Blockchains and Cryptocurrencies

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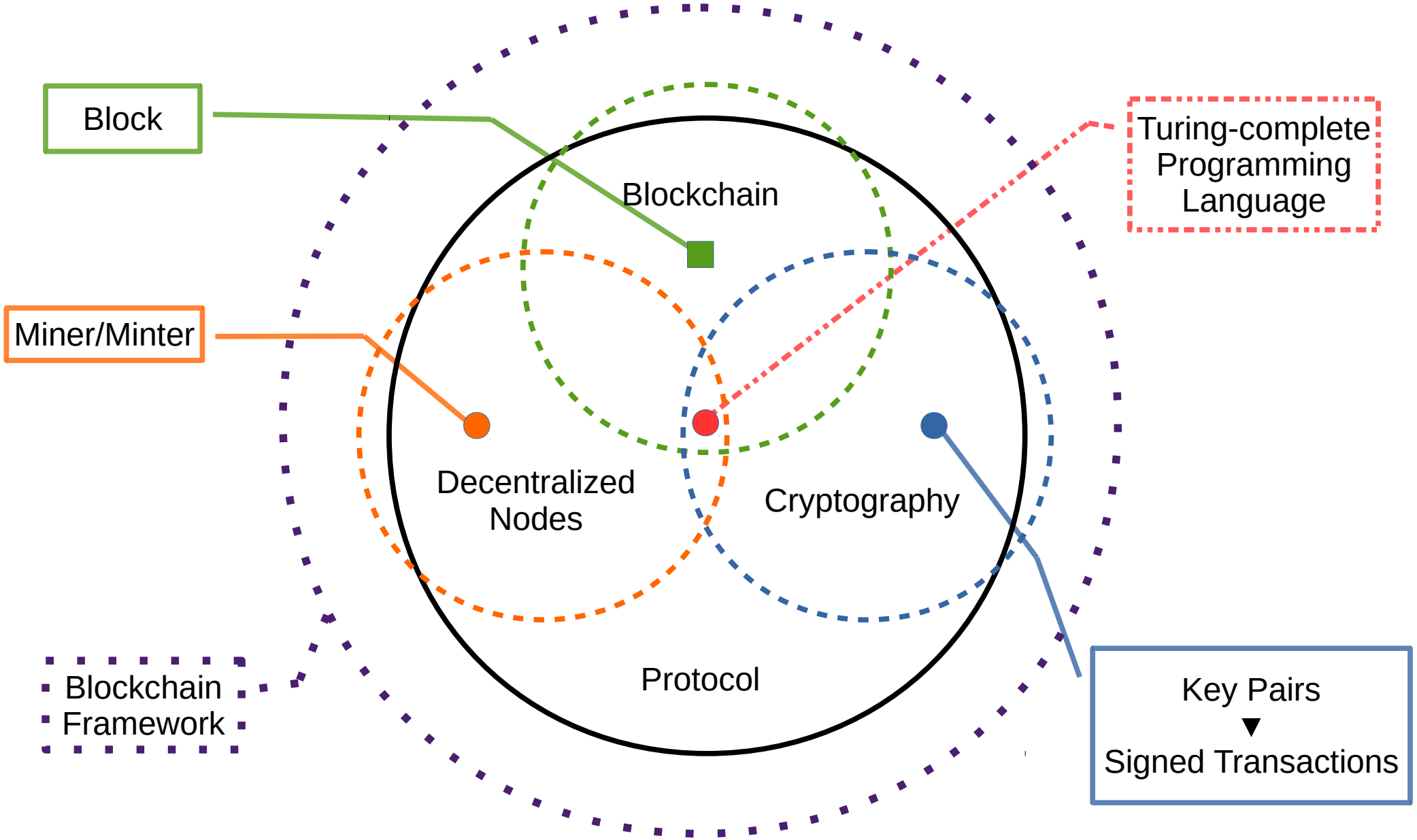
On behalf of Wyrd Solutions

Introduction

- Blockchain
  - a new type of database for storing transactions (series of blocks)
- Miner
  - a computer with special software that packages transactions into blocks to collect rewards
  - Proof of Work vs. Proof of Stake
- Cryptofinance
  - financial tasks guaranteed using strong cryptography
- Cryptocurrency
  - A currency system, secured by cryptography (keys, hashes)
- Wallet
  - Software on your computer storing private keys for your accounts
- Smart Contract
  - Code in accounts used to control transactions
- DAO/DAC
  - Decentralized Autonomous Organization/Corporation

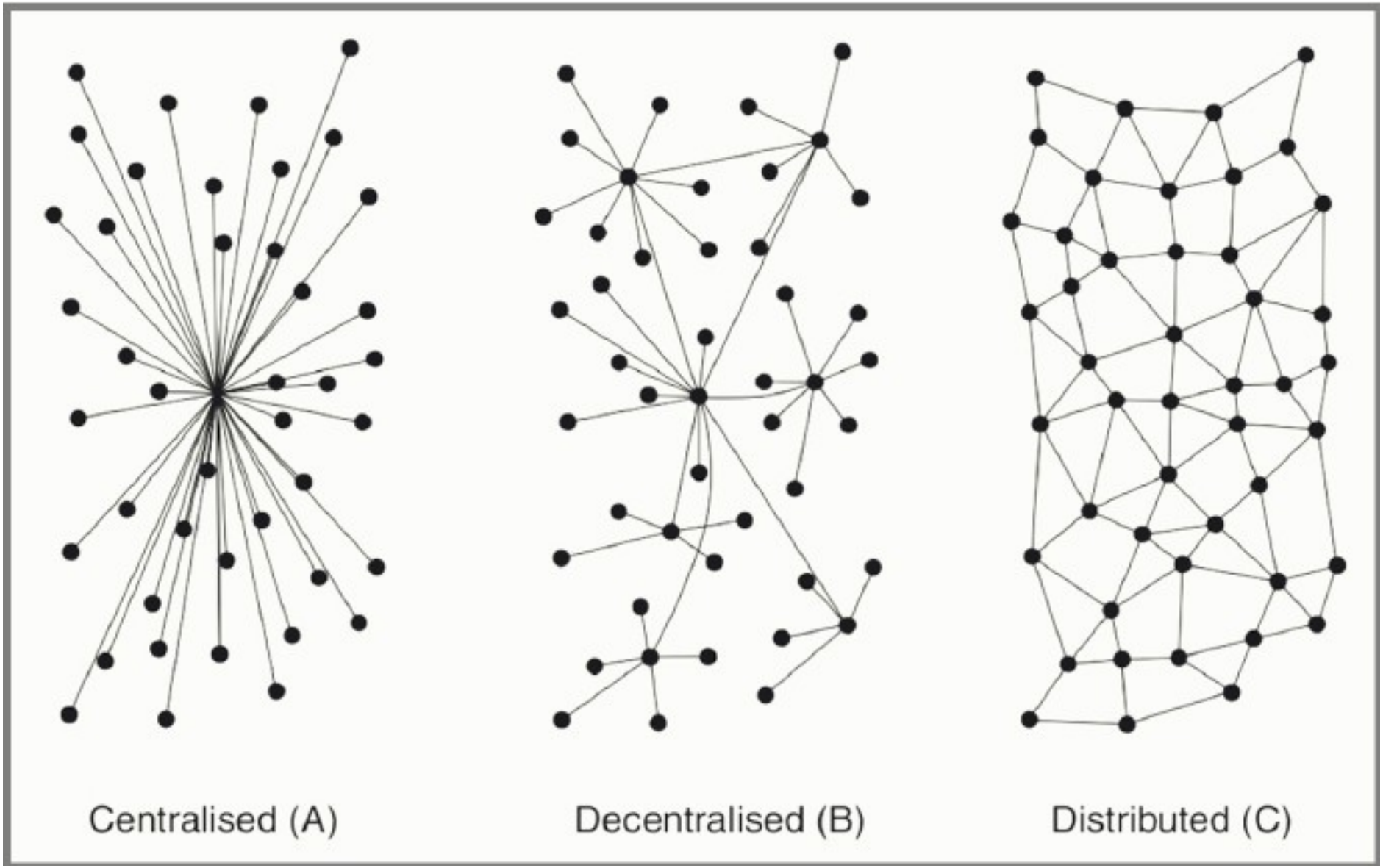
Source: https://github.com/joeblankenship1/blockchain_presentation

Introduction



Source: Joe Blankenship

Introduction



Source: https://www.researchgate.net/figure/260480880_fig1_Figure-1-Centralized-decentralized-and-distributed-network-models-by-Paul-Baran-1964

Introduction

- Hashing Algorithms
  - SHA encryption
  - Merkle/Radix (Hash) Tree Structures
- Proof-of-work
  - Computational power
- Hard fork vs. Soft fork
- Consensus/Governance Algorithms
  - Bitcoin Protocol
  - Ethereum Protocol
  - Many others
- Public vs. Private (permissioned)

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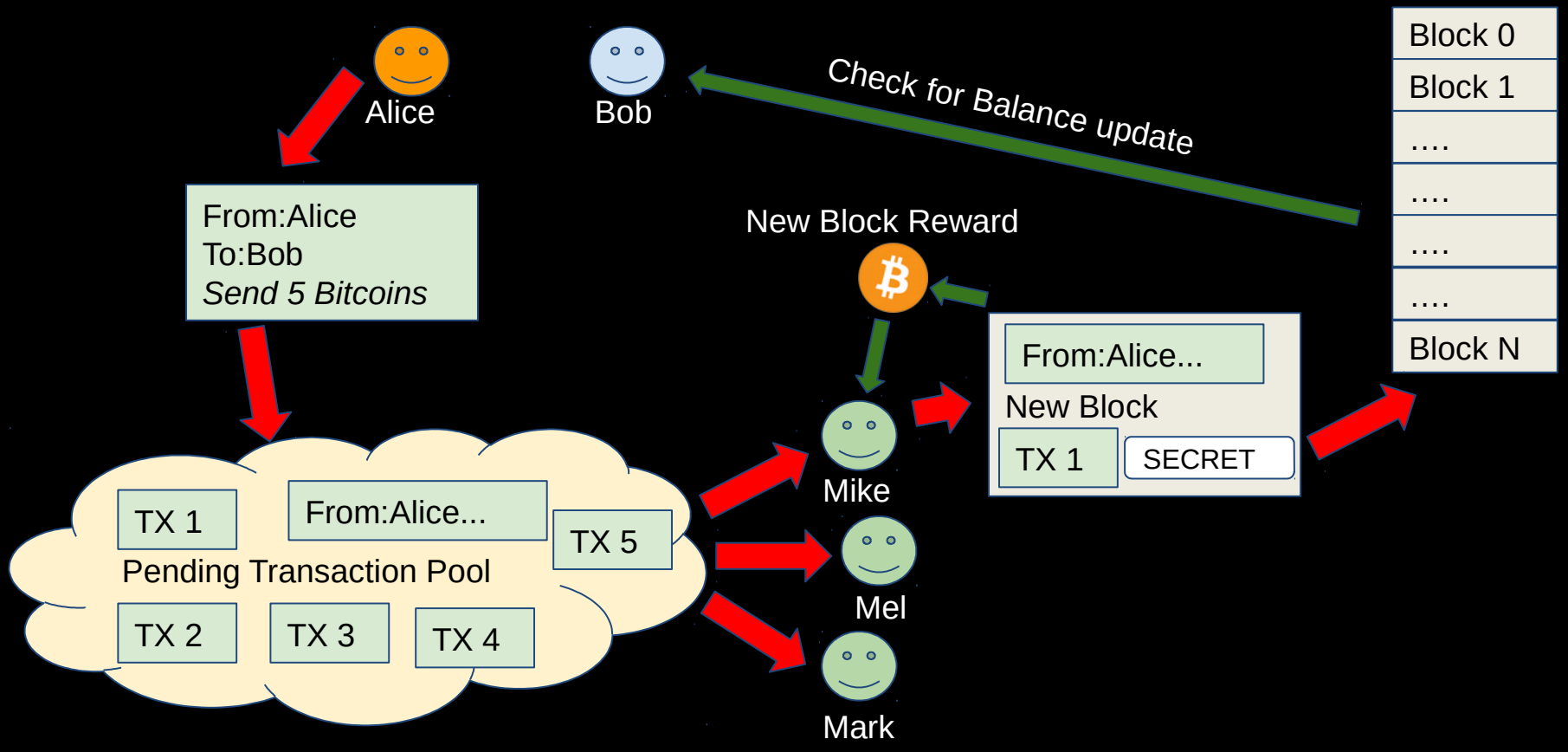
Introduction

How the Blockchain works



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Key Players

- Bitcoin - the birth of the blockchain
  - Created by “Satoshi Nakamoto” in 2008
  - Volunteer computer network for transferring Bitcoins
  - Maximum 21 Mil Bitcoins, ~16.4 Mil circulating today
  - Market Cap ~36.6 Billion USD (as of 31 May, 2017)
  - Transactions occur directly between 2 people, no middle-men
  - All accounts, balances, and transactions are public
  - Transactions take 10 min. to finalize and are not reversible

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Key Players

- Ethereum - the Smart Contract revolution
  - Created by Vitalik Buterin in 2013 (first released in 2015)
  - The World Computer - compute, communication, storage, security
  - Smart contract code lives on the blockchain; users pay others to run the code
  - No maximum amount of Ether (ETH). Currently ~92.1 Million circulating
  - Fast transaction confirmation times (~15 seconds)
  - Forked in Aug 2016 to reverse a hack; Ethereum Classic (ETC) retained the hack

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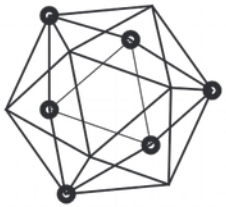
Key Players



- HyperLedger - enterprise blockchains
  - Multi-industry collaboration project started in 2015 by the Linux Foundation
  - Collaborators include every major financial institution and many tech companies
  - Private, permissioned blockchains for large companies, with arbitrary topologies
  - Intel’s blockchain project is called Sawtooth, targeting IoT (mobile, sensors, etc)
  - IBM’s blockchain project is called Fabric, targeting large enterprises
  - Developer tools are very mature, currently getting the most corporate interest

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Key Players

- Open Transactions - blockchain gateways
  - Created by Chris Odom in 2011 and released as open source
  - Currently being heavily developed by StashCrypto for voting pools
  - Client-Server architecture with no blockchain and no transaction history
  - Financial cryptography library for encryption, messaging, and balance tracking
  - Features anonymous digital cash, smart contracts, and custom asset types
  - Recommended usage as an exchange gateway, IoT clients, mobile clients, disposable assets, and temporary tokens

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Key Players

	Namecoin	Censorship-resistant DNS	2011
	Litecoin	silver vs Bitcoin gold	2011
	Ripple	Near-free Paypal	2012
	Dash / Monero	Anonymous, instant transactions	2014
	CureCoin / GridCoin / PrimeCoin	Scientific Research	2014
	Steem / Synereo	Social media platform	2015
	MaidSafe	Distributed data and web apps	2016
	ZCash	Private/selective transparency	2016

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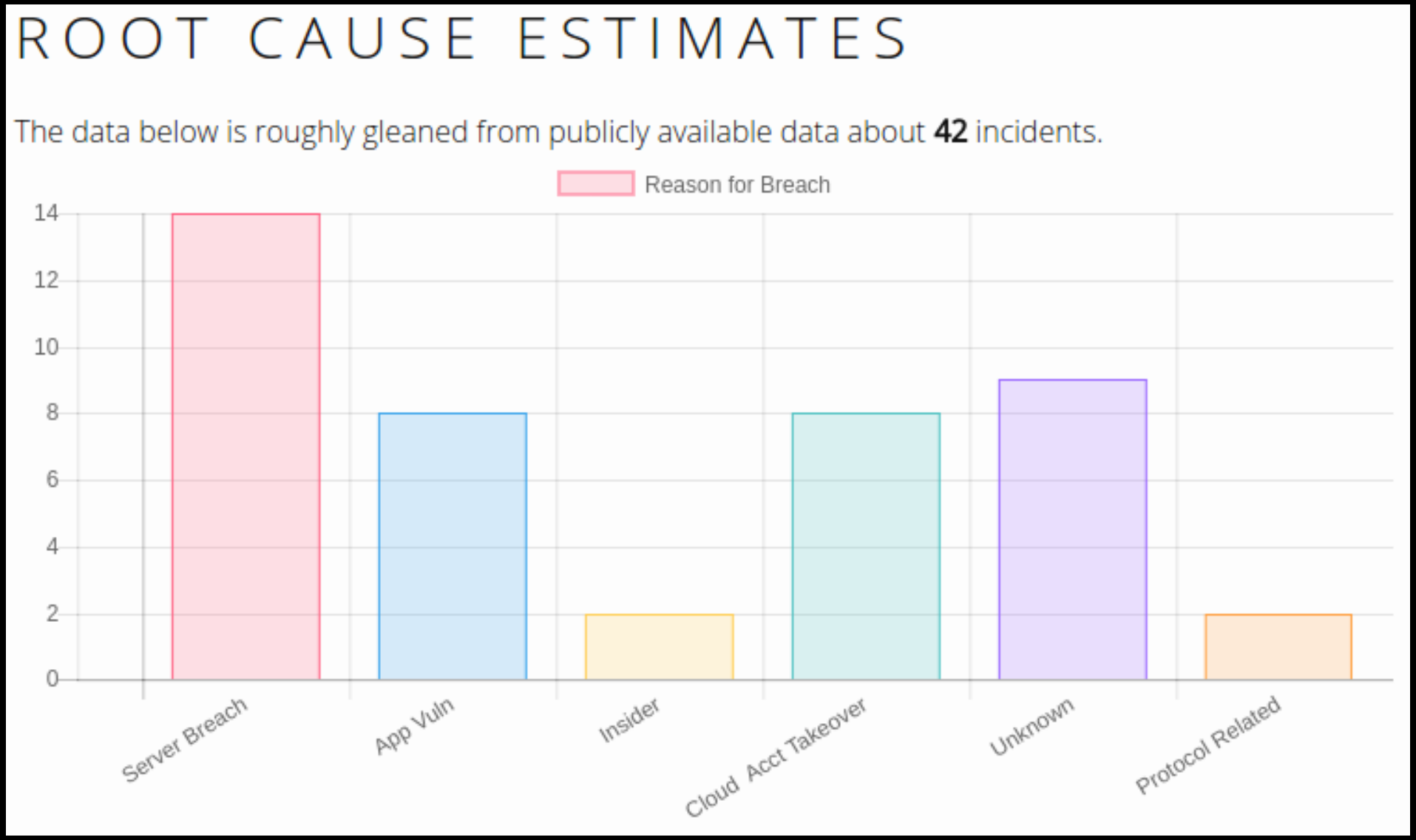
Hacks



Source: https://magoo.github.io/Blockchain-Graveyard/ - https://steemit.com/bitcoin/@michaelmatthews/list-of-bitcoin-hacks-2012-2016

Hacks

- 51% attack
- Recursive calling
- Hot wallets/Cold storage of keys
- API vulnerabilities
- Dependency backdoors
- Spear-phishing
- Embedded scripts (emailed docs)
- Admin access
  - Servers
  - Cloud infrastructure
- 3rd party plugins
- SQL Injection
- Man in the middle
  - Simultaneous requests
- DNS Hijack
- Stolen credentials

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Future of Blockchain

- Decentralization & distribution
  - Political and economic balances > Power dynamics
  - Corporations/Governments may be formalized through DAO governance
- Alternative Economies
  - “Middle Men” & Labor Dynamics
    - “Micro-employment”
  - Personal currencies backed by personal value
  - Patents, Intellectual Property, Immaterial Property (data)
- Speculation and Investment
  - Distributed, anonymous, scam-resistant currency exchanges
- Cryptocurrency vs. Fiat vs. Credit
  - Is it money? Is it capital?
- Ethical Computation

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Future of Blockchain

- FinTech
  - Wall Street, HyperLedger, Blockchain Alliance, B3i, Ethereum
- Data Storage & Record Keeping
  - IPFS, Storj, MaidSafe, Permacoin
- Voting/Legislation/Regulation
  - FollowMyVote, Estonia, Denmark
- Social Organization
  - Steem, Akasha
- Identity Protection
  - Dash, Monero, ZCash, BitNation, CryptID

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Human Trafficking Efforts

- Microsoft, ConsenSys, Blockstack Labs
  - Blockchain-based Identity
- Chainalysis
  - Pattern Matching – Time Series Analysis
- OneName, ShoCard, and uPort
  - Digital Identity
- Provenance
  - Logistical Tracking

Questions and Discussion

Thank you!

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