Swarm Network

Storage and communication Infrastructure

Token Economy

Candidate Version 0.6

Dr. Felix Xia

Felix_xia@hotmail.com

Swarm is a decentralised storage and communication system.

According to " The Book of Swarm" a stable, scalable, secure and self-sustaining storge and communication system is crucial for building up the swarm network ecosystem.

A BOC (based on contribution) token economy is introduced to the Swarm Network.

Storage and Communication: Infrastructure Contribution

"Swarm whitepaper": Swarm is a peer-to-peer network of nodes that collectively provide a decentralised storage and communication service.

Any Bzz Nodes provide reliable storge and communication service should be qualified to obtain rewards

Contribution= SC*Time

SC: Storage and Communication service unit

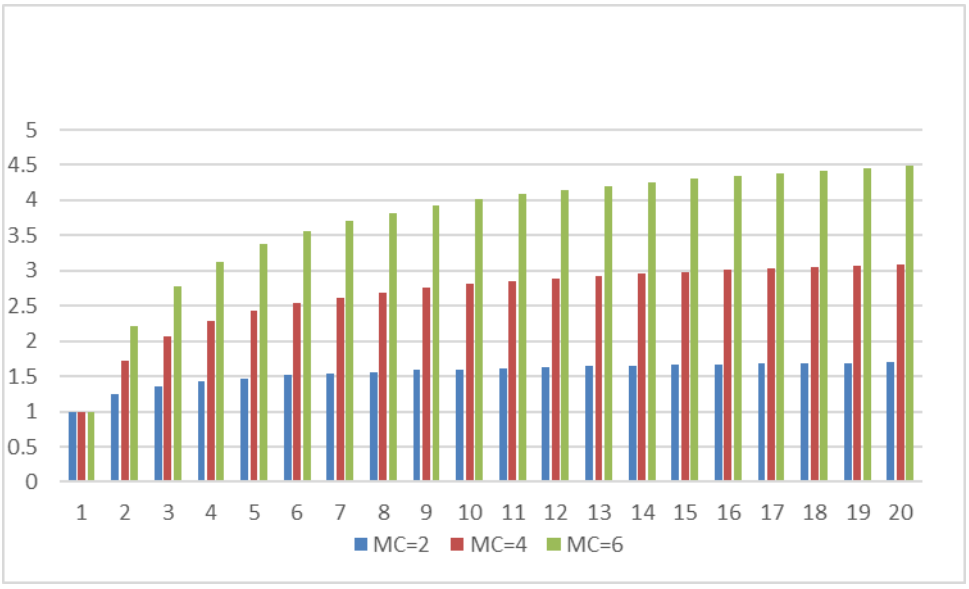
Bond: Swarm Economy Contribution

Minimum 1 Bzz is required for a fully functionable node (full node). Thereby, only full node will be eligible to get rewards.
The nodes will obtain higher rewards by bonding with more Bzz.
Minimum Coefficient of bond is 1 when there is 1 Bzz bonded with the node. More Bzz bonded with the node will result in a higher coefficient.

Contribution= Bond Coefficient *SC*time

Formula:
C = (MC-(MC-1)/(Bzz^(0.4)))
C: Bond Coefficient
MC: Maximum coefficient when the maximum amount of Bzz is bonded with the node:
Bzz: Amount of Bzz bonded with the node

Coefficient Curve:



BZZ	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MC=2	1.00	1.24	1.36	1.43	1.47	1.51	1.54	1.56	1.58	1.60	1.62	1.63	1.64	1.65	1.66	1.67	1.68	1.69	1.69	1.70
MC=4	1.00	1.73	2.07	2.28	2.42	2.53	2.62	2.69	2.75	2.81	2.85	2.89	2.92	2.96	2.98	3.01	3.03	3.06	3.08	3.09
MC=6	1.00	2.21	2.78	3.13	3.37	3.56	3.70	3.82	3.92	4.01	4.08	4.15	4.21	4.26	4.31	4.35	4.39	4.43	4.46	4.49

Benefits for bonding:
When more nodes join the Swarm network, it requires more Bzz tokens. It acts as a price support mechanism.

Let's presume:

There are 1million Bzz Nodes in the network
Minimum 1,000,000 Bzz are locked.
The node has earnt 10 Bzz reward in a period of time.
Coefficient for bond 10 Bzz with the node is 2.8
Most of the operators will keep their earned Bzz bond with nodes.
There will be 5~10million Bzz bond with nodes.

The node's operator's willingness to increase the amount of bonds can be altered by adjusting the MC value. However, it is different from any other "Fintech" blockchain, Swarm's long term vision is to provide a scalable and self-sustaining infrastructure for a supply-chain economy of data. The weight of bond contribution should be limited within range of infrastructure contribution.

Grade: Stable Node Factor

A grading system is introduced to encourage Bzz nodes operators to provide stable service by staying online within the network.

Bzz Nodes get higher rewards by staying online to provide uninterrupted service.

The grading is based on uninterrupted online time. The system is simplistic.

The node will gain 1 grade for every 30 days it is online for, the highest grade is level 5.
The node will lose 1 grade down when it's offline over 24 hours.
Here is a sample:

Online (days)	0~30	30~60	60~90	90~120	120~150
Grade	1	2	3	4	5
Stable Factor (SF)	0.6	0.7	0.8	0.9	1

A higher Bzz price leads to higher rewards for the nodes which will encourage more nodes joint to the Swarm network. However, vice versa - nodes may leave the Swarm network when the Bzz price is down.
However there is a sunk cost for the high grade nodes to leave the network as it will lose its grade.
The grading system will help Swarm to build up a stable infrastructure.

Unlike some other blockchain projects in which they confiscate the bond when the storage or network is offline, the Bzz bond will not be taken away by the Swarm network .

Reward Pool

A Reward Pool is set up for the nodes to share the incentive based on contribution.
Rewards for individual nodes is based on the portion of the contribution to the network during its time. Rewards can be distributed hourly or daily.
Formula:

$$RW = SF * \frac{C * SC * T}{\sum C * SC * T} * PL * X$$

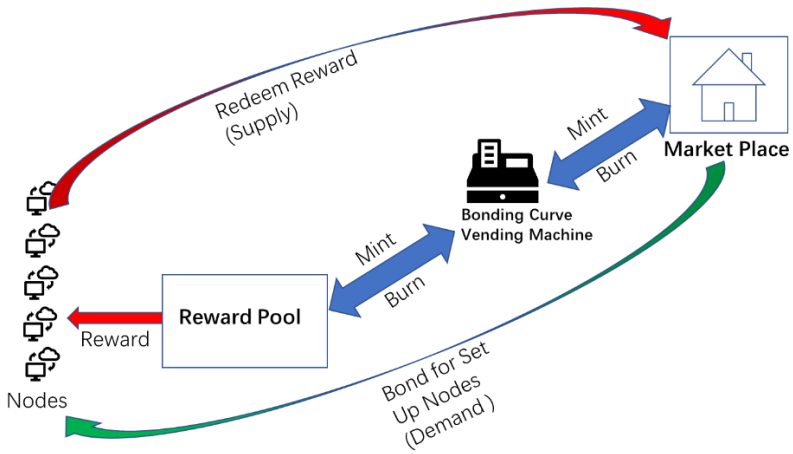
RW: Reward for the Node
PL: Reward Pool
X: Reward to be distributed in a time period (portion of the reward pool), 1/64 or 1/128 is recommended in the early stages. X is adjustable as its calculated by supply and demand in its service in the marketplace.

Initial Reward Pool = Continuous Bzz Token in the bonding curve vending machine.
Once the initial reward pool is set up, RW for individual nodes will be drawn from the pool on a daily basis. The same amount of tokens will be minted or burned in the reward pool as the "Bonding Curve Vending Machine" mints or burns tokens.

Less than 1/64 of the token in the reward pool will be distributed to the nodes daily for their contribution after 5 months of the BOC token economy take place. In turn, this won't affect a lot of the token supply in the market.

The Stable Factor is 0.2 in the first month, the extra token supply from the node operations is so minimal and therefore ignored.

Conclusion:



Swarm Token Economy Diagram

BOC “Based on Contribution” token economy is a powerful tool for building up Swarm Network storage and communication infrastructure.

“Bonding” creates demand for Bzz token.
“Grade system” provides incentives to the stable long term service nodes in the ecosystem.
“Reward Pool” is a bridge between marketplace and service. It is “the invisible hand” that is building a self-sovereign digital society.