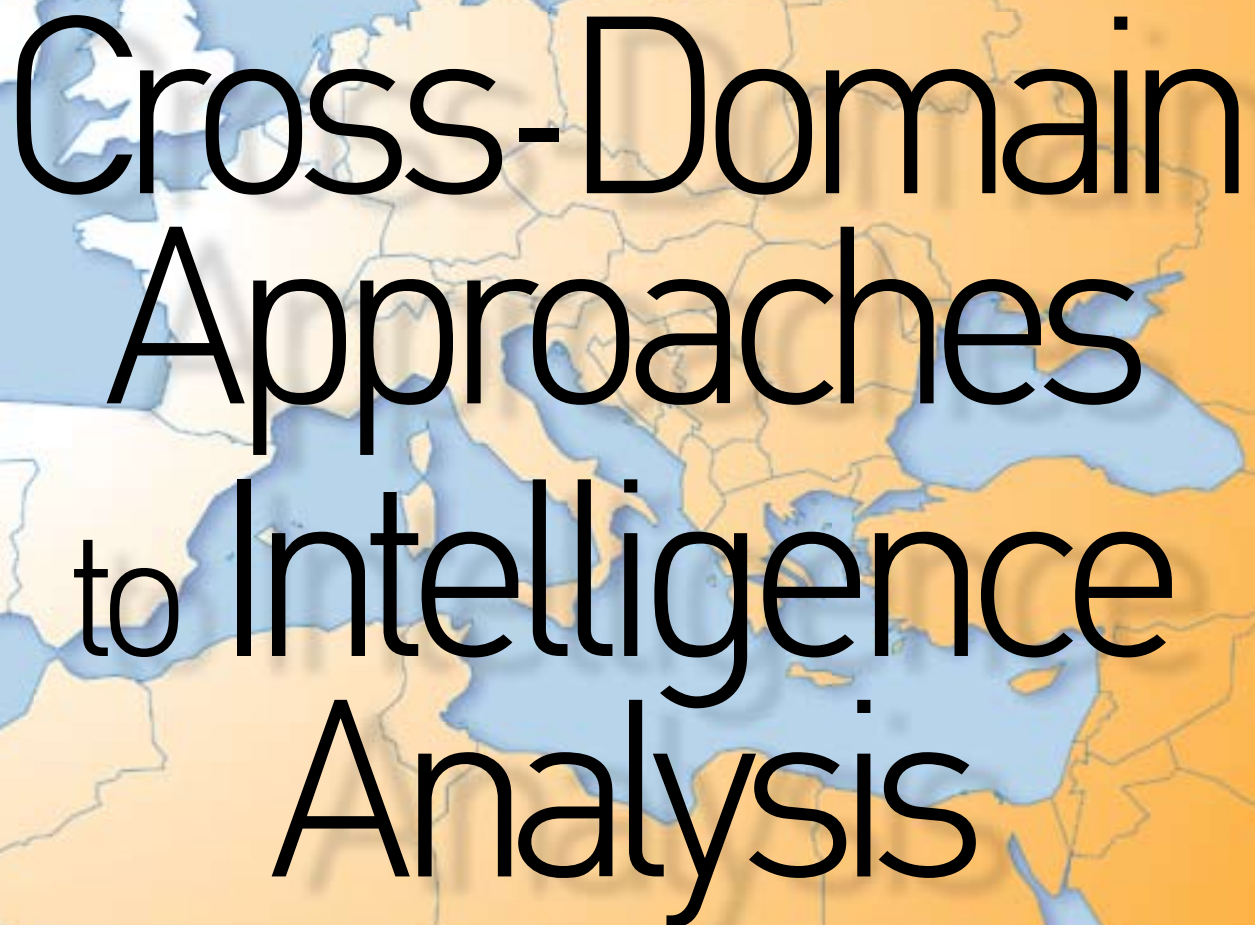


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The RIS Open Source Intelligence Cycle

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Abstract

The intelligence cycle is widely known and used in intelligence studies to explain the intelligence production process, however, the cycle in its classical shape and format is not adequate anymore for the current age. The information landscape has changed drastically, source analysis has become much more important than it already was, the communication circle has changed, the phrase “analysis” is misused and most importantly of all: the concept of customer or client is non-existent in any intelligence cycle. This paper proposes a radically changed intelligence production cycle that at least for Open Source Intelligence processes works much better, where the customer is in the middle, the phrase “analysis” replaced by “synthesis”, and where the production speeds is seriously increased by replacing the cycle by a propeller.

Keywords: intelligence cycle, propeller cycle, intelligence production process, information landscape, OSINT, Open Source Intelligence

Introduction

Open-Source Intelligence (OSINT) is mainly involved in the production of intelligence reports based on information found in open sources. However, open-source information has, in the last decades, seen some dramatic changes resulting in serious challenges for OSINT operation. Amongst these are information overflow (also known as information explosion), lack of any validation, fake information, quality control, and information turnover time. As a result, research in open sources has become a tedious process that is more driven by pure luck than by a systematic, planned and structured approach. This article argues that to start developing a uniform, universal

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OSINT process model, a restructured intelligence cycle, specifically for OSINT, is required. The new Reuser's Information Services (RIS) OSINT Intelligence Cycle presented in this paper aims to address a few of the aforementioned challenges and can be the basis for more structured OSINT research methodologies.

Shortcomings and flaws

Most intelligence cycles suffer from the same shortcomings and the same omissions, missing a few important developments in the world of OSINT. These current challenges for OSINT that will be addressed below are:

- Changes in the global information landscape (Sources) ;
- Information overflow ;
- Information turnover time ;
- Information quality ;
- The missing 'customer' ;
- Misuse of the phrase 'analysis'.

a. Sources:

Selecting the right sources for research has increasingly become very difficult indeed due to the following characteristics:

- (t) *Communication circle.* In the previous century, raw data and information was almost exclusively available only via more or less professional information producersⁱⁱ. Information was consumed by users who, typically, did not have direct access to the data. However, due to the information revolution, consumers of information have now also become producers of information. The monopoly of intelligence services on information sources is gone. Because of this, an intelligence service cannot longer simply afford using the obvious open sources for their intelligence products, since their customers have access to the same open sources to solve their information problems. It is worth highlighting that roughly 85% of all required information is found in open sources that our customers have access to just like any intelligence service. Source analysis in an intelligence cycle has become critical. Sources need to be fact-checked, validated, they need to be representative of what is out there.
- (u) *Information proliferation.* Since consumers of information have also become producers of information, the amount of data has grown

ii Such as radio/TV, press, newspapers, commercial information providers (ProQuest, Lexis-Nexis a.o.), intelligence services, etc.

substantially. Big data, The Internet of Things, the Cloud are a consequence of this. This is what a modern communication pattern looks like: the cellular phone is utilized to record events, Facebook/Reddit is used to report about said events, Twitter is used to announce it, Flickr/Instagram to quickly publish pictures, YouTube to publish videos, and Periscope to live broadcast video recordings via smartphones. This exponential growth of available information on open sources has been sponsored by the fact that the general public loves to share information about events on various social media platforms.

- (uu) *Communication patterns.* So many cheap data communication equipment, so many apps and software lead to an unmanageable increase in data formats and communication means that bypass the traditional means of communication such as TV news, books, journals and radio. The finding of people and events demands in-depth knowledge of social media, forums, and discussion groups. Researchers unfamiliar with IRC, Listserv, Usenet and the Deep Web, may miss important information about and by people and events.

As a result, there is an almost endless variety and number of sources available out there. Signals Intelligence (SIGINT) is no longer interesting or relevant since satellite communications are insignificant these days. Image Intelligence (IMINT) is something anybody can do with modern drones. Books are outdated and have been replaced with e-book readers and other mobile electronic devices. Overall, other communication channels have taken over, new kinds and types of sources pop up almost every day, many of those requiring technical skills to make use of them. Many, if not most, of the possible relevant sources are completely unknown to intelligence analysts. Finding and using sources is today's task for specialists.

b. Information overflow:

Sometimes called information explosion or document explosion, the information overflow is a phenomenon that intelligence analysts, researchers and OSINT users are familiar with. The points mentioned above add to this phenomenon to a point where there is no more storage space available for all that data, where researchers get hopelessly lost on the Internet, where the use of scientific libraries is a thing of the past. There is so much information out there, finding the pearls is almost impossible. Researchers get lost, wasting time and money.

c. Information turnover time:

Now that there are so many inexpensive communication channels and communication equipment such as mobile phones, tablets and other mobile devices, the rate in

which information is propagated has increased dramatically, yet most traditional information providers are lagging behind dramatically. Newspapers still work on a 24-hour news cycle, either in the morning or in the evening but not in between. Radio news bulletins are often just once an hour and only cover the most popular items. TV News channels mostly only cover popular events. It is not uncommon to be fully informed about some environmental disaster via modern communication channels instantly. The information turnover time is much faster than it just to be.

d. Quality:

Now that consumers have become producers of information, there is no more quality control of information. A peer-to-peer system does not exist in free Internet information, nor is there an organizing body acting like an editorial board, a series editor, or anything resembling that. The amount of junk data is thus enormous.

e. The lack of the concept "customer":

Although all intelligence production is ultimately aimed at serving the customer, almost none of the existing intelligence cycles explicitly mention the customer. Without a customer, no intelligence work makes any sense. It could be argued that the customer is left out because intelligence needs to be completely independent, but that seems like a simple excuse. At the end of the day, it is the customer who decides what the intelligence machinery needs to address.

f. Intelligence analysis:

Intelligence analysis is usually just a single step in the classical intelligence cycle. This is not a very adequate representation since analysis is done in almost every step in the cycle. It is therefore time to change the term analysis to something else and put it in its proper place.

All intelligence production is based on a thorough and in-depth analysis of the information requirements. The assumption in a traditional intelligence cycle is that nothing significant will happen between the first step and the last step. There are no major (inter)national developments that may influence the original requirement; there is no intermediate feedback whatsoever to the customer who has no chance to change the initial information requirement. The world has come to a standstill. An intelligence production process presented in a circle thus does not make a lot of sense. Some essential steps in intelligence production are missing from the intelligence cycle, amongst them: indexing, monitoring, and presenting/briefing.

Current intelligence cycles

The intelligence cycle is traditionally presented as the cornerstone of intelligence production. There are, however, so many variations of 'the' intelligence cycle that it almost looks like that every organization has its own version. Intelligence cycles differ greatly in:

- a. The number of steps. Anywhere between four and seven ;
- b. Definitions. Definitions of the steps are different. For some, requirement is a separate step, for some it is part of direction.
- c. The format. Whereas most intelligence cycles are presented in a circle, some use multiple overlapping circles, or, division halfway the circle.

There is a tendency to criticize the cycle itself as not realistic or as an oversimplified model. Instead of criticizing the intelligence cycle, it may be a good idea to look at the intelligence services that use the cycle. Perhaps the reason for so many cycle variations is that all intelligence services work (very) differently. In the end, one may say there is no such thing as a 'wrong' intelligence cycle; it is a mere reflection of the wide variety of business models that intelligence services use.

For example, the FBI uses a six-step cycle starting with requirements, but does not mention the customers¹. Their circle and descriptions look much like the one presented by the FAS². The CIA has no need for any requirements whatsoever, they start with planning immediately, apparently not interested in the original requirement³. The US Department of Justice (DOJ) is even more interesting, they start the cycle of intelligence production with collecting, not planning and certainly no requirement analysis let alone not even mentioning the customer⁴. The US Air Force cycle ends with feedback and evaluation, but since there is no customer in the cycle, one really wonders where that feedback actually goes to⁵.

Intelligence.gov⁶ starts with planning too, but requirements analysis is part of: "The process begins with identifying the issues in which policy makers are interested" which is rather remarkable since it should be the customer who identifies the issues, not the provider⁷.

Open-Source Intelligence

Before having a look at a proposed RIS Propeller Intelligence Cycle, it makes sense to first define what constitutes OSINT. This is fundamental to understand the newly proposed cycle. Definitions of what constitutes OSINT differ greatly, too. In this paper, the definition of OSINT is as follows:

Open-Source Intelligence is a collaborative, integrated methodology and production process where the customers' intelligence requirements are met by providing them with actionable intelligence that is produced

through a process of synthesis and analysis based on a representativeⁱⁱⁱ selection of open-source information that is validated, reliable, timely, and accurate.

The proposed definition of open-source information is:

Open-source information or open sources, is all information in any format that can be acquired by anyone without any restrictions, whether for free or commercial, in a legal and ethically acceptable way.

In the above, however, there are some restrictions:

- Firstly, OSINT is limited by copyright, licensing and other intellectual property rights.
- Secondly, OSINT must also be done completely legal, that is, OSINT does not involve hacking, computer network exploitation, password cracking, etc. of any kind. The open-source information must be obtained legally.
- Thirdly, OSINT should be done ethically. Because truly trained and experienced information professionals can find a lot more than they were supposed to. Open-source information that is not in the public domain or was not intended to be in the public domain does not belong to the area of OSINT. An example of this discussion can be the information published by WikiLeaks. Very interesting information, but since it was not intended to be published, since there is no author or any responsibility that can be held accountable for the information, it is not exactly known whether the information is original, changed or (in)complete thus that data is not considered as OSINT.
- And lastly, simply collecting and forwarding unedited raw information found somewhere on the Internet is not OSINT.

Another issue that comes into mind is the distinction between OSINT and OSINF. OSINT meaning Open-Source Intelligence, and OSINF meaning Open-Source Information. OSINT is a process of intelligence production; OSINF is an acronym for open-source information. In other words, OSINF is a product/material, OSINT is a process. In the RIS Propeller Intelligence Cycle, the distinction can be clearly seen. Circle one and two lead to a product that may be called an OSINF report. Only when the third circle is used, after thorough analysis of the product, the OSINF report changes into a true OSINT Intelligence report.

With regards to intelligence as a profession, there have been many remarks about OSINT not being real intelligence due to its low rank in the echelons of confidentiality. Classified or unclassified has to do with security and has nothing

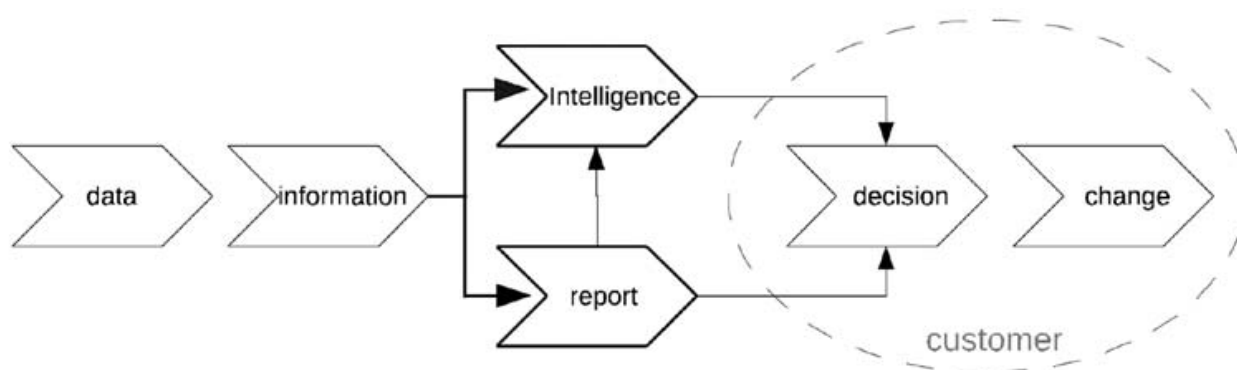
iii Representative in the sense that a source selection should be representative of what's available, representative of different viewpoints, levels, directions, opinions etc.

to do with OSINT. Ideas that OSINT is simply “unclassified information” does not seem to make any sense. OSINT, typically is contained in documents. A document is defined as any object that is intended to derive data from, or is assigned the goal of deriving data from. Examples are books, journals, archeological findings, maps, digital media, but also bricks, broken watches, plastic bags, to name a few. Police investigators can draw a lot of information from criminal evidence regardless the format, thus anything can be a document in that sense.

An intelligence production model

The new intelligence cycle is based on a simple intelligence production model that is important to understand (see Figure 1). The process starts with data. Data is the raw bits and bytes with which intelligence production starts. Data is invalidated, unstructured, duplicated, and chaotic. This data needs to be processed to produce information that is at the very minimum structured, translated, de-duplicated, ordered, decrypted, signed^{iv}, (maybe) summarized, and validated for usefulness and reliability. Information needs to be analyzed to produce intelligence or some intelligence product. Intelligence should lead to some kind of a decision or at the very least influence a decision which in turn should lead to some change.

Figure 1: RIS OSINT Data - Information model



Two things are important. The first is that, ideally, intelligence must lead to decision and change. Without change, intelligence does not make any sense. The second is that intelligence is the product of what is called 'analysis'. Intelligence is therefore created, never acquired. Any intelligence product sent by agency A to B is a true intelligence product for agency A, but for agency B the product is

iv Which is adding meta data, source descriptions etc. for later retrieval and evidence

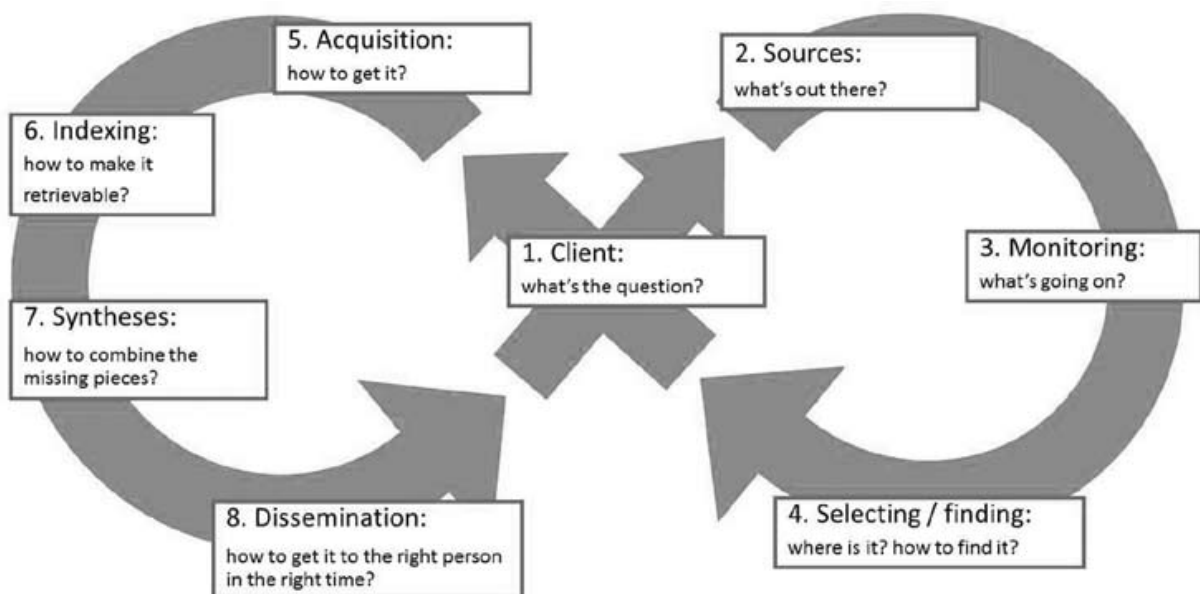
information since B has not (yet) analyzed the product. Moreover, there is also a distinction that need to be considered, between information and intelligence. Since an attempt to define the two will lead to biblical discussions, characteristics are used to make a more or less clear distinction between the two. Information can be characterized in terms of: monitoring, finding, selecting, acquiring, reviewing, cataloguing, reporting, disseminating, informing. Intelligence can be characterized in terms of comparing, understanding, interpreting, explaining, predicting, denying, confirming.

A newer intelligence cycle: the RIS OSINT Roller Coaster

An earlier attempt to create a new intelligence cycle resulted in the RIS ROLLER COASTER (see Figure 2), so called because the intelligence practitioners' work often resembles a Roller Coaster: sometimes fast, worrying and even dangerous, sometimes slow, calm and safe. The Roller Coaster was first presented and explained at the DNI conference back in 2007⁸.

Putting the customer as a pivotal point in the middle of operations was already a great improvement to get feedback and maintain a relationship. Also, recognizing that 'analysis' is not just one single step, but that it is done in almost every stage, was important. Hence, the Synthesis phase was introduced instead. But there were still some shortcomings, for instance, the Monitoring phase should be after the customer has given approval to the requirement analysis, not before. An important step, Collection Planning, was not there, and requirement analysis, although in the Roller Coaster, deserves an extra phase. Also, in practice, there is more feedback with the customer than the Roller Coaster suggests.

Figure 2: RIS OSINT Roller Coaster



A newest intelligence cycle: the RIS Propeller Intelligence Cycle

The new RIS Propeller Intelligence Cycle (Figure 3 was developed in 2012 and first presented at the CISS 2013 conference⁹, as well as at OSIRA 2014¹⁰. Valuable feedback from those conferences, as well as other peers, was used to develop the RIS Propeller Intelligence Cycle.

The Cycle aims to solve a few of the problems and issues raised before in this paper. The Cycle is composed from three interconnected cycles with the customer in the middle:

a. A preparation cycle

This cycle aims to get as much clarity about the research assignment or requirement as possible to make sure the end product meets the needs of the customer. The preparation cycle produces a plan of action which will be evaluated with the customer.

b. A reporting cycle

This cycle consists of five steps were the actual searching and acquiring is done. Information is collated, processed, indexed etc. to produce an information report. The report is evaluated with the customer.

c. An intelligence production cycle

This circle takes the information report and does the actual 'intelligence analysis' bit, produces an intelligence report and distributes it amongst those concerned. Since the customer is the pivot point and the one for who all intelligence is eventually produced, the customer will be in the middle of the new cycle. All sub-cycles start and end with the customer. The customer is now available for regular feedback and reflection.

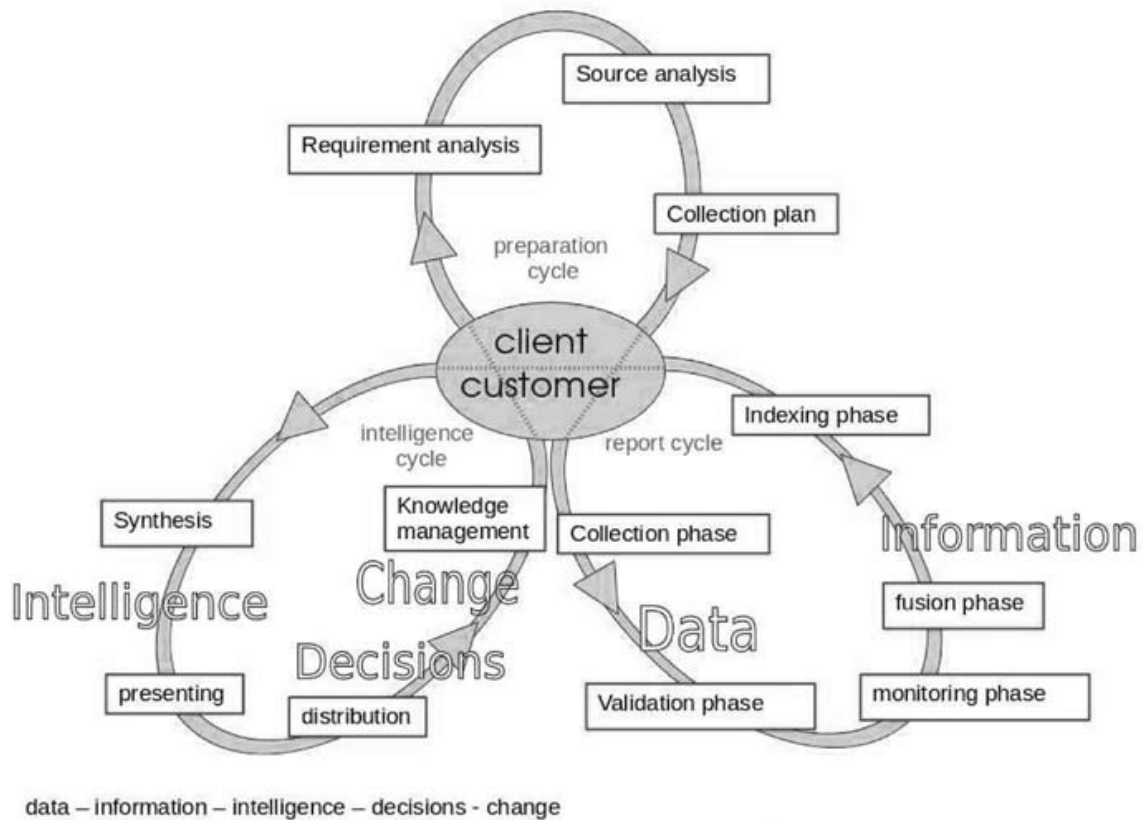
The Preparation Cycle

The preparation cycle holds three activities: requirement analysis, source analysis and collection planning.

The first phase, requirement analysis, is essential to produce a relevant intelligence report. Breaking down the original requirement into logical steps all help in de-constructing the main problem into sub-problems. Such logical steps include identifying sub-questions, identifying assumptions, identifying and solving variables to prevent misunderstanding with the customer, applying qualifiers to limit and clarify the research process etc., The result of this process is a set of pre-questions that need to be solved (to deal with assumptions and bias), and a set of answerable questions that are defined in such a way that there

can be no misunderstanding as to what exactly needs to be done. Requirement analysis is essential in intelligence production.

Figure 3: RIS Propeller Intelligence Cycle



When there is enough clarity about the tasking, the next phase is source analysis. This phase involves scrutinizing which source to use, establishing reliability and validity of each individual source, making sure the source selection is balanced and representative. As argued before, open sources are too complex to be taken lightly. A separate source analysis step is essential. Knowing what sources to use will also help reducing information overflow. Selection of a relevant, representative and balanced set of sources greatly helps reducing information overflow, since all the researcher needs to do, is to work his way down the list of vetted sources. In addition, getting lost in sources is not a problem anymore.

This will lead to the next step, which is to create a collection plan and a plan of action. This plan lists which sources will be researched in what way (queries, questions) and when. The collection plan will list, following step one and two, the expected answers from each source and the maximum number of results. The plan will also indicate when to STOP searching. This step is an important one in time management and resource management. The plan helps fighting

information overflow because all that needs to be done is to research the sources instead of being overwhelmed by millions of search results from a general-purpose Internet search engine. The plan helps in time management because searching a predefined set of sources can be planned. This step also helps in resource management, because staff can now easily be assigned to specific tasks in the plan.

Another important point is accountability. Working according to the plan and maintaining a progress journal listing activities, searches, queries, results and dates, will help the researcher in being accountable. It will help in continuing the research 'after the weekend' without loss of time or doing things again. It will also help another researcher to continue the research if the original researcher is not available. A collection plan and progress journal is fundamental instruments in intelligence research, thus, step three in the new cycle.

The Feedback I

The product of the preparation cycle is a plan of action that comprises requirement analysis, source analysis and collection planning. It is now time to go back to the customer for verification and approval. The customer can judge if the original requirement is interpreted correctly and if the problem deconstruction is correct. The customer has the option to amend the plan a little (or a lot), propose solutions, propose different sources, give tips and share ideas. This customer feedback is invaluable for the entire process and has the additional advantage of development of a trust relationship. Time has passed since the initial requirement, and maybe new developments have changed said requirements. The customer now has a chance to adjust. This feedback step solves the problem of information turnover time.

If amendments need to be made to any of the first three steps, the Preparation Cycle is run again, until all parties involved are satisfied with the end product. In the latter case, the Report Cycle will start.

The Report Cycle

The report cycle starts with the collection phase of open-source data. The collection phase involves the actual searching for data (or information) and working through the collection plan. This phase also involves the acquisition of the data. This seemingly straightforward phase may have its own issues, especially with government intelligence services where acquisition of information often is a very bureaucratic process, or technical solutions are needed to download and process different information formats, decrypt information, de-duplicate, de-archive, etc.

There cannot be an OSINT unit that works independently. They are all, or at least should, be part of a team. At the end of the day, the analyst is merely interested

in 'good' information; the acquisition channel is less relevant. Therefore, all other acquisition means and sources should be listed here, whether covert or overt. Since this phase is concerned with the information phase of the process, HUMINT is here called HUMINF, SIGINT is called SIGINF and so forth. It is also assumed that each service has a (classified) Book of Sources (an enterprise Domesday Book), each organization should have an extensive list of sources available, how to get access, restrictions, limitations, practical use, etc. The Collection Phase would be ideal to utilize such a book.

Since the Internet contains so much noisy raw information, a validation phase is needed to make reasonably clear that information is reliable, correct, useful, and from the correct source. Each e-mail, each website, each document, should be subjected to the company's validation regime. That regime should be widely agreed, doable, and within reason, simple to apply for all concerned. Validation is vital in today's world and therefore is an extra phase.

The world changes so fast, and because the process of producing an intelligence product can be time-consuming, it may be a good idea to start a monitoring phase at this stage to keep track of developments and make sure that during the process no current relevant developments are missed. If necessary, assuming the interest of the customer is very clear, the researcher may choose to adapt the requirement here or go for extra feedback from the customer. This will also help handling the problem of information turnover time.

Information from all these different sources needs to be processed to remove duplicates, to reformat, to assign Metadata, to discriminate between the relevant and irrelevant sources, to update the progress journals, add keywords and arrange the information in some meaningful way. The fusion phase is intended for that. This phase produces an information report summarizing the findings in a completely objective way without any interpretation whatsoever.

Obviously, data and information need to be stored in such a way that it can be found back again. Normally, most intelligence services simply dump the information on some network without any indexing at all. At best, some information retrieval program is used, but these are often poorly configured and do certainly not comply with what users need since they are designed and configured by IT personnel, who typically never involve the customer in their projects. The result is a huge collection of private libraries: on paper, digitally and in the personal memories of researchers. A decent indexing process of information is however still such an important phase that it deserves its own step in the cycle.

The Feedback II

The end product of the report cycle is an OSINF report with search results, plan of action, initial findings and an objective summary. The report is not analyzed

in the traditional way. There is no interpretation, explanation, predicting, judgment, just the 'facts'. The report is presented to the customer who can now decide on a couple of things. Either the customer is happy with the information report as it is and does for now not need any further services, or, the customer is less happy with the information report and the report circle will be done again, or, the customer is very happy and requires analysis of the information to produce an intelligence report.

The big advantage here is time. By presenting a report and getting intermediate feedback, the customer does not have to wait until the very end of the cycle to get results. This solves the problem of information turnover time.

The Intelligence cycle

The intelligence cycle consists of three phases: synthesis phase, presenting phase, distribution phase. Since in reality 'analysis' is done at about every step and every phase, using that term as a label for a phase is inappropriate. The term synthesis is proposed as the new term. Synthesis involves all the activities that will produce an intelligence report from an information report: interpreting, understanding, explaining, predicting, summarizing, labeling, judging, etc., in short, all those activities formerly called intelligence analysis. The end product of this phase is an intelligence report^v.

The next step is an often underestimated one: presenting. No matter how good an intelligence product is, if the message is not communicated in the proper way, all effort was useless. So many great intelligence products have been destroyed because the briefer was unable to get the message through, or, destroyed because the author could not express the thoughts properly in a report. A report is too big so that the customer does not read it (properly), poorly written so that the customer misinterprets the text, poorly presented on unclear slides, poorly presented by a speaker, etc. Also, integrity comes into play here. Services either deliberately write vague reports to minimize the risk of 'errors', or on the other side, services write their exact truth which a customer refuses because it is not what the customer wanted to read.

Then, the product needs to be distributed. This distribution phase is another often underestimated step. Whereas the ultimate goal of any intelligence product should be to have the product widely distributed amongst all parties concerned (within reason), quite often services have very strict tables and rules of who get to see which (part of) a report. In addition, intelligence services have a strong tendency to over classify their products so no matter how fantastic an intelligence product is, no one gets a chance to actually read it.

^v Which can be a textual report, a presentation, a mindmap, a telephone call, a tele-conference, anything.

The final step is knowledge management. At this stage, all the work involved in the production of the intelligence report will be analyzed, labeled, indexed, and stored for future use. The work we mean here is the intelligence analysis methodologies used, the acquisition methodologies used, search strategies, discussions etc. It seems obvious that such work comprise lessons learned (things that worked and things that did not work) and can be used again for a new report, or at least as lessons learned that may be used as input for a next project.

Discussion

We believe that by breaking the OSINT process up in three logical sub-circles, each sub-circle clearly addresses an OSINT research step, and by putting the customer in the middle, the new RIS Propeller Intelligence Cycle functions as a good basis for further research into making an OSINT research process more structured, more planned and more systematic. Further work and research needs to be done in this area to truly develop OSINT into an intelligence production discipline.

The RIS Propeller Intelligence Cycle as it now stands can be applied to many disciplines, but it assumes that the customer is a person or entity that is always actively involved in the intelligence production. That is not always the case, for instance where complete independence of the researchers is required. The RIS Propeller Intelligence Cycle is, despite being formatted as a propeller, still a fairly linear process. It also assumes that all OSINT research can be structured, regardless future developments. The idea that any intelligence research can be modelled may be completely wrong. Perhaps this is the reason why there are so many varieties of cycles out there. Maybe this is also the reason why so many professionals learn about the intelligence cycle, but no one actually follows it in daily practice. Finally, the RIS Propeller Intelligence Cycle does not reflect what the customer has already done themselves, it assumes a strict distinction between customer and support.

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