

ThreeFold Technology Overview

At the crossroad of 3 large IT Trends



Edge Cloud is the **hottest trend** in IT infrastructure (cloud).

No-one has our capabilities.

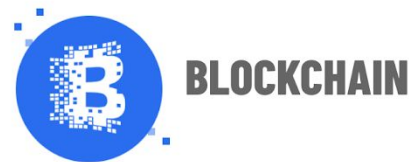
Market opportunity is enormous. Is a "must have" for: self driving cars, internet of things, 5G, AI, etc etc ...



0-People is the world's first 100% self healing IT system.

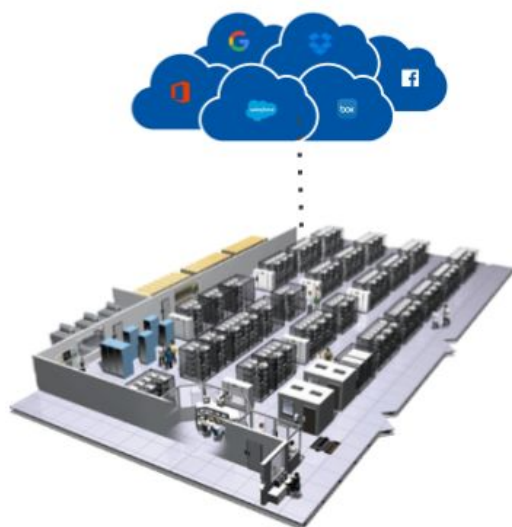
No-one has our capabilities.

People are the biggest cost contributor to IT and we have overcome this challenge with technology



We have solved the **Blockchain Dilemma** ensuring scale, performance & security can co-exist.

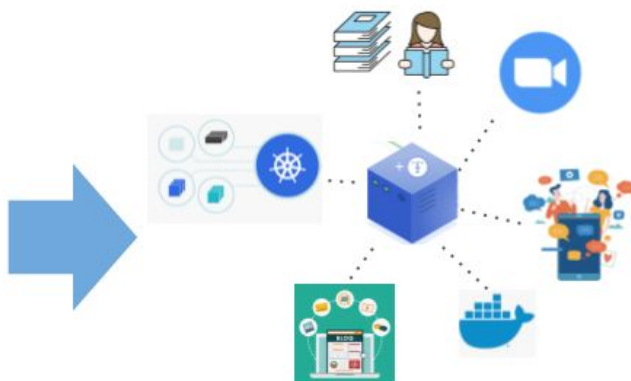
No-one has our capabilities.



business model based on lock-in, complexity & non transparent business practices

UNSUSTAINABLE

our aim 10 % of internet capacity on our grid < 5 years



10x less energy usage
No datacenters needed
available for everyone, everywhere.

SUSTAINABLE

ThreeFold Tech has invented a new paradigm for Information & Communication Technology which is more green, secure, reliable and can operate over millions of nodes without any scalability limitations.

Technology which makes TF Grid possible



Grid of Compute, Storage and Network Capacity, we call this a ThreeFold Grid.

Deployed capacity in private & public context: 18.000 CPU cores + 80.000.000 GB

The ThreeFold Grid was built from a complete review of the current Internet architecture. It simplifies the architecture through its autonomous (self-healing) technology, the first of its kind. It is the largest peer-to-peer grid of Internet (compute, storage and network) capacity in the world. Any application which runs on Linux can run on top of the grid.

Think of the grid as being the foundation of the Internet. It is where hardware and software components work together to provide a user experience. The ThreeFold Grid's capacity is distributed across 21+ countries, accumulating 18.000 CPU cores and more than 80 PB of capacity, it is the largest peer-to-peer grid in the world.

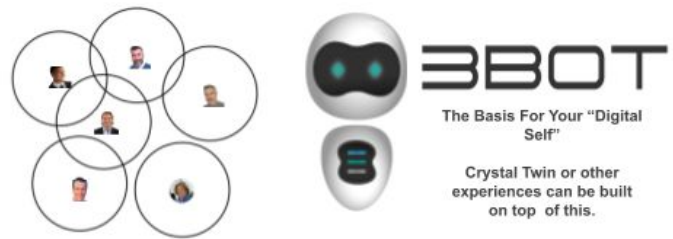
ThreeFold technology has been used to build the TF Grid.

More information see <http://www.threefold.io>

Architecture

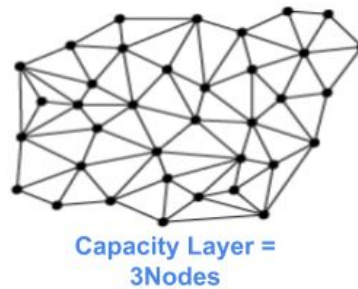
LIVING GRID OF INTELLIGENT 3BOT CELLS

- Any Company or Personal Entity owns a 3bot.
- Owns **all** your data = like DNA
- Communicates (P2P securely)
- Can be your virtual system administrator
- Works on your behalf 24/day 7/7



ULTRA EFFICIENT IT CAPACITY

- Distributed Grid (Private or Public)
- IT Infrastructure
 - Storage
 - Compute
 - Networking
- Source Of Energy
- No Active Intelligence / Reasoning
- Super smart algorithms bring hyper efficiency
- 10x more efficiency can be achieved



The system is build using 2 main components, the 3bots and the 3nodes. The 3nodes are the capacity while the 3bots are the intelligent cells which make everything possible.

INSPIRED BY NATURE

3NODES ARE LIKE OUR BODY, THEY ARE THE HOST
= ENERGY, SPACE

3Nodes deliver the required IT energy for a new conscious internet.
3Nodes are installed everywhere in the world

Each 3Node is a computer delivering
storage, compute & network capacity.

ThreeFold Farmers install & maintain the 3nodes
and earn TFT (digital money) by doing so



3BOTS ARE LIKE CELLS IN OUR BODY

Each 3Bot represents a person or legal entity. The 3bots own the info and knowledge required to let the digital universe function.

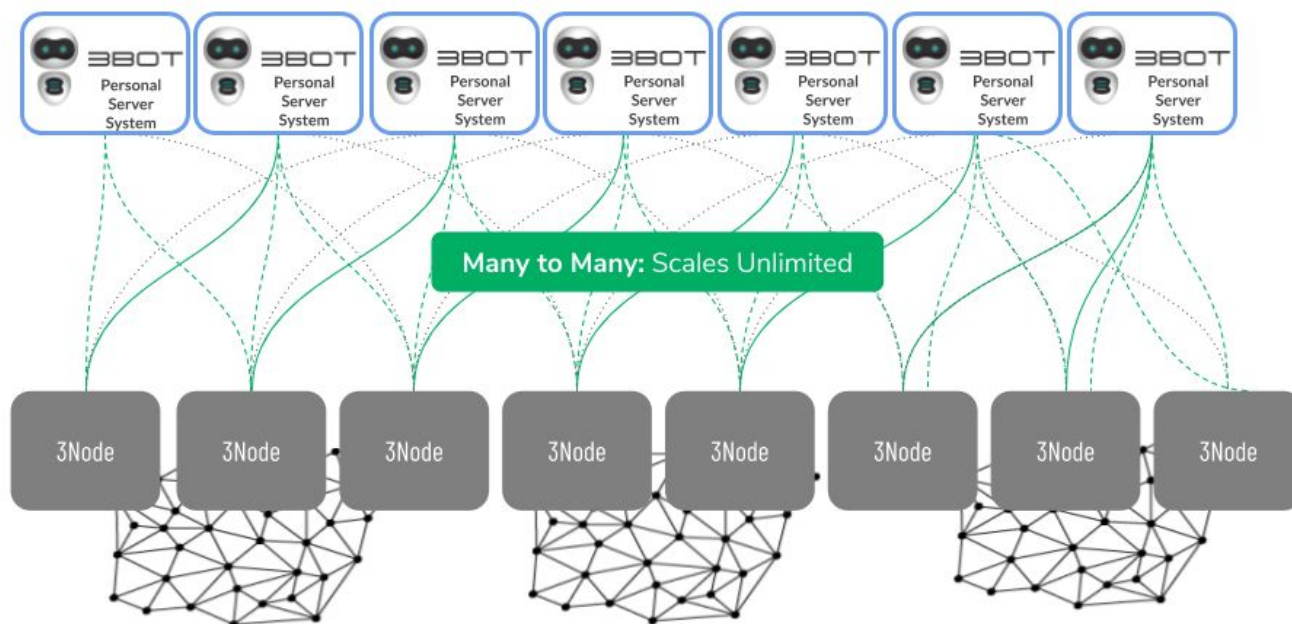


The autonomous 3bots create and maintain the new sustainable decentralized digital world.

The human cells are the smallest part of our body. They need to work together and communicate with each other in order to perform tasks needed to keep the body healthy; the whole ecosystem where the cells live. And just like human cells, 3bot servers need to work together and communicate with each other to create a new sustainable decentralized digital world. And the 3bot servers need the 3nodes to deliver the required energy for the 3bots to function, the same way human cells need blood vessels to deliver nutritions from one cell to another.

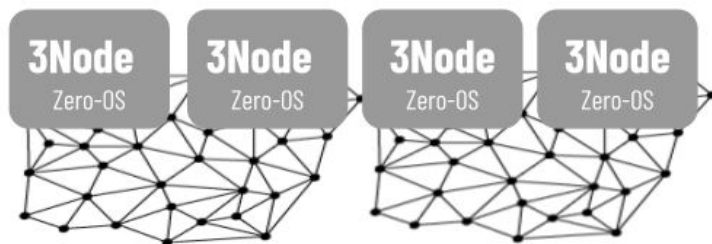


The 3-nodes are plug and play boxes which deliver the IT capacity to the grid. Each 3-node runs our operating system called Zero-OS. Zero-OS has been optimized from a security and efficiency perspective.



In this system the 3Bots, which are the intelligent cells scale independently from the 3nodes, this creates an unlimited, scalable system. The 3Bots use the resources of the 3nodes to bring any required service to life.

Technology Stack



Experience Layer:

H2 2020

Any web technology can be used to create the most amazing applications. The experiences are 100% decentralized and take 10x less time to develop. Any existing web app can be converted in no time. These solutions are not delivered by ThreeFold but by our community. Example of this = **Crystal Twin**

Autonomous Layer (3bots):

Self-Driving/Healing IT technology. 100% peer2peer decentralization. Each user or legal entity has their own "3bot's". 3bot make everything possible on the ThreeFold Grid.

State: Alfa 0.9 May 2020

IT Energy (capacity) Layer (3nodes):

Delivers the required storage/compute capacity for your IT solution. Any application which can run on Linux can run on our Zero-OS'es. Our system provides more decentralization, security and efficiency, Compatible with docker, ... +50x efficiency savings for blockchain related workloads, 10x for storage. Includes the most efficient blockchain database and object storage technology.

State: Beta 2.0.5 May 2020



Capacity Layer

The Capacity Layer is the layer where CPU and Storage resources are delivered. It consists of hardware (storage/compute servers) and the TF Tech operating system called Zero-OS. Zero-OS nodes are installed wherever capacity is required (e.g. at a base station for 5G applications, etc). It delivers 3 primitive functions: storage capacity, compute capacity in the form of highly-optimized containers, and network capacity for running the network services. It is a layer of smart, efficient, and secure algorithms created with as little code as possible.

Autonomous Layer

The autonomous layer is the bridge between end-users and the capacity layer. The autonomous technology is what powers the peer-to-peer possibilities on the ThreeFold Grid. This is possible because of an innovative decentralization technique. Each user or organization (e.g. company or department of the company) gets a digital avatar which we call a 3Bot. All these 3Bots run autonomously in the network created around them. The 3Bots know how to deploy IT and network capacity as required by the user or the company (self-driving) and they can also auto repair issues (self-healing).

Experience Layer

The Experience Layer is the layer where any experience would be developed with much more efficiency, thanks to the self-driving capability of the 3bot servers. The 3Bot API allows any chosen web technology to very easily connect to the 3Bot for all backend services. This enables very easy creation of peer-to-peer experiences (apps) for end-users.

Inspired by Nature

3Nodes deliver the required IT energy for a new conscious internet.

3Nodes are installed everywhere in the world

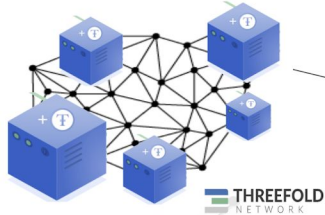
Each 3Node is a computer delivering storage, compute & network capacity.

ThreeFold Farmers install & maintain the 3nodes and earn TFT (digital money) by doing so

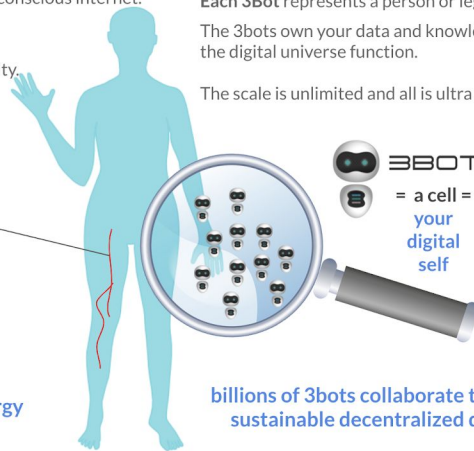
Each 3Bot represents a person or legal entity.

The 3bots own your data and knowledge required to let the digital universe function.

The scale is unlimited and all is ultra secure & private.

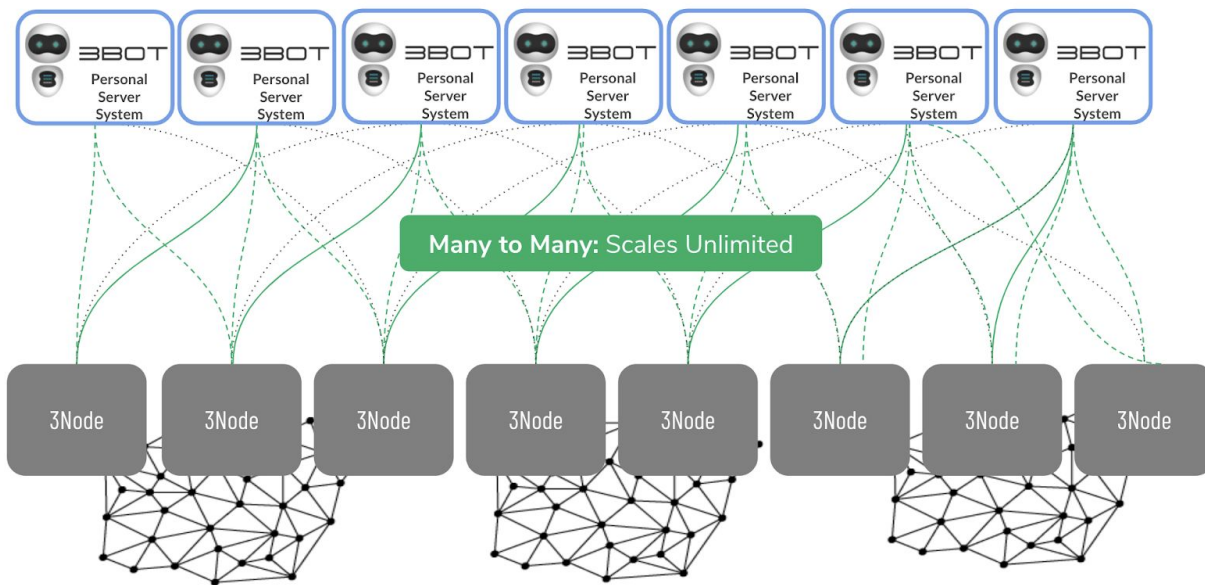


The 3Nodes deliver the required energy for the 3Bots to function.



billions of 3bots collaborate to create a new sustainable decentralized digital world.

Unlimited Scalability.



Software Components

ZERO-OS

OUR OPERATING SYSTEM:
MOST EFFICIENT UTILIZATION OF HARDWARE

Super efficient and scalable operating system that eliminates multiple layers of complexity and delivers compute and storage capacity everywhere, much closer to the source of the hardware. Its lightweight architecture makes it cost and energy efficient.

ZERO-PEOPLE =
AUTONOMOUS IT:
SELF DRIVING/HEALING SOFTWARE

A major efficiency gain comes from removing the human requirement for deploying and operating IT infrastructure and services.

By end 2019 we will be +90% self healing. This has never been achieved in the history of IT Systems.

ZERO-OS
empowers
the 3-Node



ZERO-PEOPLE

Jumpscale
empowers
3bot

ZERO-CHAIN

BCDB
BlockChain
DataBase

ZERO-CHAIN
DECENTRALIZED
BLOCKCHAIN
DEPLOYMENT PLATFORM

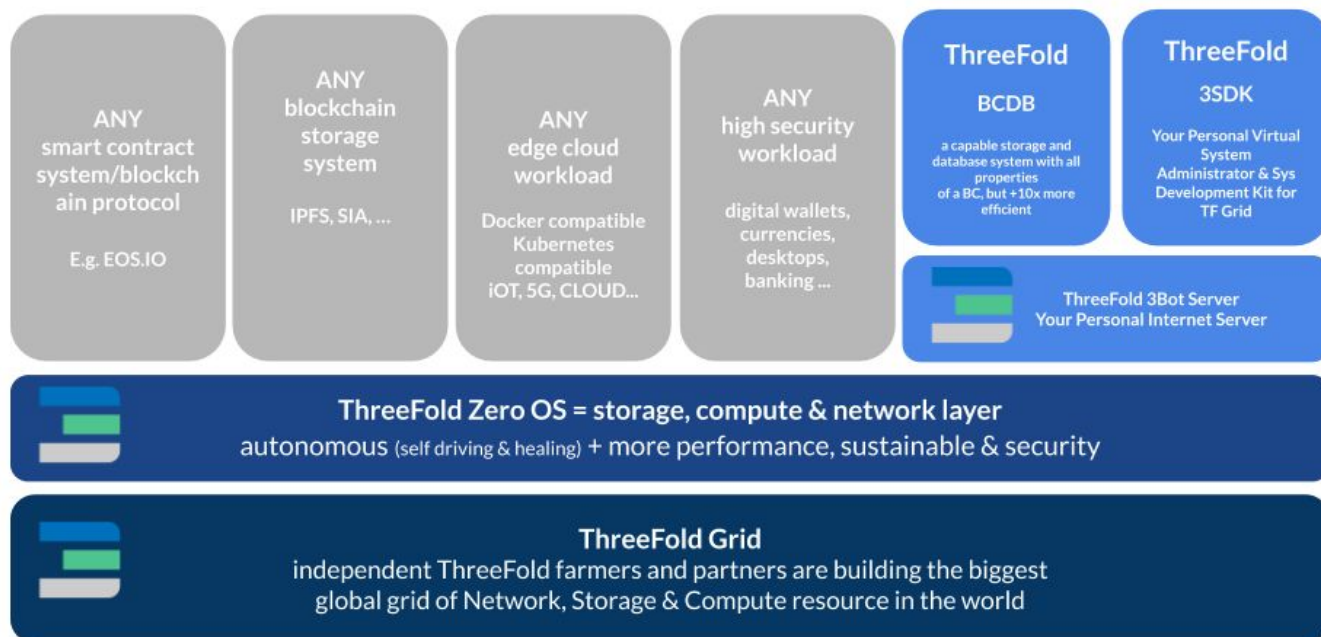
Supercharge any other blockchain technology.

Our blockchain storage backend is 50x more efficient and can be use by any other blockchain technology.

Blockchain Dilemma Problem
Resolved, Scale & Security
Go Hand in Hand

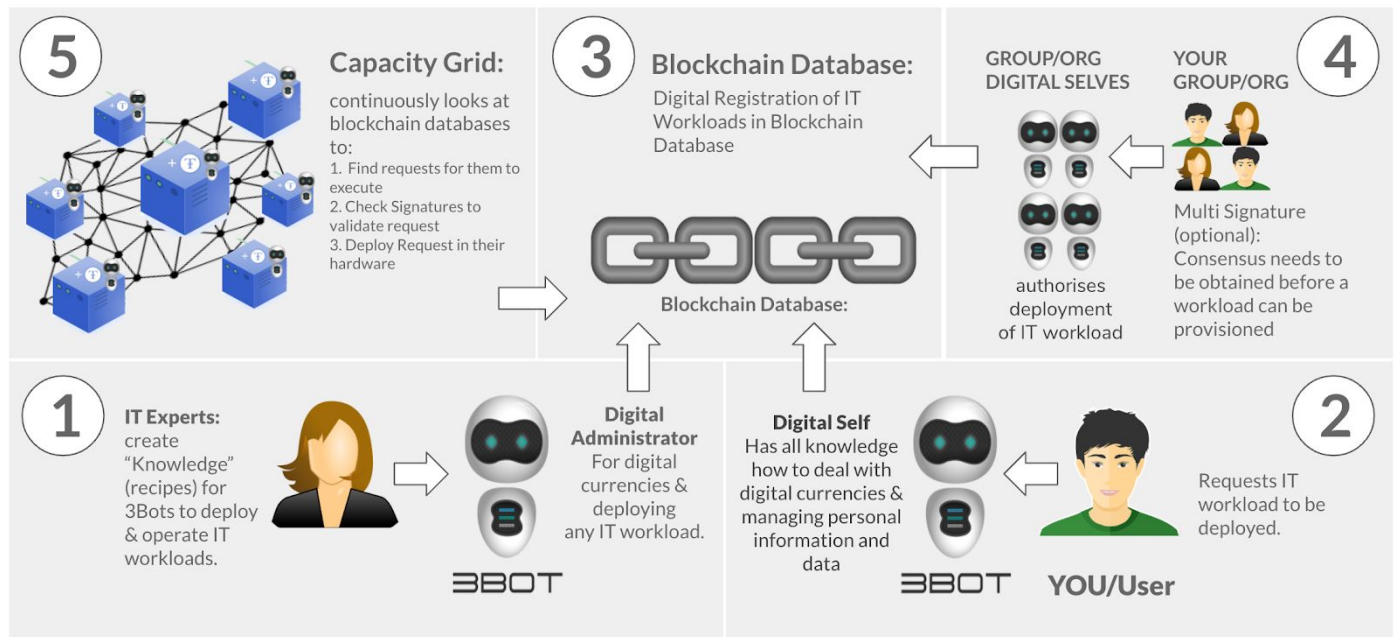
Our architecture is layered and allows everyone to interact with it at the level they require.

+ - any existing IT application can run on top of our grid without modification.



SELF DRIVING IT BY MEANS OF AN “IT” SMART CONTRACT

The workloads get deployed on top of the 3-Nodes by using a smart contract for IT layer which provides security & privacy.



STEP 1: IT Experts: Give knowledge to the 3Bots (it's like god defining our DNA of our cells)

STEP 2: Business IT/Customer: Asks their 3bot to deploy an IT workload following their requirements

- e.g. give me an archive of 1 PB in CH, e.g. deploy a CRM for 100 users, ...
- e.g. deploy my new banking app feature X
- e.g. deploy my artificial intelligence data mining job for ...

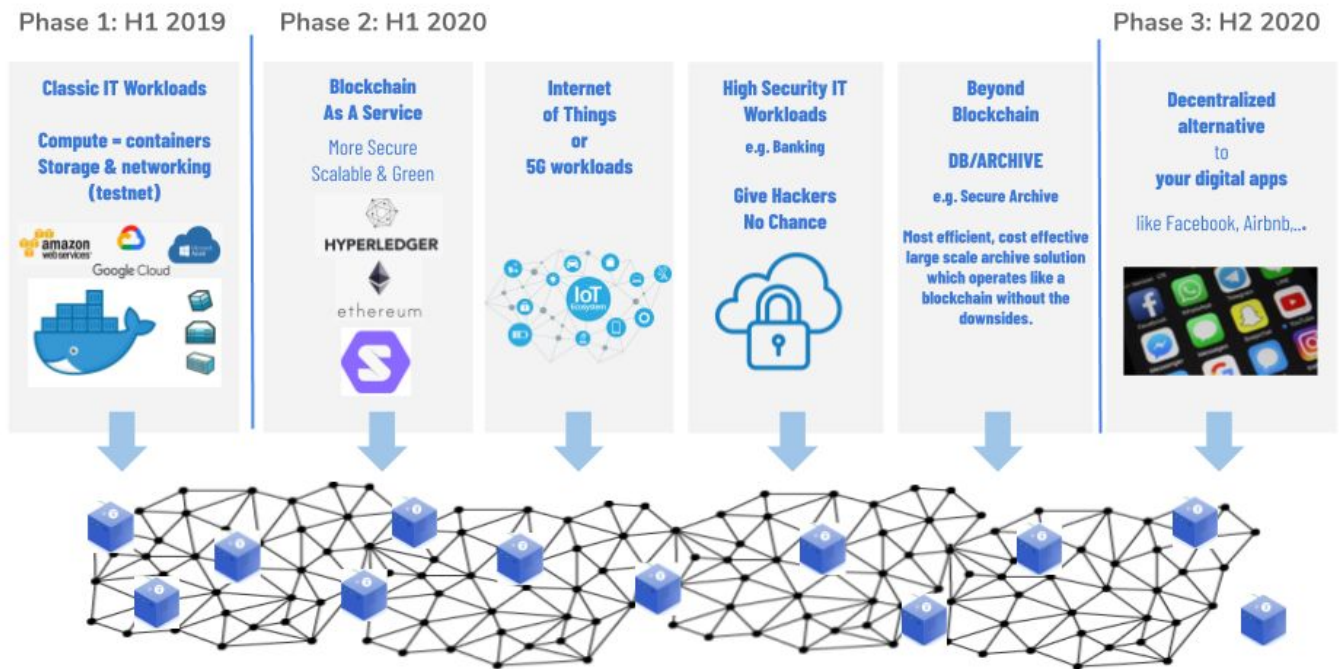
STEP 3: The 3Bot: Creates & Registers the “IT” smart contract in the BCDB (Blockchain Database) (note: this cannot be done by humans, it's too complicated)

STEP 4: Business IT Workload Stakeholders: need to give consensus to check the “IT smart contract” and give their approval e.g. another IT expert checks the quality of the code, a legal guy checks GDPR, a business person checks budget

STEP 5: The 3 Nodes...

thousands of 3 nodes can work together to execute the “IT Smart Contract” (if required) verify if consensus was reached between the business stakeholders verify the validity of the smart contract and download the “IT workload definition” download the right files to execute the smart contract and each file gets verified (signature) run the required processes and again signatures are checked to make sure the workload is pure.

Solution stack

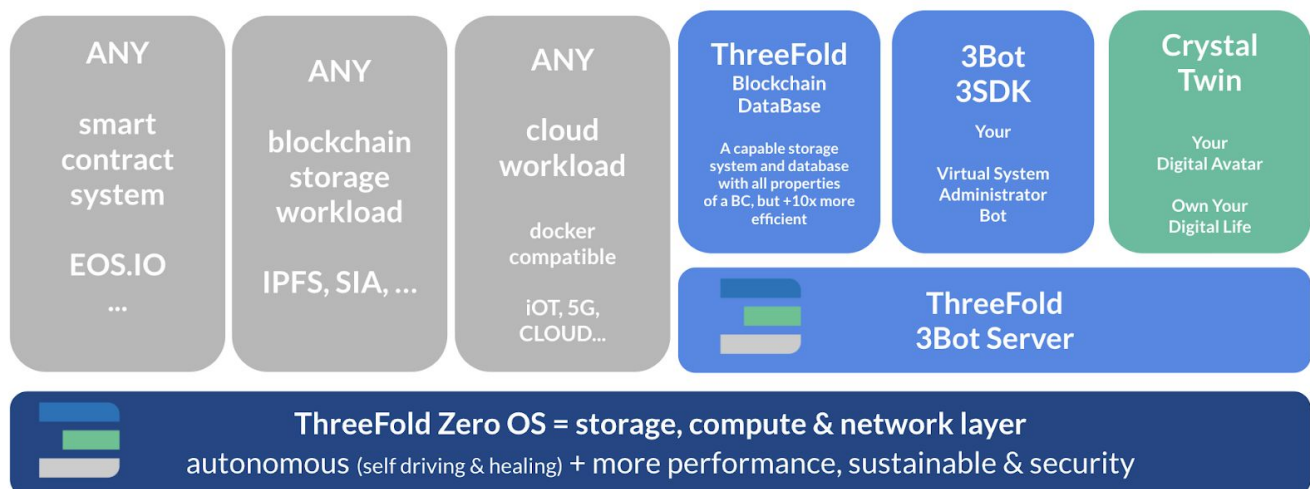


Example of use cases of the TFGrid

THREEFOLD THE MISSING LAYER FOR BLOCKCHAIN AND CLOUD

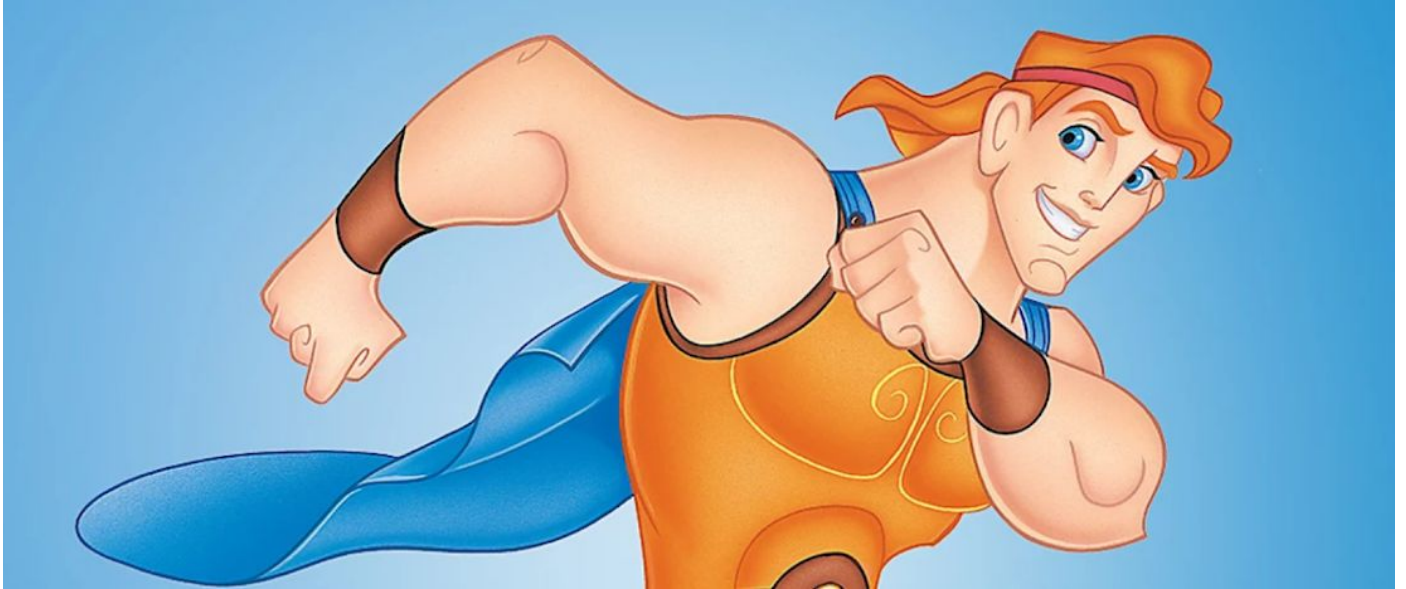
spreadsheet / docs / presentations
filemanager / photos / ...
video conferencing
email / tasks / calendar
knowledge sharing / education system
integrated multi currency wallet
decentralized secure browser engine

community



Crystal twin is an example experience which will be built on to of the 3bot server, many more partners are building their own solutions.

Hercules Product Briefs



Hercules is the productization name of the ThreeFold technology as used in TFGrid.

See https://wiki2.threefold.io/#/hercules_product_sheets