



Meetup #1

# Foundation of IOTA

Event Organizers



Event Supporters



# About DCentrum Who we are?



- A co-learning community
- Aspires to build communities on various decentralization technologies
- Create Assets & Use Cases
- Decentralized and Democratized

- Started on March 03, 2018
- Started by 8 Technology Enthusiasts from varied backgrounds
- Were a part of the IBC Hackathon in 2018 and in the Top 10
- Couple of Community Friends - Bradsol & Hyperledger Hyderabad
- Supported by the Govt. of Telangana & Nagarro

*“Dream Big, START small , But most of all, START” – Simon Sinek*

# What do we do?



## **Our Vision:**

To be a thought leader and a contributor to the ever-evolving Decentralization Landscape

## **Our Mission:**

CONNECT people to COLLABORATE, share and build knowledge on the evolving Decentralization technologies and CREATE assets for specific Industry Use Cases

# Core Community Team



**DEEPAK BHATTAD**

A seasoned professional with 14+ years of experience. Currently co-founder of a technology services company, BRADSOL. An Avid reader, loves sports and of-course Blockchain ☺.



**DHARMEN DHULLA**

Blockchain Enthusiast with 16+ years of IT industry experience. Loves Crypto and Blockchain world



**MAHESH WANKHADE**

Blockchain Associate with 8+ years of IT industry experience "love to developed web application"



**MOHIT BATHLA**

Experienced IT Product Manager || Avid Thinker || Passionate about building solutions on Blockchian



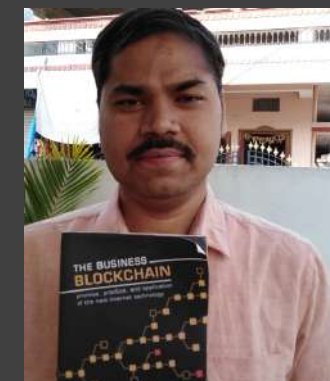
**RAJU CHERUKURI (RISHI)**

Rishi has been a Blockchain enthusiast for more than two years and is interested in building communities that work in synergy with the ecosystem, he happens to work as a Technology Architect with Nagarro, and has been in the IT Industry for 14+ years.



**SAM NAIDU**

Technical Project Manager gaining experience in Machine Learning and Blockchain technologies



**SREENIVAS CHINNI**

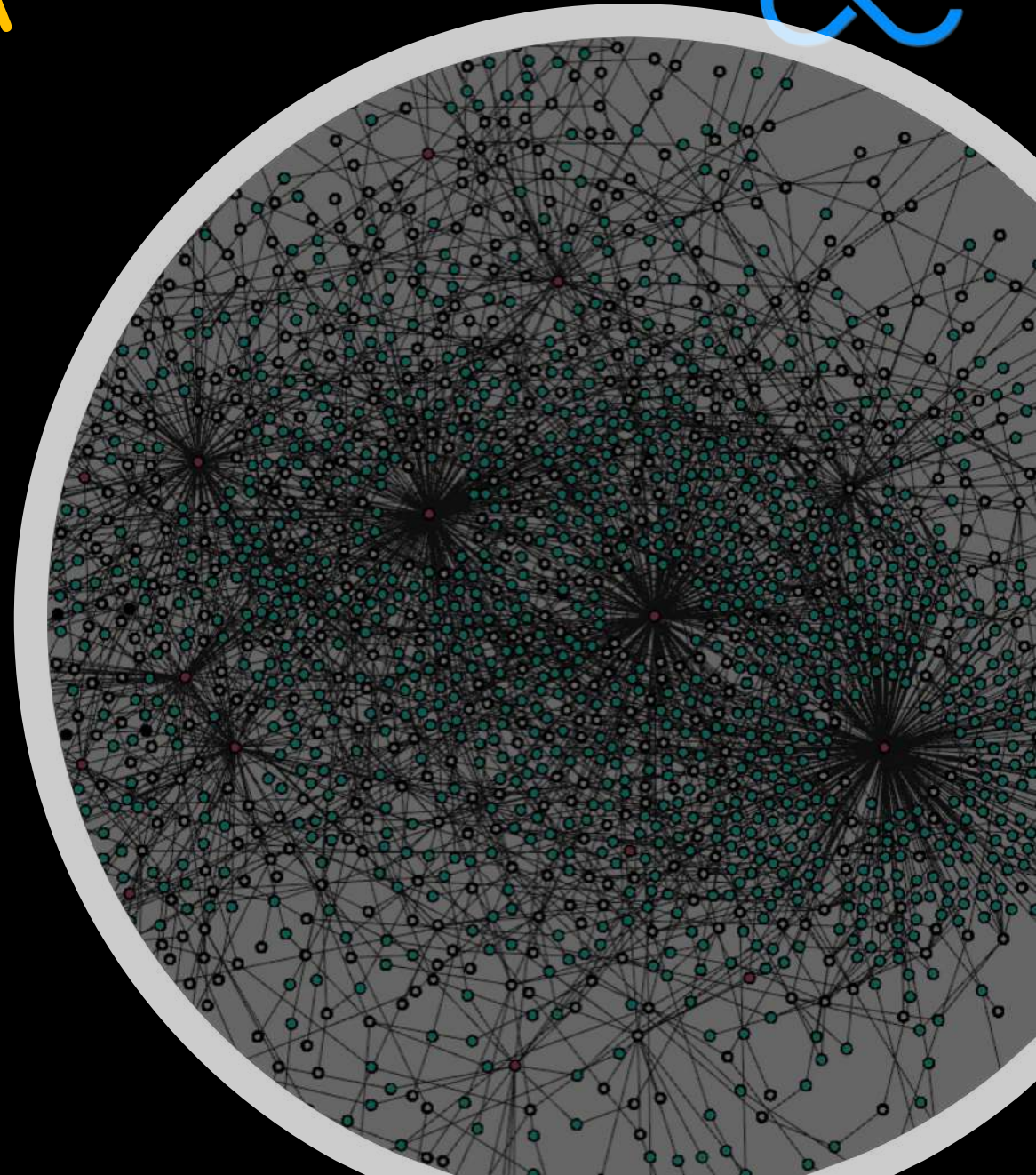
Blockchain Enthusiast with 12+ years of IT industry experience. Interested in Decentralized and IoT technologies.



# Meetup #1 – Foundations of IOTA



- ❑ Introductions and Expectations
- ❑ Why IOTA
  - ❑ Shared Economy
  - ❑ Machine to Machine Economy
  - ❑ Benefits of IOTA
    - ❑ trust, immutability, security
    - ❑ scalability and cost
  - ❑ Relation between IOT & IOTA
- ❑ Blockchain vs Tangle
  - ❑ Directed Acyclic Graph [DAG]
  - ❑ Scalability
- ❑ Applications, Use Cases of IOTA
- ❑ Hands on with IoT(A)





# D Centrum's 4-month Blockchain co-learning series:



Join to experience perfect way to learn and solve real world problems using IOTA Tangle with a group of highly motivated Decentralization enthusiasts



<http://bit.ly/IOTAHydMeetups>

\*\* Venue will be announced via Slack and confirmations after curation based on responses on above form



Hyderabad, India



Meeting  
Frequency  
**Bi-Weekly**



Total Series  
Duration  
**3 Months**

23 March 2019 –  
6 July 2019



## First thru Third Meetings:

- ✓ **Level Setting**
- ✓ **Foundation**
- ✓ **Concepts**

During initial two meetings we all will get to know each other and understand the foundational aspects to **Tangle & IOTA**. How is it different from Blockchain. Learn to document a use-case and Business Model.

*Bring together and build a solid foundation*



## Fourth Meeting:

- ✓ **Real World use case selection**
- ✓ **Architecture, Scope Decisions**

Members will propose ideas to implement and we will together pick one or more use cases by looking at domain expertise and interest from majority of the participants. Idea(s) selected will provide choice to members to form groups and brainstorm about the scoping and architecture for the use case.

*Encourages ideation and innovation from community*



## Fifth thru Seventh Meetings:

- ✓ **Building Solution by collaboration**

During this 45 day period we all will participate to build the end-to-end solution that will enable everyone coming together to build the chose use case(s)

*Put the big picture in view and encourage team members to play various roles*



## Conclusion Workshop:

- ✓ **Condensed Version Workshop**
- ✓ **Showcase of Solutions built**

One day workshop for the open community to learn in a condensed approach what was done over a period of 3 months.

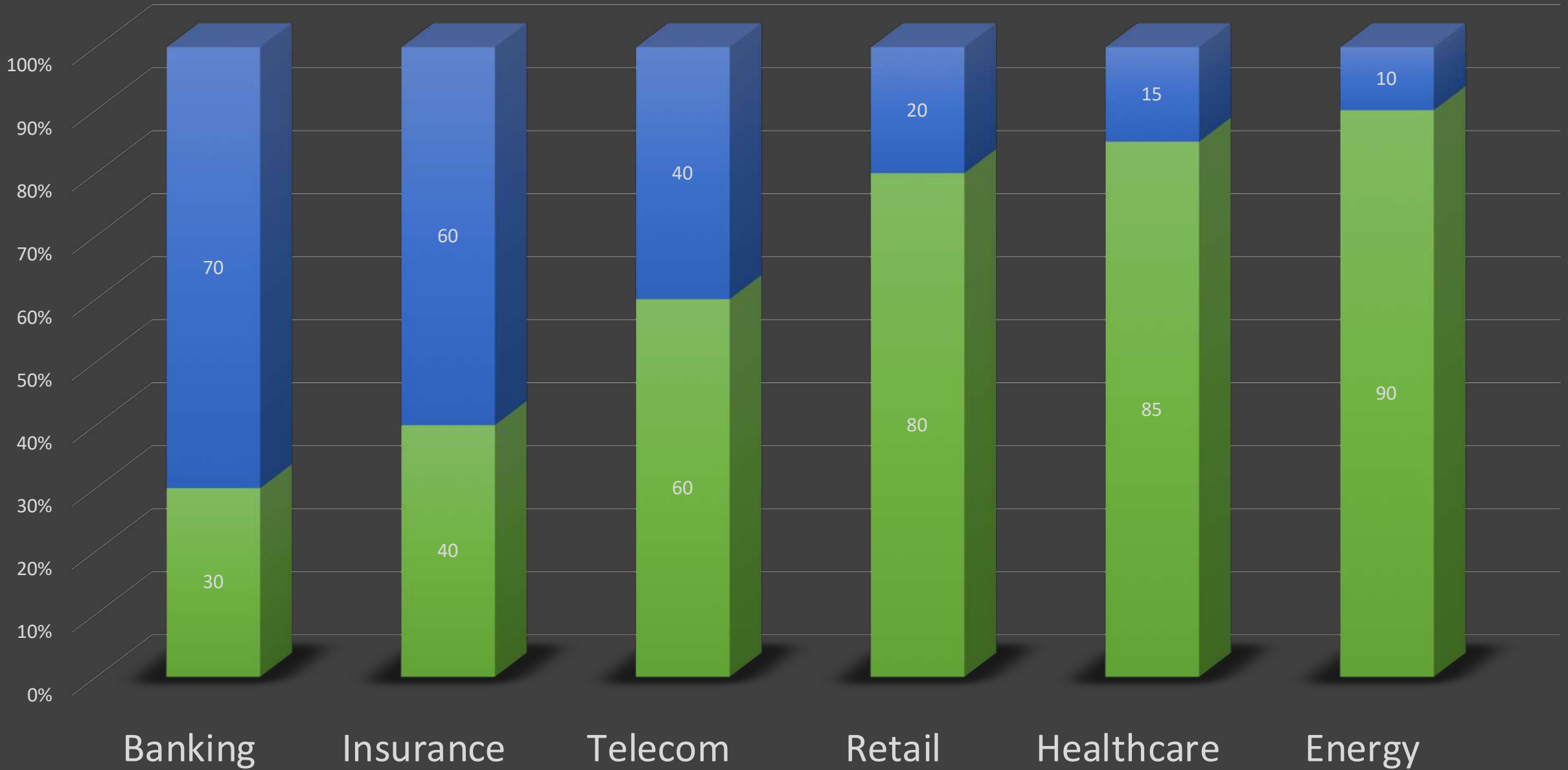
*During this workshop, the ideas built will be showcased to the open community to help increase the connect and spread the idea.*



## Typical format of each meeting:

- Welcome & General Discussion  
[30 mins]
- 2 Presentations from members  
[30 min each]
- Shared Learning & Discussion  
[60 min]
- News Briefs  
[10 min]
- Open Discussion & Networking  
[20 min +]

# Physical vs Digital nature of transactions in various industries



\*Data shown for indicative purposes only

■ Physical Nature ■ Digital Nature

# Blockchain is Blind!

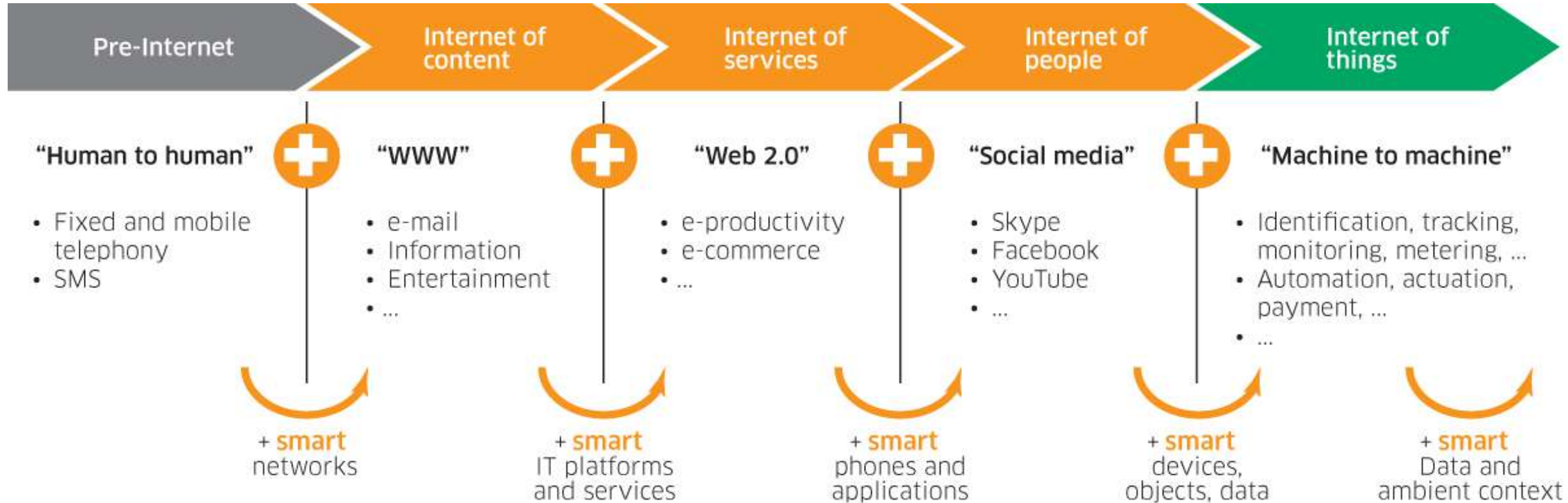


- ❑ As data becomes the new oil , trust in data is depleting
- ❑ Manual data entry is prone to collusion leading to mistrust
- ❑ So we need mechanisms that can help increase this trust in data, the saviours of such situations are:
  - ❑ Distributed Ledger Technology
  - ❑ Internet of Things
  - ❑ Machine Learning & Computer Vision

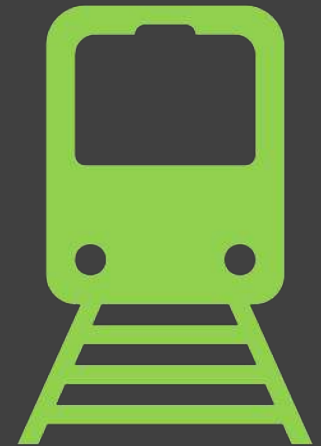


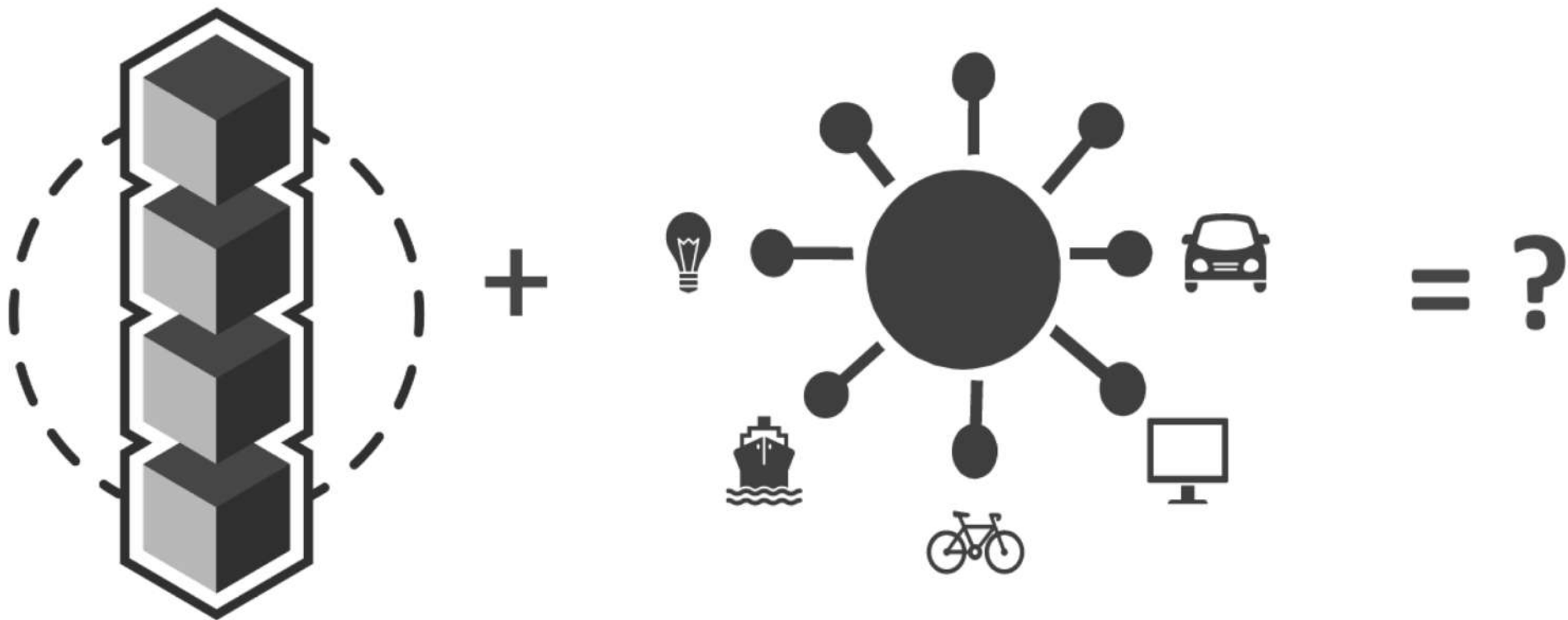


# Evolution of Internet of Things



# IoT Around us

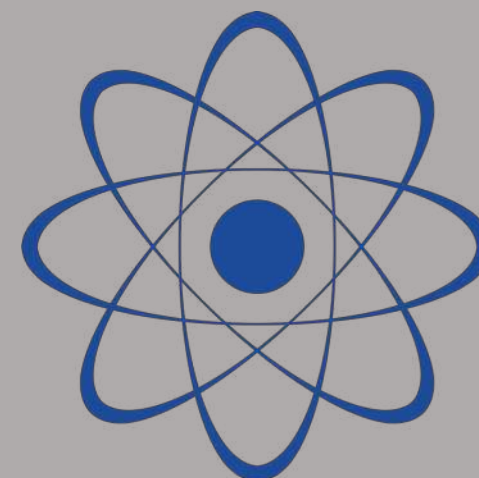
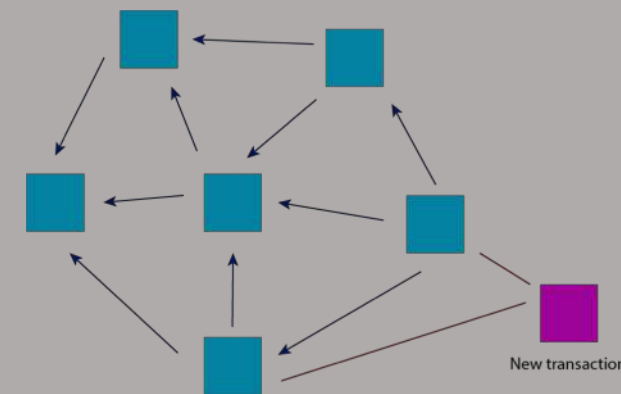




# Why IOTA



- ❑ Enabler for Shared Economy
  - ❑ Permissionless
  - ❑ Decentralized
  - ❑ P2P network
- ❑ Build to Scale : Uses a Tangle which is a Graph structure based Directed Acyclic Graphs instead of Blockchain
- ❑ No Fees: Incentivization does not require currency, to put your transaction on Tangle you need validate transactions from other's first.
- ❑ Low Resource Requirements: Works best with IOT and Machine to Machine transactions
- ❑ Secure Transactions and Quantum Resilient Cryptography



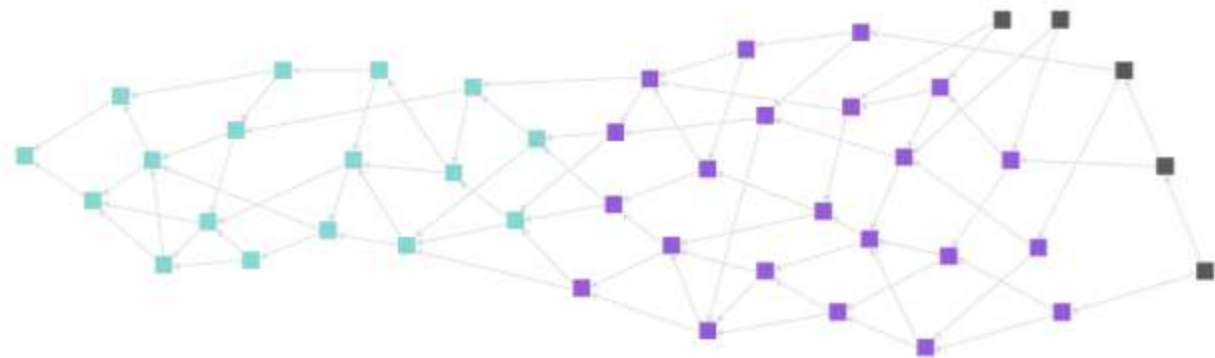




# Blockchain vs IOTA – Data Structures



Blockchain



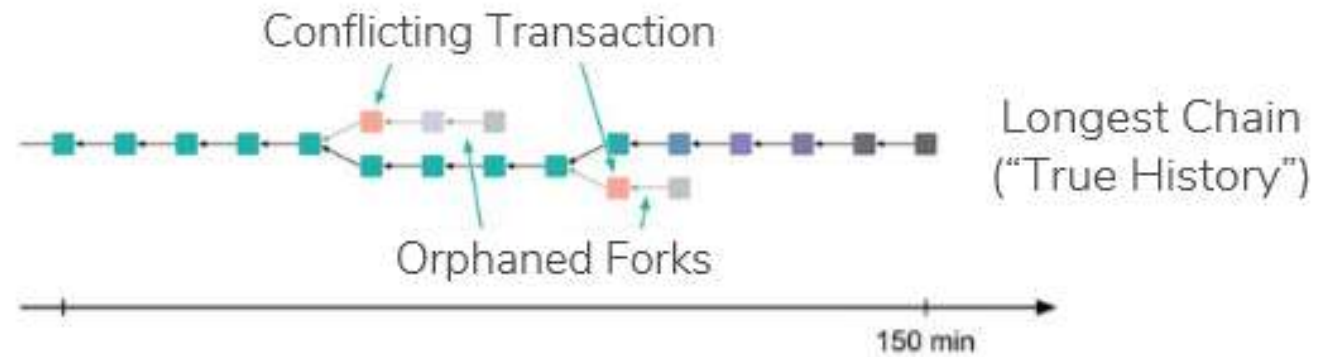
Tangle  
(DAG - Directed Acyclic Graph)



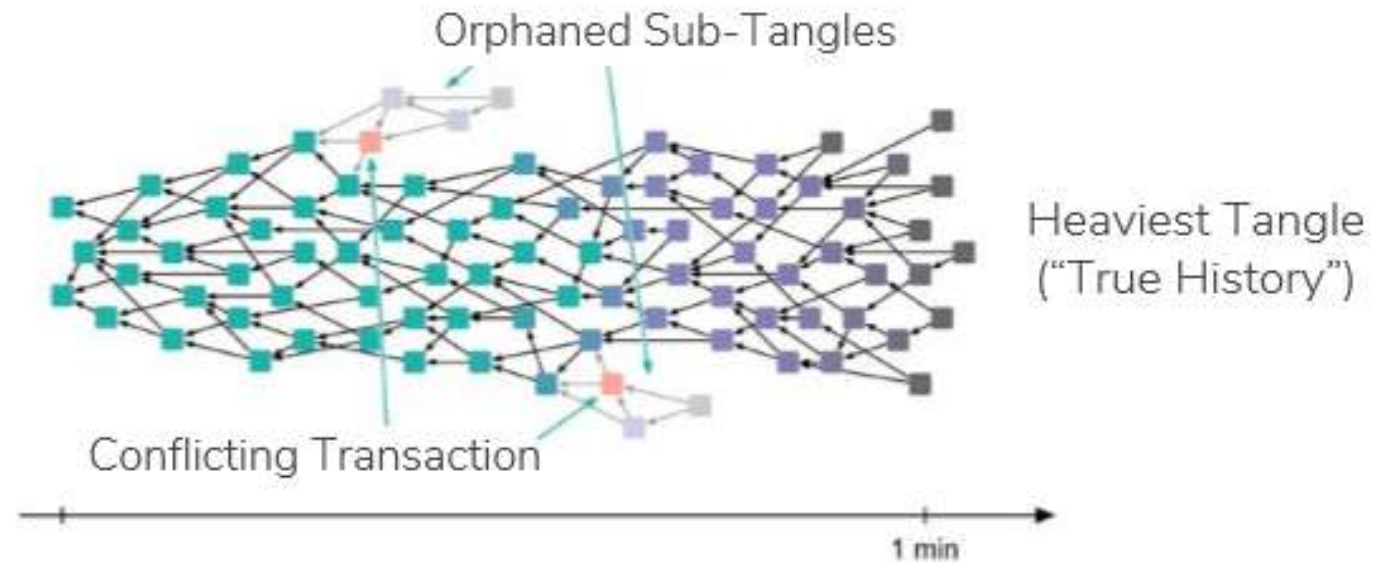
# Blockchain vs IOTA - Consensus



Blockchain

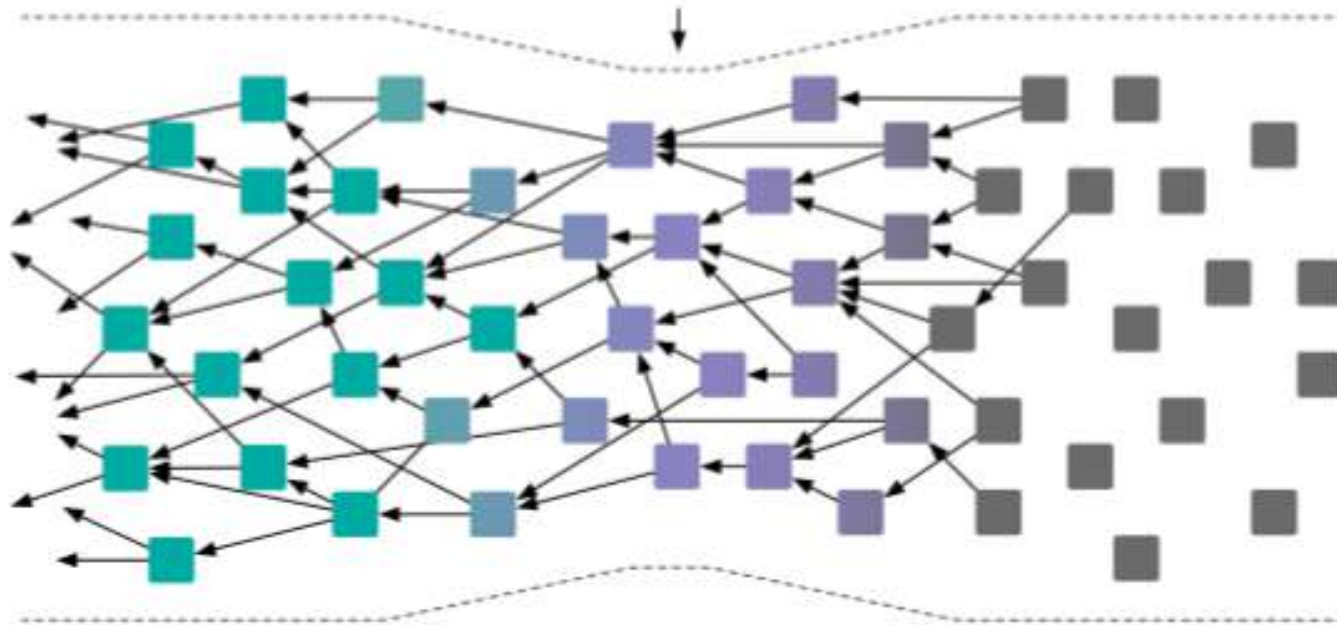


IOTA Tangle





# The IOTA Tangle



Each **Vertex** represents a transaction (Squares)

Each **Edge** represents an approval (Lines)

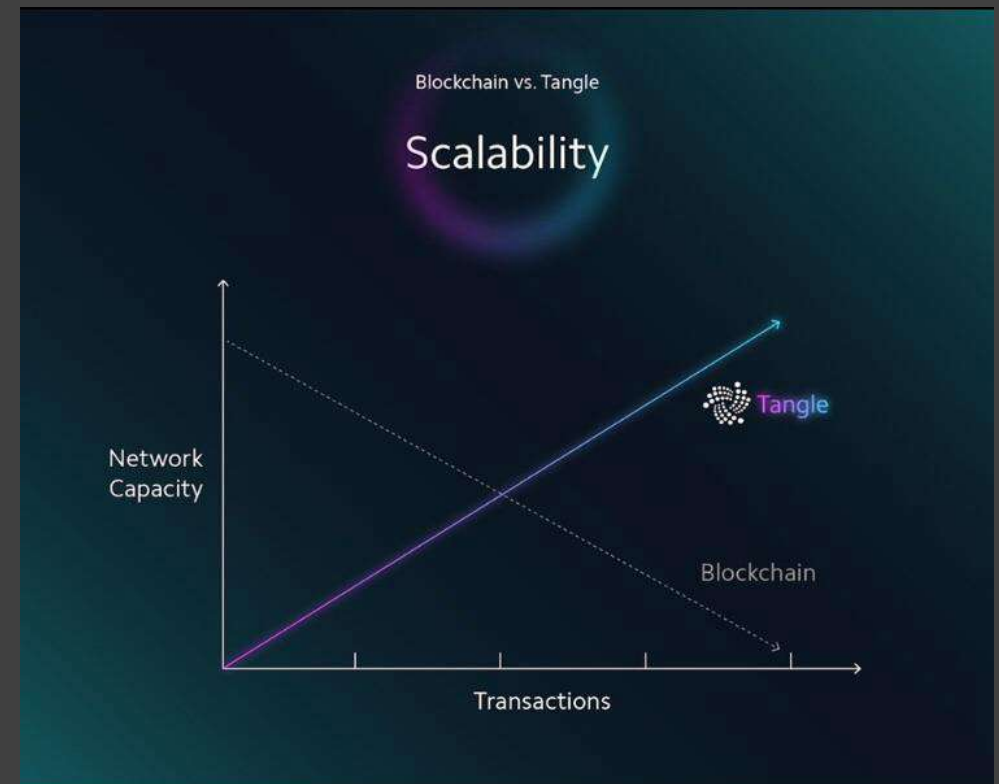
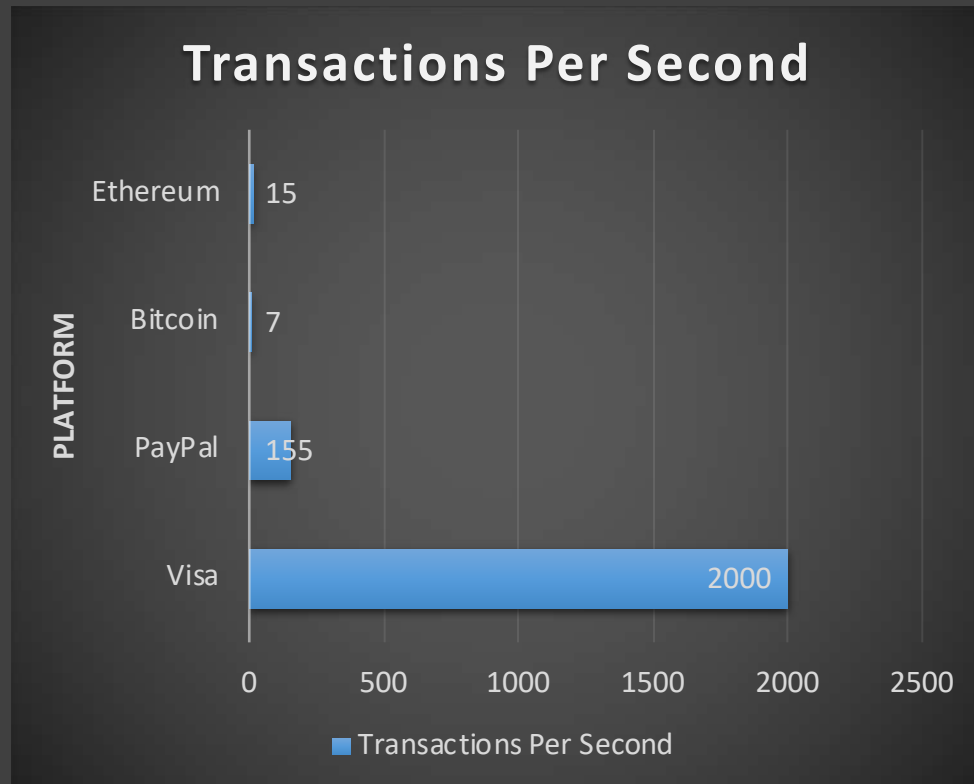


<http://tangle.glumb.de>





# Blockchain vs IOTA - Scalability

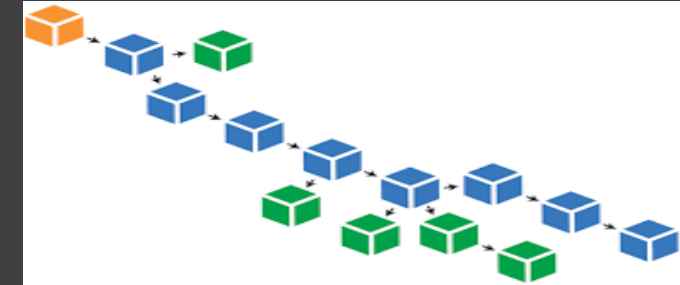




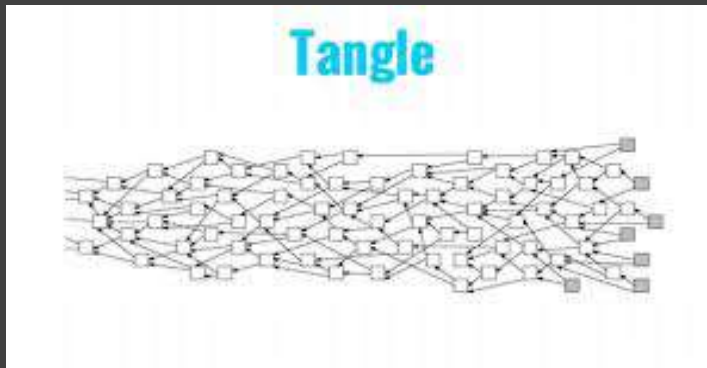
# Blockchain vs IOTA - Transactions

## Blockchain

- Predetermined **Block Size**, restricts number of transactions that can be added
- **Miners** generate and validate the Blocks for **incentive**, which is collected in the form of **transaction fee**



## Tangle (IOTA)



- Instead of storing transactions on limited size blocks, each transaction lives on its own as a vertex in **DAG (Directed Acyclic Graph)**
- Each new transaction helps in validation of other two transactions, causing throughput to increase with usage surge
- **No miners**. Hence, **no transaction fee**

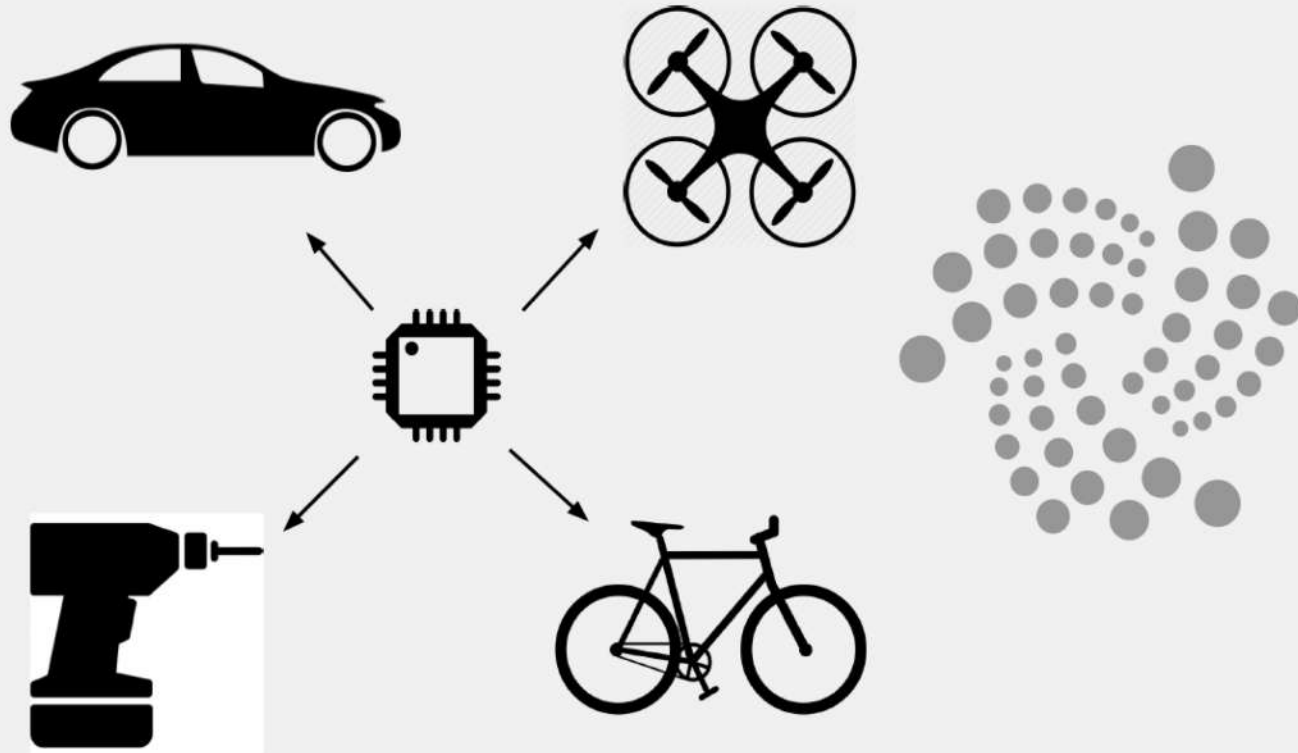


# IOTA Applications and Use cases

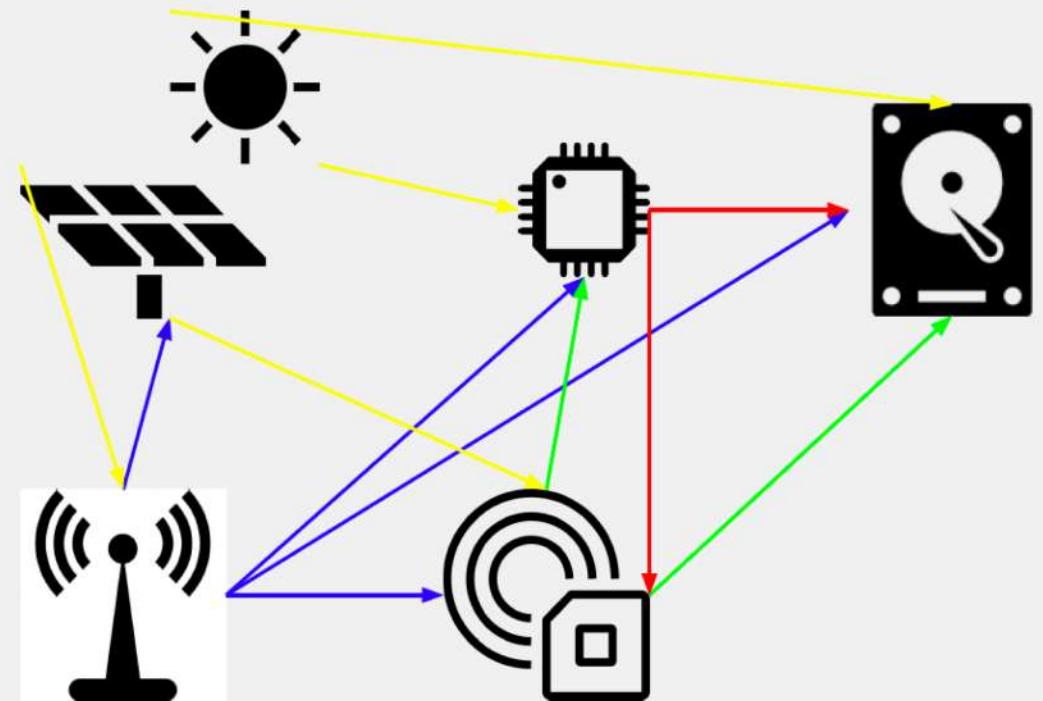
# Relation between IoT & IOTA



Anything with a chip in it can be leased



Devices trade resources among each other







Smart Mobility



Smart Energy



Smart Supply Chain



Smart Factory



eHealth



# IOTA use cases for Smart City

## **Mobility Services**

- Vehicle based ride sharing
- P2P EV Charging
- Car wallets paying tolls

## **Energy Districts**

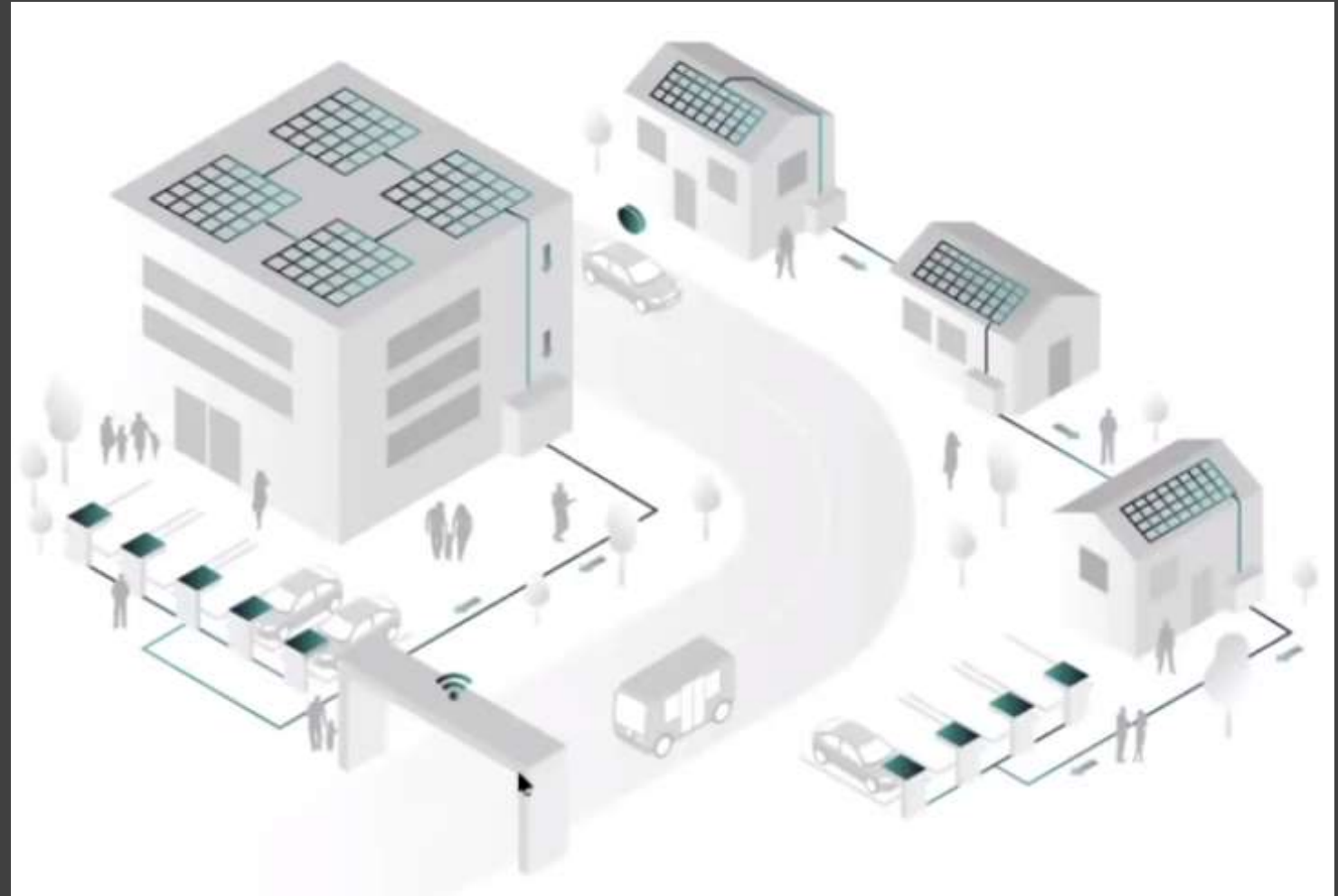
- Rooftop solar installs
- Micro-grids amongst buildings
- Incentivised grid balancing

## **Building Integration**

- Environmental Monitoring
- Access control
- Utility Optimisation

## **District Services**

- Realtime data
- Services marketplace





# IOTA use cases for Mobility & Automotive Services

- Vehicle to vehicle or vehicle to traffic signal communication
- Create a car-information app to track information like odometer reading, average speed, charge state, etc.
- Open trunk to enable packages to be delivered to them
- Allow people to use your personal charging station and pay with IOTA
- Remote honking your horns and flashing your lights for safety
- Track vehicle location
- Automatically honk your horn whenever you drive by any burger restaurant.
- Pay for tolls or parking



**Volkswagen:** <https://www.maize.io/en/content/iota-in-the-new-mobility>

**Audi:** <https://blockchainreporter.net/2018/12/14/audi-x-iota-collaboration-successfully-pushes-new-use-case-to-reality/>



# IOTA use cases for Smart Factory (Industry 4.0)

- M2M micropayments
- Reduced costs through predictive maintenance
- Increased efficiency and business opportunities through MaaS/R(obots)aaS
- Smart Supply Chains
- Inventory reduction through BI analysis of data stored in the Tangle
- Improved b2b trust through immutable and transparent record keeping
- Reduction in time and money spent on auditing data

## **IOTA implements Digital twins**

A digital twin is a virtual model based on trusted data to analyze and simulate real world conditions, respond to changes, improve operations and add value.

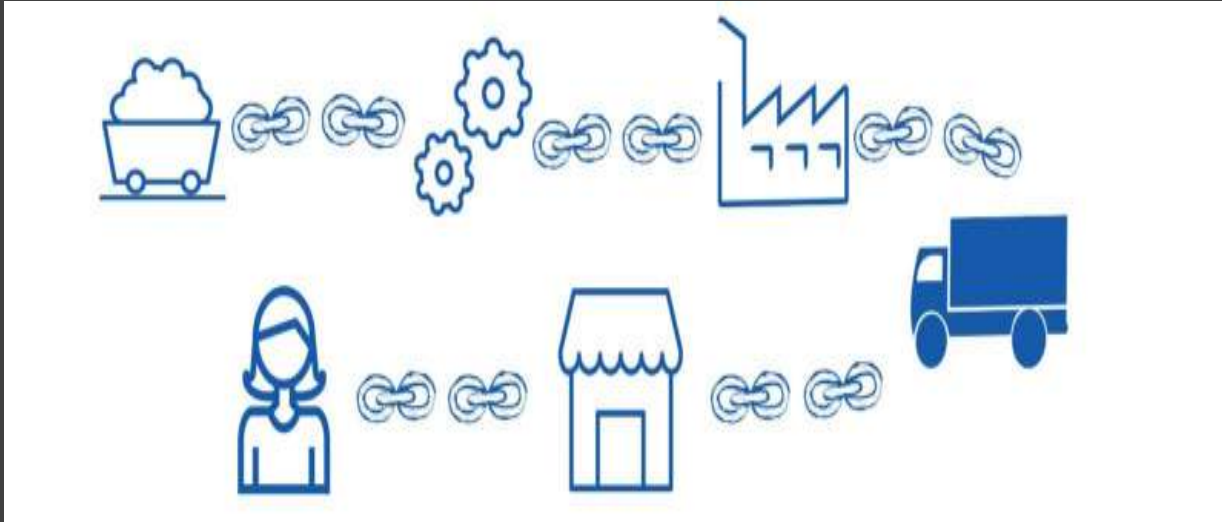


## **IOTA implementations for Industry 4.0:**

<https://medium.com/@iotasuppoter/how-iota-is-enabling-industry-4-0-b867564f57a3>



# IOTA for Global Trade & Smart Supply Chain

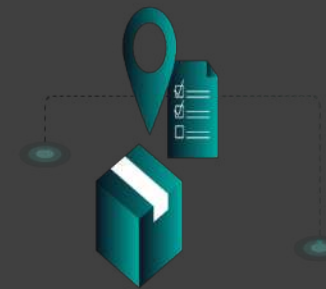


## Challenges for Global Trade & Supply Chain:

- 1.The movement of physical goods
- 2.The supporting communication and documentation requirements
- 3.The financial flows between many different actors along the supply chains.



TRACK & TRACE



TRADE FACILITATION  
&  
DOCUMENTATION FLOW



TRANSPARENCY

<https://medium.com/@iotasuppoter/iota-supply-chain-as-a-use-case-a2e5ac212e3f>

<https://blockchainreporter.net/2019/01/09/iota-partners-with-ibcs-group-for-tangle-based-supply-chain-management-solutions/>



# IOTA use cases for eHealth

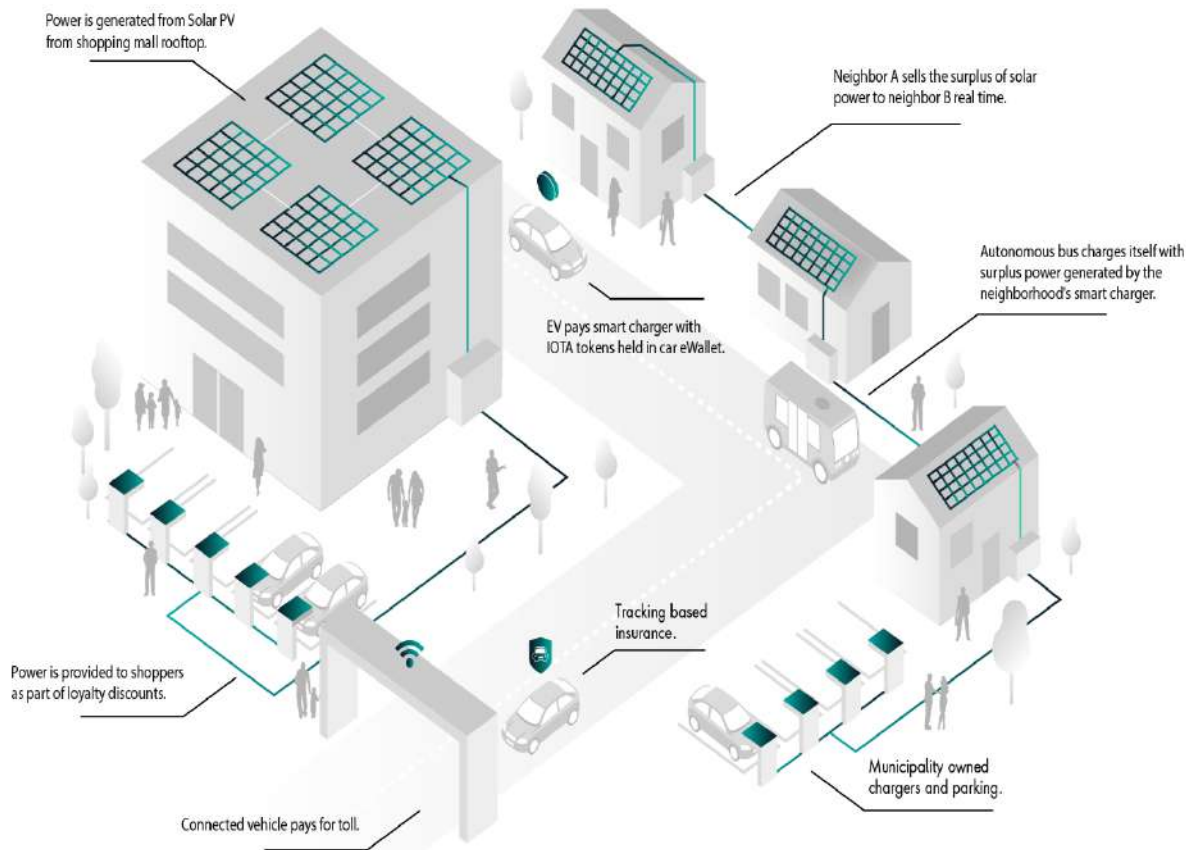
- Remote Patient Monitoring
- Health Data Exchange
- Research Data Integrity



# IOTA use cases for Smart Energy



## Smart energy community



ENGIE Lab CRIGEN and the IOTA Foundation to drive DLT innovation in the smart energy ecosystem

<https://blog.iota.org/engie-lab-crigen-and-the-iota-foundation-to-drive-dlt-innovation-in-the-smart-energy-ecosystem-eab3064839b0>

Dutch Tech Firm Develops PoC of Autonomous Smart Electricity Grid Using IOTA

<https://cointelegraph.com/news/dutch-tech-firm-develops-poc-of-autonomous-smart-electricity-grid-using-iota>

IOTA Joins Forces with Denmark's Energy Giant

<https://u.today/iota-joins-forces-with-denmarks-energy-giant>



**DEMO!**

# Getting Started with IOTA & Next Steps



- ❑ Some Hands on Possibilities of Machine to Machine Use Cases
  - ❑ Temperature Threshold to turn on AC
  - ❑ Water level detection to turn on the motor
  - ❑ Pay a Laundry Machine using the Phone payment
  - ❑ Moisture detection in soil to initiate drip for Agriculture
- ❑ Start looking deeper into the technology and come prepared, some curiosity questions
  - ❑ Deeper Look at DAG
  - ❑ How consensus happens in IOTA?
    - ❑ What are cumulative weights?
    - ❑ how proof of work happens?
    - ❑ what does validation mean in IOTA?
  - ❑ Difference between site & node?
  - ❑ What is a genesis block equivalent in IOTA Tangle?



WHY? WHO? WHERE? WHICH? WHEN? HOW? WHAT?





# Sensors

Automotive	Healthcare	Manufacturing	Retail
Pressure Sensor	Vitals Sensors	Ultrasonic Sensors	NFC
Vibration Sensor	Occupancy Sensor	RFID	Motion sensor
Sound Decibel Sensor	Air Quality Sensor	Smoke Sensor	CO2 sensors
Motion Sensor	Luminosity Sensor	Camera	Camera
Angle Sensor	Smoke Sensor	Temperature	RFID
Visibility Sensors	RFID(Asset tracking)	IR sensors	Weight sensors



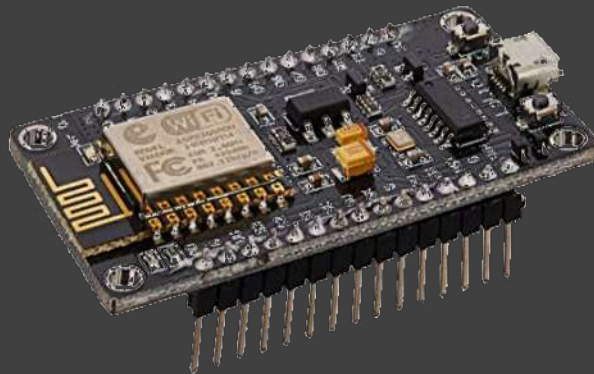
# Devices



Raspberry Pi



Arduino Uno



Node MCU



Intel Edison

# ACTUATORS

