



NGDI-Schlussbericht

Dieses Projekt ist durch den Bund mit zweckgebundenen NGDI-Finanzmitteln unterstützt worden.

Ce projet a été soutenu par la Confédération avec des moyens dédiés à l'INDG.

Dokumenten- und Versandinformation

Verfasser ! Auteur

Verfasser (Name, Vorname) Auteur (nom, prénom)	Firma / Organisation entreprise / organisation	Datum date	Bemerkungen commentaires
Burckhardt Stefan	QGIS Schweiz, Subgruppe QGEP	4.9.2021	

Review durch Projektkoordinator ! Review par le coordinateur du projet

Datum date	Bemerkungen commentaires
07.10.2021	keine

Versand an Steuerungsorgan ! Envoi à l'organe de direction

Die Termine für den Versand an das Steuerungsorgan sind dem Vertrag zu entnehmen.

Les dates d'envoi à l'organe de pilotage sont précisées dans le contrat.

Absender (Mailadresse des Antragsstellers) Expéditeur (adresse courriel du demandeur)	Adressat Destinataire	Cc (Mailadresse des Projektkoordinators) Cc (adresse courriel du coordinateur du projet)	Datum date
Stefan.burckhardt@sjib.ch	ngdi@swisstopo.ch	tools@geostandards.ch	5.10.2021

Stammdaten des Projektes ! Données de base du projet

Nr. NGDI N° INDG	20-18
Titel Titre	« Échange de données sur les modèles standard de CH pour l'eau, les eaux usées et les PGEE comme base pour la conservation de la valeur des données sur les infrastructures »
Antragsteller (Organisation) Demandeur (organisation)	QGIS Schweiz, Subgruppe QGEP
Antragsteller (verantwortliche Person) Demandeur (personne responsable)	Stefan Burckhardt
Projektpartner (Organisation) Partenaire de projet (organisation)	Ville de Pully, Direction des travaux et des services industriels
Projektleiter Responsable de projet	Stefan Burckhardt
Projektkoordinator (PROK) Coordinateur de projet (PROK)	Stefan Henrich
Projektkoordinator Stellvertreter (PROK Stv.) Coordinateur de projet remplaçant (PROK rmp)	
Kontaktperson KOGIS (RVP) Personne de contact COSIG (RVP)	Rolf Zürcher
Vertragssumme inkl. MWST Montant contractuel avec TVA	43'080 CHF
Vertragsende Fin du contrat	31.10.2021

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1 Management Summary

Bereich	Status	Remarks / Bemerkung
Gesamtbeurteilung		
Termine		The project can be completed on schedule
Kosten		The project can be completed within budget
Ergebnisse		The planned tool for INTERLIS import and export for qgep (VSA-KEK) and qwat (SIA405 water) has been developed and tested and also supports the selection of data.
Projektziele		The project goals have been achieved for the most part and a tool for INTERLIS import and export has been developed, which can also serve as a basis for other data models (entire VSA-DSS, not only SIA405 wastewater). The configuration of the INTERLIS import for qwat could not be completed, because the qwat data model must first be adapted and the ambiguities in sia405 water must be clarified with the SVGW.
NGDI-Ziele		Through the integration of ModelBaker / ili2pg, the practical test could also be tested for hierarchically structured INTERLIS models and EXTERNAL references and necessary adjustments could be identified and initiated.
Legende:	Grün: Gelb: Rot:	gut / auf Kurs, (un)genügend / problematisch / ev. Massnahmen nötig schlecht / Massnahmen nötig

Weitere Informationen

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2 Wesentliche Kennzahlen

Bisher gestellte Rechnungen + geleistete, aber noch nicht in Rechnung gestellte Arbeiten [in CHF, inkl. MWST] (1)	CHF 43'080
Vertragssumme [in CHF, inkl. MWST] (2)	CHF 43'080
Offenes Budget CHF = (2) - (1) (3)	CHF 0
Offenes Budget in % = (3) / (2)	0 %
Geschätzter Arbeitsstand [in %]	100%
Bemerkung	Letzte Rechnungsstellung folgt mit Rechnung per Ende August 2021

3 Vorgehen

Concept

The concept was developed in cooperation with the two subgroups QGEP and qwat.

The main goal was to create user-friendly interfaces for INTERLIS-based data exchange with the respective specialist systems. For this, the focus was on creating a solid technical basis, Evaluation INTERLIS Tools

For the transformation of the subject database to INTERLIS different approaches were evaluated. Especially the two options a) to write and read xtf directly or b) to use ili2pg were discussed. The decision in favor of ili2pg was made due to the already large distribution in the INTERLIS environment, the active development and the resulting strengthening of an important tool of the Swiss spatial data infrastructure. In contrast, the additional complexity of the installation (java), the reduced flexibility through the use of an off-the-shelf product and the dependency on external parties in case of problems were rated as less important.

Evaluation Implementation Model Mapping

For the conversion of data between the ili2pg database (INTERLIS-related) and QGEP/qwat database (specialist system), the approaches SQL and Python were evaluated. Finally, a Python-based approach (SQLAlchemy ORM) was implemented. In particular, the maintainability of the code was found to be more important than the continued use of an existing prototype written in SQL. In addition, there are also further advantages due to a simplified integration in the interactive user guidance.

Development

During development, the first step was to develop the interface from QGEP (of the sewer network data), since here the underlying domain model was already close to the INTERLIS model. This allowed to validate the basic implementation without having to include additional complexity on data model level.

In a second step, the import of VSA-KEK data was tackled. In the process, ambiguities have become apparent on various sides. 1) Since this format is not yet widely used in practice, new reference data sets were developed for it. 2) External references are only implemented to a limited extent in ili2pg. Corresponding issues were created 3) On subject model level the cardinality of relations was not finalized yet.

Considering these circumstances, an import interface and associated user interface could be developed, which allows to import VSA-KEK data.

The last subproject to be started was qwat. The first step was to analyze the closeness of the business model to the INTERLIS model. It was determined that only a part of the data model can be represented with the current models. Based on this, suggestions for adaptations of the INTERLIS as well as the specialized model were formulated. An interface for data export was developed, which allows valid data to be exported as xtf and could serve as a basis for migration in the event of a future adaptation of the specialist model.

Testing

During an intensive testing phase, the tools were validated and various bugs were fixed.

The following members of QGEP tested the implemented functionalities: Pully, SIGE (data from French-speaking Switzerland), Holinger Thun, Fischer Ingenieure AG (data from German-speaking Switzerland).

Translation

Translation

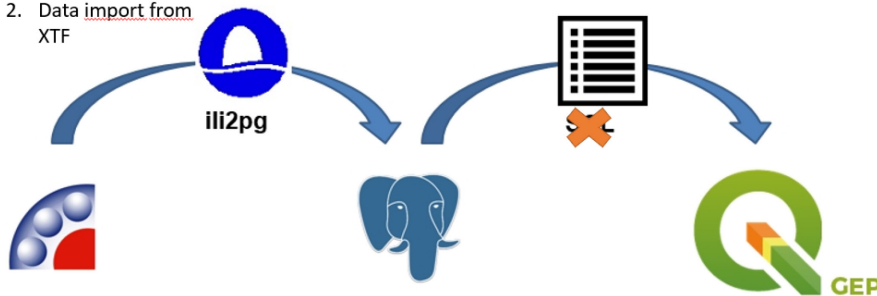
Export also to French is prepared and will be available as soon as ili2db release 4.5.1 is integrated into ModelBaker.¹

4 Results

INTERLIS Import:

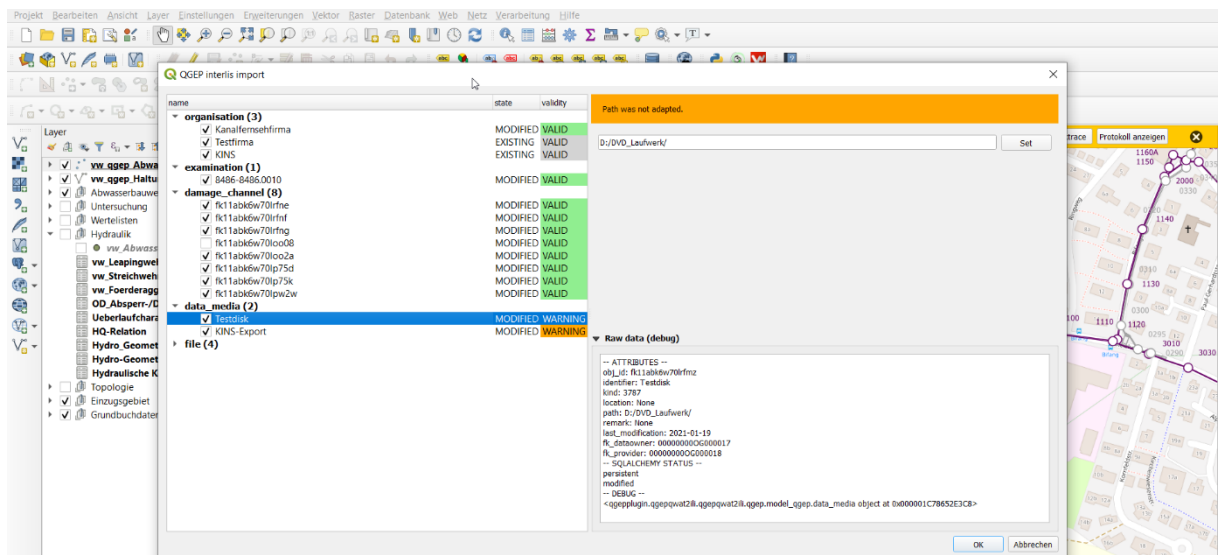
1. Schema creation
2. Data import from
XTF

3. Model matching and data import



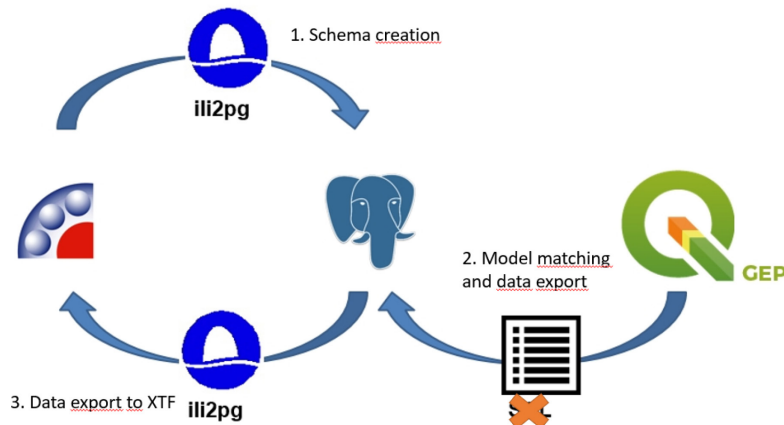
Import works as follows:

1. Schema creation with ili2pg
2. Data import into newly created postgres schema and check of selected xtf
3. Semi automated model matching and data import into QGEP – user interface to visualize and fix matching errors.



INTERLIS Export:

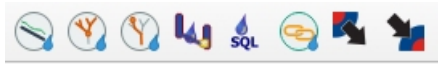
¹ As per <https://github.com/claeis/ili2db/issues/405> it should be fixed in 4.5.1, but it's not released yet : <https://downloads.interlis.ch/ili2pg/>



Export works as follows:

1. Schema creation with ili2pg
2. Model matching and data export from QGEP/qwat – user interface to select only part of the network
3. Data export to the selected INTERLIS data model. Validity check with ilivalicator.

The export / import logic is implemented as a dedicated Python library ([qgepqwat2ili](#)). This library offers a command line mode and can be integrated into a user interface. For QGEP, this has been integrated into the QGEP plugin with two additional buttons. Currently the user selects the media (qgep or qwat) and the models (VSA_KEK_2019_LV95 for qgep and SIA405_Wasser_2015_LV95 for qwat are configured to be used for these selections)



The code and the library can be found on github: <https://github.com/QGEP/qgepqwat2ili>

The QGEP plugin is available in the QGIS repository

(<https://plugins.qgis.org/plugins/qgepplugin/>). Code and documentation can also be found on github: <https://github.com/QGEP/qgepplugin>

A short user manual is published and maintained in the [QGEP documentation](#) (Admin guide)

The decision to use ili2pg created dependencies that led to delays in the meantime. At the same time, however, they made it possible to test this tool, which was co-financed from NGDI funds, with two very comprehensive professional models of the two professional associations. Thus, all INTERLIS model constructs used in the professional media of sia405 (inheritance, base models, EXTERNAL references as well as the language translations) have been tested.

5 Milestones

Meilenstein (Beschreibung)	Datum	
	geplant	erreicht
Signature contract – start of project	1.8.20	1.9.20
1st intermediate report to NGDI (Stefan)	31.12.20	31.12.20
VSA-KEK INTERLIS import/export interface first release and demo	28.2.21	19.3.21
2nd intermediate report to NGDI (Stefan)	31.4.21	31.4.21
SIA 405 water INTERLIS import/export interface release (and demo)	31.3.21	31.6.21
Users tests in customers' spatial data infrastructures	31.5.21	31.8.21
Corrections and bug fixing	1.6.21	31.8.21
Interfaces SIA 405 for QWAT and VSA-KEK for QGEP are	31.8.21	31.8.21

operational and documented.		
Final report to NGDI	31.8.21	31.9.21

6 Risks / Problems

Risiko / Problem	Vorschlag / Empfehlung für Massnahme/n zur Risikominderung / Problemlösung
Qwat data model and data model SIA405 water do not match in all areas	Implementing INTERLIS export for SIA405 water only. Suggestions to adjust the qwat data model for a better fit in future.
Hydraulic part of SIA405 water data model has conceptual errors in INTERLIS	Feedback to SVWG as model owner²
EXTERNAL references in INTERLIS models – not yet supported in ili2db	Issue raised and documented: https://github.com/claeis/ili2db/issues/283

7 Outlook

Through this project, important interfaces for QGEP (import / export) and qwat (export) could be developed. Due to the conceptually identical structure, synergies could be created, which can also be used for further planned interfaces (VSA-DSS). The technical choice of encapsulation in a separate Python library (qgepqwat2ili) allows the interface to be used in qwat as well as in QGEP. The additional option of command line mode also allows the interface to be integrated into automated processes (e.g. weekly export). The intensive examination of the data models of qwat and QGEP and the associated specialist models sia405 Water and VSA-KEK have shown that the further away the specialist models are from the standard model, the matching effort for the development of an interface increases massively. Therefore, the data import from SIA405 Water to qwat could not be completed. However, the project has analyzed the differences in detail and serves as a basis for the future planned adaptations of qwat. The need and urgency for this are given and shown and will be presented to the steering committee of qwat at the next meeting. These are in particular the change of the ID to the STANDARDOID (as in qgep), the harmonization of attributes according to SIA405 Water and the clarification of conceptual differences (valves <-> shut-off valve on pipe or as pipe node), so that no data loss occurs even when re-exporting data. As soon as the differences are clarified, the import can also be configured in the existing framework.

In a next project, the selection of import / export models could also be extended and, for example, data according to VSA-DSS could also be supported.

² Proposed correction SIA405 Water

https://docs.google.com/document/d/19Q5Yp1_waByTJYbt3FPtfgkYnVfdRRrfG1e21VDrMRM/edit?usp=sharing