

Blockchain-X

Blockchain 101

DRAFT VERSION 0.1

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OUTLINE

Blockchain 101

1. What is money / banks / bitcoin
2. **Bitcoin: A comprehensive overview**
3. Blockchains, cryptography, hash functions
4. Ethereum / Smart Contracts / Dapps
5. Use cases





**First:
QUESTIONS TIME!**

What is Money?

In order to understand Bitcoin you have to understand money



This is Money!

In order to understand Bitcoin you have to understand money

Medium of Exchange

Money exists to facilitate the exchange of *value*.



Requires Trust

All parties must trust that the medium of exchange will carry its value.

Scales the Economy

Scales the economy as transactions can be done at greater speeds. You can also split up value into smaller parts (instead of bartering).

Store of Value

Money can be accumulated to store value over time. Note this also requires **trust** that the value is sustained.

What is a Bank?

In order to understand Bitcoin you have to understand banks



This is a Bank!

In order to understand Bitcoin you have to understand banks

Centralized **Trust Agency**

Regulated by governments. Many people put their trust in them.

Manages **private ledgers**

Banks make sure that your account information is up to date and that it can be audited. Only the banks are able to verify the authenticity of account balances etc.



Identity Management

Links a person to accounts, if the person can show who they are and the bank accepts them as customers.

Offers paid **services**

Banks can offer you loans, investing opportunities, credit cards, mobile apps for transferring and receiving money etc.

History of Money



LET'S START at the beginning!



History of Money



Metal coins, Lydia, ~500BC

Used by Merchant's in Lydia, today's Turkey.
Adopted by Greece, Roman Empire etc.

Banks, Italy, 15th Century

Medici family. Double entry ledgers. Track deposits and withdrawals. Inspired Central Banks.

Fiat Money, Global, Post WW1

Means to increase money supply. Fiat money has value only because of the guarantee of the issuing authority /government.

Prehistory, Year < 10k BC

Oldest technology? First abstraction layer on bartering: Shells, barely, feathers.

Notes, China, 1200 AD

Notes and the first fiat-like money system introduced in China.

Gold Standard, England, 1821

Bank of England promises to redeem notes for gold. Brought stability to prices.

Credit Cards, USA, 1950

Diners Club Card, first CC to be introduced



2008: Enter Bitcoin

The Genesis (PoC) Application of Blockchains
Network money! Currency as an application!

History of Bitcoin



10k BTC for a Pizza, **2010**

First real-world transaction: 2 pizzas in Jacksonville, Florida for 10,000 BTC.

87% crash in price, **Nov 2013**

The bitcoin price falls 87% from one day to another. Largest crash in the currency's history

Bitcoin becomes mainstream, **2017**

ICOs, blockchain technology, and the price of bitcoin are ever present in the news. The hype takes the price to \$20k / BTC

Bitcoin Whitepaper, **2008**

Satoshi Nakamoto releases Bitcoin in the wake of the financial crisis.

First Altcoins, **2011**

Namecoin and Litecoin are among the first to fork Bitcoin and create currencies with specific improvements.

Mt Gox hack, **2014**

6% of all bitcoin ever created stolen from the largest exchange. \$500Mn.

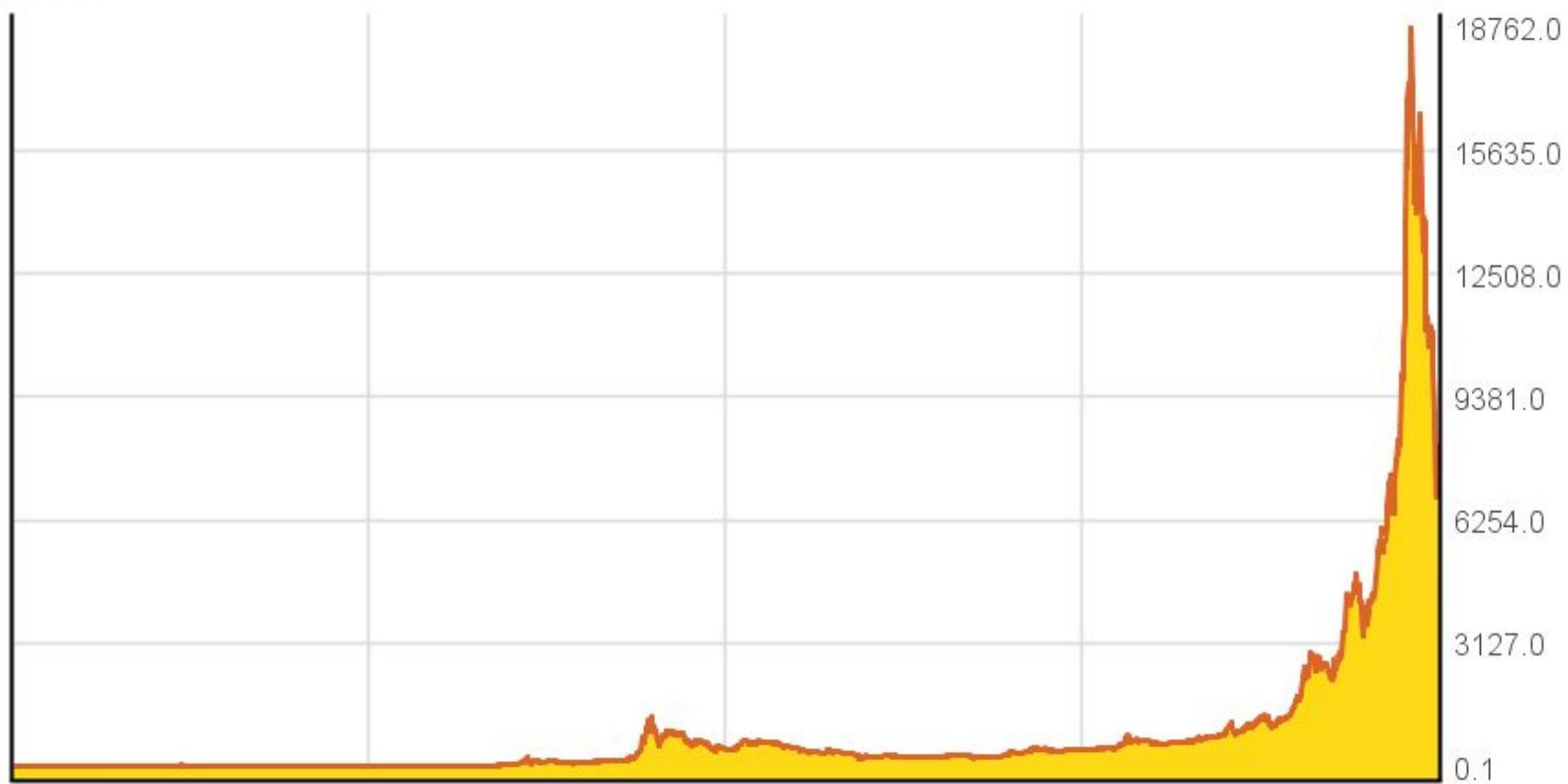
FUTURE **2025**

History of Bitcoin

Blockchain-X
Fred-Ojala

■ BTCUSD

● Price 2013-04-11 124.9



2010 Jul 2011 Sep 2012 Jun Sep 2013 Jun Oct 2014 Jun Oct 2015 Jun Oct 2016 Jun Oct 2017 Jun Oct 2018

FUTURE 2025

What is Bitcoin?!

Decentralized Trust System

Regulated by a community, where anyone can join and contribute to the system. Trust in the protocols powering the system decided by the community.

Trustless system with public ledger

Make sure that your account information is up to date and that it can be audited from any source. Anyone can join this system.



Pseudo-anonymous Identities

Anyone can join the network by generating a key that will be used to create and address for a pseudo-anonymous account. The protocol keeps track of owners.

Transfer Money P2P

Transactions are carried out between users without any central authority that validates them, person-to-person, without intermediaries. No trusted third party required for transfer of funds.

bitcoin / Bitcoin?!

- ***bitcoin*** is the currency
(digital money)
- ***Bitcoin*** is the technology / protocol
(almost like the infrastructure for a decentralized bank)

Bitcoin: Digesting the first wiki paragraph!

Wiki: *Bitcoin is a cryptocurrency and worldwide payment system. It is the first decentralized digital currency, as the system works without a central bank or single administrator. The network is peer-to-peer and transactions take place between users directly, without an intermediary. These transactions are verified by network nodes through the use of cryptography and are recorded in a public distributed ledger called a blockchain. Bitcoin was invented by an unknown person or group of people under the pseudonym Satoshi Nakamoto and released as open-source software in 2009. Bitcoins are created as a reward for a process known as mining.*

Bitcoin: Overview

User-perspective:

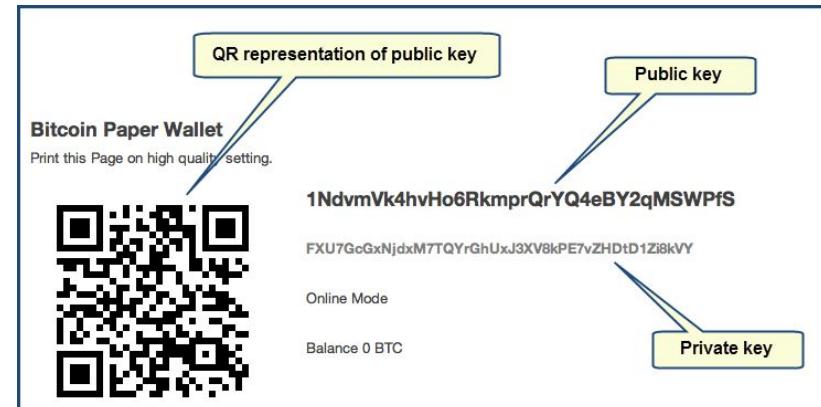
1. Enables **simple transactions** with a trusted digital currency.
2. Every user creates a **wallet** (**public / private key chain**) to send and receive transactions.
Use private key to sign transactions, use public key to encrypt message. Public key can decrypt, and verify it was you.

Bitcoin Transaction Example

txid 90b18aa54288ec610d83ff1abe90f10d8ca87fb6411a72b2e56a169fdc9b0219

```
{  
  "hash": "90b18aa54288ec610d83ff1abe90f10d8ca87fb6411a72b2e56a169fdc9b0219",  
  "ver": 1,  
  "vin_sz": 1,  
  "vout_sz": 2,  
  "lock_time": 0,  
  "size": 226,  
  "in": [  
    {  
      "prev_out": {  
        "hash": "18798f8795ded46c3086f48d5bdabe10e1755524b43912320b81ef547b2f939a",  
        "n": 0  
      },  
      "scriptSig": "3045022100c1efcad5cdcc0dcf7c2a79d9e1566523af9c7229c78ef71ee8b6300ab...[snip]"  
    }  
  ],  
  "out": [  
    {  
      "value": "5.93100000",  
      "scriptPubKey": "OP_DUP OP_HASH160 4b358739fc7984b8101278988beba0cc00867adc OP_EQUALVERIFY OP_CHECKSIG"  
    },  
    {  
      "value": "1678.06900000",  
      "scriptPubKey": "OP_DUP OP_HASH160 55368b388ccfe22a3f837c9eee93d053460db339 OP_EQUALVERIFY OP_CHECKSIG"  
    }  
  ]  
}
```

tx format version - currently at version 1
in-counter - number of input amounts
out-counter - number of output amounts
tx lock_time - should be 0 or in the past for the tx to be valid and included in a block
size - of the transaction in bytes



Private / Public Keys



Bitcoin identity: Each entity is represented by a unique private - public key pair

- ◊ **Private Key:** Secret. Think of it as a password. You need to keep it safe. If you lose it, it is lost, there is no recovery option. Generated from random processes. Used to sign transactions and prove ownership.
- ◊ **Public Key:** External. Think of it as a user name. Generated from the Private key. Elliptic curve cryptography, one way function. Deterministic. Same private key will generate same public key. Your public address for receiving bitcoin.

Is the Private key safe?

Can someone else guess your private key or could randomness generate an exact copy of someone else's private key? (Or collision two inputs giving same outputs?)

- ◊ The total address space is 160 bits:

$$2^{160} = 1,461,501,637,330,902,918,203,684,832,716,283,019,655,932,542,976$$

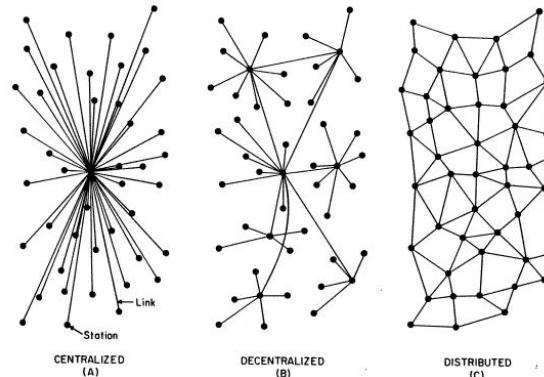
- ◊ There are only 2^{63} grains of sand on Earth.
- ◊ The total pool of Bitcoin addresses in use is so minuscule compared to the total addresses possible.



Bitcoin: Overview

System perspective:

- Anyone can join and maintain the system / ledger (**trustless**).
- Every node keeps copy of the ledger and updates it with valid, signed transactions according to **consensus** rules.
- Ledgers exist all over the world (**distributed database**), users connect to them (decentralized). No single company or government can control it.



Bitcoin: How can we trust the ledger?

Build trust:

1. Traffic delays and fraud attempts -> **Different recent entries**. Every node needs to cast a **vote** on a valid block.
2. To prevent **Sybil attack** (creation of many identities), need to **spend / stake resources to validate ledger entries**. An attacker must outspend the majority.
3. Need to **solve cryptographic puzzle** to confirm a new entry / block in the ledger.
4. Each **puzzle builds on previous answers**, and the winner is not only the most recent solutions, but the blockchain with the most solutions linked together. **The longest chain is the most valid one** (more nodes are working on it).
5. *Repeat*

Bitcoin: Incentivize

Why do peers wanna join and set up mining rigs?

1. **Monetary incentive:** Every time the puzzle is solved a small reward is added to the solver's balance. Plus transaction fees.
2. Nodes are called **miners because they are rewarded money**, but their main task is to maintain the ledgers.
3. Convenient way to distribute money.

Deflationary. After 2140 no new bitcoin.



Source: <https://www.cnbc.com/2018/01/12/what-it-looks-like-inside-an-actual-bitcoin-mining-operation.html>

Bitcoin: Intro

Summary:

1. Bitcoin is a **collaborative ledger**.
2. People spend money by sending **signed messages** to nodes describing where and how much money should move. Nodes make sure that they are true by checking signature.
3. **Math based voting process to ensure legitimate transactions.**

Key benefits, bitcoin provides:

4. **Identity:** Share public key to transfer bitcoin and use private key to redeem.
5. **Transactions:** UTXO, balance of all unspent transactions
6. **Record keeping:** Each entity keeps a copy of the blockchain
7. **Consensus:** Peers can cast expensive votes via Proof-of-Work



User owned and managed

Bitcoin: Intro

Fulfils characteristics of a currency

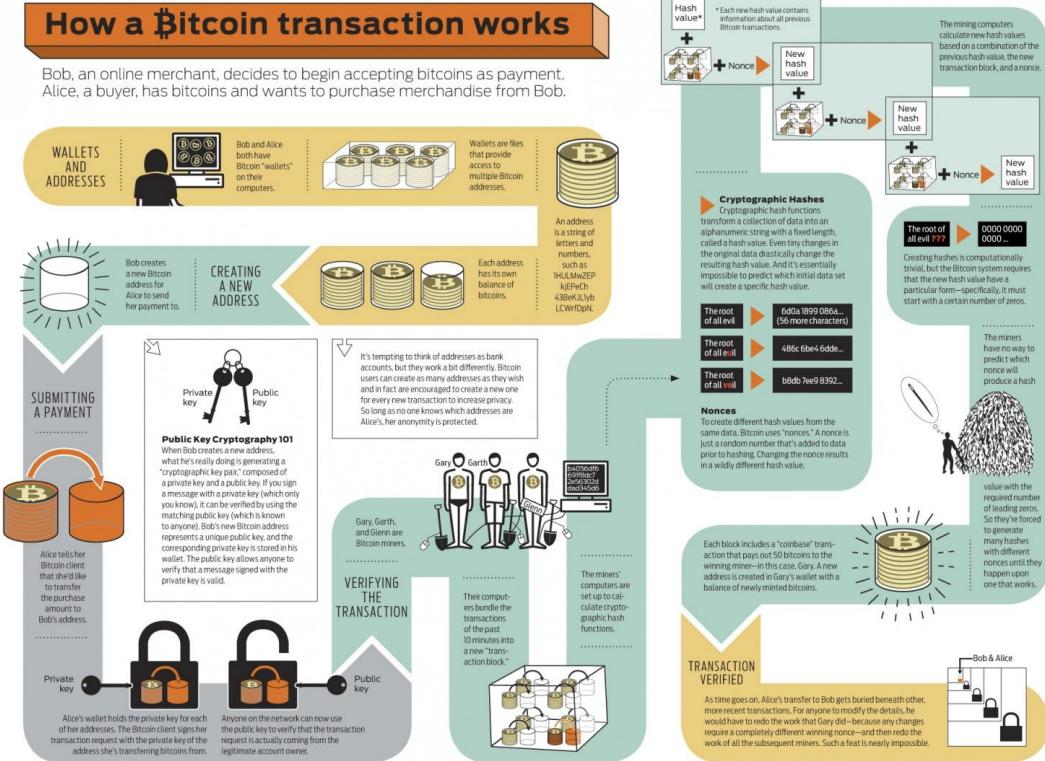
1. **Scarcity:** Finite units. Deflationary BTC. 21Mn in total. Mining reward halved every X years.
2. **Fungibility:** Interchangeable for identical units. Swap accounts should be OK.
3. **Divisibility:** Subunits for ease and precision of payments. 1 satoshi is 10^{-8} BTC
4. **Durability:** Long-lasting units. Bitcoin cannot be destroyed physically.
5. **Transferability:** Liquidity, for ease of transacting. Bitcoin is a global infrastructure.
6. **Legitimacy:** We can trust the Bitcoin protocol, it has not been hacked for years



We pay thousand of dollars for hashes on a ledger. Network money!

User owned and managed

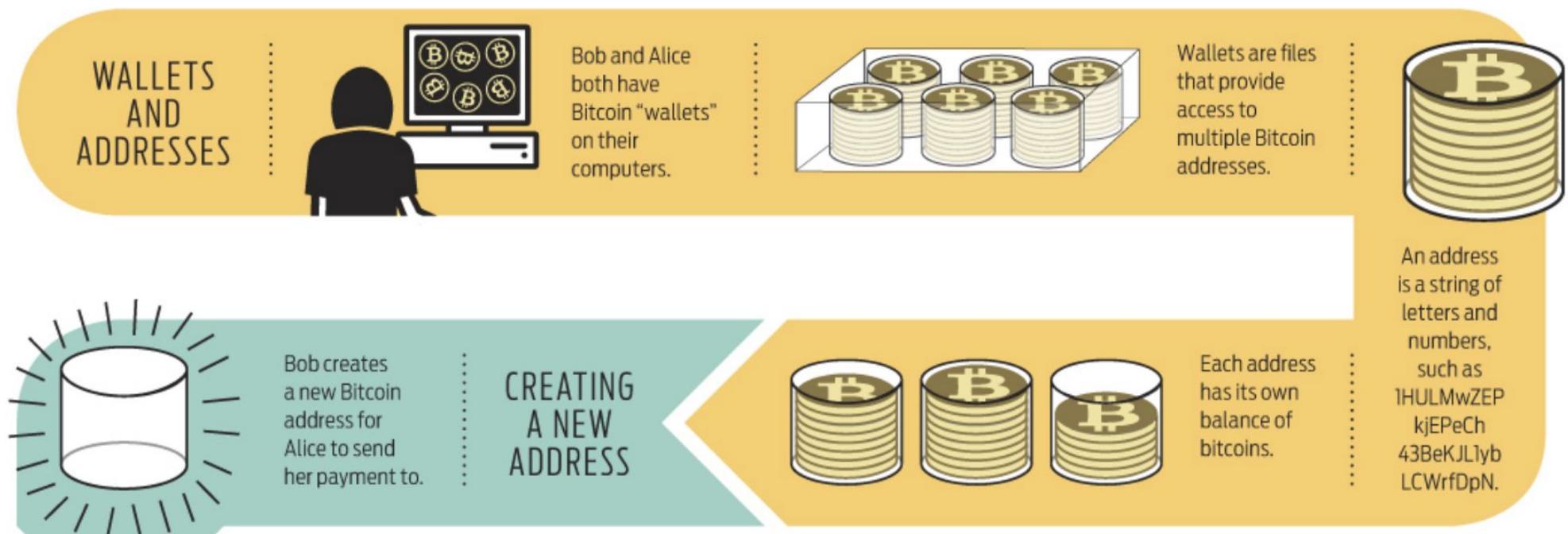
Bitcoin: System Overview



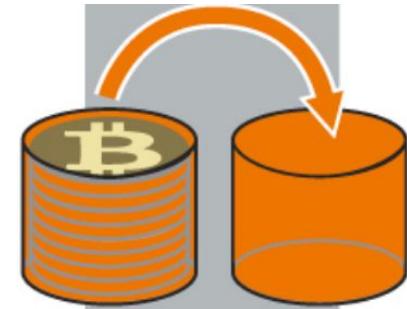
Source: IEEE Spectrum

Bitcoin: System Overview (1/4)

Bob, an online merchant, decides to begin accepting bitcoins as payment. Alice, a buyer, has bitcoins and wants to purchase merchandise from Bob.



Bitcoin: System Overview (2/4)



Alice tells her Bitcoin client that she'd like to transfer the purchase amount to Bob's address.

Submitting Payment



Alice's wallet holds the private key for each of her addresses. The Bitcoin client signs her transaction request with the private key of the address she's transferring bitcoins from.

Anyone on the network can now use the public key to verify that the transaction request is actually coming from the legitimate account owner.

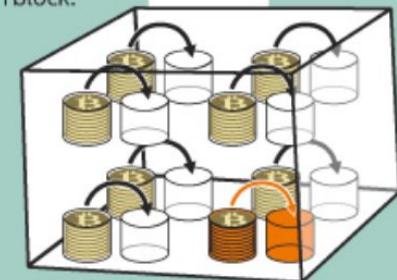
VERIFYING THE TRANSACTION

Gary, Garth, and Glenn are Bitcoin miners.



b4056df6
691f8dc7
2e56302d
dad345d6

Their computers bundle the transactions of the past 10 minutes into a new "transaction block."



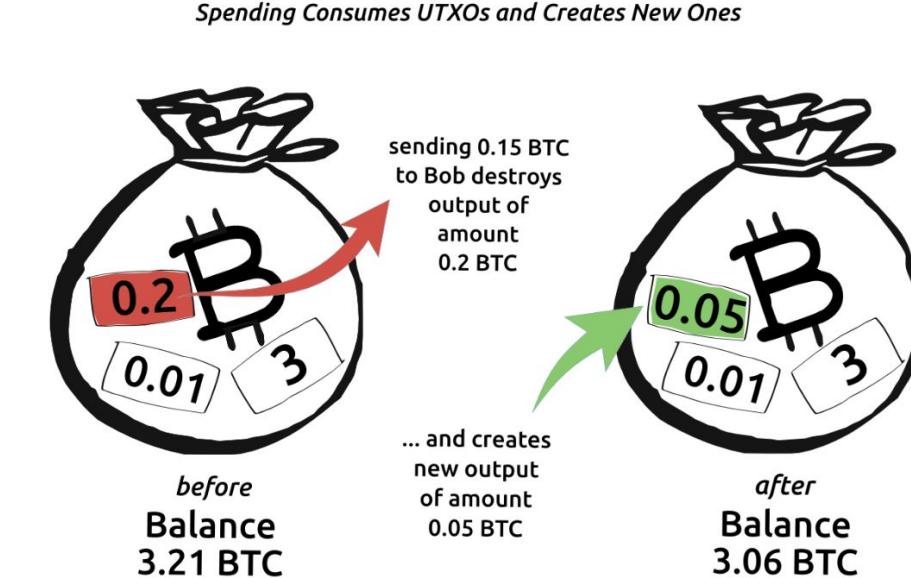
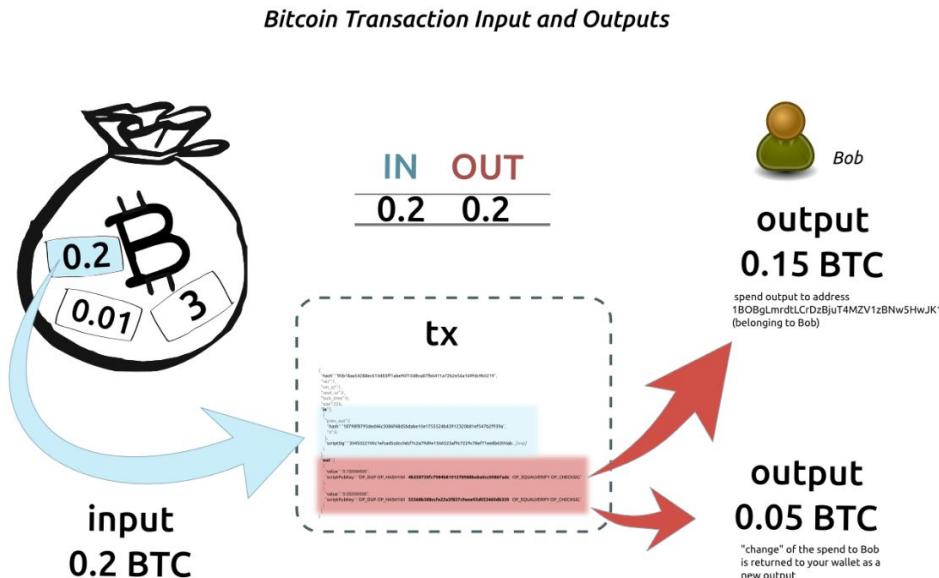
The miners' computers are set up to calculate cryptographic hash functions.

Bitcoin Transactions: The UTXO model

Unspent Transaction Outputs (UTXOs) as a model for available balances and transactions.

Transactions destroy original UTXO(s) and creates two new outputs: receiver and change back to our wallet.

Account balance is achieved by adding up UTXO. Private key redeems UTXO. Wallet tracks UTXOs.



What makes a transaction valid?

- ◇ **You have the balance in your account** (available funds)
- ◇ Insuring that the **funds have not be used in any other transaction.**
- ◇ **Proof of ownership** (signature)



Money:

You have it in the pocket
You cannot clone dollar bill
You are the one with the dollar.

Cryptocurrency:

Your public address have received UTXO
All previous UTXO used have been destroyed
You have the private key to sign transactions

Bitcoin: System Overview (3/4)

Cryptographic Hashes

Cryptographic hash functions transform a collection of data into an alphanumeric string with a fixed length, called a hash value. Even tiny changes in the original data drastically change the resulting hash value. And it's essentially impossible to predict which initial data set will create a specific hash value.

The root
of all evil

6d0a1899 086a...
(56 more characters)

The root
of all eul

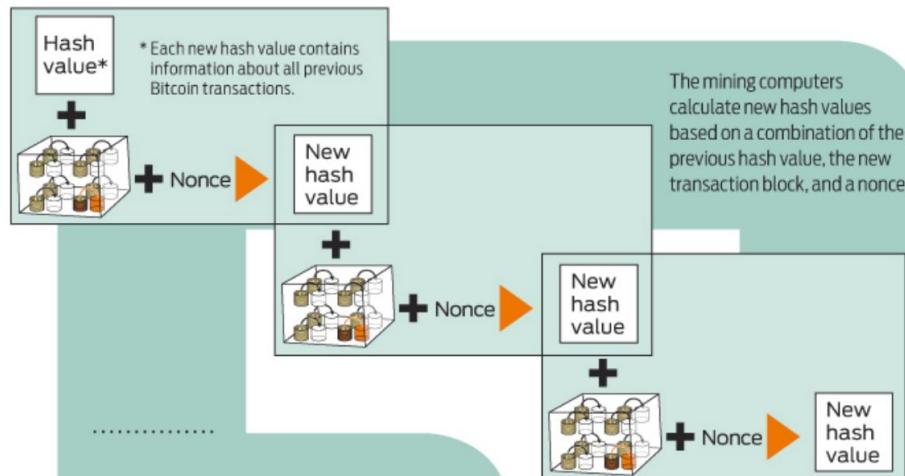
486c 6be4 6dde...

The root
of all veil

b8db 7ee9 8392...

Nonces

To create different hash values from the same data, Bitcoin uses "nonces." A nonce is just a random number that's added to data prior to hashing. Changing the nonce results in a wildly different hash value.



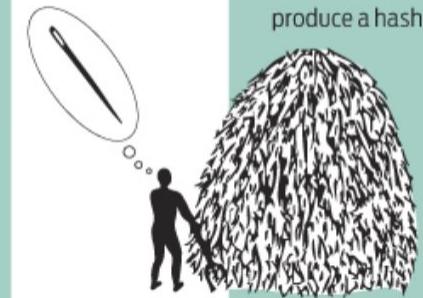
The root of
all evil ???



0000 0000
0000 ...

Creating hashes is computationally trivial, but the Bitcoin system requires that the new hash value have a particular form—specifically, it must start with a certain number of zeros.

The miners
have no way to
predict which
nonce will
produce a hash



value with the required number of leading zeros. So they're forced to generate many hashes with different nonces until they happen upon one that works.

Blockchain: Hashes

Hash is a **deterministic one way function with arbitrary input and an output of fixed length**, e.g

1gwv7fpx97hmavc6inruz36j5h2kfi803jnhg.

The same input will always create the same output.

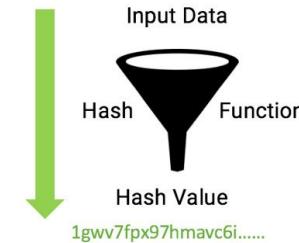
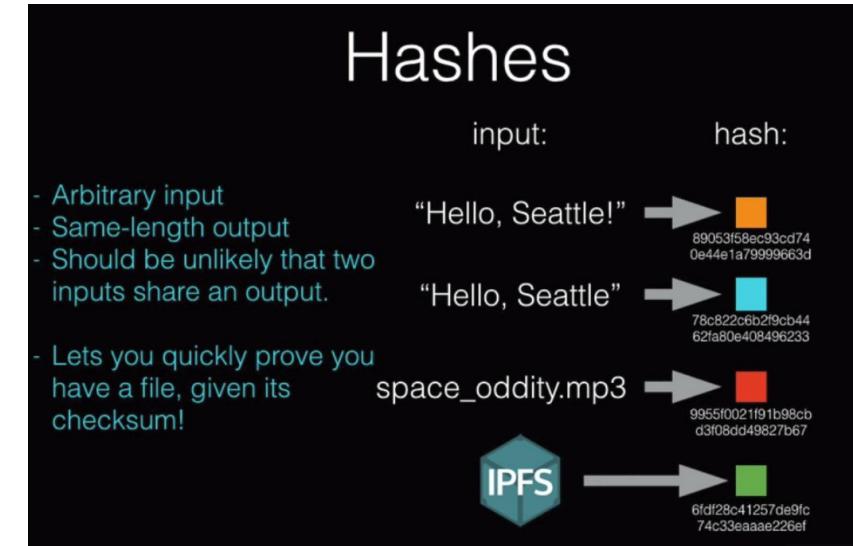
Given output y we cannot recreate input x

$f(\text{fruits+blender}) = \text{smoothie}$

$$f(x) = y$$

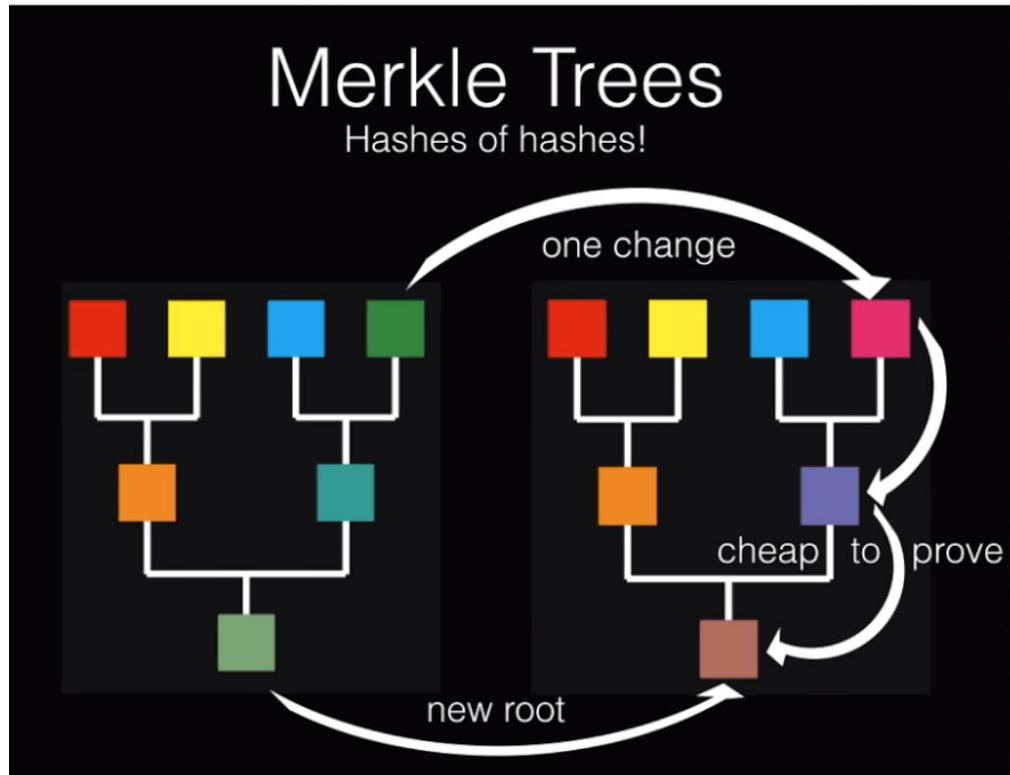
Used for **proving that something is the same as something else, without revealing the information beforehand.**

Alice knows the answer to a math problem, wants to prove she knows it but not reveal the answer. Hash the answer. Bob can verify, when / if he finds the answer.



$$md5("hello world") = 5eb63bbbe01eed093cb22bb8f5acdc3$$

Blockchain: Merkle Trees



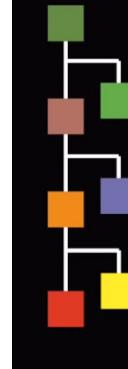
Source: <https://www.youtube.com/watch?v=-SMliFtoPn8>

Reaching Consensus

How to add to a shared blockchain

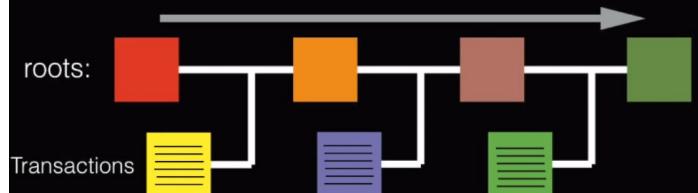
Proof of Work

- Blocks are added gradually.
- People take turns adding blocks. ("One CPU One Vote")
- Bitcoin style: The root checksum must start with a number of zeroes! (Difficulty)
- The block includes a nonsense "nonce" that can be changed to create new checksums.
- The difficulty is adjusted to target a desired time between blocks.



Bitcoin

A Blockchain Ledger



Avoids double-spending
by ensuring transaction ordering.

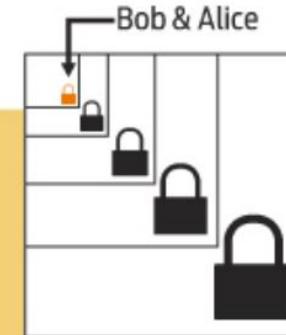
Bitcoin: System Overview (4/4)

Each block includes a “coinbase” transaction that pays out 50 bitcoins to the winning miner—in this case, Gary. A new address is created in Gary’s wallet with a balance of newly minted bitcoins.

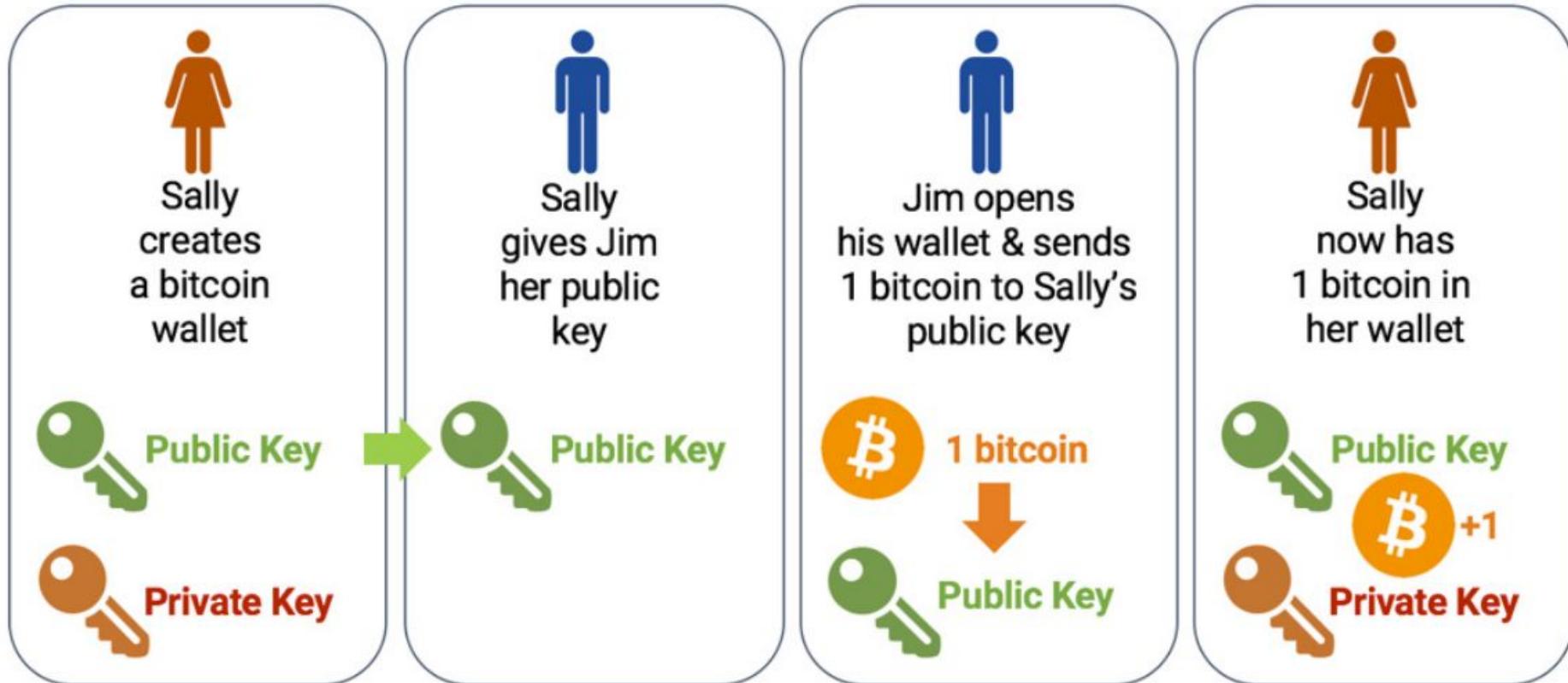


TRANSACTION VERIFIED

As time goes on, Alice’s transfer to Bob gets buried beneath other, more recent transactions. For anyone to modify the details, he would have to redo the work that Gary did—because any changes require a completely different winning nonce—and then redo the work of all the subsequent miners. Such a feat is nearly impossible.



Bitcoin: Transaction, summary



Goal of the Bitcoin Blockchain: Trust

Anonymous: Decentralized system, anyone can join without screening.

Decentralized: You have to destroy every node to destroy the network.

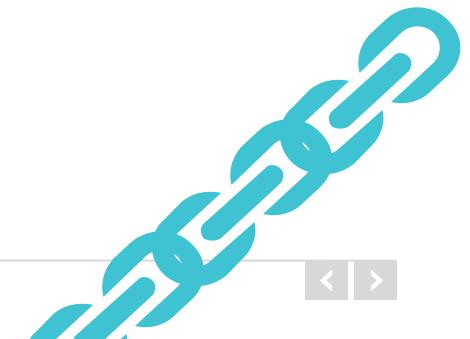
Immutable: Every transaction is recorded and linked together sequentially. Cannot be changed / deleted.

Trustless: You can trust that every node obeys the protocol because of incentive structures.

Consensus: Validity of a new block is determined by the network. Enables open network where everyone can join, but we are still able to maintain honesty and integrity of the network!!

Global: Not discriminatory against anyone. As long you have a computer, internet access and resources you can participate in the Bitcoin network. Financial inclusion!

Trust in code.



Consensus Problems Concentration of Power

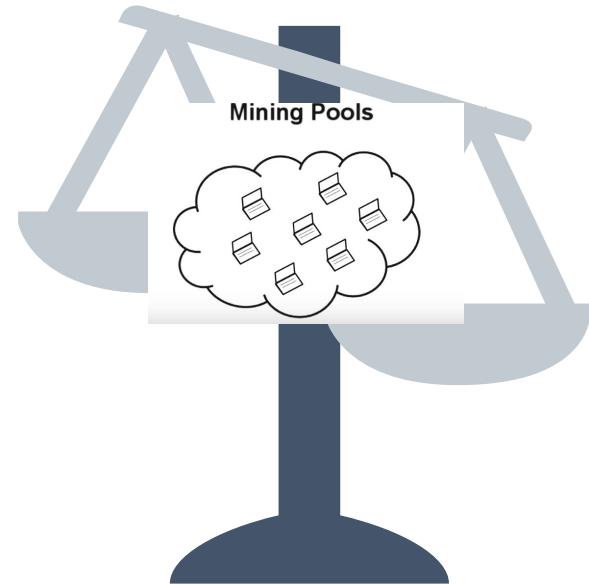
A lot of nuances of the Blockchain ecosystem and technology lead to the concentration of power and that different market actors gain advantages.

ASIC Hardware

Special hardware optimized for Proof of Work leads to

Majority attack

51% of the computing power can result in faulty transactions being posted to the Blockchain



Mining Pools

Consortiums of miners split the reward. Lead to concentration of power.

Owenshership

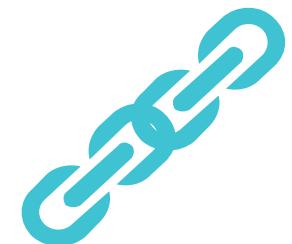
96%: amount of bitcoin owned by just 4% of addresses (containing 2.9 million BTC).

Blockchain: Record Keeping

Keeps track of everything that has happened in Bitcoin since the Genesis block 2008

Normally a centralized system keeps track of everything, and one server will confirm validity.

- ◇ Every node carries out transaction. **No central point of failure**, gets around the honey pot problem.
- ◇ **By including the hash of the previous block the ledger becomes immutable**, because it is cryptographically secured (by adding hash of every block after the other).



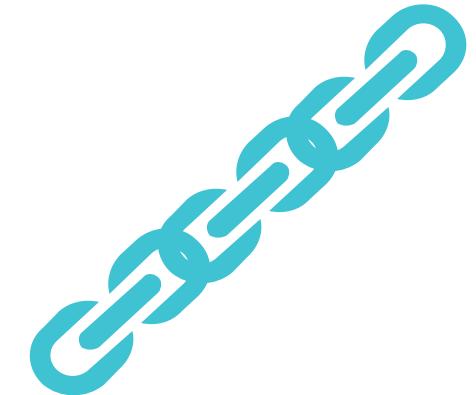
Blockchain Novelties

Byzantine Fault Tolerant Distributed Computer System

A fundamental problem in distributed computing and multi-agent systems is to achieve overall system reliability in the presence of a number of faulty processes. This often requires processes to agree on some data value that is needed during computation. Handled by Bitcoin.

Solution to the **Double-spend problem**

Bitcoin is a was the first digital money system to solve the double spend problem by utilizing the proof-of-work algorithm to verify transactions.



Blockchain Terminology

Forking Updating the protocol

A **soft fork** (backward compatible, previously valid blocks are made invalid) in the protocol is when there is a minor update to the protocol.

A **hard fork** (not backward compatible, previously valid blocks invalid or vice versa) is when there is a major update to the protocol, and two sides disagree. Can result in a split between the chains.



Forking to the longest chain

When **two votes for a new block are cast at the same time**. Both are valid for a while, but eventually one will have a new block on top, all miners will abandon the shorter chain, and start mining on the longer one.

This is a rule built into the protocol. It is as if that block has never happened.

Blockchain Terminology

51% attack

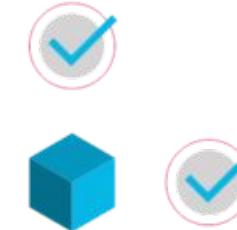
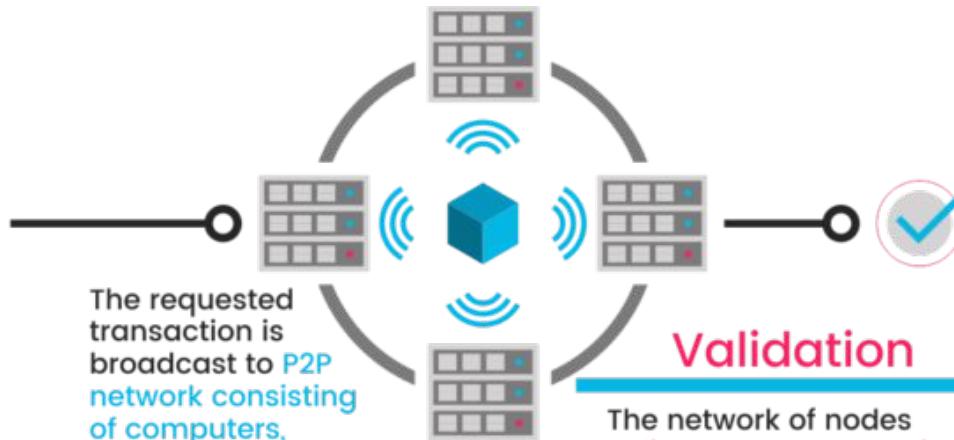
- Everything relies on an **honest majority assumption**
- A malicious majority can control the network.
- There was a mining pool that almost had 51% in 2013 of the computing resources. A majority decides the truth. 6 blocks in a row. Wait for more than 6 confirmations.
- Enables opportunity to send transaction to oneself.
- A majority of the computing power, then you can always vote on the longest chain. Can fork from everyone else and say this is chain is the longest and valid.

Blockchain 101: How it works

How it works:



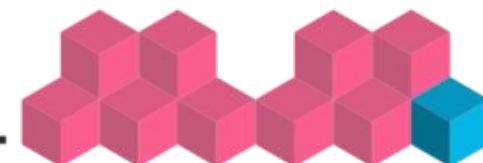
Someone requests a transaction.



A verified transaction can involve cryptocurrency, contracts, records, or other information.



The transaction is complete.



The new block is then added to the existing blockchain, in a way that is permanent and unalterable.



Once verified, the transaction is combined with other transactions to create a new block of data for the ledger.

- ◇ **Distributed network:** Bitcoin was one of the first to combine:
 - **Cryptographic identities:** Public / Private. Reveal nothing about yourself.
Prove claim ownership of assets. Responsible for actions.
 - **Consensus protocol:** Nakamoto consensus. Tie voting power to a specific external resource (computing power, resources). Democratic decision.
 - **Blockchain:** Immutable source of truth, ledger we can add to but not change later. Append only. Cannot change. No central point of failure.

Smart Contracts

◆ Contract definition:

- Agreement with another party.
- Some entity to enforce the contract and the terms (can be violated)

◆ Smart Contract (Nick Szabo, 1996):

- Define terms of agreement in programmatic code.
- Code that facilitates, verifies, or enforces the negotiation / execution of a digital contract.
 - Need trusted entity to run this code. So that we can verify that the output we get is what we intend it to be.



ethereum

HOMESTEAD RELEASE

BLOCKCHAIN APP PLATFORM

- **Blockchain Smart Contract Platform:** Take away idea of trusted entity needed to run smart contract, replace with trustless distributed network we get from Bitcoin.
- **Distributed Computer / Decentralized platform to run smart contracts**
- **The total network has a state,** not just transactions
- Distributed state machine - transactions change global state (did I send email, vote etc?)
 - transactions == state transaction function
- **Native asset called ether (ETH)**
 - Basis of value in Ethereum ecosystem
 - Needed to align incentives, and reward miners.
- Turing complete Ethereum Virtual machine that can run any code

Blockchain Terminology

Smart Contracts on Ethereum

A smart contract is a computer protocol intended to digitally facilitate, verify, or enforce a contract. Smart contracts allow the performance of credible transactions without third parties.

- ◇ Stored as code on the Blockchain and evaluated by all nodes.
Like transactions without recipient. Ethereum Virtual Machine
- ◇ Transparent, distributed, and decentralized agreement
- ◇ Smart Contracts can call other Smart Contracts
- ◇ Requires *gas* to run (to prevent DDOS)

Blockchain Terminology

ICO: Initial Coin Offering

- ◇ *The introduction of a new cryptocurrency / token*
- ◇ Can either be a security or a utility token
- ◇ Incentivizes a community to buy into the idea -> Scale factors and network effects.

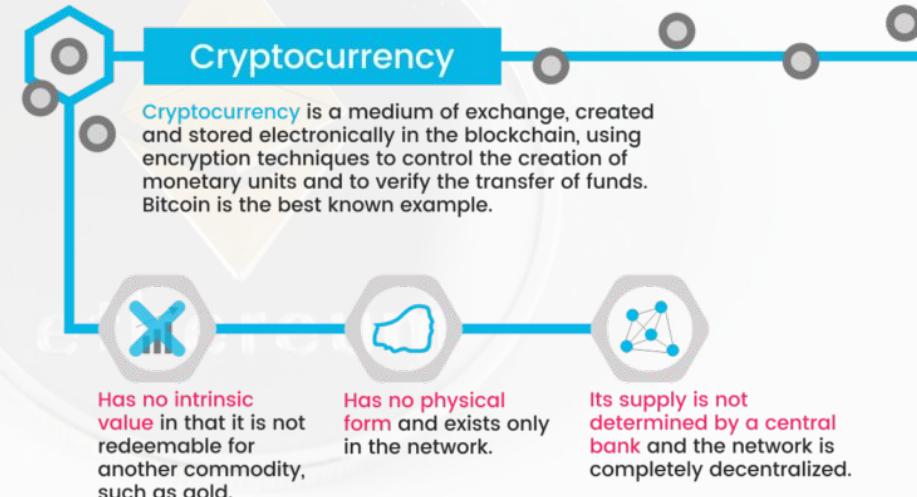
Today over 3000 coins have been introduced to the world, most of them on the Ethereum Blockchain using the ERC20 standard*

* coinranking.com (April 2018)

Blockchain Terminology

Altcoins / Cryptocurrency / Tokens

- ◊ *Digital currency, medium of exchange and store of value*
- ◊ Independent of Central bank
- ◊ Utility token or security
- ◊ Application-centric or general
- ◊ Based on new or existing blockchain



Blockchain Terminology

Exchange

Platform where you can exchange and swap cryptocurrencies. Almost like FOREX. Decentralized exchanges are possible with Blockchain technology.



Blockchain Terminology

dApp (Decentralized Application)

- Open source, decentralized applications cryptographically secured and stored on a public Blockchain.
- Often uses a **token that is native** to the Blockchain or the application for access.
- **Miners will be rewarded in the native token** for running the application.

Ethereum: Powering Web 3.0

Web 3.0

- Distributed file storage
- 24hour stock markets
- Decentralized exchanges
- CryptoKitties (scarce items)
- Decentralized file storage
- Store sensitive data and records
- Smart grid solutions for energy
- Supply chain management
- Medical records
- Track goods
- Remittances
- Prediction markets
- Gitcoin
- Federated Learning
- Content creation automatic compensation
- Get paid to reply to emails



Positive outcomes

- ◇ **Data Privacy:** Blockchain tech has the potential for users to own their personal data, think of it as reversed user agreements. Services needs to sign how they can use data etc.
- ◇ **Financial inclusion:** Today there are 2 billion adults without a bank account. Bitcoin and other cryptocurrencies are free for anyone to join. Most of them have a cellphone.
- ◇ **Sharing Economy:** Decentralize services, to cut costs of middle men. True Airbnb, Uber

Blockchain 101: Hard numbers

1. Global **Market Cap**:
Blockchain tokens

\$820Bn (Jan 2018)
0.9% of World GDP



2. Number of **Total Unique Users of Blockchain tech**

2.9 - 5.8Mn



3. Ratio of **Female Bitcoin Owners**

Only 5-7%

4. Blockchain **Disk Space**

Bitcoin: **164Gb**
Ethereum: **63Gb**

1. <https://coinmarketcap.com/charts/>

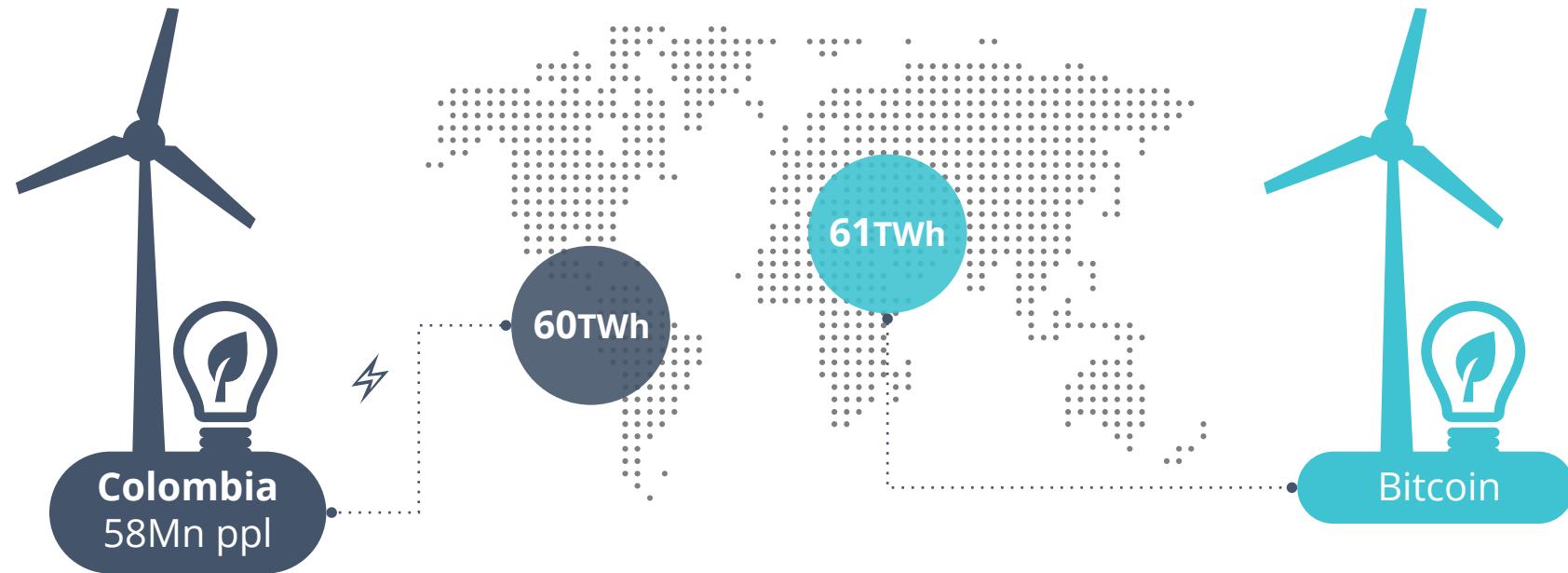
2. https://www.reddit.com/r/Ripple/comments/80hd4j/ripple_xrp_price_and_the_total_number_of/

3. <https://www.forbes.com/sites/lamjackie/2017/12/10/where-are-the-women-in-the-blockchain-network/>

4. <https://blockchain.info/charts/blocks-size> (Bitcoin) <https://etherscan.io/chart2/chainedatasizefast> (Ethereum)

Comparison of Annual Energy Problem

Bitcoin, Ethereum and many other Blockchain Technologies currently utilize Proof of Work as their consensus algorithm. Scalability problem and waste of resources. It is estimated that



Source: <https://digiconomist.net/bitcoin-energy-consumption>

Ethereum Development Frameworks



geth

geth is the command line interface for running a full Ethereum node implemented in Go. By installing and running geth , you can take part in the Ethereum live network and. mine real ether; transfer funds between addresses; create contracts etc.

etherchain.org



Etherchain is an Explorer for the Ethereum blockchain. It allows you to view account balances, look up transactions and explore smart contracts.

Ethereum Development Tools: dApp Browsers



Mist

Browser that can interact with dApps. Full client that downloads a full node of the Ethereum Blockchain.



Metamask

Browser extension for interacting with the Ethereum blockchain. Only contains keys to sign transactions.



Parity

Modern Ethereum client to interact with the Ethereum blockchain.

Ethereum Development Frameworks



Solidity

Programming language designed for developing smart contracts on the Ethereum Blockchain. The language is similar to Javascript and it is compiled down to bytecode to run on the Ethereum Virtual Machine (EVM).



Truffle Framework

Ethereum Swiss Army knife, contains a lot of development tools. Development environment, testing framework and asset pipeline for Ethereum. Smart contract compilation, Automated contract testing with Mocha and Chai etc.



Remix-IDE

Remix is a browser-based compiler and IDE that enables users to build Ethereum contracts with Solidity language and to debug transactions.

Other Useful Resources



CoinMarketCap

Top 100 Cryptocurrencies by Market Capitalization. The go to website for Cryptocurrency market cap rankings, averaged exchange rates, charts etc.



bitcoin.org

Wonderfully informative “Official” bitcoin website, with plenty of tutorials etc.



Popular application to buy cryptocurrency for fiat currency. Also has an exchange related to it called GDAX. Bought Earn.com yesterday.

Thanks!



Connect with me:

<https://alex.fo>



E-mail
afo@berkeley.edu



LinkedIn
linkedin.com/in/alexanderfo



Twitter
[@alexarfroj](https://twitter.com/alexarfroj)

ALTERNATIVE: Outline

Blockchain Technology & Business Applications

History pre Blockchains

Bitcoin: Blockchain's Genesis Application

Cryptography 101

Tour of Distributed Ledger Technology Terminology

Simple Blockchain Implementation

Ethereum

Smart Contracts

Decentralized Applications (Dapps)

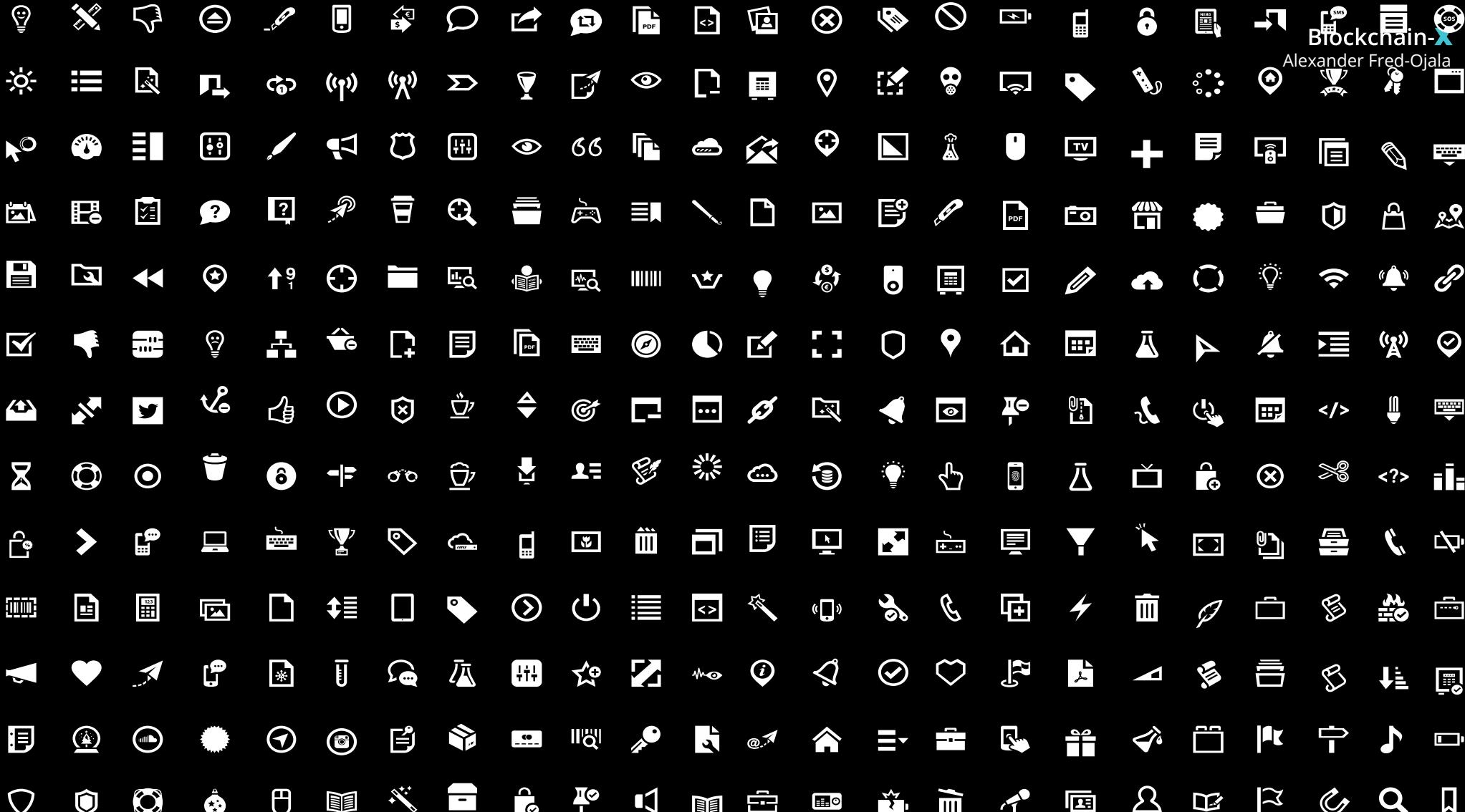
Public and Private Blockchains

Hyperledger and other Consortiums

Use Cases across Industries

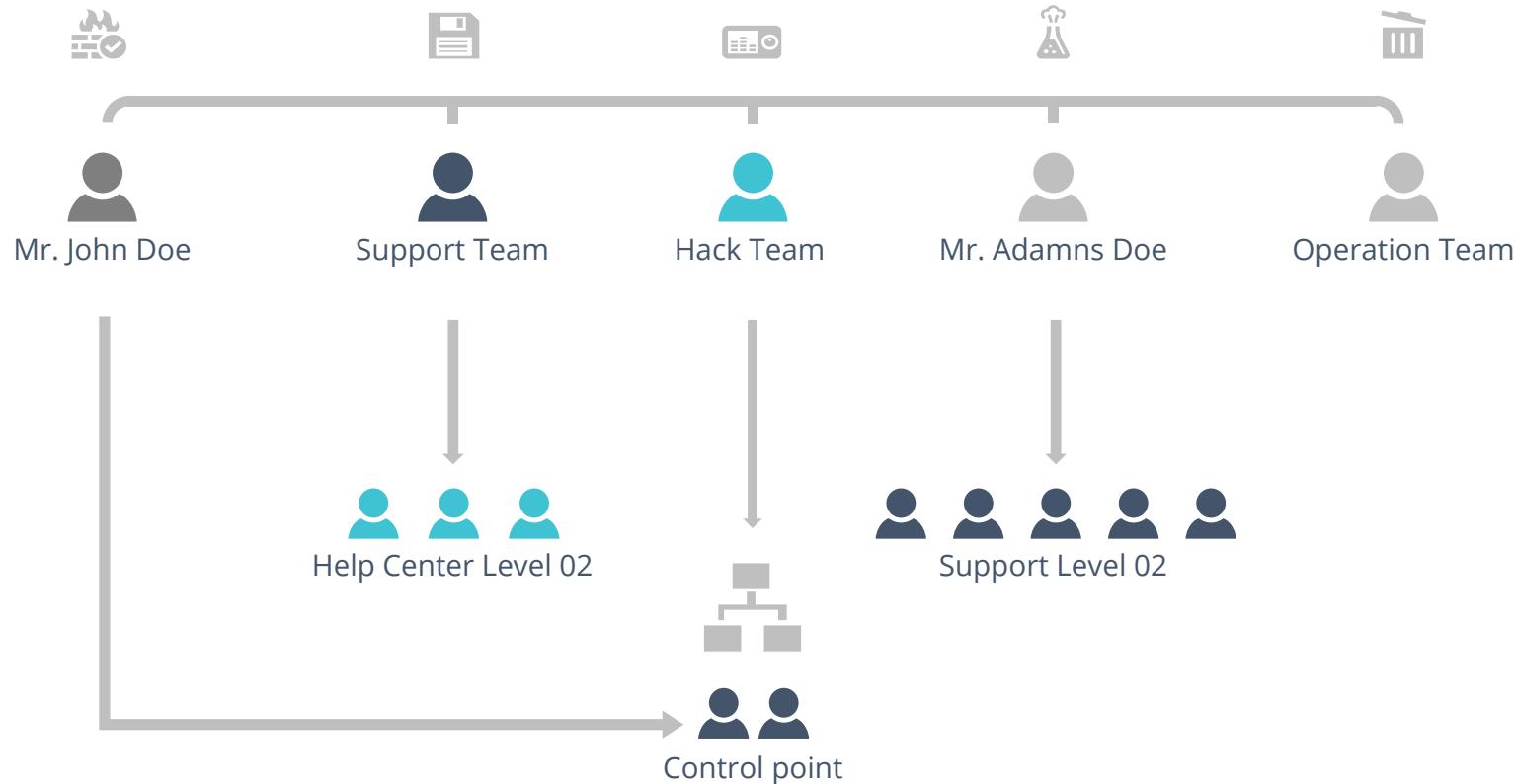
Beyond the Hype: Barriers

Current State of the Technology / Adoption Cycle



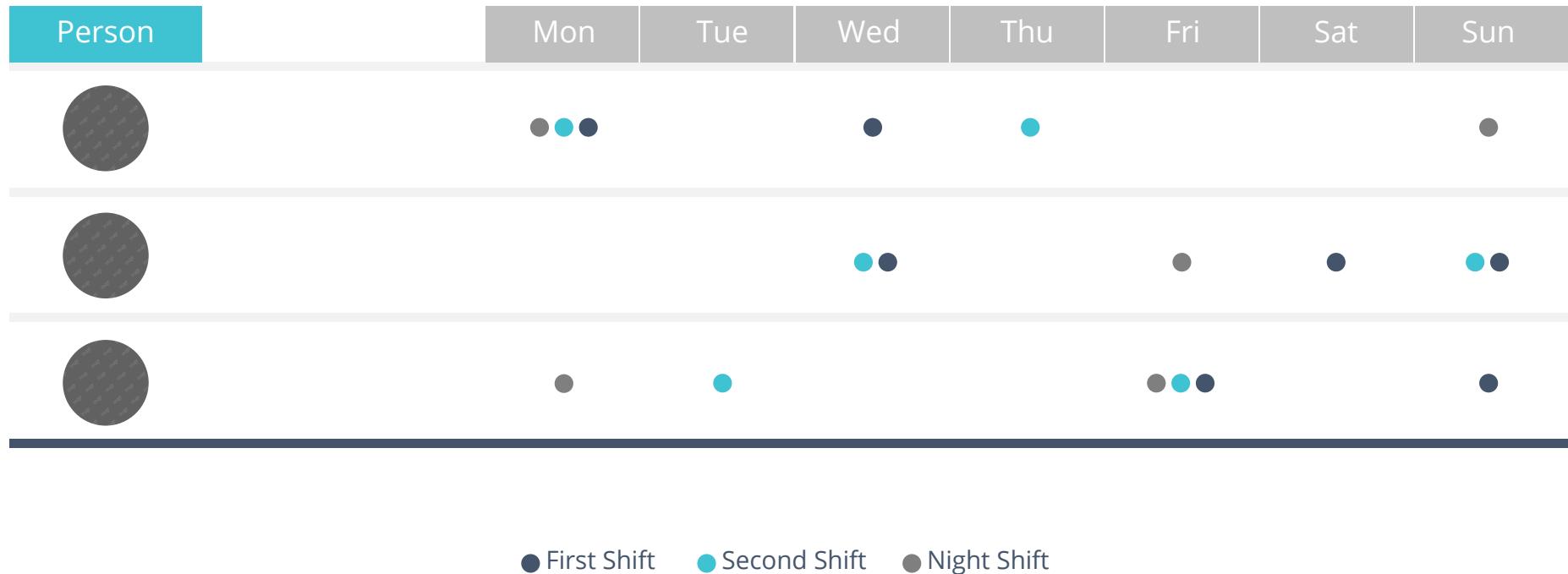
Development Team Structure

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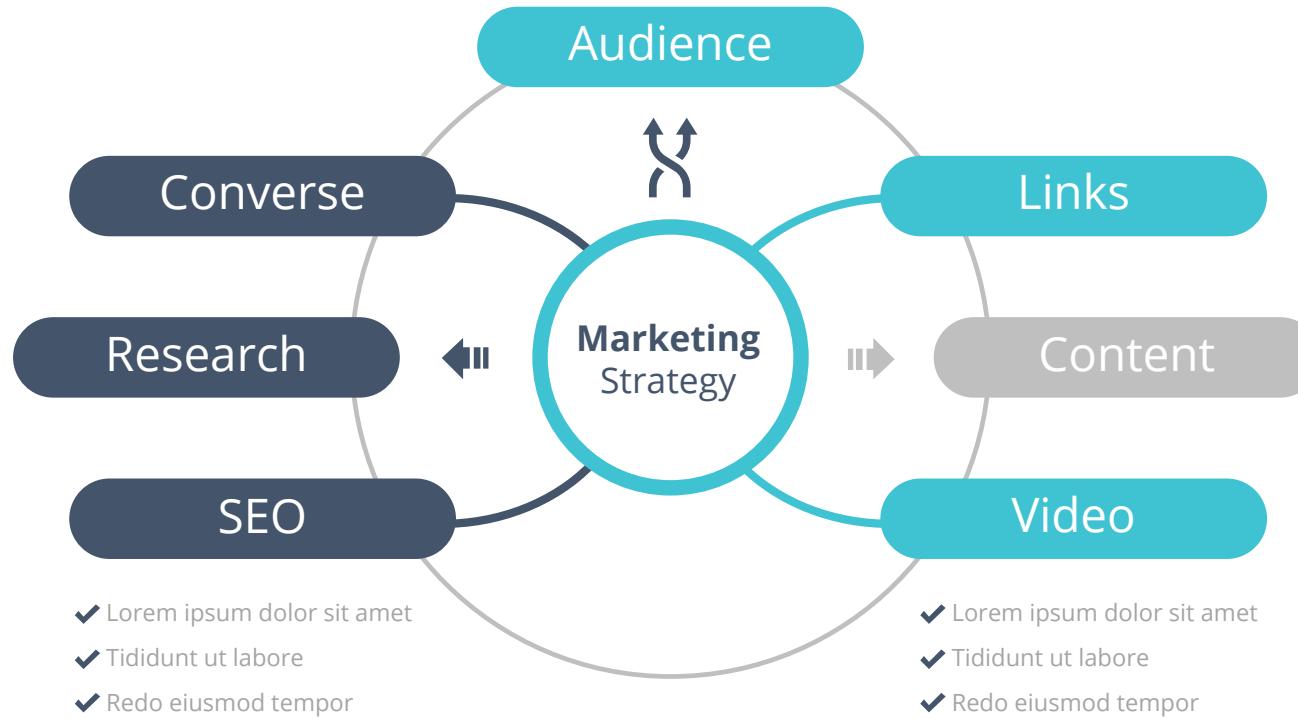
Team Weekly Schedule

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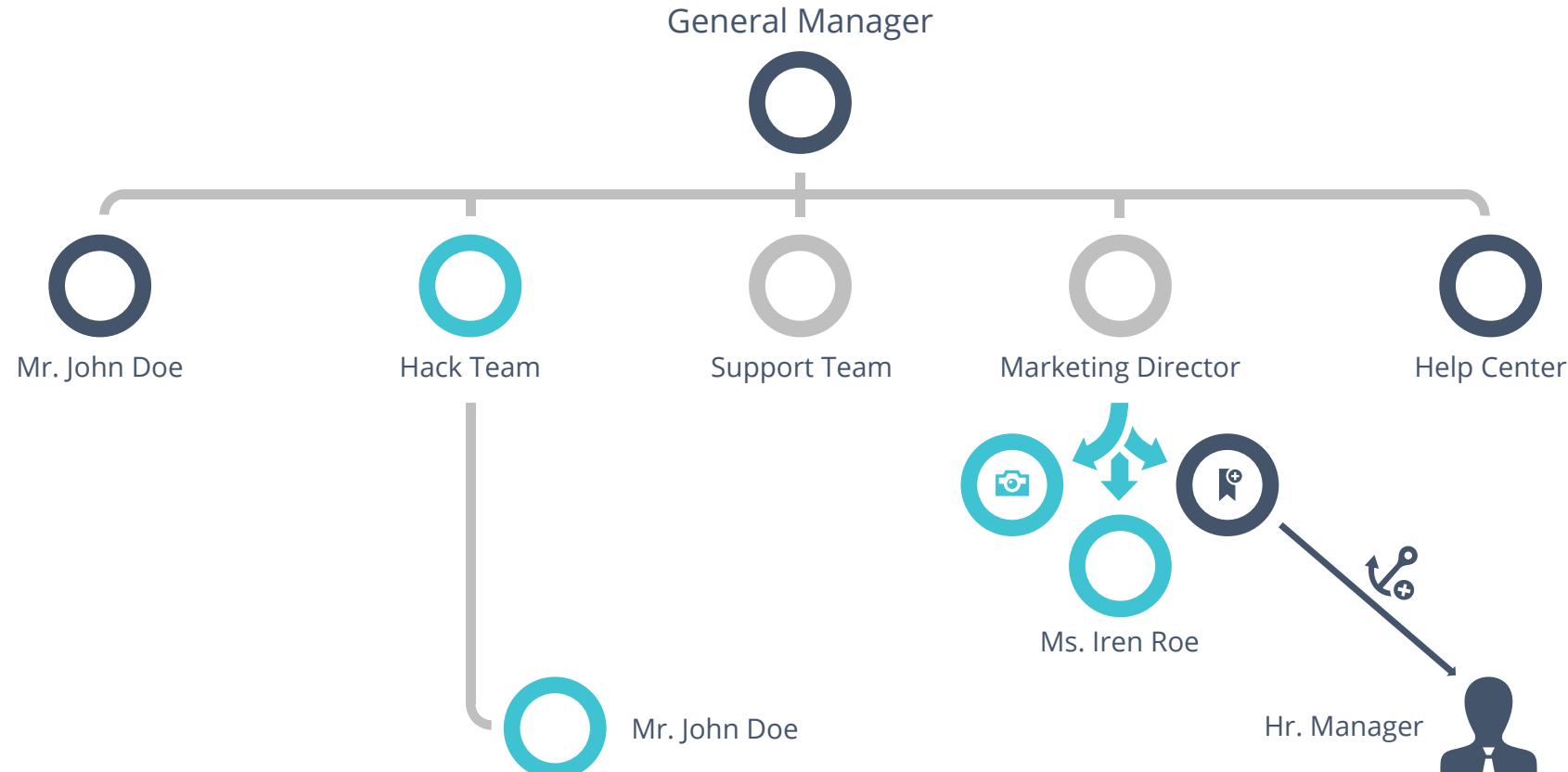
Marketing Strategy Steps

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General Manager Tasks

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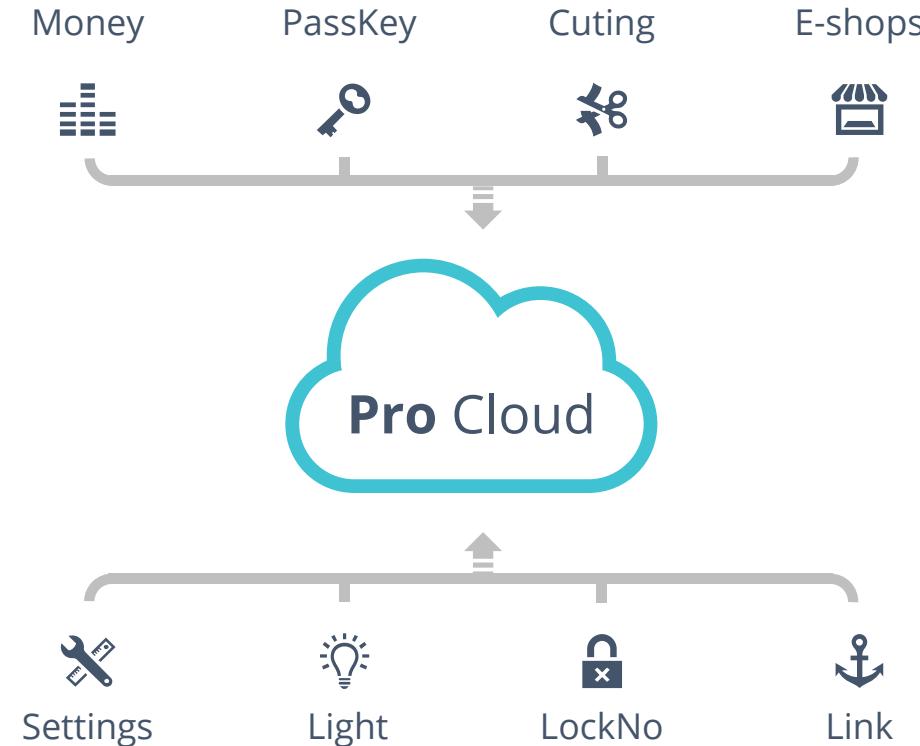


Design and **innovation consultancy** that
helps bring innovative products



Pro Cloud Online and Offline

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Quarter Table Composition

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

	FEB	MAR	APR	MAY
	Lorem ipsum dolor sit amet			
	Tididunt ut labore			
	Redo eiusmod tempor			
	Conse ctetur adipisicing			
	Nse ctetur adipisicing			
	Elit sed do eiusmod tempor			
	Incidentum ut labore			

Nonstop

Poweron

Creative

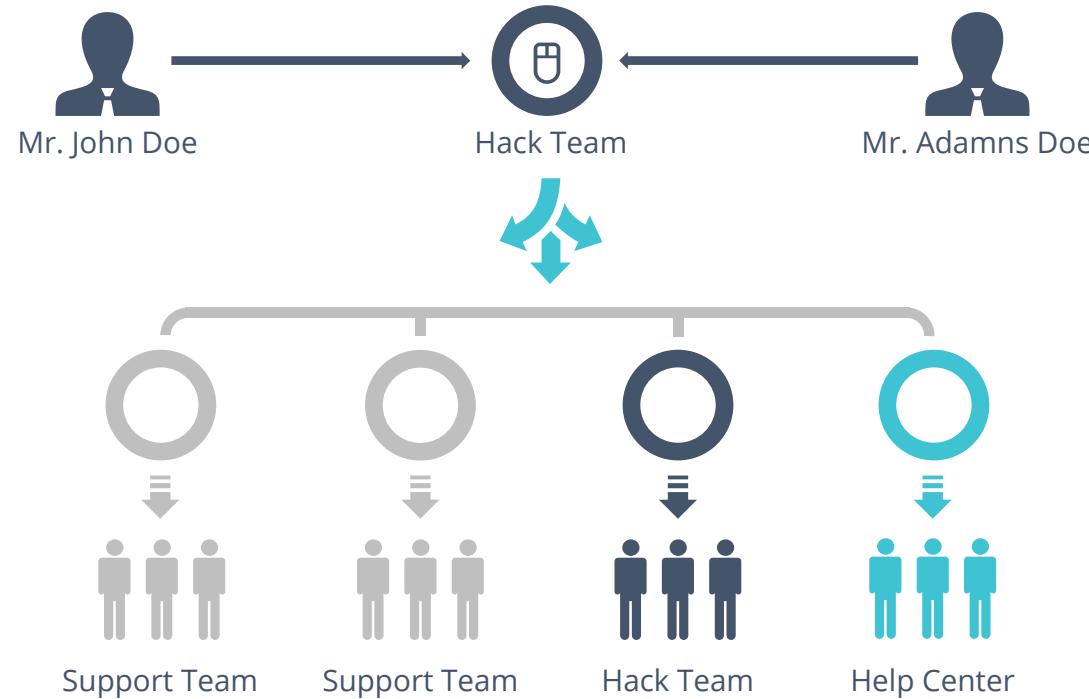
Shutdown

Notime

Repeat 30

Business Consulting Service

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We are a **FULL-SERVICE**, client-driven design studio focused on **CREATING AND DEVELOPING** brands



At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas.

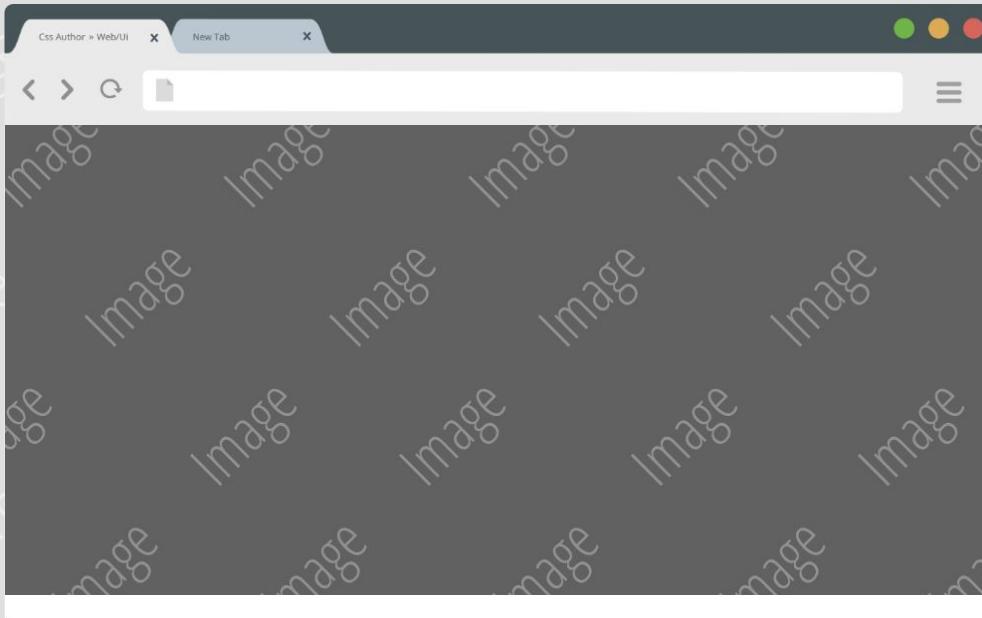
Promotional Campaigns Success

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WEBSITE BUILDING AND CONSULTATION!

Avoluptatem accusantium doloremque laudantium,
totam rem aperiam, eaque ipsa quae ab illo inventore
veritatis et quasi architecto beatae



3,777 \$



2,008 \$



9,113 \$



5,117 \$



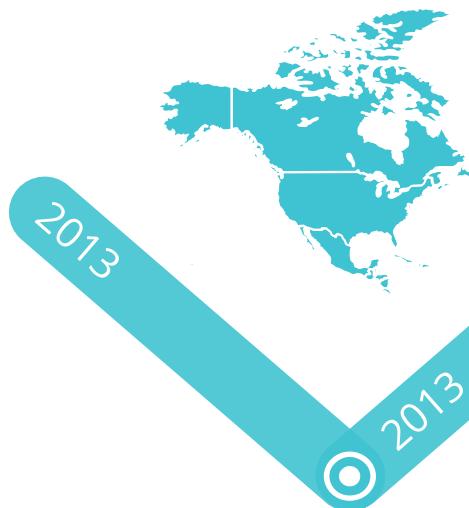
5,003 \$



3,468 \$

Best Countries Market in 2016

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North America

South America

At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.



2015

2016



Australia

At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.



Design Power Types

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Restore Balance

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga.

Power Supply

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga.





Restore Balance

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Power Supply

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Premium Innovation

Tet accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores.



From the Blog

Tero et iusto dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat.



Get in Touch

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium.

Cloud Online and Offline

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Global Solutions

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Let's start

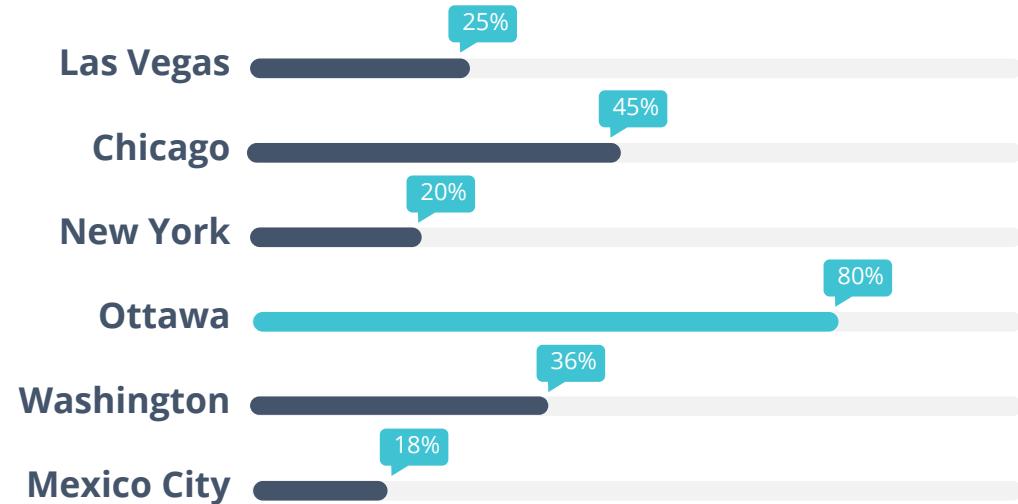
labore et dolore magnam aliquaquaerat voluptatem.
Ut enim ad minima veniam,
quis nostrum amok.

America Cities Profit Percent

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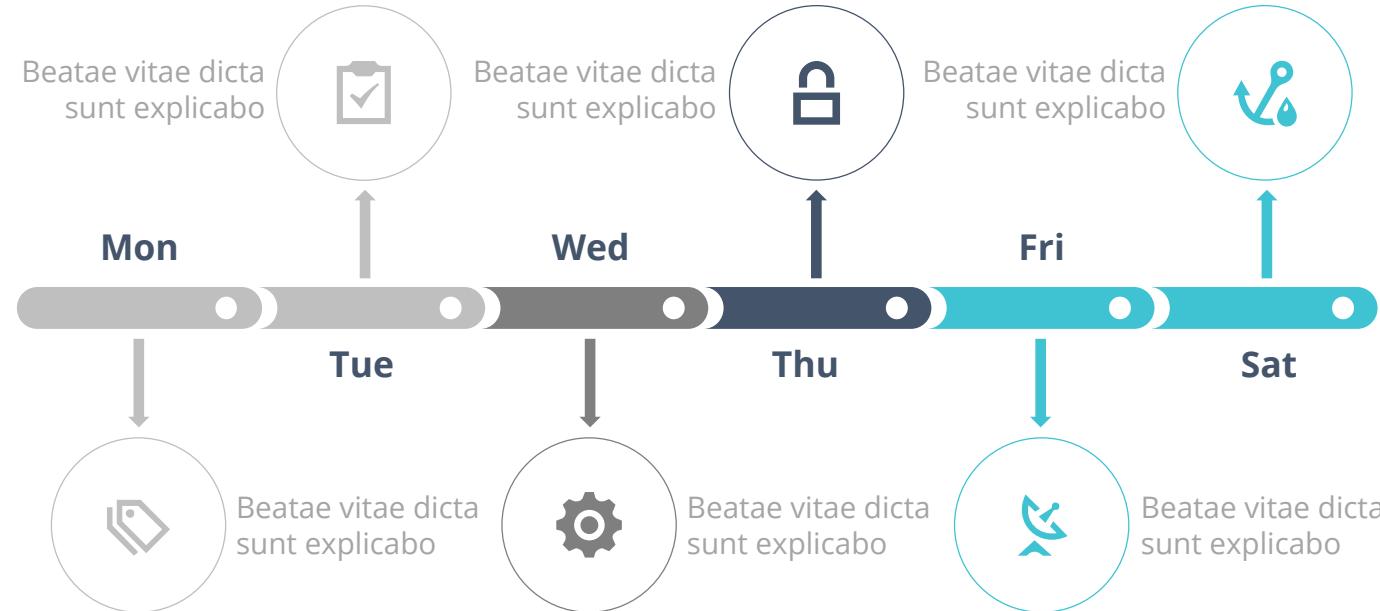


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Weekly Timeline Process

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COFFEE TIME, sponsored by ABC!
10:30 TO 10:45

General Sponsors:



Today Company Sections

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Winning Freelance Writer

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At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat

Welcome Message

Cupiditate non provident, similiq[ue] sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio.

Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut

Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod non recusandae. Itaque earum rerum hic tenetur a sapiente delectus, ut aut reiciendis voluptatibus maiores alias consequatur aut perferendis doloribus asperiores repellat.

Freelance Writer

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Second Designer

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Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut rerum necessitatibus saepe eveniet ut et voluptates repudiandae sint et molestiae non recusandae.

Mobile Results You Need

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Light Indicate

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ducimus blanditiis praesentium

Keyboard Mini

At vero eos et accusamus et iusto odio
ducimus blanditiis praesentiu



Document Supply

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dignissimos ducimus blanditiis praesentium

Video Stream

At vero eos et accusamus et iusto odio
dignissimos ducimus blanditiis praesentium

We are a

FULL-SERVICE

client-driven design studio
focused on **CREATING AND DEVELOPING**
brands



Shopping **Users**



Silent Support

100% Satisfaction Guarantee

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Personal



Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est optio cumque nihil.

Medium



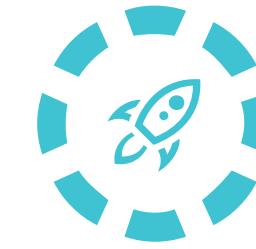
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Business



Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est optio cumque nihil.

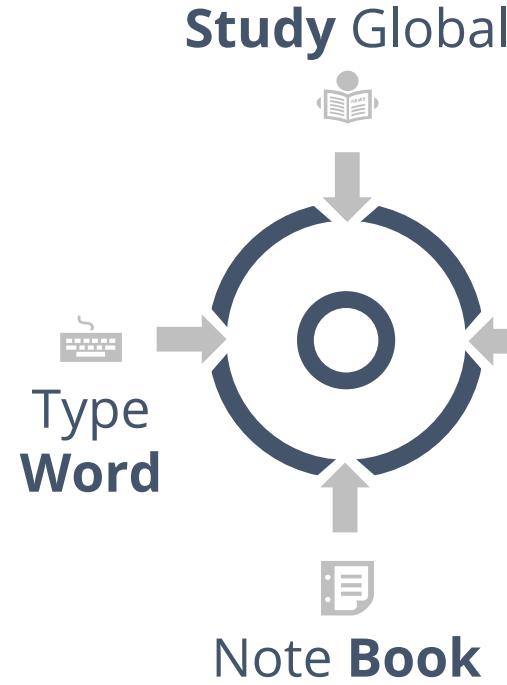
Professional



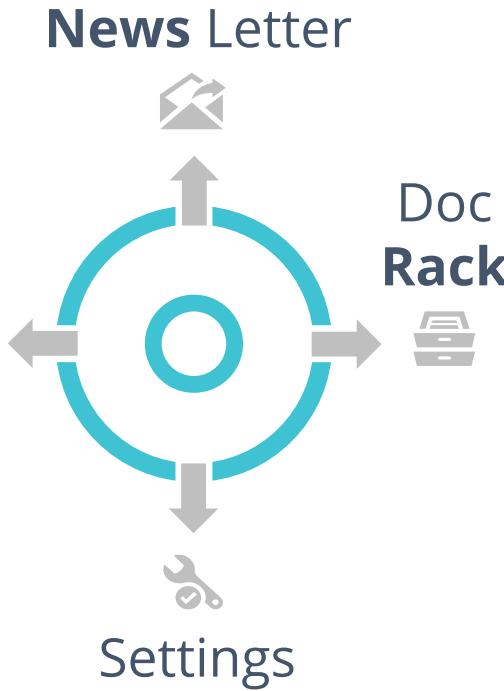
Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est optio cumque nihil.

No Budget Studding

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facilis est et expedita e
distinctio. Nam adeco libero
tempore, cum soluta nob
est eligendi do dikame
cumque nihil.



Internet Results You Have

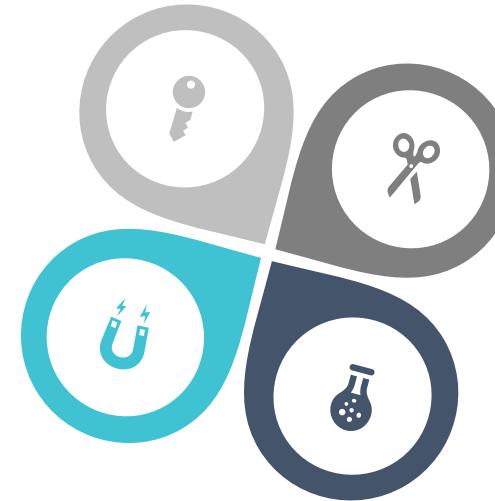
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Global Solutions

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est eligendi dikame optio cumque nihil.

Affiliate Programs

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est eligendi dikame optio cumque nihil.



Premium Services

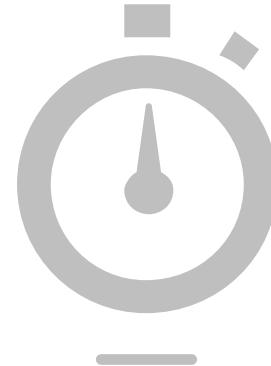
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High Definition

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est eligendi dikame optio cumque nihil.

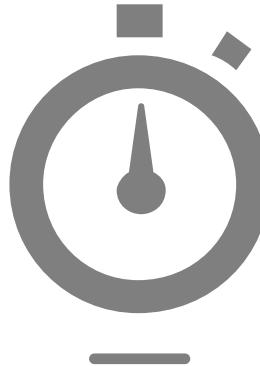
Speedup Your Website

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



Personal

4.3s



Medium

3.7s



Business

2.1s

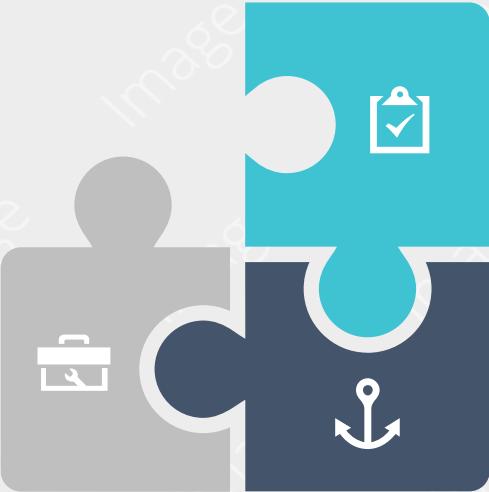


Professional

0.9s

Information Rules

At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.



Access Deny

At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Fresh Ideas

At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

More Features

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas.

Solutions For Your Business

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Security **Details**



Customer Reviews



Site Requirement



Shopping **Users**



Silent Support



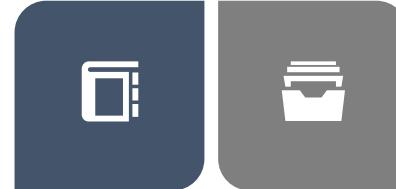
High **Definition**

We Are Creative Agency

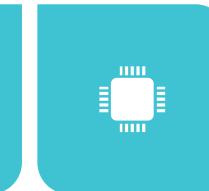
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Create great way
for any company to



Design Creations



Gallery

Creations

Chip

Design Power Types

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- Full Power**
- Power Supply**
- No Battery**
- Recycle Process**
- Half Power**

labore et dolore magnam aliquam quaerat voluptatem. Ut enim ad minima veniam, quis nostrum amok e exercitationem ullam corporis suscipit laboriosam, nisi ut commodi consequatur?

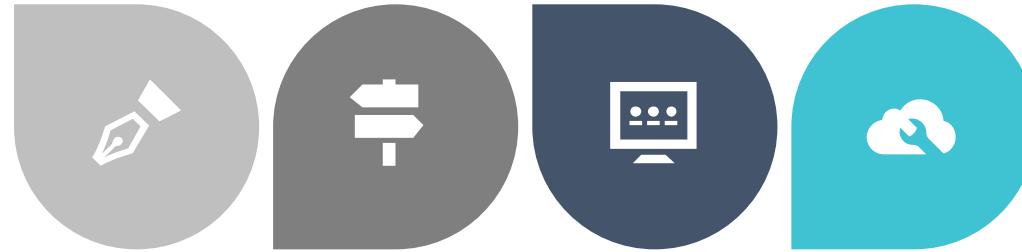
Present your site in the **most beautiful** way!



At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium
voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat.
Cupiditate non provident, similique sunt

Fully Responsive Balance

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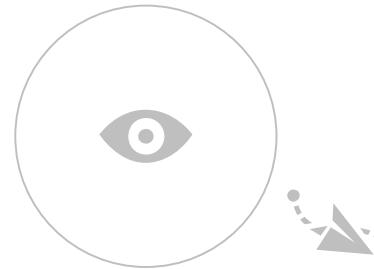


Restore Balance

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas.

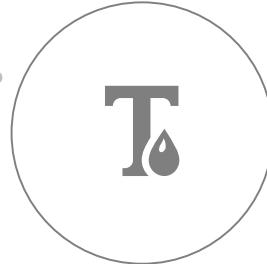
User Experience Strategy

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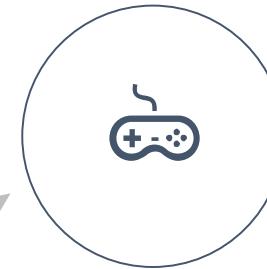
Personal

Et am harum quidem
rerum on facilis.



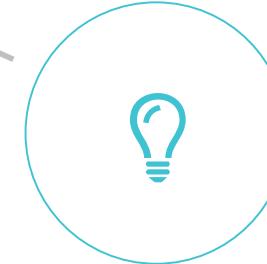
User Experience

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rerum on facilis.



Development

Et am harum quidem
rerum on facilis.

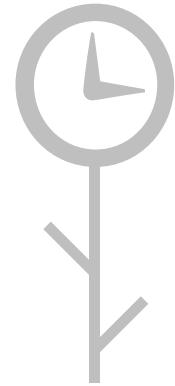


Product Strategy

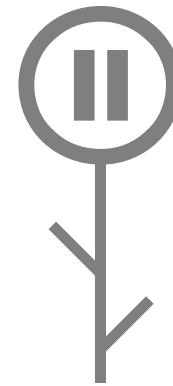
Et am harum quidem
rerum on facilis.

Planting Ideas House

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**Planting
Ideas**



**Pause
Progress**



**Restore
Effects**



**Capture
Time**

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga.



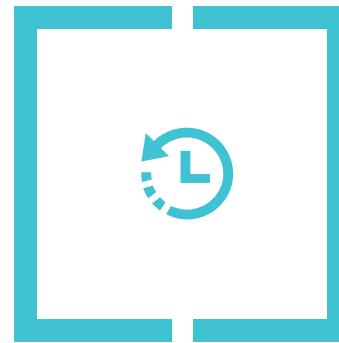
LUNCH TIME, sponsored by ABC!
12:30 TO 13:45

General Sponsors:



Three Type Service Update

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New
Languages



Zoom
Skills

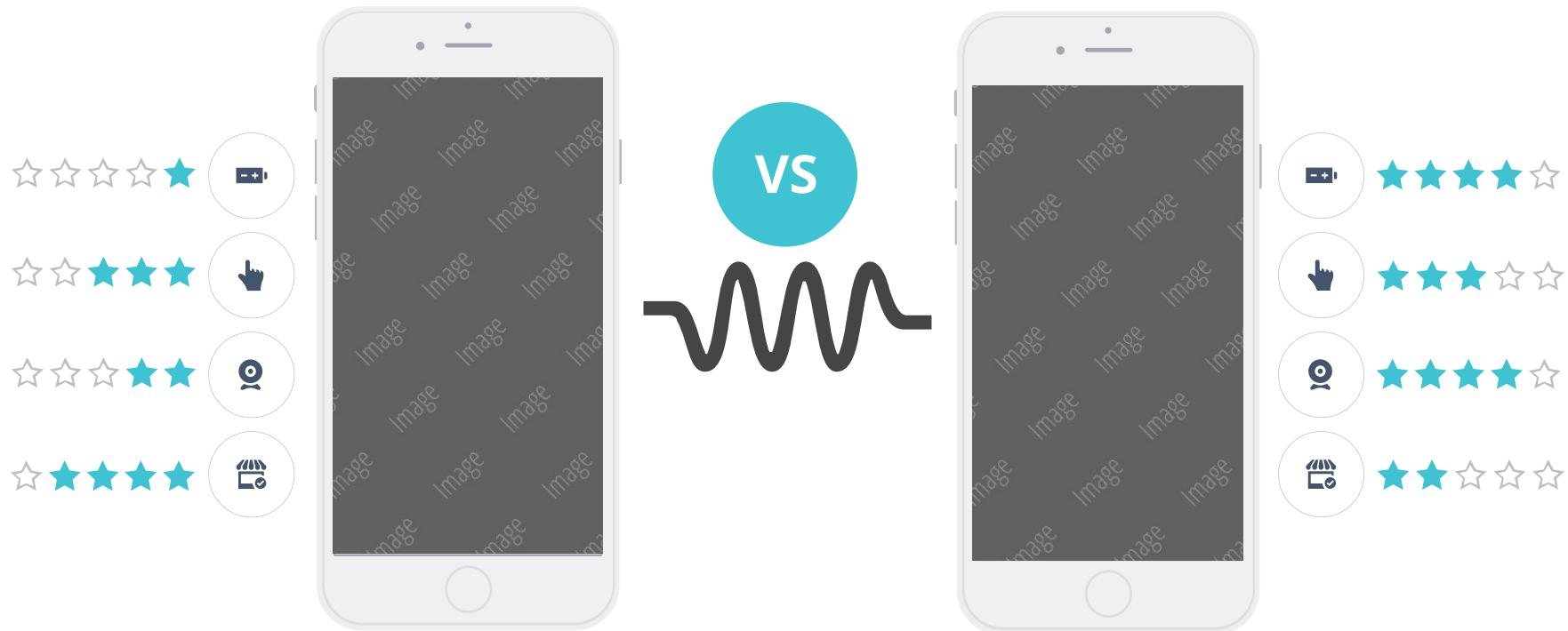


Goes
Live

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Compare Mobile Designs

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Powerful Way Content

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Finish Destination

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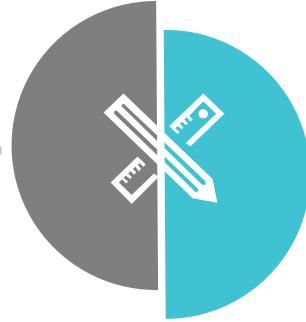
Top Level Screen Useful

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Cloud Services



Settings Remote



Wireless Type



At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga.

Success **CORPORATE**



Avoluptatem accusantium
doloremque laudanti, veritatis
et quasi architecto beatae

Company **APPROACH**



Avoluptatem accusantium
doloremque laudanti, veritatis
et quasi architecto beatae

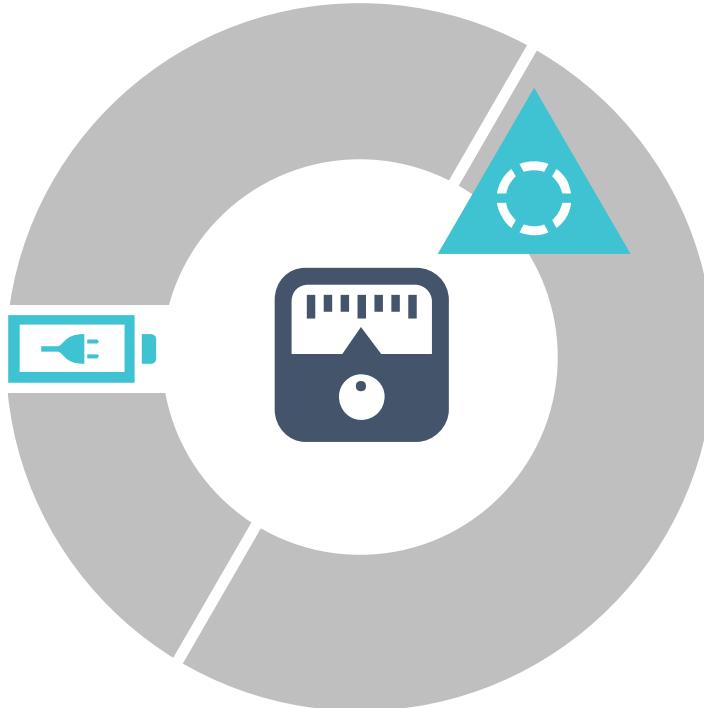
Our **PEOPLE**



Avoluptatem accusantium
doloremque laudanti, veritatis
et quasi architecto beatae

Employers Working Style

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



Instructional Designer ↴

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt. Neque porro quisquam est.

Freelance Writer 🎵

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt. Neque porro quisquam est, qui dolorem ipsum quia dolor sit amet, consectetur, adipisci velit, sed quia non numquam eius.

Introduction Solution Update

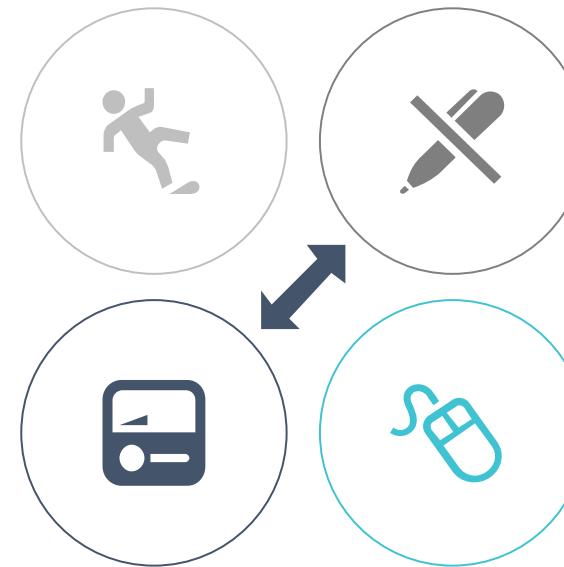
AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Global Solutions

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est eligendi dikame optio cumque nihil.

Affiliate Programs

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est eligendi dikame optio cumque nihil.



Premium Services

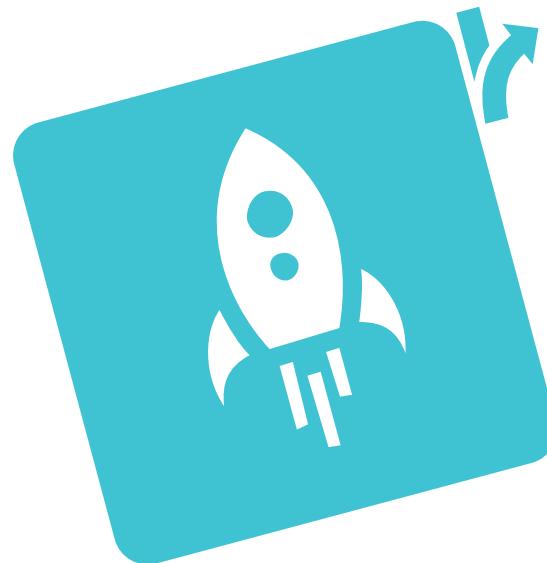
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High Definition

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est eligendi dikame optio cumque nihil.

Micro Technology Progress

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

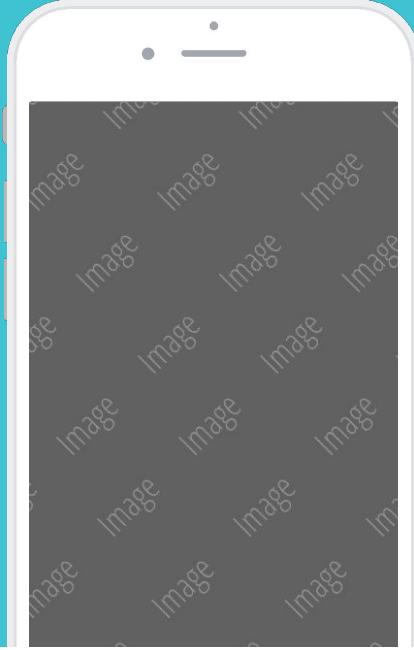


Micro Process

Yiusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecati cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga.

Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut rerum necessitatibus saepe eveniet ut et voluptates repudiandae sint et molestiae non recusandae.





If you want to change
the **mobile results**, you
need a fresh design.



Lorem ipsum dolor sit amet,
consectetur adipisc elit.

Global Solutions

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut.

Platform For Your Projects

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Google Plus



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

RSS Feed



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Unlock System



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Access Deny



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Information Rules



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Fresh Ideas



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Facebook Post



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Twitter Text



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Code Design



At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

This Is Tour Path

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



Free Time

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi voluptatem sequi nesciunt. Neque porro quisquam est.

Continue Shopping

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi voluptatem sequi nesciunt. Neque porro quisquam est.

Web Design

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi voluptatem sequi nesciunt. Neque porro quisquam est.

We Manufacture Future

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Freelance Writer

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecati cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio.

Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut rerum necessitatibus saepe eveniet ut et voluptates rerum hic tenetur a sapiente delectus, ut aut reiciendis voluptatibus maiores alias consequatur aut doloribus asperiores repellat.



Instructional Designer

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. Nemo enim ipsum voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione voluptatem sequi nesciunt. Neque porro quisquam est, qui dolorem ipsum quia dolor sit amet, consectetur, adipisci velit, sed quia non numquam eius modi tempora incidunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim ad minima veniam, quis nostrum exercitationem ullam corporis suscipit laboriosam, nisi ut aliquid consequatur, vel illum qui dolorem eum fugiat quo voluptas nulla pariatur? Quis autem vel eum iure reprehenderit qui in ea voluptate velit esse quam nihil molestiae consequatur.

OUR MARKET TODAY!



USA: 56 Million

Africa: 23 Million

Asia: 9 Million

Australia: 5 Million

Compare Internet Tools

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Free Time

At vero eos et accusamus et iusto odio
ducimus blanditiis praesentium



Access Deny

At vero eos et accusamus et iusto odio
ducimus blanditiis praesentium

Shopping Cart

At vero eos et accusamus et iusto odio
ducimus blanditiis praesentium



Information Rules

At vero eos et accusamus et iusto odio
ducimus blanditiis praesentium.

Code Design

At vero eos et accusamus et iusto odio
ducimus blanditiis praesentium

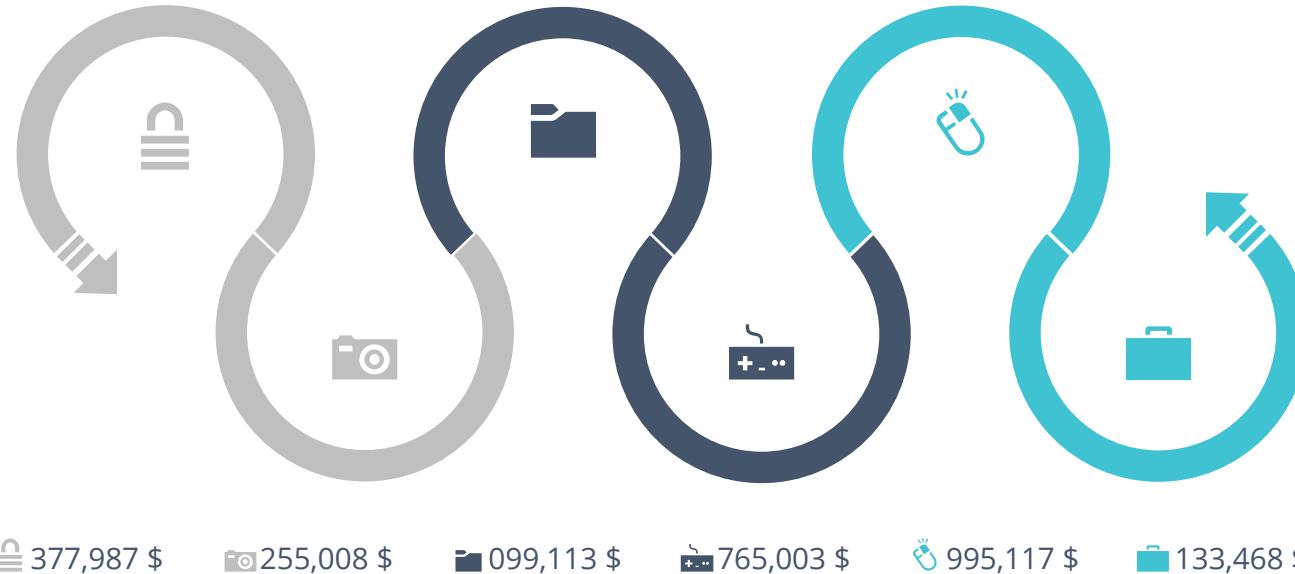


Unlock System

At vero eos et accusamus et iusto odio
ducimus blanditiis praesentium.

Product Template Profit

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



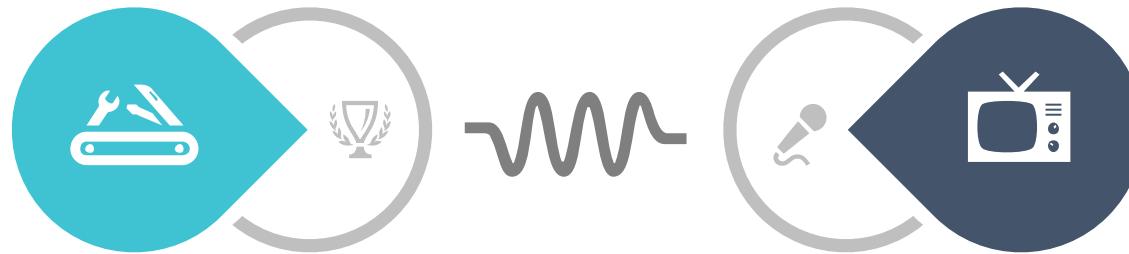
At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio.

Compare Analyses For Us

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est delah eligendi optio cumque nihil abo impedit quo minus amarentoi id eje earum rerum hic tenetur a u sapiente delectus.

Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est delah eligendi optio cumque nihil abo impedit quo minus amarentoi id eje earum rerum hic tenetur a u sapiente delectus.



Invest **900,555,560\$**



Credit **840,900,110\$**



Profit **190,399,870\$**



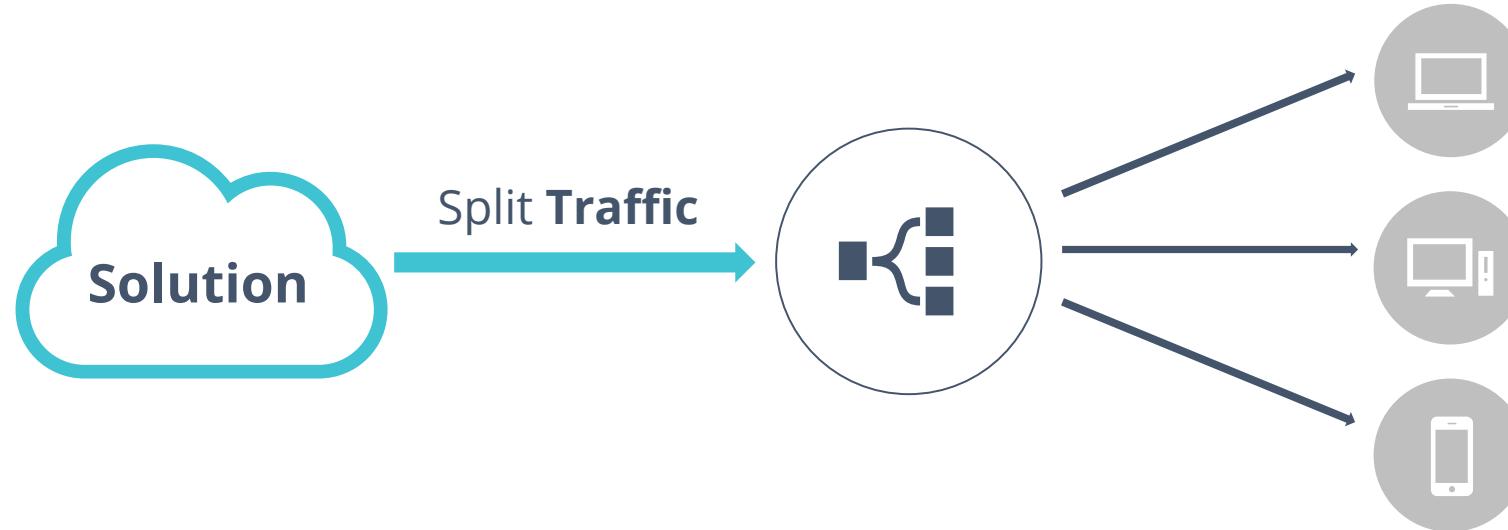
A voluptatem dolore me laudantium,
totam rem aperiam, ea que ipsa quae
ab illo inventore veritatis et quasi
architecto beatae

Nemo enim ipsam voluptatem quia
voluptas sit aspernatur aut odit aut
fugit, sed quia consequuntur magni
sequi nesciunt.

Neque porro quisquam est, qui
dolorem ipsum quia dolor sit amet,
consectetur, adipisci velit, sed quia
non numquam eius modi

Solutions For Devices

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Top Three City Places

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Traffic City



At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat.

Business Place



Cupiditate non provident, similiq[ue] sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio.

Judge Place



Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus.

Timeline Growing

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Business Manager Comments

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Business Conference



Yiusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecati cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga.

Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut rerum necessitatibus saepe eveniet ut et voluptates repudiandae sint et molestiae non recusandae.



From the Blog

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore.



Get in Touch

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore.



Most User Friendly Steps

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Shopping Control

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore.



Library Shelves

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore.



Remote Gaming

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore.



Locking System

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore.

Security Levels

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore.

Voice Volume

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore.

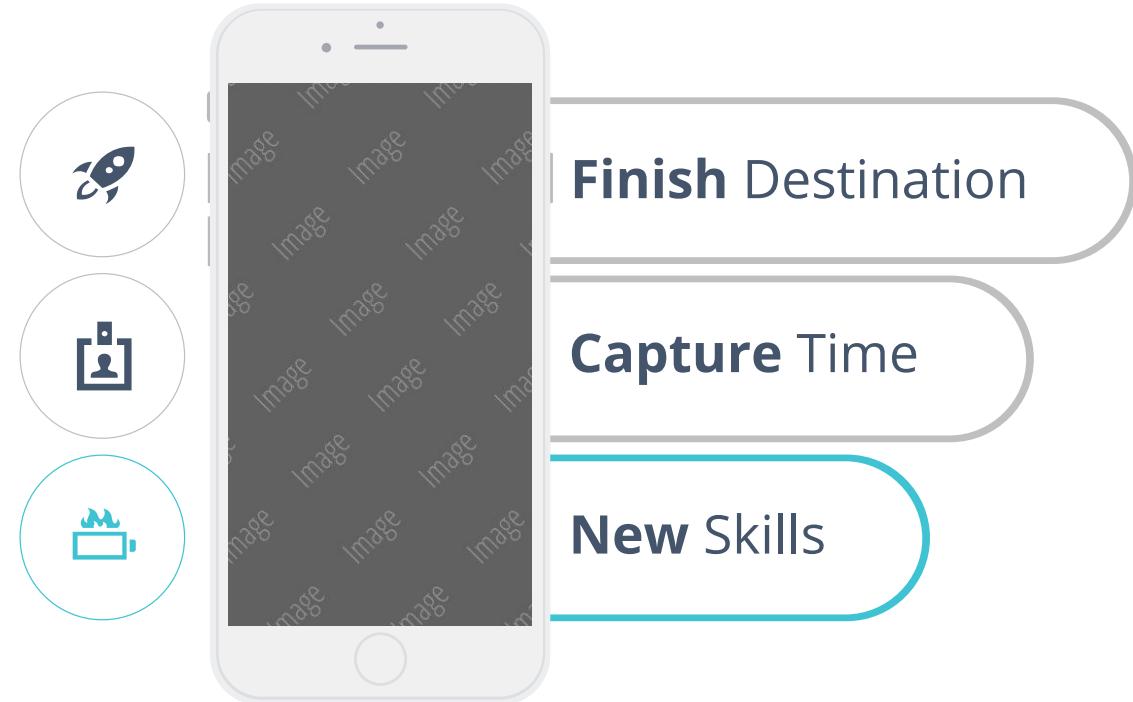
Included Mobile Themes

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos.

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos.

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos.



Compatibility Test

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



Social Media Ad Campaign Success

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



Google Ads

At vero eos et accusamus et iusto odio ducimus praesentium.



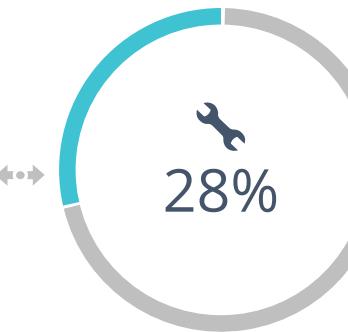
Facebook Ads

At vero eos et accusamus et iusto odio ducimus praesentium.



LinkedIn Ads

At vero eos et accusamus et iusto odio ducimus praesentium.



Twitter Ads

At vero eos et accusamus et iusto odio ducimus praesentium.

DIGITAL CREATIVE AGENCY.

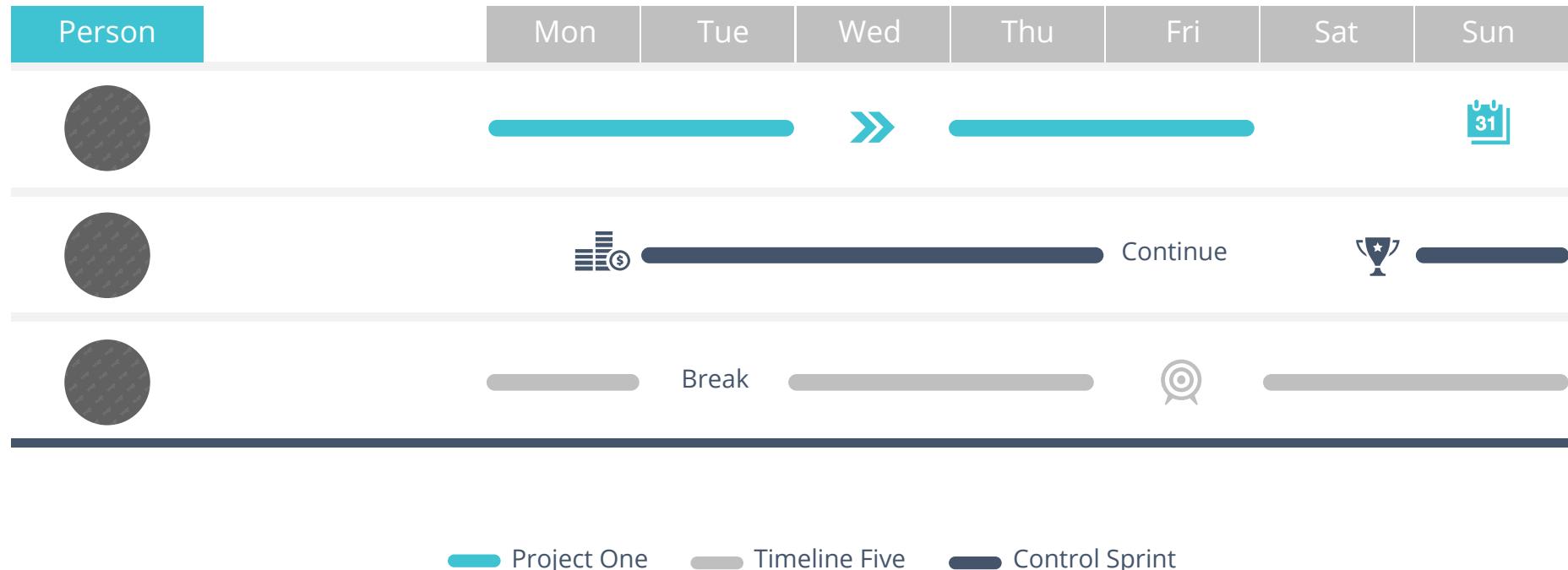
We craft products, experiences & platforms



At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas.

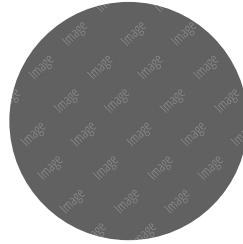
Hack Team Weekly Schedule

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



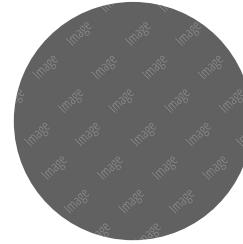
Marketing Readers Today

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



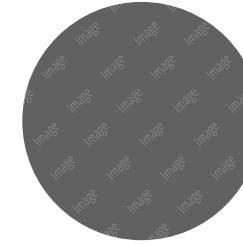
Iren Roe

Et harum quidem rerum
facilis est et expedita
tinctio. Nam libero



John Doe

Et harum quidem rerum
facilis est et expedita
tinctio. Nam libero



Alenn Roe

Et harum quidem rerum
facilis est et expedita
tinctio. Nam libero



High Level Point Location

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Quidem rerum facilis est et expedita
distinctio. Nam libero tempore

56M

58M

73M

Quidem rerum
est et expedita

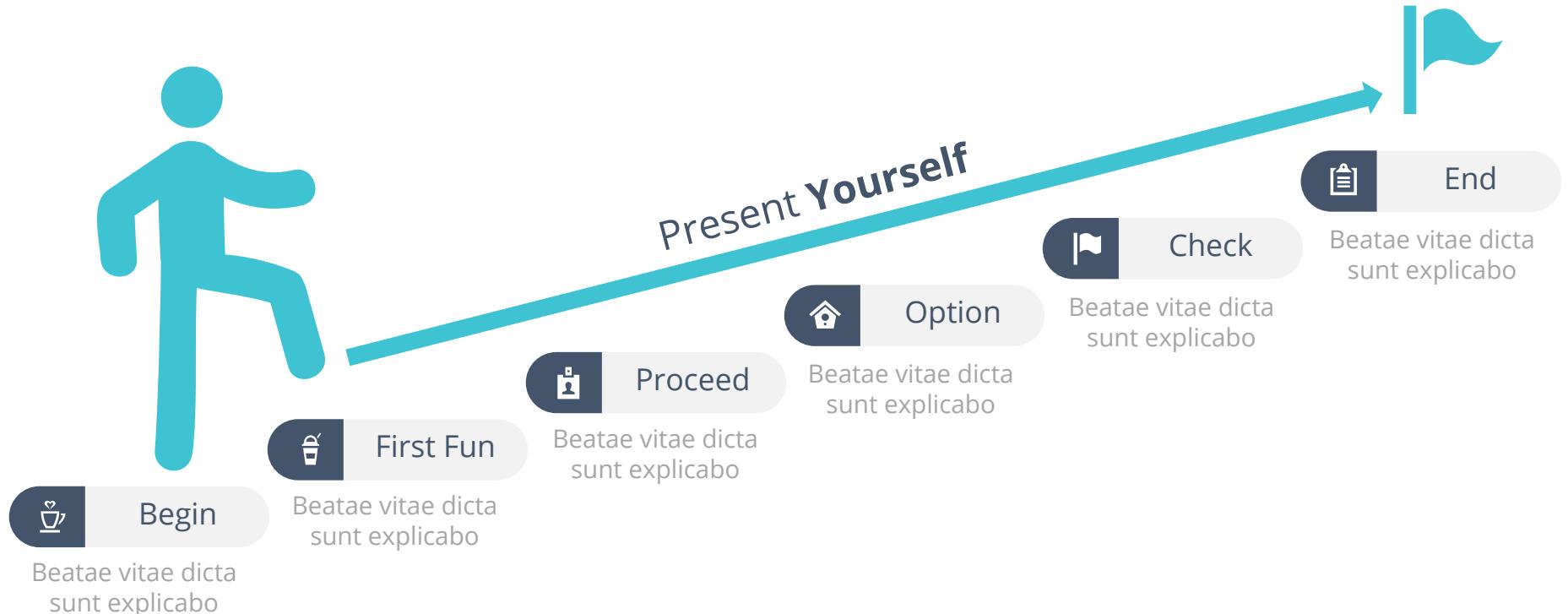
Ame harum quidem rerum facilis est
et expedita distinctio. Nam libero.



DIGITAL CREATIVE AGENCY.
We craft products, experiences & platforms

Needed Steps To Success

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



Last Year Campaign Monitor Chart

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Personal

Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est delah eligendi optio cumque.

Small Business

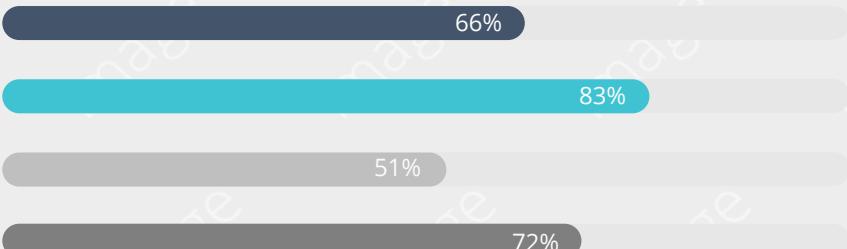
Ame harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est delah.

Business Plus

Quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est delah.

Professional

Harum quidem rerum facilis est et expedita distinctio.



Our Partners Benefit Chart

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas.

Fresh Ideas Income Points

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

Quidem rerum facilis est et expedita distinctio. Nam libero tempore

Ame harum quidem rerum facilis est et expedita distinctio. Nam libero.

Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore.

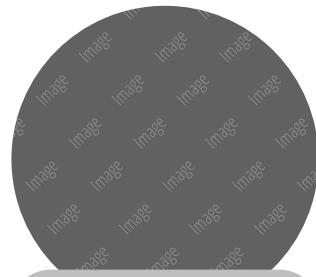
Et harum quidem rerum facilis est et distinctio. Nam libero tempore, cum solute.

Ame harum quidem rerum facilis est et expedita distinctio. Nam libero.

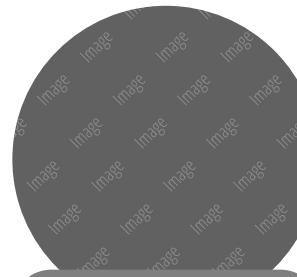
Quidem rerum facilis est et expedita distinctio. Nam libero tempore

New Things Are Awesome

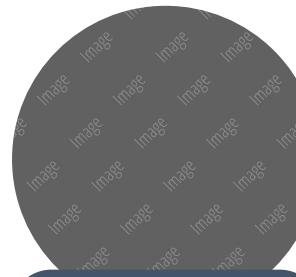
AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



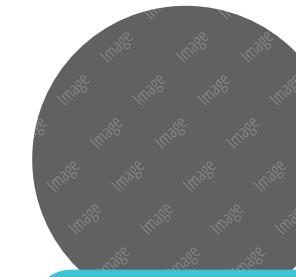
Roof



Phone



Tools



Station

Et harum quidem rerum
facil expedita tinctio
neam libero.



Et harum quidem rerum
facil expedita tinctio
neam libero.



Et harum quidem rerum
facil expedita tinctio
neam libero.



Et harum quidem rerum
facil expedita tinctio
neam libero.



Restore Balance

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas.



Power Supply

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas.

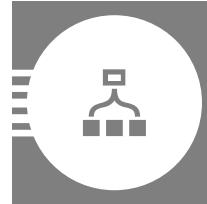


Premium Innovation

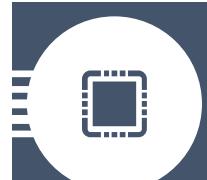
At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et quas molestias excepturi sint occaecat. Cupiditate non provident, similique sunt in culpa qui officia deserunt mollitia animi, id est laborum et dolorum fuga. Et harum quidem rerum facilis est et expedita distinctio. Nam libero tempore, cum soluta nobis est eligendi optio cumque nihil impedit quo minus id quod maxime placeat facere possimus, omnis voluptas.

Just Build It By Three Skills

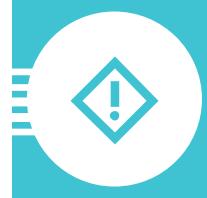
AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et i nesciunt. Neque porro quisquam est.



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Impressive SWOT Analyse

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Success **CORPORATE**



Avoluptatem accusantium
doloremque laudanti, et
quasi architecto beatae



Blockchain-X
Alexa
Fred-O

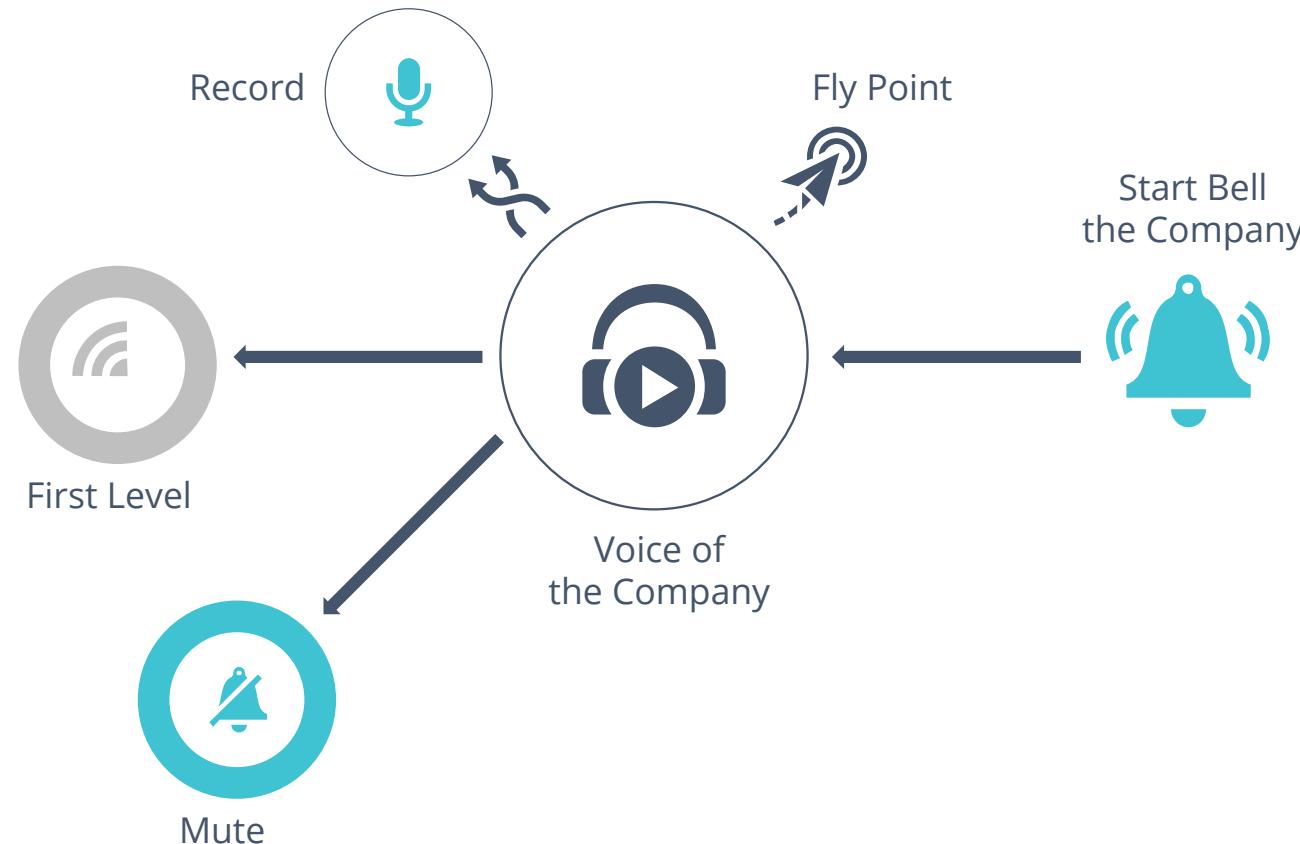
Building Model Structure

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Voice Of The Company

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QUESTIONS TIME!
Have a question? Ask NOW!

General Sponsors:



Pr Agency Benefit Scheme

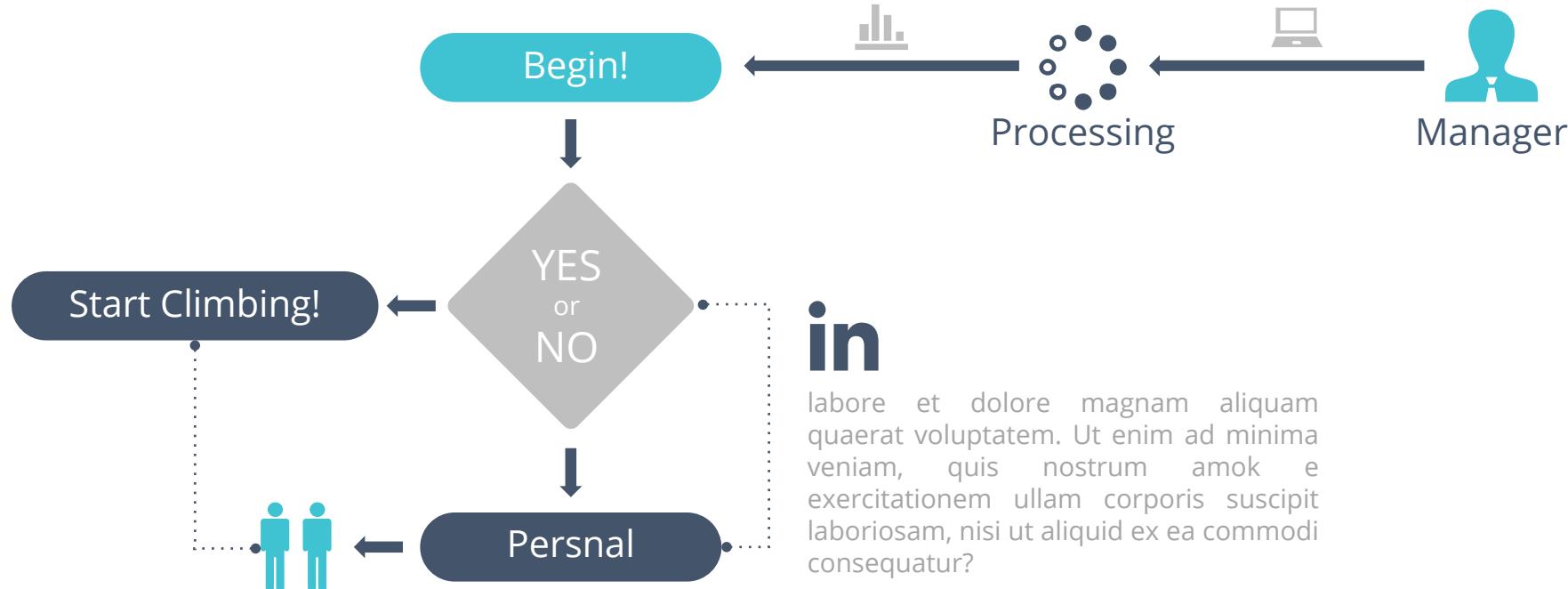
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Time Planning Issue Algorithm

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Healthcare Startup

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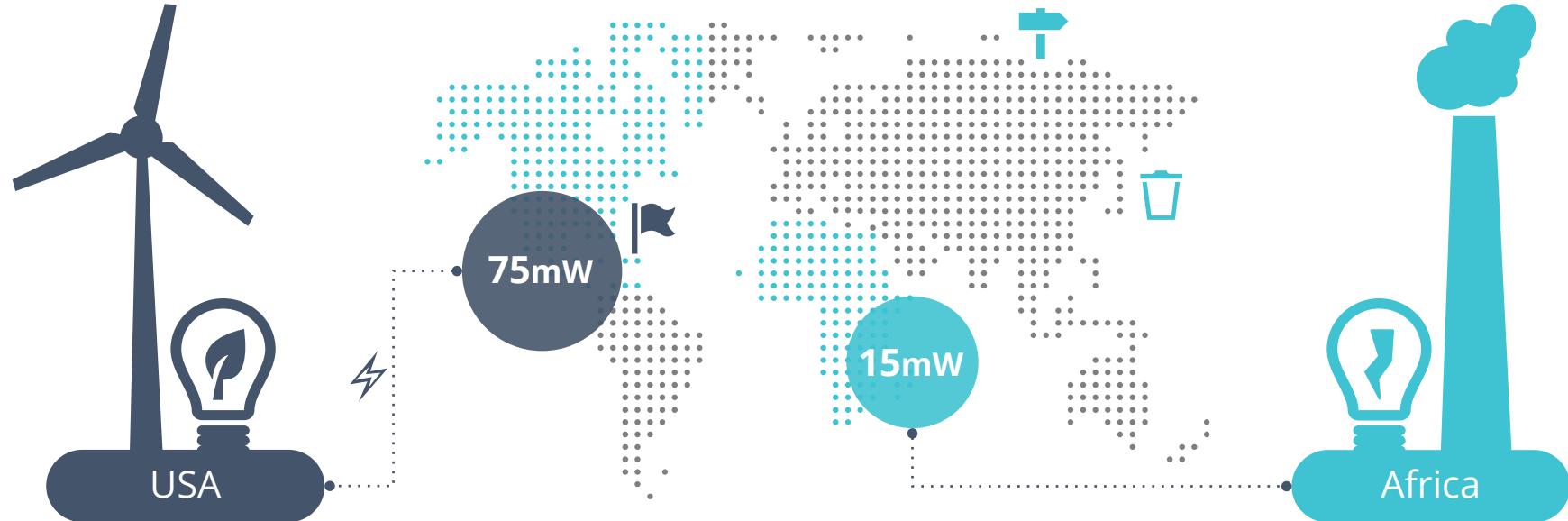
Manager Best Research Algorithm

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World ECO System Problems

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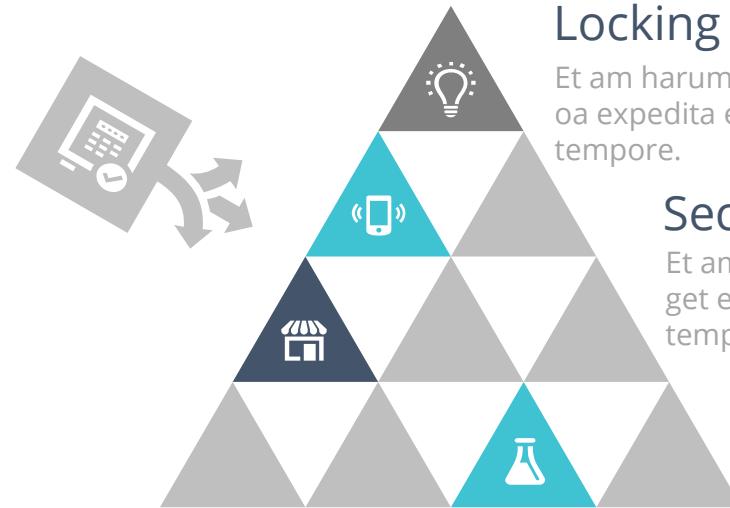


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Innovation Studio Pyramid

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Locking System

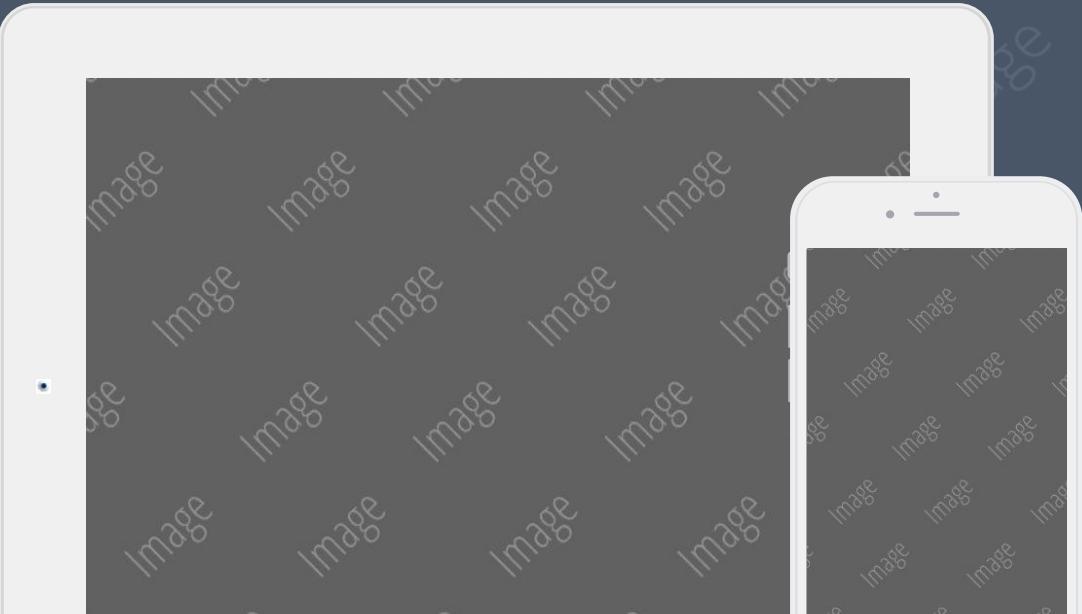
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Security Levels

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Voice Volume

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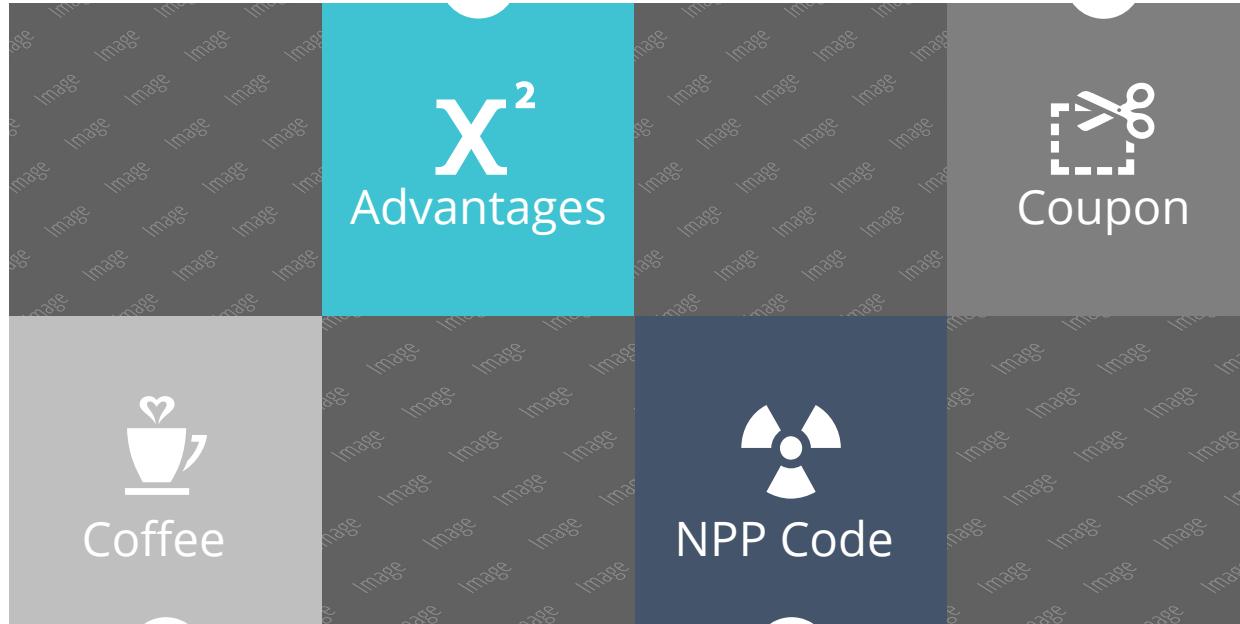


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that transform brands

Magazine Gallery Pages

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Company Gallery

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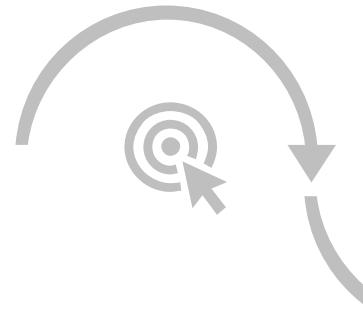
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Mobile Results You Need

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RSS Feed

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Fresh Ideas

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Access Deny

At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

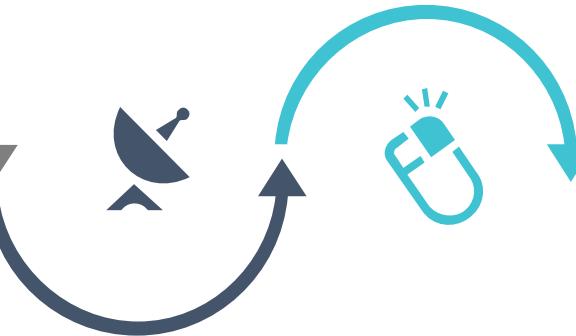


Code Design

At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Unlock System

At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.



We Know
HOW TO DO IT

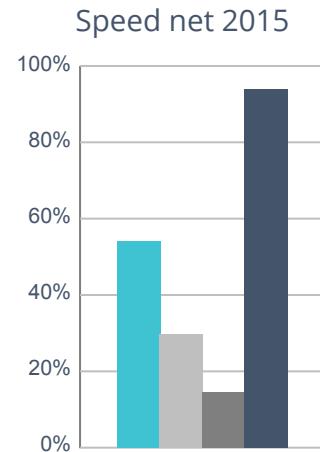
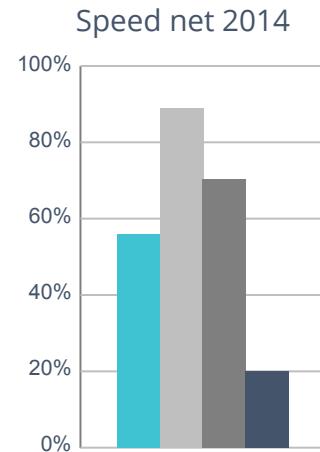
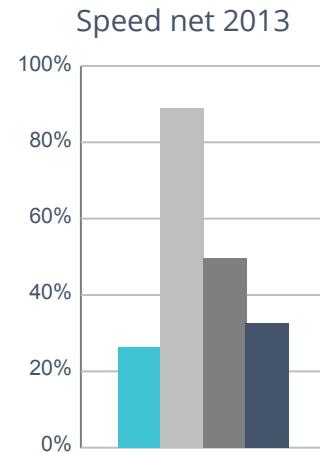
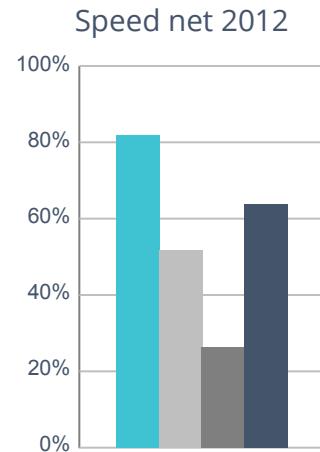


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veritatis et quasi architecto.



Speed Net Results Last Years

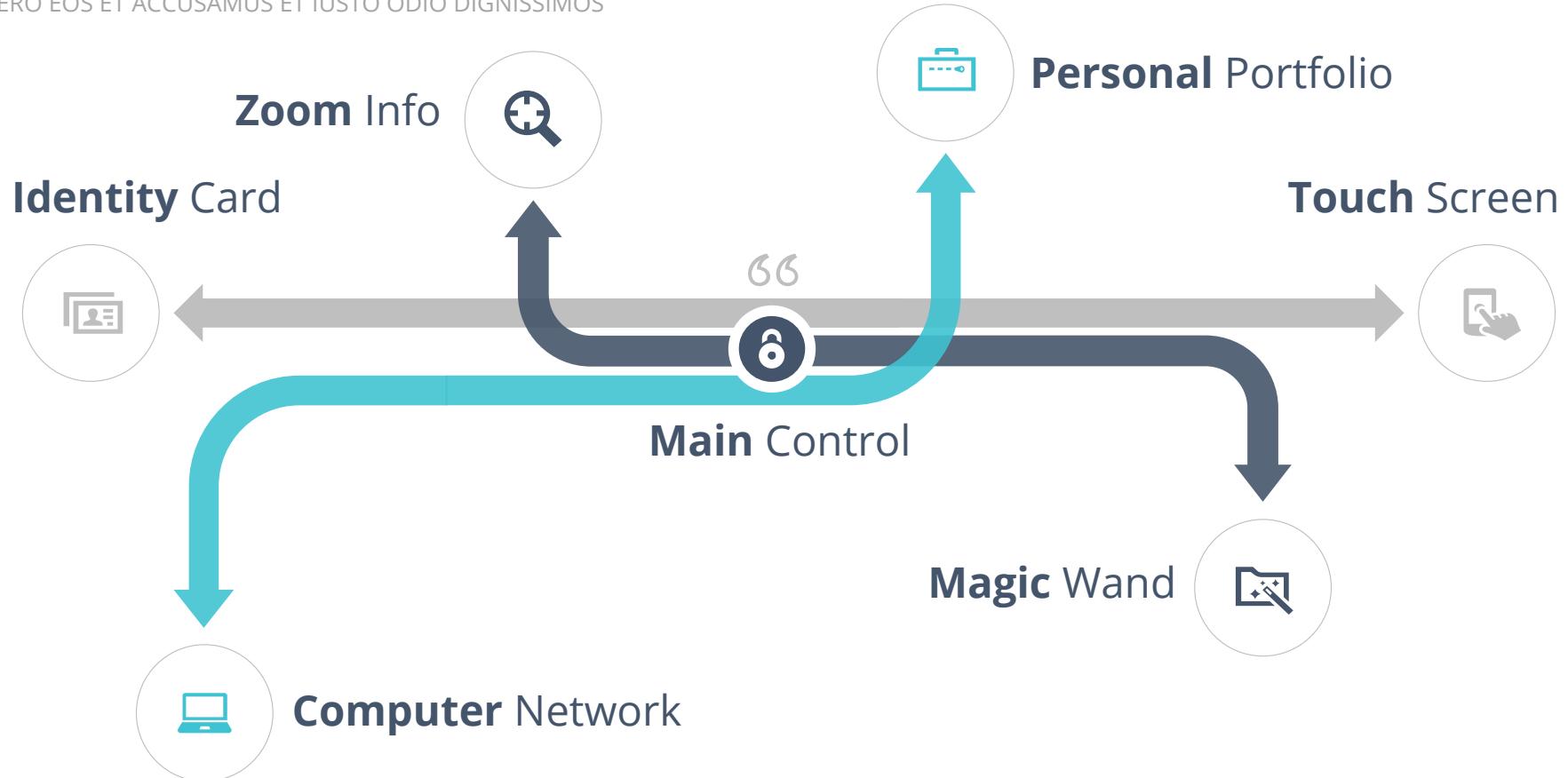
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■ London ■ Madrid ■ Muenchen ■ Roma

Security Control Program

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Europe Technologies Countries

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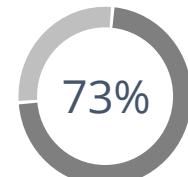
Germany

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Spain

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France

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Idea Control

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Library Shelves

Avoluptatemi accusantium doloremque a laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore architecto beatae amer.

Voice Volume

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Customer Support Plan Table

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Personal	Small Business	Business Plus	Professional
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Winner Professional Ways

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Stock Photos

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Modern Artwork

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Development Issue

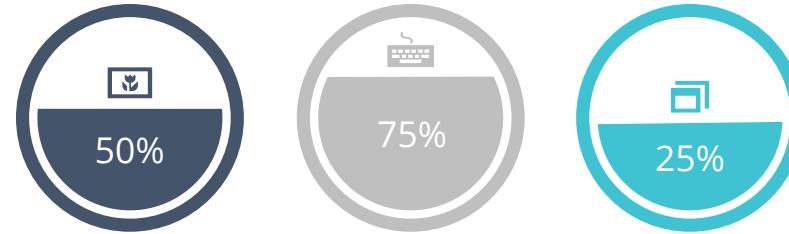
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Unique Webdesign

New Product Profit

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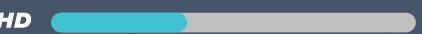
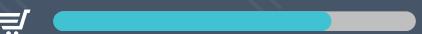


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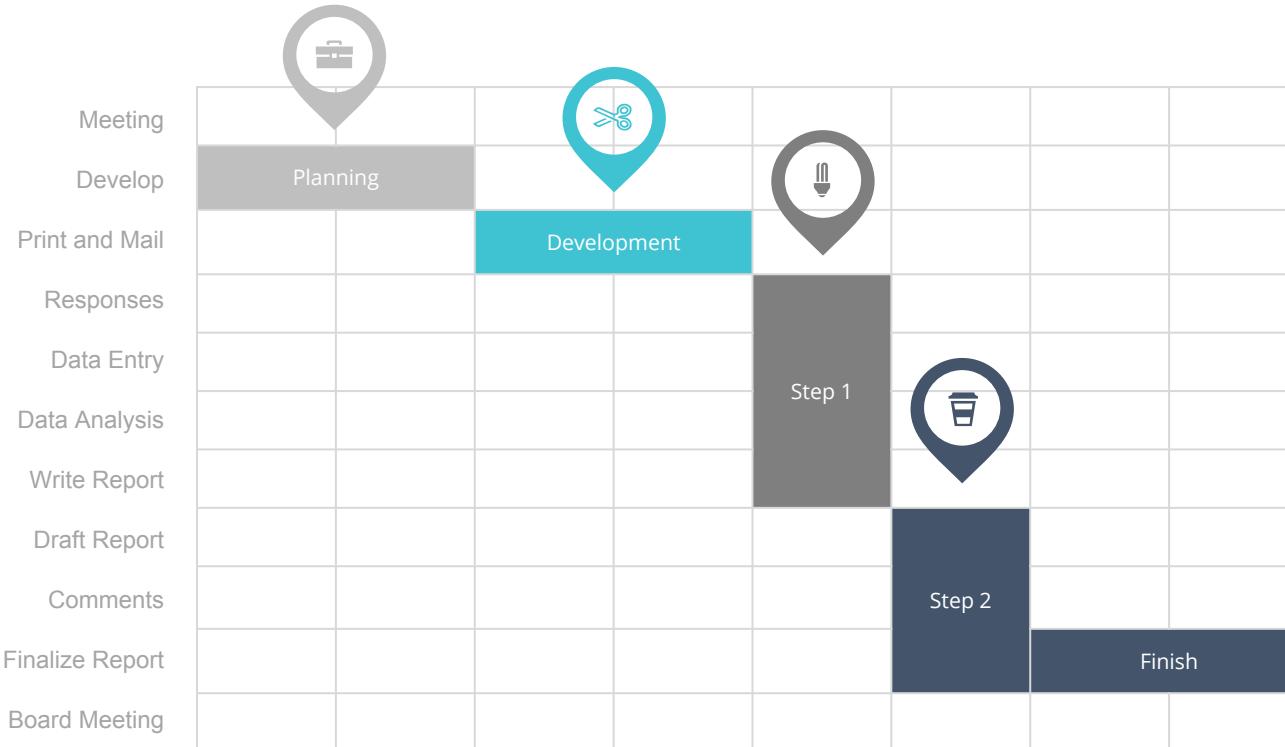
John Doe

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inventore veritatis et quasi architecto beatae



New Project Complete Schedule

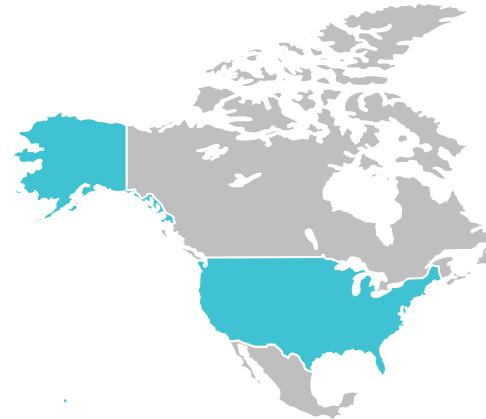
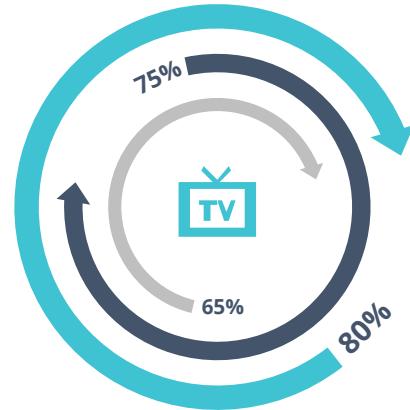
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Most Appropriate Markets Ever

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- ➡ Ret iusto odio ducimus blanditiis praesentium.
- ➡ At vero eos et accusamus et iusto odio ducimus blanditiis praesentium.

Remote Management Factors

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RSS Feed

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Fresh Mind

Ret iusto odio ducimus blanditiis praesentium.



Page Templates

Moeet accusamus et iusto odio ducimus blanditiis praesentium.



Steering **WHEEL**



A voluptatem accusantium
doloremque laudanti,
veritatis et quasi architecto
beatae



Online Shop SEO Tricks

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Adequate Human Commands

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Person Construct

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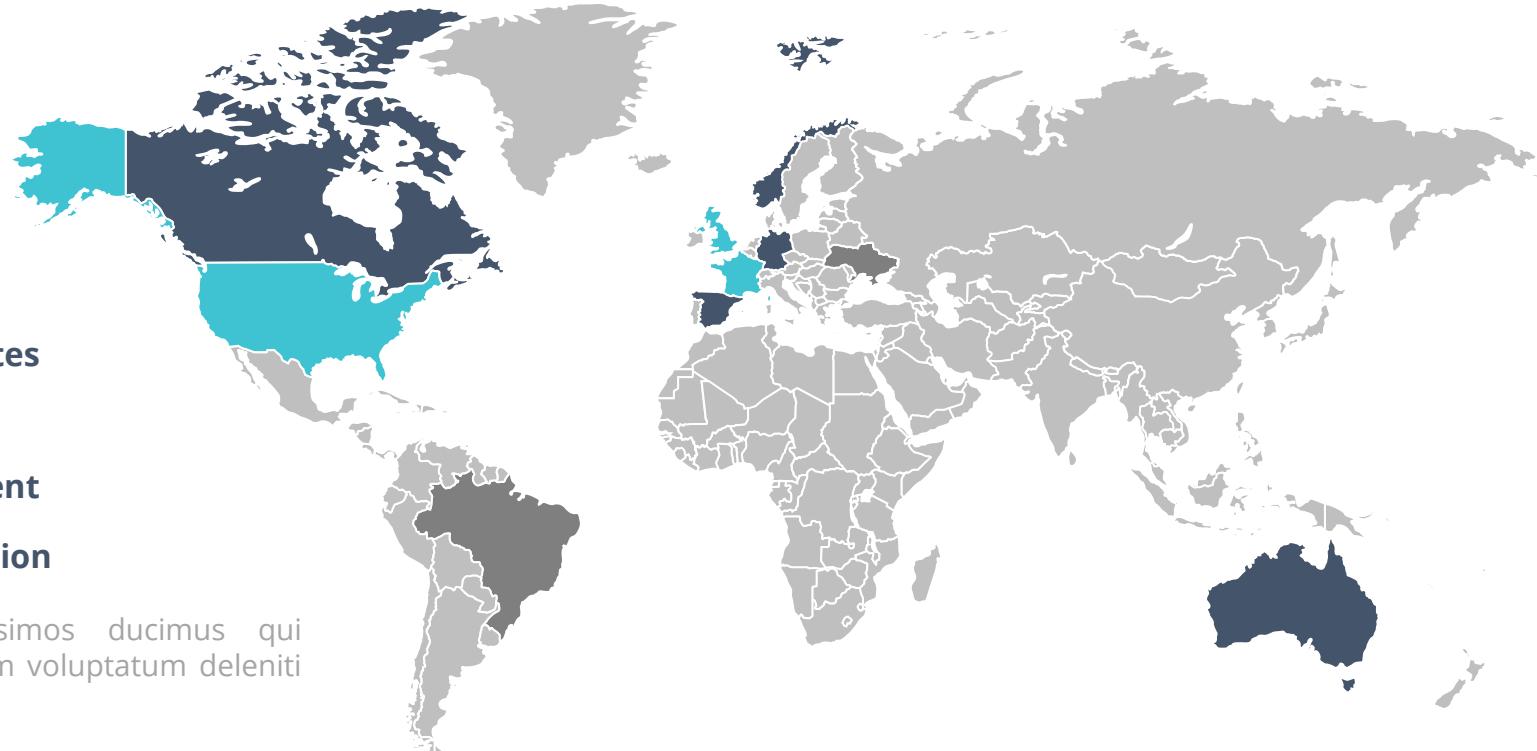
At vero eos et accusamus.

Developed Countries Government Status

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- Economy Updates
- Justice Trust
- New Government
- Lasting Stagnation

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blanditiis praesentium voluptatum deleniti
molestias excepturi.





LET'S START at the beginning!

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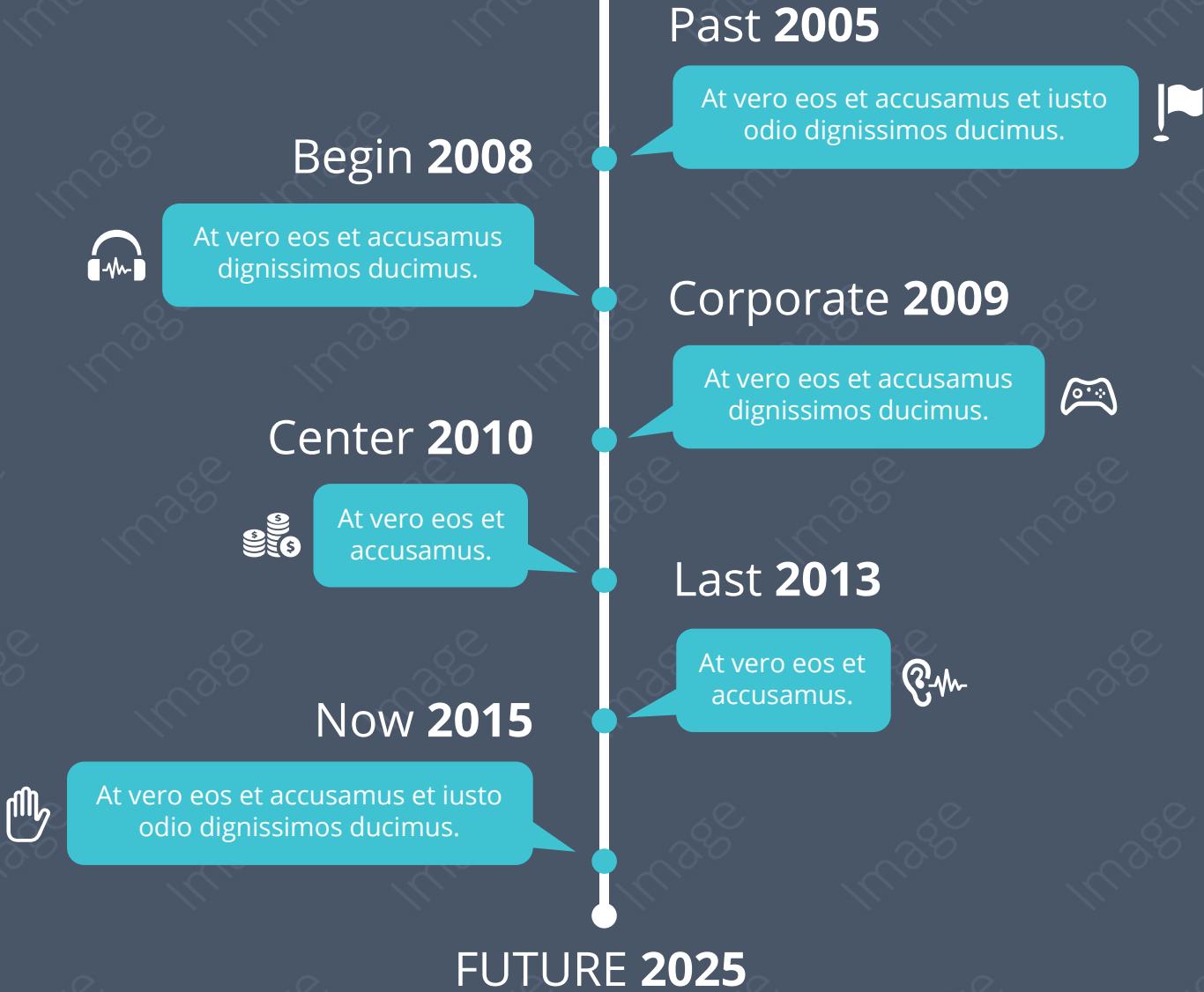


Balanced Collaboration Comes first

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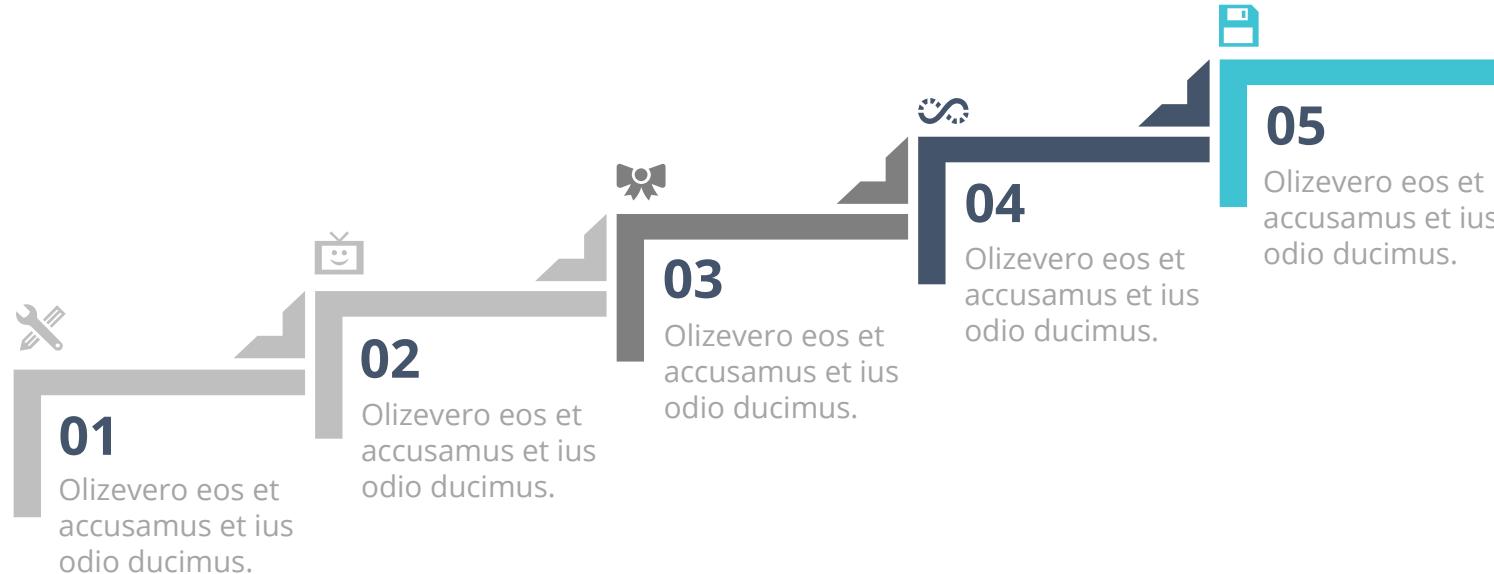


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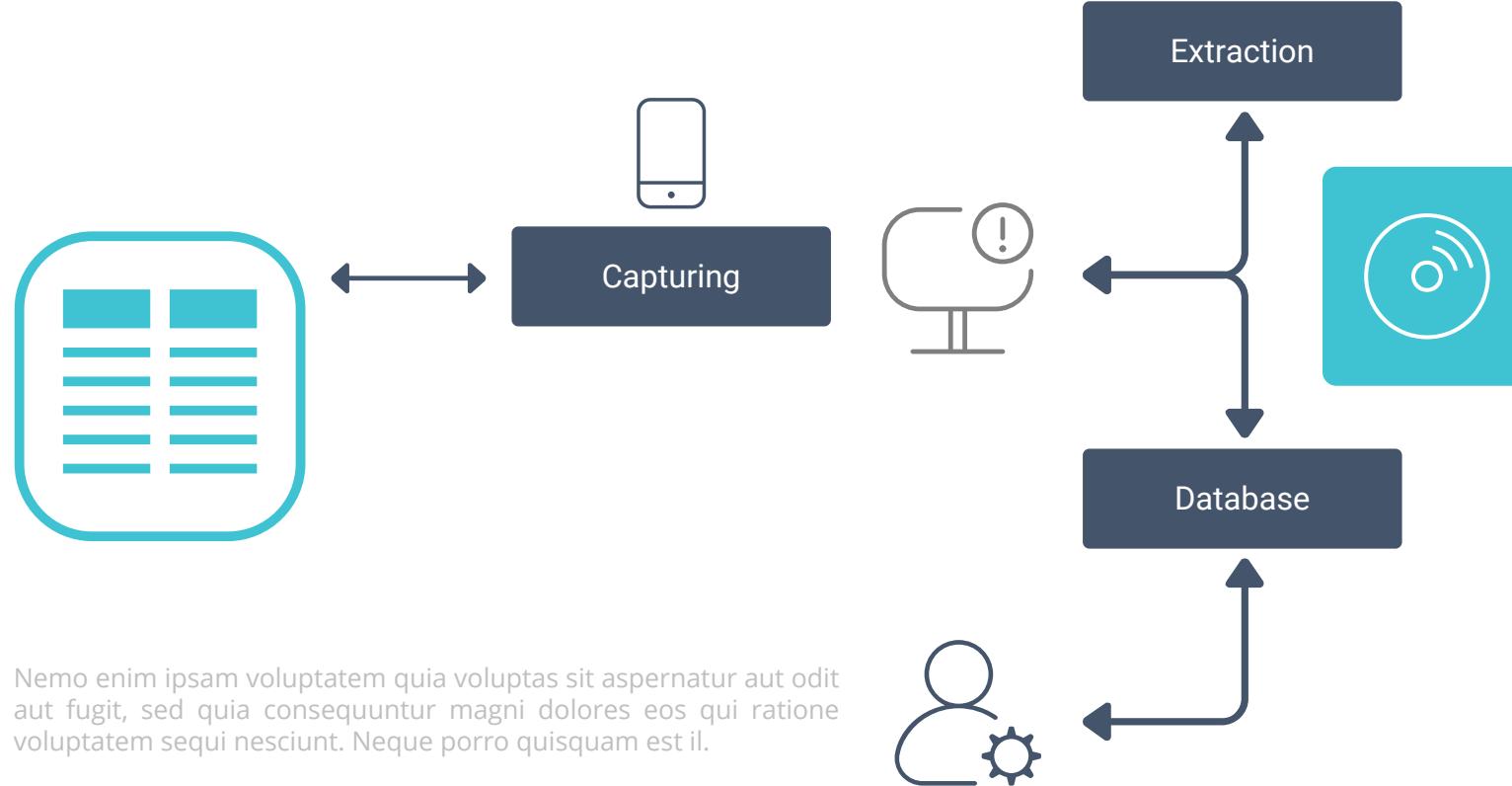
Step By Step Control Area

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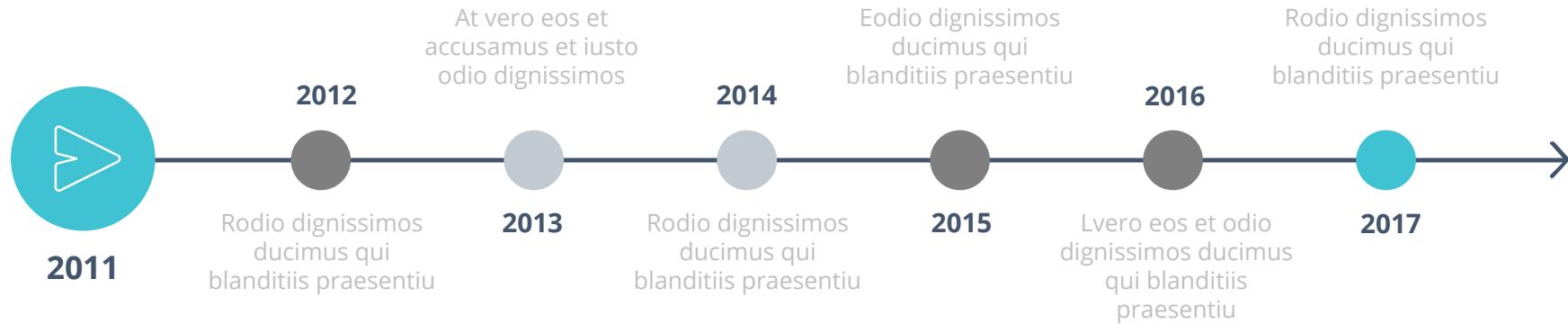
Typical structure of fingerprint system

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Set Appropriate Indicators and Targets.....

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Market Shaping Industry Reporters

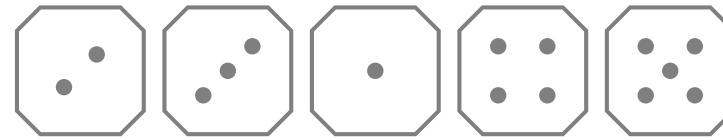
AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS

White space

Be consistent

Best Practices

GOOD Luck!



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dicta sunt explicabo.



Typical Structure of Successful Events

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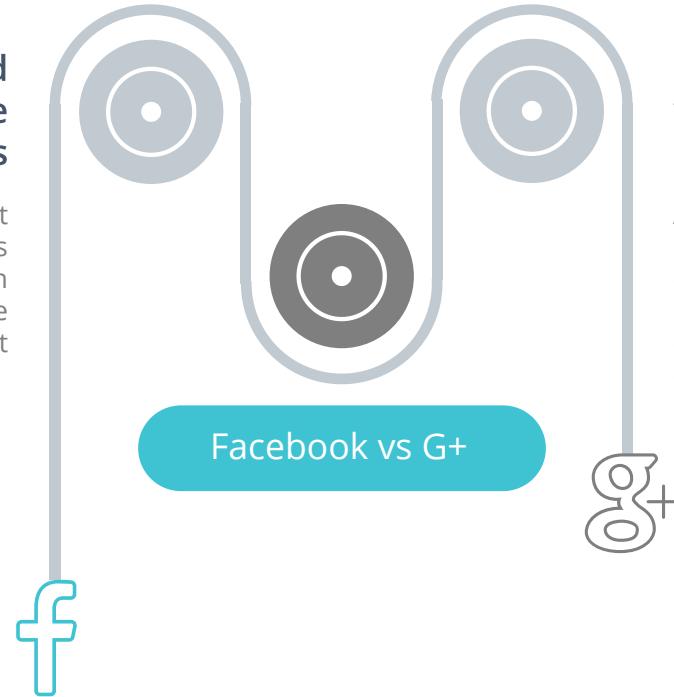


Simple & Powerful Tools

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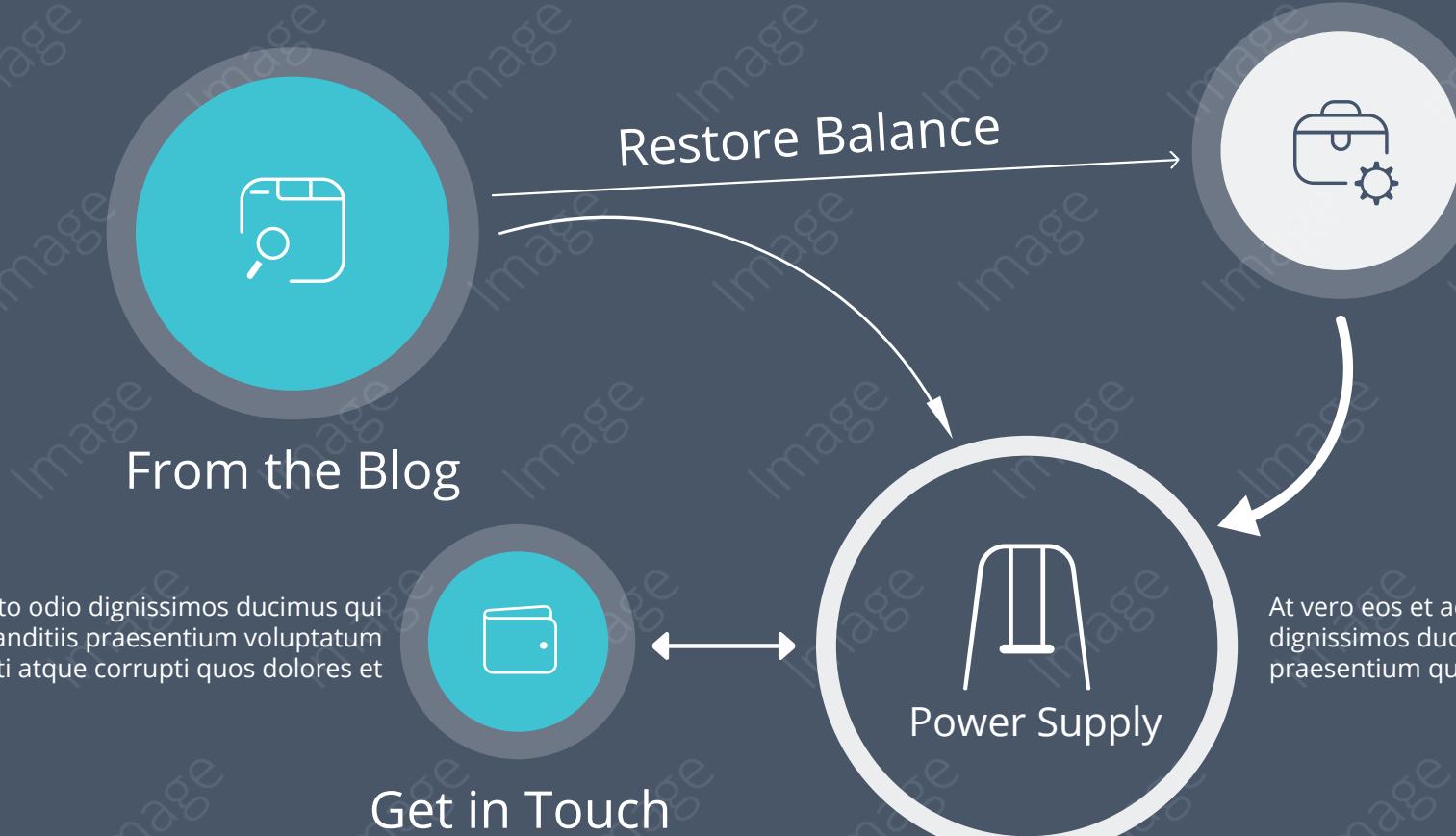
Built-in and downloadable tools

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et



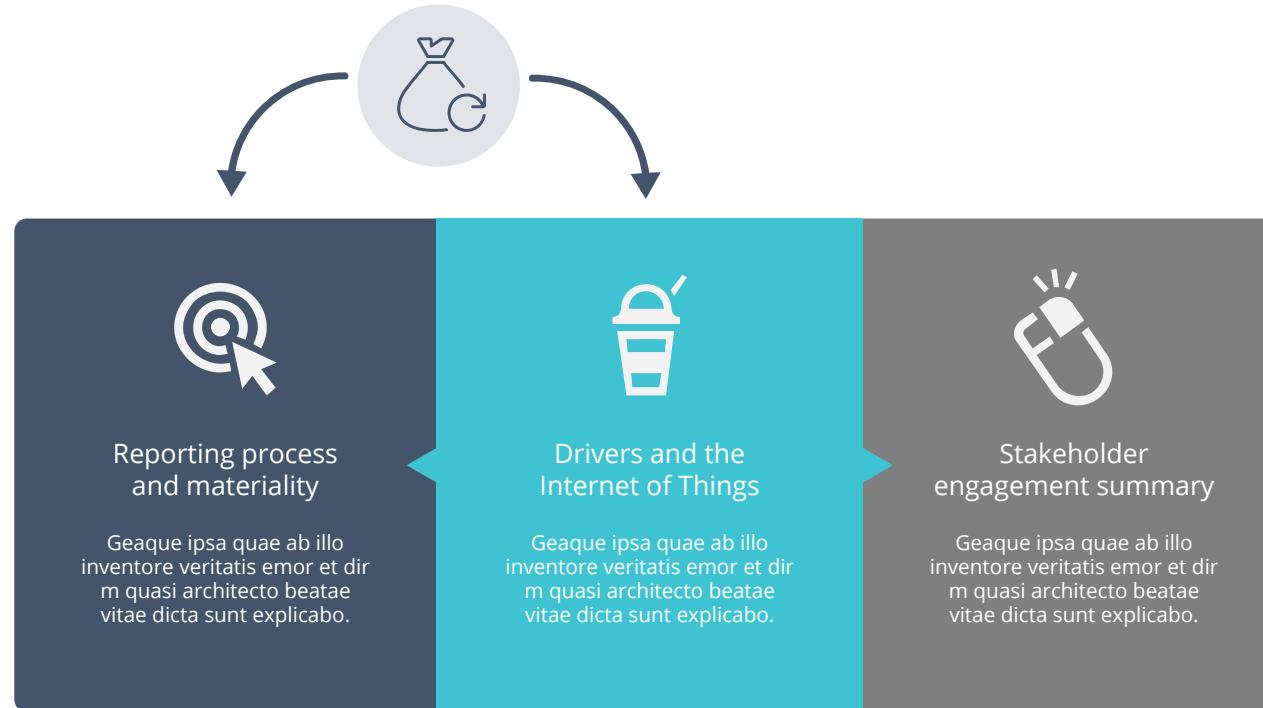
User accounts with administrative access

At vero eos et accusamus et iusto odio dignissimos ducimus qui blanditiis praesentium voluptatum deleniti atque corrupti quos dolores et



Reporting process and materiality

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We Serve all Industries

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The leading cloud

Typical structure of fingerprint system

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Facebook

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Google +

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Expand bank strategy

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Global Solutions

Et am harum quidem rerum on facilis est et expedita e distinctio. Nam libero tempore, cum soluta nobis est eligendi dikame optio cumque nihil.

Affiliate Programs

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Premium Services

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High Definition

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Company Contacts

AT VERO EOS ET ACCUSAMUS ET IUSTO ODIO DIGNISSIMOS



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Genovan Street Light Avenue 2018 Str.

Company E-mail Address

youremailaddress@email.com

Phone Number

00 (123) 456 78 77 33 ; 00 (669) 77 22 555

Fax Number

(123) 456 78 21 21; (669) 77 22 990



Thanks for Watching

Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium,
totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto.

