ARTIS Blockchain

Economy Paper

Draft v0.3

ARTIS

Stop Paying, Start Living

Building the foundation for a human-centric, crypto-based ecosystem

Content

Abstract

Blockchains will revolutionize the world we live in. This new technology has the potential to disrupt entire industries and challenge the status-quo of our reality. ARTIS will be one of the blockchains to contribute to the revolution that's underway.

The ARTIS Blockchain ("*ARTIS*") is built to serve as a foundation for decentralized applications by providing an open-source ecosystem sharing many similarities with the Ethereum Blockchain and therefore enriching the application space for new business models.

ARTIS combines the advantages of its infrastructure such as the Proof of Stake consensus algorithm, with novel proposals in the blockchain space such as Plasma, Raiden and Sharding to solve for the two biggest issues that blockchain faces right now: sustainability and scalability.

ARTIS introduces two completely new system features:

- "*Streems*", which literally make cash flow continuously between two accounts.
  This is a new on-chain scaling solution and is especially suited for regular payments or value transfers of all sorts. Streems need very few transactions, can run for an indefinite time and can be adjusted through oracles.
- Sybil-attack resistant Member registration via a well-defined network structure.
  In ARTIS, humans will be registered anonymously and will get freshly minted ARTIS coins ("ATS") via a Streem. This will broaden the available user base for services built on top of the ARTIS Blockchain and assures a broad distribution of coins.

ARTIS has a special focus on practical security and usability in order to address the various security incidents in the course of blockchain history. The Minerva App ("wallet") will provide proven, simple and safe key-storage and is designed to allow service integration in an intuitive way. The combination of broad ATS distribution and an automatic top-up feature for Crypto-Euros will lead the way to mass adoption for services on ARTIS.

Building a sustainable, organizational framework is paramount to guarantee long-term success for this new decentralized Blockchain system. The ARTIS ecosystem consists of:

- ARTIS Foundation
  This non-profit organization located in Europe will provide financial support for the protocol development and important 3rd party activities enriching the open-source space and the ARTIS ecosystem.
- lab10 collective
  This common good-oriented cooperative located in Graz (Austria) will cover

most of the initial ARTIS development and communication. A three-year contract with the ARTIS Foundation ensures that the lab10 collective provides key developmental resources.

- ARTIS Network
  The hardware infrastructure is maintained by *Trustnodes* and *Freenodes*. The sign-on process of *Members* is handled by *Registrars*. Governance, coin distribution and consensus will be managed independently, to avoid interference between them.

Governance for ARTIS will be a decentralized, liquid democracy inspired system utilizing the unique ARTIS Network; combining a mixture of off-chain and on-chain decision making.

ARTIS is built for continuous value increase and therefore the distribution of ARTIS coins is tied to the growth of the ARTIS ecosystem. The total amount of ATS is capped at a maximum of 21,000,000,000 ATS and 3,000,000,000 ATS are available at the beginning. Approximately 75% of ATS will be distributed for free to every registered *Member* and limited amounts will go to all ARTIS network-relevant functions as well as the ARTIS Foundation to support further development.

ARTIS is creating a Blockchain for the new era of cryptoeconomics. It takes into consideration interactions with other cryptoeconomic systems, various scalability solutions and interactions with these protocols by humans and machines. ARTIS leverages the most advanced technology to offer a foundation for third party applications that make human interaction, sharing and business safer, easier and more sustainable. This creates an ecosystem for a future worth living in.

1. The ARTIS Ecosystem

1.1. Background: The Rise of Cryptoeconomics

Since the introduction of Bitcoin in 2009, the world has witnessed the rise of distributed ledger technology and cryptocurrencies. This new paradigm is frequently called cryptoeconomics and encompasses the protocols that govern the production, distribution and consumption of goods and services in a decentralized digital economy.

Cryptoeconomics uses computer networks, cryptography and dis-/incentives that are derived from game theory to create a new ecosystem for how we trade, work and live. Blockchain is the underlying technology of cryptocurrencies, and it is about to fundamentally transform traditional systems in the same way that the emergence of the internet once did.

This innovation, however, is still in its infancy. Crucial aspects of cryptoeconomics, such as protocols and interactions between systems, are not sufficiently defined yet. Many early adopters have bought cryptocurrencies with the intention to hold them long term or trade them hoping to make a profit. Very few people realize that the technology upon which cryptocurrencies are built is far more powerful than the quick gains and hype which attracts many people into the field.

The power of blockchain is about to disrupt centralized systems. In the 21st century, most industries, regardless of their size, spend vast amounts of money, time and resources on correcting errors, avoiding fraud, tracking records, and carrying out other such mundane tasks that are required to keep the system functioning. By using a decentralized cryptoeconomic system, this effort can be reduced tremendously.

The answer lies in blockchain - a shared, trusted and decentralized public ledger. Blockchain is secured through cryptography and no single person or central entity controls the flow of information or value. This means that when transactions are logged onto the blockchain, they become immutable – they cannot be deleted or altered in any way. At its core, blockchain is about creating trust in a trustless system.

ARTIS is a blockchain framework that takes into consideration interactions with other cryptoeconomic systems, various scalability solutions and interactions with these protocols by humans and machines. ARTIS builds upon the current advantages of blockchain technology and is designed to not only improve how we interact with the system as a whole, but also to derive real economic value from those interactions.

1.2. Vision of the ARTIS Blockchain

The ARTIS Blockchain is laying the foundation for a human-centric, crypto-based ecosystem. The ARTIS vision is to be a Blockchain that benefits the common good, respects privacy, is resource-efficient and will be available as open source for every human.

Sustainability: In addition to using resource-efficient technology (Proof of Stake), ARTIS facilitates the implementation of new business models focused on reducing resource consumption (e.g. sharing economy).

Usability: The ARTIS ecosystem will be user-friendly and intuitive, making interactions on and with the Blockchain easy. ARTIS will provide a framework and foundation for implementing automation in new and novel use-cases.

Cooperation: ARTIS will be an integral part of the evolving network of Blockchains connected through systems like the Interledger Protocol. The ARTIS foundation also proactively seeks to collaborate with start-ups and developers enhancing the ARTIS experience.

Privacy: While transactions on the Blockchain are already pseudonymous, ARTIS will offer fast and private payment channels for better privacy.

1.3. Design of the ARTIS Ecosystem

When designing a new blockchain system, a host of different aspects such as usability, scalability, security and integration must be taken into consideration.

ARTIS addresses the following issues:

- Interaction with blockchains is still a grey area for the average user. Cumbersome user interfaces, complicated security measures and a general lack of access leave much to be desired within existing frameworks.
- Private key-management is not suitable for lay people who usually do not have backups, lose their passwords and expect phone support.
- Machine integration is still very vulnerable when hardware is accessible to hackers and software changes are not easily detected.
- Purchasing coins poses another big hurdle for lay people and the current crypto business world. There is no convenient connection to legacy banking.
- Identity management in a Blockchain system is still under development, but is needed for most business applications.
- Cryptocurrencies lack real-life use cases and their price is highly influenced by speculation.
- Planning business cases is difficult if transaction fees are not predictable and comparatively low.
- Scalability is an issue many are working on, but the proposed solutions are still far from achieving the needed growth. This is true for Smart Contracts as well as simple transactions.
- Security is constantly evolving but right now massive amounts of cryptocurrencies are stolen and get lost due to security loopholes and unintended software behavior.
- Sustainable financial stability of blockchain systems is often fickle. To avoid vulnerabilities, the support of developers has to be assured by businesses.

The design of the ARTIS ecosystem is therefore comprised of:

1. **ARTIS Foundation**

   The continuous financial support to develop the protocol and important applications should be independent of selfish business interests. Therefore, the ARTIS Foundation is set up as an independent entity, able to promote the success of the ARTIS ecosystem in the best possible way.

2. **Robust Network Infrastructure**

   The network of nodes will have between 50-200 independent servers. Therefore, compared with the number of mining pools of systems with Nakamoto consensus (e.g. Bitcoin or Ethereum), the ARTIS network will offer a much higher decentralization and resilience.

   The ARTIS ecosystem will be completely public and permission-less as soon as the Growth Phase starts. During the Bootstrap Phase, the parameters for the network infrastructure will be fine-tuned to allow the best possible decentralized governance.

3. Simple Mobile Integration

Usability will be addressed by creating a mobile app by combining the best features of Status[i], Toshi[ii] and Byteball[iii]. This will provide the best possible user experience and offer simple integration with ARTIS-based services. It will also allow direct, automated transfers between Euro/Dollar and ATS. The integration of new tokens will be simple, ensuring full participation in new innovations and a simple way to trade them.

Many people are still scared to be tricked into sending funds to the wrong address and therefore it will be possible to redeem funds for a predefined period. Furthermore, the key management will be possible in a more secure, but still decentralized way for less experienced users.

A simple support for self-sovereign identity data management and authentication is also planned for the Bootstrap Phase, making interaction as seamless and natural as possible.

4. Cooperation with Startups and Businesses

The best possible network growth will happen if startups are able to build new businesses on ARTIS and existing companies can integrate their use cases. Right from the start, ARTIS has established an impressive cooperation network which will continuously be extended to fulfill growth targets.

5. Rigorous Security Audits

ARTIS will build on the proven Ethereum technology and will therefore avoid some of the security problems of completely new systems. Security is essential and therefore everything which is modified will be peer-reviewed. Anything critical to the security of funds will be audited by accredited external experts. Some of them can already be found in the cooperation network list.

The basic development of ARTIS is currently done by the lab10 collective, an Austrian cooperative with substantial development capacity and knowledge. While ARTIS is currently developed by the lab10 collective, the blockchain itself is based on decentralized decision making.

The future development will be done by lab10 collective members as well as other software talents selected by the ARTIS Foundation. Furthermore, the ARTIS Foundation will support new startups financially (with ATS) to improve the economic value for the entire network.

1.4. The Minerva App

In our current economy, monopolistic platform structures enjoy a clear competitive advantage due to their efficiency and network effect. However, these structures lead to privacy infringements on their customers and lack innovation. Furthermore, payments are unnecessarily complex and go through a myriad of service providers.

ARTIS will allow to change that by providing an intuitive interaction interface for users. This application, the ARTIS "*Minerva*" app, has privacy built into it and users can choose their mode of payment freely. Minerva is an all in one DApp/Chat/Contract/Payment App for interacting with the ARTIS blockchain.

The development of Minerva will be ongoing and will include the following features:

1. **Transactions**: *Minerva* will allow true peer-2-peer payments. These can also be initiated within a chat, via private payment channels as well as via "Streems" in a pseudonymous fashion.

2. **Usability**: Secure decentralized key management by leveraging existing interpersonal trust relations.

3. **Communication**: Minerva will have a chat feature to communicate with trusted friends and service bots.

4. **Sharing Economy**: Minerva will provide an interface for sharing resources. In a DApp area, service providers can offer subscription services for sectors such as mobility and energy. The use of resources will be monitored by the system and payed via continuous Streems in a clear, contractual way with the possibility to use self-sovereign-identity for it.

5. **Currency Conversions**: Minerva will allow convenient currency conversions from fiat to crypto and vice versa at a fixed exchange rate through full fiat backing.

2. Governance Layer

One of the least developed parts in decentralized Blockchain systems are governance mechanisms. There are always Unknown-Unknowns and therefore system design cannot incorporate them at the time of definition. However, the following procedures are planned for technical and non-technical changes.

For technical suggestions and improvement proposals, the global developer community can contribute through open source platforms. ARTIS will use Github similar to BIP[iv] (Bitcoin Improvement Proposal) and EIP[v] (Ethereum Improvement Proposal) to manage suggestions. Proposals for ARTIS can be handed in as AIP's (ARTIS Improvement Proposal).

For non-technical proposals, ARTIS plans to use its trusted network in combination with Liquid Democracy to allow decentralized decision making. The trusted network could be used in a similar way as Dash[vi] uses their Masternode voting system.

In the ARTIS Blockchain economy there are the following participants:

- **ARTIS Foundation**
  Responsibilities: Manage financial assets, assure the development of the ARTIS protocol and support other beneficial activities for the ARTIS ecosystem
- **ARTIS Network**: Trustnodes / Freenodes / Registrars / Members / Users
  Responsibilities: Maintain a trustworthy, well performing network infrastructure and foster a decentralized, yet powerful network for interactions among all parties
- **ARTIS Community**
  Responsibilities: Highlight challenges, propose and work on improvements for the ARTIS protocol and network structure

2.1. The ARTIS Foundation

The legal entity to support the ARTIS ecosystem will be the ARTIS Foundation, a non-profit organization in Europe.

Functions to be fulfilled by the ARTIS Foundation:

- Support start-ups to enlarge the ecosystem
- Finance important R&D work in connection with the ARTIS Blockchain
- Establish a decentralized governance mechanism for the ARTIS ecosystem
- Finance the development work for the ARTIS Blockchain
- Support open-source projects which are vital for a free internet
- Support ARTIS marketing and promotion efforts

The organizational structure will be defined in line with the current regulation.

2.2. The ARTIS Network

The node network is calculated to eventually grow to a total of 200 *Trustnodes*. These Trustnodes will manage up to 10,000 *Freenodes*, where every Freenode can have up to 100 *Registrars*. Every Registrar can register up to 500 unique humans (*Members*). This creates a total system capacity of 1bn Members. Estimations for [coin distributions](#) are done for a network of up to 250M registered Members.

Web of Trust

The layered structure of different roles in the ARTIS network creates a robust web of trust. The consensus will happen on Trustnode level. These Trustnodes will be scattered all over the world assuring different legislations and high resilience. After an application process, the real identities of Trustnodes, Freenodes and Registrars will be known within the system, but will be shielded from public visibility. The combination of trust anchors and cryptoeconomics will allow the formation of a working web of trust, which has been hard to establish so far.

The network structure is defined under the premise to have certain knowledge about other participants who will have to take responsibility for their actions.

Trustnodes: highest ATS staking requirement, high compute and availability requirements

- Grow the network of Freenodes and Registrars
- Monitor business participants and detect malicious behavior

Freenodes: medium ATS staking requirement

- Run the *Saturn* payment channel network
- Run Plasma chains for cheaper subnetworks
- Build, maintain and supervise the Registrar network

Registrars: low ATS staking requirement

- Conduct the anonymous sign-on process for *Members*
- Support *Members* with their questions

Members

- Use the system and enjoy some extra coins

Using the ARTIS Blockchain will not require any registration and the interaction is public. Running a node is permissionless. For Trustnodes and Freenodes, reputation has to be earned over time and actions have to be performed so that rewards are delivered in full.

The ARTIS ecosystem forms a web of trust and therefore it must also be able to punish malicious behavior and fraud. There are two mechanisms coming into play:

- Burning of staked ATS or representative tokens
- Permanent exclusion from the ARTIS network

The latter will come into effect latest at the Growth Phase and is part of the decentralized governance mechanism.

2.3. The ARTIS Community

For ARTIS to be able to realize its vision, the cooperation and collaboration with a multitude of network partners is paramount.

ARTIS initial development

- lab10 collective eG: The lab10 collective with its 38 members is a cooperative founded in July 2017 and registered in Austria. The first closed internal funding round took place in October 2017. There will be a three year contract between the ARTIS Foundation and lab10 collective eG to assure continuous development and rapid adjustments in case of problems. Further information can be found at: www.lab10.coop
- Community Contribution: As soon as the code is open sourced, developers from around the globe are free to contribute with their suggestions through the AIP system.

lab10 collective cooperation partners

- AIT - Austrian Institute of Technology (Web)
- Bitcoin Austria (Web)
- BlockchainHub (Web)
- Coinfinity (Web)
- Danube Tech (Web)
- Energie Kompass (Web)
- Zeropass (Web)

2.4. The ARTIS Team

The ARTIS team members cover a whole host of disciplines and have many years of experience in the fields of blockchain technology, mathematics, cryptography as well as digital currency communities. The development team consists of 10 developers. Below is an overview of the main team members and their bios.

Name	Experience
Dietmar Hofer *Lead ARTIS Dev*	Dietmar worked as a SW engineer for the last 12 years, dealing with embedded and distributed systems, mobile and web. Before deep diving into Blockchain in 2016, he helped bootstrap Bike Citizens in the role of the tech lead. His experiences paired with his values made him a strong proponent of open technologies, decentralization, ethical and privacy respecting design, pragmatic choices, simplicity and great UX.
Dr. David Forstenlechner *Lead Architect*	David is a Software Architect with a focus on large-scale, multi-platform codebases. Evangelizing and implementing Continuous Integration/Delivery pipelines and Agile practices since 2005 with extensive experience working on dynamic, distributed and multi-national teams. Early adopter of Cloud and Infrastructure as Code technologies for streamlining the application lifecycle of large software development projects.
Robert Mitwicki *Lead Minerva Dev*	Software engineer/CTO, over 9 years of experience with designing, building and testing various software for small and big companies. Working in multidisciplinary and international teams around the world. Strong know-how in the fields of infrastructure, web and mobile development.
Nejc Kuzmič *Lead UX/UI Designer*	Nejc Kuzmič is a designer focused on creating thoughtful experiences, developing functional interfaces and defining delightful interactions with digital products. In 2015, he graduated Information Design from the FH Joanneum in Graz. He previously worked for the startup Bike Citizens in Graz and for the digital design agency Men on the Moon in Vienna.
Helmut Siedl *Quality Assurance / Software Testing*	Helmut worked as software tester with a focus on customer acceptance tests for the world's leading producer of engine testbed software for 6 years. He is a ISTQB Certified Tester CCNA and a Diplom Projectmanager. This knowledge combined with many years of experience as blockchain enthusiast is ideal to set up a QA Testing for the ARTIS software with special focus on Minerva.

Name	Experience
Lukas Obermann	Lukas has been working in the software business for 9 years now; 6 years as lead developer and 2 years self-employed. During this time, he gathered a lot of experience in creating products - from the idea to completion as well as maintenance and building on them.
Peter Grassberger	Peter has been a self-employed Web and Software Developer for 2+ years. He holds a Media Technology and Design Bachelor's degree from the FH Hagenberg. He likes to contribute to Free Software and fights for Digital Rights.
Markus Teufelberger	Interested in all things technical, Markus currently works at mgIT GmbH as a systems architect making sure that the lights of various servers stay on and keep blinking. He studied Chemistry and Computer Science at TU Graz and loves to think about and tinker with new and interesting problems as well as solutions to them.

The development team is supported by experts in the fields of marketing and communications, copy writing, graphic design, finance, event management, video production, and more:

Name	Experience
Thomas Zeinzinger	Thomas has 15+ years of experience in supporting startups and companies in business development, innovation management and process improvement. He holds a MSc. in Material Science and has worked in various management functions of multinational companies in the Automotive and Energy sector. In 2013, he started his own company with a focus on startups.
Wolfgang Bergthaler	Wolfgang has 10+ years of experience as an entrepreneur, independent consultant and business developer working in Europe and India.
Gabriela Steiner	Gabriela has a Master's degree in Business Administration and has been working as a senior executive in marketing for several years. After gaining international work experience in India, she is now back in Austria.

Name	Experience
Jakob Schneider	With degrees in law, sinology and design and many diverse work experiences in Australia and China, Jakob has been working as a creative strategist for the past couple of years, building and structuring authentic brand communication that is unique, honest and valuable. In developing concept & copy, Jakob draws on learnings from his current Master in Cognitive Science to contribute to a sustainable society.
Christiane Preuss	Christiane is a graduated Communication Designer and worked in different agencies focusing on holistic and authentic visual concepts for projects and brands.
Dr. Amaliny Hasselbeck	Amaliny has more than 10 years of experience pioneering tech and digital businesses around the globe. She has a track record in growing businesses in innovative and disruptive markets. She holds a Ph.D. in Technology and Innovation Management, an MBA in Entrepreneurship and a Postgraduate Diploma in Psychology. Amaliny has been studying and working in Germany, Australia, UK, India, Singapore and USA.
Bernhard Wladkowski	Experienced associate with a demonstrated history of working in startups and the marketing industry. Skilled in consultative sales management, new business opportunities, entrepreneurship, events and project management. Strong professional and autodidact in the blockchain industry, ironman and mind coach.
Dario De Nicolo	Dario is a media production specialist based in Graz. He has been a video editor since forever and has well over 10 years of professional work experience in digital video- and TV-production and post-production as well as his own media production company, ECOMOTIV.
Helmut Siedl *Community Manager Bitcointalk/Slack*	Helmut acts as community manager on Bitcointalk and the ARTIS Slack as a direct contact for users to provide valuable feedback for Quality Assurance (QA). He has been working in similar functions for other blockchain projects since 2013.

2.5. Financial Management of the Foundation

The ARTIS Foundation is built to have very little operational cost. Its responsibilities are to handle the daily financial management as well as the digital asset management.

Storage of digital assets will be done mainly in cold storage. Partial signatures and redundant storage on indestructible media will add additional security. Hardware wallets will be used for operation with digital assets allowing seamless transfer in a peer-to-peer fashion.

A maximum of 25% of all digital assets are moved to exchange services like Bitstamp[vii] or Bittrex[viii], so that even in the unlikely event of an exchange mismanagement, the continued support for the ARTIS ecosystem is not endangered.

Funding Source

During the initial coin distribution (1.5bn ATS), all supporters will receive ATS coins for their donation. The ARTIS Foundation is free to conduct or support additional funding rounds to extend the ARTIS ecosystem and support the development of global services for the common good.

Initial Coin Distribution
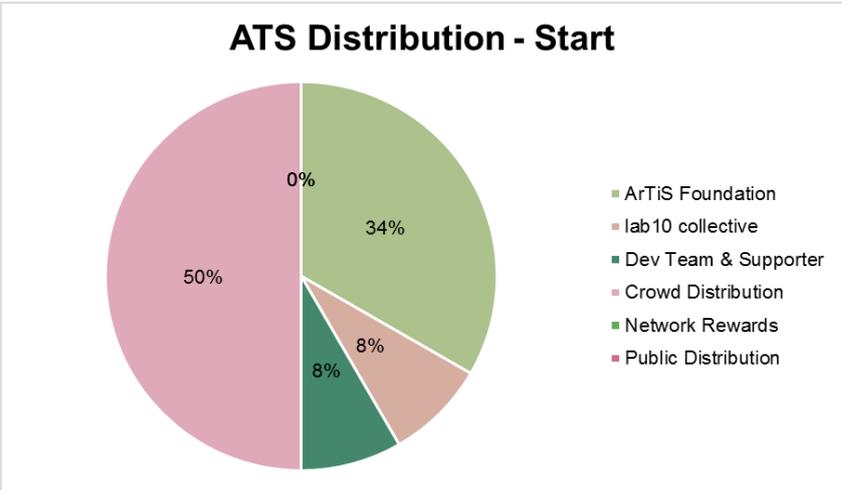
50% or 1.5bn ATS for the initial crowd distribution
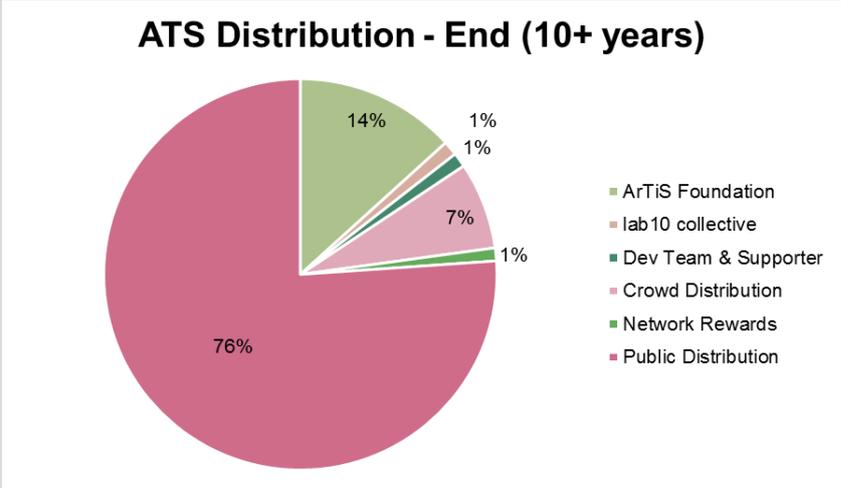
33.4% or 1bn ATS for the *ARTIS Foundation*

8.3% or 250M ATS for the development team and early supporters

8.3% or 250M ATS for the lab10 collective

Figure 1: Initial Coin Distribution

As soon as the network of registered Members grows, more ATS will be generated within the system. After the maximum amount of 21bn ATS is generated, the distribution will be as follows:

76% or 15.9bn ATS for public distribution to registered *Members*

13.2% or 2.8bn ATS for the *ARTIS Foundation*

7.2% or 1.5bn ATS for the initial crowd distribution

1.2% or 250M ATS for the development team and early supporters

1.2% or 250M ATS for the lab10 collective

1.1% or 224M ATS for network rewards to the *ARTIS Network*

Figure 2: Final Coin Distribution

Restrictions on the use of funds

After the first year, the ARTIS Foundation and the lab10 collective are allowed to sell some of their coins. However, coins cannot be sold if the price is below the initial exchange rate.

Coins of lab10 team members will be locked for up to three years (vesting period).

2.6. Legal Affairs and Other Matters

Legal affairs

The ARTIS Foundation is established in Europe. In all legal matters, one must seek advice from a lawyer who practices the local law.

Disclaimer

The ARTIS Foundation is a non-profit organization. Participants in the initial coin distribution will gain access to the ARTIS Blockchain. The financial supporter understands that there is neither expressed nor implied warranty with ARTIS to the extent permitted by law and that ATS are distributed on an "as is" basis. The financial supporter understands that the ARTIS Foundation will not provide any refunds under any circumstance.

Dispute resolution

For disputes, the parties shall settle based on agreement. In the case that no settlement is reached, each party can further dispute via legal means.

3. ARTIS Timeline

The initial ideas for ARTIS were discussed by Dietmar Hofer and Thomas Zeinzinger in autumn 2016 and some basic implementations were tested throughout the first half of 2017. It was then that it became clear that a new Blockchain is needed to implement novel functionalities and to approach the topic of coin distribution in a new, more inclusive way. ARTIS is based on the code of Ethereum with specific alterations to the protocol and will actively support the ecosystem and provide open-source code to the global community.

The ARTIS development was started in August 2017. The ARTIS test network is up and running since December 2017 and the implementation of core features is done in parallel with the development of the communication strategy.

Testnet Phase: December 2017 – November 2018

A predefined group of people are running nodes to test the software parts needed to integrate and change. Around those trusted nodes, ARTIS will have friendly customers testing the system.

Bootstrap Phase: December 2018 – November 2019

During this phase, a defined set of trusted nodes develop the system cooperatively until the needed parameter are found for reliable, complete decentralization. The network is extended geographically and in number of participants.
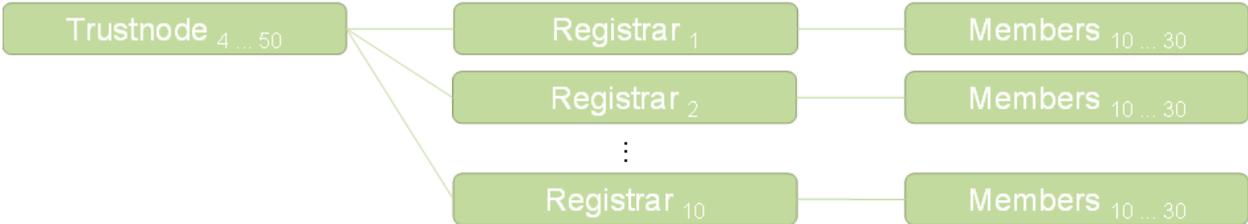

Figure 3: Network size in Bootstrap Phase

Target-Network size after 12 months: 50 Trustnodes; 200 Registrars; and 10,000 Members

Growth Phase: December 2019

With the base system running securely, defined simple interaction and scalable registration, ARTIS can go into the next phase, growing the network.
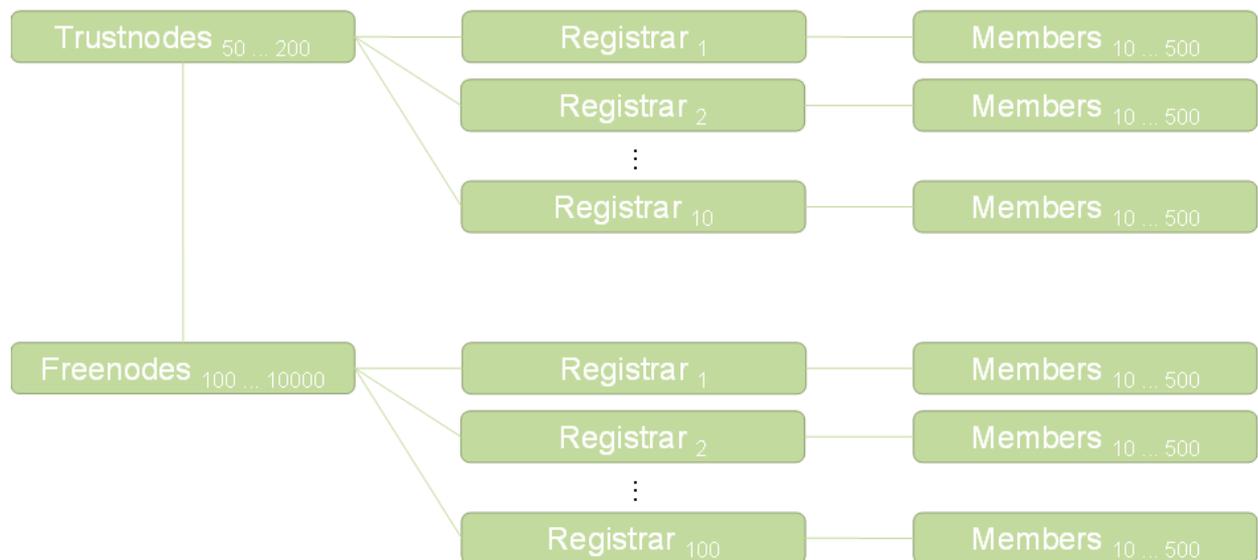
Figure 4: Network size in Growth Phase

Target-Network size after 24 months: 100 Trustnodes; 200 Freenodes; 2,000 Registrars; 50,000 Members

Target-Network size after 48 months: 200 Trustnodes; 600 Freenodes; 10,000 Registrars; 1,000,000 Members

Target-Network size after 60 months: 200 Trustnodes; 1,000 Freenodes; 35,000 Registrars; 5,000,000 Members

3.1. Development Efforts

ARTIS introduces two completely new system features: "*Streems*" and human-centric coin distribution. Besides these R&D-intense features, the focus on usability for end users in a decentralized business context is reflected in the release timeline for ARTIS.

Release: Progressive Carl (Bootstrap Phase: November 2018 – October 2019)

Motto: "The value of specific goods and services is defined by people's perception of its value"

- ARTIS Main- and Test net with the ATS coin
- Proof-of-Stake consensus
- Reputation system for trusted nodes
- Minerva App for discrete transactions and Streems
- Basic human sign-on process

Release: Sincere Eugen (Start Growth Phase: November 2019)

Motto: "Prices follow supply and demand"

- Introduction of Plasma chains
- Improved and better scalable human sign-on process
- Self-sovereign identity for humans and machines
- Standard to connect with other public and private blockchains

Release: Impatient Joseph (TBD)

Motto: "Progress is caused by creative destruction"

- Introduction of payment channels
- Introduction of quantum-resistant cryptography
- Off-chain computation
- Native oracle support

Release: Dynamic Ludwik (TBD)

Motto: "No boom & bust cycles thanks to positive money and floating interest rates"

- Extend towards decentralized treasury and syndicated loans
- Governance mechanism with liquid democracy

Release: Hardened Friedrich (TBD)

Motto: "Freedom of choice in a decentralized world"

- Further scaling through sharding
- Improvements towards decentralized exchanges

3.2. ATS Coin Distribution

Initial coin supply: 3,000,000,000 ATS

Inflation depends on the size of the registered members and the size of the network infrastructure, therefore the exact number of available coins will vary over time.

Maximum coin supply: 21,000,000,000 ATS (assuming 250M registered Members)

The ARTIS Foundation will get 10% of freshly minted ATS as soon as the value of the coin has risen 3-fold due to the network effect.

In the following graphs, the model predicts 250M Members after 10 years and the respective distribution of almost the full total supply of ATS.
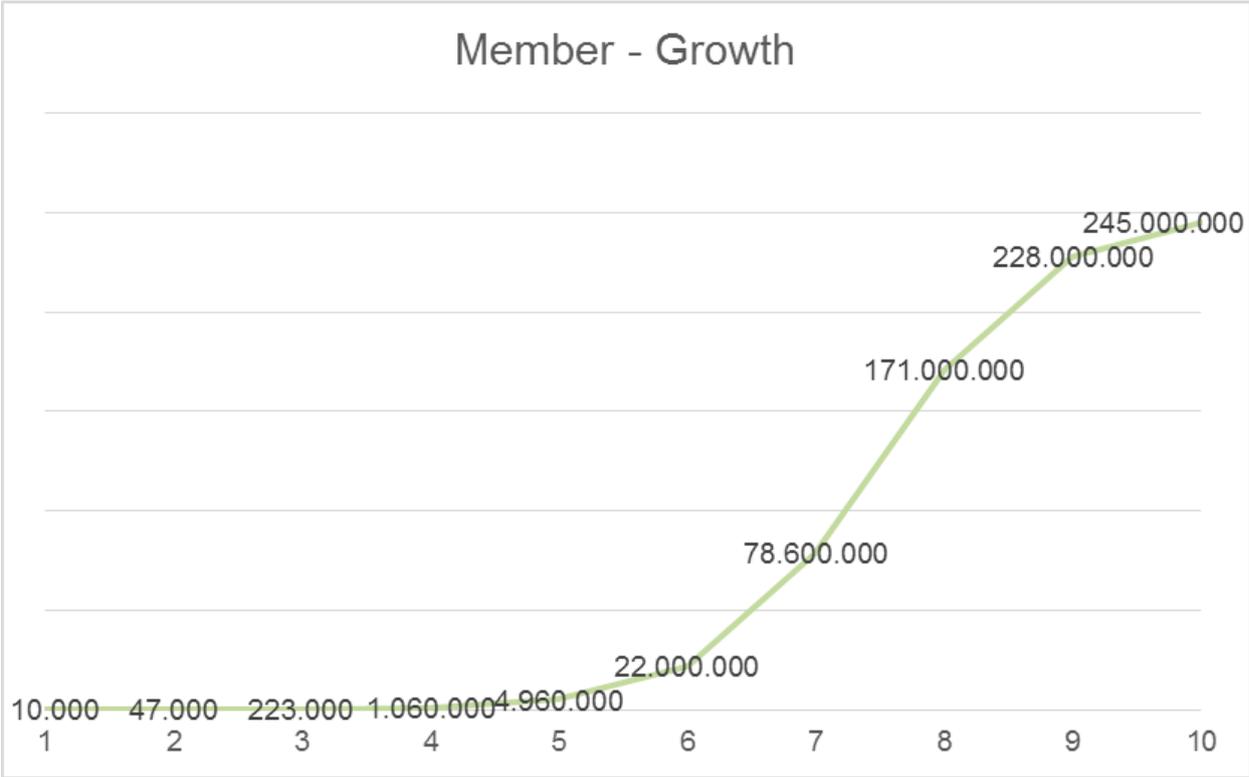
Figure 5: Member growth

Minting of new ATS will stop when 21,000,000,000 ATS are distributed.

After all 21bn ATS are distributed, it is vital to assure an interest running the ARTIS Network and therefore, the following economic considerations are discussed:

- Network infrastructure is rewarded via transaction fees and payments from business platforms building on top of ARTIS.
- Registered Members will then be rewarded via loyalty schemes building on top of ARTIS.
- Obviously frozen accounts (e.g. no access for 5 consecutive years) could face an incremental growth in demurrage and these "burned" funds could be minted and redistributed to Members and network infrastructure operators.
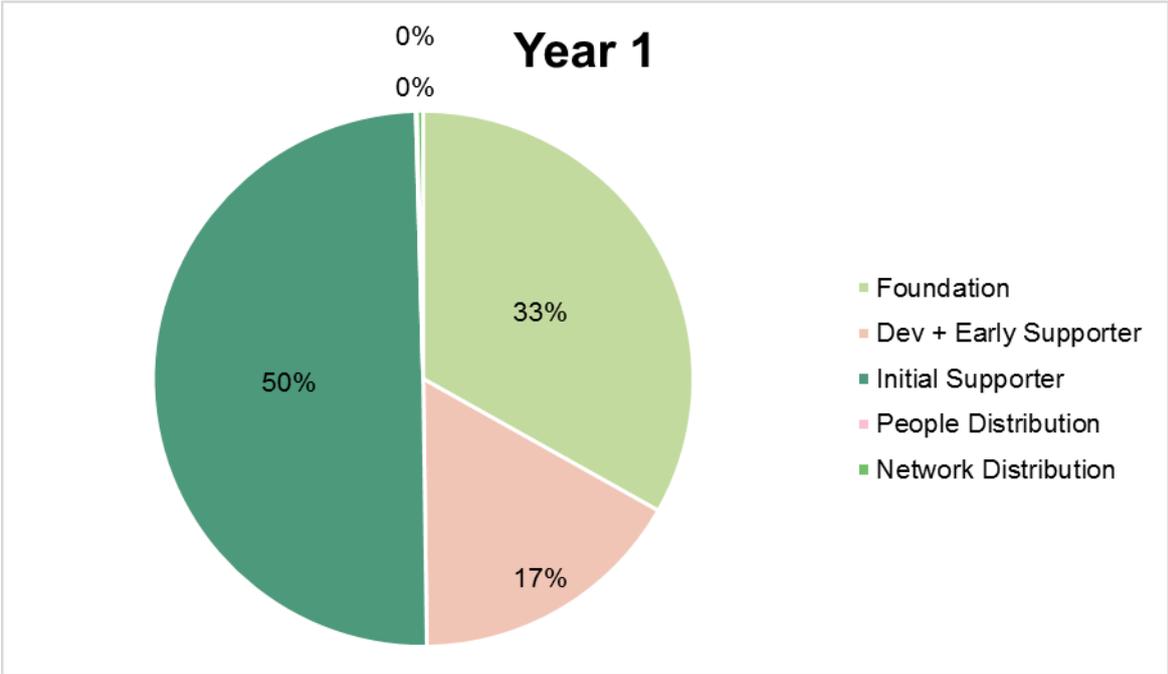
Figure 6: Year 1 - Estimated: 3,002,356,117 ATS
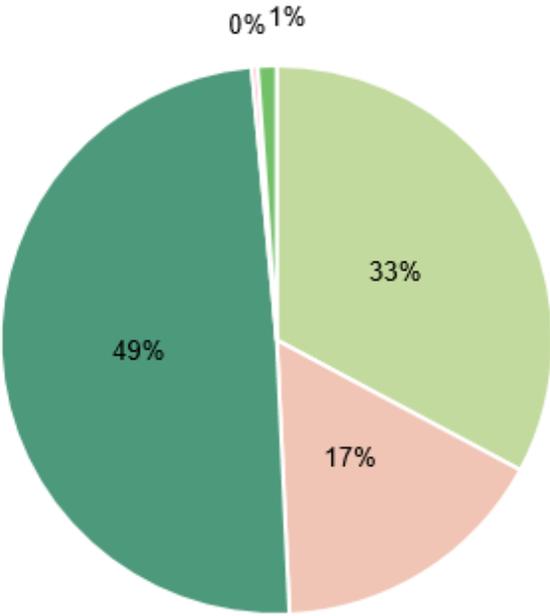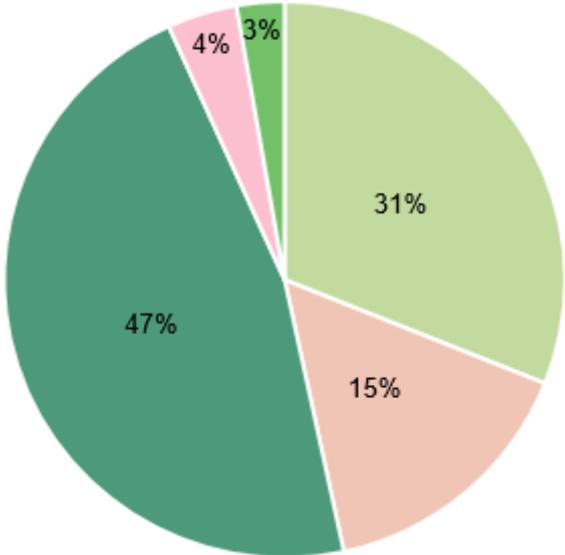

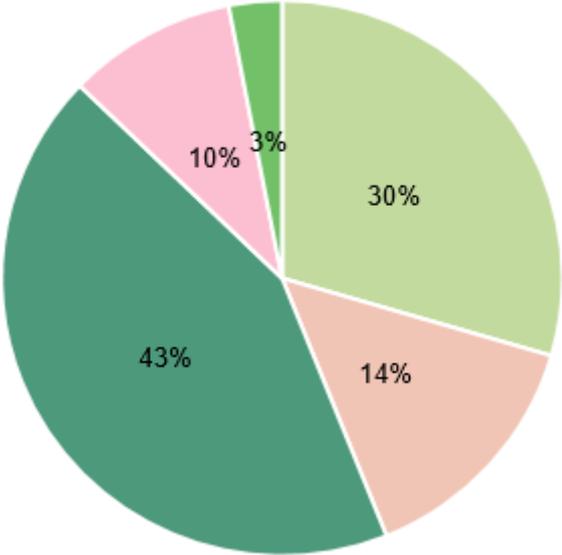*Figure 7: Year 2 - Estimated: 3,044,359,941 ATS*   *Figure 8: Year 4 - Estimated: 3,218,086,602 ATS*

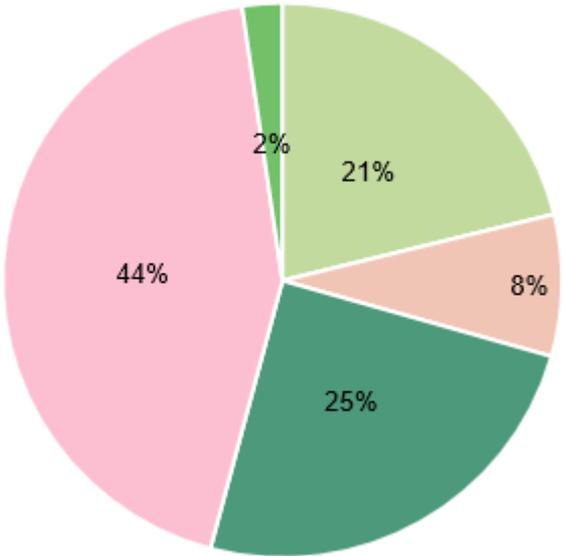*Figure 9: Year 5 - Estimated: 4,467,351,192 ATS*

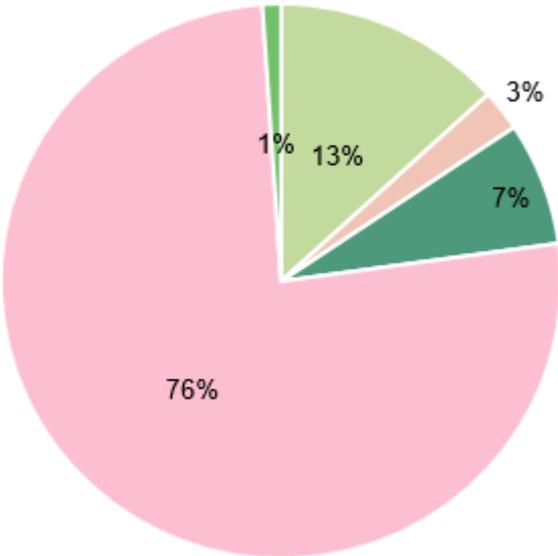*Figure 10: Year 7 - Estimated: 6,061,397,733 ATS*

Figure 11: Year 10 - Estimated: 20,875,156,732 ATS

4. Business Use Cases

ARTIS will be a multi-purpose Blockchain platform for all kinds of markets. The *ARTIS Foundation* will form multiple partnerships - especially with organizations that want to work on:

- *Regional currencies* (Goal: globally applicable regional currency systems)
- *Subscription systems* (Goals: remove ad-financed media and allow new business models)
- *Instalment payments* (Goal: massive cost savings by automating contracts)
- *Transparent Fair Trade* (Goal: transparent and fair flow of money)
- *Shared industry and machinery* (Goals: distributed ownership and transparent accounting)
- *Electrical power accounting* (Goals: distributed ownership, transparent accounting, and trading of electricity)
- *Loyalty and payback systems* (Goal: use coins to support one's own region)
- *Voucher systems* (Goal: provide wallets to use safe and secure crypto-vouchers)
- *Insurance and reinsurance* (Goal: integrate insurance / re-insurance in shared systems wherever possible)
- *Own your own data* (Goal: move the user back into the center of data ownership but be open to analytics)

To be more precise, some of the already ongoing projects are listed below:

Case I: Blockchain Voucher Systems

In November 2017, the lab10 collective got a grant from the netidee foundation[ix] to develop a wallet dealing with vouchers that are handled on a blockchain system. The focus of this project is to reduce the administrative burden of accounting when vouchers are either sold or are in the seller's books as open deliverables. As a first test case, the Voucher-Wallet is able to handle drink payments at a self-service checkout. However, it is also a test bed to make interactions with a blockchain system less difficult for lay users. For the end user, it will not be visible that there is a blockchain involved. Interactions will offer utmost convenience by using NFC, Bluetooth and sound for interaction between apps and at the point-of-sale. Furthermore, the storage of data will be completely done in a server-less, decentralized fashion - reducing additional hassle, cost and third party dependence.

The development of this system will be continued to also handle meal-vouchers, concert tickets, travel tickets and similar use cases. Based on this project, other applications are already discussed with cooperation partners from various verticals.

The lab10 collective is committed to using ARTIS as the preferred blockchain system for the Voucher-Wallet, but compatibility is assured with any Ethereum-based system. Depending on the use case, it is likely that transaction costs will become the dominant deciding factor for the preferred blockchain system.

Case II: Share Everything

We live in an economic system in which the number of sales is one of the main metrics for financial success. If consumer durables (such as cars, bikes, or tools) are sold, the frequency and duration of their usage is of little relevance or interest to manufacturing companies. Many of those goods are used infrequently, and yet there are few incentives for companies to produce long-lasting goods with the lowest possible total-cost-of-ownership. Inspired by this problem, the MakerSpace Graz[x] (Austria) developed a Proof-of-Concept called "Leasie" to provide an alternative counteracting the current resource-wasting approach. Resources can be booked, a deposit is deducted and after using it, all service providers get their monetary share, including an invoice for accounting. Insurance can be completely automated and even re-insurance can be fully integrated.

In 2018, this system will be expanded to also integrate with accounting systems, making it even more convenient and time-saving. First contacts are established with city representatives and local industries which have a multiparty ownership and complex rental systems for their resources.

Case III: Regenerative, Decentralized Energy Use

The FFG[xi] (Forschungs Förderungs Gesellschaft, Austria) provided a grant to build a new Innovation Lab[xii] (ENICS - Energy Innovation Cluster Südburgenland) for regenerative energy. Coupled with that, the project SonnWende+[xiii] was also given the green light. The project consortium is led by AIT[xiv] (Austrian Institute of Technology), the partners in this project are the Energy Institute - Johannes Kepler University Linz[xv] and the lab10 collective eG[xvi]. The major focus in this project is to increase the percentage of consumption of self-generated, renewable energy. Blockchain technology will play a major role in this project, allowing fast and secure accounting of energy flows among partners. The entire project is an intense co-creation process together with all the stakeholders involved to produce accepted and working prototypes.

Besides this project, the lab10 collective eG and Energie Kompass GmbH[xvii] (running the ENICS) will cooperate to establish a "Blockchain Competence Hub" for the energy sector. Local startups focusing on energy applications will be supported by the ARTIS protocol improvements as well as by offering additional educational initiatives.

Case IV: Bridging the Fiat-World with the Crypto-World

Currently, the fiat-world is still very well separated from the crypto-world and this is causing severe acceptance problems for cryptocurrencies. Banks are typically rather conservative with regards to cryptocurrencies and while they could bridge the gap, they don't - fearing possible compliance issues. Nevertheless, there are a couple of projects that aim to make a 1:1 exchange with the Euro or Dollar and provide a full backing of converted funds. The lab10 collective eG is currently discussing with potential escrow partners (telecom providers, financial service providers, etc.) to develop a highly automated 1:1 conversion from Euro to ECU ("Euro Crypto Unit") by connecting someone's bank account with the Minerva app. The user will be able to set limits and the escrow service provider will make sure that the user never runs out of funds, while providing the safety of an assured withdrawal to the Euro system.

The convenient availability of an ECU in everyone's Minerva app will allow further service applications down the road, especially when the Streems functionality is made available.

Case V: Streeming Money

Any kind of business model that works on a smart contract platform can be implemented on ARTIS. A special feature of ARTIS will be the functionality of streaming money. This feature can be used for time-based payments such as subscriptions and regular instalments. All recurring payments can leverage the power of STREEMs.

But not only traditional payments will benefit from this feature. Any time-based value transfers such as bequeathing a property to an heir can be done over time. Other possible use cases for Streems could be salary payments or children's pocket money.

Every-day use cases for Streem are any pay-per-use systems such as urban parking or consuming media. Instead of having to pay for a specific amount or duration in advance, often without knowing how much may be required, the user simply starts the service. At the same time, a Streem is triggered. In the example of parking, as you park your car, the parking spot sends a trigger and your car (its wallet) streams money automatically for the service. When the user stops parking or stops consuming media, the Streem stops automatically. In the example of parking, the parking lot sends another signal to your car to end the Streem as you are leaving the parking. Transaction costs arise only at the start and at the end of a Streem. The user benefits from the ease of use and the convenience of Streems.

Glossary

1. Cryptocurrency: A digital asset that can be used as a medium of exchange. Cryptography is used to secure its transactions, to control the creation of additional units, and to verify the transfer of assets.
2. Bitcoin: A cryptocurrency and a payment system invented by an unidentified programmer, or group of programmers, under the pseudonym of Satoshi Nakamoto.
3. Ethereum: A public blockchain-based distribution computing platform, featuring smart contract functionality.
4. Blockchain: A continuously growing list of records (blocks), which are linked and secured using cryptography. To modify an old record, the entire blockchain would have to be recalculated.
5. Cryptoeconomics: Cryptoeconomics or cryptoeconomy refers to a field of economics which uses computer networks, cryptography and dis-/incentives that are derived from game theory.
6. Proof of Stake: A collection of consensus algorithms in which coins are frozen which then are allowed to run nodes. Based on their conduct, they are incentivized, or punished for any rule violations.
7. Smart Contracts: Smart contracts are computer programs that are stored in a blockchain. When triggered, the virtual machine running on nodes updates the smart contract.
8. Virtual Machine: Virtual machines are emulations of computer systems. In the case of blockchains, they are designed to execute computer programs in a platform-independent environment.
9. Wallet: A cryptocurrency wallet facilitates the receiving or spending/sending of cryptocurrency. It stores the public and private keys that are then used for transactions.
10. Nodes: Nodes are servers that save the blockchain and make sure that new transactions are communicated across the network.
11. Interledger Protocol: A protocol introduced by Ripple, enabling secure transfers across payment systems.
12. DApp: Abbreviated from for decentralized application. A DApp has its backend code running on a decentralized peer-to-peer network, as opposed to a centralized server.
13. Oracle: A machine or a program which can select appropriate data inputs based on pre-defined rules.
14. NFC: Abbreviation for Near-field communication, a set of protocols that enables two electronic devices in close physical proximity to each other, to establish communication.
15. Minting: The counterpart to proof-of-work mining for block generation is proof-of-stake minting. The more coins someone holds, the higher the likelihood of getting a block reward.
16. Sharding: Sharding is a database logic that could also be used for blockchains to make them scalable.

17. Sybil Attack: A term used in computer security, describing the subversion of a reputation system by forging identities and gaining an unfair advantage in peer-to-peer networks.

Revision History

Version	Date	Author	Summary of changes
0.2	Jan 31, 2018	lab10 collective	Initial release (draft)
0.3	Feb 28, 2018	lab10 collective	Initial release (draft)

Table of Figures

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