# 5G + AI + BC : A Crossroad to the future

## I-COM  Italy of Things – Roma, October 30 - 2018

*Antonio Sassano*

# A technological crossroad

**New Generation Network**
- **Low Latency**
- **High Capacity**
- **Software defined**
- **IOT Enabler**

## Synergic Effect

☐ **Robotics**
☐ **Industry 4.0**
☐ **Web 3.0**
☐ **Autonomous «things»**
☐ **DAO**

**BLOCKCHAIN TECHNOLOGY**

*Distributed Ledger*
- **Open & Public**
- **Decentralized**
- **Secure «by design»**
- **Micro-Transactions**
- **Cryptocurrencies**
- **Smart Contracts**

*Artificial Intelligence*
- **Deep Neural Networks**
- **Optimization Algorithms**
- **Data Mining**

# BlockChain, AI and 5G Synergy

- **BChain** efficiency requires *fast end-to-end networks* (**5G** low latency)

- **5G** *network design/management* requires *complex* **AI** algorithms

- **AI** algorithms are empowered by the availability of **massive data** (**5G** IOT)

- **IOT** transactions are empowered by micropayments (**BChain** transactions)

- **AI** algorithms can control autonomous «things» only with **5G** networks (LL)

- **Medium Access and Clustering of massive IOT** ensured by **AI**

- **Massive (IOT) data market (integrity, ownership)** ensured by **BChain**

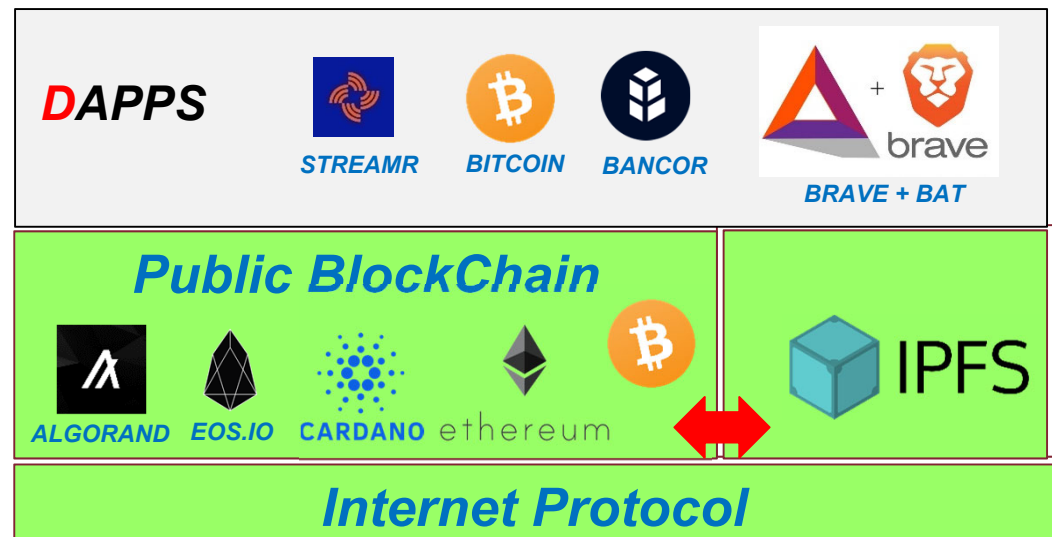- **AI** Algorithm Accountability/Transparency increased by **Smart Contracts**

- *…..*

# The Public BlockChain

Web 2.0 **non-interoperable silos** (platforms)

| APPS | |
|---|---|
| **CLOUD Platforms** | |

**Internet Protocol**

Web 3.0 **Public** BlockChain

- **Decentalised Cloud** (IFPS)
- **Decentralised Control**
- **Data** owned by producer
- **«Fat Protocol»** paradigm
- Tokens move value downward
- **Security «by design»**

**D**APPS

STREAMR   BITCOIN   BANCOR   **BRAVE + BAT**

**Public BlockChain**

ALGORAND   EOS.IO   CARDANO   ethereum

IPFS

**Internet Protocol**

# *BlockChain and Internet of Things*

- ## The IOT ecosystem requires:
  - Ability to **automatically exchange value** ($) **for data**
  - *Proof of ownership of exchanged data (**data market**)*
  - *Data Integrity and Reliability (**tamper proof** data, security)*
  - *Widespread interoperability (not **silos of trust**)*
  - *Billions of txn each worthing nano$ (not **centralized trust**)*

- ## A technology fits the needs → (Open) BlockChain
  - BlockChain matches the natural **distributed architecture of IOT**
  - **Data Integrity**: BlockChain is secure «by design»
  - **Smart Contracts** fit the automatic interactions among «things»
  - **Micropayments** and **data exchange** are naturally implemented
  - DAPP **Streamr** : Smart Contracts (Ethereum) manage (IOT) data inflow and outflow. Data stored in a **Distributed File System** (IPFS)

# *Role of Public Administration: 5G + AI + BC*

- **The future services (all !) need 5G + AI + BC**
  - **Driven by** *reliable* **and** *valuable* **user** **data***;*
  - *Managed* **by complex AI algorithms;**
  - *Empowered by 5G* **communication networks**
  - **Relying upon the «trust infrastructure»: the Blockchain**

- *The role of Public Administration*
  - *New rules for infrastructure **«roll-out»** (permits, em pollution)*
  - *Clear and **predictable** spectrum strategy (**«spectrum review»**)*
  - *Strong **demand side policy** (smart roads, e-health, public goods management, process digitalization)*
  - New rules to guarantee an *Equitable acces to 5G networks*, *Network (Cyber) Security* and *Algorithm Accountability*
  - *Funding Basic Research **and Research Projects***
  - *Promote Experiments (Challenges) **on real life (PA?) problems***

# BlockChain: *a Hype or Here to stay? A short story*

- ## The History of Internet:
  - **The dream: A resilient network without a C&C Center**
  - The (once) Big Platforms Attempt ('80-'90) *«We are the secure, fast and efficient network»:*
    - **DNA** *(DECNet Internet 17k Nodes in 1989)*
    - **SNA** *(IBM),* **DSA** *(Honeywell)*
  - TCP/IP *and the* WWW ***made all of them obsolete!***

- ## Here we are again:
  - **The dream: A resilient «Book of transactions». No Central Trust**
    - **Everyone can access, read and write on the Book**
  - The Big Platforms Attempt: *(thousands of)* **Private BlockChains**
    - **Private:** *some can* read, *few* **authorized stakeholders** *can* write
    - Thousands of different and not interoperable *«***castles of trust***»*
    - **Do you trust more your competitors or mathematics?**
  - **Public, Open BlockChain** *will likely make* **all of them obsolete.**