

The Realization of GRAPES Model on the China Meteorological Application Grid Environment

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Based on the GRAPES (Global/Regional Assimilation and PrEdiction System) and grid technique, the China Meteorological Application Grid (CMAG) has been established. It mainly consists of CMAG portal, GridWeather user interface system, source code management system (CVSexplorer), GRAPES assimilation and prediction system, and visualization system, etc. GRAPES was a unified model system which developed by CAMS both for global and regional weather prediction applications.

And CMAG portal includes Resource Access Portal (RAP), NWP Products Browse Portal (PAP) and Remote Collaborative Portal (RCP). RAP provides an approach to access geographically distributed computing resources. PAP disseminates NWP services to the public and professional clients. While RCP offers a universal platform for scientists to develop NWP modules, to share source codes, to register modules within the grid and to perform NWP experiments.

Authenticated users can modify the GRAPES workflow, the forecast domain, time step, dynamical scheme, physical parameterization schemes according to his requirements via GridWeather interface.

A grid platform has been established, computing resources such as SunWay cluster 48I and Oscar cluster 32 at CAMS, SunWay 32I and 32P at NMIC, Dawning cluster at Guangzhou Regional Meteorological Center and Guangxi Meteorological Bureau, Ocean cluster at Shanghai Typhoon Institute and Dawning 4000A at Shanghai

Super-computing Center have been aggregated. GRAPES system is running everyday within this platform.

With the implementation of CMAG into the existed operational NWP system and research environment, substantial benefits can be achieved, for example, it can aggregate the geographically distributed computing resources and give end users remote access to the computing, data and storage resources they need, can establish a virtual research center and a uniform platform to make good use of expertise to develop the new NWP system, can accelerate the procedure from research to operation and can help the under-developing regions to establish the NWP system.

The realization of CAMG provides a remote collaborative research environment for the geographical distributed scientists to make contributions to the development of the GRAPES.

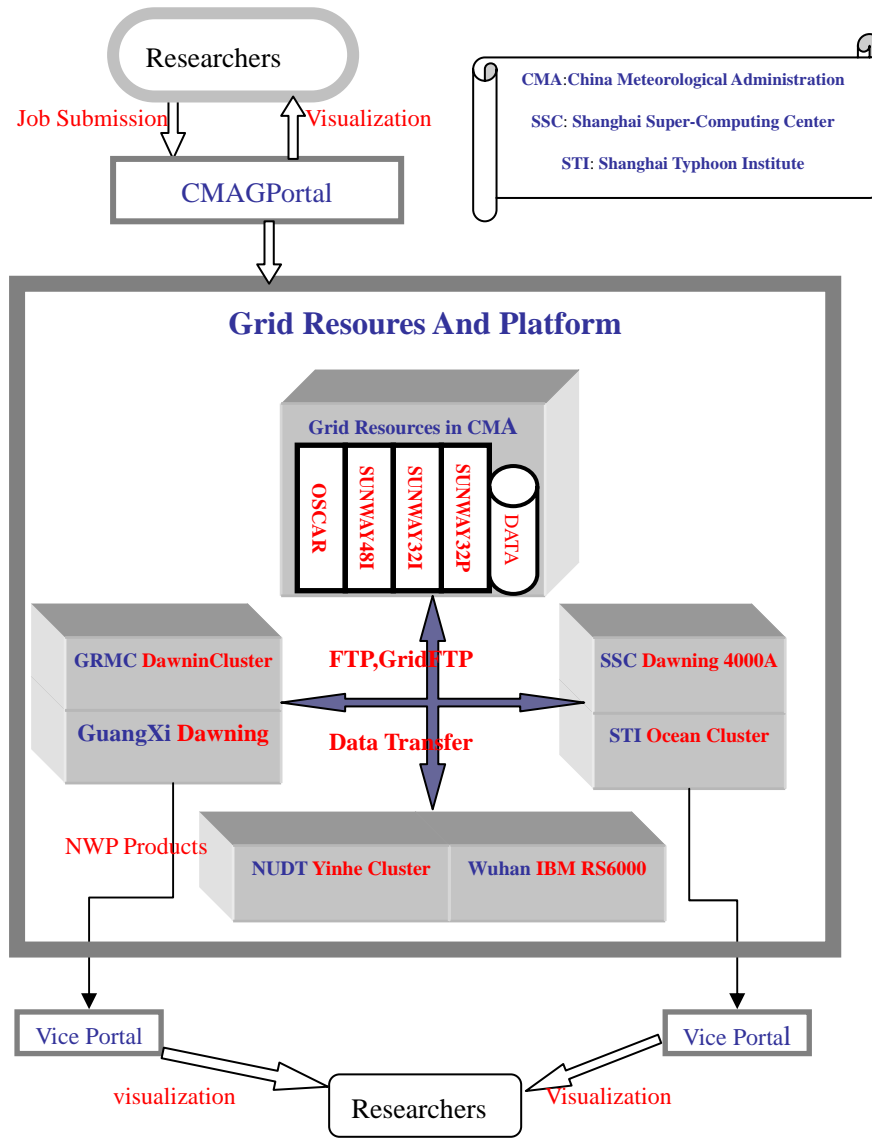


Fig. 1 Flowchart of Remote Collaborative Portal

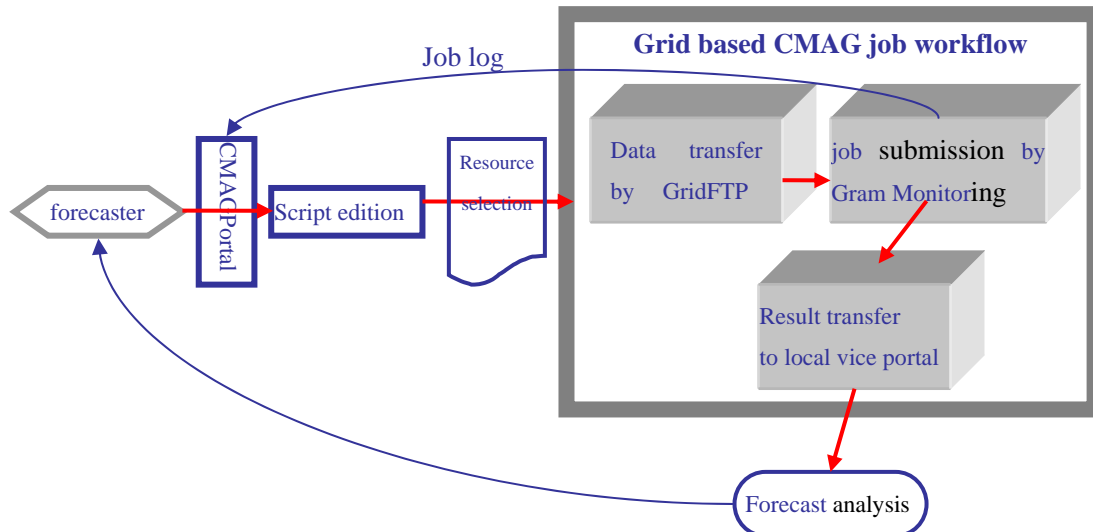


Fig. 2 Flowchart of operational GRAPES model system running on the CMAG environment

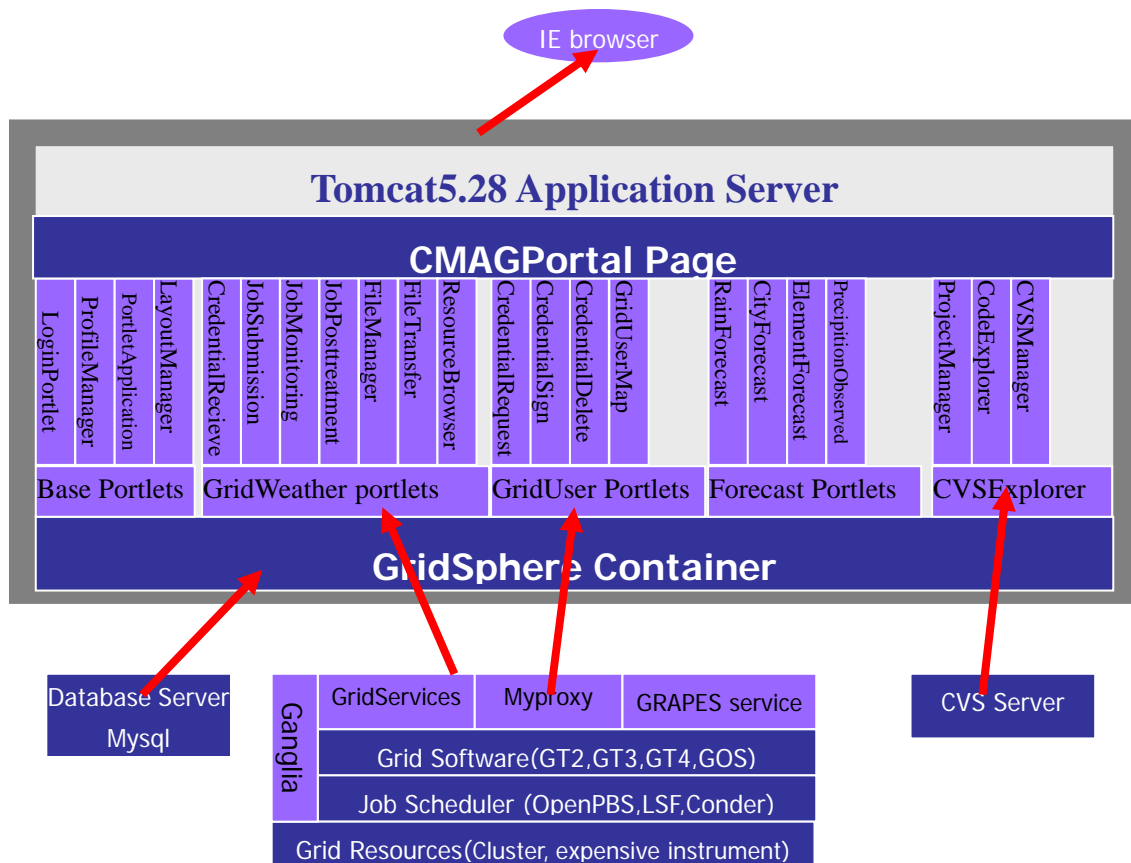


Fig 3 Framework of CMAG

Computing resources	Location	Grid Software installed	Security	NWP software installed	Job scheduling
Oscar	CAMS	GT4	CMA CA Center	GRAPES	OpenPBS
Sunway48I	CAMS	GT4	CMA CA distributed package	GRAPES	OpenPBS
Sunway32I	NMIC	GT4	CMA CA distributed package	GRAPES	OpenPBS
Sunway32P	NMIC	GT4	CMA CA distributed package	GRAPES	OpenPBS
Ocean	STI	GT4	CMA CA distributed package	GRAPES	OpenPBS
Dawning	GRMC	GT4	CMA CA distributed package	GRAPES	OpenPBS
Dawning	GXMB	GT4	CMA CA distributed package	GRAPES	OpenPBS
PC	WHSI	GT4	CMA CA distributed package	GRAPES	No
Dawning4000A	SSC	GT3	SSC CA distributed package	GRAPES	LSF

Table 1 Computing platform on CMAG