CHIP SUPPLY + BLOCK CHAIN

AUBURN UNIVERSITY
RFID LAB

Collaboration LLC

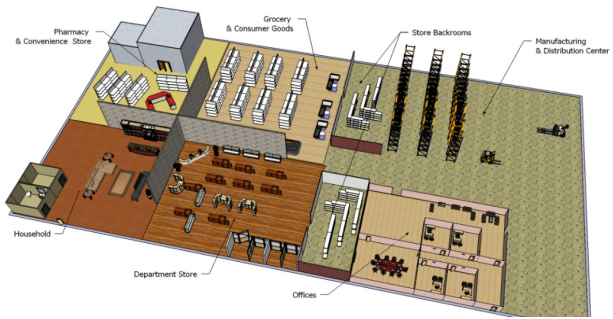
GS1 US

Intro to the **RFID Lab** at **Auburn University**

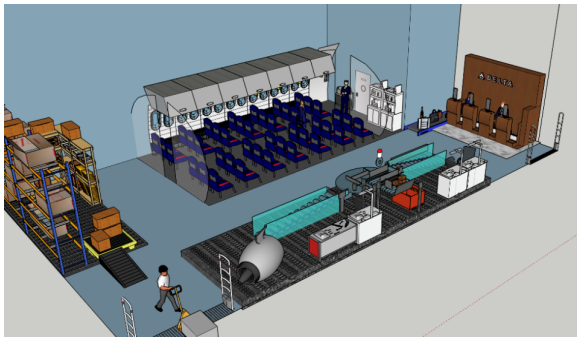
MISSION:

Develop the ***business case*** & ***technical implementation*** for emerging technologies in the supply chain through research, support, and education

Retail, Apparel, CPG



Aviation & Aerospace



RFID Lab Sponsors

RFID 101

RFID serves as a
serialization solution

It assigns a
unique digital identity
to
each physical item

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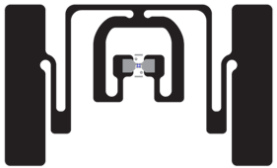
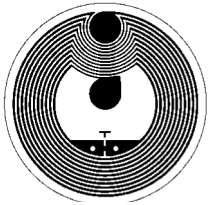
SGTIN = Serial # + GTIN

QR Code

2D Data Matrix



RFID Tag



NFC Tag

There are multiple **SGTIN** data carriers:

Data carriers used by optical scanning solutions include QR Codes and 2D Data Matrices.

Data carriers like RFID Tags and NFC Tags utilize radio-wave technology to capture **SGTIN** information

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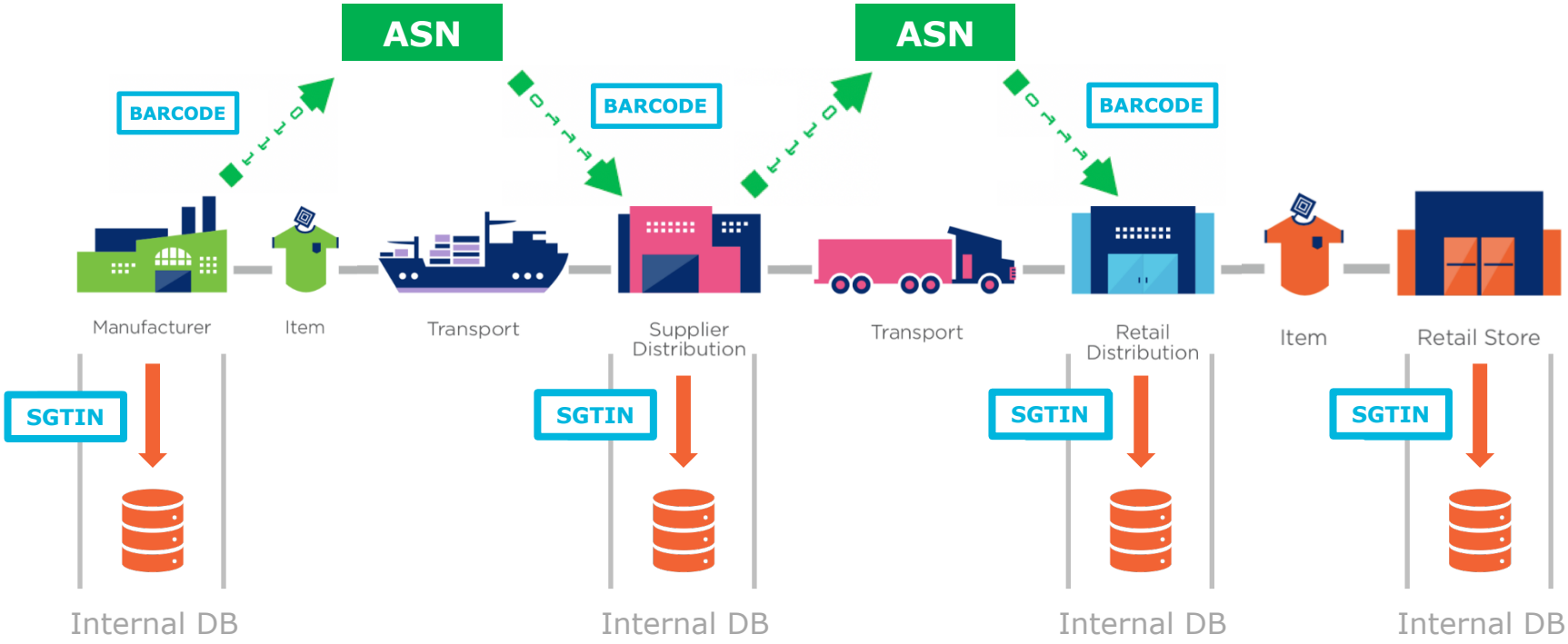
Retail / Apparel Data Flow Today



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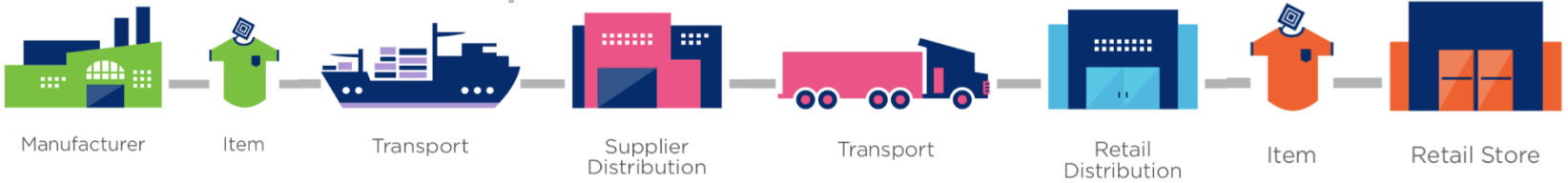
Retail / Apparel Pain Points



$98B
Counterfeiting

$35B
Claims

$13B
Shrink

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Retail Supply Chain Pain Points

$98B	Counterfeiting Gray Market
$35B	Claims or Chargebacks
$13B	Shrink or Unaccounted for Inventory
$146B	TOTAL

$146B

=

4.2%

of Retail Sales

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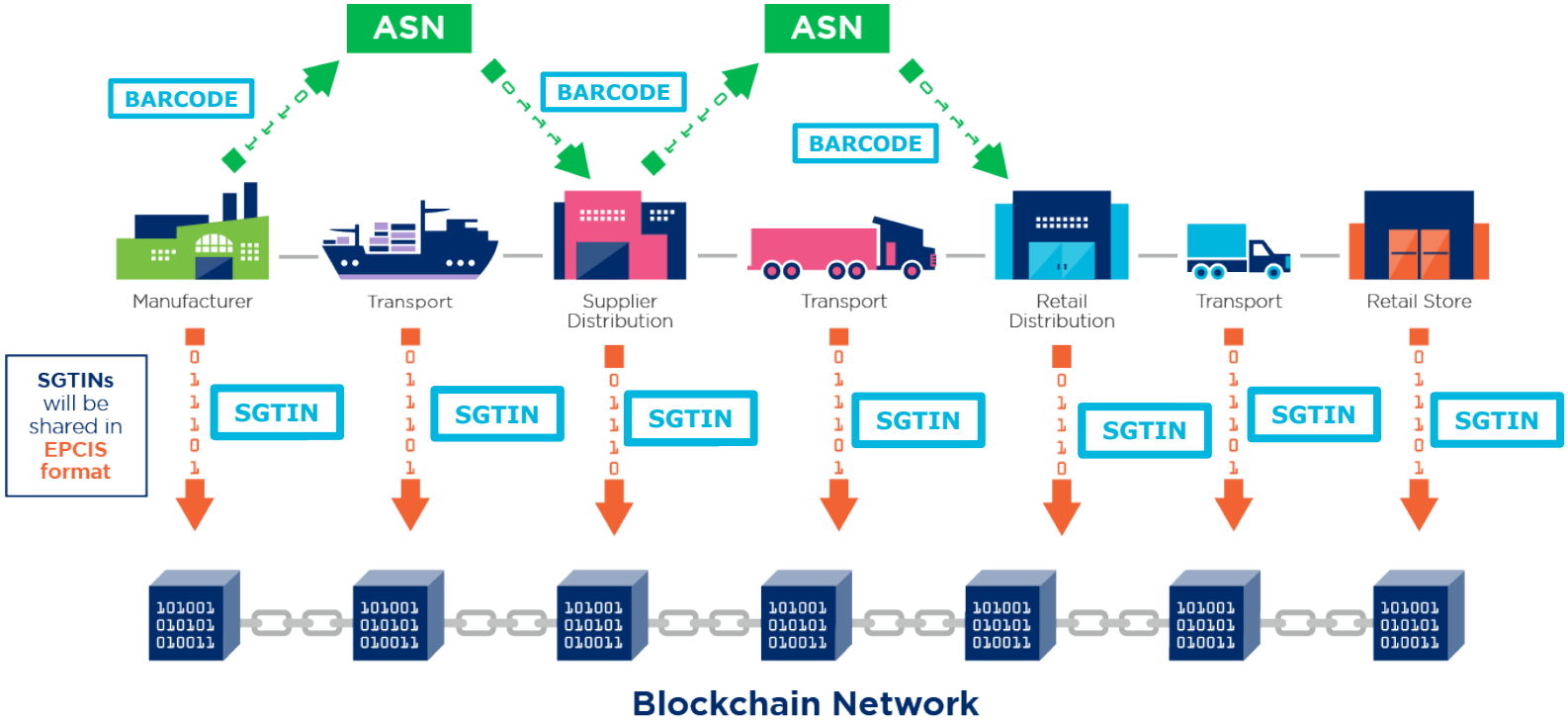
CHIP Uniting Supply Chain & Blockchain



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CHIP SUPPLY + BLOCK CHAIN

The first blockchain proof-of-concept for *serialized* supply chain data in the retail apparel industry

3 Brands

2 Retailers

1 Logistics Provider

+2 million

items accounted for with SGTINs

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CHIP Partner Pairs

Vertical Brand

Wholesale Brand

&

Retailer

Wholesale Brand

&

Retailer

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Supply Chain Nodes

Vertical Brand

Manufacturing Facility — Domestic DC — Retail Store

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Supply Chain Nodes

Wholesale Brands & Retailers

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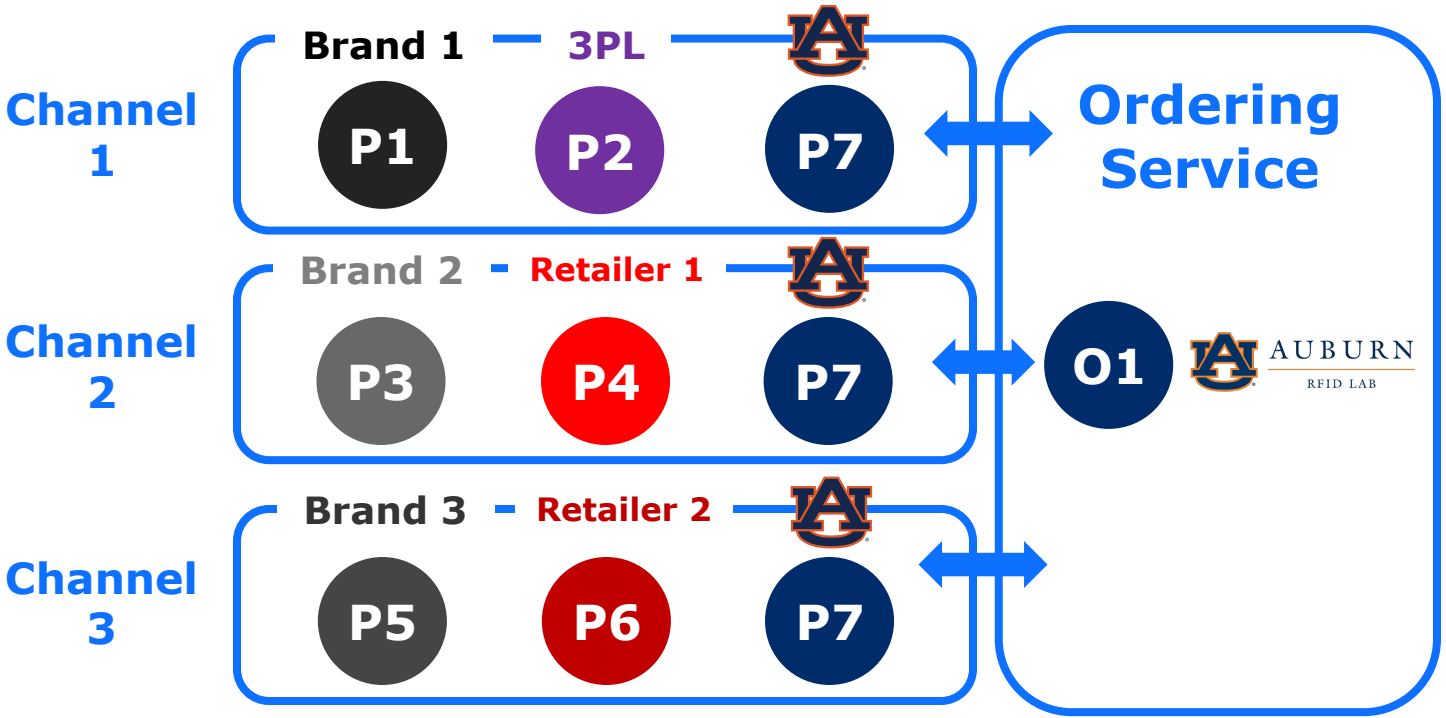
Hyperledger Fabric: Architecture



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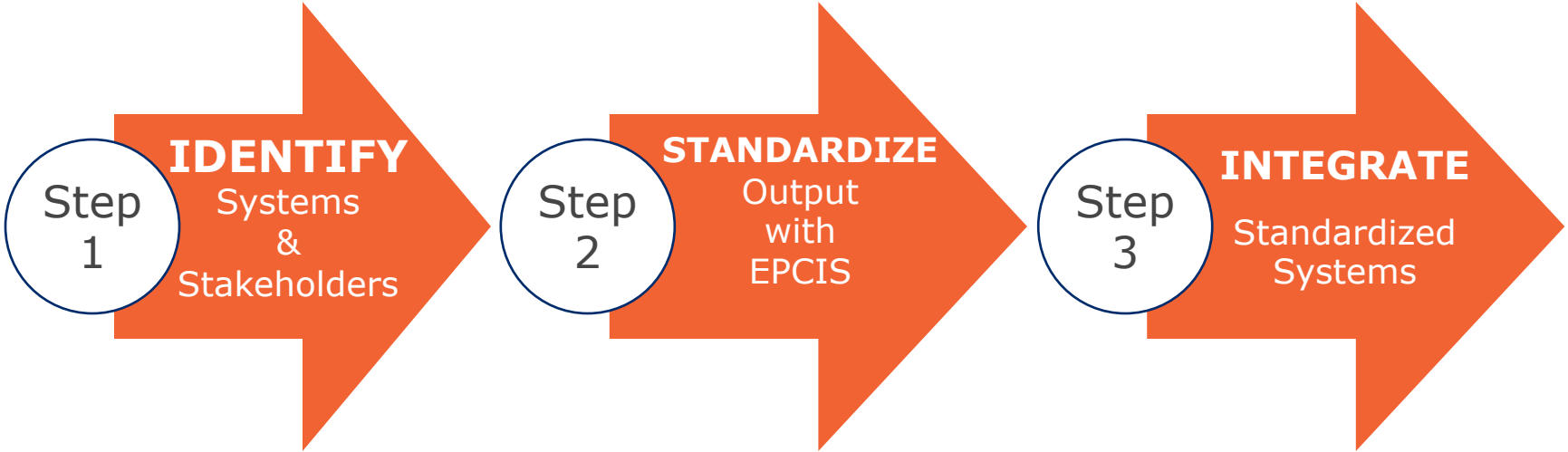
Project Steps



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Step 1

Step 1

IDENTIFY Serialized Systems Stakeholders

- Serialized Systems:
  - SGTIN (RFID) & SSCC
  - Capabilities at Manufacturing, DC, Store, etc.
- System Stakeholders:
  - Solution Provider support?
  - Control of the software stack

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CHIP

Step 2

Step 2

STANDARDIZE System Output with *EPCIS*

- Identify the Key Data Elements (KDEs) and Critical Tracking Events (CTEs) that current systems support
- Transform current data output into EPCIS-compliant format

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Step 3

Step 3

INTEGRATE Standardized Systems

- Utilize Auburn application via APIs for data ingestion
- Validate or translate into EPCIS format and feed through blockchain client application to blockchain network

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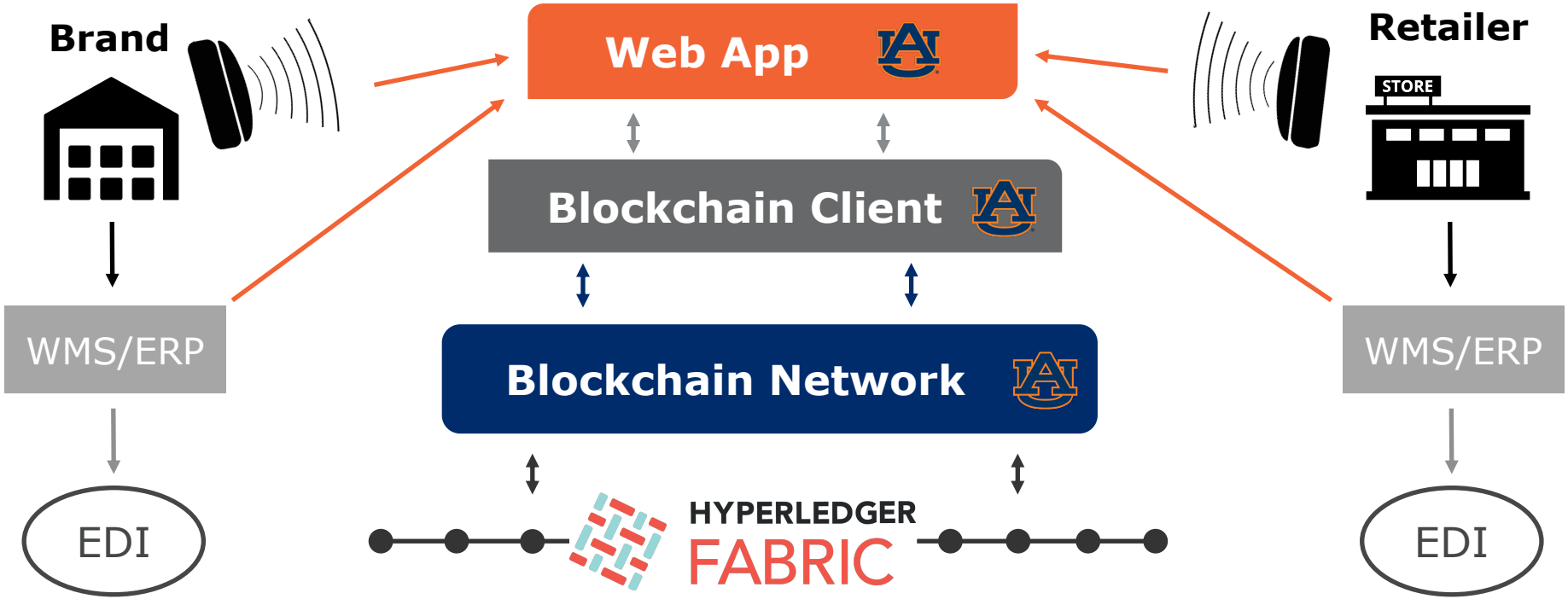
Technology Stack: CHIP (Current)



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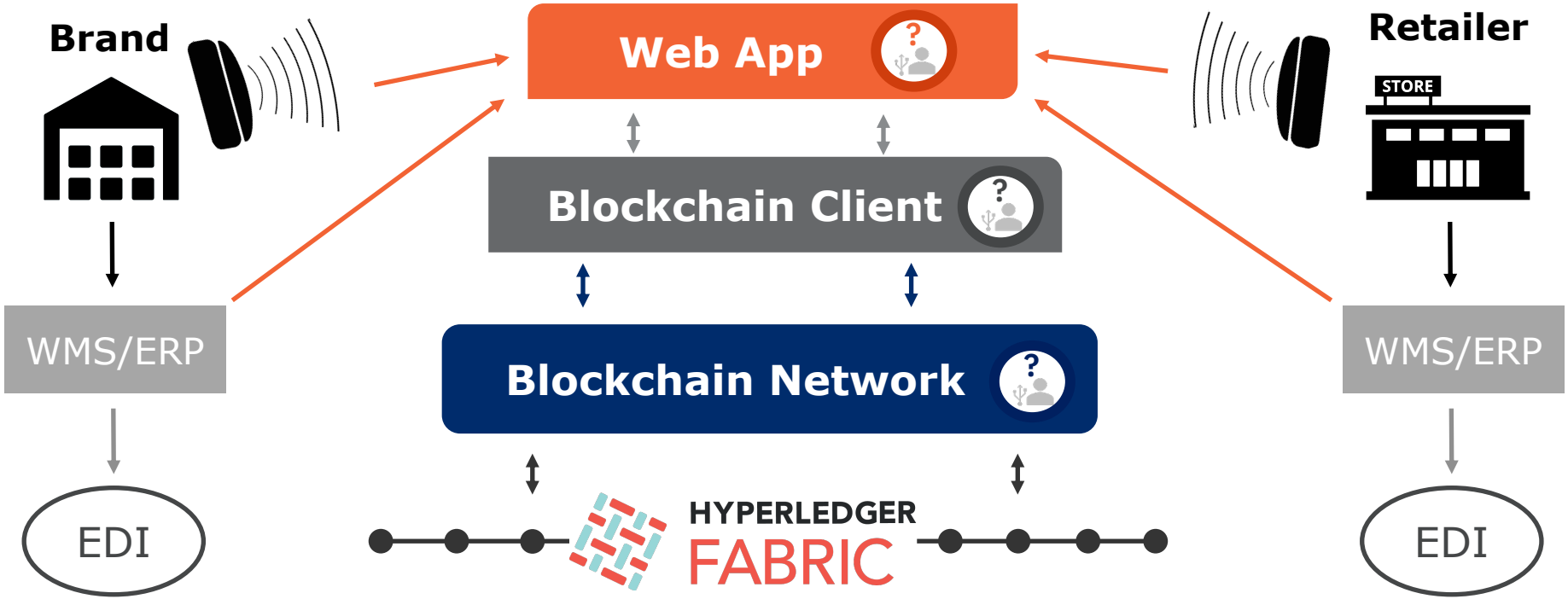
Technology Stack: CHIP (Future)



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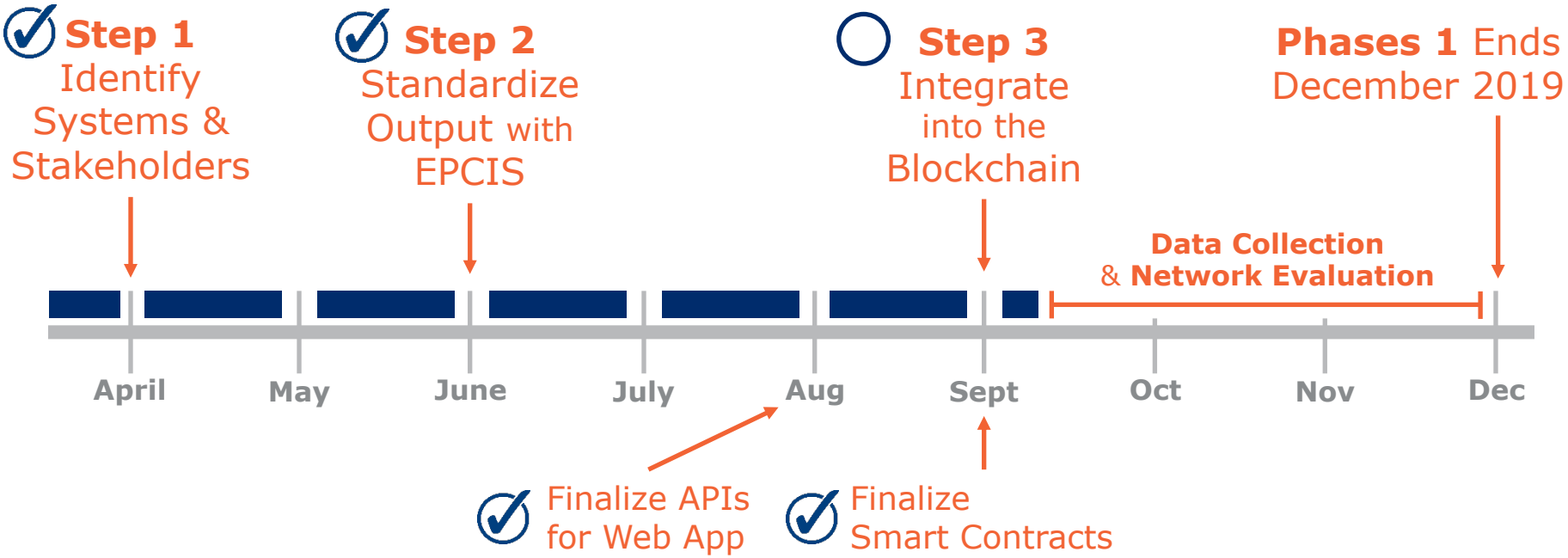
Project Timeline



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Position Paper: "**Why Retail is Ready for Blockchain**"

- Highlights the supply chain problems faced by the retail industry
- Details how blockchain and serialized data can address those problems
- To be released: **Oct 9th**

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Privacy and Confidentiality Hyperledger Fabric

Four Levels of Privacy:

1. **Private** network design
2. **Permissioned** access control functions
3. **Channel** architecture
4. **Private Data Collection**

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Privacy in Hyperledger Fabric: Private Network

Fabric supports **PRIVATE** blockchain networks

Members must be approved and identified

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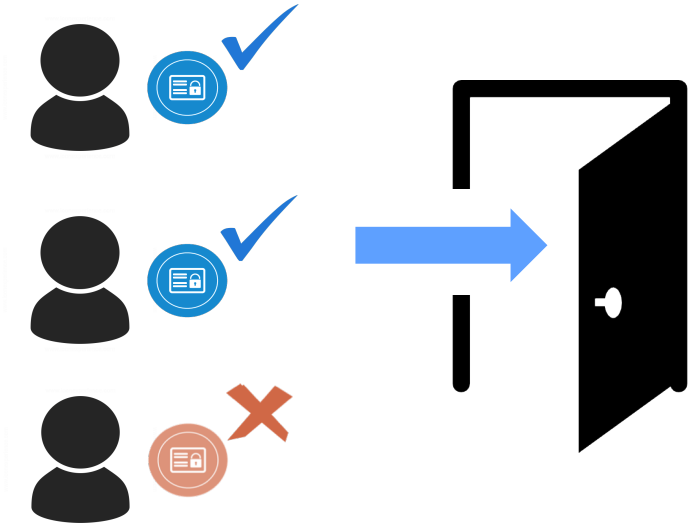
Privacy in Hyperledger Fabric: Permissioned

Each member of the network is granted certain privileges or ***permissions***

serves as an access control function



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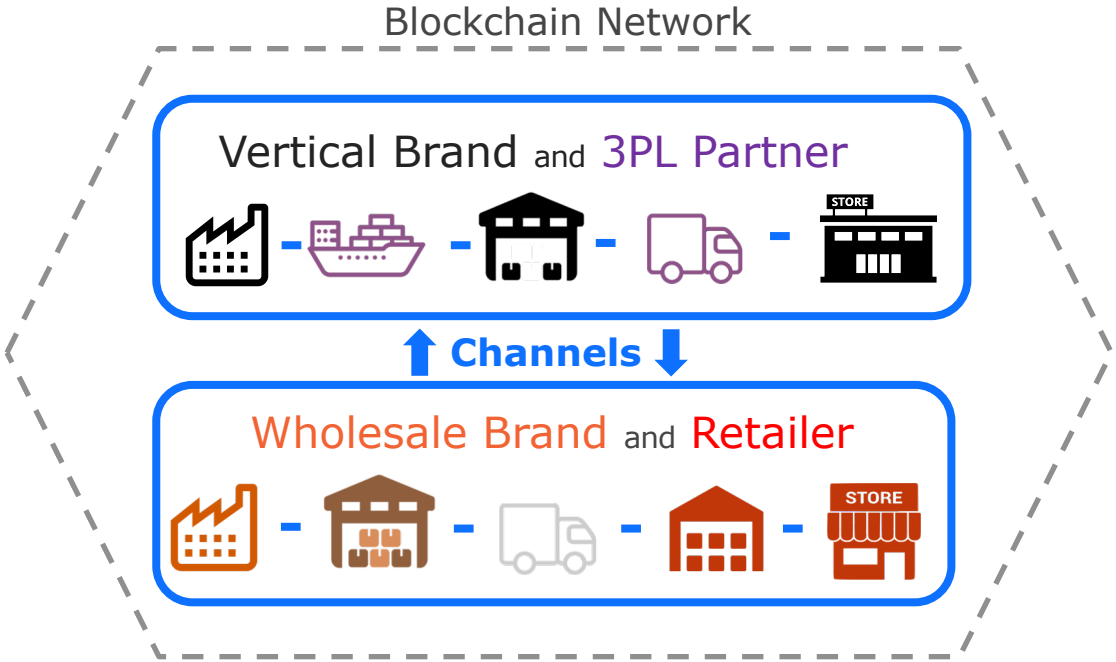
Privacy in Hyperledger Fabric: Channels

Members sharing data with each other can be organized into

CHANNELS

- Channels partition off parts of the network
- each Channel has its own private ledger



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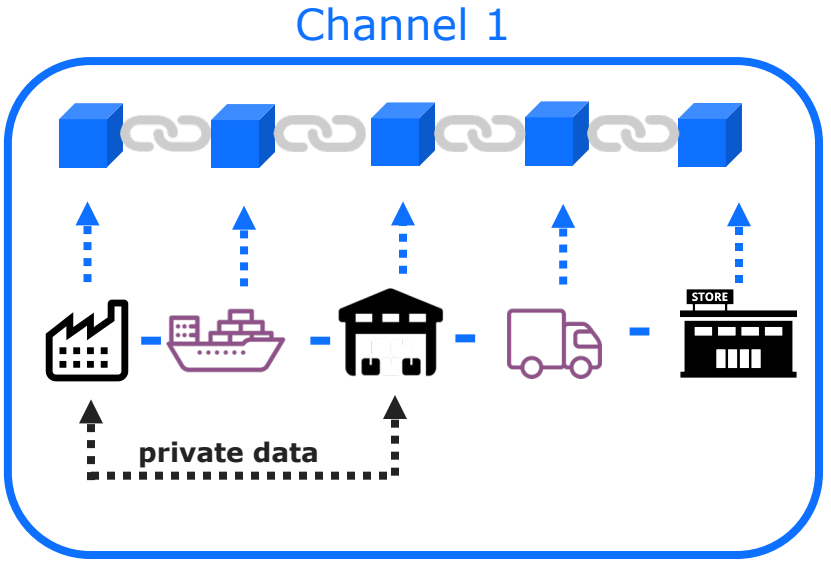
Privacy in Hyperledger Fabric: Private Data Collection

Within a Channel, participants can share data with a subset of other channel members with **PRIVATE DATA COLLECTION**

- Data is shared privately between select members and a *hash* of the transaction data is stored on the channel chain



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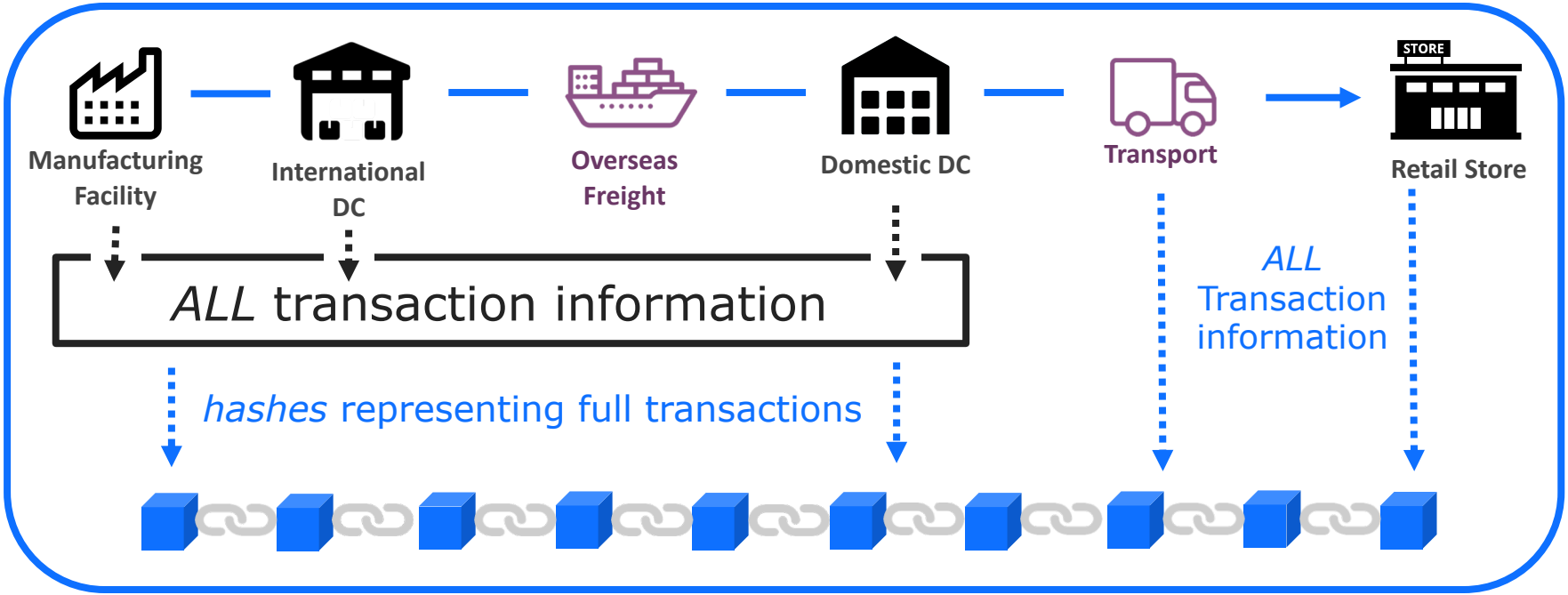
Privacy in Hyperledger Fabric: Private Data Collection



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