A Early Warning System Based On Grid Infrastructure

L. Mossucca (1), O. Terzo (1), P. Ruiu (1), A. Albanese (2), R. Vigna (2), and N.P. Premachandra (2)

(1) Istituto Superiore Mario Boella(ISMB), Torino, Italy (mossucca@ismb.it), (2) Politecnico di Torino, IT

The Early Warning System is developed by ITHACA (Information Technology for Humanitarian Assistance, Co-operation and Action) in collaboration with Istituto Superiore Mario Boella (ISMB), under a special request made by World Food Programme (WFP), the food aid branch of the United Nations, in order to increase efficacy in approaching emergency preparedness related to flood events. The system is conceived to give an alert in advance about the occurrence of heavy rainfalls around the world which can be used by WFP or other humanitarian assistance organizations to evaluate the event and understand the potentially floodable areas where their assistance is needed. The rainfall dataset used in this project is the Tropical Rainfall Measuring Mission (TRMM) Multisatellite Precipitation Analysis (TMPA). The expected amount of data received every day are approximately 2.5 million rainfall values, corresponding to 312000 values each three hours. The first requirement is related to the hydrological analysis in a time not exceeding three hours, since after this time the next values of rainfall are downloaded and prepared for a new analysis. This product is delivered in near real-time for monitoring the current rainfall condition over the world. Considering the great deal of data to process continuously, this contribution presents a flexible architecture based on Grid Computing technique in order to reduce the total processing time for the real time rainfall analysis. The Flood Grid Architecture is composed of 11 nodes: a master nodes and 10 worker nodes for the analysis. Each worker node is configured to run the hydrologic model, while the master node is configured to download data file from NASA Server and distribute these data to each node on the grid architecture. We want to focus the attention on the advantages of using a distributed architecture in terms of performances comparing the different processing time between a sequential approach on a single node and a parallel approach on a distributed architecture.