Can-Trace
Technology Guidelines

Agriculture and Agri-Food Canada
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Can-Trace Technology Guidelines

A Review of Enabling Technologies for Product Markings and Document Exchange
Based on Can-Trace's Canadian Food Traceability Data Standard Version 2.0

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1. Introduction

1.1 Purpose and Rationale

The purpose of this report is to:

- Identify the ways in which physical markings and paper-based or electronic documents capture and communicate the data elements specified in Can-Trace's **Canadian Food Traceability Data Standard Version 2.0 (CFTDS v 2.0)**

- Discuss characteristics and benefits of different applicable technologies.

This report was developed by the Can-Trace Working Group, which includes manufacturers, retailers and distributors from across the food industry, as well as technology consulting organizations and solution providers.

The report does not attempt to provide organizations with definitive advice on which approach or technology is best for a given situation, as such solutions depend on a number of factors. For guidance, consider engaging a professional service provider with appropriate expertise.

e-Commerce has brought revolutionary changes to the way business is conducted and has impacted every traditional business process, affecting both large and small companies. Business areas that have changed due to the adoption of e-commerce processes include, but are not limited to: business-to-business (B2B) communication, data synchronization and product identifiers, including RFID, Universal Product Codes (U.P.Cs) and Global Trade Item Numbers (GTINs). Industry experts argue that implementation of these technologies is essential for long-term competitiveness.

Most major Canadian retailers require that their trading partners utilize one or more of these product identification technologies, which enhance product traceability. Although these technologies involve a cost, they also greatly improve business efficiency and competitiveness, typically with a return on investment (ROI) realized within the first 12 to 18 months of implementation. To review the business benefits of product traceability, review the Can-Trace Business Case Report and Decision Support System for Food Traceability at www.can-trace.org/reports.

1.2 Key Assumptions and Methodology

The Technology Working Group began with the assumption that the data elements outlined in CFTDS v 1.0 would be applied primary producers, processors, retailers, distributors and others to improve the traceability of specific products throughout Canada's food supply chain. The group also examined the various methods of documenting product data to enable product tracking and tracing throughout the food supply chain.

Based on this examination, the Working Group developed a simple matrix, shown in Tables 1.5.1 and 1.5.2, that specifies exactly where the mandatory Can-Trace data elements should be listed. In the **Canadian Food Traceability Data Standard Version 2.0**, the technology guidelines have been updated to reflect the changes that have been made to the traceability standard since the publication of CFTDS v 1.0. The latest version of this Can-Trace standard requires participants in the food supply chain to collect, maintain and share a minimum number of data elements to enable whole-chain traceability based on a one-up/one-down model.

A one-up/one-down model of traceability involves an organization's ability to track and trace a particular product as it moves internally or externally from the company's supplier, through its own operations, and to the next partner in the value chain.

This report will show that product data must be synchronized between trading partners through the use of supportive technologies, physical markings and document exchange.

Finally, Can-Trace gratefully acknowledges the assistance of the Technology Working Group and Answers 4 Business in the development of this report.

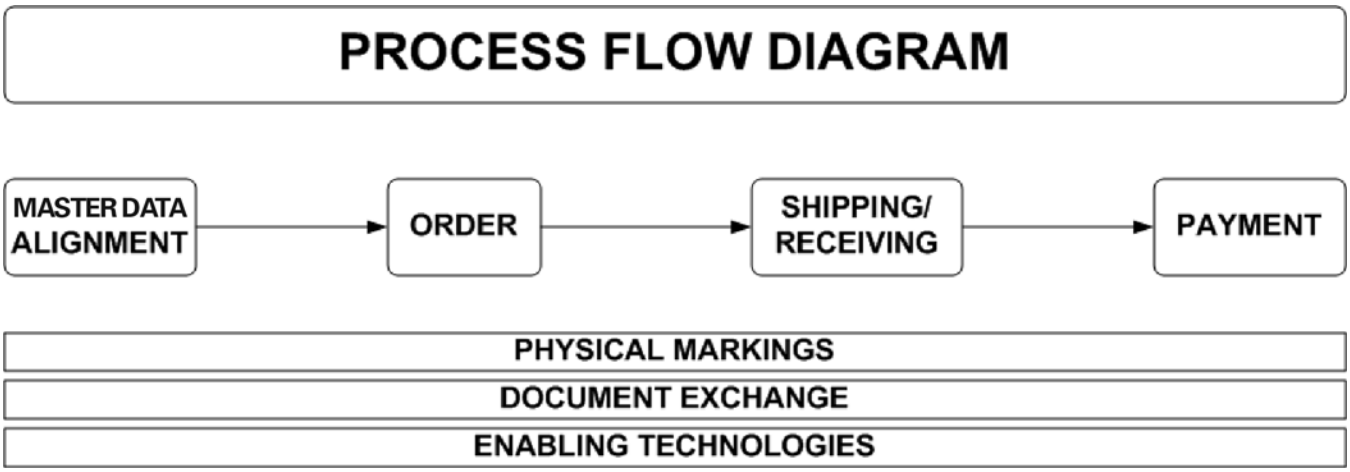
1.3 Supply Chain Process Flow Overview

The movement of a product through a supply chain requires a series of consecutive activities involving information exchange, all of which are necessary to deliver a product from sender to receiver. The Supply Chain Process Flow Diagram, below, illustrates the following activities, in sequence:

- Master Data Alignment
- Ordering
- Shipping/Receiving (Transportation)
- Payment

Supporting each of these activities are physical markings, such as labels and RFID tags, on cases and pallets. In addition, documents such as purchase orders and Advance Ship Notices (ASN), govern the transactions between trading partners in the supply chain. Mandatory Can-Trace data elements are contained on both the physical markings and the documents. Also, a range of supporting technologies, with innovation levels that range from low to high, may be used to conduct transactions that enable the flow of goods.

Figure 1.3 – Process Flow Diagram



1.4 Overview of Enabling Technologies for Physical Markings & Document Exchange

This section will provide a high-level overview of the different enabling technologies that currently accommodate the Can-Trace data elements. These enabling technologies are discussed in greater detail in Section 2.

Table 1.4, Enabling Technologies for Physical Markings and Document Exchange, provides a snapshot of the technology alternatives that exist for each Can-Trace data element. The first column lists the Mandatory and Optional data elements, as outlined in the **Canadian Food Traceability Data Standard Version 2.0**. Enabling technologies that support product flows within the food supply chain are listed across the top. A checkmark indicates that a technology accommodates a particular data element.

Please note that the information on RFID is based on EPCglobal and GS1 global standards.

Table 1.4 – Enabling Technologies for Physical Markings and Document Exchange

Can-Trace Data Elements	Enabling Technologies					
	Fax	Email	Bar Codes	RFID	EDI	XML
Mandatory Data Elements						
Lot Number	✔	✔	✔	✔	✔	✔
Product Desc.	✔	✔			✔	✔
Product Identifier	✔	✔	✔	✔	✔	✔
Quantity	✔	✔			✔	✔
Receipt Date	✔	✔			✔	✔
Receiver Identifier	✔	✔			✔	✔
Sender Identifier	✔	✔	✔	✔	✔	✔
Ship Date	✔	✔	✔	✔	✔	✔
Ship from Location Identifier	✔	✔	✔	✔	✔	✔
Ship to Location Identifier	✔	✔	✔	✔	✔	✔
Shipment Identifier	✔	✔	✔	✔	✔	✔
Unit of Measure	✔	✔			✔	✔
Optional Data Elements						
Animal Age	✔	✔		✔		✔
Best Before Date	✔	✔	✔	✔	✔	✔
Contact information	✔	✔			✔	✔
Country of Origin	✔	✔	✔	✔	✔	✔
Date of Pack/Catch/Retirement	✔	✔	✔	✔	✔	✔
Logistic Provider Identifier	✔	✔			✔	✔
Receiver Name	✔	✔			✔	✔
Sender Name	✔	✔		✔	✔	✔
Shipping Container Serial Number	✔	✔	✔	✔	✔	✔
Supplier License Number (seafood)	✔	✔	✔	✔		✔
Vehicle Identifier	✔	✔	✔			✔

1.5 Explanation of Recommendations

Having provided a quick look at what various technologies can accommodate in terms of the Can-Trace data elements, the tables below indicate whether a data element should appear as a physical marking on the product and/or whether it should be contained in the supporting documentation that is exchanged between trading partners.

1.5.1 Recommendations Regarding Physical Markings

Table 1.5.1 describes the format for physical markings and indicates which data elements are mandatory for a particular trading unit, such as cases, bins, totes and pallets. This chart shows which trading partner within a supply chain has the responsibility to ensure that the mandatory data is provided on the trade unit. Mandatory and Optional data refer to the data elements outlined in the **Canadian Food Traceability Data Standard Version 2.0**.

To establish technical consistency, Can-Trace established minimum mandatory physical markings for trade units. The minimum criteria include: Lot Number, Product Description, Product Identifier and Sender Identifier.

To accommodate smaller companies that do not have pallet-based systems that use unique serial numbers, the Serial Shipping Container Code (SSCC) number has been categorized as an Optional data element.

Please note that although the SSCC number is listed under Optional data elements, the Technology Working Group unanimously agreed that companies that do use product pallet-based systems should to indicate both the Sender Identifier and Serial Shipping Container Code number on the pallet, as these data elements comply with the GS1 SSCC standard format. Companies that operate with pallets as a trade unit, such as floor-ready displays and endcap pallets, should adhere to these guidelines for physical markings.

Also, due to varying capabilities of primary producers in different sectors, the application of physical markings at the primary producer level is optional.

Table 1.5.1: Physical Markings								
Mandatory Data	**Trade Unit (Case, Bin, Tote, etc)**				**Pallet**			
	Store/ Operator Level	**Wholesaler Distributor Retailer**	**Processor/ Packer**	**Primary Producer**	**Store/ Operator Level**	**Wholesaler Distributor Retailer**	**Processor/ Packer**	**Primary Producer**
Lot Number	Y	Y	Y					
Product Desc.	Y	Y	Y					
Product Identifier	Y	Y	Y					
Quantity								
Receipt Date								
Receiver Identifier								
Sender Identifier	Y	Y	Y			Y	Y	
Ship Date								
Ship from Location Identifier								
Ship to Location Identifier	Y	Y	Y	Y	Y	Y	Y	Y
Shipment Identifier								
Unit of Measure								
Optional Data								
Animal Age								
Best Before Date								
Contact Information								
Country of Origin	Y	Y	Y	Y	Y	Y	Y	Y
Date of Pack/Catch/Retirement		Y	Y	Y		Y	Y	Y
Logistic Provider Identifier								
Receiver Name								
Sender Name	Y	Y	Y	Y	Y	Y	Y	Y
Shipping Container Serial Number	Y	Y	Y	Y	Y	Y	Y	Y
Supplier License Number (seafood)								
Vehicle Identifier								
Enabling Technologies	RFID, Bar Code, Human Readable							

Companies that trade variable weight products should include the Quantity and Unit of Measure among an item's physical markings.

1.5.2 Recommendations Regarding Supporting Documents

In Table 1.5.2, the first column lists the Mandatory and Optional data elements that are used in different forms of supporting documents. The remaining columns outline various types of supporting documentation, in either a physical or electronic format, which companies use to share product with their trading partners participants in a supply chain.

For example, an Advanced Shipping Notice (ASN) document that carries almost all of the mandatory data elements that are recommended in **Can-Trace's Canadian Food Traceability Data Standard Version 2.0**.

Conversely, the Item Set-Up transaction requires only four mandatory data elements: Product Description, Product Identifier, Receiver Identifier and Sender Identifier.

Regardless of the type of supporting documents, complying with the mandatory data elements recommended by the new Can-Trace standard facilitates the accurate exchange of product information and improves traceability efforts in Canada's food supply chain.

Table 1.5.2: Document Exchange

Mandatory Data	Item set-up	Order	Shipping/ Transportation Document (Paper and Electronic) (BOL/ASN)	Receipt Confirmation/ Exceptions	Payment
Lot Number			Y	Y	
Product Desc.	Y	Y	Y	Y	Y
Product Identifier	Y	Y	Y	Y	Y
Quantity		Y	Y	Y	Y
Receipt Date				Y	Y
Receiver Identifier	Y	Y	Y	Y	Y
Ship Date		Y	Y		
Ship from Location Identifier			Y		
Ship to Location Identifier		Y	Y		Y
Sender Identifier	Y	Y	Y	Y	Y
Shipment Identifier			Y	Y	Y
Unit of Measure		Y	Y	Y	Y
Optional Data					
Animal Age			Y		
Best Before Date			Y		
Contact Information		Y			Y
Country of Origin	Y		Y		
Date of Pack/Catch/Retirement			Y		
Logistic Provider Identifier			Y		
Receiver Name		Y	Y		Y
Sender Name	Y	Y	Y	Y	Y
Shipping Container Serial Number			Y	Y	Y
Supplier License Number (seafood)	Y	Y	Y		Y
Vehicle Identifier			Y		
Enabling Technologies	EDI, XML, Fax, Email, Mail, Phone				

2. Enabling Technologies

2.1 Physical Identification/Markings

Physical identification on products and product packaging is vital for identifying, communicating and collecting traceability information. Physical identification systems include bar codes, human readable formats and Radio Frequency Identification (RFID), which are described below.

Bar Codes

A bar code is a machine-readable symbol of product data created in a visual format of precisely arranged parallel lines – or bars – and spaces that vary in width. Optical scanners called bar code readers can read the product data encoded within a bar code. Bar codes are widely used in industry because this automated product identification system improves the speed and accuracy of computer data entry. Bar codes identify retail sales items, as well as bins, cartons, pallets. In addition, bar codes are utilized to manage work in progress, track documents and scan identification cards. Global standards for bar codes are developed by GS1 and its Member Organizations, including GS1 Canada. However, a number of companies also develop their own proprietary bar code systems.

Human-Readable

The most common product identification formats that humans are able to read include paper-based labels, tags and writing on packaging. Human-readable formats are advantageous, as they are immediately discernible by individuals and do not require automation to identify a product as it moves through a supply chain. However, human-readable product information requires translation into multiple languages to increase the effectiveness of identifying a product that is traded around the world. Also, most electronic data collection devices are incapable of reading human-readable formats. Therefore, to maximize the effectiveness of product marking systems, companies frequently select human-readable and either bar code or RFID systems.

Radio Frequency Identification (RFID)

Radio Frequency Identification is an automatic identification method that relies on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be attached to or incorporated into a product, animal, or person for the purpose of identification using radio waves. An RFID tag stores data on an item's attributes and tracks the item's movement. Both the International Standards Organization (ISO) and EPCglobal have proposed different sets of comprehensive standards for RFID tags; efforts are underway to gain consensus on a single standard.

2.2 Document Exchange

Document Exchange, or the communication of traceability data between trading partners, is fundamental to a successful one-up/one-down traceability model. Below is a list of several methods used to accomplish the exchange of traceability data on documents in physical or electronic format, along with a brief explanation.

EDI: Electronic Data Interchange (EDI) is the computer-to-computer exchange of business data in standard formats. In EDI, information is organized according to a specified format set by both parties, allowing a "hands-off" computer transaction that requires no human intervention or re-keying on either end. All information contained in an EDI transaction set is, for the most part, the same as on a conventionally printed document. EDI standards are set by a number of standards bodies and adopted by industries. GS1 and its Member Organizations, including GS1 Canada, administer global standards for EDI to ensure consistency among trading partners around the world.

XML: Extensible Markup Language (XML) is a specification for how to describe data, which was developed by the World Wide Web Consortium (W3C). W3C is an international consortium where member organizations, a full-time staff and the public work together to develop standards for the World Wide Web. It allows designers to create their own customized communications, enabling the definition, transmission, validation, and interpretation of data between applications and between organizations.

Facsimile (FAX): A telecopying device that electronically transmits written or graphic material over telephone lines to produce "hard copy" at a remote location. In recent years the ability to send fax documents from electronic data sources has improved the efficiency of this data carrier. Fax is still a pervasive technology used for the exchange of traceability data, particularly with small and mid-sized firms that may not have the resources for XML or EDI data exchange.

E-mail: Messages can be entered from the keyboard or electronic files stored on disk. Most mainframes, minicomputers, and computer networks have an e-mail system. Some electronic-mail systems are confined to a single computer system or network, but others have gateways to other computer systems, enabling users to send electronic mail anywhere in the world. Companies that are fully computerized make extensive use of e-mail for exchange of traceability data because it is fast, flexible, and reliable.

Mail (and Courier) – Surface mail is generally used as a backup for electronic forms of communications. The disadvantage of mail is that it is more costly per unit than many electronic forms of communication, and it relies upon a "hard copy" of the documents in question. However, the most common form of data exchange between supply chain partners, especially for small and mid-sized firms, continues to be simple paper-based forms and other human readable (such as pre-printed) documents. The disadvantage of this format is that data exchange is limited to the speed and accuracy of the original data input.

Phone – Telephones convert sound waves into electrical signals that can be transmitted over distances and then converts received signals back into sounds. As such their use for traceability data transmission is limited to circumstances where no physical document is required to execute a transaction.

2.3 Comparing Technologies

The two tables on the following pages provide an overview comparison of two types of technologies – one an established technology, the other an emerging technology -- for both Physical Markings and Document Exchange.

Table 2.3.1 presents a comparison of two Automatic Information Data Capture (AIDC) technologies that contain physical markings: bar codes and RFID.

Table 2.3.2 presents a comparison of two Data Transmission technologies that support document exchange: EDI and XML.

2.3.1 Comparison of Physical Marking Technologies

Table 2.3.1 – Automatic Information Data Capture Technology

Bar Codes vs. RFID		
	Bar Coding	**RFID**
Proven Technology	Yes	Yes
Investment already made by retailers	Yes	No
Investment already made by suppliers	Yes	Partially
Investment already made by distributors	Yes	Partially
Can store changes in data	No	Yes
Used on pallets	Yes	Yes
Used on cases	Yes	Yes
Used on items	Yes	Yes
Ease of scan	Yes	Yes
New hardware required	No	Yes
New software required	Yes	Yes
Allows more automation	Yes	Yes
Business Case for use	Yes	TBD
Performance	Read only when close to the reader in a specific orientation, only in open environments	Read/write is possible at reasonable distances and when tags are not visible
Efficiency	Ability to read one at a time – line of sight	Ability to read multiple tags simultaneously (no line of sight required)
Memory/Storage	Limited amount of data can be assigned to a bar code	Significantly higher data capacity to capture detailed information
Flexibility	Static information	Potential for dynamic read/write capability
Reliability	Read only under operator supervision and only in clean/controlled conditions	Tags can be read/written automatically; are less reliable in some environments

2.3.2 Comparison of Document Exchange Technologies

Table 2.3.2 - Data Transmission Technologies

EDI vs. XML		
	EDI	**XML**
Proven Technology	Yes	Yes
Investment already made by retailers	Yes	Partially
Investment already made by suppliers	Yes	Partially
Investment already made by distributors	Yes	Partially
Predominantly adopted	Yes	No
Proven in a wide variety of sectors & supply chain roles	Yes	No
Standardized Format	Yes	In progress
Secure Exchanges	Yes	Yes
New hardware required	No	No
New software required	Yes	Yes
Allows more automation	Yes	Yes
Business Case for use	Yes	Yes

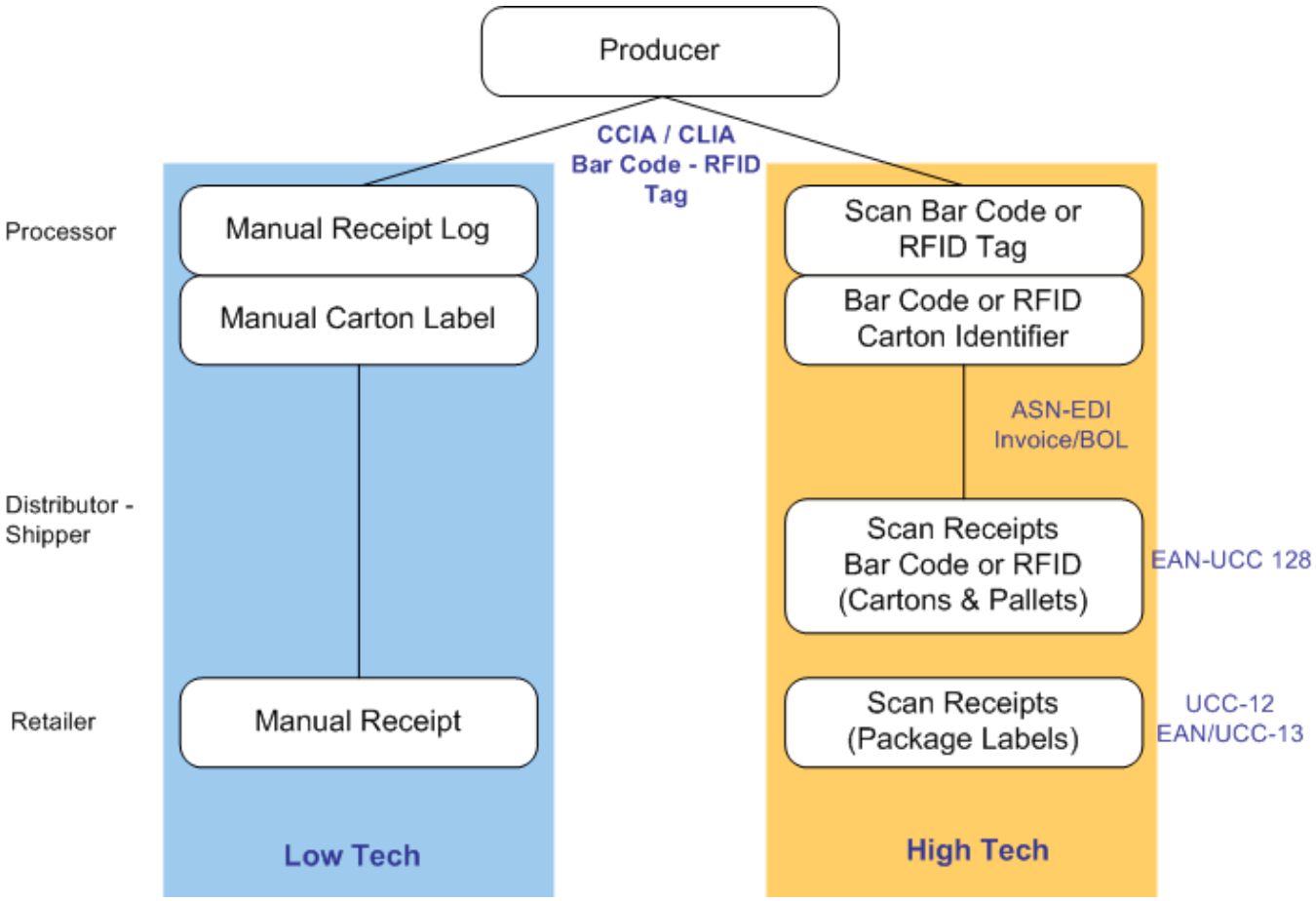
3. Examples & Implications of Current Technology Usage

3.1 Livestock Process Flow with Data

Figure 3.1 depicts two potential approaches for collecting and communicating the data elements outlined in the CFTDS v 2.0, using an example of a livestock processing company. The left side we identify how to achieve traceability using the CFTDS v 2.0 through manual receipt logging, perhaps in a logbook, and manually applying handwritten carton labels. A more technologically rich approach would involve having a producer's electronic tag scanned for receipt, labeled using a bar code or RFID and communicated to trading partners using EDI. Companies can achieve traceability using either approach or a mix of the two.

Organizations' adoption of automated reading and communication tools greatly enhance the efficiency and reliability of an end-to-end supply chain traceability system. Investing in supply chain technology benefits small and medium-sized businesses as much as their larger counterparts.

Figure 3.1 - Live Animal Traceability Data Flow Model

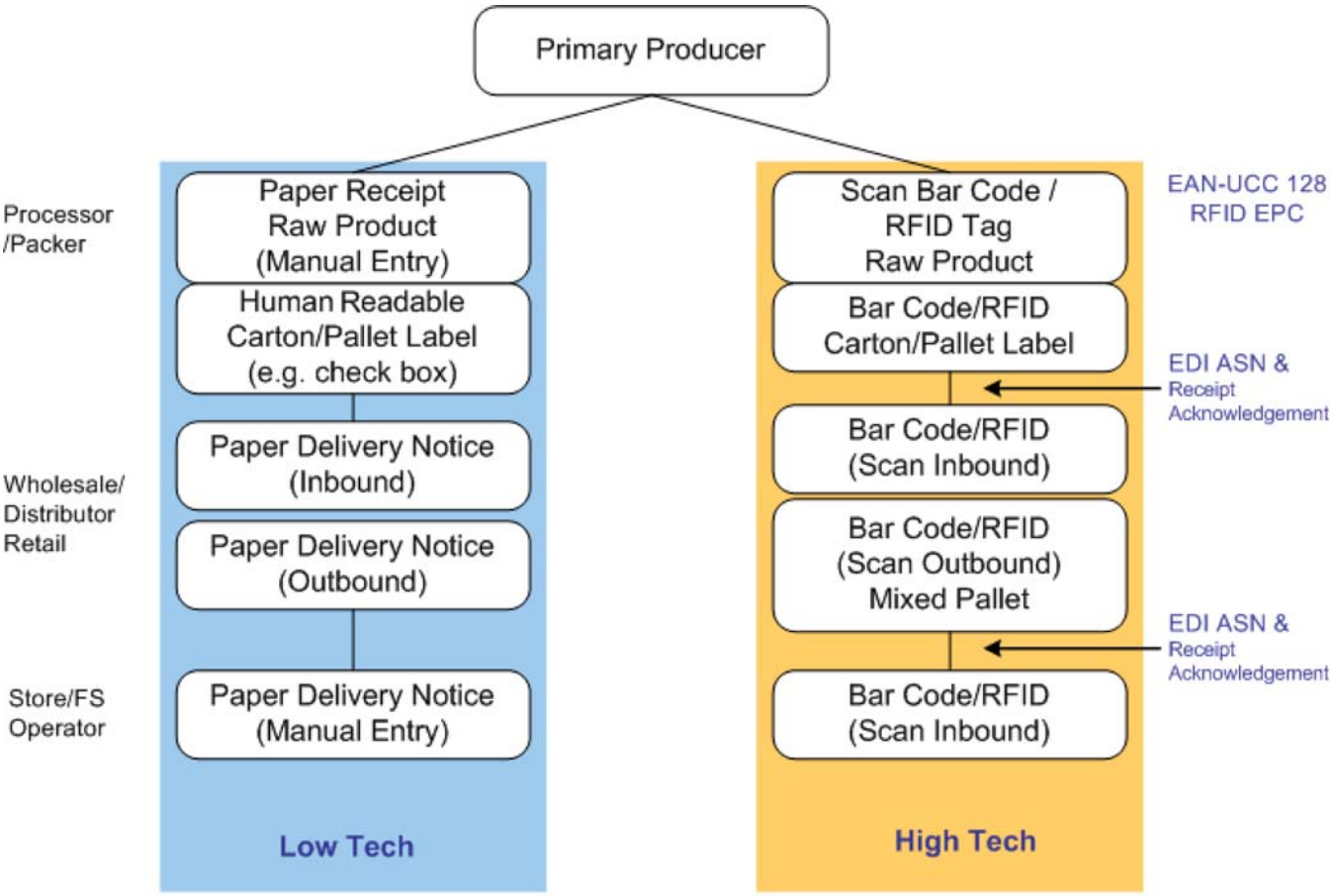


3.2 Produce Process Flow with Data

Figure 3.2 (below) depicts two potential approaches for collection and communication of the **Canadian Food Traceability Data Standard, version 2.0** data elements in a produce process example. Again, on the left side, we identify how traceability can be achieved using the CFTDS through manual receipt logging (perhaps in a log book) and manually applying carton labels (which may be handwritten). A more technologically rich approach would have the producer's electronic tag scanned for receipt, labeled using bar code or RFID, and communicated with EDI to trading partners. It should be noted that both approaches are feasible, as is a mix of these approaches, and traceability can be achieved either way.

The efficiency and reliability of any end-to-end supply chain traceability system will be enhanced greatly when supply chain enterprises use automated reading and communication methods. Small and medium sized businesses can benefit as much as larger companies from investments in technology.

Figure 3.2 – Produce Traceability Data Flow Model



4. Summary of Technology Options

Companies of any size can implement the **Can-Trace Food Traceability Data Standard Version 2.0**, whether their technological approach is limited or robust. Figure 4 (below) identifies the various technology levels achievable today on a continuum and highlights benefits of each level. The advantages of applying advanced technologies to whole chain traceability are evident from this illustration.

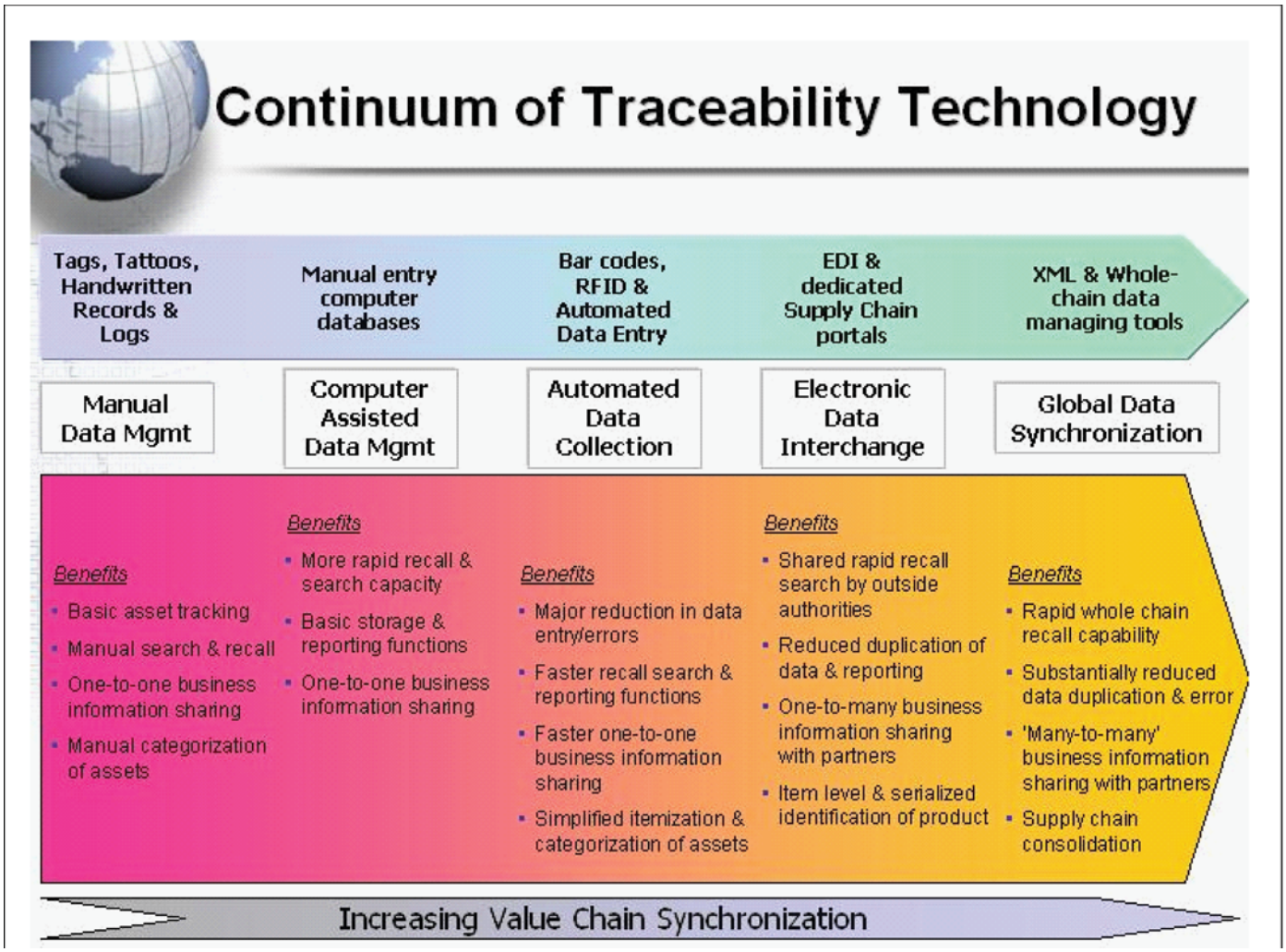


Figure 4 Schematic Representation of the Continuum of Traceability Technology

5. Summary and Conclusion

While the **Can-Trace Food Traceability Data Standard Version 2.0** specifies what types of data elements are require to comply with the standard's minimum amount of data elements, this Technology Guidelines report explains how trading partners should share that data in terms of a product's physical markings and supporting documents. This report intends to provide guidelines for organizations that plan to establish or enhance their own traceability systems by complying with CFTDS v 2.0.

This report must also emphasize the growing importance of electronic forms of transmitting, sharing and storing product traceability information. Although automation presents a challenge for small and medium enterprises (SMEs), business-to-business e-commerce technology represents the way of the future. The need for electronic communication technology is particularly strong among companies whose access to export markets is contingent upon their ability to convince regulators that they have timely and accurate product recall systems in place.

The remaining sections of this report provide resources for additional technical and industry information. Readers who require further guidance should consider engaging a professional service provider with appropriate expertise.

6. Glossary of Terms

Advance Shipment Notice (ASN): Also referred to as a Ship Notice/Manifest, the ASN is a communication (normally via electronic means) of the contents, ship date and time of an expected shipment. When received ahead of the incoming shipment, this communication helps with a number of supply chain planning and data communication tasks.

Bill of Lading (BOL): A document that establishes the terms of a contract between a shipper and a transportation company. It serves as a document of title, a contract of carriage and a receipt for goods.

Canadian Cattle Identification Agency (CCIA): The CCIA (led by a board of directors made up of representatives from all sectors if the cattle industry) is responsible for the Canadian Cattle Identification Program, which is an industry initiated and established trace back system designed for the containment and eradication of animal disease.

Canadian Livestock Identification Agency (CLIA): The CLIA is responsible for developing national standards and minimum criteria for multi-species identification and traceability.

Commercial Invoice: Represents a complete record of the transaction between exporter and importer with regard to the goods sold. Also reports the content of the shipment and serves as the basis for all other documents about the shipment.

Electronic Product Code (EPC): is an electronically coded 96-bit tag, which may contain a Global Trade Identification Number (GTIN). Unlike a UPC number, which only provides information specific to product, the EPC gives each product its own serialization number, giving greater accuracy in tracking. The EPC was the creation of the MIT AutoID Center, a consortium of over 120 global corporations and university labs. The EPC system is currently managed by EPCglobal Inc., a subsidiary of the Electronic Article Numbering International group (now known as GS1) and the Uniform Code Council (UCC) (now known as GS1 US), creators of the UPC bar code. The EPC is used utilizing radio frequency identification or RFID.

EAN.UCC: European Article Number/Uniform Code Council now known as **GS1**. Global standard numbering system to identify services and products.

EAN/UCC-8: Now referred to as a **GTIN-8**. The eight-digit EAN.UCC System data structure is assigned by the numbering association under special circumstances when the product has space constraints. The EAN/UCC-8 does not contain a company prefix but a country code, item reference and check digit.

EAN/UCC-13: Now referred to as a **GTIN-13**. The EAN/UCC-13 has been traditionally used outside of North America to mark consumer items. Effective January 1, 2005 all retailers were required to scan either a UCC-12 EAN/UCC-8 or an EAN/UCC-13.

EAN/UCC 128: Now referred to as a **GS1-128**. A bar code symbol used on either: (1) a case to encode the GTIN and related Application Identifiers or (2) a pallet to encode the SSCC and related Application Identifiers.

Electronic Data Interchange (EDI): A form of electronic commerce in which the computer-to-computer exchange of business data is in a standardized, structured format.

Global Trade Item Number (GTIN): A unique 14-digit numeric identifier of a trade item within the global EAN.UCC code of standards.

INV Number: Invoice Number.

Master Data Alignment: Involves the maintenance of accurate and synchronized databases for Master data. Master data is information that seldom changes and it applies to product, party and location information.

Packing Slip: Itemized list of commodities with marks/numbers but no cost values indicated.

Pallet: A platform with or without sides, on which a number of packages or pieces may be loaded to facilitate handling by a lift truck.

Purchase Order (**PO):** A form used to convey purchase terms, price and order quantities to vendors.

Product Tracking: is the capability to follow the path of a specified unit of a product through the supply chain as it moves between organizations. Products are tracked routinely for obsolescence, inventory management, and logistical purposes. In the context of this document, the focus is on tracking produce from the grower to retail point of sale.

Radio Frequency Identification (RFID): RFID tags are small integrated circuits connected to an antenna, which can respond to an interrogating RF signal with simple identifying information, or with more complex signals depending on the size of the integrated circuit. The tag is affixed to or incorporated into a product to track its movement and attributes of the product.

Shipping Advice: A notice sent to a local or foreign buyer advising that shipment has gone forward and containing details of packing, routing, etc. A copy of the invoice is often enclosed and, if desired, a copy of the bill of lading.

Shipping Container Code (SCC): The Shipping Container Symbol is the 14-digit number applied to intermediate packs and shipping containers containing UCC-12, EAN/UCC-13 or EAN/UCC-8marked items

Serial Shipping Container Code (SSCC): An 18-digit number that identifies the nature of the container, the company prefix identifying the owner and a serialized number. There is no relationship between the SSCC and the GTINs on the shipment. The relationship is between the SSCC and the ASN

Sender Identifier: Most commonly, a number assigned by GS1 member organizations (including GS1 Canada and GS1 US in North America), also known as the company prefix. This could also be another form of unique identification.

TI-HI Dimensions: The configuration of the number of cases in a pallet layer (Ti) and the number of layers on a pallet (Hi).

UCC-12: Now referred to as a **GTIN-12**. The UCC-12 bar code, formally known as a UPC bar code is a member of a family of bar code symbols known as EAN/UCC. The UCC-12 has two versions, the UCC-12 Version A (UPC A) and UCC-12 Version E (UPC E) symbols. Version E is the zero suppressed version.

UPC Number: (Universal Product Code) The standard bar code symbol for retail food packages in the USA and Canada.

7. Additional Resources

GS1 Canada http://www.gs1ca.org is a valuable resource and provides links to several websites related to Standards.

7.1 Document Exchange

7.1.1 EDI Standards

GS1 http://www.gs1.org
GS1 Canada http://www.gs1ca.org
American National Standards Institute http://www.ansi.org/
Accredited Standards Committee (ASC) X12 http://www.x12.org/
Canadian EDI Implementation Guidelines (Consult GS1 Canada)

7.1.2 XML Standards

GS1 (under GSMP) http://www.ean-ucc.org/global_smp/ean.ucc_standards.html
The Accredited Standards Committee (ASC) X12 http://www.x12.org/

7.2 Physical Markings

7.2.1 Bar Codes

GS1 Canada (under Standards) http://www.gs1ca.org
GS1 US (under EAN.UCC Standards) http://www.gs1us.org/gs1us.html
GS1 General Specifications (Consult your GS1 country member organization)

7.2.2 RFID

EPCglobal Canada http://www.epcglobalcanada.org
EPCglobal Inc. http://www.epcglobalinc.org

8. Appendix: Samples

8.1 Document Exchange Samples

8.1.1 EDI Transactions Relevant to Can-Trace

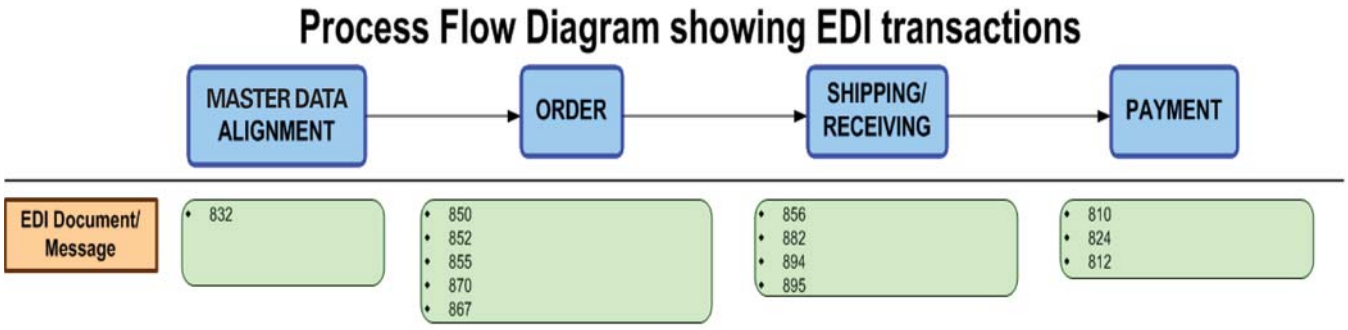


Figure 8.1.1 Process Flow Diagram – EDI Transactions

Figure 8.1.1 above illustrates the various EDI transactions that can be used at the different steps throughout the Supply Chain. Below are the definitions of the above-referenced transactions:

EDI 832 (Price/Sales Catalog): This transaction set can be used to provide for customary and established business and industry practice relative to furnishing or requesting the price of goods or services in the form of a catalog.

EDI 850 (Purchase Order): This transaction set can be used to provide for customary and established business and industry practice relative to the placement of purchase orders for goods and services.

EDI 852 (Product Activity Data): This transaction set can be used to advise a trading partner of inventory, sales, and other product activity information. Product activity data enables a trading partner to plan and ship, or propose inventory replenishment quantities, for distribution centers, warehouses or retail outlets.

The receiver of the transaction set will maintain some type of inventory/product movement records for its trading partners to enable replenishment calculations based on data provided by the distributor, warehouse or retailer.

EDI 855 (Purchase Order Acknowledgment): This transaction set can also be used as notification of a vendor generated order. This usage advises a buyer that a vendor has or will ship merchandise as prearranged in their partnership.

EDI 870 (Order Status Report): This transaction set can be used to report on the current status of a requirement forecast, an entire purchase order, selected line items on a purchase order, selected products/services on a purchase order, or purchase orders for a specific customer in their entirety or on a selection basis. The transaction set can also be used to report on the current status of single or multiple requisitions. The report format allows for the inclusion of "reasons" relative to the status. This transaction set may also be used to update the supplier's scheduled shipment or delivery dates. This transaction set can result from either an inquiry or a prearranged schedule agreed to by the trading partners

EDI 867 (Product Transfer and Resale Report): This transaction set can be used to: (1) report information about product that has been transferred from one location to another; (2) report sales of product from one or more locations to an end customer; or (3) report sales of a product from one or more locations to an end customer, and demand beyond actual sales (lost orders). Either buyer or seller may issue report.

EDI 856 (Ship Notice/Manifest): This transaction set can be used to list the contents of a shipment of goods as well as additional information relating to the shipment, such as order information, product description, physical characteristics, type of packaging, marking, carrier information, and configuration of goods within the transportation equipment. The transaction set enables the sender to describe the contents and configuration of a shipment in various levels of detail and provides an ordered flexibility to convey information. The sender of this transaction is the organization responsible for detailing and communicating the contents of a shipment, or shipments, to one or more receivers of the transaction set. The receiver of this transaction set can be any organization having an interest in the contents of a shipment or information about the contents of a shipment.

EDI 882 (Direct Store Delivery Summary Information): This transaction set can be used to summarize detailed delivery, return and adjustment information which was previously reconciled at time of delivery in a retail direct store delivery environment, and also to request payment for the products delivered. This transaction set will provide only a summary of direct store deliveries and adjustments without product detail.

EDI 894 (Delivery/Return Base Record): This transaction set can be used to enable a Direct Store Delivery (DSD) vendor to communicate the details of a DSD delivery and is to be used during the check-in procedure.

EDI 895 (Delivery/Return Acknowledgment or Adjustment): This transaction set can be used to enable a distributor or Direct Store Delivery (DSD) vendor to communicate adjustments to a DSD delivery or to acknowledge the completion of a delivery. The transaction set contains changes to the Delivery/Return Base Record identified during the check-in procedure. A Delivery/Return Acknowledgment and/or Adjustment Transaction containing no changes are considered to be an acceptance of the preceding Base Record or Adjustment. The transaction set will contain only the detail data, which is to be changed.

EDI 810 (Invoice): This transaction set can be used to provide for customary and established business and industry practice relative to the billing for goods and services provided.

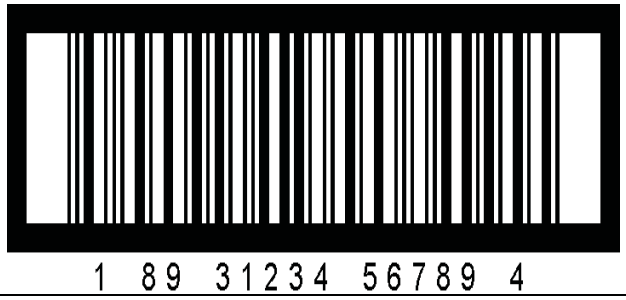
EDI 824 (Application Advice): The transaction set can be used to provide the ability to report the results of an application system's data content edits of transaction sets. The results of editing transaction sets can be reported at the functional group and transaction set level, in either coded or free form format. It is designed to accommodate the business need of reporting the acceptance, rejection or acceptance with change of any transaction set. The Application Advice should not be used in place of a transaction set designed as a specific response to another transaction set (e.g., purchase order acknowledgment sent in response to a purchase order).

EDI 812 (Credit/Debit Adjustment): The transaction set can be used to notify a trading partner of an adjustment or billback and may be used to request an adjustment or billback. It identifies and contains the details and amounts covering exceptions, adjustments, credits, or debits for goods or services. This transaction set is multidirectional between trading partners.

EDI 997 (Functional Acknowledgment): The transaction set can be used to define the control structures for a set of acknowledgments to indicate the results of the syntactical analysis of the electronically encoded documents. The encoded documents are the transaction sets, which are grouped in functional groups, used in defining transactions for business data interchange.

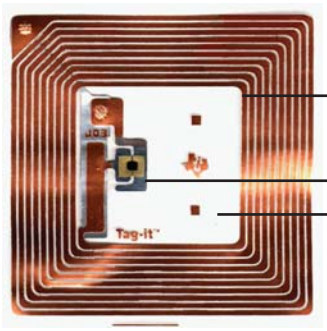
8.2 Physical Markings Samples

8.2.1 Bar Code Samples

Bar Code	Character Set	Applications/ Comments	Sample Not actual size
Shipping Container Code (ITF-14)	Numbers Only	Special use of the Interleaved 2 of 5 code to mark shipping cartons containing UPC encoded products (see also SCC-14)	
Shipping Container Code (SCC-14) GS1-128	Numbers Only	Special use of Code 128 to mark shipping cartons containing UPC encoded products (see also ITF-14)	
GS1-128 Secondary	All ASCII characters and control codes	Specialize of Code 128 which defines data formats for commerce SSCC uses this barcode structure	 Application Identifiers 01 = GTIN, 11 = Production Date yy/mm/dd, 3102 = Net Weight Kilograms, 21 = Serial Number

Bar Code	Character Set	Applications/Comments	Sample Not actual size
GTIN-13	Numbers Only	Retail product marking world-wide	
GTIN-8	Numbers Only	Retail product marking world-wide; compressed code for products with limited label space	
UPC-A	Numbers Only	Retail product marking in USA and Canada	
UPC-E	Numbers Only	Retail product in USA and Canada; compressed code for products with limited label space	

8.2.2 RFID Samples (Images of RFID tags)



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Chip

Support

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