Distributed Ledger Technology

Assembled by Stephen Downes

Platforms, Hosting and Support	

Fabric

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Hyperledger Fabric

- Private business networks, IBM Bluemix hosting, or Docker containers
- Emphasizes open governance, open standards & open source

Hyperledger is:
- a Linux Foundation Project
- Hyperledger Fabric
- Hyperledger composer
- A collaborative effort created to advance cross-industry blockchain technologies for business, announced December 2015, now over 140 members. Open source, open standards, open governance. One active framework ("Fabric") and seven projects in incubation.

See also:
https://blog.acolyer.org/2018/06/04/hyperledger-fabric-a-distributed-operating-system-for-permissioned-blockchains/

Fabric is a permissioned blockchain system with the following key features:
- A modular design allows many components to be pluggable, including the consensus algorithm
- Instead of the *order-execute architecture* used by virtually all existing blockchain systems, Fabric uses an *execute-order-validate* paradigm which enables a combination of passive and active replication. (We'll be getting into this in much more detail shortly).
- Smart contracts can be written in any language.

Frabric - protocol specification on GitHub -
https://github.com/hyperledger-archives/fabric/blob/master/docs/protocol-spec.md
- "The fabric is a ledger of digital events, called transactions, shared among different participants, each having a stake in the system."

Wikipedia article - https://en.wikipedia.org/wiki/Hyperledger

Hyperledger Composer modelling language

(This is probably a specific instantiation of more general concepts, but I'll leave it here until I know this)

Business Network Definitions

Business Network Definitions are composed of:
- a set of model files
- a set of JavaScript files
- an Access Control file

Diagram: https://hyperledger.github.io/composer/v0.16/assets/img/Composer-Diagram.svg
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https://hyperledger.github.io/composer/v0.16/reference/cto_language

Model Files

A Hyperledger Composer CTO file is composed of the following elements:
- A single namespace. All resource declarations within the file are implicitly in this namespace.
- A set of resource definitions, encompassing assets, transactions, participants, and events.
- Optional import declarations that import resources from other namespaces.

Resources in Hyperledger Composer include:
- Assets, Participants, Transactions, and Events - these are resources.
  - Belongs to a namespace
  - a name, and an identifying field
  - an optional supertype, which the resource extends
  - An optional 'abstract' declaration (indicates this resource cannot be created, can only be extended)
  - a set of named properties, designated by o
  - a set of relationships, designated by -->
- Enumerated Types.
  - types.
- Concepts - abstract classes, eg. Address, .
  - Resources can have properties which are these

There's more about data types, arrays, field validators (regex used to validate field), decorators (used to annotate a model with metadata)

Access control file

Access control language (defines what people can see) - standard.
Example:

```
rule SimpleRule {
    description: "Description of the ACL rule"
    participant: "org.example.SampleParticipant"
    operation: ALL
    resource: "org.example.SampleAsset"
    action: ALLOW
}
```

Queries:

Queries in Hyperledger Composer are written in a bespoke query language. Queries are defined in a single query file called (queries.qry) within a business network definition. https://hyperledger.github.io/composer/v0.16/reference/query-language

Transaction processor functions

A transaction processor function is the logical operation of a transaction defined in a model file. For example, a transaction processor function of a Trade transaction, might use JavaScript to change the owner property of an asset from one participant to another.

Azure Blockchain Development Kit

https://github.com/Azure-Samples/blockchain/tree/master/blockchain-development-kit
Version 1 - November, 2018

Azure Blockchain Workbench Documentation
https://docs.microsoft.com/en-us/azure/blockchain/workbench/

Introducing the Azure Blockchain Development Kit
https://azure.microsoft.com/en-us/blog/introducing-the-azure-blockchain-development-kit/
- Aligned with Truffle

Truffle

https://truffleframework.com/
Blog - https://truffleframework.com/blog
Boxes: https://truffleframework.com/boxes
- Truffle - https://truffleframework.com/truffle - Truffle takes care of managing your contract artifacts so you don't have to.
- Ganache - https://truffleframework.com/ganache - one-click blockchain
- Drizzle- A collection of front-end libraries that make writing dapp user interfaces easier and more predictable.
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Truffle—a development framework for Ethereum - http://truffleframework.com/ - Requires NodeJS 5.0+. Works on Linux, macOS, or Windows.
- "API which abstracts developers from low-level Ethereum stuff (like assembling and signing raw transactions, compiling Solidity code, working with smart contract ABIs, etc.)" https://hackernoon.com/ethereum-blockchain-in-a-real-project-with-500k-users-f85ee4821b12

- Partnership with Microsoft - https://twitter.com/trufflesuite/status/1063524049475665920 and https://www.youtube.com/watch?v=myOczdMt4Wg

v5.0.0-beta.2 – Bento Box of Candy
https://github.com/trufflesuite/truffle/releases/tag/v5.0.0-beta.2

DFINITY

https://dfinity.org/
"A blockchain supercomputer designed to host the next generation of software — Cloud 3.0"
"DFINITY is building a new kind of public decentralized cloud computing resource. This rests upon a new blockchain computer that is similar in concept to Ethereum but has vastly improved performance and, ultimately, unlimited capacity. Business applications running on this computer will be unstoppable and won't need to involve complex components such as databases, backup and restore systems or Amazon Web Services, allowing costs to be cut by 90% or more by reducing the supporting human capital required. Of course, such a powerful public resource requires governance."
- White paper - https://dfinity.org/pdf-viewer/pdfs/viewer?file=../library/dfinity-consensus.pdf

DFINITY vs. Ethereum
https://medium.com/futuresin/dfinity-vs-ethereum-44c97b4ad55b
According to CryptoBriefing, the foundational layer provided by Nervos is completely decoupled from the dApp on which it runs. Five basic components comprise the system:
1. Cells
2. Cell Types
3. Validators
4. Generators
5. Identity
Both DFINITY and Nervos give some concept of the blockchain being like a nervous system. Jan(Xie Hanjian) speaks about blockchain not just being about a trusted "engraving on the stone" metaphor, but as smart contracts that can punish bad actors. That is a new kind of automated security.

Software developer Adam Taché wrote the best intro to DFINITY I've ever read. You can read it here.
https://hackernoon.com/state-of-cryptocurrencies-summer-2018-932016549375

Quorum

https://www.jpmorgan.com/global/Quorum - by JP Morgan
"Enterprise-ready distributed ledger and smart contract platform"
- Download from GitHub https://github.com/jpmorganchase/quorum
- "Quorum supports both transaction-level privacy and network-wide transparency, customizable to business requirements"
    - All public and private smart contracts and overall system state derived from a single, shared, complete blockchain of transactions validated by every node in the network.
    - Private smart contract state is known to and validated by only parties to the contract and approved third parties, like regulators.

- Smart contracts written for an existing Ethereum implementation remain network-transparent on Quorum out of the box.
- Enhancing many existing smart contract designs to meet privacy requirements is simple and straightforward.
- The Zero-knowledge Security Layer allows for cryptographically assured, private settlement of digitized assets on Quorum.

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Multichain

https://www.multichain.com/
Open platform for building blockchains

Chaincode

"**Chaincode** is a program, written in Go, node.js, and eventually in other programming languages such as Java, that implements a prescribed interface. **Chaincode** runs in a secured Docker container isolated from the endorsing peer process."
https://hyperledger-fabric.readthedocs.io/en/release-1.1/chaincode.html
- [Chaincode for Developers](), and the other, [Chaincode for Operators]()
- Github - https://github.com/IBM-Blockchain-Archive/learn-chaincode

Baidu - Super Chain

Baidu Blockchain as a service:
https://technode.com/2018/01/12/baidu-launches-blockchain-open-platform/

Baidu is apparently creating a blockchain system called "Super Chain," which it says will be super-fast and super-efficient.

"Super Chain can 'insert and remove consensus mechanisms to solve the current energy consumption problem," Wei explained, and is also "compatible with the development system of Bitcoin and Ethereum.'"

Alibaba - Ant Financial

Alibaba's Ant Financial has used blockchain technology (in Chinese) on its donation platform in Alipay as early as July 2016.

Ark

"ARK provides users, developers, and startups with innovative blockchain technologies. We aim to create an entire ecosystem of linked chains and a virtual spiderweb of endless use-cases that make ARK highly flexible, adaptable, and scalable. ARK is a secure platform designed for mass adoption and will deliver the services that consumers want and developers need." https://ark.io/ - explorer: https://explorer.ark.io/

- Ark! The wordpress of crypto!
  https://decentralize.today/some-great-projects-are-out-there-they-just-dont-talk-about-them-21d677e29ecf
- ARK Desktop Wallet is natively built for all major Operating Systems. Our full HD wallet meets the top security standards in the industry and supports the Ledger Nano S secure hardware wallet.
- Integration of Inter-planetary File System (IPFS). (See below)
- Research, Sourcing, and Development of various Smart Card/NFC materials.
- Partnerships and R&D for NFC/contact less chip and wearable devices. With optional hardware wallets.

https://decentralize.today/the-rant-76727cdf27f3
"This is a system where your grandmother can create her own blockchain-based token, when the bar next door can create their reward program with it, when the man in the street can easily create his own vision with one click."

https://decentralize.today/ark-opportunity-knocks-12a1d62afe12
Ark—Opportunity Knocks
Web: https://ark.io/
News: https://blog.ark.io/
Forum: https://forum.ark.io/
Facebook: https://www.facebook.com/arkecosystem
Twitter: https://twitter.com/ArkEcosystem
YouTube: https://www.youtube.com/channel/UCpc2k6zOOutGT9y56urDClg
Reddit: https://www.reddit.com/r/arkecosystem
Github: https://github.com/ArkEcosystem

ARK Core v2—MainNet Launch!
https://blog.ark.io/ark-core-v2-mainnet-launch-95a5b621f6f7
ARK Core v2 is now ready for launch. We are proud to announce the final and now official release date of Wednesday, November 28th.
- Dynamic fees
- Plugin system
- Increased TPS (Transactions per Second) and TPB (Transactions per Block)
- JSON-RPC Docs : https://docs.ark.io/guidebook/core/json-rpc.html#installation
- JSON-RPC API: https://docs.ark.io/api/json-rpc/
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Particl

https://particl.io/

Privacy-Focused Marketplace & Decentralized Application Platform
- "focus is on something called dapps which are Decentralized Applications, with the first one being a decentralized marketplace"
- "Every coin, regardless if it's Dash, Monero, Ethereum or Bitcoin; you name it and it can be used on the marketplace. "

https://decentralize.today/some-great-projects-are-out-there-they-just-dont-talk-about-them-21d677e29ecf

"Particl is another project which powers the vision of Satoshi with its crypto agnostic Marketplace! It is a project just like Amazon but it accepts every coin and every token. This is where Blockchain is being used at its best!"

Particl—New Status Report Released
https://decentralize.today/new-status-report-released-7d24cbaaa33f
https://particl.io/status-report/
"we can announce that we have started working on an integration to the Trezor hardware wallet!"

Particl Platform: The intrinsic value of the blockchain
https://decentralize.today/particl-platform-the-intrinsic-value-of-the-blockchain-7ff12d5e6a45
"A Privacy coin in the heart of a decentralized market without intermediaries"
-m diagram - https://cdn-images-1.medium.com/max/1600/1*rzh3oUA93iNHZVgEr4tWEQ@2x.jpeg

R3 - Corda

https://www.r3.com/
Previously: R3CEV

Corda White Paper -
https://static1.squarespace.com/static/55f73743e4b051cfcc0b02cf/t/57bda2fdebbd1acc9c0309b2/1472045822585/corda-introductory-whitepaper-final.pdf

"Corda offers the universal interoperability of public networks with the privacy of private networks"

Code on Github - https://github.com/corda/corda

https://itnext.io/whats-up-with-r3cev-f2dfccffe5b9
R3CEV-consortium consists of more than 70 of the world's largest financial institutions. It is developing Corda, a platform that is using a "permissioned" blockchain

Meta Mask

https://metamask.io/
- MetaMask is a bridge that allows you to visit the distributed web of tomorrow in your browser today. It allows you to run Ethereum dApps right in your browser without running a full Ethereum node.
- MetaMask includes a secure identity vault, providing a user interface to manage your identities on different sites and sign blockchain transactions.
- You can install the MetaMask add-on in Chrome, Firefox, Opera, and the new Brave browser. If you're a developer, you can start developing with MetaMask today.

Rootstock

https://www.rsk.co
"RSK is the first open-source smart contract platform with a 2-way peg to Bitcoin that also rewards the Bitcoin miners via merge-mining, allowing them to actively participate in the Smart Contract revolution. RSK goal is to add value and functionality to the Bitcoin ecosystem by enabling smart-contracts, near instant payments and higher-scalability."
Resources

- Source code at https://github.com/RSKSmart
- RSK Stats: https://stats.rsk.co
- RSK Explorer: https://explorer.rsk.co/
- RSK Faucet: https://faucet.rsk.co/
- RSK Network status: https://twitter.com/RskSmartNetwork
- White Paper - https://docs.rsk.co/RSK_White_Paper-Overview.pdf
- Sidechains and Drivechains - https://docs.rsk.co/Drivechains_Sidechains_and_Hybrid_2-way_peg_Designs_R9.pdf
- Lumino Transaction Compression Protocol White Paper - https://docs.rsk.co/LuminoTransactionCompressionProtocolLTCP.pdf
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Catena

https://explorecatena.com/about?lng=en
The Catena Blockchain Suite is an industry first product to quickly enable publishing of complex datasets onto public or private blockchains. Utilising smart contracts and hardware security modules, Catena enables a new level of data consistency and integrity.
- The Catena Blockchain Suite is a set of software components, and integration services, to allow organizations and governments to interface with public or private blockchains. Catena allows for public information to be permanently embedded on a private or public blockchain.
- Source code: https://github.com/explorecatena

- API - https://etherscan.io/address/0xff77e51f2c6473f72392865e0a0000de19af774a#code

Brave

This isn't really blockchain, but I speculate here that it's only a matter of time before someone develops a browser that mines and sends profits to websites browsed.

https://brave.com/
Brave is a free and open-source pay-to-surf[4] web browser based on the Chromium web browser and its Blink engine, announced by the co-founder of the Mozilla project and creator of JavaScript, Brendan Eich. It claims to block website trackers and remove intrusive Internet advertisements, replacing them with ads sold by Eich's company

How blockchain can help advertisers combat 'ad blindness'
https://venturebeat.com/2018/08/12/how-blockchain-can-help-advertisers-combat-ad-blindness/
"Basic Attention Token is a known name in the young industry due to its Brave internet browser, which essentially acts like any other browser but features a more sophisticated advertising model. The browser's 3.1 million+ monthly active users can choose to block ads entirely, filter some of them, or view them all and get paid in BAT tokens for letting the browser measure their "attention.""