Analysis of AIS and VMS data within the waters of Mauritania and Senegal

Project acronym:
FarFish

Project title:
Responsive Results-Based Management and capacity building for EU Sustainable Fisheries Partnership Agreement- and international waters

Grant agreement No: **727891**
Project co-funded by the European Commission within the
Horizon2020 Research and innovation programme

Start date of project: **1stJune 2017**
Duration: **54 months**

Published 06/11/2020

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1 Introduction

This report presents the results of an analysis done within the FarFish project, where VMS (Vessel Monitoring System) signals transmitted to Senegalese and Mauritanian authorities are compared to AIS (Automatic Identification System) data. European fishing vessels operating within SFPA (Sustainable Fisheries Partnership Agreements) are obligated to supply VMS data to the contracting countries when fishing in their waters, and all vessels over 300 GT that are on "international voyage" are according to IMO obligated to transmit AIS signals. Discrepancy between VMS and AIS signals can therefore indicate that IUU (Illegal, Unregulated, Unreported) fisheries are taking place.

The analysis uses publicly available AIS data from GFW [1](Global Fishing Watch), covering the 2012-2016 period, and a list of VMS transmitting vessels provided by CRODT for the Senegalese case study. For the Mauritanian case study, the AIS data is compared with the maritime legislation in place. The aim of the analysis is to study the occurrence of different fleets by country and check with the international agreements, if any, what are the conditions for their presence, and if there are any inconsistencies.

This analysis provides an example on what can be achieved by studying available information on marine traffic, and cross-checking with VMS and AIS information. This use of already available data can serve as a cost-efficient tool for MCS (Monitoring, Control and Surveillance).

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[1] https://globalfishingwatch.org/

2 Methods

Data from the GFW database was obtained by the FarFish CSIC team, covering the period 2012-2016. This data contains the AIS signals transmitted by all fishing vessels found in the country (either Mauritania or Senegal) EEZ. The vessels are identified via MMSI. For the Senegalese Case Study, CRODT provided the consortium with a list of the vessel names for which they have VMS data. That is, they did not provide the actual VMS. For the Mauritania CS, we did not have any VMS related information.

First step was to identify the CRODT listed vessels and match them with their MMSI, so they can be compared with the GFW data. In Mauritania, this step was not needed as we only had the GFW data. The Flag State was also annotated. This was done by checking the provided names against publicly available databases such as MarineTraffic[2] or vesselfinder[3].

A spreadsheet was created containing all the vessels, both in the GFW and the CRODT lists. The document contained the Flag States, the years they were found fishing, the peak months of effort and the licenses under which they were allowed to fish, if any. These licenses were found via whofishesfar[4] and the database from ICCAT. Once all the information was collected, we analysed the number of vessels per Flag State, the difference between the CRODT list and the GFW list for the Senegalese case study and the trend in the number of vessels per year, for both EU and non-EU vessels. Next, we tried to identify the agreements between the Coastal State and the Flag State, checking the availability of the documents and the periods covered by them.

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[2] https://www.marinetraffic.com/
[3] https://www.vesselfinder.com/
[4] https://www.whofishesfar.org/

3 Senegal

Vessels from at least 28 countries (Flag States) were fishing within the waters of Senegal in the study period 2012-2016 according to AIS signals. Figure 1 shows which countries had vessels fishing in Senegalese waters and how may vessels there were.
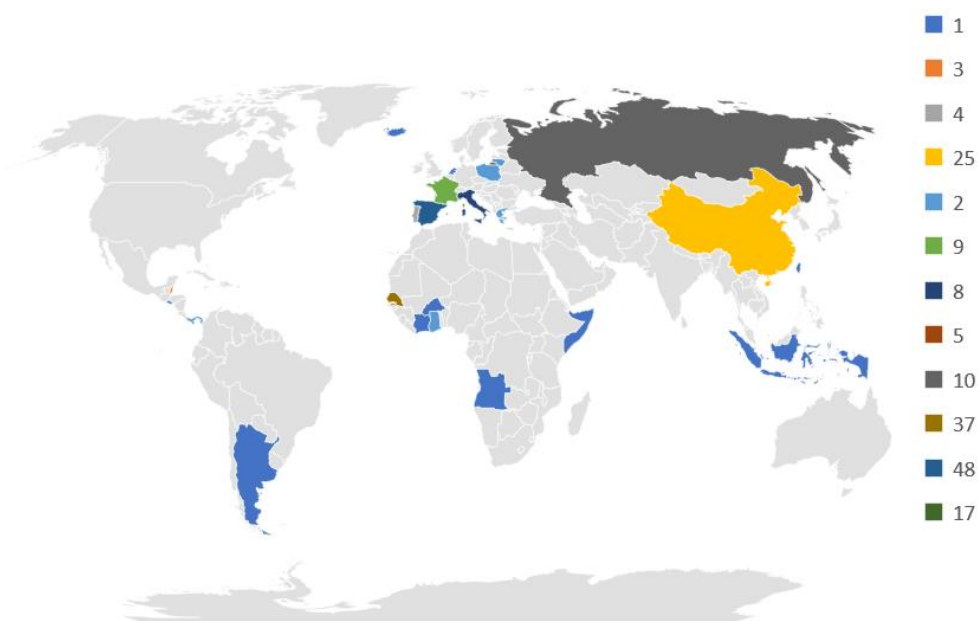

Figure 1: Flag states present in the Senegal EEZ

Of the foreign fleets it was Spanish vessels that had the greatest presence (24%), followed by Chinese vessels (13%), as shown in Figure 2.
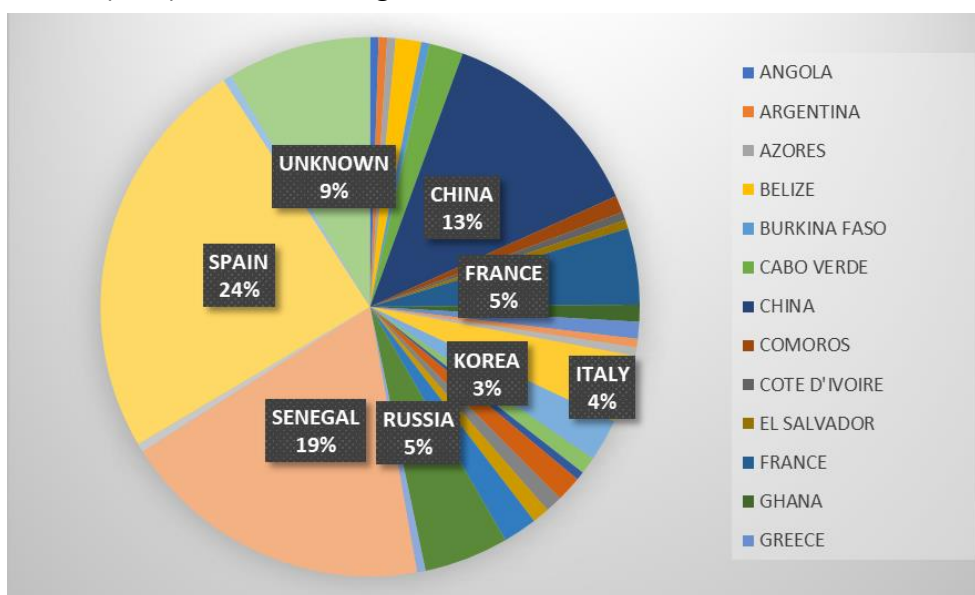

Figure 2: Percentage of vessels by flag state

The number of vessels transmitting VMS or AIS signals increased significantly from 2013 to 2015, but reduced again in 2016, as shown in Figure 3.
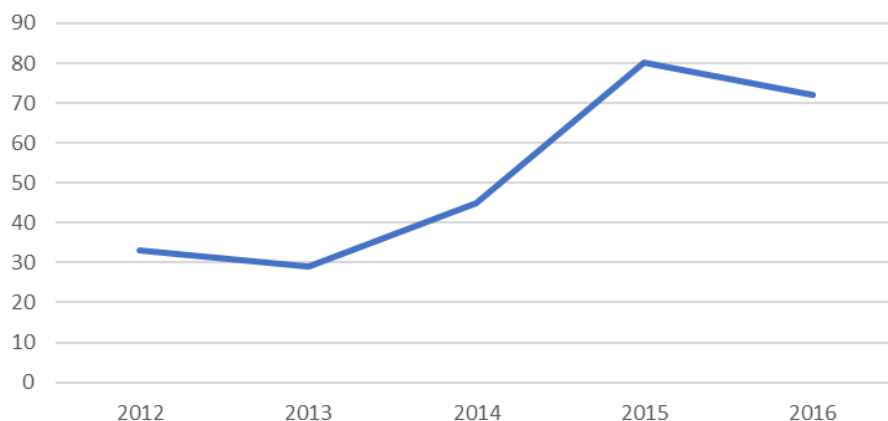

Figure 3: Number of vessels transmitting AIS and VMS signals by year

The graph above shows the trend of number of vessels transmitting either VMS or AIS per year. It is important to note that 2014 was the year that a new SFPA between Senegal and the EU was implemented (2014-2019). In 2015 a total of 24 out of 25 vessels from China started their activities in the area (always according to the signal transmissions), being the main responsible of the increase in number of vessels between 2014 and 2015.

3.1 Main inconsistencies between CRODT and GFW data (VMS vs AIS)

A total of 44 of the vessels from the list provided by CRODT did not appear in the GFW provided data. If entered manually into the GFW search engine, 20 of those vessels do appear in the map. But they have activity records from 2016, being outside the year gap studied by the CSIC (2012-2016).

7 vessels with identified Flag States (1x Angola, 1x Italy, 1x Argentina, 4x Senegal) are not found via GFW.

17 vessels from the CRODT list are not located via GFW, vesselfinder or similar. Needs to be considered that they might have ceased operation.

CRODT doesn't have information on any Chinese or Russian vessels.

5 out of 9 French vessels were licensed under the Senegal SFPA, but are not listed by CRODT as VMS transmitting boats.

3.2 Fishing agreements

According to whofishesfar.org, 30 EU vessels were fishing in Senegal under the SFPA 2014-2019 agreement. But only 22 of those appear on GFW and the CRODT list.

42 of the EU vessels listed by CRODT and GFW appear in whofishesfar fishing in Senegalese EEZ under licenses other than the Senegal SFPA, such as ICCAT licenses or licenses under the SFPA of other neighbouring countries (Mauritania and Guinea).

Senegal has agreements with neighbouring countries, such as Mauritania (400 licenses for Senegalese pirogues to fish in Mauritania) and Guinea Bissau. No mention of other vessels [5]() (First agreement between Guinea Bissau and Senegal, renewed every two years, being the last time January 2019 [6])

There are no documents to be found about a fisheries agreement between China and Senegal. There are fish meals factories funded by China in Senegal, but no particular agreement could be found. Conditions for their funding and for their fishing activities remain unclear. The following link shows declarations from the minister affirming that there is no agreement between the countries, dated last December[7] . As the data provided is not up to date, it is not easy to check if the situation today is clearer than it was when the analysed signals where transmitted. I.e. those potentially illegal vessels could have been "punished" already[8].

The agreement between Russia and Senegal exists, there are articles in national newspapers about it[9]. But an official document for the agreement was not found.

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[5] https://www.lepoint.fr/economie/senegal-mauritanie-ce-que-dit-le-nouvel-accord-de-peche-04-07-2018-2233234_28.php

[6] http://extwprlegs1.fao.org/docs/pdf/sen147223.pdf

[7] https://www.senenews.com/actualites/accord-de-peche-avec-la-chine-les-precisions-du-ministre-alioune-ndoye_293529.html

[8] https://www.greenpeace.org/africa/fr/communiques-de-presse/587/la-chine-suspend-les-subventions-et-retire-la-licence-a-des-compagnies-impliquees-dans-des-activites-de-peche-illegale-en-afrique-de-louest/

[9] https://aprapam.org/publication/l-actualite-d-aprapam/contribution-l-accord-de-peche-fantome-entre-la-federation-de-russie-et-le-senegal

3.3 Potential actions

- Confirm with CRODT the lack of an official agreement with China.
- Ask CRODT to provide the agreement with Russia.
- Check with CRODT conditions for mandatory AIS in Senegal EEZ.
- Check compatibility between ICCAT, SFPA and other African countries agreements: are they equivalent?
- EU vessels under the SFPA, investigate why some of them are not sending data. Problem from the transmitter or from the receptor side?
- Ensure if it is mandatory for Senegal to inform the EU about fisheries agreements with third parties.
- Compare fishing effort peaks with biology of catch species. Investigate if fleets under no agreement have different seasonal trends (i.e. do they catch during sensible periods of catch species life cycles).

4 Mauritania

The AIS data provided by GFW has been analysed with the aim of looking for inconsistencies between AIS and the maritime legislation in place, and any other additional information that might be useful for the Mauritania case study of FarFish. Vessels from at least 32 countries (Flag States) were fishing within the waters of Mauritania in the study period 2012-2016 according to AIS signals. Figure 4 shows which countries had vessels fishing in Mauritanian waters and how may vessels there were.

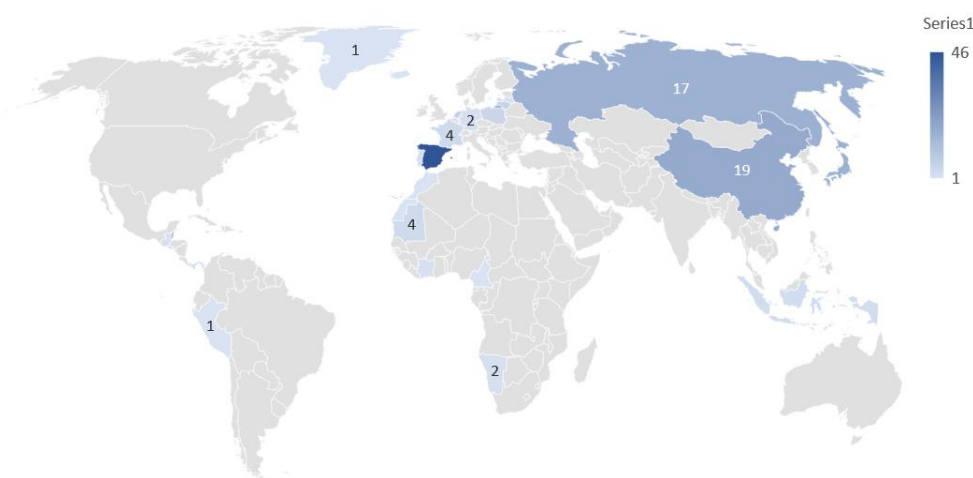

Figure 4: Flag states present in the Mauritanian EEZ

Of the foreign fleets it was Spanish vessels that had the greatest presence (24%), followed by Chinese (10%), Japanese (9%) and Russian (9%) vessels, as shown in Figure 5.
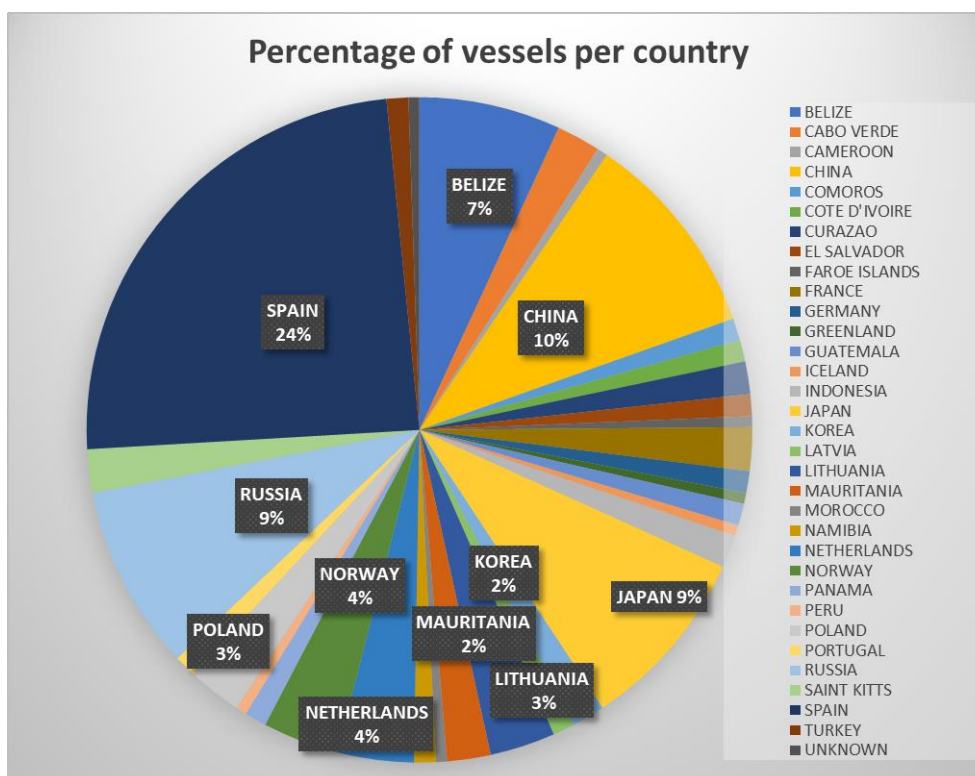
Figure 5: Percentage of vessels by flag state

The number of vessels transmitting AIS signals were relatively stable, around 60, until 2016 when they increased to around 100, as shown in Figure 6.
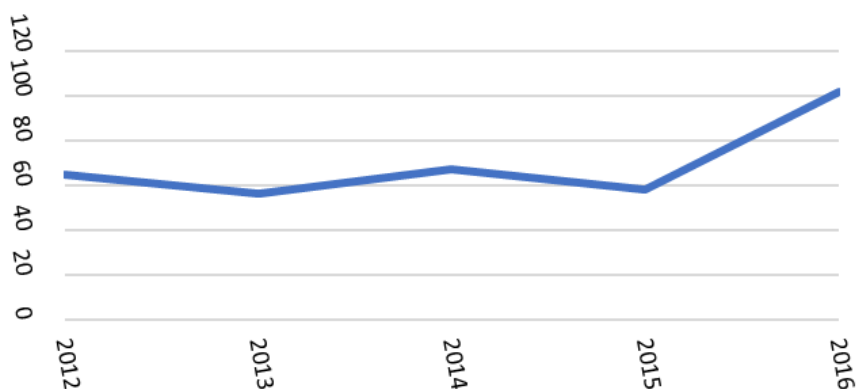

Figure 6: Number of vessels transmitting AIS signals by year

7 out of 17 vessels from Japan started their activities (always according to the signal transmissions) at the end of 2016. All the other Japanese vessels were fishing in the area in 2012-2013 and came back in 2016. All 3 vessels from Indonesia, and 2 out of 3 vessels from Korea started their activity in 2016.

The increase in number of vessels between 2015 and 2016 matches the signing of a new SFPA between Mauritania and the EU (entered into force 11/2015). But only 10 of those new vessels are from an EU MS (9 from Spain), so this alone does not explain the increasing numbers.

4.1 Fishing agreements

According to whofishesfar.org, 57 EU vessels were fishing in Mauritania under the FPA 2012-2014 agreement. 89 vessels were given authorizations. Whofishesfar contemplates the Mauritania FPA until 2014. Important to note that 2014 was the year the last SFPA between Senegal and the EU was implemented (2014-2019).

Japan and Mauritania signed their first agreement in 1977[10]. It allows them to fish for tuna and octopus. Records found for a possible agreement signed for the period 2015-2020, but official text had not been found [11]. It has been necessary to wait for the FiTI initiative reports to be able to access the document [12]

Only 4 national vessels were found fishing via AIS, and only since 2014.

There are no official documents to be found about a fisheries agreement between China and Mauritania. However, there are records of an agreement signed in 2010 between Mauritania and the Chinese company Poly Hondone Pelagic Fishery co. Ltd., for a duration of 25 years[13][14]. , . Seems that the agreement is with a private Chinese company, and not with China as a whole. There is also a chinese-mauritanian partenariat[15].

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[10] https://fr.le360.ma/monde/mauritanie-532-millions-de-dollars-de-dons-japonais-depuis-1977-59631
[11] http://www.peches.gov.mr/IMG/pdf/rapport_finalcadre_d_investissement.pdf
[12] http://www.fiti-mauritanie.mr/wp-content/uploads/2020/12/ACCORD-JAPAN-TUNA-FISHERIES-COOP.pdf
[13] https://www.asso-sherpa.org/wp-content/uploads/2014/04/AVRIL-CP-Version-site-Polyhondone-Muaritanie-Annexe.pdf
[14] https://mondafrique.com/4251-2/
[15] http://www.mcp-mr.com/

The agreement between Russia and Mauritania exists, with records of an initial agreement for small pelagics signed in 2003, renewable each 5 years. But an official document for the agreement was not found.

4.2 Potential actions

- Look for an agreement between Japan and Mauritania starting 2016.
- Chinese and Indonesian vessels have a clear pattern with months in which they are not fishing. Look for established closures in such months.
- Japan vessels operate mostly in December. Investigate possible reasons (closures, targets,)
- Records on Ukrainian vessels have been found. Investigate why they´re not sending AIS signals.
- Russia-Mauritania agreement is supposed to be public. Look for official text.
- Check compatibility between ICCAT, SFPA and other African countries agreements: are they equivalent?
- Ensure if it is mandatory for Mauritania to inform the EU about fisheries agreements with third parties.
- Compare fishing effort peaks with biology of catch species. Investigate if fleets under no agreement have different seasonal trends (i.e. do they catch during sensible periods of catch species life cycles).

5 Discussion

GFW has proved to be a useful IT tool when it comes to cross check AIS and VMS information, with the aim of demonstrate the compliance (or lack of it) by certain fleets. But there are several concerns, not only about its usability but with the interpretation of the results by both developers and individual end users, that should be highlighted as they are not official control or monitoring centre with qualified data officers. It needs to be reminded that AIS is a security feature, so its primary purpose is to avoid vessel collisions and therefore it is not meant to be a monitoring tool. This means that a vessel could have the AIS off for legitimate security reasons, e.g. threat of piracy. This is especially true in risk areas identify as "Pirate hotspots"[16] such as the waters around the Horn of Africa or the Gulf of Guinea. Or there could be other reasons, such as satellite signal saturation, that could translate into a blank gap of the AIS signal registration, despite the vessel trying to transmit such signal. On top of to these challenges, GFW takes qualitative assumptions on the supposed activity and trajectory of a vessel according to its speed and direction. This has a certain degree of subjectivity which cannot render accurate results at all times, and it is very difficult to prove it.

Furthermore, if we want to cross-check information between AIS and VMS signals, we will need the VMS reports/logbooks from the national authorities. This has been difficult to get, understandably, as it is private information of sensitive nature dealing only with fishing vessels (while AIS is public and deals with all type of vessels including merchant ships). For the purposes of this project, the only record of fishing vessels activity we have been able to get in the form of secondary data is a list provided by CRODT of vessels that send VMS data. That is, we have not had access to VMS data as such for any of those vessels, but a list of the transmitting vessels provided by the main national research institution. This raises question about use of MCS data for applied science and research purposed under EU funds.

Even the limitations mentioned, it has been possible to detect some inconsistencies and discrepancies between those fishing fleets operating in the area and the ones that are actually allowed to do so. Most of these have to do with the fact that the agreements between the countries and the fleets of a specific Flag State are done through a commercial company (also known as direct authorisations or private agreements), such as Japan Tuna, and not between governments (i.e. public agreements). Thus, it is almost impossible to access the text and content of non-EU public or private agreements, even with current initiatives such as FiTI (in place in Mauritania). The FiTI report for Mauritania provides access to the Japan Tuna agreement, but does not mention an agreement with China which has an obvious presence and activity there, given the size of the fleet and the press records indicating construction of landing and processing facilities in areas such as Nouadhibou

The cross-checking pilot exercise developed in this paper has shown great potential as a proxy for estimating activity of fishing vessels in absence of official or public data. However, access to the VMS

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[16] https://eunavfor.eu/

information and the content of the fishing agreements affecting the area are key to be able to make informed decision for fisheries management and control. To ensure a level playing field, all fishing agreements between States or between States and big companies should be made publicly available and communicated to the European Commission, should they have an SFPA signed, as requested in the transparency clause.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 727891. www.farfish.eu

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