



THE MAGNUS COLLECTIVE

WORLD'S FIRST ROBOTICS AND A.I. AUTOMATION TOKEN

DEFINING THE UNIVERSE OF ROBOTICS AND AI

AUTOMATION FOR ORGANISATIONS



"RAPID ADOPTION OF ADVANCED ROBOTICS ACROSS THE GLOBAL ECONOMY COMBINED WITH THE BLOCKCHAIN REVOLUTION HAS STARTED A NEW ERA"

THE OPPORTUNITY

- The combination of declining prices in Robotics, performance improvements and increasing widespread adoption of the block chain will lead to exponential growth.
- The exponential speed of technology innovation will make robotics and A.I. as omnipresent as personal computers and the internet.
- The combination of blockchain with cloud and distributed robotics will make robotic collectives secure, autonomous, reliable and profitable.

THE PROCESS

- The Magnus Token helps capture economic value in an investable universe of robotics and AI automation.
- The Magnus Token captures the entire value chain of robotics, automation, AI, and enabling technologies worldwide across different sub sectors.
- The Token methodology is designed to bring stability to a high growth industry through active and passive roles for the token.

THE COLLECTIVE

- The founding firms of the collective have been recognised by Industry leaders including LG, Walt Disney, IEEE, BCG.
- The Token is supported by a unique coverage team comprised of financial, research, and academic leaders from within the Robotics and Automation Industry.



Why should you get the Magnus Token ?

USABILITY

1. MGS could be used to lease any Robotic platforms on the collective and used for buying and deploying skills on the collective;
2. MGS is used to contribute to Crypto currency's ecosystem;

PROCESS

1. Attractive Bonuses up to 60% during ICO;
2. Staking - Use your tokens for staking to receive transaction fees from the Collective;
3. The remaining unsold Magnus from the Token pool will be burnt

INDUSTRY

1. Existing business and Experienced team with widespread industry coverage, partnership, press and media coverage;



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“Artificial intelligence will reach human levels by around 2029. Follow that out further to, say, 2045, we will have multiplied the intelligence, the human biological machine intelligence of our civilization a billion-fold.”

RAY KURZWEIL
Futurist

Vision

MAGNUS COLLECTIVE OVERVIEW

A cognitive and collaborative collective between Artificial Intelligence, Robots, Humans, Sensor Networks and distributed hardware built on the Ethereum smart contracts. Magnus starts a new era of business, technology, and, thinking. The Magnus Era brings with it a fundamental change in how intelligent systems are built and interact with each other. Magnus's end goal is to make people smarter, machines better, Robots cheaper and faster, and, AI better by ensuring a collaboration with other agents in the Magnus Collective network.

In addition Magnus will have its own independent agent bots called "Sentry Bots" which will ensure that rogue agents are out of the Magnus network. Sentry Bots will use a whitelist and blacklist to maintain reputation and efficiency in the Magnus network.

Magnus will be able to negotiate and transact with other block chain or non-block chain based network that will come in the future using gateways called Portals. Portals will ensure that even if Magnus does not obtain leadership in terms of the network - Magnus will never become obsolete or outdated . Portals will translate the negotiation and requests between different networks and open up Magnus to all the external

networks that are being created.

**COGNITIVE SOLUTIONS ARE
ALREADY REDUCING TOWN TRAFFIC,
IMPROVING EMERGENCY FACILITIES,
AND IMPROVING CUSTOMER
INVOLVEMENT.**

**OUR OPINION IS THAT THIS IS JUST
THE BEGINNING AND ONLY THE
TIP OF THE ICEBERG. IT IS TIME WE
ACCELERATED THE PROCESS.**

**WITHOUT COOPERATION, THESE
TECHNOLOGIES ARE STUCK IN
SILOS, RELEGATED TO INDIVIDUAL
COMPANIES AND INDUSTRIES.**

Note - The name Magnus Collective is inspired from Saint Albertus Magnus is said to have created an android in the 13th century - One of the first collective of intelligent agents to behave as an Automaton .



Press Coverage of the Magnus Ecosystem

Forbes

Mashable

FORTUNE

POPULAR
SCIENCE

Inc.

The Boston Globe

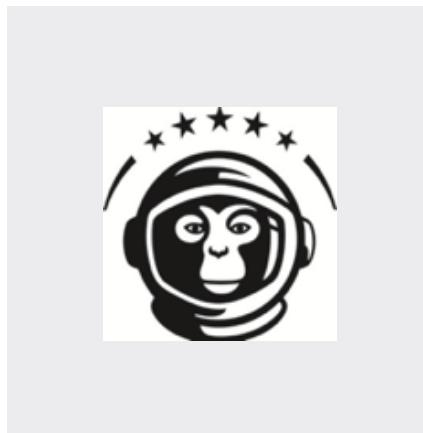
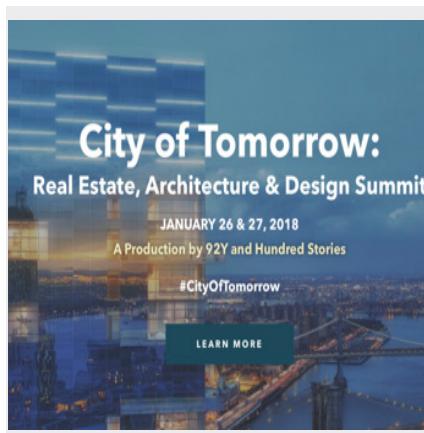
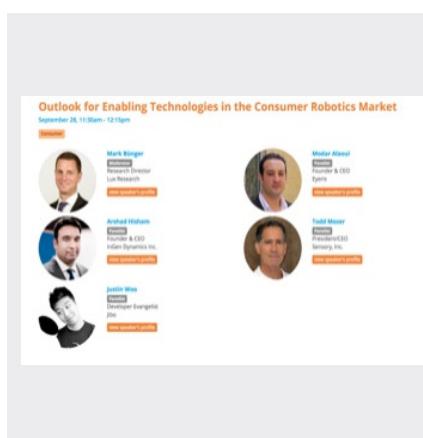
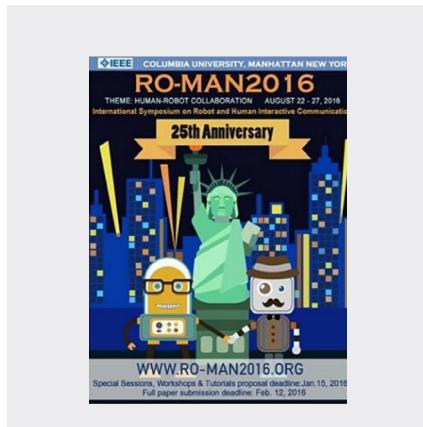
Sc discovery
science

SLASH GEAR

TNW
THE NEXT WEB



Industry Recognition of Magnus Ecosystem



Magnus ecosystem featured in reputed global industry reports

You are here: Home > Categories > Telecommunications and Computing > Computing and Electronics > Security Robots Market by Type; by Region: Market Size, Forecasts, Insights and Opportunities (2016 - 2021)

SYNDICATED STUDY
Security Robots Market
(2016 - 2021)

Market Analysis and Forecasting Report


Security Robots Market by Types; by Regions: Market Size, Forecasts, Insights and Opportunities (2021)

ID: 3838313 | Report | August 2016 | Region: Global | 103

DESCRIPTION	TABLE OF CONTENTS	SAMPLES	COMPANIES MENTIONED	FORUM
The report on the security robots market provides an in-depth analysis of the forecasts and opportunities of security robots that cater to the commercial, government and residential ecosystem. The study includes market analysis of security robots in the indoor and outdoor environments.				
The report also provides the market size and forecasts of security robots, categorized segments - Hardware, Software and Services. The services category is further into Leasing and Rental, and Maintenance. Further to this, the report also provides market data for customers across five regions.				

GLOBAL SECURITY ROBOTS

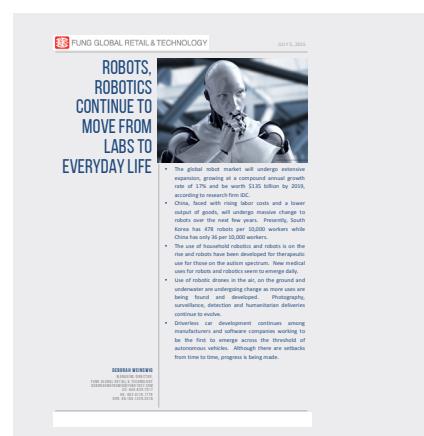
A syndicated study from global market reports leader research and markets featured us in the Market size, forecasts, opportunities and insights



FUNG GLOBAL REPORTS

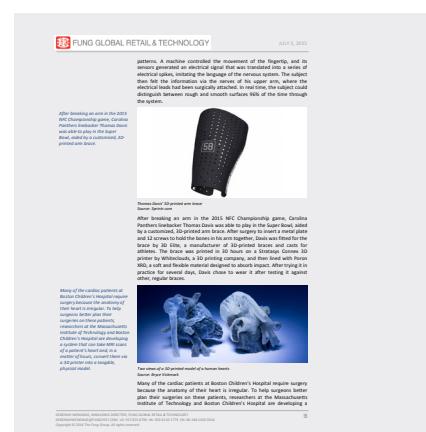
- ROBOTICS AND ROBOTS

Robots are walking out of labs and into our lives as robotics technology is increasingly being used in everything from industry to household tools.

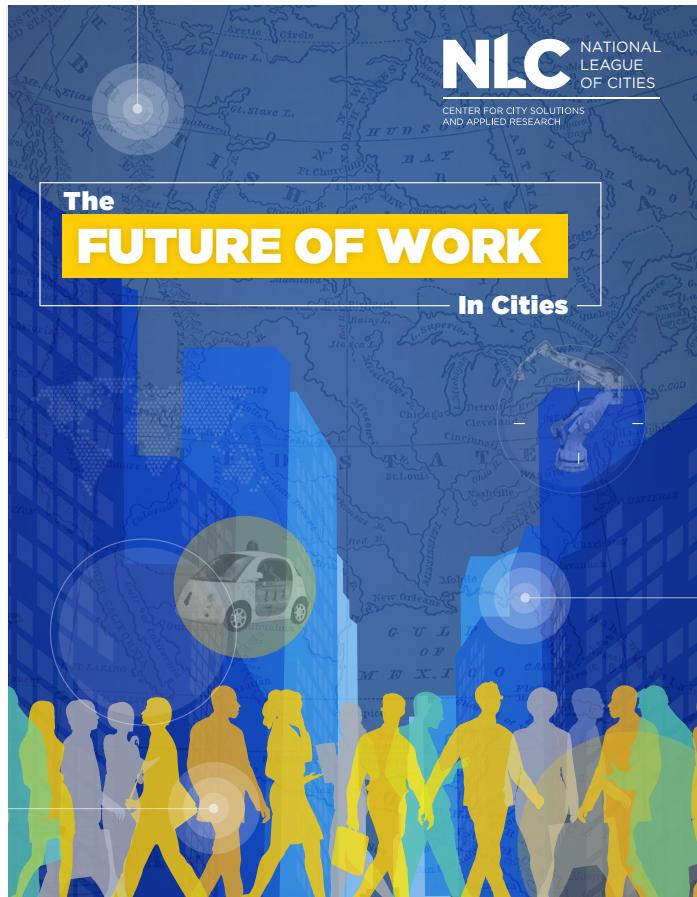


GLOBAL ARTIFICIAL INTELLIGENCE AND ROBOTICS MARKET

Featured in the global
artificial intelligence and
Robotics market in market
leading research reports.



Magnus ecosystem featured in Washington based Future of Work Report by NLC - National League of Cities U.S.



Examples of Workforce Automation

Many elements of the workforce have already been automated, and these early examples reveal that we might be losing more than just jobs to automation. In many cases businesses will benefit from efficiency while consumers may be frustrated by the loss of interaction and socialization. An automated customer service prompt may increase efficiency and lower wait times for callers, but fail to account for individual nuance and increase irritation. Other examples of automated functions and interfaces include:

Eatsa, a fast-food restaurant requiring zero human interaction. Customers place orders via tablet and receive their prepared food through one of several glass cubbies set into a wall. Line cooks and kitchen staff remain out of sight on the other side of this wall.¹⁴

Momentum Machines has developed a robotic system capable of making 400 hamburgers an hour, automating everything from the grinding of the meat to bagging the order. The company plans to open its first restaurant in San Francisco in the next few months.¹⁵

made by **Kiva Systems**.¹⁷ Since introducing Kiva, the average time for finding something and boxing it for shipping has gone from an hour and a half to 15 minutes. After Amazon bought Kiva and stopped selling its robots to other retailers, major U.S. retailers are racing to develop more advanced automation technologies. Amazon has invested significantly in automated drones and artificial intelligence via its new Amazon Robotics division.

Robotic security guards developed by **Silicon Valley's Knightscope** are equipped with 360 degree cameras, intelligent threat and breach identification, and autonomous patrolling capabilities.¹⁸

Aido's personal home robot moves around the home on its own and has an HD projector in its body, along with sensors for air quality, temperature, humidity, noise, ambient light, pressure, and gravity. Aido can also talk to other home appliances using wifi, BLE, ZigBee, and Z-Wave.¹⁹

FUTURE OF WORK - NLC

One of the key players identified by U.S. Govt's NLC (National League of Cities). A washtington based US Government organisation providing guidance to local leaders in 19000 US Cities

National League of Cities serves the interests of 19,000 cities, towns and villages in the US as well as professionals working in municipal government.

The Future of Work in Cities contrasts the realities cities face today with the ways they are planning for tomorrow, exploring the means by which cities can exploit innovative opportunities while realigning local governance priorities.

This research initiative aims to empower local leaders in cities across America to be proactive rather than reactive toward the changing economy, helping them position cities for growth as these trends accelerate.



Magnus ecosystem corporate partners through PnP Program - Ranked #15 by Forbes)



PnP ECOSYSTEM PARTNERS

The group of ecosystem anchor partners including Johnson & Johnson, Zimmer Biomet, AARP, Nokia, Siemens, Ascension, Pfizer, Boehringer Ingelheim, and Servier.

REPUTED MEMBERS

Companies in the community have raised over \$4 billion in funding, including Danger, Dropbox, Lending Club, SoundHound, and Zoosk.

SIEMENS

NOKIA

Pfizer

ZIMMER BIOMET
Your progress. Our promise.[®]

Johnson & Johnson

FAMOUS ALUMS

Famous Alumnus include Google and PayPal among others.

Google

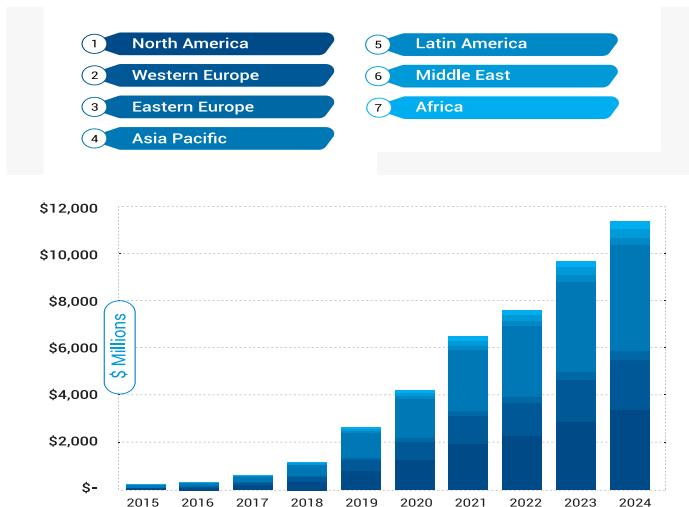


1.2 MAGNUS GROWTH DRIVERS

The current technology and business landscape is ripe for a network like Magnus because of the 5 growth drivers which has been on steroids for the last decade .

1. AI GROWTH

ARTIFICIAL INTELLIGENCE REVENUE BY REGION,
WORLD MARKETS: 2015-2024

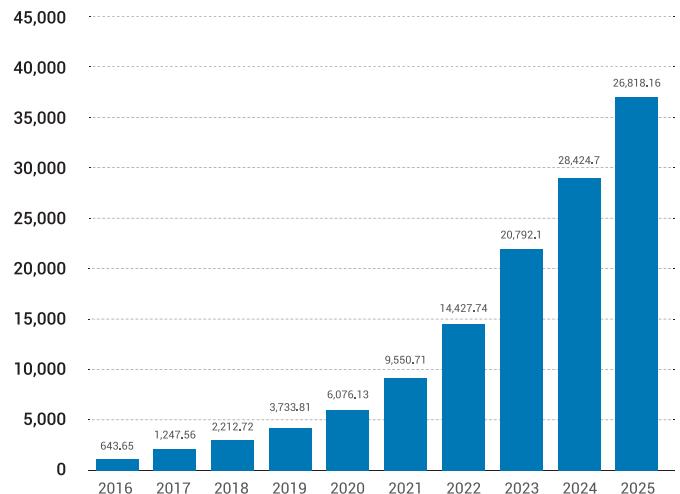


Within the next decade global artificial intelligence market is expected to be worth more than \$3 trillion. And according to PWC, AI will contribute as much as \$15.7 trillion to the world economy in the next decade.

To give some context that's more than the current output of some of the world's largest economies. AI is forecasted to disrupt and uproot existing ways of doing business, transportation and definition of work as well.

A report from Harvard Business Review found out that even though AI has been used

GLOBAL A.I. REVENUE FROM 2016 TO 2025



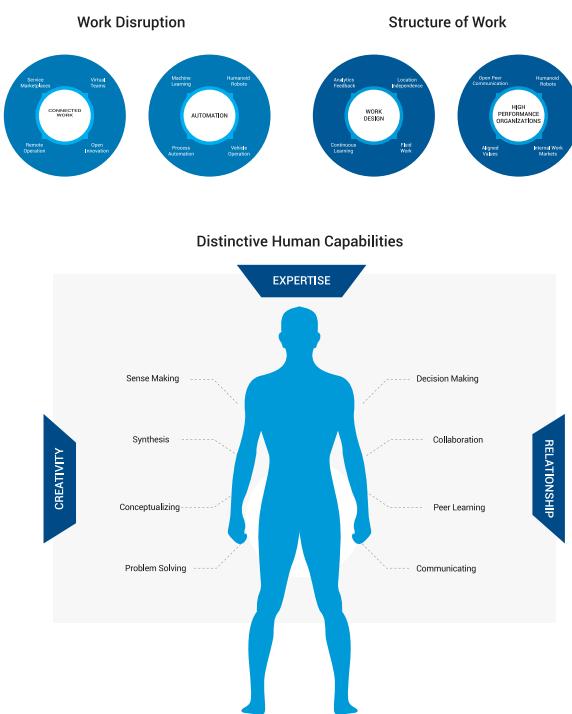
sporadically in different sectors, the game changing opportunities are yet to happen.

The biggest opportunities will only be tapped when AIs can work together, leveraging each other's strengths across different geographies, verticals, and use-cases.



2. AI-HUMAN COLLABORATION

HUMANS AND AI IN THE FUTURE

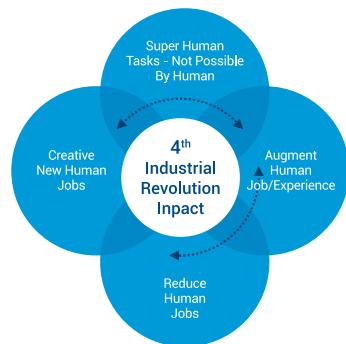


AI innovation has accelerated in the last few years, - the main growth drivers being cheap computation and access to large data pools.

Artificial intelligence, signal processing and machine learning are already driving many of the common tech that is being run today, from search engines , voice enabled assistants and even advertisement targeting online. Creating a combined cognitive platform is already happening - this is not a research project in a college lab - and it is accelerating faster in the last decade.

Till now the smart people were those that received the highest scores by making the least number of mistakes. AI will change that fundamental logic because there is no way any human can outsmart, for example Google's new AI engine or the IBM Watson platform.

TRANSITION TO AN A.I SOCIETY



- | | |
|---|---|
| Direct: | Indirect: |
| <ul style="list-style-type: none"> > Advanced sensor perception > Advanced Speed of execution > ... | <ul style="list-style-type: none"> > Social experience > Knowledge learning > ... |
| Direct: | Indirect: |
| <ul style="list-style-type: none"> > Data Scientists > AI/Robotics Engineering > ... | <ul style="list-style-type: none"> > Advisory support > Facilitation > ... |
| Direct: | Indirect: |
| <ul style="list-style-type: none"> > Connected work > Geographic awareness & reach > ... | <ul style="list-style-type: none"> > Transport Drivers |

So we are looking at an era of augmentation where humans will have to work with AI's to produce tangible results.

Smart machines can process, store, and recall information faster and better than we humans. Additionally, AI can pattern-match faster and produce a wider array of alternatives than we can. AI can even learn faster. In an age of smart machines, our old definition of what makes a person smart doesn't make sense.



3. IOT AND SENSORS GROWTH

The rapid advances in adoption of IoT-driven devices is expected to reach a total cap exceeding \$195 billion in 2023, according to analysts.

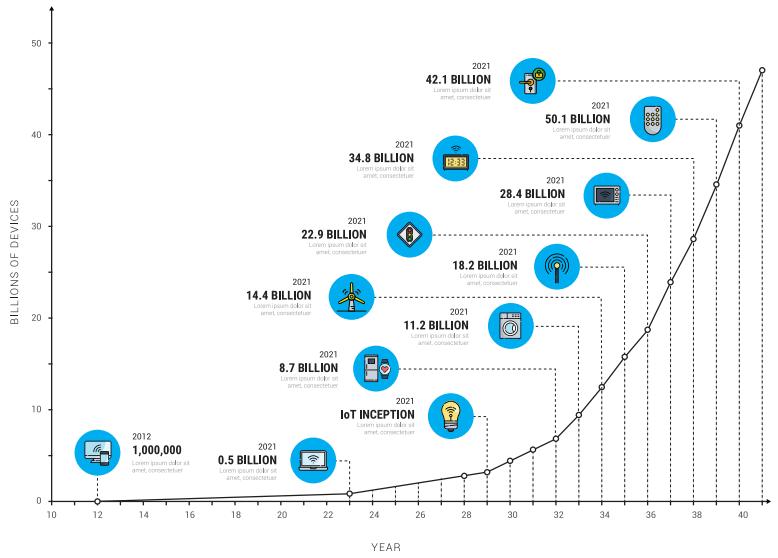
Currently at a market of \$16 billion in 2016, this growth is mainly driven by the increasing popularity of smarter in-home, mobile, and transportation devices — and the need to capture that data and enhance communication infrastructure.

Gartner reports that close to 6 billion devices were connected in the last year alone — with this number set to exponentially grow over the next decade.

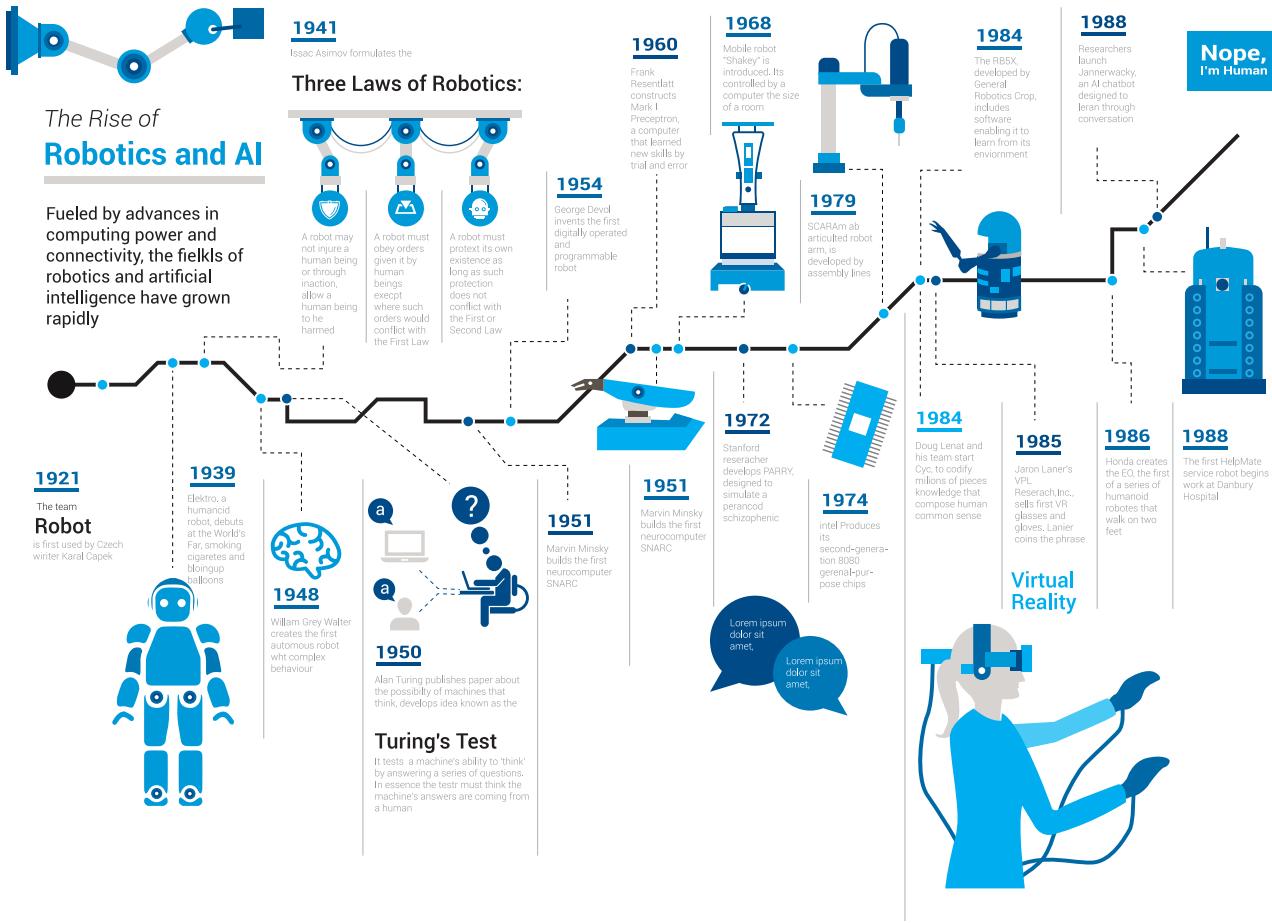
These are significant numbers and with a potential for a lot of information to be exchanged between the various interested parties .

THE INTERNET OF THINGS

AN EXPLOSION OF CONNECTED POSSIBILITY



4. THE RISE OF ROBOTICS



Robotics is at inflection point like the industrial revolution in the early 1900's. After growing at a compound rate of 17 per cent a year, IDC forecasts the robot market to be worth at least \$130 bn by 2020. The Asian markets including Japan and China is driving up this boom as they retool their existing manufacturing capabilities. The market for industrial and consumer Robots is set to explode in the next 5 years bringing new use cases to the forefront.

Techniques like collaborative Robots, Consumer Robotics are all fueling this growth.

5. THE RISE OF CLOUD COMPUTING AND DISTRIBUTED HARDWARES

Cloud computing has been a hot topic for years, but most companies are still in the early stages of adoption. As IT workloads shift to the public cloud over the next several years, opportunity abounds for infrastructure and platform-as-a-service vendors, or IaaS and PaaS, respectively



1.3 MARKET NEEDS AND INDUSTRY PAIN POINTS

With Magnus, companies, organizations, and individuals can empower their sensor networks, Robots, AI agents, hardware and human agents to participate in markets, buying and selling goods and services. No longer must all these agents exist in isolation, only capable of operating within a specific company, vertical or domain.

Agents can use Magnus markets to trade information, sensor feeds, platforms, analytical capabilities that previously needed to be created from scratch. Agents can also use Magnus markets to monetize their own assets, information, skills and learning to create tremendous value from proprietary information, algorithms, and functionality. This is a major opportunity, and we've attracted the best of experts to work with us on Magnus. We have globally respected experts in Robotics, Software, Entrepreneurship, Mechanics, and mathematics—not to mention our rich experience in Robotics, Artificial intelligence and machine learning.

Magnus creates significant network benefits. Participants of our platform gain five major competitive advantages:

1. **Access**— AI Agents can work with Human actors , leverage distributed file systems and collaborate with other Actors for unprecedented access.

2. **Efficiency**— Actors can form Sub-Collectives which can lead to substantial increases in efficiency .

3. **Transparency** —The combination of AI tools will result in emergent intelligence and capabilities that no other platform can provide in a transparent manner to all actors

4. **Collaboration** —Information can be processed materially faster than the competition by actors working together for a common objective

5. **Innovation**— All the actors can innovate within the collective as the Collective incentives innovation.

With these key problem points Magnus is positioned to ride the 5 key growth drivers.



2 THE MAGNUS COLLECTIVE OVERVIEW

Magnus is the first truly decentralized network of intelligent AI agents, Robots, Sensors, hardware and humans creating a global market for knowledge, skills and processing power.

Combined with flexible tools to aid developers in securely distributing and monetizing their software, Magnus altogether changes the way Intelligent agents, human agents are organized and executed. By powering decentralized microservices and asynchronous task execution, Magnus is set to become a key building block for future web of IOT-Devices, AI-Agents, Human Programmers and Hardware. And, by substantially lowering the price of computations, complex applications such as object recognition path planning , and machine learning based skills become more accessible to everyone on the Magnus network.

Magnus connects agents(AI programs, Humans, Hardware and Sensors) in a peer-to-peer network, enabling both application owners and individual users (“requestors”) to rent resources of other users’ (“providers”). These resources can be thought of a Sensors-As-A-Service, AI-Processing-As-A-Service, Information-As-A-Service and Skills-As-A-Service .

Today, such resources are supplied by centralized Robots, AI programs which, are constrained by closed networks, proprietary payment systems, and hard-coded provisioning operations. Also core to Magnus’s built-in feature set is a dedicated Ethereum-based transaction system, which enables direct payments between requestors, providers, and software developers.

The function of Magnus as the backbone of a decentralized market for power can be considered both Infrastructure-as-a-Service (IaaS), as well as Platform-as-a-Service (PaaS). However, Magnus reveals its true potential by adding dedicated software integrations - The Magnus team have deep experience in Sensors , IOT, Robotics, Artificial Intelligence and Machine Learning Systems.

Any interested party is free to create and deploy software to the Magnus network by publishing it to the Agent Registry. Together with the Transaction Framework, developers can also extend and customize the payment mechanism resulting in unique mechanisms for monetizing.



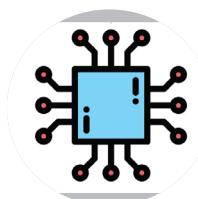
2.1 NETWORK DYNAMICS - FIVE DIFFERENT TYPES OF ACTORS

The Magnus Collective revolves around five different type of Actors



Robotic Systems

These may involve either individual Robotic systems working in isolation or a swarm of Robotics with a common goal (A sub-collective).



IOT Hubs

IOT hubs include Sensor arrays or other IOT devices that can communicate with the Magnus Collective



AI Collectives

AI collectives involve either a standalone AI agent or a sub-collective of AI actors working towards a common goal



Human Actors

Human Actors play a central role in the Magnus collective - They can either work in groups or as individuals.



Distributed File Systems

Distributed file systems are how information is stored on the Magnus collective. AI and Machine Learning involves large data sets and efficiency of use, access speed and redundancy is key here.

2.2 WHY BLOCKCHAIN ?

Blockchain, which gained prominence with Bitcoin, has proven that by combining peer-to-peer networks with cryptographic algorithms a group of agents can reach an agreement on a particular state of affairs and record that agreement without the need for a controlling authority.

Combining blockchain with other systems, such as robotic swarm systems or AI collectives, enables the group to be autonomous, flexible, more secure and also collaborate without any friction.

Blockchain technology demonstrates that by combining peer-to-peer networks with cryptographic algorithms, a group of agents can reach an agreement on a particular state of affairs and record that agreement in a secure, verifiable manner without a central authority.

Due to the decentralized nature, and key principles such as security and fault-tolerance, blockchain technology is extremely useful in combination with emergent fields of Robotics Swarms, AI collectives, and IOT hubs.

2.3 OXFARI FRAME WORK - NETWORK DYNAMICS

0xFari is an open source framework consisting of Ethereum smart contracts and front-end libraries that govern the interaction between the various actors and provide their baseline functionalities. Each interactions backend logic will be controlled by a combination of 0xFari contracts shared by Actors on the collective and a set of Interaction-specific contracts. 0xFari will share reusable components where possible.

0xFari is already integrated with popular frameworks including Stanford ROS - Robotic Operating system and Ingen dynamic's home robot platform. Interactions between AI to AI, AI to Robot, Robot to Robot, Robot to cloud and Robot to Human has been modeled over a block chain - And we have working prototypes of both the source code and physical videos of the network in action.

Every actor in the network can act as a Service Provider , Service Buyer or a Verifier.



2.4 EXTERNAL ACTORS

External Actors or customers can interact with the collective through similar smart-contracts that will drive the growth of the network. External Actors will use the Magnus Token to negotiate and purchase services within the collective.

2.5 SYNTAGMA - GOVERNANCE OF THE COLLECTIVE AND SUB-COLLECTIVES

Called the Syntagma, The Magnus collective will be using a custom Aragon implementation for the governance perspective. Launched in 2017, Aragon is an operating system for decentralized entities. The Aragon platform provides an easy to use interface for creating, administering, and governing virtual entities. Aragon allows for user-friendly management of the basic components of an entity such as voting right distribution, role assignments, and accounting. The behavior of an Aragon entity can be customized by changing its by laws.

The creation of a sub collective on the Magnus Collective will trigger the creation of a deposit

pool and corresponding entity on the Aragon Network. Through the Magnus Network Collective Token interface, token holders can stake their tokens to deposit pools to mint tokens which represent voting rights in collective-specific Aragon entities, via which all collectives governance activities will occur.

Voting rights can be used to partake in the processes that determine the characteristics a sub-collective ranging from its design, to its functionality, to its accepted code of conduct, to the way revenue generated by the district is utilized or distributed. Aragon entities created for sub-collectives will come preconfigured with a suggested set of by laws and parameters, but sub-collective participants can vote to change these as they see fit.



THE MAGNUS COLLECTIVE

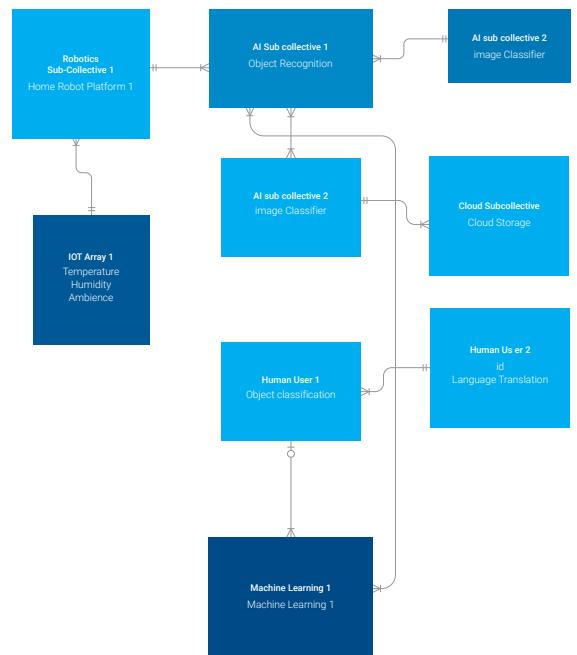
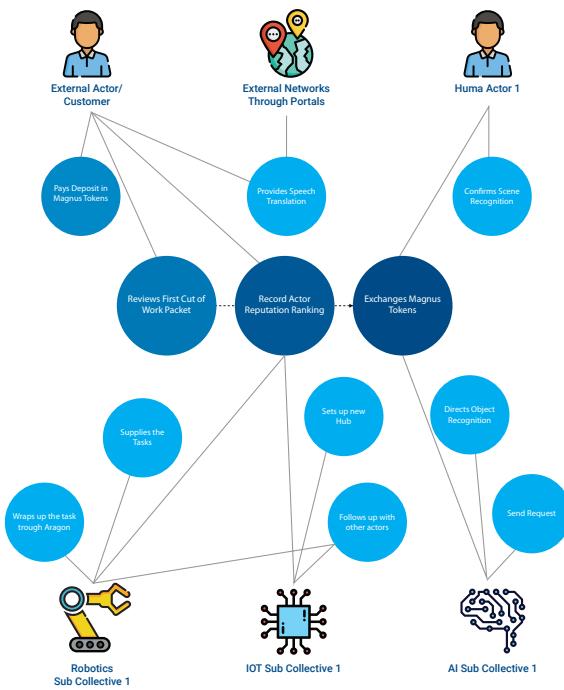
2.6 SENTRY

Sentry are special sub collective created by the Magnus Collective that patrols the Magnus network and ensures that no bad actors are present and essentially keeps a reputation system running.

3 PORTALS

Portals are gateways to external networks both block chain and non block chain - that allows participants in the Magnus collective to negotiate and transact with other providers.

NETWORK DYNAMICS WITH THE MAGNUS TOKEN



4 TOKEN ECONOMICS

4.1 LONG TERM VISION FOR THE ECONOMIC LOGIC

The Collective has four long term goals.

1. The first goal is to create a highly useful hub of Robotics, AI, IOT, Humans and cloud systems.
2. The second goal is to accelerate the development and use of Robotics, leading to a service economy where individuals and organizations can lease robotic services using the Magnus Token.
3. The third goal is to create and bridge an open exchange between different entities that are developing at a rapid pace in the last decade in BlockChain, Ai, Robotics and cloud computing. Currently most of the new players are operating in silos or islands - And Magnus is attempting to change this.
4. The fourth is to create a network effect of good will and innovation within the collective which will lead to accelerated technological progress and economic development.

4.2 ECONOMIC ROLES AND ECONOMIC OBJECTIVES

Magnus's economic logic is optimized for achieving those goals. To become the collective Magnus needs both a framework and an open market for buying and selling services.

The 0xFari framework lets Actors work together, it makes them interoperable. The role of all markets is to facilitate efficient transactions and minimal costs - and with the least number of obstacles. The 0xFari implemented through a series of Smart Contracts enables the Magnus Collective to act as a hub for a set of sub-collectives of Robotics, AI, IOT, Humans and Cloud Storage.

Magnus Collective is a decentralized, open network. One of the core founding principles of Magnus is that - it welcomes any entity on the collective irrespective of location or size of the Actors entities. Anyone will be able to use or provide collective services on the network. It is a free-to-use, and, permission-less market. So this in effect will enhance and increase the acceleration of adoption in the Robotics innovation - including opening up new entrants from the international community irrespective of location or other constraints.



It is a free-to-use, and, permission-less market. So this in effect will enhance and increase the acceleration of adoption in the Robotics innovation - including opening up new entrants from the international community irrespective of location or other constraints.

The Magnus token is a utility token, with a core purpose of being used to buy, sell and trade Robotics, AI, IOT and other transactions carried out by the different Actors wrapped in 0xFari framework.

This token can be acquired during the token generation event, and will also be distributed after the token generation event, to participants in the developing economy. The release of MGN tokens after the initial token issuance event will occur via a schedule to be described below, which can be modulated via democratic governance.

To elaborate the context and underpinnings of the economic logic further, note that there are 6 economic roles in the Magnus Collective Economy:

- Facilitate collaboration between different Actors in Robotics, AI, IOT, Cloud and Humans
- Facilitate Buyers of services;
- Facilitate Providers of services (including those offering non-monetary services);
- Verification of services.
- Governance and Monitoring through Syntagma , and , Sentry.
- Interface all relevant external blockchain and non-block chain networks through Portals.



4.3 WHY DO WE NEED THE MAGNUS TOKEN ?

To maximize success, the Magnus Collective economic logic must enable buying and selling of all services, while making the discovery process as useful as possible - And ensure that all actors have easy and frictionless access to the collective.

So the economic logic is tuned for the following objectives:

- Open, global, and permission-less access to the various actors.
- Services verification and discovery.
- Good will generation.
- Innovation in Robotics.
- Bridging and going across different networks (and Blockchains)

The Magnus token is designed to achieve these objectives. It guarantees free and non-discriminatory access from the start, and concentrates value created by the collective . It has mechanism in place for inflationary incentives

for verifying services, is backed 2 year lease of popular and industry recognised Robotic platforms and for rewarding good intent on the network .

The Magnus token was brought to life after careful thinking and long deliberation on the benefits. We have thought through hard coding economic logic versus designing an economic logic that drives rapid growth. If we cannot find a token that satisfies all the unique requirement of the Token - the collective may collapse - and fail to achieve the stated objectives.

The conclusion of our careful analysis was that only a native token lets the Magnus Collective optimize for the desired objectives.

To create a market that makes transactions easy, guarantees world wide access, and promotes growth we require a native token tuned for Robotics, AI and IOT market. And we have decided to back our token with a lease of the Robotics platform - Especially the Ingen Table Top Robot platform.



In more depth, some of the underlying reasoning was as follows.

Magnus Collective requires:

a. Permission-less global exchange

Magnus Collective opens Robotics, AI and IOT technology and development to the whole world. Any fiat currency would create asymmetric access to the Magnus collective - effectively creating a barrier to actors not using the Fiat Currency. To ensure fair access to all the distributed actors, a single token economy is required.

b. Utility use support

Most of the available tokens do not have a utility backing. Magnus tokens will be backed by leases of popular Robotics platforms. In essence this guarantees that during market volatility there is tangible benefit for exchanging the tokens for leases.

c. Self governance and rapid scaling

To enable a Robotics, AI and IOT economy, a scalable design is required. Of the current popular models Ethereum is the closest match we have

- However we need certain modifications to the manner the current ethereum network works
- This is enabled with specific smart contracts and adapters that will run over ethereum. As the number of transactions increase this can create a latency problem - This would be addressed in our later releases. In addition we will allow for a large number of micro-transactors in large volumes.

d. Frictionless Inflationary Rewards

The various actors in the collective has an incentive to participate in the various verification processes without an enforced penalty. The Sentry can tax bad behavior which makes it more expensive for actors to engage in moral hazard. So the overall incentives are aligned to grow and expand the collective.

For these reasons and more, it's clear that if we want to optimize the economic logic, a native token is required.



4.4 TOKEN ECONOMICS

Token economics usually consists of Physical Aspects and Policy aspects of the Token. In this section we briefly discuss the reasons behind this.

4.4.1 PHYSICAL ASPECTS

4.1.1 SUBSTRATE / SYSTEMS

Ethereum is probably the biggest, the most popular and the most advanced system in comparison to anything else right now for us to build on. In addition Ethereum has plans for Swarm, Whisper and a P2P protocol in the wraps. As the network matures we would be able to back integrate the new features to the Magnus Collective . And finally the Ethereum components are available in various programming languages, including Go, C++, Rust, Python, JavaScript. So we have decided to adopt and build the Magnus collective using Ethereum.

Currently the Magnus Token will exist only on the Magnus Collective - However the implementation of Portals will allow cross compatibility and community exchanges with new and upcoming networks. Future direction will be decided by the community.

4.4.1.2 ROLE

The Magnus Token has two roles - It has a passive role and an Active role as explained below.

1. Passive Roles - Leasing of Robots , AI, IOT, cloud and information based services. (Note: A passive token simply plays the role of money in a system, holds value, or collects rent. Passive tokens include frequent-flier miles, game credits, virtual currency, awards, points, etc. A passive token could represent the ownership of a diamond or piece of land, or it could be like a share of stock or any collateralized debt instrument.)

2. Active Roles - Activation of AI services , Activation of specific Robotic Functions, Negotiation of services. (Note : An active token doesn't have business logic built in; it is a signed order in a system that recognizes the token and applies business logic to accomplish things. The software looks up the token and sees what properties, rights, and obligations it has in the system. An active token has to be more than just access to transact in its native system.)

4.4.1.3 SUPPLY

The supply of Magnus Token will be limited.

4.4.1.4 SOURCE CODE

The Magnus Collective is founded on open principles. Both the block chain and Robotics related source code from the Robotics Company. (Roughly 55% of the Robotics source code will be public).



4.4.1.5 FUNGIBILITY, TRANSFERABILITY AND TOKEN FLOW MODELS

The Magnus Token is Fungible and Transferable. The Token flow model is circular, where they exchange back and forth, as with currencies.

4.4.1.5 PAYLOADS

The payload will include 2 Year Lease of the Popular Robot platforms - Taken care by a smart contracts. This will ensure that the Token holds its value since it will be backed by a real tangible utility that can be provided.

4.4.1.5 DIVISIBILITY

18 Decimals.

4.4.2 POLICY ASPECTS

4.4.2.1 FORKS

Substrate Fork - Effects

1. Hardware Lease of the product defines utility. Chances of Substrate Forks very low with Ethereum as it is the most popular network currently.

Project Fork - Effects

1. A future project fork will not affect the intrinsic value of the Token. Magnus fee prices are already determined by the market. So the chances are low. Even if a project fork happens. We have Token

transfer mechanism planned.

4.4.2.2 MONETARY POLICY

Magnus uses a Fixed number of Tokens - So it is an Inflationary Token. The number of tokens in the collective can decrease through

1. Burning
2. Losing private Key
3. Mistakes

Price Inflation can happen though

1. Market Demand : As market demand increases price inflation will go up.
2. Monetary inflation : Number of coins goes down in circulation. We estimated that one percent of all Magnus tokens will be lost forever every year.

4.4.2.3 FISCAL POLICY

These are the Fiscal policy we have planned for the Token

1. Buying Back Token inventory - This can push up price at a retail cost. The is not anticipated. A potential scenario would be when there is enough cash liquidity for the company - we might contemplate buying back token inventory.

2. Market Making - We have a reserve amount set for market making

3. Other Policy - Please see the detailed breakdown and plan shown at appendix.



4.5 THE VERIFIERS AND THEIR ROLE

Verifiers control the costs for existing actors to transact in the Collective. Based on the rankings assigned by the verifiers - Actors might find the network costs high or low. Every actor has the capacity to be a verifier .

4.6 TOKEN ISSUANCE

4.6.1 PRE SALE

Token Amount : The maximum token amount is 118.2 million MGSSs. Tokens are minted during the crowd sale and the total supply is fixed at the end of the crowd sale so that the maximum token amount might not be reached. In case the maximum number should be reached, the crowd sale allows a specific number of atoms to be created due to arithmetic imprecisions.

The price of one Magnus coin is \$ 0.66 or 66 cents.

Pre-ICO : 60% Bonus

Main ICO 0: 40% Bonus

Main ICO 1: 30% Bonus

Main ICO 2: 20% Bonus

Main ICO 3: 10% Bonus

Main ICO 4: 5% Bonus

The Pre-ICO will open on the 29th of January 2018 and the Main ICO will open on the 15th of February 2018.

4.6.2 TOKEN SALE PHASES

This goes through the following phases:

1. Pre-ICO : Phase with 60% Bonus. 2 Weeks.
2. Main-ICO 0 : Phase with 40% bonus. 48 Hours.
3. Main-ICO 1 : Phase with 30% bonus. 1 Week.
4. Main-ICO 2 : Phase with 20% bonus. 1 Week.
5. Main-ICO 3 : Phase with 10% bonus. 1 Week.
6. Main-ICO 4 : Phase with 5% bonus. 1 Week.
7. The unsold tokens will be burnt after the ICO

4.6.3 TOKEN POOL

85% of total raise goes to Magnus Public community which is planned to be used in the following manner.

1. 15% - Magnus Angel Investors
2. 30% - Magnus Support program
3. 15% - Magnus Community Fund
4. 10% - Magnus Innovation Accelerator
5. 8% - Magnus Development Fund
6. 5% - Magnus Bounty Program
7. 17% - Magnus Market Making Reserve



15% of total Raise goes to the Magnus Internal Team

1. 10% - Co-Founders
2. 10% - Consultants for Law, Finance, Research, Business Development e.t.c
3. 80% - Magnus Foundation Budget

4.6.4 TOKEN RIGHTS

The Magnus token has the following rights.

a. Payment Rights

Magnus tokens are simply the sole means of payment for a platform or service. In short, to pay for any services on the Magnus Collective, one needs the native currency. This creates a clear use case for the token with the following features

1. Product Usage

2. Product Access

3. Ownership

b. Governance Rights

Magnus Tokens will entitle holders to influence the direction of the platform or protocol: vendor selection, additional features, even some basic protocol decisions.

c. Access Rights

Magnus also play a role of being needed to access the network and pay transaction fees. But small amounts are needed to use the platform at all. This is a developing feature and the following is subject to change.

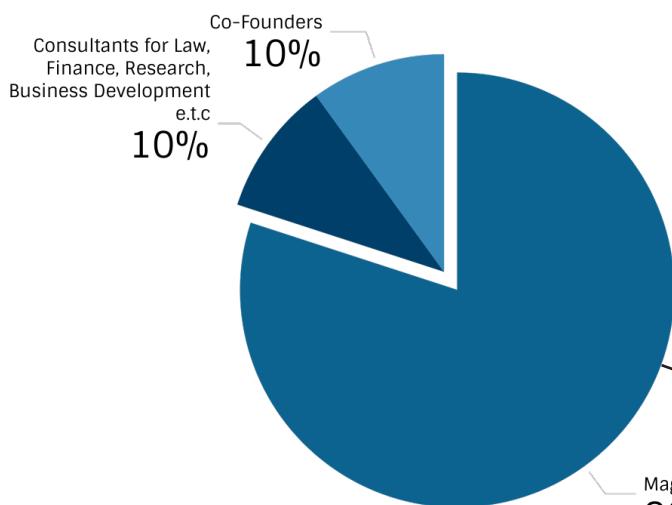
1. Running Smart Contracts
2. Security Deposit
3. Usage Fees



TOKEN SALE ECONOMICS AND DISTRIBUTION

15% of Raise

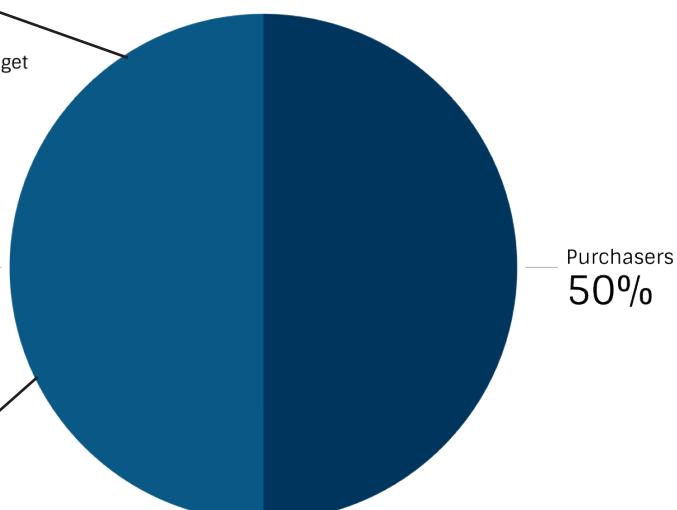
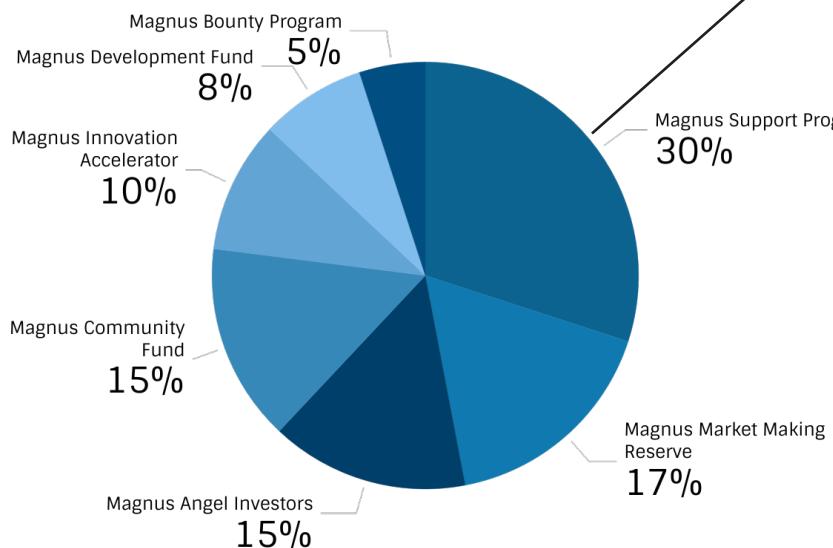
Goes to Magnus Internal Team



Total 112.8 Million Magnus

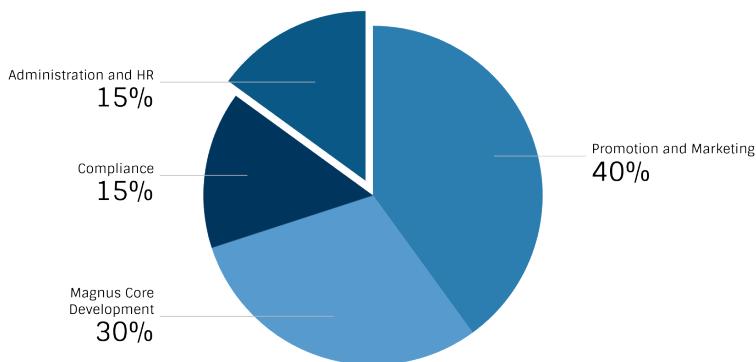
85% of Raise

To Magnus Community as follows

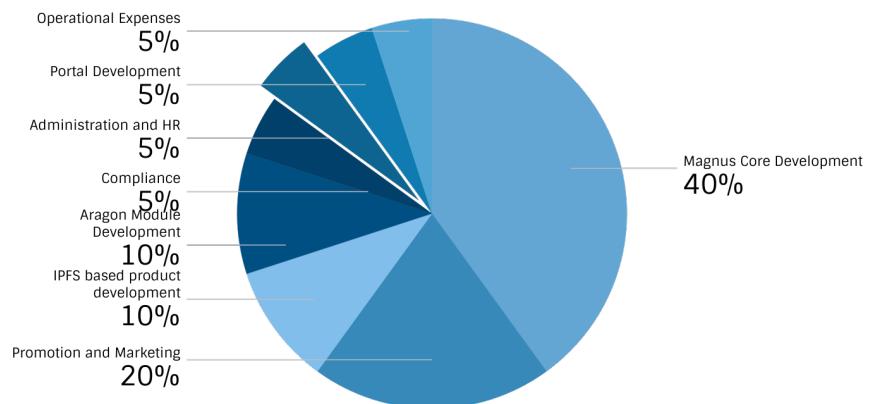


RAISED FUNDS ALLOCATION - PRE-ICO, MAIN ICO (SOFT CAP) AND MAIN ICO (HARD CAP)

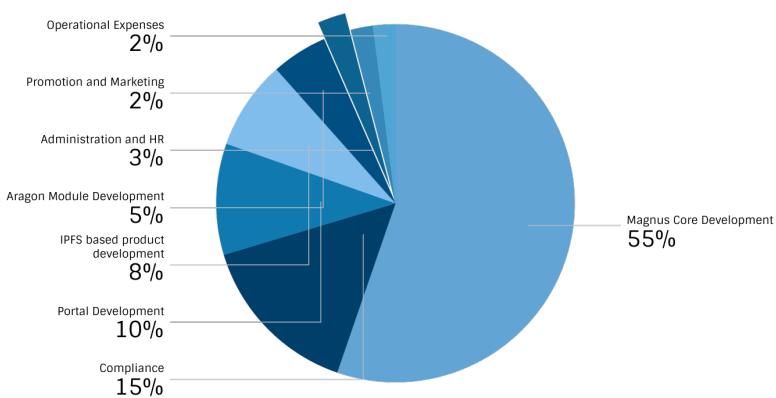
Raised Funds Allocation Pre-ICO



Raised Funds Allocation- ICO Soft Cap



Raised Funds Allocation- ICO Hard Cap



5 SYNTAGMA - HOW DOES IT WORK

5.1 REPUTATION AND MAGNUS VOTING

The Magnus Collective uses a variation of the Banzhaf voting power to calculate the Actor reputation in three activities (Verifier, Seller and Buyer).

Banzhaf Voting Power Index

$$B_i = \frac{c_i}{\sum_{k=1}^n c_k}$$

c_i = times voter i is critical

The Banzhaf power index is a way to measure voting power. The power index is usually applied when everyone votes at more or less at the same time. Also known as the Penrose-Banzhaf index - the formula was also explained in 1940's by L Penrose.

The fundamental idea is that the power of a voter should not be based just on the number of votes. The power really should depend on whether the voters can influence or make a decision.

We can explain this further. Let us assume a voting system defined by the number of votes needed to pass (The quota) and the number of votes of each person has. This is written in bracket notation:

[quota; person 1, person 2, ..., person n]

In the 5 person company, when each person has 1 vote, and a majority of 3 votes is needed, the voting system can be written as:

[3; 1, 1, 1, 1, 1]

In the 6 person company with 100 shares, when five people have 15 shares, one has 25 shares and a majority of 65 votes is needed, the voting system can be written as:

[65; 15, 15, 15, 15, 15, 25]

The Banzhaf voting index works as follows. First we identify all the different set of ways in which the voters can group together; these are known as coalitions.

Then for each group, We sum the total number of votes - if this is less than the quota [Vote pass criteria], ignore the group. If the total is larger than the vote pass criteria [quota], then identify which voters are critical.

A critical voter is one whose removal from the coalition leads to the group falling below the Vote pass criteria [Quota]. There can be one or multiple voters critical in the group. A critical voter can influence the vote decision and hence the name.

The number of times a voter is critical across all possible groups the voter is involved in is the numerator of the Banzhaf power index. The denominator is the sum of the number of times all voters are critical. The Banzhaf power index for a voter is then the ratio:

(# times voter is critical)/(sum of # times all voters are critical)



THE MAGNUS COLLECTIVE

BANSHAF INDEX WITHIN THE MAGNUS COLLECTIVE

There are three voting ranks for each actor in the Magnus Collective

a. Buyer Ranking Voting

This is a number between 0 and 10 and is a cumulative result of all the successful and favorable voting decisions in which a particular actor has voted for ranking a Buyer.

The more times an Actor makes a successful voting the more powerful the weights are. We propose an interval based voting weightage.

This is an example and the exact mechanism would evolve as the collective grows.

If Ranking Voting (BRv) > 0 and BRv < 3

$$\text{Voting Weight} = \text{BRv} * 1$$

If Ranking Voting (BRv) > 3 and BRv < 6

$$\text{Voting Weight} = \text{BRv} * 2$$

If Ranking Voting (BRv) > 6 and BRv < 8

$$\text{Voting Weight} = \text{BRv} * \text{BRv}$$

If Ranking Voting (BRv) > 8

$$\text{Voting Weight} = \text{BRv} * \text{BRv} * \text{BRv}$$

b. Seller Ranking Voting

This is a number between 0 and 10 and is a cumulative result of all the successful and

favorable voting decisions in which a particular actor has voted for ranking a Seller.

c. Verification Voting

This directly uses the quota system - The quota is initially set to a genesis value. However this evolves as the system grows to make sure that the Banzhaf power index for the none of the sub-collectives of actors becomes more than a specific value P_{limit} to avoid malicious actors to game the system.

During Genesis P_{limit} can be set to a specific value - However this would evolve as the collective grows.

c. Banzhaf Power Index Resets

After every 100 blocks that are written in the Magnus Collective - The Banzhaf power index and the quota is recalculated for every actor in the system. This will ensure that no actor or group of actors gets or accumulates uneven power.

Suppose $W = \{ w_1, w_1, w_1, w_1, \dots, w_n \}$ is the list of voting weights of all the actors. A coalition represents the subset of W and the weight of the coalition is the sum of the weights in the subset. All possible coalition weights can be obtained by expanding the function.

$$g(x) = (1 + x^{w_1})(1 + x^{w_2})(1 + x^{w_3}) \dots (1 + x^{w_n})$$

We call this the generating function for the coalition weights of the weighted voting system.

The sum of coefficients of x^k as k runs between $q - w_i$ and $q-1$ in the generating function gives the total Banzhaf power index for actor i .



THE MAGNUS COLLECTIVE

5.2 ROADMAP TO A FULLY AUTONOMOUS SYNTAGMA

In the early phases of network development, the Collective key management will make some of the governance decisions, which then will be migrated over to a purely democratic governance as the collective evolves.

Changes to the Syntagma are called Amendments. Major changes are called primary amendments and minor changes are called secondary amendments.

The following is the timeline for the Syntagma evolution

Years 2017-2019 :

Magnus Vulcan, Romulus , Klingon, and, Talaxian

a. The first two years preceding the token sale, primary and secondary amendments are to be determined by Magnus Collective Leadership, in accordance with the by-laws of the Collective installed at time of network inception.

token holder votes.

- b. For secondary amendments in the operation of Magnus Collective: 51% majority of MGS token votes.

Years 2022 Onwards :

Magnus Axanar

- a. For primary amendments in the operation of Magnus Collective : 71% supermajority of MGS token votes.
- b. For minor changes in the operation of Magnus Collective : 51% majority of AGI token votes.

Years 2020-2021 :

Magnus Kazon and Ocampa

- a. For primary amendments in the operation of Magnus Collective : Agreement of the Magnus Collective Leadership, plus 51% majority of MGS



5.3 WHITE LISTS

White lists are Actors who come verified into the collective via a third party or reliable verification mechanism. An example would be an agent from Google or IBM for example. White lists will be entered as part of the Syntagma and the Sentry agents ensure that whitelist actors are allowed access with fairly high base ranking.

5.4 BLACK LISTS , DELINQUENT LISTS AND TIER 1/TIER 2 VIOLATIONS

Black lists are maintained by the rules in the Syntagma and the Sentry Agents enforce the blacklists . Tier 2 Violations results in addition to black list. Black list consists of 100 points. Each violation results in Black list points based on severity of Tier 2 violation. Tier 1 Violations results in a Delinquent List.

Tier 2 violation points

1. Category Red - 10 Black list points
2. Category Orange - 5 Black list points
3. Category Yellow - 2 Black list points

Black listed actors will have to pay more transaction fees to Magnus collective. There is opportunity to get out of black list by performing more good will services.

However a Tier-1 violation will result in a delinquent list. Delinquent list actors are not allowed to participate in the collective. An example starting set would be as follows and the collective will modify this on its own as it progresses to an Autonomous Syntagma.

Tier 1 Violations

1. Narcotics
2. Injury to Humans
3. Illegal possession
4. Human Trafficking
5. Underage pornography

Tier 2 Violations

1. Misrepresentations
2. Collusion
3. Fraud



MAKING COMPLEX FEATURES ACCESSIBLE

**THROUGH THE
MAGNUS COLLECTIVE**

6 ARCHITECTURE

6.1 ACTORS AND THE COLLECTIVE

The collective operates in a manner that the different actors can interact with each other in a frictionless manner. Each actor has a Verifier Ranking, Buyer Ranking and a Seller Ranking which is assigned according to their past activities in the collective.

All the actors are assigned a base ranking of 4 when entering the collective for each Verifier, Buyer and Seller attributes.

6.2 THE DYNAMICS OF PROVIDING SERVICES IN ROBOTICS AND AI

Many Magnus Collective Actors will live on the cloud, houses or even as minute representation in the form of different IOT devices. Embedded devices that join the collective will be able to exchange data and AI services with other embedded devices containing Magnus Collective actors, as well as with Magnus Collective actors in the cloud and elsewhere; and they will be able to carry out financial exchanges associated with these data and AI exchanges using tokens.

The home robots created by Ingen (a co-founding organization of Magnus Collective) will be a proving ground for some of the first embedded Robotic Collectives. Robotics and AI collectives

can also barter transactions with each - exchanging skills.

6.3 THE COLLECTIVE

6.3.1 ROBOTICS IN THE COLLECTIVE

a. Security in Robot Collectives and Cloud Robotics

In commercial applications security is of paramount importance - and this has in ways been hindering a large scale deployment of a swarm or cloud of Robotics. Mechanisms through which members of the group of Robots can trust each other is the central point here. This also helps screen out members of the collective that has malicious intent.

There are four key elements here are

- Data confidentiality
- Data integrity
- Entity authentication
- Data origin authentication

Magnus Collective by the features of the block chain built underneath it can address all these key elements in a comprehensive manner. Magnus Collective can provide not only a reliable peer-to-peer communication channel to swarm's agents, but are also a way to overcome potential threats , vulnerabilities , hack attacks and phishing attacks.



Data Integrity and Entity Authentication in the Magnus Collective :

A public key and digital signature cryptography which comes standard with any modern BlockChain network inc are accepted means of not only making transactions using unsafe and shared channels, but for also safely identifying participants in the network. The public and private, are created for each Actor in the collective provides these capabilities, as illustrated in Fig. A1 . Public Keys are the actors main identification in the collective while the private key which you can think of as kind of passwords in traditional systems are used to confirm an actor's identity and the operations.

Data confidentiality in the Magnus Collective:

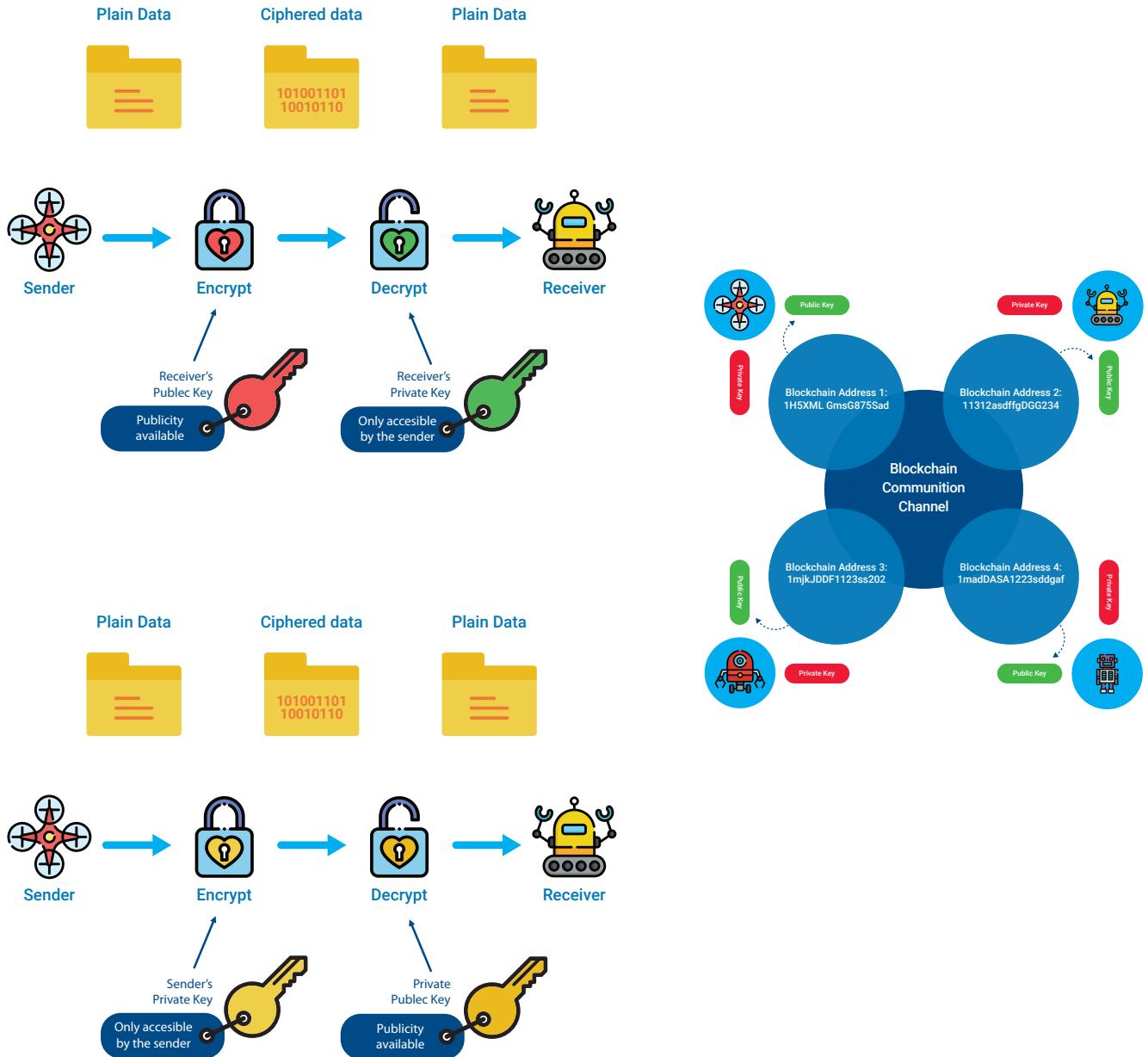
In the Magnus Collective, public key cryptography as shown in Fig. B1 allows robots to share their public keys with other actors in the collective who want to communicate with them. This ensures that any Robot in the Collective can send any encrypted message to any other actor in the collective - Knowing that only the original intended recipient can read the message. Even if the communication channel is shared or the message falls in to the wrong hands this combination of keys ensures that any malicious party cannot use the information.

Data origin authentication using the Magnus Collective :

Another unique benefit of using the Ethereum based block chain as the infrastructure for Magnus is the ability to confirm the Data origin of any message or transaction. Any Robot in the Magnus Collective can use their own private key to encrypt messages. Any other actors in the collective that knows the senders public address can then use it to decrypt the message. The contents of the message will be public - But the origin of the message would be confirmed as no other entity could have sent the message. Figure C1 illustrates this.



THE MAGNUS COLLECTIVE



THE MAGNUS COLLECTIVE

b. Distributed Decision Making in the Collective - Task Allocation, Map Building , Obstacles

Distributed decision making algorithms have played a crucial role in the development of Robotics systems working as a collective. These systems have the ability to collect information from multiple reference points and, thus, reinforce and ensure the accuracy of the data obtained.

Magnus will provide an infrastructure for all Robotic sub collectives to reach a global agreement regarding the object of interest — e.g., paths to traverse, tasks to be subdivided, or obstacles to avoid. Magnus sub collective will provide a distributed decision making protocol which will ensure that the collective achieves a common outcome.

The Magnus Collective will initially provide frameworks for the following expanding to more use cases as the collective evolves

- Dynamic task allocation
- Collective Map building
- Obstacle avoidance

As the collective evolves various problems would need to be solved including, rate of transactions versus accuracy of data during collective decision-making. A real world implementation of the distributed decision making would require more autonomous and intelligent ways of tackling the challenges faced. The Magnus Collective would be key to make sure that all actors in the distributed network will reach an agreement on real world information and improve the quality of data collection manyfold

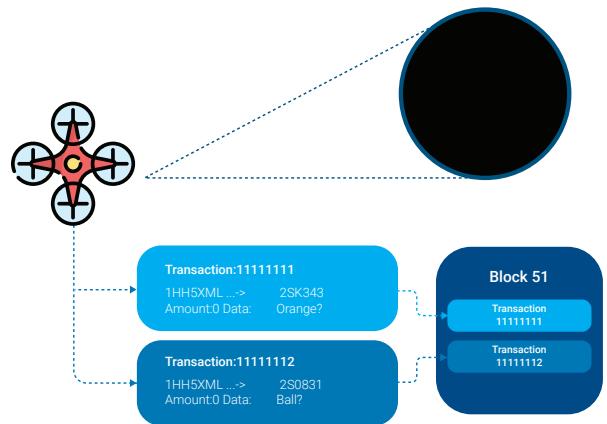
f. Voting for Decision Making in the collective

The following figures illustrate how the Magnus Collective can be used to assist in the decision making process of robotic sub collective. Every time a Actor or a member is trying to poll the remaining members on an agreement, it can issue a special transaction, creating an address associated with each of the possible options the robotic collective has to choose from, as shown in Fig.A.

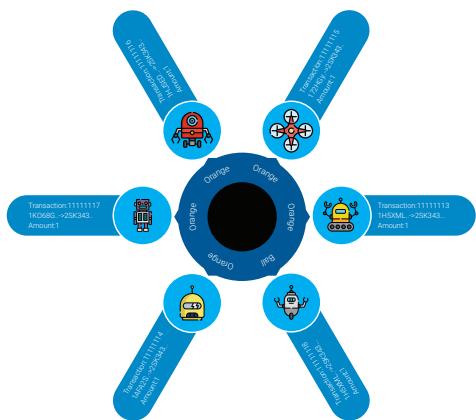
After being included in Magnus Collective block the information is publicly available and other members can vote according to their situation by, as shown in Fig. B. Let us say for example an agreement is reached when counting the reputation based vote from all the Sub-collective members. Since all robots can monitor the balance of addresses involved in the voting process as shown in Fig. C. this is secure and audit-able.



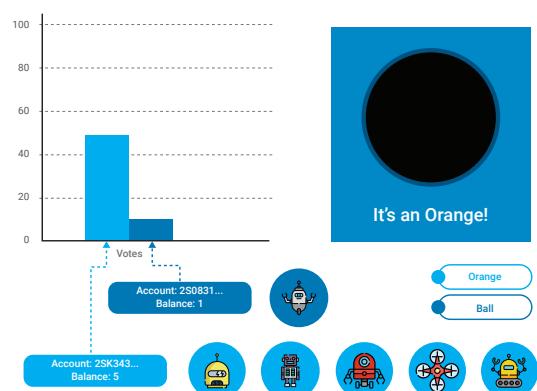
(a) One of the Robot sub-collective recognizes an object of interest during a scouting. Since there are two potential solutions - The robot creates two transactions, creating two special addresses representing the possible options and registering them in the blockchain.



(b) The rest of the Robot sub collective zeroes in one the object of interest to process it. Each sub collective member issues a vote into the appropriate address according to the object matching their classification algorithm.



(c) After all the sub collective members finish voting - The entire sub-collective reaches a decision on the end state.



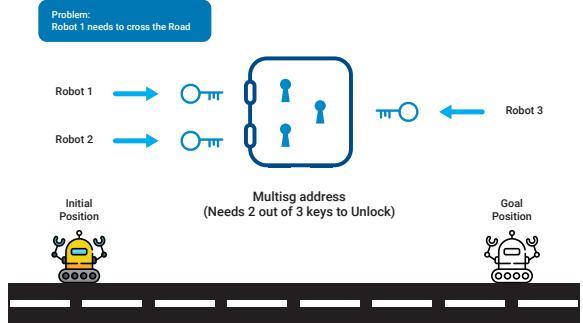
(d) The voting data is then saved on to the Magnus Collective Network so that it can reaccessed for faster access.



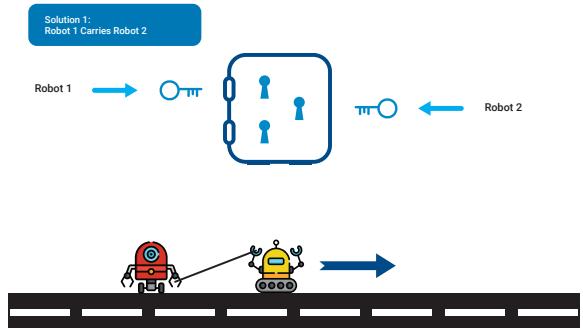
g. Multi-Sig based collaboration

Blockchain technology in robotic sub

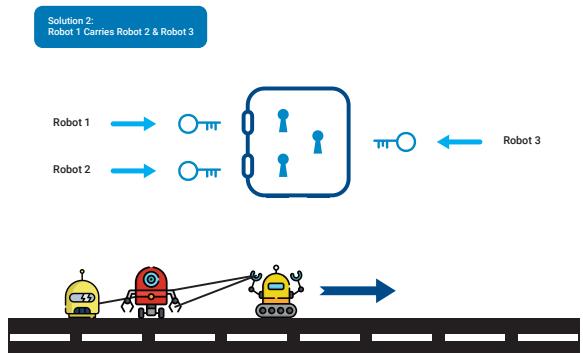
collectives opens the way to advanced collaborative models between robots using multi-signature techniques. Multisig techniques is based on addresses and transactions that have more than one private key.



An m- of-n address is the simplest Mult-sig address. Here $m < n$ — , which is an address associated with n private keys that requires signatures from at least m keys to transfer or complete the transaction.



Collaborative Robots on a common mission can exchange information, publish and secure transactions using this technique.



THE MAGNUS COLLECTIVE

h. A global frictionless Behavior Exchange for Robots, AI and IOT hubs

The Magnus collective can be thought of as a giant exchange where the different members and actors engage in barter of services using the Magnus Tokens. A network of actors might also emerge as a hierarchy inside the collective.

6.3.2 HUMAN ACTORS IN THE COLLECTIVE

Just as humans need algorithms to avoid fundamental errors and decision making, the current issues of Big data need human judgement to keep errors in check. What these clearly shows is that a case for Human and AI collaboration is now much stronger than ever.

Certainly reasoning about fairness, societal acceptability, and morality should not be handled by AI alone. Every algorithm however fair and robust they are - Needs human oversight at the current stage of development.

To summarise, humans plus AI supplemented by a better process for working with algorithms is win-win solution producing results either the most talented humans or the most advanced algorithms in isolation cannot produce.

Since the use of Crowdsourcing i.e. Using humans in the loop is very effective - Magnus will contain frameworks for

- Analyzing images and video
- Classification
- Learning

- Error recovery

The Collective can also provide access to

- a) Datasets, publications, models, benchmarks, and simulation tools
- b) Open competitions for designs and systems
- c) Open-source software

Rather than a mythical monolithic AI that will emerge superior to humans, the term “Multiplicity” characterizes a new paradigm systems where diverse groups of humans work together with diverse groups of machines to address difficult problems in search, transportation, healthcare, design, and discovery.

Multiplicity combines the wisdom of crowds with the power of cloud Robotics, AI and IOT hubs. - And this is what the Magnus collective strives to achieve with human actors in the collective.



6.3.3 AI IN THE COLLECTIVE

For some transactions in the Magnus Collective , a user can simply use tokens to purchase an AI service directly from a single Agent in the network, which fulfills the request by itself. However, many services require a more complex combination of actions by multiple Agents. Control of Ingen or ROS enabled Robots is one example. It requires multiple AI Agents – specialized in natural language processing, object recognition , speech synthesis, etc. – to collaborate according to a particular architecture.

As a simpler example, say Tom requests that Magnus Collective translate the audio within his embedded video. His request is sent to Sub collective A, which serves as a referrer, sending requests to summarize texts to Sub Collective B – which specializes in speech to text and translation requests to Sub Collective C – which specializes in semantic analysis and summary of audio.

An Actor or Sub-Collective B might then pay an Actor D to do some specialized natural language processing tasks on Tom's text (such as entity extraction or word sense disambiguation), essentially enlisting Actor D as a subcontractor to fulfill part of Tom' request.

Similarly a Sub-Collective doing object recognition might call another sub-collective engaging in face detection which in turn might negotiate with a face recognition module. The Object recognition module might engage with a cloud based system over the internet.

With this dynamic interaction of numerous Actors , Sub-collectives , and, AI hierarchies carrying

out complex AI services using their collective intelligence, Magnus Collective will be able to solve complex problems.

6.3.4 IOT IN THE COLLECTIVE

Different IOT Hubs behave in the same way as AI and Robotic collectives do with the exception that the IOT sub collectives deals mostly with information processing.

Specific portals will open up the IOT hub collective networks outside the Magnus Collective.

6.3.5 CLOUD HARDWARE AND DISTRIBUTED FILE SYSTEMS IN THE COLLECTIVE

Magnus is already built an interface to IPFS which is in prototype stage. The Magnus adapters to IPFS will allow the actors to share files through the IPFS system. Magnus is also on track to provide compatibility with the SWARM system once this goes live.

Any other file or distributed cloud systems can be connected by creating appropriate portals.



6.4 ENCAPSULATION OF AI, ROBOTS , IOT AND OTHER ACTOR SERVICES

The following sections explain how we plan to encapsulate the various elements.

6.4.1 OBJECTS OF INTEREST

Objects of Interest are defined as the units or items on which the actors need processing or are willing to trade on. We expect the following as the set of Objects of interest in the beginning - evolving as the collective advances.

1. Location

2. Media

1. Audio

2. Video

3. Photograph

1. Human

2. Face

3. Scene Interpretation

4. Outdoor

5. Animals

6. Objects

3. Sensors

4. Skills

5. Task Segments

6. PROCESSING SEGMENTS

6.4.2 INTERACTIONS BETWEEN THE ACTORS

The following are the primary interactions we see in the collective. However we expect this evolve as the collective expands.

1. Discovery - Publish to the collective that information of interest is found. Think of this as kind of like a push transaction.

2. Request_Information - Information request. Any actor can request a particular information to the collective. The request packet can also contain the amount of Magnus the requester is willing to pay and the time limit for the request.

3. Request_Skills - Learning skills and behaviors . Any actor can request a particular skill to the collective. The request packet can also contain the amount of Magnus the requester is willing to pay and the time limit for the request. This is primarily meant to be run on AI and Robotics sub collectives.

4. Request_Processing - This is more of a be time bound, repetitive processing . The providers we anticipate for these would be cloud and shared file systems.

5. Request_Tasks - Can be time bound, Goal based processing. The providers for this can be any actors.



THE MAGNUS COLLECTIVE

7 BUSINESS SECTORS OF INTEREST - FUTURE PLANS :OVERVIEW

The primary purpose for the Magnus Collective is to ensure frictionless interaction between various actors in Robotics, AI, IOT , Cloud and humans. Magnus Collective will not attempt to control the various business sectors in which it matures.

However the first three years of the Magnus Collective's operation needs some guidance on the core domains or sectors it can spread its wings.

The founding companies of the Magnus Collective already has strong partnerships in place.

Consumer Robotics

We will create tools enabling Magnus Collective to be used generically for affective robots in the home, office, school, nursing home and hospital etc. We will leverage the relationship of Magnus Collective with InGen Dynamics, and also reach out to a variety of other robotics firms. Firms such as LG has already signed a letter of partnership intent.

Healthcare:

Already in talks with various anchor partners including Johnson & Johnson, Nokia, Siemens, Zimmer, AARP, Ascension, Pfizer and Servie. There is tremendous interest in deploying blockchain based Robotics and AI hardware solutions. Pilots are also underway.

Retail and Hospitality :

Driven by a huge need in services in this sector - An AI and Robotics based blockchain will have a huge adoption rate.

This is subject to change and the Magnus Collective will explore further domains. panchor partners including **Johnson & Johnson, Nokia, Siemens, Zimmer, AARP, Ascension, Pfizer and Servie**. There is tremendous interest in deploying blockchain based Robotics and AI hardware solutions. Pilots are also underway.



8 MAGNUS PRODUCT ROADMAP

Now we outline the technology developments that we plan to undertake in accordance with the above foci.

8.1 MAGNUS VULCAN: DECEMBER 2017

We are fortunate to be in a position where a significant portion of the Magnus Vulcan framework has been designed and the model has a set of working prototypes with Robots , AI and IOT implementations on the blockchain.

The blockchain has already been demonstrated with prominent multi national firms and companies. Built on Ethereum, IPFS and Aragon - We have created sample implementation of the network.

BlockChain Back End Work

1. Reference Actors implementation in Javascript and Python with APIs for interaction with blockchain, other Agents and AI integration via Python modules or JSON-RPC.
2. Initial set of Magnus service-related smart contracts, covering Actors and basic rule set implemented in Solidity.
3. ERC-20 Smart contracts for tokens and economic logic.
4. Example and tutorials for code integration.

IPFS prototypes

1. IPFS based adaptors have been built to interface with the different components.

AI Engines

1. A prototype of the Object recognition engine has been built.
2. The Object recognition Engine has been interfaced and inserted with existing Robots on the test net.

Robotics Development

1. Stanford ROS has been integrated partially with Magnus Collective.
2. The Ingen SDK has been interfaced with the block chain.

Existing working prototype with use cases

The following use cases have been fully implemented and demonstrated in front of popular crowd of major partners, stakeholders and investors committees.

1. Robot to Robot interaction
2. Robot to AI interaction
3. AI to Human Interaction
4. Robot to IOT interaction
5. AI to cloud interaction

The source code for all this has been published into our GitHub. We also have demo videos for the Robots interacting via the Magnus Collective Block chains - learning some skills with the interchange.



8.2 MAGNUS ROMULUS : JULY 2018

As the Block Chain Back End develops on the Ethereum smart contracts we expect the following to develop.

BlockChain Back End Work

- Implementing an array of smart contracts covering the standard interactions between Actors and external customers, and among Agents, with models such as subscriptions and more flexible pricing.
- Initial implementation of ranking system.
- Design of the governance model.
- Reference implementation of Actors using third party Robotic platforms.
- Scripts for connecting Magnus to third party platforms including MacOS, Android and Microsoft.

AI Development

- Complete versions of proof-of-concept Agents implemented during the Vulcan Release .
- Deep neural net based Agent that creates other Agents by learning new deep neural net models. Initial use cases will focus on recognizing faces, facial emotions and objects in images. Prototype Third party Robotic platforms, controlled by Magnus Collective.

IPFS prototypes

1. IPFS based adaptors have been built to interface with the different components.

IOT prototypes

1. More IOT devices would be brought to the collective. Smart contracts for IOT prototypes will be deployed to the test net

Robotics Development

1. Deeper integration with ROS to ensure cross platform compatibility
2. Full use case testing with ROS components

8.3 MAGNUS KLINGON : DECEMBER 2018

The Magnus Collective will finish all core components by December 2018. The following would be completed.

1. Actor Interaction Systems for
 - 1. Robotic Sub Collectives
 - 2. AI Sub Collectives
 - 3. IOT Sub Collectives
 - 4. Human Sub Collectives
 - 5. Cloud / file system sub collectives
2. Ranking Systems for
 - 1. Service providers
 - 2. Service buyers
 - 3. Verifiers



THE MAGNUS COLLECTIVE

3. Syntagma Implementation

1. Aragon based

Syntagma will go live - Alpha

2. Bylaws and Syntagma

codecs will be released

4. Sentry Implementation

1. Basic Sentry's will be in Alpha

In addition deployments will be piloted with various partners.

8.4 MAGNUS TALAXIAN : DECEMBER 2019

We plan to concentrate on the these elements

1. Portal Developments

1. Portal to the popular Robotics frameworks will be created and deployed

2. Portals to popular IOT based hubs will be created tested and deployed

2. Pilot / Partner customizations

1. Pilot programs will be accelerated with the various partners including in

1. Healthcare

2. Retail

3. Travel and Hospitality

3. Ecosystem Engagement

1. Magnus Collective will reach out to the various interested parties to accelerate this

8.5 MAGNUS KAZON : DECEMBER 2020

We expect the Kazon version to be concentrating more on the Syntagma as the Syntagma nears Autonomous status.

8.6 MAGNUS OCAMPA : DECEMBER 2021

The Ocampa version will concentrate more on complete Portal development.

8.7 MAGNUS AXANAR : DECEMBER 2022

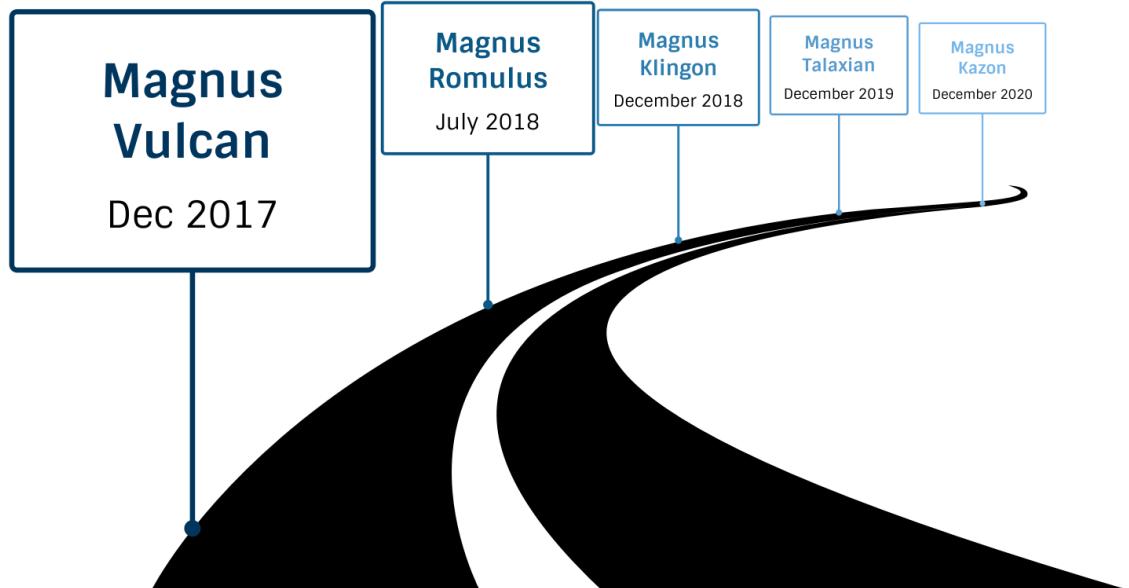
Axanar would be the crowning achievement of the Magnus Collective. We expect Axanar to contain all the self sustaining moving parts so that the collective moves on its own with a vibrant community of partners, developments and a growing ecosystem .



Magnus Roadmap



BlockChain / Architecture						
• ERC 20 Smart contracts • Magnus Alpha prototypes • IPFS adaptors	• Governance Model • Ranking and Reputation system • Aragon and IPFS alpha prototypes	• Interaction system in Beta	• Portal to be developed for the most popular platforms	• Syntagma to enter final status	• Portals to go live	• Portals in final form, Syntagma in Final Form
Robotics and AI						
• A prototype of the Object recognition engine has been built. • Stanford ROS has been integrated partially with Magnus Collective.	• Complete versions of proof-of-concept Actors implemented during the Vulcan Release .	• Third party Robotics platforms and SDKs to be integrated with the platform	• All versions of the Magnus Robotics and AI platforms to be in final version	• Autonomous trading of third party skills and behaviours in the collective to go live	• Complete Portal integration to enable all platforms in the market	• All platforms in final form and platform live
Prototypes						
• The Ingen SDK has been interfaced with the block chain.	• Complete versions of proof-of-concept Actors implemented during the Vulcan Release .	• Syntagma and Sentry to go live	• Ecosystem engagement to begin	• Multiple deployments of working prototypes deployed to the ecosystem	• All prototypes in final form and commercialization to begin	• All prototypes in final form
Pilots and Partners						
• Pilots underway with corporate partners including Nokia, Siemens, Ascension, Pfizer, Sanofi among others	• Corporate partnerships set to gain traction and gain momentum	• Third part Robotic platforms to be bought in to the fold	• Healthcare, Retail and hospitality platforms to be engaged	• Begin Production and live use cases of systems	• Refine the partnerships and convert them into profitable franchise's	• All partnerships live in the network and the platforms in full final form



9 CONCLUSION

Magnus Collective is a complex framework attempting to confront four complex and critically important goals concurrently

1. The first goal is to create a highly useful hub of Robotics, AI, IOT, Humans and cloud systems.

2. The second goal is to accelerate the development and use of Robotics, leading to service economy where individuals and organizations can lease robotic services using the Magnus Token.

3. The third goal is to create and bridge an open exchange between different entities that are developing at a rapid pace in the last decade in BlockChain, Ai, Robotics and cloud computing. Currently most of the new players are operating in silos or islands - And Magnus is attempting to change this.

4. The fourth is to create a network effect of good will and progress within the collective which will lead to accelerated technological progress and economic development as the Magnus Collective reaches its milestones.

We realize that this is a very complex undertaking - However we have layered the risks on the project and have a strong team of partners who is willing to work with us in navigating the complexities and have modularized the development plan with clear milestones in place.

The Magnus Era brings with it a fundamental change in how intelligent systems are built and interact with each other. Magnus's end goal is to make people smarter, machines better, Robots cheaper and faster, and, AI better by ensuring a

collaboration with other agents in the Magnus Collective network.

Through effective execution on the business side as well as on the technology side. Magnus is poised to become a leading network for Robotics, AI and IOT hubs in the near future . The unique portal based design ensures that - Even if other networks comes to life in the coming years - Magnus will always be forward compatible. The effects of the Magnus Collective will not only felt in Robotics, AI and IOT where it will have a prominent place - But also in the day to day interactions we take for granted today.

As a collective with humans in the loop - Magnus is poised to ride the next wave of revolutionary disruptive innovations in technology, economic and business.



Appendix - Future Versions - Anticipated issues

a Latency problem

The latency issue becomes important when robots or robot sub collectives are used in formation control or cooperative tasks. In these situations, fast and reliable information is required to orchestrate the movements of the different parts of the collective. Issues including but not limited to physical location errors might arise in situations when the real time system fails to sync with the transaction that originated it.

Further research needs to be done to solve this problems. A unique way of resolving this would be if the sub-collective can avoid going to the internet or a larger network altogether. They can instead locally use the previous transaction for faster results. A reputation system can also be curated from past transaction within the sub collective to cut waiting times.

b Size Problem or Bloat

If large quantities of robots and Ai sub-collectives are deployed for long periods of time, there is a chance that the block chain would expand to a point where all the transaction cannot be stored anymore. Commonly referred as bloat this can have a significant impact on Robotic sub-collectives.

c Bandwidth Limitation

There is a limitation on the number of transaction that can saved in a block in Ethereum or any block chain for that matter. This can severely constrict the throughput of the system in busy networks with a large number of actors and sub collectives.

We can solve this by increasing the number of transactions that are getting recorded. To avoid issues like block a parallel pegged side chain can be explored.

