A DYNAMIC GRID WORKFLOW FOR REMOTE SENSING QUANTITATIVE RETRIEVAL SERVICE

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ABSTRACT

Remote sensing quantitative retrieval is a complex computing process due to the terabytes or petabytes of data processed and the tight-coupling remote sensing algorithms. The tremendous computing requirement of the algorithms and the high costs of high-performance supercomputers drive us to hunt for share of computing resources. Grid computing provides us a virtual environment with uniform access to resources existing in internet. Grid software packages, such as Globus, Legion, Ninf, Condor, Unicore, EcoGrid etc., solve the issues of decentralized control, resource scheduling, security, quality of service,and so on. They enable users to utilize the services to access resources. Many domains: astronomy, geology, high-energy physics and bioinformatics so on, have had successful stories in Grid computing by integrating large-scale, distributed and heterogeneous resources[1-3]. Grid computing is not yet mature. For example, computer-to-computer traffic is a bottleneck of network communication for enormous amount of data. The tight-coupling remote sensing algorithms, which need to be scheduled according to the logic order, can't be scheduled randomly by Grid platform. Therefore, we need a tool which can use interactive graphical editors to present the executing relationships of algorithms on human-friendly diagrams and to generate automatically the corresponding submitted description files of grid platform.

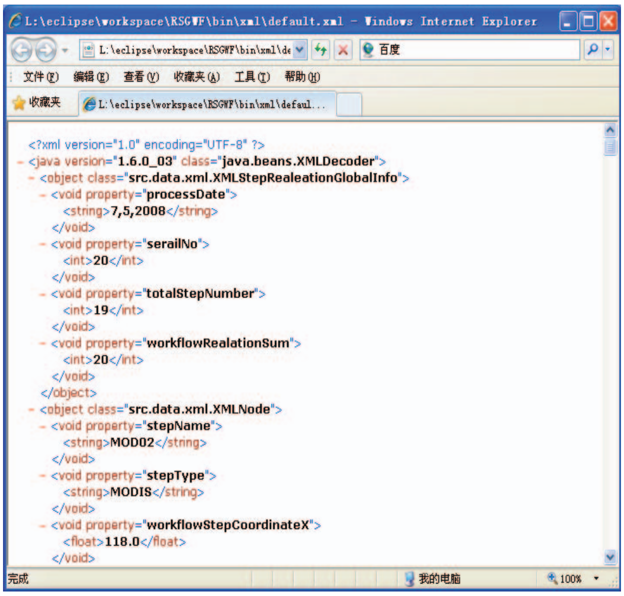
Fortunately, workflow technologies make it possible. Using workflow technology, we can construct a remote sensing information processing environment to integrate the distributed data and computational resources. Although Workflow Management Coalition gives many standards for business workflows being used, it is very hard to draw up a single standard, because almost all workflow and business process management systems have their own modelling methodology and system[4,5].

In order to access the distributed and heterogeneous resources and services, it is necessary to design a remote-sensing-oriented Grid workflow GUI for many users who are not only short of the technical expertise to use the existing Grid workflow components, but also have not specific knowledge of the remotely sensed data processing methods.

In this paper, we use a interactive GUI to represent the processed steps of remote sensing algorithms and their relations including concurrence/synchronism and executed order. To exchange workflow files, we use XML format to record the user's workflows. According to the criterions of Grid platform, we transform the XML format of workflows into the corresponding submitted description files of grid

platform.

Our ongoing research have finished the interactive GUI of remote sensing algorithm description, used XML to record the user's describe information of workflow (see Figure1), and accomplished the scheduled of algorithms of remote sensing according workflow mechanism (see Figure2). The next work is to build a Grid workflow platform suitable for remote sensing quantitative retrieval services.



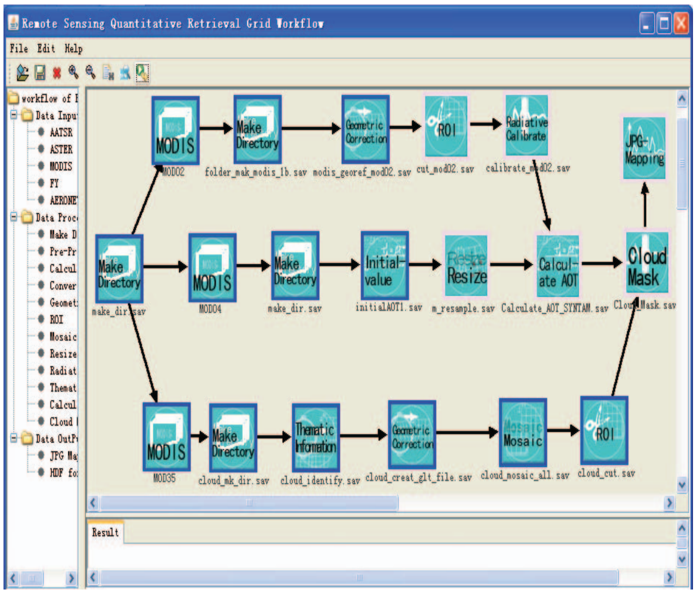


Figure 1. A case of workflow xml format

Figure 2. A case of workflow scheduled

Key words: Remote Sensing; Quantitative Retrieval Services; Grid Computing; Workflow

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