

Product and Food Traceability – create transparency

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Supply Chain Visibility and Optimization for a smarter planet



Lack of Traceability

Business Problem? Consumer Problem? Government Problem?

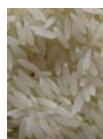


consumer survey

- 42% of consumers buy different brands today vs. 2 years ago... because of safety concerns
- 47% more concerned today about food safety than 2 years ago

FORTUNE

Wal-Mart: the new FDA



Rice
GMO



Lettuce
E. Coli



Chocolate
Salmonella



Chicken
Bird Flu



Chicken
Listeria



Gr. Beef
E. Coli



Toothpaste
Diethylene Glycol



Spinach
E. Coli



Chocolate
Nuts



Onions
E. Coli



Peanut Butter
Salmonella



Baby Food
Botulism



Pet Food
Melamine?



Canned Chili
Botulism



Snacks
Salmonella



Dog treats
Melamine



Tomatoes
Salmonella



Jalapeños
Salmonella



Cantaloupe
Salmonella



Toys
Lead



Pork
Listeria



Gr. Beef
E. Coli



Beef
E. Coli



Milk
Melamine



Peanut Butter
Salmonella



Cookie Dough
E. Coli



Chicken
Bird Flu



Gr. Beef
Salmonella

2006

2007

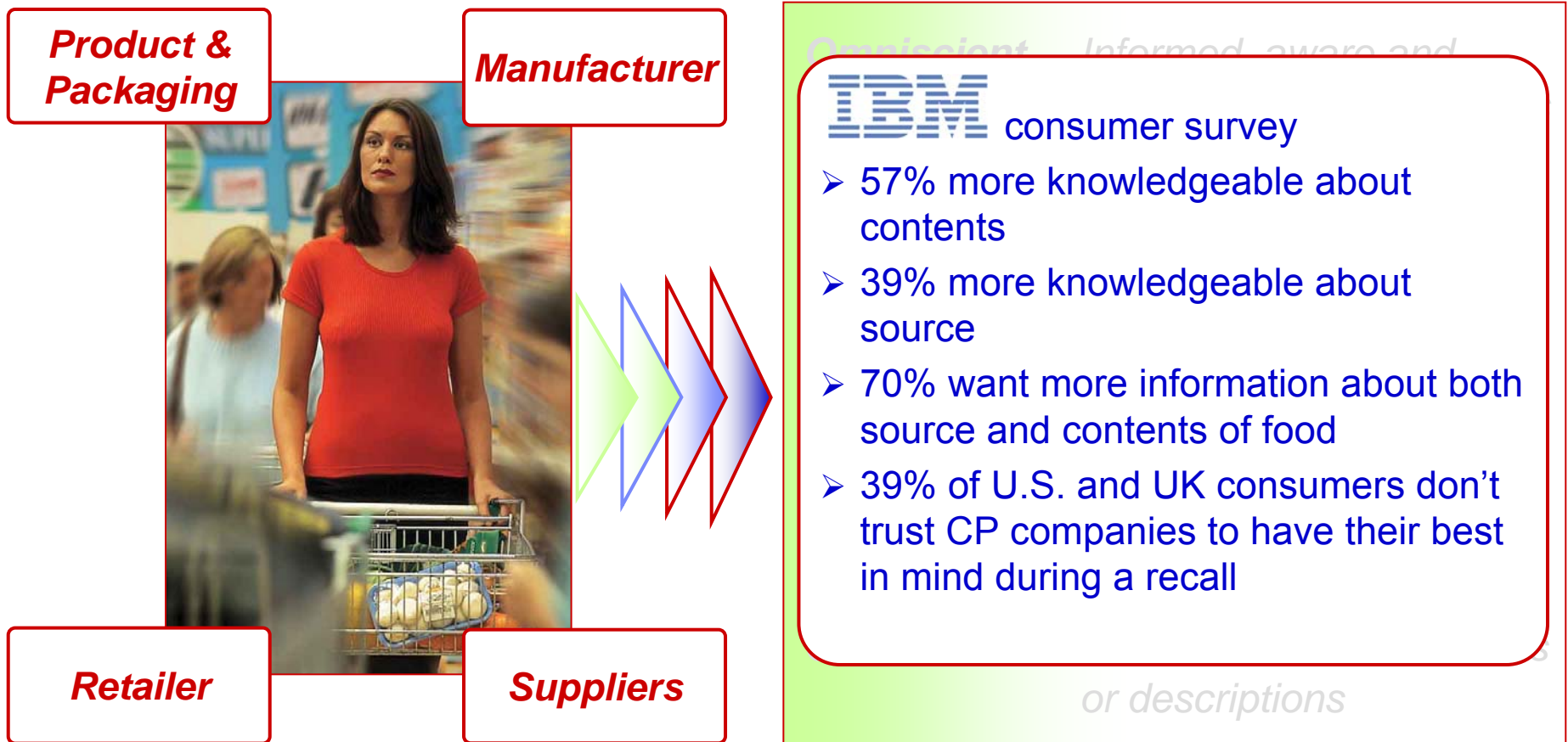
2008

2009

Source: IBM research, IBM survey of U.S. and UK consumers; Fortune, July 16, 2008; <http://www.environmental-expert.com/resultEachPressRelease.aspx?cid=21001&codi=60507&lr=1>

Consumers Demands

The 'Omni Consumer' ... a.k.a. the 'Information Omnivore'



Sources: IBM Institute for Business Value analysis

What is Traceability?

The ability to obtain and verify the location, status and history of an item.



Pharmaceuticals: Can I be sure my prescription drugs are not counterfeit?



Parts: Which parts and subassemblies were assembled to which VIN?



Food: Where does my food come from and is it safe to consume?



Returnable Containers: Do my suppliers have enough containers to meet my production needs?

InfoSphere Traceability Server is enabling customers in multiple industries to answer these questions today.

Global Traceability Leaders

Pharmaceutical



Retail



Consumer Products



Automobile/Heavy Industrial



Consumer Electronics



Serialization

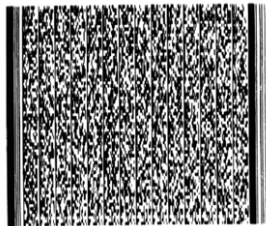
Traceability requires serialization



RFID



1D
Barcode



2D
Barcode

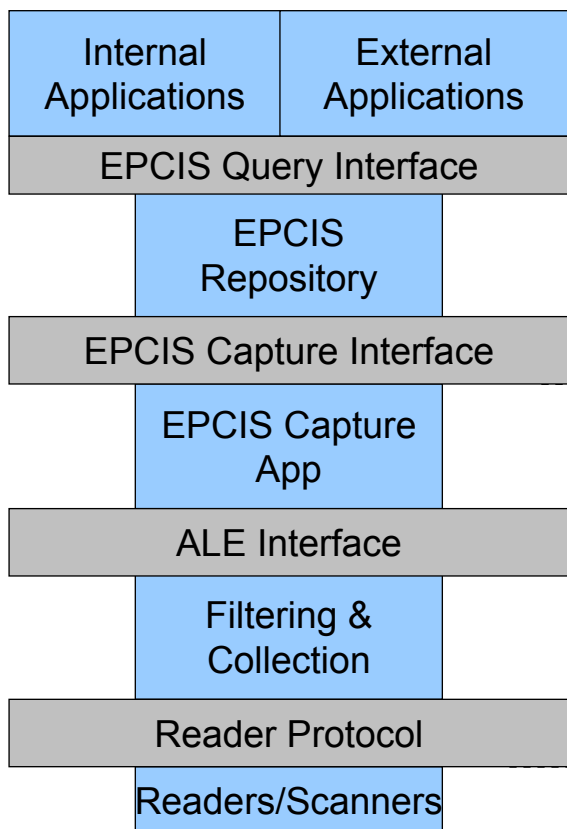
- A unique number placed on an item/case/pallet – names can be changed through the supply chain
- Serialization provides common “global identifier”
- Serialization can be applied via RFID, 1D, 2D Barcode, or human readable

Standards Based Solution Components

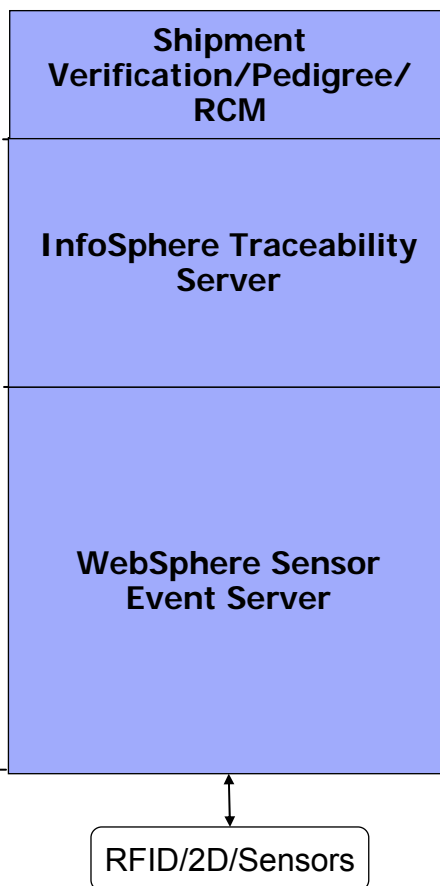
Robust interfaces and “plug & play” components

GS1

Standard Solution Architecture

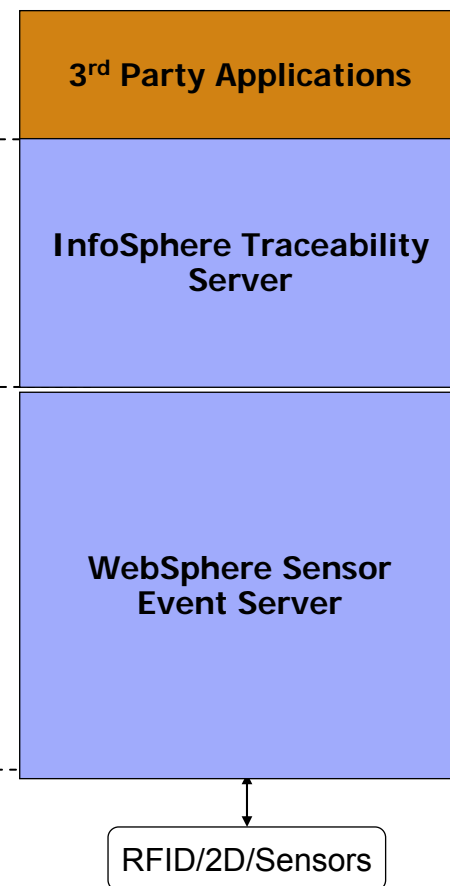


Solution Architecture



Hybrid

Solution Architecture



How standards based traceability works

Trusted Physical Data is Converted into Usable Information

Reporting & Analytics

- ✓ End-to-end Traceability
- ✓ Inventory Visibility
- ✓ Temperature Tracking

Business Benefits

- ✓ Targeted Recall
- ✓ Reduced Spoilage and Waste
- ✓ Increased Consumer Safety

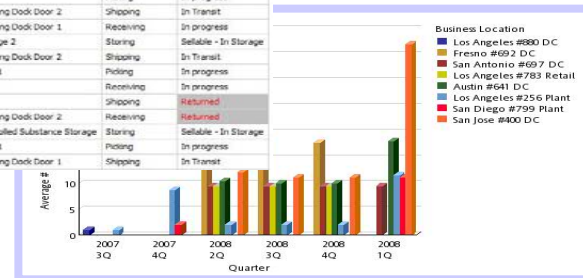
IBM InfoSphere Traceability Server

Item History - Manufacturer

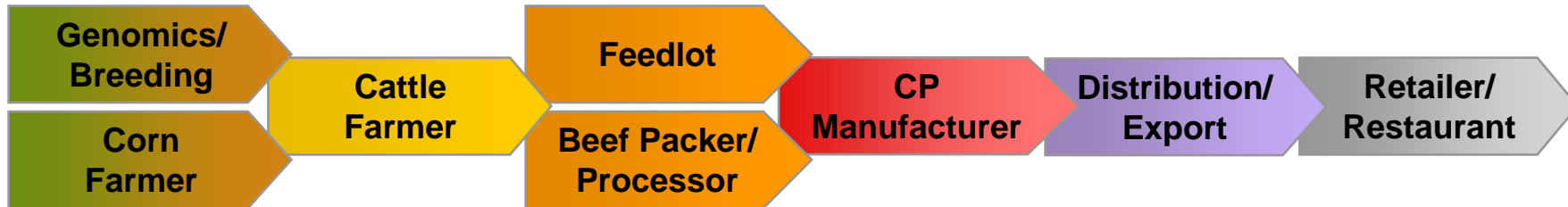
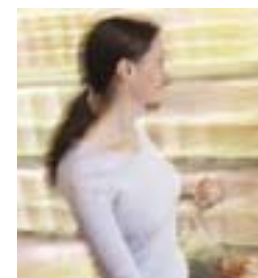
EPC Number: urn:epc:id:sgtin:101151.154145.1 Item Type: Unit

Product: Amilzak Batch: 20472 Lot: 0210 Expiration Date: Mar 7, 2011 1:46:49 PM

Event Time	Company	Relevant Location	Role/Product	Business Step	Disposition
Mar 13, 2008 7:03:37 PM	Manufacturer 1	San Diego #799 Plant	Commissioning 3	Commissioning	Active
Mar 16, 2008 1:32:25 PM	Manufacturer 1	San Diego #799 Plant	Storage 2	Storing	Sellable - In Storage
Mar 23, 2008 4:56:01 AM	Manufacturer 1	San Diego #799 Plant	Pack	Picking	In progress
Mar 24, 2008 1:32:25 PM	Manufacturer 1	San Diego #799 Plant	Shipping Dock Door 2	Shipping	In Transit
Mar 27, 2008 5:51:37 PM	Manufacturer 1	San Jose #400 DC	Shipping Dock Door 1	Receiving	In progress
Mar 28, 2008 1:32:25 PM	Manufacturer 1	San Jose #400 DC	Storage 2	Storing	Sellable - In Storage
Apr 7, 2008 4:10:49 PM	Manufacturer 1	San Jose #400 DC	Shipping Dock Door 2	Shipping	In Transit
Apr 8, 2008 7:18:01 PM	Manufacturer 1	San Jose #400 DC	Pack 1	Picking	In progress
Apr 12, 2008 6:20:25 AM	Distribution Center 1	Fresno #692 DC		Receiving	In progress
Apr 12, 2008 2:01:23 PM	Distribution Center 1	Fresno #692 DC		Shipping	Returned
Apr 15, 2008 12:06:11 PM	Manufacturer 1	Austin #641 DC	Shipping Dock Door 2	Receiving	Returned
Apr 18, 2008 6:49:23 PM	Manufacturer 1	Austin #641 DC	Controlled Substance Storage	Storing	Sellable - In Storage
Apr 25, 2008 1:32:47 PM	Manufacturer 1	Austin #641 DC	Pack 1	Picking	In progress
Apr 25, 2008 7:47:11 PM	Manufacturer 1	Austin #641 DC	Shipping Dock Door 1	Shipping	In Transit



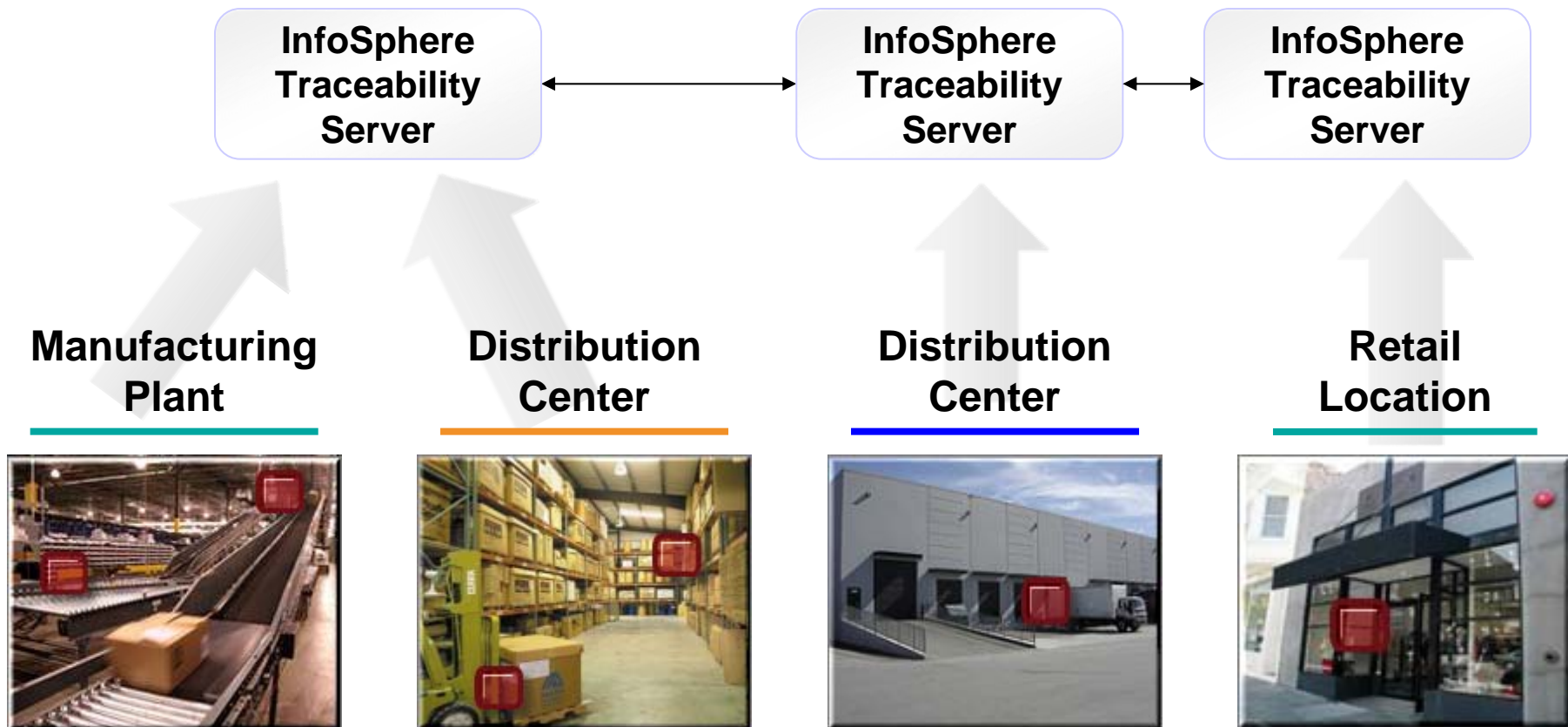
TRUSTED INFORMATION



Traceability Architecture

Events are captured at various points in the supply chain, stored in a secure traceability network and can be securely shared with trading partners

What, Where, When, Why, Who



Types of Data

WHAT

Manufacturing Data

- Lot/Batch
- Expiration

Environment Data

- Temperature

Transactional Data

- PO
- Invoice

WHERE

Location

- City/State
- Country/Region
- Store #
- Dock #
- Port #

**InfoSphere
Traceability
Server**

WHY

Business Process

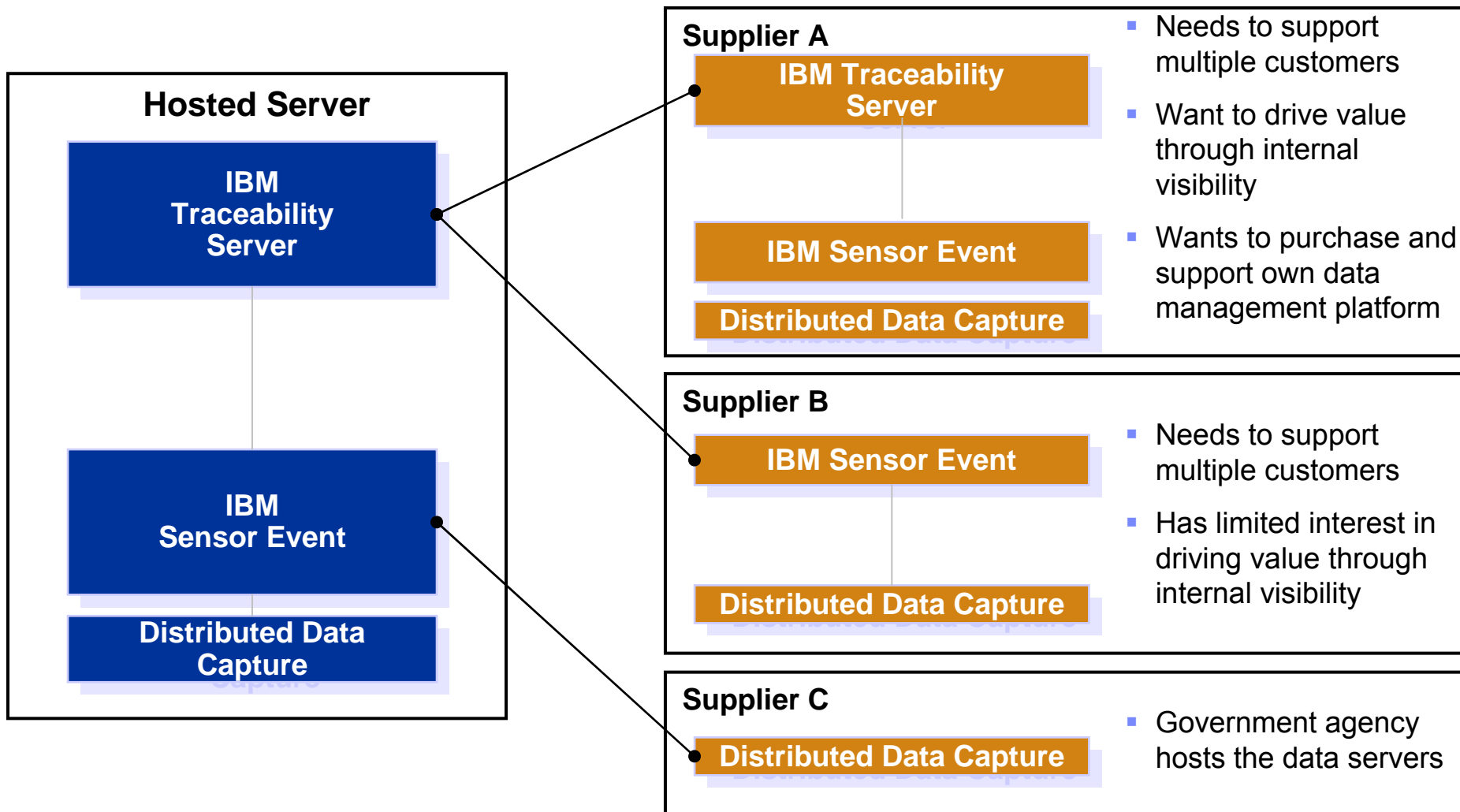
- Receipt
- Ship

WHEN

Timestamp

How is Data Captured?

From large to small enterprises



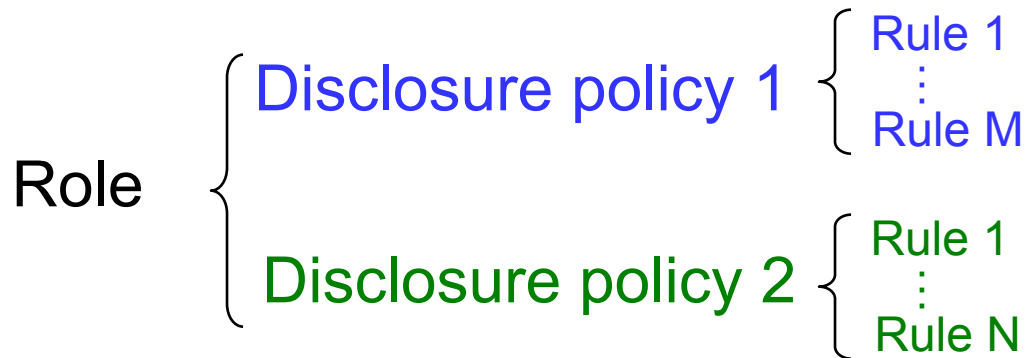
How Data is Shared?

Secure and granular access

<i>event_id</i>	<i>type</i>	<i>timestamp</i>	<i>action</i>	<i>readpoint</i>	<i>bizlocation</i>	<i>bizstep</i>	<i>disposition</i>	...

visible (blue box around type, timestamp, action)

suppressed (green box around readpoint, bizlocation, bizstep)

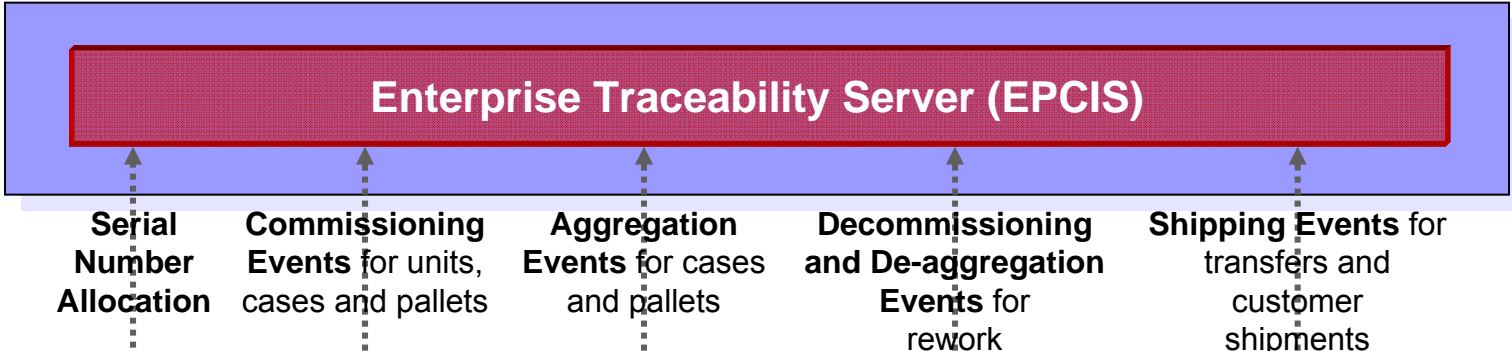


Platform for Applications

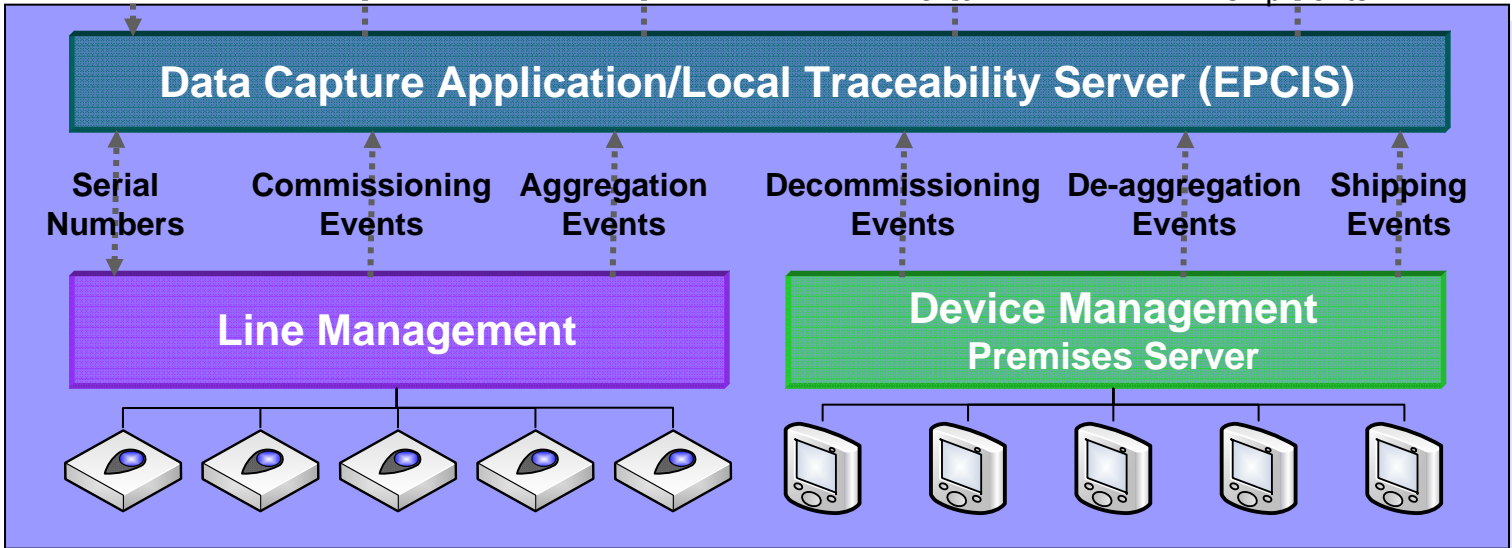
Applications



Data Center



Packaging Plant



Industry Aligned Applications

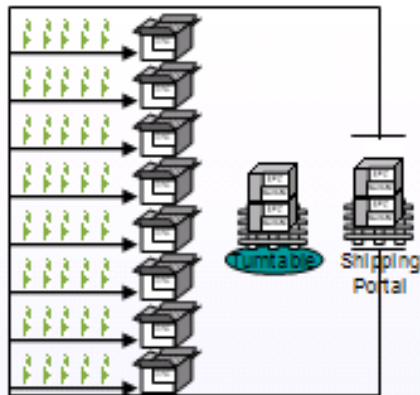
	Automotive/ Heavy Equip	Food/ Retail/ CPG	Consumer Electronics	Pharmaceutic al
Shipment Verification	X	X	X	X
Product Authentication	X	X	X	X
Inventory Visibility	X	X	X	X
Electronic Pedigree		X		X
Product Traceability	X		X	X
Container Management	X	X		X

High Performance – needed to support many apps

US Pharma Manufacturer

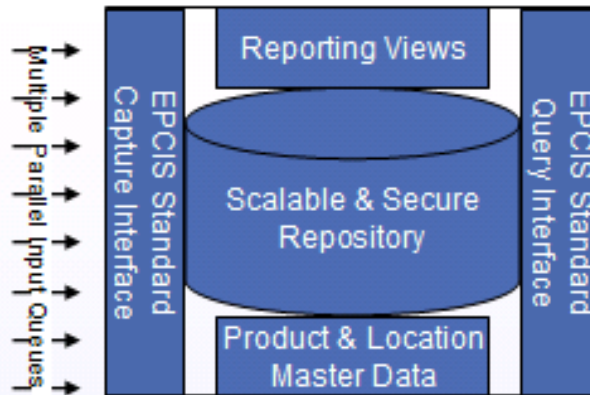
Data Capture

Packaging Plant



- 8 Packaging Lines @ Total Capture - **380 events (unit EPCs) per second**
- Unit to Case Aggregation – 144 units/case – **380 events/second**
- Case to Pallet Aggregation – 72 cases/pallet – **Maximum 6525 EPCs/second**
- Shipping Portal – Read all units – **Maximum 6525 EPCs/second**

InfoSphere Traceability Server

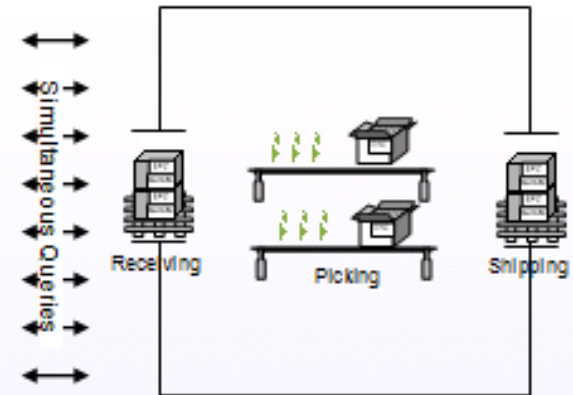


- **Preloaded Data – 510 million events (1 year of data)***
- Hardware –
 - IBM xSeries 366 4 CPU/8 core Xeon 3.66 GHz
 - 8 GB RAM
 - RAID array (DS4300 with EXP710) for disk (10,000 RPM)
 - DB on Linux RAID 5 over 100-baseT network

*3-4 days to upload

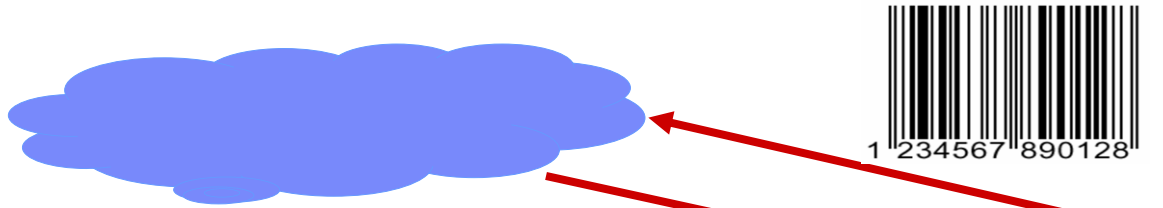
Queries & Reporting

Distribution Center



- Webservice Queries at Receiving, Picking, & Shipping – to emulate trading partner and WMS information requests
 - **Over 800 queries/minute**
 - **Avg return 0.25 seconds**
 - **Max return 0.90 seconds**
- Simultaneous Reporting
 - **Return in less than 1 minute**

Small Businesses and Consumers will be Empowered



- 1) How do I know if this product is on the recall list?
- 2) Has this product been mislabeled and contains a ingredient I am allergic to?
- 3) How can I trust that this food in fact 'organic'?
- 4) How can I remember to eat this product before it expires?
- 5) Where was this product manufactured and distributed?
- 6) How do I know if this product genuine or counterfeit?



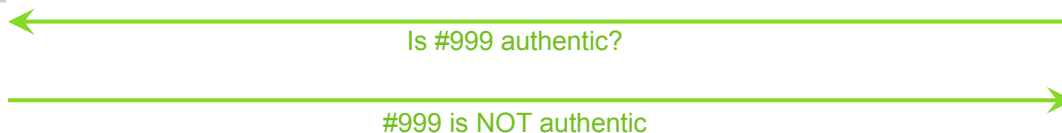
Use Case: Product Authentication



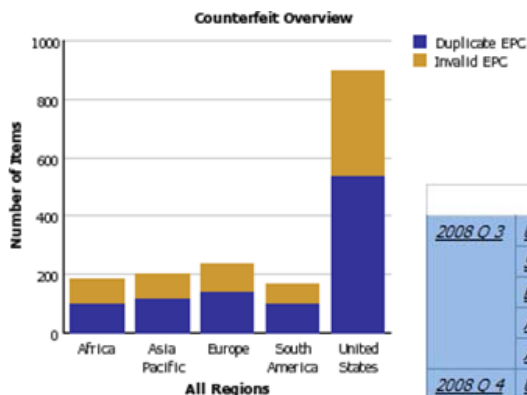
Manufacturer

Wholesaler

Pharmacy

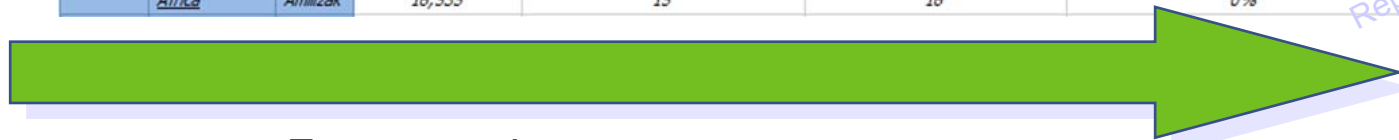


Top 10 Locations with Counterfeit Product	
Location	Count
USA: Wholesaler 2: San Francisco #433 DC	160
USA: Retailer 5 Houston #192 DC	51
Africa: Retailer 11: Tripoli #222 DC	31
APAC: Wholesaler 4: Seoul #255 DC	29
LA: Wholesaler 7: Sao Paulo #297 DC	29
APAC: Retailer 7: Antalya #712 DC	28
USA: Retailer 5 San Francisco #382 DC	28
USA: Retailer 6 Atlanta #212 DC	27
EU: Retailer 8: London #291 DC	27
USA: Retailer 5 Raleigh #162 DC	26



			Number Received	Number of Duplicate EPCs Seen	Number of Invalid EPCs Seen	% of Invalid EPCs to the Total Received
2008 Q 3	United States	Amilzak	136,466	28	44	0%
	South America	Amilzak	6,777	8	10	0%
	Europe	Amilzak	35,853	18	16	0%
	Asia Pacific	Amilzak	15,025	6	2	0%
	Africa	Amilzak	11,518	8	9	0%
2008 Q 4	United States	Amilzak	93,592	50	62	0%
	South America	Amilzak	7,834	6	7	0%
	Europe	Amilzak	33,307	10	8	0%
	Asia Pacific	Amilzak	16,250	14	16	0%
	Africa	Amilzak	16,535	15	16	0%

Sample Reports



Ensure product accuracy

Apple iPod Counterfeit Case

The imitation players, which often sport non-standard headphone jacks and lack a dock connector, are sometimes stamped with a valid Apple serial number.

- Apple Memo to Service Partners



Use Case: Targeted Recall

Where was this recalled item last seen?
 Who is the contact person for that location?
 Number returned?
 Number not returned?
 Percentage of not returned?



				Number Shipped	Number Returned	Number Unaccounted For	% of Number Unaccounted For to Total Shipped
2008	USA: Pharma Manufacturer	Amilzak	7982	202,249	0	202,249	100%
	USA: Retailer 1	Amilzak	7982	594	12	582	98%
	USA: Retailer 2	Amilzak	7982	656	11	645	98%
	USA: Retailer 3	Amilzak	7982	720	14	706	98%
	USA: Retailer 4	Amilzak	7982	1,221	11	1,210	99%
	USA: Retailer 5	Amilzak	7982	5,219	134	5,085	97%
	USA: Retailer 6	Amilzak	7982	4,774	134	4,640	97%
	USA: Wholesaler 1	Amilzak	7982	6,010	418	5,592	93%
	USA: Wholesaler 2	Amilzak	7982	12,741	969	11,772	92%
		Amilzak	7982	14,666	1,215	13,451	92%
		Amilzak	7982	10,914	0	10,914	100%
		Amilzak	7982	1,363	52	1,311	96%
		Amilzak	7982	1,260	34		97%
		Amilzak	7982	1,406	51		96%
		Amilzak	7982	1,010	30		97%
		Amilzak	7982	6,795	301		96%
		Amilzak	7982	5,360	262		95%
				4,919	640		87%
				9,182	1,099		88%
				9,059	1,469		84%

Sample Reports

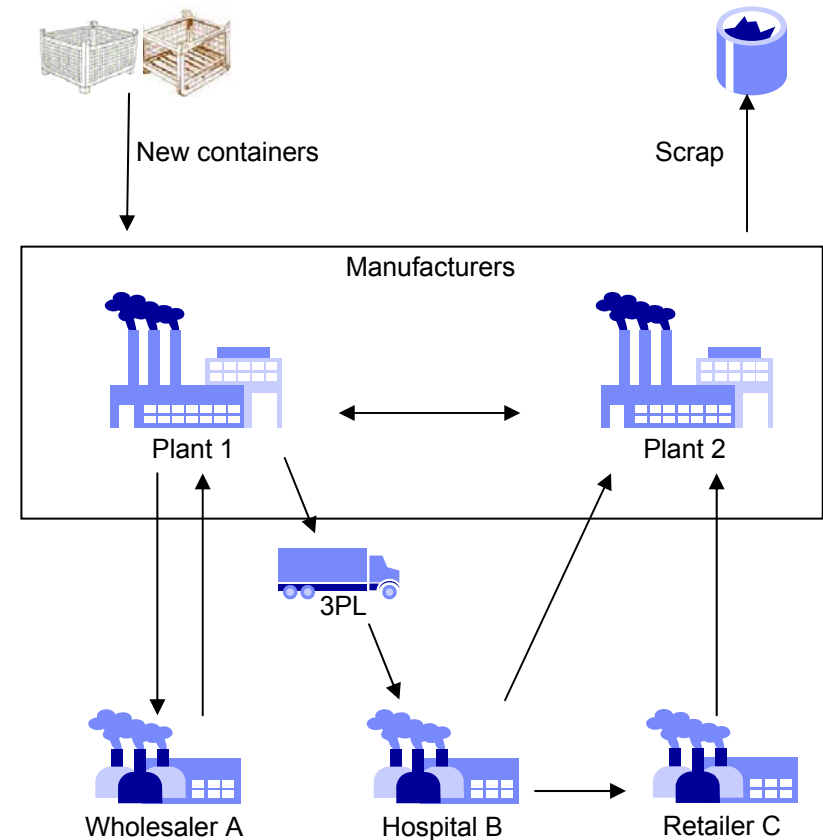


Ensure targeted recall completeness

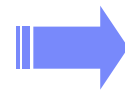
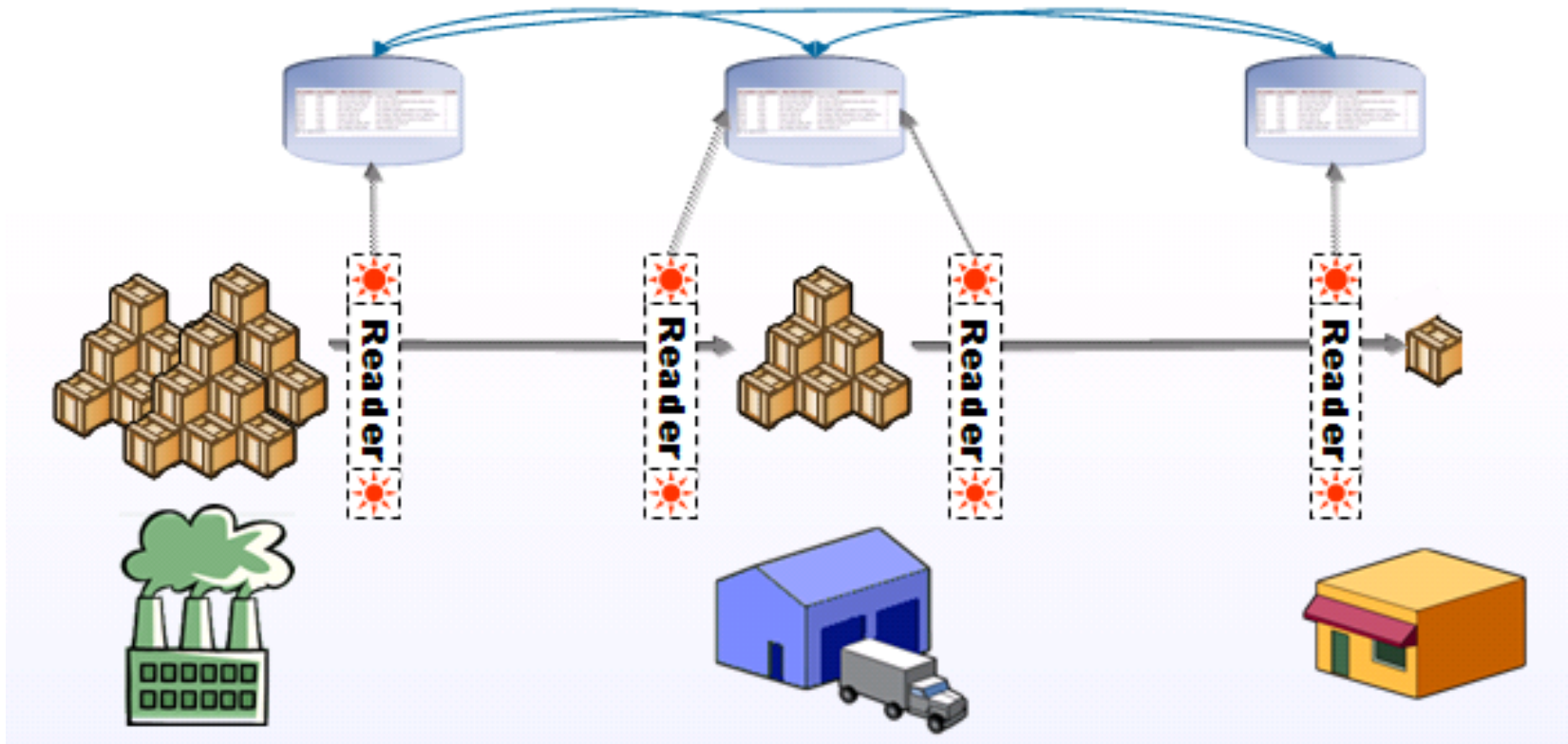
Use Case: Reusable Container Management

- **Reusable containers** represent an efficient way to manage costly **temperature sensors/RFID**
- Continuous monitoring **of containers is required**
- Globalization demands **additional container capacity**
- **Replacement costs** are very high

Schematic Flow of Containers



Use Case: Inventory/Supply Chain Visibility



- *Inventory at the supplychain level*
- *Expiration management*
- *Recalls*

Appendix – Food References

Nortura/Matiq

Consumer Products: Largest food producer in Norway



Business Challenges:

- Ensure meat products kept in optimal condition from farm through supply chain to retail store
- Fulfill existing plan to set up hosted service and find customers outside Nortura (parent company)

IBM Solution:

- RFID solution complying with EPCglobal's EPCIS standard and allowing sharing across enterprises
- InfoSphere Traceability Server software
- SWG Lab & GTS technical infrastructure services



Business Benefits:

- Key market player with first food tracking solution of its kind in Nordics
- Enables engagement of new food manufacturing customers to help them ensure product safety

Premium Liquor Producer

Consumer Products: Brand protection / anti-counterfeiting

Business Challenges:

- Products are prime targets for counterfeiters
- Counterfeit bottles are impacting brand image
- Supply chain visibility is missing on sub-tiers

IBM Solution:

- Secure, innovative solution with ability to provide end-to-end process traceability including product pedigree and authentication
- WebSphere Premises Server, InfoSphere Traceability Server and Lotus Mobile Connect

Business Benefits:

- Unique product identification defined for a market, leading to improved accuracy
- Real-time information to determine authenticity
- Improved efficiency in grey market location identification and supply chain management
- Ability to realize broad vision of enabling worldwide counterfeit tracking



Bama / Telenor

Consumer Products: Perishable goods tracking



Business Challenges:

- Product waste caused by temperature-related problems along value chain during transport and distribution

Design win – internal only;
not external customer reference

IBM Solution:

- RFID solution to tag cases and tracks, and follow location of its food products
- IBM WebSphere Premises Server and InfoSphere Traceability Server software platform hosted by Telenor; Trace Tracker application



Business Benefits:

- Target to reduce product waste by 10% per year
- Enhance supply chain efficiency and discipline
- Improve supply chain traceability by enhancing documentation (product movement / handling / storage temperatures, and corrective actions)

Metro

METRO Group*The Spirit of Commerce*

Retail: Supply chain visibility/Freshness management

Business Challenges:

- Automating supply chain data exchange with consumer product / distribution companies
- Responsiveness to changes in consumer demand in stores for meat products
- Open SW middleware infrastructure

IBM Solution:

- RFID solution for tracking of pallet shipments & monitoring processes throughout supply chain
- Extensive application & technology services
- IBM software platform including WebSphere Premises Server and InfoSphere Traceability Server



Business Benefits:

- Increased sales with better stocked store shelves
- Improved inventory monitoring and inventory decision making with more accurate data
- Operational cost savings and increased profits through increased process automation