

Quality assurance framework applications in Turkish Statistical System

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ABSTRACT

The aim of this paper is to present the study done on quality assurance framework applications in Turkish Statistical System (TSS). Quality assurance framework applications will be the baseline for continuous improvement and sustainability in TSS. This paper summarizes the activities of TurkStat after the reorganization based on GSBPM approach and the new coming efforts for TSS in parallel with the reorganization. The SMART is taken as the strategic approach to contribute the quality assurance framework applications in the Statistical System of Turkey. Primarily, national quality standards, quality indicators and quality evaluation process are determined with this approach. A Quality Evaluation Questionnaire is prepared in accordance with national quality standards based on GSBPM, CoP and QAF. To support and perform in-depth assessment a checklist is designed. Pilot studies are conducted by using the questionnaire and the checklist. The results are presented in this paper.

KEY WORDS: integrated quality, Generic Statistical Business Process Model, CoP, sustainability, Turkish Statistical System, national quality standards, reorganization.

1. Integrated quality in official statistics

The concept of quality nowadays is not only evaluated as statistical product quality but also considered as the whole process quality from the specification of data/information needs to the dissemination of official statistics. This approach can be expressed as “integrated quality in official statistics” which requires the development of a robust infrastructure based on national and international standards and building the systems on this baseline and configuring them with continuous improvements.

Turkish Statistical Institute (TurkStat) adopted the statement of establishing a user-centered, sustainable statistical system based on the international standards in the Strategic Plan (2012-2016) as the vision of Turkish Statistical System (TSS). This system consists of 63 institutions and 295 official statistics are produced. Input data used to produce official statistics have a wide range from administrative records to statistical surveys. In this system the role of TurkStat is to perform cooperation and coordination, to monitor and control the system, to take measures to prevent the breakage of the system and to ensure continuous improvement.

If we define the TSS as a chain and the responsible institutions producing official statistics as a chain-forming rings, "the chain is only strong as its weakest link" approach drive forward the necessity of addressing the system as integrated. In the statistical system consisting of many actors, there is no unique mathematical formula to prevent breakage and to ensure sustainability, but an integrated quality management approach based on collaboration with stakeholders will generate an engine power in achieving the sustainability of the TSS. With this awareness, TurkStat conducts various studies in order to provide integrated quality both within its organizational structure as well as in the production of official statistics in cooperation with the public institutions representing the other rings of the chain.

Turkey Statistics Law no: 5429 came into force in 2005, is a legal framework for our country’s statistical system and constitutes the legal basis and determine the fundamental principles and rules in terms of quality and standards in official statistics. The Official Statistics Program (OSP) has begun to prepare in order to collect all official statistics produced by institutions and organizations under one umbrella for five-year periods since 2007. The program also refers to the Statistical System of Turkey.

With the Program the answers of “5W 1H” questions for each official statistics are presented as metadata; “Who is responsible from official statistics? What are the classifications used, and

what is the data collection methodology for official statistics? Why is it produced? When will it be presented to the users (publication period)? Where will it be presented (web address, etc)? and How is it distributed to the users (press release, database, electronic media, etc)?”.

One of the most concrete achievements of the programmed period is the prevention of duplicated data, further progress in the use of administrative data and launching of the standardization work in official statistics. In the first period of the Program covering 2007-2011, publication and distribution processes of official statistics was standardized by the National Data Release Calendar. The quality factor was emphasized during the second program covering the years 2012-2016, and training activities were organized based on quality principles, classification, and metadata and process management to the representatives of the institutions. Since 2011, awareness on the importance of quality issues was raised among the representatives of Statistical Council and OSP working groups, and they were asked about the improvement works to be done by them.

2. Process oriented reorganization of TurkStat and improvements

The new developments in national and international arena and the changing working conditions paved the way for the reorganization of TurkStat which will help to achieve corporate goals, to ensure the productivity of human resources and to increase the effective and efficient functioning of the organization and business processes. As well, TurkStat has begun to study on Generic Statistical Business Process Model (GSBPM) in 2010. The GSBPM analysis showed how the organization should be structured around the processes to optimize the work flows and to reduce the cost. In 2012, a new organizational structure formed parallel with the experiences gained from the GSBPM (see annex 1).

Along with the process-oriented organizational structure, TurkStat focused on the standardization of metadata, process and quality issues. In the new structure; statistical infrastructure activities such as data collection, data analysis, administrative recording systems, standards and metadata management activities were planned to be carried out by the newly founded departments and groups.

Since 2012, various studies have been initiated under the improvement of statistical production processes. These can be summarized as follows;

The main focus of the **first phase of GSBPM - specifying needs-** is a parallel fact with the user-centered statement in the TurkStat's vision. Before the reorganization, responsibility of the

Publication and Information Dissemination Department was dissemination oriented, after the reorganization it has been transformed into a structure that will also manage customer relations actively and the name was changed to Dissemination of Information and Communication Department (DICD). In order to manage communication activities “Communication Strategy” document was prepared.

Incorporating user perspectives in the system has been considered among the most important issues with the reorganization. Seminars, panels and press conferences are organized and the requests of users are evaluated as an input in the statistical production processes. The web page of the Institute was redesigned and became more user-friendly.

In order to increase the cooperation between organizations and to improve the business registers a new department called The Register Systems (RSD) was established. One of the main objectives of OSP is to produce statistics using administrative records rather than conducting surveys and facilitating the efforts in this direction. The development works carried out by The Register Systems Department are very important to bring out the potential of administrative records and the national registration systems to produce statistics.

Register Systems Department actively performs the organization and coordination activities related with OSP. OSP working groups are composed of representatives of public institutions, universities and civil society organizations. A directive on the “Formation of Official Statistics Program Working Groups and Working Procedures” arranged by RSD. After the directive, the working groups has become more active, participants from broader profile has been represented and also the frequency of the meetings during the year has been increased.

With the recent reorganization of TurkStat, the metadata studies were merged under a new department called Metadata and Standards. The new department is responsible for coordinating the efforts to establish standards and a comprehensive metadata system in TurkStat. Process and data infrastructure studies carried out by Metadata and Standard Department (MSD), are very important for the **design phase of GSBPM**. An integrated evaluation of metadata with all components - quality, process, structural and reference - and dissemination of standards throughout the organization are provided.

Within the scope of GSBPM studies 260 statistical products and services were analyzed. The business steps were identified, evaluated and modeled. Input-output clusters were created at product and sub-sub process level of the model. In 2013, the work done by MSD to configure a

new metadata system compatible with ESMS and DDI has gained speed. Several institutions publish their metadata in SDDS format on their web site. Once the new metadata system is built by TurkStat, it is planned to be spread to other institutions in the medium term. Publishing metadata information in the Official Statistics Portal (<http://www.resmiistatistik.gov.tr/>) is one of the main objectives.

A metadata checklist for questionnaires has been developed to ensure compliance with the metadata standards. The harmonization of the metadata (codes, variables, sub categories, data sets, naming conventions, definitions, etc) in organizational databases is a work in progress. In addition, a publication named "How to Develop a Questionnaire? All steps from design to testing" was prepared as a guide for researchers. A questionnaire checklist for the design standards was prepared within the scope of the publication.

TurkStat started measuring the burden on the respondents for selected surveys in 2013. The aim is to establish a baseline and monitor the changes in actual burden as a result of the measures taken over time.

One of the other important initiatives within the context of standardization is to set up national standards for registry systems and the integration of these systems in Turkish Statistical System.

As part of **build phase of GSBPM**, the building of "Harzemli System" is the most important innovation of TurkStat. The system provides a central and manageable structure for electronic data entry applications. The system offers special applications like requirement analysis, data entry application, analysis reports, bug tracking and user management. The structural metadata (information on datasets and variable groups) entered by the subject matter departments with the coordination of Metadata and Standard Department is used as input in the Harzemli System.

The data collection process of TurkStat was carried out by the subject matter departments with the field support of regional offices. Each of the 26 regional offices has to deal with different subject matter departments for different surveys. In order to perform coordination and monitoring of data collection work a new department called The Data Collection Coordination Department (DCCD) was founded with the reorganization.

Data Collection Coordination Department is focusing on the **collect phase**; a Production Process Schedule of Surveys was created by DCCD in order to manage and monitor the timeliness and responsibilities. The timeliness of TurkStat surveys could be measured by comparing the scheduled date of the activities with the actual dates. Monitoring of the Schedule is done on a

daily basis. In addition to the Production Process Schedule for surveys another checklist, Field Application Checklist, was developed to improve the quality of data collection. The main objectives of the Checklist are;

- to make systematic quality control of the field work,
- to identify the problems and deficiencies encountered during the data collection of the surveys with application-based reports,
- to take necessary measures to overcome the problems and to take improvement actions for the following applications of the surveys.

The Field Application Checklist and the Production Process Schedule are mutually supportive procedures developed to increase the efficiency of the collect phase of surveys.

Standardization of the data processing and analysis techniques is another important issue to address. In order to combine the efforts within the data processing and analysis framework and to carry out various methodological works in this subject a new group called The Data Analysis Techniques was created. In the context of **process phase of GSBPM**, this group has initiated a study called standardization of macro control and imputation processes. An inventory to include the methods used for data consistency checks, outlier detection and imputation was started to be created. Once the Inventory was completed, “Macro-control and Imputations Standards Handbook” would be prepared to contribute to the process phase.

In the context of **analyze phase of GSBPM**, a “Directive on Principles and Procedures Related to the Revision Guidelines of Statistical Data Produced by Turkish Statistical Institute” was published and the Revision Handbook was prepared. This handbook contains general information about the revision, revision information form and methodological document.

Several important studies have been started by TurkStat within the **dissemination phase of GSBPM**. In accordance with the reorganization, the job description of Electronic Publishing Team under the Department of Dissemination of Information and Communication was revised with the emphasis on mobile services and social media. Web page content management has been started to be carried out by this team to improve the effectiveness of the web page. Official Statistics Portal is presented to the public in 2014 in order to set up a database of all official statistics. Studies performed in the context of the Official Statistics Program could be monitored through this portal.

TurkStat aims at standardizing the processes and the data infrastructure. But the standardization of processes needs to be carefully managed; also this process takes a significant amount of time. TurkStat plans to create a comprehensive process checklist including all processes from A to Z by defining key process indicators based on standard processes. The integration of this checklist with other control studies will be performed. And IT based system to control processes is planned to be developed.

3. National quality standards for official statistics and applications of quality assurance framework

The above mentioned initiatives of TurkStat are the baseline for the improvement of whole statistical production processes in TSS. Statistical Law of Turkey gives the responsibility of monitoring and managing the TSS to TurkStat by pursuing the performance of tasks assigned by the Program to the institutions and organizations in relation to official statistics. And also, the responsibility of examining statistics produced by these institutions and organizations in terms of their conformity to international standards, performing quality controls and providing technical support and ensuring the coordination of these issues are given to TurkStat. (Statistics Law of Turkey, Article 18 h paragraph). In order to establish a sustainable statistical system, all institutions constituting the rings of the chain are very important and they need to take necessary steps to improve official statistics.

A SMART approach is taken as a strategic formula to perform integrated quality efforts in Turkish Statistical System. The “S-Specific” indicates the specific objectives and defined as generating a quality assurance framework for official statistics in order to contribute sustainability. “M - Measurable” denotes quality indicators that can be measured for official statistics. Physicist William Thompson says that "If you can't measure it, you can't improve it". From this point of view, specific measurable quality indicators are selected based on CoP. “A – Achievable” means, national quality standards should be achievable that every institution within TSS could adopt these standards in its own statistical production systems. “R-Relevant” denotes that the objectives of TurkStat should be relevant to the objectives of the other partner institutions of Turkish Statistical System in the sense of the official statistics. “T-Timely” indicates that these standards should be valid for a specific time period and updated according to the developments in statistics.

The three pillars of SMART are: (1) common acceptance and adoption of quality standards by TSS set in accordance with national and international requirements (2) monitoring and

controlling of production processes focusing on these standards (3) ensuring continuous improvement through cooperation, participation and training. All of these elements constitute the basic components of a sustainable statistical system.

“National Quality Standards in Official Statistics, 2014” was prepared in accordance with the European Statistics Code of Practice (CoP). 16 standards have been identified around the 10 quality principles; (1) adequacy of resources (2) statistical confidentiality (3) impartiality and objectivity (4) sound methodology (5) appropriate statistical procedures (6) user orientation (7) accuracy and reliability (8) timeliness (9) coherence and comparability (10) accessibility and clarity (see Annex 2).


The Official Statistics Quality Evaluation Questionnaire and a checklist were prepared to determine the level of compliance with national quality standards in official statistics. While designing the questionnaire, international works like QAF, NQAF, the European Self Assessment Checklist for Survey Managers (DESAP), GSBPM and Eurostat Peer Review Questionnaire was taken into consideration.

The Official Statistics Quality Evaluation Form includes the following sub-sections: (1) general information (2) data sources and cooperation (3) specifying user needs (4) data collection (5) classifications (6) data process and analysis (7) dissemination of official statistics (8) opinions and recommendations. The checklist is used to check the existence and provision of other supporting materials like metadata documents, strategies/objectives (defined in Strategic Plan, Activity Plan, etc.), and formal meeting decisions related with official statistics and flow diagram of statistical production processes.

“Quality Evaluation of Official Statistics, 2014” study focuses on both process and product quality. But, there are some questions related with structural quality. The questionnaire and the checklist are the main parts of the evaluation process. Administrative Records Evaluation study carried out during 2012-2013, is one of the other inputs of quality evaluation process. The main objectives of the quality evaluation process for official statistics in TSS are;

- to prepare a "Data Source Inventory",
- to make a current situation analysis for the adequacy of resources of statistics produced from administrative records,
- to determine inter-institutional cooperation activities carried out within the production processes,

- to see the current situation of “to what extent” the user needs taken into account,
- to obtain basic information and documentation related with the data collection, process and analysis phases of official statistics,
- to perform information sharing about quality standards,
- to determine the level of compliance with the quality principles and standards,
- to determine the quality improvement actions proposed under each principle,
- to prepare a "Quality Assessment Report" for each official statistic.

If the statistics is compliant with the quality standards of official statistics, the official statistics quality logo as seen here  will be given. Quality accreditation process will be initiated with the formal requests of institutions responsible for official statistics production. Official statistics that meet national quality standards will ensure the quality assurance of products submitted to users and will increase the trust to official statistics. Periodical review of official statistics every 3 years and taking quality improvement actions regarding these standards will contribute to the achievement of integrated quality management and a sustainable statistics system.

4. Pilot applications of Quality Evaluation Questionnaire and the Checklist

The experiences gained through the standardization works in TurkStat, and the experiences gained in the official statistics produced by the other public institutions since the programmed period started in 2007 have helped in quality evaluation works and quality assurance framework applications in official statistics.

TurkStat carried out three in-house pilots in 2013 using the draft quality evaluation questionnaire. The templates applied to 3 public institutions: the General Directorate of Highways, the Directorate General for Health Research, Turkish Patent Institute. Templates were revised and approved by the Data Quality Control Board and the framework of the quality evaluation process was determined. Two quality evaluation working groups were formed to evaluate two official statistics and then pilot studies were carried out with the Undersecretariat of Treasury and Ministry of Forest and Water. During the period of February-March 2014, a detailed review was performed and the current situation analysis and quality evaluation reports were prepared. The pilot evaluation reports contain extensive information about the official statistics.

Figure 1 (Annex 3) shows how the questions in the questionnaire are related with the quality indicators of CoP, and the number of questions mapped to each indicator. The number of questions related with quality indicators 3.1, 7.1, 7.7, 8.4, 11.1, 11.3, 12.1 has more weight in the questionnaire. The mapping between GSBPM level 2 and the quality indicators based on the Quality Evaluation Questionnaire can be seen in Annex 4.

In the quality accreditation process, the following issues are set up as the major requirements;

- Responsible institutions¹ should set up a separate statistical unit and should employ adequate staff graduated from statistics discipline.
- Responsible institutions should use the metadata standard format defined by TurkStat and publish this metadata in their web site and should ensure periodical updates.
- Responsible institution should ensure internal consistency of administrative data.
- Official statistics should be accurate and reliable.
- International definitions, methodology and classifications should be used in the production of official statistics. If there are not any international standards, national standards should be defined and documented.
- Appropriate statistical procedures should be applied in the process of official statistics production.

The representatives of the Statistical Council were informed about the findings of the pilot study, about the national quality standards, and the major requirements to obtain the quality logo. The most important feedback from the representatives is the organization of training activities for institutions producing official statistics. TurkStat will prepare training activities based on quality standards, and technical support will be provided to these institutions.

4. Conclusion

The SMART is a valuable strategic approach to develop a quality assurance framework for official statistics based on national quality standards. As national quality standards surrounding quality assurance framework initiatives evolve, responsible institutions are beginning to weave sustainability capabilities more deeply into their statistical production processes and organizational culture.

¹ Responsible institution refers to the institution which is responsible for producing and dissemination of official statistics

The establishment of systems incorporating user requirements and quality-oriented statistical procedures in data sources, product and processes, and the monitoring and controlling of these systems with an integrated quality management would ensure continuous improvement in Turkish Statistical System (TSS).

The most important finding from pilot application is the importance of raising awareness, training and deployment of professionalism in official statistics production for a system involving multiple statistical actors. These efforts could be achieved with the quality evaluation studies. Quality evaluation studies would specify the current situation and the deficiencies of data collection, process and analysis phases of official statistics.

As a final comment on the quality assurance framework applications; using only a quality assessment questionnaire would not be sufficient. A comprehensive review process should be organized as structural in-depth reviews for each official statistic. Supporting materials like metadata, process flows and other related documentation should be analyzed to allow a more detailed assessment.

5. References

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Annex 1: TurkStat's Statistical Business Process Model

Quality Management / Metadata Management

1.Specify Needs	2.Design	3.Build	4.Collect	5.Process	6.Analyse	7.Disseminate
1.1.Determine needs for information	2.1.Design statistical products and outputs	3.1.Build and develop production system components	4.1.Establish frame and registers, select sample	5.1.Classify and code	6.1.Evaluate the information for its effect	7.1.Update dissemination systems
1.2.Consult and confirm needs	2.2.Design frame and sample methodology	3.2.Integrate production system with other systems	4.2.Set up collection	5.2.Micro-edit	6.2.Produce statistics	7.2.Produce dissemination products
1.3.Establish output objectives	2.3.Design data collection methodology	3.3.Test production system	4.3.Run collection	5.3.Macro-control	6.3.Ensure statistical quality	7.3.Manage release of dissemination products
1.4.Check data availability	2.4.Design statistical processing and analysis methodology	3.4.Finalize production system	4.4.Finalize collection	5.4.Impute	6.4.Examine and evaluate statistics	7.4.Manage user queries
1.5.Prepare business plan	2.5.Design production systems and workflows			5.5.Calculate weights and derive variables	6.5.Prepare statistics for dissemination	
					6.6.Finalize content	

Annex 2: National Quality Standards for Official Statistics, Ver. 1, 2014

Quality Principles	National Quality Standards for Official Statistics
Adequacy of Resources	<p>1. Human resources, financial resources and computing resources should be sufficient in terms of both quantity and quality to satisfy the needs of Turkish Statistical System and should be used effectively.</p> <p>2. The potential of producing statistics from administrative records should be improved to ensure cost-effectiveness.</p>
Statistical Confidentiality	<p>3. In the production and publication of official statistics, measures are taken to ensure statistical confidentiality.</p> <p>4. Data security is ensured in the production processes (collection, processing, analysis, dissemination) of official statistics.</p>
Impartiality and Objectivity	<p>5. Responsible institutions and organizations produce and disseminate official statistics in professional, impartial and transparent manner and all users are treated as equally.</p>
Sound Methodology	<p>6. The compliance of methods used in the production of official statistics with the national and international standards is ensured.</p> <p>7. The compliance of concepts, definitions, coverage and classifications used in the production and dissemination of official statistics with national and international standards is ensured.</p>
Appropriate Statistical Procedures	<p>8. Appropriate statistical procedures (micro control, macro-control, imputation, correction in the data source, data analysis, revision, seasonal adjustment, etc.) are implemented in the production of official statistics.</p>
User Orientation	<p>9. User needs are taken into account in the production of official statistics.</p> <p>10. Institutions and organization involved in Turkish Statistical System takes strengthening and enhancing cooperation precautions to develop official statistics.</p> <p>11. The use of administrative records and data sharing is expanded between the institutions and organizations in TSS.</p>
Accuracy and Reliability	<p>12. Official statistics reflect the reality with accuracy and reliability.</p>
Timeliness	<p>13. The period of time elapsed between publication date of official statistics and reference period of data is provided in compliance with national and international standards.</p> <p>14. The publication date of official statistics is predetermined and published in accordance with the National Data Release Calendar. Changes in the publication date are announced with the reasons to the public.</p>
Coherence and Comparability	<p>15. Official statistics are consistent internally and as a time series, comparable across regions and countries, and relevant data from different sources can be combined with each other and be used as commonly.</p>
Accessibility and Clarity	<p>16. Official statistics and metadata are disseminated in clear, understandable and convenient format and the accessibility of them is provided.</p>

Annex 3: Mapping between the Questions and GSBPM/CoP.

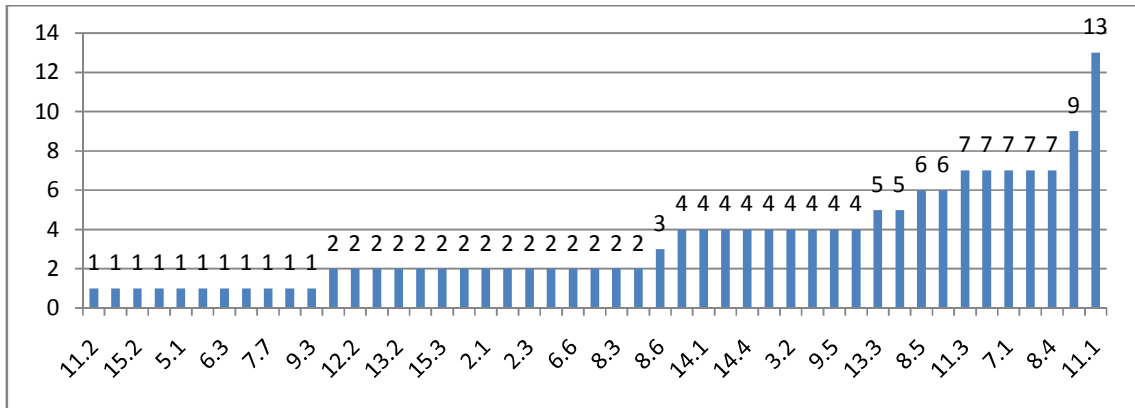


Figure 1. Number of questions related with CoP

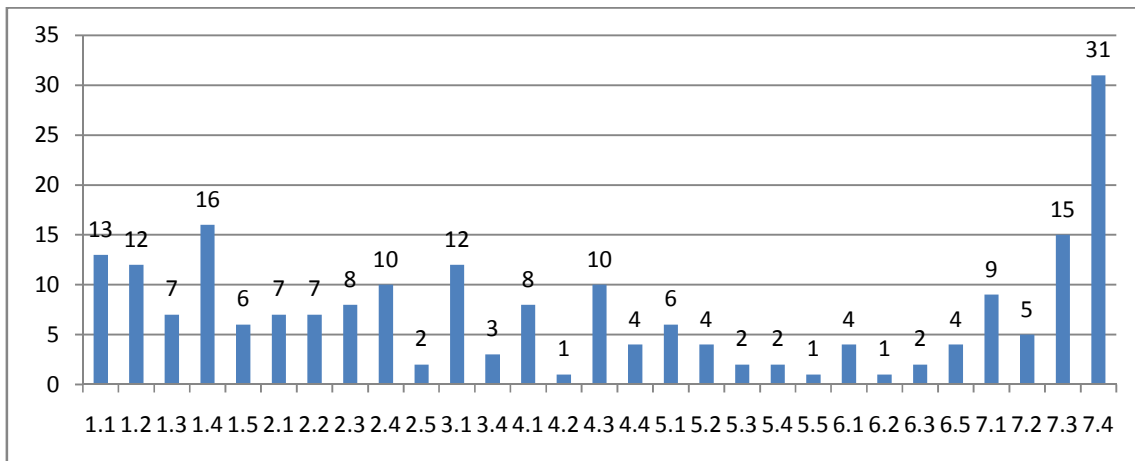


Figure 2. Number of questions related with GSBPM

Annex 4: GSBPM Level 2 and quality indicators (CoP)

GSB PM	2.1	2.2	2.3	3.1	3.2	5.1	5.4	5.5	6.3	6.6	7.1	7.2	7.4	7.5	7.6	7.7	8.1	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.3	9.5	9.6	10.2	10.3	11.1	11.2	11.3	12.1	12.2	13.1	13.2	13.3	13.4	14.1	14.2	14.3	14.4	15.1	15.2	15.3	15.5	15.6					
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