The Turkish State Meteorological Service

Providing Critical Data to Its Country with DATACORE™ Integrated Solutions

Key Facts

Organization:
Turkish State Meteorological Service

Location:
Turkey

Application:
Meteorology & Climatology

Introduction

Established in 1937, the Turkish State Meteorological Service (TSMS) is Turkey's official government bureau that is commissioned with producing the meteorological and climatological services for the entire country.

TSMS' mission is to provide accurate and trusted weather information to Turkish society. By doing so, it hopes to help its people, economy and government agencies optimize their decision-making based on actual weather and climatic expectations which contributes to the sustainable development of the country. This mission is achieved through monitoring, analyzing and predicting weather and climate, based on up-to-date applied research, international information exchanges and partnerships, which allow access to the latest knowledge and practices.

Numerical Weather Prediction

A vital part of TSMS is its Numerical Weather Prediction (NWP) Division, which is responsible for weather prediction and simulation using computers and state of the art weather simulation software. The NWP is the main user of TSMS' powerful computational systems, where key meteorological weather forecasting applications are running. Some of the weather forecasting codes used at NWP are WRF, MM5, and wave forecasting application METU-3. These codes are used by NWP on a 24/7 basis along with several other applications for different fields of weather forecasting. Other important responsibilities include in-house research and software development work that is focused on the further improvement of NWP models resulting in more accurate forecasting outputs.

Computing Infrastructure

The main servers TSMS uses for key computational intensive applications and underlying storage infrastructure are mostly from SGI®. The preferred architecture of computational servers is Symetric Multi Processing (SMP), where all cores have very fast access to the entire system's main memory and to all Input/Output devices. A key advantage of thoroughly implemented SMP servers for TSMS is their ability to provide very high performance for all types of workload combined with simple usage of all resources for all users, as well as very simple management and administration.

For this reason, in 2008, TSMS selected an SGI Altix® 4700 SMP server, with 512 Itanium processors and 1TB of shared memory. This has been TSMS' computational workhorse for the last 5 years. Additionally, several smaller SGI Altix 450 SMP servers were installed for less demanding applications, data assimilation and other functions. In 2012 the resources were extended with a new SGI UV™ 2000 SMP system.

Their New SGI UV 2000

During the year 2012, TSMS saw a necessity for increased performance of its computational resources to satisfy its

growing application resolution and research needs. TSMS wanted an architecture which consumed less power and occupied less space in the room infrastructure along with Open Source software support. TSMS, along with partner and integrator, DATACORE, evaluated a variety of SMP designs and solutions, and the SGI UV 2000 was chosen. This latest configuration includes:

- SGI UV 2000 with 16 compute blades
- 256 cores of Intel® Xeon® processor E5-4640 running at 2.4GHz
- 1TB of coherent shared memory
- SLES 11 operating system with SGI performance extensions
- Intel + GNU compilers

The system was delivered and installed in December 2012. Since early 2013, TSMS has used their SGI UV 2000 system to operate limited Area Weather and Marine Forecast Models (ALARO, AROME, WRF, and METU-3) on a 24/7 basis. They also use it for in-house research and development work.

Storage Infrastructure

There is also a high demand at TSMS to support the storage infrastructure for all of the data from forecast computations as well as the results from forecast simulations.

The storage infrastructure at TSMS for NWP was created as a high-performing shared file-system built on Storage Area Network (SAN) accessible to all computational and storage/backup servers. The key advantage of a shared file-system is that all servers can access a common file-system which results in no time loss for copying and no disk capacity wasted for copies. The importance of a SAN shared file-system is mainly its high storage throughput for all important servers combined with less strain on the Ethernet network from frequent file transfers.

In 2008, TSMS selected a storage solution based on SGI CXFS™ and underlying disk arrays of SGI InfiniteStorage™ 4600. CXFS provides no-compromise data sharing, enhanced workflow, and reduced costs in data-intensive environments. As a result, all servers see identical data on their local disks. Once a file is written (or modified) by any member of the CXFS pool, all other servers see the file immediately without copying or data transfers between servers. The performance of CXFS share file-system assures the smooth work of all servers and applications which use data inside the CXFS pool.

“We selected the SGI UV 2000 shared memory system for our weather forecasting because of its simplicity and flexibility to adopt any task which may occur. We have had a long term experience with SGI’s technology, and it has always provided value for what we do,” states Fatih Kocaman, Head of Numerical Weather Prediction Division, TSMS.

“Machine performance was triplicated under the scope of the project”, stated Hüseyin SASMAZ, Customer and Professional Services Manager at DATACORE, which has unveiled many successful projects in Turkey in cooperation with SGI.

About TSMS

The Turkish State Meteorological Service, (TSMS), was founded in 1937, and is the Turkish government bureau commissioned with producing the meteorological and climatic data for its country. Approximately 1000 people are employed at their headquarters, and another 2000 are located throughout different parts of the country. It is the only legal organization which provides all meteorological information in Turkey.

About Datacore

DATACORE was founded in 2000 with the purpose of providing value added turn-key solutions. DATACORE is the first and only system integrator in Turkey that focuses mainly on “Intelligent Data Management.” This includes the consolidation of storage, back-up, archive, business continuity, disaster recovery and virtualization solutions.

About SGI

SGI, the trusted leader in high performance computing (HPC), is focused on helping customers solve their most demanding buisiness and technology challenges by delivering technical computing, Big Data Analytics, cloud computing, and petascale stroage solutions that accelerate time to discovery, innovation, and profitability.

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