IOTA

Connecting our world to{day,morrow}

INVESTING IN CRYPTOCURRENCIES
ON MY WAY TO A LAMBORGHINI
LOSER
2
LAMBO
"I'm in it for the technology."
AWWWWWWWW
YAAAAAAAA
MILLIONAIRE

Crossing the Chasm

Important Puzzle Pieces

Technology

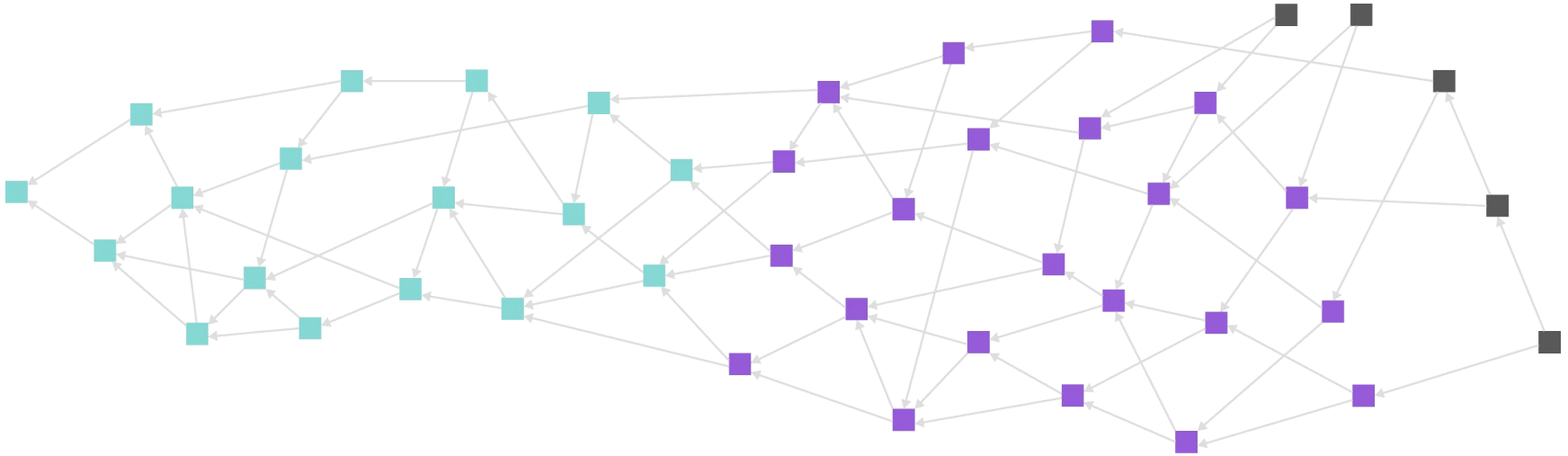
Governance

Ecosystem

Technology

The Tangle

Feeless, Scalable, Quantum-immune



The Tangle is a permissionless peer-to-peer network
based on the open source distributed ledger protocol IOTA

The Tangle

Feeless, Scalable, Quantum-immune

Machine-to-Machine Payments

Today there is no protocol for machines to pay each other. With distributed ledgers, every machine will be able to have a wallet and they can freely transact with each other.

Data Immutability

Feeding data into a distributed ledgers makes it immutable and tamper-proof. Thanks to this data integrity, it is easy to share data with external parties in a verifiable manner.

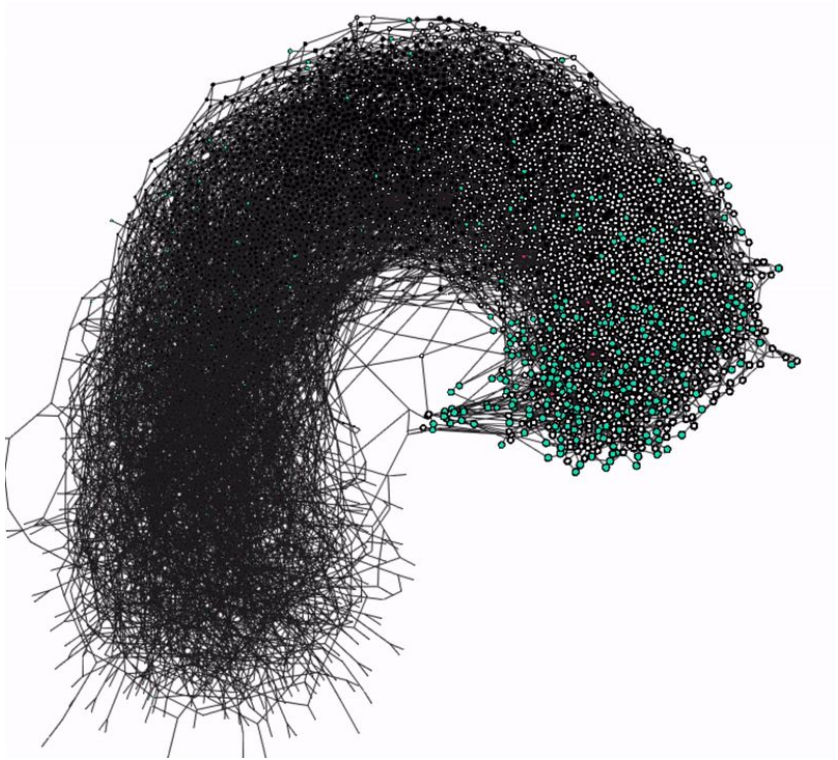
The Tangle

Feeless, Scalable, Quantum-immune

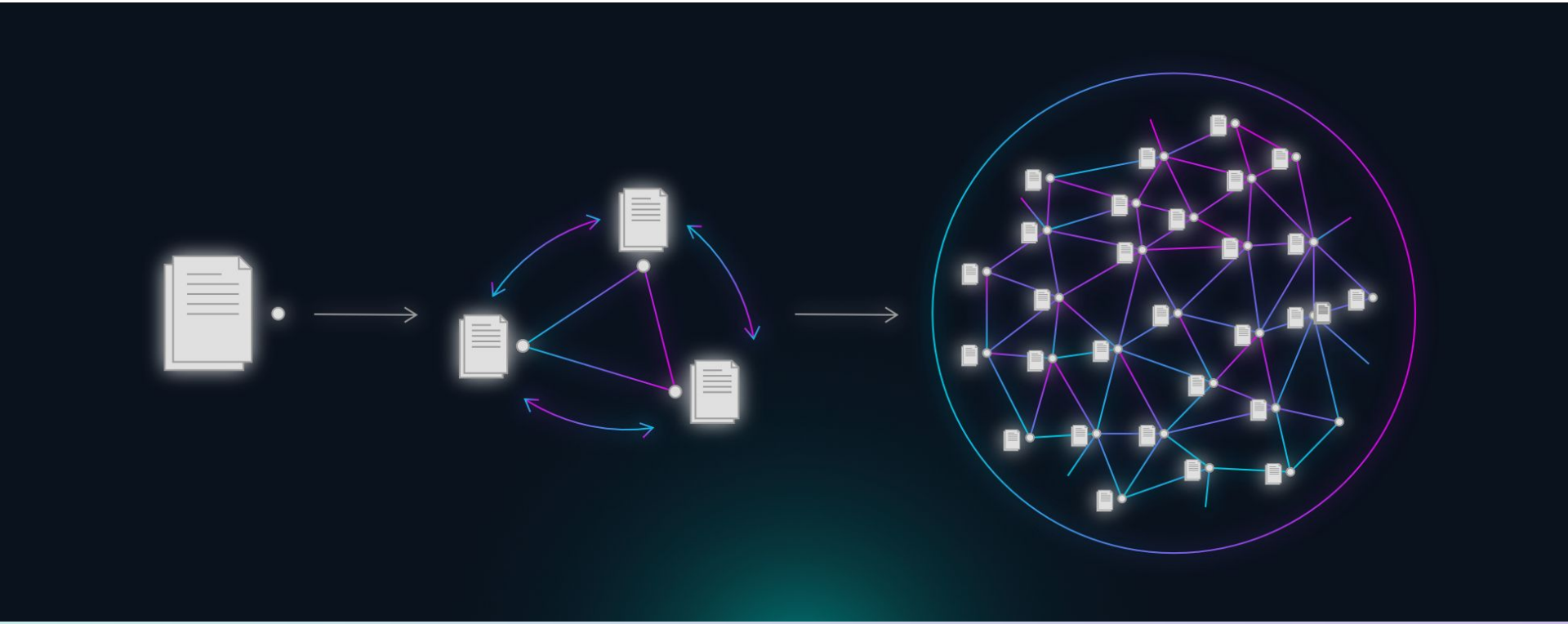
Permissionless Ecosystems are the Future

Everyone can participate in this Ecosystem from well established companies like Bosch, DNB, Airbus to Startups or simply developers.

A Healthy Tangle

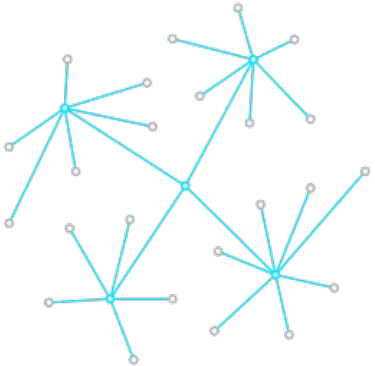


What are Distributed Ledgers?

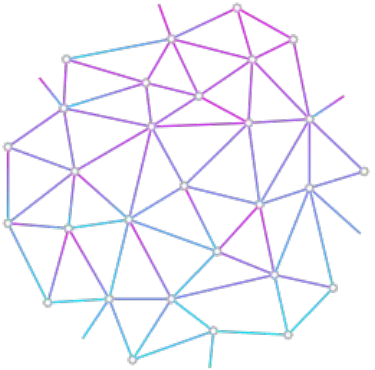


Networks

Centralized

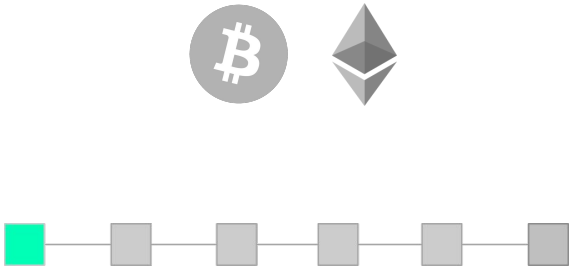


Decentralized
With Intermediaries

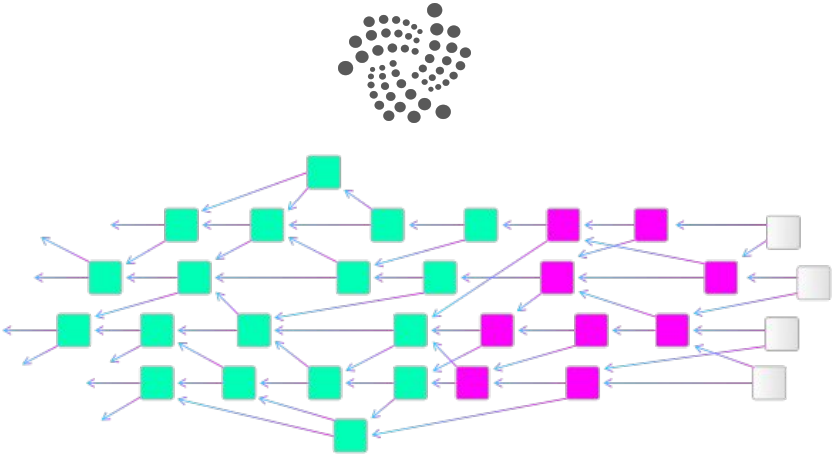


Distributed
No Intermediaries

Blockchain vs. Tangle

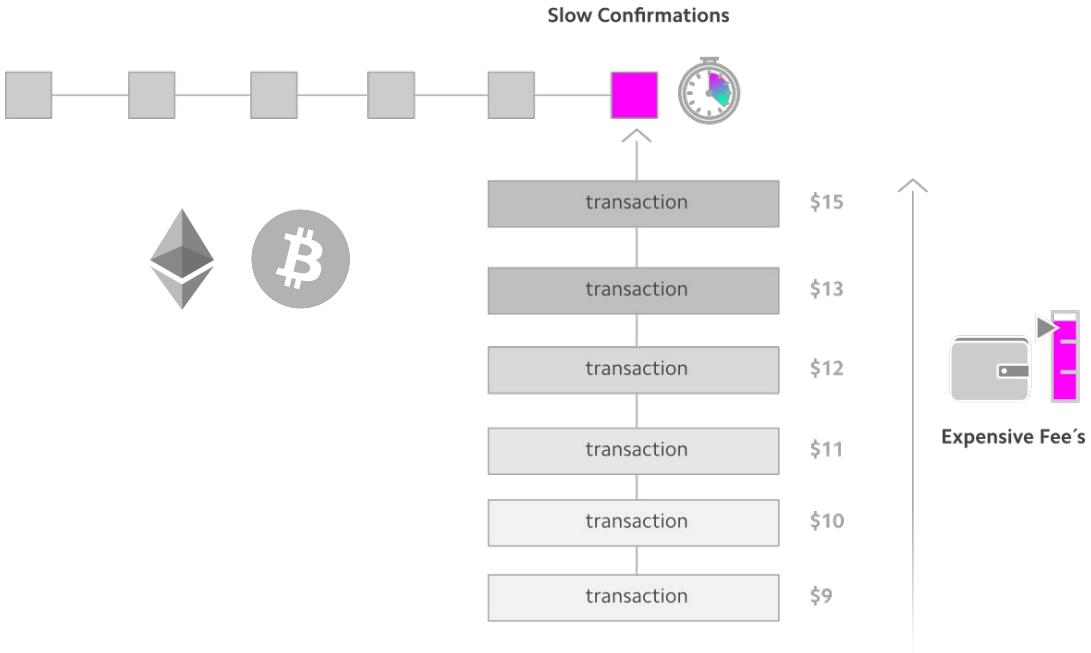


Blockchain

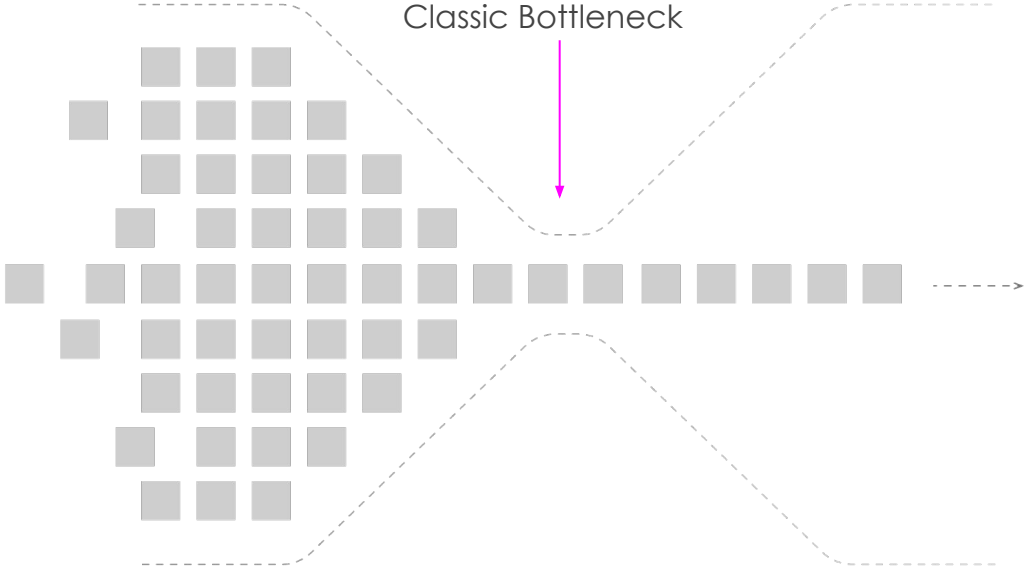


Tangle
(DAG / Directed Acyclic Graph)

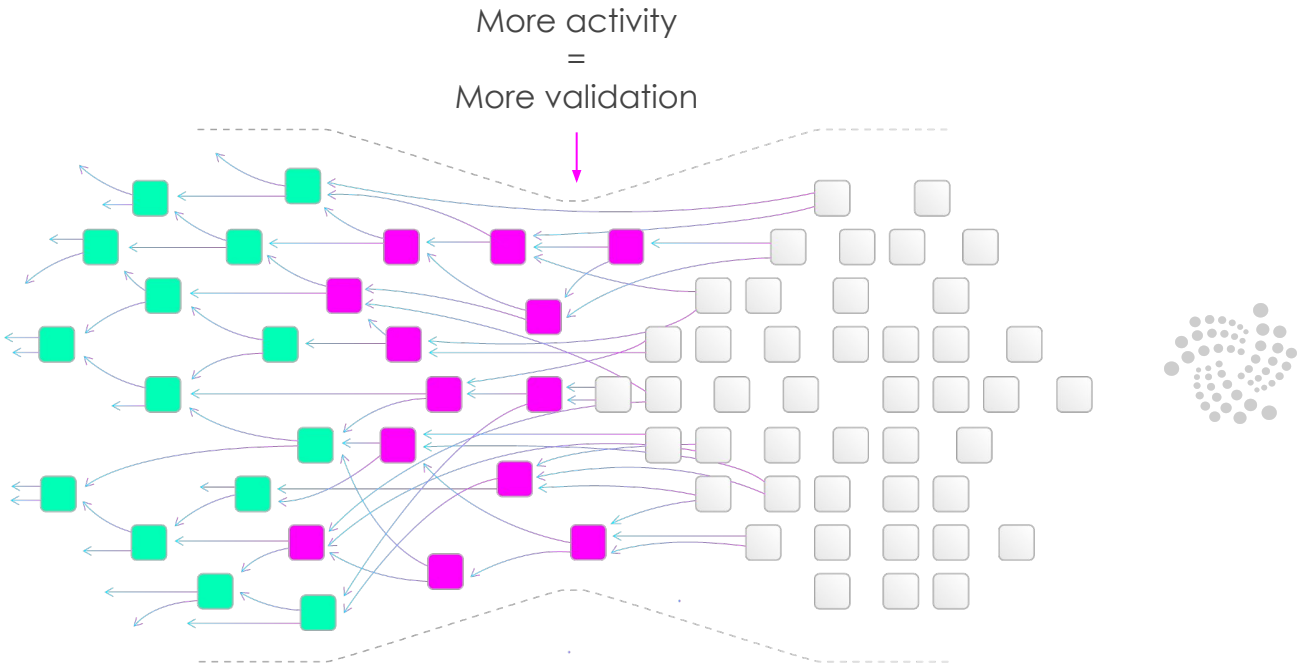
The Blockchain Bottleneck



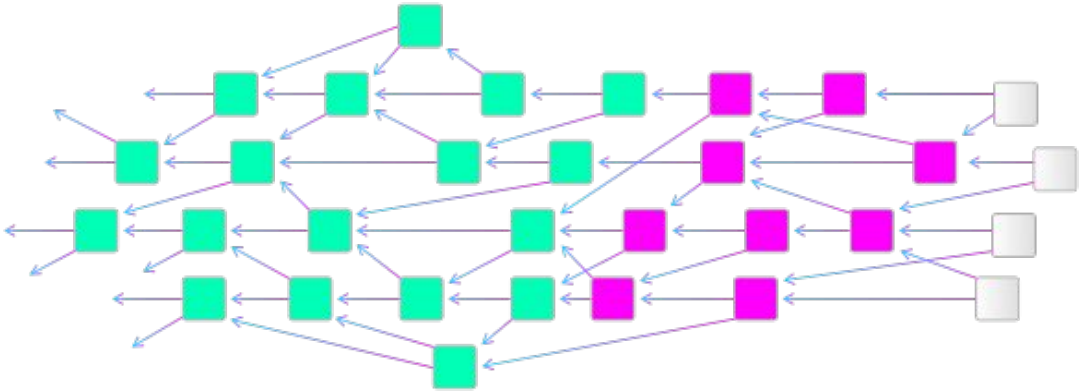
The Blockchain Bottleneck



Tangle scales!



Consensus in IOTA



Each transaction validates 2 previous unconfirmed transactions

- Chosen by Markov Chain Monte Carlo Random Walk algorithm

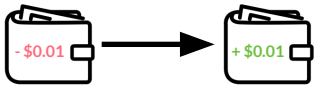
Signed with private key

Small amount of Proof of Work

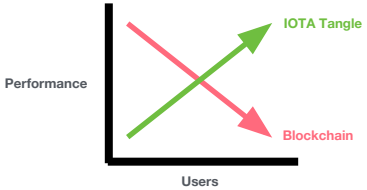
- Similar to Hashcash, not Bitcoin
- Spam and Sybil-resistance

Blockchain vs. Tangle

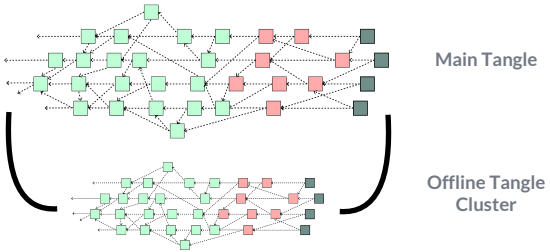
No Transaction Fees



Scalability



Offline Transactions (Partitioning)



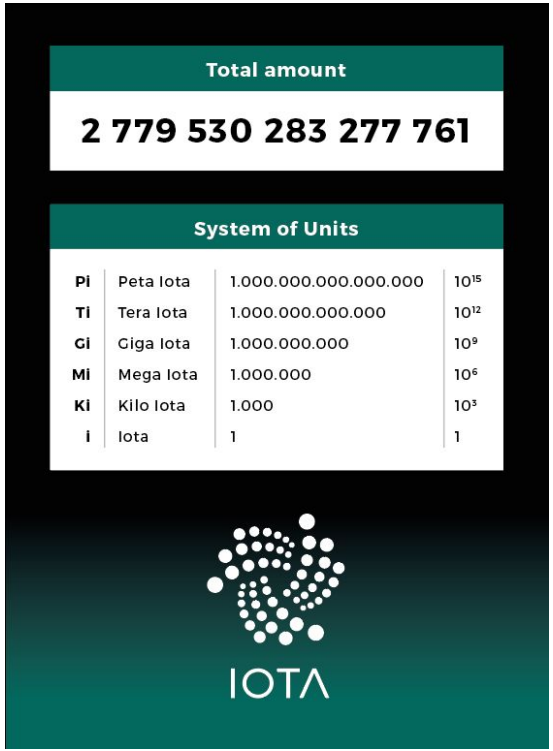
Other Benefits:

- No Miners
- Quantum immune

Disadvantages:

- Need a large enough network to be self-sustainable

Bitcoin vs. IOTA



Other Comparison:

BTC has:
2,100,000,000,000,000 Satoshi

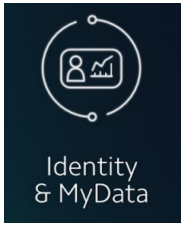
The IOTA Tangle today has
2,779,530,283,277,761 IOTA

So almost 3 Quadrillion IOTAs and only a difference of roughly 680 trillion units

A word of caution:

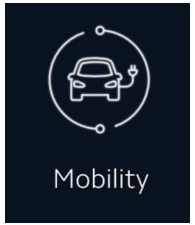
Exchanges work with MIOTAs don't let people scam you!

IOTA Use case and Industries



iampass

BiiLabs



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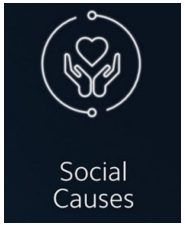
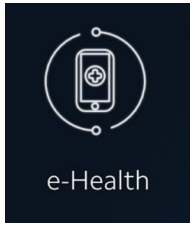
MOBI

Audi

+CITYXCHANGE



UNOPS

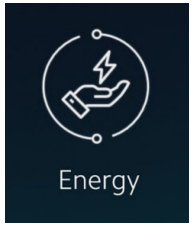


ALPHA VENTURI

OSLO CANCER CLUSTER

Norwegian Centre for
E-health Research

OSLO MED TECH



eNGIE Lab

CRIGEN

FUJITSU

IBCS Poland

DNB

CRYPTO FINANCE

SPACEBIT

SQC

eCl@ss

kontakt.io

Governance

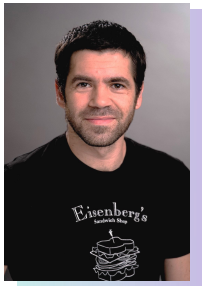
The IOTA Foundation

- Non-profit Foundation based and regulated in Berlin, Germany
- Growth from 6 to 90+ full time employees distributed across 17 countries
- $140m+ in funding
- Focused on Technical and Regulatory Challenges of Crypto-Currencies & DLT

(Some) New IOTA Foundation Member(s)

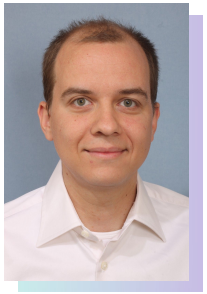
Angelo Capossele

Senior Researcher.
He designed and developed security solutions focused on the protection of national critical infrastructures from cyber threats and collaborated with companies and research centres to help design novel technologies. He worked on different verticals such as smart cities, digital manufacturing and creative industry, touching a wide spectrum of web technologies and programming languages.



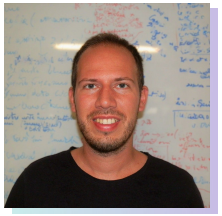
Dani Shaanan

Research Scientist.
Will focus on the Coordicide project “the eventual removal of the Coordinator, a bootstrapping mechanism that creates additional security for the Tangle”



Wolfgang Welz

Researcher.
Designed and programmed the Ledger Nano S hardware wallet with a team of three other community developers



Luigi Vigneri

Senior Researcher.
Theoretical (network modeling, convex optimization) and programming (C, C++, Python, MATLAB) skills. IEEE publications

Anne Smith

Senior Project Manager.
Will help drive IOTA’s adoption as the standard protocol and platform in the Mobility space.

Sadjy Sadjan

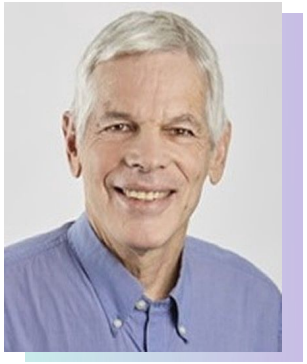
Networks, Systems and Security Engineer.
SysOps and Security Expert

The IOTA Research Council

IOTA RESEARCH COUNCIL

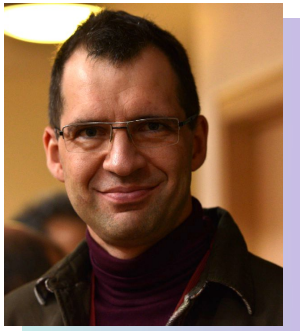
- The IOTA Research Council will work closely with our research department
- Strategic technological direction
- Provide academic oversight to IOTA research
- Assess and grant funding to academic partners
- Oversee collaboration with academia and other research organizations
- Consists of distinguished academics that are at the forefront of their area of expertise
- Oversee the quality to ensure high academic standards.

The IOTA Research Council Members

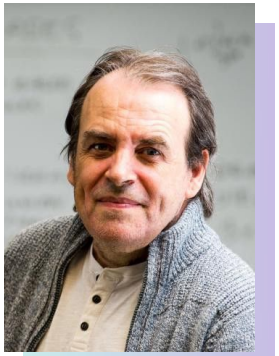


Gur Huberman is the Robert G. Kirby Professor of Behavioral Finance at **Columbia Business School** where he has taught since 1989. Prior to that, he taught at Tel Aviv University and at the University of Chicago. Between 1993 and 1995 he was Vice President at JP Morgan Investment Management responsible for research on quantitative equity trading. In that capacity, he also helped develop tax aware strategies for the private bank. He earned his Ph.D. (with distinction) in operations research from Yale in 1980 and his B.Sc. (cum laude) in mathematics from Tel Aviv University in 1975.

Dr. Moody Alam obtained a PhD in computer science (distributed artificial intelligence) at the Univestity of Southampton in 2013. He spent a year at Microsoft Research, Cambridge investigating the AI aspect of smart energy systems. Spent two years in the AIC Research Group at the University of Southampton applying AI to develop smart energy systems. Then he moved to Machine Learning Research Group at University of Oxford to continue my research on smart energy systems. 2016, joined Energy Systems Catapult (an elite tech and innovation centre set up by the Govt. of UK's innovation agency - InnovateUK) as the Lead Data Scientist.

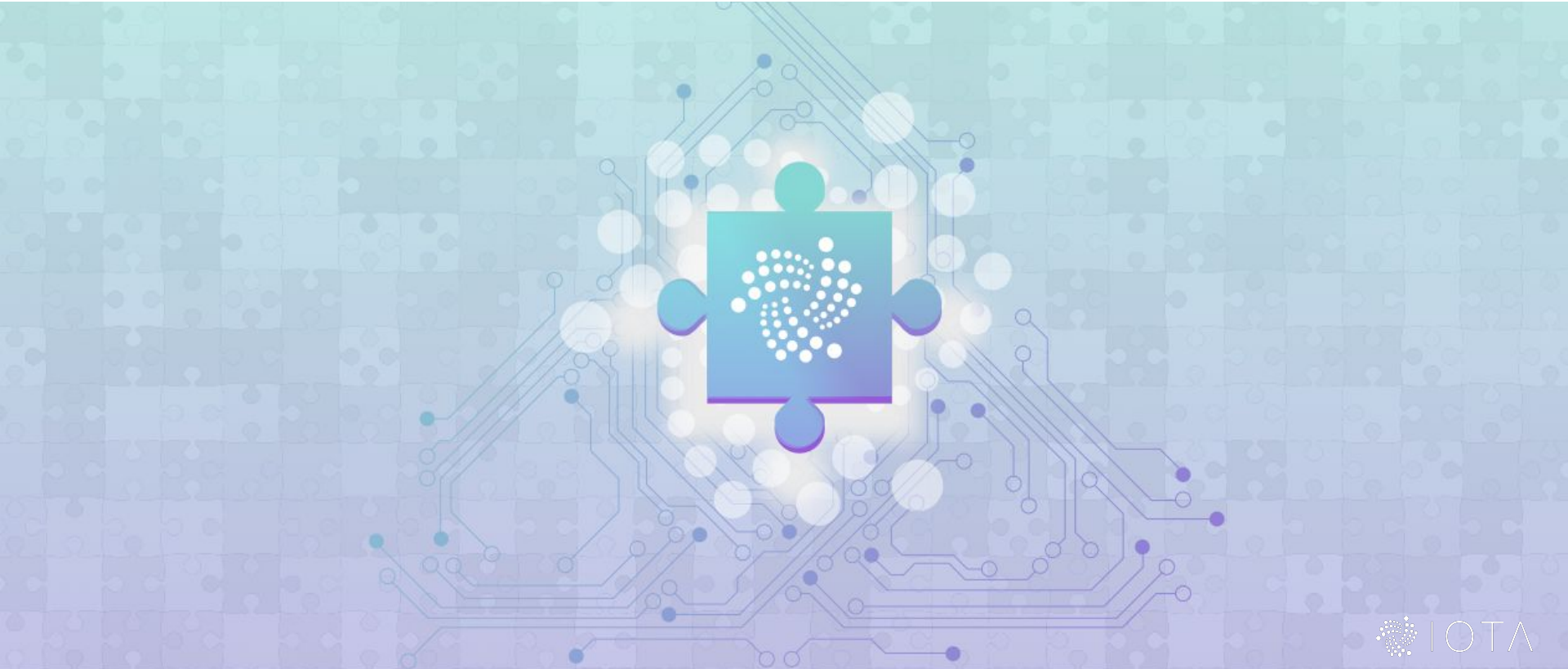


Serguei Popov
IOTA Foundation Board of Directors
is a research mathematician working in the field of Probability Theory and Stochastic Processes. He graduated from and attained his Ph.D. at the Moscow State University under the supervision of Professor Mikhail Menshikov, with whom he still happily collaborates. Around 20 years ago he moved to Brazil to do a postdoc, and then progressed to professorship first in the University of Sao Paulo, and then in the University of Campinas.



Bill Buchanan is a Professor in the School of Computing at Edinburgh Napier University, a Fellow of the BCS, and a Principal Fellow of the HEA. He was appointed an Officer of the Order of the British Empire (OBE) in the 2017 Birthday Honours for services to cybersecurity.In 2018, in partnership with Blockpass IDN, he set up the world's first blockchain identity research laboratory. he also currently leads the Centre for Distributed Computing and Security, and The Cyber Academy.

Production Readiness & Standardization

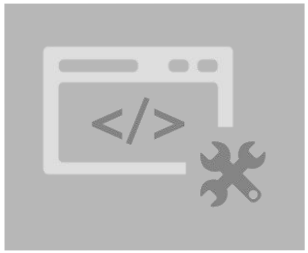


Production Readiness & Standardization

Research

Exploring the unknown

Going beyond IOTA and developing solutions for the Machine Economy requires the brightest minds to work together and research new solutions.



Development

Cutting edge technology

Development of production-ready software will make it possible for the Foundation's members to easily adopt and integrate the developed solutions.

Education & Promotion

Show your Competence

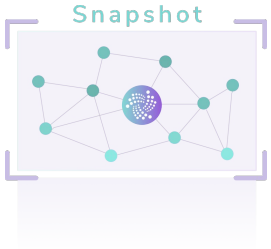
Educating members and non-members through seminars, educational materials and even larger events will ensure the Foundation's success in achieving its goals.

Standardization

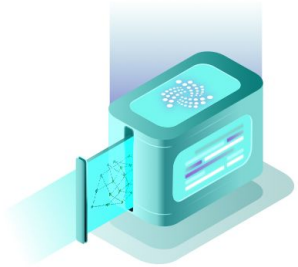
Of Core Protocols

Interoperability requires standardization. A major effort of the IOTA Foundation will be to standardize the core protocols that we're developing.

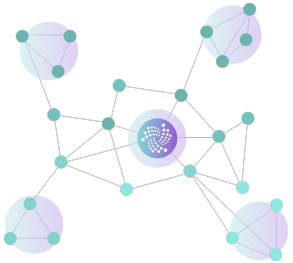
Milestones Ahead



Local Database Snapshots



Permanent Data Record PermaNodes



Scaling & Sharding

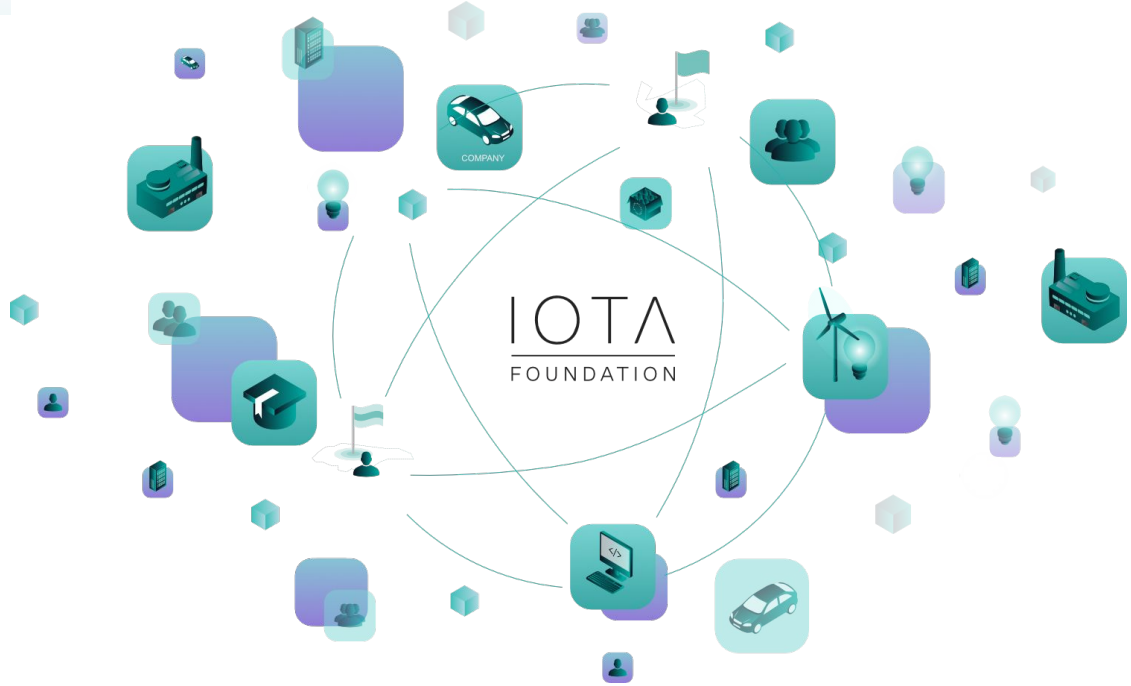
Economic Clustering

TURN OFF THE COORDINATOR

Removing the Coordinator

“The Coordicide”

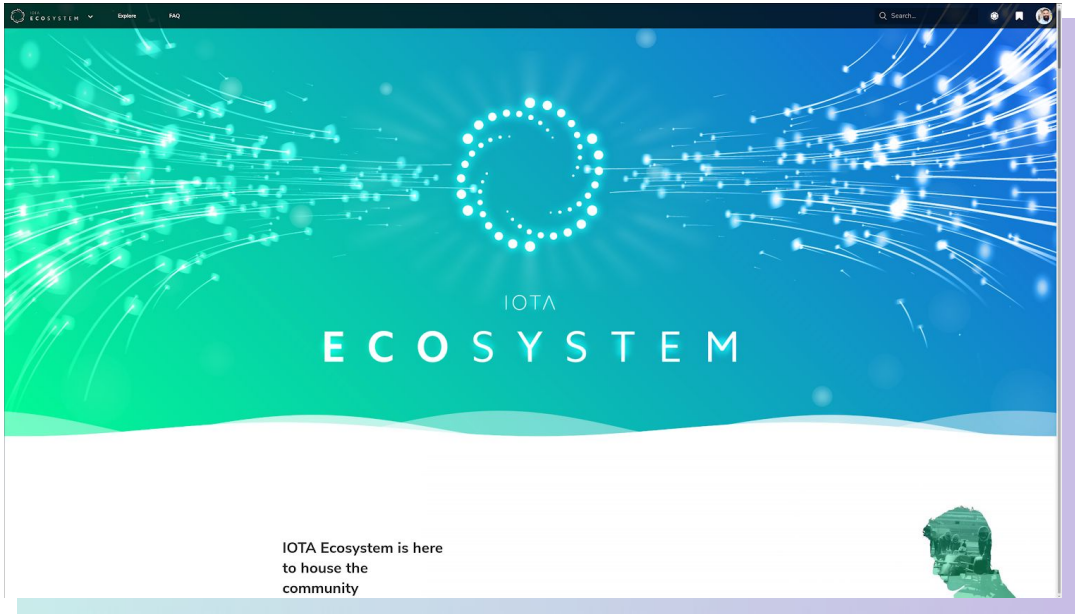
IOTA Foundation Ecosystem



Our universe relies on a network of many collaborators
– corporates, academics, governments, NGOs

The Ecosystem and Cooperations

IOTA Ecosystem gGmbH



Official IOTA Ecosystem

Tutorials

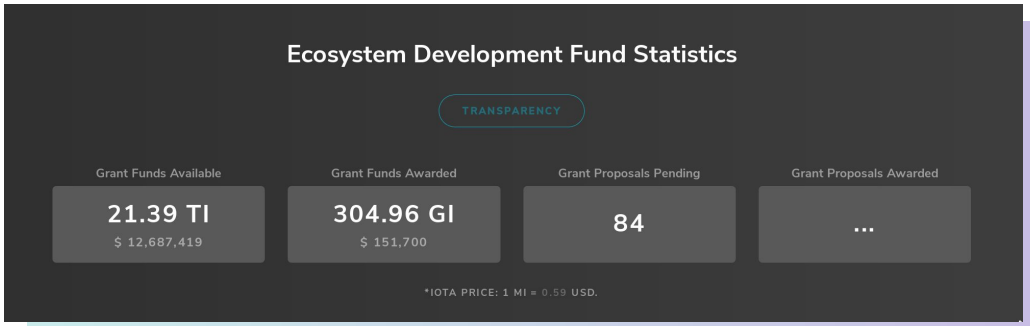
Projects

Events

Developers

Ecosystem Development Fund

IOTA Ecosystem Development **Fund**



Support projects in the IOTA Ecosystem

e.g.

Proof-of-concepts, open-source utilities and libraries, educational resources, media, philanthropic endeavors, to hack-a-thons, ideation workshops, meetups.

IOTA Ecosystem Regional Community Leader

Antonio Nardella

Regional Community Leader
Altoadige/Südtirol

Meetups

Proof-of-Concepts

Regional contact for companies

DLT like any other technology is a tool and it fits the purpose and never underestimate what a hacker can do with technology!

Ecosystem Funds Granted

Akita M2M economy showcase (USD $367,560)

This M2M ecosystem showcase shall provide a functioning prototype that can be demonstrated by Akita and replicated for a future IOTA Lab or other lab, any corporation or even at home.

The complete process will be documented from scratch to the final showcase. The code will be made public in an open source GitHub repository and all the necessary components will be listed in a respective blueprint cookbook (Hardware, Software, Programming Skills, external resources).

Latest Collaboration(s)

The “ibcsTracker” was built using IOTA’s open source Track and Trace application as a starting point, which is available for companies to use to start building tracking solutions for their markets.

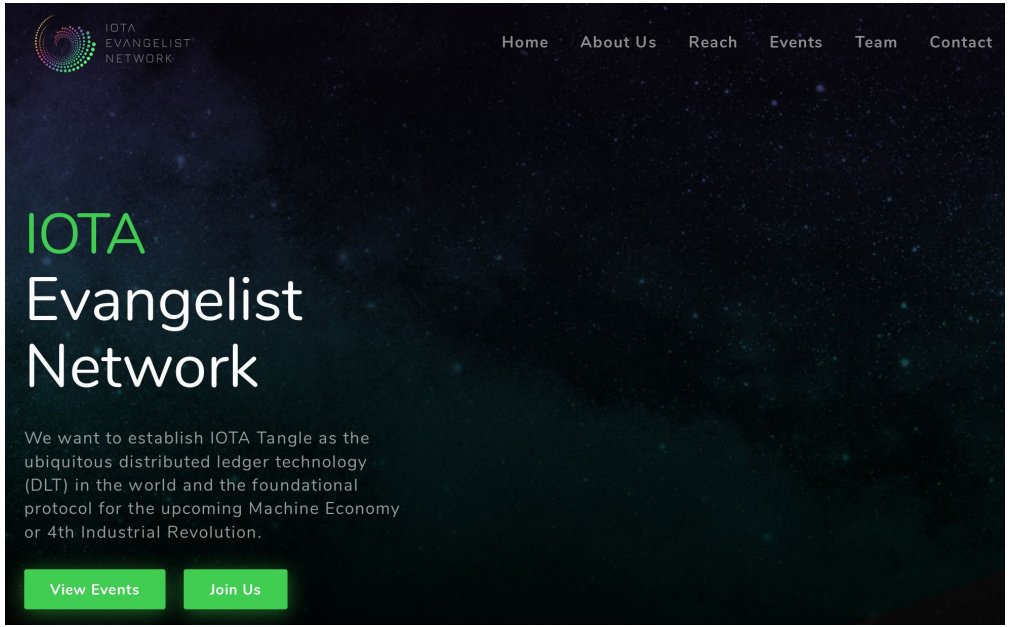
The IOTA-powered solution aims to support IBCS Group customers in improving their delivery planning and shipment, by ensuring a cross-system interoperable chain of custody to manage assets (e.g. pallets, windows and glasses stands) used to move goods across Central Europe. The IBCS Poland Proof of Concept (PoC) is yet another concrete example of IOTA’s vision for enabling the Global Trade and Supply Chain.

Latest Collaboration(s)

By implementing a universal standard between devices, eCl@ss also enables organizations to develop new methods of machine-to-machine payments.

eCl@ss has established standards for the classification and description of connected devices with a worldwide consortium of leading companies including Lufthansa, Siemens, Staples, PBS Network and Medtronic among many others. The organization's standardized catalogue allows companies to quickly introduce trusted identification and simplified communication between IoT devices, while simultaneously lowering costs associated with device management.

IOTA Evangelist Network - IEN.io



A world-wide strong community of IOTA enthusiasts.

Content Creating

IOTA Demo

IOTA PoCs

140+ members so far

What is going on

The Perfect Brainstorm Contest Winners

210 submitted ideas

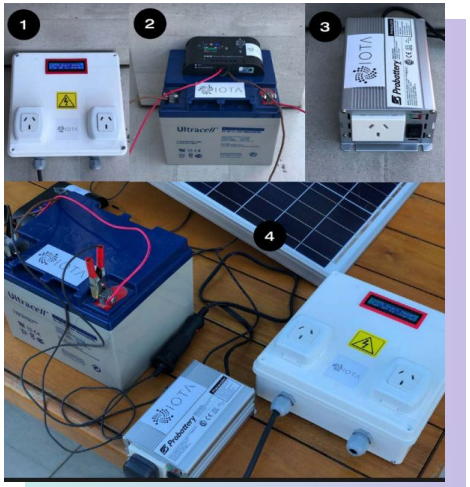
The top 10 projects won an IOTA branded Ledger hardware wallet

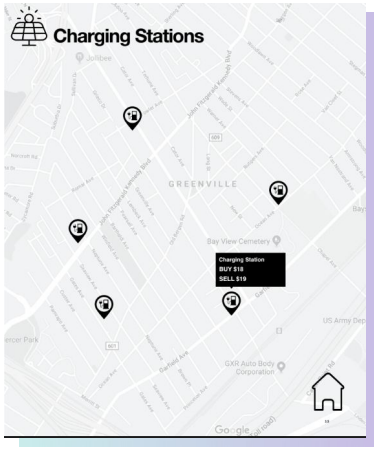
The first 3 projects receive cash prizes

The first project will be developed with the IOTA Foundation

#3 Circular Energy Management

Winners: Nicolas Schteinschraber and Federico Gonzalez





The problem of this sharing economy, is that once the bike or scooter runs out of battery, they are often times left on the street or even dumped into rivers or trash cans.

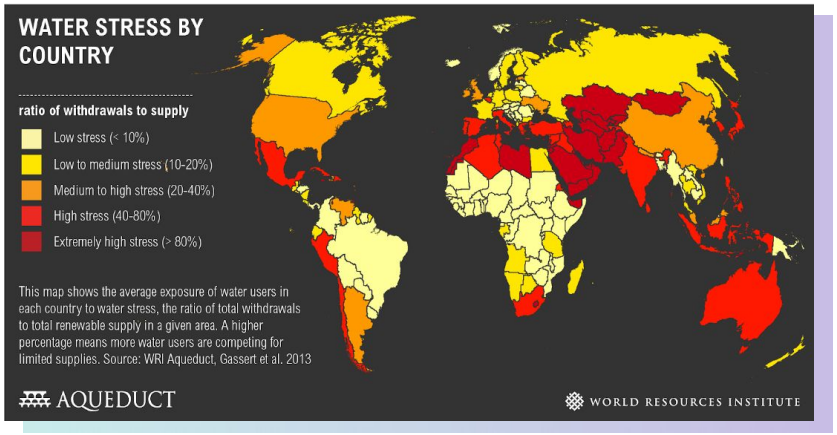
Nicolas and Federico proposed a charging station network for power charging.

Not only will it be possible to purchase electricity with IOTA micropayments, but the charging station itself can purchase energy nearby, creating a local prosumer economy.

People in cities can also setup these charging stations to earn money—creating a completely new model for a sharing economy.

#2 LogIOTA Aid System

Winner: Johannes Schroth



With global warming causing more droughts and water shortages, water has become a precious good that needs to be efficiently administered and distributed.

Especially in developing countries, water stress affects more than 700 Million people.

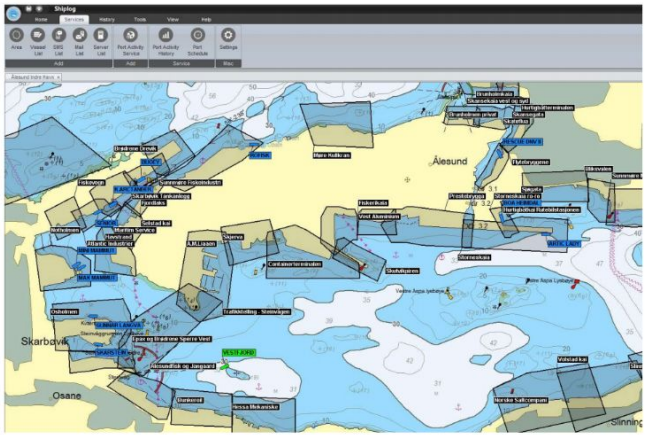
LogIOTA proposes to use flash channels to efficiently distribute this precious resource via micropayments.

Water consumption would be controlled via micropayments by simply adjusting the price and by identifying and tracking the person at the well to ration their water consumption.

This leads to a fairer distribution of water, less queues at the water supply, and improved hygiene.

#1 Vessel Demurrage & Dispatch

Winners: Leif Arne Strømmen and Erik Aadland



Geo-fencing illustrated in a complex port districts in Norway. Our oracle software solution can easily cover 1000+ docks for a port with 10.000s calls yearly.

The shipping industry carries over 90% of all global trade each year.

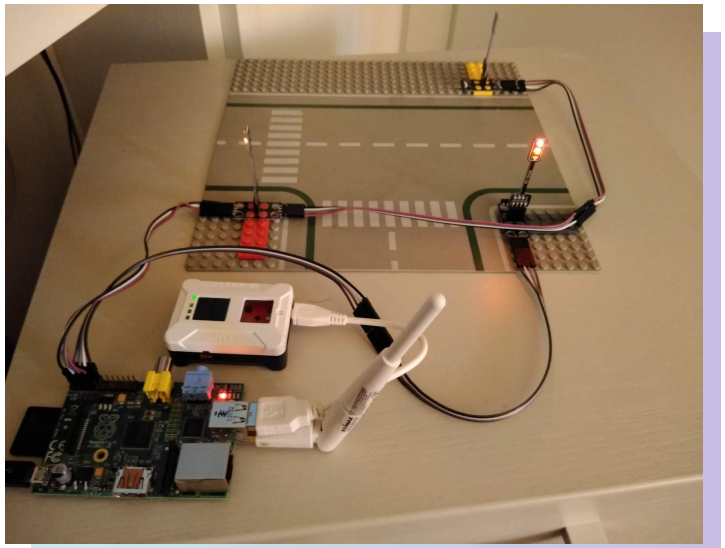
- it has not been fully digitized. Many processes are still based on paper and rely on human intervention.
- One such example is the process for vessel demurrage & dispatch. If a charterer needs longer to dispatch the cargo, a demurrage fee has to be paid to the ship owner; or if the cargo is offloaded faster, the ship owner may pay the charterer a dispatch fee.
- These contractual terms are largely paper based or stored in proprietary databases—making it incredibly difficult to share key data. The process behind the demurrage & dispatch is also very manual, requiring the involvement and coordination of several parties.

The solution to this problem is the IOTA tangle

- important contractual terms and data is stored on the Tangle
- making it easy to share with third parties.
- To automate the process of correctly recording the time of arrival and departure of the ship, geofencing and AIS signals (ship position, ship identity, time stamps etc.) are used.
- Through this, the port can fully automate the invoicing of all fees to the vessel. This application can already be realized with today's technologies and infrastructure, solving a billion dollar problem with IOTA.

#TwoToTangle Mention: RaspiTIN

Winner: Antonio Nardella



The infrastructure of future smart cities and the collected data will be a key factor for a safe ecosystem between humans and machines. RaspTIN is a sensor that collects traffic and weather information, and shares it between participants to help prioritize traffic and ensure safety.

Presented at

DAVINCI Free Software Lab

IDM SÜDTIROL ALTO ADIGE

Working Group
Artificial Intelligence
Machine Learning

NOI Techpark
Via A. Volta / Voltastraße 13
Bolzano/ Bozen

efre·fesr Südtirol · Alto Adige

ICT - IOTA Controlled agenT

is an experimental IOTA node for the Internet-of-Things (IoT)

IoT will be full of tiny devices directly connected to each other in a dynamic mesh network

Some of these devices will move around, or suddenly turn off or on

a constantly changing environment requires a data integrity protocol with enough redundancy to deliver messages and make data accessible, despite the unpredictable nature of the network (fog computing)

IOTA Foundation is aiming to build its own IoT microcosm, with Ict as a fundamental building block.

ICT - IOTA Controlled agenT

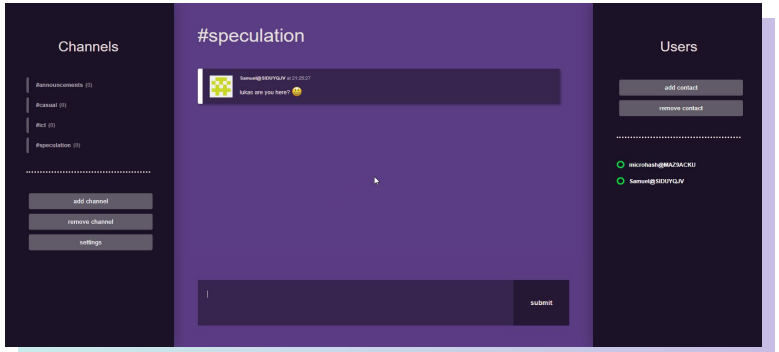
Gossip Protocol—to receive and forward IOTA transactions, plus validation of signatures etc., similar to what IRI is currently doing.

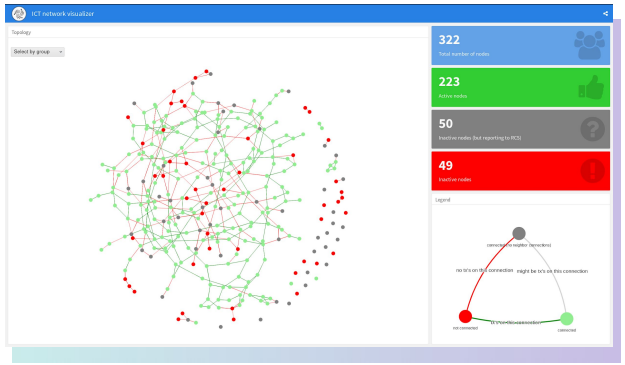
IOTA eXtension Interface (IXI)—a simplistic interface as a modular approach, to make the Ict core client extensible with various plugins and applications—the “IXI modules”.

Swarm Logic—to achieve shared goals in a swarm, where individual Icts adjust their level of redundancy, to filter out transactions not relevant for that goal.

Economic Clustering—will be the only consensus mechanism integrated into the Ict core client. Other consensus mechanisms must be implemented as IXI modules running on top.

ICT - IOTA Controlled agenT - IXI Modules



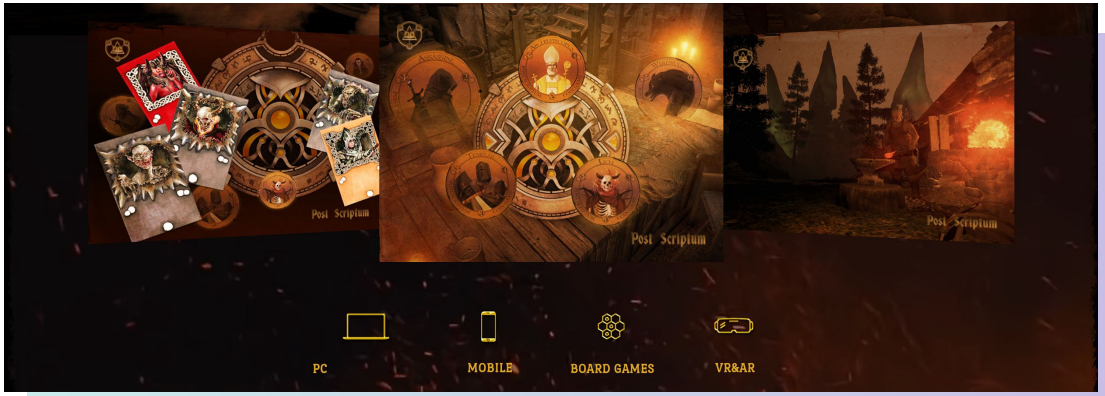


IOTA eXtension Interface

Chat.ixi - Cryptographically secure chat over the Tangle

Report.ixi - ICT nodes reporting tool - Made by the IOTA Community (ixuz, test, schaeff, Bouke, lambtho)

Paracosm - Post Scriptum



Medieval MMO sandbox

Unique personal assets and their history in a distributed ledger

Digital token = real token

Meetup Relevant Projects

Development

BOSCH

XDK

IOTA

Bosch XDK110 and
Masked Authentication Messaging

IOTA MAM can run on Bosch XDK (32-bit cortex)

Secure sensor data transmission to the Cloud via IOTA

Micropayments to the Cloud

Transfer sensor data to DLT IOTA/Tangle via MAM - DIY - Ecosystem Project

Bosch XDK

Bosch XDK collects data:

- ID
- Temperature
- Humidity
- Pressure

Broker

Broker

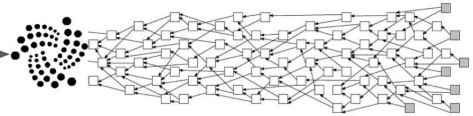
MQTTtoMAM

MQTTtoMAM

Data is sent as JSON over mqtt to the broker

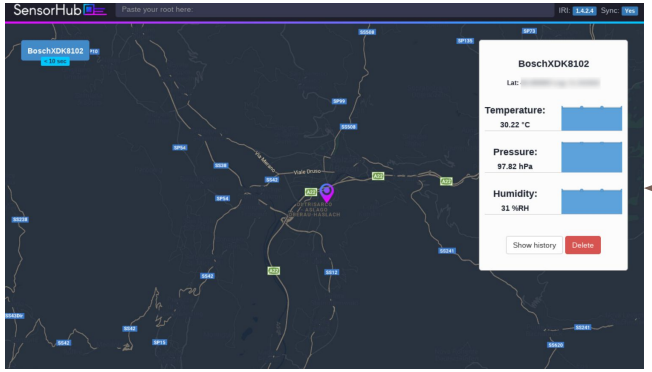
NodeJS App on server sends data to IOTA/Tangle via MAM

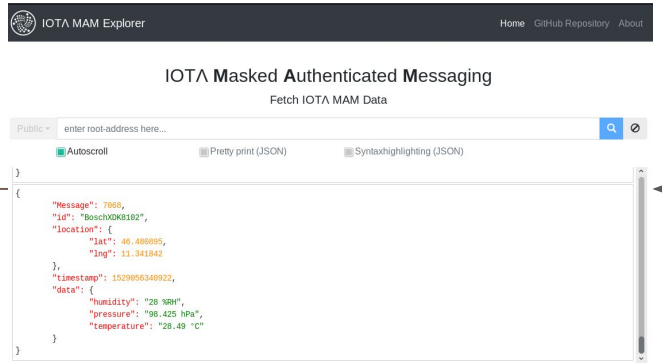
IOTA/Tangle



Data is sent encrypted to the nodes via MAM (Masked Authenticated Messaging)

Only with the **RootKey** it is possible to see/collect the data



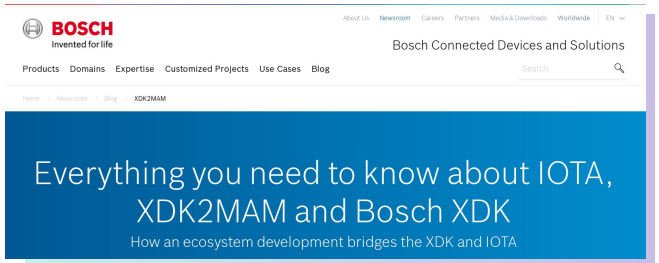


XDK2MAM.io

XDK2MAM main goal is to provide open source software to allow interaction between this powerful hardware and the promising IOTA Tangle.

- HTTP
- MQTT
- USB
- BLE

We deliver open source software to take advantage of Bosch Cross Development Kit over IOTA's Protocol Masked Authenticated Messaging.



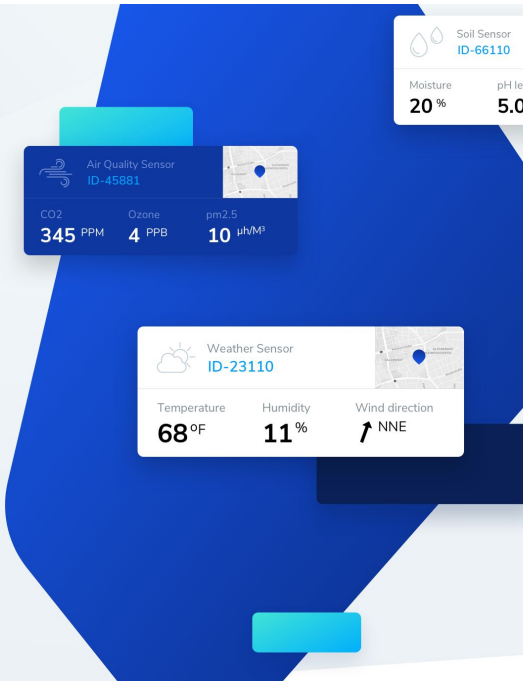
Data Marketplace

IOTA

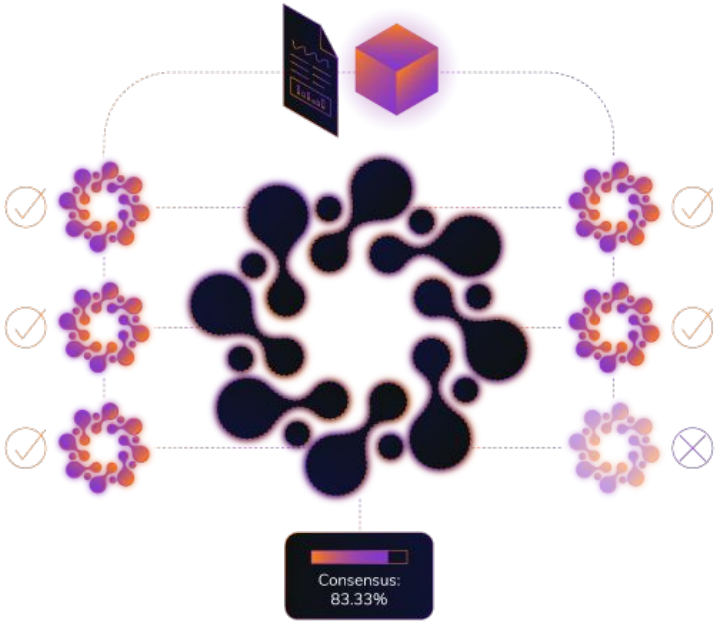
IOTA makes it possible to securely store, sell, and access data streams.

Never has getting access to diverse, fine-granular data been this easy!

TRY IT YOURSELF



Qubic and Abra



Quorum Based Computing

Oracles

Smart Contracts

Distributed Computing

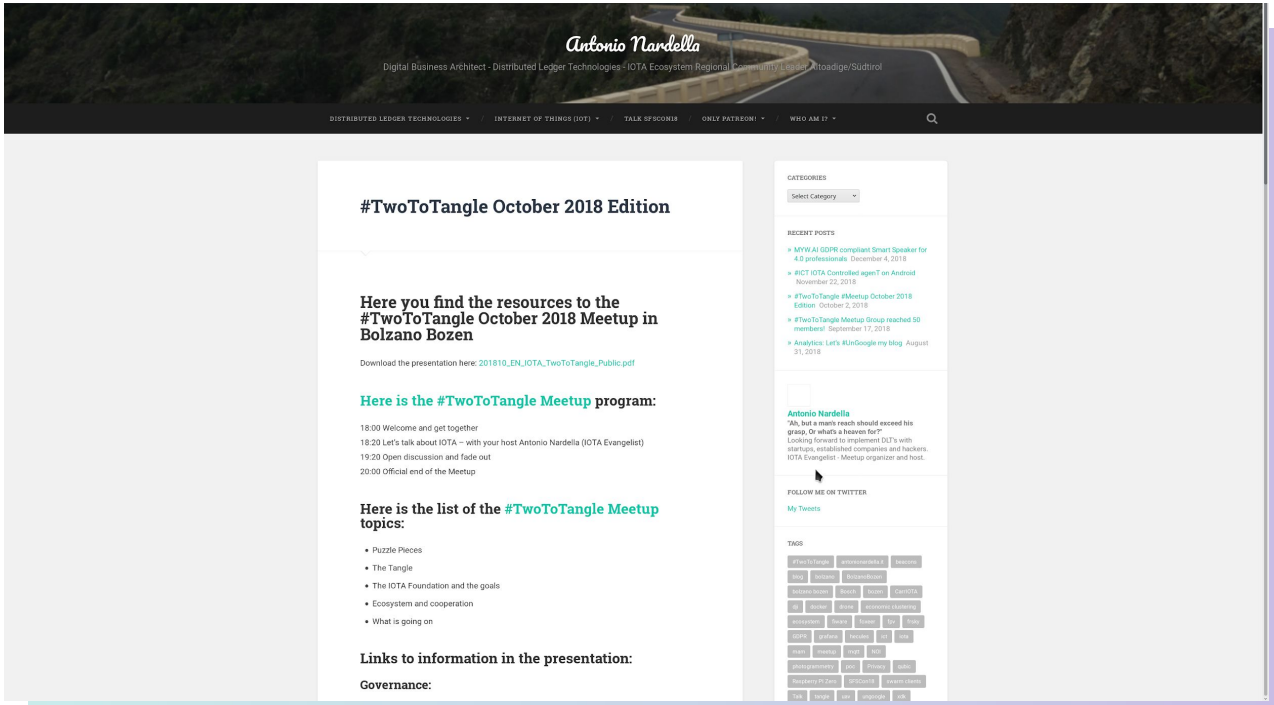
Let’s innovate with

A Final Remark

In open source,
we feel strongly that
to really do
something well,
you have to get a lot
of people involved.

Linus Torvalds

Invite to antonionardella.it



- Resources and Presentations
- Latest News and articles in Italian about IOTA
- Geeky Stuff

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