Leveraging Blockchain

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Why is blockchain exciting? Data Sharing.

Most of the excitement about blockchain is really just **excitement about the possibility of sharing data across company lines**.

- For some entire industries, this is an unfamiliar concept.
- For industries where data sharing is familiar and interesting, blockchain presents an interesting way to discuss it...and to raise awareness of the need for data sharing across organizational silos.

The Global Language of Business

GS1 Standards

Identify GS1 Identification Numbers
Companies, Products, Locations,
Logistics, Assets, and Services

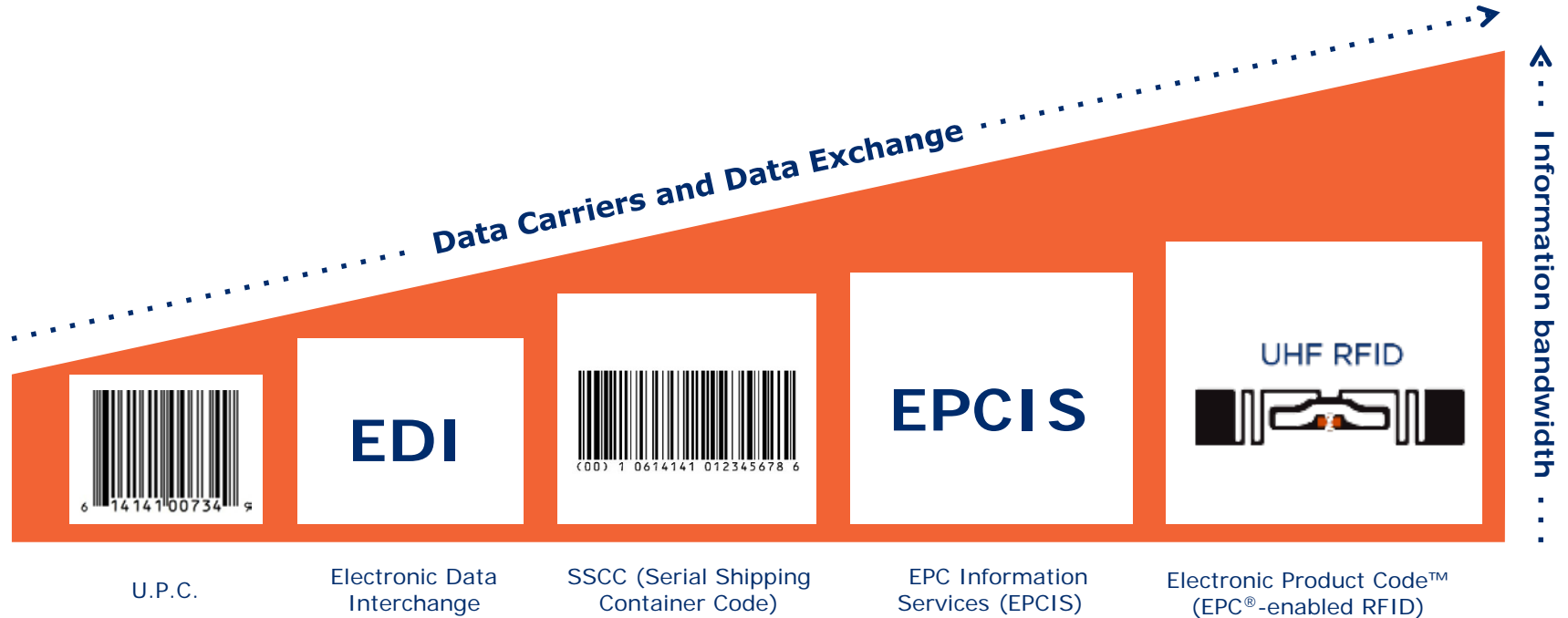**Capture** GS1 Data Carriers
Barcodes and EPC®-enabled RFID
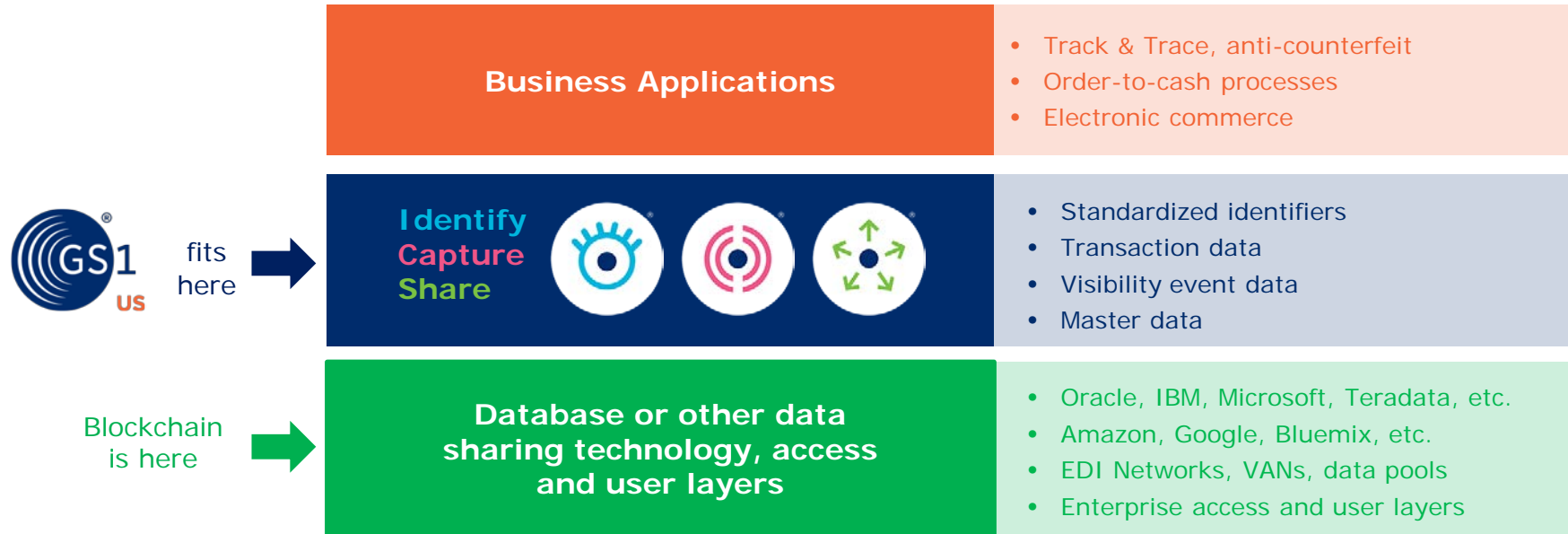
Share GS1 Data Exchange
Master Data, Transactional Data,
and Physical Event Data

Industry Driven Standards Evolution

Data Carriers and Data Exchange

Information bandwidth

EDI

EPCIS

UHF RFID

U.P.C.

Electronic Data
Interchange

SSCC (Serial Shipping
Container Code)

EPC Information
Services (EPCIS)

Electronic Product Code™
(EPC®-enabled RFID)

Where does GS1 fit and where does "blockchain" fit?

Business Applications	• Track & Trace, anti-counterfeit • Order-to-cash processes • Electronic commerce

Identify Capture Share	• Standardized identifiers • Transaction data • Visibility event data • Master data

GS1 US · fits here →

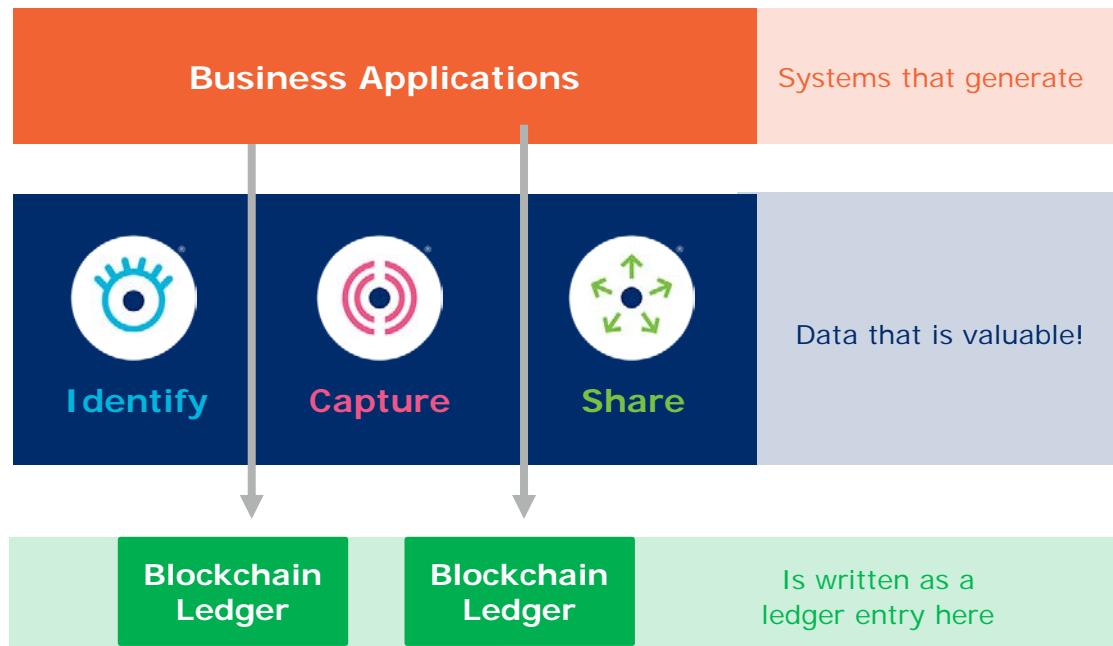| Database or other data sharing technology, access and user layers	• Oracle, IBM, Microsoft, Teradata, etc. • Amazon, Google, Bluemix, etc. • EDI Networks, VANs, data pools • Enterprise access and user layers

Blockchain is here →

Blockchain is a shared, secure, distributed ledger
GS1 facilitates standards for data and some business applications
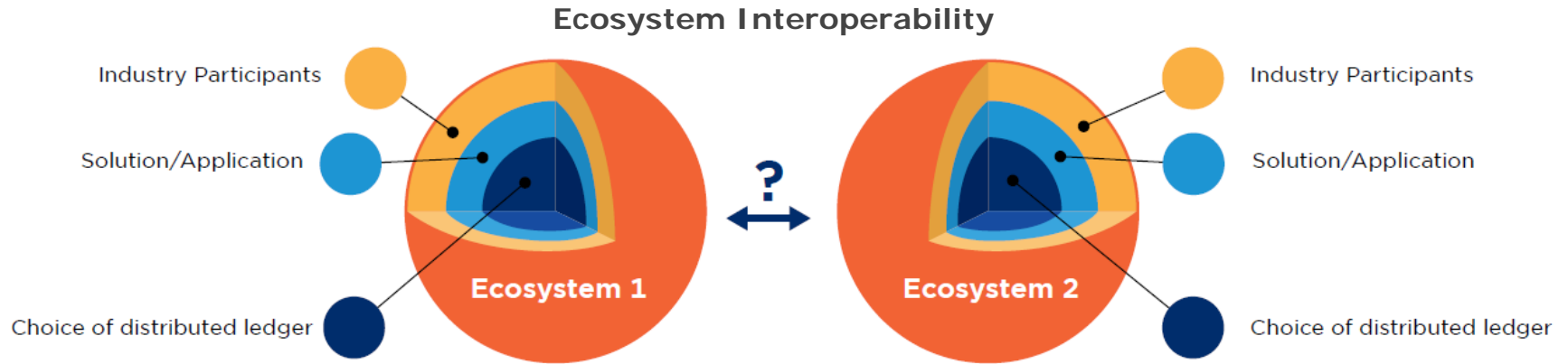
The Role of Standards in Blockchain

Blockchain is a replicated, secure, distributed ledger

GS1 facilitates standards for data and some business applications

Business Applications	Systems that generate

Identify   **Capture**   **Share**

Data that is valuable!

Blockchain Ledger   **Blockchain Ledger**   Is written as a ledger entry here

GS1 US

The future landscape of ecosystems

Ecosystem Interoperability

Industry Participants

Solution/Application

Choice of distributed ledger

Ecosystem 1

?

Industry Participants

Solution/Application

Choice of distributed ledger

Ecosystem 2

Bridging Blockchain Ecosystems

- Ensure use of GS1 standards for identity of parties, places, and products
- Ensure use of existing standards networks and vocabulary as common language for data sharing
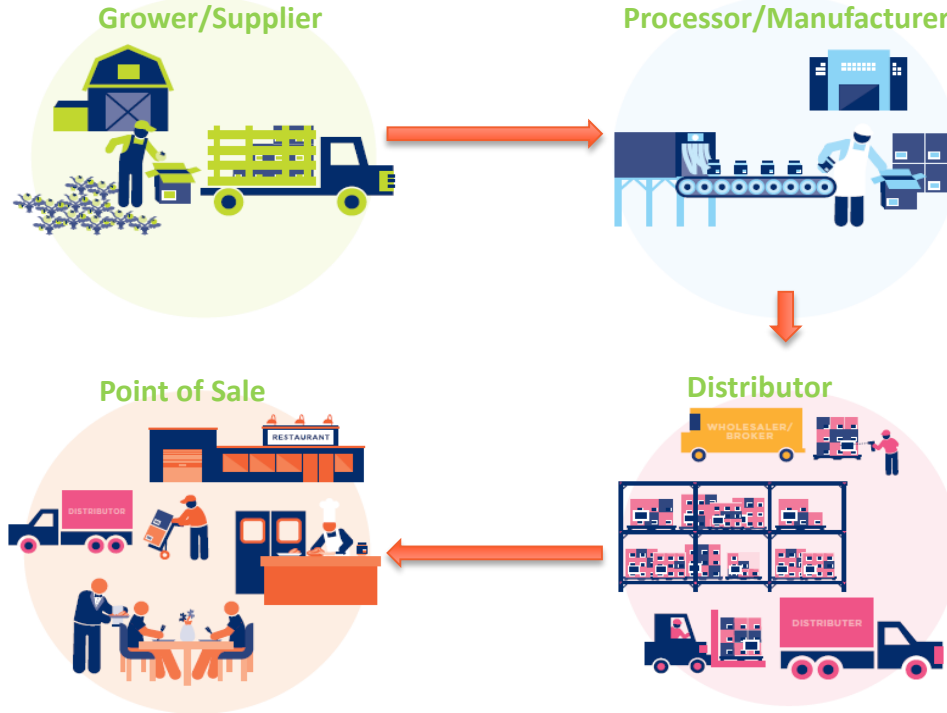- Establish inter-ecosystem and ecosystem-to-ecosystem governance

GS1 US

Use Case

What data helps you solve your problem?
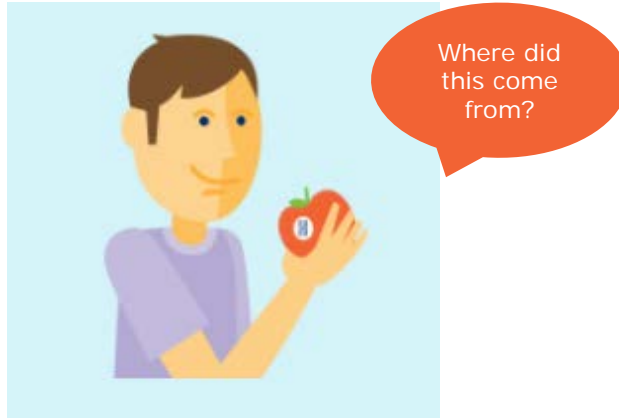
Capture, Store, and Share Data

Grower/Supplier

Processor/Manufacturer

Distributor

Point of Sale

Enabling supply chain visibility

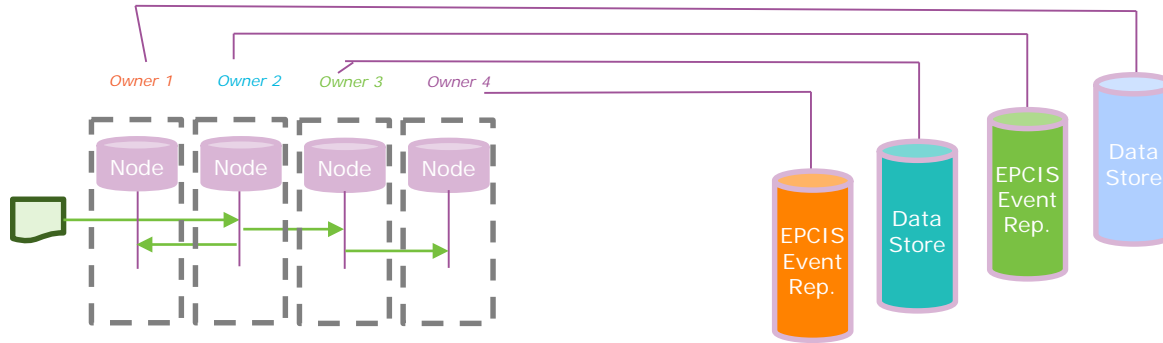| Analysis	Automation	Tracing	Tracking
Couponing	Business process optimization	Anti-counterfeiting / provenance	Asset management
	Exception management	Chain of custody / ownership	Food freshness
	Process documentation	Customs clearance	Inventory management
		Traceability	Sales promotion

The 4 data dimensions of an EPCIS event

- **What** objects are the subject of event?

    Individual objects (GTIN + Serial Number or Lot/Batch Number)

- **When** did this event take place?

    Date, time, time zone

- **Where** did this occur and where are the objects thereafter?

    Identity of physical location (Global Location Number or GLN)

- **Why** did this event take place?
    Business step (e.g. "Shipping") and Disposition (e.g "in transit")

Enterprise Blockchains

- **A blockchain is just a shared ledger**…
  - It's a unique kind of ledger where:
    - You **can't change data.**
    - You **can't delete data.**
    - You **can't query for data** (at least in initial public blockchain implementations).
      - This means that the data set could get BIG…**really BIG**.

- When implemented to address business applications in the supply chain space, **an enterprise blockchain is generally an index that references off-chain data** (off-chain data can continue to be maintained in traditional data stores).
  - These can be Electronic Product Code Information Services (EPCIS) repositories.
  - This might solve the problem of ledgers getting too large.
  - This also enables fast sharing of a common truth about events and contracts.

Blockchains and Data Stores Working Together

Owner 1 Owner 2 Owner 3 Owner 4

Node Node Node Node

EPCIS Event Rep. Data Store EPCIS Event Rep. Data Store

Enterprise Blockchain ledger

- Access and permission control layers
- Pointers to off-chain data and hashes of off-chain data
- Some relevant pieces of data needed for validation and business processes and smart contracts
- Identifiers based on GS1 Standards (party, location, things, etc)
- Data stored in accordance with GS1 standard data structures

Off-chain resources

- Access and permission control layers
- Event, transaction and master data stored in accordance with GS1 standard data structures
- Identifiers based on GS1 Standards (party, location, things, etc)
- Other data resources that may be needed (documents, images, files, etc)

Pilots, Pilots, Pilots

March 21, 2018 **Coffee & Company**

Starbucks to pilot 'bean to cup' traceability with new technology

Coca-Cola Taps Blockchain to end Supply Chain Forced Labor

JP BUNTINX | MARCH 21, 2018 | 2:00 PM

Kelly Products to Launch Beef Blockchain to Provide Complete Conception-to-Market Transparency for Georgia Beef

Blockchain technology will provide beef market with greater visibility, safety and efficiency

Harnessing blockchain for electronic health records

By Sara Friedman   Jun 20, 2018

coindesk

Metals Exchange Forms Blockchain Group to Modernize Minerals Industry

Common Themes

Most every Enterprise Blockchain pilot is revealing two important insights:

Basic business processes in pilot organizations need to be adapted before distributed ledgers will bring the expected value.

As organizations work to benefit from the added trust in data sharing that immutable ledgers may provide, they are already realizing operational benefits from the business process adaptations that they've identified.

Standards are the foundation
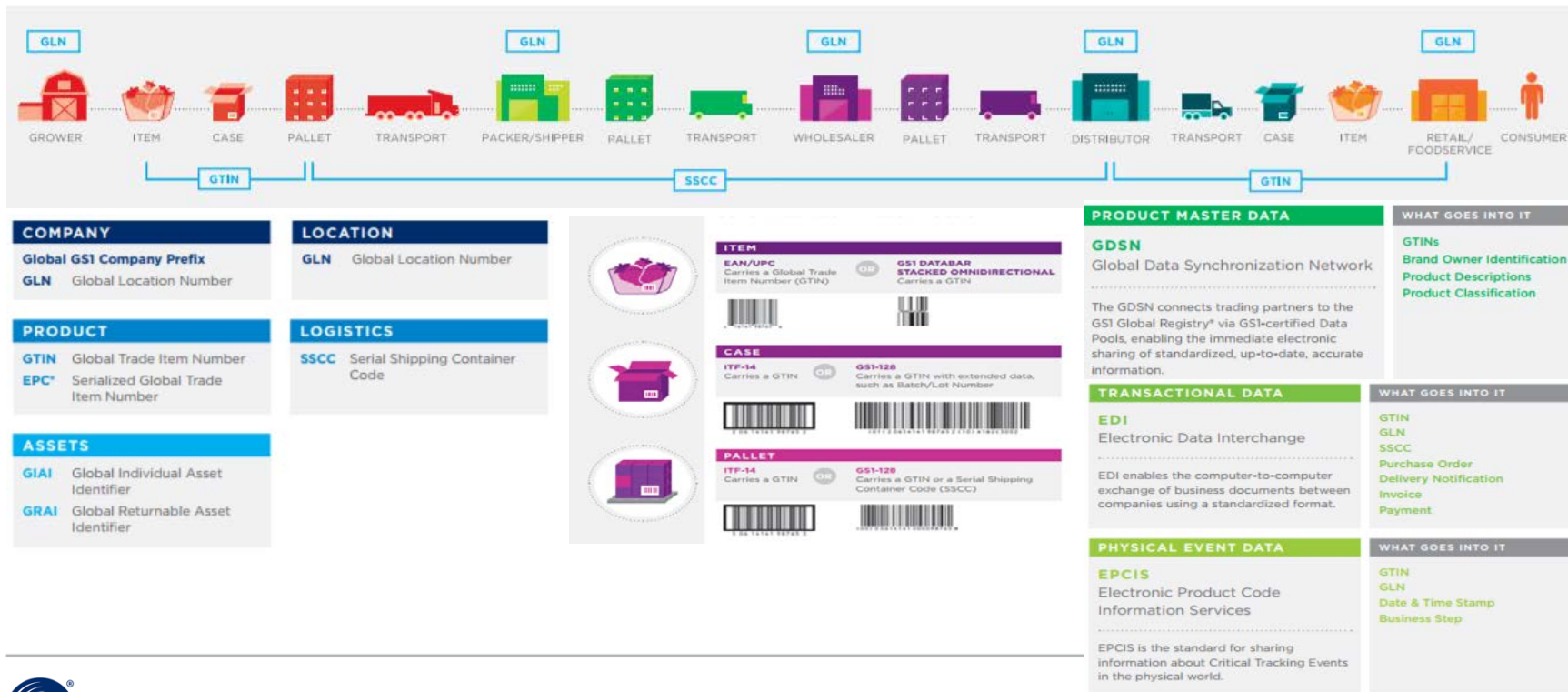
Tips for Supply Chain Practitioners

- Continue your education on blockchain technology and how it may help lead to improvements in supply chain efficiency and security

- Focus on implementing the necessary core fundamentals for traceability, including identification (products and logistics units), automated data capture (barcodes, RFID, and other sensors), and physical event data sharing to lay the groundwork for blockchain

- Participate in efforts to define requirements for industry-wide governance, interoperability, and implementation roadmaps to ensure blockchain's successful evolution to a fit-for-purpose, scalable supply chain solution

Standards Make Interoperability Possible

Sharing unique identification through a common language of standards creates an ecosystem of platforms, applications, and networks that securely links people, places, and things.

Standards Make Transparency and Trust Possible

Delivering trusted product data required for visibility and traceability, providing safer environments for patients and consumers alike.

Thank you

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