

Open Government Data Initiative : AP2A Methodology

Milan Latinović*, Srđan Rajčević*, Zora Konjović**

* Agency for Information Society of Republic of Srpska, Banja Luka, Republic of Srpska, Bosnia and Herzegovina

** University of Novi Sad, Faculty of Technical Sciences, Novi Sad, Republic of Serbia

milan.latinovic@live.com, srajcevic@gmail.com, konjovic.zora@gmail.com

ABSTRACT - This paper proposes new and innovative methodology called "Action Plan To Applications", a.k.a. AP2A methodology. As indicated inside methodology name, it's scope/roadmap on how to handle OGD from first phase of action plan, through data gathering, publishing, molding, all the way to first useful applications based on that data. This methodology keeps in mind lack of infrastructure and all database challenges that could affect Balkan countries, and aims to create roadmap on how to accomplish two very important tasks. First task is ofcourse implementation of OGD concept, and second task is building up informational infrastructure (databases, procedures, process descriptions etc.) which is usually bottleneck for every development initiatives. General idea is actually simple, to do these two tasks parallel, within defined process but still flexible enough to allow modifications from actor to actor, institution to institution, data owner to data owner, and ofcourse government to government.

Keywords: open data, electronic government, methodology, semantics, context

I. INTRODUCTION

In order to successfully implement OGD in countries with lower level of development (such as Balkan countries, compared to UK, Germany and Estonia ofcourse), there is an urgent need of new, customized, specialized methodology for OGD implementation. This can be done only by learning current methodologies and concepts (UK and Estonia in particular in this paper), and molding it into scope of Balkan countries.

As already mentioned, many public organizations collect, produce, refine and archive a very broad range of different types of data in order to perform their tasks. The large quantity and the fact that this data is centralized and collected by governments make it particularly significant as a resource for increased public transparency.

There is huge list of positive aspects of data openness, as follows:

- Increased data transparency provides basis for citizen participation in decision making and collaboration to create a new citizen oriented services.
- Data openness is expected to improve decision making of governments, private sector and individuals.
- Public is expected to use government data to improve quality of life, for example, through accessing specific databases via their mobile devices, to inform better before they make certain choices, etc.

- Also, OGD is defined as very valuable resource for economic prosperity, new forms of businesses and social participation and innovation.

As described in [1] there are two important society movements that are campaigning for greater openness of information, documents and datasets held by public bodies. The first is "Right to Information" movement and the second is "Open Government Data" movement / initiative.

Right to Information movement can be explained through Right to Information Act (RTI) which is an act of the Parliament of India related to rights of citizens to ask for a data and get response to their query. This is closely related to existence of some form of Law on Freedom To Access Information. Existence of this law or equivalent seems to be one of the prerequisites for any kind of Open Data initiatives.

OGD movement presents free usage, re-usage and redistribution of data produced or commissioned by government or government controlled entities. This is closely related to government transparency, releasing social and commercial value, participatory governance. As stated on Open Government Data main portal it's about making a full "read-write society, not just about knowing what is happening in the process of governance but being able to contribute to it.

Having initiative for data openness presupposes existence of digital data in first place. This means existence of valid databases with data which has new value for citizens or consumers. Sometimes this is called "Repository Registry" or "Registry of Repositories" beautifully described in [2]. This problematic deals with registry characteristics, metadata issues, data gathering practices and workflows, issues related to registry updates and future registries.

After existence of digital data is verified, there is completely different issue about deciding if this data is applicable to be open data or not. Having that in mind, owners of data have tough decision to make, regarding which data is eligible to be publically presented and in what form. There is interesting Open Data Consultancy Report made for Scottish Government [3] which aims to resolve this issue and present examples of Government Open Data repositories. Also, remarkable resource of real world examples of Open Data repositories can be found at "Research project about openness of public data in EU local administration" [4].

After polishing and publishing data repositories, a.k.a. data sets, citizens should use this data, either in raw form or by consuming it through applications built upon open data. These applications should respect licenses related to open data defined by data owner. Yes, it's important to point out

that although open data is free for use, this usage can be defined by specific open data licence, such as Creative Commons CCZero (CCO), Open Data Commons Public Domain Dedication and Licence (PDDL), Creative Commons Attribution 4.0 (CC-BY-4.0), Open Data Commons Attribution License (ODC-BY) or other described in [5] and [6]. Also, it's important to note that process of reading of defining licence for that matter, should follow definitions described in RFC 2119, a.k.a. "Key words for use in RFCs to Indicate Requirement Levels", [7].

Governments make Action Plans, but if these plans are just generically copy pasted from other countries without understanding of specific system and infrastructure, than all of the mentioned steps will not happen. Main goal of this work is to write roadmap, framework or even a methodology which describes how to implement functional OGD concept specialized for Balkan countries. This methodology would describe process from Creation of Action Plan to Creation of Application for end user, so we'll call it "Action Plan to Application Methodology" or AP2A methodology. It's understandable that once defined in this paper, this methodology should be tested in real government systems, evaluated and optimized.

II. ANALYSIS OF OGD IMPLEMENTATIONS

This section analyses several e-government systems which includes OGD implementations. Each of these governments are considered to be advanced in compare to Balkan countries. That's why it's important to review their efforts, activities to realize how they spent their time and other resources. Only after finding out more details about these systems we can compare their use cases with our future use cases (use cases and methodologies aimed on Balkan countries).

This section will consider three different countries and their OGD efforts:

- The Netherlands - huge OGD efforts and lots of publically available materials and related services. Basis for this part of research will be Open Government Partnership Self-Assessment Report, The Netherlands 2014 [8]
- Estonia - included into this research as country with state of the art e-government implementations, indicated in e-government report for year 2015 described in [9]
- United Kingdom - will be analyzed for their action plans presented on their Open Government portal [10]. Key idea is to examine 2011-13 UK Action Plan (I), 2013-15 UK Action Plan (II) and current version on 2016-18 UK Action Plan (III). Together with "Implementing an OGP Action Plan" and "Developing an OGP Action Plan" guidelines

A. The Netherlands and OGP

I had a privilege to listen to lectures from Mr Tom Kunzler, project manager at Open State Foundation (Amsterdam Netherlands). This analysis is based on his presentation, combined with examination of [8] with idea to locate interesting initiatives and services related to Dutch Government.

Open State Foundation promotes digital transparency by unlocking open data and stimulates the development of innovative and creative applications.

The Open Government Partnership (OGP) is a multilateral initiative that aims to secure concrete commitments from governments to promote transparency, empower citizens, fight corruption, and harness new technologies to strengthen governance. In the spirit of multi-stakeholder collaboration, OGP is overseen by a Steering Committee including representatives of governments and civil society organizations. [11]

To become a member of OGP, participating countries must:

- Endorse a high-level Open Government Declaration
- Deliver a country action plan developed with public consultation, and commit to independent reporting on their progress going forward.

The Open Government Partnership formally launched on September 20, 2011, when the 8 founding governments (Brazil, Indonesia, Mexico, Norway, the Philippines, South Africa, the United Kingdom and the United States) endorsed the Open Government Declaration. Currently, OGP has 67 state members.

After analyzing available materials these are conclusions:

1. Open data is defined as information gathered with public funds. This data should be accessible for everyone without copyright restrictions or any kind of payment for this data.
2. Open data should be presented in an open data standard (without commercial standards such as .xsl, but with usage of .csv, .json or .xml data). Of course this is not mandatory, but it is preferred (according to the national open data portal, data.overheid.nl).
3. it's preferable that data is machine readable, but it's not mandatory.

Also, there is significant consideration about quality of data in terms of separating public information from open data. It's clearly stated that public information is indeed publically presented, but it doesn't assure required quality to be presented as open data.

This issue has been addressed by Tim Berners Lee, the inventor of the Web and Linked Data initiator, who suggested 5-star deployment scheme, as presented within [12]. This scheme proposes five levels of validating quality of specific open data / open database / open dataset etc.

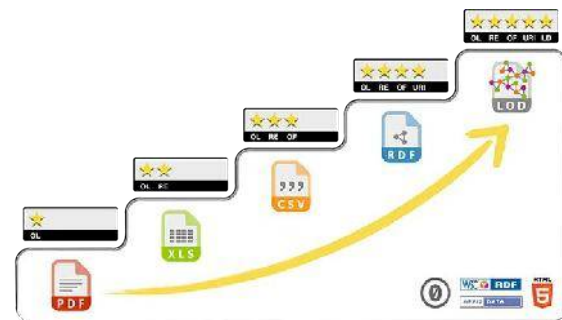


Image 2.1.1. - 5-star deployment scheme by T. B. Lee [12]

1-star data defines publically available data on the web with an open licence (i.e. PDF file)

2-star data defines data which is available in a structured form (i.e. XLS)

3-star data defines data which is available in a structured form with usage of open standards (i.e. CSV)

4-star data defines usage of Uniform Resource Identifiers (URIs) to identify data (i.e. RDF)

5-star data defines linking your data (defined in previous levels) with someone else's data (i.e. with Wiki data)

Related to examples of data that can be made opened and applications that could be created with this data, resources point to several specific aspects of usage:

1. Public transportation data - Making public transportation data open can lead to creation of variety of applications widely used in everyday life, tourism etc. and also makes sure that there will be some healthy competition with the 'official' public transport apps. And that apps will be better because consumers can choose and they have to compete with each other.

2. Open Decision Making on a local level - The municipalities Amstelveen, Den Helder, Heerde, Old IJsselstreek and Utrecht are the first five municipalities in the Netherlands that release meetings minutes, agenda's and other relevant documents as open data. This is the outcome of a pilot done by Open State Foundation with the Ministry of Interior, the Association of Municipalities and the clerks of these five municipalities. This is an important step to make local politics transparent and accessible to citizens, journalists and councilors. [13]

3. Openspending - All financial information of Dutch municipalities and provinces available as open data at www.openspending.nl. It's possible to compare and benchmark budgets and realization and aggregate data per inhabitants, households and surface of government. Web site is used by councilors, citizens, journalists, consultants and regional governments.

B. Estonia e-Government

Based upon the report [9] it's possible to reconstruct road map that Estonia accomplished since year 2001 till now. In last fifteen years Estonia positioned as one of the fastest growing e-government and research environments, which makes it interesting for this analysis.

The development of e-government and information society in Estonia can be summarized as follows, taking the key points of development and key initiatives:

- 2001 - Implementation of X-Road system (est. "X-tee") which represents middle layer for exchanging data between different key points within public administration. These activities are followed by creation of eDemocracy portal which encourages citizens to involve in public debates and decision making.
- 2002 - Implementation of national ID cards, which represent digital identity of citizen, and can be used for business, public administration and private communication.

(Comment: Below, will be obvious that this project is the basis for all further activities)

- 2003 - Finland and Estonia sign agreement on harmonizing communications using digital certificates, the project "OpenXAdES" which is an open initiative that promotes "universal digital signature". Also, the same year was created portal www.eesti.ee that represents a "one-stop-shop", i.e. portal of public services administration Estonia.
- 2004 - Adoption of the new Information Society Policies.
- 2005 - Adoption of the Policy Information Security. Likewise, the same year Estonia established the service for voting via the Internet www.valimised.ee, where citizens can vote using ID card (ID Project from 2002)
- 2006 - The introduction of services for future students to apply to universities online through the portal www.sais.ee. Also, this year introduced a Department for the Fight against security incidents related to Internet space Estonia (a.k.a. Computer Emergency Response Team - CERT). Also, this year Estonia presented a framework for interoperability (a.k.a. Estonian IT Interoperability Framework), version 2.0.
- 2007 - The establishment of electronic service for taxes and subsidies for individuals and legal entities. That same year, Estonia created the portal www.osalusveeb.ee, which allows public debate on draft legislation related to e-government of Estonia. Finally, introduced a web portal for online registration of companies www.ettevotjaportaal.rik.ee which allows registration of the new company within a few hours, with the use of ID cards (Project from 2002). Also, this year introduced the possibility for citizens through e-government portals require the card for online voting (eVoter card), after which citizens no longer receive ballots by mail.
- 2008 - Introducing Cyber Security Strategy. Also introduced is a service for issuing parking permits portal www.parkimine.ee/en also using ID cards from 2002 project. That same year, introduced the service for a refunds www.emta.ee
- 2009 - On 1 October 2009, the Estonian Informatics Centre - EIC opened its Department for Critical Information Infrastructure Protection (CIIP). CIIP aims to create and run the defense system for Estonia's critical information infrastructure. In August 2009, Estonia's largest ICT companies establish the Estonian Broadband Development Foundation with the objective that the basic infrastructure of the new generation network in Estonian rural areas is developed by the end of 2015.
- 2010 - On 1 July 2010, Estonia switches to digital-TV. The Estonian Government approved on 1 April 2010 an amendment bill to the Electronic Communications Act and the Information Society Services Act regulating the use of individuals' electronic contact data for sending out commercial emails. Implementation of 'Diara' also happened. It's open source application that allows public administrations to use the Internet in order to organize polls, referenda, petitions, public inquiries as well as to record electronic votes using electronic identity cards.
- 2011 - A new version of the State Portal 'eesti.ee' goes live in November 2011 based on user involvement and their feedback. Tallinn, the capital of Estonia, is awarded with the

European Public Sector Award 2011 for citizen eServices. There were lots of other activities within this year but most of them were related to evaluations, conferences and awards. Seems like a year of awards and achievements for government of Estonia.

- 2012 - Preparation of new Information Society Strategy 2020. The greatest benefits of this strategy include: good Internet accessibility, the use of services to support the development of state information and security for citizens and businesses, as well as the development of electronic services.

- 2013 - This year Estonia approves the Green Paper on the Organization of Public Services in Estonia, to establish a definition of "public service", identify problems faced by citizens and enterprises in usage of e-government services. Also, prime ministers of Estonia and Finland finalize first digitally signed intergovernmental agreement related to joint development of e-government services, linked to data exchange layer (known as X-Road).

- 2014 - This year seems to be focused on two agendas "Free and secure internet for all" and "Interoperability and intergovernmental relations". Also, eHealth Task Force is set up at the leadership of the Government Office with a goal to develop a strategic development plan for Estonian eHealth until 2020. Also, Estonia starts implementing X-Road like solutions in other countries (outsourcing knowledge and services), such as agreement with Namibia.

This report has only some predicting data related to this year 2015, so it will not be included into this analysis.

After analyzing available materials these are conclusions:

1. Initially, Estonian government focused on two important aspects of information society "Interoperability aspect" and "eDemocracy aspect". It's interesting to realize that Estonia didn't base Interoperability system upon some large scale concept that covers all databases and ministries. Instead they decided to locate several most important databases, to interconnect them, and within next years to build upon that. So, in a terms of data interoperability and ontology concepts, Estonia used "Bottom To Top model" in its cleanest form. This is very interesting since almost every OGP or OpenData or eGovernment initiative proposes already completed solutions and frameworks which are (by nature) based upon "Top To Bottom model" which isn't what most successful countries used.

2. Seems like Estonian primary focus wasn't on Open Data but on Open Services, meaning that most of Estonian initiatives are focused on producing new service (e-democracy, e-voting, e-academy) and only after significant amount of services and high level of interoperability Open Data became interesting in it's pure form.

3. Since most of Estonian services had lots of future versions, revisions and citizen involvement, seems like Estonian "concept" of e-government looks like this:

- a. LOCATE ISSUE LARGE ENOUGH TO BE ADDRESSED WITH SERVICE
- b. CREATE FIRST VERSION OF ELECTRONIC SERVICE

- c. LINK NEW SERVICE TO ID CARD (PROJECT FROM 2002)

- d. PROTECT SERVICE WITH ADEQUATE LEGISLATION

- e. GET CITIZENS FEEDBACK ON SERVICE AND LEGISLATION

- f. CREATE NEW IMPROVED VERSION OF SERVICE

- g. OFFER SERVICE TO OTHER COUNTRIES (KNOWLEDGE INDUSTRY)

4. Estonia makes great effort on involving citizens into public debates (legislative and decision making). It's important to realize that Estonian services aren't based on anonymity, but on proven identity of each individual / citizen, which is realized through ID CARD project, and everything is interconnected with X-ROAD.

5. Baseline for all projects is Bottom-To-Top interoperability (created on several most important databases) connected with Digital Identity Management (probably PKI system) a.k.a. National Identity Provider.

C. United Kingdom's Action Plans

United Kingdom's Action Plan I (2011-13) is initial strategy document which follows the idea "Making Open Data Real" and it focuses on Improving Public Services and More Effectively Managing Public Resources. Most interesting part of this Action Plan (related to this research of course) is Annex A, which lists all data sets planned for a release:

- Healthcare related data sets

Data on comparative clinical outcomes of GP practices in England

Prescribing data by GP practice

Complaints data by NHS hospital so that patients can see what issues have affected others and take better decisions about which hospital suits them

Clinical audit data, detailing the performance of publicly funded clinical teams in treating key healthcare conditions

Data on staff satisfaction and engagement by NHS provider (for example by hospital and mental health trust)

- Education based data sets

Data on the quality of post-graduate medical education

Data enabling parents to see how effective their school is at teaching high

Opening up access to anonymized data from the National Pupil Database to help parents and pupils to monitor the performance of their schools in depth

Bringing together for the first time school spending data, school performance data, pupil cohort data

Data on attainment of students eligible for pupil premium

Data on apprenticeships paid for by HM Government

- Crime related data sets

Data on performance of probation services and prisons including re-offending rates by offender and institution

Police.uk, will provide the public with information on what happens next for crime occurring on their streets

- Transport related data

Data on current and future roadworks on the Strategic Road Network

All remaining government-owned free datasets from Transport Direct, including cycle route data and the national car park database

Real time data on the Strategic Road Network including incidents

Office of Rail Regulation to increase the amount of data published relating to service performance and complaints

Rail timetable information to be published weekly

Next Action Plan II (2013-15) is interesting because it reflected to implementation of previous Action Plan I. It's clearly stated the importance of establishment of Public Sector Transparency Board, which would work alongside government on Open Data activities including:

- Creation of publication "Open Data Principles"
- Establishment of gov.uk portal in order to channel and classify open data for ease of usage
- Creation of e-petitions portal - general idea of E-petitions portal is that the Government is responsible for it and if any petition gets at least 100.000 signatures, it will be eligible for debate In House of Commons.
- Independent review of the impact of Transparency on privacy, in a form of review tool

After analyzing available materials these are conclusions:

1. UK Action Plans are focused to specific sets of data (even Ministry specific), mostly Healthcare, Education and Transport. These seems like a good datasets for initial Open Government initiative.
2. UK Open Government initiative strongly focuses on civilian sector (Public Sector Transparency Board) which works alongside government.
3. Most interesting services related to UK use case are: 1) transport services and 2) public petitions portal.
4. There is no clear explanation how Digital Identity is maintained within UK. Seems like they don't address this issue with their Action Plans, meaning that they probably consider this prerequisite.

III. AP2A METHODOLOGY

After analysis in previous section, it's clear that methodologies and action plans from advanced governments can't be directly applied to Balkan countries, and that some infrastructure preparations are in order before building stable Open data Applications. Idea is to create methodology which would ensure creation of successful action plan, and implementation of this action plan up to Applications level.

Some of key infrastructure issues that needs to be resolved are:

1. Determining data repositories and owners
2. Defining current state of data repositories
3. Defining set of rules for making data open or not, and defining their current state

4. Creation of Action Plan for Data Repositories preparation and publishing

5. Infinity plan - handling new requests for data repositories and requests by data owners

D. Determining data repositories and owners

In government environment every database is most likely defined by some kind of legislative. If you take example of Republic of Serbia legislative or Bosnia and Herzegovina legislative with entities legislative of Republic of Srpska and Federation of Bosnia and Herzegovina, it's visible that most databases are defined by law, or other sub acts related to specific law.

We can conclude that every database needs to be defined by law. It implies that, if database exist, one or more laws define this database, how it is created, who is data owner, who maintains database and for which purposes. Finding these records is actually Phase I of A2AP methodology.

Best way to determine data repositories and owners would be reading trough all legislative for a key phrases such as "data", "repository", "data entry", etc. Also, we need to keep in mind that each legislative is handled by specific Ministry and that Ministry should be aware of what that database represents and where it is implemented.

For example, within a Law on Electronic Signature of Republic of Srpska, two Regulations are introduces. Firstly, there is Regulations on records of certificate entities and second is Regulations on qualified certification entities. Both of these define databases of these entities, which is handled by Ministry of Science and Technology of Republic of Srpska. So, reading trough these regulations points out to Ministry, and they are able to provide additional information about these databases/registries.

Now, reading trough all legislative could be very challenging job, where simple electronic service can be quite useful. Most of the countries are in process or already digitalized their Official Gazette's, with full text of all active legislative. If we imagine automated software that simply reads through these documents for specific set of keywords. These keywords points out to possible existence of database. As a result, software would provide array of potential databases described with example below (JSON format used in example):

```
{ "PotentialDatabases": [
  { "Id": "10045", "Article": "25", "TriggerList":
    "data,database,registry", "Probability": "70" },
  { "Id": "10492", "Article": "1", "TriggerList": "registry,
    entry", "Probability": "50" },
  { "Id": "20424", "Article": "80", "TriggerList": "data",
    "Probability": "40" }
]}
```

After receiving result from service, administrator/user would manually read through selected articles and create list of databases linked with Regulations/Ministries who are responsible for them. End result of this activity would be

presented as a list of databases sorted by owners. This would enable to proceed to next step of methodology.

Creation of described service is a challenge for itself, because it's idea to hit most accurate results with specific set of rules. This can be implemented by some selective logics or "IF- ELSE IF - ELSE " oriented systems, or even with some neural network. This neurological network would use supervised learning algorithms to "learn" to recognize database from legislative.

IV. CURRENT STATE OF DATA REPOSITORIES

After successful determination of data repositories, good system should find out more about these repositories and their owners. Acquiring set of metadata that describes current state of databases / data repositories is vital step in AP2A methodology.

Approach is quite straightforward, create a set of unified queries that describe technical and non-technical details of data repositories and ask potential owner. Get the answers, archive them, check if these answers generated any new owners and/or data repositories and repeat the process.

Set of questions that should be asked in any iteration could look like this:

- IS DATA REPOSITORY IMPLEMENTED?
 - IF (TRUE) CONTINUE WITH QUESTIONS
- § IS DATA REPOSITORY IN DIGITAL FORM?
 - IF (TRUE) CONTINUE
 - Ⓢ ASK TECHNICAL SET OF QUESTIONS
 - ◇ FORM OF DATABASE (FILE SYSTEM, RELATIONAL, OODB, etc.)
 - ◇ DATABASE ACCESS (WEB SERVICE, VPN, RESTRICTED, etc.)
 - ◇ TECHNICAL DOCUMENTATION ON DATABASE
 - ◇ MODULARITY OF DATABASE
 - ◇ other important technical questions
 - ELSE IF (MIXED FORM) CONTINUE
- Ⓢ ASK ABOUT DATES WHEN REPOSITORY WILL BE FULLY DIGITALIZED
- Ⓢ ASK ABOUT METHODOLOGIES THAT WILL DIGITALIZE DATA
- Ⓢ ASK ABOUT DATA OWNER
 - ELSE
- Ⓢ ASK IF REPOSITORY IS PLANNED TO BE DIGITALIZED
 - ELSE END;

Providing answers to presented set of questions (for each database defined in Phase 1) can be viewed as Phase 2 of A2AP methodology. It's important to understand that this phase represents only current state of data repositories, and that this state doesn't recognize time.

So, to make it completely clear, main goal of Phase 2 of A2AP methodology is information gathering. This includes gathering information about databases from its potential owners, through a set of questions unified for all datasets.

This paper provides example set of question (in order to present logic of this phase). Creating real time set of question can even be considered as a creation of sub methodology and challenge itself.

E. DTL (Databases Time Lines) and LOI (Level of Implementation)

Upon Phase 2 completion, we have databases, their owners and their descriptions, but we don't have two important information. We don't know databases time line, we're aware that info is related to present database but we don't know database chronology. This is very important and it will be explained in detail.

Also, we're not aware of Level of Implementation of database, thus we have all provided data but we're yet to categorize it. So, we have two challenges, DTL recreation and LOI defining.

Second challenge, LOI defining can easily be solved. As we mentioned in Section 2.1., this issue has been addressed by Tim Berners Lee, the inventor of the Web and Linked Data initiator, who suggested 5-star deployment scheme, as presented within [12]. We can use his scheme to validate inputs from Phase 2 for each database, and simply categorize each database with 5-star deployment scheme. Ofcourse, depending of number of stars some database got, there is new opportunity for this data improvement, but this will be considered in next phase. For now, this resolves LOI challenge.

Let's define DTL challenge with couple of statements:

- Each database is created according to some legislative (law, regulation, etc.) which should clearly describe structure of that database (at least in Use Case form, maybe even in technical).
- Laws and regulations change over time (Use Cases change, requirements change, etc.)
- We can conclude that if laws and regulations change databases change too.
- When database change (updates, gets new version) we still have old data inside (updated in some cases).
- When user asks for data from database he is concerned not only about quantity of data, but about quality too.
- There is issue on definition of quality of data:
 - Different users can have different ideas of what quality of data is.
 - Different versions of law and regulation can define different quality standards.
 - Different Use Cases for data define different quality expectations.

So, we can define that DTL challenge is actually a quality challenge, where the quality of data is challenged by three aspects: Use Case for which is this data required, time when this data is gathered (there can be different timeframes if data is gathered within longer period of time), and compliance of that data with legislative (not with current legislative, but with legislative which was active at the time when data was

gathered). This is very complex issue, and it can be applied to any form of database (Medical Records, Tax Administration, Land Registry, etc.)

Further considerations of DTL challenge are out of scope of this paper. Idea is to point out importance of time frames in databases and its relations to legislative. In that manner, each database should aim to have large set of Meta data (mostly time and owner related), to describe entries, so that these datasets can be of any real use. AP2A methodology is not intended to change database or logic of these databases, but it should try to gather as much as time data as possible for these databases. After gathering all DTL relevant data and after LOI classification, for each database from Phase 1 and Phase 2, this phase (Phase 3) can be considered completed.

F. Action Plan for Data Repositories

Action Plan for data repositories presents Phase 4 of AP2A methodology. This clearly indicates that Action Plan which is initial activity in OGP of developed countries, is actually proposed as Phase 4 of methodology for Balkan countries. This only means that there is, as previously stated, significant need for preparations, described in Phases 1,2 and 3.

Action Plan itself is bureaucratic process and there are already defined mechanisms for creating and accepting documents like this. It's important to point out that proposed Action plan should have two main goals:

1. Preparation (in technical and nontechnical manner) recognized databases and turning them into data sets for Open Data portal.
2. Increase of LOI for specific data sets

As we were able to see in analysis from Sections 2.1, 2.2.and 2.3, all Action Plans for Open Data are "owner driven". This means that future action plan should recognize not only what will new data sets be, but also who is owner and which responsibility is to create these data sets.

In that manner, logical concept of Action Plan should be presentable by TORR (Table of Roles and Responsibilities).

Table 3.4.1. - Table of Roles and Responsibilities for 4th Phase of AP2A

CANDIDATE FOR NEW DATA SET	OWNER OF REQUIRED DATABASE	CURRENT LOI	TARGETED LOI	DATE OF COMPLETION
Candidate 1	Owner(s) 1	LOI 1-5	LOI 1-5	DATE
Candidate 2	Owner(s) 2	LOI 1-5	LOI 1-5	DATE
...
Candidate N-1	Owner(s) N-1	LOI 1-5	LOI 1-5	DATE
Candidate N	Owner(s) N	LOI 1-5	LOI 1-5	DATE

G. Infinity plan / listener phase

Infinity plan is Phase 5 of AP2A methodology and it is actually a recursive activity which happens on defined time interval after previous phases are completed. This means that AP2A methodology proposes four previous phases in linear order, and this phase as a recursive one (with specific time intervals to iterate).

This phase is considered as listener phase, where system listens for events/triggers from external sources and if these triggers are important enough AP2A will recognize need for new databases and/or datasets and it will iterate through several or all phases of AP2A again.

Let's explain this through example. If new legislation is created (new law or regulation) then this legislative needs to be checked for potential databases (Phase 1), and ofcourse all following phases needs to be completed. So, in case of new legislative AP2A needs to be iterated from the start, from Phase 1.

If some legislative is changed and that changes affect already existing repository than repository owner needs to be asked about current/new state of repository, which is Phase 2 of this methodology. So, changes on current legislative on already existing database will trigger AP2A methodology, but from Phase 2. If external triggers recognize some kind of development or infrastructure project that aims to increase level of some information system, than most likely affected databases will change LOI, which means AP2A should be iterated from Phase 3. If citizens or other parties have specific requests and these reflects to Action Plan, it might cause previous phase to be repeated.

Ofcourse, after each repetition inside AP2A methodology, system returns to state of Phase 5, Infinity plan, a.k.a. Listener phase. As a conclusion to this, image 3.5.1. presents diagram of complete AP2A methodology proposal, with trigger events clearly defined.

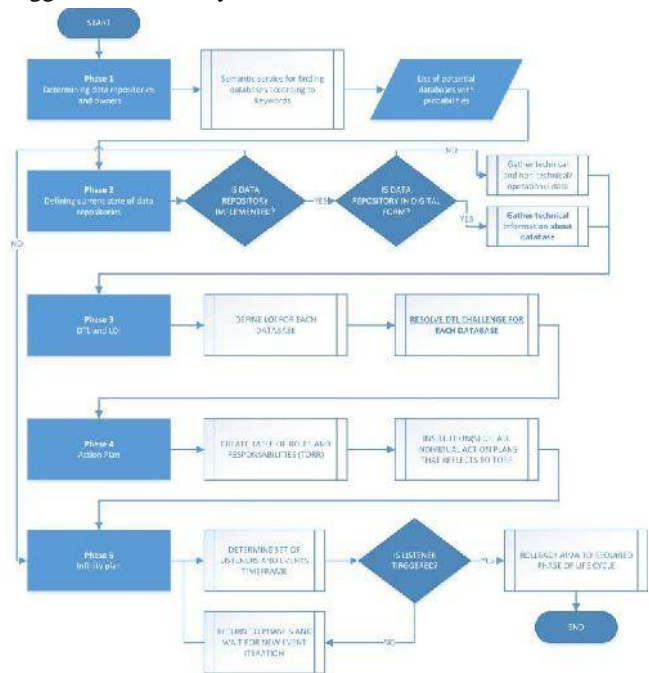


Image 3.5.1. - AP2A methodology, flow chart diagram

V. CONCLUSION

This paper proposes new and innovative methodology called AP2A, with goal to define roadmap to handle OGD from first phase to action plan, through five proposed phases. This methodology is created after research based on OGD implementations in Netherlands, Estonia and United Kingdom, described in Section 2 of this paper, with resources marked as [1],[2],[3],[4],[5],[6] and [7].

Main goal of AP2A methodology is to create business process for to help decision making in process of defining databases, data sets and making them published and publically available, trough couple of phases. Phase 1 of this methodology describes how to define "Register of Registries", reconstructed from current legislative. Also, this phase proposes existence of specific electronic service which is able to read through legislative. Phase 2 proposes set of technical and non-technical questions (future meta data) that should be answered in order to fully describe each existing database. These two phases form initial preparation for further data handling.

Phase 3 of this methodology handles DTL challenge and LOI determination. It's proposed that LOI determination is easy to handle by using same concept as the Netherlands described in Section 2.1. and in [12]. Related to DTL challenge, this paper doesn't resolve it, but it describes it in details and proposes reuse of electronic service from Phase 1 in order to somewhat automate this challenge. Phase 4 is formal creation of action plan, which is final delivery of this methodology.

Once Action plan is fully defined, some kind of maintenance and monitoring of its implementation is in order. Phase 5 of this methodology represent that kind of monitoring tool. Name of this phase is "Infinity phase" since it never actually ends, rather it iterates trough set of listeners and waits for specific set of events to trigger response. After specific event is recognized, this phase shifts AP2A to new iteration, starting from Phase 1,2,3 or 4, depending of severity of event. For more important events AP2A will be shifted to earlier phases of existence and re-iterated all over again.

It's important to notice that described methodology is limited to technology aspects of OGD implementation. In technology aspects, usage of this methodology can help in implementation of OGD, and also it can help better define database structures throughout all government systems. Also, proposed electronic service is reusable with smaller calibrations on keywords and probability matrix.

This research will continue in two paths: first one is defining and prototyping proposed electronic service, and the second one is resolving issues of DTL trough new concepts and possible automation of certain parts of process.

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