The Global Language of Business

Guiding Principles for Attributes and Codes

Reference document for attribute and code development and creation

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1 Introduction

The purpose of the Guiding Principles for Attributes and Codes is to provide a reference document for attribute and code development and creation. It provides an overview of attributes and codes along with its fundamentals, principles, and rules.

1.1 Out of scope of this document (Please see Appendix for links)

- Global Product Classification (GPC) Principles
- GS1 Architecture Request for Finding (RFF) GPC vs GDSN duplication
- GS1 Validations
- GS1 Work request submissions
- Technology: GS1 Web Vocabulary, GDSN, etc.

2 Master Data Overview

GS1 Global Master Data (GMD) is a process that gives all trading partner a standard way to exchange product information in the same way globally/regionally or locally. This provides a benefit to consumers when making buying decisions based on consistent information. It ensures that product information is correct and uniform, everywhere in the world. The term "product" as used throughout this guide refers to physical and digital products and services.

The business objectives of Master Data are to provide:

- A common way to exchange the data required to list, order, ship, store and sell products.
- A common vocabulary of information to help consumers with their buying decisions.

2.1 Attributes

Attributes are defined as a changeable property or characteristic of a product or company that can be exchanged to provide a common language across various parties.

2.1.1 Attribute data types

Attributes can come in various data types. There are reasons why you would or would not use a particular data type from a business purpose. This is critical when researching if an attribute, which may already exist, will suite your purpose. This is not a complete list of attribute types. For a full list please refer to the Work Request template page https://www.gs1.org/standards/wr: How to fill out GS1 Attribute template Click here to download

Data type of attribute	What is it?	Why use it?	When not to use it?
Description	A way to communicate a text of information that encompasses the language used.	Allows a way to send descriptive information. In addition, allows the user to send the information in various languages as some markets have multiple national languages or the community languages vary.	When you need exact values exchanged.

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Data type of attribute	What is it?	Why use it?	When not to use it?
Code	A way to send exact value from a drop-down list.	These are useful when specific data values are needed to improve accuracy. These can be translated, if necessary, by the user. These are particularly important to facilitate consumers' search and discovery of products when shopping on websites.	When the data can vary for similar information. There is a limit on how many codes are useful before it becomes useless.
Boolean	A way to state a data point is true/false, yes/no to a piece of information.	When there is a need for a positive or negative response. Usually for compliance with a regulation when the false/no is just as important as true/yes.	If only the positive of true/yes is needed, you may need a code, not an attribute. Be aware of exceptions as non-binary logic may fit your need.
NonBinaryLogicEnumeration	A way to state true/false, yes/no to a piece of information. Additionally allows the user to state something is not applicable to a product or is unspecified.	This is particularly useful when working with regulations. When yes/no is needed, but sometimes regulations have exceptions, and this allows a user to state the attribute is not applicable.	When the only values are true/false, yes/no.
String	A way to communicate a text of information when a language or translation is not needed.	For things, like product model numbers, when you have various character sets needed and translation is not needed.	Avoid using in multiple markets with different languages is required.
Measurement	A way to share information that will need a measurement and the ability to state the unit of measure.	Useful for many of the types of measures that are needed for especially scientific or length measurements.	Not useful for counts of objects.
Integer	To share whole numbers with no decimals. This includes negative integers also.	Useful for scores or things that can use negative and positive whole numbers.	Do not use if you only need positive numbers.
Non-negative Integer	Sharing whole number information that cannot be negative integers.	This is useful for counts of things.	Do not use for decimal, measurements as it is the wrong data type.

3 Master Data Fundamentals and Principles

3.1 Foundational goals

- Insure there is a business need and benefit for any master data request.
  - Understand how the information will be used by the business user.
- Reduce the amount of duplication by analysing the request and understanding what the actual need is.

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- A requestor will need to give a business cost and impact of "why" the current standard does not work.
- This is not absolute as the term duplication will be defined further.

- Awareness of cost and impact to the communities. A business need and benefit should outweigh the cost or impact to the community.

3.2 Levels of Master Data Usability

- Concept: Levels of defining master data usability – the objective is to define how business terms are created or analysed by trading partners. Sometimes looking at a business term from a simplistic aspect without no context of meaning, to looking at something so specific, it can only be used for 1 purpose.

Level		
Generic Business Term	No business context	Example: Stick
Business Context + Business term	Splitting the business context from the term	Item: Pogo Stick, Packaging: Stick, Material: Wooden Shape: Stick, Dispenser: on Stick.
Unique/Specific Business term	Business context included in term	Pogo stick, Wooden stick, popsicle stick, deodorant stick, lip stick

What does this look like:

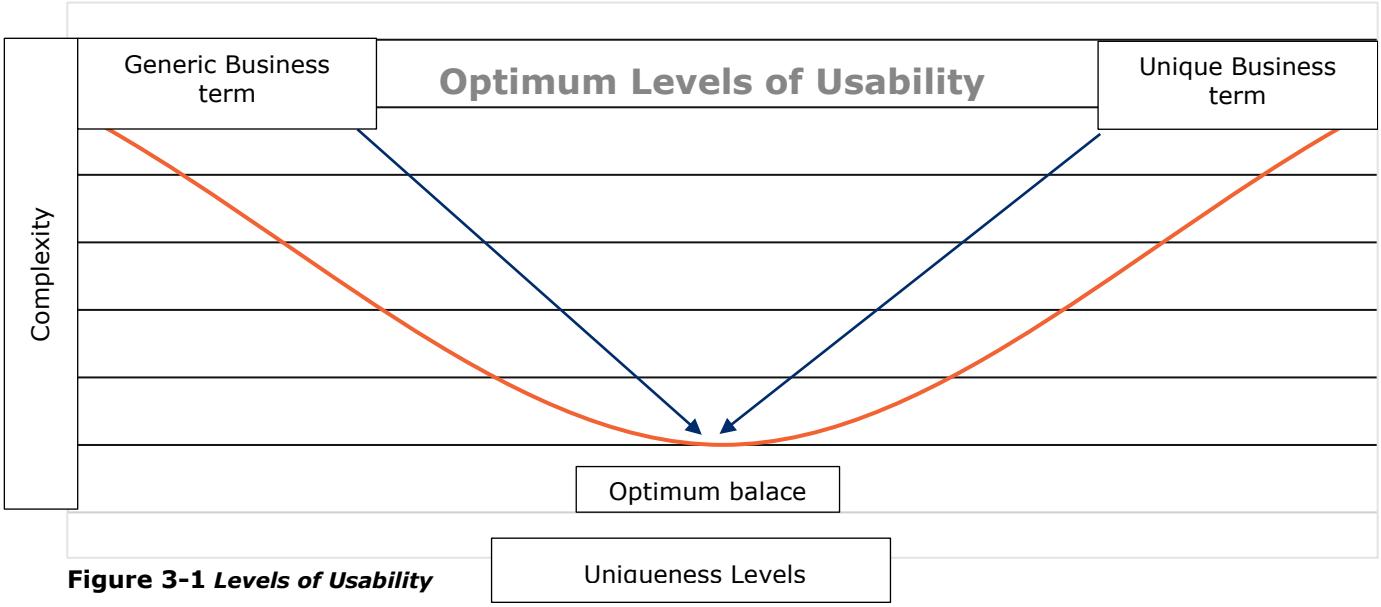

Figure 3-1 ***Levels of Usability***

Complexity can be seen two ways:

- Unique term = Large number of attributes or codes = complex to find what is needed
- Generic term = no business value as the attribute has little business meaning, hence more requests for attributes/codes.

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3.3 Business readability versus Machine-to-Machine capability

Due to initiatives like the GS1 Global Data Model and Attributes Definitions for Business there is a larger need to make sure attributes and codes are readable by a businessperson or are defined with "business friendly" definitions.

This allows the standards created to be technology agnostic. This means the same standard can be used in an electronic system exchange or in a spreadsheet by someone who may be visually reading it.

3.4 General Principles

Business Object – An attribute, attribute + code or a code can be defined as a business object. This means the element or combination of elements should result in unique standards.

Duplication – from a Master data perspective means that the "Business Object" is duplicative.

- An attribute or code by itself may be considered as being duplicative, but one must always evaluate the business context (attribute) used.
- This means not only the content is the same but in business, the same objective is meant, serves the same business purpose.
  - Is the information important for Consumer facing – shopping purchase?
  - Is the information important for patient safety and regulatory?
  - Even though there is overlap – what is the % something can overlap?

Example 1:

Gluten – If a term of just "Gluten" is exchanged.

- Is it an allergen?
- Is it about a type of diet?
- Is it a claim the product contains gluten or free from gluten?

Gluten needs a business context to understand the business purpose.

Therefore, a code of GLUTEN may exist in multiple attributes, pending the business context or object being defined.

Example 2:

Different Business needs

- Consumer information vs. Recycling needs - Example of when attributes seem to be duplicate but serve a different purpose.
  - Consumer information

    Packaging Feature Code is designed for consumer facing data as the codes contain additional "features" of the packaging, which may influence a consumer's buying decision.
    - CAP
    - CROWN_CAP
    - SCREW_CAP
    - SCREW_CAP_METAL
    - SCREW_CAP_PLASTIC
    - TWIST_OFF_CAP
- Recycling needs

  Packaging Material Element Code, Packaging Material Type Code and Packaging Material Composition Quantity – Create a "Business object" to specify the amount of material one of these elements are made of for recycling programs.
  - Packaging Material Element Code is simply CAP with no function of how to use the cap, not material suggestion.

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- Packaging Material Type Code is POLYMER_HDPE as this is a specific type of material. There is value to the consumer for this type of information. E.g., recycle programs.
- Packaging Material Composition Quantity would be the weight of the Cap made of HDPE Plastic.

4 Attribute vs Codes

4.1 Introduction

This section defines the process of determining the correct type of attribute needed. Common feedback received is "there are too many attributes" or "there are too many codes to select from".

4.2 Attribute vs. Code balance

Balance		
Generic Attributes & Codes	The business context is all in the code or value and definition.	This leads to hundreds of codes in one attribute. This tends to make lists too big for businessperson to find the right code.
Business Attribute & Code	Allows flexibility to create proper attributes and minimize duplication.	A balance between codes and attributes, product category specific and product specific attributes and codes.
Product Specific Attributes	The attribute can stand on its own without any interpretation.	This leads to thousands of attributes. Difficult for sellers to maintain as they will have to populate and look through thousands of attributes.

4.2.1 Determining proper attribute

4.2.1.1 Product category specific attribute or generic attribute used across multiple product categories

- Specific/Unique attribute – when the attribute needs to be product category specific.
- Generic attribute – when the attribute is usable to go across product categories.
- Business costs to examine
  - Regulation compliance

    Example: Failure to comply may lead to fines.
  - Poor data quality – leading to liability.

    Examples: Incorrect allergens, Patient safety, etc.

Versus

- Adding an attribute to various systems
- Adding business process to capture additional information

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Balance is Key

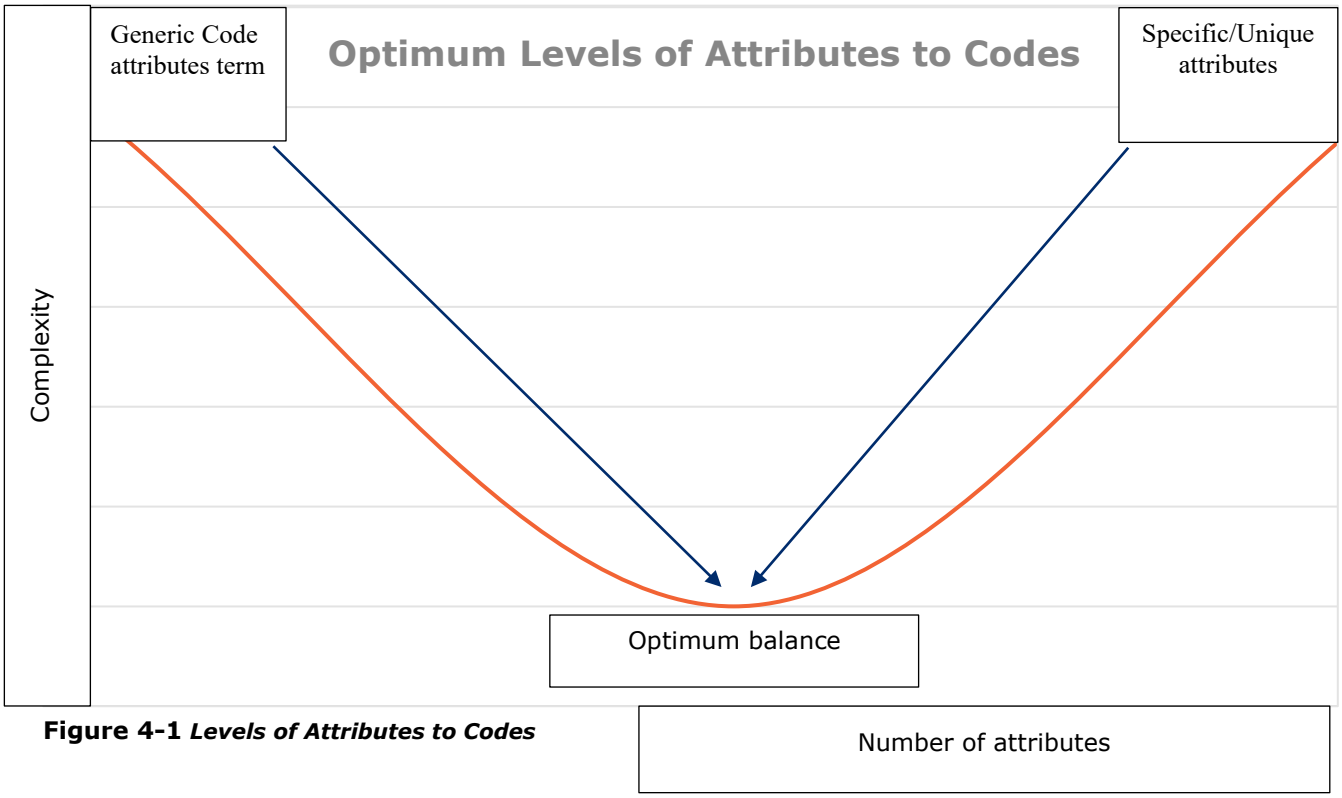

Figure 4-1 ***Levels of Attributes to Codes***

4.3 Steps to determining what to ask for:

Question 1

Does your "business requirement" already exist as an attribute?

How to verify

1) Get latest copy of GDSN Business Message Standard (BMS), use the Global Data Dictionary (GDD), or get copy of Attributes Definitions for Business (ADB).
2) In BMS or GDD look for a technical attribute name (XML) or a definition, which contain something similar or exact to your business requirement.
3) In the ADB, search the Business attribute names, definitions, usage statements and examples, which contain something similar or exact to your business requirement.

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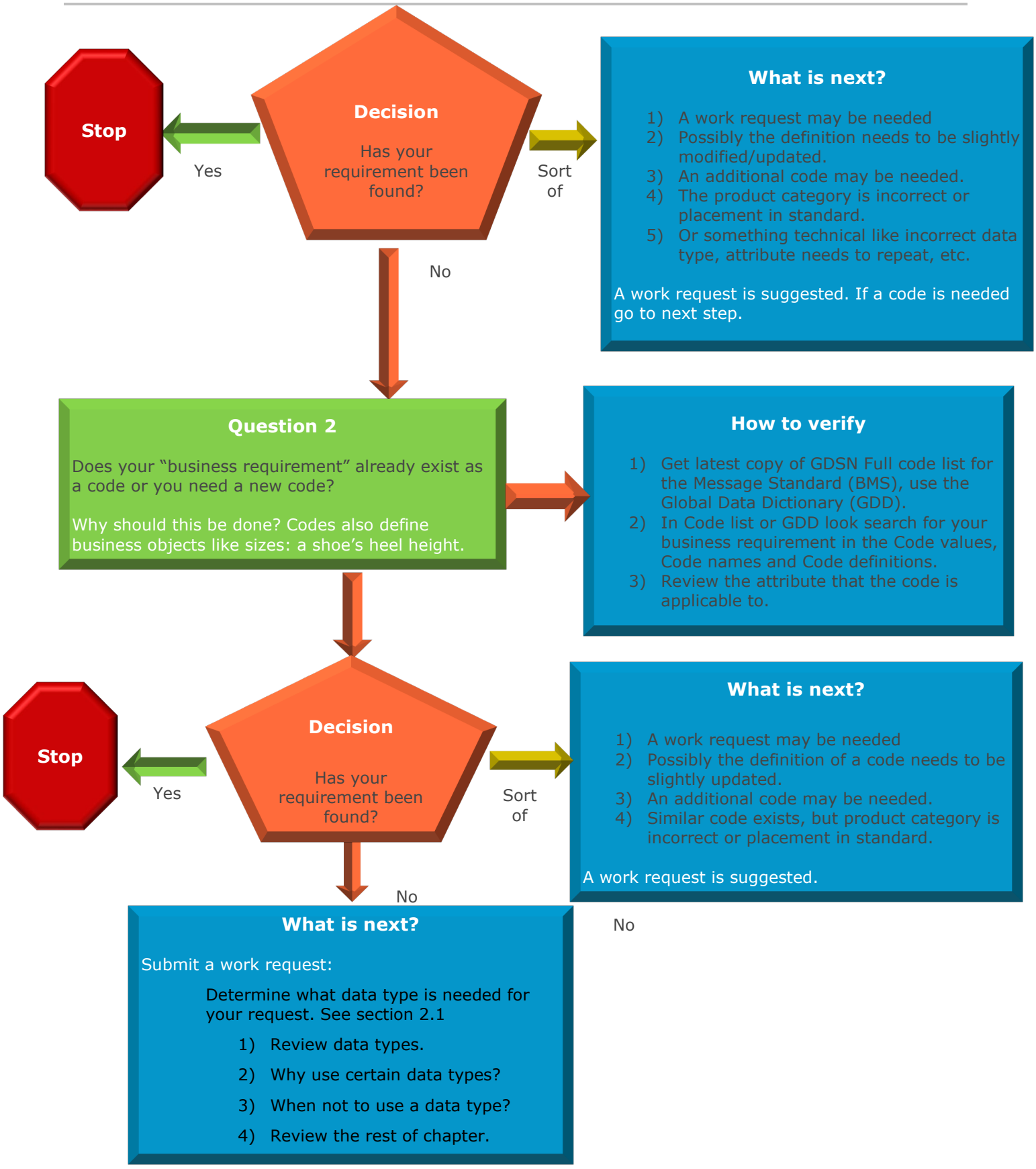

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4.4 Changes to current standards

- If an attribute/code exists but definition is not clear or needs expansion to meet the business need.
  - Solution: Expand the definition. Example: Vegan food/nonfood originally the definitions for claims concerning Vegan only referred to food, a simple work to include in the definition was state non-food product were also applicable.
- An attribute exists, but the data type does not meet the business need.
  - Examples:
    - Search & discovery on a website for drop down or a description data type.
    - A drop-down list for a website cannot be created from a description. A buyer would have to read each description to determine which drop down selection the product may go into.
    - Therefore, the business need is different, and the current standard does not support the business usage, therefore duplication is acceptable when the business need is clear and the benefit exists.

4.5 Requesting Boolean attributes

- Should only be requested, if a negative answer is required by regulation or has a specific business benefit.
  - Example: Filtered vs Unfiltered, when multiple filters exist, no need for positive isFiltered as an attribute "filter Type Code" would be useful.
  - Example: Has Automatic Transmission as the negative would be a manual transmission which consumers search for. This has a benefit to consumers.
- If this a feature of product and the seller would never claim something does not have a feature, then a negative claim is usually not a marketing claim to sell something.
  - If only the positive is needed this should be a code somewhere.
  - Example: Waterproof. A seller would not claim a product is not waterproof.

4.6 Specific product category or generic attribute for codes

4.6.1 Specific product category

One of the challenges with code attributes is determining should an attribute be generic or a specific product category attribute.

- Step 1: Is the list of codes "unique" for a "Product Category".
  - Unique would be that 70-80% of the codes are unique for a "Product Category".
  - Product Category would be the appropriate level in the GPC Hierarchy (Segment>Family>Class>Brick) that "Uniqueness" can be found.
- Examples:

  1) Size types for Medical Devices were found to be unique to the GPC Segment of Medical devices, therefore a new attribute was determined to be applicable. In addition, fines due to incorrect selection of a proper clinical size reported to a regulatory body.

  2) Seafood separated from Meat/Poultry. Seafood presentation codes were unique at the GPC Family, therefore a separate attribute was created.
- Step 2: Sometimes the "product category uniqueness" process does not work, and a Logical "Uniqueness" must be created. A business determination must be made of where "uniqueness" occurs.

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- Example:

  1) Meat vs. Poultry type of cuts – When looking at GPC

  Segment – Food/Beverage/Tobacco – Unique

  Family - Meat/Poultry/Other Animals – Unique

  Class – The type of cuts spans across two classes

  - Meat/Poultry/Other Animals – Prepared/Processed
  - Meat/Poultry/Other Animals – Unprepared/Unprocessed

  Therefore, a business decision can be made there is a need to split Meat and Poultry cuts as the animal belong to a type of group and their cuts were unique for each type of group (Meat group and Poultry group)

- Step 3: **If at the GPC Segment level the value can span across multiple segments then a generic attribute is best.**

  In this instance we can leverage the code value context mapping.

4.6.2 Generic attributes for codes

The development of how to manage large code lists for generic attributes utilizes the Code Value mapping to Master Data Context.

4.6.3 What is Master Data Context?

During GDSN Major Release an idea was generated to map GPC Bricks to product categories groups called "Contexts" that have like product characteristics. The "groupings" were defined as:

DP001	Audio Visual Photography, Electronics, Communications, Computing and Appliance Products.
DP002	Audio Visual Media Products
DP003	Beauty Hygiene Home Healthcare Products
DP004	Cleaning Hygiene Products, Lubricants, Fuels, Automotive and Building Product Chemicals
DP005	Clothing And Personal Accessories
DP006	Food Beverage Tobacco and Pet Food Products.
DP007	Medical Devices
DP008	Pharmaceutical
DP009	Sporting Goods
DP010	Building Products, Automotive, Tools, Office and Arts Supply Products
DP011	Household/Office Furniture/Furnishings
DP012	Kitchen Merchandise
DP013	Live Animals and Live Lawn/Garden Plants
DP014	Toys, Games, Musical Instruments
DP015	Cross Segment and Variety Packs

Note: DPI or DP is defined as Distribute Product Information. You may see both in GS1 documentation.

The GPC Brick mapping to Context can be found here: GDSN Release page

The file is named under Release Guidance: GPC to Context Mapping

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4.6.3.1 Generic attribute codes mapped to context

The way to alleviate the issue of too many codes in a generic attribute that may cross several contexts is to provide which contexts a code is applicable.

This then can reduce the number applicable codes to a product when selecting.

- Example:
  - AC_DC_ADAPTER would be applicable to Electronics, Toys, etc. but most likely not applicable to Food, Live animals, etc.
  - Based upon the GPC Brick selected a system or review of the code mapping can reduce a list of applicable codes by 20-70%. This is important as it reduced the potential for error in selecting a bad code.

4.6.3.2 Generic attribute codes mapped to context example

In the mapping the codes values are assigned a rating on applicability

1 = Most likely used

2 = On occasion used (used infrequently) ~5%

3 = Very rare occasions or not applicable >1%

Code Value	Code Name	Definition	DP001 Audio Visual Photography, Electronics, Communications, Computing, Appliances	DP002 Audio Visual Media Products	DP003 Beauty Hygiene Home Healthcare Products	DP004 Cleaning Hygiene, Lubricants, Fuels, Automotive, Building Product Chemicals	DP005 Clothing And Personal Accessories	DP006 Food Beverage Tobacco Pet Food Products	DP007 Medical Devices	DP008 Pharmaceutical	DP009 Sporting Goods	DP010 Building Products, Automotive, Tools, Office and Arts Supply Products	DP011 Household/Office Furniture/Furnishings	DP012 Kitchen Merchandise	DP013 Live Ani... Live Lang... Pla...
AC_DC_ADAPTER	AC DC adapter	A power supply that is built into a plug and is not built into the unit it is powering.	1	3	1	1	1	3	1	3	1	1	1	3	3
ADDITIONAL_ATTACHMENTS	Additional attachments	Indicates whether a product comes with separate accessories for example a shower hose sold with a shower head.	1	3	1	1	3	3	1	3	1	1	1	3	3
ADJUSTABLE	Adjustable	Code indicating the ability, or lack of ability, to change to conform to a specific user's needs, usually as it relates to size.	1	3	1	1	1	3	1	3	1	1	1	3	3

5 Rules & Guides for leveraging GPC Brick attributes

This is a guide when trying to leverage GPC Brick attributes as master data attributes potentially to support business to consumer information.

Steps on what should be done:

1. Review the content outlined above.
2. Analysis should be done prior to submission; community resources are limited.
   - If analysis is not done and request is just repeating GPC Brick attributes, the work request will be sent back as not actionable.
3. It is the responsibility of the submitter to try their best to work through the process before submitting a work request.
4. Since GPC brick attributes are applicable to product, is there a common attribute name or part of a name that spans across product categories? (See section 4.5 or guidance).
   - How many categories can the values go across?
   - What level of GPC hierarchy does it fit?
     - If many GPC Segments are applicable, then a generic attribute utilizing the Context mapping is recommended.
5. Are there terms in the brick attribute values that are similar?
   - Example: Can another attribute be created that can reduce number of codes?
     - numberOfRibs – for meats there was over four hundred codes with the term "Ribs" and a number of ribs for the product. By adding one attribute numberOfRibs, this reduced the number of codes needed.

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6. Creating possible Boolean where makes sense, see section 4.4 Booleans
    - Example:
        - In meats Boneless vs Boned makes a difference to consumers.
        - But does isBoneless make sense or do codes BONELESS and BONE_IN provide more formation and no incorrect interpretation.
7. Examine the list of attribute code values.
    - GPC historical values may need to be updated.
    - Some brick attribute values were placed incorrectly in the wrong attribute. A work request may be needed to update GPC.

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A Appendix

- Global Product Classification (GPC) Principles
- GS1 Architecture Request for Finding (RFF) GPC vs GDSN duplication
- GS1 Validations
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