An environment knowledge management web system

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We present the first results gathered in the course of development of an innovative knowledge management system towards an environmentally sustainable society. This system should allow the integration of heterogeneous data sources related to environment state (mainly meteorology and climatology data) independently of geographical location and organizational ownership of data. Its core functions include efficient processing, storage, retrieval and visualization of regional environmental data over the Internet. It is expected to collect enough data volumes and computation models not only to monitor the current climate parameters, but also to assess potential effects of the global climate change on the regional environment. For the user the system will be available as large-scale scientific web portal dedicated to the domains of distributed meteorological measurements and regional climate assessment. Two regions are targeted within this project – Siberia and Central Asia.

As of now, basic research on the design and implementation of the system has been performed, aimed at elaborating the system architecture as data grid [1] – large-scale distributed database surrounded by a number of grid services capable to compute derivative data interesting for different subject area stakeholders. To evaluate this architecture, sample web-service based technological infrastructure allowing computing basic physical characteristics of atmosphere aerosol has been implemented. In order to achieve full functionality and scalability, it is planned to port it to Globus Toolkit 4.0 [2]. Prototype of the powerful user interface is designed that allows for convenient data input, examining and processing via web-accessible portal equipped with GIS tools for environmental data visualization. Consistent knowledge structures, namely data schemas and ontologies in the meteorology and climatology domains, are under construction. The kernel of the system will be deployed in Tomsk, Siberia and Novosibirsk, Siberia. It will be mirrored and adopted for local specifics at Tashkent, Central Asia.

Ultimately we plan to produce the following Deliverables:
- overall system architecture;
- implementation of computing Grid services;
- distributed database;
- project web portal.

These materials should be of significant interest for professional research community. We expect them to form a solid basis for socio-economical prognoses regarding the territories covered by collected data and for elaboration of practical recommendations addressed to regional and national decision makers.

REFERENCES

1. Kunszt P., Guy L. The Open Grid Services Architecture, and Data Grids // Grid Computing: Making the Global Infrastructure a Reality. New York: Wiley & Sons, 2003.
2. Status and Plans for the Globus Toolkit 4.0 (GT4). http://www-unix.globus.org/toolkit/docs/development/4.0-drafts/GT4Facts/index.html.