

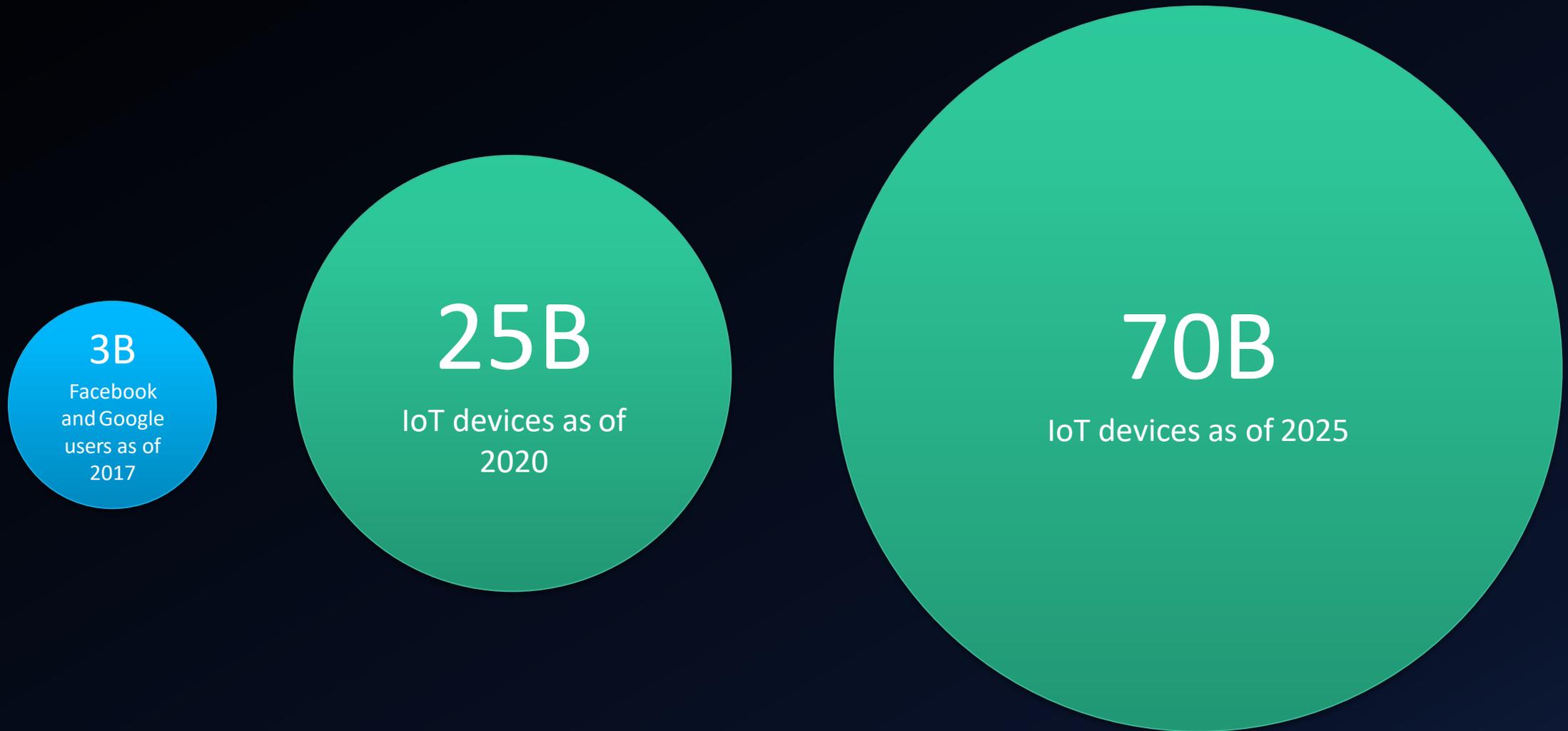


# IOTEdge Network

A M2M Economy for Internet of Things  
Powered by a Decentralized Edge Computing Network

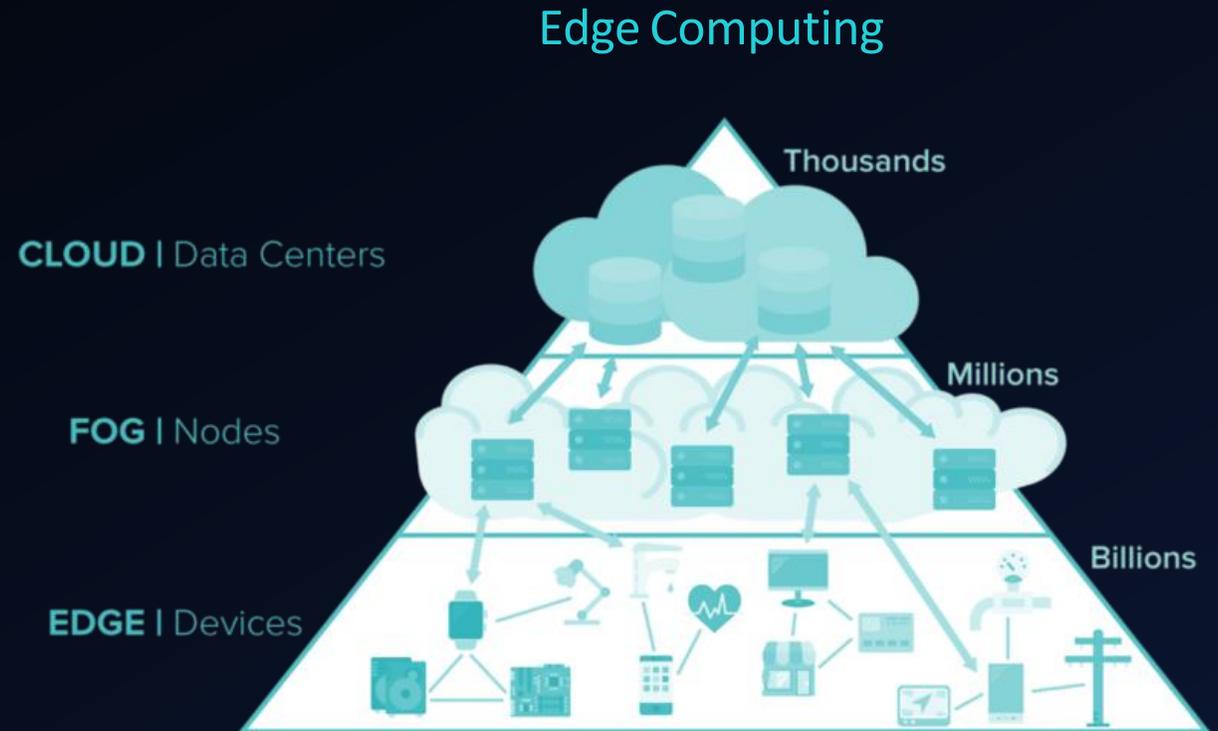
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# IoT is on The Verge of Exponential Growth



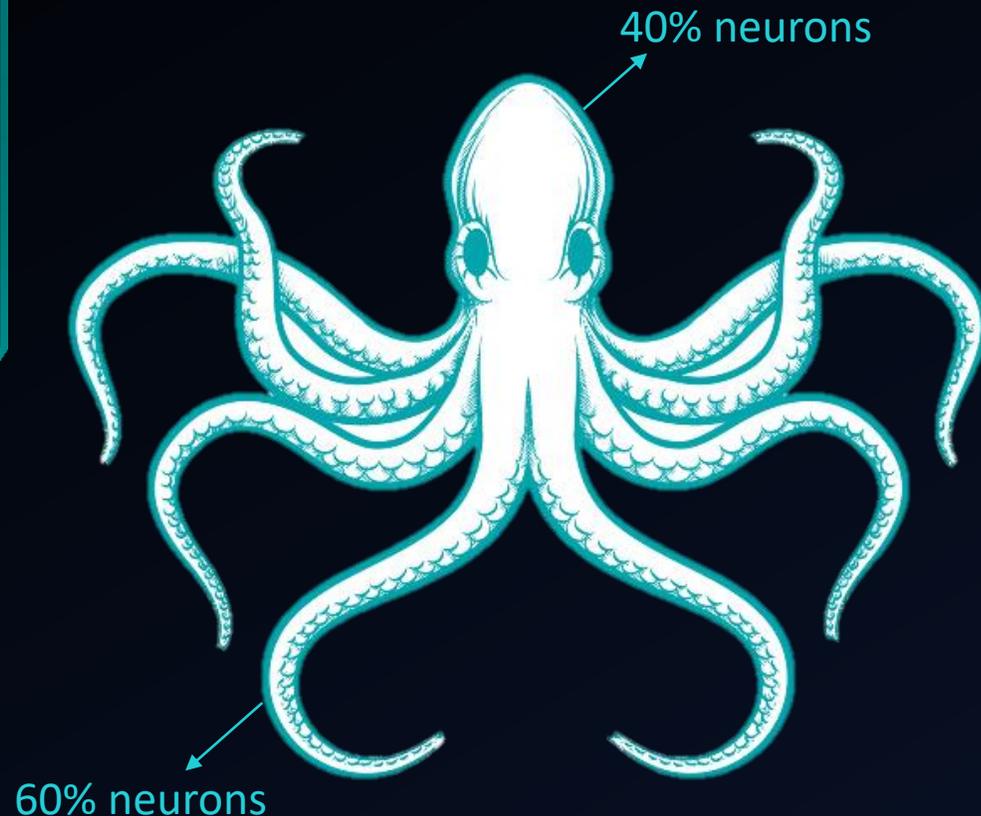
# Why Edge Computing?

1. Gazillion amount of data put huge burden on the network and cloud, cost shoots up
2. Poor user experience for real time applications
3. The risk of data leak is increased while transmitting sensitive data to the cloud



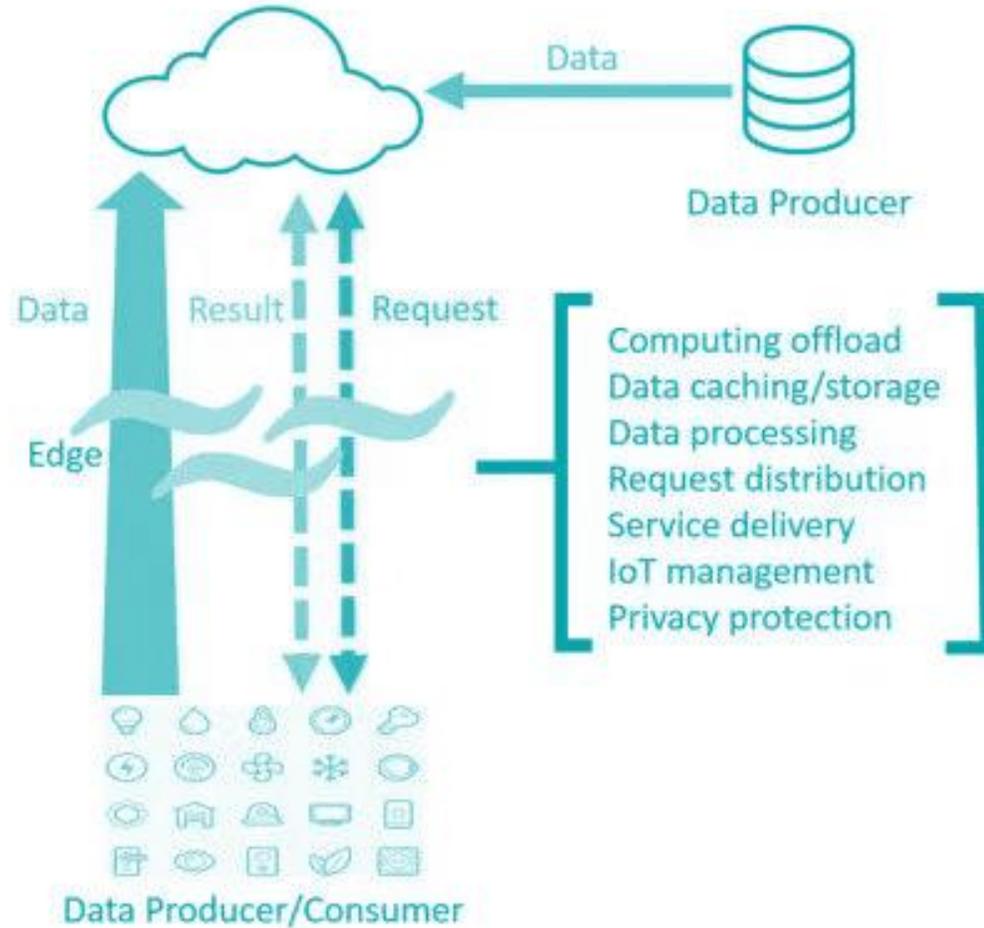
# Edge Computing Metaphor - Octopus

The octopus uses legs to think & solve problems on the spot.



- The octopus has 60% of the neurons distributed on the legs, which allows the legs to respond quickly to the surrounding environment.
- Also allows its legs and feet to cooperate with each other without tying knots.
- This "distributed computing" method of "one brain + multiple cerebellums" explains the working principle of edge computing

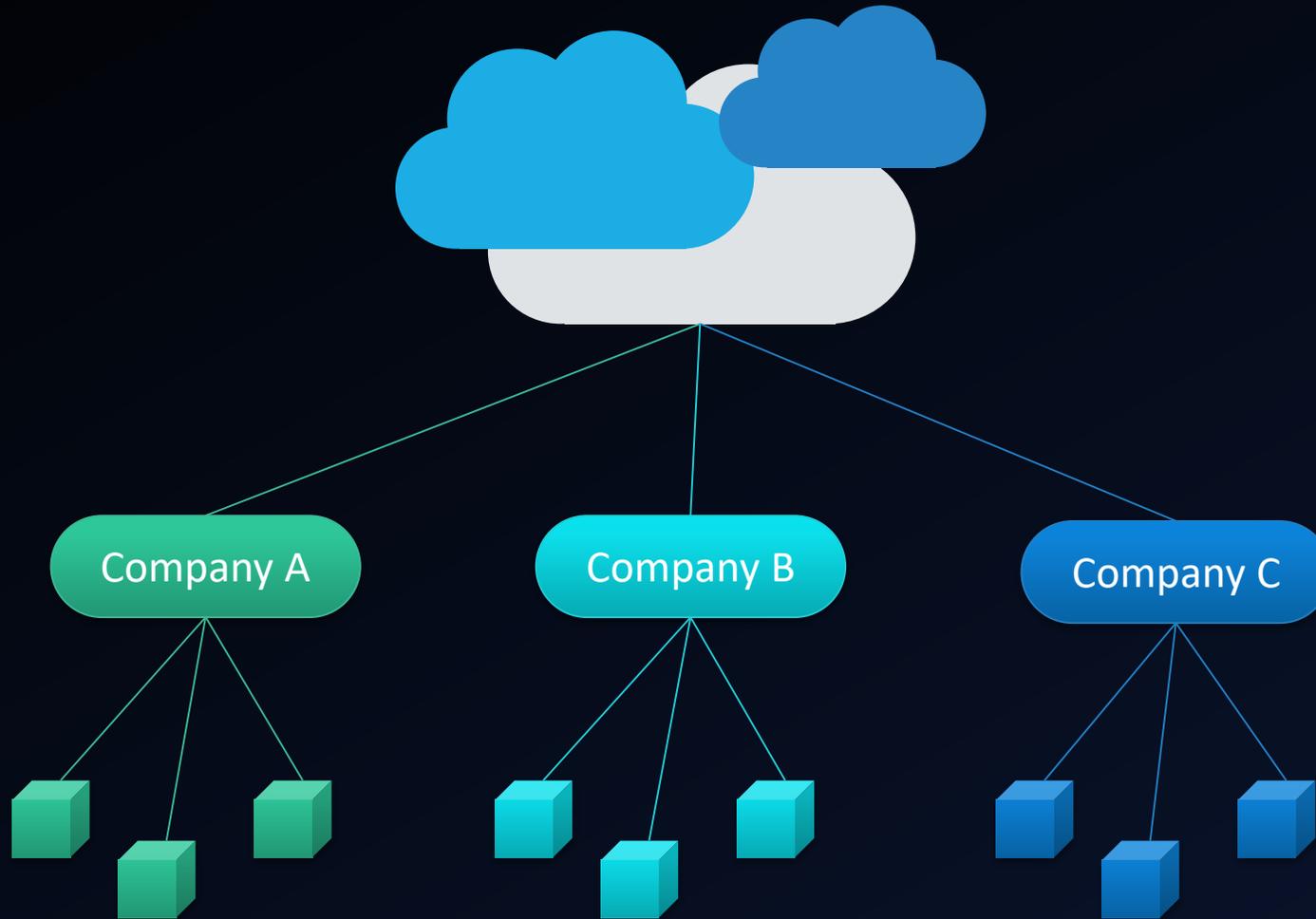
# What Does Edge Computing Mean Technically?



Edge Devices are routers, routing switches, gateways, IADs, access controllers, etc.

By 2020, the spend on edge infrastructure will reach up to 18% of the total IoT infrastructure spend (IDC)

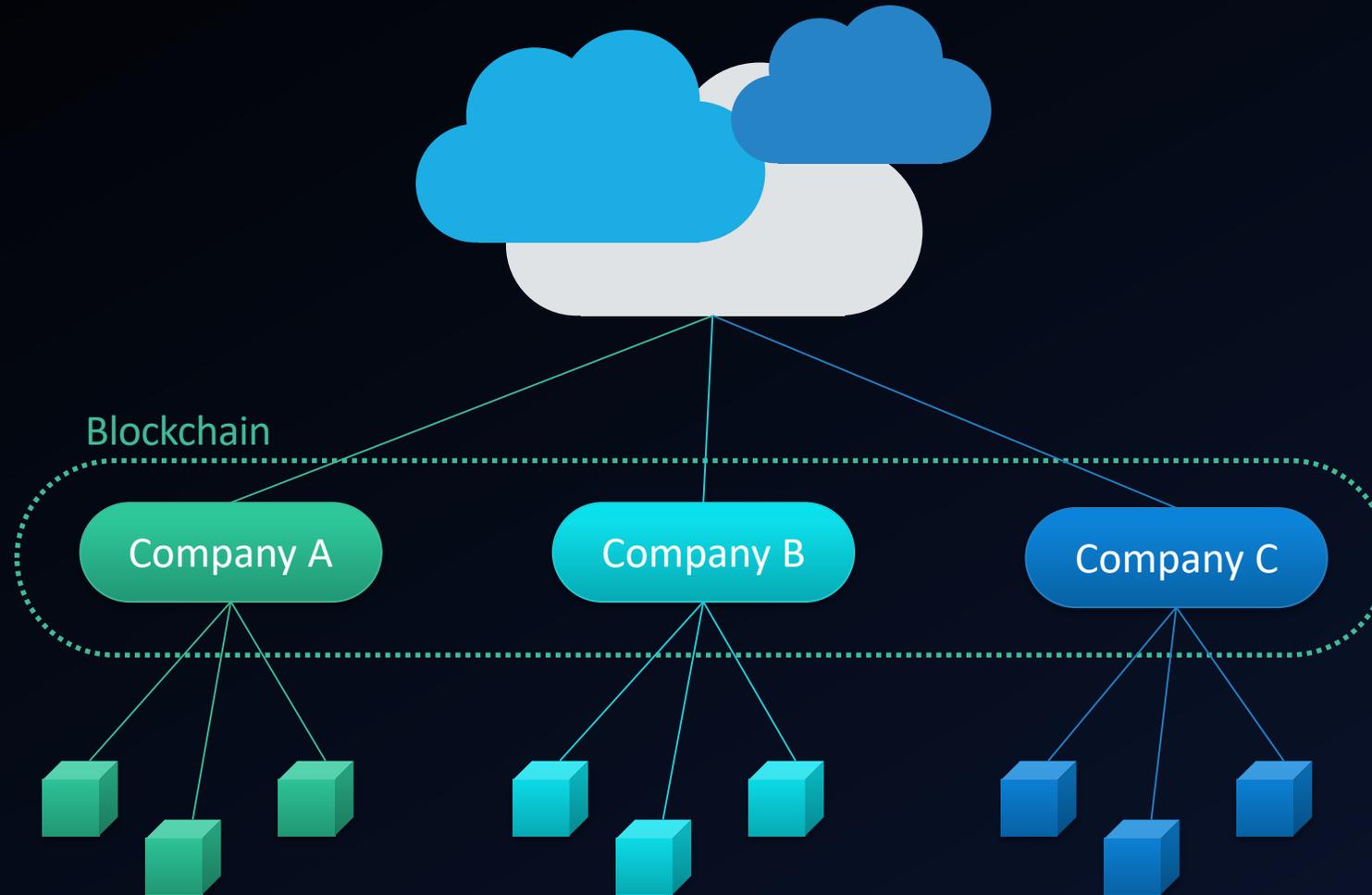
# Challenges of Edge Computing Networks



## Edge Nodes

- Segmented, untrusted
- Unsecure
- Idle resources

# When IoT meets Blockchain



## Edge Nodes

- Collaborated
- Tamper-proof, peer-to-peer encryption, traceable ownership
- Shared resources via token economy

# What is IOTEdge Network

IOTEdge is a decentralized, permissionless, self-regulating edge computing network for Internet of Things, built on blockchain 3.0 technology for autonomous machine-2-machine economy.



# IOTA Features

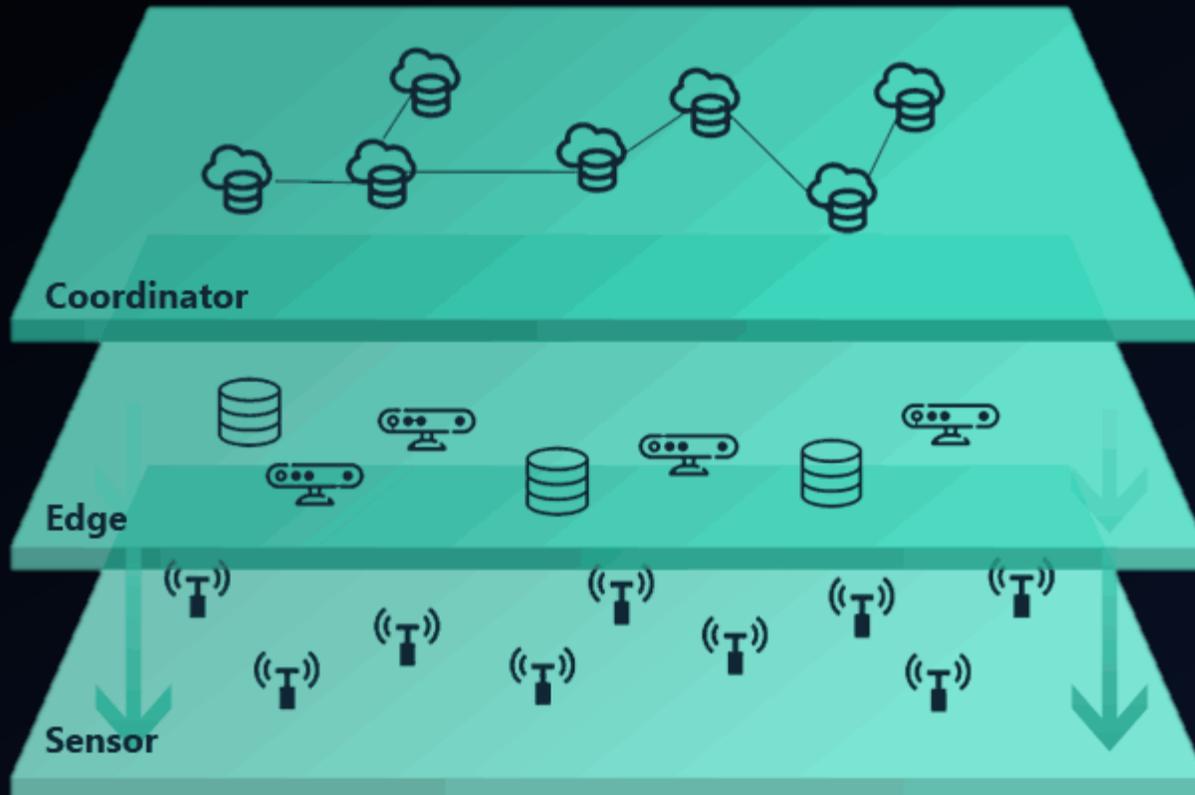
## Pros

- Infinite Scalability
- No fee Micro-transactions
- Quantum-resistance
- Lightweight
- Secure data transfer

## Cons

- No smart contract
- Security vulnerabilities
- Still fairly new, under development

# IOTEdge Network Architecture



## Coordinator

A group of servers installed coordinator SDK, deploy and orchestrate edge node services and checkpoints valid transactions when nodes number is small

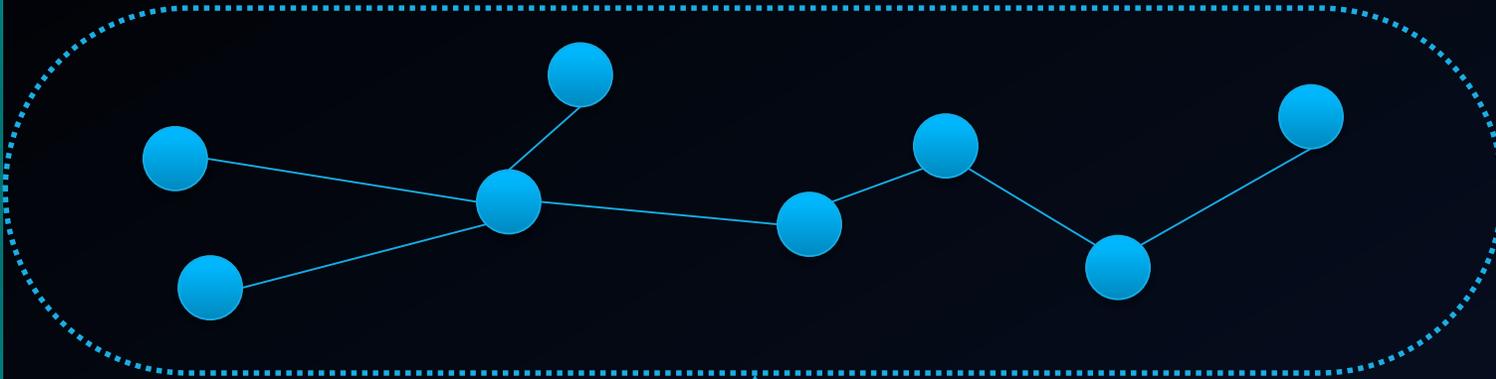
## Edge Node

Edge devices including IoT gateways, routers, NAS, etc. Nodes capable of running contract computations

## Sensor

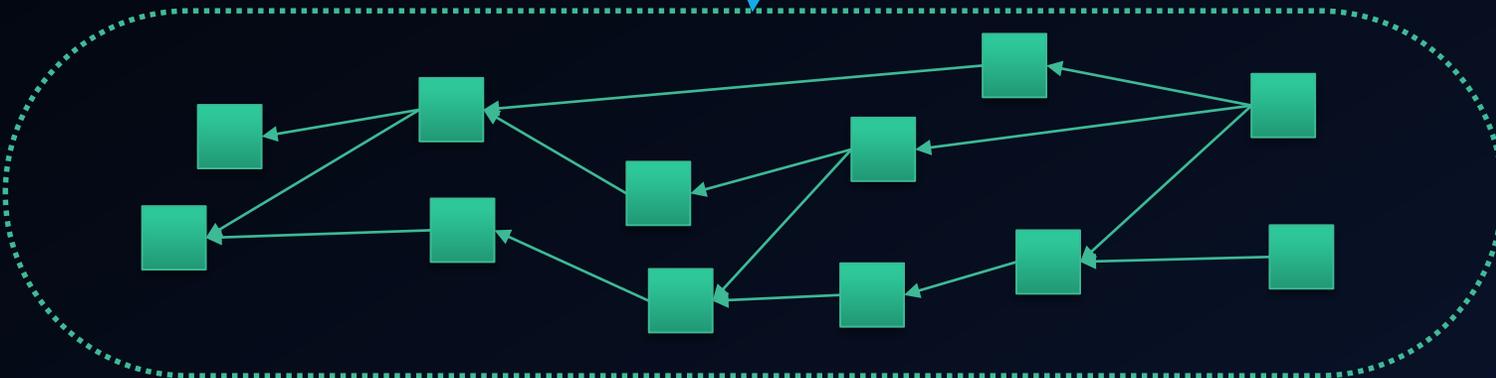
Lightweight end-users who create smart contracts, and provide secret input to edge nodes.

# IOTEdge 2-level Chain Structure for Fast Consensus



## G-Chain

based on Blockchain, keeps and supports a global ledger for macro transactions which happens at minutes or even hours level.



## L-Chain

based on DAG, supports machine-to-machine micro, local transactions, which happens frequently at millisecond level, in a neighborhood with 10s to 1000s devices.

# Relationship between the chain and the nodes

	Coordinator	Edge Node	Sensor
Transaction	macro transactions between service providers, e.g. subscription contracts between different entities	both macro transactions between service providers and micro transactions between IoT devices	machine to machine micro transactions
Chain	G-Chain client, powered by Ethereum-like chain	G-L-Chain dual client, powered by both Ethereum-like chain and LST-Tangle.	L-Chain client, powered by LST-Tangle
Host	Server-like computers	IoT gateway, router, or NAS, close to the neighborhood (LAN) it is serving	IoT end devices, such as wristbands, thermostats, sports trackers.
Transaction cycle	hours or days	minutes	milliseconds
Scale	global level, millions of owners!	from 100s to 100,000 nodes	from 10s to 1000s nodes

# Why LST-Tangle

- Locality: Deployment and interactions between IoT devices are largely happening within a limited neighborhood
- Short-term: what happens right now on an IoT device generally has nothing to do with what happened long time ago

**We introduced Local, Short Term Tangle (LST- Tangle)!**

# How Does LST-Tangle Work

- The ledger running on each LST-Tangle client will be a local DAG, where all the transaction records are only from the IoT devices within their neighborhood. Thus the tips, namely the un-validated transactions are also only local tips within their neighborhood.
- The DAG tree will be periodically “trimmed” and only kept the DAG graphs within last time period “T”.
- Every transaction value is limited at the local level, thus making potential attack less harmful.

# Why Proof of Stake posterior (PoSp)

## Problems

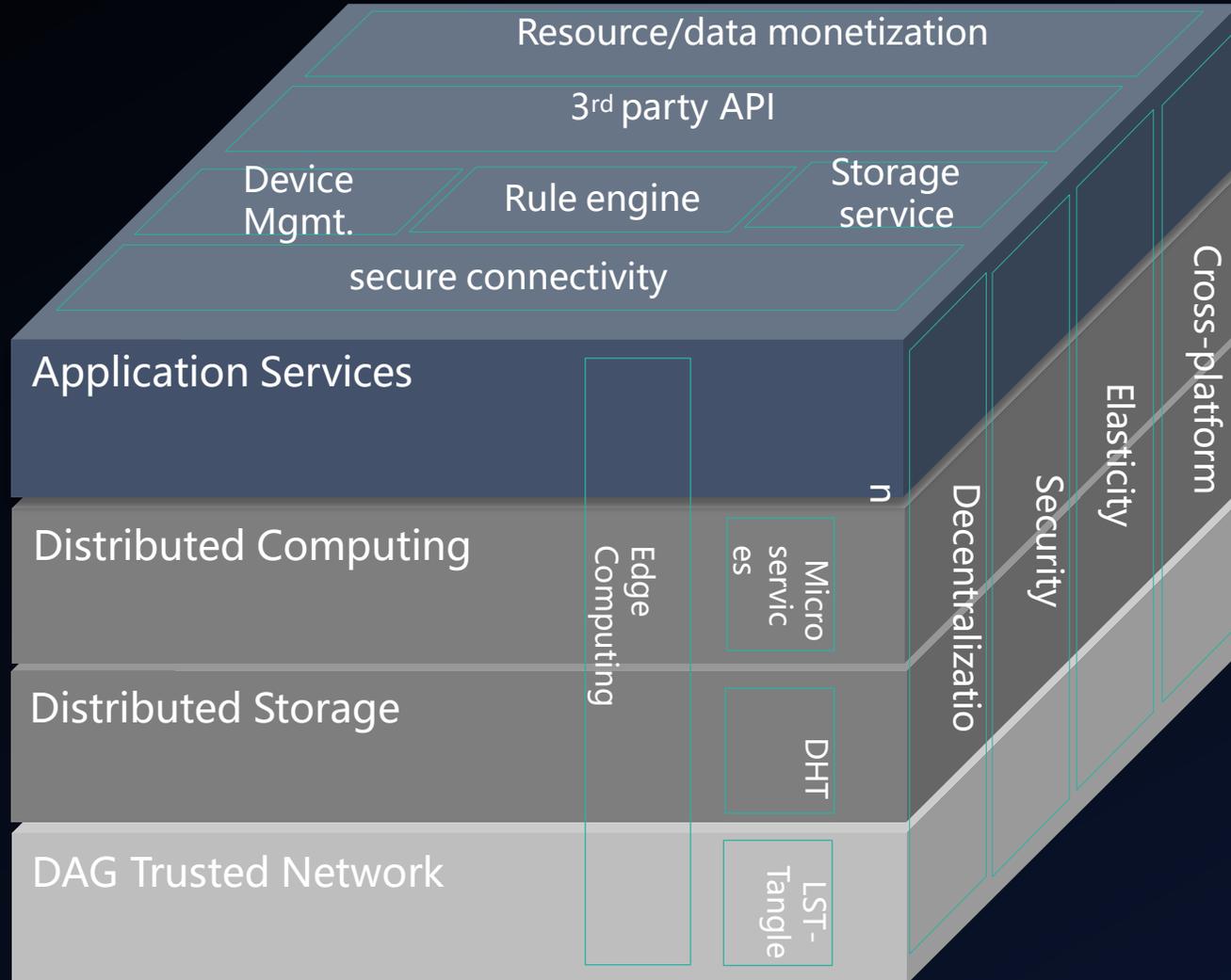
- Latency: some applications require for real time response, milliseconds to seconds level, such as mobile device location tracking
- Constrained resource: IoT devices tend to have low battery, low memory, low bandwidth, low computing power

## Solution

- The DAG tree itself won't have consensus mechanism
- Instead, the DAG tree will be summarized and consolidated into one macro transaction, with Proof of Stake (PoS) consensus on the newly generated macro transactions, called PoSp

**This will greatly reduce latency and resource consumption at the IoT end device level, while keeping the network secure at the macro transaction level.**

# IOTEdge Edge Node



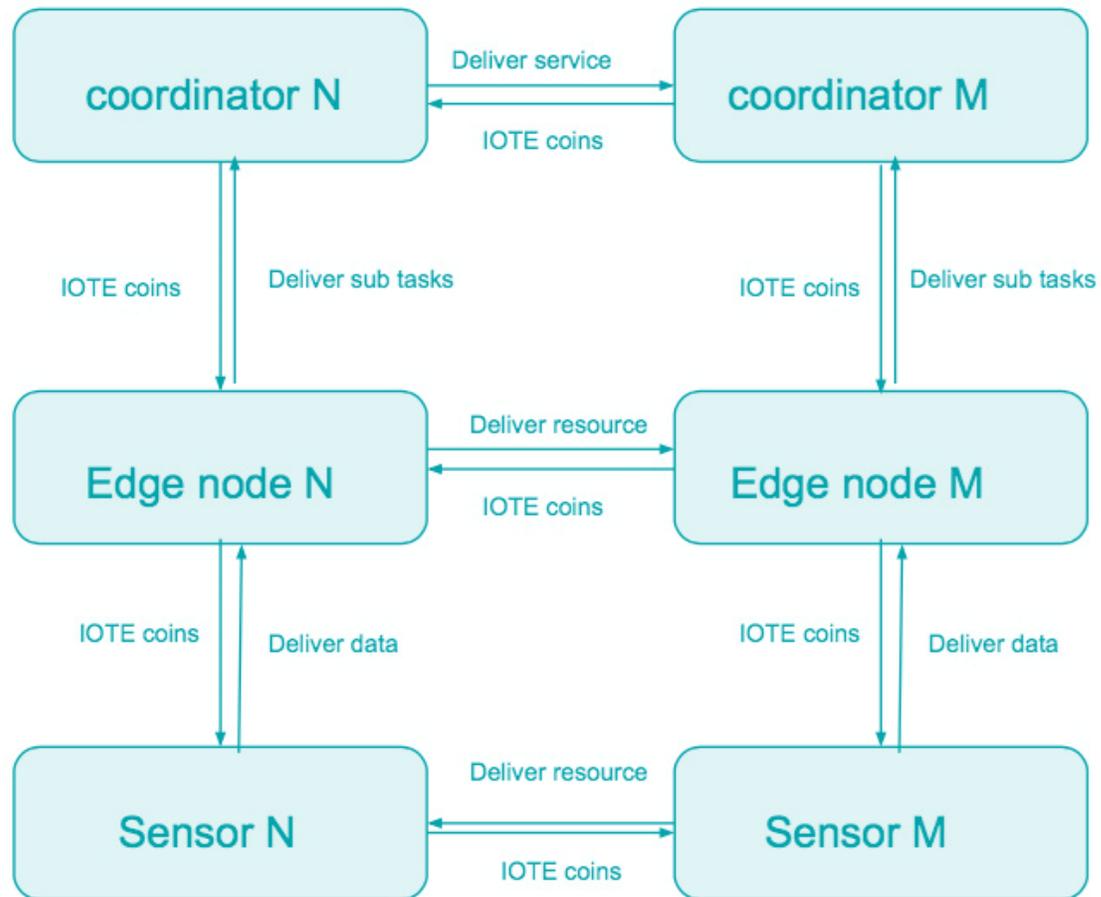
# We Take Security and Privacy to Another Level

- Each sensor has a trusted root built in the chip or flash memory. Based on the trusted root, the sensor has a physical-level trusted identity, which ensures the authenticity of data source.
- IOTEdge assigns a unique identity to each sensor, and each data generated by the sensor is tagged with sensor's ownership, and this ownership is logged, traceable and tamper-proof.
- Based on LST-Tangle, data sent from a node can be looked up, traced, but cannot be tampered with.
- IoTEdge uses MAM (Masked Authenticated Message) technology to encrypt data to protect privacy. Only authorized parties can read and reconstruct the corresponding data stream.
- Smart contract is executed in a Trusted Execution Environment (TEE)

# IOTEdge Competitive Advantages

- Highly scalable, no miner, no transaction fee for device layer
- Encrypted, privacy-preserving transaction improves security
- Fast 2-level chain consensus scheme greatly improves the throughput of the network
- The shared use of resources (bandwidth, storage, computing power) greatly reduces the overall infrastructure cost

# Tokenized Economy



IOTE can be obtained in the following ways:

- Sale of computing power
- Sale of storage space
- Sale of bandwidth
- Sale of data
- Sale of software services
- Contributing code to improve the platform
- Community reward programs

# Token Distribution

Token Name: IoTEdge Token

Total Token Supply: 1,000,000,000

Distribution	Percentage
Private sale	20.04%
Public sale	6%
Advisor	4.96%
Foundation	10%
DEV Team	15%
Marketing & Ecosystem	20%
Mining Reward	24%

# Core Team

The IoTEdge Network, founded in Silicon Valley in the U.S. 2018, the HQ in San Jose and R&D Center in Beijing.

Core team earned P.h.D. and master degrees from Carnegie Mellon University, University of California (UCSB), Nanyang Technological University, Singapore (NTU), Peking University and top universities, and worked for Cisco, Microsoft, Fortinet, Tencent, HP, Arista, and Fortune 500 companies. As a project, the direction has been affirmed by YC's experts in the private meeting, 2018. Great experience in the IoT communications, 5G technology, Bluetooth, LoRa. IoTEdge, Merging IoT and blockchain to create a decentralized, monetized edge computing network on IoT devices.

# Opportunities

Asset Tracking

Smart Energy

Healthcare

Smart Supply  
Chain

Industrial IoT

And more ...



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# THANKS

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