with tokens as they help verify the service providers. Not only does this help improve active user counts but it can drive new players to your game that are looking for fresh ways to mine tokens and have plenty of fun in the process.

A reputation system

The Network Units framework will have an in-built cross platform reputation system. This way when you are a collaborative player in one game it is likely you will be matched with collaborative players in all the games you play on the NU infrastructure. This reputation system can be used to support communities (guilds/clans/alliances) that are looking for a particular style of players or a minimum reputation/score. Our anti cheating mechanism will be built right into the NU framework and will work hand in hand with the reputation system in order to prevent cheaters getting matched with the fair playing majority.

Network Units is decentralized

Because the NU platform is decentralized we can offer a more resilient solution that is backed by its automatic failover in the event of a catastrophe or deliberate malpractices. This ensures players are seamlessly moved to a new provider so their gaming can continue without disruption.

Network Units Token Generation

NU will be used to power all transactions on the Network Units Platform. We will have a public Presale and a public Crowdsale that will commence upon completion of the Presale. Funds raised during the Presale will be used for marketing the upcoming Crowdsale event. Please note Presale contributions are non refundable.

Network Units Presale Event Details

Presale Begins	November 8, 2017 1:00 PM UTC
Presale Ends	December 23, 2017 1:00 PM UTC
Presale Hard Cap	10,000 ETH
Minimum Presale Cap	500 ETH
Token Price	1 ETH = 500 NU
Minimum Transaction Amount	0.01 ETH
Distribution	Smart Contract is used to generate tokens instantly upon receiving ETH. Base rate Tokens are transferred to the contributor's wallet instantly. Presale Quantity Bonus Rates will be released in phases after the Crowdsale. Transfers are locked until the Crowdsale ends.

Presale Quantity Bonus Multiplier

Amount Contributed	Bonus Rate Multiplier
0 - 50 ETH	35%
50 - 250 ETH	40%
250 or greater	Contact Us

Please note that although base rate will be released instantly the Presale quantity bonus multiplier tokens will be released in phases after the Crowdsale is finished.

Network Units Crowdsale Event Details

Begins	December 23, 2017 1:00 PM UTC
Ends	January 21, 2018 1:00 PM UTC
Hard Cap (Maximum Supply NU) approx	28,758,333 NU
Hard Cap (Maximum Supply ETH) approx	16666 ETH
Minimum Goal	3333 ETH
Token Price	1 ETH = 500 NU

Minimum Transaction Amount	0.01 ETH
Distribution	Smart Contract is used to generate and transfer tokens instantly upon receiving ETH. Presale quantity bonus multiplier tokens will be locked and released in phases after the Crowdsale. Transfers are locked until Crowdsale completion.
Minimum not achieved	Smart Contract will issue refunds to Crowdsale participants minus costs.

Distribution

During the Presale & Crowdsale, **55%** of the NU supply will be available for purchase (**15817083 NU**). The remainder will be distributed as follows

Decentralized B.V.	10%
NU	10%
Inbound	10%
Marketing	5%
Bounties	5%
Coordination	5%

Unsold Tokens

Our Smart Contract generates NU tokens as it receives contributions of ETH therefore there will be no unsold or leftover amount.

Minimum Goal

Our minimum funding goal for the Crowdsale has been set to **3333 ETH**. If the minimum is not met upon the completion of the main Crowdsale, all funds will be returned to contributors, minus marketing and legal costs. The budget will be allocated as follows:

Development	50%
Licensing, Subscriptions and Hardware	25%
Marketing, Legal & Misc	25%

Bonus Rates

Bonus Rates	Bonus percentages
Angel Day (First day of Crowdsale)	30%
Crowdsale Rest of Week 1	15%
Crowdsale Week 2	10%
Crowdsale Week 3	5%
Crowdsale Week 4	0

The Network Unit Token

1. Users with more than 10,000 NU tokens will be able to earn more tokens by becoming hosts or relays by renting out their hardware
2. Developers who wish to have an easy to integrate, secure and stable multiplayer network solution can rent the Network Units infrastructure using NU tokens.
3. Developers will receive a share of the penalties if one of their hosts are penalized. This will be awarded in NU tokens
4. NU tokens will be tradable on exchanges
5. Active Clients are the players that participate in the verification process. They help to make the network stronger and more secure. For their participation, they receive a part of the tokens awarded to the masternode operator, based on their contribution.

For Game Developers

MMORPG's allow many players to interact in a shared game world. Generally, the MMORPG model of today is free to play however premium content is purchasable. This model has attracted many users although; a majority of them will not purchase any premium content. NU will be an attractive option for developers who wish to save on hosting costs for a more reliable and faster service. Additionally, development time can be reduced by using our flexible multiplayer framework as opposed to developing one from scratch.

The use of the "Free to Play" model was used initially to attract more players. It can be very tough for developers who put their heart and soul into a project only to find that the costs to maintain it are far greater than they expected. This puts them in an unfortunate situation of having to invest their own money just to keep their project alive. Any opportunity to save is an opportunity to allow developer's projects to survive, giving them more time to improve and successfully complete their projects.

The "Free to Play" model MMORPG's is not the only use for the NU platform. It is also advantageous for subscription based MMORPG's, multiplayer action games and FPS's, any turn based or real-time game and even unique titles that have no specific genre. Any opportunity to

save money for a better service is a benefit as it ensures that the profit margins are greater and losses are minimal and most importantly, developers are able to save time.

For Service Providers

Token holders of 10,000+ NU will be eligible to rent their hardware out to the NU platform as Service Providers. They will receive tokens as a reward for renting their resources to developers. Not only does this make the network stronger and more secure but it also allows holders with the opportunity to mine by contributing their hardware. This is a very genuine and pure business transaction where both parties have a mutually beneficial arrangement.

For Active Clients

Active Clients are players that have linked their wallet to their gaming accounts. Their role is to add an additional verification layer for the Service Providers. This is to make our network stronger and more reliable. Not only does this incentivize gamers to set up or connect their wallets, but it gives these users an opportunity to mine while playing a supported game of their choice.

Technical Features

Masternodes/Service Providers

Masternodes will be required to provide a stake and run the host application. This host application will serve requests based on our multiplayer framework. Masternodes can act as relays for other masternode hosts and take over as the new host in the event of a failure. Masternodes will also be responsible for verifying peers. Clients (Gamers with connected wallets) will also verify that they are in fact providing their resources.

Gamers/Active Clients

Active clients are gamers that connect their wallets to their game that utilizes the NU multiplayer framework. This allows them to participate in our verification process that runs in the background. Not only does this help make the infrastructure stronger and more reliable but Active clients can earn tokens for participating in this process.

Orchestration Protocol

Developer Criteria

Developers will be able to select the criteria they require vs the pricing they are willing to pay in order to use the NU infrastructure. Minimal latency may be requested so service providers with backbone internet connections may be required for a more premium service. Or maybe cost effectiveness is more important for a game where a slight latency can be forgiven. Perhaps the game is more CPU bound vs Memory bound or vice versa. Regardless of the requirements, developers will have plenty of options and a variety of ways to set up their criteria. Lastly, it can also be setup with conditions where requirements can potentially change depending on situation, this makes the NU framework very flexible, adaptable and even more cost effective than other centralized solutions.

Level of Service Provided

There will be different types of services provided depending on whether a service provider has backbone internet access, strong CPU, high memory and large bandwidth allowances. Not only

will service providers be able to choose the portion of resources they want to share but they can also set utilization limits.

Matchmaker

When players are matched and a game is to begin an auction process is held which determines the best bid for the level of service required by the developer. The developers have specified their criteria in terms of the level of service vs pricing they require and the service providers have specified what they are willing to bid for the level of resources they can provide. The best bid is determined and the game begins immediately. The service will keep running until no players remain. At this point if players are to join again a new auction process will be held and the best bid at this time will be selected as the service provider for this new session.

MMORPG Style or Gameworlds

The auction process is similar to the matchmaker process detailed above, the only difference is that the service will run until it fails over or the service is stopped for any reason. This is because sessions are required to persist for this style of play. Additionally, if the current active user base grows past the level of service that can be provided, and the developer has specified the required level of automatic scaling in their criteria, a new auction process is held to determine a more suitable provider. Players are then seamlessly moved to a new provider so their gaming can continue without disruption.

Automatic Failover

During the auction process a backup node is also decided on, during the course of the game, the auction process will be held again if the backup node is no longer available. This will help facilitate the automatic failover process by ensuring there is a service provider ready to take over in the event of a catastrophe.

Esports Hosting

Developers will have the option of allowing custom multiplayer server hosting. This will allow anyone to host their own custom esports tournament on the resilient Network Units Infrastructure.

Proof-of-Service

We use two types of verification in order to determine the proof of service:

1 Masternode/Service Provider Verification

Online Verification is requested from a node by a random number of verifying nodes which will attempt a minor network function by the service provider application installed on the node.
A mismatch or timeout results in the verifying node or nodes complaining using our smart contract. This will be triggered by the Service Provider application. When the majority of the verifying nodes complain, the reputation of the node that is verified is affected. Random node-to-node verification is done by using staking and reputation fueled by on-blockchain complaints.

Not only is reputation affected but the Nodes stake (NU tokens) can be affected also. In the case of a verification where the outcome is negative (where the outcome is not the same as the majority) the node will be charged a penalty of its stake and reputation. If the outcome is positive (the majority of nodes verify with the same outcome) the node will be awarded reputation and in some cases, NU tokens.

In order to maintain a fair process and to keep Ethereum gas prices at a minimum, a smart contract transaction is only required if at least one complaint is recorded. This will happen at the end of the verification process. Failing to submit to the smart contract will result in a penalty of that node's stake. Additionally, in the first verification round only nodes that record a complaint are entitled to the stake(s) of the penalized node(s) if the majority agrees with the complaint.

To Summarize:

- Verification is carried out randomly between nodes or on request
- Multiple nodes are involved in the verification process
- Reputation can be affected by the verifier and the verification requestor
- Reputation is influenced positively by duration without complaints (positive) and negatively with complaints (negative)
- Timeouts, dishonesty and bad nodes count towards a negative reputation.

2 Active Client Verification

Active Clients are gamers that connect their wallets to their gaming accounts. This is done through our dashboard rather than the game itself in order to avoid potential issues with gaming marketplaces. The game will provide a unique code which the user can submit to our smart contract in order to get rewarded for playing. In the background, the client will be adding another verification layer that works very similar to the Peer Verification detailed above. This will help make our infrastructure stronger and will also encourage more players to become Active Clients.

Strict Verification Policy

In order to compete with large cloud providers or dedicated server hosts, our service must be more secure, reliable and efficient. Therefore, a strict verification policy is imperative to maintain a quality of service that is exceptional. It is true that we will have automatic failover system in place however, we believe that failovers are not a solution but a means to maintain connectivity in the event of a failure. It is these failures that our strict verification policy is aimed at reducing.

Improved Reliability

Because the NU platform is decentralized, players will receive minimal disruptions to their gaming experiences. Not only will Service Providers that lose connection be penalized, but our decentralized failover system will automatically move players to the closest potential Service Provider.

Host Application

The host application will be connected to the Service Providers wallet in order to identify the masternode so that it can receive payment in the form of our tokens for sharing its resources.

Game Developers

Game developers will maintain their wallets and ensure that it has enough tokens in order to rent the platform for their own projects. This will be provided in an easy to use unity asset that they can easily integrate into their own projects. The asset will be responsible for connecting the users to the right hosts as well as verification of the host's uptime and shared processing. Our framework will allow synchronous and asynchronous gaming and eventual integrations with

decentralized Databases and decentralized storage will cover a lot of potential scenarios for developers requiring multiplayer functionality in their games.

Users

Users can enjoy improved speed, uptime and reliability on the Network Units Infrastructure. Our integrated asset will handle verification for users that become Active Clients by connecting their wallets to their game Id. Active clients will be rewarded for their role in strengthening the network. Gamers who do not link any wallets will still be able to enjoy the game, they will just not receive any rewards.

Integration

Unity3D is the most popular gaming engine due to its multiplatform support and massive asset store and community. We will be offering the NU framework as an asset on the Unity Store.
We will provide sample projects with the asset for examples of how to utilise the NU framework to its full potential. We are also considering integration with Unreal Engine, please contact us if you would like to express interest in UE or any other Engine you feel would be worth considering.

Evil Badger

Evil Badger is a game development and research studio based in Australia. It has two published releases on the Android and iOS store and one of those published releases supports VR. Evil Badger has researched and experimented with AR and Holographic technologies and is currently looking to expand into multiplayer gaming. By developing Network Units, Evil Badger aims to create a decentralized way to handle multiplayer gaming infrastructures. It also aims to provide this in an easy to use unity asset that any developer can integrate into their own games. We feel it is important that we intend to use our own platform for our own operations so that external developers can choose the Network Units platform for their own projects with confidence!

Development Roadmap

Timeline

2015

- Evil Badger Company Registration
- Release of Wood Smash 3D on iOS and Android

2016

- Release of El Mirador on iOS and Android with Cardboard VR support
- Expansion to Holographic and VR Research & Development for applications, gaming and entertainment
- Experimentation of .netcore viability for multiplayer server functionality

Q1 2017

- Research into current Hosted Multiplayer Framework Solutions
- Research Optimization code for Dark Experiences on VR & Holo

Q3 2017

- UDP and RUDP library experimentations
- Zombie Mocap Development
- Spatial Mapping Implementation for HoloZombies

Q4 2017

- Bled of State Political Fighting Game Release to iOS and Android.
- Network Units Service Provider Application Proof of Concept Development

Q1 2018

- Initial Smart Contract Development for Verification Reputation
- Network Units Framework Proof of Concept Demo Release
- Acquire more Programmers as Contractors and/or Staff

Q2 2018

- UDP and RUDP library conversions to .netcore.
- Viability Studies of TCP integration.
- Initial Smart Contract Development for Active Client Verification

Q3 2018

- Initial Smart Contract Development for Masternode Staking
- Initial Release of Service Provider Application

Q4 2018

- Release Network Units Unity Asset with initial Real Time Action Networking functionality.

Q1 2019

- Blockchain Storage and Database viability research
- Flagship Title Release 1

Q2 2019

- Full Integration of Reliable RUDP and or TCP protocols

Q3 2019

- Flagship Title Release 2

Q4 2019

- Next Phase Release of Network Units Unity Asset with TCP and or RUDP functionality.

Q1 2020

- Flagship Title Release 3

Research

Industry

The ever evolving gaming industry has shown tremendous growth over the last decade and continues to rapidly grow every year. The gaming industry in its entirety is now worth over $100bn in annual revenue, and more and more game developers are capitalizing on this massive boom. Multiplayer gaming has been present since the 1970s when computers began supporting the "time-sharing system" created by the University of Illinois[1]. With almost 50 years of innovation, multiplayer gaming is faster, more hi-tech supporting impressive graphics, and allows global gaming with live chat and team-speak features. Network Units aims to take these innovations further!

The Sharing Economy

The sharing economy since its conception in the early 2000s has grown exponentially over the past decade. With a "peer to peer" or "business to business" model, it has become a successful collaborative network in the modern era. Another term for this model is "Collaborative Economy" which can be described as, "an economic system of decentralized networks and marketplaces that unlocks the value of underused assets by matching needs and haves, in ways that bypass traditional middlemen"[2]. Businesses such as Uber, AirBnB, Zipcar, AirTasker, Kickstarter, TaskRabbit and Etsy (while not owning any of their industry specific assets) have seen immense success by providing a platform for individuals and businesses to offer their services and assets in return for recurring revenue. By reducing costs that are incurred from the alternative use of centralized sources, the service provider as well as the buyer tend to profit fully while boosting the economy.

Similarly, Network Units hopes to provide an ecosystem that encourages the growth of a "peer to peer" economy while reducing costs and maximizing profits for all involved parties. Armed with speed, security and reliability, Network Units will be at the forefront of innovation that powers a global multiplayer platform. Game developers as well as Service Providers will be an integral part

of the Network Units collaborative economy that will provide futuristic gaming opportunities for players and developers.

Future Opportunities

Growing interest in multiplayer e-Sports in Asia has seen its introduction into the 2022 Asian Games in China[3]. Tournaments will include elite multiplayer teams with games featuring MOBA (Multiplayer Online Battle Arena) and real-time strategy. Grand prizes will be worth up to $20 million and will require an ultra-fast, reliable and a fail-safe network to operate optimally. Expanding from the Asian Games, eSports (specifically multiplayer gaming) is proposed to be a part of the Olympic Games in the future. Exponential growth and such market opportunities create the space for development of multiplayer gaming platforms with improved functionality. With time, Network Units hopes to provide the infrastructure required by current and future developers to allow their games to support the growing demands of the multiplayer gaming industry and power the competitions and tournaments that are held globally.

References

Lambert, L., 2005. Internet: A Historical Encyclopedia. 2nd ed. California: MTM Publishing.

ABC News. 2017. Esports will be a medal event at the 2022 Asian Games. [ONLINE] Available at: http://www.abc.net.au/news/2017-04-19/e-sports-to-be-medal-event-at-asian-games/8452458. [Accessed 28 September 2017]

Rachel Botsman. 2015. Defining the Sharing Economy: What Is Collaborative Consumption–And What Isn't? [ONLINE] Available at: https://www.fastcompany.com/3046119/defining-the-sharing-economy-what-is-collaborative-consumption-and-what-isnt. [Accessed 28 September 2017].

---

[1] Lambert, L., 2005. Internet: A Historical Encyclopedia.

[2] Rachel Botsman. 2015. Defining The Sharing Economy: What Is Collaborative Consumption–And What Isn't?

[3] ABC News. 2017. Esports will be a medal event at the 2022 Asian Games.