Data acquisition system of the Széchenyi István Geophysical Observatory

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Abstract

The Széchenyi István Geophysical Observatory (IAGA code: NCK) has been established in 1957 within the International Geophysical Year [1]. Ever since its foundation it supplies essential data in different fields of geophysics. During this long historical period the data collection techniques, the instrumental background and the available software packages has been changed dramatically which forced us to reconsider completely our former ways of organizing and serving this large amount of data.

Introduction

The primary goal of the observatory is to study the magnetic end electric field of the Earth. One of the greatest value of the data collected in the observatory during the past 57 years is its continuity and its good quality. This collection of geomagnetic and geoelectric data is unique within Europe. It is well known, that for studying long term geophysical processes (e. g. Sun cycles, magnetic pole wandering) it is necessary to have these kind of long time series.

Discussion

Besides fundamental research, serving data to our clients (researchers of other institutes, governmental bodies, disaster management, international databases) is an important obligation of our institute. As information technology develops, the requirements towards our data service are rising accordingly. Although transforming the analogue historical measurements into digital ones has been gradually started some decades ago, efforts to bring together all the different kind of digital data sources into a platform which provides unified data access to the users of our data products has been started to make only during the past few years.

Figure 1 depicts a simplified diagram of the multilayer approach we follow in our service. The system gets more and more compact as we move from the bottom layer to the top layer. We have full control over all layers, but our end users communicate only with the top layer. In the past few years we have made major improvements on all layers of the system. This work includes upgrading sensors,

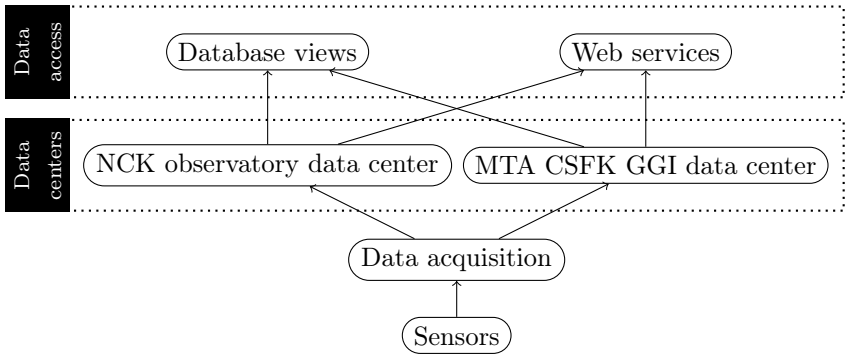

Figure 1: *Simplified data acquisition and data service diagram associated to present days' measurements in Nagycenk Observatory*

data acquisition devices; improving the interconnectibility of our computers in the observatory; improving the connection between our institute and the observatory; writing scripts for automatic data conversion and data forwarding; designing database structures and building web services.

Conclusions

As the number of different types of measurements and the size of the data they produce increases explosively, accessing a certain slice of this data gets more and more difficult without a unified platform. We briefly summarized the actions we have taken towards building such a platform. This opens the door towards a "big data" approach in our data processing schemes, making it possible to analyze our database as a whole rather than analyzing it data source by data source. Or system is a work-in-progress and there is a clear need for fine-tuning it further.

Acknowledgements

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References

[1] Bencze, P. 2001. The beginnings and the IGY. Geophysical Observatory Reports of the Geodetic and Geophysical Research Institute of the Hungarian Academy of Sciences (year 1994-1998), 9-23.