Astra

The Social Supercomputer

10/01/17

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MOTIVATION

Even after 200 years of countless medical breakthroughs, many life-threatening diseases still afflict vast swaths of humanity. Around 8 million people die from numerous types of Cancers worldwide every year. Nearly half-a-billion people suffer from Malaria every year and close to a million innocent children die from mosquito bites but we still don't have an efficacious vaccine against it. Heart diseases and strokes take the life of another 15 million people prematurely. And there is an ever present risk of new pandemics, like SARS, Ebola, and Zika, suddenly emerging and ruthlessly cutting short the lives of millions of children, women, and men.

Discovering the causes and cures for the above perennial medical challenges requires our scientists to explore myriad potential paths quickly and then focus on the most promising ones for further research. In modern medicine, the exploration of various plausible paths quickly requires enormous computing power, which unfortunately our scientists do not have. However, all of us have powerful computers with capacity in teraFLOPS (10^{12}) sitting idle at our homes, at work, in our pockets, and in our cars. If we can seamlessly combine our spare computing power for the above noble causes, then we can build the most powerful Supercomputer in the world.

Astra is weaving together billions of devices to build one of the most powerful Supercomputer in the world with the processing capacity in exaFLOPs (10^{18}) and storage capacity in zettaFLOPs (10^{21}). This worldwide Supercomputer will be available to researchers around the globe. In addition, Astra is leveraging the latest **Trust Machine**[1] technology to design an innovative Incentive System

[1] Colloquially known as Blockchains; A Blockchain is just one particular implementation of an

so that all citizens of the world are inspired to share their spare computing resources for worthy causes. People will be earning both Social Rewards and valuable Digital Currencies for their contributions (including the native currency of Astra ecosystem called **STARs**).

The scientists in other disciplines, such as, Climate Change, Subatomic Physics, Astronomy, Genomics, Materials Research, Machine Learning, Economics, Linguistics, and Humanities also need endless computing power and storage capacity to solve intractable problems. The Astra Supercomputer will also be used by these scientists for path-breaking discoveries.

In recent years another revolutionary invention has arrived on horizon that has the potential to empower people all over the world to thrive economically, politically, and socially and reach their full potential. It can make our economies superefficient and governance transparent and corruption-free. This revolutionary technology is **Trust Machines** which enables us to **automatically establish and preserve collective social truths**. However, the **automation of trust** requires keeping numerous copies (thousands) of a piece of information and constant communication among them for verification and synchronization. Thus, the Trust Machines are extremely compute, storage, and communication intensive. The Astra Supercomputer will be used for building and maintaining these Social Trust Machines and earning valuable Digital Currencies for the community members (Bitcoin, Ether, ZCash, Dash, Monroe, STARs, etc.).

ownerless, ethereal Data Structure required for building Trust Machines.

1. THE PROBLEM

There are four emerging computing challenges that require orders of magnitude more computing, storage, and networking resources than are currently available. These are:

1. Medical, Scientific, and Humanities Research
2. Public Verification of Information for Trust Machines
3. Big Data Analysis, Machine Learning, and Artificial Intelligence
4. On Demand Edge Computing for Global Sensor Networks[2]

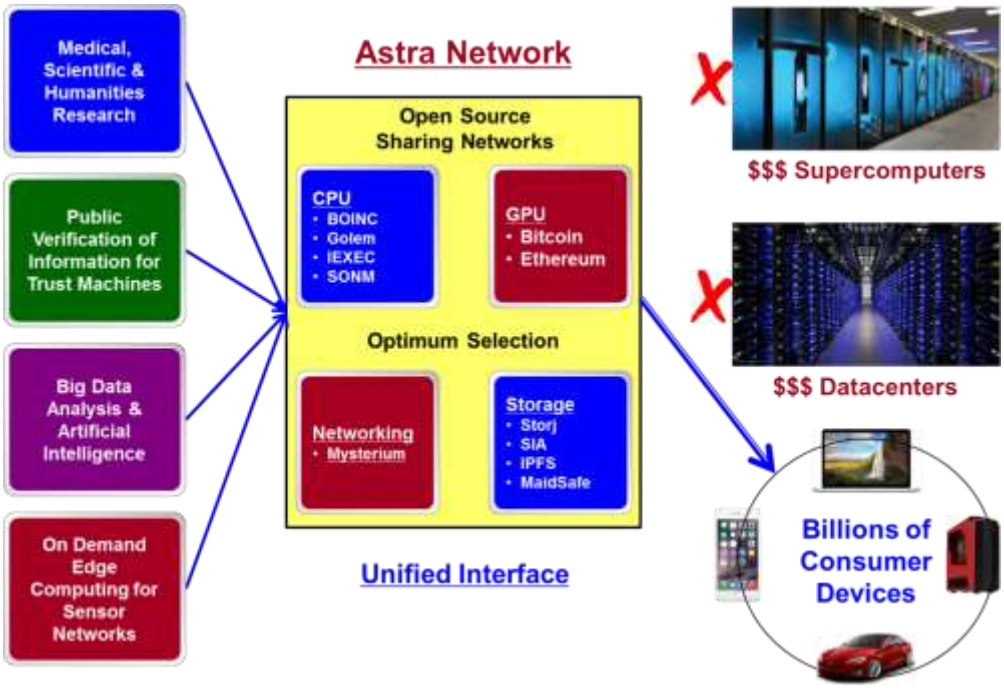


Fig 1: Four Emerging Computing Challenges

[2] Colloquially known as Internet of Things (IoT) or Internet of Everything (IoE)

Discovering the causes and cures for numerous dreadful diseases that afflict humanity requires endless computer simulations. Similarly, search for materials that can absorb maximum sunlight for solar panels requires scientists to examine millions of molecular combinations. For research efficiency, scientists like to conduct data-driven research whereby exhaustive simulations are run before a promising path is identified for further investigation. The computing and data storage requirements of scientists are likely to grow in the coming years by orders of magnitude.

With the arrival of Trust Machines, it is now possible for the first time in human history to build publicly auditable trustworthy data repositories. Such trustworthy data repositories are empowering people to cooperate with others whom they don't yet know or trust. They will allow people to hold their corporations, institutions, and governments accountable. The trustworthy data repositories will lead to highly efficient economies and transparent corruption-free governance across the world. However, the Trust Machines requires numerous copies (thousands) of a piece of information and constant communication to keep them automatically synchronized. Thus, the new automated trust systems are highly compute, storage, and communication intensive.

The advent of Internet in 1990s enabled businesses and governments to gather prodigious amounts of data from people and machines. The businesses and governments soon realized that they could glean valuable insights and intelligence by analyzing this Big Data. The statistical analysis of continuous streams of Big Data requires vast computing, storage, and networking resources. In addition, the mountains of repetitious data can be fed to machines so that they can automatically learn *past patterns* and then intelligently respond to future events. Again, this training of Machines with repetitious data (euphemistically

known as Machine Learning) requires Supercomputing capabilities.

The fourth megatrend is proliferation of sensors in all walks of life. In particular, video sensors in smart phones, security cameras, and self-driving cars that generate voluminous data. This data often has to be stored and processed where it originates without the luxury of hauling it all the way back to the centralized data centers. In coming years need for such computing on the network edge with strict performance requirements will rise exponentially.

To solve the above computing challenges, we have three options. Either we build large numbers of fast Supercomputers that cost $100 Million apiece or huge Datacenters that cost anywhere from $250 Million to $1 Billion. The third option is to interconnect billions of computing devices through Internet and use their spare computing capacity to solve the above challenges. There are a number of open source 'Sharing Networks' that interconnect computers. However, these open source 'Sharing Networks' suffer from three fundamental problems:

1. The Convenience Problem
2. The Market-Seeding Problem
3. The Incentives Problem

Astra's first mission is to solve the above three fundamental problems to jumpstart the market for "Online Computer Sharing". In the second phase, Astra will focus on solving the data-security and guaranteed-performance problems.

The Convenience Problem

There are a number of open source 'Sharing Networks' that interconnect

computers. However, each 'Sharing Network' requires a complex process of software download, installation, parameter setting, and learning to operate it. Moreover, for each computing resource (CPU, GPU, Storage, and Networking), a user is expected to download and setup separate set of software programs. In addition, the rewards offered by various 'Sharing Networks' vary with time and location. Also, often the 'Networks' do not disclose in advance how much a consumer will earn by renting out their spare computing and storage capacity. The blind markets just deposit certain number of tokens in a consumer's account after their resources have been consumed. **Thus, for maximum profitability consumers are expected to download a number of 'Sharing Network' programs on their machines, set them up, and constantly switch among them.**

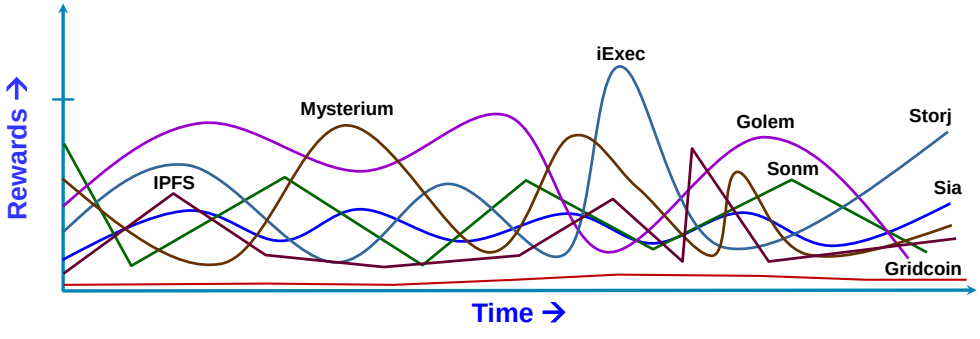


Fig 2: Time-varying Rewards from Plethora of Networks

The Market-Seeding Problem

The peer-to-peer computer sharing is a brand new market opportunity. Therefore, the next big challenge is how to systematically seed and grow such a market. Seeding the market requires creating an 'initial supply' of sharable computing resources and an 'initial demand' in the absence of Capital for upfront investment. Astra is solving these challenges by collaborating with

existing volunteer computing communities and using its native token 'STARs' to attract both suppliers and customers.

The Incentives Problem

Once the market is seeded, for its healthy growth we need to persuade millions of people around the world to offer their computing devices on a regular basis. It will require both emotional and economic incentives to change people's perception and behavior. The next two chapters discuss the innovative new incentive system that Astra has been designing using Trust Machines.

2. ASTRA SOLUTION

The Astra is building a 5-pronged solution to the challenges identified in the previous chapter:

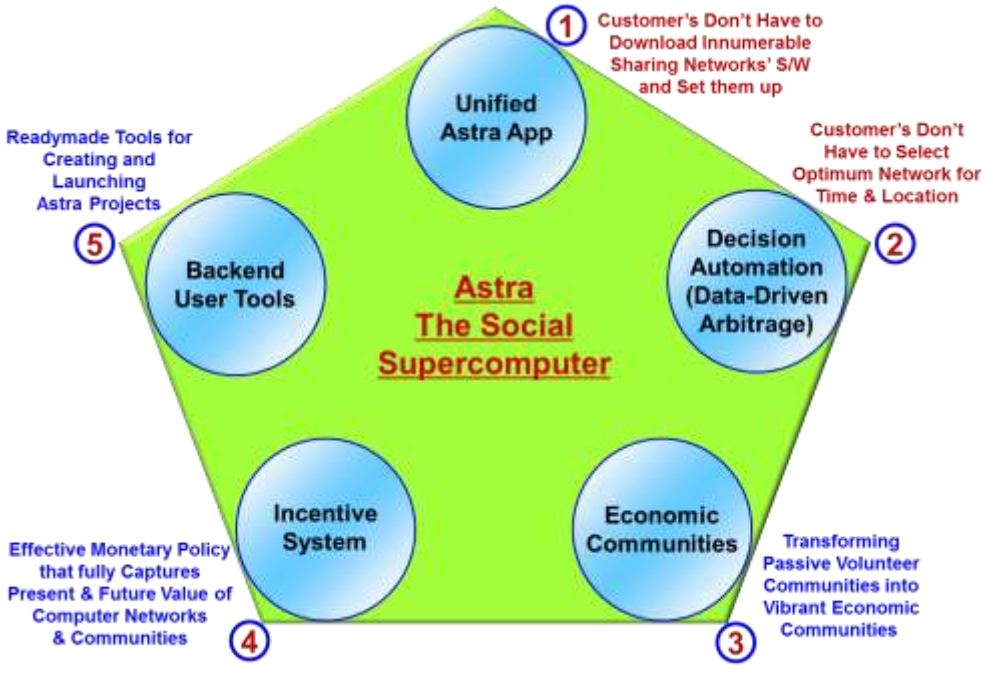


Fig 3: Five-Pronged Astra Solution

1. **Unified Astra App:** An intuitive interface to the numerous 'Sharing Networks', so that consumers don't have to download, install, and setup a confusing array of individual software programs.
2. **Decision Automation:** Optimum selection of a 'Sharing Network' that maximizes returns in Digital Currencies. Automatic selection of optimal options for each 'Sharing Network' so that consumers don't have to learn about their intricacies.
3. **Economic Communities:** Astra is transforming passive volunteer

communities into vibrant economic communities where members have strong incentives to share computing resources and create valuable content and digital assets. Astra will also offer a suite of tools for building and nurturing action-oriented communities.

4. **Incentive System:** An effective monetary policy that fully captures the present and future value of Global Networks and Communities that Astra is building. Community incentives in the form of Community Coins and Virtual Tradable Assets.
5. **Application Launch System:** An intuitive platform to build and launch distributed computing projects on Astra Network. End Users can create their applications in any environment and Astra will be able to launch them on any 'Sharing Network'.

Unified Astra App: The following picture illustrates the light-weight Astra App with minimum number of options.

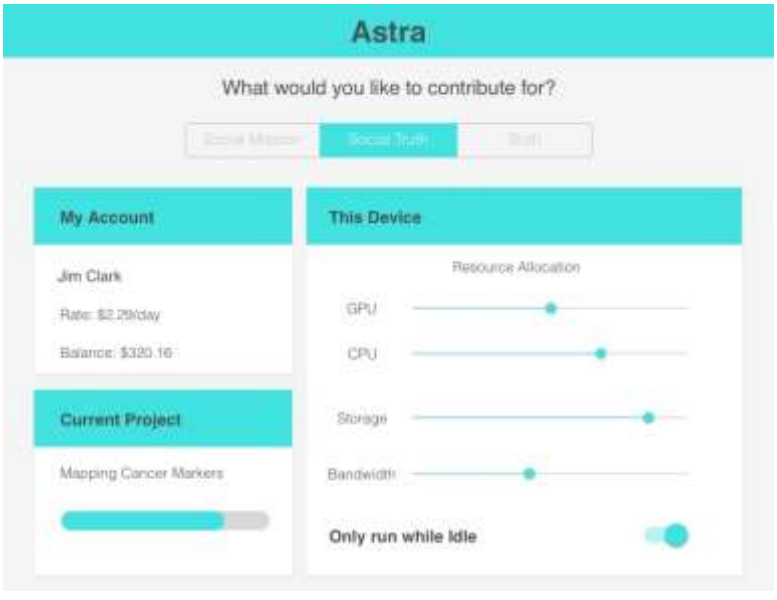


Fig 4: Unified Astra App

Decision Automation:

The Astra App can assess a consumer's unused computing, storage, and networking resources and recommend what proportion should be offered to sharing networks and at what times. Astra also collects the demand and rewards data for each network and then automatically selects a network that is likely to produce highest return at a given location and time. The user does have the right to override Astra's recommendations in terms of resources offered, time-slots, and the networks selected.

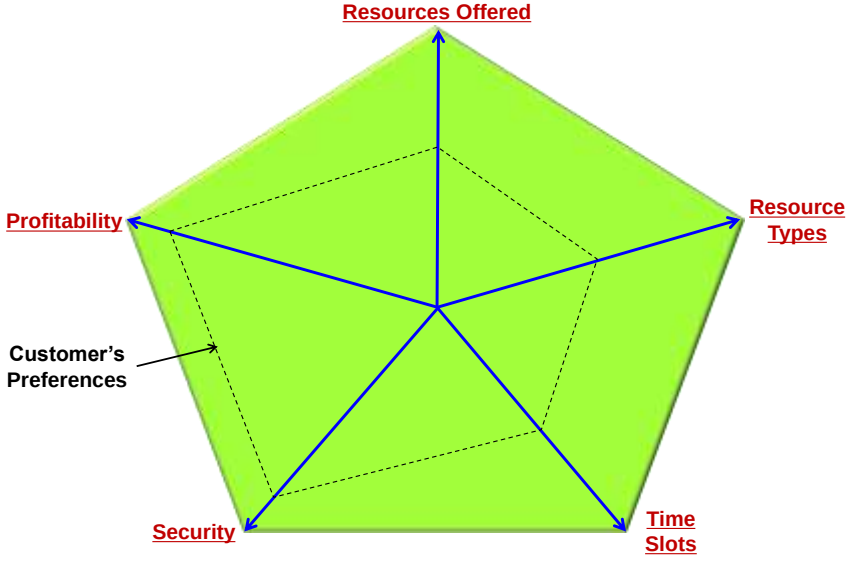


Fig 5: Automation of Customer Decisions

Astra uses proprietary big data machine learning algorithms to match consumer's preferences with the appropriate network at a given time and location.

Economic Communities:

Astra is building vibrant economic communities for three primary reasons:

1. To **jumpstart** the market for shared computing resources and maintaining members' interest over long-term
2. To build trustworthy repositories of **'Social Truths'**, which require participation from a large number of independent agents
3. For long-term **sustainable competitive advantage**, which cannot be easily copied

The next chapter on 'Astra Communities' discusses how Astra is transforming current Disparate, Passive, and Uninspiring communities into Modern, Vibrant, and Economic Communities committed to solving intractable problems.

Incentive System:

The Astra team believes that **incentives change human behavior**. The right emotional and economic incentives can attract a large number of contributors to the causes and keep them engaged over long term. To fully capture and monetize the energy of communities, Astra is creating three classes of valuable Digital Assets:

1. The Platform Currency – **STARs**: It will be used to purchase and sell computing resources. Astra has designed a thoughtful monetary system so that the value of STARs gradually grows over time and attracts mainstream consumers.
2. Community Digital Assets: Whenever a community reaches significant milestones, it will have the right to collectively create a limited number of Digital Assets. In the beginning these Digital Assets will be only for emotional satisfaction and team camaraderie, however with right marketing their value will rise. After a community decided holding

period, these Digital Assets will be tradable creating value for members.

3. Community Coins: Once a community has reached significant milestones, it will have the right to create their own Community Coins and incentivize members. The purpose of Community Coins is to capture and monetize the energy of a community and motivate them to bigger challenges. The Community Coins will be tradable on multiple exchanges.

Backend User Tools:

Astra is developing a suite of backend tools to build and launch distributed computing projects on Astra Network. End Users can create their applications in any environment and Astra will be able to launch them on any 'Sharing Network'.

3. ASTRA ECONOMIC COMMUNITIES

Over the last 20 years hundreds of online communities have been built to educate and motivate people to share their unused computing resources for scientific discoveries. A few of these communities are – fightAIDS@HOME, ProteinFolding@HOME, Rosetta@HOME, DrugDiscovery@Home, LHC@HOME, SETI@HOME, Cosmology@HOME, Einstein@HOME, etc. These communities were often built and led by the scientists themselves or other dedicated leaders. Similar communities have sprung up on YouTube, Facebook, Twitter, Reddit, and other social media platforms where charismatic leaders urge their followers to share computing power for scientific causes. Lately, they have also been urging their followers to share computing power for verifying information in large mining pools to build repositories of 'Social Truths' and earn Digital Currencies. Some examples here are – BitcoinMeister, BoxMining, Barnacules, Crypt0, and CryptoBud, etc. However, the above traditional communities suffer from three major drawbacks:

1. **Disparate,** siloed communities with little cross-flow of ideas and people
2. **Passive** communities with often only one way flow of information from the leader to members
3. **Lack of Incentives** to keep the leaders and members motivated and engaged over long term

In place of this current mélange of discordant, passive, and uninspiring communities, Astra is building Modern, Vibrant, and Economic communities as discussed in the following three sections.

Modern Communities:

The current project-specific websites were built with 1990s web technology and are not people friendly anymore. They lack modern social networking features to organically grow their communities. They force people to learn the nuances of each project team and present disparate user experiences (Fig 6 below). It is difficult for members to move from one project to another or to organize competitive games and collaborative endeavors. In summary, the current project-specific communities have become silos in themselves with very little cross flow of ideas, information, and people among them.

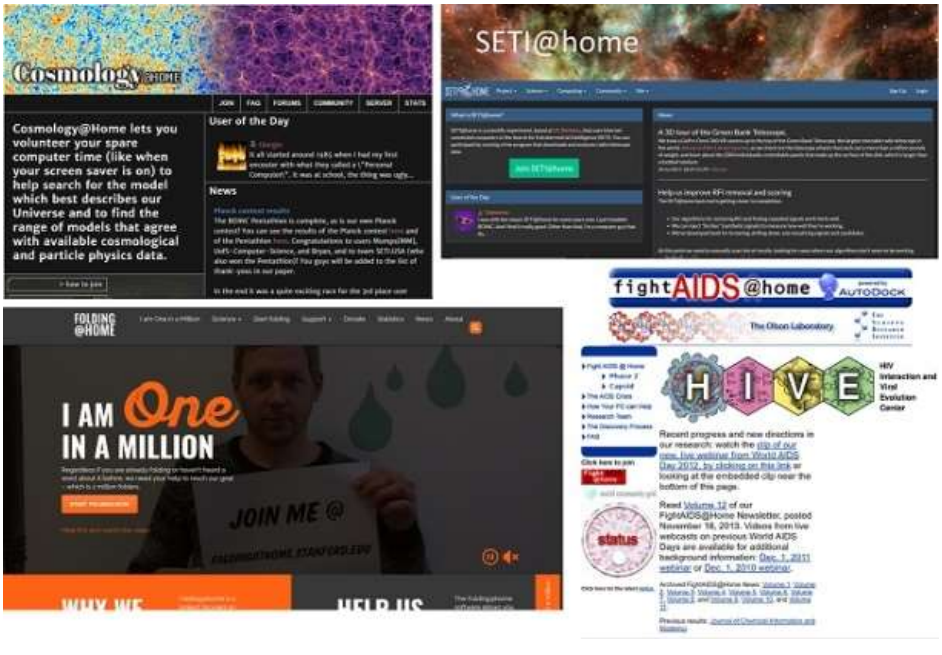


Fig 6: Disparate Online Communities for Shared Computing

The Astra team feels that over the last 20 years, enormous strides have been made in the social networking technology. And the time is ripe to bring these advances to the numerous Shared Computing communities. Astra is building a

set of readymade tools that will allow leaders to build their communities very quickly without having to learn any web programming. The modern Astra Communities will offer consistent user experience to members and visitors alike irrespective of project. They will be able to learn about new scientific discoveries readily and migrate seamlessly from one project to another. Moreover, members will be able to create their own personal pages to build their personas and express their thoughts, experiences, and motivations.

Vibrant Communities:

The current online communities for shared computing are essentially *passive* communities with often just one-way dissemination of instructions and information from the leader to members. Astra would like to transform these into *vibrant* communities where members are emotionally committed to advance their shared causes.

There are four psychological factors that cause people to come together and form vibrant communities to take on big challenges. These are 'Emotional Connect', Identity, Influence, and Fulfillment as illustrated in the Fig 7 below. Astra is building a set of software tools and social mechanisms to seed and nurture these four factors. They will empower community leaders and members to build and foster emotionally-connected vibrant communities with a sense of belongingness.

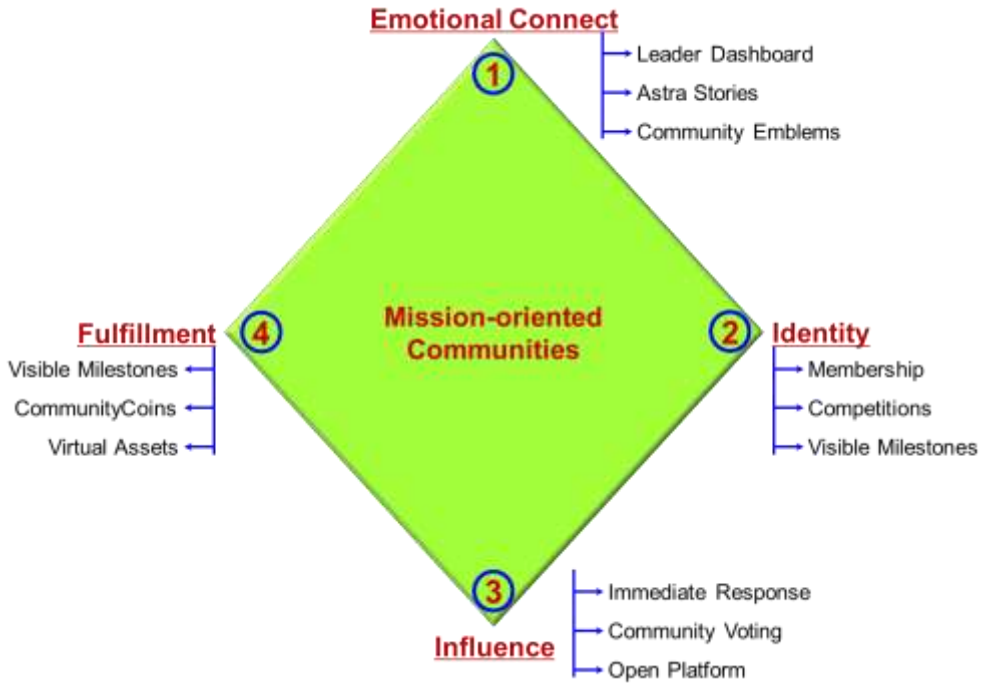


Fig 7: Astra Tools for Building and Nurturing Communities

Economic Communities:

Currently, most of the communities for Shared Computing work on volunteer basis. There are not enough incentives for volunteers to stay engaged over long term. On YouTube, Facebook, and Twitter channels also the only source of community leaders' income is a very minuscule share of advertising revenue they generate. The Astra team believes that **incentives change human behavior**. The right emotional and economic incentives can attract a large number of contributors to the causes and keep them engaged over long term.

The software tools and social mechanisms outlined in the previous section on Vibrant Communities can be used to offer **Emotional Incentives** to members, such as, Identity, Accomplishments, and Recognition. Initially, these emotional incentives will encourage members to contribute resources and jumpstart the

market. Later, the emerging Trust Machines technology (or Blockchain in colloquial parlance) will be leveraged to offer **Economic Incentives** to people and grow the communities as discussed below.

The Trust Machines empower dispersed communities of people to collectively keep track of each little "**Piece of Information**" and thus transform it into a "**Property**". A "**Property**" can be measured, valued, and traded in marketplaces. Now the community members can assign precise value to the contributions of each other and collectively create unique, non-duplicable 'Digital Assets'. These mechanisms can be used to design very innovative incentive systems to keep communities motivated and engaged. One of the key missions of Astra is to leverage the emerging Trust Machines technology to transform passive online communities into vibrant **economic communities**. The **economic communities** have the sustained incentives to stay motivated and create value over long term.

In the Astra economic communities members will be able to take individual and collective actions, which will be tracked, valued, and traded. Some of the creative and economic activities planned are:

1. Sharing of Computing, Storage, and Networking Resources
2. Insightful Scientific Content Creation and Curation
3. Creation and Trading of Rare Digital Assets
4. Individual and Community Games

The above economic activities will also drive up the demand for platform currency STARs and CommunityCoins. In summary, Astra is leveraging the Trust Machines technology to build, animate, and capture the energy of communities with both emotional and economic incentives for two noble missions as illustrated in Fig 8 below.

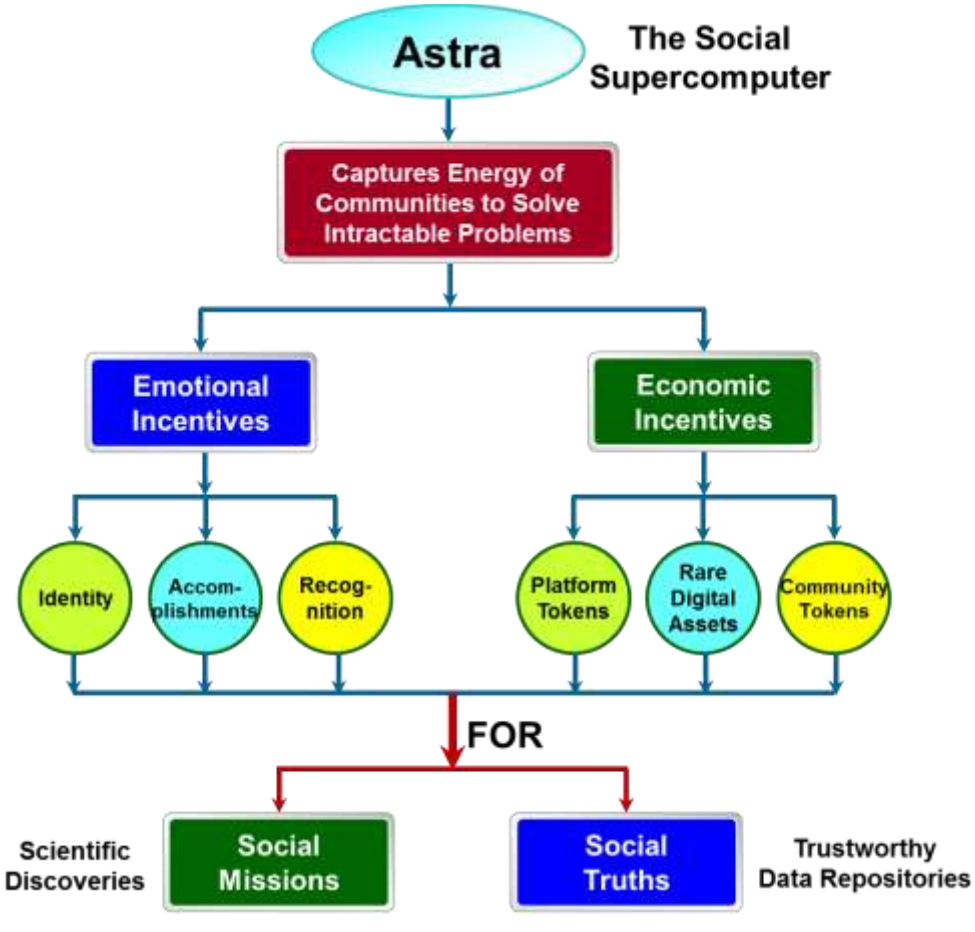


Fig 8: Astra Social and Economic Incentive System

4. COMPETITION

Astra plays at a unique position in the industry value chain compared to some of the perceived competitors as illustrated in the Fig 9 below. In this position, there is no competitor who is building communities and is closer to the end consumers. Astra's mission is to organize consumers in action-oriented communities and make it extremely easy for them to contribute to scientific projects and join the world of Digital Currencies. Currently, Astra provides seamless integration with all open source sharing networks. Later, Astra will backward integrate with its own unique technologies for guaranteed-performance and data-security.

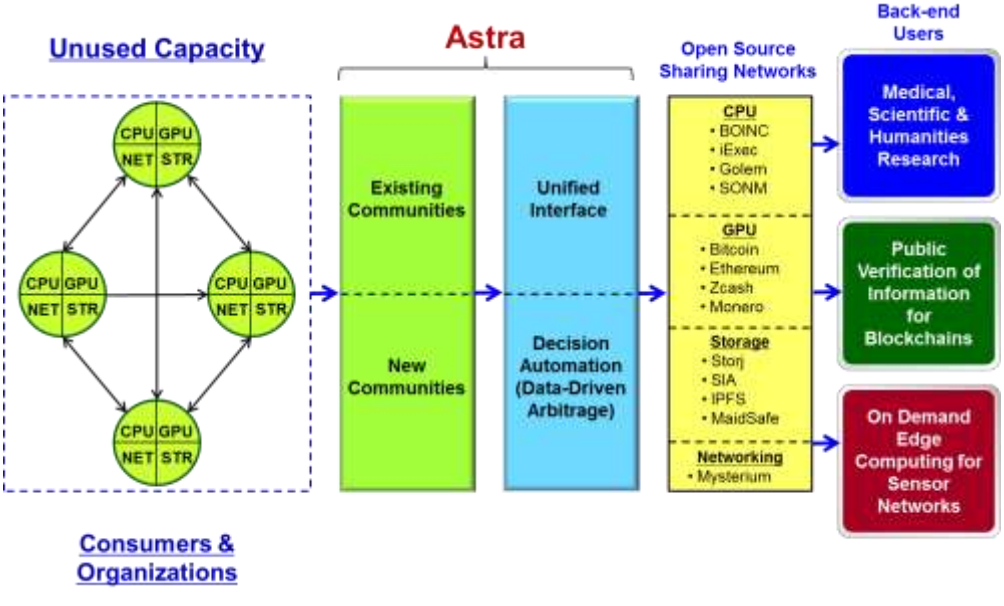


Fig 9: Astra's Position in the Value Chain – Closest to Consumers

5. LEADERSHIP

The development of a world-class Social Supercomputer requires talent in the following four categories: Computer Networking, Trust Machines, Community Development, Economic Incentive Systems, and User Experience Design. Astra has assembled a top-notch team of experienced engineers, economists, and a few key technical and business advisors.

Rajesh Trivedi, Founder & CEO, launched Astra in January 2017. Mr. Trivedi discovered the Astra market opportunity, built the business case, and persuaded a team of top-notch engineers to join in the endeavor. As a founder of Astra, Mr. Trivedi brings with him over 14 years of experience as a technologist and an entrepreneur, having helped in the founding of two previous technology companies. He enjoys discovering new markets, defining them, and validating them with anchor customers. He has extensive engineering, product marketing, and business development experience in the trust machines, networking, software, and semiconductor industries. Previously he worked for Xilinx, Altera, Versatile Optical Networks, and Lattice Semiconductor in various engineering, marketing, and corporate strategy roles. Mr. Trivedi earned BS in Electrical & Electronics Engineering from Birla Institute of Technology and Science, Pilani, India; MS in Computer Science from Michigan Technological University; and an MBA from Ross School of Business, University of Michigan, Ann Arbor.

Harman Bains, Front End Engineer, is an experienced full-stack Software Development Engineer. He excels in architecting and building highly intuitive and user friendly software systems. Mr. Bains previously worked as a Software Engineer at Workday in Pleasanton, CA. He earned a B.S. in Neurobiology and a B.S. in Computer Science from the University of Washington.

Abraham Mengistu, UX Designer, is a highly creative user experience and user interface designer. He is passionate about deeply understanding consumer needs and how Astra products can delight them. Mr. Mengistu earned a B.S. in Biological Sciences from San Jose State University.

Silas Sadia, Blockchain Systems Engineering, is passionate about design of efficient Blockchain systems. He is interested in full-stack system development and has written parallelized, performance-minded CPU and GPU code for use in cryptography, scientific computing, and machine learning at the University of California, Berkeley. He is currently incorporating cutting-edge consensus algorithms to architect a truly decentralized and fault-tolerant Blockchain for Astra.

Soham Kale, Full Stack Software Engineering, enjoys creating visually appealing and intuitive user interfaces to boost the mass adoption of complex technologies. At Astra he is designing the Web App and Mobile App, and integrating them with the Networking Stack and various Blockchains. He has worked on software engineering projects with Space Systems Laboratory at the University of California, Berkeley.

Sanjeev Varakantam, Business Development and Customer Relations, Sanjeev enjoys working closely with customers from around the world and delighting them. He has over 15 years of experience in Application Engineering and Consulting where he relentlessly solved customer problems. He is also a savvy crypto-investor and understands how online communities can be brought together with right token incentives. Sanjeev has a BS and MS in Computer Engineering.

Dr. Jeff Flowers, Blockchain Advisor, was a Founder of the Blockchain University in San Francisco in 2014. He is a leading thinker and practitioner in the new emerging space of Blockchain Applications. Dr. Jeff Flowers is also a Chemistry Professor and fully understands the vast computing resources required for building a library of molecular combinations. He is helping Astra design an innovative incentive system using Blockchain technology to motivate people for proactive participation. Dr. Flowers doctoral work, at San Francisco State University, focused on the use of neural networks and gamification protocols towards achieving highly optimized education pathways.

Dr. Johnnie Chamberlin, Science Advisor, is passionate about Scientific Computing, Environmental Science, and how Blockchains may have positive social impact. He wrote an inspiring article on the monumental computing needs of our scientists and researchers. Dr. Chamberlin is the author of two books and was a research fellow for NYT Bestselling book Drawdown. Dr. Chamberlin has a PhD in Environmental Dynamics and a Graduate Certificate in Sustainability from the University of Arkansas, a MS in Environmental Engineering from Duke University, and a BA in Cognitive Science from UC Berkeley.

6. ASTRA NETWORK UTILITY TOKENS

Astra is building a network of communities and computers (Astra Network) for discovery of scientific and social truths. The economic incentive system in this network will be run using the Astra Network Utility Token called STAR (STARs for plural). The STARs will be used to motivate members to join communities and make proactive contributions. In summary, the STARs will be used for the following purposes within the Astra Network:

1. To motivate people to join various communities and proactively participate.
2. To share their idle computing resources and get rewarded in STARs.
3. To buy and sell computing services and resources in peer-to-peer transactions without any intermediary.
4. To motivate community members to create rare digital assets and trade them using STARs.
5. Access to new computing services that may be introduced by the Collaborative Astra Network in future.

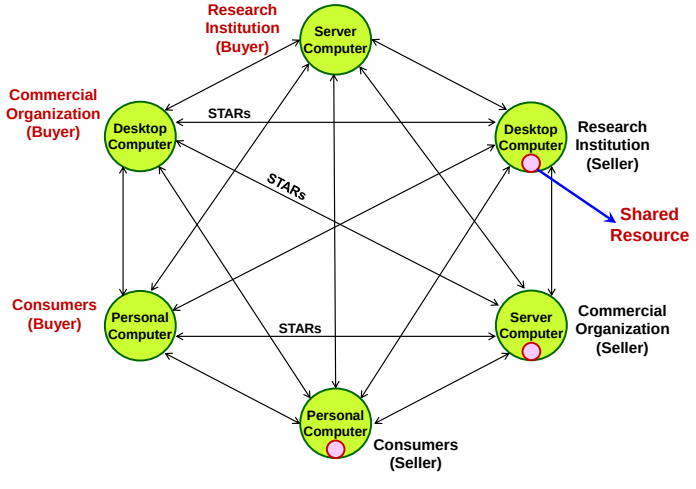


Fig 10: Community Members Purchase Computing Services and Resources using STARs in Peer-to-Peer Transactions

Astra Business Model

Initially, the Astra Services will be offered to Research Institutions and Ethereal Apps (eApps), which want to verify information and establish Trustworthy Public Data Repositories.

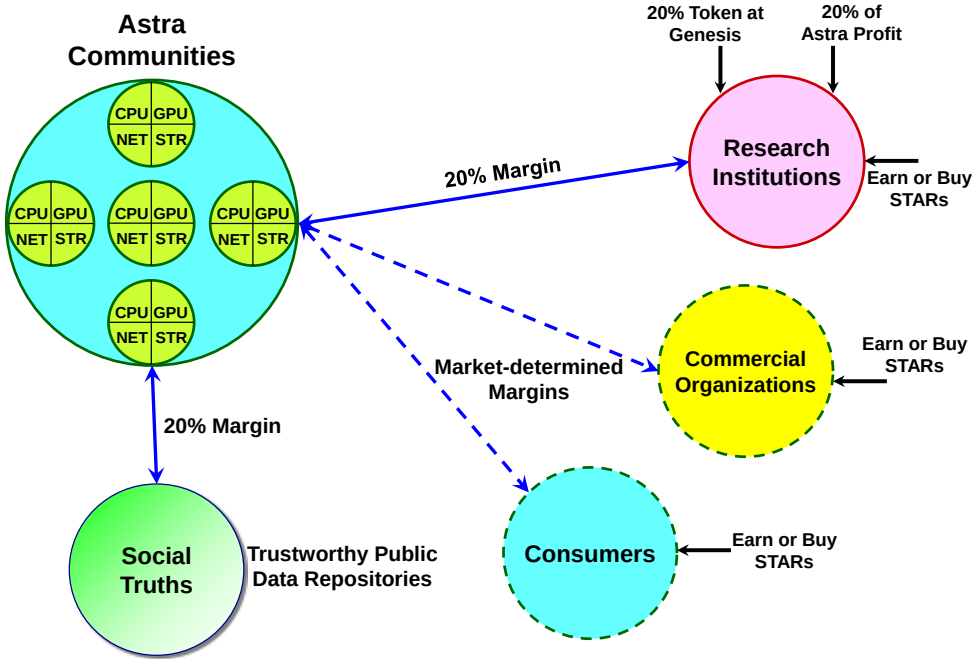


Fig 11: Astra Business Model

Currently, individual Research Labs hire a number of programmers and social marketers to write complex software and build volunteer communities. They dedicate significant budget for obtaining supposedly free volunteer computing resources. Astra will be automating many of these cumbersome processes across the Research Labs. Thus, it will be economical for Research Institutions to purchase STAR Tokens from the market and use them to buy readymade Computing Services and Resources than to do the custom development.

Moreover, Astra will reserve 20% of STAR Tokens at Genesis for free distribution to Research Institutions. In addition, 20% of Astra Network's profit per month will be reserved for free allocation to Research Institutions. Thus, the Astra Network will streamline acquisition of computing resources and launch of scientific research programs.

The Astra Network can also be accessed by other Ethereal Applications (eApps) to verify information and build their Trustworthy Public Data Repositories. Astra offers a truly ownerless and ethereal infrastructure for verification of information.

Why Astra is seeking both Scientific and Social Truths?

A normal laptop, desktop, and gaming computer has all four computing resources – CPU, GPU, Storage, and Networking. As illustrated in Fig 12 below, the scientific research projects mostly require CPU and Storage. The information verification for collective Social Truths is mostly GPU and Networking intensive. Thus, a community member can contribute her or his computer for both purposes.

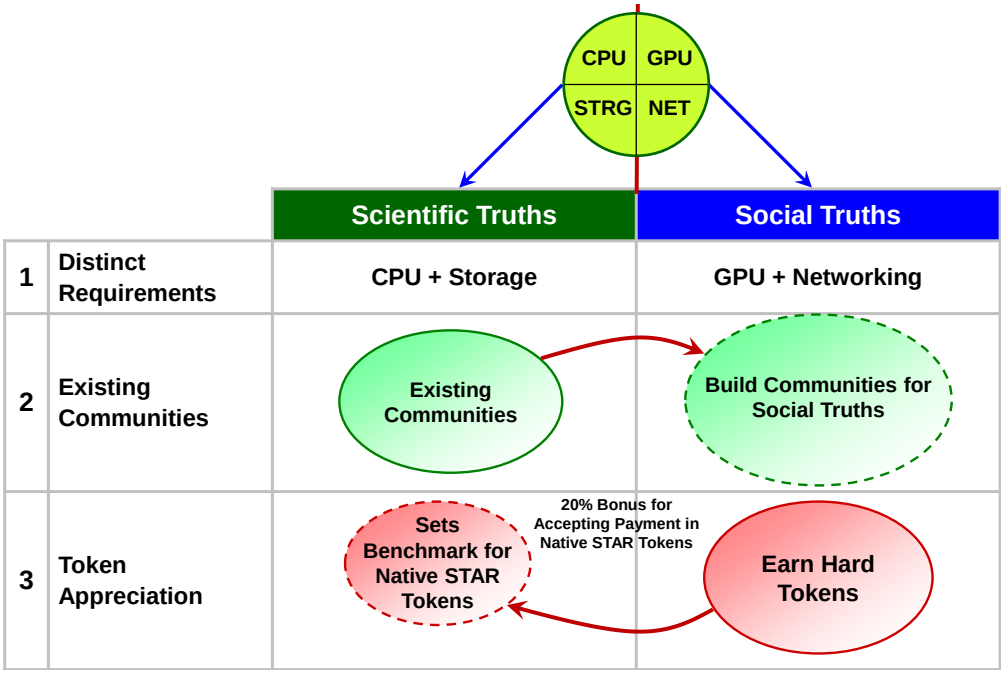


Fig 12: Scientific and Social Truths

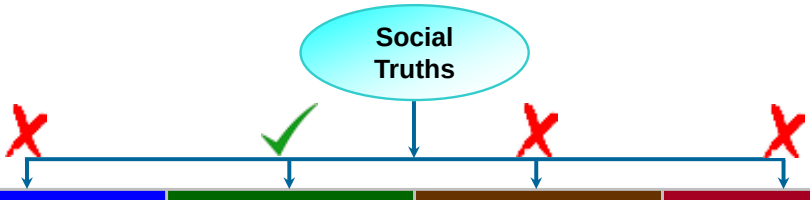
There are three reasons for seeking both the Scientific and Social Truths using the Astra Network:

1. **Distinct Requirements:** The two activities have distinct resource requirements. Therefore, both can be performed simultaneously on most computers.
2. **Existing Communities:** For Scientific Research, there already exist hundreds of volunteer communities that Astra plans to work with. Astra's objective is to grow the number and size of these communities as well as leverage them for establishing and preserving Social Truths. The establishment of Social Truths will allow community members to also earn hard established coins.
3. **Anchor for Valuation of STARs:** The earning of established hard tokens allows us to establish an anchor for the valuation of Astra's

native STAR token. When a community member verifies information and earns a Hard Token (such as, Ether, Litecoin, or Monero), she will normally have to pay 20% fee. However, if the member chooses to be paid in STAR Tokens, then this fee will be waived. Thus, a community member can earn up to 25% bonus on their earnings. This reward mechanism will provide a reference point for the valuation of STARs.

A New Trustworthy Approach for Social Truths

The Fig 13 below outlines various approaches for verifying information and building Trustworthy Public Data Repositories. The other approaches such as "Pooled Verification" and "Centralized Verification" are controlled by a handful of vested entities and suffer from fears of tampering and general lack of Trust. Astra offers a new trustworthy approach of Community Verification. In Astra Network, the information verification is performed by a large number of players who do not have any strategic power. The community members provide resources and get rewarded solely on the basis of their contributions. The members have no incentives to form coalitions and attempt to fork or tamper the information. Thus, Astra provides a truly ownerless, ethereal network for building Trustworthy Public Data Repositories.



Individual Verification	Community Verification	Pooled Verification	Centralized Verification
• Unable to Participate in "Proof of Work" Consensus	• Combine Resources for Verification	• Investment Required	• Strategic Power • Rent Seeking
	• Ethereal • Ownerless	• Unprofitable for Retail Investors	• Threat of Govt. Shutdown
	• Trustful	• Unfair Practices • ICO Front-running	• Unfair Practices • ICO Front-running

Fig 13: A New Trustworthy Approach for Establishing "Social Truths"

7. STAR TOKEN SALE

Astra will be conducting a token sale in early 2018 to build world-wide vibrant communities. The token sale will be conducted in two stages. The first stage will be a Pre-sale of Tokens. The Pre-sale will be followed by a Public Sale of Tokens. The Public Sale will be conducted in 5 weekly rounds with varying bonus incentives. The participants in the token sale will have to pre-register and pass KYC/AML verifications. The US based community members who contribute more than $20,000 will have to pass the accreditation check as well.

Before the commencement of sale, one billion SRAR tokens will be created in a Smart Contract. A large proportion of tokens (40%) will be used as incentives for Scientific Researchers and Consumers to join communities and build the Astra Network. The STAR tokens will be allocated for different purposes according to the following schedule:

Distributed at Token Sale	**25%**
Scientific Researchers	**20%**
Consumer Incentives	**20%**
Company Expenses	**10%**
Founders, Advisors, and Early Backers	**25%**
Total	**100%**

Table 1: Allocation of Astra (STAR) Tokens

The objective of the token sale is to raise resources for expanding the team and to further building the network. The mechanics of the STAR token sale are summarized in eth following table:

Project Funding Goal	**$50 Million**
Pre-sale of Tokens	**Jan 10th 2018 to Jan 31st 2018**
Public Sale of Tokens	**Feb 10th 2018 to Mar 16th 2018**
Total STARs Created	**1,000,000,000**
Maximum STARs Sold	**250,000,000**
Accepted Tokens	**ETH**

Table 2: Mechanics of Astra Token Sale

The proceeds from the STAR Token Sale will be used for the following purposes:

Development	**65%**
Marketing	**15%**
Administration	**10%**
Legal	**5%**
Contingency	**5%**
Total	**100%**

Table 3: Usage of Funds

The schedule and detailed instructions for participating in STAR Token sale will be announced separately on the Astra Website: https://www.GoAstra.Network.

8. LEGAL CONSIDERATIONS

The Astra team is working with competent outside legal counsel to ensure that we are building our Network on very sound legal foundations. Though Astra tokens (STARs) are Network Utility Tokens, we are offering them as 'Securities' in full compliance with the law. The STAR tokens will be offered to accredited investors under SEC's Regulation D 506(c) rules.

Please carefully read and understand this white paper and Astra "Terms of Token Sale". You should also consider consulting appropriate advisors to evaluate suitability of STAR tokens.

Risks:

1. STAR tokens are network utility tokens within the Astra Network. STAR tokens are not securities. STAR tokens are non-refundable. STAR tokens are not for speculative investment. No promises of future performance or value are or will be made with respect to STAR, including no promise of inherent value, no promise of continuing payments, and no guarantee that STAR will hold any particular value. STAR tokens are not participation in the Company and STAR tokens hold no rights in said company. STAR tokens are sold as a functional good and all proceeds received by Company may be spent freely by Company absent any conditions. STAR tokens are intended for experts in dealing with cryptographic tokens and blockchain-based software systems.
2. This white paper describes our current vision for the Astra Network. While we intend to attempt to realize this vision, please recognize that it is dependent on quite a number of factors and subject to quite a number

of risks. It is entirely possible that the Astra Network will never be implemented or adopted, or that only a portion of our vision will be realized. We do not guarantee, represent or warrant any of the statements in this white paper, because they are based on our current beliefs, expectations and assumptions, about which there can be no assurance due to various anticipated and unanticipated events that may occur.

3. Please know that we plan to work hard in seeking to achieve the vision laid out in this white paper, but that you cannot rely on any of it coming true. Blockchain, cryptocurrencies and other aspects of our technology and these markets are in their infancy and will be subject to many challenges, competition and a changing environment. We will try to update our community as things grow and change, but undertake no obligation to do so.
4. As with any cryptographic token, significant risks exist. These risks include potential failures in the still new Ethereum platform and with Astranetix technology. Prospective token purchasers ought to thoroughly assess the involved risks and know that possibilities involving a catastrophic failure in underlying technology that wipe out token value could happen. These risks will be further covered in the terms and conditions for the sale. We will endeavor to mitigate risks relating to Astranetix technology through rigorous testing and other engineering means. We will mitigate risks relating to the Ethereum platform by monitoring other options for public blockchains.
5. The emerging cryptographic token space is sparsely regulated right now. Our goal is to be as compliant as possible within such a regulatory environment. The contents of this document do not constitute legal advice and we encourage prospective purchasers with concerns to consult with an attorney. We expect the regulatory environment to

evolve as the cryptocurrency space matures and we will do everything we can to maintain compliance.

6. Due to the retrospective nature of regulatory action, the Astra team can make no guarantees regarding the legality of the Network or launch in any given jurisdiction.