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1 Introduction

This document provides information regarding best practices related to Data Governance, Product Data and Image Capture and Product Data Inspections. It was developed as a sector-neutral, standardised set of best practices that enables trading partner collaboration to achieve the benefits of good quality data, regardless of size, sector, or supply chain role.

The GS1 Data Quality Framework for Master Data Services (MDS) aims to define a universally applicable set of Master Data Service best practices, which any GS1 Member Organisation, authorized third party, or company can adopt, irrespective of size, product type, or channel. These best practice guidelines provide organizations with a common approach to data quality. Additionally, these guidelines will enable each region and industry to add additional components to address their industry or business process specific needs.

The key decision point in outlining data quality for an MDS and looks at the fact data recipients are reluctant to abandon their internal audit procedures and company-specific workarounds for business processes unless there is a MDS value added service solution which can deliver validated, perpetually updates, accurate, standardized product data and images. In other words, the data recipient may more readily trust the data if they understand that it has been properly validated in order to meet a specific business function.

Consumers have become more demanding in their purchasing decisions. From a consumer's perspective, having access to the right product at the right time at the right price is paramount to their shopping experience – whether it is through traditional brick-and-mortar or on-line purchasing. With shrinking margins and increased competition, the ability to meet the consumer's needs in the most cost-efficient manner is critical to retailers and e-tailers alike. The ability to service the customer in the manner they are demanding is dependent upon accurate and complete data.

With this growing demand for additional product data attributes, so does the need for data to be timely as well as accurate. A common approach to data governance will promote a level of trust about product information received by trading partners and consumers alike.

1.1 Overview and Scope

The GS1 Data Quality Framework for Master Data Services is designed to outline best practices and specifically requirements for master data capture and product data validation. It covers topics on data governance processes, and looks at what GS1 Standards, are needed to support the Master Data Services process, such as the GS1 General Specification GTIN Allocation Rules, GS1 Product Image Specification standards and the GS1 Global Data Synchronization Network Package Measurement Rules

The Initial scope will focus on the CPG sector targeting the "Product Lifecycle" ensuring it is developed in a way that it is extensible to other sectors and business processes. This document covers the initial scope of gathering, documenting and sharing best practice. A future phase may document how to conduct certification of Master Data Service providers.

This document also outlines best practices in the areas listed below, which provide suggestions to consider if you already have a Master Data Service in place, or intend to launch a service in the future including the following.

- Procedure for best practices for Data and Image Capture
- Image Standards
- Product Inspection
- Training and Education

The recommendations included in this document are intended to establish a baseline for Master Data Services, which may serve as a means to develop additional services as needed by the sector or membership being served. The key objective is enabling the Brand as the Data Source with a view of serving the Data Recipient's needs in order to meet specific needs. It is acknowledged that as an organisation progresses and matures relative to the Master Data Services it offers and that more advanced offering may be incorporated into the portfolio overtime.

Regardless of the level of maturity, a cornerstone of success is not only understanding the business process in question but also the use case for master data and the necessary validations to ensure the data is fit for its intended purpose. In the end, data quality is the result of intentional actions taken to ensure the data is fit for its intended use. Clear communication and collaboration between the Brand, the data recipient and the Master Data Service providers is critical to success.

1.2 Guiding Principles

The following guiding principles apply to all master data services:

- The GS1 Data Quality framework for Master Data Services provides master data services with an approach that can be deployed in any country while also providing the ability to add additional components to address their national/local industry-specific needs
- The Master Data Service should always adhere to GS1 Standards e.g. GS1 GDSN Package Measurement Rules, GS1 GTIN Allocation Rules and GS1 Product Image Specification standards
- Universally applicable set of guidelines which any MO or Third Party or Company can adopt, irrespective of size, sector, product type or channel
- With capturing or comparing data from a physical product sample, the sample is always considered to be the truth, against which data is compared
- GS1 standards and guidelines also define the global best practice and provide a framework for trading partners to manage their business process in the most efficient way.

1.3 Definitions

Master Data Service

A specialized service for quality improvement defined by the policies and procedures put in place by an organization that captures both product data and images in a structured way. The ultimate goal being to provide the end user community with a "trusted single version of the truth", from which to form decisions upon.

Data Source

The source of the data e.g. brand owners, retailers, distributors, 3rd parties

Data Recipient

A recipient of the data and the authorized user e.g. brand owners, retailer, distributor, 3rd parties

Quality Assurance

Quality Assurance in a Master Data Services ensures confidence that quality product data and images are captured and compared. They provide physical checks on the captured data either directly by the Master Data Services Company or by the provider of the data e.g. data source. The Quality Assurance process will look to check and verify against the specifications and requirements e.g. business process. It is a monitoring process and an associated feedback loop that confers error prevention.

Inspection

Inspection verifies and validates if the product capture confirms to and is in line with all reference documentation and procedures as well as principles of good practice. The data is verified against the data that was captured/published to the defined data source.

Inspection Person(s)

A person(s) who are qualified to conduct inspections and have the appropriate industry qualifications and experience.

1.4 Scope of Master Data Services

While there are various Master Data Service models as it relates to improving data quality. Below are two very common approaches to receiving and checking data and images.

Product Data and Image Capture

- Master Data Service creates/captures data and images by using product samples
- Master Data Service conducts its Quality Assurance (QA) based on its own resources having created/captured both the data and images: internal QA process
- This data would also be approved/signed off by the Data Source

Product Data from the Data Source

- Master Data Services receives data and images from Data Source
- Master Data Services conducts a Quality Assurance by using product samples and data provided by the Data Source e.g. excel spreadsheet
- Discrepancy reports are created and sent to the Data Source for analysis and correction of the product data

As mentioned in the beginning of the document, additional practices may be developed to meet advanced Master Data Quality objectives and more so around ensuring the data is fit for the intended purpose. This document focuses on two the methods listed above.

1.5 Master Data Services – The Business Process Focus

A Master Data Service initially determines which user business process, or processes, it intends to support in the market place. Each individual business process can be defined by its business process steps (choreography) and the master data use case needed to meet the user's need.

It is important to remember the need to ensure that all elements of the information supply chain are included. This may include consumer, logistics and regulatory needs for the business process defined across all levels of the product; consumer, trade item and pallet. The proper actions should result in the following.

- Reduced effort for the Data Source to gather the appropriate product attributes, based on a defined business process
- Reduced effort for the Recipient to manage/re -distribute the data received based on their business process adding 'information data supply chain' efficiencies immediately to both parties.

A business process Master Data Service delivers value within the context of a specific business need. Each business process results in a specific desired outcome. To effectively and consistently achieve that outcome requires a service framework that addresses:

- a. Business process integrity
- b. Alignment with GS1 standards and guidelines
- c. GS1 Key management integrity
- d. Data model and data validation integrity

Some Business process managed master data services are illustrated below e.g., Shelf Edge Management/Planogram product data content, Legislation requirements, Product Incident/Regulatory Reporting/New item introduction and lifecycle management There are many more and these can be defined by identifying what business process is required by the Data Source and Data Recipient e.g. Product Recalls, Safety Data Sheets and Hazmat Information.

The business process for master data (managed service) integrates the GS1 standards and guidelines into its own data capture and validation processes to ensure that all process steps and business process data remain in compliance with the standards. Similarly, a (defined attribute) master data service may manage the capture & validation of product images and dimensions. This

service will observe the GS1 standards for image capture (specifications, naming convention) and the GS1 Package Measurement Rules when determining height, width and depth.

For example, a master data service that manages the new item introduction and change management business process will ensure compliance with the global GTIN Allocation Rules.

Alignment to the GS1 global standards and guidelines may not always be sufficient. The Master Data Service must still be cognizant of local process or data integrity practices and include them within the definition of standards compliance.

A unique data model needs to be associated with each business process. This is important as the data model defines the complete body of information that is required to execute the business process and to apply the master data validations needed to support that process. The business process-centric Master Data Service introduces the necessary data capture and data validation processes that ensure compliance to the appropriate data model.

Finally it is important to remember that product data needed to power business processes does not remain static. Changes to product data over the course of the product lifecycle require that the business process Managed Data Service ensure the on-going completeness, accuracy and timeliness of product data.

It's important to be aware that both services could be conducted on the same product at the same time and below is an illustration on the service linked to a business process methodology.

	<u>New item introduction & lifecycle management</u>	<u>Product incident/ regulatory reporting data content</u>	<u>Shelf management/ planogram product data content</u>	<u>Print advertising marketing data content</u>
Image/video	X		X	X
Weight & Dimensions	X		X	
Product information "back-of-pack"	X	X		X
<u>Enhanced marketing content</u>	X			X
<u>Regulatory information</u>	X	X		
<u>3rd party trusted data</u>	X	X		
<u>Product off-pack informational requirements</u>	X	X		

1.6 Master Data Service Methodologies

There are several data quality service operations that a Master Data Service provider could provide as outlined below. Often many of these service operations are required by country, regulatory agency or by trading partners (to meet the needs of one or more business process requirements/objectives). In addition, a Master Data Service provider may offer product data inspection and comparison services.

- GS1 Identification Key/GS1 Company Prefix validation
- Data Capture & validation
 - Digital product images and video
 - Product/package weights and dimensions
 - Product "back of pack" information, such as ingredient statements
 - Regulatory product disclosure information (e.g. hazardous materials)
 - Product "off pack" information e.g., on-line content, shelf life, stacking factor
 - Business process related data capture e.g. planograms, product recalls, where specific attributes are identified and Images are captured against specific business process defined.

- Trading partner-specific requirements e.g. digital images, 360° images for electronic planogram creation and eCommerce websites

1.6.1 Product Data and Image Capture

The Master Data Service for product and images captures and validates of all data available on and off the product packaging that is visible to the consumer along with images, weight and measurements (height, width depth), enhanced marketing content, regulatory information, 3rd party trusted data and key validation as noted above. All levels of the hierarchy, including the inner pack can be captured; base unit, case and pallet.

1.6.2 Product Data Comparison Service

The Master Data Service to perform "product data comparison is where a Data Source would send a product sample along with a "product data sheet". The product comparison service would compare the product data sheet with the physical product. Any discrepancies found will be recorded and sent back to the Data Source for correction within their ERP systems, or any other where product data is maintained and shared through GDSN.

2 Master Data Services – How to Capture Data and Images

As shown in the diagram below, the Master Data Services provider works with Data Source and ideally with Data Recipients to ensure the highest level of data quality by acting as a data quality agent. The Data Source provides a physical product sample to the Master Data Service provider. The Master Data Services provider captures the required information and images then checks the validity of the information prior to acquiring Data Source approval.

Upon approval, the Master Data Service provider can then syndicate the data/images to the data recipients. Care must be taken to ensure the data is fit for the intended purpose by the data recipient.

Master Data Services (MDS) – Capture Data and Images

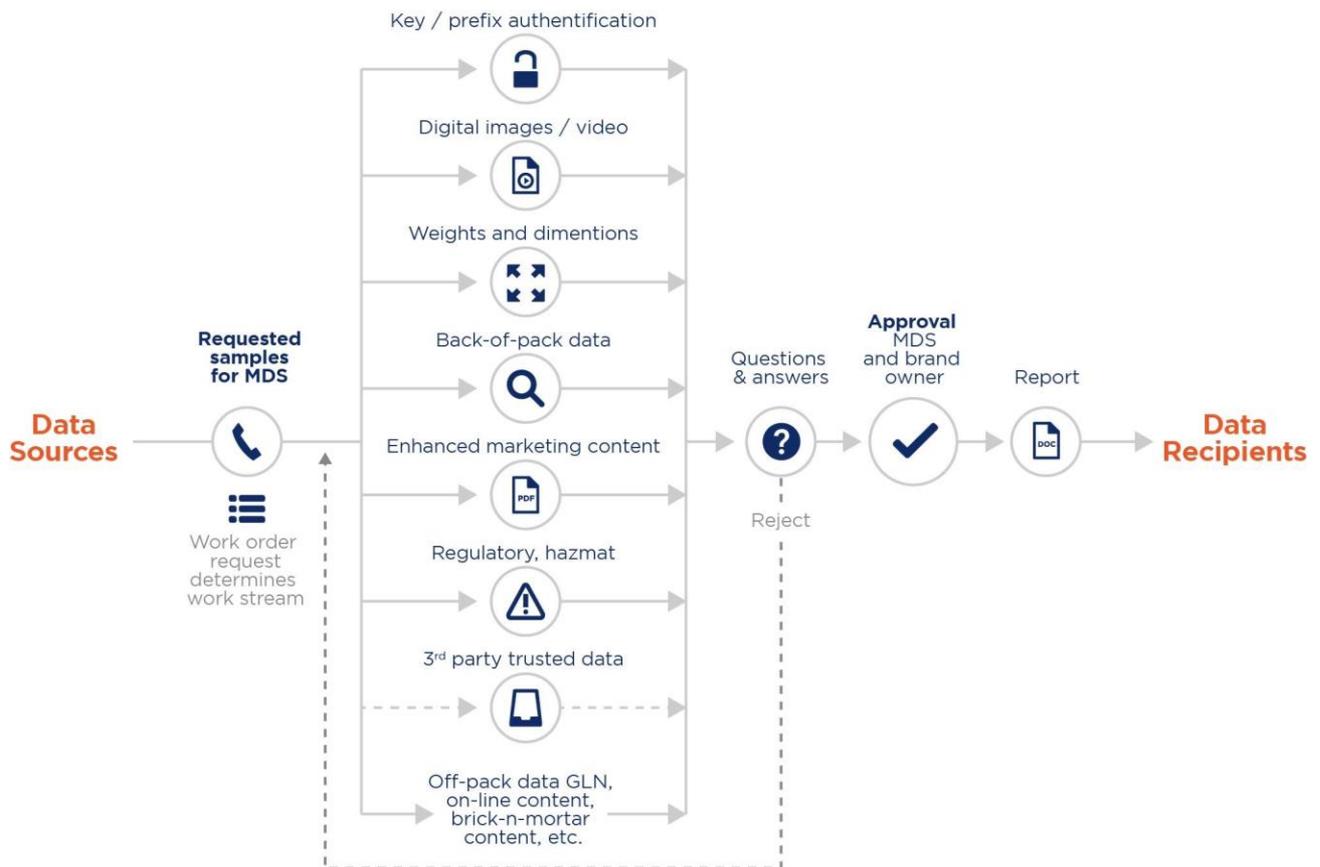


Figure 2-1 Master Data Services – Capture Data and Images

2.1 Request for Product Samples

The process starts by acquiring product samples from the data source e.g. brand owner. It is recommended that at least two product samples are obtained to avoid adding additional time in case the product arrives damaged or unsuitable for use e.g. for Image Capture. Therefore, it is recommended to use different samples for data capture and image capture so for example for data capture a filled sample is necessary so the weight can be checked and the best before format. For images it is usually recommended to have an empty package.

Depending on the location of the service, the product may be delivered to the MDS warehouse, or wherever the service is conducted e.g. Data Source or Data Recipients warehouse. If sampling at the Data Source location where the product is produced then multiple samples may not be needed.

2.2 Categories of Master Data Service Activities for Product Data and Images

In this section we describe the best practices for data and image capture for the Master Data Core Functions, illustrating the need to drive for accuracy, continuity and consistency.

Master Data Core Services consists of capturing, collecting, and structuring the item data and digital assets to be used for different purposes and may be shared with different data recipients.

When multiple services are offered by the same MDS provider, it is recommended that there is an order procedure in which the data source places an order with the MDS provider indicating which service(s) is required for that specific trade item information or product image.

2.2.1 GS1 Identification Key/GS1 Company Prefix Validation

The foundation of the GS1 System is identification. Trading partner confidence in the identification of a product GTIN is a necessary prerequisite to the user's confidence in the data associated with that identifier. Ultimately, the identifier must be unique, authentic, and be traceable; if the identification cannot be trusted, neither can the corresponding data. A best practise is to validate the GS1 Identification Key by using GS1 GEPIR solution, which is an internet-based service that gives access to basic contact information for companies that are GS1 subscribers.

2.2.2 Image and Video Capture

Image capture can run concurrently with the data capture process. For Image capture Photographer will take the appropriate images. Below are some best practice aspects.

- Depending on the agreed requirement by either the Data Source or their trading partner the photographer would capture the appropriate images e.g. Basic pack shots e.g. for marketing or planograms, or if based on a specific business process they may take additional e.g. 360 degree, out-of-pack, with supporting elements, etc.
- The Master Data Service provider may edit / store the digital assets as an additional service
- The GS1 Image Specification is the primary reference document to take into account
- At this point in the process Hi-Resolution images or Video's maybe captured

The capture/storage of digital images associated to products is a key best practise within the Master Data Services. The best practise is to use the product identification number - Global Trade Item Number (GTIN) which is necessary to store/identify/associate product related attributes and images. It's also important to note that digital assets (e.g. images) are only one part of what is needed. Data, both Meta and associated, are essential for the timely and accurate usage of the image assets.

Note: Full information on Image standards can we be found in the following Reference documents:

- Product Image Specification issue 2.6, Ratified, Nov-2014. A newer version is on plan to be published shortly. Always refer to the latest version.
- GS1 in Europe guidelines to GS1 Product Image Specification (validation stage)

2.2.3 Data Capture - Weights and Dimensions

The product sample it enters the workflow to capture weights and dimensions. Below are some best practice aspects.

- Product is weighed and measured using the GDSN Package Measurement Rules is the primary reference document.
- Equipment use for measuring and weighting must be calibrated to ensuring accuracy.
- For service traceability, it is recommended that an image of the sample is produced. This helps identify if the wrong sample has been submitted causing a discrepancy report.
- Application of the tolerances (based upon packaging type) as described in the GDSN Package Measurement Rules

Measuring equipment

In order to ensure valid results, measuring equipment should always be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; where no such standards exist, the basis used for calibration or verification shall be recorded.

Listed below are some key best practise points on measuring equipment:

- Be checked, adjusted or re-adjusted as necessary
- Be identified to enable the calibration status to be determined
- Be safeguarded from adjustment that would invalidate the measurement results

- Be protected from damage and deterioration during handling, maintenance and storage

2.2.4 Data Capture - Product “Back of Pack” Information

Data Capture for ‘back of pack’ information needs to be captured exactly as it is described on the product label. When working with food products for example it is important to capture the allergens and nutritional information on the pack and ensure if local legislations are in place in a certain country or region then its recommended to validate the legislation is being followed e.g. EU1169/2011. Below is a best practice aspects.

- All information listed and any statements are captured

2.2.5 Data Capture - Enhanced Marketing Content

Enhanced Marketing content is a way of marketing and distributing value, relevant and consistent content to attract and retain customers. It is an art of communicating with customers without selling. The data includes promotional information, recipes. Below are some examples of enhanced marketing content.

- Promotional information linked to on line stores
- Product data to support promotional video’s for enhance marketing campaigns

2.2.6 Data Capture - Regulatory

Data Capture can be provided by an external service independent from the Master Data Service. This service may or may not have a direct business relationship with the licensed or authorised user of the data however, the third party must be able to prove that it can validate the authorised user. Finally, in addition to being date and time stamped, the data has an expiry data and is version controlled.

Some examples:

- Material Sheets
- Chemical analysis ingredients reports

2.2.7 Data Collection - 3rd Party Trusted Data

In certain cases the data source may choose to contract a 3rd party to curate data for their products. This may be done in cases where the data may not be readily available and needs to be documented. In such a case the 3rd party should be approved by the data source

Some examples:

- Hazardous Materials

2.2.8 Data Collection - Product Off-Pack Informational Requirements

Data Collection may extend to off-pack information and can be related to trading partner specific attributes and validation rules to support specific trading partner operational needs. Without this data, the given business process may not be fully executed. Examples are: GLN (Global Location Number) of the manufacturing plant, the first ship date, tax information, etc.

2.2.9 Quality Assurance

Once the product data, images and related information are captured, the Quality Assurance team validates the captured data/images for completeness and accuracy, and if needed will reject the item to the point in the process that failed validation. Upon successful validation, the product workflow move to one of two workflow steps. It may also be necessary to have a Quality Control also in place where Quality Assurance is monitored, this could result in process and people improvements by conducting additional education programs, with a view to limit quality assurance failures/rejections

As a best practice the data captured or inspected can be 'flagged' in order to allow such the owners of data or recipients of it to be aware of the quality level; and this can be communicated by different ways such as the GDSN, external portals or other ways

2.2.10 Approval by Data Source

This is the final step prior to publication where the accountability for the product data and image information is signed off by the Data Source; this means that the Data Source is ultimately responsible for the accuracy of their data. Below are some best practice aspects.

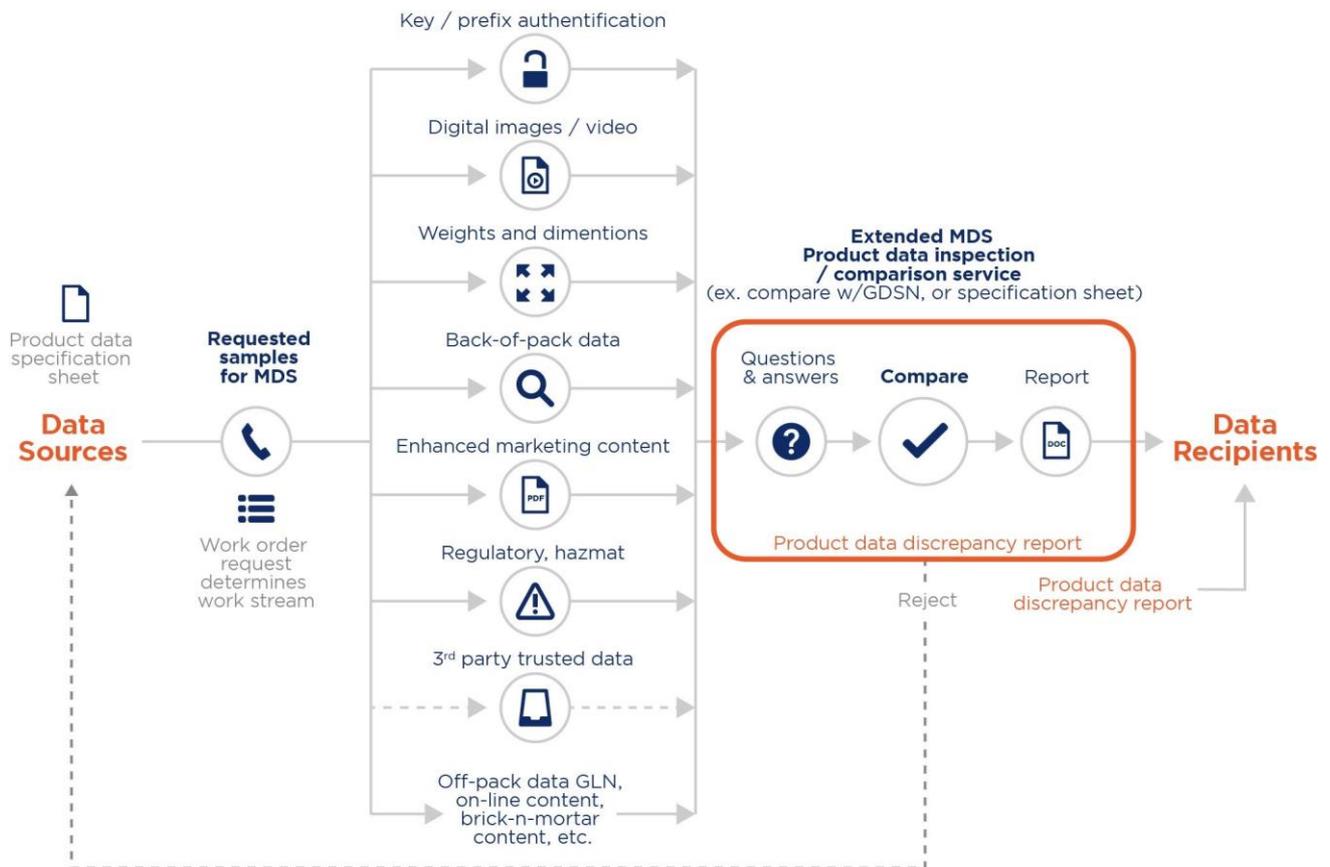
- A critical stage of the process where all images and product data captured is presented to the Data Source for verification and sign off prior to publication.
- Note that the Data Source can decide to allow the Master Data Services provider to publish the data after capturing the data, in any case there must be a process through which the Data Source is able to notify if there 's any issue.
- Data Source should either reject (with reasons) or approve the information
- If rejected then the Master Data Services provider should review and resolves reasons for rejection with the Data Source
- If approved by the Data Source the data attributes and image(s) are stored for reference e.g. versioning by the Master Data Service provider
- Data Synchronisation/publication can be conducted either by a Data Source or the Master Data Services provider (if permission has been granted by the Data Source)
- It is recommended to have a Service Level Agreement, which includes (at a minimum) responsibility/ownership of the data and throughput response time

3 Master Data Services – How to Quality Assure Data from the Data Source

The Master Data Service Product Comparison is where a Data Source would send a product sample along with a "product data sheet". The Product Comparison service would compare the product data sheet with the physical product data (using the data captured from the core service). Any discrepancies found will be recorded and sent back to the Data Source for so the appropriate updates can be done. It is recommended that a new product data inspection is done after any update until all discrepancies are eliminated.

Once the comparison is performed and the report is generated the workflow moves into Product Information Distribution.

Figure 3-1 Master Data Services – Data from the Data Source
Master Data Services (MDS) – Data from the Data Source



3.1 Sampling

Trading partners in a market need to agree on which trade item's product data needs to go through the product data inspection service. In some markets trading partners may decide on a certain percentage of all products, whereas in other markets the requirement may be that all trade item's product data must be inspected with no discrepancies to be listed.

4 Product Information Distribution

The Master Data Service provider offers various options to publish the data to data recipients.

- Data and Images are sent to the Data Source for publication to their trading partners e.g. GDSN.
- Data and Images are sent to the Data Recipients who have subscribed to the service.

5 Item Maintenance: Add, Change and Delete

Trading partners in various markets may decide when a Master Data Service should be used. The requirement may differ for new items, changes and when a trade item is discontinued.

Most commonly MDS service is required for new trade items, and for some categories of item changes. When discontinuing trade items, there is usually no reason to verify correctness of the associated product data.

6 Master Data Services Education & Training Procedure

A best practice on Education and Training should ensure that all parties responsible for capturing attributes and images, and carrying out Quality Assurance and Quality Control of the product data are part of an on-going education program. Appropriate records of education, training, skills and experience should be kept for each individual, along with an evaluation of the effectiveness of the training. This information can help identify instances where additional training may be required.

Evaluation of the Education and Training Programs is key and should comprise of an Education and Training best practice designed to verify the competence levels and proper application of the GS1 System of Standards within the organization. It is also recommend that prior to any Education and Training programs that you verify that you are using the most current version of the GS1 System of Standards.

A Appendix – Case Studies

A.1 Case Study – GS1 Mexico

1. Document Purpose and Scope

The purpose of this document is to provide with an overview of the Data Compliance Service (Secodat) which covers such data & images capture / comparison services, allowing any trading partner to meet high quality standards and best practices, supporting operational and business processes.

There will be a description of the main services provided by Secodat, which in summary are:

- Data capture
- Data comparison
- Image capture
- Image edition



Note: there are other services within the portfolio, nevertheless the ones mentioned before are the bottom line to consider in order to meet basic needs in the market place.

2. Audience

This case can be used as a guidance by any party interested on defining, establishing or improving data quality services related to item information, under global standards and local needs: data recipients, data suppliers, GS1 Member Organizations, among others.

Background

On early 2000's the first Industry initiative around Master Data in Mexico was not successful at all because the presence of mistakes at the product information. These problems hindered efficient use of the catalogue (Data Pool), so brand owners and retailers were not able to feed their internal processes with good data quality.

On 2004 an Industry Steering Committee composed by brand owners, retailers and distributors launched "Secodat" following global standards such as the GS1 GDSN standards.

As a key element to make this successful, brand owners and data recipients in the Retail sector, decided to have visibility of the data quality of items, based on Secodat's validation process, which in the beginning consisted on comparing the data provided by data suppliers with a physical sample of the product. Later on, the range of services augmented to such data and image capture.

Some key elements to mention are:

- There's a general data model defined and used by all the parties, and every company decides internally the level of usage for specific business processes.
- Even though the data capture service covers a group of up to 80 pieces of data, the inspection process considers a group of up to 23 attributes

3. Master Data Service Description and Scope

Secodat is managed by GS1 Mexico and offers the next portfolio of services:

Data capture

This process consists on capturing, collecting, integrating, complementing or modifying any item data based on the back of pack information and / or data provided by the data supplier, at any given sample of products. The steps involved are:

1. Formal request done by the customer: there's a Secodat system to allow users to ask for this service. After doing so, a formal order is created and the data supplier brings physical samples of the items to Secodat's facility or it can work on the other way around.
2. Data integration: Secodat captures all the information related to the item that needs to be shared for data synchronization purposes. This data considers such descriptive and logistic information at different levels (e.g. base unit, case, pallet).
3. Data publication into the Data Pool (Syncfonia): once the information is consolidated, it's published into Syncfonia.
4. Quality inspection: an operator inspects all the items that have been captured, so the items are technically flagged as "Verified".
5. Data publication: finally the item data is ready to be shared with the data recipients, allowing all the data users to be aware of the quality status of every item.

Product information comparison (Validation)

This process is based on the comparison of item data provided by the brand owner or captured by Secodat, through the data capture service. The steps involved are:

1. Data integration: data supplier or Secodat captures all the information related to the item that needs to be shared for data synchronization purposes. This data considers such descriptive and logistic information at different levels (e.g. base unit, case, pallet).

2. Data publication: once the information is integrated, the data supplier publish and sends the item data to validation, through GDSN in order to allow Secodat to compare the information in Syncfonia (GDSN Certified Data Pool) to a physical sample of the product.
3. Quality inspection: the data supplier schedule an appointment to allow Secodat inspecting all the items that need to be verified, so an order request is done and the physical products are brought to Secodat 's facility or can be inspected at the data suppliers location.
4. If the inspection is 100% accurate, the item is flagged as "Verified", if not it appears as "Rejected" so data suppliers are able to modify the data or ask Secodat to do it.

Note: there 's visibility all along the process to allow the data supplier to take control on the progress of the item.

1. Data publication: once the item data complies against the Data Quality Model defined by the industry, the information is published by making use of GDSN for the pieces of information and to allow all the data users to be aware of the quality status of every item.

Image capture / edition

Through this service, Secodat captures, edits and or publishes digital assets, such as item pictures for planogram or marketing processes.

Even though this portafolio of services is highly tighten to the data services and data synchronization process, companies are able to request any of these in a separate way. From an operational perspective, there are two kind of services:

Image capture

The intention of the image capture service is to take a group of pictures related to a given item, separately and commonly with a neutral background. In the whole every product has a set of up to 6 pictures for planogram processes and three other for marketing purposes such as web pages, leaflets, mobile application, among other. Here the procedure:

1. Formal request done by the customer: there 's a Secodat system to allow users to ask for this service. After doing so, a formal order is created and the data supplier brings physical samples of the items to Secodat 's facility or it can work on the other way around. It 's important to mention that this service covers just consumer units
2. Image capture: Secodat captures all the digital assets related to the item that the supplier requested. This images include such 6 for planogram and 3 for marketing.
3. Quality assurance: once the pictures have been taken, there 's a deep quality assured process focused on editing all the images, and naming them according to the current standards.
4. Image publication: Finally, the item pictures are ready to be provided to the data supplier. In most of the cases pictures are storage at an Image Repository fully integrated to Syncfonia, allowing such data suppliers to access them and data recipients to get all these digital information through URL 's links by the GDSN synchronization process.

Image validation

This service allows any customer to make sure the digital assets related to their item assortment, comply against high quality standards. Here a list of all the aspects considered within the validation process:

Technical validations

- File format: jpeg, png, tiff
- Image size: 50k minimum *

- File Resolution (planogram): 150dpi
- File Resolution (marketing image): 300dpi
- Color mode: RGB
- Image naming according to the profile



* Note: some images go beyond these specifications for color features

Operational validations

- Items with vertical default front: height 900px
- Items with horizontal default front: width 1800px
- White or transparent background
- Item should be contoured and cropped to the product's edge
- No props or additional objects
- No evidence of dust or scratches
- No manufactured shadows (shadows should be realistic and neutral)
- No signatures, fingerprints or visible watermarks

GS1 specifications

- GTIN consistency with a given item sample
- Visual reference bases on the default front
- Comments management for additional languages
- Final items (no dummies)

Provide the associated data model

As mentioned before, in Mexico, the data suppliers and recipients that make use of a standardized data synchronization process, use a common set of attributes, all of them GDSN based, allowing them to enhance areas such as:

- Logistics
- Planograms
- New item introduction
- eCommerce

In summary the number of attributes goes up to almost 80 pieces of data, and a subset of 23 are the ones that are covered for the validation process.

Find attached the specific data model for the Mexican market.

Roles and Responsibilities associated to the service

- Data recipients (commonly retailers) are usually the trigger of the data quality services, as they support the usage of them for ensuring getting data under high data quality standards.
- Data supplier (commonly brand owners) is the responsible of request and make use of the services. Even though Secodat validates or captures the data, brand owners are always expected to verify the item data and images that have gone through the services as they are liable for the item information in any services.
- GS1 Mexico: helps the Industry to discuss under a neutral way to create, maintain, improve or modify all the standards and specifications around the data quality services, based on a user driven process.
- Secodat: operates in a 100% all the data quality services defined by the Industry at the GS1 working groups or committees.

Key customer requirements for this service

- As mentioned above, for the data capture service, it's considered a framework made of 80 GDSN attributes.
- Data recipients and suppliers requested to have visibility of the item quality status by "flagging" them within Syncfonia.
- When an item has gone through a correct validation, data recipients automatically integrate the related data in their internal processes, such as new item introduction, automatic reception in logistics environments, images and descriptions for web portals.
- Even though any sector which needs to synchronize master data where the GS1 barcode is the key to collect all the related data, is able to use this services, there's a deep implementation on supermarkets and convenience stores.

Align to the GS1 Standards and document where possible

There's a fundamental principle to make sure all the service operates under local regulations and global standards, nevertheless a list of the main reference documents is mentioned next:

- Description and definition of all the pieces of data located at the GDSN Global Data Dictionary
- GDSN measurement rules
- Global Product Classification standards
- GTIN allocation rules
- Product Image Specifications

4. High Level Business process the service supports and the related data attributes

Even though there 's a common framework of data / images covering the services for any customer, every data supplier / recipient is able to make use of them for specific processes or benefits. The most common ones are:

- New item introduction
- Planograms
- Logistics
- Web portals
- New item opportunities in the marketplace
- Internal inspections for data suppliers
- Support local regulations
- Automation of goods reception at Distribution Centers

5. Business Value

KPI's related to the service

Some of the main KPI 's established in order to ensure the quality of the services are:

- Up to 24 hours to provide with a report of results for every service request of any item that has been submitted for data inspection
- Up to 5 business days to publish any given item as "verified" into Syncfonia that has been submitted to the data capture service.
- Up to 5 business days for companies on the queue waiting for having an appointment for its request to be processed.
- 100% accurate contact data
- 95% of quality assurance for items measured by making use of the Cubiscan
- 99% of quality assurance for items measured by human resources
- 80 products measured by operator in average depending on demand per region
- 90 products inspected by operator in average per day
- Once the report has been created, any item could not remain more than 10 business days in storage

Benefits accomplished

Some of the main benefits in voice of users are:

- Confidence of the data that has gone through the data quality services, allowing trading partners to avoid rejection of products based on inconsistent or inaccurate data.
- Reduction of particular formats used by data recipients to introduce new items
- Reduction of item registration on a 50% of time: "by scanning the barcode our staff is able to get such the consumer item / logistics unit information"
- Efficiencies at logistics environments by avoiding re capturing data or validating individually every configuration
- Internal alignment on master data for brand owners staff
- Avoid up to 75% of conciliation and paper work based on bad quality of the data
- Ensure compliance against local regulations
- Implement, improve or maintain quality processes within companies

6. Key validations which take place for this service

Checking for GS1 Key Integrity

In terms of the GS1 Key, Secodat first of all validates the physical structure and composition of the barcode in order to communicate the data supplier that it complies against high quality standards.

As the Data Quality process is integrated to Syncfonia, there's no way to change any item data which requires a new GTIN. If the data suppliers intends to do so, then the system does not allow them to do so and it's validated against the record of the last verification or inspection under that item.

Business Process Integrity

Measurement, Analysis and Improvement.

Secodat plans and implements the tracking, measurement, analysis and improvement processes needed to:

1. Demonstrate compliance with product requirements.
2. Ensure the compliance of the quality management system.
3. Perform an ongoing improvement of the effectiveness of the quality management system.

This must cover the determination of the applicable methods, including statistical techniques, and the scope of use.

Customer Satisfaction

Tracking to customer satisfaction is conducted through the surveys performed randomly, with the purpose of knowing their perception regarding the compliance of requirements; this information is analysed to take convenient actions for both parties.

Internal Audit

Secodat conducts internal audits at planned intervals to determine if the quality management system:

- Is compliant with the planned provisions, with the requirements of the international regulation (ISO 9001:2008) and with the requirements of the quality management system established in Secodat.
- Has been implemented and is maintained in an efficient manner.

An audit program is planned, considering the status and importance of processes and the areas to be audited, as well as the results of prior audits. The audit criteria, scope, frequency and methodology were defined. The selection of auditors and performance of the audits was developed ensuring the objectivity and impartiality of the auditing process. Auditors should not audit their own work.

A procedure was established for internal audits, in which the responsibilities and requirements to plan and perform audits were defined, establishing the records and information of results.

Audit records are maintained from audits and their results.

The person responsible for the area that is being audited must ensure the corrections are being made and the necessary corrective actions are being taken without delay, to eliminate non-conformities detected and their causes. Tracking activities must include verification of the actions taken and the report on the results of verifications.

Tracking and Measurement of Processes

Secodat applies proper methods for tracking, and when applicable, measurement of the processes of the quality management system. These methods should demonstrate the capacity of the processes to achieve the planned results. When the planned results are not reached, corrections and corrective actions must be conducted, when appropriate.

Note: When determining the proper methods, it is recommended that Secodat considers the adequate type and degree of compliance or measurement for each of its processes regarding its impact on compliance with product requirements and on the effectiveness of the quality management system.

Monitoring and Measurement of the Product

Secodat tracks and measures service characteristics, to verify that requirements are being met. This must be performed in the proper stages of the service performance process, according to the provisions planned. Evidence must be maintained of compliance with the acceptance criteria.

The records must indicate the person (people) authorizing the product release to the customer.

Product release and service provision to the customer should not be performed until the planned provisions have been completed, unless they were otherwise approved by a competent authority and if appropriate, by the customer.

Control of Non-Conforming Service

Secodat ensures the service is not according to the service requirements; it is identified and controlled to prevent its unintended use and delivery. A documented procedure was established to define the controls and responsibilities related, to treat the non-conforming service.

When applicable, the area of Solutions and Tools deals with the non-conforming services through one or more of the following manners:

- a. By taking actions to eliminate the detected non-conformity.
- b. By authorizing its use, release or acceptance under concession by a competent authority and, when applicable, by the Associate.
- c. Taking actions to prevent its originally intended use or application.
- d. Taking proper actions to the effects, real or potential, of the non-conformity when a non-conforming product is detected after its delivery or when its use has already started.

When a non-conforming service is corrected, it must be subject to a new verification to demonstrate its compliance with the requirements.

Records are maintained of the nature of non-conformities, and of any action taken subsequently, including the concessions that have been obtained.

Data analysis

The data generated by Secodat and by the SGC are evaluated through indicators, from the audits, from the Associate satisfaction and from suppliers, with the purpose of generating the corresponding actions to each of them.

Ongoing improvement

Secodat performs an ongoing improvement of the quality management system effectiveness, through the use of the quality policy, quality purposes, audit results, the data analysis, corrective and preventive actions and the review by the Management area.

Corrective action

The area of Solutions and Tools takes actions to eliminate the causes of non-conformities, in order to prevent them from happening again. Corrective actions are adequate to the effects of the non-conformities found.

A documented procedure was established to define the requirements to:

- a. Review of non-conformities (including the complaints of customers).
- b. Determine the causes of non-conformities.
- c. Evaluate the need of take actions to prevent non-conformities from happening again.
- d. Determine and implement the actions needed.
- e. Record the results of the actions taken.
- f. Review the effectiveness of the actions taken.

Preventive action

The area of Solutions and Tools determines the actions to eliminate the causes of potential non-conformities to prevent its occurrence. Preventive actions are adequate to the effects of potential problems.

A documented procedure was established, to define the requirements to:

- a. Determine the potential non-conformities and their causes.
- b. Evaluate the need to take actions to prevent the occurrence of the non-conformity.
- c. Determine and implement the actions needed.
- d. Record the results of the actions taken.
- e. Review the effectiveness of the preventive actions taken.

Data Attribute Integrity

By flagging every product as "validated" within Syncfonia, if there's any change done to the set of attributes that are verified, that item automatically goes to "Non validated" and this status is visible to such the data supplier and the recipients that have previously being selected within the distribution list.

When an item is received again, the data considered to be updated is related to the last version of the item. If there's any change identified which requires a new GTIN, Secodat reports back to the data supplier in order to proceed with the standardised way to do so.



7. Change Management: Item change and item delete: how is on-going maintenance conducted to the lifecycle of the product(s)

Periodically Secodat runs an inspection at the Retailers point of sale, ensuring that all the item information allocated within Syncfonia is 100% consistent against the data found at the samples of products in the supermarket.

If the result is negative, then Secodat captures all the data / images and report back to the brand owner in order to update their information in Syncfonia.

The processes involved in this operation covers:

- Barcode scanning
- Item measurements
- Data capture
- Image capture

8. Country Reference Data Model

See www.gs1mexico.org and www.syncfonia.com

A.2 Case Study – GS1 Sweden

Document Purpose and Scope

The purpose of this document is to share experience of establishing and successfully running a data and image quality service. The ultimate goal is to create understanding what it takes to deliver a service that can create the necessary trust by the trading partners that need the product master data and images to run their operation efficiently.

Audience

Any GS1 MO or other party interested in creating a Master Data Quality Service.

Background

The logistical group of the Swedish Trade Association contacted GS1 Sweden in 2006 to investigate the possibility to check item data by comparing with samples and also verify barcode quality. Through the automatic validation service (today known as Validoo Item), it was found out that 99.5% of the information was technically consistent, but users felt that the information did not match the real products when they actually arrived in the warehouses. In fact, each warehouse had to have a re-measurement team correcting the measurements that the suppliers had submitted.

A study was initiated with the purpose to answer how, when and why quality assurance was needed. It was found out that on average only 70% of the information in the Trade Item Information for each trade item was correct compared to physical samples. Only 30 % of trade items had error free information.

Validoo Q-lab started to form and was launched in 2009 with the aim to only exist for one year. It was expected that it wouldn't take the Swedish user community longer than one year to learn how to do it correctly.

Master Data Service Description and Scope

GS1 Sweden operates its master data service in a separate limited company called Validoo AB. This company is fully owned by GS1 Sweden and is operated under the same governance structure as GS1 Sweden.

The service offering consists of

- A GDSN certified data pool – Validoo Item
- A data quality service that ensures correctness of data in the data pool – Validoo Q-lab
- An imaging service which produces or quality assures product images associated with the trade items available in the data pool – Validoo MediaStore

The data quality service

The data quality service monitors the quality of the trade item information by comparing the data with product samples. The basic principle is that the physical product is “the truth” and the trade item information submitted by the supplier must match the physical product.

The flow goes like this:

Ordering

1. The supplier creates trade item information about a trade item hierarchy.
2. The supplier sends the trade item information thru GDSN to Validoo Q-lab. Validoo Q-lab is registered as a data recipient in GDSN. This means that all item information has passed all GDSN validations and target market specific validations before it reaches Validoo Q-lab. The supplier can use any GDSN data pool as his source data pool. Validoo Q-lab uses Validoo Item as its recipient data pool.
3. The supplier places an order for a data quality check in Validoo's order portal. When placing the order the supplier must choose which trade item hierarchy to associate the order with. When the order is done, a delivery note (order slip) is printed by the supplier.
4. The supplier attaches the delivery note to a physical product sample and sends it to Validoo Q-lab's warehouse facility.
5. When delivered, the physical sample is registered and associated with the corresponding order, and a work order is created and placed in queue. The sample is stored in a suitable storage area (ambient, refrigerated or frozen).

Quality assurance

1. When a work order is assigned to a QA operator the corresponding sample is fetched from the storage area. For efficiency similar products are grouped together and assigned to the same QA operator at the same time.

2. The QA operator captures data off the physical sample and enters it into the QA-system. Both base units and case level units are checked. For case level and non-food base units around 30 attributes are captured. For base units that are food items, an additional 15 attributes are captured. Examples are dimensions, GTIN, certification labels, ingredient statement, nutritional information and dangerous goods information.
3. The QA operator takes one or more pictures of the sample that are also uploaded into the QA system.
4. After entering the information, the item information submitted by the supplier is compared against the information entered by the QA operator. Discrepancies are presented to the operator so it can be rechecked for typing errors etc.

Reporting

1. If there are no differences between the submitted and the captured data an approval message is sent to the supplier.
2. If there are differences between data submitted by the supplier and what the QA operator has captured off the package, a discrepancy report is automatically generated and sent to the supplier.
3. Data recipients selected by the supplier have access to the QA status of each trade item. This status information is used by retailers to support listing decisions.
4. If the supplier has questions around his discrepancy report he may contact Validoo's customer service. In any discussions, the pictures of the sample are very useful in the resolution process.

Eliminating discrepancies

1. After receiving a discrepancy report the supplier has to find a way to eliminate the discrepancies. There are two options:
 - f. Correct the information and resubmit
 - g. Send another product sample (in case the wrong sample was sent the first time)
2. The process is then restarted with the supplier entering a new order.

The product image service

Image production

Ordering

1. The supplier creates trade item information about a trade item hierarchy.
2. The supplier sends the trade item information thru GDSN to Validoo MediaStore. Validoo MediaStore is registered as a data recipient in GDSN.
3. The supplier places an order for image production in Validoo's order portal. When placing the order the supplier must choose which trade item to associate the order with. When the order is done, a delivery note is printed by the supplier.
4. The supplier attaches the delivery note to a physical product sample and sends it to Validoo MediaStores image production facility.
5. When delivered, the physical sample is registered and associated with the corresponding order, and a work order is created and placed in queue. The sample is stored in a suitable storage area (ambient, refrigerated or frozen).

Production

1. The photographer is assigned a photo order and a corresponding product sample is fetched from the sample storage area. If multiple photo orders for similar products are in queue they are grouped together for high efficiency at the photo station (same light settings, angles, etc.).
2. Images are captured at the photo station. Number of images and angle depend on the package type as described in the Validoo Product Photography Manual.

3. After the image has been captures it is retouched for removal dust and scratches, any best-before-dates are removed, and a correct clipping path is added, all in compliance with the GS1 Image Specification.
4. The image is then approved by the supplier in the order portal.
5. Upon supplier approval the image is published in the Validoo MediaStore platform

Image Quality Assurance

Ordering

1. The supplier creates trade item information about a trade item hierarchy.
2. The supplier sends the trade item information thru GDSN to Validoo MediaStore. Validoo MediaStore is registered as a data recipient in GDSN.
3. The supplier places an order for image quality assurance in Validoo’s order portal and uploads a product image. When placing the order the supplier must choose which trade item to associate the order with.
4. Upon upload the system automatically performs technical checks of the image file, such as file format and image size. If errors are detected at this stage, this is immediately reported in the upload interphase. If there are no errors, the work order is put in queue for manual quality control.

Quality Assurance

1. When the work order is assigned to an image QA operator, the image is opened in Photoshop and checked. Some control parameters are sharpness, light, clipping path, and cropping. In addition it is verified that the product on the image matches the associated product information (same brand name, GTIN (if visible), package type, package size, etc.).
2. Any discrepancies are registered into the QA-system.

Reporting

1. After the quality assurance process a report is sent back to the supplier. This report can provide an OK status or a discrepancy report.

Eliminating discrepancies

1. For images there are a two ways of eliminating discrepancies.
 - h. The supplier corrects the image (or product data) and places a new order.
 - i. The supplier asks that Validoo corrects the image (possible for some error types)

GS1 Standards in action

GDSN Trade Item	Used by suppliers to submit their trade item information to Validoo Q-lab
GDSN Food & Beverage Extension	Used by suppliers to submit their additional product information about food items to Validoo Q-lab
GDSN Package Measurement Rules	Used by Validoo Q-lab when capturing measurements
GS1 Product Image Specification	Used for quality assuring, retouching and creating product images.
GDSN Validation Rules	

Additional GS1 Sweden and Validoo specifications

In addition to the global GS1 standards, user groups formed by GS1 Sweden and Validoo has created the detailed specifications needed to achieve the goals of exchanging complete, consistent and correct product master data an associated images.

Swedish Target Market Data Set for Trade Item	Maintained by GS1 Sweden's user group for Trade Item information
Swedish Target Market Data Set for Food & Beverage Extension	Maintained by GS1 Sweden's user group for Trade Item information
Swedish Target Market Validation Rules	Maintained by GS1 Sweden's user group for Trade Item information
Validoo Quality Assurance Rules for Trade Item	Maintained by Validoo's user group for QA-rules
Validoo Quality Assurance Rules for Food & Beverage Extension	Maintained by Validoo's user group for QA-rules
Validoo Guidelines and Quality Assurance Rules for Product Images	Maintained by Validoo's image expert user group
Validoo Product Photography Manual	Maintained by Validoo's image expert user group

High Level Business process the service supports and the related data attributes

The inception of the Validoo services was to support the listing process. However, in the Swedish FMCG user community all data needed to manage the item after listing is required already in the listing process. Some of the rationale for this is that in a wide spread country like Sweden (low density of people) the logistical cost as part of the total cost is higher than in some other countries. This means that logistics data is crucial to agree on the right price in the listing process. This has led to that the information gathered during the listing process supports multiple business processes at the data recipient side. Some processes are mentioned in the diagram below.



Examples of supported business processes at the recipient side is

- The listing decision itself (category management information)
- Order-to-cash, i.e. the procurement process, which is the orderable unit, how menu consumer units in a case
- Logistics and warehouse management, dimensions and weights, storage temperatures, shelf life, etc.
- Product facts, needed customer support, and the selling process to downstream trading partners, i.e. restaurant operators.
- Marketing information including hi-resolution images for print
- Selling online, including images and product facts
- Shelf planning, including lo-res images and dimensions
- Diet planning, for food service operators, like schools and hospitals

Business Value

The business value of correct item data is very high. One way of measuring the value is to analyse the cost of bad data. Examples are

- Transports are half full (or empty....)
- Trucks not loaded properly
- Injuries when loading and handling (wrong pallet height causes the top layer to fall off when loading into truck or shelf)
- Goods don't fit in the warehouse
- Ordering the wrong quantities (mixing up levels in a hierarchy)

Value story from a retailer

Coop (Sweden's second biggest retailer, accounting for about 20% of the market) has calculated the cost generated by errors in the Trade Item information, namely if the technical information and the physical pack is not the same. If a package has 20% discrepancy in the measurements it will cause costs related to poor usage of transports, extra work to change the measurements on the pack, re-pick (or re-stock shelves), and extra work to adopt to shelf.

"Every trade item with an error cost us a minimum of 50 000 SEK (approx. € 5 000). The bulk of the cost is created in store. Often we discover the error first when receiving the goods in the distribution centre. At that point we have already created planograms for the stores that are no longer accurate or in line with the truth, says Ralf Lind, Business Development Manager at Coop Inkpot & Kategori AB.

During 2015, 9% of the articles passing Validoo for the first time have had an error related to measurements. 9% per month is about 45 trade items for Coop. $45 * 50\ 000\ \text{SEK} = 2\ 250\ 000\ \text{SEK}$ per month = 27 MSEK per year (2,7 million €). This is for one retailer...

Key validations which take place for this service

There are currently no validations of the GS1 Identification Keys in these services. GS1 Sweden has submitted a WR (10-00291) that has been ratified by the GS1 Management Board (2014-12-26) that all GTINs and GLNs registered in the GS1 Global Registry will be automatically checked against GEPIR. This will be done automatically and warning messages will be sent to any source data pool registering GTINs or GLNs based on invalid GS1 Company Prefixes.

Change Management: Item change and item delete: how is ongoing maintenance conducted to the lifecycle of the product(s)

Validoo is offered as an infrastructure service to the Swedish market. Trading partners decide when and under what conditions the services offered should be used. Currently the main focus is to verify correctness of item data for new products before they are listed. During the life cycle of the products, the information is updated and synchronised through GDSN. There is currently no common agreement under which circumstances suppliers are recommended to perform a new data quality verification when a product is changed but keeps its GTIN (within the boundaries of the GTIN allocation rules).

When packaging is updated the corresponding images are also updated. All images published thru Validoo must go thru the verification process described in this document.

Country Reference Data Model

The Swedish country data model contains around 185 attributes (will increase to around 220 after Major Release) including the Food & Beverage Extension. 45 or so are checked in the quality assurance process offered by Validoo Q-lab. Some attributes are checked in more than one way.

A.3 Case Study – GS1 Netherlands

Introduction

The purpose of this case study is to describe how GS1 Netherlands applies the Master Data Service (MDS). We will be looking at what the different options GS1 Netherlands has to check the data and who is responsible for this process. At GS1 the Netherlands **MDS** is used in 3 processes.

1. Outsourcing (commissioned by suppliers and retailers)
2. Onboarding mandatory for all new suppliers (commissioned by GS1)
3. Samples/audits (commissioned by GS1)

To be qualified as a Master Data Service for GS1 Netherlands, the relevant company must go through a certification process. (*Upon request*)

In this document the three different processes and learning’s will be described.

Audience

The industries drivers that lead us to create a **MDS**, are Legislation (e.g. EU 1169) the Retailers mandates and to gain more efficiency in the supply chain. We have support from local/multinational associations such as big retailers and suppliers (Ahold, Unilever e.g.)

Our audiences are Food, health & beauty retailers, wholesalers and suppliers for example:



Roles and responsibilities associated to the service

GS1 Netherlands	<ul style="list-style-type: none"> ■ Drafting and maintaining the manual for exchanging product data information through GS1 Data Source. ■ Certification of implementation partners in accordance with the requirements set out in this document and GS1 standard.
Supplier / brand owner	<ul style="list-style-type: none"> ■ Responsible for their product label information, assuring the quality of their label information and correctly providing it to the retailer.
MDS partner	<ul style="list-style-type: none"> ■ Responsible for continuous compliance with the requirements of the certification process and agreements. ■ Upon loss of certification and or failure to certify within the period prescribed by GS1, the MDS partner is required to inform its relevant clients about the loss of the GS1 certification.

Outsourcing MDS

The role of GS1 is to certify the (new) Master Data Services. After the certification, GS1 has no insight on how the MDS goes to work concerning outsourcing. Therefore, I’ll describe a few steps of the certification process.

In the Netherlands we have a certification for Master Data Service. 'GS1 QUALITY MARK' - certification for collecting label information in accordance with requirements for the food and drug sector.

With the GS1 Quality Mark, implementation partners can demonstrate that their services are approved by GS1 in the area of collecting and recording product data information details on pre-packaged foods.

If an implementation partner has earned the Quality Mark, then it entails:

- That it has demonstrated that it possesses the necessary expertise and skills to collect and enter label information in GS1 Data Source in accordance tot the sector agreements.
- Quality assurance of the MDS partner's services.
- Transparency for suppliers about which implementation partners meet the criteria for the 'GS1 Quality Mark' regarding Label Information.
- Assurance that MDS partners have equal opportunities to be audited.

This certification applies only to the new GS1 Data Source web interface. Certification for delivery through PIM solutions will be looked at on an individual basis.

The document describing the different steps of the certification process on the Master Data Services is available on request.

For now we certified three implementation partners on label information in the Netherlands:

- Xxtract
- Brandbank
- Syndicate Plus (only label information)

Learning's

The following observations have been made during the (still unfinished) certification Master Data Services, because we don't have insight in their outsourcing process.

- Having found some strange discrepancies between the measured values and the defined values, it appeared that the measuring equipment was not correctly calibrated. One of the issues found was that the measured gross weight appeared to be less than the theoretical net weight.
- Sometimes the product has to be measured in a different orientation because otherwise the product will never be in a stable position. Their application can swap the dimensions with one button, but sometimes they forget to do so.
- -They had difficulties in applying the international measurement rules, because these rules are not always consistent and clear. This is particularly in a case of flexible packaging.

MDS process in Onboarding

GS1 Netherlands works together with new supplier to guarantee the quality of their data, so the supplier will run through a series of steps to practice entering trade item data and to show that they are able to enter this data correctly.

The supplier will enter data on some trade items, which will be checked automatically and verified for correctness by an external **MDS**. If the supplier has entered the data correctly they receive a certificate. Then the supplier can start entering data on their whole assortment and make it available to their customers via GS1 DAS.

The supplier has two options to enter their data:

1. **Brand owner** The supplier enter their data by themselves.
2. **Outsourcing** The supplier can also outsource the recording of logistical data and/or label information in GS1 DAS. GS1 has certified various companies that can do this for suppliers

(Xtract and Brandbank). If the supplier commission a certified company to record data on their whole assortment they do not need to perform the steps in the certification process for example take a training course, enter products and send them in, and so on.

MDS steps in On Boarding

1. **Sending in Products** To check whether the suppliers have entered data in GS1 DAS correctly they have to send some products (consumer units) to the Master Data Service (**MDS**).
 - To get a good idea of the quality of their data we use the following rule for the number of products the supplier need to send in: *10% of the assortment, with a minimum of 4 and a maximum of 15 products*. GS1 will inform the supplier how many products to send in.
 - The **MDS** will look at the actual width, depth, height and weight of the products and the data quality checker compares them with the product data of the supplier, entered in the data pool. The suppliers need to send in the actual products (food), including the label.
 - The number of products we ask the supplier to send in is based on the total number of consumer units that the supplier has in their complete assortment, not just the products that they supply to one client. We ask the suppliers to send in as many different sizes, products and package types as possible, as that will enable them to practice with data on their whole assortment.
2. **Register and send products to the MDS service** (GS1 outsources measuring and verification to an **MDS**, which checks the data of the consumer units that the supplier have selected and sent in. The supplier send the consumer units that they have registered via the site to the **MDS**, stating the respective GTINs))
3. **Checking Data Quality** (Once the supplier have sent their consumer units to the **MDS** and entered the data, GS1 will start checking the quality of their data.

Logistical data	<ul style="list-style-type: none"> • The verification service checks whether the actual dimensions and weights of your products are the same as the data you have entered (physical checks). • The GS1 Data Quality Checker also carries out a series of automatic (integrity) checks, for example comparing net and gross weights (net must not be greater than gross). <p>Certification requirement: all the products sent to the verification service must score 100% for both physical and integrity checks.</p>
Label Information	<ul style="list-style-type: none"> • In the case of packaged food products we check whether the label information on two consumer units is the same as the trade item data you have entered (physical checks). • The GS1 Data Quality Checker also carries out a series of automatic (integrity) checks, for example whether the allergen type has a valid code in the code list. <p>Certification requirement: the Label Information must not contain any errors. You also need to score 100% in the GS1 DAS Data Quality Checker for the Label Information Integrity Check.</p>

Results of verifying logistical data

The checks on the logistical data entail the following steps:

- The day after the supplier has entered the logistical data (and the respective trade item hierarchy) they will find the score for the integrity checks in the GS1 Data Quality Checker (see chapter 5).
- The physical measurements will be carried out about five working days after the supplier send the consumer units to the **MDS**. The results can be viewed in the Checker soon afterwards.
- We also keep the supplier abreast of their scores for both integrity and physical checks in the weekly e-mails from the GS1 Data Quality Checker (see chapter 5). If one or both scores is/are below 100%, the supplier has to look in the Checker or the attachments the weekly e-mails to see what discrepancies have been found and correct the data in GS1 DAS.

- The supplier has to save the data and release it again after each change so that the GS1 Data Quality Checker and the **MDS** can check the new data.
- The supplier checks their scores again and correct their data if necessary, until they have entered all the data correctly and are scoring 100%.
- The supplier has completed this part successfully once they score 100% for all their consumer units in the certification process!

Results of verifying label information

This only applies to suppliers of pre-packaged food products. Verification starts once the **MDS** has received the products and the label information has been entered in GS1 DAS and published to the **MDS**.

The steps are as followed:

Physical checks

- The **MDS** checks whether the label information of two selected consumer units match one-on-one with the data in GS1 DAS and is filled in according to GS1 standard.
 - GS1 will e-mail the supplier a report of the results within five working days. The supplier has to study the findings in the test report.
 - The supplier has to make the necessary changes in the data pool for all the consumer units that where they have entered data regarding the certification process.
 - The supplier has to release the data on the revised GTINs in GS1 DAS.
 - The supplier notifies GS1 Account Management (accounts@gs1.nl) once the supplier has made the changes and released the data. We then inform the **MDS** so that they can check two new labels.
 - After about five days the data will have been rechecked and the supplier will be sent another test report. The supplier can check the data again and correct it, if necessary, until they have entered all the data correctly.
 - The supplier has completed this part successfully once they no longer have any errors in the Label Information test report.
- 4. Integrity checks** The supplier will also find the score for the Label Information Integrity Check and any discrepancies in the GS1 Data Quality Checker (see chapter 5), as well as being kept abreast with weekly e-mails. Once the supplier no longer have any errors, the score in the Checker for the integrity check will be 100%
 - 4. Entering Data on their Whole Assortment** Once the suppliers score 100% for all their trade item they will be sent a certificate and the company name will be added to the list of companies using GS1 DAS on the GS1 website. GS1 will e-mail the certificate to the supplier. As soon as they have received the certificate, the supplier can enter data on all their trade items and publish their data to the retailers.
 - 5. GS1 Data Quality Program** Trade item data can only help to optimize business processes if it is complete and correct, so GS1 continues to help companies to monitor and improve their data quality by carrying out checks in the GS1 Data Quality Checker and random checks on products. You can keep track of your scores in the GS1 DAS Data Quality Checker

Learning's

We use an external company to check the data of the supplier when they go through the registration process (Xtract). We chose for an external company because we didn't have enough capacity at GS1 Netherlands, the quantity of registrations were increasing every year.

Our learning's on using an external verification service, the main thing is that it takes more time because;

- You don't have direct control on this part of the process

- Miscommunication can occur, so make sure you have clear agreements.

If you can arrange an internal quality assurance service then that is also an idea to look in to when you don't have many suppliers. The lines of communications will be shorter and you can work faster if the service is on location.

This is the link to the GS1 Data Source Roadmap for new suppliers:

https://www.gs1.nl/sites/default/files/ld_gs1das_roadmap.pdf

MDS process in Audits / Samples

GS1 Netherlands is executing a Data Quality program based on physical sample checks and logical checks and build in the web interface via the Clavis data quality checker (see chapter 5).

MDS steps in GS1 regular Data Quality Program

Situation

At the start of GDSN in The Netherlands only logistical data was exchanged via GDSN. The focus has been on quantity but over time we have concluded that quality is poor and retailers do not trust the data. Usage was not optimal as a result and as a consequence the focus of suppliers on GDSN was reducing. This circle need to be broken with a DQ program.

A number of suppliers do not have the capacity and/or knowledge to enter the significantly increasing set of information in GDSN and a service to support them was required (**MDS**).

Approach

GS1 has started a DQ program endorsed by retailers. Results are reported back to the supplier via the Clavis data quality checker.

Periodically physical checks on samples.

Continuous Logical checks on all GTIN's via the data quality checker.

Suppliers that do not perform are urged to improve by GS1 and retailers – sometimes using a form of penalties.

Program until 2015: There is currently a new program in development.

Audits on logistics: product checks on dimensions such as Depth / Height / Width and Weight

- Based on a sample of 10% of the active assortment of the supplier.
- **MDS** measured the articles in distribution centres of the retailer. Then the MDS captures data in a report.
- GS1 uploads the report in the Data quality checker and it then verifies the data with the data in GS1 DAS and reports by vendor abnormalities and receives this every week.
- Suppliers have daily access to the Data quality checker for change in scores and understanding deviations

Audits on label information of food products: checks on all the mandatory fields.

- Based on a sample of respectively 3, 5 or 10 products per supplier, depending on the size of their assortment.
- GS1 select products (+ reserve if products are not available) and asks suppliers to send in products to the **MDS**.
- **MDS** measuring products; explains data fixed in a standard report.
- GS1 sends the report to the supplier with abnormalities and the percentage right/wrong with the request to correct the data.
- In order to support suppliers GS1 has certified several parties (for the moment Xxtract and Brandbank) to setup a data capture service that captures the required product information and eventual enters the data in GDSN

Learning's

- - MDS: We don't have direct control on this part of the process- Everything takes more time (think about changes that we as GS1 want to make)
- - MDS: Miscommunication can occur, so make sure you have clear agreements.
- - We are responsible for the measurement rules and overall GS1 standards, therefore if there are discrepancies in the results, we need to provide the support and solution to our suppliers.

Program as of 2016 (in development):

Audits on food label and drug products: checks on all mandatory food label fields checks on dimensions: Depth / Height / Width and Weight.

- The base is 100% measuring of new products and mutations by supplier.
- Depending on improvement in the Data quality scores, 100% is changed to measuring only samples. So who performs well is less measured.
- GS1 and suppliers select products (new/mutations) and suppliers send their product labels to the **MDS**.
- **MDS** measuring products; explains data fixed in a standard report.
- GS1 sends the report to the supplier with abnormalities and the percentage right/wrong with the request to correct the data.
- Repetition of process and outfitting to sample depending on score or data quality.
- Extra focus on data capturing for small companies

Data quality Checker

In the Netherlands we use a tool that makes the quality of the data transparent. The Data Quality Checker monitors the quality of the product data that are:

- Active in GS1 Data Source (GS1 DAS)
- Are published to GS1 DAS subscribers (buyers) in the Dutch market
- Are published to the GLN of the GS1 Data Quality Checker (8712345012021).

The GS1 Data Quality Checker is a tool that checks and identifies discrepancies in the data that suppliers have added to the data pool. These checks are based on the standards and national sector agreements.

The Data Quality Checker checks for integrity (automatic) discrepancies (for example, a Consumer trade item cannot be heavier than a Non-Consumer trade item) and physical (manual) discrepancies regarding product measurements (width, depth, height, and weight).

The Data Quality Checker operates on the basis of scores for each type of check, which state the degree to which your data are approved. A score of 95% means that no discrepancies have been detected in 95% of the data of the suppliers.

This is the link to the Data Quality User Guide:

https://www.gs1.nl/sites/default/files/LD_GS1DAS_DataQualityCheckerUserGuide.pdf

Business process the service supports and related data attributes

Business processes, KPIs and metrics

Data quality initiatives: what retailer business processes do they support today:

- Reliable POS information
- Orders and deliveries process
- Better shelf management – planogram

- Efficient and reliable truck loading
- Efficient warehousing
- New line introduction

Our KPI and metrics

- Logical (automated) checks
- 66 checks on logistics information
- 36 checks on food label information
- Validity tests: checks on dependency between attributes
- Multilevel Parent/Child Consistency checks
- Mandatory tests: checks if required fields are present
- Consistency tests: checks on consistency between attributes
- Physical checks on dimensions: Depth / Height / Width and Gross Weight and Food label information (1169)
- For all processes except planogram

Product images

We are in the process of starting up a project of exchange of images which will be a front format (not commercial image)

Type of consulting services we offer

- Training
- Account management (one to one support for suppliers / retailers)
- Customer support
- Documentation
- Communication
- Physical production inspections (checks) on logistic information and food label information
- Automated logical checks via DQ checker

Key validations which take place for this service

In scope

- Data attribute integrity (see earlier in this document)

Out of scope

- GS1 keys integrity (not part of MDS)
- Business processes

Change Management

Item change and item delete is supported by GS1. It is not part of **MDS**.

Country Reference Data Model

This is the link to the GS1 Data Source - Master data attributes for the food, health & beauty sector:

https://www.gs1.nl/sites/default/files/ld_gs1das_attributeguideandinstructions.pdf

A.4 Case Study – GS1 Canada

1. Document Purpose and Scope

2. Audience
3. Master Data Service Description and Scope
 - - Describe what the service contains
 - - Provide the associated data model
 - - Roles and Responsibilities associated to the service
 - - Key customer requirements for this service
 - - Align to the GS1 Standards and document where possible
4. High Level Business process the service supports and the related data attributes
5. Business Value
 - - KPI's related to the service
 - - Benefits accomplished
6. Key validations which take place for this service
 - - Checking for GS1 Key Integrity
 - - Business Process Integrity
 - - Data Attribute Integrity
7. Change Management: Item change and item delete: how is on-going maintenance conducted to the lifecycle of the product(s)
8. Country Reference Data Model