



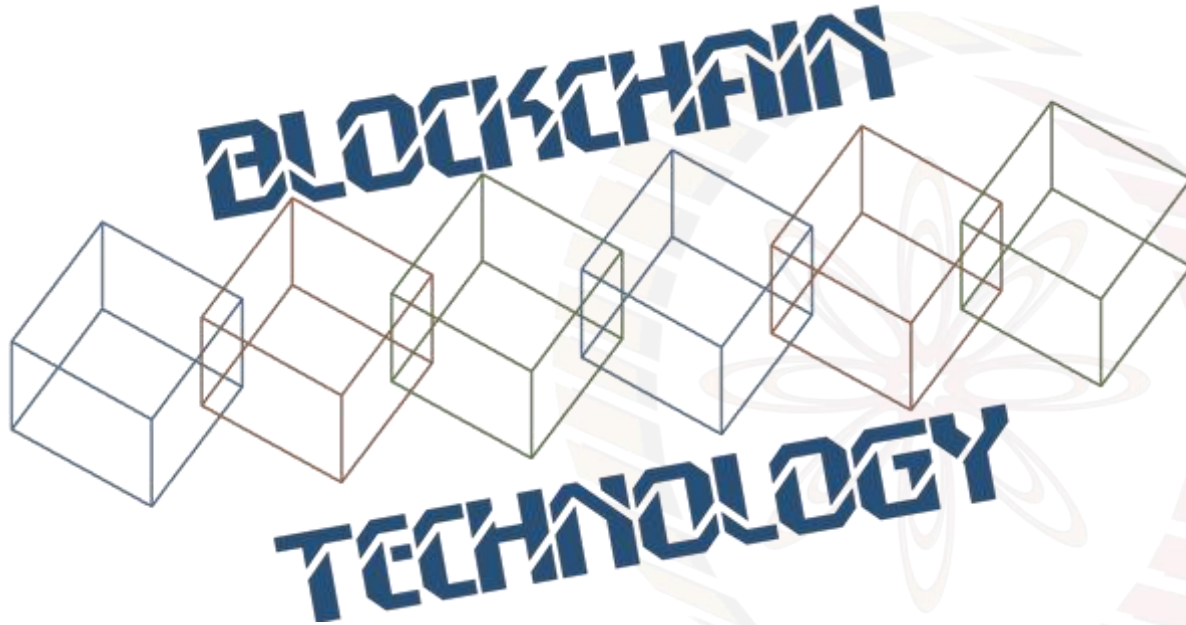
# **BLOCKCHAINS**

## **ARCHITECTURE, DESIGN AND USE CASES**

**SANDIP CHAKRABORTY**  
**COMPUTER SCIENCE AND ENGINEERING,**  
**IIT KHARAGPUR**

**PRAVEEN JAYACHANDRAN**  
**IBM RESEARCH,**  
**INDIA**

Image courtesy: <http://beetfusion.com/>



## BLOCKCHAIN IN SUPPLY CHAIN - II

# Diamond Provenance



**\$45 Billion**

Lost annually to insurance fraud



**10-15%**

Of claims paid out that are later found to be fraudulent



**65%**

Of all fraudulent claims go undetected

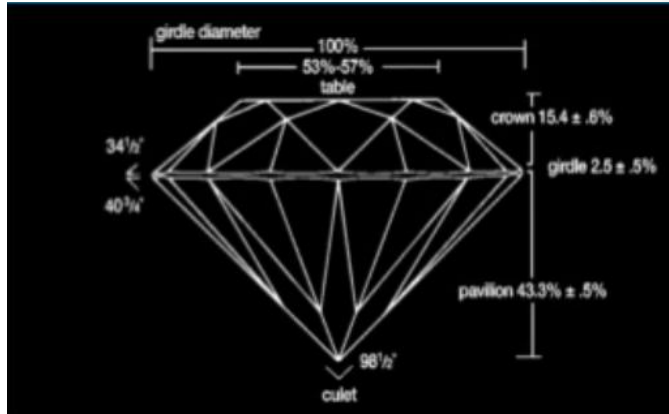


**\$2 Billion**

Annual cost of jewellery fraud to insurers

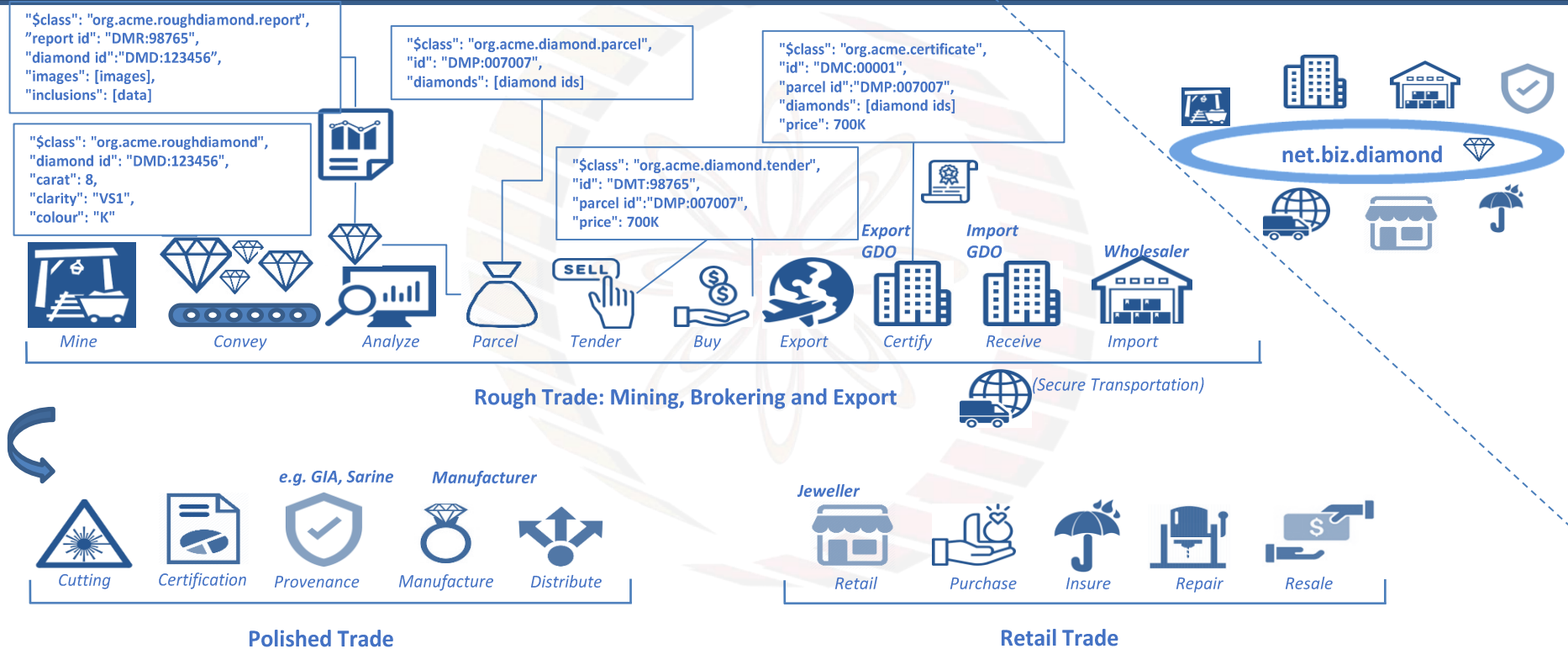
*\*Courtesy: [www.everledger.io](http://www.everledger.io)*

# Everledger

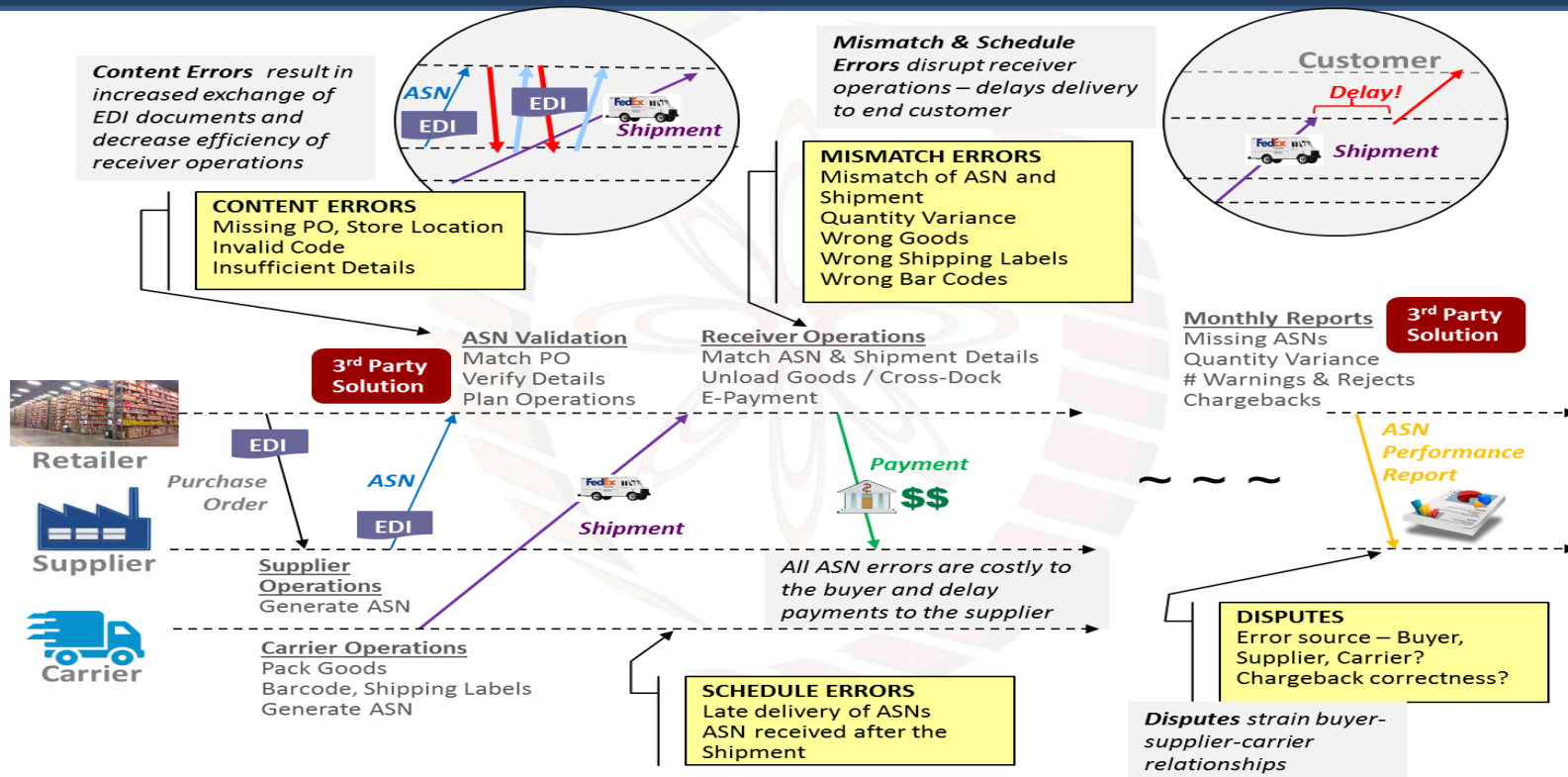


- Everledger tracks provenance of diamonds from mines to jewellery stores to combat fraud
- Measures 40 or so physical attributes of a diamond such as cut and clarity, that can be used to uniquely identify a diamond; recorded on blockchain
- Unique serial number microscopically inscribed on diamond
- Over 2 million diamonds tracked
- Built on Hyperledger Fabric

# The Diamond Lifecycle



# Supply Chain Compliance



# Addressing Supply Chain Fraud

Collusion: (Bank + Buyer) Participation -> \$400MM+ Write-off



Collusion on the between employees at PEMEX (Buyer) and Banamex (Bank) allowed \$585M in A/R advancement on the behalf of a former contractor Oceanografía (Supplier). Failure of checks and balances and distributed nature of silo systems allowed fraud to persist.

Fraud Existed in both Bank & Buyer

- Physical paper invoices lacked electronic control and validation method
- Disparate reporting systems made identifying the fraud by Buyer/Bank difficult

Fraud involved 2 patterns:

- **Fake Invoices** – number of fake invoices among real ones.
- **Collusion** – collusion is suspected in this case with Banamex and/or Pemex employees to illegally validate fake invoices

Several other fraud patterns exist such as over-invoicing, under-invoicing, duplicate invoicing, etc.

Global trade fraud estimated to be in the trillions of dollars yearly

# Fun Reading

- Supply Chain Meets Blockchain, Deloitte whitepaper:  
<https://www2.deloitte.com/content/dam/.../us-cons-supply-chain-meets-blockchain.pdf>







thank you!