Chain2Sustain

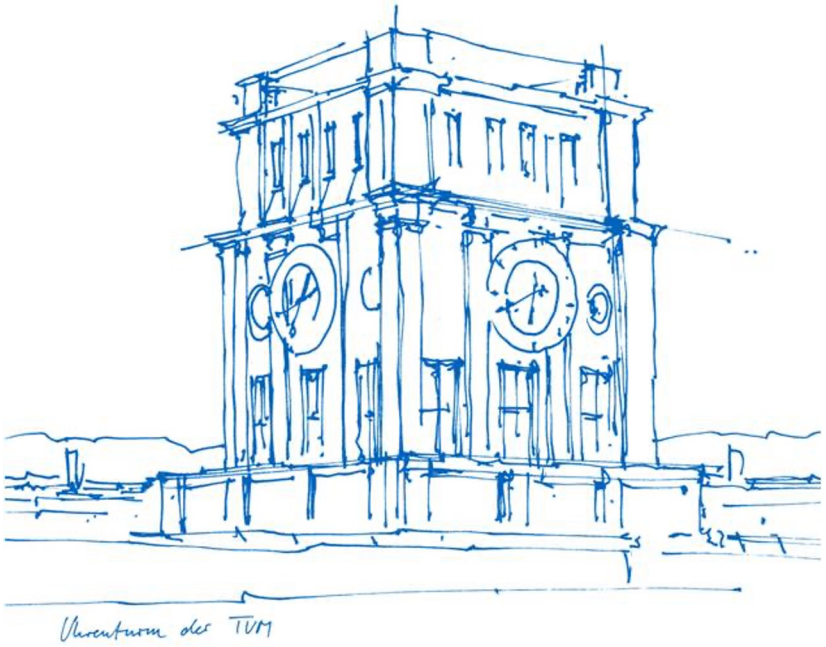
Sustainable Supply Chains based on Blockchain

Technische Universität München

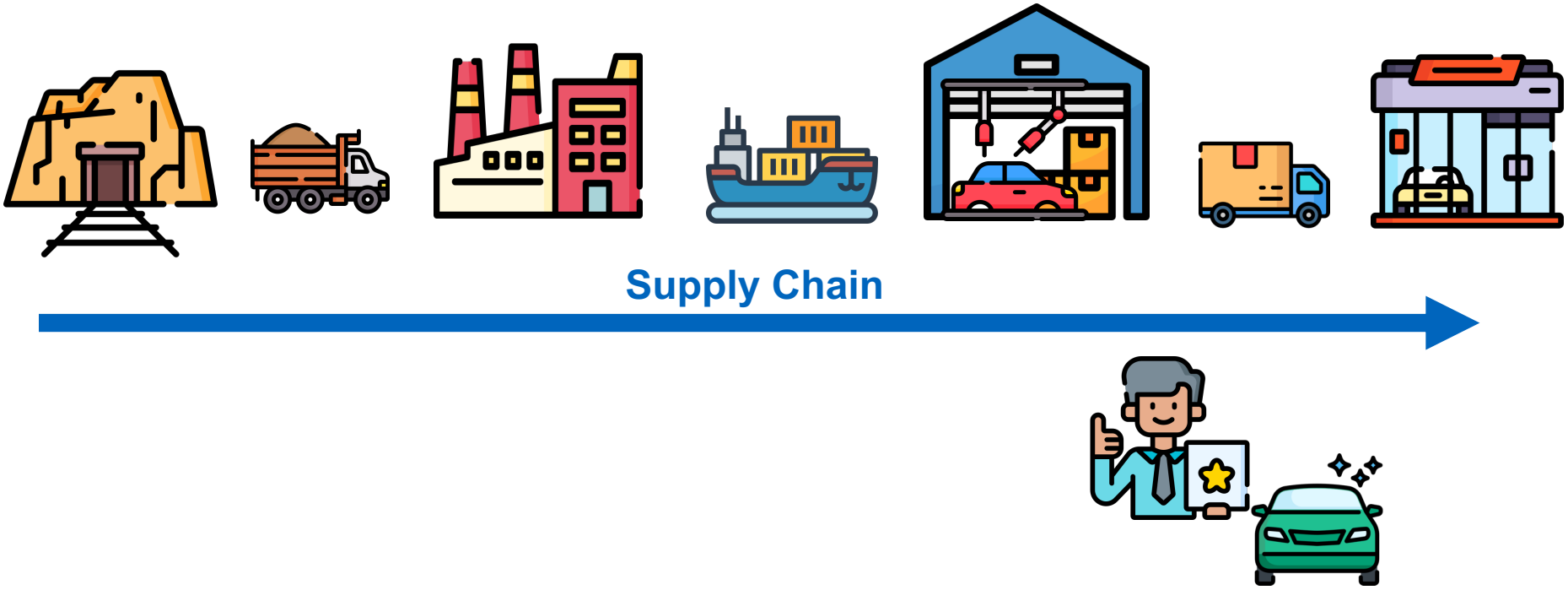
Department of Informatics

Blockchain technology for public sector innovation

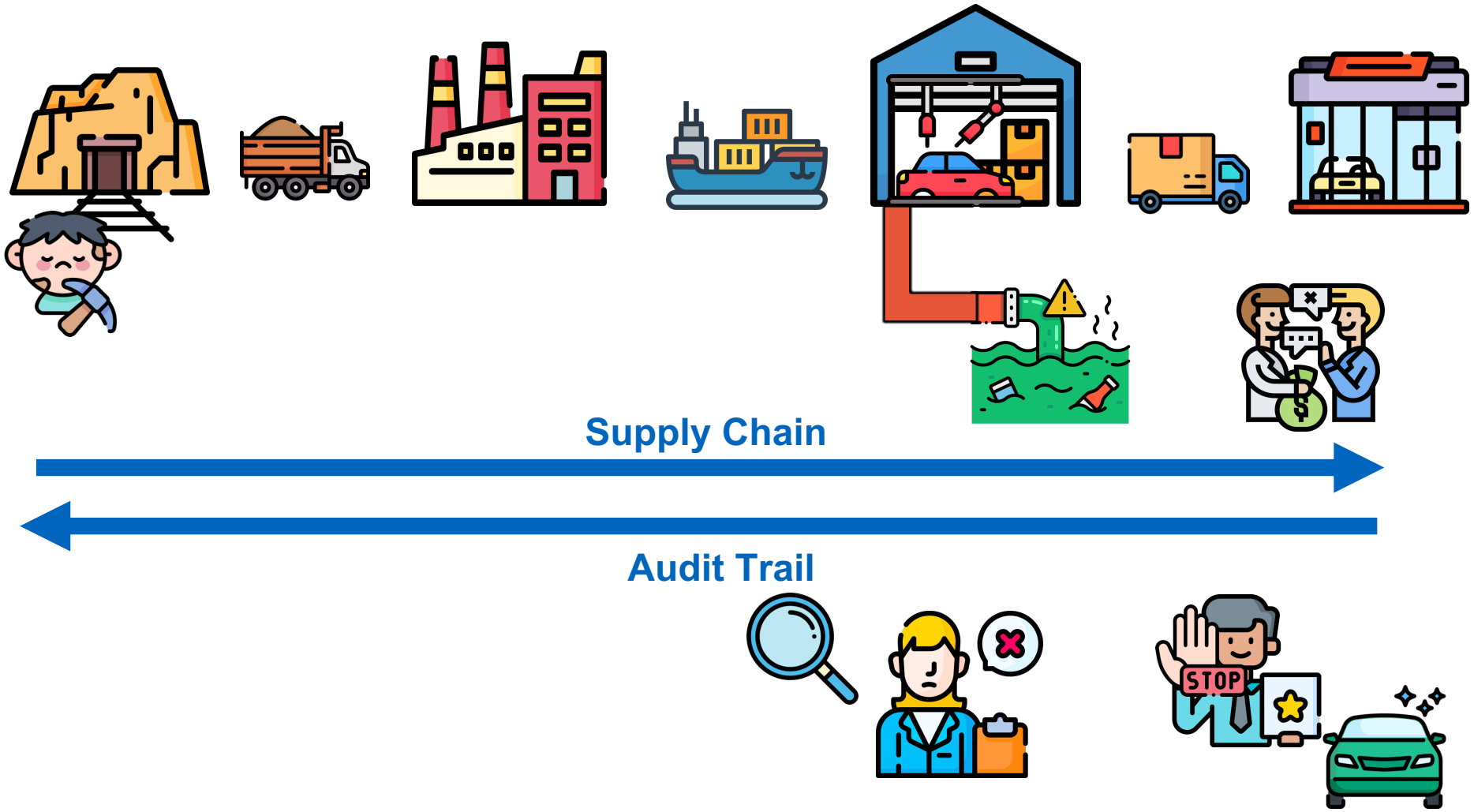
16th of May, 2023



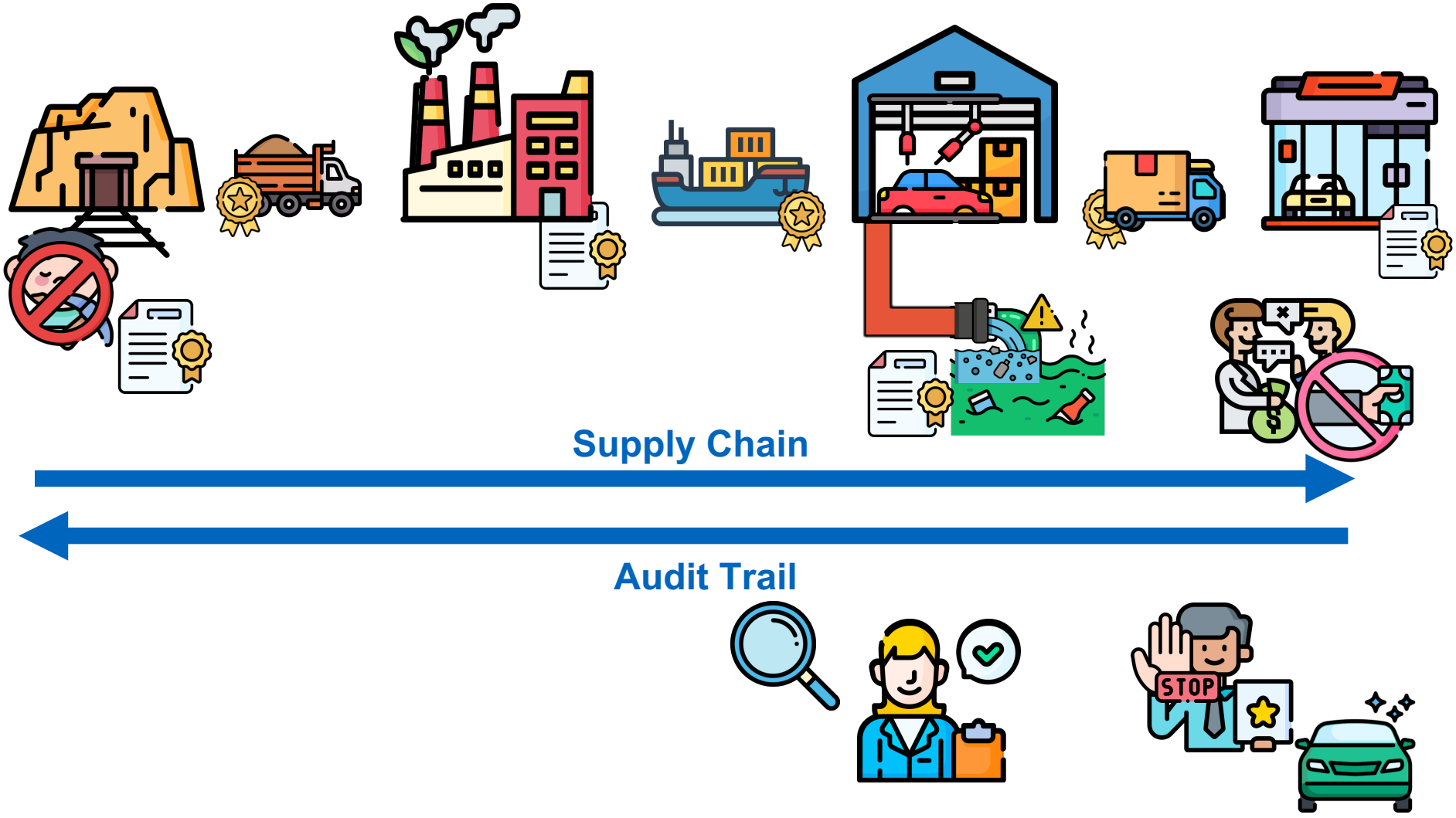
Sustainable Supply Chains



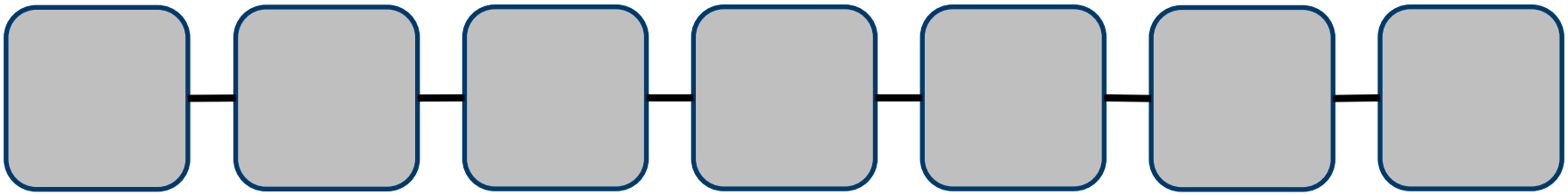
Sustainable Supply Chains



Sustainable Supply Chains



How blockchains can help



Requirements – Stakeholder

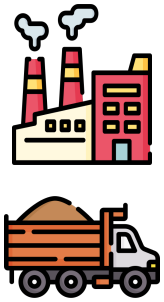
Supply Chain

Original Equipment Manufacturer (OEM)

Auditor

Consumer

Requirements – Stakeholder



Supply Chain

G1: retain business/trade secrets

G2: prove themselves as trustable partners

G3: system must be simple to integrate and reliable

OEM

G1: Proof ethical and sustainable sourcing

G2: provide audit trails

G3: Possibility to add new suppliers

Auditor

G1: Need to be able to track every part of the chain

G2: Well-organized data

G3: remain uninfluenced by outside sway

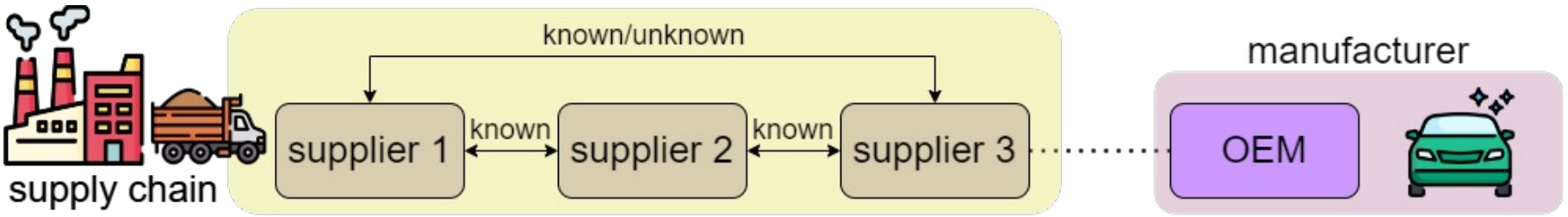
Consumer

G1: Purchase goods with a clean conscience

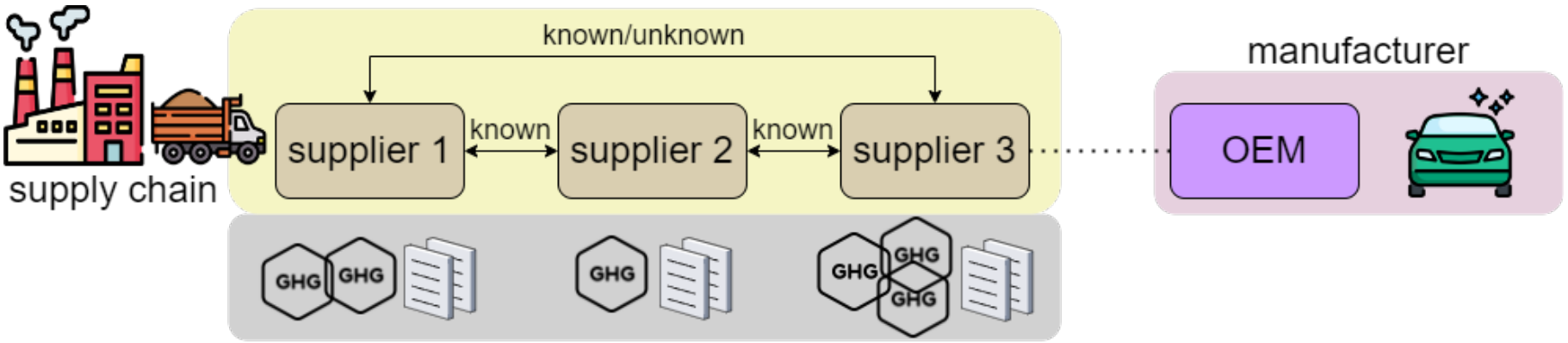
-> fair and sustainable manufacturing

G2: well organized and comprehensive overview

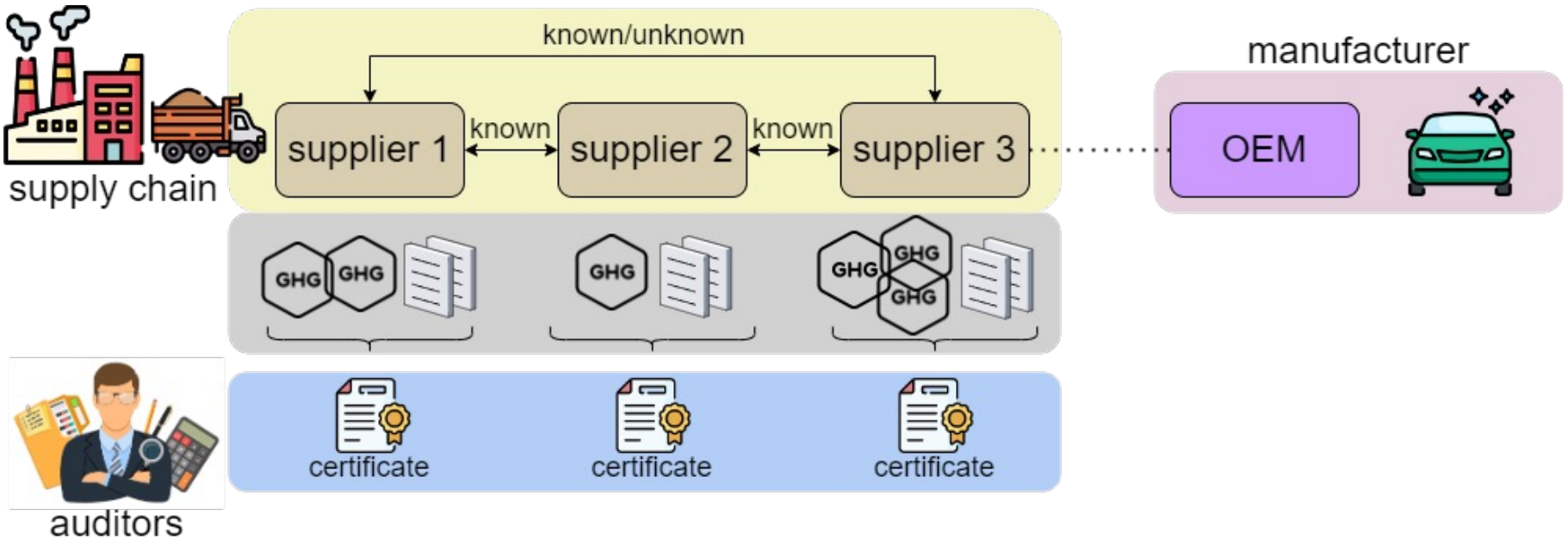
Proposal


known/unknown
supplier 1
known
supplier 2
known
supplier 3
supply chain
manufacturer
OEM

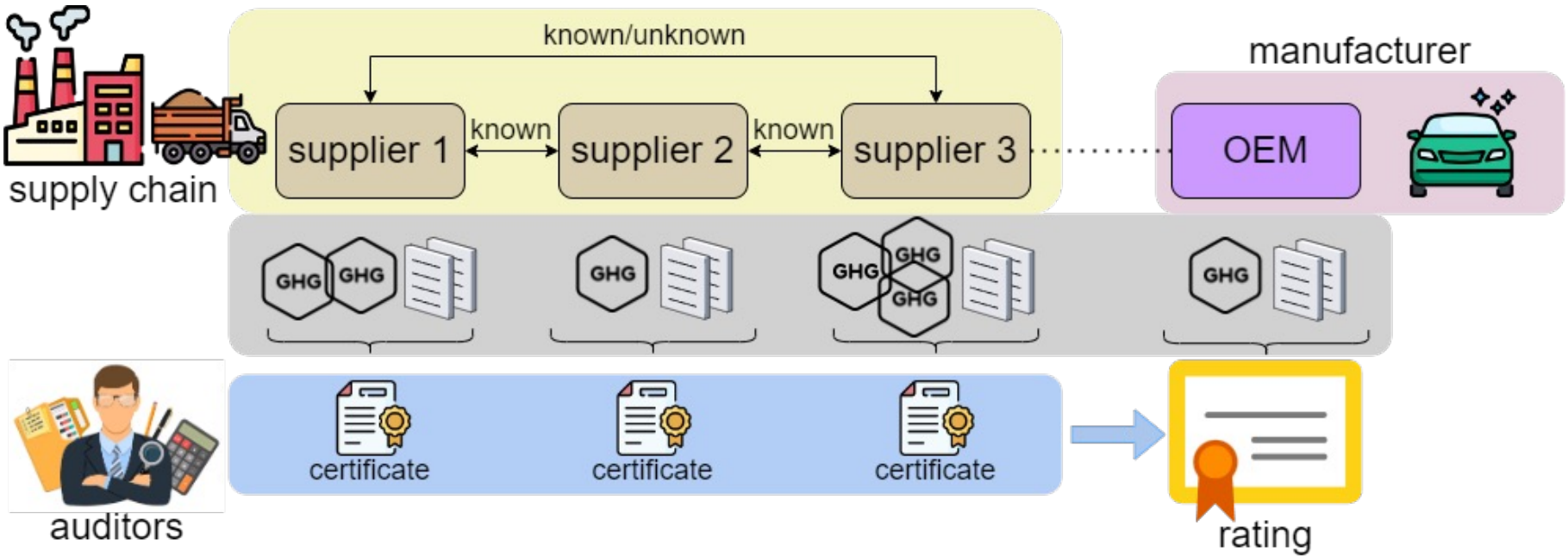
Proposal


known/unknown
supplier 1
known
supplier 2
known
supplier 3
supply chain
manufacturer
OEM
GHG
GHG
GHG
GHG
GHG

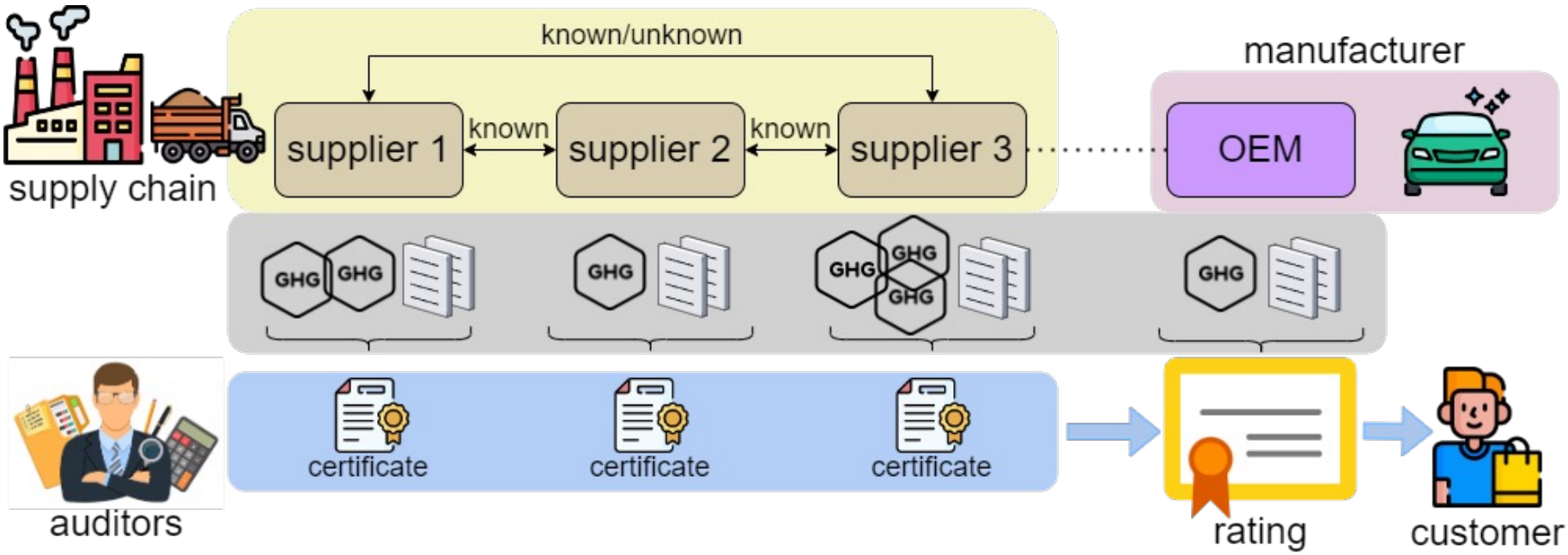
Proposal


known/unknown
manufacturer
supplier 1
known
supplier 2
known
supplier 3
OEM
supply chain
GHG
GHG
GHG
GHG
GHG
certificate
certificate
certificate
auditors

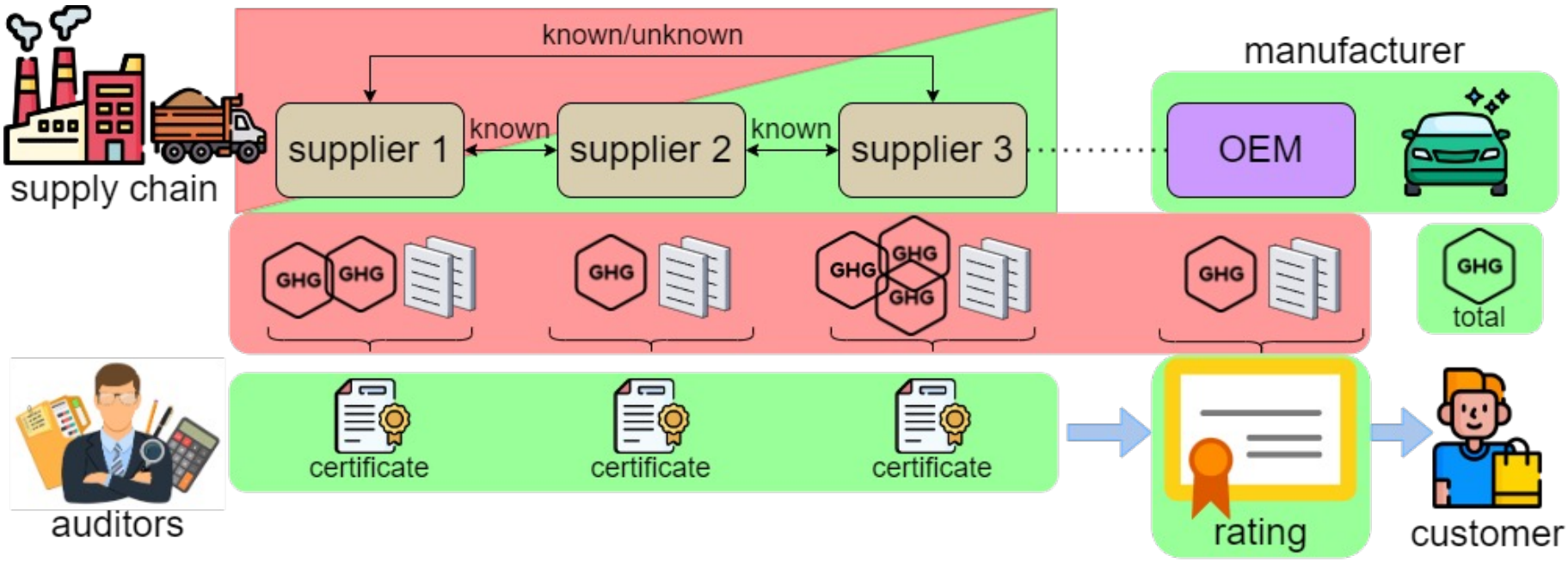
Proposal


known/unknown
supplier 1
known
supplier 2
known
supplier 3
supply chain
manufacturer
OEM
GHG
GHG
GHG
GHG
GHG
GHG
certificate
certificate
certificate
auditors
rating

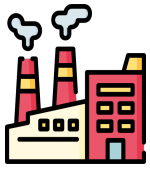
Proposal


known/unknown
supplier 1
known
supplier 2
known
supplier 3
supply chain
manufacturer
OEM
GHG
GHG
GHG
GHG
GHG
GHG
certificate
certificate
certificate
auditors
rating
customer

Proposal


known/unknown
supply chain
supplier 1
known
supplier 2
known
supplier 3
manufacturer
OEM
GHG
GHG
GHG
GHG
GHG
GHG
total
auditors
certificate
certificate
certificate
rating
customer

Proposal – Stakeholder



Supply Chain

G1: retain business/trade secrets

G2: prove themselves as trustable partners

G3: system must be simple to integrate and reliable

A1: Create assets and verify them

A2: Provide information for audits and others

OEM

G1: Proof ethical and sustainable sourcing

G2: provide audit trails

G3: Possibility to add new suppliers

A1: Create assets and verify them

A2: Provide information for audits and others

Auditor

G1: Need to be able to track every part of the chain

G2: Well-organized data

G3: remain uninfluenced by outside sway

A1: Audit companies and issue certificates

A2: Issue final rating

Consumer

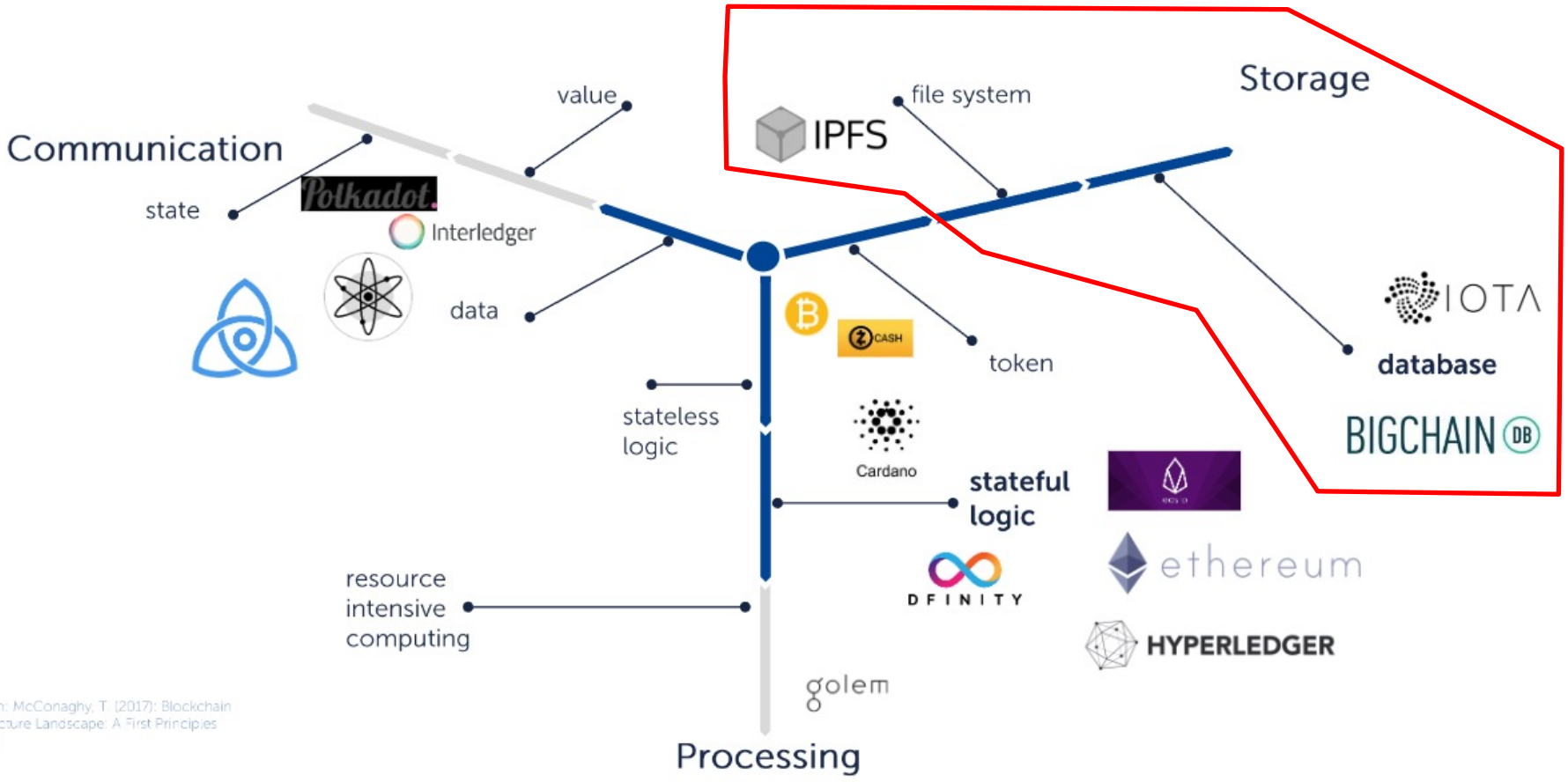
G1: Purchase goods with a clean conscience

G2: well organized and comprehensive overview

-> fair and sustainable manufacturing

A1: review ratings and other figures

Proposal - Technology



- Private/Permissioned or Consortium Blockchain

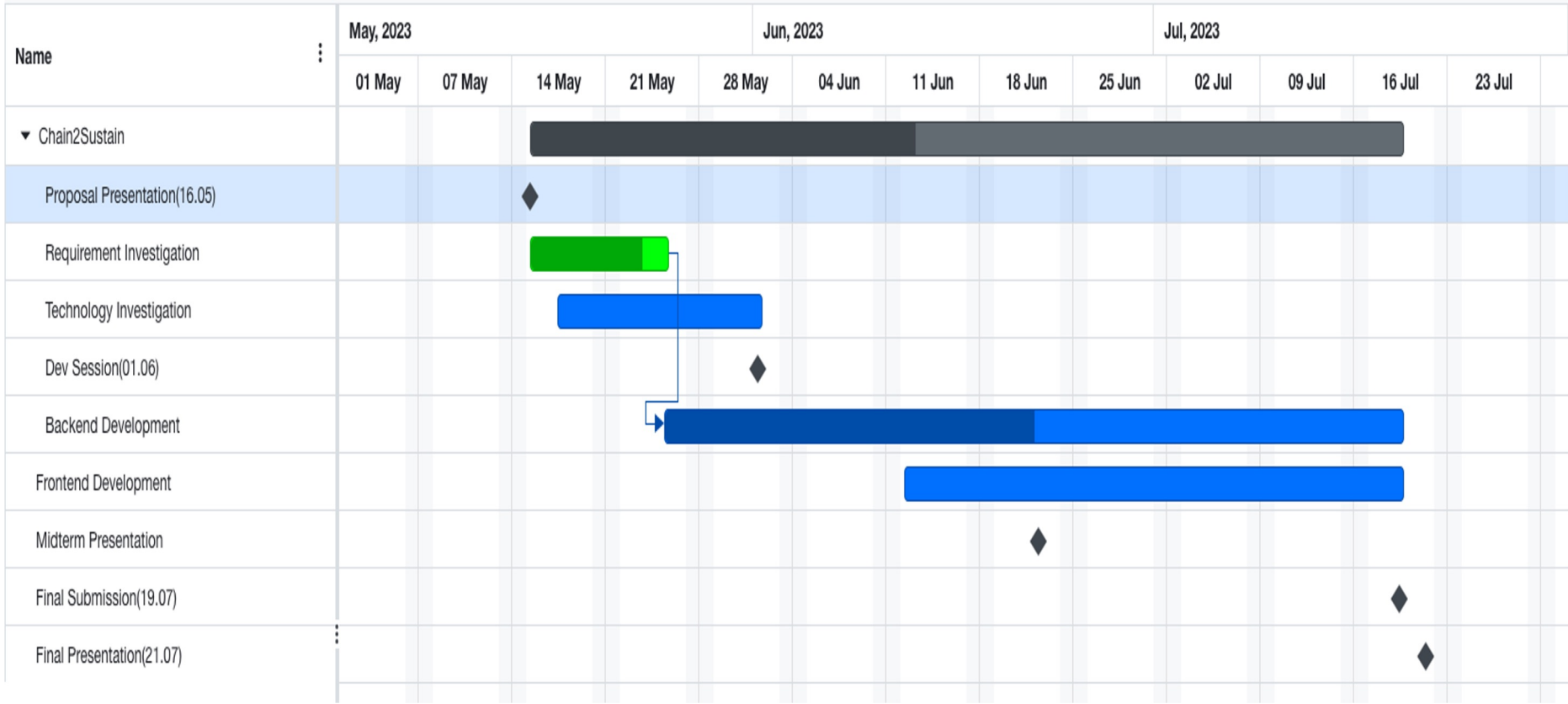
Challenges

- Finding out how to attach certificates to goods to prove whether product is environmentally friendly and produced in ethical way(no child labour, employee satisfaction).
- Finding out which aspects should be considered by authorities while giving certificate.
- How to keep track of assets that are traded between parties(charge port).
- How to ensure data privacy. Sensitive trading data between suppliers and car manufacturers.
- What kind of transactions will be done between parties.

Challenges

- What kind of information at the end will customer see.
- How to ensure scalability.
- Determine who will validate the transactions between parties.(Proof of Authority?)
- How to create user friendly UI for car manufacturer, customer and supplier that interacts with blockchain.

Roadmap


Name
May, 2023
Jun, 2023
Jul, 2023
01 May
07 May
14 May
21 May
28 May
04 Jun
11 Jun
18 Jun
25 Jun
02 Jul
09 Jul
16 Jul
23 Jul
Chain2Sustain
Proposal Presentation(16.05)
Requirement Investigation
Technology Investigation
Dev Session(01.06)
Backend Development
Frontend Development
Midterm Presentation
Final Submission(19.07)
Final Presentation(21.07)

Proposal - Technology

Public/Permissionless blockchain	Private/Permissioned blockchain	Consortium blockchain

• Anyone
  • join the network
  • read & write access
• Consensus
  • solve a complex cryptographic problem (e.g. PoW)
• Transparency - little to no privacy in transactions
• Examples
  • Bitcoin, Ethereum
	• join by invitation
	• one or more participants control the network
	  • based on a set of rules by the network admin
	• Requires identities of users
	• Example
	  • Multichain
		• semi-decentralized
		• a group of approved participants control the network
		• join by invitation
		• Consensus
		  • networks operators validate transactions
		• Examples
		  • Hyperledger Fabric, Corda