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Redesign of the chain of economic statistics in the Netherlands¹

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Introduction

Statistics Netherlands (SN) is in the middle of radical changes. A number of very heterogeneous driving forces pose major challenges that can only be met when the way the institute operates is thoroughly reconsidered. Van der Veen (2007) gives an overview of the present situation and the challenges ahead in a broad context. In particular, efficiency and quality of key statistics must be improved, while the administrative burden is significantly lowered at the same time. These goals can only be achieved simultaneously when available register data is used to the maximum.

An ambitious Master Plan (or Modernization Program) has been developed with at its core the outline of a Business Architecture for Statistics Netherlands. It serves as a reference framework for the future organisation of the statistical processes at our institute. Two programs have now started to implement the ideas from the SN Business Architecture. The HEcS² program aims at redesigning the whole chain of economic statistics from an integrated perspective. A sister program aims at developing a number of Generic Processing Services. All statistical processes will gradually be adapted or redesigned in such a way that they may benefit from these services. The HEcS program is only one, though very important, case.

Below we first give a brief overview of the general setting. We describe the driving forces behind the redesign and the approach of the Master Plan, including the SN Business Architecture. Next we turn to the redesign of the chain of economic statistics, with a focus on the intended use of register information.

Driving forces behind the redesign

The HEcS redesign program and all other Master Plan activities are driven by a number of forces that act on Statistics Netherlands, for example general goals of the Dutch government. Below we discuss these driving forces.

Reduction of staff costs

Statistics Netherlands is – like all other government institutions – confronted with ongoing budget reductions due to the intention of central government to increase efficiency of government agencies in general and to reduce the number of government employees. In the next years, reductions of at least 15–20% have to be realized for our institute. Hence, the redesign of the chain of economic statistics must yield substantial efficiency gains.

A specific aspect concerns the reduction of IT cost. Over the years, many different dedicated ‘tailor-made’ systems have been developed and implemented by our IT division. The number of

¹ The views expressed in this paper are those of the author and do not necessarily reflect the policies of Statistics Netherlands

² The acronym HEcS stands for ‘Herontwerp Keten Economische Statistieken’ or ‘Redesign of the Chain of Economic Statistics’. It is a pun on the Dutch word ‘Heks’, meaning ‘Witch’, and thus hints at the touch of magic that is needed to carry out all that needs to be done

systems amounts to several hundreds, including subsystems several thousands. All of these systems need to be maintained, and this costs a lot of effort from both IT and statistical staff. The maintenance burden has grown to such proportions that necessary innovations suffer. New and more efficient ways for dealing with systems development have to be developed.

Reduction of administrative burden

Another stimulus for the redesign derives from the national pressure to reduce the administrative burden on the business sector. Although statistical reporting is only a small part of the total administrative burden, the private sector and politicians insist that this burden should be reduced. SN fully supports this endeavour. The pressure to minimize the reporting burden is illustrated by a recent proposal³, endorsed by a majority of the Dutch Parliament, which requires that SN stops all data collection from small and medium-sized enterprises. Although the Dutch government immediately replied that European obligations make it impossible to carry out the proposal, it indicated that major efforts must be made to reduce statistical reporting.

Improved quality of statistics

The quality of statistics needs to be improved, where quality is to be understood in a broad sense. For example,

- coherence between subsequent (monthly/quarterly/annual) estimates for the same variables;
- improved timeliness of publications;
- consistency between data on the same population;
- reproducibility of production processes;
- transparency of compilation methods,

are all aspects of quality in this sense. In particular for key economic it is clear that steps must be taken to improve the current situation. Criteria need to be developed that facilitate guarding these quality aspects.

A specific quality aspect concerns flexibility and robustness. This applies both to the output and input side of the statistical process. On the output side, the increased complexity of society and the rapid changes it is going through imply an increasing demand for reliable statistical information. The focus is shifting towards thematically presented information providing more insight into how developments and sectors are related. Statistics Netherlands wants to speed up its flexible response to the changing needs for information. This requires combining data from various sources. On the input side, the increasing dependency on external data suppliers like register holders call for quick and flexible responses to complications with external data, and at the same time the production process should be robust enough to cope with environmental fluctuations.

General approach: the Master Plan

In 2005, the Master Plan ‘Rekenen op Statistiek’⁴ was written. The original focus was on reducing IT cost. Although this goal is still considered important, recently some of the other driving forces have come more to the front. In particular, the needs to increase efficiency and to reduce administrative burden are now primary concerns. Accordingly, the focus of Master Plan activities shifts somewhat from time to time. Below we present some important elements of the

³ Motion of Aprotroot and Van As, members of the House of Representatives of the Dutch Parliament, 2005–2006, 29 515, nr. 111

⁴ Counting on Statistics

Master Plan (or Modernization Program) that are relevant to the HEcS program. Ypma and Zeelenberg (2007) describe the general approach in more detail.

Statistics Netherlands Business Architecture

As part of the Master Plan an outline of a Statistics Netherlands Business Architecture was developed. It serves as a reference framework for the future organisation of the statistical processes at Statistics Netherlands and covers a number of important aspects that the HEcS program should take into account. Most importantly, the SN Business Architecture definitely leaves the old ‘stovepipe’ approach, where each statistical process has its own relatively autonomous systems and procedures, for a more harmonised approach that unifies design and production concepts.

The SN Business Architecture is developed using the Integrated Architecture Framework (IAF) approach. IAF is service-oriented, which makes the approach flexible and future-proof. It gives a concise, complete and practical overview of all relevant aspects. It is useful for the development of systems, but its main function is to show the relations and interdependencies of the organisation and IT in all its major elements. For many architectural efforts only part of it will be of paramount importance. Still, the overall framework will provide the right scope and positioning of the aspects and areas involved and the way they need to be included. The framework is applicable at enterprise level of architecture, as well as at domain and project level of architecture. It describes a basic design of the statistical process at an abstract level in terms of activities, functions and objects using a uniform terminology.

Key features of the Business Architecture that are also central to the HEcS approach include:

1. Chain orientation. The statistical process is modeled as a *value chain*⁵ of coherent subprocesses operating between steady states. Every sub-process adds value to the data being processed.
2. Output orientation. Output requirements are leading in the (re)design of statistical processes. This implies that output needs to be specified at an early stage of redesign. Legal obligations, in most cases concerning European regulations, are to be met at all time. For other less formal output requirements it needs to be (re)assessed whether merit and costs match, observing the consequences of the driving forces described above.
3. Steady States. The SN Business Architecture identifies a number of steady states for the chain of statistical processes. Each steady state contains data in an explicitly described state of processing⁶. For example, raw data obtained from a sample survey or from an administrative register is considered as a first steady state; output disseminated to Eurostat and other users is considered as a final steady state. A number of additional steady states are identified between these extremes. Mutual use and re-use of source data and intermediary results is facilitated through interaction of the steady states. At the same time, they guard the coherence of the whole statistical system. Furthermore, steady states play an important role in chain management.
4. Chain management. It is imperative that the production progress can be monitored across the whole chain against quality and performance expectations. When anomalies occur, necessary measures have to be taken through a system of chain management.

Generic Processing Services

A number of generic processing services are being developed as part of the Master Plan. Currently, a first set of six generic processing services has been identified and projects have started to develop them:

⁵ Or rather, it is not a chain but a network of processes. Many cross-relations exist between processes in the chain.

⁶ It is important to realize that steady states are a conceptual notion. It is tempting to visualize them as databases, and often this will indeed be the case, but it is not necessarily so.

1. Data collection. This service will take care of all statistical data collection within the institute, including related logistics and administrative issues, such as reminding late respondents and data entry. All modes of data collection will be addressed: including web-based surveys, field interviews, and paper questionnaires. A special unit will be assigned to register handling. Other statistical units will thus be able to concentrate on their core business of data processing.
2. Data Service Centre (DSC). All data storage and retrieval for authorised (internal) users will be channelled through this service. This refers in particular to the steady states that have been identified in the SN Business Architecture. Standardised tools for access of the DSC are being developed.
3. Meta service. This is a ‘supporting’ project that aims to unify the way meta is being used in the institute. The meta service is closely linked to the DSC. It should handle conceptual meta, qualitative meta and process meta.
4. Output. The purpose of this project is to enhance the accessibility, functionality and performance of Statline, the Statistics Netherlands publication database on the internet.
5. Rule-based processing. This project is to provide the statisticians with tools that enable them –to a large extent– to specify and implement their own processes, such that involvement of IT staff can be minimized. Tools for three kinds of activities will be provided: statistical ETL (extraction, transformation and loading of data), BPM (Business Process Management) and BRM (Business Rules Management).
6. Chain Control. The chain management processes mentioned require supporting tools and services, which this project aims to develop.

In the future the number of generic services may expand further. Statistics Netherlands is now implementing a first version of these services in a test environment. When fully deployed later on, the services should gradually be used throughout the institute. All statistical processes will be adapted or redesigned in such a way that this becomes possible. The HEcS program of the redesign of the chain of economic statistics is only one, though very important, case.

Outline of the HEcS program

In the fall of 2006, preparations have started for drafting the HEcS program. In the spring of 2007 a first version of a HEcS Program Plan has been written. The program will run until 2010 and is divided in three ‘levels’ according to clusters of statistics that are scheduled for redesign:

1. The core of economic statistics relating to economic growth: in particular structural business statistics and related short-term (turnover) statistics, including related statistics on financing and (both financial and non-financial) investment. The system of National Accounts also belongs to this level.
2. Statistics on financial institutions and foreign trade statistics.
3. Statistics on the Non-profit sector (including government) and the agricultural sector.

A number of ‘level 1’ HEcS redesign projects have already started, with many more to follow. A central role among the first group of projects is played by the HEcS Architecture project. This project aims at designing an architecture for the chain of business statistics. As mentioned above, an outline of a SN Business Architecture has already been developed which serves as a reference framework for the future organisation of the statistical processes at Statistics Netherlands. The level of detail, however, is not sufficient to sketch a clear perspective of the chain of economic processes. Therefore one of the first objectives of the HEcS program is to refine the SN Business Architecture such that it sufficiently describes the future chain of economic statistics. Moreover, the HEcS Business Architecture also serves to further (re)define the HEcS Program Plan and provides a starting point for the migration path towards the new situation, including organisational changes.

Below we describe some of the guiding principles of the HEcS program before we turn to the role of registers in the program.

Top-down approach

Economic statistics are often compiled ‘bottom-up’ with considerable detail for two reasons. On the one hand, output demands and obligations ask for a certain level of detail. On the other hand, methodological considerations also require sufficient detail. For example, the classical way of business statistics compilation based on stratified survey sampling assumes relatively many homogeneous strata.

The statistics considered as the most important, however, are aggregated indicators like the growth of GDP (commonly referred to as ‘the economic growth’), the index of consumer prices and retail trade turnover. The focus of the HEcS approach is on compiling such indicators ‘top-down’ as accurately as possible, and with as little revisions as possible. Branche-specific results and other refinements are considered as derivative results that may be applied at a later stage.

Thus, less attention will be paid to details that are considered less important. For example, data may be collected (when at all) with a lower frequency. It may also be necessary to rely on expert guesses or use model-based estimates. In all cases, the approach should be such that obligatory output can still be compiled with sufficient quality.

Tailor-made approach for large and complex units

Large and complex units will receive special attention in the new situation. In the current situation such units are basically treated the same way as any other units, and this for each individual process. Large and complex units are by their nature part of almost any survey carried out by Statistics Netherlands. Hence, this approach causes duplication in questionnaires and results in inconsistencies for individual units.

An infamous example concerns inconsistencies observed between production statistics (PS) data, collected on the level of business units⁷, and data from the balance sheet statistics for non-financial enterprises (BSS), collected on the level of enterprises. Both data sets contain a profit and loss account, but when these are compared for an enterprise and its constituent KAUs they seldom match. The same problem arises for example for employment figures. Such inconsistencies problem pose major problems at the level of national accounts, where sector accounts (using BSS data) and supply-and-use tables (using PS data) must match by definition. Part of this problem, that has worsened significantly in recent years, relates to globalisation issues. Many of the larger Dutch companies operate on a multinational level and they have complicated cross-border relations.

In order to deal with both the consistency issue and the response burden issue, a HEcS project has started that will develop a tailor-made approach for large and complex units. For each unit at hand, data collection will be streamlined in such a way that our statistical needs are satisfied in one data package, while the specific characteristics of the unit are taken into account. Data processing will then take place in an integrated environment. Integrated results are delivered to one of the above-mentioned steady states for further processing. For example, joining results with results for smaller units (see below) in order to produce specific output will be one possible further action.

It has not yet been decided what the scope of this tailor-made approach will be. Part of the project is to establish which units are to be included. The current idea is that at most about one thousand enterprises should be dealt with according to this approach. The number of KAUs involved is yet an order of magnitude bigger.

⁷ To be precise, Kind-of-Activity Units or KAUs

This project is expected to contribute to both quality improvement and reduction of administrative burden perceived by large units. From a pilot study it appeared that the approach works. Moreover, the units involved appreciate the fact that Statistics Netherlands tries to avoid duplication in questionnaires and unnecessary questions. The project is not expected to yield direct efficiency gains, however. Successful implementation is rather labour-intensive and will require well-qualified staff.

Register-based statistics for smaller units

Statistics for small and medium-sized enterprises will be compiled as much as possible on the basis of administrative data (secondary sources). The reasons for this are twofold. On the one hand, conforming to the new SN Law (see below), Statistics Netherlands is only allowed to collect data when no adequate administrative data are available. On the other hand, it is expected that large-scale use of administrative data leads to efficiency advantages.

Administrative data have by their nature a goal different from the production of statistics. Hence, they are not exactly geared to statistical needs. In the past this argument was often used to dismiss the use of administrative data for statistical purposes. In economic statistics, they were primarily used as supplementary data. This stance is no longer acceptable. Where necessary, creative solutions need to be developed in order to overcome the unavoidable difficulties. This may require rigorous choices in the field of output.

Registrations do not cover all statistical information needs, and sometimes they are just not available in time. It is also crucial to check the quality of secondary sources independently, for example in order to avoid that legal or administrative changes lead to unwanted statistical effects. For such reasons it will remain necessary to keep on collecting primary data in selected cases. In such cases, it has to be argued clearly why data collection is necessary, and merits and costs have to be judged.

An important problem that has yet to be solved concerns the medium-sized units that are too small for the tailor-made approach, and too big to rely exclusively on register data. As part of the HEcS architecture a general strategy for these cases needs to be developed.

Coherence between primary statistics and macro-economic statistics

The HEcS program re-examines the relation between primary statistics and macro-economic statistics. Primary statistical data serve, for example, as the starting point for the compilation of National Accounts. The present chain of processes involved is not always fully logical, which results in quality loss and inefficiencies. This situation negatively affects estimates of economic growth and leads to revisions that are considered too big.

For example, gaps (so-called 'white spots') in information are often only resolved at National Accounts level, which is considered sub-optimal. The new HEcS approach should make it possible to resolve the white spots early on.

Redesign of National Accounts

A full redesign of the system of National Accounts takes place jointly with the redesign of primary business statistics, both as part of the HEcS program in order to stay in control of the whole chain. Important elements in the National Accounts redesign are, apart from those described already above, a rationalization of the National Accounts compilation process, separation of the error detection and balancing processes and the introduction of automatic balancing techniques where possible. In the scope of this paper we will not discuss details.

The role of registers in the HEcS program

The success of the HEcS program relies to a large extent on extensive and efficient exploitation of register data. In 2004 a new Dutch Statistical Law came into force. This law gives Statistics Netherlands full access (for statistical purposes) to all registers that are maintained by government bodies. Moreover, this access is free of costs. On the other hand, the new Statistical Law requires Statistics Netherlands to use register data as much as possible, even to the extent that additional data collection is only allowed when it can be made clear that registers do not provide sufficient information.

For social statistics, the use of register data is now well-established within Statistics Netherlands. The Dutch population register as maintained by the municipalities is fully accessible to our institute and serves for example as the basic underlying population for our Social Statistics database, next to other government registers and augmented with own data, collected for cases where no adequate register data is available.

For economic statistics, and in particular business statistics, the use of register data is as yet less well-established. In the past, relatively few and isolated applications of mostly fiscal registers have been developed. See Bruinooge *et al.* (1997) and Braaksma *et al.* (2000) for some early examples of the use fiscal data as the basis for statistics production. Van Velzen (2005) describes the current approach for business statistics, where fiscal registers are used mostly as auxiliary data.

The HEcS program should make major progress in enhancing the role of registers. As mentioned above, the optimal use of register data is one of the cornerstones of the HEcS program. Below we describe a number of register-related projects that have already started under the HEcS program. Further projects will follow when the business architecture for the chain of economic statistics has been developed.

Registers available

The registers currently regarded as most useful for economic statistics are those maintained by the Tax Office. Registers available include VAT, corporate tax and wage tax registers. Recently two new registers have become available due to changes in the Dutch taxation system. From 2006 onwards, all enterprises in the Netherlands are required to provide the Tax Office with standardized, and rather detailed, electronic profit statements on an annual basis. This includes self-employed persons, a group that was traditionally not well covered by register sources. Another improvement is the new integrated register of wages and social security 'Walvis' that is maintained jointly by the Tax Office and a government body responsible for Social Security. This register contains information on wages and salaries, both from an employee and enterprise perspective. Although exploration of this register is still in its infancy, it is expected to become a very important and high-quality source for labour-related data.

Statistics Netherlands already has agreements with most register holders concerning logistic aspects of the data provided. A key element in exploiting registers is moreover that it is possible to judge and monitor their quality, see Daas and Fonville (2007). A register may change over time, either because the applicable law changes or because the register holder changes its processing. Since Statistics Netherlands has no direct control over the registers, it is imperative that a close eye is held on (changes in) the information content, in order to avoid unwanted and unrealistic breaks in statistical time series. This implies that it is of the utmost importance to maintain good relations with register holders at both management and operational levels.

A very specific example of the use of register data concerns the use of supervisory data from the Dutch Central Bank DNB. DNB, as the supervisory authority for Dutch financial institutions, maintains registers of these institutions and collects many supervisory data that are valuable from a statistical point of view. A very good working relationship has been established between

both institutions that grants SN access to supervisory data. Part of the statistical processing is carried out by DNB. Braaksma and Claassen (2007) describe the current state of affairs.

Complications with the use of registers

Administrative registers have by their nature a goal different from the production of statistics. Hence, when using register data, a number of difficulties have to be overcome. We mention some important ones, using the VAT register as an example. Similar problems apply to other registers.

1. The VAT turnover definition does not always agree with the statistical turnover definition. This relates for example to differences in time of recording of turnover or differences in what is considered as turnover to be attributed to a certain unit.
2. Currently the General Business Register (GBR) maintained by Statistics Netherlands is considered the reference framework for all economic statistics. Hence, all VAT-units need to be linked to GBR-units (KAUs) before their data can be successfully used. It is not possible, however, for all VAT units to find matching GBR units. Although the number of successful matches has strongly improved, for example by a redesign of the GBR and by more sophisticated matching techniques, it is still not possible to match all VAT units. This calls for specific treatment of those units for which no match is found.
3. In the Netherlands, VAT turnover has to be declared either on a monthly, quarterly or annual basis. The main determining factor is the size of a unit, measured in terms of VAT to be paid. In practice, about half of the enterprises in the scope of this project declare VAT on a quarterly basis, which poses problems for monthly statistics.
4. VAT turnover has to be declared within one month after the period concerned. After declaration, VAT data has to be processed first by the Tax Office and then within our institution before it is available for statistical purposes. For monthly statistics in particular this poses a timeliness problem.
5. When errors are suspected in VAT data, it is not possible to contact either the enterprise itself or the Tax Office for clarification. This severely restricts the possibilities of data editing. In many cases such problems are not fatal due to the amount of data, but in the case of outliers difficult decisions may have to be made. When systematic errors occur, however, it should be possible to discuss the causes with the Tax Office.

In the cases mentioned above, either (model-based or other) adjustments need to be made, output specifications have to be changed or the differences have to be accepted. For example, the central role of the GBR may be reconsidered when trying to solve the matching problem. As a second example, a way out for the VAT timeliness problem could be to

- reduce the monthly statistics to relatively aggregated indicators, based on data collected from large units;
- enhance the system of quarterly statistics in return and increase its level of detail.

The sheer amount of VAT data available on a quarterly basis enables a level of detail that is unthinkable when using survey sampling. Of course, it has to be investigated carefully that other difficulties do not inhibit this.

Direct estimates for totals

As explained above, the General Business Register (GBR) maintained by Statistics Netherlands is currently considered as the reference framework for all economic statistics. In turn, the GBR derives from the commercial registers maintained by the Dutch Chambers of Commerce. The ensuing need to match register information to GBR units results in data loss. In some cases, more than half of a register can not be used for this reason. Moreover, the data loss is not

distributed homogeneously, such that in some cases the situation may be even worse. This situation is highly undesirable when registers are used as the basis for compilation of statistics.

In order to solve this problem, a project was defined to investigate to what extent it is possible to compile statistics starting from a register perspective instead of a GBR perspective. This approach is inspired by the HEcS top-down principle described above. The intended project results should provide key totals for the Dutch economy as a whole. These may subsequently be disaggregated, for example according to lines of industry, using GBR information as a supplementary source. When the approach is successful, the quality of totals for the Dutch economy should benefit.

Co-ordinated population estimates

Population estimates for economic agents (both KAUs and enterprises) active in the Netherlands are used for two goals. First, the estimates are published independently, and transmitted to Eurostat as part of the SBS obligations. Second, and not less important, the estimates are used as a reference frame for grossing up of many economic statistics, for example in the context of the SBS obligations.

Traditionally, the number of active units is measured on the basis of the GBR. A supporting questionnaire is sent out each year to a sample (drawn from the GBR) in order to be able to correct for GBR inaccuracies. The information obtained from the sample is combined with GBR information and register data (for example VAT and income tax registers) in order to compile estimates. The former paper questionnaire has been replaced by a web-based questionnaire, which already significantly improves efficiency and reduces the response burden. Nevertheless, still some 35 thousand units receive a questionnaire.

We now believe that it is possible to compile statistical population estimates based primarily on register data. The approach is similar to that used for the direct estimation of totals. In fact, the same project is responsible for both direct estimates of totals and co-ordinated population estimates.

An important problem that needs to be addressed concerns the definition of an active unit. Traditionally, the notion of active unit (based on the general principles given in European legislation) is often made operational by requiring that at least fifteen hours of labour are spent in the unit on a weekly basis. It has not yet been decided if this criterion will be maintained or dropped, or whether a new criterion will have to be introduced.

Short term indicators based on VAT

An important project that will fully exploit the available VAT data concerns short-term, monthly and quarterly, turnover statistics. These high-profile statistics are both used in their own right, as short-term indicators for the economical situation, and serve as sources for the compilation of quarterly GDP estimates in the context of National Accounts. Furthermore they are used to provide Eurostat with data according to the STS regulation.

Traditionally, the short-term turnover statistics are compiled from a sample survey with either a monthly or a quarterly frequency. Although the questionnaires involved are rather simple, often restricted to a single question on turnover, they are considered a major nuisance by those addressed. Statistics Netherlands has committed itself to abandoning the questionnaires addressed to small and medium-sized enterprises as soon as possible. The target is that from 2008 onwards, all data collection referring to enterprises with less than fifty employees will be replaced by VAT turnover data, with the possible exception of a very limited number of lines of industry where specific difficulties arise, that can not be overcome using VAT data.

A number of recent research projects and data experiments, for example in the context of the redesign of the GBR, have given us confidence that the approach is viable and sound results can

be achieved in a relatively short time span. Nevertheless, the output program may have to be reconsidered as described above, given the inherent limitations of the registers available.

Register information for large units

As mentioned above, large and complex units will receive a tailor-made approach of data collection and data processing. Part and parcel of the data collection strategy will be that information that is already available from registers will not be collected again. According to common wisdom, it is not feasible to use administrative data for these units due to their complexity, which poses severe matching problems. In a pilot study concerning the thirty largest Dutch enterprises, however, it turned out that useful register information was available for one in four of these units. It is expected that when extending the project to a larger number of units, the percentage of units for which useful administrative data is available increases even further. This fact will be taken into account when designing dedicated questionnaires.

Conclusion

We have described the plans that are envisaged for the redesign of the chain of economic statistics in the Netherlands. The HEcS program has just started and much remains yet to be done. It is clear that success of the program is of the utmost importance for Statistics Netherlands. A critical success factor is to what extent it is possible to fully exploit the available registers.

Of course, developments in Statistics Netherlands are not isolated: other statistical institutions face similar situations. We hope that we may benefit from sharing experiences with colleagues.

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