



Blockchain Overview

05/26/2017



Acquaint



Learn



Brainstorm



***I am
working in
a small
group***

***I am not
just
listening, but
also doing***

***I have time
to discuss
ideas with
others***

***I am
not
hungry!***

I learn best when...

***I am taught by
an enthusiastic
and passionate
teacher***

***I have
opportunities
to be
creative***

***I have
things to
look at and
listen to***

***I am
motivated by
the subject***

***I am given hands
on, practical
experiences***

***I have positive
relationships with my
peers and teachers***

***I am working
towards a set
goal***

Overall flow

Understanding Block chain

- Concept
- Digital asset
- How is it work
- Blockchain in nut shell

What's happening out there!

- Applications
 - Bitcoin
 - Other areas
- Trend in finance industry
- Potential sectors & usage

Brainstorming

- Points to consider to apply
- Use cases



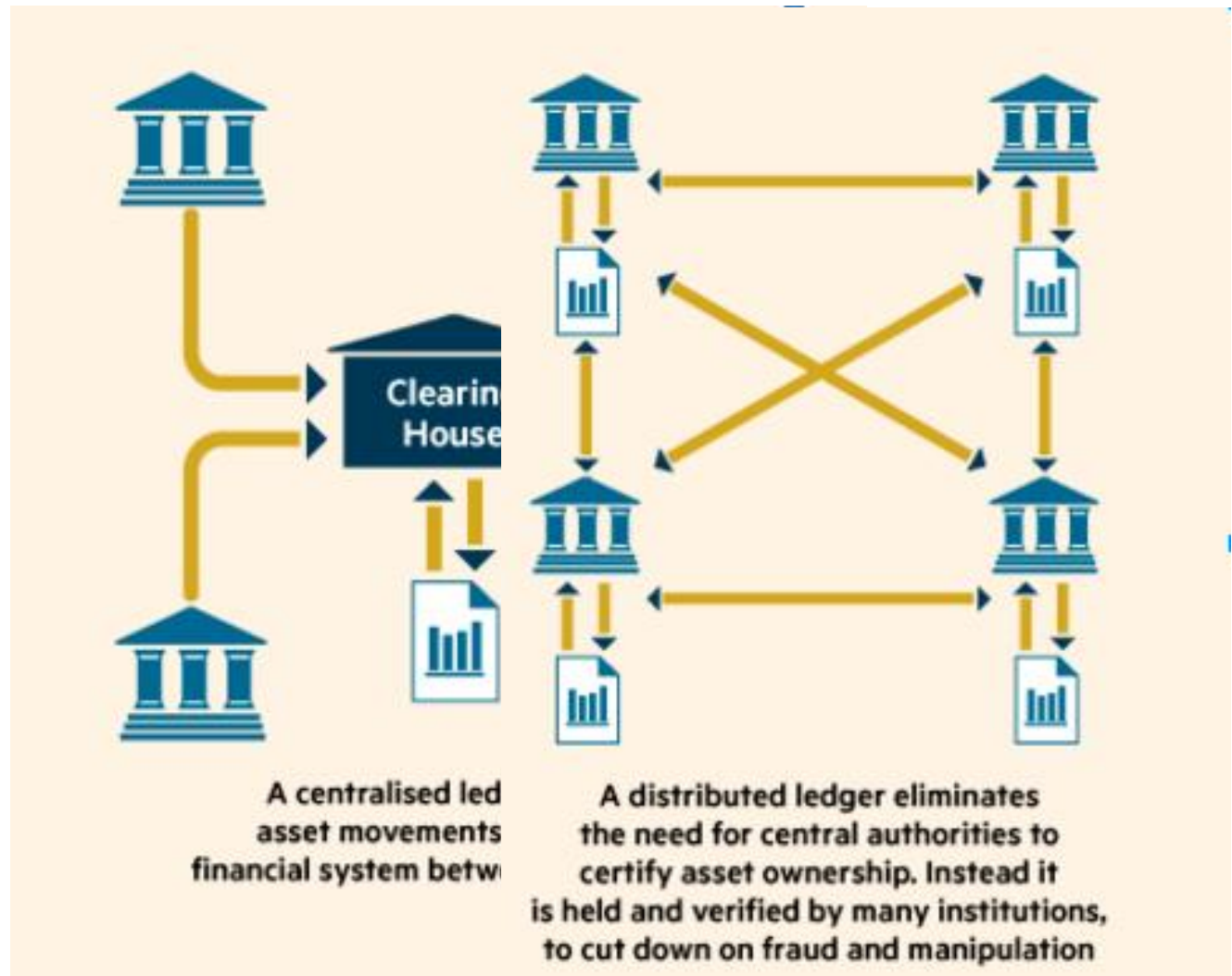
Understanding Block chain

Concept (of trade)

Understanding

What's happening

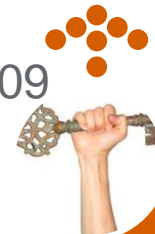
Brainstorming



Digital asset : Cryptocurrency



- A cryptocurrency is a medium of exchange like normal currencies such as USD, but designed for the purpose of exchanging digital information
- Government has no control over cryptocurrencies as they are fully decentralized.
- The first cryptocurrency to be created was Bitcoin back in 2009
- The technical system on which all cryptocurrencies are based on a system created by *Satoshi Nakamoto*



Ownership



Genuine

Digital Assets

Anything that is capable of being owned or controlled to produce value, is considered ***an asset***

- Can be tangible or intangible
- Value can be converted into cash.

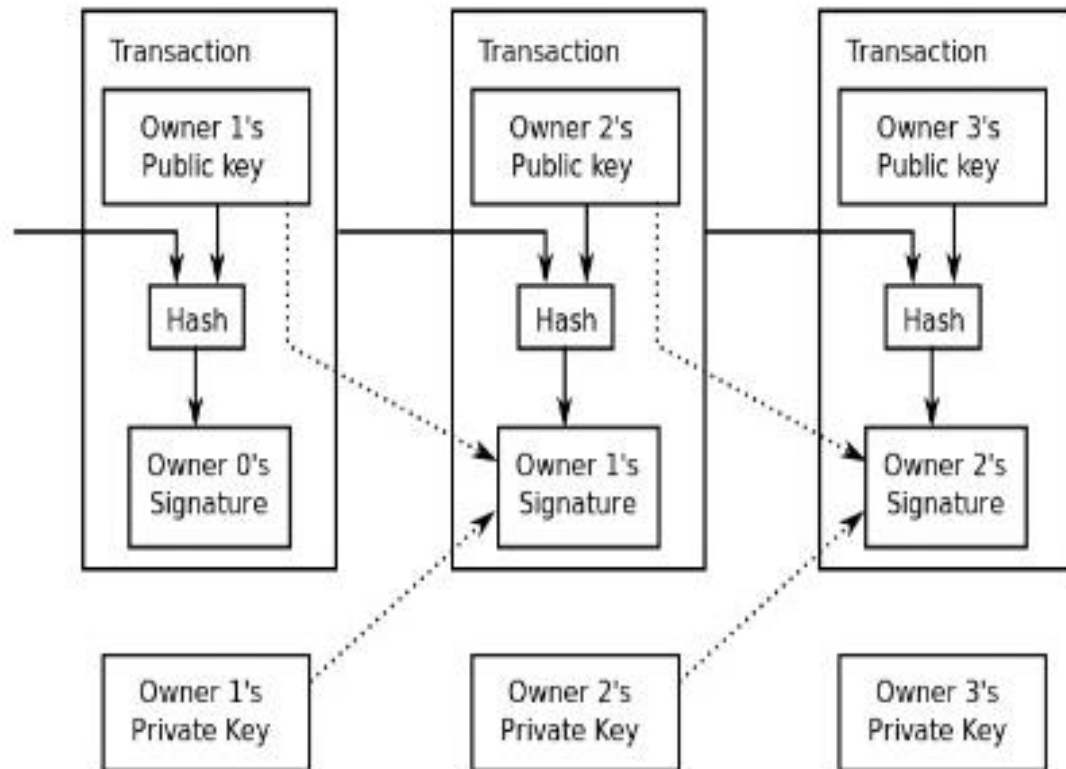
Cash is an asset. Other asset's examples:

- Cars, House (physical)
- Bonds, securities, repurchase agreements (intangible)
- Music, video, games (intangible, digital)
- ***EMR, Provider demographics / contracts / credentials etc.***



Blocks

- Private key:
 - Digital signature
 - Allows spending
- Public key:
 - Allows signature verification
 - Represents the wallet address
- Transactions are published in the blockchain



Distributed Ledgers (*electronic*)

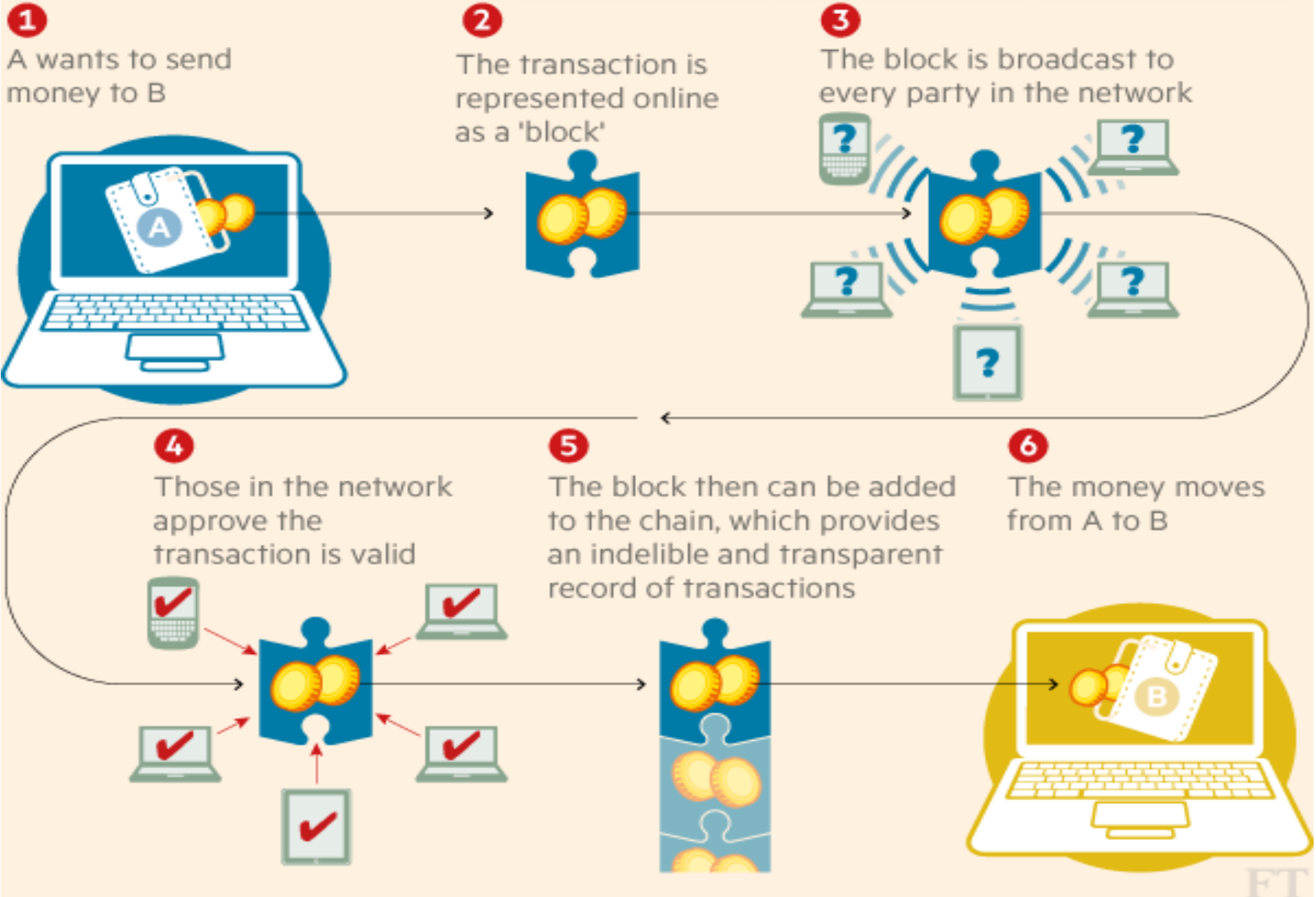
Understanding

What's
happening

Brainstorming



How is it work



Blockchain in a nutshell

Understanding

What's
happening

Brainstorming

Append-only **system of record** shared across business network

Shared Ledger

Cryptography

Ensuring secure, authenticated & verifiable transactions



Consensus



Digital Asset

All parties agree to network verified transaction

Details about the asset like business terms embedded in transaction

Broader participation, lower cost, increased efficiency

Text version

➤ Distributed Ledger

- Rather than having a central record keeping system, identical records are spread across everyone connected to a network

➤ Append only

- No one can change any record the system allows to append only

➤ Hash Signed

- Every information is signed using a hash ensure no one other than owner can change the info

➤ Copy with all the parties

- They are all updated simultaneously and transactions only go through when enough parties on the network sign off on them

➤ Digital Assets

- Cash is an asset; there are others as well!!

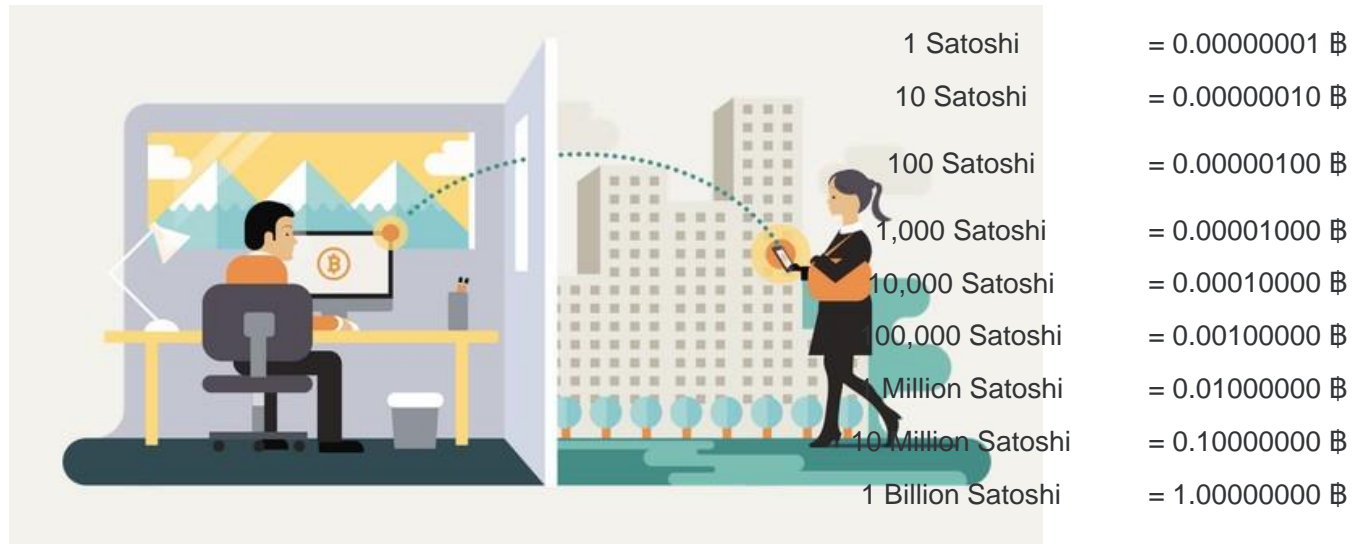


What's
happening
out there

First application : Bitcoin

Bitcoin first appeared in a 2009 white paper authored by a person, or persons using the pseudonym Satoshi Nakamoto. The [white paper](#) detailed an innovative peer to peer electronic cash system called Bitcoin that enabled online payments to be transferred directly, without an intermediary

Although commonly associated with Bitcoin, blockchain technology has many other applications. Bitcoin is merely the first and most well-known uses. In fact, Bitcoin is only one of about seven hundred applications that use the blockchain operating system today



Applications of Blockchain

Understanding

What's
happening

Brainstorming

- Store people's online identities on the blockchain. That identity is then linked to reviews and scores on the sharing economy and other marketplace sites — a little like with Facebook
- Users : **Airbnb, HomeAway, OneFineStay**

SHARING ECONOMY



- Instead of having a central power provider which sends electricity to everyone's house and workplace, Goldman envisions a distributed network
- Users : **TransActive Grid, Grid Singularity**

ELECTRICITY MARKET



- Put property records on the blockchain so that prospective buyers can quickly, easily, and cheaply verify that the owner of a house really does own the place. At present, this process is done manually
- Users : **BitFury, Factom**

PROPERTY



- By applying blockchain to the clearing and settlement of cash securities – specifically, equities, repo, and leveraged loans
- Users : **Digital Asset Holdings, R3CEV, Chain.com**

SECURITIES



- Goldman envisions identity data stored on a blockchain that could help finance firms easily and quickly check new customers as part of "know your customer" regulation — a bit like a digital passport
- User : **SWIFT and others**

FINANCE



Blockchain Adoption (Finance)

Understanding

What's happening

Brainstorming

- Started research on blockchain with specific interest in digital security
- Developed 'Cuber Wallet', an app based on 'Colored Coins' (June 2015)
- Partnerships: Coinbase & CoinFloor

UHVpank

June 2014

- Areas of interest: Faster payments & banking services
- Partnership: Rabobank partnered with Ripple Labs

ING
Rabobank **ABN-AMRO**

Dec. 2014

- Accelerator program with Safello, Atlas Card & Blocktree
- Partnered with Safello in June 2015 to test banking services on blockchain

BARCLAYS

Mar. 2015

CommonwealthBank

- Areas of Interest: Payment settlement
- Partnership: Ripple Labs

USAA

- Research team studying Bitcoin

May 2015

SOCIETE GENERALE **BNP PARIBAS**

- Societe Generale has started staffing employees with BTC, blockchain & cryptocurrency expertise
- BNP Paribas is exploring faster transactions with blockchain

citi

- 3 separate systems within Citi that deploy blockchain technology
- Developed an equivalent to Bitcoin, called 'Citicoins'

July 2015

Oct. 2013

fidor
BANK

- Areas of interest: Digital currency exchange (Oct. 2013), money transfer services (May 2014) & BTC trading (Feb. 2015)
- Partnerships: Karken, Bitcoin Deutschland GmbH, Ripple, Bitcoin.de

Sep. 2014

CBW
BANK **cross river bank**

- Areas of interest: Risk management system & cross border payments
- Partnership: Ripple Labs

Jan. 2015

BBVA **Compass**

- Participated in a \$75 Mn Series C funding for Coinbase (Jan. 2015)

Apr. 2015

UBS

- Areas of Interest: Payments, trading & settlement, Smart bonds
- Partnership: Mentoring London based FinTech startups in blockchain

June 2015

Santander

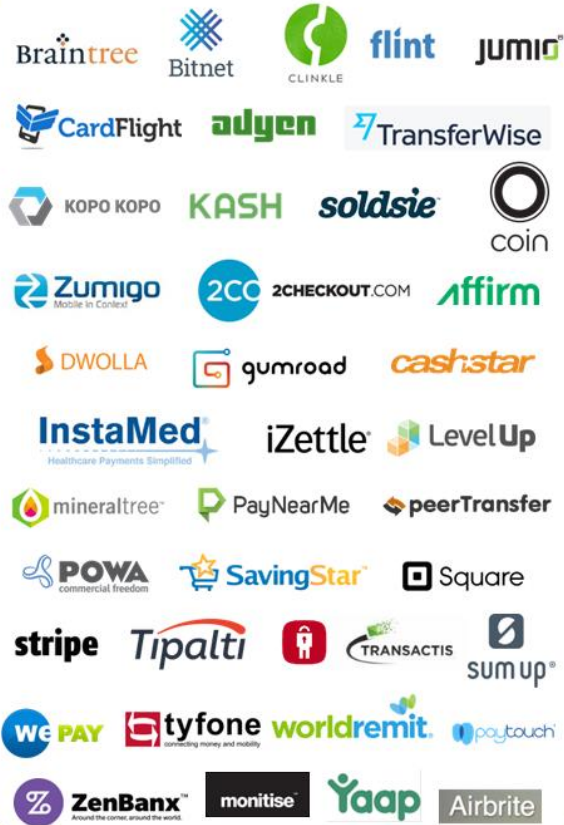
- Claims 20-25 use cases for blockchain and that ~GBP 12 Bn could be saved in banks infrastructure by switching to blockchain concept.
- Areas of interest: international payments and smart contracts

Westpac **ANZ**

- Areas of interest: Payments and Banking services
- Partnership: Ripple Labs

There are many more...

Digital & Mobile payments



Bitcoin & Cryptocurrency



Capital Markets & Investing



Banking & Corporate Finance



Big Data & Analytics



Financial platforms



Crowdfunding & peer-to-peer lending



Personal financial management



Blockchain technology

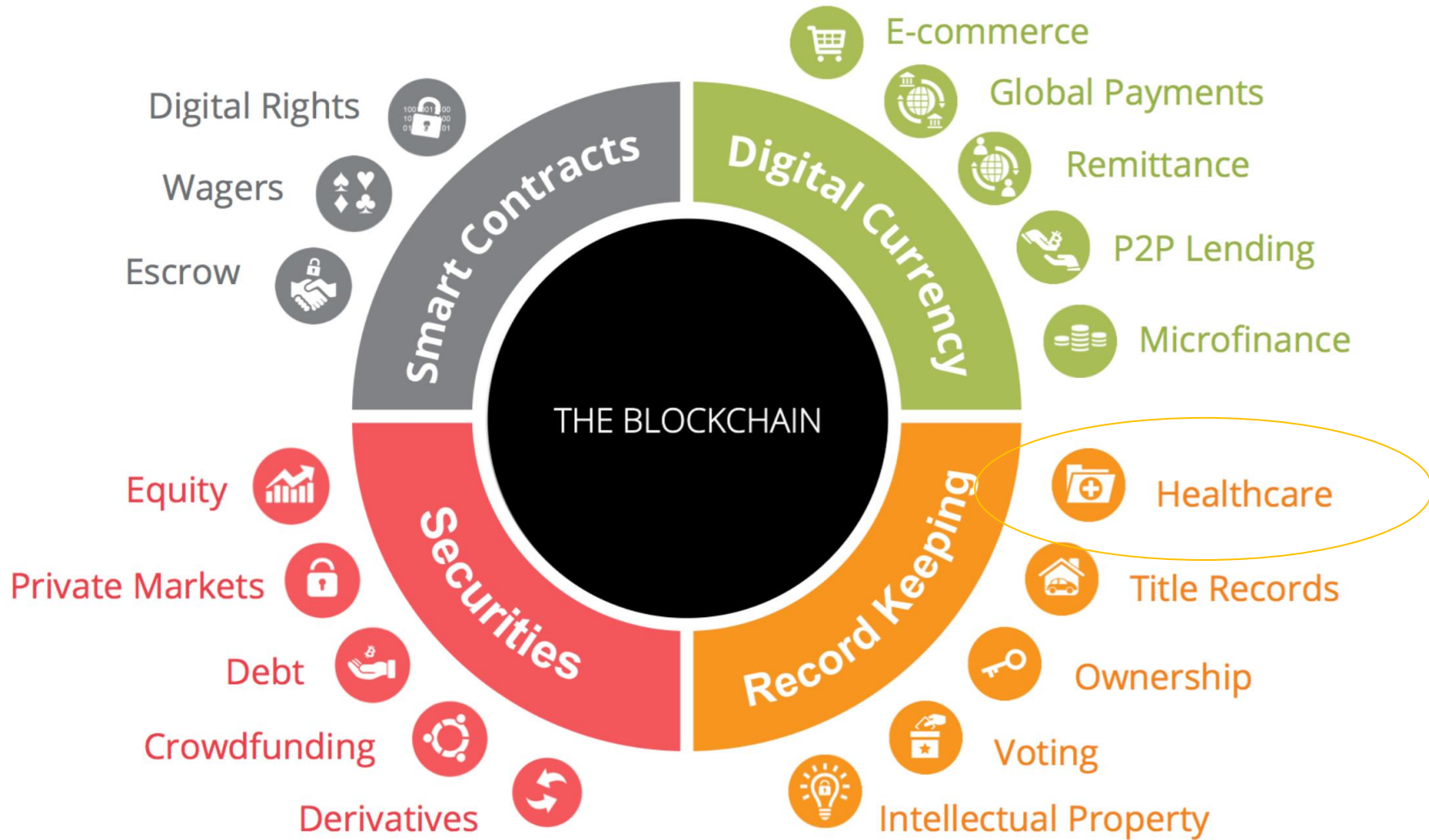


Potential sectors

Understanding

What's happening

Brainstorming



Brainstorming

How it works:



Someone requests a transaction.

The requested transaction is broadcast to P2P network consisting of computers, known as nodes.



Validation

The network of nodes validates the transaction and the user's status using known algorithms.



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.

Cryptocurrency

Cryptocurrency is a medium of exchange, created and stored electronically in the blockchain, using encryption techniques to control the creation of monetary units and to verify the transfer of funds. Bitcoin is the best known example.



Has no **intrinsic value** in that it is not redeemable for another commodity, such as gold.



Has no **physical form** and exists only in the network.



Its supply is not **determined by a central bank** and the network is completely decentralized.

Options for adopting Blockchain

Understanding

What's
happening

Brainstorming

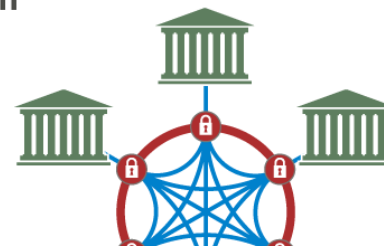
Public blockchain (permissionless)

An open network that anybody can access like the bitcoin model. The digital ledger of transactions is shared, transparent and run by all participants



Private blockchain (permissioned)

The preferred option of most banks it is a closed system checking all

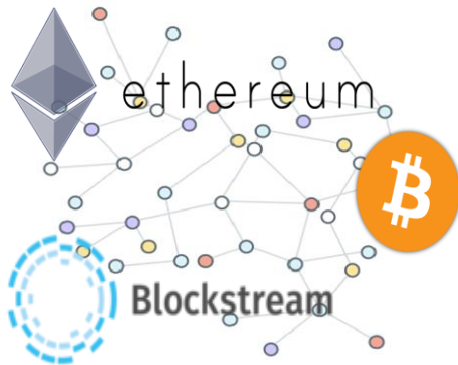


	Public	Private
Access	Open R/W	Permissioned
Speed	Slower	Faster
Security	Proof or work / stake	Pre-approved participants
Identity	Anonymous	Known

Points to consider : which option to go with

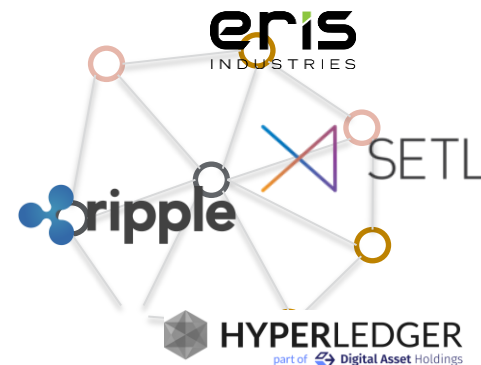
There are two options for building private network for businesses 1) Reconfigure a public network fabric for private use, or 2) Build on top of a untested private network fabric that's available

Public Network Fabric

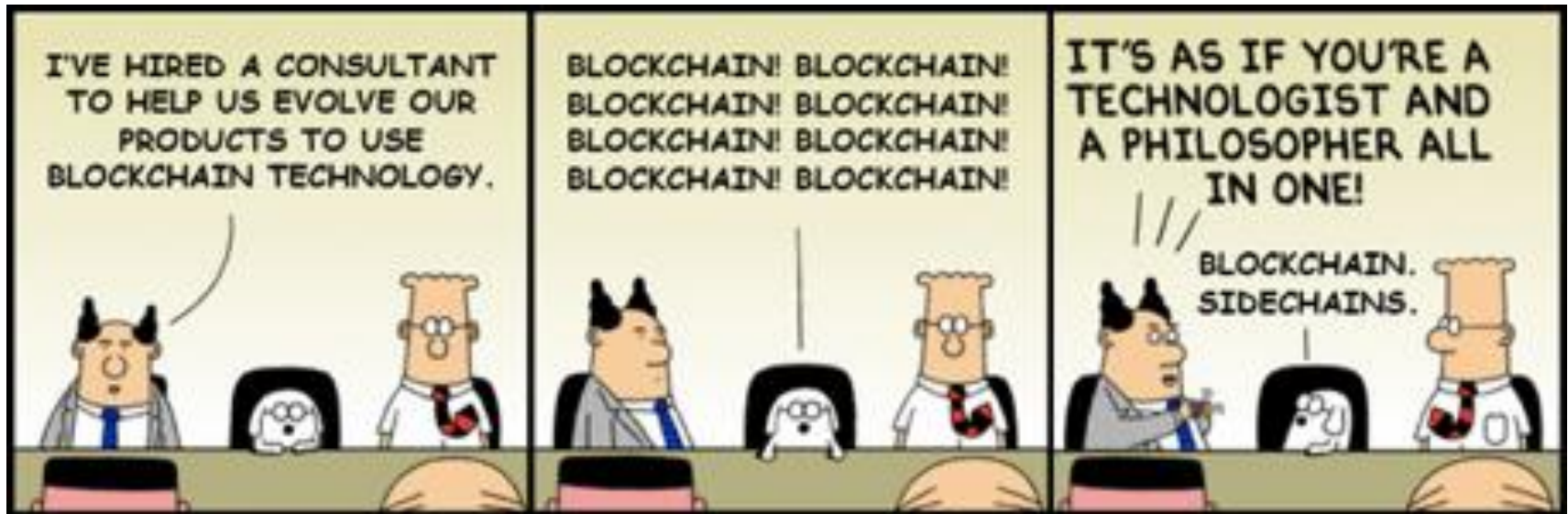


1. Designed for public network
2. Slow and inefficient
3. Built-in virtual currency
4. Difficult to push upgrades
5. Heavily forked
6. Lack enterprise support

Private Network Fabric



1. Incomplete & usually untested
2. Usually too simple & inflexible
3. Still lack critical enterprise features such as identity management system
4. Generally lack community support
5. Not standardized



Points to consider : Funct attributes

Understanding

What's
happening

Brainstorming

Initiate



- ☐ Multiple parties participate in transaction
- ☐ Validation of the transaction is needed
- ☐ Updatons from Parties are not trusted or non standard
- ☐ Securing the transaction is required

Plan



- ☐ List & priorities the applications

If there is any checkbox which can't be checked; we shouldn't pick blockchain as a solution

Strengthen



- ☐ Would standardize contracts help
- ☐ Standardization is feasible

Implement



- ☐ Public blockchain
- ☐ Private blockchain

A blockchain solution could address the **HIPAA** Privacy Rule by separating and encrypting identity, PII, and PHI.

Points to consider : Tech attributes

Understanding

What's
happening

Brainstorming

Analyze



- ☐ Data model is defined
- ☐ A data unit denotes a business entity & foot-print is in KBs
- ☐ At any point in time data unit describes its state

Design



- ☐ Append only solution fits well
- ☐ Meta data is well articulated
- ☐ Consortium and/or hash algo

Code



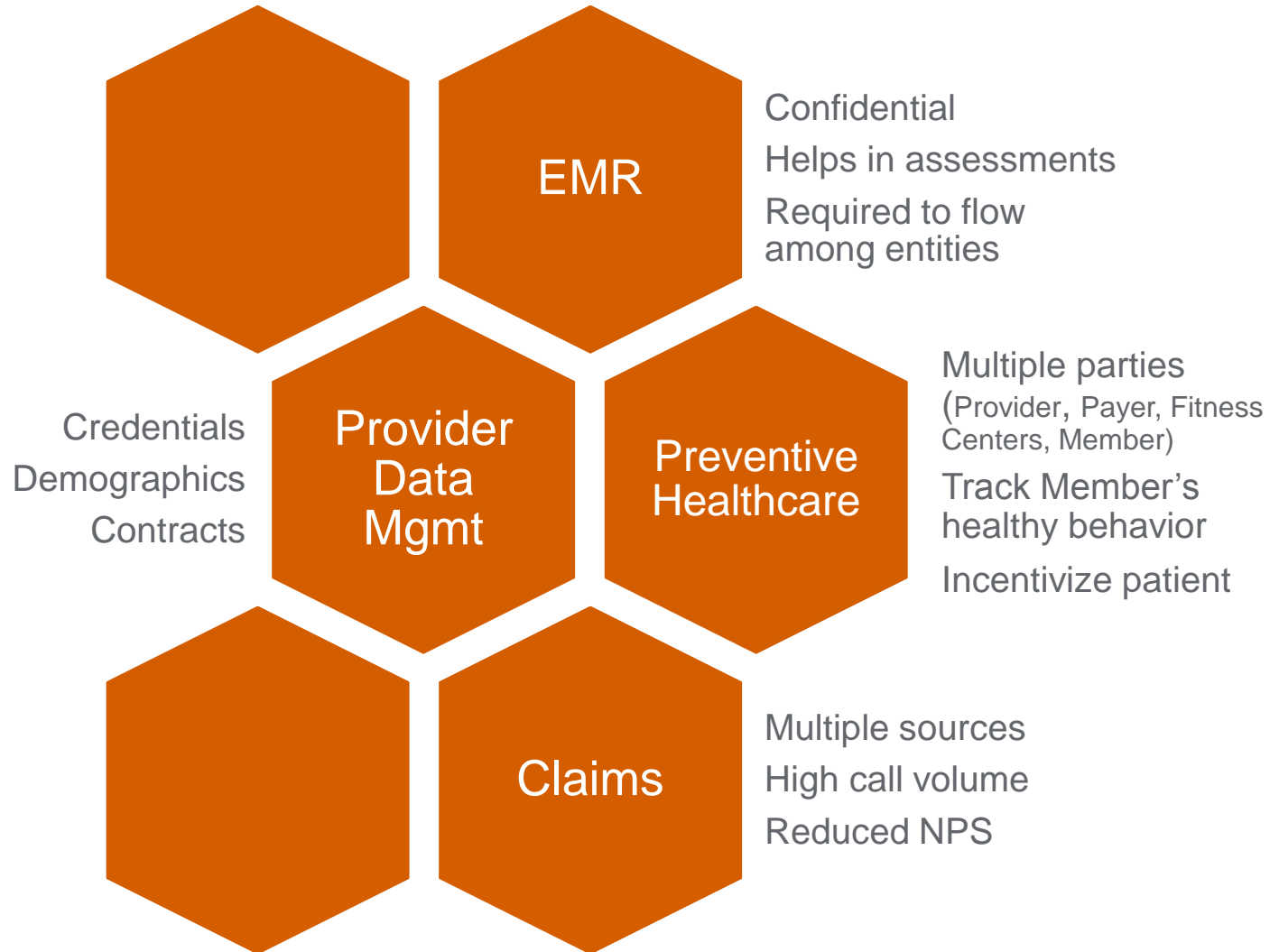
- ☐ Vault implementation
- ☐ Trace back is needed or not
- ☐ API and/or EAI

Use cases

Understanding

What's
happening

Brainstorming







Electronic Medical record

- Very confidential & critical to conduct any assessment
- Patient own medical records and grant access to providers
- Data moves around across various parties
- Time lag in this data movement impacts NPS




Initiate



-  Multiple parties participate in transaction
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-  Securing the transaction is required

Analyze



-  Data model is defined
-  A data unit denotes a business entity & foot-print is in KBs
-  At any point in time data unit describes its state

Provider Data Management

- Broad segments - credentials, demographics & contracts
- Changes in data causes penalties
- Changes impact payments & hence Impacts NPS

Initiate



- ☐ Multiple parties participate in transaction
- ☐ Validation of the transaction is needed
- ☐ Updations from Parties are not trusted or non standard
- ☐ Securing the transaction is required

Analyze



- ☐ Data model is defined
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- ☐ At any point in time data unit describes its state

Claims

- Subject closest to members heart
- Multiple parties involved in processing
- Primary reason behind calls to call center hence impacts operational cost
- Absence of correct & accurate information impacts NPS

Initiate



- ☐ Multiple parties participate in transaction
- ☐ Validation of the transaction is needed
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- ☐ Securing the transaction is required

Analyze







- ☐ Data model is defined
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Preventive Care

- Track patient healthy behavior
- Multiple parties involved (Payer, Provider, Fitness Center, Patient)
- Assess the patterns and Incentivize patient
- Intervene proactively – save medical cost




Initiate



-  Multiple parties participate in transaction
-  Validation of the transaction is needed
-  Updations from Parties are not trusted or non standard
-  Securing the transaction is required

Analyze



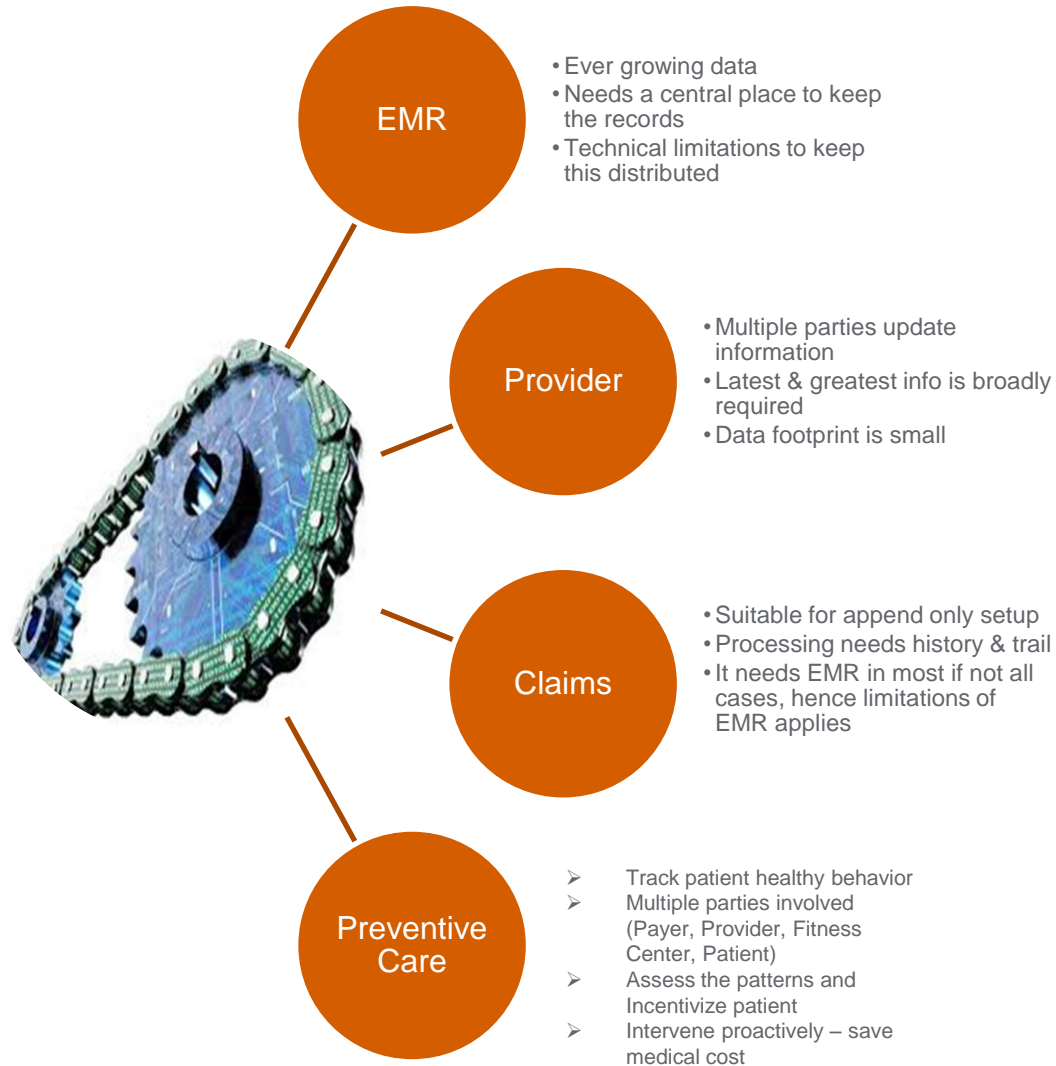
-  Data model is defined
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Use cases (summary)

Understanding

What's
happening

Brainstorming



Provider Data Management : Industry wide challenge

- Approx. **\$2.1 billion** annual spend on maintaining provider Databases
- Inaccurate provider data causes significant downstream impact, according to the *National Health Insurer Report Card* (4/2016) claims processing errors make up **\$17 billion** in unnecessary administrative costs.
- The industry lacks definitions and benchmarks for provider data quality, leaving individuals and organizations to define, measure, and improve quality in silos.
- The healthcare system lacks standards for provider data elements, creating irreconcilable inconsistencies across stakeholders.
- Provider data producers and users do not hold each other accountable for high-quality provider data.
- Provider data also changes frequently: providers move, renegotiate contracts, gain or lose certifications, retire, and pass away.

- *National Health Insurer Report Card* (4/2016)
- *The Morning Consult* (April, 2016)
- *Wall Street Journal*, (12/2015)

Blockchain : How can it can help to solve this business problem ?

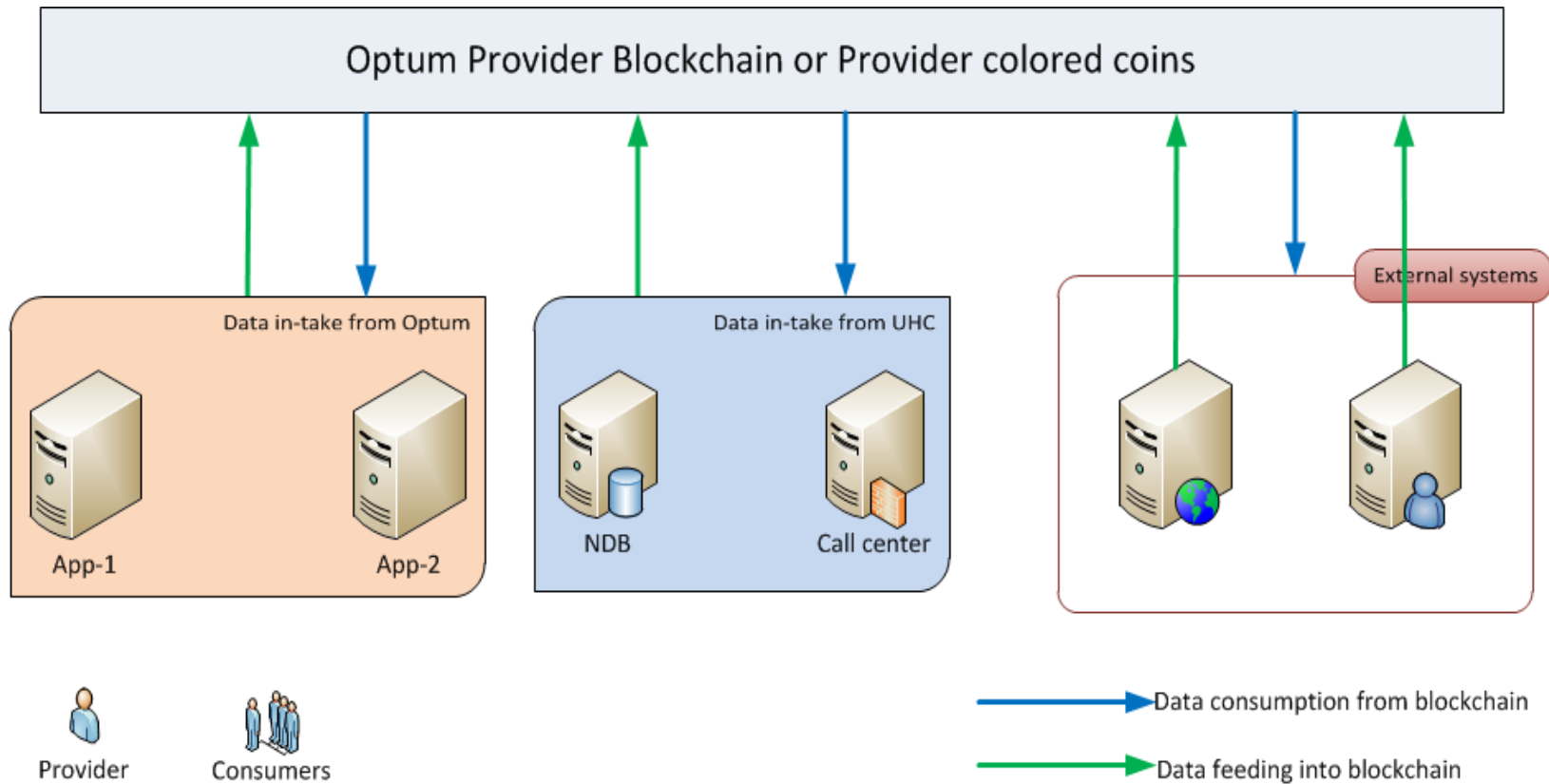
- Keep data in a distributed, encrypted ledger rather than having one central administrator acting as a gatekeeper to data.
- The shared ledger is spread across a network of synchronized, replicated databases visible to anyone with access.
- Hacking one block in the chain is impossible without simultaneously hacking every other block in the chain's chronology.
- Implementing an immutable, auditable Blockchain solution for provider data changes will create a single source of truth for data exchanges cross-industry and potentially save millions of dollars in unnecessary costs.
- Multiple payer will come together and lead the industry with a solution that benefits all contributing participants.

Rough sketch

Understanding

What's happening

Brainstorming



Q&A