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Blockchain for Supply Chain

Current State of the Art

Nov 2018

Blockchain Mania

How did we get here? What does this mean? What should I do?

"While blockchain technology is relatively new, it is also a continuation of a very human story, and the story is this. As humans, we find ways to lower uncertainty about one another so that we can exchange value."

Bettina Warburg, blockchain researcher, entrepreneur and educator

History of the Database and Network

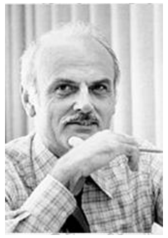
Blockchain is the natural next progression in database and networking technology

Paper & Mainframes
1950's

Data is
Recordable

Mainframe computing opened the doors for the recording and use of mass quantities of data in a digital fashion.

SQL Database
1970's



Data is
Searchable

With the invention of SQL information became more searchable, thereby making it more accessible and user friendly.

Networks / Internet
1990's

Data is
Distributable

The explosive growth of the internet has helped us distribute information and content all over the world, but

Blockchain
Today

Data is
Shareable

Blockchain shifts the paradigm of computing, allowing us to transfer value and run applications on a shared platform.

Blockchain technology, like mainframe, SQL, and the internet will revolutionize how we consume and use information.

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Remarks of CFTC Commissioner Rostin Behnam at the BFI Summit (June 4, 2018

https://www.cftc.gov/PressRoom/SpeechesTestimony/opabehnam7

Blockchain is more than technology: it is an advance that reaches out into every aspect of life. We could use Blockchain to address the most basic, the most primal problems on our planet: corruption, income distribution, poverty, food, and health care. And, the fear billions of people experience everyday as they try to survive.

...virtual currencies may – will – become part of the economic practices of any country, anywhere. Let me repeat that: these currencies are not going away and they will proliferate to every economy and every part of the planet. Some places, small economies, may become dependent on virtual assets for survival. And, these currencies will be outside traditional monetary intermediaries, like government, banks, investors, ministries, or international organizations.

We are witnessing a technological revolution. Perhaps we are witnessing a modern miracle.

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Christine Lagarde (Managing Director of the International Monetary Fund)

http://www.imf.org/external/pubs/ft/fandd/2018/06/how-policymakers-should-regulate-cryptoassets-and-fintech/straight.htm#author

"Consider distributed ledger technology [Blockchain], which underpins crypto assets. It can enable faster and cheaper transactions, from trading securities to sending money to relatives abroad. It can be used to securely store records such as diplomas and real estate deeds and to automatically execute so-called smart contracts."

Network and Database FUSED

Solves the unsolvable problem of digital trust

Blockchain has solved the <u>digital scarcity</u> problem

This means we can create digital objects to securely store:

- Financial assets
  - Money
  - Certificates (Stocks/Bonds)
  - Title
- Identity
  - Digital Signatures
  - Votes
  - Permissions
- Authenticity
  - Immutable Records

Cryptographic structure creates TRUST

Millenials are Driving Decentralization

Slide courtesy of Fundstrat

Earlier in 2016, Facebook IQ, a team of researchers, scientists and analysts funded and supported by Facebook Inc., published a white paper entitled "**Millennials + money: The unfiltered journey**" to evaluate the beliefs and thoughts of today's youth on traditional banking and financial systems. **The paper found that 92 percent of millennials firmly expressed their distrust of banks.**

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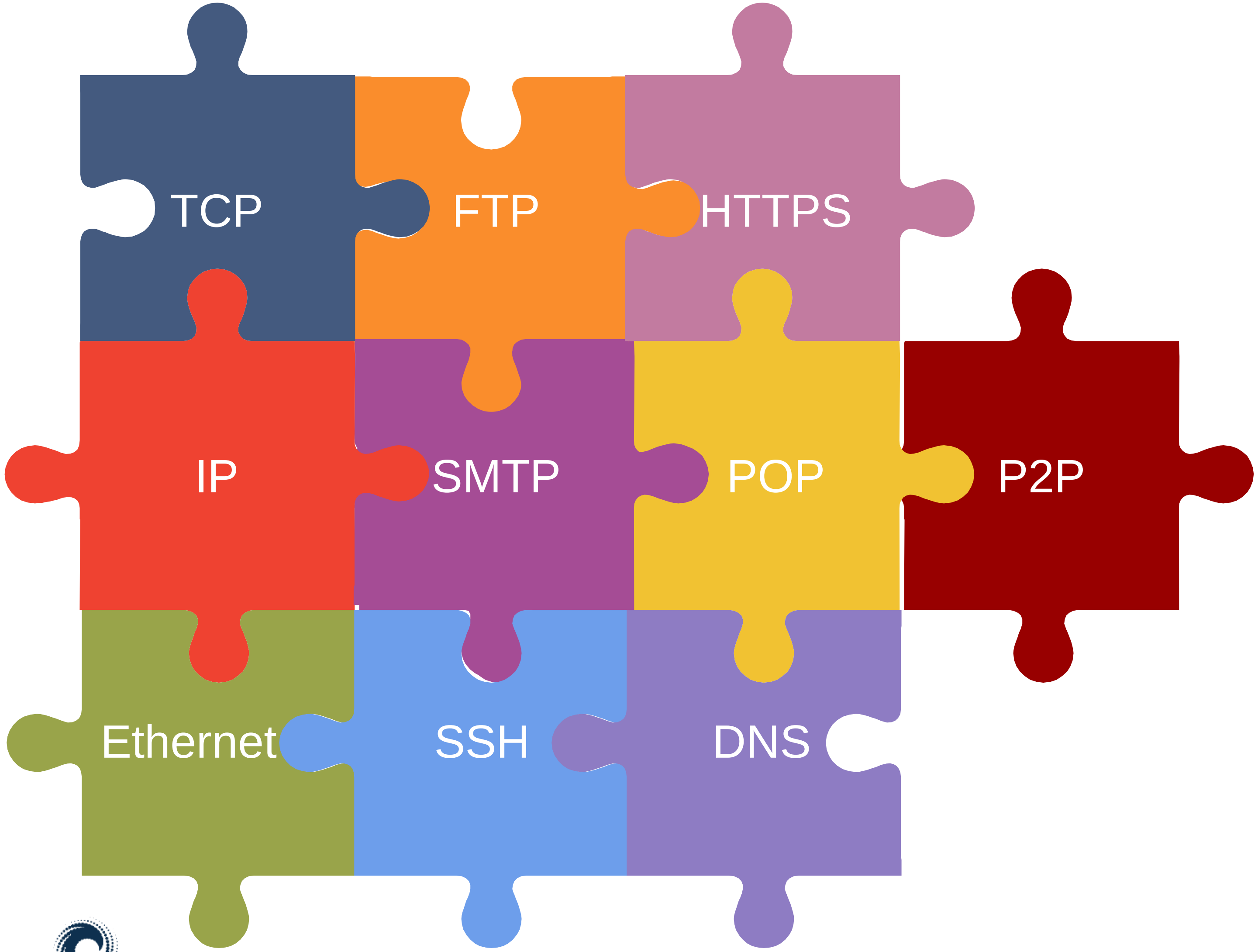
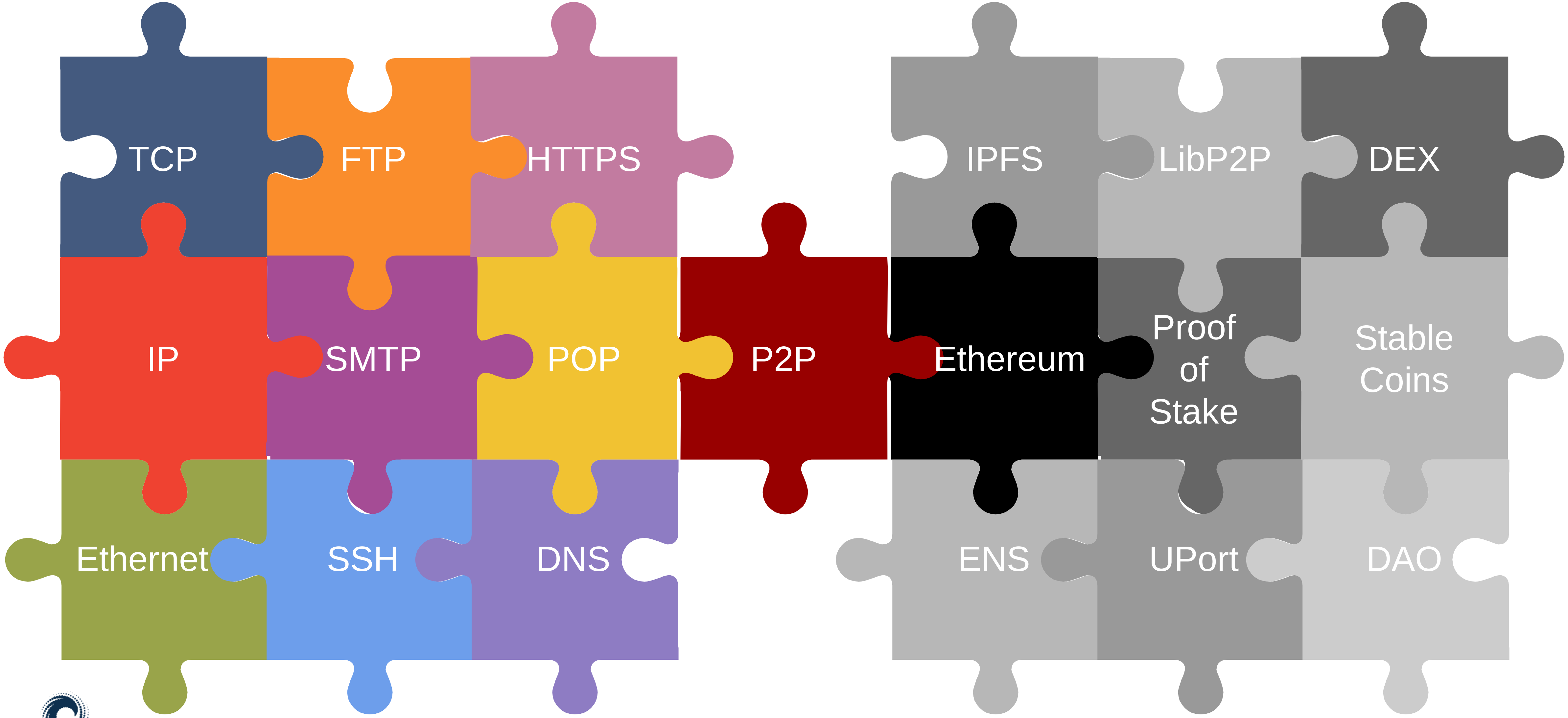
The Internet is Incomplete



Blockchain is Extending the Internet



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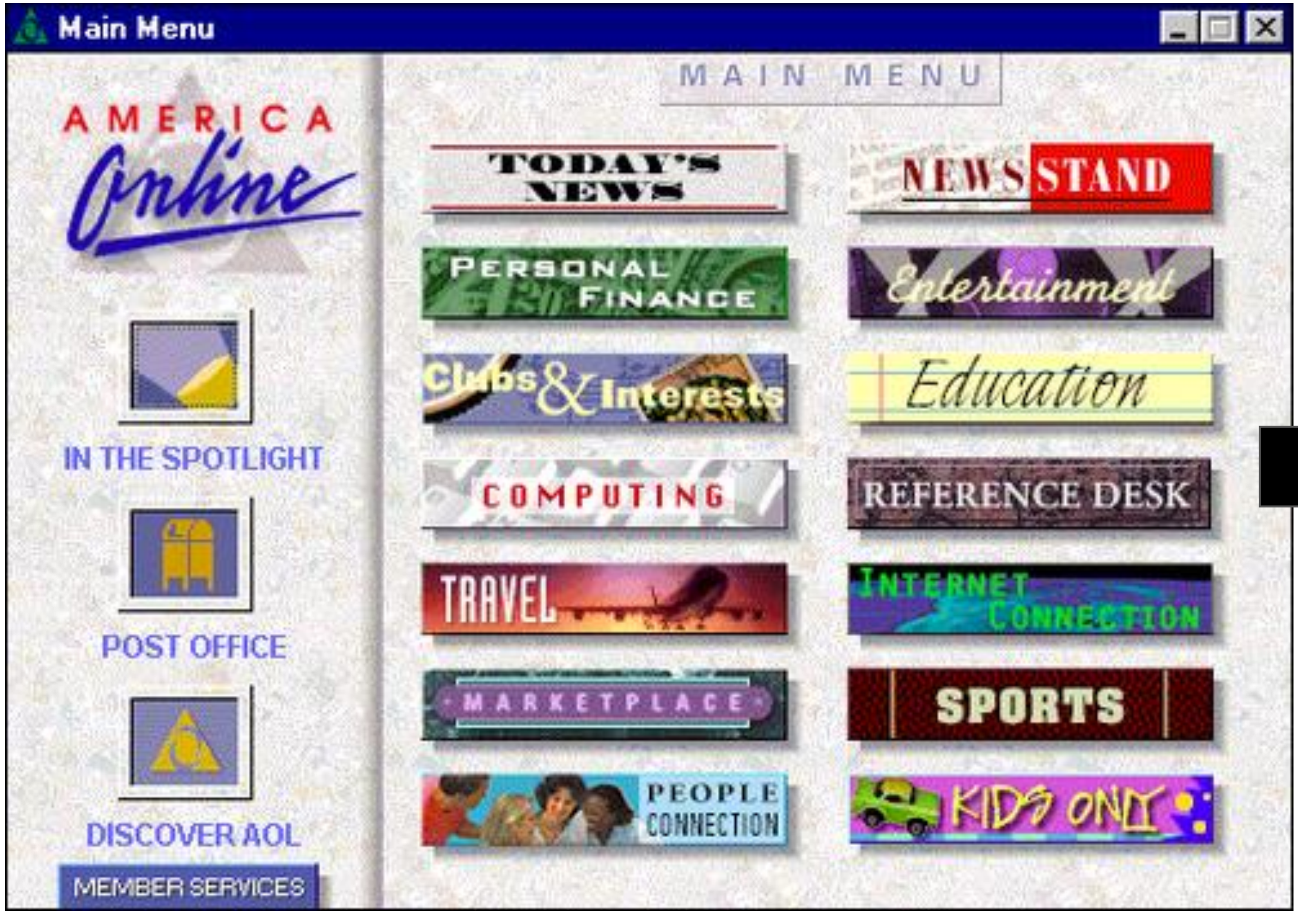
Blockchain is Still Early, but Maturing FAST

Setting up your blockchain wallet is similar to creating your first email account



About to happen!

Anyone's guess

Enterprise Ethereum Alliance

The Enterprise Ethereum Alliance has grown to over **450** member and is currently the largest Blockchain working group in the world

MISSION & VISION

Enterprise Ethereum Alliance offers:

- A clear roadmap for enterprise features and requirements
- Robust governance model and accountability, clarity around IP and licensing models for open source technology
- Resources for businesses to learn about Ethereum and leverage this groundbreaking technology to address specific industry use cases

Enterprise Ethereum will:

- Be an open source standard, not a product
- Address enterprise deployment requirements
- Evolve in tandem with advances in public Ethereum
- Leverage existing standards (ISO/SWIFT/etc.)

WORKING GROUPS

- Advertising
- Insurance
- Tools & Integrations
- Banking
- Supply Chain
- Energy
- Healthcare
- Token
- Legal Industry
- Quorum

How this Relates to Supply Chains

https://www.capgemini.com/wp-content/uploads/2018/10/Digital-Blockchain-in-Supply-Chain-Report.pdf

Issues with traditional supply chains

- Lack of traceability
- Risks involved with multiple stakeholders
- Lack of responsiveness
- Largely manual processing
- Regulatory compliance
- Reconciliation burden

How blockchain could address these problems

- Audit trail for all transactions
- Immutable - secure against undesired changes
- Near real-time
- Digitalized means quicker
- Tamper-proof data is easily verifiable
- Single shared source of truth

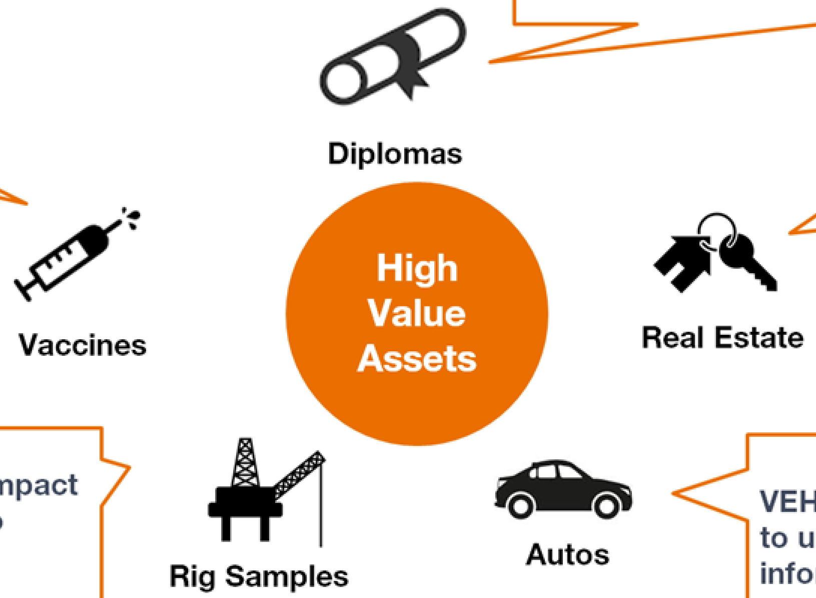
Source: Capgemini Research Institute.

Global Impact across Every Industry

Foundational protocols have wide spread and dramatic impacts

EDUCATION: Diploma validation takes weeks/months impacting individuals, schools and corporations with admissions and recruitment

HEALTHCARE: Absence of vaccine provenance and administration records impacts patients, donors, social workers and manufacturers



REAL ESTATE: Absence of approval and sale provenance of lands/real-estate can lead to long validation lead times during sale or invalid double-sales

OIL & GAS: Lost and untraced samples impact important business decisions and lead to costly fines for non-compliance

VEHICLES: Capture and reliably track vehicle telematics to unlock new business value for used car sales or inform insurance pricing and rental car management

A tamper proof asset tracking system for all participants to instantly trust and reliably validate asset ownership, chain of custody, proof of origin etc. does not exist

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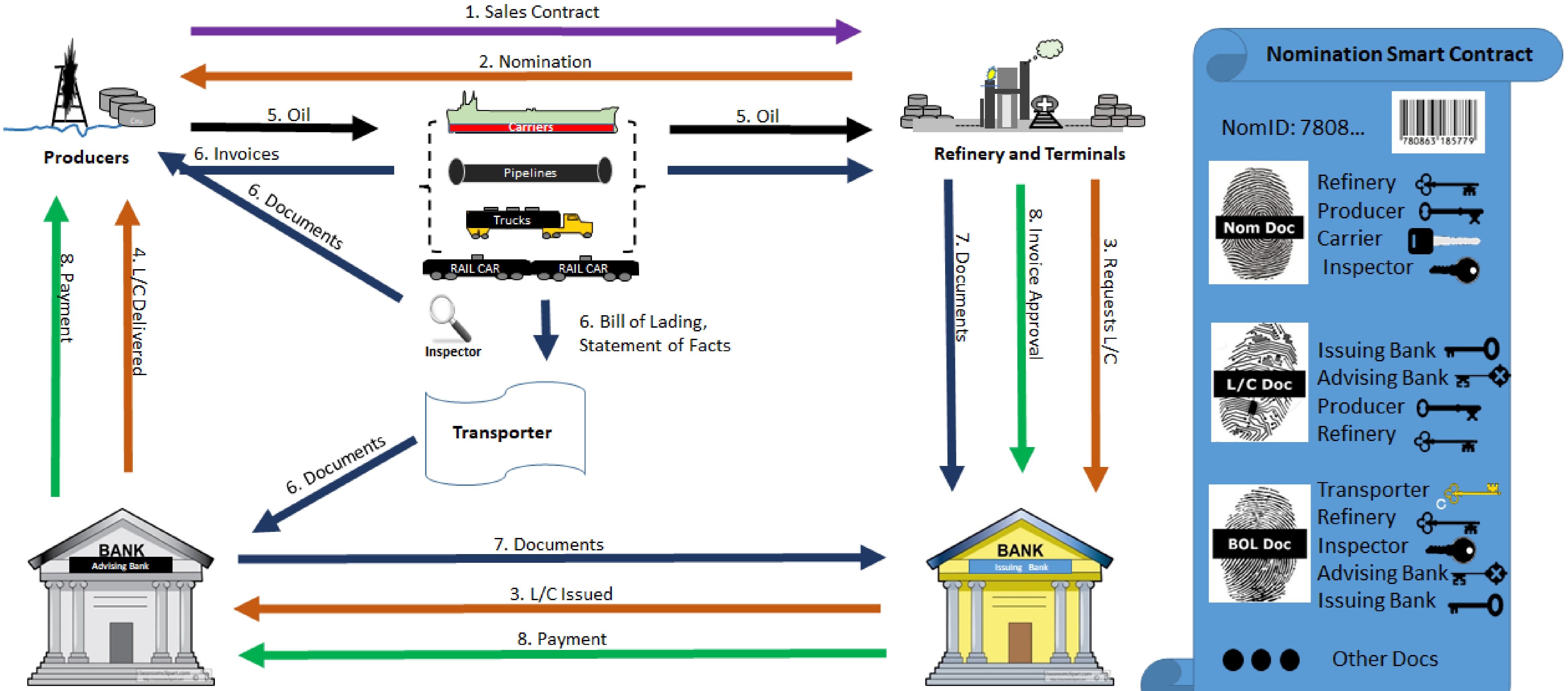
Oil and Gas Industry

Vakkt Consortium (*vakt.com*)- BP, Shell, Equinor, Gunvor, Koch, Mercuria, ABN Amro, ING and Societe Generale

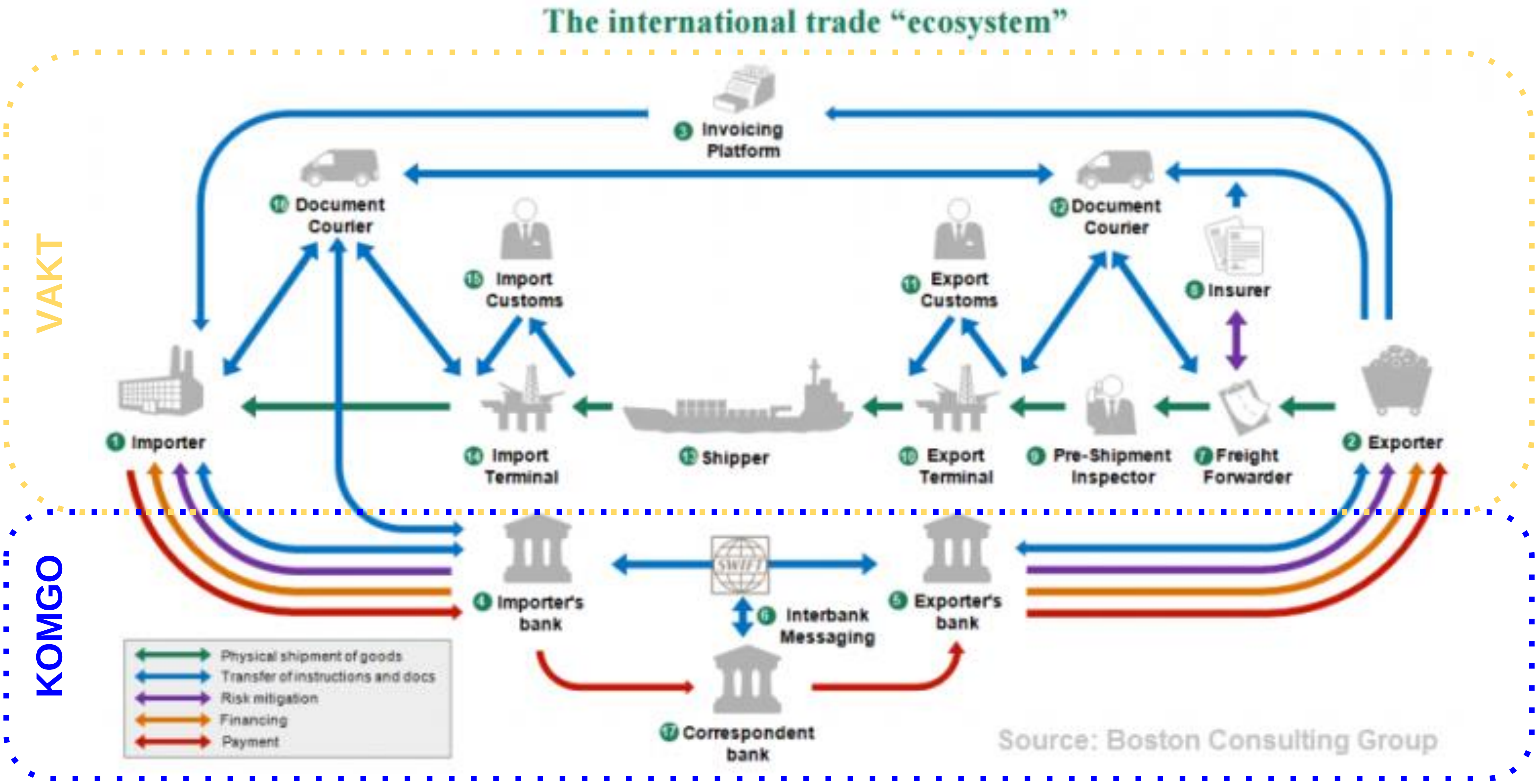


Network-based trading empowers the entire commodity ecosystem

komgo.io

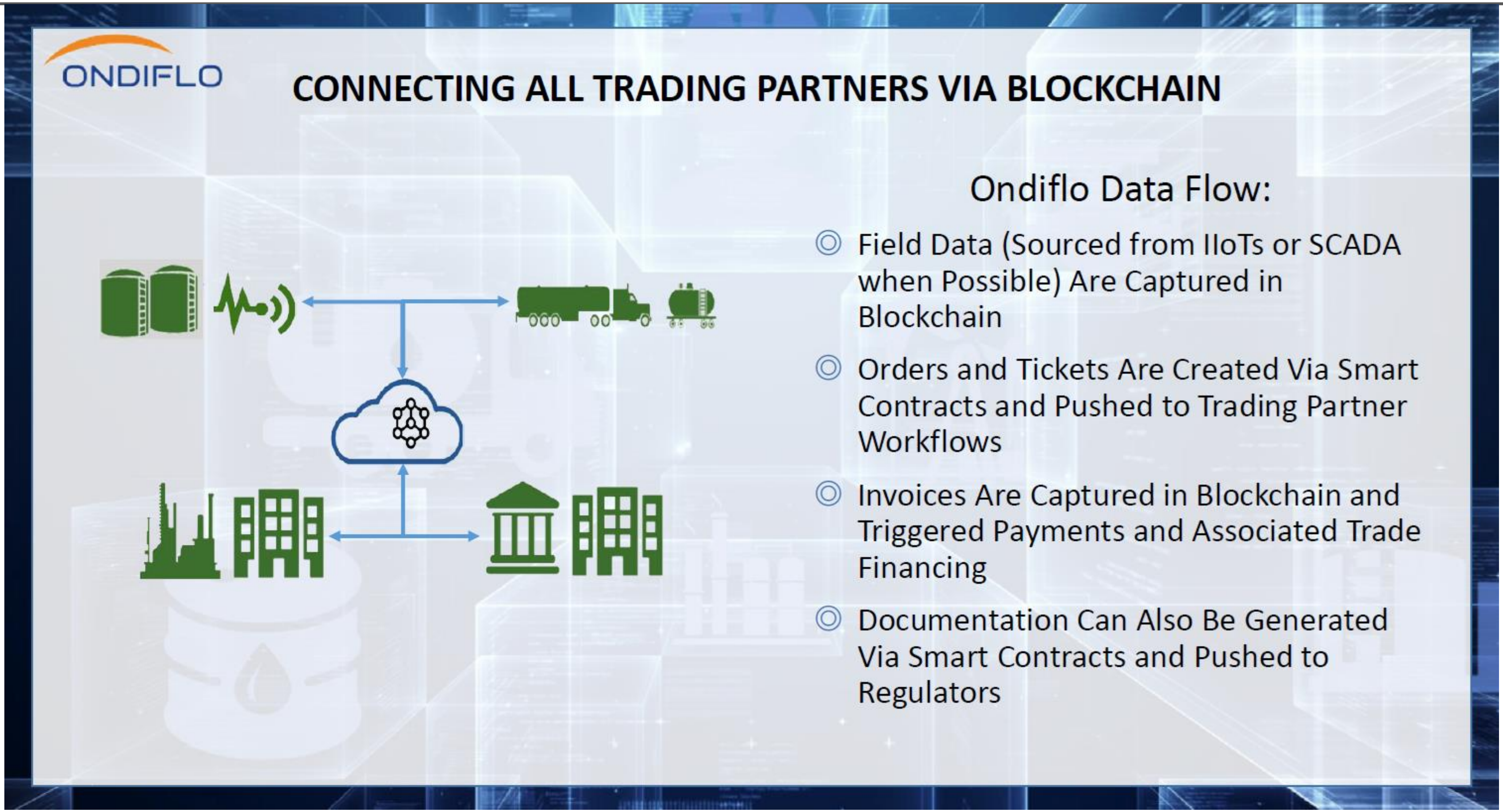
Offering network participant's a reduction of costs whilst increasing document handeling efficiency where the blockchain technology improves speed, adds security and reduces fraud.

International Trade



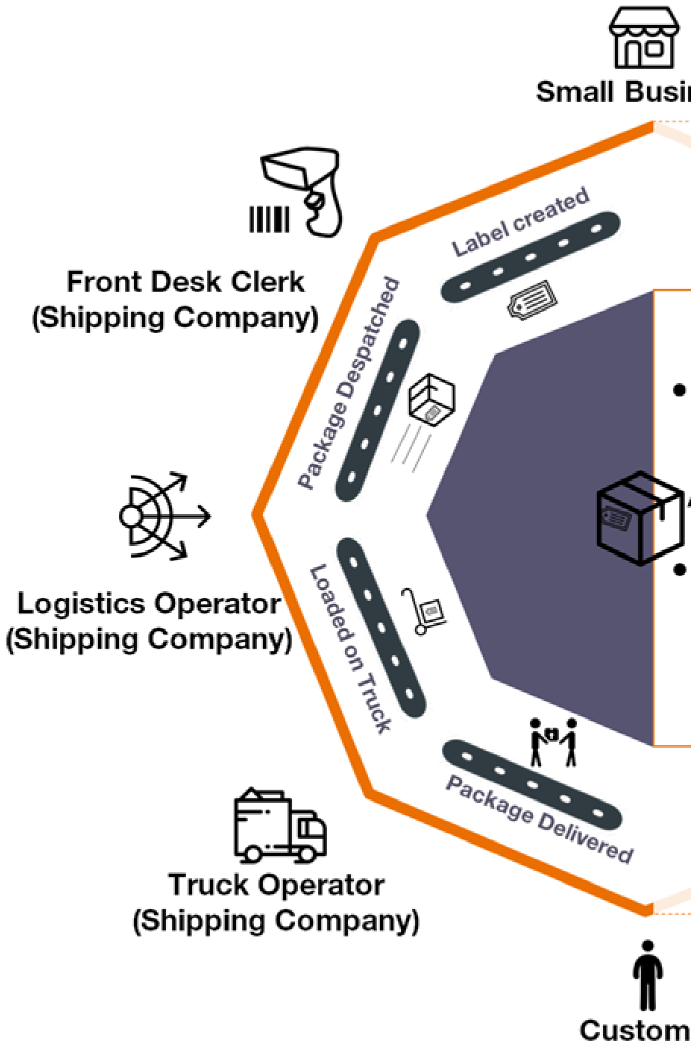
Onshore Ticketing Solution

Ondiflo brings a tangible product to market for oil and gas companies looking to explore blockchain's value proposition



Art of the Possible Today

Viant is a platform that makes blockchain implementations fully configurable



Assets

- Any Physical or Digital entity that requires to be tracked

Attributes

- Asset attributes of interest (**what**), ownership (**who**), time (**when**), location (**where**) etc.

Business Processes

- Progression of assets through various steps of a business process(s) is recorded on chain for lookbacks and evidence of trail
- Smart contracts enforce the business process(s) on chain curbing rogue actions

Business Actions

- User or machine initiated action that allows assets to progress from one process state to the next
- User actions unrelated to process state required for performing administrative and corrective functions

Actors

- Users that interact with the asset to perform process actions and transform the asset from one state to next
- Users that have ownership or custody of the asset
- Users that participate in audit, review and attestation of the asset to validate history

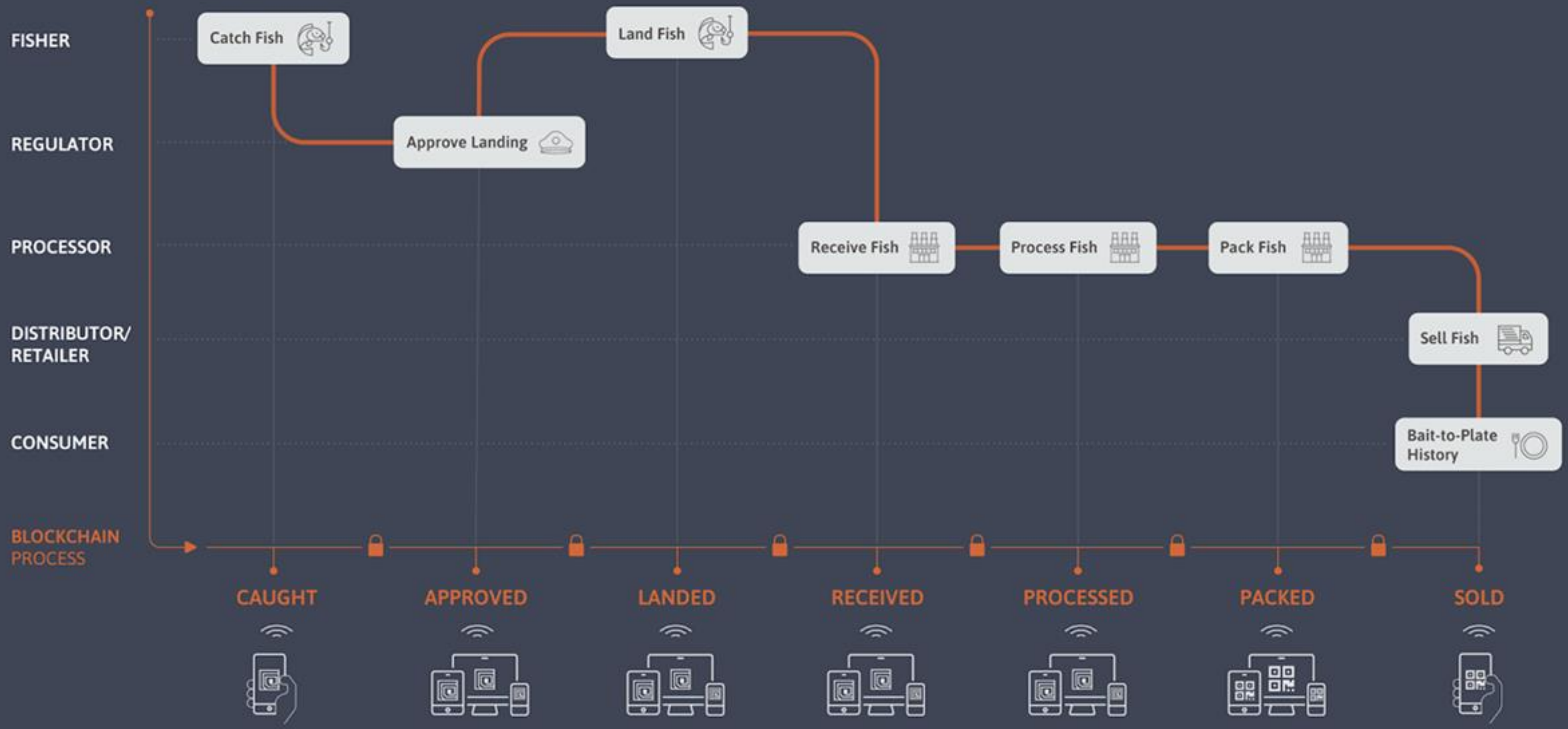
Role Permissions

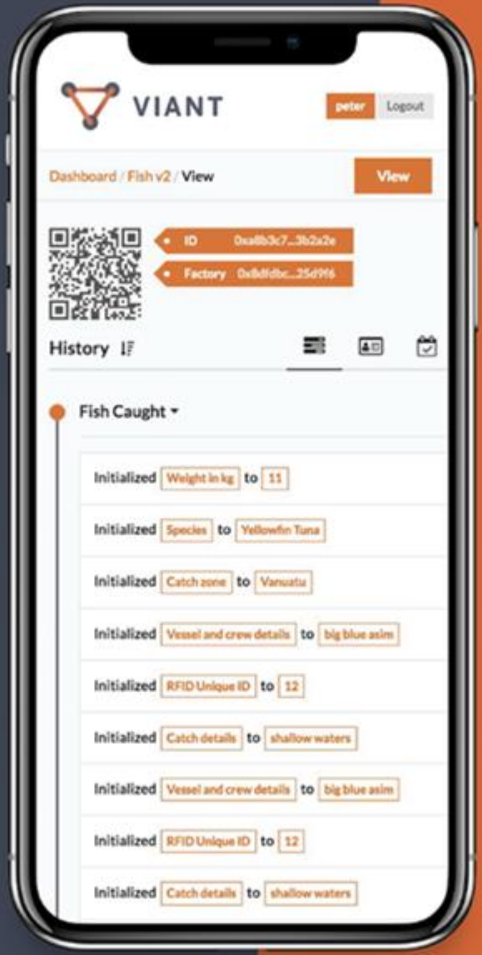
- A class of users performing similar actions or functions are grouped into Roles
- Permissions to perform business actions are assigned by roles
- The web interface and smart contracts enforce the permissions preventing rogue users from tampering

BETA CASE STUDY

Bait to Plate

Tuna traceability with the World Wide Fund for Nature (WWF)





The World Wildlife Fund for Nature participated in the Beta program to translate their Yellowfin tune idea into a solution on Viant.

VIANT

WWF

ConsenSys

A Venture Production Studio building distributed applications using blockchain technology

VISION

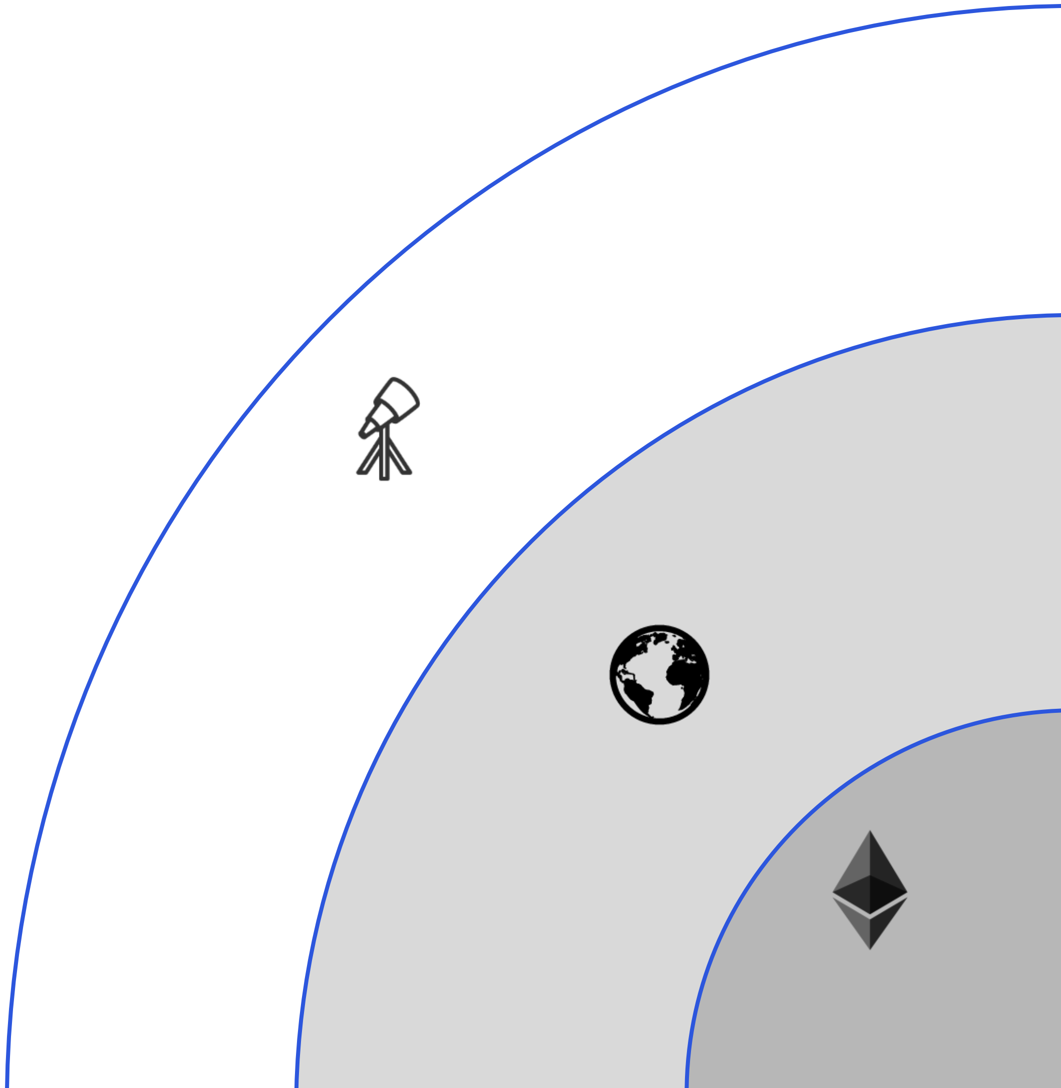
Our vision is a world in which **distributed applications** and the Ethereum world computer **enable a new class of frictionless, global commerce with inclusion for all.**

MISSION

Our mission is to assemble the tools needed to build and scale the **emerging economic, social, and political operating system for the planet.**

PLATFORM

Envisioned to go well beyond the capabilities embodied within the Bitcoin blockchain, **Ethereum** came into existence with the purpose of becoming **the world computer**.



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Thank You!

Feel free to reach out

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Thank you.