

Introduction to Cloud computing

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#idea Can we use Bitcoin's blockchain to do electronic voting? Would it be secure? Would it be possible to keep the vote secret?

[Tradueix el tuit](#)

11:57 a. m. · 20 d'ag. de 2013 · Twitter Web Client

About me

- Tech Lead @ [Loyal Guru](#)
- Board member @ [Blockchain Catalunya](#)
- Contributor @ [Go & Docker ecosystem](#)
- Speaker @ [speakerdeck.com/dario](#)

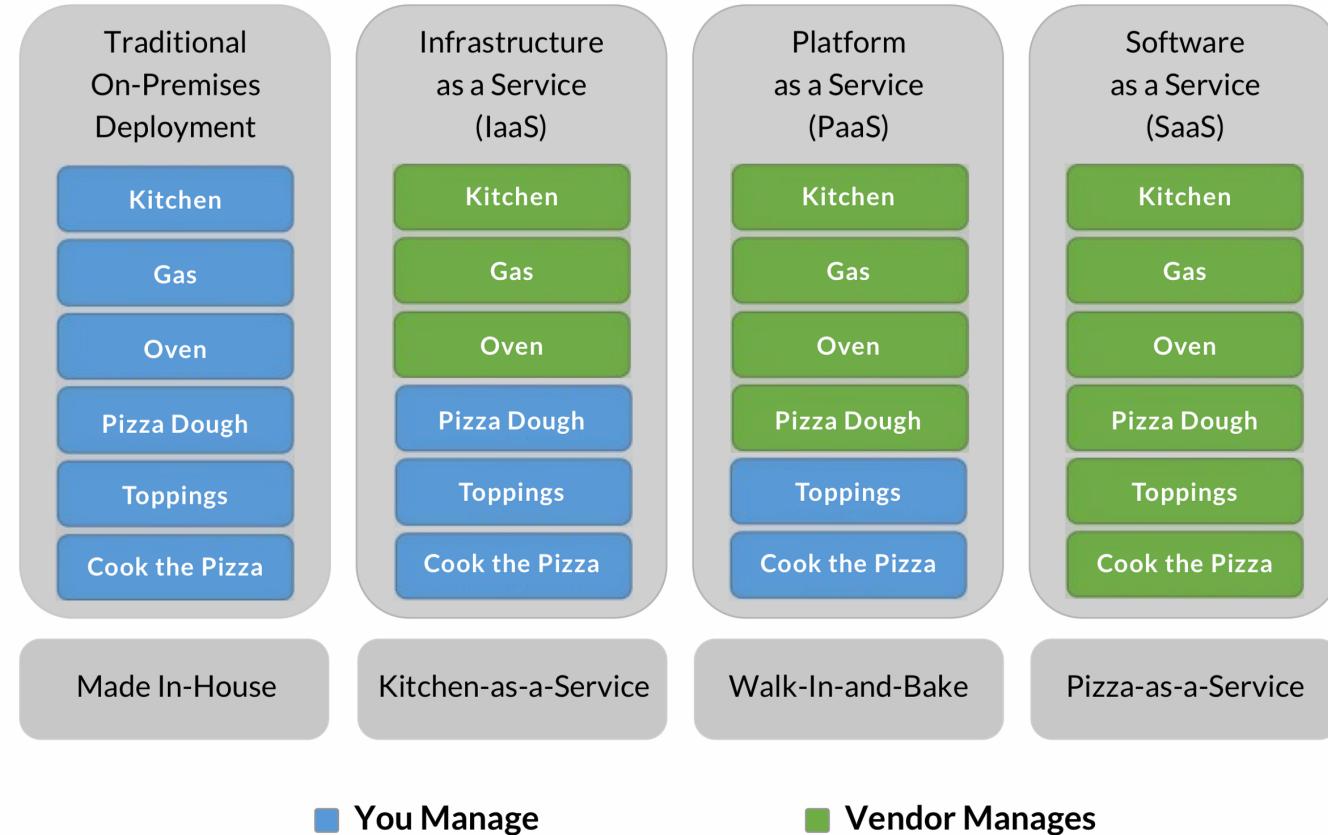
1/3: Cloud

- What
- Where
- Why
- Who

What is the cloud?



New Pizza as a Service



IaaS



Amazon EC2



DigitalOcean



the open cloud company

⋮

⋮

⋮

PaaS



HEROKU



salesforce



Parse Server

⋮

⋮

⋮

BaaS



Firebase



Skygear



Parse Server

⋮

⋮

⋮

SaaS



zendesk



PayPal



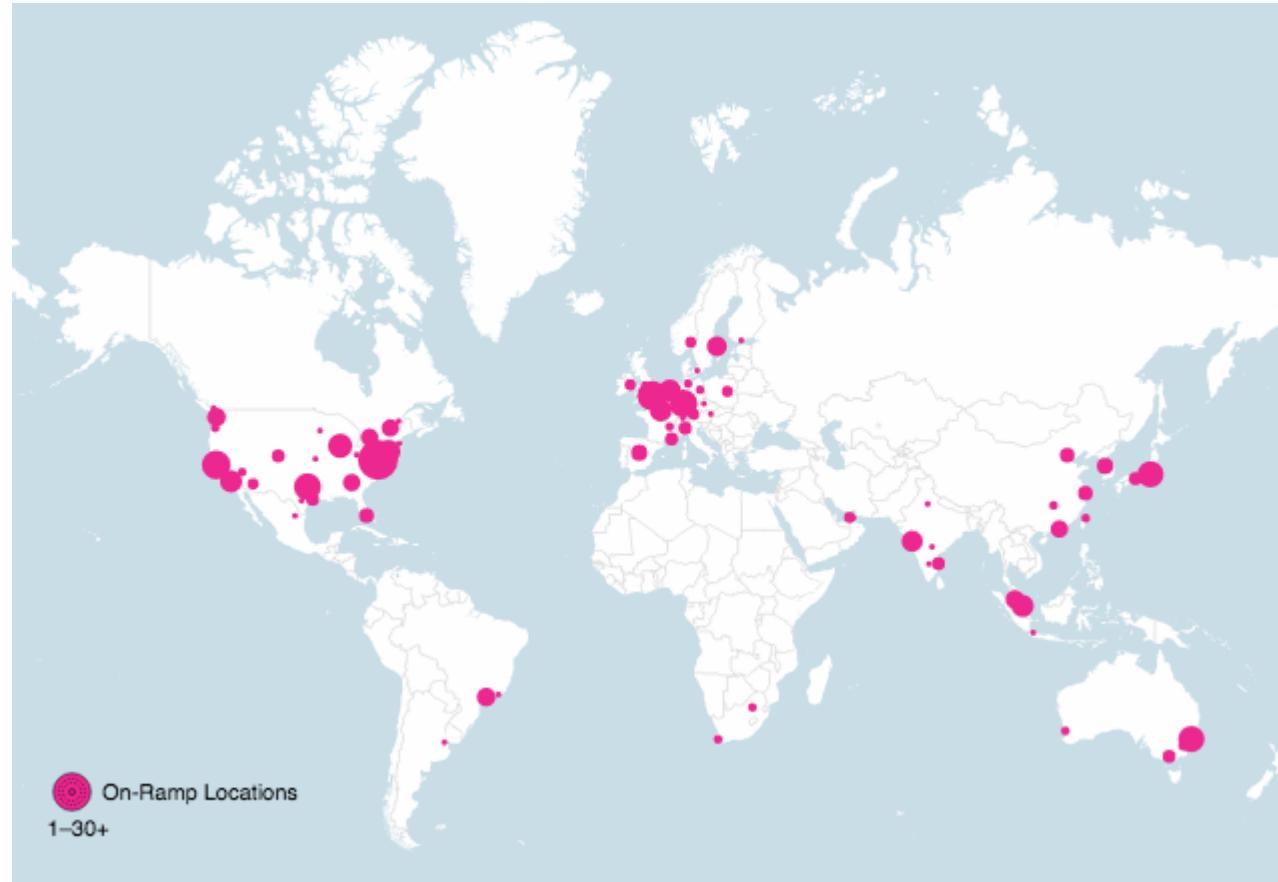
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⋮

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Where is it?



Why use it?

- Cost and deployment time reduction
- Ubiquitous access
- Pay per use, no upfront payments (if you don't want)
- Always up-to-date technology
- (Almost) unlimited storage
- Security
- Fairness

Who is the cloud?

- Amazon Web Services
- Google Cloud Platform
- Microsoft Azure

Figure 1. Magic Quadrant for Cloud Infrastructure as a Service, Worldwide



Google Cloud Platform

[Why Google](#)[Solutions](#)[Products](#)[Pricing](#)[Getting started](#)[Contact sales](#)[Docs](#)[Support](#)

Google Cloud Platform

Grow your business with our secure storage, powerful compute, and integrated data analytics products.

[TRY FREE](#)[SEE PRICING](#)

Featured products

Compute Engine

Scalable, high-performance VMs.

Cloud Storage

Object storage with global edge-caching.

Cloud Run (beta)

Serverless agility for containerized apps.

Cloud SQL

MySQL and PostgreSQL database services.

Anthos

Build and manage modern hybrid applications across environments.

BigQuery

A fully managed, highly scalable data warehouse with built-in ML.

Cloud Vision

Derive insight from images powered by ML.

Security key enforcement

Enforce the use of security keys to help prevent account takeovers.

GOOGLE CLOUD PLATFORM

- Featured products
- AI and machine learning
- API management
- Compute
- Data analytics
- Databases
- Developer tools
- Hybrid and multi-cloud
- Internet of Things (IoT)
- Management tools
- Media
- Migration
- Networking
- Security
- Storage

MORE GOOGLE CLOUD PRODUCTS

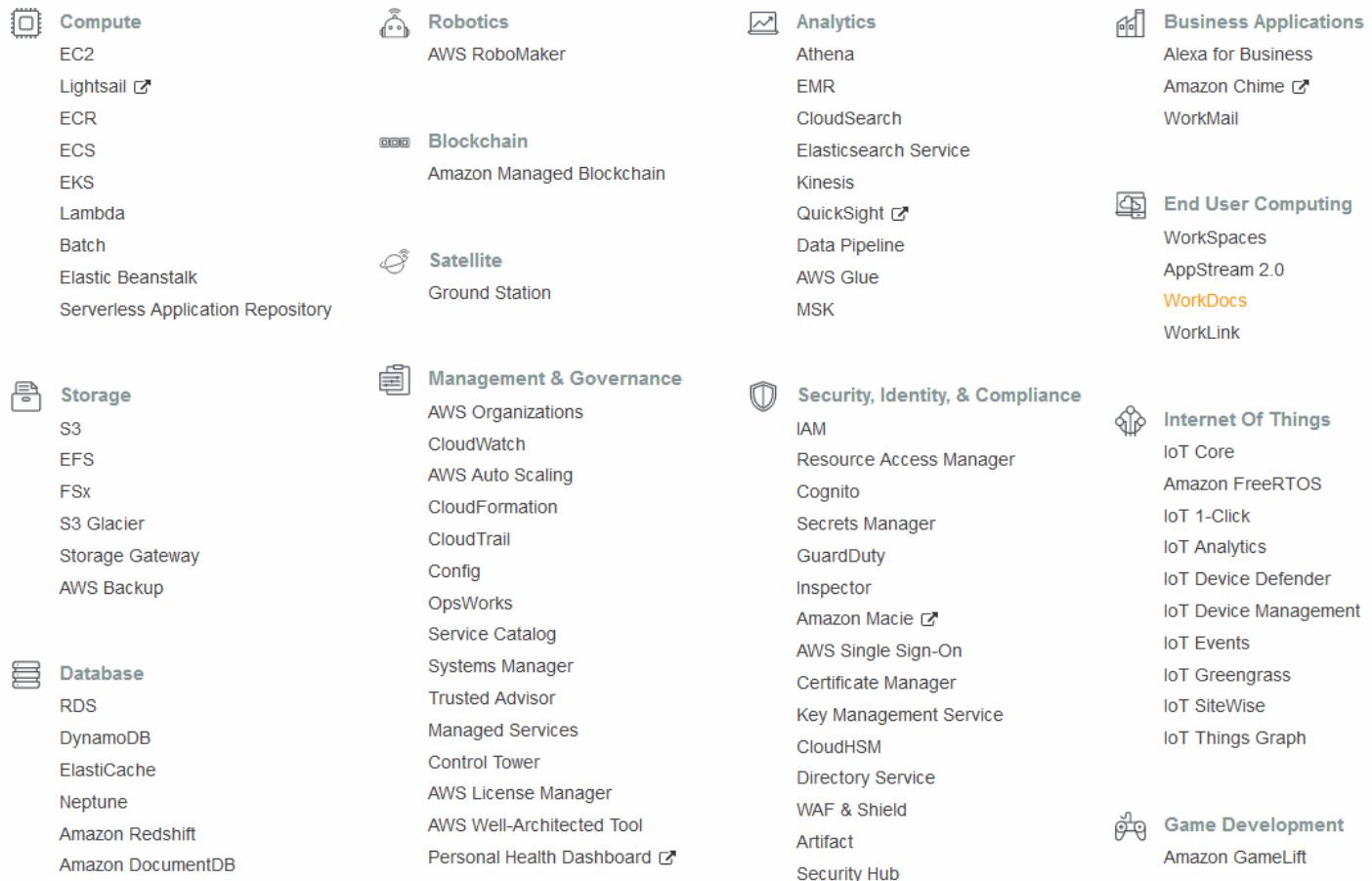
- G Suite
- Google Maps Platform

Microsoft Azure



TECHNOVERT
Approach

Amazon Web Services (AWS) I



Amazon Web Services (AWS) II



Migration & Transfer

AWS Migration Hub
Application Discovery Service
Database Migration Service
Server Migration Service
AWS Transfer for SFTP
Snowball
DataSync



Media Services

Elastic Transcoder
Kinesis Video Streams
MediaConnect
MediaConvert
MediaLive
MediaPackage
MediaStore
MediaTailor



Mobile

AWS Amplify
Mobile Hub
AWS AppSync
Device Farm



AR & VR

Amazon Sumerian



Networking & Content Delivery

VPC
CloudFront
Route 53
API Gateway
Direct Connect
AWS App Mesh
AWS Cloud Map
Global Accelerator ↗



Machine Learning

Amazon SageMaker
Amazon Comprehend
AWS DeepLens
Amazon Lex
Machine Learning
Amazon Polly
Rekognition
Amazon Transcribe
Amazon Translate
Amazon Personalize
Amazon Forecast
Amazon Textract



Application Integration

Step Functions
Amazon MQ
Simple Notification Service
Simple Queue Service
SWF



AWS Cost Management

AWS Cost Explorer
AWS Budgets
AWS Marketplace Subscriptions



Developer Tools

CodeStar
CodeCommit
CodeBuild
CodeDeploy
CodePipeline
Cloud9
X-Ray



Customer Engagement

Amazon Connect
Pinpoint
Simple Email Service

Services categories

- AI + Deep/Machine Learning
- AR & VR / Mixed Reality
- Blockchain
- Business Applications
- Compute
- Database
- Data analytics
- Developer Tools
- End User Computing
- Internet of Things
- Management & Governance / DevOps
- Networking & Content Delivery
- Media Services
- Security, Identity & Compliance
- Storage

AI + Deep/Machine Learning

- **Amazon Comprehend (Medical)**: NLP service to understand text. Useful for extract information from scientific papers.
- **Rekognition + SageMaker**: machine learning services. I.e. to de-identify medical images.

AR & VR / Mixed Reality

- **Amazon Sumerian:** set of tools to develop AR and VR experiencies, like VR medical simulations.

Business Applications

- **Alexa:** voice assistant, like a assistant for emergency communications.
- **Amazon Chime:** communications service, for medical remote assistance, i.e.

And the usual stuff

- **Compute:** resizable servers, serverless applications, etc.
- **Storage:** file and block storage and backup
- **Database:** relational databases, key-value storage, etc.
- **Data analytics:** Business Intelligence, data mining, etc.
- **Management & Governance / DevOps:** monitoring, deployments, automated scaling, etc.
- **Security, Identity & Compliance:** cryptographic key management, user access control, etc.

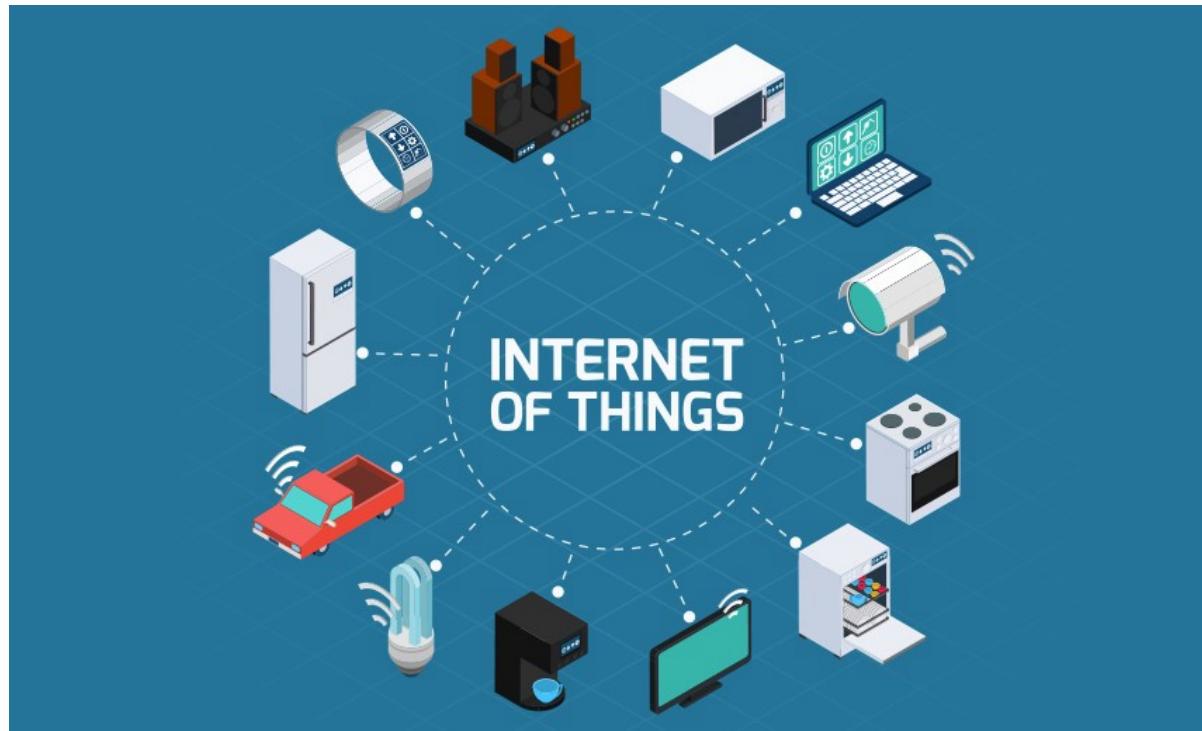
Multi-cloud solutions

- Use your favourite solutions among different providers.
- The sky is the limit!

2/3: Beyond the cloud: IoT and Blockchain

Internet of Things

- Smart objects: connected and autonomous devices



Internet of Medical Things (IoMT)

- Application of the IoT for medical and health related purposes, data collection and analysis for research, and monitoring
- Possibilities:
 - Remote health monitoring
 - Emergency notification systems
 - Smart equipment

Blockchain

What is the blockchain?

- First: (the slowest*) database
- Second: distributed ledger
- Third: chain of blocks

**: there is a reason for this.*

Features (or why is it slow?)

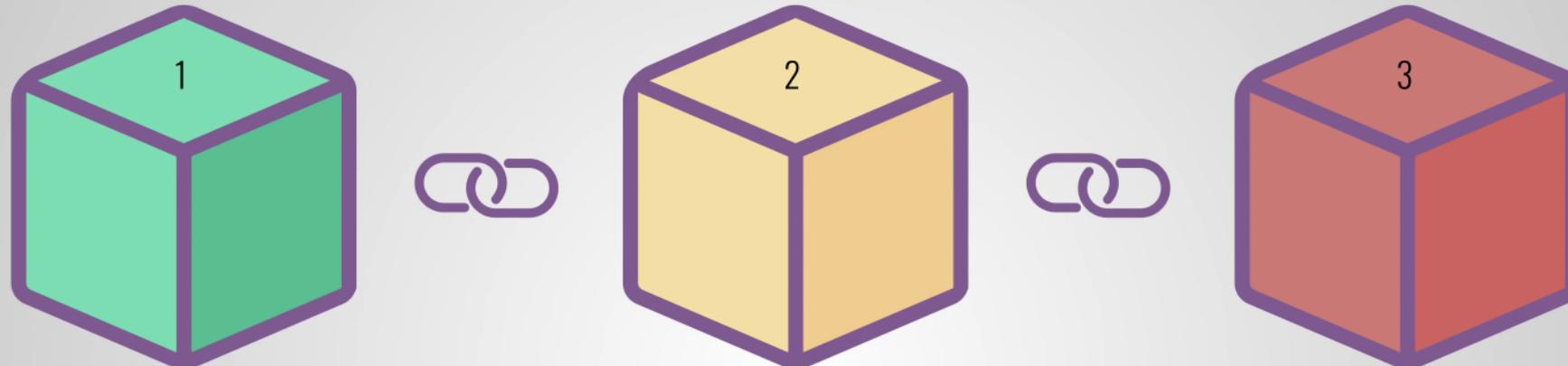
We trade off speed for:

- Decentralization
- Immutability
- Trustlessness

How does it work?

- (Chain of) Blocks:
 - Data: i.e. transactions
 - Hash: Proof of Work (high computational cost)
 - Asymmetric key cryptography: identity (encryption and signatures)
- The result: an emergent consensus





Hash: **1Z8F**
Previous hash: **0000**

Hash: **6BQ1**
Previous hash: **1Z8F**

Hash: **3H4Q**
Previous hash: **6BQ1**

Where is it?

GLOBAL BITCOIN NODES DISTRIBUTION

Reachable nodes as of Wed Apr 15 2020
23:21:21 GMT+0200 (Central European Summer Time).

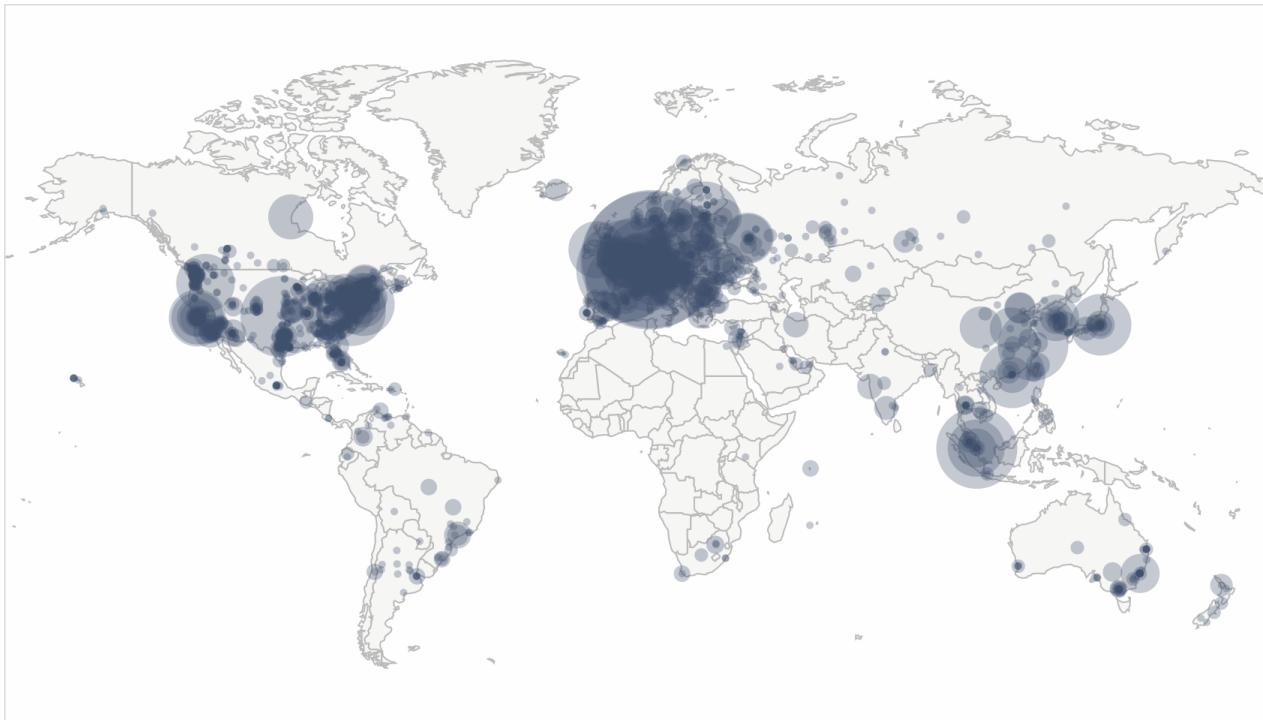
10112 NODES

[24-hour charts »](#)

Top 10 countries with their respective number of reachable nodes are as follow.

RANK	COUNTRY	NODES
1	United States	2024 (20.02%)
2	n/a	1925 (19.04%)
3	Germany	1793 (17.73%)
4	France	579 (5.73%)
5	Netherlands	449 (4.44%)
6	Canada	326 (3.22%)
7	Singapore	274 (2.71%)
8	United Kingdom	258 (2.55%)
9	China	225 (2.23%)
10	Russian Federation	221 (2.19%)

[More \(98\) »](#)



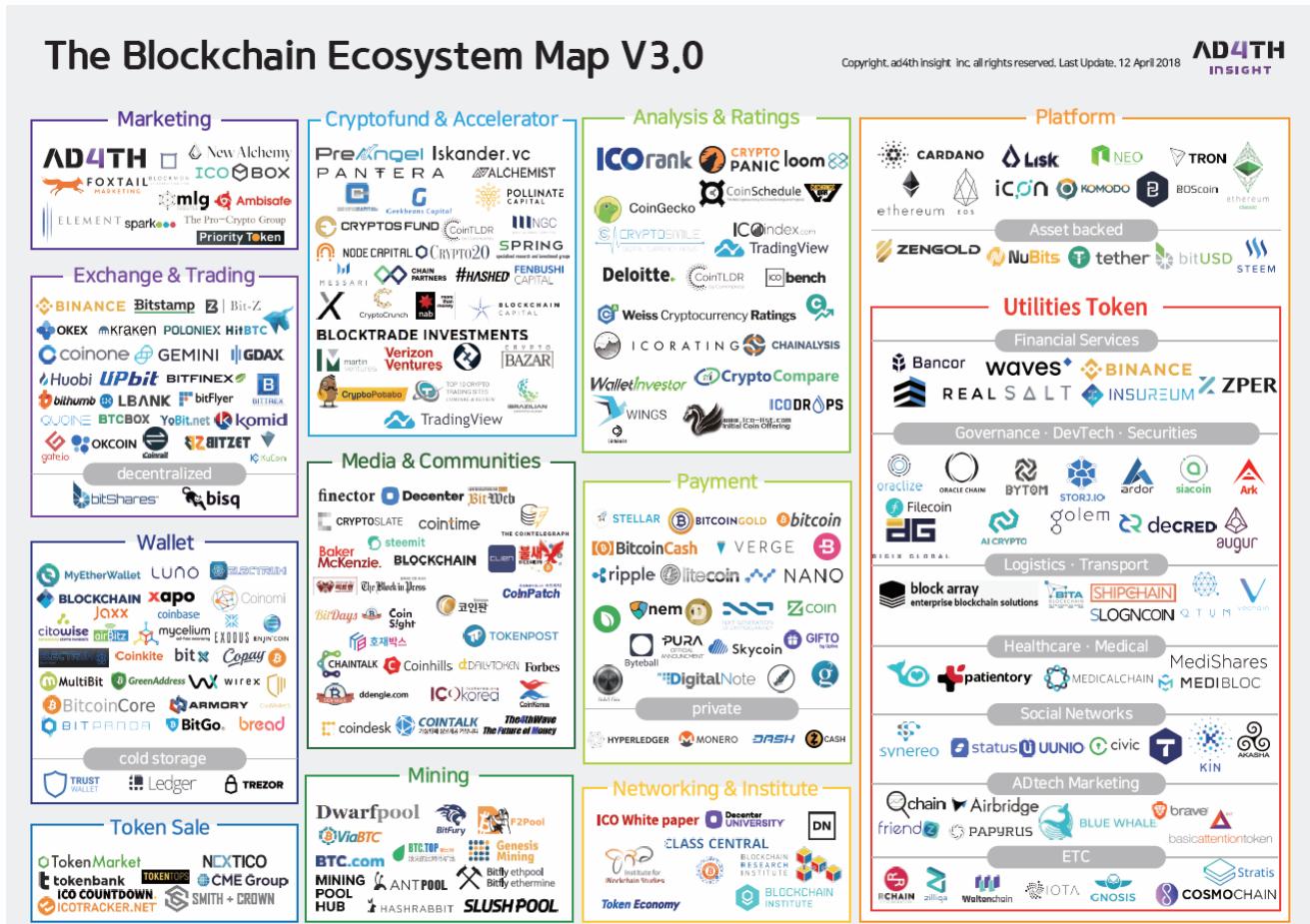
Map shows concentration of reachable Bitcoin nodes found in countries around the world.

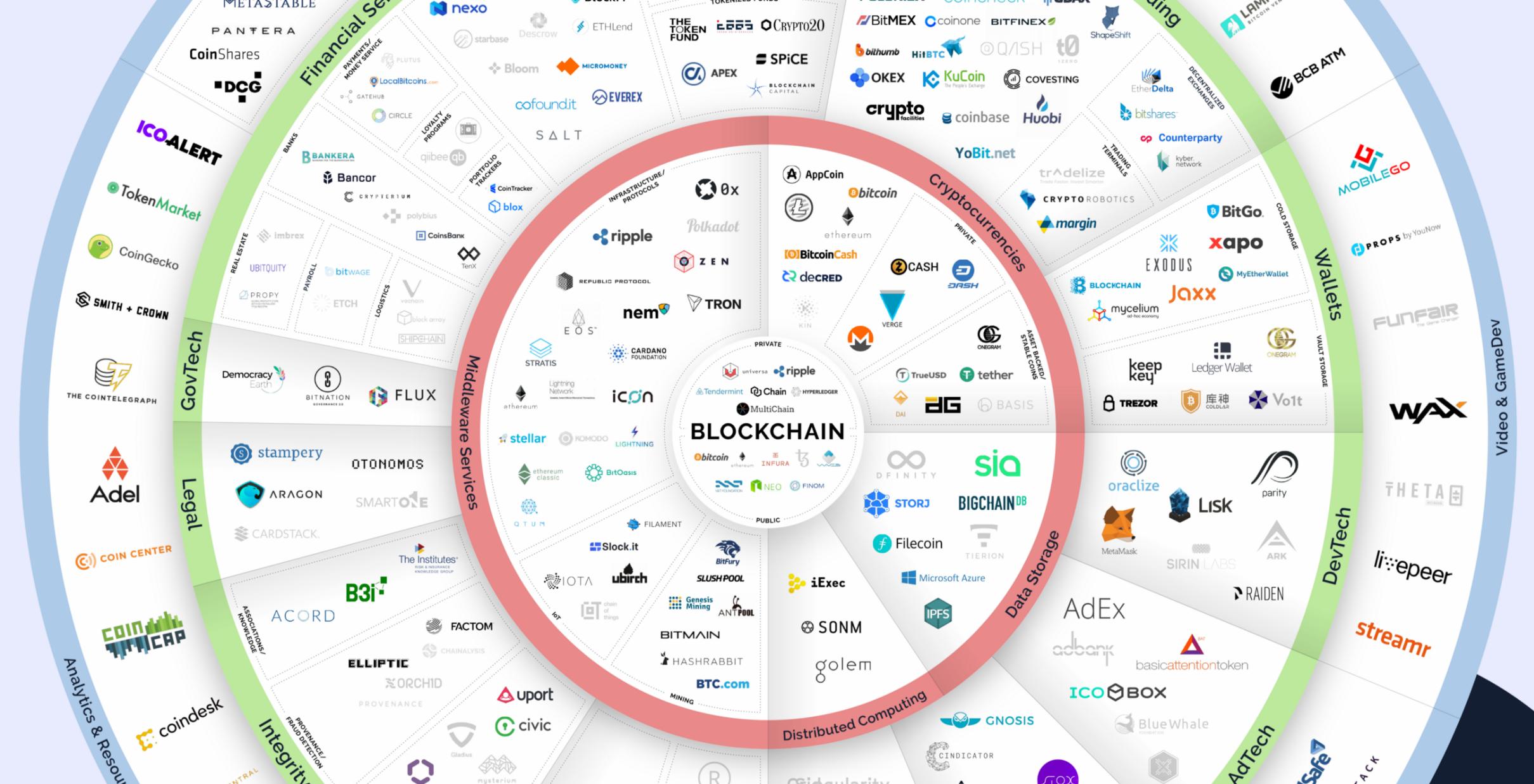
[LIVE MAP](#)

Why use it?

- Traceable
- No trusted third parties
- No central authority
- Cryptographically secure and immutable
- **Remember:** don't store everything in there!

Who is the blockchain?





How can be used it?

- Value transfer: **Bitcoin**
- Notary and smart contracts
- Real Estate (and any physical object): **tokenization**
- Distributed computing and storage
- Digital identity
- Electronic voting
- Healthcare - Medical
- Gambling
- ...

Medical applications

- Temperature-Controlled transport monitoring
- Health records storage and management: **Medibloc**, **Medicalchain** & **Patientory**
- Mutual Aid Marketplace: **MediShares**

Wait... Smart contracts?

- DApps: Distributed apps
- Stored in the blockchain, so they are:
 - Immutable
 - Distributed

I need a blockchain!

- Not so fast...
- Use this: brucemacd.github.io/You-Dont-Need-A-Blockchain/

3/3: Practicum

a: Hello World – Our first smart contract

<https://studio.ethereum.org/>

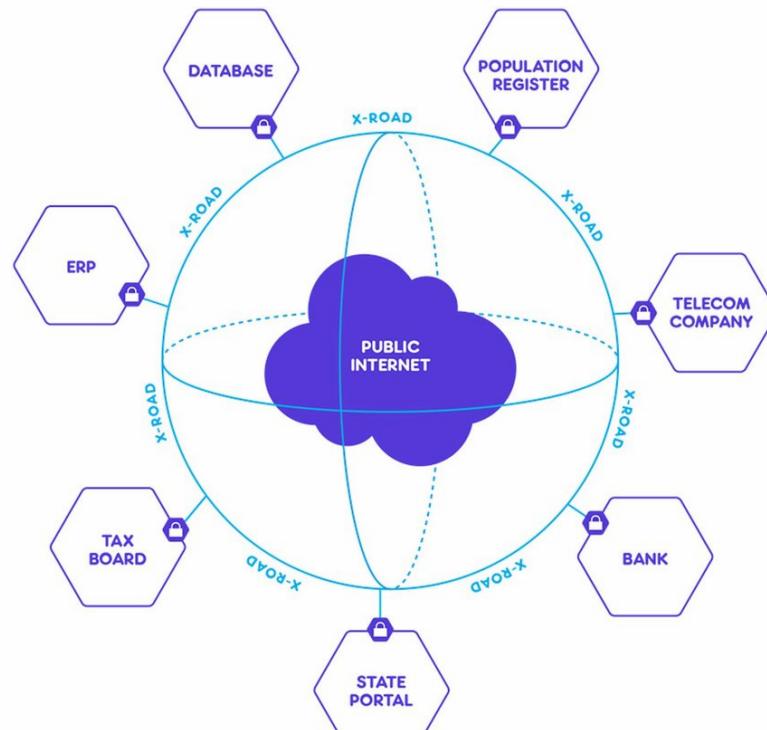
3/3: Practicum

b: CryptoPizza – Unique tokens

<https://studio.ethereum.org/>

3/3: Practicum

c: Our own X-Road - Tying up



Thank you! Q&A time!

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