EpiK Protocol

Economic Model

Whitepaper - 2.0

February 2021

Vision

“EpiK” was derived from “Epigraphic Knowledge”, which means the deciphering of knowledge previously recorded on stele.

At EpiK Protocol, we envision to build a global collaborative decentralized knowledge graph by applying four core trusted capabilities – trusted storage, trusted incentive, trusted governance and trusted finance, to organize the collaboration among global knowledge community users with an extremely low costs. Thus transferring human knowledge in various domains into an eternal knowledge graph, which broadens AI’s horizons and usher in the era of cognitive intelligence.

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1 Principle

EpiK Protocol's native token is "EPK", with a total supply of 1Billion. Full circulation is estimated only to be achieved 50 years from the initiation of EpiK's Mainnet.only to be achieved 50 years from the initiation of EpiK's Mainnet.

Founding Team	5%	Total: 50M, upon mainnet, 1/16 to be released per 90 Days
Foundation	5%	Total: 50M, upon mainnet, 1/4 to be released per 90 Days
Investors	20%	Total: 200M. Upon mainnet, it will be unlocked in 15-24 months.
Storage	70%	Total: 700M, upon mainnet, decayed by 0.9573501 per quarter, to be fully released in 50 years.

The goal of this economic model is to allow each role in the ecosystem to maximize its own interests while collaborating to promote the growth of the EpiK's decentralized knowledge vault.

2 Participants

EpiK Protocol is a jointly-built, trusted and safe decentralized knowledge graph collaborative platform with sharing benefits, consisting of 5core participants, namely the Knowledge Experts (KEs), Knowledge Nodes (KNs), Knowledge Gateways (KGs), Bounty Hunters and EKP holders. A single user can play multiple roles without conflicts.

Knowledge Users (KU)

EPK Token Holders, to vote for KEs or to access EpiK's knowledge.

Knowledge Gateway (KG)

Knowledge Gateway (KG) is the access portal to access and retrieve knowledge from the Knowledge Vault. AI applications will be able to utilize Knowledge from EpiK Network via the Knowledge Gateway (KG).

Knowledge Nodes (KN)

Knowledge Nodes (KN) contribute data storage space to download and maintain knowledge in the Knowledge Vault. Knowledge Nodes (KN) node can choose to store these data (the data can be saved by multiple KNs) to improve their "Storage Power".

Bounty Hunters

Bounty Hunters assist with tasks proposed by the KEs for token rewards. KEs can publish bounties tasks for Bounty Hunters to complete, and be rewarded with EPK Tokens.

Bounty Hunters

Knowledge Experts (KE) are domain experts who will organize and refine knowledge in various categories before uploading them to the Knowledge Vault. KEs will contribute to their respective areas of expertise in the Knowledge Graphs.

Among these roles, KEs and Bounty Hunters are responsible for supplying knowledge, processing unstructured data into high quality structured knowledge graph data and maintaining data quality; KNs continuously provide data storage of EpiK's structured knowledge graph data in a decentralized network, ensuring its availability; KGs make knowledge accessible, efficiently indexing the knowledge graph data in the decentralized network and providing traceability for tamper-proofing. EPK holders are responsible for maintaining the operation and governance of EpiK's blockchain ecosystem.

3 Knowledge Supply

As data accuracy of the knowledge Graph will directly affect the application value of data, KEs and Bounty Hunters are present to ensure the data quality of the knowledge graph. With the assistance from Bounty Hunters, KEs are responsible for producing credible and quality knowledge, verifying and uploading to EpiK's knowledge graph, completing the knowledge supply process.

3.1 Knowledge Experts

Within the system, only KEs are allowed to upload Knowledge data. To ensure data accuracy, information on the KEs will be disclosed, with all uploaded data traceable back to the corresponding KEs. This subjects the work of KEs to the supervision of the global community.

3.1.1 Voting

There is no limit on the number of KEs but new KEs can only be nominated by the existing KEs. During the initiation phase, EpiK Protocol Foundation will be the only KE within the ecosystem. Any community individual or organization can submit an application to the foundation to become a KE. Nomination for the first batch of KE will be announced by the Foundation to the community before the EpiK Protocol mainnet 1.0 "Rosetta" launches. The nominee (s) will have their application submitted on-chain to the EpiK Protocol mainnet. Individuals or institutions that are still in the nomination stage do not have the right to nominate any other KEs.

Upon nomination, these individuals and/or institutions will immediately follow through to the voting stage. There is no time limit for voting. All EPK token holders will be able to vote but EPK tokens that are used to vote will be locked and will not be in circulation. Voters can choose to cancel the vote at any point in time but their locked EPK can only be retrieved 3 days after the cancellation of vote. EPK tokens that are locked due to voting will receive a share of a 1% allocation from each block reward, distributed in proportion to their locked EPK over the total locked EPK, as a reward for voting. Voters can withdraw these rewards at any time without cancelling the vote.

When a nominee obtains more than 100,000 EPK community votes, he/she will immediately be promoted to a KE, who will then have the privilege to nominate other experts, and have the power to upload knowledge to EpiK's Knowledge Vault. Vice versa, if a KE is unable to retain a minimum of 100,000 EPK of community votes, he/she will lose his KE privileges immediately. However, knowledge that was uploaded by this fallen KE will remain relevant.

3.1.2 Returns

Returns of the KEs is directly correlated to the amount of knowledge contributed by them. The system will distribute 9% of each block reward to KEs according to the proportion of data contributed. In the event that KE contributed data but is reverted back to the nomination stage during the reward distribution, he/she will not receive the reward distribution. Rewards are only given to those who contributed data and are currently holding the KE titles.Domain experts could apply to withdraw their own rewards from the reward pool at any time. After applying for withdrawal, there is a 7-day lock-up period. After the lock-up period expires, the rewards can be withdrawn to the wallet.

After the successful election of the KEs, they will agree to the rules and regulation of "EpiK Protocol Knowledge Expert Commitment", issued by the EpiK Protocol Foundation by default . If KEs violate any of the rules stated within the commitment, such as malicious uploading of junk data in EpiK's mainnet 1.0 "Rosetta" stage, their KE status will be cancelled by the Foundation with immediate effect. At Mainnet 2.0 "Hammurabi", Community can submit proposals to vote to disqualify KEs who are flouting the commitments. This will be further elaborated in the soon to come "EpiK Protocol Governance Whitepaper".

3.2 Bounty Hunter

KEs are responsible for producing, verifying and uploading knowledge but generating high-quality data is not a simple task. With the limitations of automated tools, the process of knowledge extraction, fusion and refinement to generate knowledge in Resource Description Frameworks (RDF) statement format are still very much labour intensive. This is where Bounty Hunter can contribute to EpiK's ecosystem.

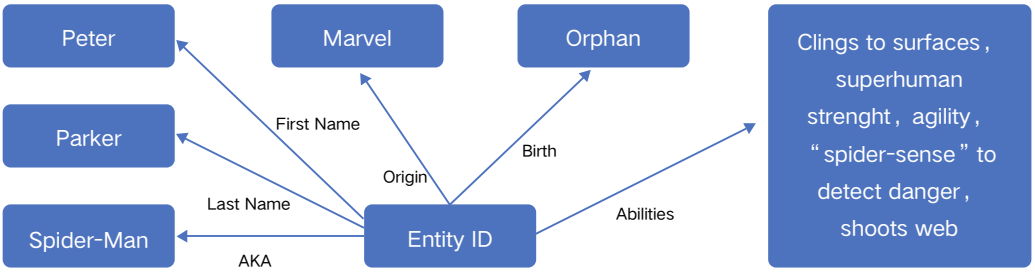
To further elaborate on the collaboration between KEs and Bounty Hunters, lets dive deeper into an example, where a KE prepares to process the series of "Spider-Man" into a knowledge graph, he will process the information gathered in small sections using the following

"Spider-Man is a fictional superhero created by writer-editor Stan Lee and writer-artist Steve Ditko. He first appeared in the anthology comic book Amazing Fantasy #15 (Aug. 1962) in the Silver Age of Comic Books. He appears in American comic books published by Marvel Comics, as well as in a number of movies, television shows, and video game adaptations set in the Marvel Universe. In the stories, Spider-Man is the alias of Peter Parker, an orphan raised by his Aunt May and Uncle Ben in New York City after his parents Richard and Mary Parker died in a plane crash. Lee and Ditko had the character deal with the struggles of adolescence and financial issues, and accompanied him with many supporting characters, such as J. Jonah Jameson, Harry Osborn, Max Modell, romantic interests Gwen Stacy and Mary Jane Watson, and foes such as Doctor Octopus, the Green Goblin and Venom. His origin story has him acquiring

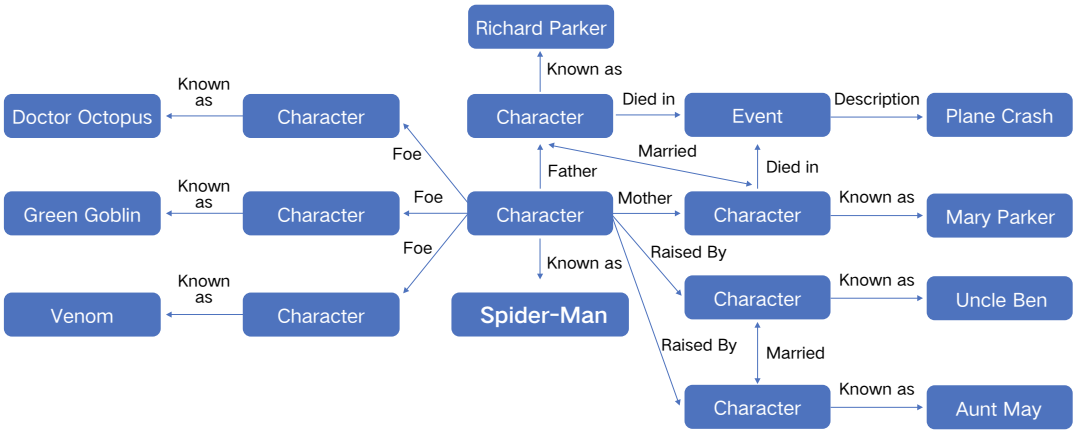
spider-related abilities after a bite from a radioactive spider; these include clinging to surfaces, superhuman strength and agility, and detecting danger with his "spider-sense." He then builds wrist-mounted "web-shooter" devices that shoot artificial spider-webbing of his own design." (Quoted from: https://en.wikipedia.org/wiki/Spider-Man)

Two tasks may be derived from this subsection:

1. Entity extraction: Extract the entities involved, including but not limited to characters, locations, objects, time, etc. A bounty hunter can use tools to automate entity extraction, then proofread on whether the extracted entities are accurate and complete. For example, the automated tool may have extracted the entity "Spider-Man", and the bounty hunter needs to associate it with the entity "Peter Parker", indicating that they are the same person.



2. Relation extraction task: extract the relationships between entities involved in this section, including but not limited to attributes, relatives, siblings, employment, etc. Similarly, this process will also be done by bounty hunters using tools to automatically extract relationships, and then proofread. For example, an automated tool may extract the relationship of "Spider-Man". The bounty hunter needs to associate these seven people with the seven entities "Peter Parker", "Richard Parker", "Mary Parker", "Uncle Ben", "Aunt May", "Doctor Octopus", "Green Goblin" and "Venom" respectively, and link these people with the their perspective relationships, reflecting all seven of them participated in the events in Spider-man's life.



From this example, we can observe that machines have a hard time understanding natural language, which is easily understood by humans. This is why EpiK Protocol envisions to build a super-large-scale knowledge graph where KEs will breakdown and verify tasks, Bounty Hunters will assist in completing the sub-tasks of knowledge extraction, and nodes will store these refined knowledge. EpiK Protocol will be able to educate machines to better understand human knowledge and broaden AI's horizon.

For each task, we recommend that KEs set a bounty that is acceptable to market by working hours. These bounty rewards will come from a Knowledge Fund jointly managed by KEs. 0% to 15% of each block reward will be transferred to Knowledge Fund as subsidies for KEs to assign and Bounty Hunters to claim in order to produce high-quality knowledge. The specifics on how to determine the ratio will be elaborated in Chapter 6. In addition, during mainnet 1.0 "Rosetta", KEs and bounty hunters will collaborate using a centralized Bounty platform built by the Foundation. When mainnet 2.0 "Hammurabi" initiates, this Bounty platform will be decentralized and governed autonomously based on the "EpiK Protocol Governance White Paper", that is released by the Foundation at a later stage. When a KN got disqualified by the Foundation or the Community due to foul play, the recommending KN will also be penalized, increasing their required EPK votes to remain as KN status by 25,000 per penalty.

4 Knowledge Storage

Storing knowledge in an immutable environment is one of the requirements of EpiK Protocol's knowledge graph, and decentralized storage technology is the most innovative and efficient solution to store these knowledge permanently over time. Referencing the storage model of Filecoin, EpiK Protocol will also take sectors as the unit, and utilise proof-of-replication (PoRep) and proof-of-spacetime (PoSt) to ensure a complete data storage in a decentralized environment. As the scenarios of Filecoin are mostly universal storage, which is utilized by large files. While in the knowledge graph collaborative scenarios of EpiK Protocol, small bin-log files are produced by micro-collaboration with high frequency, so as to make the best of network resources, EpiK Protocol envisions to construct a Layer2 storage network customized for knowledge graph collaborative platform, which is based on the core technology of Filecoin.

On EpiK Protocol Layer2 network, anyone who stakes 1,000 EPK can be a Knowledge Node (KN). KNs need to provide data storage services for KEs. Before KEs upload data, they are required to send an on-chain message to register the data, then source for online KNs for free storage (Deal). Knowledge data is then transferred to the KN. After KNs stores the data locally and completes the PoRep, they are required to send an on-chain message to announce the sector where the corresponding data is stored, notifying the entire network that a complete copy of the data has been stored. Periodically KNs are required to send on-chain messages and publish the PoSt of the active sector, informing the network of the integrity of the data stored locally. Each piece of knowledge graph data is designed to be small to avoid wasting storage space, with each sector size set to 8MB by default.

The knowledge node provides free data storage services for domain experts. After storing the data uploaded by the domain experts, the knowledge node can obtain computing power. For each new file uploaded by domain experts, knowledge nodes that have completed file storage in the first N positions can get double the computing power.

KNs are not required to respond to KEs data upload requests in real time. When synchronizing block information, if KNs find knowledge graph data that they have not stored, they can immediately generate free storage deals, and request data through the methods described in Chapter 6, completing the PoRep to obtain the node power, and maintain it by continuously uploading the PoSt. Every KN can save a copy of the data uploaded by KEs, and there is no limit on the number of KN per data. For KN, only storing data registered by KEs will allow them to obtain node power, and storing multiple copies of the same data does not increase one's node power. In addition, the data uploaded by KEs needs to be stored over a long period. KNs do not need to promise eternal storage but every 7 days, each KN is required to upload the PoSt of all his stored data in batches. If any batch of the upload fails, the KN will not lose any staked EPK tokens, but instead will lose the node power for that batch of sectors. If PoSt of the missing sectors is uploaded within 28 days, and the lost node power will be recovered, otherwise the KN will have to re-initiate a storage deal for the missing sectors to regain computing power.

EpiK Protocol uses the Expected Consensus algorithm to produce blocks, any KN with a node power greater than 0 has the opportunity to be a block producer. Using Expected Consensus, the greater the node power, the higher the probability of being a block producer. A block will be produced every 30 seconds, and there may be zero or more KNs who will be this block producer. The first block producer to complete and broadcast the block to the majority of other KNs in the entire network will receive storage rewards, of 115.2 EPK block rewards, of which breaks down in the following manner:

- 75% will be distributed to KNs who are currently producing blocks via the “7 + 7” methodology - rewards will be released after 7 days, over a period of the next 7 days.
- 1% will be allocated to voters who voted for KEs (as mentioned in Chapter 4).
- 9% will be allocated to existing KEs (as mentioned in Chapter 4).
- 15% will be allocated based on the supply and demand of EpiK's knowledge graph data into Knowledge Fund and the subsidies for KNs' operation cost (in Chapter 6).

Block rewards will be reduced once in every 90 days by 0.9573501 of the prior block reward amount. According to this reduction ratio, block rewards will be halved every four years, resulting in the full circulation of the 700M EPK tokens by storage in an estimated time period of 50 years.

5. Knowledge Access

Knowledge in EpiK's Knowledge Vault is stored in the respective decentralized nodes, and as knowledge capacity grows, sustaining access to EpiK's Knowledge Graph is the basic and most important task on hand. As such, bandwidth of the entire network will be capped at all times. EpiK Protocol will allow users to access data in an orderly manner under limited bandwidth resources, and at the same time, encourage KNs to continuously optimize their bandwidth resources.

In EpiK Protocol, users can get 10MB of data access traffic per day for every EPK staked. The data access limit is refreshed daily. As mentioned at the end of Chapter 4, 15% of each block reward will be allocated and distributed according to the supply and demand of the knowledge graph data of the entire network, which is best measured by the percentage of EPK staked in order to obtain daily traffic access into EpiK' s Knowledge Graph. A high percentage will indicate that EpiK' s Knowledge graph is in high demand and Nodes will need to be better incentivized to increase bandwidth quality, ensuring a smooth visitor experience. Vice versa, a low percentage will indicate that Knowledge in EpiK' s Knowledge Graph is not valuable yet and the Foundation will use this funds to accelerate the construction of a more valuable Knowledge Graph. The specific distribution formula is as follows:

$$\text{Bandwidth Incentive Pool} = \min\left(\frac{\text{staked tokens for accessing data}}{\text{circulation tokens} * 75\%}, 100\%\right) * 15\% * \text{RewardPerBlock}$$

$$\text{Knowledge Fund Incentive Pool} = 15\% * \text{RewardPerBlock} - \text{Node Incentive}$$

If the amount of EPK staked for accessing data accounts for 15% of EPK total circulation and each block reward is 115.2 EPK, the current block node will receive 86.4 EPK as block reward as per the "7+7" unlock arrangement. Meanwhile, 3.456 EPK will be injected into the Bandwidth Incentive Pool, which is to be distributed to data retrieval providers at the price 0.00002 EPK/Mb. And the Knowledge Fund Incentive Pool will also receive 13.824 EPK, which is to be distributed to bounty hunters in crowdsourcing applications like Knowledge Mainland.

6. Governance

At EpiK Protocol, we envision to build an everlasting knowledge vault by applying decentralized storage and decentralized crowdsourcing to construct a global collaborative decentralized knowl edge graph. However, the community needs to be autonomous, to realize this vision. Parameters mentioned above are to assist with the initialization of EpiK Protocol mainnet 1.0 "Rosetta", and the Foundation will reserve the right to modify these parameters accordingly to efficiently coordinate the demands of all parties. After mainnet 2.0 "Hammurabi" is launched, all governance rights will be transferred from the Foundation to EpiK DAO, where all EPK token holders will be able to participate in proposing new initiatives and voting for consensus, further improving and sustaining EpiK Proto col.

Specifics to EpiK DAO governance plan, as well as Knowledge Fund governance plan, will be further elaborated at a later time in "EpiK Protocol Governance Whitepaper".

7. Risk and Disclaimer

1. This document is for informational purposes only and does not constitute any recommendation, solicitation or offer to buy or sell any stock or securities in EpiK or its related companies. Such solici tations must be made in the form of a confidential memorandum and must comply with applicable securities laws and other laws.

2. Nothing in this document should be construed as a token sale. Nothing in connection with this white paper should be construed as participation in a token sale, including any request to obtain a copy of this white paper or to share this white paper with others.

3. The EpiK team will continue to make reasonable attempts to ensure that the information in this white paper is accurate. During development, the platform may be updated, including but not limited to the platform mechanics, tokens and their mechanics, and token distribution. Portions of the docu mentation may be adjusted as the project progresses in a new version of the white paper, and the team will publicize the updates by posting a notice on the website or in a new version of the white paper. EpiK expressly disclaims any liability for any loss or damage resulting from (i) reliance on the contents of this document, (ii) inaccuracies in the information herein, and (iii) any action taken as a result of this document.

4. The team will make every effort to achieve the objectives stated in the document. However, due to the existence of force majeure, the team is unable to fully make the commitments.

5. EPK, as the official token to EpiK, is an important tool for the platform to perform. Ownership of an EPK does not confer ownership, control, or decision-making power over EpiK. EPKs, as cryptographic tokens used in EpiK, are not (a) currencies of any kind; (b) securities; (c) equity interests in legal entities; or (d) stocks, bonds, notes, warrants, certificates, or other instruments granting any rights.

6. The EPK may or may not add value depending on the laws of the market and the needs of the application, and the team makes no commitment to its value and is not responsible for the consequences of any increase or decrease of its value.

7. To the fullest extent permitted by applicable law, the Team shall not be liable for any damages and risks arising out of participation in trading transactions, including but not limited to direct or indirect personal injury, loss of business profits, loss of business information or any other financial loss.

8. EpiK complies with any regulatory and industry self-regulatory statements that are conducive to the health of the token distribution industry. By participating, participants will fully accept and comply with such inspections. At the same time, all information disclosed by the participant to complete such inspections must be complete and accurate.

9. EpiK expressly conveys to participants the potential risks. And by participating in a Token Sale transaction, participants acknowledge that they understand and agree to the terms and conditions set forth in the bylaws and accept the potential risks of the platform at their own risk.

10. Citizens of countries where the sale of tokens is prohibited are not allowed to participate.