

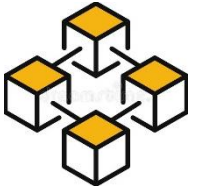


UNIT 7.3

BLOCKCHAIN APPLICATIONS

CRYPTO TOKENS

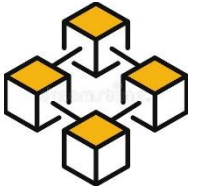
Lecturer: Ph.D Lê Quang Huy



CONTENT

1. INTRODUCTION
2. ASSETS
3. TOKEN
4. CRYPTO TOKEN
5. SUMMARY
6. DISCUSSION





2. ASSET

2.1. WHAT IS ASSET

2.2. CHARACTERISTICS OF ASSETS

2.3. CLASSIFICATION OF ASSET

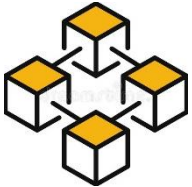
2.4. ASSET MANAGEMENT

2.5. DIGITAL ASSETS

2.6. DIGITAL ASSET MANAGEMENT

2.7. CRYPTO ASSETS

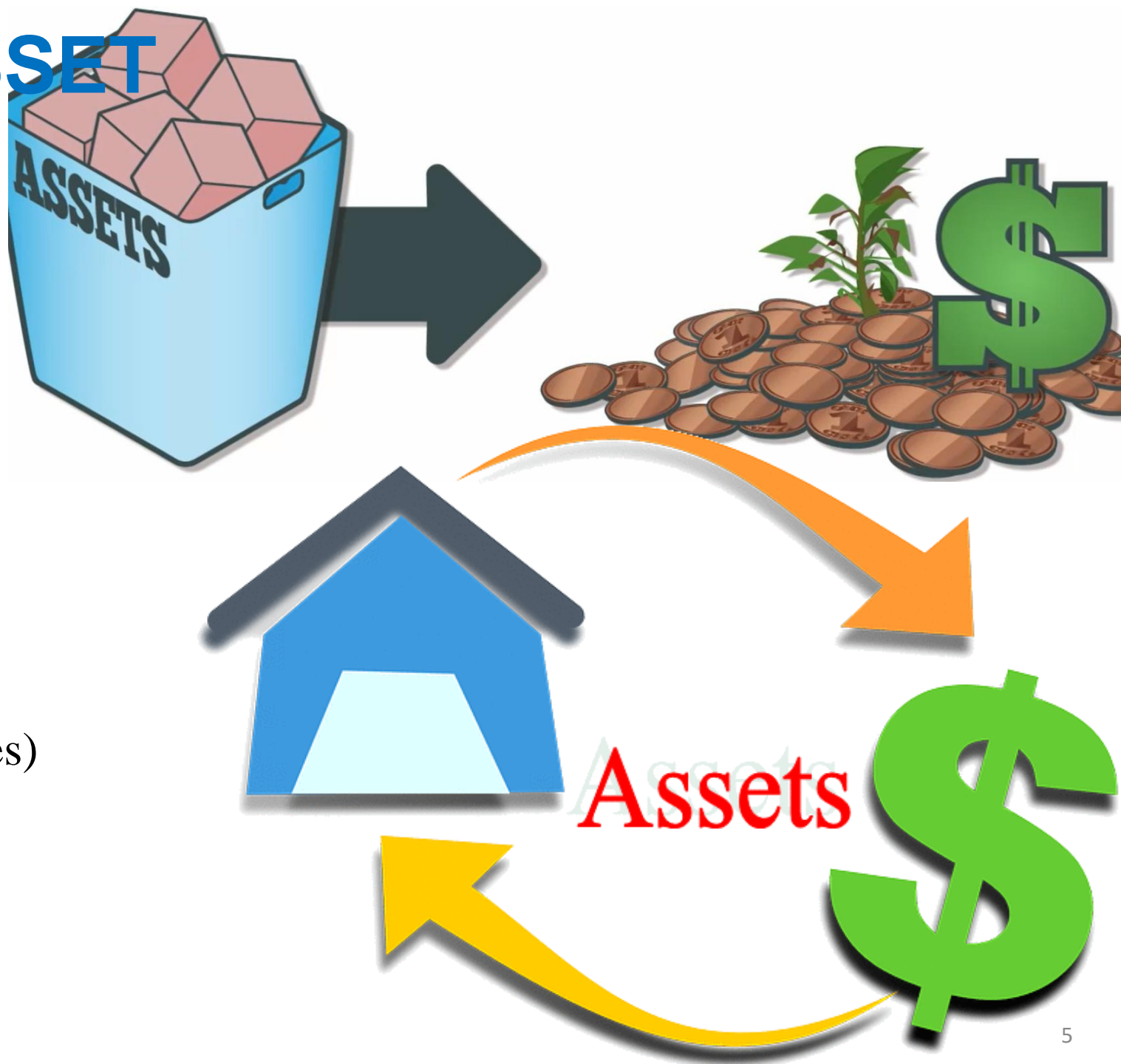


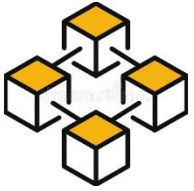


2.1. WHAT IS ASSET

Asset is a things:

- Have value
- Can be transformed (convert) into monetary (cash) value.
- Form:
 - Tangible (physical resources)
 - Intangible (nonphysical resources)





2.2. CHARACTERISTICS OF ASSETS

- Ownership: ownership or control of the asset.
- Economic value: provide economic value.
- Resource: can generate future economic value.

Important Features of an Asset

1. Asset has a Price or Value in market.

2. It must Generate some Revenue.

3. It has Maintenance or Repair Cost.

4. It undergoes Depreciation over time.

5. It has an Estimated Useful Life span.

6. It also has a Scrap Value.

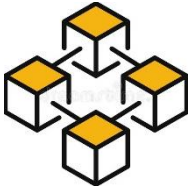
Major characteristics

A probable future benefits exists.

The business has an exclusive right to control the benefits.

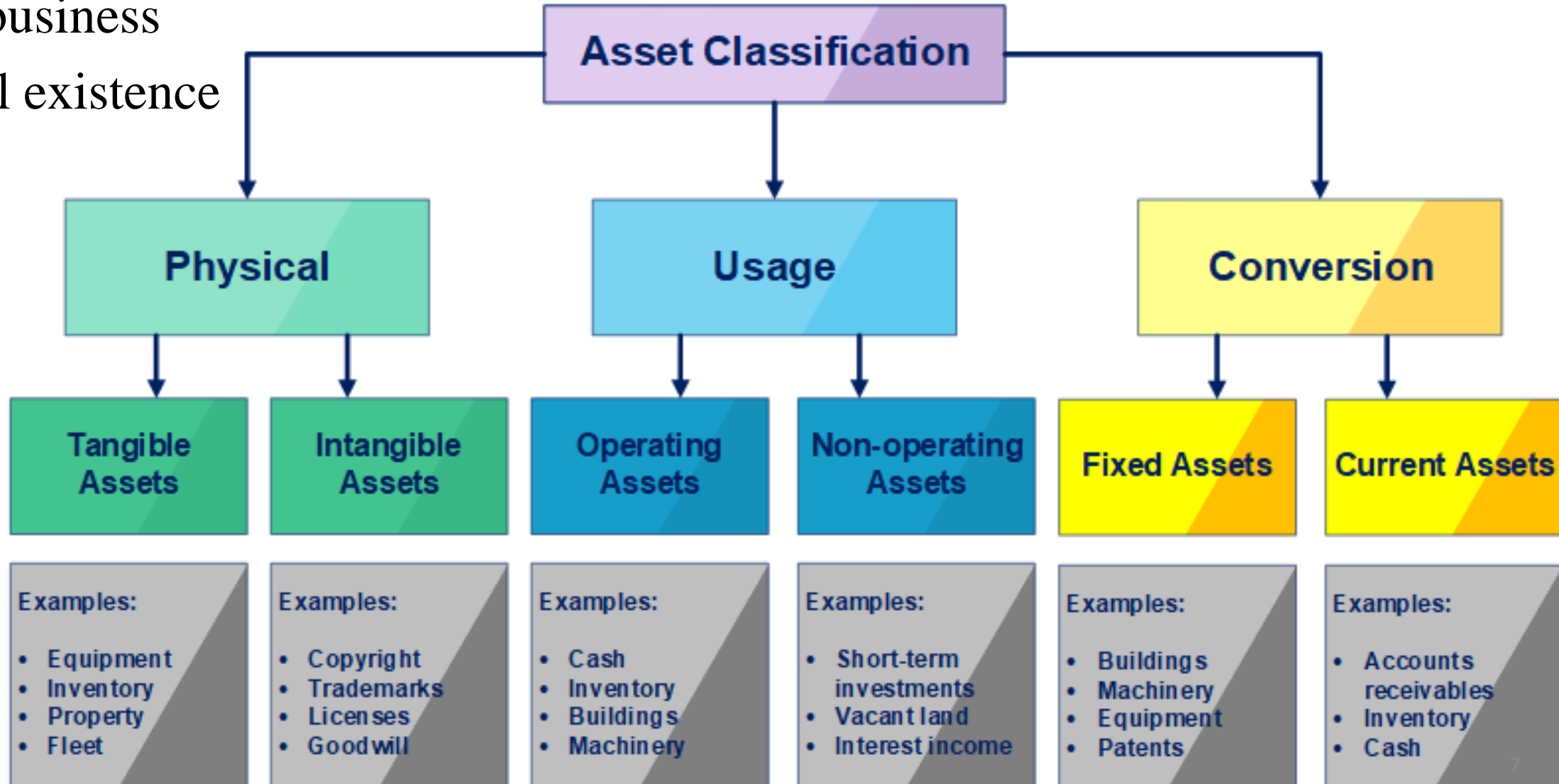
The asset must be capable of measurement in monetary terms.

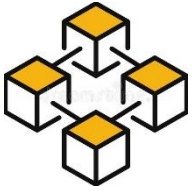
The benefits must arise from some past transaction or event.



2.3. CLASSIFICATION OF ASSET

- Convertibility to cash
- Use in business
- Physical existence





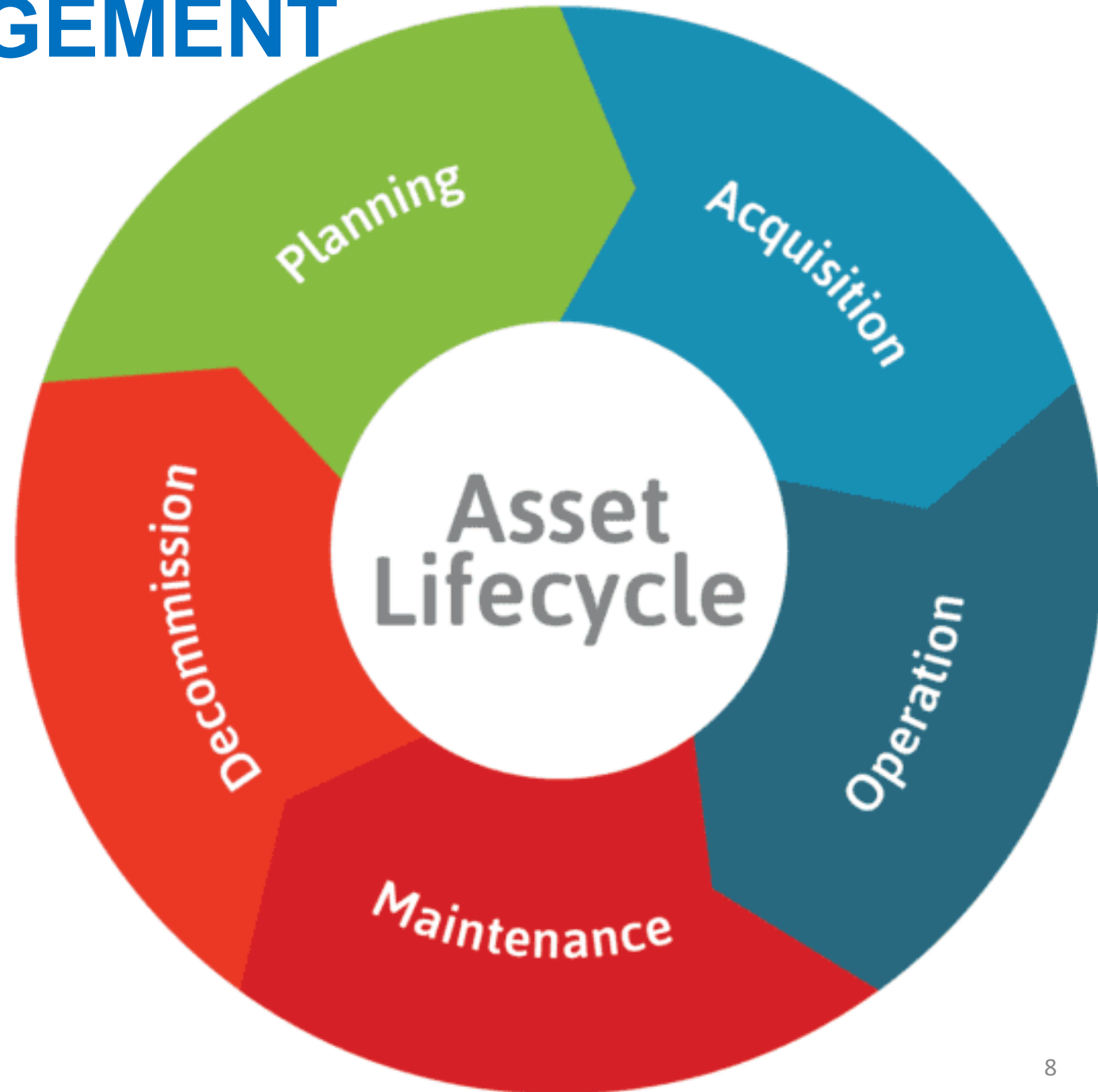
2.4. ASSET MANAGEMENT

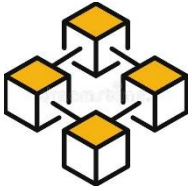
Asset management:

- Process of maximizing asset value
- Entire lifecycle
- Most cost-effective manner

Necessary:

- Maximum value from assets (ROI)
- Minimise 'life cost' of assets.

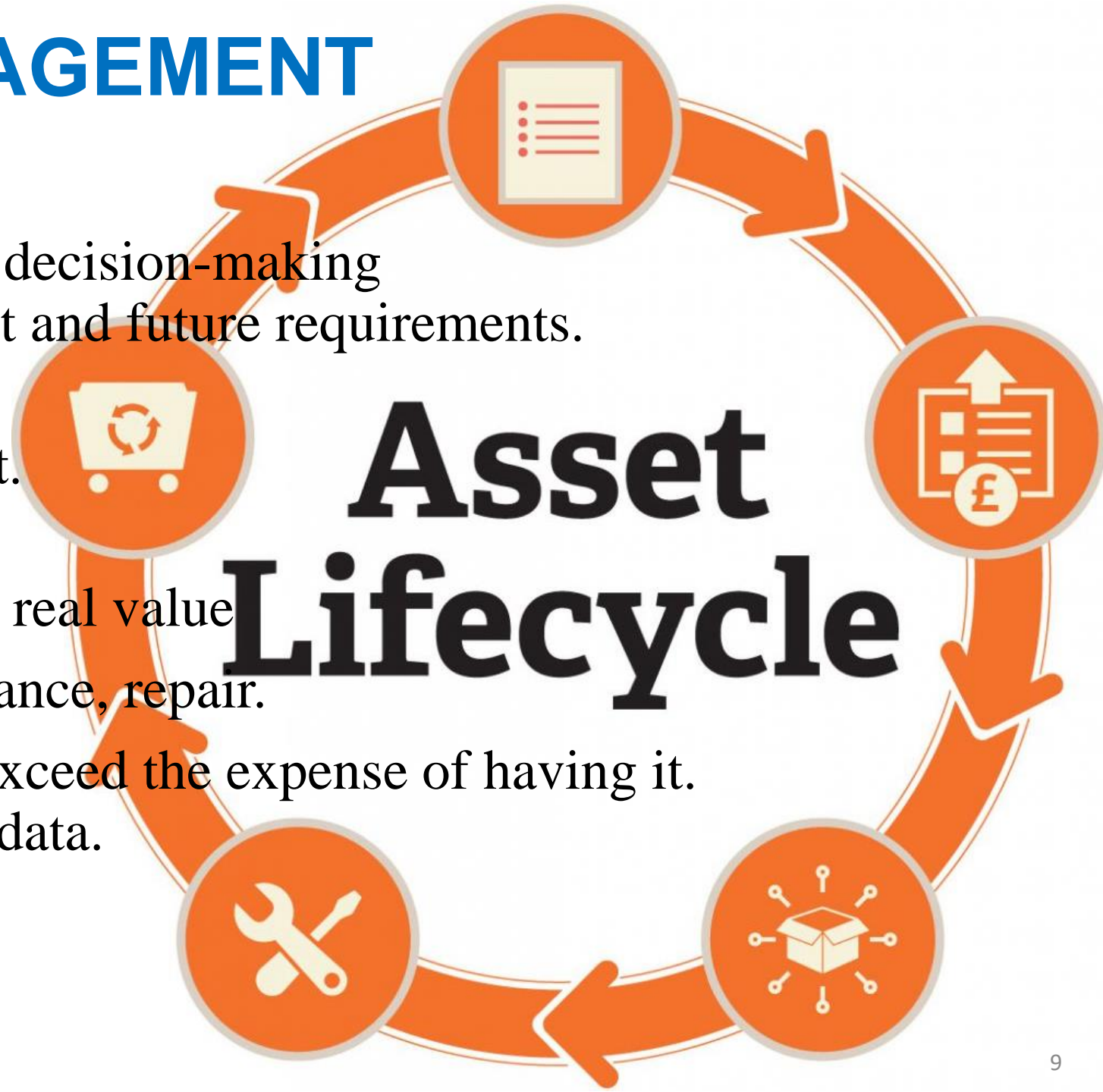


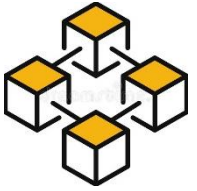


2.4. ASSET MANAGEMENT

Management:

- Planning: gather information for decision-making assesses and evaluates for current and future requirements.
- Procurement/acquisition: lowest-priced, 'premium' product. begins to be used.
- Operation: being used delivering real value
- Maintenance: monitore, maintenance, repair.
- Disposal: costs of maintenance exceed the expense of having it. dismantling, wiping of sensitive data.





3. TOKENS

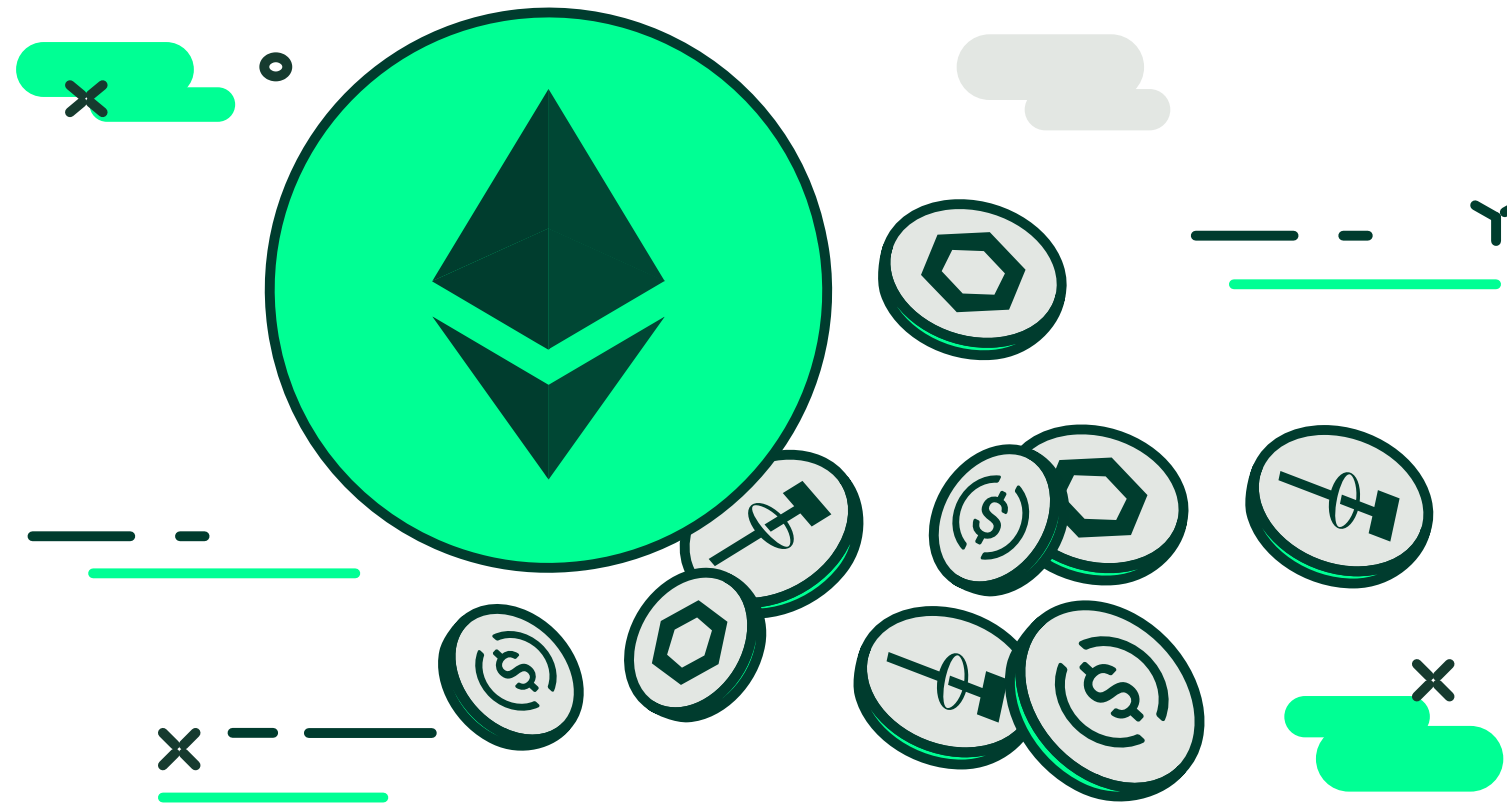
3.1. TOKEN DEFINITION

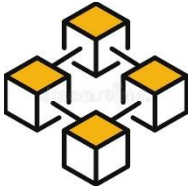
3.2. TOKEN TAXONOMY

3.3. TOKEN ACTIVITIES

3.4. TOKENIZATION

3.5. DIGITAL ASSET





3.1. TOKEN DEFINITION

Arts, entertainment, and media: game, music group, animated television series...

Computing:

- Token: object (software or hardware) represents the right to perform operations:
- Session token, Security token or hardware token, Bearer token, Access token, Tokenization (data security), Invitation token, Token Ring, ...
- Lexical token, a word or other atomic parse element.

Economics

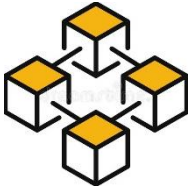
- Token (voucher, gift card)
- Token coin: Casino token, Knight token
- Token money, currency

Other uses

- Token (cryptocurrency), Token (railway signalling),
- Token Racing, Tokenism ,
- Type-token distinction (computer programming)
- Wedding token

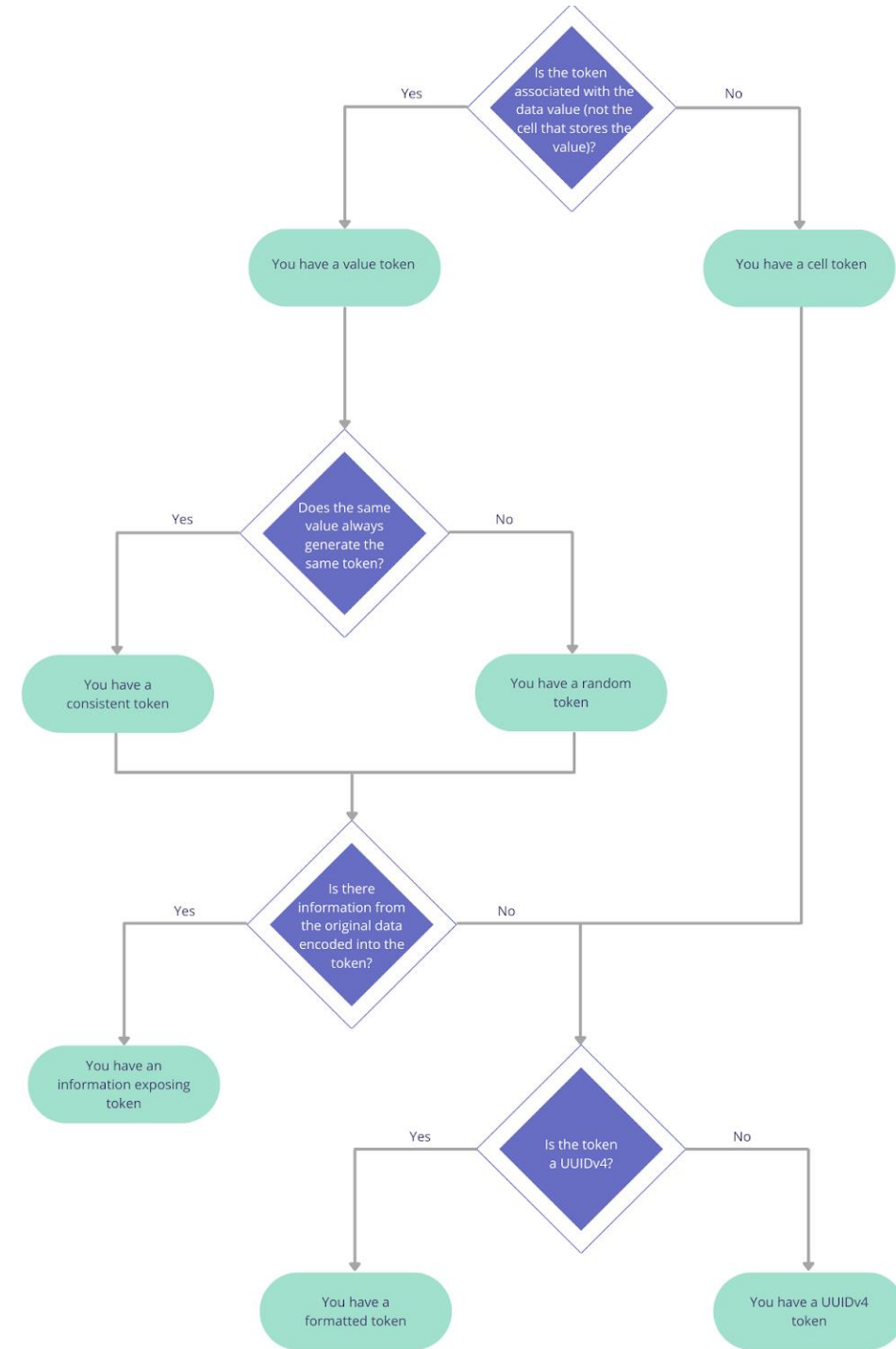
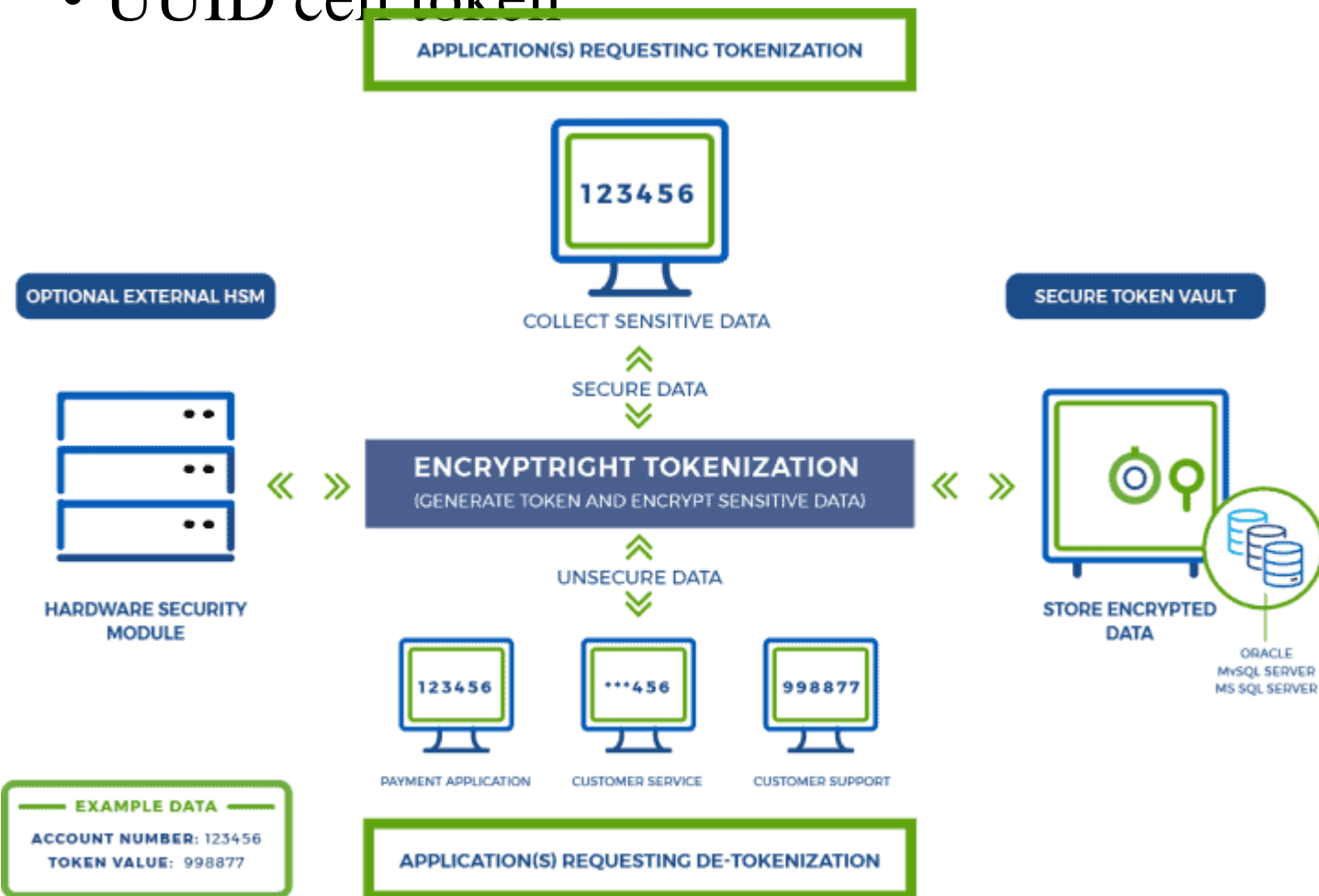


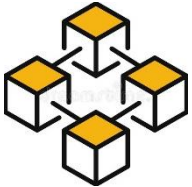
TOKENS



3.2. TOKEN TAXONOMY

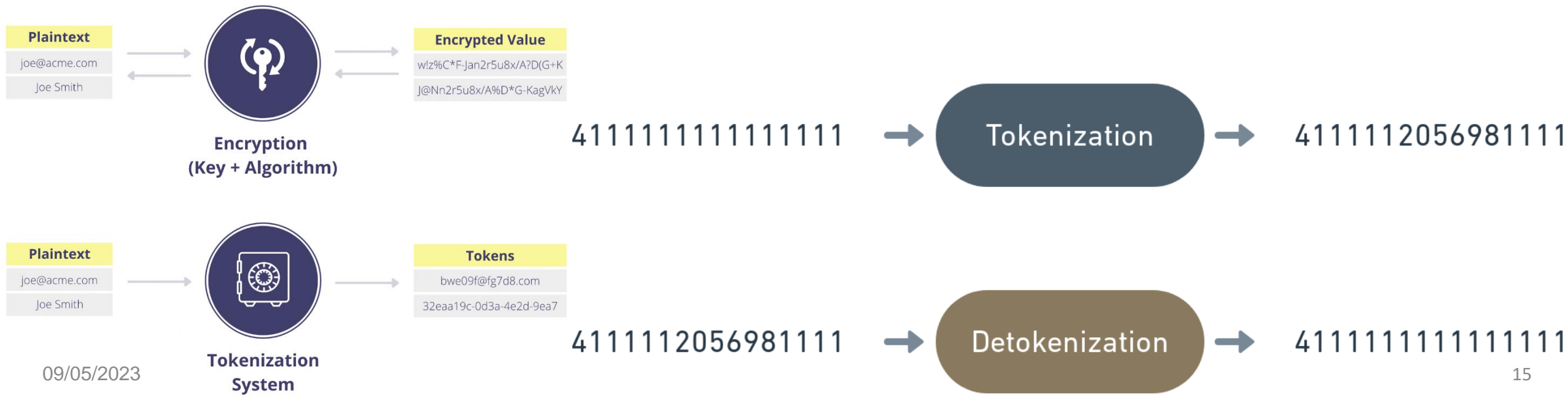
- Consistent format-preserving token
- Random format preserving token
- UUID cell token

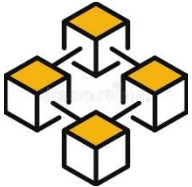




3.3. TOKEN ACTIVITIES

- Tokenization (data security):
 - Substituting (mapping) a sensitive (original) data element with a non-sensitive equivalent (token)
 - That has no intrinsic/exploitable meaning or value. (safeguard sensitive data).
- De-tokenization:
 - Token is a reference (identifier) maps back to sensitive data through a tokenization system

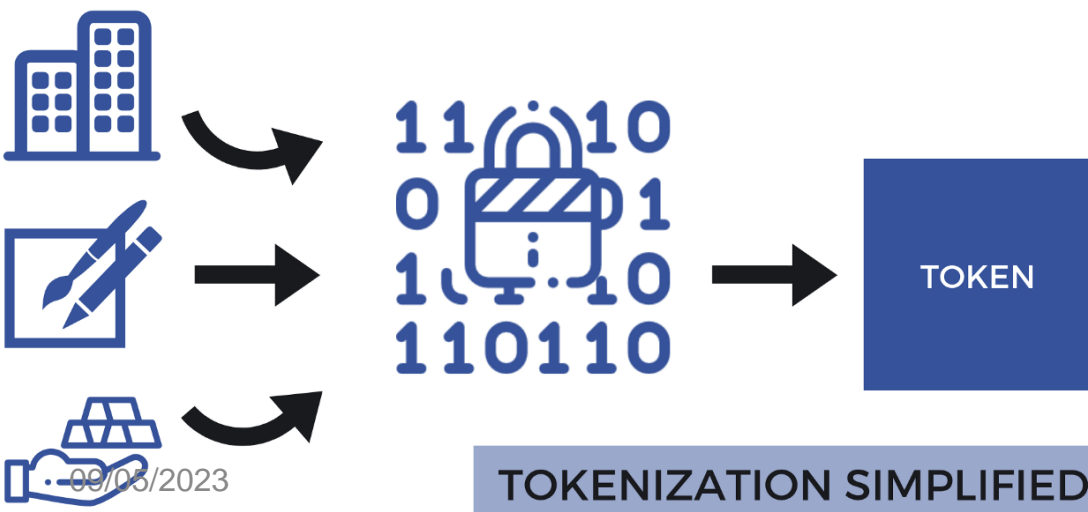
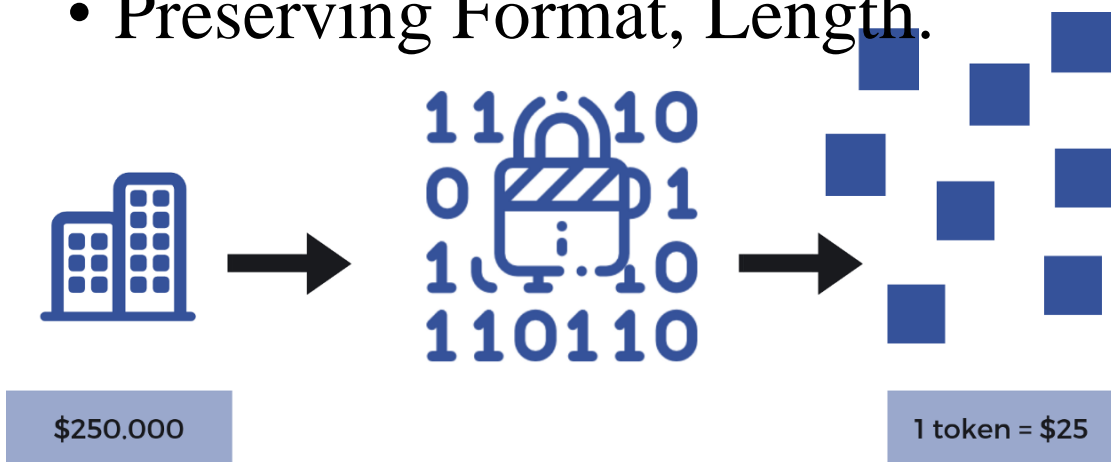




3.4. TOKENIZATION

Tokenization:

- Infeasible to reverse without tokenization system
- Preserving Format, Length.



Plaintext values
Email: joe@acme.com
Phone: 415-555-5135



Token Values
Email: bwe09f@fg7d8.com
Phone: 671c2daf-bec21ca



Plaintext	Token
joe@acme.com	bwe09f@fg7d8.com
415-555-5134	671c2daf-bec21ca

Format-Preserving
Tokenization

Plaintext
oe@acme.com

Token
bwe09f@fg7d8.com

Plaintext
1 (313) 555-8170

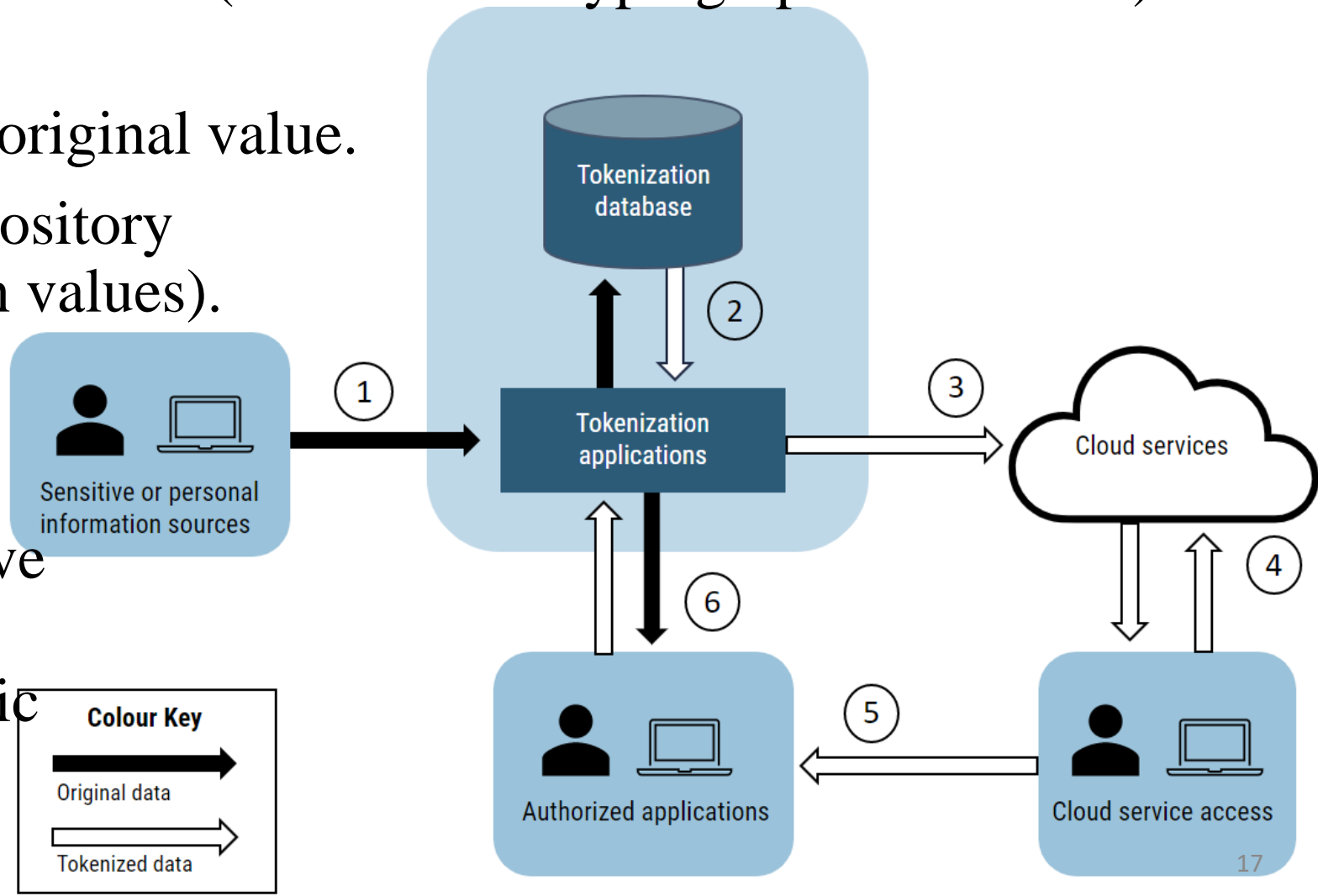
Token
+4 (234) 897-5438

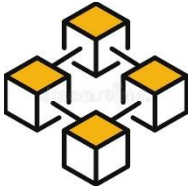


3.4. TOKENIZATION

Tokenization systems components:

- Token Generation: producing a token (irreversible cryptographic functions).
- Token Mapping: assigning the created token value to its original value.
- Token Data Store: central repository (original values, related token values).
- Encrypted Data Storage: Token Data Store and sensitive data in transit.
- Management of Cryptographic Keys: for Token Data Stores.





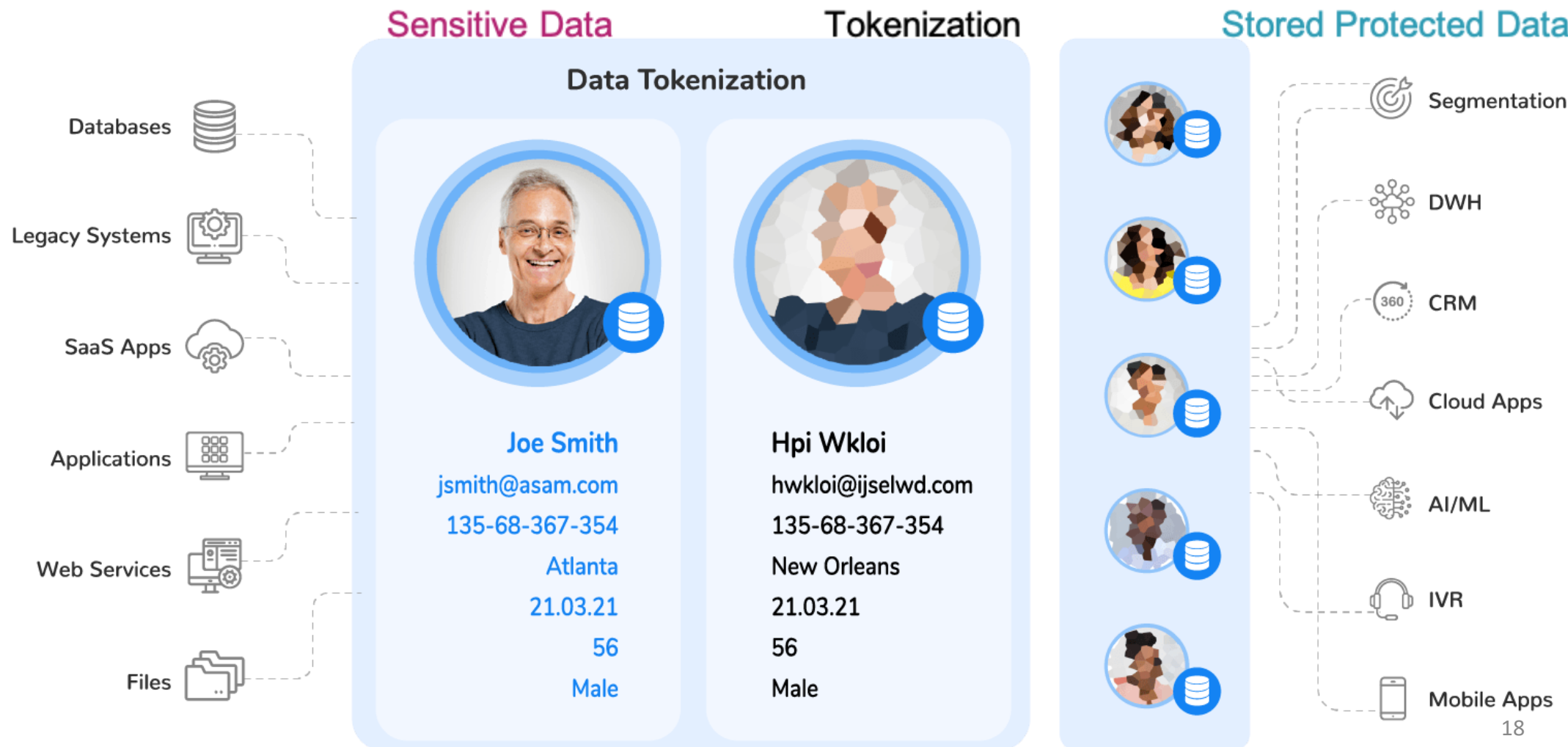
3.4. TOKENIZA

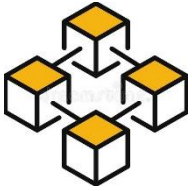


Tokenization applications: 0544-4124-4325-3490

**CipherTrust
Tokenization**

4269-8572-9741-2570





3.5. DIGITAL ASSETS

Digital asset: is asset

- Exists in digital form
- Comes with a distinct usage right.

Token:

- Tool for representation digital assets

What is a Digital Asset?



Images



Video



Design Files



Documents



PDFs



Presentations



Marketing Collateral

Content Assets

COMMON DIGITAL ASSETS

A digital asset is any asset that exists in a digital form and includes a right to use.



Cloud Storage



Digital Media



Graphics



Word Documents



Website Domains



Presentations



Directories

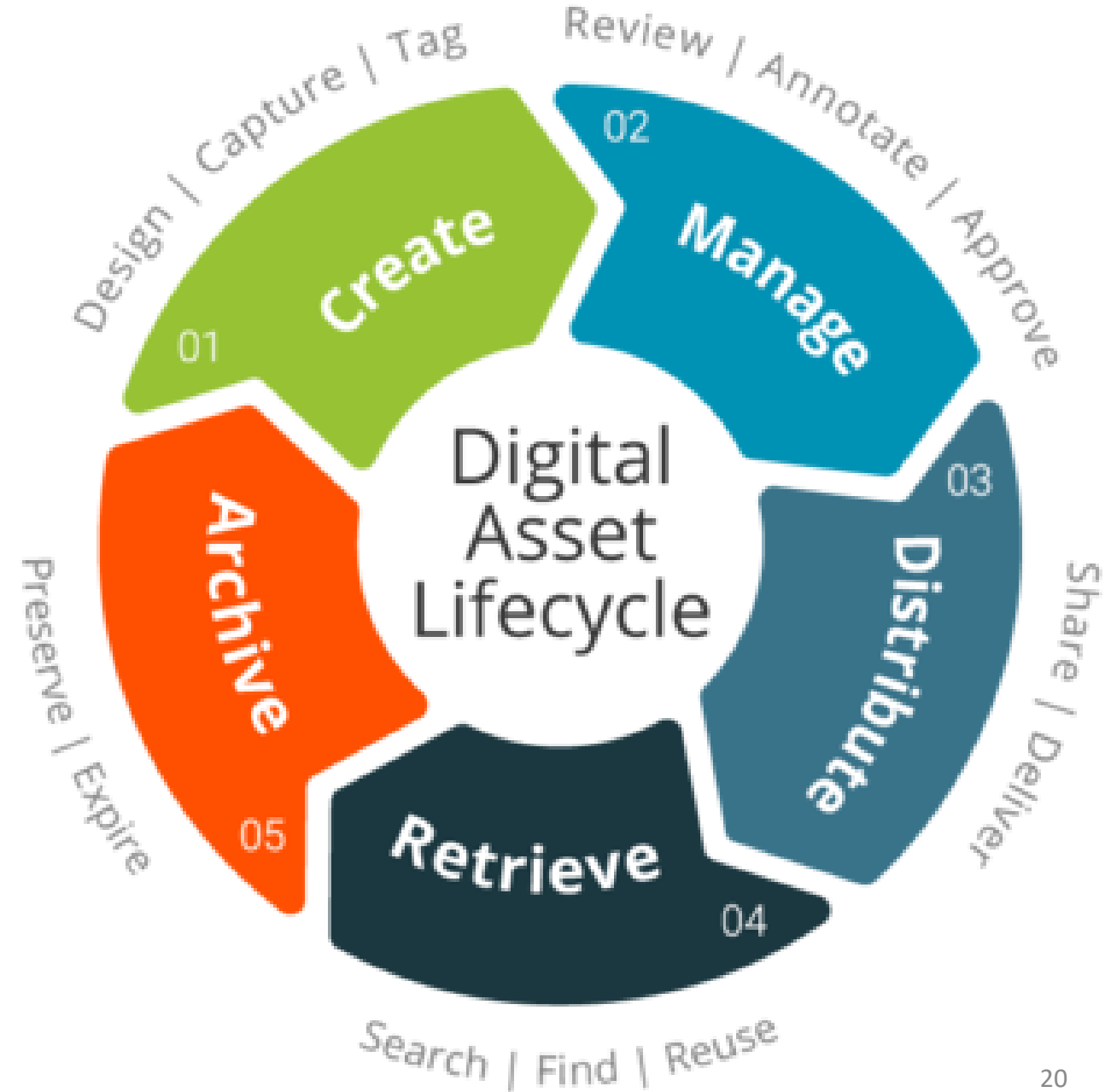


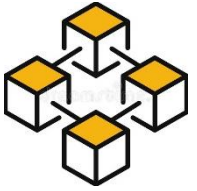
PDF Documents

3.6. DIGITAL ASSET MANAGEMENT

Digital asset management:

- organizing digital capital
- quickly and efficiently retrieval





4. CRYPTO TOKENS

4.1. CRYPTO TOKEN

4.2. CRYPTO ASSETS

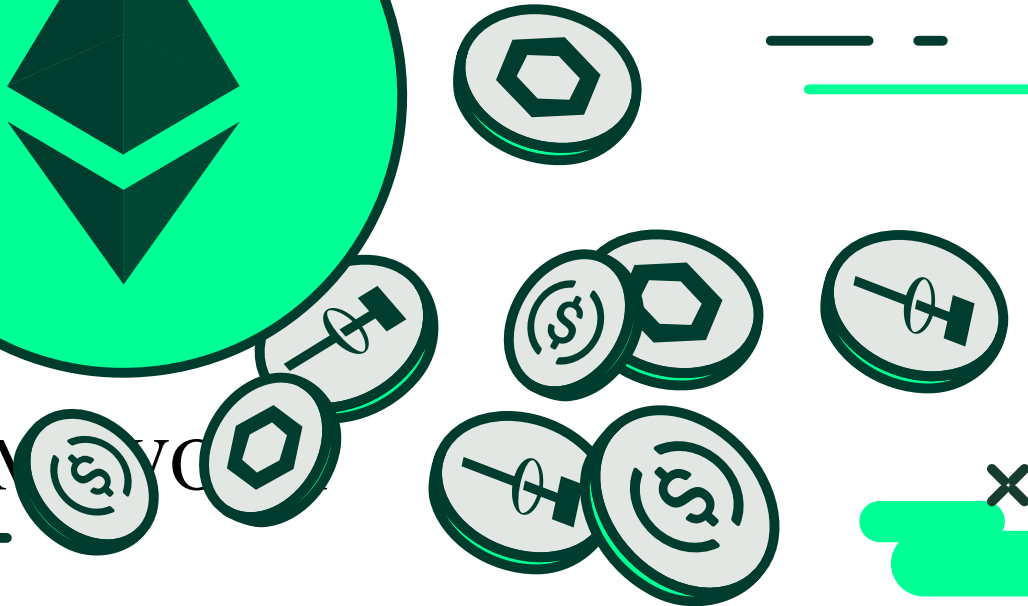
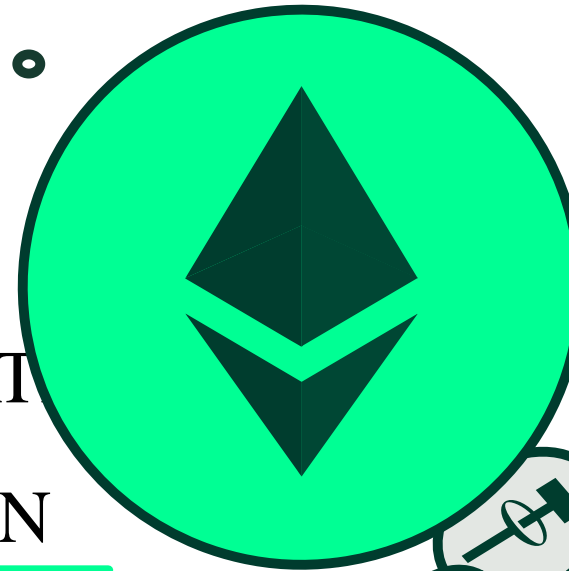
4.3. CRYPTO TOKEN CLASSIFICATION

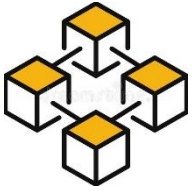
4.4. BLOCKCHAIN TOKENIZATION

4.5. CRYPTO TOKEN TAXONOMY FRAMEWORK

4.6. CRYPTO TOKEN STANDARDS

4.7. CRYPTO TOKEN APPLICATIONS





4.1. CRYPTO TOKEN

Crypto Tokens (blockchain token):

- Cryptographic string of characters (letters), digital tokens
- Represents scarce assets.
- Operate by smartcontract

Features:

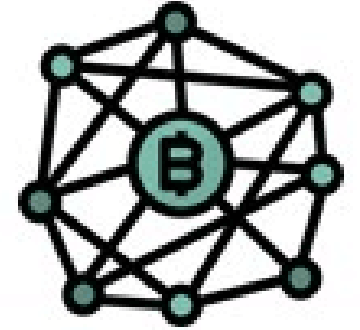
- Fixed/transparent supply
- Avoid tokens inflation
- Developed on top of a blockchain protocol
- Through smart contracts

CryptoCurrency vs Crypto Tokens

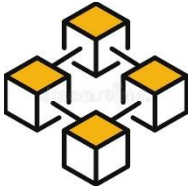


A digital asset

operating on



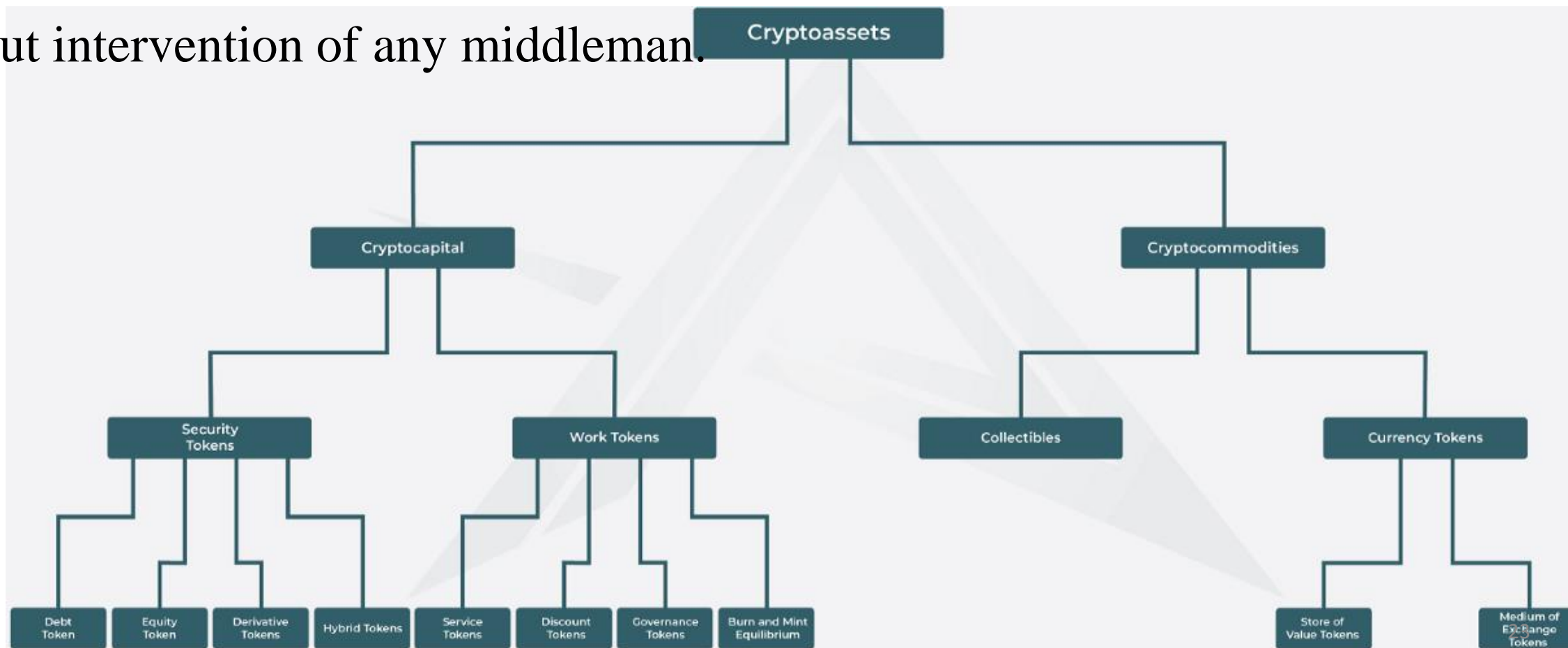
**A crypto coin's
blockchain**

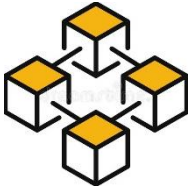


4.2. CRYPTO ASSETS

Crypto Asset: is a digital asset which

- Utilizes cryptography, peer-to-peer networking, public ledger.
- Regulate creation of new units, verify and secure transactions.
- Without intervention of any middleman.





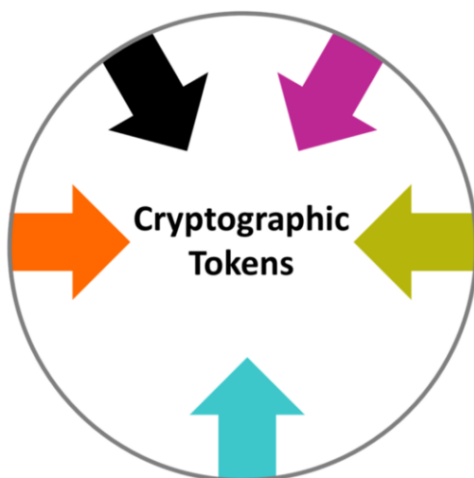
4.3. CRYPTO TOKEN CLASSIFICATION

MAIN TOKEN TYPES PER DIMENSION

Purpose
What is the token's main purpose?
Cryptocurrencies
Network Tokens
Investment Tokens

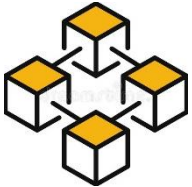
Utility
What utility does the token provide?
Usage Tokens
Work Tokens
Hybrid Tokens

Technical Layer
On which system layer is the token implemented?
Blockchain-Native Tokens
Non-native Protocol Tokens
(d)App Tokens



Underlying Value
Where does the token derive its value from?
Asset-backed Tokens
Network Value Tokens
Share-like Tokens

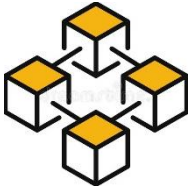
Technical Layer	Purpose	Underlying Value	Utility	Legal Status*
Blockchain-Native Tokens Description: A token that is implemented on the protocol-level of a blockchain Characteristics: <ul style="list-style-type: none">Critical to operate the blockchainIntegral component of the blockchain's consensus mechanismPart of the blockchain's incentive mechanism for block validators/other nodes Examples: BTC (Bitcoin, Bitcoin); ETH (Ether, Ethereum), STEEM (Steem, Steem)	Cryptocurrencies Description: A token that is intended to be a "pure" cryptocurrency Characteristics: <ul style="list-style-type: none">Intended as a global medium of exchangeFunctions as a store of value Examples: BTC (Bitcoin), ZEC (Zcash), KIN (Kin, Kik)	Asset-backed Tokens Description: A token that functions as a claim on an underlying asset Characteristics: <ul style="list-style-type: none">Allows trading via IOUs without actually having to move the underlying assetThe issuer is responsible to hold the underlying assetIntroduces counterparty risk Examples: USDT (Tether USD, Tether), GOLD (GOLD, GoldMint), Ripple IOUs (Ripple)	Usage Tokens Description: A token that provides access to a digital service, similar to a paid API key Characteristics: <ul style="list-style-type: none">Grants holders access to exclusive functionality of the service Examples: BTC (Bitcoin), STX (Stacks, Blockstack)	Utility Tokens Description: A token offering owners clearly defined utility within a network or (decentralized) application Characteristics: <ul style="list-style-type: none">Closely tied to the functionality of the issuing network or applicationInternal network/app currency but not necessarily attempting to be a currencyGrants owners the right to actively contribute to the system vs. passive investor roleAvoids security-like features Examples: GNO (Gnosis), STEEM (Steem)
Non-native Protocol Tokens Description: A token that is implemented in a cryptoeconomic protocol on top of a blockchain Characteristics: <ul style="list-style-type: none">Integral component of the protocol's consensus mechanismPart of the protocol's incentive mechanism for nodesTracked on an underlying blockchain to which it is not integral (e.g. ERC20 Tokens on Ethereum) Examples: REP (Decentralized Oracle Protocol, Augur)	Network Tokens Description: A token that is primarily intended to be used within a specific system (e.g. network, application) Characteristics: <ul style="list-style-type: none">Token has functionality within the issuers systemNot intended as a general cryptocurrency Examples: GNO (Gnosis), STX (Stacks, Blockstack)	Network Value Tokens Description: A token that is tied to the value and development of a network Characteristics: <ul style="list-style-type: none">Tied to the value generated and exchanged on the network (e.g. transaction fee volume)Closely intertwined with key interactions of network participants Examples: ETH (Ether, Ethereum) STEEM (Steem)	Work Tokens Description: A token that provides the right to contribute to a system Characteristics: <ul style="list-style-type: none">Owning Tokens is the precondition for contributing to the systemContributions are either incentivized with a rewards system or holders get utility from the system/decentralized organization Examples: REP (Reputation, Augur), MKR (Maker, Maker DAO)	Security Tokens Description: A token that behaves like a security Characteristics: <ul style="list-style-type: none">Showcases security-like features, e.g. voting on decisions regarding the issuing entity, dividends, or profit sharesHolders are regarded as ownersLittle or insufficient utility Examples: SPICE (SPICE VC), Bitwala (tba)
(d)App Tokens Description: A token that is implemented on the application-level on top of a blockchain (and potentially protocol) Characteristics: <ul style="list-style-type: none">Integrated within the applicationPart of the app's incentive mechanism for nodes and/or usersTracked on an underlying blockchain to which it is not integral (e.g. ERC20 Tokens on Ethereum) Examples: WIZ (Wisdom, Gnosis), SAFE (Safecoin, SAFE Network)	Investment Tokens Description: A token that is primarily intended as a way to passively invest in the issuing entity or underlying asset Characteristics: <ul style="list-style-type: none">Promises owners a share of asset value or in (future) success of the issuing entityNo or little significant functionality Examples: Neufund Equity Tokens (Neufund), DGX (Digix Gold, DigixDAO)	Share-like Tokens Description: A token with share-like properties Characteristics: <ul style="list-style-type: none">The issuer promises token owners a share in the success of the issuing entity (e.g. dividends, profit-shares)May or may not come with voting-rightsMostly on no/weak legal basis Examples: DGD (DigixDAO), LKK (Lykke) <i>Likely to be classified as a security token</i>	Hybrid Tokens Description: A token featuring traits of both usage and work tokens Characteristics: <ul style="list-style-type: none">Grants access to system functionalitiesAllows owners to contribute to the system Examples: ETH (Ether, Ethereum, after Casper), DASH (Dash)	Cryptocurrencies Description: A token that is a pure cryptocurrency Characteristics: <ul style="list-style-type: none">Acts as a store of value and medium of exchangeNot emitted by a central authority against which owners have claimsIn Germany (according to BaFin):<ul style="list-style-type: none">currently not regarded as lawful, functional currencynot regulated by e-money laws Examples: BTC (Bitcoin), ZEC (Zcash), LTC (Litecoin)



4.3. CRYPTO TOKEN CLASSIFICATION

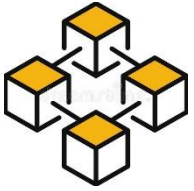
- Payment token: function as currency, serve as a medium of exchange, store of value, and unit of account.
- Utility token: digital access to a application/service on blockchain.
- Asset Tokens: refer to assets, are backed by real-world assets, (tokenized), gold, silver, debt, commodity, real-estate
- Security token: function similarly to traditional securities, represent the fractional ownership of any real-time asset.





4.3. CRYPTO TOKEN CLASSIFICATION

Class					
Payment Token		Utility Token		Investment Token	
Role/Purpose					
Right	Value Exchange	Toll	Function	Currency	Earnings
Representation					
Digital		Physical	Virtual		Legal
Supply					
Fixed			Schedule-based		
Incentive System					
Enter Platform		Use Platform		Stay Long-Term	
Fungibility					
Fungible			Non-Fungible		



4.4. BLOCKCHAIN TOKENIZATION

Real World

A paper contract representing a claim on, or right to, some good, service, or asset in the real world...

Blockchain World

... is converted into a digital contract in the form of a token within a blockchain network

Blockchain Tokenization:

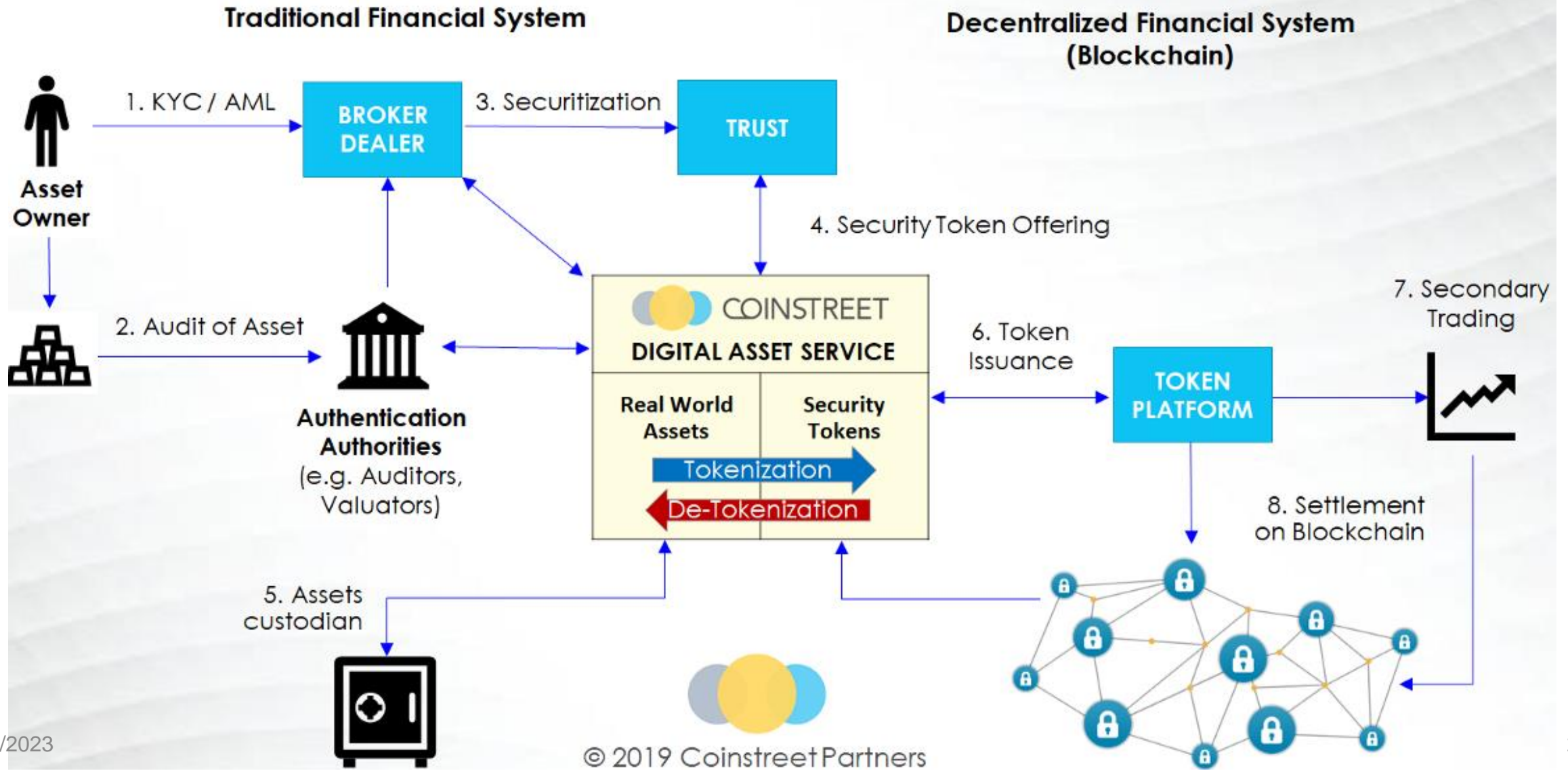
- For security token.

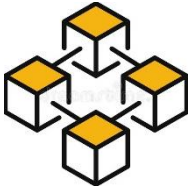


4.4. BLOCKCHAIN TOKENIZATION

Tokenization process

ASSET TOKENIZATION PROCESS

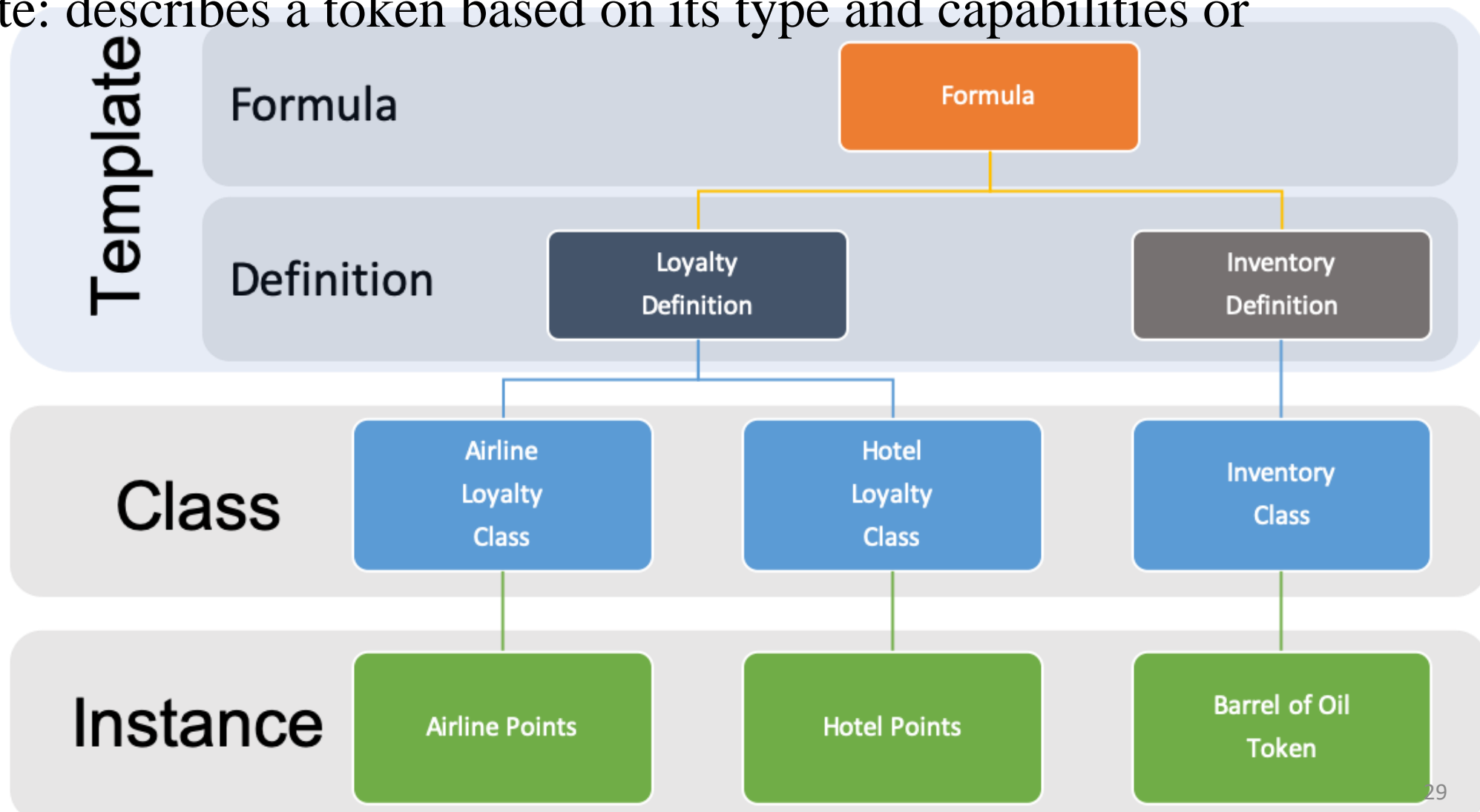


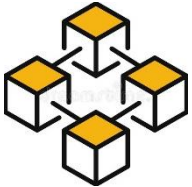


4.5. CRYPTO TOKEN TAXONOMY FRAMEWORK

Token Taxonomy Framework model on tokens.

- Token Template: describes a token based on its type and capabilities or restrictions

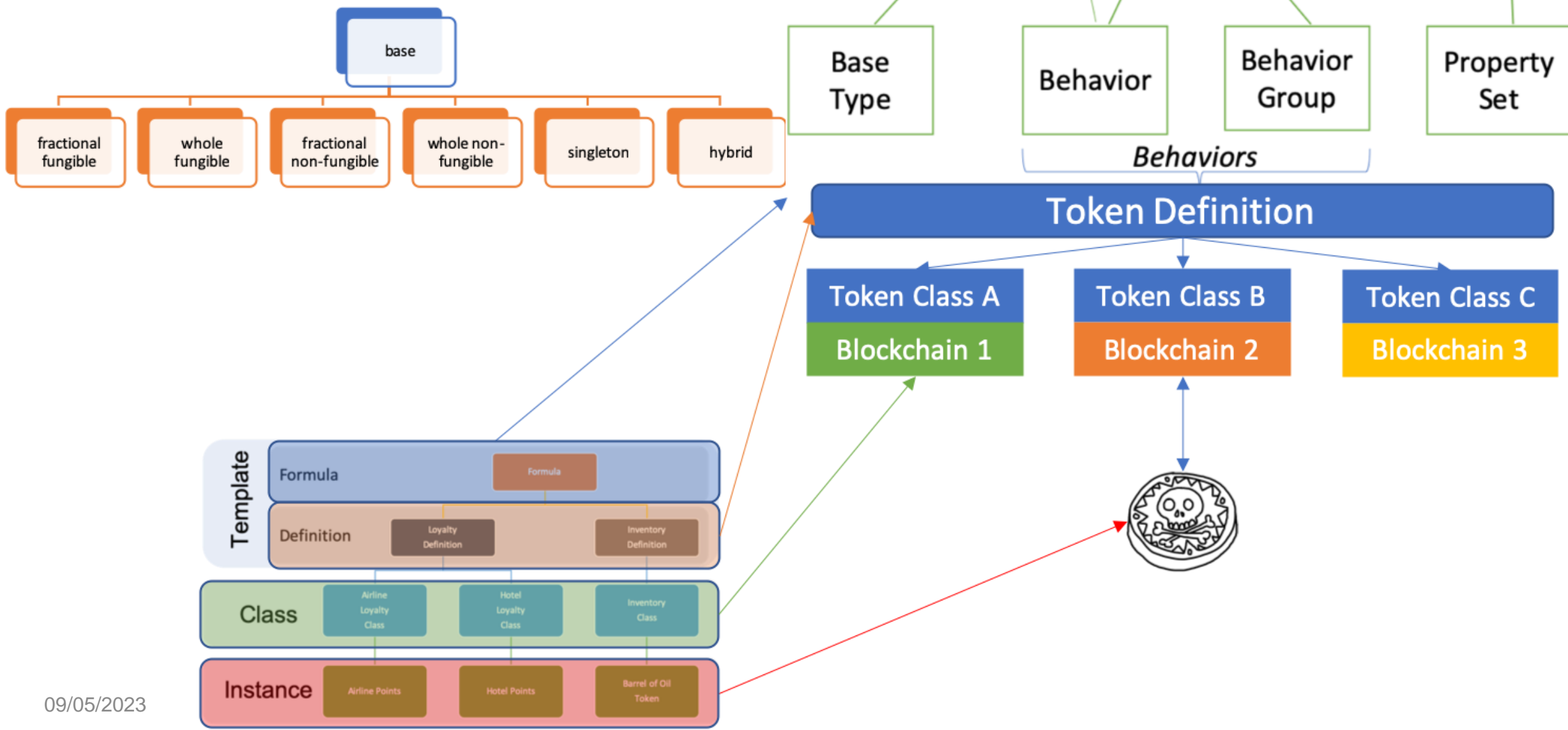


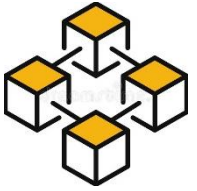


4.5. CRYPTO TOKEN TAXONOMY FRAMEWORK

Template Formula.

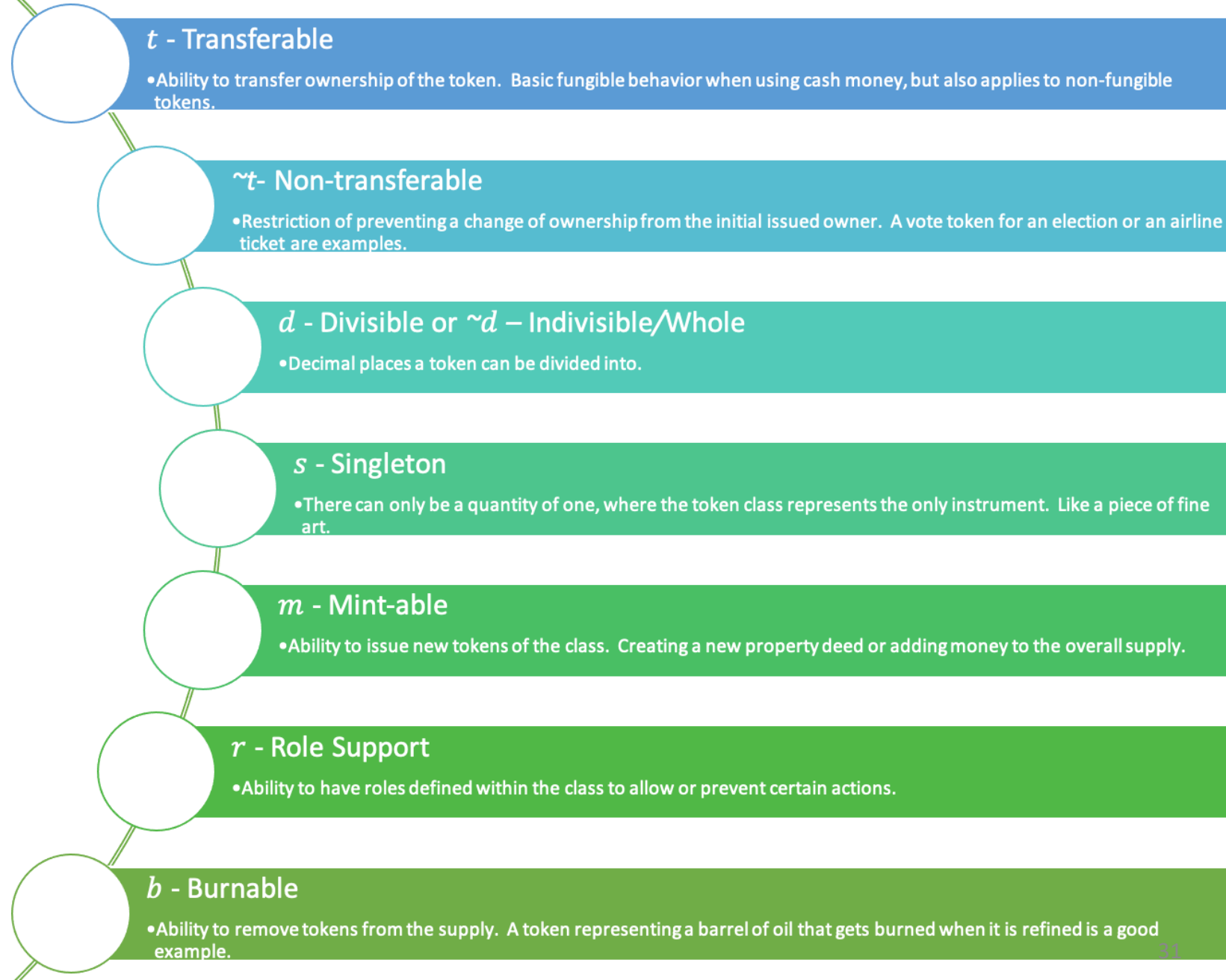
$$[\tau_F\{\sim d, g, SC\} + \phi SKU]$$





4.5. CRYPTO TOKEN TAXONOMY FRAMEWORK

Crypto token activities:



4.6. CRYPTO TOKEN STANDARDS

Token standards: set of rules, conditions, functions, events for crypto token works, smart contract follow.

- create, issue, deploy new tokens.
- on blockchains: utilize smart contracts
- subset of smart contract standards

Ethereum Token Standards

ERC - 20



Fungible Tokens

Most basic token standard, used to create interchangeable tokens

Trade-able virtual currencies
Governance/voting tokens
Staking tokens



ERC - 721



Non-Fungible Tokens

Basic NFT standard, used to create unique tokens, distinguishable from others in the same collection

Collectable art
Digital items and property
Tickets (events, seats, lottery)



ERC - 1155



Multi-Token Standard

A single interface that manages any combination of multiple token types (fungible, non-fungible, etc).

Alternate to ERC-20 and ERC-721
Video game items
Memorabilia



ERC - 4626



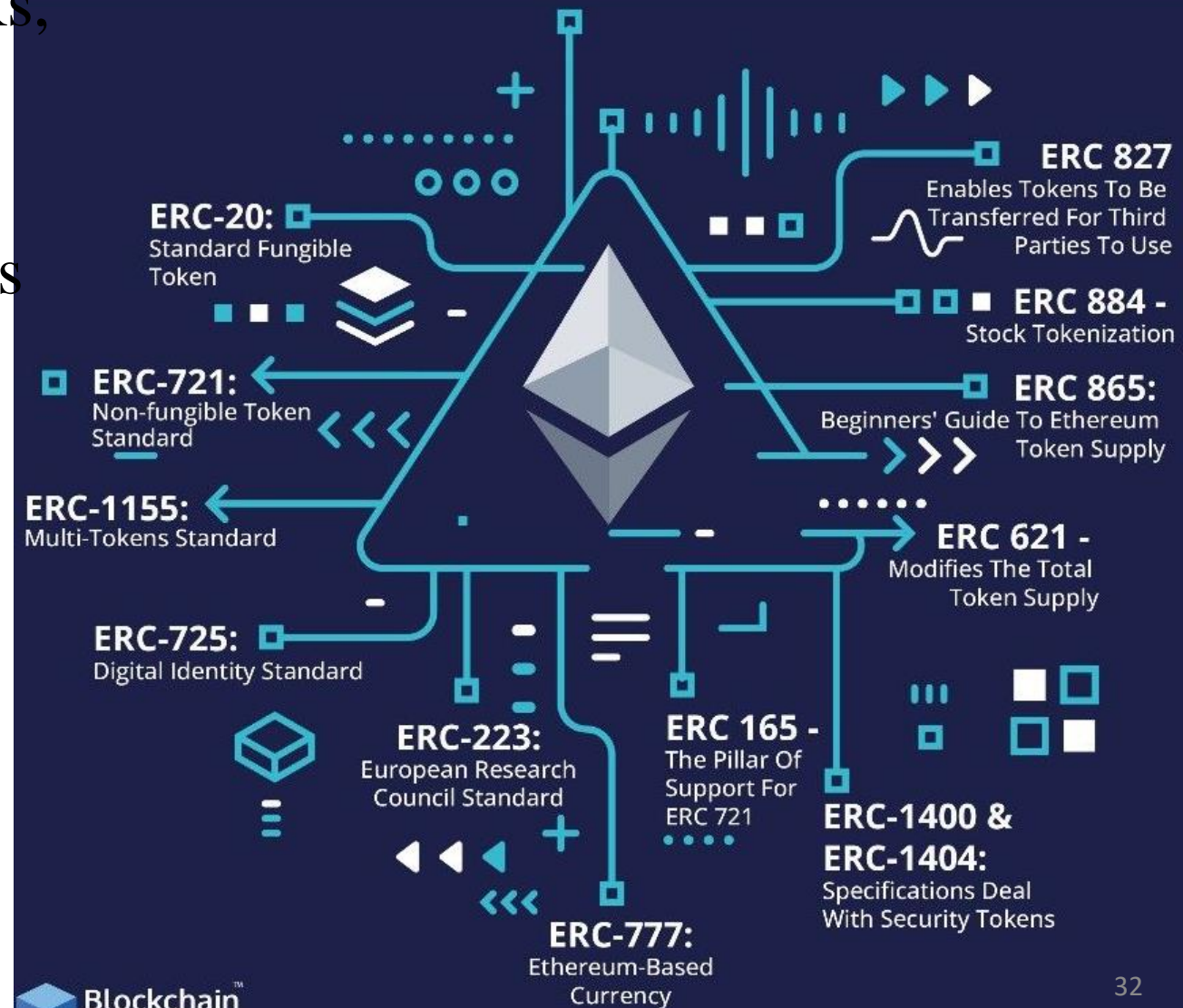
Tokenized Vault Standard

A standard that represents a yield-bearing vault; extending ERC-20 to include deposit, redeem, etc

Lending markets
Interest bearing tokens
Aggregators

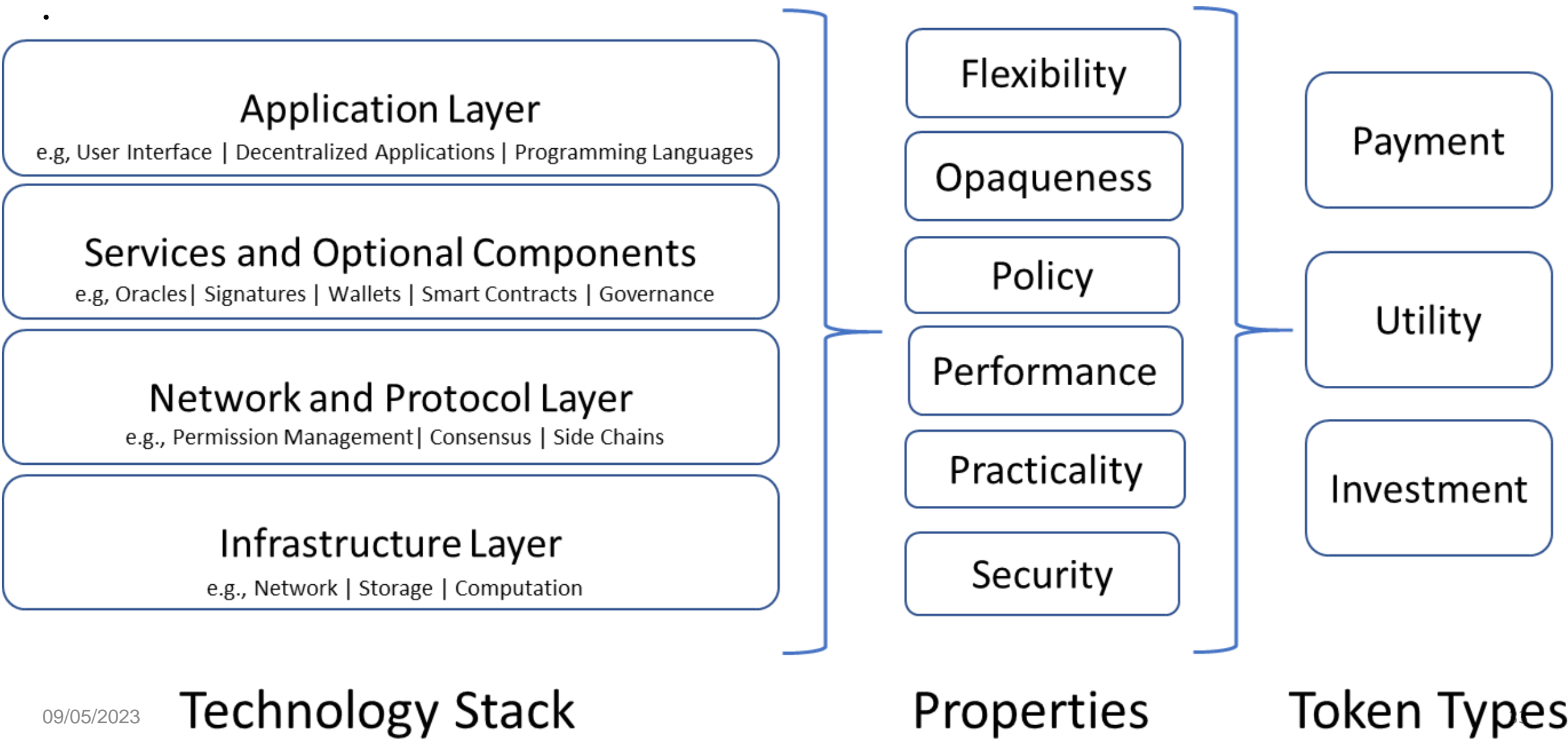


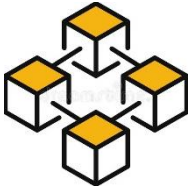
ERC TOKEN STANDARDS LIST





4.6. CRYPTO TOKEN STANDARDS



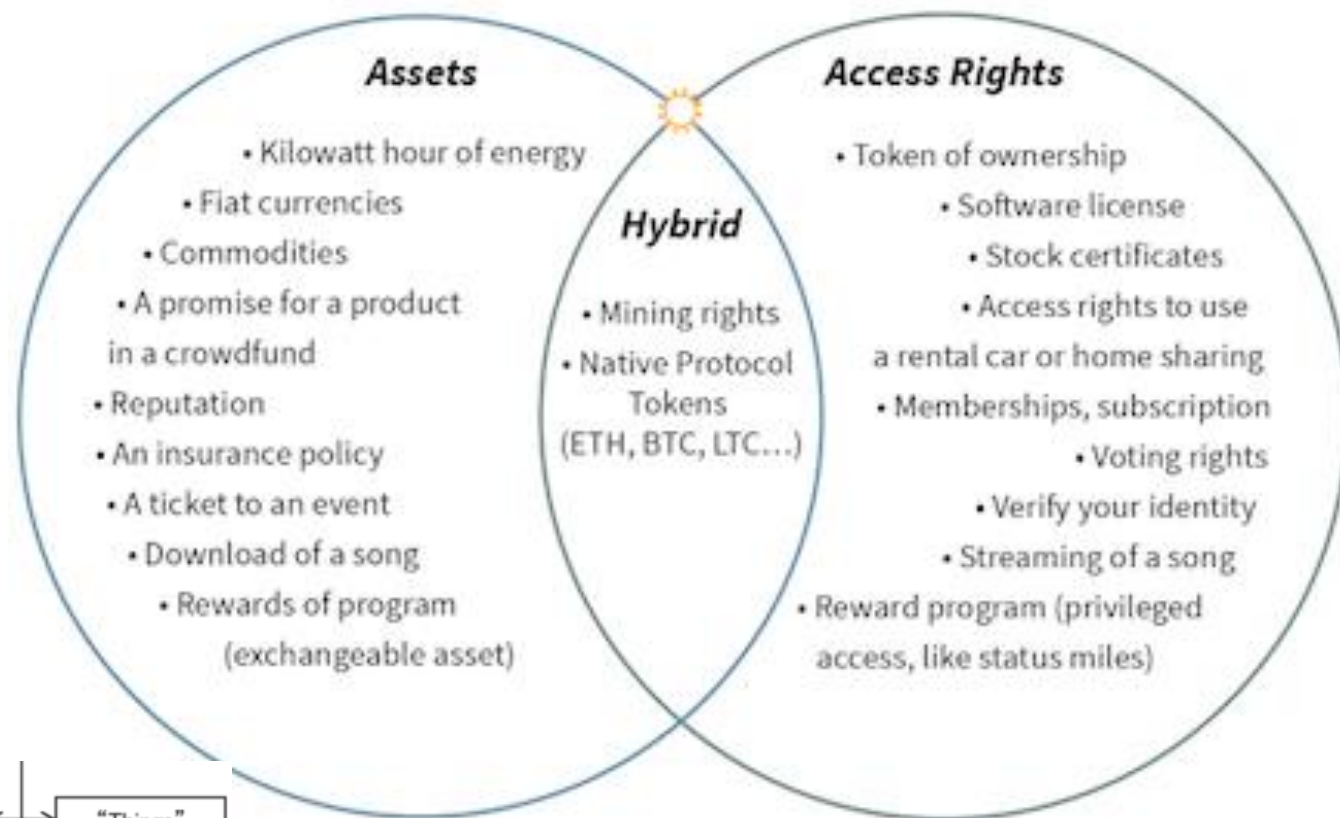


4.7. CRYPTO TOKEN APPLICATIONS

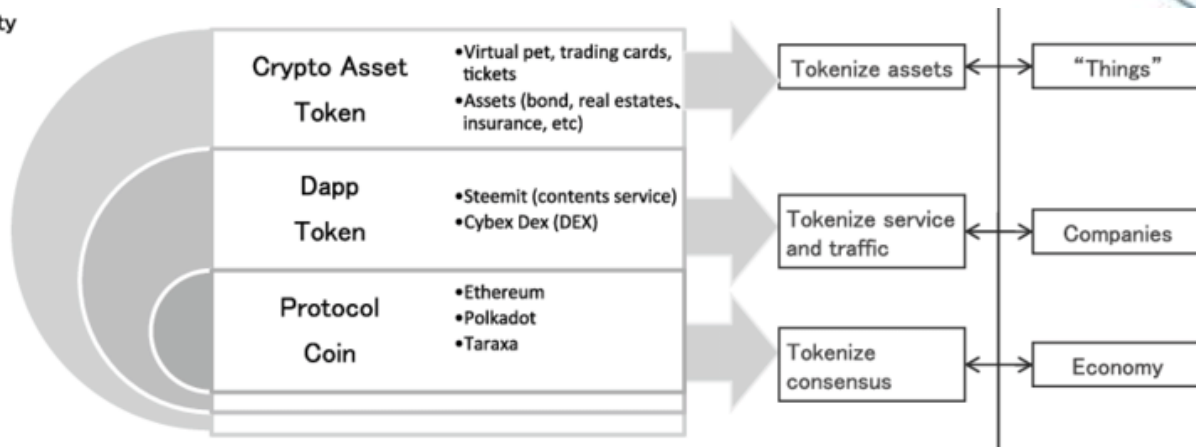
Application Tokens

From the Book "Token Economy" by Shermin Voshmgir, 2019

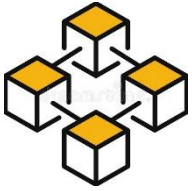
Excerpts available on <https://blockchainhub.net>



Centralized Security
↑
↓
Decentralized Utility

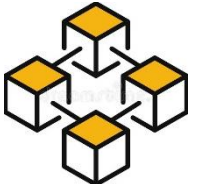


Application tokens can represent any asset or access rights or a combination of both. They can have simple or complex functions.



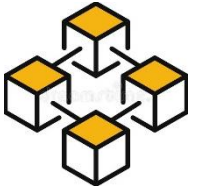
5. SUMMARY

- Asset:
 - Things have value, can be transformed into money.
 - Can generate future economic value
- Token:
 - Pointer reference something, represents digital assets.
 - Tokenization: Substituting a sensitive data element with a non-sensitive equivalent
- Crypto token (blockchain token):
 - Represents crypto assets, Operate by smartcontract
 - Standardized for operate on blockchain.



6. DISCUSSION





FINISH

Thank You