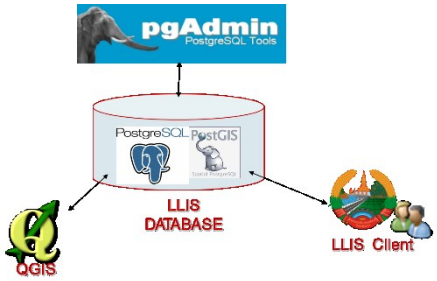
LaoLandReg – Digital Cadaster Database Management System

What is LaoLandReg?

The LaoLandReg (LLReg) is a digital cadaster database management system for importing, processing and maintaining cadaster information (geometry and textual data). It has the potential for a modular extension to a land information system comprising additional land related information such as land use, land value and land development. The LLReg comprises of a backend database for data keeping and a front-end client (LaoLandReg) for data entry, process monitoring and the generation of outputs such as land titles, reports and survey certificates. Furthermore, the system can be connected to a GIS interface (QGIS). Quality control, data editing, data imports, composing of maps and interfaces to other databases systems are handled through QGIS.



The front-end client has modules for first registration and subsequent registration. The system can manage changes on the land parcel`s geometry like subdivision, consolidation or boundary reestablishment. LLReg is a product developed under the scope of bilateral development cooperation in succession of three land management programs implemented by GIZ and financed by the BMZ (German Ministry for Economic Cooperation and Development). The first version was developed back in 2009 by the German consulting GCI - Dr. Schindler. It had a database with a basic front-end client to capture cadaster information from systematic land registration in rural pilot districts. The database and the front-end client have been gradually extended and improved from version 2.0 to version 6.34 according to functional specifications written by the Department of Land (DoL). Until now around 250,000 EUR (2009 - 2019) have been spend on the development of the system. Currently the source code is undergoing some restructuring and new features will be integrated to utilize LaoLandReg for all registration processes as well as to handle service charges and registration fees within the system. This development is conducted by a local IT consulting. It is expected that a stable version can be introduced to the land offices countrywide by the end of 2019.

How does LLReg comply with global trends in land administration?

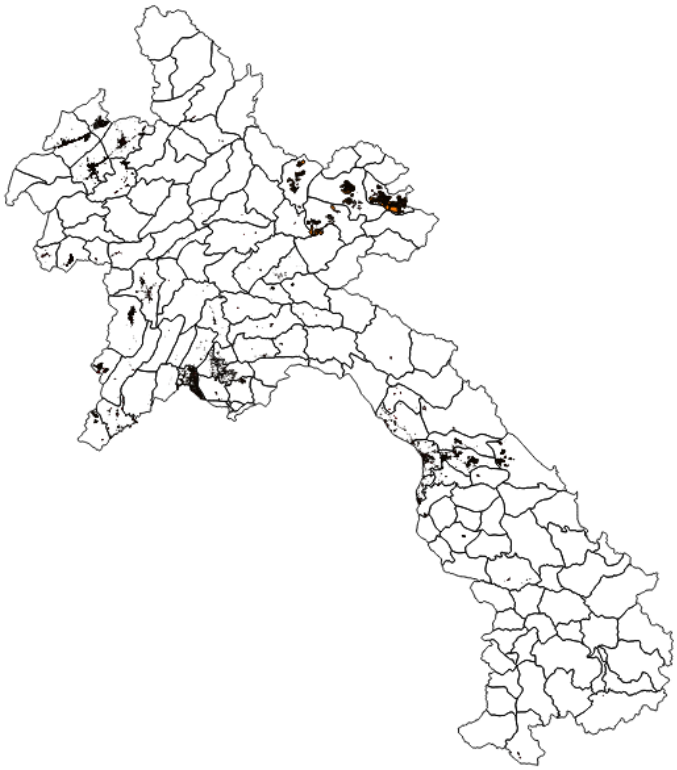
The system follows the principles of a modern cadaster stated by the FIG (International Federation of Surveyors). LLReg comprises the 7 success factors for a modern digital cadaster formulated by the FIG[1]. To meet these criteria completely, extensions and improvements to the existing system have been specified and are currently under development scheduled to be finalized by the end of 2019.

a) **Security** through duplicate storage of records in case of disaster and controls are provided through storage of cadaster records at district, province and national level. Scanned supporting documents are

[1] http://www.fig.net/resources/publications/figpub/pub11/figpub11.asp

linked to the cadaster records and stored digitally. A barcode provides additional security for validity of land title and register form.
b) **Clarity and Simplicity** through a database model which generally follows the ISO 19151 Geographic Information - Land Administration Domain Model
c) **Timeliness** of provision of up-to-date and complete information is provided as only one system is used countrywide which is able to deal with all kinds of land registration processes to keep the cadaster database up to date.
d) **Fairness** is kept through equitable access to the system for applicants at decentral level in rural districts as well as in urban centers.
e) **Accessibility** is provided to all authorized user at different levels. Linkages to other modules in a modern land administration system is provided through a GIS interface which allows the overlay, visualization and analysis of spatial data from other database management systems such as the Land Use Information System (LUIS) or the State Land Lease Concession database.
f) **Costs** are reduced by using almost solely open source software and by bundling resources for development, maintenance and dissemination of one system countrywide.
g**) Sustainability** is targeted through intensive capacity development within DoL and the decentral agencies on system maintenance, administration, documentation & through the establishment of a trainer and backstopper team for the operational level. The system development follows the specific needs of the Lao land administration by providing front-end clients which are customized to the needs and capacities of local land officers.

Where is LLReg used and how much cadaster data is currently being managed?



In 2017 HE Minister Somath Polsena approved LLReg to become the official land registration database management system for the whole country. The system has been introduced and trained to all 18 provinces in the country for first registration and to 12 provinces for subsequent registration. 135 out of 148 districts are using the system. Currently there are 125,000 cadastral records stored and managed in LLReg out of a total of estimated 1,260,000 land records. Another 450,000 textual land records have been migrated from digital predecessor database management systems to LLReg. The integration of the geometry of existing cadastral parcels is an ongoing process as the quality needs to be assessed first to be able to decide whether a migration of the data to LLReg takes place or if reestablishment of the cadaster

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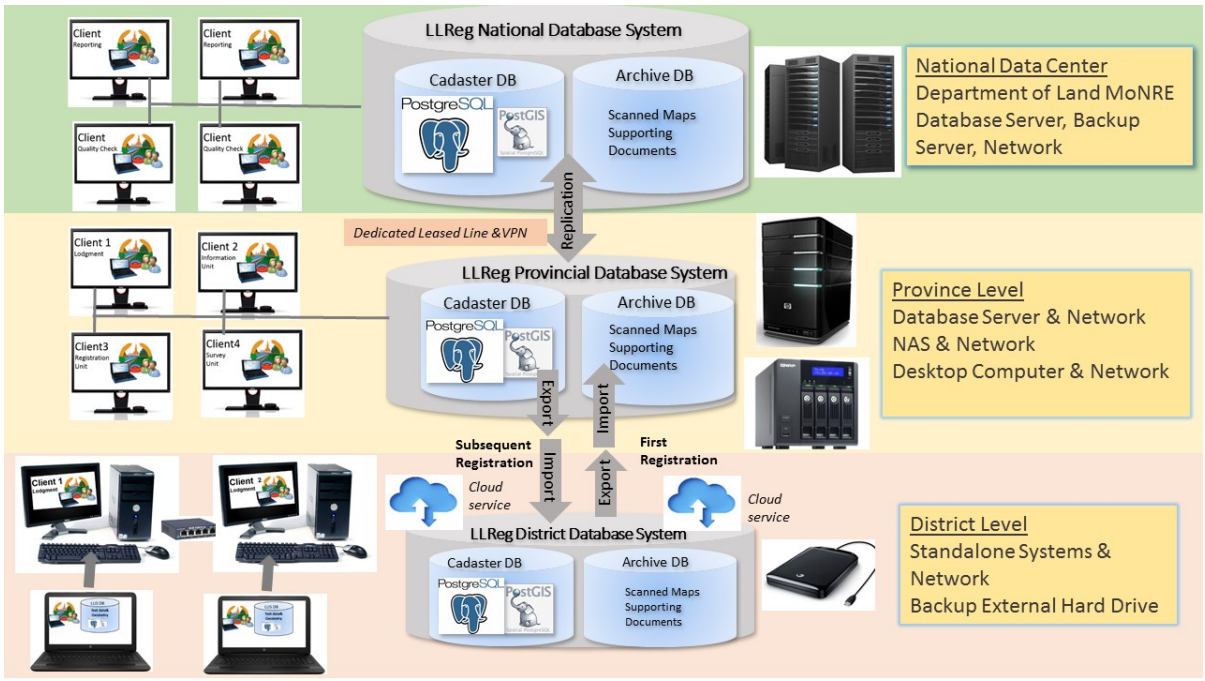
through resurvey is the better option. The necessary work procedures for migration of the existing digital cadaster have been developed, tested and trained to teams from the DoL by GIZ.

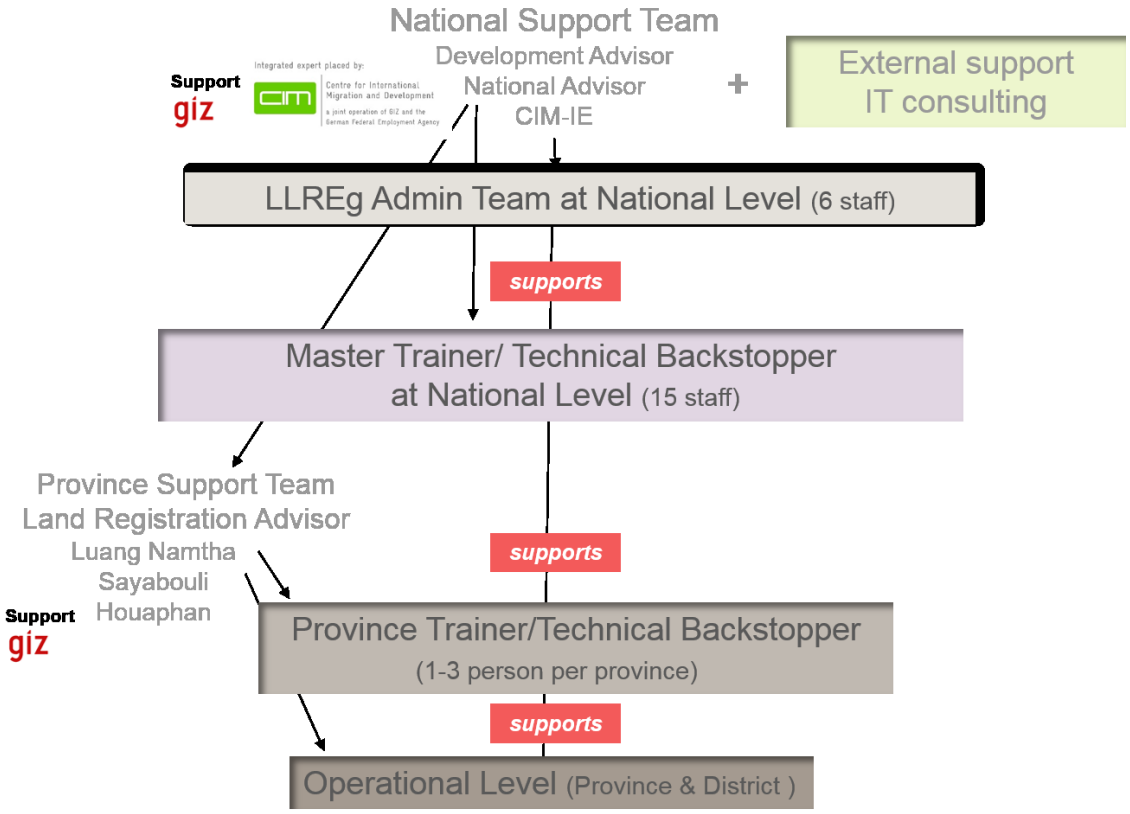
How is the decentral cadaster data integrated to a national database?

LLReg is a system primarily used for land registration at district and province level. As the internet infrastructure isn`t widely available and the client users need to access and update the system frequently, the databases are deployed at the administrative level where the registration tasks are conducted. In terms of first registration it is the district level and for subsequent registration still mainly the province level. However, the complete system of land registration service deliveries is currently under revision. The access to front-end services for the public shall be improved through digitalization and transferring more competencies to the district level. The handling of the digital processing, storage and production of outputs in back-end centers shall be streamlined in digital processes with high security standards by trained personal. The overall goal will be to provide all necessary land registration services in a transparent and timely way. The LLReg system at district level currently works as a standalone system, meaning the front-end client and the backend database are installed in one computer or in a local network where multiple client computers are connected to one database. The cadaster data from the district system is exported in compressed xml format and can be send to the province by a web-based data platform. In all provinces supported by GIZ this is done via QNAP and a linked cloud service (my qnapcloud). The district cadaster data goes through a quality assessment before it can be transferred to the compiled province database. At national level all data is managed in a data center with database server with a redundant backup system. In three selected pilot provinces smaller data centers are currently established. The provision of an adequate IT hardware infrastructure for LLReg contributes to higher data security, better data storage and backup and eases the synchronization of cadaster data between province and national level through replication routines as well as database maintenance through automatized updates. This BMZ funded pilot project is running from 2017 until the end of 2019 with an overall volume of around 200,000 EUR. The experiences of this pilot activities will be used to develop a plan for countrywide expansion of IT hardware infrastructure for cadaster data management. Beside the cadaster data all supporting documents need to be digitized to be stored in an archive database which is linked to the LLReg system.



Who is managing LLReg?

At national level there is a team of six appointed staff (LLReg admin team) who take care of database maintenance and management. They train a team of around 15 national trainers on LLReg database and client handling for first & subsequent registration, quality control and database cleaning as well as data migration from the predecessor systems to LLReg. The national trainers coach implementers at Province and District level on systematic & subsequent land registration, data migration of cadaster data, quality control and cleaning tasks as well as on data security, user management and digital data management. A GIZ advisor team at national level including a CIM-IE helped to set up the LLReg management structure which includes the formulation of work tasks, writing of manuals, documentations and work instructions, the development of training curricula and facilitation between the LLReg Admin Team and the external IT support on programming tasks and technical specifications. Land registration advisor placed in Luang Namtha, Xaignabouly & Houaphan province help to solidify work processes through regular coaching and refresher trainings for practitioners at district and province level.



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