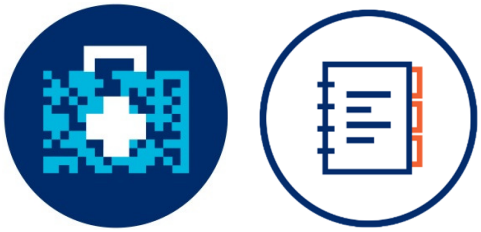
GS1 Australia

The Global Language of Business

Title	**Healthcare Data Quality Framework**
Version	**1.0**
Date	**August 2017**



Document Purpose

The purpose of this document is to be the central guide to the Healthcare Data Quality Framework. It complements the Executive level[1] document which describes the need for a data quality framework in the Australian Healthcare sector.

The Framework has industry leadership from GS1 Australia and the Australian Digital Health Agency.

The document is intended for all participants whose roles are defined herein. The main audience is Publishers/Suppliers who are required to deliver quality data into the National Product Catalogue (NPC).

Disclaimer

[1] Executive Primer

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Executive Summary

A review of data quality and usage within the multiple systems across the Australian Healthcare sector has highlighted opportunity for considerable efficiency improvement and reduction in costs that are currently resulting from poor data quality.

Within the computer systems used to run hospitals it was found that a significant proportion of the data[2] was proven to be of low quality[3]; incorrect, incomplete and out of date, resulting in high costs falling into the millions whilst contributing to negative patient outcomes[4].

Across the total Australian Healthcare supply chain, lost revenue from unclaimed joint replacement prostheses (due to data inaccuracies), resulted in costs of an estimated $8.75million per annum. The potential cost of manual checking of Units of Measure is $8.8million per annum and results in over or under-supply which has patient-safety implications[5].

The complexity of the Healthcare industry lends itself to a "bigger issues" attention which has contributed to the masking of and de-prioritisation of high-risk issues. It's timely that a re-focus on the data and supporting framework be adopted to enable data reliability within the Healthcare systems.

The industry has come to understand that the quality of the data relating to a product is as important as the quality of the product itself.[6] This document describes the upcoming ***Healthcare Data Quality Framework,*** which was launched in July 2017.

Supported by the Australian Digital Health Agency and GS1 Australia, this Framework provides tools and support to participants across various areas of the supply chain within the HealthCare sector. There is a strong reliance on Suppliers to undertake the most active part in adoption of this framework. It will be role of the supplier to remediate data errors currently in the NPC as well as establish an internal Data Quality Management (DQM) system using guidance from a self-assessment scorecard.

The data quality issue is an ongoing concern that is gathering momentum and highlighting the need for immediate address. The Healthcare Data Quality Framework is a critical part of Australia's Healthcare improvement that will positively impact costs and patient outcomes.

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[2] Master product data

[3] ***Post Implementation Report Out,*** Australian Digital Health Agency & GS1, January 2017

[4] ***Healthcare Data Crunch Report 2014*** – matching of net content and Unit of Measure data varied from 0% to 99.6% for the two fields. The results show there is a risk that the wrong product at the wrong quantity could arrive at hospital stores area, resulting in both inaccurate supply and patient safety impact due to reduced quality of care.

[5] ***Healthcare Data Crunch report 2014***

[6] *GS1 Value of Trusted Data for Hospitals*

This Framework has been established to assist all stakeholders in the Healthcare sector who supply or are a touch-point of product master data. Given the urgency of the issues within the Australian Healthcare systems and services, the success of the framework relies on the adoption and sponsorship by its stakeholders in partnership with the support offered by GS1 Australia.

1.0 Healthcare Data Quality Framework

In any automated, digital process the quality of the data used to feed the process is critical. Australian Healthcare service delivery now comprises many automated digital processes, however industry experience and investigations have shown that the quality of the data feeding these processes is low and contributes significantly to increased costs and risk.

The GS1 Australia Healthcare Data Quality Framework has been developed to address the data quality issues. The framework provides the information needed to implement sustainable data quality practices. It requires ongoing commitment from all stakeholders to be successful.

2.0 Scope of the Framework

The scope of the Data Quality Framework is to remediate all data quality issues within the NPC[7] and to develop and implement sustainable data quality management processes.

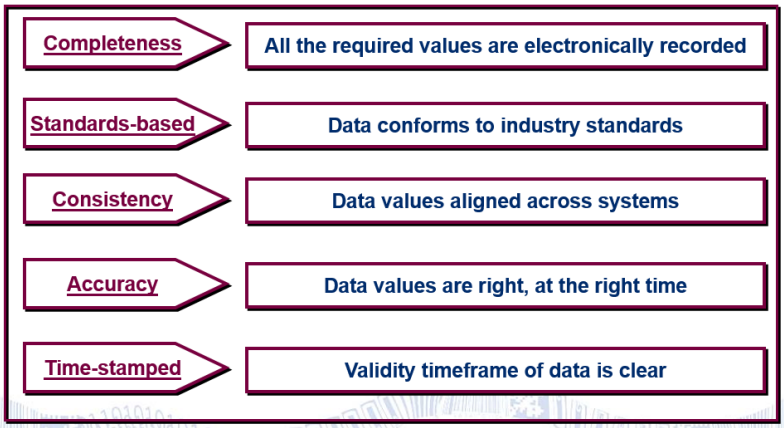
2.1 Remediation of Data Quality Issues

A key aspect of the Data Quality Framework is the automated generation of monthly data quality reports by GS1 Australia. The reports will be issued to both Publishers and Recipients to provide visibility of critical data issues and specific areas of error concentration. Publishers are required to review their report and correct any data quality issues identified by the reports. GS1 Australia offer a dedicated support to Publishers for the remediation of data quality issues.

[7] NPC

2.2 What is Data Quality?

Underpinning the importance of understanding the meaning of the term "Data Quality", the GS1 Global Office defines it with following pillars:



*Source: GCI/CapGemini Report: "Internal Data Alignment", May 2004

The NPC provides data validation using sophisticated rule-based tools. There is a diagram depicting the end-to-end validation process further down in this document.

The NPC validator can verify data to ensure that it is valid through a series of logic based rules.

However, validated data does not necessarily equate to correct data. The NPC Validator cannot verify the accuracy of the populated individual field value. For example:

- A prosthetic rebate code (PRC) may be present but may be the incorrect or unrelated code for the specified item.
- A price may be present and correctly formatted but is no longer current and therefore should have been end-dated.
- Product dimensions may fall within valid tolerances, but the overall dimensional attribute value may be incorrect.
- Ingredients may have changed, resulting in a replacement product, but the update has not been made in the NPC.

This framework addresses policy and procedure around data quality from the supplier source, right through to the recipient systems that use the data. It is about remediating data that is already in the NPC as well as ensuring data quality sustainability. Each of the role owners have a responsibility for their part in the end to end data processes.

2.3 Why Data Quality

Trusted data quality exchanged between trading partners is critical to the efficient operation of the Healthcare Industry. To realise the full potential of the

NPC, trading partners must ensure that quality product and pricing information is aligned across their systems.

In the absence of reliable data, trading partners are forced to set up additional means to control data quality, resulting in increasing complexity and resource exhaustive data processes with increased risks in both patient safety and downstream business touchpoints.

2.3.1 Specific Use Cases in Australia

Below is a link to of use cases for standardised product data. The use cases defined within the document referenced via the link have been identified by cross sector representatives from the Australian health system with assistance from the Australian Digital Health Agency.

Use Cases for Australian Health Sector

2.4 Central source of truth – NPC

The Australian Healthcare sector uses the NPC[8] as a data sharing tool for suppliers to publish standardised Healthcare data to Recipients. This framework objective focuses on the quality of the data in supplier systems, the NPC and in buyer systems.

The NPC adheres to global standards for data sharing and synchronisation across supply chains. It enables suppliers to provide master data to customers once, providing the opportunity to create a central "source of truth". This "central source" has been very successful, but the "truth", or quality, of the data needs to be addressed urgently.

To that end, this framework focus is not specifically on the NPC, rather this framework is about the quality of the data within it.

The NPC provides validation tools and services to trap and identify "invalid" data. However, "valid" data is not the same as true "quality" data which must also be current and accurate.

The standardised nature of the data in the NPC means that a supplier's internally-held data may need to be mapped or calculated before being sent to the NPC. Ensuring the mapping/calculation is accurate is part of data quality in the NPC. An example may be a supplier's units of measure for a product must map to an identifying Global Trade Item Number (GTIN) in the product hierarchy.

[8] Hosted by GS1 Australia and includes data support services

The adoption of this Framework will result in the NPC becoming the central source of truth for Healthcare master data. Data that is used to run systems that deliver a myriad of healthcare services throughout Australia.

2.5 What is a Data Quality Management system?

A DQM system is simply a set of processes that deliver quality data as its output.

Publishers/Suppliers will conduct a data quality self-assessment of the processes they use to capture, validate and verify Healthcare data. A standardised scorecard is provided to prompt and record self-evaluation pertaining to data quality within organisations.

The self-assessment exercise will reveal the level of attention and process around data quality within the business and thus enable the planning and of a DQM system to address the identified data quality gaps and issues.

2.6 Sustainable Data Quality Management

Sustainable data quality is a critical aspect of the Data Quality Framework. The framework provides a framework for reviewing and or establishing Data Quality Management (DQM) within organisations. To assist Publishers to assess their DQM level, the framework includes a standardized spreadsheet-based scorecard tool[9], customized for healthcare data quality. This user-friendly tool will allow suppliers to self-rate and produce a data quality score in the areas of:

- Strategy
- People
- Data
- Process
- Technology

[9] Developed by GS1 Global office

Phase A – Action NPC Data Quality Report	Phase B – Conduct Data Quality Self-Assessment	Phase C – Plan DQM system	Phase D – Document & Implement DQM	Phase E – Review & Embed DQM	Sustained Data Quality
Commit to the DQ Framework. Action NPC Data Quality Report – Begin data remediation	Manage and Complete Data Quality Self-Assessment using scorecard. Report results (internally)	Plan Data Quality Management (DQM) based on self-assessment	Document SOPs and Implement DQMS processes Report on data quality outcomes (internally)	Review and adjust SOPs Embed DQMS into Policy and finalise SOPs. Ensure DQMS authorities and succession in place	Conduct a second Data Quality (DQ) self-assessment to ensure that internal improvements have occurred. Monitor the NPC or internal DQ reports and action the necessary remediation
continuous data remediation					
Framework Outcomes	**Framework Outcomes**	**Framework Outcomes**	**Framework Outcomes**	**Framework Outcomes**	**Framework Outcomes**
• Supplier committed to Framework • Supplier has commenced remediation of their data	• Visibility of internal supplier data quality status • Continued data remediation	• Supplier has planned a DQMS within their businesses • Supplier has remediated existing NPC data	• Improved data quality across the business • Improved stability of data quality for the business • Clear identification of non-compliant suppliers	• DQM embedded across business • Risk of data quality degrading over time mitigated	• DQ is a high priority and is embedded in business-as-usual processes • DQ issues that arise, are identified and remediated earlier in the data lifecycle • Subsequent analyses can show significant improvement in areas such as prosthetic rebate revenues and other areas previously impacted by low data quality

3.0 Phase A: Action the NPC Data Quality Report

Phase A involves the internal business communication, at a senior management level, stating the organisation's commitment to the Data Quality Framework. The intention of the internal communication is to ensure the business is aware of senior management support for the framework to drive the accountability and change adoption across all levels of the business, effectively putting the Data Quality Framework into action.

Suppliers and Publishers with data loaded to the NPC will be sent an NPC Data Quality report. As the NPC data validation rules have continued to expand and evolve over time, a post load validation is applied across all historical data to ensure its compliance to the current rule set and give opportunity for remediation.

All data loaded into the NPC, regardless of its publication status[10] is included in the GS1 Australia's data quality validation process. Data Recipients will receive a monthly data quality report which ranks all trading partners Publishers in accordance to the quality of their data in the NPC, as well as benchmarking them against other Publishers for that Recipient. Data Publishers will receive a similar report providing a ranking for the quality of their data in the NPC.

Below is a link to a sample report that a Data Recipient will receive:

Link to sample Recipient/Customer NPC Data Quality Report

Data Recipients will be required to work with suppliers to correct the reported data quality errors and update the NPC catalogue.

Data remediation activity is monitored by GS1 via the tracking of all updates to data in the NPC.

Below is a link to a sample reports that a Publisher will receive:

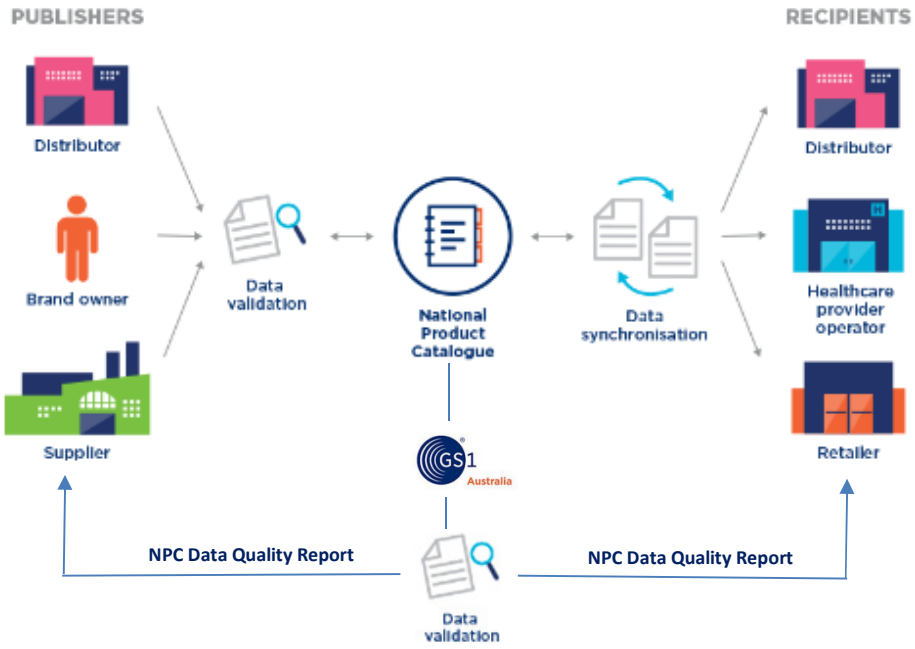
Link to a sample of your Supplier (summary) NPC Data Quality Report

A comprehensive list of all the items (GTINs) and prices identified as errors will be included within the Data Quality report. The Data Publisher is responsible for the correction or data enrichment completion and re-publication of these items. Support for data remediation activities is available by contacting a nominated Data Services Advisor at GS1 Australia.

[10] Some middleware first loads the data to the NPC then you publish it in a subsequent step, others both load and publish.

3.1 Data Validation Process: end-to-end

The diagram below shows the end-to-end flow of master data, via the NPC, from Supplier/Publisher to Buyer/Recipient.



At the first point of "Data Validation" a standard set of validation rules are applied to data before it can be loaded into the NPC. The applicable rule set can vary slightly, depending on the intended Data Recipient. All data must be validated before loading to the NPC[11].

The format and channel of the validation report received by a Publisher depends on the data load method. There are four methods of uploading data into the NPC, two are manual and two are automated as follows:

Manual Data Upload Options

Publisher Excel file load

Publisher Graphical User Interface (GUI)

Automated Data Upload Options

NPC Certified Product (Middleware)

In-house developed upload (XML) files

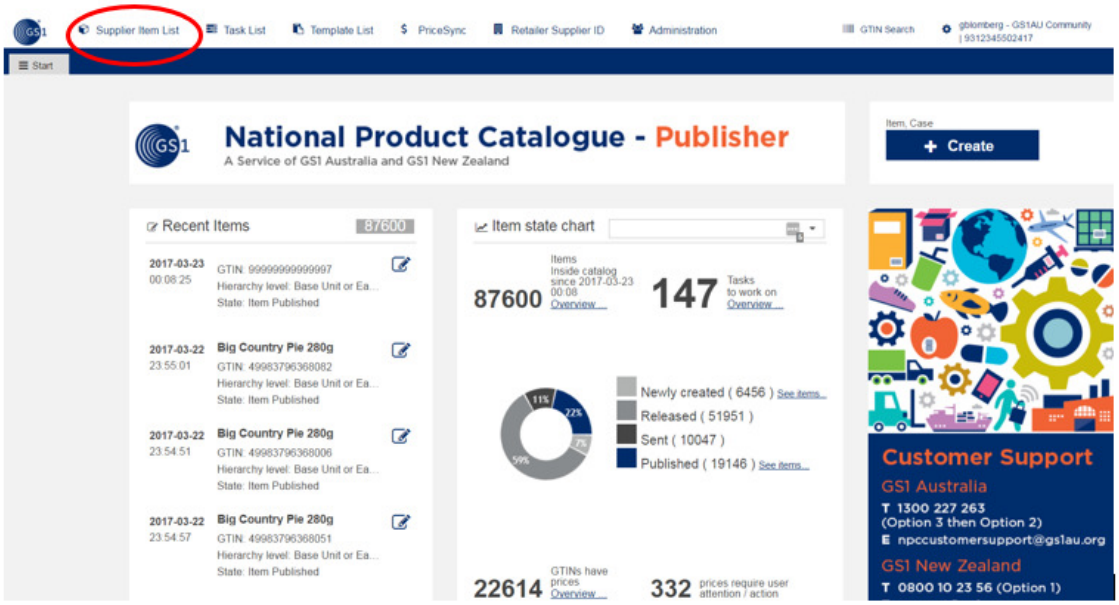
[11] GS1 Australia offers a by-request data validation service called an "offline validation". This is by exception only, and usually only used by very new users of the NPC. Instead, your monthly NPC Data Quality Report will provide you with the same validation and you can contact your GS1 Data Services Adviser (DSA) to assist you to interpret and action the report.

3.1.1 Validating your Data Online – via manual upload

The manual data upload option is accessed via the NPC GUI[12] titled "Publisher" which provides an online graphical user interface to suppliers, enabling data entry, validation and publishing of data to customers as the Data Recipients.

Data can be uploaded via a correctly-formatted Excel template. The template can be downloaded from the NPC in a blank state ready to be populated. Alternately data can be entered online, by individual attribute using keyboard data entry.

Below is a screen shot of the dashboard landing page as it appears for a Publisher:

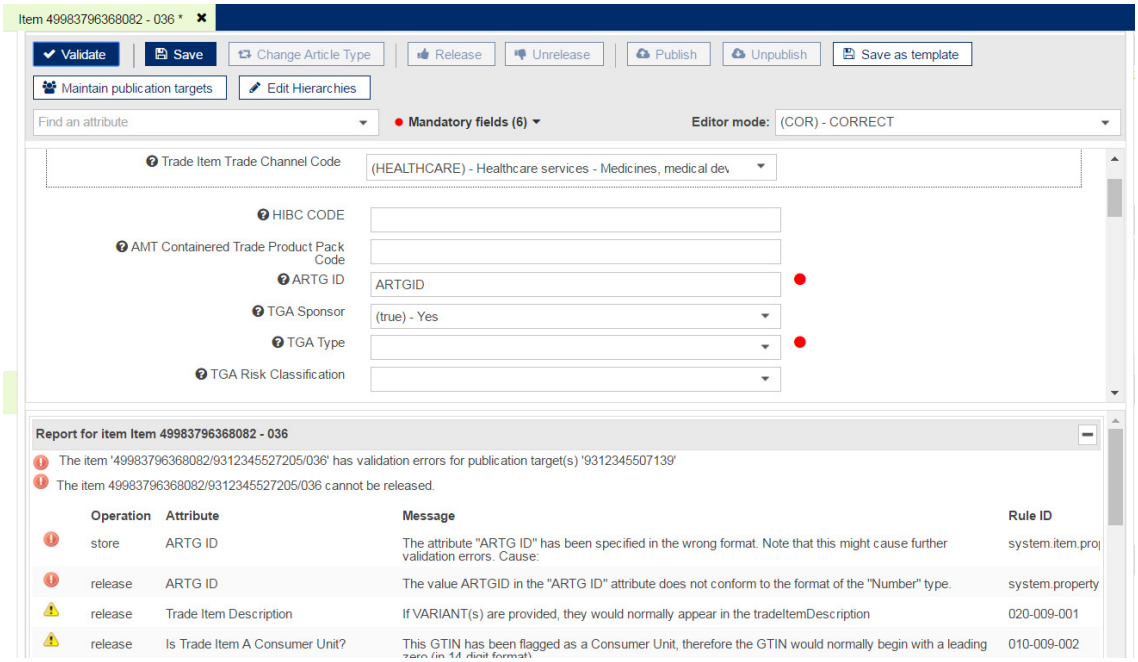


- **Publisher - Landing Dashboard GUI interface to the NPC -**

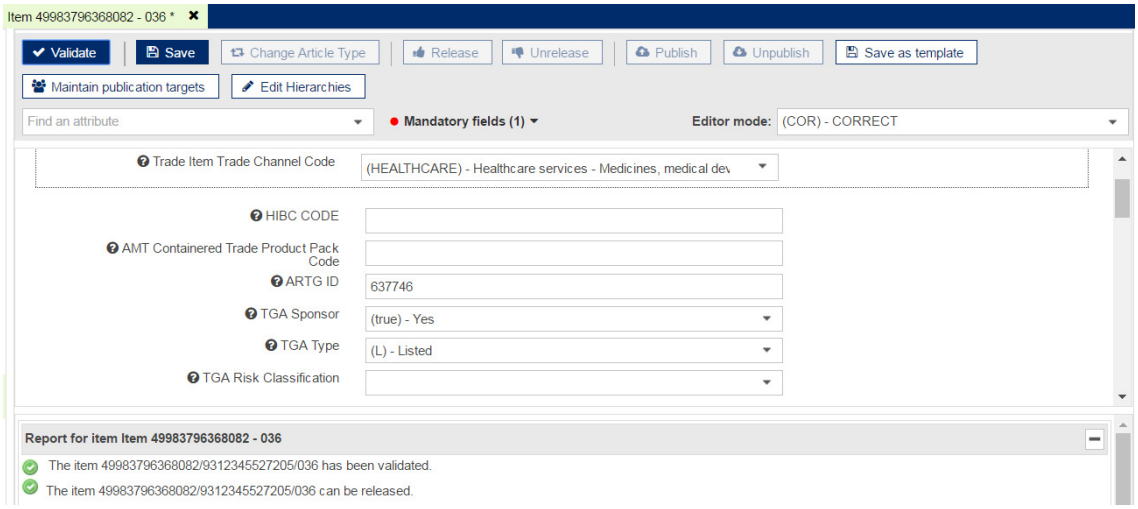
Items can be accessed and created via the **Supplier Item List** option using manual data entry or uploading of a spreadsheet template, which will be followed by the validation step of the process that occurs within GS1 Publisher.

[12] Graphical User Interface

The below screen shot shows an item in the data entry stage in Publisher. Validation can be run at any time during the data entry process. The results of the validation are shown in the lower widget. The below example shows the item has two errors requiring attributes "ARTG ID" and "TGA Type" to be addressed before the item can be released to flow into the NPC.

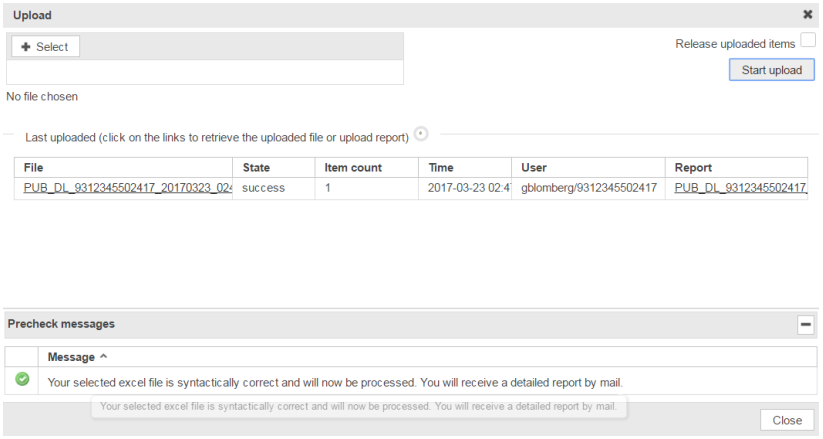


- **Validating an item online in Publisher -**



- **Attributes fixed & item can be released ready to Publish -**

Below is a screenshot of a successful upload with the Validation Report which is accessible online and concurrently sent to the supplier/publisher via email. Errors (or warnings) reported via the email require review and corrective action to proceed to the item publication stage.

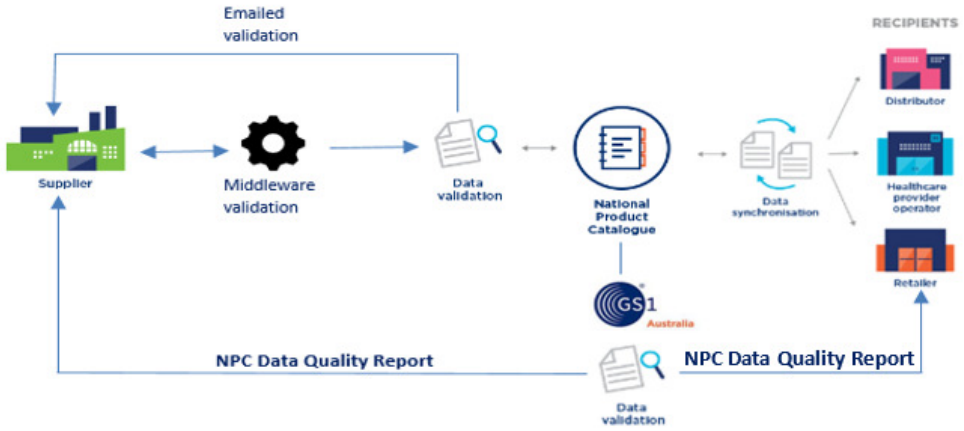


- **Upload data in Excel Template gets validated automatically -**

3.1.2 Validating your Data – via automated upload

Below are some diagrams outlining the validation process for automated data load methods, either via 3rd party middleware[13] solution or sent directly from business/ERP.

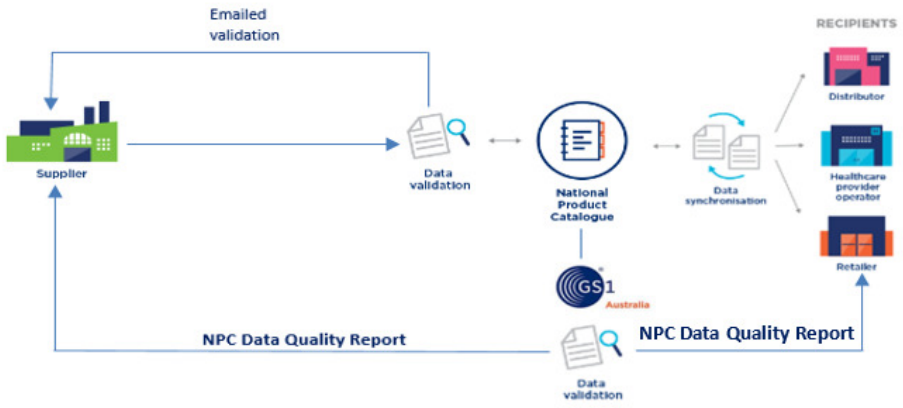
Middleware: When using a 3rd party middleware solution the full set of validation rules will be applied to data before it is sent off to be loaded into the NPC. As such, the middleware solution provides reporting of errors and warnings that need to be addressed before data can be released/published.



Note the validator operates between the middleware used by suppliers and the NPC. This acts as a validation gateway as part of the NPC architecture and will send an emailed validation report, in addition to any validation notifications provided by the middleware. Providing the middleware conducts a full validation the validation reports sent back from the GS1 validator should only ever return "green" (no errors or warnings) status.

[13] Certified Partners provide middleware solutions that can take your data inputs and load the NPC.

In-house developed upload (XML) files:



If using internally developed (XML) files sent directly to the NPC for loading, then the validation report will be sent directly from the validator that is part of the NPC architecture. The reported statuses will be red, amber or green depending on the severity of errors/warnings therein. Below is a sample of a "green" report from the validator:

validator

[UPLOAD] Acme Company Australia Pty Ltd 937777NNNNNNN GREEN National Product Catalogue Validation Report

[GREEN] National Product Catalogue Validation Report

Supplier Name: Acme Company Australia Pty Ltd
Date of Upload: 22 March 2017
Time of Upload: 11:59
Filename: 20170322115944_Price_0.xml
File Size: 15.96 KB
Status: No Error(s) found.

Summary

Your current Data Services Advisor is Sherin Thomas, 1300227263, sherin.thomas@gs1au.org.
0 price types out of 6 price types uploaded contain error(s) / warning(s).
To login to the National Product Catalogue Validator and view the full Validation Report, click here.
To access the product directly on the National Product Catalogue, click here.

Below is a sample of a "red" report from the validator:

validator

[UPLOAD] Fiction Company Australia Pty Ltd : RED National Product Catalogue Validation Report

NationalProductCatalo... .zip File

[RED] National Product Catalogue Validation Report

Supplier Name: Fiction Company Australia Pty Ltd
Date of Upload: 17 March 2017
Time of Upload: 16:10
Filename: cin_1SyncGS1 Net_1703171609513710.LH3H51019000107
File Size: 181.27 KB
Status: Block Error(s) found.

Summary

Your current Data Services Advisor is Mary Lau, 1300227263, mary.lau@gs1au.org.
9 items out of 14 items uploaded contain error(s) / warning(s).
To login to the National Product Catalogue Validator and view the full Validation Report, click here.
To access the product directly on the National Product Catalogue, click here.

Notice in the example of the "red" report from the validator includes an attached file. This file is a compressed spreadsheet listing all the items/prices against which the errors occurred and listing the name and description of the error.

4.0 Phase B – Data Quality Self-Assessment Scorecard

The purpose of completing a self-assessment is to provide a deeper level of understanding of the current state of data and the related data processes.

The identification of gaps either within data of processes will become an enabler for sustainable data quality. Completion of the self-assessment exercise may bring to light further opportunities within the business for the use of reliable data.

The first self-assessment will be completed in phase A of the framework implementation and then repeated a second time towards the end of the phased framework, once improvements have been implemented.

The Self-Assessment Scorecard tool provides an ability to benchmark data quality performance based on the achieved score. Demonstrated commitment to data quality is shown in the improvement of scores.

The Scorecard tool can be used to compare performance across functional areas or across product ranges etc. adopting best practices from the higher performing areas to improve others.

Results can be communicated to key Data Quality Framework stakeholders within your business to reflect the trend of data quality sustainability across the sector.

Below is a link to the Self-Assessment Scorecard. Gaps identified following completion of the self-assessment can be communicated to the data content and process owners within the Data Quality Management system of the business. User instructions are located on the first worksheet.

Link to the Data Quality Self-Assessment Scorecard

5.0 Phase C - Plan Data Quality Management (DQM)

Data quality and process gaps identified through the Self-Assessment process may require varied approaches to achieve an end goal of sustainable, fit-for-purpose data quality. Depending on the level of process complexity, identified gaps may be simple to close or you may require data mapping/translation or other processes to be carried out. Determining these requirements will provide the basis for the business Data Quality Management (DQM).

5.1 Senior Management Commitment and Appointment

What must a DQM system achieve? It must enable the business to reliably deliver quality data into the NPC by ensuring cross functional accountability within the roles of the business responsible for the data inputs through every stage of the data management processes. This includes prompt remediation action of data quality issues and the related process gap closure to ensure sustainable data quality.

Due to the critical nature of data quality within the Health Care sector, it is a requirement to have a defined system with documented processes irrespective of business size.

For a small business, perhaps supplying only a few products, the DQM System may be quite simple, requiring the participation of one or two people to check data accuracy in every instance. This may be achieved by the introduction of a data quality manual that identifies data related roles and responsibilities and is rigorously followed.

In a larger business, the DQM system has many touchpoints across multiple areas in the business so it requires the support of senior leadership to be successful. It may involve the appointment of senior managers for each of the areas of data ownership over the various business process owners, such as:

- Regulatory
- Marketing
- Packaging
- Logistics
- Administration
- Sales (pricing)

Data quality directors or stewards may form a business group and provide the focal point for all data-related needs within the group. They may be a cross-departmental team of data governance staff who are responsible for data quality end-to-end. These people must be engaged to help plan and implement the Data Quality Management system.

5.2 Data Quality Awareness and Culture

Culture around data is changing. The quality of the data about a product is now as important as the product itself[14].

Preparing the business to embrace data quality means creating a culture around its importance. Early engagement with data Recipients gives opportunity to work with them and provide case studies on how they are affected by data quality and in turn provide data quality insights from the supplier business perspective.

Everyone involved in data quality roles has a responsibility for their part in the process. The raising of awareness of the impact of poor data can assist in the

[14] *GS1 Value of Trusted Data for Hospitals – Lessons Learnt*

development of a sense of necessity/pride. Reward and recognition for individuals that show commitment to good data quality can drive the adoption of a best practice/process culture.

Development of a clear set of objectives for Data Quality Management system. DQM objectives can be derived from sources such as data quality issues:

- identified by customers
- appearing in NPC Data Quality Reports
- process or other gaps identified in the Self-Assessment process

5.3 Create Data Quality Management Processes

The Data Quality implementation and operational plan must ultimately meet all the objectives set for your Data Quality Management system.

The Self-Assessment includes questions about the topics below:

- Finding the origin of the data; how does it get created and where is it stored?
- What format is it in relative to the requirements of the NPC data set?
- What operations i.e. mapping or translation must be done to transform data into valid NPC data?
- How is data verified? Who is authorized to verify data?
- How are updates/amendments traced?
- Does the business adhere to GS1 standards for?
    - Measurement of items
    - Item numbering allocation (GTINs); new items and changed items
    - Location allocation (GLNs)
- How is authorization for data to be published externally to customers via the NPC achieved?
- Will data be in a central database with secure/authorised access? If not, how will it be aggregated ready for publication?
- Does the business understand and accommodate the scope of item publication required by your Customers? E.g. only ranged items vs all items
- Is pricing published at the required level using correct location identifiers (e.g. GLNs for area health vs hospitals)?
- Identify the internal processes that trigger or should trigger the creation or updating of master item or price data

5.3.1 Healthcare NPC Data Considerations:

a. How does the business currently represent a product and its levels of packaging (units of measure), versus the GTIN and GTIN hierarchy structure of the NPC?

b. Assuming a product with 3 levels of packaging (Case, Base and Intermediate), where the order unit is the Intermediate unit:

   i. What happens if a change is made to the Case level (requiring a new GTIN) without changing the Base? How will this flow into NPC?

   ii. What happens if a change is made to the Intermediate level (requiring a new GTIN) without changing the Base? How will this flow into NPC?

   iii. What happens if a change is made to the Base level (requiring a new GTIN)? How will this flow into NPC?

c. Can a given GTIN be present and active in more than one of the internal Item Masters at the same time? How will this flow into NPC?

d. How is the rollover from current product variant to a new product variant managed? How is an End Date applied to the old version? How will this flow into NPC?

- **Classification structure:**

  a. What is the current Product Classification method/structure (defined by the business for internal reporting), versus the UNSPSC and GPC classification structures? How will the data translate from internal to NPC?

- **Customer organisation (GLN) structure, especially for Pricing:**

  a. How does the business currently represent the customer location hierarchy, versus their NPC GLN hierarchy (e.g. Commonwealth government, State Government, Jurisdiction, Districts, DCs, Hospitals, Wards, etc.), especially as it relates to Pricing and physical Delivery?

  b. For a given data Recipient, how many levels of the customer hierarchy currently hold a Pricing value, versus their NPC Pricing GLNs?

- **Item data attributes:**

  a. What NPC data attributes (for industry and/or individual Recipients) currently exist in internal systems? Are they in the same format as NPC?

- **Price attributes:**

    a. What NPC Pricing attributes (for industry and/or individual Recipients) currently exist in internal systems? Are they in the same format as NPC?

5.3.2 Supplier Process Considerations

5.3.2.1 New Prod Development/Introduction:

- What changes to current process are needed to capture all the item data attributes, especially those not currently captured? Is there a need to change Product Hierarchy structure? Is there a need to change Product Classification structure?
- How is the repeatability of this process assured (across any silos/geographies that may exist)? Is there clear ownership and clear roles and responsibilities?
- If the new product will not be available to every customer, or not at the same availability date, how will the control "ranging"/publication to the right customer(s) at the right time(s) be achieved?
- What metrics are currently tracked (or need to be tracked) to monitor this process to ensure it performs to target, and can be used to surface opportunities for continuous improvement, and to drive accountability?

5.3.2.2 Product Lifecycle & Rollover Management:

a. What changes to current process are needed to have visibility and control over the end availability date of the old version, and the start availability date for the new version? By target market and/or by Recipient?

5.3.2.3 Contract/Tender Management

a. What changes to processes are needed?

5.3.2.4 Price Administration

a. What changes to current process are needed to capture all the price attributes, especially those not currently captured (e.g. Contract ID)? Are there changes needed to Customer Hierarchy structure for any Recipients, especially as it relates to the levels which have Pricing?

b. How is visibility and control managed over the end date of the old prices, and the start date for new prices? By Recipient?

For each area determine how the business can ensure the reliability/repeatability of this process (across any silos/geographies that may exist)? Is there clear ownership and clear roles and responsibilities?

What metrics are currently tracked (or need to be tracked) to monitor this process to ensure it performs to target, and can be used to surface opportunities for continuous improvement, and to drive accountability?

Each of the above analyses may yield a "gap" between current versus target state for which the business must determine how to close via:

A. Process changes;
B. System changes and integration;
C. People changes to skills/competencies, roles, accountabilities, including managing staff continuity

5.3.3 Supplier IT Systems Considerations

- Will systems architecture be completely internal, or will there be utilisation of the services of middleware providers?
- What changes will need to be made?
- What integration will be required to connect systems?
- How will adds/changes be detected to data since last extract and upload to NPC?
- How will the publication of the right products to the right customers, at the right point(s) in time be managed?

Collectively, whether system(s) are electronic or manual:

- Must be able to store the item and price attributes in a way that can be extracted for loading to NPC, and managing publication to the right Recipient GLNs, at the right time(s)
- The extract and load process must be able to detect adds/changes for loading to NPC, and map to the NPC GTIN hierarchy/attributes and GLN;
- What metrics are currently tracked (or need to be tracked) to monitor system(s) to ensure performance to target, and can be used to surface opportunities for continuous improvement, and to drive accountability?

5.3.4 Education & Training

Schedule and plan sessions for staff who are impacted by this project. This will include the data stewards and those who create, source and enter data into business systems.

Some training resources will be provided as part of the Framework.

6.0 Phase D – Document & Implement DQM

Documentation of the Data Quality Management system should include:

- Statements of a data quality policy and data quality objectives
- A data quality manual
- Documented procedures and records

The implementation progress should be monitored to ensure that the DQM system is effective and meets the policy objectives. A monitoring method should be established.

The activities include:

- Procedure for dealing with user feedback
- Data verification
- A review of the data input and processing procedures
- Product master data management
- Preventive action

The preventive action should include provisions to:

- Review data quality issues (including user feedback)
- Determine the causes of data quality issues
- Determine and implement action needed to ensure that data quality issues do not recur
- Correct data in the product master data

7.0 Phase E – Review & Embed DQM system

The review phase of the Framework measures the outcomes of the project against the original objectives and is required to ensure the business has adopted the necessary changes for sustain stainability of the same. The following activities are included in this phase:

- Review of the Data Quality Policy
- Review of the Data Quality Management system objectives
- Repeat the Self-Assessment Scorecard and compare results to the previous results
- Ensure all issues presented in your monthly NPC Data Quality Reports from GS1 have been addressed
- Audit of data quality processes against the SOPs as written and subsequent adjustment as needed.

-

8.0 Sustained Data Quality

On completion of the project review the business has moved from a project phase to business-as-usual. The expected outcome being sustainable data quality underpinned by policies, processes and role responsibilities embedded within the business.

The adoption of metrics enables the business to measure data quality as part of the DQM system.

A monthly NPC Data Quality Report will be sent to data publishers and recipients.
from GS1. The success of the Data Quality Framework will have resulted in few if any validation errors appearing in the report. Data quality sustainability can be measured by these reports. GS1 Data Services Advisor(s) are available to assist data publishers and recipients.

Completion of periodic self-assessments can be used as a tool to assist in achieving the goal of the highest possible scorecard result.

Fostering a collaborative relationship with customers regarding data quality can give a common understanding of data usage and data quality issues when they arise.

9.0 NPC Implementation Steps & Resources

The NPC (NPC) is the standard repository that is used to publish and share healthcare master data across the Australian Healthcare Industry.

The target audience for this Framework are suppliers who have published data into the NPC already, who must now remediate the quality of that data and put in place a system to ensure ongoing quality data in their NPC catalogues.

Below is a standard checklist of steps for implementing the NPC.

Contact GS1 Australia Data Services Support – 1300 227 263 for assistance.

GS1 Australia - National Product Catalogue Ready Checklist – All Publishers

This checklist is designed for all Publishers as a guide to becoming National Product Catalogue Ready. Completing this checklist is a prerequisite to begin the ongoing process of data synchronization and electronic collaboration with your Recipients. All Publishers are encouraged to contact GS1 Australia for assistance in completing this checklist and to be officially made National Product Catalogue Ready.

Check List	
❑	1. Register for National Product Catalogue
❑	2. Determine Your National Product Catalogue Product Range
❑	3. Identify Your Data Requirements
❑	4. Conduct a Gap Analysis
❑	5. Determine your National Product Catalogue Data Upload and Connectivity (if applicable) Method
❑	6. Source Retailer Supplier IDs (If applicable)
❑	7. Determine your National Product Catalogue Structure
❑	8. Prepare your Data
❑	9. Clarify Off-Invoice Allowances, Charges and 'Ship To' Locations (if applicable) against Pricing, with your Trading Partners
❑	10. Discuss Price Relationships Setup with National Product Catalogue Customer Support
❑	11. Populate National Product Catalogue
❑	12. Commence "Data Quality" Program with National Product Catalogue Customer Support
❑	13. Start the Synchronization Process with Your Recipients
❑	14. Ongoing Data Maintenance

The GS1 Australia website has a specific area of resources for Healthcare users of the NPC go to: https://www.gs1au.org/our-services/national-product-catalogue/

There is a specific **Healthcare** section with these resources:

- Item data dictionary
- Best practices for descriptions
- Prostheses rebate code list
- Pharmacy Wholesalers implementation guide
- Information about NSW Health Price Global Location Numbers
- Healthcare Data Recipients Matrix
- Register for Locatenet

10.0 Party Roles and Responsibilities

This section of the document is important because it not only defines roles relative to the NPC it also documents the responsibilities within each role for this Data Quality Framework.

10.1 Framework Governance and Management

The introductory program for this framework was run by a Steering Committee made up of industry representatives, supported by GS1 Australia. The Framework will track industry progress and encourage and support participation.

10.2 Supplier/Publisher

Data published into and shared via the NPC data pool remains the responsibility of the supplier/publisher.

Suppliers are responsible for ensuring that all data attributes requested by their trading partners are provided, that the data is accurate and fit for the intended purpose(s), and that it is updated on a timely basis to ensure currency and the continual ability of the data to be used. This constitutes quality data.

Supplier/Publisher may choose to maintain their data publication into the data pool via direct integration using XML messaging, by utilising a middleware solution, or by contracting a third party to load/maintain via a manual load mechanism or they can enter their data themselves using the NPC "Publisher" GUI.

Regardless of the method of load, it is critical that they have processes in place to maintain the highest possible quality of the data. Ideally the publication of data into the data pool should become part of the new product introduction process as this ensures that all data is sourced and maintained throughout a product's lifecycle.

Suppliers control who has access to their data via publication mechanisms and the use of party identification (via GLN[15]) and dates to control visibility. It is an important role of suppliers/Publishers to work with their trading partners/buyers/Recipients to address identified issues with data, including but not limited to the data quality, missing products and pricing discrepancies to ensure the data they provide is always accurate and fit for purpose.

Senior managers and functional managers will be involved as you will be asked to commit to the Framework after understanding why data quality is so vital to the health of the Healthcare industry. Your commitment to data quality through this Framework will also deliver benefits to your business.

You will be provided with reports, tools and support to remediate your data and to plan and implement processes to ensure you can deliver ongoing data quality sustainability.

[15] Global Location Number (using the GS1 numbering/identification standard)

Staff from the areas of product and price administration, regulatory, packaging, marketing and potentially other areas will be involved. Those who create, source and communicate master data about healthcare products will be asked to research the processes used to create or source the data that must be provided into the NPC. The business will make improvements to those processes and then embed them, via training and documentation, into standard operating procedures and policy.

Specific responsibilities for Supplier/Publisher in this Data Quality Framework:

- Provide written confirmation of commitment to the Framework when invited
- Provide a senior management contact for the Framework
- Remediate your NPC data in response to provided NPC data quality reports
- Conduct a Data Quality Self-Assessment
- Implement a Data Quality Management system (DQM) within the organisation
- Embed the Data Quality Management System (DQMS) into policy and business-as-usual
- Participate in Sustainable Data Quality
- Provide reporting on progress via provided tools as well as less formally via your contact to the Framework Communications Contact person

10.3 Buyer/Recipient

The engagement of suppliers/Publishers should be led by the buyer/recipient with support from GS1 Australia.

Data published to buyers/Recipients via the NPC must be quality data directly from the product source. The process eliminates Recipient's need for repetitive processes to source, load and maintain product and pricing data. It also ensures they are using correct, current data when transacting with suppliers.

Buyer/Recipients should provide feedback to suppliers on an ongoing basis regarding the products they require, issues with the data, new data they need and its purpose.

The standard data fields or data "attributes" as they are called, have been identified and documented.

To enable data to be received, the buyer/recipient organisation needs to choose how they will access the data pool and data using either direct XML messages or by using a middleware solution to interface between the data pool and internal intended source of truth for item master data - this is most often an ERP[16] but may depend on the organisation.

[16] Enterprise Resource Planning software application database within the business

Data should then be work-flowed to support other uses/systems depending on the organisations needs, these may include Warehouse Management, Resource planning, Sales/Merchandise systems, Procurement tools, Inventory management, Internal catalogues, or specialist systems (such as clinical) where it is important to have data consistency across the organisation.

Buyer/Recipients need to have a robust process for reviewing the data during initial synchronisation to ensure data between supplier and buyer is aligned for consistency between both source and user systems.

Any issues found during this process or subsequently should be addressed to the supplier immediately to allow them to investigate, confirm or amend the data within the data pool. Failure to raise concerns and reinforce the need to update data undermines the value of the process and solution.

Specific responsibilities for Buyer/Recipient in this Data Quality Framework:

- Commit to the Framework
- Drive and assist supplier action to remediate data quality. This role is extremely important as only the customer has any leverage with the supplier relationship.
- Contribute to the understanding of how data is used by providing use cases for the data they have requested, including;
  - where it will be stored within their business
  - what systems/IT solutions will use the data
  - and what processes it will support
- Provide documented visibility of the processes used during initial synchronisation with a supplier.
- Provide documented visibility of the processes used to query data and to accept corrected data.

10.4 GS1 Australia/GS1

GS1 Australia is a not-for-profit membership-based industry body. GS1 hosts the NPC and provides data services to members.

GS1's role in this Framework is to support members who are remediating their data as part of the Framework, via GS1 Data Services Support as well as sending a monthly NPC Data Quality report to members. GS1 will also support the management of the Framework to help drive the desired outcomes as stated.

10.5 Industry Groups

This is being finalised and will be loaded in due course.

10.6 Australian Digital Health Agency

In order for the NPC to be able to be uniformly implemented for the benefit of the whole industry, there are layers of governance, guidance, decision making and general input that are required on an ongoing basis. The Australian Digital Health Agency, and previously National eHealth Transition Authority (NEHTA) along with various other key groups provide the governance and guidance to ensure harmonious implementation thus facilitating potential for benefits realisation that is consistent and shared across the whole of industry.

10.7 Middleware Solution Providers/Certified Product Partners

Due to systems architecture within some organisations, it is sometimes not possible to connect directly to the NPC or other GDSN data pools.

The NPC Certification Framework is designed to certify a product's ability to meet the local NPC supplier / data source requirements by all engaged industry sectors.

The CPP product will sit between your business systems and the NPC and allow you to manually enter data or ideally to integrate data from your back-office systems into the middleware for validation and loading to the NPC.

Link to: List of CPP partners

11.0 Appendix A: GS1 Data Services

GS1 Australia Data Services Support: 1300 227 263

GS1 works with various industries to support the development, maintenance and implementation of interoperable global standards to support improved business processes. All standards developed within the GS1 standards development process are open, global standards. The ongoing process to define and continually review the GS1 standards is managed via a Global Standards Management Process (GSMP).

At a local level, member organisations such as GS1 Australia, work with their local industry communities to ensure all global requirements are reflected within the standards. They also support implementation within the industries where there is a call for the use of global standards, and in many cases develop solutions or services to support this implementation where there are no other solutions commercially available in the market or there has been a specific request from an industry. The delivery of the NPC for Healthcare is one such industry driven service.

The standards fall broadly into three primary categories:

Identification – providing defined machine interpretative keys to identify products, locations, assets, parties to trade, relationships, logistics units, consignments and more. There are also additional standards defined for attribute data. All identifiers using the GS1 system of standards are globally unique as a result of a global number management process. GS1 identification keys are reflected in and reflective of ISO standards and technical specifications.

Data Capture – to facilitate the ability to capture the above standardised identification in physical flows there are defined standards, technical specifications and guidelines that define the encoding of the above identification "keys" within barcodes (linear and 2-dimensional), direct marking and Radio Frequency Identification (RFID). By providing standards for how identifiers are captured it ensures all systems needing to encode, read or interpret the data are able to do so consistently. GS1 data capture technologies are reflected in and reflective of ISO standards and technical specifications.

Data Sharing – to support defined physical flow/activities there are also specific defined standards for the sharing of Master Data, Transactional Data and data related to Events. In GS1 terminology these standards are defined within Global Data Synchronisation (GDS), Electronic Data Interchange (EDI) in the form of EANcom (based on EDIFACT/UNCEFACT) and GS1 XML, and Electronic Product Code Information Service (EPCIS) standards.

Where GS1 is a data pool provider they may have additional roles and responsibilities – for further details please refer to "Data Pool provider" section.

11.1 GDSN Data Pool

In order to participate in the Global Data Synchronisation Network (GDSN) and register or subscribe to items in the GS1 Global Registry®, trading partners must make use of a GDSN-certified Data Pool (DP) like the NPC (NPC).

A certified Data Pool is a solution built to comply with GS1 standards which has been tested to have interoperability within GDSN. Only trading partners using a certified DP are able to synchronise data through GDSN.

GDSN Data pools are required to maintain their certification and connection to the network, meeting or exceeding the minimum requirements of the certification process.

Access, support, costs and any additional tools to users are determined by the data pools to meet the needs of their clients and industries that they serve. The NPC has tools that allow access to data in a non-integrated way where users are not able to synchronise Machine-to-Machine.

11.2 Global Data Synchronisation Network (GDSN)

The *Global Data Synchronisation Network*® (GDSN) enables trading partners to automatically share their business data with each other. Where fully integrated, this means that updates within a supplier's database can flow via their data pool connection and on to their trading partner/buyer organisations, ensuring their database is similarly updated as a result. Everyone has access to the same continuously refreshed data – effectively achieving *Data Synchronisation*.

For this to happen, each organisation needs to join a data pool certified and tested by GS1, who connect to the GS1 Global Registry®, a central directory which keeps track of connections, guarantees the uniqueness of data and ensures compliance with shared GS1 standards.

11.3 NPC

There are many data pools spread across the world. The NPC (NPC) provided by GS1 Australia is one such data pool, which has been developed to meet the needs of the local Australian industries GS1 Australia serves.

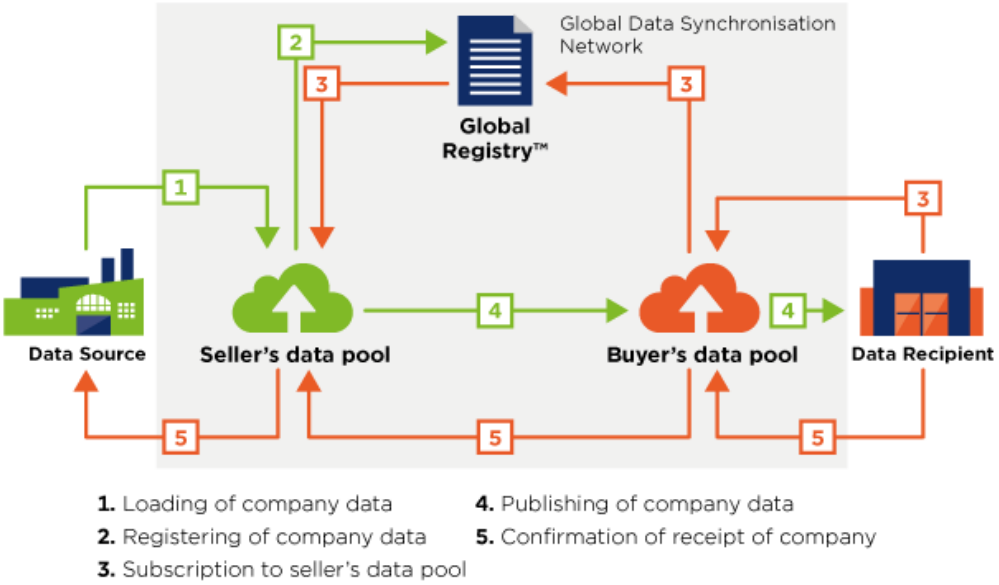


Figure 1 – Global Data Synchronisation Network

Suppliers and customers willing to synchronise data with each other will perform the 5 following basic steps detailed below:

Step 1: Suppliers prepare internal data and ideally systems to match GS1 Standards (GTIN, GLN, etc.)

Step 2: Suppliers upload their data to a GDSN-certified source data pool of their choice (via in-house or third party). The NPC is the data pool used by Australian Healthcare.

Step 3: The data pool sends basic information about each item to the GS1 Global Registry. The GS1 Global Registry holds this information and the location of each item data pool.

Step 4: Data Recipients subscribe to the supplier information in the GS1 Global Registry via their chosen GDSN-certified data pool. The GS1 Global Registry identifies the source data pool of the requested item(s).

Step 5: Using a synchronisation engine, trading partners perform the publication/subscription process. Thereafter, item information can be automatically and continuously synchronised between their respective data pools.