Evaluation report of questionnaire

WP4 Deliverable 4.1.4

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Introduction

This evaluation report summarizes the results of the questionnaire prepared in WP3 of the DAREFFORT project, regarding technical and IT topics which are important for the implementation of the common data exchange service within the project. In addition to the questionnaire, results from technical information forms provided by the technical contacts of national data providers are summarized in this document.

The tables presented in this document reflect the information for data exchange which will be used for implementing the common data exchange service based on deliverable 4.1.1 Flood forecasting and IT expert recommendations. This document also reflects the latest status of information, and therefore may differ from the status of deliverable 3.1.3 Evaluation report of questionnaire (WP3).

The technical information summarized in this document is derived from the 12 countries participating in the DAREFFORT project.

1   Real time hydrological data

In the following tables data delivery methods for real time hydrological data are described which are foreseen to be used in DAREFFORT project, and which will be the basis for future DanubeHIS. The information may differ from the Evaluation Report of Questionnaire of WP3, Deliverable 3.1.3, because the focus of the present document is the technical implementation of DAREFFORT data exchange platform. Especially the delivery methods and available parameters differ from information which can be retrieved from public websites and in bi-lateral data exchange, because for the DAREFFORT data exchange platform standardised solutions have to be used.

1.1   Data delivery methods for real time hydrological data

In Table 1 the data delivery method foreseen in DAREFFORT project and future DanubeHIS is described as derived from the questionnaire and technical information forms of the national data providers.

Overall there are two main types of data delivery: FTP-server or Web-API. In most countries data delivery methods which already exist can be used, these are Austria, Croatia, Germany, Hungary, Moldova, Serbia, Slovakia, and Slovenia. In case of Austria there is an existing Web-API by which water-level can be retrieved. This Web-API will be enhanced to retrieve additional hydrological and meteorological parameters. In other countries appropriate data exchange formats will be defined, these are Bulgaria (probably FTP), Czech Republic (Water ML 2.0), Romania (FTP), and Ukraine (FTP or API).

Table 1: Data delivery methods for <u>real time hydrological data</u> foreseen in DAREFFORT project and future DanubeHIS

	selected stations for DanubeHIS are automatic?	database	persistence of storage	data delivery method for DanubeHIS	data delivery method same as for SAVA HIS?	availability of processed data
Austria	all	relational data base	uncorrected will be replaced by the tested ones	API	-	yes
Bulgaria	all	relational data base	since 2001	planed by FTP	-	not provided
Croatia	all	relational data base	indefinitely	FTP	yes	yes, csv
Czech Republic	all	relational data base	indefinitely	planed waterML 2.0	-	planed waterML 2.0
Germany	all	relational data base	1 year and 1 month	API	-	yes
Hungary	all	relational data base	since 1983	all solutions possible	-	yes
Moldova	all		indefinitely	API	-	yes, digital and paper
Romania	not all	relational data base	at least one month	FTP	-	yes csv, xls
Serbia	all	relational data base	7 days	FTP	yes	yes
Slovakia	all	relational data base	30 days	API	-	not provided
Slovenia	all	relational data base (ORACLE)	indefinitely access last 30 days	API	yes	yes
Ukraine	2 of 21		moment of installation	FTP or API	-	yes, after request, not online

1.2   Update frequencies for real time hydrological data

Table 2 shows the availability and capabilities regarding update frequencies for different hydrological parameters which can be transferred using the data exchange protocols summarised in the previous section. Because the information given in Table 2 reflect the technical capabilities of the concrete interfaces used for data exchange within the DAREFFORT project and in future DanubeHIS, the avail-

able parameters and frequencies shown in Table 2 may differ from the information of Evaluation Report of Questionnaire of WP3, Deliverable 3.1.3 about availability on public websites or bi-lateral data exchange.

Table 2: Availability and update frequencies of <u>real time hydrological data</u>

	water level	discharge	water tem-perature	turbidity	Water quality	Sediment transport
Austria	30 minutes	30 minutes	30 minutes	-	-	-
Bulgaria	daily	daily	no measure-ment	-	-	-
Croatia	hourly	hourly	hourly (not every station)	-	-	-
Czech Republic	10 minutes	10 minutes	10 minutes	-	-	-
Germany	15 minutes	15 to 60 minutes	15 to 60 minutes	-	15 to 60 minutes	15 to 60 minutes
Hungary	hourly	hourly	hourly	-	-	-
Moldova	15 minutes	15 minutes	15 minutes	-	-	-
Romania	once/twice a day/more than twice a day*	once/twice a day/more than twice a day*	once/twice a day/ more than twice a day depend-ing on station	-	-	-
Serbia	hourly	hourly	hourly	-	-	-
Slovakia	15 minutes	15 minutes	15 minutes	-	-	-
Slovenia	10/30 minutes	10/30 minutes	10/30 minutes	10 minutes	-	-
Ukraine	1-2 times a day	daily	1-2 times a day	-	-	-

* depending on hydrological conditions / warning level exceedance, minimum is once per day

The parameters **water level, discharge** and **water temperature** can be / will be delivered using the foreseen data exchange interface in almost all countries, except in Bulgaria. Because other parame-ters are only provided in few countries, it is not recommended to enhance the minimal parameter set of **water level, discharge** and **water temperature** for data exchange in DAREFFORT project. This meets the draft specifications of minimal set of hydrological data foreseen to be exchanged in future DanubeHIS, except water temperature for Bulgaria.

The minimal common overall update frequency is one hour for automatic stations and daily for man-ual stations.

2   Real time meteorological data

In this chapter data delivery methods for real time meteorological data are described which are fore-seen to be used in DAREFFORT project, and which will be the basis for future DanubeHIS. As for the

real time hydrological data the information may differ from the Evaluation Report of Questionnaire of WP3, Deliverable 3.1.3. Especially the delivery methods and available parameters differ from information which can be retrieved from public websites and in bi-lateral data exchange, because for the DAREFFORT data exchange platform standardised solutions have to be used.

2.1 Data delivery methods for real time meteorological data

In Table 3 the available and planned data delivery methods for DAREFFORT project and future DanubeHIS are described as derived from the questionnaire and technical information forms of the national data providers.

As for the real time hydrological data there are basically two main types of data delivery: FTP-server or Web-API. In most countries data delivery methods which already exist can be used, these are again Austria, Croatia, Germany, Hungary, Moldova, Serbia, Slovakia, and Slovenia. In case of Austria the existing Web-API for hydrological data will be enhanced to exchange meteorological parameters. In other countries appropriate data exchange formats will be defined, these are Bulgaria (probably FTP), Czech Republic (Water ML 2.0), Romania (FTP), and Ukraine (FTP or API).

Table 3: Data delivery methods for <u>real time meteorological data</u> foreseen in DAREFFORT project and future DanubeHIS

	selected stations for DanubeHIS are automatic?	database	persistence of storage	availability of grid data	data delivery method for DanubeHIS	data delivery method same as for SAVA HIS?	processed data available
Austria	all	relational data base	uncorrected will be replaced by processed data	no	will be available in 2020, similar to hydrological data	-	yes
Bulgaria	all	relational data base	since 2001	no	planed by FTP	-	not provided
Croatia	all			no	FTP	yes	yes, csv
Czech Republic	all	relational data base	indefinitely	yes	planed waterML 2.0	-	planed waterML 2.0
Germany	all	relational data base		yes	API	-	yes
Hungary	all	relational data base	since 1981	no	all solutions possible	-	yes
Moldova	all			no	API	-	
Romania*	not all	relational data base	at least one month	yes	FTP	-	yes
Serbia	all	relational data base	7 days	no	FTP	yes	yes

	selected stations for DanubeHIS are auto-matic?	database	persistence of storage	availabil-ity of grid data	data deliv-ery method for Dan-ubeHIS	data delivery method same as for SAVA HIS?	processed data available
Slovakia	all	relational data base	30 days	not pro-vided	API	-	not pro-vided
Slovenia	all	relational data base (POSTGRES-ORACLE)	indefinitely access last 48 hours	yes	API	yes	yes
Ukraine	non		moment of installation	no	FTP or API	-	yes, after request, not online

* hydrological stations are also used in the DAREFFORT project for providing the meteorological data. This may change in the future.

2.2 Update frequencies for real time meteorological data

The availability and capabilities for DAREFFORT project regarding update frequencies of real time meteorological information is shown in Table 4.

Again, because the information given in Table 4 reflect the technical capabilities of the concrete in-terfaces used for data exchange within the DAREFFORT project and in future DanubeHIS, the availa-ble parameters and frequencies shown in this table may differ from the information of Evaluation Report of Questionnaire of WP3, Deliverable 3.1.3, which depicted the availability of data on public websites or bi-lateral data exchange.

Table 4: Availability and update frequencies of real time meteorological data

	precipi-tation	air Tempe-rature	humi-dity	precipi-tation type	snow cover	air quali-ty	air pres-sure	wind speed	wind direction
Austria	30 minutes	-	-	-	-	-	-	-	-
Bulgaria	daily	-	-	-	-	-	-	-	-
Croatia	hourly	hourly	-	-	hourly	-	-	-	-
Czech Republic	10 minutes	hourly	hourly	-	once a week	hourly	-	-	-
Germany	1 minute / 10 minutes / hourly	10 minutes / hourly	-	-	-	-	hourly	10 minutes / hourly	10 minutes / hourly
Hungary	hourly	hourly	-	-	daily	-	-	hourly	hourly
Moldova	real time	real time	real time	-	real time	real time	real time	real time	real time

	precipi-tation	air Tempe-rature	humi-dity	precipi-tation type	snow cover	air quali-ty	air pres-sure	wind speed	wind direction
Romania	Once / twice a day	Once / twice a day *	-	-	-	-	-	-	-
Serbia	daily	daily	-	-	once/twice a day	-	-	-	-
Slovakia	5 minutes (published hourly)	5 minutes (published hourly)	5 minutes (pub-lished hourly)	5 minutes (pub-lished hourly), not all sta-tions*	5 minutes (pub-lished hourly	-	5 minutes (pub-lished hourly	5 minutes (pub-lished hourly	5 minutes (pub-lished hourly
Slovenia	10/30 minutes	10/30 minutes	10/30 minutes	10/30 minutes	once a day	-	-	-	-
Ukraine	every 6 hours	every 3 hours	-	daily	daily Nov to March	-	-	-	-

*22 synoptic stations

Only the parameter **precipitation** can be delivered in all countries using the foreseen data exchange interface at the moment, which meets the draft specifications of minimal set of meteorological data foreseen to be exchanged in future DanubeHIS.

Additionally, there could be a possibility to also exchange air temperature in the future because only Austria and Bulgaria do not foresee to provide this information at the moment.

The minimal common overall update frequency is one hour for automatic stations and daily for man-ual stations.

3   Grid data

Grid data is not available in all countries. Table 5 shows which countries provide grid data and the file format in which the data is available

Table 5: Availability of meteorological grid data

	grid data	file format	Provider	Coverage	Data base
Austria	no	-	-	-	-
Bulgaria	no	-	-	-	-
Croatia	no	-	-	-	-

	grid data	file format	Provider	Coverage	Data base
Czech Republic	yes	dbf, txt, csv, jpg	CHMI	Czech Republic area	relational data base
Germany	yes	eigenes Binärformat RADOLAN, GIS-lesbar	DWD	Germany	
Hungary	no	-	-	-	-
Moldova	no	-	-	-	-
Romania	yes	net Cdf, grib files, and other specific proprietary format	-	-	-
Serbia	no	-	-	-	-
Slovakia	not provided for DAREFFORT	-	-	-	-
Slovenia	yes	Radar data: http://meteo.arso.gov.si/met/en/service2/ maps: http://meteo.arso.gov.si/met/en/climate/maps/	-	-	-
Ukraine	no	-	-	-	-

4   Ice data

In Table 6 the periods in which ice data is measured if any, the parameters which are measured and the corresponding update frequencies are listed.

Because of the nature of ice phenomena and the regional relevance, the periods, but also parameters vary between the countries.

Table 6: Measured ice data and update frequencies

	ice data measurement period	ice cover	percentage of surface covered by ice	thickness of ice cover	duration of ice cover	height of snow	water equivalent
Austria	not in real time, only in hydrographic yearbook	-	-	-	-	-	-
Bulgaria		regular	-	-	-	-	-

	ice data measurement period	ice cover	percentage of surface covered by ice	thickness of ice cover	duration of ice cover	height of snow	water equivalent
Croatia	no data (croatian water has some)	-	-	-	-	-	-
Czech Republic	Oct to Apr	yes	-	-	-	-	-
Germany	snow season	-	-	5 minutes automatically /daily via observer	-	-	5 minutes automatically /daily via observer
Hungary	Dec to Mar (can differ)	daily	daily	daily	daily	-	-
Moldova	Nov to Apr	once in 5 days (manual)	yes	yes	yes	-	-
Romania	in general Dec to Feb	-	yes	yes	yes	yes	Every 5 days
Serbia	Nov to Mar	-	daily	daily	daily	-	-
Slovakia	when occure	daily (6:00) by observer	-	-	-	-	-
Slovenia	not measured	-	-	-	-	-	-
Ukraine	Nov to Mar	-	yes	yes	-	yes	-

5 Meta data

In Table 7 the availability of meta data of hydrological and meteorological stations is summarized.

Table 7: Availability of meta data, and access method

	onli-ne	hydrological	meteorological	electronical
Austria	yes	delivered with real time data	-	yes
Bulgaria	no	-	-	yes, in diffe-rent files
Croatia	yes	https://hidro.dhz.hr/hidroweb/skrip-te/hidrobazahtml.py?funkc=puninfopost&kpost=XYZ	https://meteo.hr/infrastruktura/popis_osnovne_mreze_meteoroloskih_postaja.xlsx	yes
Czech Republic	yes	hydro.chmi.cz/hpps/hpps_prfbk_detail.php?seq=307007 hydro.chmi.cz/hpps/hpps_prfbk_detail.php?seq=307372 http://portal.chmi.cz/files/portal/docs/poboc/OS/stanice/ShowStations_CZ.html		yes
Germany	yes	https://www.hnd-da-ten.bayern.de/webservices/export.php?user=XXX&pw=XXX&pgnr=STATIONNUMBER&metainfo=1	Metadata for a particular station is automatically downloaded when precipitation data for that station is downloaded.	yes
Hungary	yes	http://www.vizugy.hu/?mapModule=OpVizallas&SzervezetKod=0&mapDa-ta=VizmerceLista#mapModule	-	yes, english excel
Moldova	no	-	-	yes
Romania	no	-	-	xls or csv
Serbia	yes	http://www.hidmet.gov.rs/eng/hidrologi-ja/povrsinske/pov_stanica.php?hm_id=42010	http://www.hidmet.gov.rs/eng/meteorologi-ja/stanica_moss.php?moss_id=13167	yes excel
Slovakia	no	-	-	yes excel
Slovenia	yes	http://gis.arso.gov.si/geoportal/catalog/main/home.page http://www.arso.gov.si/vode/podatki/arhiv/hidroloski_arhiv.html	http://gis.arso.gov.si/geoportal/catalog/main/home.page http://www.meteo.si/met/en/app/web-met/#webmet==8Sdwx2bhR2cv0WZ0V2bvEGcw9ydlJWblR3LwVnaz9SYtVmYh9iclFGbt9SaulGdugXbsx3cs9mdl5WahxXYyNGapZXZ8tHZv1WYp5mOnMHbvZXZulWYnwCchJXYtVGdlJnOn0UQQdSf;	yes
Ukraine	no	-	-	yes, excel

Meta data is not in all countries available online via a web-interface. All of the countries can make meta data of the stations available electronically.

6 Summary

One main result from the questionnaire and the technical information forms is that for data exchange of real time data in the DAREFFORT project and for future DanubeHIS there will be mainly two main types of data delivery: FTP-server or Web-API.

In most countries data delivery methods which already exist for hydrological and meteorological real time data can be used, these are Austria, Croatia, Germany, Hungary, Moldova, Serbia, Slovakia, and Slovenia. In case of Austria there is an existing Web-API by which water-level can be retrieved. This Web-API will be enhanced to retrieve additional hydrological and meteorological parameters. In other countries appropriate data exchange formats will be defined, these are Bulgaria (probably FTP), Czech Republic (Water ML 2.0), Romania (FTP), and Ukraine (FTP or API).

In all countries the hydrological parameters **water level and discharge** can be / will be delivered using the foreseen data exchange interface. Water temperature can be delivered by all countries except Bulgaria.

Only the meteorological parameter (**precipitation)** can be delivered in all countries using the foreseen data exchange interface at the moment, which meets the draft specifications of minimal set of meteorological data foreseen to be exchanged in future DanubeHIS. Additionally, there could be a possibility to also exchange air temperature in the future because only Austria and Bulgaria do not foresee to provide this information at the moment.

Ice data is provided very heterogonous level at the moment. Also grid data is not available in each country.

Meta data is electronically available in all countries. If there is no Web-API for transferring meta data it is recommended to provide meta data of hydrological and meteorological stations via csv-files.

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