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

AIRBUS, Boeing, Delta, FedEx, Walmart, Amazon.com, Kohl's, Target, Home Depot, Nike, Hudson's Bay Co., Macy's, Under Armour, VF, Uniqlo, H&M, Avery Dennison, Checkpoint, GS1 US, Intel, Johnson Controls, Microsoft, Mojix, NXP, SML, Smartrac, Stanley, Zebra
RFID 101

RFID serves as a serialization solution

It assigns a unique digital identity to each physical item
SGTIN = Serial # + GTIN

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.
Retail / Apparel Data Flow Today

CHIP

 ASN

 BARCODE

 Manufacturer -> Item -> Transport -> Supplier Distribution

 SGTIN

 Internal DB

 ASN

 BARCODE

 Transport -> Retail Distribution

 SGTIN

 Internal DB

 ASN

 BARCODE

 Retail Distribution -> Item -> Retail Store

 SGTIN

 Internal DB
Retail / Apparel Pain Points

$98B  Counterfeiting
$35B  Claims
$13B  Shrink
Retail Supply Chain Pain Points

- Counterfeiting: $98B
- Gray Market: $35B
- Claims or Chargebacks: $13B
- Shrink or Unaccounted for Inventory: $13B

TOTAL: $146B

4.2% of Retail Sales
Uniting Supply Chain & Blockchain

Blockchain Network

SGTNs will be shared in EPCIS format
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
Partner Pairs

Vertical Brand

Wholesale Brand & Retailer

Wholesale Brand & Retailer
Vertical Brand

Manufacturing Facility — Domestic DC — Retail Store
Supply Chain Nodes

Wholesale Brands & Retailers

- Manufacturing Facility
- Domestic DC
- Retailer DC
- Retail Store
Hyperledger Fabric: Architecture

Channel 1
- Brand 1: P1, P2, P7
- 3PL: P7

Channel 2
- Brand 2: P3, P4, P7
- Retailer 1: P7

Channel 3
- Brand 3: P5, P6, P7
- Retailer 2: P7

Ordering Service: O1
Project Steps

Step 1: IDENTIFY Systems & Stakeholders
Step 2: STANDARDIZE Output with EPCIS
Step 3: INTEGRATE Standardized Systems
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
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
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
Technology Stack: **CHIP** (Current)

- **Brand**
  - WMS/ERP
  - EDI

- **Web App**
  - Blockchain Client

- **Blockchain Network**
  - Hyperledger Fabric

- **Retailer**
  - WMS/ERP
  - EDI
**Project Timeline**

**Step 1**
Identify Systems & Stakeholders

**Step 2**
Standardize Output with EPCIS

**Step 3**
Integrate into the Blockchain

**Phases 1**
Ends December 2019

- [ ] April
- [ ] May
- [ ] June
- [ ] July
- [ ] Aug
- [ ] Sept
- [ ] Oct
- [ ] Nov
- [ ] Dec

- [ ] Data Collection & Network Evaluation
- [ ] Finalize APIs for Web App
- [ ] Finalize Smart Contracts

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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
Four Levels of Privacy:

1. **Private** network design
2. **Permissioned** access control functions
3. **Channel** architecture
4. **Private Data Collection**
Privacy in Hyperledger Fabric: Private Network

Fabric supports PRIVATE blockchain networks

Members must be approved and identified
Privacy in Hyperledger Fabric: Permissioned

Each member of the network is granted certain privileges or *permissions* serves as an access control function.
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
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
Privacy in Hyperledger Fabric: Private Data Collection

ALL transaction information

hashes representing full transactions