

## **Technical Report about the Citizen Observatory**

**Period covered by the report:** M21 – M42 (from January 2020 to June 2022)

**Periodic report n.:** final report

**Project partner:** ARSO

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## 1. INTRODUCTION

Deliverable 3.3.2 “Design of architecture of platform and development of a prototype” (Activity 2 - Oblikovanje arhitekture okolja in razvoj prototipa) is part of the activities of the Work Package 3.3 – “Development of an Innovative Two Way Flood Risk Communication Environment in Transboundary River Basins” of the VISFRIM Project (Vipava/Vipacco and Other Transboundary River Basins Flood Risk Management). The objective of the WP3.3 was to set up a Citizens’ Observatory that will encourage active participation of citizens in environmental monitoring activities, based on properly designed innovative technologies. The goal was to develop green technologies (web platform and mobile app), which would be developed and after workshop tested in real life. Local communities would be involved in dealing with floods and developing the Citizens’ Observatory. The Deliverable 3.3.2 is the report on the design of architecture of information platform needed to support Citizens’ Observatory and implementation of the design in a working prototype. The designed and implemented prototype had to meet functional requirements, that were obtained from workshops with potential users of the platform. The developed platform had to meet additional technical requirements, which enabled deployment and operation of the platform inside existing IT infrastructure managed by ARSO. Functional requirements provided threefold objectives for the platform related to the flood risk management:

- provide information to citizens,
- gather information from citizens and
- educate citizens

To realize those objectives, ARSO firstly set up a conceptual model for the user interactions with the platform. Based on the conceptual model ARSO devised the implementation plan, where it decided on architectural parts of the platform and technologies to be used for particular part. Technologies were chosen by taking into account their functional characteristic as well as familiarity with the technology by ARSO staff. Besides architecture of the platform, ARSO designed first iteration of a graphical user interface (GUI) with all the graphical elements, needed for the frontend part of the platform. The platform was then

developed by external contractor and deployed on the server that was bought with Visfrim funds and installed into ARSO datacenter. When the platform became operational for testing purpose, ARSO conducted testing with different users. Users provided feedback on user experience, bugs and implemented features. Based on the gathered feedbacks, ARSO introduced improvements to the platform. More detailed technical description of the architecture of the implemented platform and the components, that were used, is available in separate document “Appendix 1”.

## **2. RAISING AWARENESS ACTIVITIES AND REQUIREMENTS SPECIFICATION**

During the project implementation staff from ARSO, who worked on Visfrim project, attended the online course “Citizes Science Projects: How to make a difference” on Future learn web page (<https://www.futurelearn.com/courses/weobserve-the-earth>).

ARSO also attended first online workshop about the Citizens’ Observatory on flood risk management on 18. November 2020, organized by AAWA and staff from WeObserve project. ARSO sent invitations to potential interested people from Slovenia and AAWA sent invitations to potential interested people from Italy. The workshop was in English language and ARSO had a presentation about past flood events occurred in Slovenia. The workshop was attended by more than 50 people from local authorities, decision makers and experts. The workshop was interactive and stakeholders could share their ideas about flood risk mitigation.

## **3. CONCEPTUAL MODEL**

The conceptual plan and the first iteration of user experience was made based on technical and content analysis of requirements. The three objectives for the platform can be in more detail elaborated with specific requirements:

- **Provide information to citizens:** We want to provide information about current situation in a river basin. In order to achieve such result, citizens’s reports, information on current water level, current weather and water related events (reported by different civil protection services), need to be available on the platform. In addition to

information on current situation, citizens need to be informed on water level and floods related warnings issued for next couple of days. The platform should also provide news on activities related to flood risk management.

- **Gather information from citizens:** We want to enable citizens to be active participants in flood risk management, by giving them tools that can be easily used for providing reports when we do different activities near water bodies in the river catchment. Citizens could report on the state or change of current water level or report a blockade of canal by debris or report observed damage on the infrastructure (bridges, riverbanks, roads by the river).
- **Educate citizens.** An important part of the platform is also educational content, which make the web platform relevant to users also in periods when there are no extreme events happening or forecasted in next couple of days. By educating citizens before floods happen, we can prepare them to take appropriate actions during extreme events to protect their lives and property. Educational content is composed of regular web content including different multimedia elements such as text, images, animations, video etc.

#### 4. PROJECT IMPLEMENTATION

Firstly, the graphic user interface (GUI) was made. The design of the GUI was guided by information and good users' experience. At the beginning all content elements were put together on a wireframe model for desktop (big and medium computer screen) and mobile view. ARSO used basic design principles where the most important information is put on the top of the page.

The web platform is available on <https://vode.arslo.gov.si/visfrim/sl/>. In the head of the web page there is the Visfrim logo and title of the web page. On the right part of the head there are links for Instagram (arslo\_vreme), Twitter (ARSO vode) and Facebook page (ARSO vode), where user can get additional information. A user can change the language from Slovene to Italian and English.

On top left part of the web page there are hydro textual warnings for next couple of days, if resulted from forecasting. Otherwise, the last report by citizens is shown in this place. Next to warnings or citizens' report weather forecast, which is useful information for predicting the conditions for possible floods, is shown.

Besides weather forecasts there is a picture of the *Varsom Regobs* application and clicking on it user is directed to the Google Play shop, where it is possible to download it. Web application Crossrisk (<https://crossrisk.eu/sl/>), which is the result of Interreg Slo-At project, was also used as an example, from which staff from ARSO drew lessons on architecting the web platform, such as trying to use existing mobile applications. This approach brings a couple of advantages: no need to develop and also maintain one part of the whole platform. The second one is that, by using an existent and established application, we are also tapping into user base of that application and also enabling VISFRIM users to become part of a larger community of users. Larger community of users is important for establishing a “critical mass” of users that make platform live and active. Both VISFRIM and Crossrisk use the same mobile application *Varsom Regobs*, that was developed by the Norwegian Water Resources and Energy Directorate (<https://play.google.com/store/apps/details?id=no.nve.regobs4>). The application provides all the needed capabilities for submitting citizens' reports:

- it allows citizens entering text description about the situation that is reported or selecting available descriptions from a tree of options;
- it enables easy capture of images from the site and recording of geolocation, time and date of the report;
- collected information from different sources (observers, hydrological and meteorological information provided by ARSO or information from Administration for Civil Protection and Disaster Relief) is visible to users on the map.

In detail ARSO staff worked on the translation of the mobile application user interface into Slovene language: task accomplished with the cooperation of the Norwegian Water Resources and Energy Directorate. The translation to the Slovene language wasn't financed by Visfrim funds.

In detail, on the web page, the user can select the river catchment of interest. When a river catchment is automatically or manually selected, all the related information is made visible such as points for submitted reports by citizens, points for meteorological and hydrological stations, points of events reported by Administration for Civil Protection and Disaster Relief and points of web cameras. Clicking on any of these points, the webpage opens tooltip with specific information pertaining to the type and location of the point. User has the option to filter points shown on the map by selecting time and type. Underneath the map there is a web component of the type carousel, that shows cards for each citizens' report (that is also shown as a point on the map). The card can show images, if there is an image attached to the report, and summary of the report. By clicking on the card, the whole report can be visualized.

On the map the user can select different layers:

- observer reports
- SPIN events (System for reporting on interventions and disasters),
- cameras
- hydro-stations and
- meteo-stations

Also static layers, previously prepared by VISFRIM partners, are available:

- river network (Soča/Isonzo river network),
- river basin (Soča/Isonzo river basin),
- hydro stations (from Soča /Isonzo catchment from Slovenian and Italian side),
- meteo-stations (from Soča /Isonzo catchment from Slovenian and Italian side).

There is also educational content on the web platform such as blog, infographics, quiz and useful links. Also map of precipitation and clouds on the Slovenian territory, measured by radar, was added. Below there are some educational animations, hydro-forecasts for selected stations on the map and last Twitter posts published on ARSO vode. All the described parts of the Visfrim platform are visible on picture 1.



**VISFRIM** - STANJE VODA,  
OPÓZORIJA IN LJUBITELSKA OPAZOVALNICA

ZADNJE POROČILO

05. 07. 2022

Arh

**Komentar:** Močan naliv, na tleh veje dreves in del strehe.

VREMENSKA NAPOVED ARSO VREME

**Ljubljana**  
Torek, 05.07

3 °C

Veter: 4 km/h  
Vlažnost: 81 %

Podrobnejša napoved na [ARSO VREME](#)

Jutri

6 °C

5 °C  
0 °C

6 km/h

PRENESITE IN SODELUJTE

V

REGOBS

ZEMLJEVID POROČIL

DODAJ POROČILO

Celotno območje

▶

INFOGRAFIKE

- Vodni krog ▶
- Vzroki za poplavo ▶
- Vzroki za poplavo doma ▶
- Tipi poplav ▶
- Ukrepi pred poplavo ▶
- Ukrepi ob napovedi poplave ▶
- Ukrepi med poplavo ▶
- Ukrepi po poplavi ▶
- Vodnja po poplavljeni cesti ▶
- Terminologija ▶
- Hidrološki model ▶
- Poplave in taljenje snega ▶
- Preventivni ukrepi ▶

POSLOVNI SPLETNIK

**ZAKLJUČENA INVESTICIJA PROTIPOPLAVNIH UKREPOV NA OBMOČJU ČUKLJE ZAPUČKE V OBČINI ŠEMPETER - VRTOJBA**

21. 12. 2021

Občina Šempeter - Vrtojba je jeseni 2020 zaključila 1. fazo protipoplavnih ukrepov, ki jih izvaja v okviru strateškega projekta VISFRIM, z naslovom Upravljanje poplavne ogroženosti na porečju reke Vipave in na ostalih čezmejnih porečjih. Od konca januarja, ko je začela z gradbenimi deli, pa do jeseni je Občina uspešno izvedla investicijo na območju velike poplavne ogroženosti v Vrtojbi, med zaselkoma Čuklja in Zapučka, v skupni vrednosti 349.542,23 EUR. Občina je iz strani Nacionalne kontrole S

**Starejše objave:**  
[Protipoplavni ukrepi in hidravlično modeliranje na porečju Vipave 08. 12. 2021](#)  
[Teti coplav in njihovi veliki 03. 12. 2021](#)  
[JAVNO IZOBRAŽEVANJE O NARAVNIH NESREČAH 24. 11. 2021](#)  
[Mednarodni dan za zmanjšanje ogroženosti zaradi naravnih nesreč 24. 11. 2021](#)  
[Poplavljenje moza 24. 11. 2021](#)

RADAR

KVIZ

Če živimo v poplavnem svetu, kako pridemo do zaščitnih sredstev?

- Poskušamo da zaščitna sredstva dostavimo občinski službe ali pripadniki civilne zaštite.
- Zaščitna sredstva in pripomočke imamo sprejete doma na znanih mestih.
- Zaščitna sredstva ne pripomorejo veliko pri zaščiti moje hiše ob poplavih.

NAPREJ

KORISTNE POVEZAVE

[Hidrološka opozorila](#)  
[Ovisi stopenji nevarnosti in močnih učinkov](#)  
[Atlas oboljja](#)  
[Vremenska opozorila za Italijo](#)  
[Vremenska opozorila za Avstrijo](#)





Picture 1 Web platform as presented in desktop web browser.

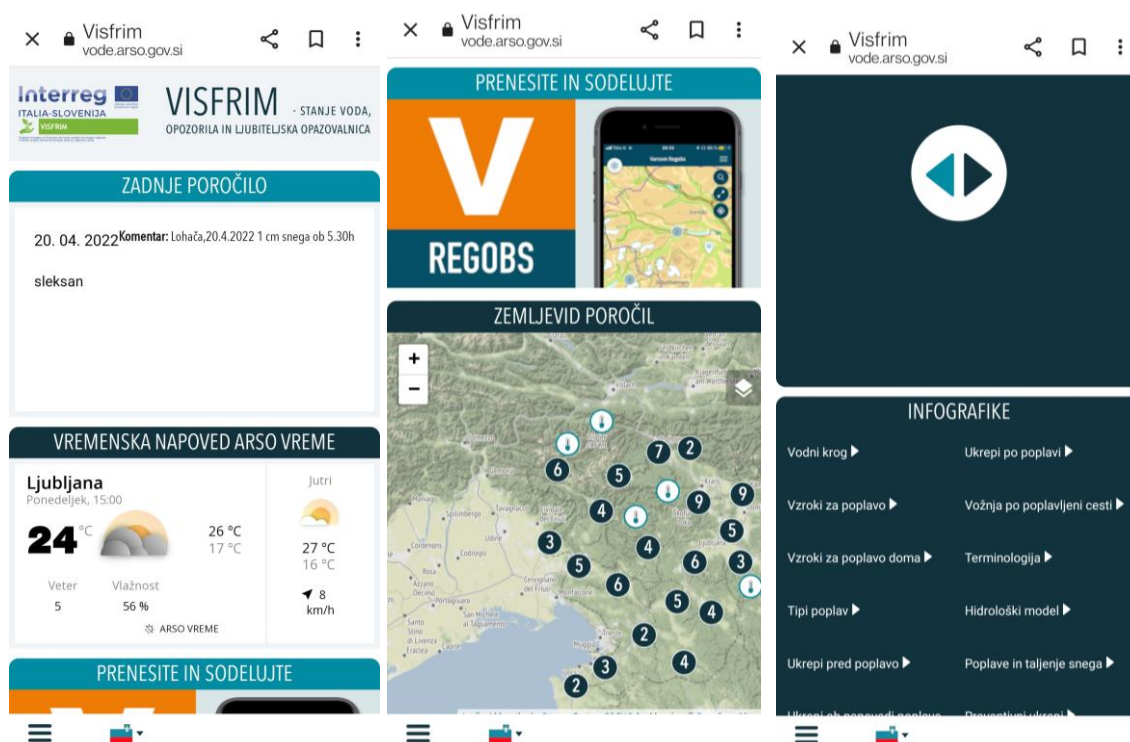
Special attention was paid to make the system able to support the access to the highest possible number of users in case of flood event. In such case of an increased load, the platform should keep the desirable performance.

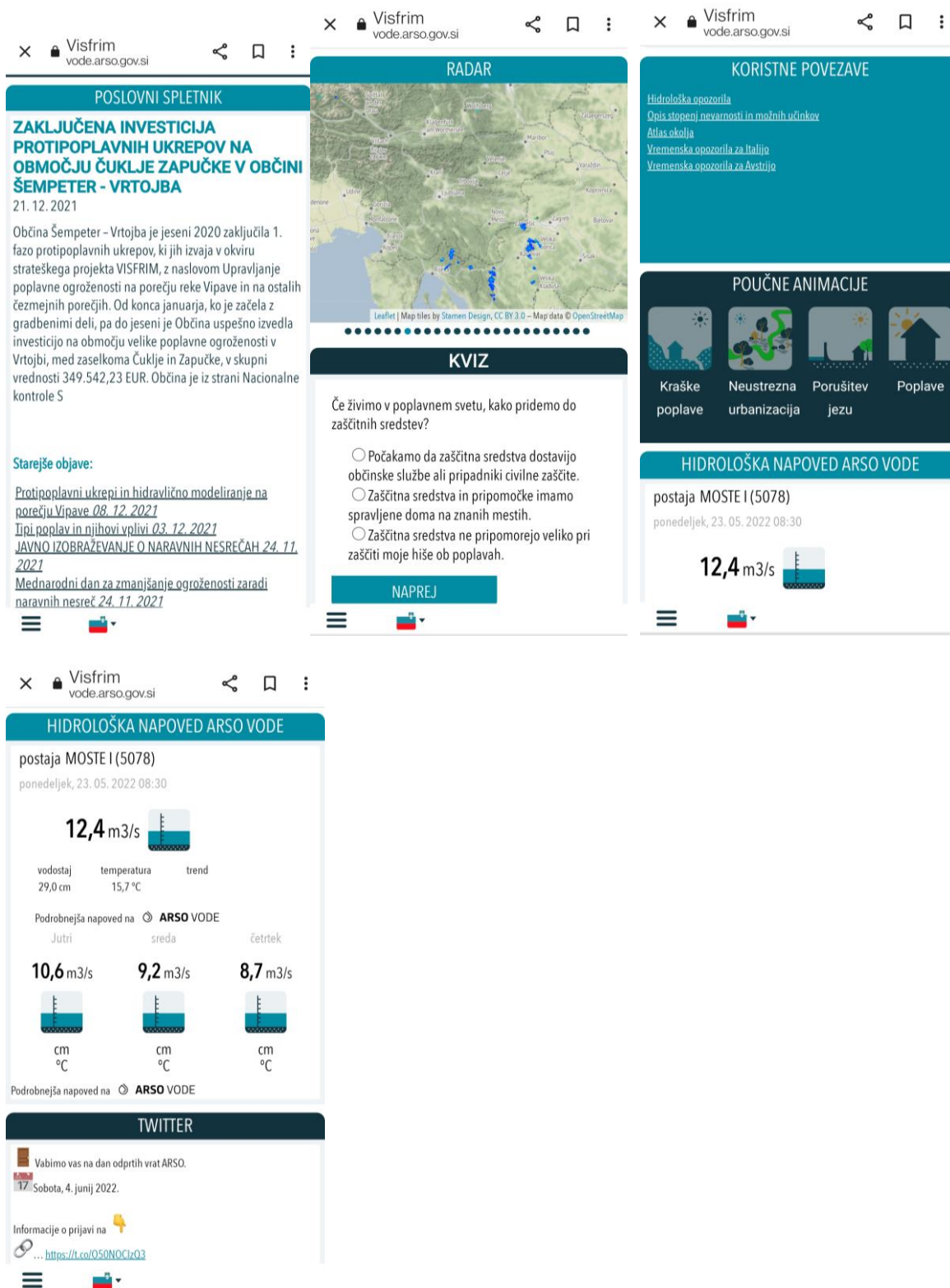
## 5. TESTING AND IMPROVEMENTS

After the web platform was deployed, staff from ARSO started testing it and implemented a number of improvements and bug fixes after testers' feedback. The testing exposed several bugs connected to different parts of the platform. The bugs were fixed in cooperation with external developer. Testers also suggested a few improvements.

Suggested improvements were related to the arrangements of web components on the web page and their sizes. Additionally, there were suggestions to include new components, such as radar animation for precipitation and river network layer for the main map. The improved platform also enables submission of citizens' reports without the use of mobile application (Varsom RegObs). The Visfrim platform offers indeed the option of direct entering a citizen's

report in the tab “Add report”, which is placed besides the tab “Map of reports”. When adding the report, a citizen must enter location, time and other data. Uploading the picture is optional. In addition to the desktop view, the website is also optimized for mobile clients (phones, tablets, etc.) On picture 2 there is a collage view of platform on a mobile device. In addition to sequentially viewing content sorted by relevance, faster access to a menu is also available. In desktop view mode it is placed on main page, whereas it is at the bottom left in mobile mode. When the user clicks on an entry in the menu, the application automatically moves to the appropriate place on phone. The website offers up to date content, which will be regularly published by hydrological forecasters.





Picture 2 Mobile view of the Visfrim platform

## 6. WORKSHOP

ARSO organized a workshop on 13/04/2022 at Monument of peace in Cerje, where local stakeholders were invited. Invitations were sent through email and the event was promoted via different social media. The workshop was attended by 17 people.

The workshop started at 10 am with the introductory speech by Nika Leban, employee at tourism in Miren – Kostanjevica, who wished all the attendants pleasant gathering and warm welcome. Ingrid Arh from ARSO had a presentation about some general information about the VISFRIM project and some past flood events occurred on Vipava valley. Legal frames for the implementation of the VISFRIM project was the Flood directive with areas of increased flood impact. She also presented some activities for reducing floods, explained how warning system on ARSO works and described some results from the VISFRIM project, such as structural and non-structural measures for reducing the risk of floods. Damjan Dvoršek from ARSO presented the first version of the technologies supporting the Citizens' Observatory (<https://vode.arso.gov.si/visfrim/sl/>). He presented what kind of information citizens can get and which kind of observation could be uploaded. Citizens can upload information about damaged bridges and other infrastructure, flooded roads, landslides, fallen trees, clogged drains as well as measurements of water level from gauging stations. Everybody, who had a mobile phone with access to internet, could check and test the technologies supporting the Citizens' Observatory in real time. An example of good practice for entering and reviewing observations with the Norwegian application Varsom Regobs was presented. The application is available also in Slovenian and can be downloaded and used by users. Observations, entered by the Varsom Regobs application, are visible on the Citizens' Observatory online platform.



*Picture 3 The workshop for Visfrim Citizens' Observatory*

After the presentation, a discussion followed about the platform where everybody could give critics and suggestions. Some of suggestions were:

- Administration for protection and rescuing is supposed to be informed about natural disasters, such as landslides;
- There are some mistakes in regulating the watercourses. There are severe floods at the same intensity of precipitation. The main problem is in laws. Suggestion was that concessions should be granted from municipalities. Waterbed is higher because of alluviums and the waterbed should be cleaned. Meanders should be created and, where needed, also water reservoirs.
- Before natural events occur, local people should be informed trough text or further ways similarly to firefighters.
- On Zalošče it is supposed to install a camera above the bridge.

- Information center should inform Civil Protection about which roads are flooded.

Some improvements of the platform were consequently planned to be done for addressing users' experience.

The workshop finished at 12:00 and after some catering was prepared for visitors at Okrepčevalnica Cerje, which is on the same location. After break and some unformal chat, visitors had the chance to visit other floors of Pomnik miru as guided tour with Ariana B. Suhadolnik. After tour the journalist Goran Tenze from National RadioTV station Ars had an interview with Ingrid Arh, Damjan Dvoršek and Mojca Sušnik about the Visfrim project. Whole podcast is available on the link: <https://ars.rtv slo.si/2022/04/pogled-v-znanost-365/> .

## **7. CURRENT STATUS AND FUTURE PLANS**

The web platform is finished: only regular maintaining task for the operational purpose of the website is still on-going, which won't be financed by Visfrim funds.

In detail ARSO will proceed promoting the Visfrim web platform to ensure that inhabitants, living in flood prone areas in Slovenia, could benefit from it: in fact, even if the original area of interest was set only to Soča and Vipava transboundary catchments, the technology was developed so that citizens from any part of Slovenia could use it and take advantages from it. For these purposes, during the project implementation, ARSO put efforts to promote the Citizens' Observatory technology in different ways in order to reach as many potential end-users as possible: project webpage, podcasts and social media platforms, whose links are available inside the CO website. In addition there was one radio show about the platform and the project, that was aired on national radio in addition to the already mentioned workshop in Monument of Peace at Cerje.

The list of promotional activities and their reach is described in more detail below:

- Workshop for CO on 13.4.2022 in Monument of Peace at Cerje, that was attended by 17 people.

- Page ARSO vode on Facebook has 2.200 followers. In detail post on Visfrim workshop (<https://www.facebook.com/ARSOvode/posts/407259998071001> ) has a total reach of 608 people.

**Podrobnosti objave**

**ARSO vode**  
 Objavil Matija Klančar · 25. april · 🌐


**Delavnica - Opazovalnica občanov**

💧 V okviru Interreg projekta **VISFRIM Interreg ita/slo** (Upravljanje poplavne ogroženosti na porečju reke Vipave in ostalih čezmejnih porečjih) je bila s strani ARSO organizirana delavnica z naslovom **Opazovalnica občanov**, katere namen je bil na eni strani predstavitev spletne platforme, ki bo omogočala večsmerno izmenjavo informacij, povezanih s poplavno varnostjo, med občani, strokovno javnostjo in upravljalci porečij ter na drugi strani pridobitev mnenj za dopolnitve in izboljšave omenjene spletne platforme.

💧 Predstavljen je bil primer dobre prakse za vnos in pregled opazovanj z norveško aplikacijo Varsom Regobs, ki je na voljo tudi v slovenskem jeziku in si jo lahko uporabniki naložijo na telefon ter jo uporabljajo. Opazovanja, ki se vnesejo v aplikacijo Varsom Regobs, so vidna na spletni platformi Opazovalnica občanov.

Več na: 📌

- 🌐 Spletna stran projekta VISFRIM: <https://www.ita-slo.eu/sl/visfrim>
- 🌐 Spletna platforma VISFRIM: <https://vode.arslo.gov.si/visfrim/sl/>
- 📱 Aplikacija Varsom Regobs: <https://regobs.no>



**Performance for your post**

**608** Dosežene osebe

**6** Všečki, komentarji, delitve

**27** Klikli objave

<b>20</b> Ogledi fotografije	<b>3</b> Kliki povezave	<b>4</b> Drugi kliki
---------------------------------	----------------------------	-------------------------

**Povzetek distribucije**

↓ **1,1x less** Post impressions   ↑ **1,6x more** Klikli objave   ↓ **3,1x less** Odzivi

**Prikaži več podrobnosti**

**Negativne povratne informacije**

**0** Skrij vse objave   **0** Skrij objavo  
**0** Prijavi kot neželeno   **0** Stran mi ni všeč

**6** Všečki, komentarji, delitve

**Branded content distribution** **View breakdown**

<b>608</b> Skupni doseg	<b>608</b> Neplačani doseg	<b>0</b> Doseg plačane objave
<b>655</b> Skupni prikazi	<b>655</b> Organic impressions	<b>0</b> Paid impressions

- Page ARSO vreme on Facebook has 25.000 followers. In detail post on interreg projects [Crossrisk](#) and [Visfrim](#)

(<https://www.facebook.com/ArsoVreme/posts/4462897693734271> ) has a total reach of 5.882 people.

**Podrobnosti objave** ✕

**ARSO vreme**  
 Objavil Matija Klančar · 07. maj 2021 · 🌐 ⋮

❄️ Snežna odeja in podnebne spremembe ❄️

☁️ V luči aktualnih dogajanj še naprej pišemo o snegu. Naše nižinske postaje sicer niso izmerile novozapadlega snega, a je ta včeraj vendarle pobelil nekatere nižje predele Gorenjske. To je bilo že drugo sneženje v tem tednu. Ponekod je namreč snežilo tudi v noči na ponedeljek (3. maja). V Ratečah je bilo ta dan ob 7. uri zjutraj izmerjenih 5 cm novozapadlega snega. To ni bil prvi primer majskega snega. Postaja je doslej v kar nekaj letih v maju izmerila novozapadli sneg. Rekordna vrednost je bila izmerjena 3. maja 1985 – 40 cm.

❄️ Snežna odeja je reden pojav v večjem delu Slovenije. Ni pomembna samo za zimski turizem, ampak tudi za ekosistem. Snežna odeja je naravni zadrževalnik vode, iz katerega se voda počasi sprošča, še posebej spomladi in v zgodnjem poletju. To je za rastline v vegetacijskem obdobju zelo pomembno, saj je ta del leta običajno manj namočen.

💧 Poleg tega snežna odeja vpliva na pretočne režime večine naših rek, saj imajo te vsaj delno snežni režim z značilnim spomladanskim viškom kot posledico taljena snega. Z upadom snežne odeje, ki ga v prihodnosti pričakujemo, se bo količina vode, ki bi se sicer postopoma sproščala spomladi in zgodaj poleti, zmanjševala. Na ta način se bo zmanjševal spomladanski višek. Po drugi strani se bo povečal jesenski višek, ki je rezultat padavin, ki se več ne zadržujejo toliko v snežni odeji, ampak takoj odtečejo.

Več o stanju voda, opozorilih in ljubiteljski opazovalnici na spletni strani projekta [VISFRIM Interreg ita/slo](#)

**Performance for your post**

**5882** Dosežene osebe

**68** Všečki, komentarji, delitve

**262** Klikli objave

<b>85</b> Ogledi fotografije	<b>12</b> Kliki povezave	<b>165</b> Drugi kliki
---------------------------------	-----------------------------	---------------------------

**Povzetek distribucije**  
-1,9x

↓ <b>1,9x less</b> Post impressions	↓ <b>1,4x less</b> Kliki objave	↓ <b>1,9x less</b> Odzivi
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[Prikaži več podrobnosti](#)

**Negativne povratne informacije**

**1** Skrij vse objave    **2** Skrij objavo

**0** Prijavi kot neželeno    **0** Stran mi ni všeč

**68** Všečki, komentarji, delitve

**Branded content distribution** [View breakdown](#)

<b>5882</b> Skupni doseg	<b>5882</b> Neplačani doseg	<b>0</b> Doseg plačane objave
<b>6120</b> Skupni prikazi	<b>6120</b> Organic impressions	<b>0</b> Paid impressions

- Page VISFRIM Interreg ita/slo on Facebook has 480 followers
- Web page Moja Občina.si has on Facebook (<https://m.facebook.com/MojaObcina.si/>) 87.000 followers. Post about Visfrim Citizen Observatory (<https://www.mojaobcina.si/miren-kostanjevica/novice/pomnik-miru-gostil-delavnico->



agencije-republike-slovenije-za-okolje-

arso.html?fbclid=IwAR3kWavkgogI64ZM9qE782zBxivup8WjheH8Eo69AgC9roK0l

Yhhse\_0Txk ) was seen by 5.977 people.

- The number of people, who downloaded the podcast and listened through the radio, is 300 and number of subscribers on podcast is 6000.
- Twitter ARSO vreme (<https://twitter.com/meteoSI/status/1526143947269079040> ) has 12.400 followers and the post for CO was seen by 1.753 people.

× **Tweet Analytics**

 **ARSO vreme**  @meteoSI · May 16

 Vzporednice s projektom VISFRIM lahko najdemo na področju snežnih razmer. Tudi v projektu CROSSRISK smo predstavljali aplikacijo Varsom RegObs.

Vabljeni k uporabi! 📌 ...

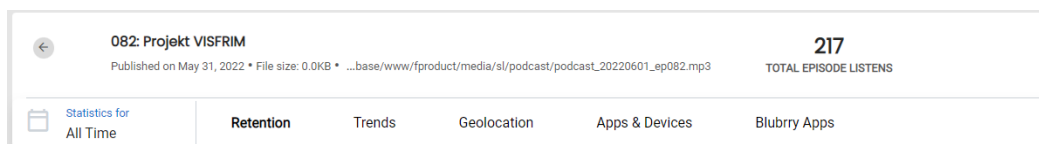
 **2**
 **1**
 **0**

Impressions ⓘ <b>1,753</b>	Engagements ⓘ <b>145</b>	Detail expands ⓘ <b>108</b>
	New followers ⓘ <b>0</b>	Profile visits ⓘ <b>6</b>

- Twitter ARSO vode has 1986 followers and there were tweets about the VISFRIM project ([https://twitter.com/ARSO\\_VODE/status/1526139652683464704](https://twitter.com/ARSO_VODE/status/1526139652683464704)), which were seen by 1.946 people.



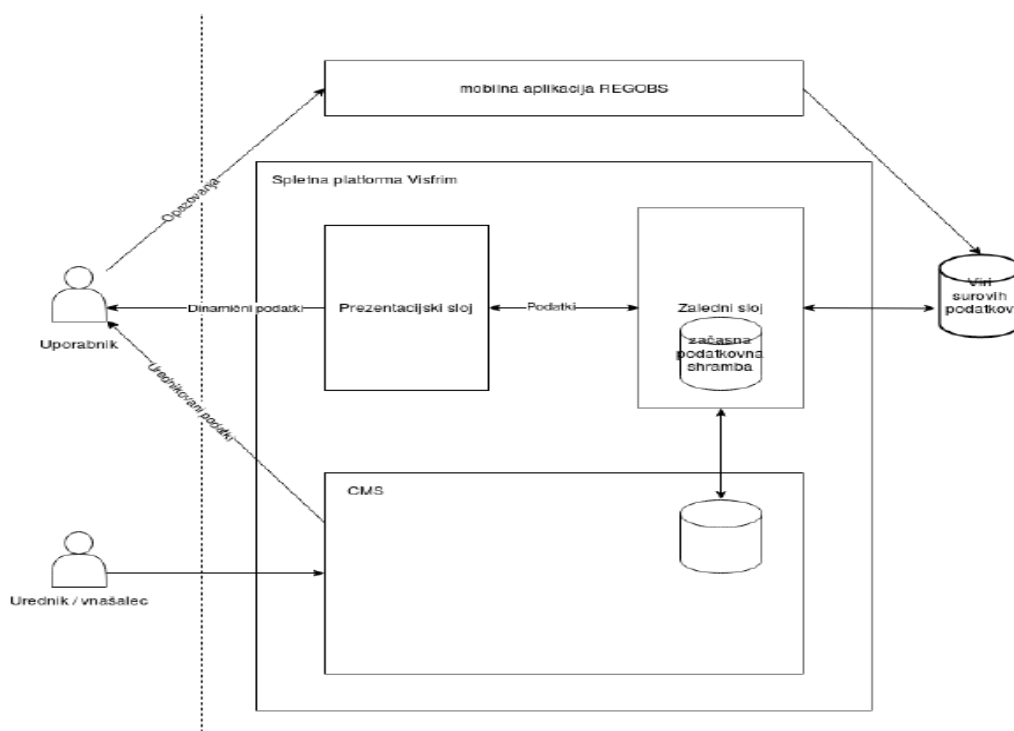
- ARSO recorded podcast about Citizen observatory ( <https://bit.ly/3xf0fyh>.) Number of listeners was 217.



The total amount of people, that read posts on different social media, listened to podcasts or attended the workshop, was more than 16.000 until now.

## APPENDIX 1

The description of the technology agnostic block diagram with predicted interactions (Picture 1.) that conforms to the principle of separating the data from the user experience which dictates the solution in two independent layers: backend layer (API) and front-end layer.

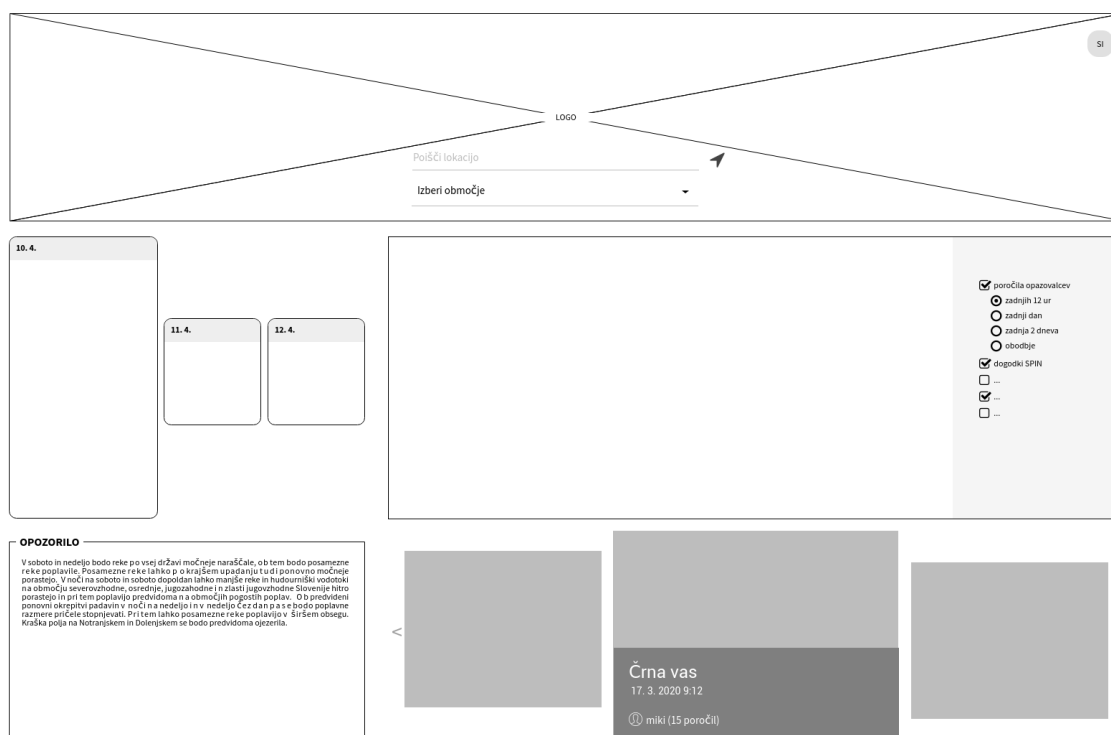


Picture 1 The technological agnostic block diagram with predicted interactions for Visfrim platform

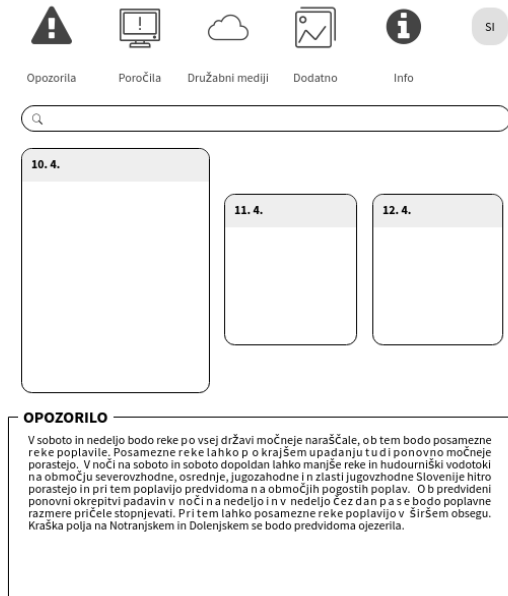
Citizens are submitting their observations and reports through the use of mobile application. Collected information from different sources such as mobile application backend, hydrological and meteorological information provided by ARSO or information from Administration for Civil Protection and Disaster Relief is being integrated and stored by data backend layer (Zaledni sloj). Data backend layer provides collected information to the frontend layer (Prezentacijski sloj) through the use of API. The frontend layer provides this information to the citizen through the GUI, which is accessible with the use of a web browser. Additional component of the web platform is also content management system (CMS), which enables management of regular web

content such as news and multimedia, which are part of the educational content and news on activities related to flood risk management. Beside consumption of the content by the citizens the CMS enables administrator or editor (urednik/vnašalec) to edit this content inside the platform.

The design of the GUI was guided by the information and user experience that we want to provide to the citizens. At the beginning all content elements were put together on a wireframe model for desktop and mobile view. Picture 2 shows wireframe of GUI for big computer screen and in picture 3 mobile phone version of the wireframe. This rearrangement of GUI elements will be achieved by so called Responsive Web Design.



Picture 2 GUI wireframe for big computer screen.

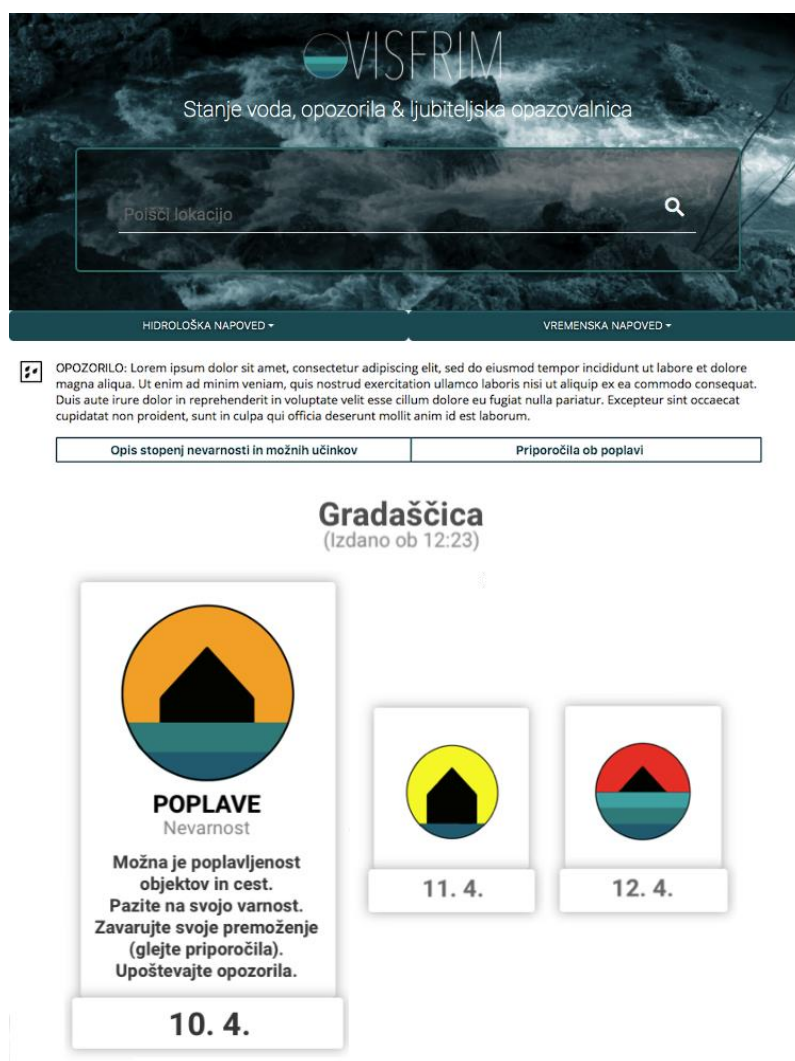


Picture 3 GUI wireframe of mobile version.

We used basic design principle where we want to put the most important information on the top of the page. The first thing that user can do on the web page is to select river catchment that he is interested in. This information can also be inferred automatically with the use of Geolocation Web API, but in case user blocks location information or want to select different catchment than the catchment his current location falls, it's important the user is presented with an option to choose. When the river catchment is selected either automatically or through manual choice the GUI shows information pertaining to that catchment. The GUI is comprised of different web components or widgets. First, we show Hydro warnings for the next couple of day if they exist. We combine all location specific information on a map that is positioned next to the warnings. Location specific information shown on the map is comprised of location points for the submitted citizen reports, location points for meteorological and hydrological stations, location points of events reported by Administration for Civil Protection and Disaster Relief and location points of web cameras. Click on any of the points opens tooltip with specific information pertaining to the type and location of the point. User has an option to filter points shown on the map by selecting time period and the type of the

points he is interested in. Underneath the map is a web component of the type carousel that shows cards for each citizen report that is also shown as point on the map. The report card can show image, if there is an image attached to the report and summary of the report. By clicking on the card, the whole report can be reviled. Another element on the page is textual warning that provides more concise information in textual form on the released warnings.

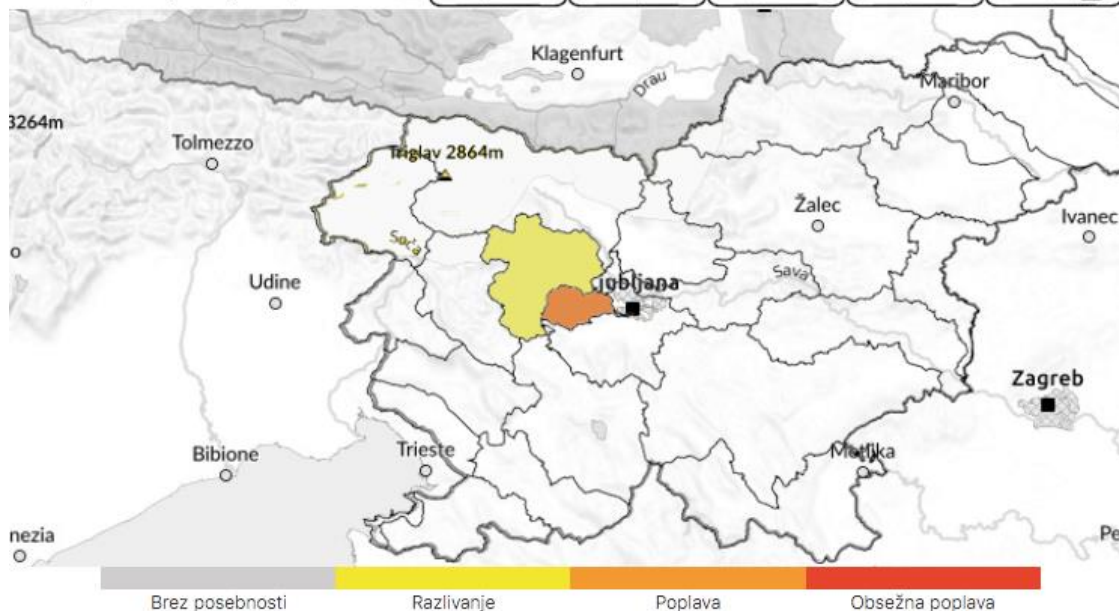
In the next stages of the development, we also added graphical elements to the wireframe to obtain first mockups of the GUI. Pictures 4-8 show this mockup of different web components. During this phase of development, we also added additional components such as social media component for twitter, and component that shows weather and news.



Picture 4 Mock-up of warnings web component.



Prikaži poročila ljubiteljskih opazovalcev za zadnjih 12 ur zadnji dan zadnja 2 dneva zadnje 3 dni obdobje



Picture 5 Mock-up of map and carousel web component.



### Trenutne razmere



### Dodatne informacije



Picture 6 Mock-up of twitter component and map with selection check boxes.



### Zgodovina poplavnih dogodkov

- [Visoke vode in poplave morja med 12. in 20. novembrom 2019](#) [pdf, 3.9 MB]
- [Visoke vode in razlivanje rek 29. in 30. maja 2019](#) [pdf, 2.9 MB]
- [Visoke vode in poplave rek od 1. do 5. februarja 2019](#) [pdf, 3.2 MB]
- [Visoke vode in poplave rek med 27. in 31. oktobrom 2018](#) [pdf, 2.4 MB]

Več ...

### Informativna vsebina

- [Opis stopenj nevarnosti in možnih učinkov](#)
- [Priporočila ob poplavi](#)
- [Rezultati projekta Visfrim](#)
- [Atlas okolja](#)
- [Vremenska opozorila za Italijo](#)
- [Vremenska opozorila za Avstrijo](#)
- [Vremenska opozorila za Hrvaško](#)


### Novice



- [Opozorilo v Izoli in Piranu \(Delo\)](#)
- [Možnost poplav zaradi obilnih padavin \(MMC\)](#)
- [Škoda februarskih poplav \(MMC\)](#)

Več ...

### Sporočite nam svoje mnenje

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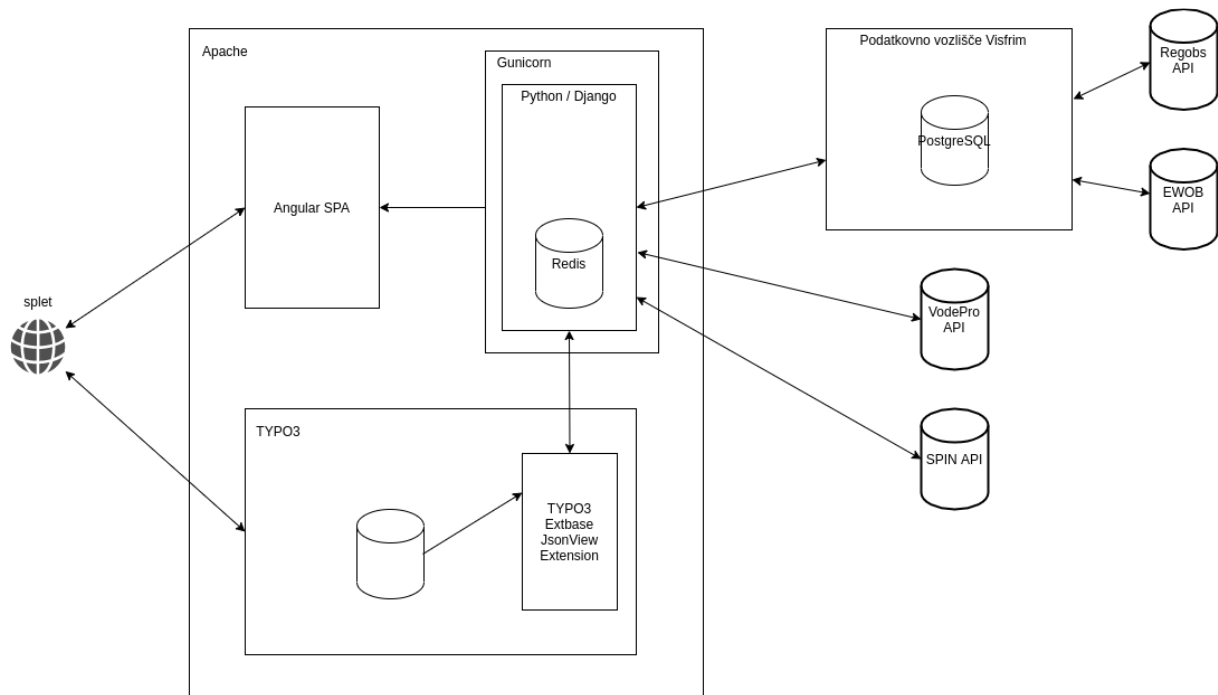


## OVISFRIM

Zagotavljanje učinkovitega upravljanja poplavne ogroženosti na čezmejnih porečjih na podlagi razvoja metodologij in učinkovitih tehnoloških orodij, s katerimi se bodo izvajali obstoječi načrti zmanjševanja poplavne ogroženosti ter njihove nadaljnje posodobitve v skladu s Poplavno direktivo do leta 2021.

Picture 7 Mockup of news and weather web component.

Picture 8 shows initial shamanic architecture of our web platform with all the components and data sources.



Picture 8 The block diagram of the building blocks of the proposed web solution platform.

First, we have a Data Point (Podatkovno vozlišče) which can collect citizens reports by pulling different API endpoints, where currently only Varsom Regobs API pulling is implemented. The reports are stored in Postgresql RDBMS, where we design the data model such to accommodate storing reports from different sources. We used Postgresql capabilities for storing objects in JSON format to accomplish this. Data Point provides access to collected reports through REST API.

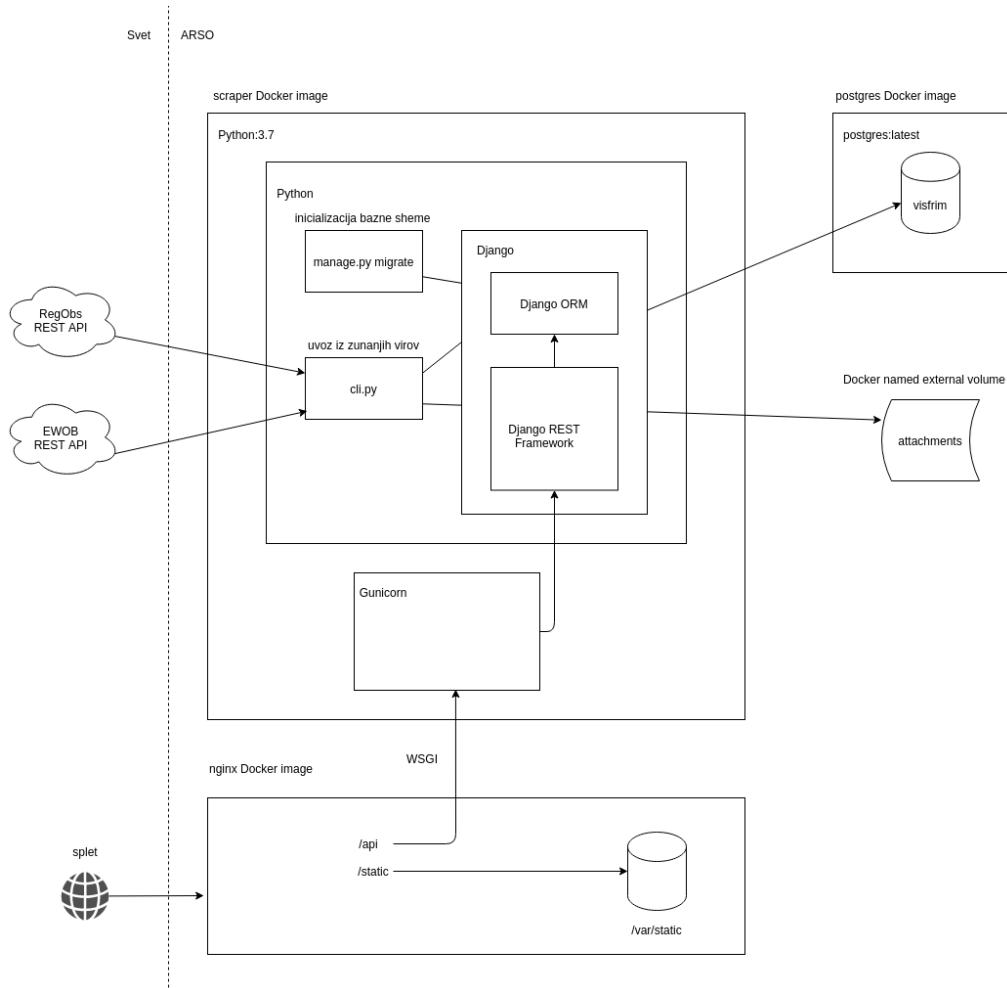
The web platform backend integrates information by pulling API endpoint of the Data Point, VodePro API (provided by ARSO) and SPIN API (provided by Administration for Civil Protection and Disaster Relief). The integrated information is then made available to the web frontend. The web platform backend is implemented on Django REST Framework and served by Gunicorn server. It additionally integrates Redis in-memory data object store, used as a

cache for pulled objects, that are pulled from API endpoints. Special attention was paid to increase maximum amount of users that can access the platform in case of flood event. In such a case of an increased load, the platform should keep the desirable performance. For the detection of malfunctions, special plug-ins for the Nagios and Monitprod were developed.

The frontend of the platform, which implements the GUI, was developed as a single page application with the help of Angular framework. We decided on this fronted framework, because ARSO has a number of applications already developed in this framework. Beside Crossrisk web platform also main ARSO weather web application (<https://vreme.arso.gov.si/>) is developed with Angular.

The content management system component was initially planned as Typo3 CMS, because ARSO was planning to use it as a platform for providing ARSO's new web pages. Unfortunately, ARSO did not finish its web modernization effort in time and new more contained solution was needed. We decided on Ghost CMS.

All the components of the web platform were deployed inside Docker container on the same physical server inside ARSO datacenter. The diagram of the deployment of the Data Point is shown on picture 9.



Picture 9 Deployment diagram of the Data Point.

The main part of the of the Data Point is a python 3.7 Docker container (scraper) that hosts Django server with Django REST Framework extension, that implement REST API endpoints. Request to the REST API endpoints serve citizen reports that were pulled from Varsom Regobs and then stored in Postgresql database. The scraper container also hosts script (`cli.py`) that is responsible for pulling citizens reports and gunicorn server. The Postgresql database is deployed in separate container and attachments to the reports such as images and videos are stored in a persistent Docker named external volume. Additional Docker container with Nginx web server deployed inside serves REST API endpoints from



scraper container through Web Server Gateway Interface (WSGI). Nginx web server is also used for serving static web assets such as css, js and HTML files.

The web backed uses a similar python 3.7 Docker container that hosts Django server with Django REST Framework extension and implements REST API that is consumed by web frontend. This container also hosts script that is responsible for pulling API endpoints of the Data Point, VodePro API and SPIN API. In the same way the implemented REST endpoint is exposed to the web through Gunicorn and Nginx server. In this case additional containers that host Redis store and Ghost CMS were deployed.

## **Relazione tecnica sull'Osservatorio dei Cittadini**

Il deliverable rientra tra le attività previste nel Work Package 3.3 – “*Sviluppo di un ambiente tecnologico per una comunicazione bidirezionale con i cittadini, finalizzata alla gestione del rischio idraulico*” del progetto VISFRIM. L'obiettivo del WP3.3 era quello di realizzare un Osservatorio dei Cittadini attraverso il quale incoraggiare la partecipazione attiva dei cittadini nelle attività di monitoraggio ambientale, utilizzando tecnologie innovative opportunamente progettate. L'obiettivo era quindi quello di sviluppare tecnologie verdi (piattaforma web e mobile app), da testare poi nella vita reale in territorio sloveno. In dettaglio il prototipo è stato progettato e realizzato in modo da soddisfare i requisiti funzionali precedentemente definiti nel corso di workshop, rivolti ai potenziali utenti della piattaforma. I requisiti funzionali mirano in particolare a conseguire tre obiettivi: fornire informazioni ai cittadini, raccogliere informazioni dai cittadini ed educare i cittadini.

## **Tehnično poročilo o Opazovalnici občanov**

Rezultat je del aktivnosti delovnega paketa 3.3 – “Razvoj inovativnega dvosmernega okolja za obveščanje o tveganju poplav v čezmejnih porečjih” projekta VISFRIM. Cilj delovnega paketa 3.3 je bil vzpostaviti Opazovalnico Občanov, ki bo spodbujala aktivno sodelovanje občanov v aktivnostih spremljanja okolja, ki temelji na pravilno zasnovanih inovativnih tehnologijah. Cilj je bil, da se razvijejo zelene tehnologije (spletna platforma in mobilna aplikacija), ki se lahko kasneje testira v realnem življenju v Sloveniji. Prototip je bil torej zasnovan in implementiran tako, da izpolnjuje funkcionalne zahteve, ki so bile predlagane na delavnicah, organiziranih za potencialne uporabnike platforme. Funkcionalne zahteve podrobno določajo tri cilje platforme v zvezi z obvladovanjem poplavne ogroženosti: zagotavljanje informacij državljanom, zbiranje informacij od državljanov in izobraževanje državljanov.