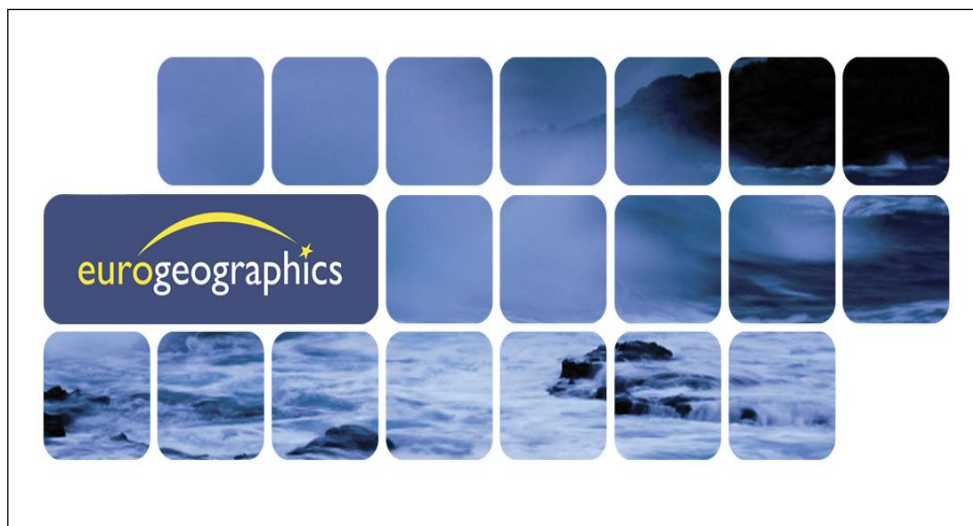


How NMCAs define quality requirements on new and existing data sets

**A Paper by the
EuroGeographics Quality Knowledge Exchange Network**

November 2015



1 Executive Summary

This paper is the summary of the results of a brainstorming exercise carried out by the EuroGeographics Quality Knowledge Exchange Network (EG Q-KEN), as part of the activities foreseen in its work plan for the year 2014. The exercise was performed during the plenary meeting of the EG Q-KEN on 7th – 9th May 2014, hosted by Lantmäteriet in Malmö (Sweden).

The final aims of the activity were to identify best practices regarding how NMCAs define quality requirements on new and existing data sets by answering the following initial questions, which were presented to the group as start up for discussion:

- Do the quality requirements set the quality levels, or vice versa?
- Conformance – Do we set them because we know that is what is needed or because we know what can be achieved?
- How do we know what is needed? Does the customer drive this or do we because we know what we can deliver?

The brainstorming was carried out using the methodology described in section 5 and its final results are stated in section 6 of this paper.

This paper concludes that customer focus is becoming increasingly important for NMCAs. Detection of quality requirements is a key process where both customers, users and producers, have mixed responsibilities and have to share expectations and possible solutions. Existing limitations (budget, delivery deadlines, technological aspects, etc.) shall intervene as input in this process to determine the level of quality which is required.

Furthermore, these organizations shall examine not only the current market in which they are positioned, which is nowadays changing rapidly, but also other potential markets with the aim to identify potential users and unexpressed needs.

Finally, the exercise identified that NMCAs need guidelines on how to apply the existing available procedures to capture customer / user requirements, and that the improvement of such methodologies is a topic for further research.

HISTORY			
<i>Version</i>	<i>Author</i>	<i>Date</i>	<i>Comments</i>
1.0	Jordi Escriptu	2014-07-22	First Draft
1.0	Thierry Prin	2014-08-29	Review of v1.0
1.1a	Carol Agius	2014-09-17	Draft comments to v1.0 / Q-KEN Plenary Meeting in Barcelona
1.1b	Ana de las Cuevas Suárez	2014-09-26	Review and consolidation of comment in v1.1a
1.2	Jordi Escriptu	2015-02-24	Last review
1.3	Jonathan Holmes	2015-11-18	Language review

File name:	QKENPaper_HowNMCAsDefineQualityRequirements_v1.3.docx		
Keywords	Conformance, Customer, Data set, Evaluation, Needs, NMCAs, Data quality, Producer, Quality, Requirements.		
Abstract	Paper on how the NMCAs define quality requirements for new and existing datasets. It describes the main outcomes from a brainstorming activity of the EG Q-KEN members regarding this topic, based on the experience and best practices identified in their organizations. The aim of the document is to identify items for further research and discussion within the group.		
Distribution:	EuroGeographics Website		
Approved by:	Jonathan Holmes	Date :	18 th November 2015

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3 Acronyms

AQL	A cceptance Q uality L imit
EG Q-KEN	E uro G eographics - Q uality K nowledge E xchange N etwork
GI	G eographic I nformation
NMCA	N ational M apping and C adastral A gency

4 Introduction

One of the activities expected from the EG Q-KEN for the year 2014, as stated in the work plan, is to collect information on how the NMCAs define quality requirements on new and existing data sets.

This is a field in which the state-of-the-art has evolved a lot in the past 20 years, changing the way the organizations producing geographic information take into account the needs of their users.

Traditionally NMCAs have utilized the expert knowledge of their GI professionals to design, at a conceptual level, the products they think best-suited for the expected final applications, in most cases without evaluating to what extent the needs of users were satisfied. In contrast, the organizations are nowadays becoming more concerned about how to satisfy the different types of users at a practical level and how to know the expected quality of products.

The aim of the brainstorming exercise described in this paper was to identify the state-of-the-art regarding such a field in the organizations participating within the EG Q-KEN.

The discussion within the group was promoted by setting up the following initial questions:

- Question A: Do the quality requirements set the quality levels or vice versa?
- Question B: Conformance – Do we set them because we know that is what is needed or because we know what can be achieved?
- Question C: How do we know what is needed? Does the customer drive this or do we, because we know what we can deliver?

The results obtained from this activity may be used to investigate in more depth current trends, best practices and gaps in identifying user requirements and applying them to the final products.

5 Methodology

This brainstorming exercise was performed during the plenary meeting of the EG Q-KEN in Malmö, 7th – 9th May 2014. The group was asked to think about the topic beforehand.

The objective of the activity was briefly described at the beginning of the exercise, taking the opportunity to introduce the initial questions foreseen to promote the discussion.

Afterwards, the quality experts attending the activity were split into two separate groups, A and B (composed of 6 and 7 people, respectively), in order to produce results in isolation approximately for a duration of two hours.

The results from both groups were presented at the end in order to identify common points of view and conclusions.

This paper has been prepared by Jordi Escriu (ICGC, Catalonia - Spain) and Ana de las Cuevas Suárez (IGN, Spain), who volunteered to integrate the outcomes from the exercise in a formal document. It was finally revised by the EG Q-KEN during the Q-KEN Plenary meeting in Barcelona (17th September 2014).

6 Results

This section presents the outcomes from the brainstorming exercise, integrating the results obtained by both working groups. They are organized following the order of the initial questions made to the audience.

The overall feeling of organizations is that quality requirements are nowadays driven by the customer, and that this trend is becoming increasingly crucial in the future.

The situation has changed - in fact, it is already changing – from the one in the past, when it was the GI producer who was the driver and set the quality levels based on its expert knowledge.

Therefore, we are going through a transition period where different approaches may be used for both, new and previously existing data sets.

6.1 Question A: Do the quality requirements set the quality levels, or vice versa?

In an ideal world the user should define the product (specification) and the producer develops the specifications, tools and methods to implement the product. In the practical world the alignment between what the user wants and what can be provided is a compromise limited by investment – time, budget, technology and resources. At the end, the final data specification is likely to be a compromise between the needs and the budget or deadline, keeping the balance between the quality of the product and the related costs.

New data sets

The needs from the customer may be fully taken into account in the case of new data sets, so that the quality requirements directly intervene in the design of the product. Hence, they set the data quality levels.

The importance of clearly identifying the key customers – those who request and pay for the data – and their requirements, cannot be understated. It is also worth taking into account other potential users (namely ‘non-users’) by means of theoretical use cases. In order to broaden the use of our product, it is especially important to have its quality properly described within the metadata.

Another aspect is that the collection of requirements is a continuous, non-stop process. Therefore, the design of the product takes only into account those identified at a specific point in time.

Existing data sets

Many data sets that were created in the past were designed unilaterally by the GI producer based on their knowledge and experience, with scarce or no intervention of users. In these cases the producer set the quality levels of the product, indirectly determining the requirements that were able to be fulfilled and the potential uses of the data set, although they are sometimes difficult to find out.

Nevertheless, NMCAs should take into account their knowledge of the customer in order to improve such data sets (new versions, documentation of potential use cases, etc.).

6.2 Question B: Conformance – Do we set them because we know that is what is needed or because we know what can be achieved?

New data sets

In the design of newly created data sets, NMCAs try to find out the user needs before establishing the final characteristics of the product and its data model. Hence, quality levels or AQLs are established based on what is needed.

As already mentioned, there are still difficulties to know about these needs and determine the associated requirements. Activities that need to happen are:

- Decide on a methodology to be used in collecting them.
- Know how to filter them in order to establish priorities, taking into account the costs.
- In doing so, take into account the different customers / users.

Despite of these issues, it is important to highlight the availability of a helpful and complete standardization and best practice framework (e.g. ISO 19157, ESDIN DQ model, etc.), which organizations should always be able to utilize and reuse.

Existing data sets

Traditionally, the production of GI data sets started without clearly establishing the quality levels to be achieved, or it was based on just a few of them (absolute or external spatial accuracy).

Some of these data sets will not be compliant if appropriate AQLs were set up, so NMCAs should at least evaluate their quality and report it as a result in the metadata.

At the moment, the only thing we can do to improve these data sets is to derive the AQLs by using one of the following options, ordered in descending preference:

- a) Just reporting the data quality results, without establishing the AQLs.
- b) Use experts to set the AQLs, reporting in the metadata if data is conformant to them.
- c) Set the AQLs taking into account just what can be achieved.

In any case, it would be interesting for the final user to know:

- Which option has been used to establish the AQLs. Including this information in the metadata (probably within the usability element) is considered as a best practice.
- The date foreseen for the next update of the data set and what improvements are likely to be seen.

6.3 Question C: How do we know what is needed? Does the customer drive this or do we because we know what we can deliver?

New data sets

For newly created data sets, the customer / user is clearly the driver of the process. Sometimes they do not know exactly what they want and NMCAs have to be aware of this situation in order to guide the process using their expert knowledge.

It is perceived that identifying these requirements is as complex as important, with many different procedures and tools put in place across organizations to get feedback from users, user groups and communities. Methods of doing this include:

- Organize physical events:
 - Meetings.
 - Workshops.
 - Other kind of events.
- Making use of online technologies:
 - Through the web site of the organization.
 - Promoting discussions in blogs / online forums.
 - Taking specific actions, such as using questionnaires or publishing a new specification to ask for feedback.

- Other methods:
 - Developing pilot projects.
 - Getting direct questions from users via the commercial unit (see figure 1).
 - Making use of a market service to observe the different markets (see figure 1).
 - By analysing customer complaints, feedback & error reports you can deduce requirements that are currently unmet.

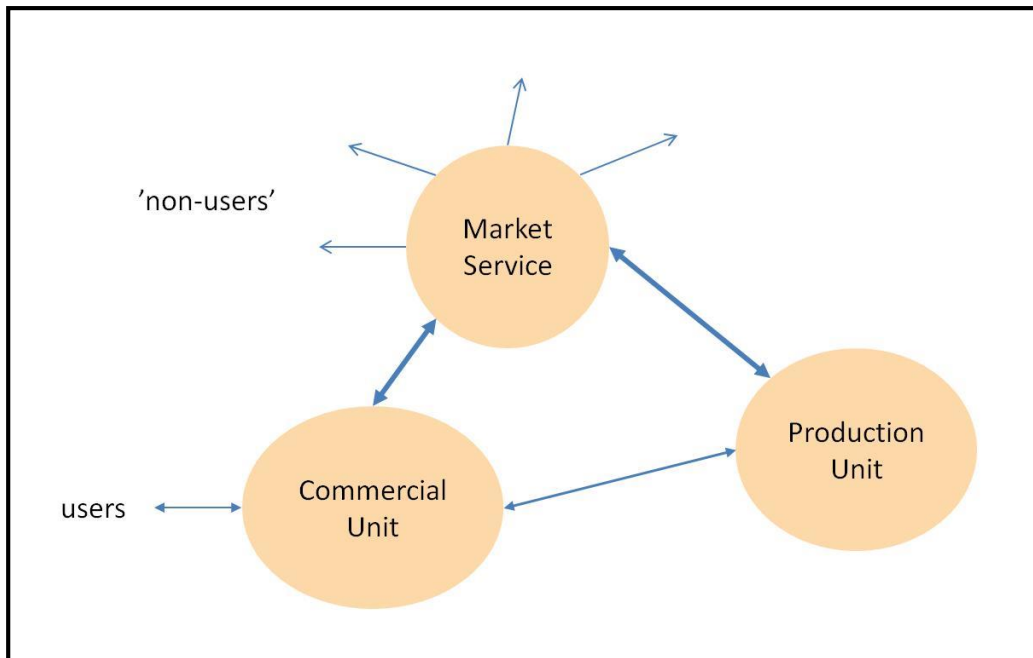


Figure 1. Commercial Unit and Market service

The evaluation of results from all these tools often suffers from subjectivity and they are always difficult to summarize. Additionally, there is no standardized methodology to define the use cases.

Existing data sets

Since these data sets already exist and the customer / user did not have much opportunity to influence in their design, NMCAs are the driver in this case.

As a result, at least the organizations must take into account new user needs in the updates and new versions of such data sets.

7 Conclusions

The results from the exercise show that:

- Nowadays the quality requirements start to be driven by the customer, whereas in the past these were producer driven. The experience of the organizations indicates that the process of identifying needs and requirements is really a mix of responsibility between customers and producers.
- The customer is becoming increasingly important in defining our products in the design process.
- There are many tools and procedures available to identify customer / user needs and requirements, but their evaluation is complex and often subjective. NMCAs may find it useful to have guidelines about available paths.
- In addition to the key customers / users of our products, it is also worth taking into account in the design the potential users, namely 'non-user'. In order to find out information it is necessary to look at the market opportunities. NMCAs should find out unexpressed needs and identify how to meet them and get to know the potential future users of their products. Additionally, NMCAs should learn how to exploit the changing market and other potential markets.
- There is no standardized methodology to define the use cases. How to proceed in a proper way to get the requirements from the customer is a topic for further research, which should be analysed and explored.