Blockchain Standardization Landscape

Ramesh Ramadoss, PhD
Co-Chair, IEEE Blockchain Initiative
Technical Director, InterWork Alliance

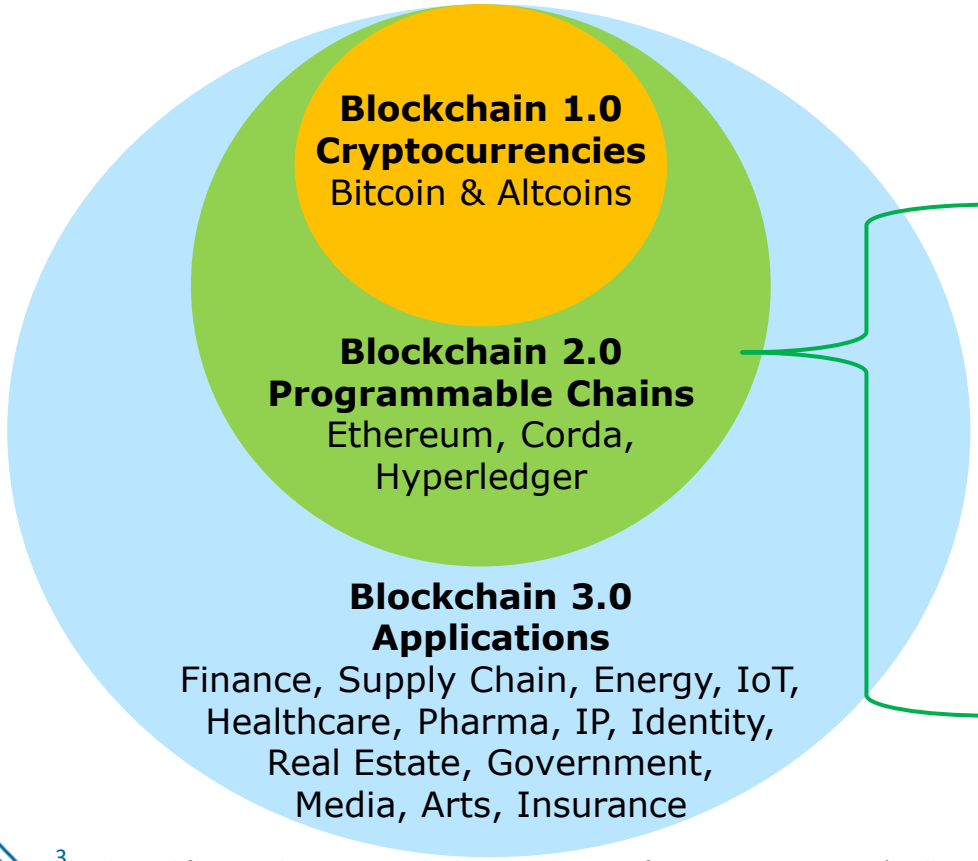
17 June 2020, European Commission, Joining Forces for Blockchain Standardisation

IEEE
Advancing Technology for Humanity

Outline

- Blockchain Evolution
- Blockchain & DLT (Standardization Landscape)
- Digital Asset & Tokens (Standardization Landscape)
- Concluding Remarks

Blockchain Evolution



Blockchain 1.0

Jan. 2009: The first bitcoin software was launched! Satoshi Nakamoto solved the double-spending problem in the whitepaper “Bitcoin: A Peer-to-Peer Electronic Cash System, Oct. 2008”.

Blockchain 2.0

Jul. 2015: Ethereum Frontier Version went live! Vitalik Buterin and Gavin Wood conceived this general-purpose computing platform with smart contracts.

Sept. 2015: R3 Corda was launched as an open-source platform for the financial industry.

Dec. 2015: Hyperledger Project was created by the Linux Foundation for building open source enterprise solutions using blockchain & Distributed Ledger technologies (DLT).

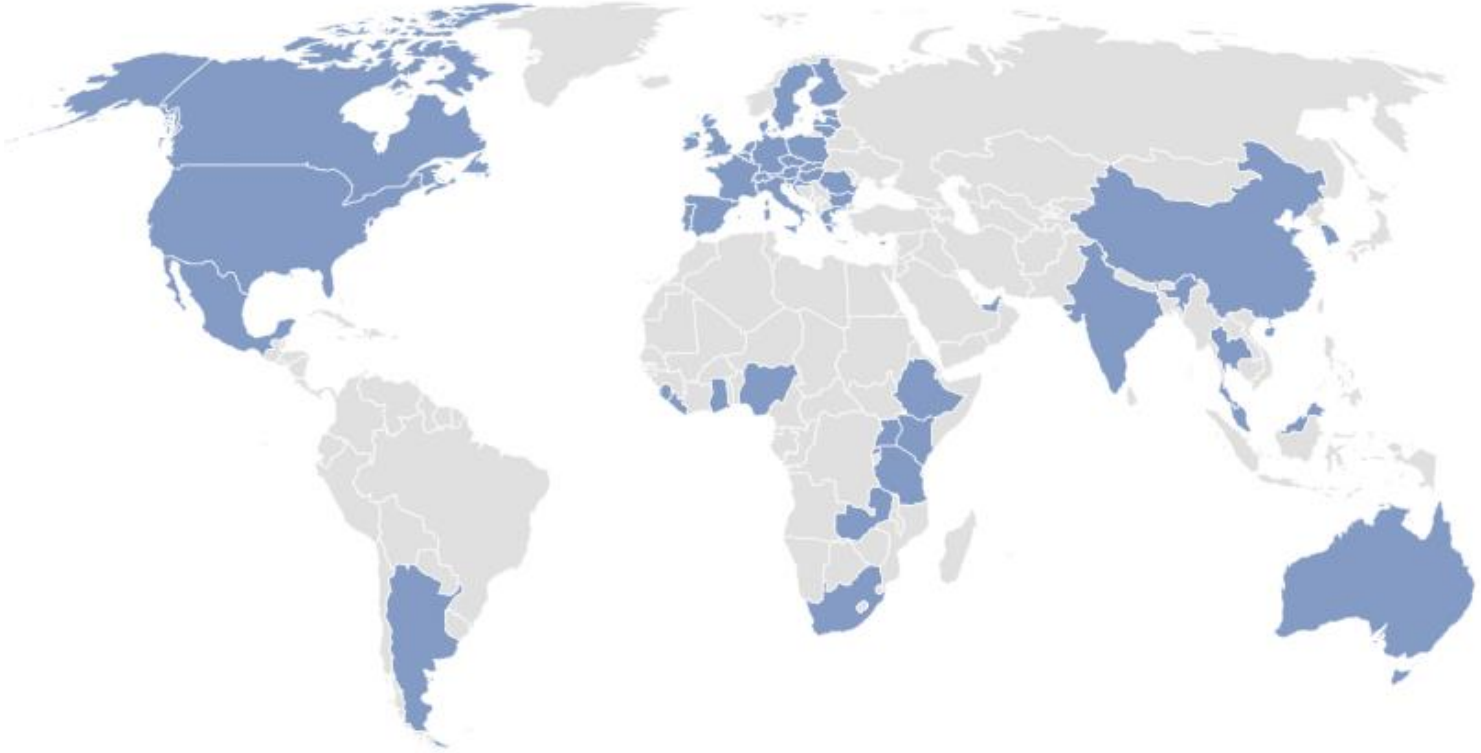
Adopted from Melanie Swan, Blockchain: Blueprint for a New Economy, O'Reilly Media, 2015.

Enterprises in Blockchain

Source: Forbes

WWW.BLOCKDATA.TECH | INFO@BLOCKDATA.TECH

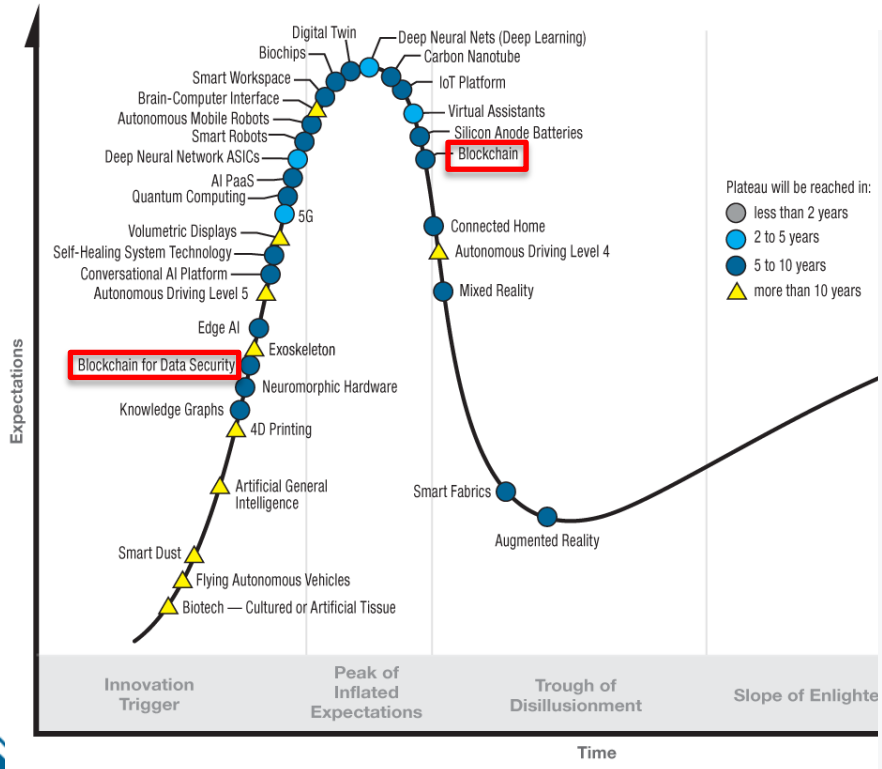
Governments Using Blockchain



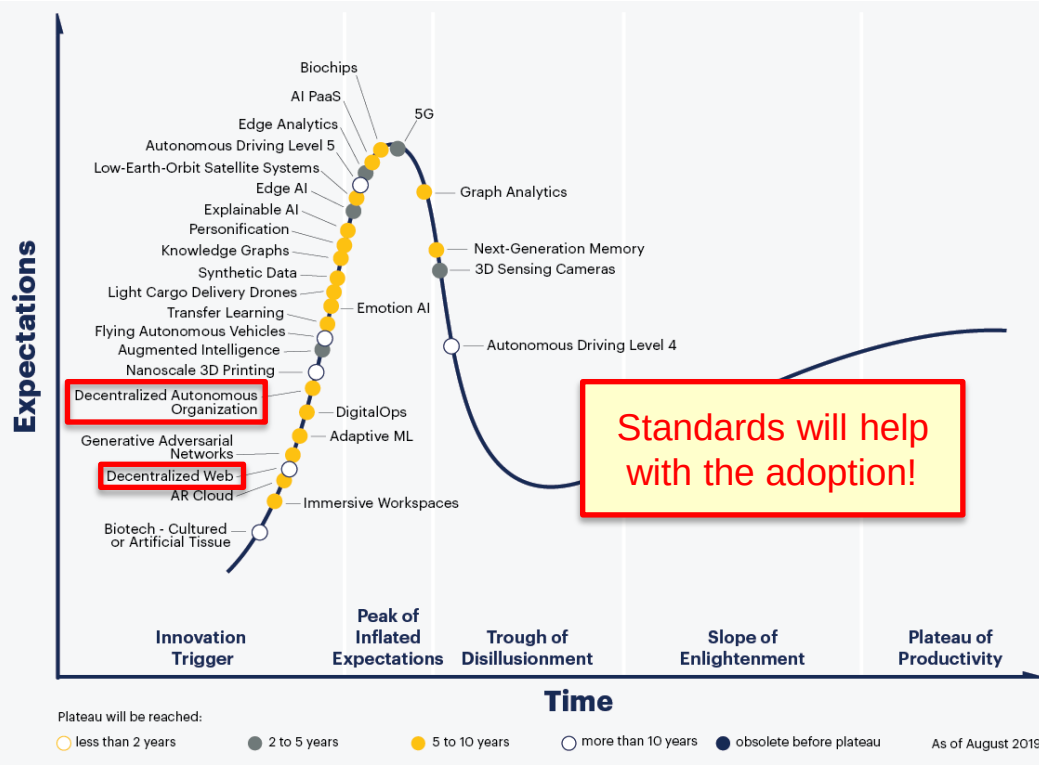
Source: Which Governments Are Using Blockchain Right Now?
https://consensys.net/blog/enterprise-blockchain/which-governments-are-using-blockchain-right-now/

Blockchain Technology: Hype Cycle

2018 Gartner Hype Cycle



2019 Gartner Hype Cycle



Outline

- Blockchain Evolution
- Blockchain & DLT (Standardization Landscape)
- Digital Asset & Tokens (Standardization Landscape)
- Concluding Remarks

Blockchain & DLT: Standardization Landscape

International/Regional SDOs (Generic Level)	International Standards Organizations, regional and government organizations are working on general topics (Terminology, Taxonomy, Smart contracts, Governance, etc.)
Alliances & Consortia (Industry Specific)	Enterprises are working on standards & specs through alliances and consortia for industry-specific applications (e.g., Finance, Supply chain, IoT, etc.).
Open Source Community (Technology Specific)	Open Source community is working on technical specifications at the code level (e.g., EIP process).

All parties have common goals toward blockchain standardization to address interoperability, scalability, adoption, governance etc.

Biggest Challenge: Bringing stakeholders from different levels to work together!

Blockchain & DLT: Standards Development Organizations

International Standards Development Organizations (SDOs)

Regional/Government Organizations

Enterprise Alliances & Consortia

Open Source Community

IEEE

IEEE Blockchain Standards Working Groups

Governance
P2145 - Standard for Framework and Definitions for Blockchain Governance
Chair: Thomas Cox, StrongBlock

Interoperability
2418.2-2020 - IEEE Approved Draft Standard Data Format for Blockchain Systems
Chair: Ming Li, CESI

Healthcare
P2418.6 - Standard for the Framework of DLT Use in Healthcare and the Life and Social Sciences
Chair: Heather Flannery, Consensys Health

Energy
P2418.5 - Standard for Blockchain in Energy
Chair: Claudio Lima, BEC

IoT (4)
P2418.1 - Standard for the Framework of Blockchain Use in Internet of Things (IoT)
P2144.1 - Standard for Framework of Blockchain-based Internet of Things (IoT) Data Management
P2144.2 - Standard for Functional Requirements in Blockchain-based Internet of Things (IoT) Data Management
P2144.3 - Standard for Assessment of Blockchain-based Internet of Things (IoT) Data Management

https://blockchain.ieee.org/standards

IEEE Blockchain Standards Working Groups

Finance (2)
P2142.1 - Recommended Practice for E-Invoice Business Using Blockchain
P2418.7 - Standard for the Use of Blockchain in Supply Chain Finance

Government (2)
P2418.8 - Standard for Blockchain Applications in Governments
P2141.1 - Standard for the Use of Blockchain in Anti-Corruption Applications for Centralized Organizations

Enterprise Applications (4)
P2141.2 - Standard for Transforming Enterprise Information Systems from Centralized Architecture into Blockchain-based Decentralized Architecture
P2141.3 - Standard for Transforming Enterprise Information Systems from Distributed Architecture into Blockchain-based Decentralized Architecture
P2146.1 - Standard for Entity-Based Risk Mutual Assistance Model through Blockchain Technology
P2146.2 - Standard for External Data Retrieval of Blockchain for Risk Mutual Assistance Model

https://blockchain.ieee.org/standards

ISO TC 307 Blockchain and DLT

WG1 Foundations
- DIS 22739 Terminology
- TS 23258 Taxonomy and Ontology
- CD 23257.2 Reference Architecture
- Study on Data Flows and Data Taxonomy

https://www.iso.org/committee/6266604.html

WG2: Security, Privacy and Identity
- TR 23244 Privacy and personally identifiable information protection considerations (Published)
- TR 23245 Security risks, threats and vulnerabilities
- TR 23245 Overview of identity management
- TR 23576 Security management of digital asset custodians

WG3: Smart Contracts
- TR 23455 Overview of and interactions between smart contracts (Published)
- TS 23259 Legally binding smart contracts

WG5: Governance
- TS 23635 Guidelines for Governance

WG6: Use Cases (TR 3242)

SG7: Interoperability of blockchain and distributed ledger technology systems

JWG 4: ISO/IEC JTC 1/SC 27 WG: Blockchain and distributed ledger technologies and IT Security techniques

EEE

ITU-T: Focus Group on Application of DLT

https://www.itu.int/en/ITU-T/focusgroups/dlt

Focus Group on Application of Distributed Ledger Technology (FG DLT)	Document Type	Status
D1.1 DLT terms and definitions	Technical Specification	Completed
D1.2 DLT overview, concepts, ecosystem	Technical Report	Completed
D1.3 DLT standardization landscape	Technical Report	Completed
D2.1 DLT use cases	Technical Report	Completed
D3.1 DLT reference architecture	Technical Specification	In Progress
D3.3 Assessment criteria for DLT platforms	Technical Specification	Completed
D4.1 DLT regulatory framework	Technical Report	Completed
D5.1 Outlook on DLTs	Technical Report	Completed

W3C

https://www.w3.org/2017/vc/WG/

Verifiable Credentials Working Group
The mission of the Verifiable Credentials (formerly known as Verifiable Claims) Working Group (VCWG) is to make expressing and exchanging credentials that have been verified by a third party easier and more secure on the Web.

The Internet Research Task Force (IRTF)

https://irtf.org/dinrg

Decentralized Internet Infrastructure Research Group (DINRG)
DINRG will investigate open research issues in decentralizing infrastructure services such as trust management, identity management, name resolution, resource/asset ownership management, and resource discovery.

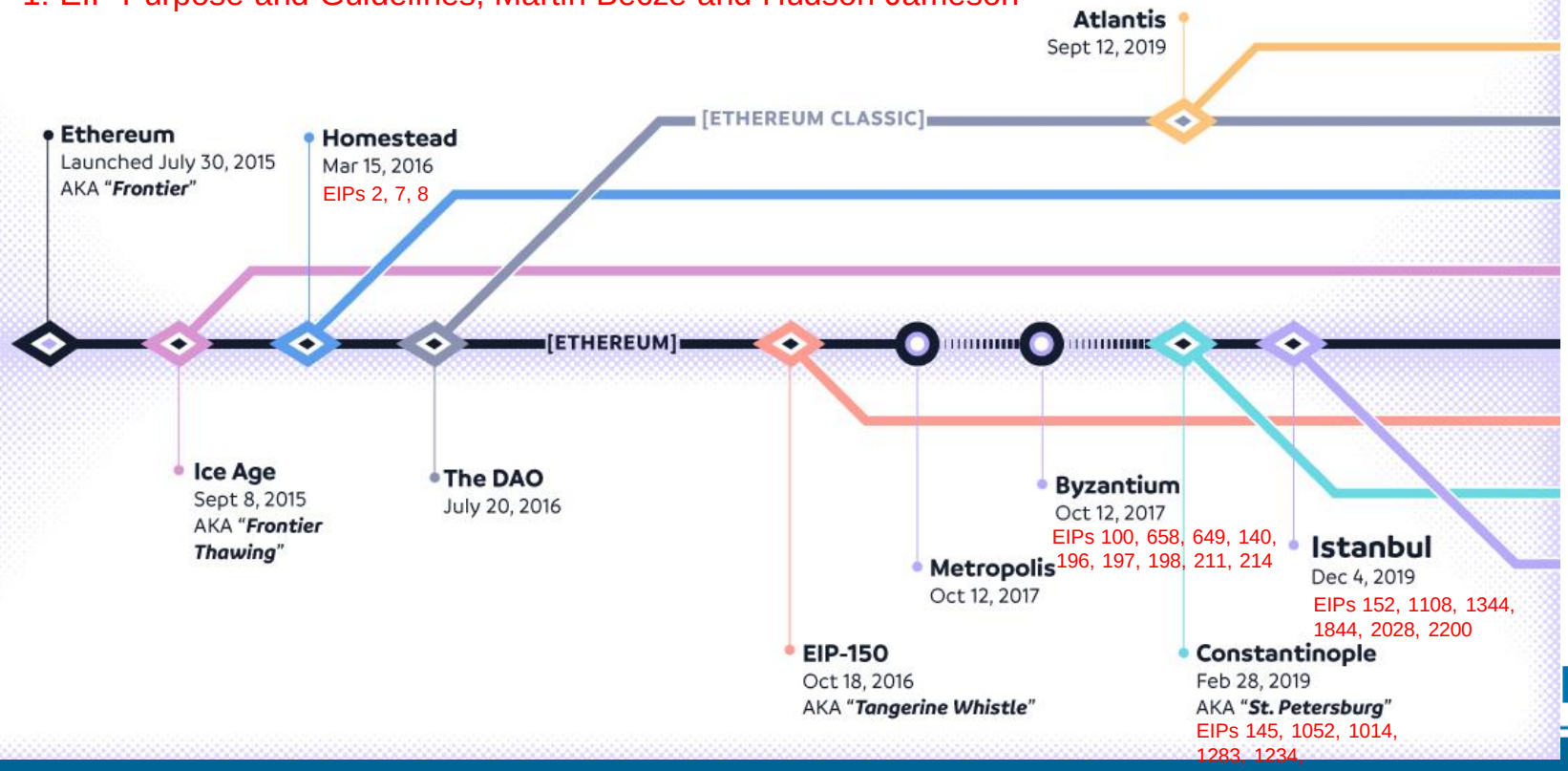
Enterprise Alliances & Consortia: Standards & Specs

Org	Topic	Type	Status	
EEA	Client Specification Off-Chain Trusted Compute Specification	Tech Specs Tech Specs	v4 published v1.1 published	https://entethalliance.org/
TIOT/IIC	Blockchain and IoT Reference Architecture	Standard	Draft	https://www.iiconsortium.org/
BiTA	BiTAS Std 120-2019: Location Component Specification	Tech Specs	Published	https://www.bita.studio/
MOBI	Vehicle Identity Standard Usage Based Insurance Electric Vehicle Grid Integration Connected Mobility & Data Market Place	Standard	Published	https://dlt.mobi/

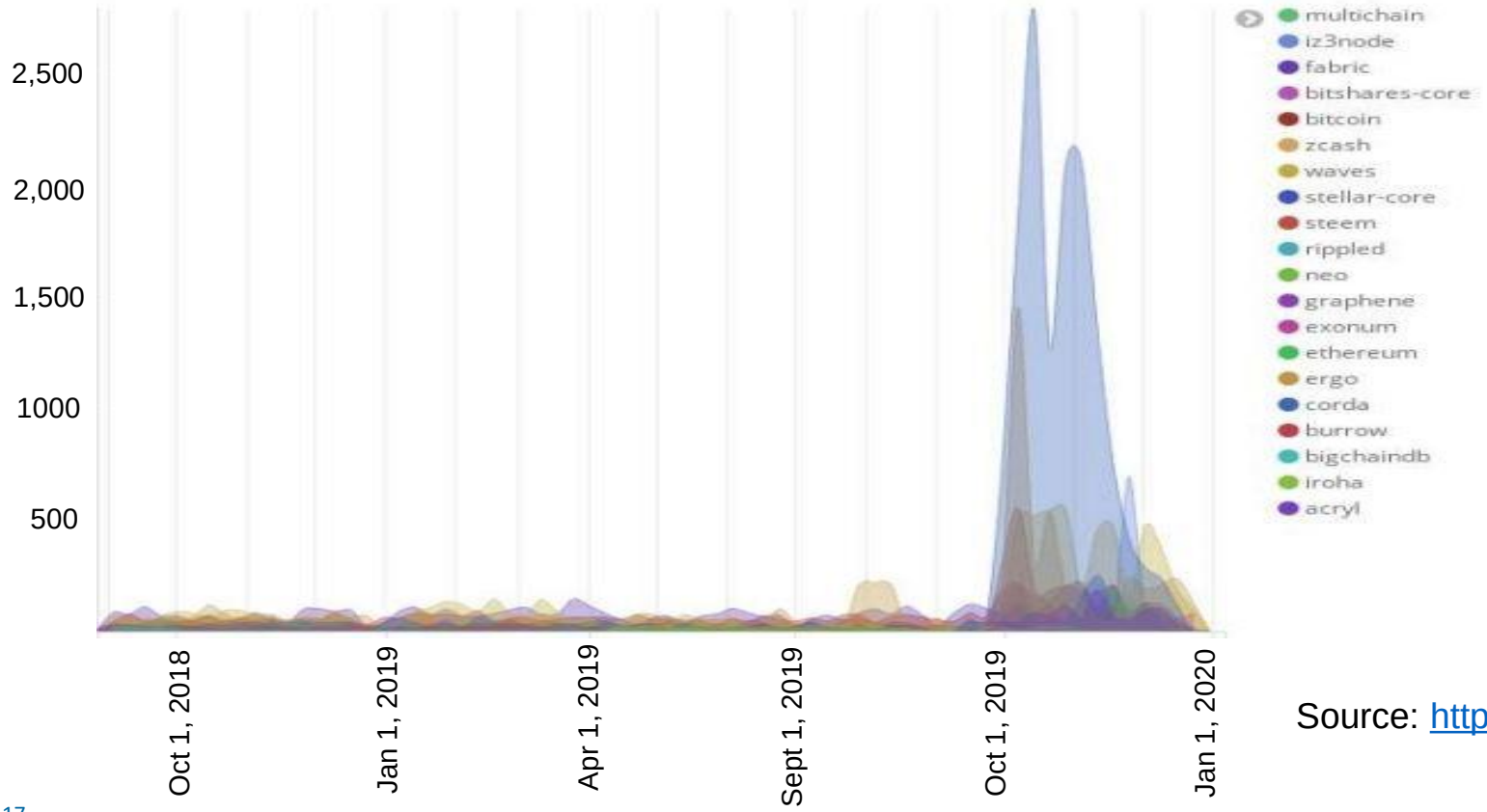
Open Source Community: Ethereum Improvement Proposal

Ethereum Improvement Proposal (EIP)

EIP-1: EIP Purpose and Guidelines, Martin Becze and Hudson Jameson



Open Source Community: GitHub Commits

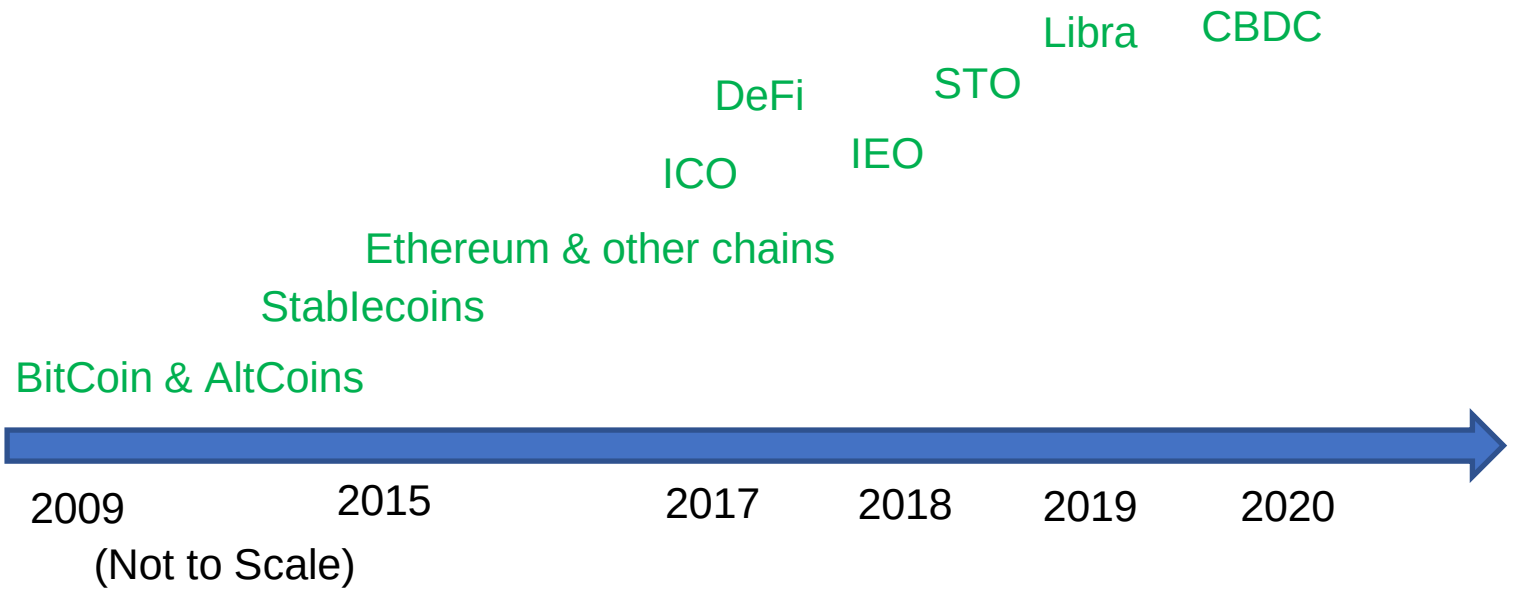


Source: https://dltc.spbu.ru/

Outline

- Blockchain Evolution
- Blockchain & DLT (Standardization Landscape)
- Digital Asset & Tokens (Standardization Landscape)
- Concluding Remarks

Crypto/Tokens/Digital Asset Evolution



Digital Asset & Tokens: Standardization Landscape

Governments/Policy Makers (Regulatory Framework)	European Framework for Digital Assets China CBDC and many other countries
Alliances & Consortia (Business Framework)	Token Taxonomy Framework (TTF) International Token Standardization Association (ITSA) interVASP (GDF/IDAXA)
Open Source Community (Technical Specs/Code)	Ethereum (ERC-20, ERC-721, ERC-1400, DS-20 etc.) NEO (NEP-5), NEM, Tezos etc. eThaler, R3 SDKs

Digital Asset & Tokens: Standards Organizations

International Standards Development Organizations (SDOs)

ISO

IEEE

Enterprise Alliances & Consortia

InterWork Alliance

GDF

ITSA INTERNATIONAL TOKEN STANDARDIZATION ASSOCIATION

Developer Community (Open Source)

ethereum foundation

NEO smart economy

nem

IEEE

Digital Asset & Tokens: Standards Work

InterWork Alliance (https://interwork.org/)
Token Taxonomy Framework (TTF)

GDF / IDAXA / CDC (https://intervasp.org/)
InterVASP Messaging Standard

ITSA (https://itsa.global/)
International Token Identification Number (ITIN)

ISO (https://www.iso.org/committee/6534796.html)
ISO/TC 68/SC 8/WG 3 Digital Token Identifier – DTI

IEEE (https://blockchain.ieee.org/standards)
P2140.1 - Standard for General Requirements for Cryptocurrency Exchanges
P2140.2 - Standard for Security Management for Customer Cryptographic Assets on Cryptocurrency Exchanges
P2140.3 - Standard for User Identification and Anti-Money Laundering on Cryptocurrency Exchanges
P2140.4 - Standard for Distributed/Decentralized Exchange Framework using DLT (Distributed Ledger Technology)
P2140.5 - IEEE Draft Standard for Custodian Framework of Cryptocurrency
P2143.1 - IEEE Draft Standard for General Process of Cryptocurrency Payment
P2143.2 - Standard for Cryptocurrency Payment Performance Metrics
P2143.3 - Standard for Risk Control Requirements for Cryptocurrency Payment
P2418.9 - Standard for Cryptocurrency Based Security Tokens
P2418.10 - Standard for Blockchain-based Digital Asset Management

Digital Asset & Tokens: Standards Work

Ethereum (https://eips.ethereum.org/erc)
ERC-20, ERC-721, ERC-1400,

NEO (https://docs.neo.org/docs/en-us/sc/write/nep5.html)
NEP-5 Token Standard

Tezos (https://forum.tezosagora.org/)
TZIP-12 (FA2): A Multi-Asset Interface for Tezos

Security Token Standards (STO)
ERC-1400/ERC-1410/ ST-20 (Polymath, https://thesecuritytokenstandard.org/)
ERC-1404 (TokenSoft, https://erc1404.org/)
DS Protocol (Securitize, https://www.securitize.io/blog/ds-protocol-interfaces-released
R-Token (Harbor, https://github.com/harborhq/r-token
SRC-20 (Swarm/Stellar, https://www.swarm.fund/src20
NEM Symbol (https://nemsymbol.com/)

Outline

- Blockchain Evolution
- Blockchain & DLT (Standardization Landscape)
- Digital Asset & Tokens (Standardization Landscape)
- Concluding Remarks

Overlapping Scope & Work!

Topic(s)	ISO TC 307	IEEE	ITU-T FG DLT	INATBA
Terminology	DIS 22739 TS 23258		D1.1	
Interoperability	SG7	P2418.2		Interoperability WG
Governance	TS 23635	P2145		Governance WG
Reference Architecture	CD 23257.2		D3.1	
Use Cases	TR 3242		D2.1	

Standards Development Organizations have liaison agreements, however work on overlapping topics are being carried out (independently).

Blockchain/DLT/Digital Asset/Tokens: Too Many Standards?

Adopted from
https://xkcd.com/927/

Take-Home Message: Join forces for harmonization of our standards development work!

IEEE

Thank You!

Ramesh Ramadoss, PhD
Technical Director | InterWork Alliance
Ramesh.Ramadoss@InterWork.org

InterWork Alliance

LinkedIn

IEEE