EXTENDED YEARLY MANAGERIAL REPORT FOR WP1

WP1 D1.0.3

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Abstract: This document describes the work done in WP1 during the period March 2002 - February 2003 from a managerial point of view.

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CONTENT

1. INTRODUCTION

This Extended Yearly Managerial Progress Report summarises the activities in the framework of the WP1 CrossGrid Application Development during the period March 2002 – February 2003.

The document consists of four sections. Section 1 is the introduction. Section 2 is a glossary of definitions, acronyms and abbreviation used in the text of the document. Section 3 contains the overview of the co-ordination and management activities during the first annual reporting period. Section 4 covers the application development activities of WP1 Tasks 1.1-1.4 for the period. Section 4 is divided into 4 sub-sections. Sub-section 4.1 covers the application development activities of WP1.1: interactive simulation and visualisation of a biomedical system; sub-section 4.2 - WP1.2: flooding crisis team support; sub-section 4.3 - WP1.3: distributed Data Analysis in High Energy Physics; sub-section 4.4 - WP1.4: weather forecast and air pollution modelling. Section 5 provides the information about conference contributions and journal publications concerned with the CrossGrid activities for the period March 2002 – February 2003.

2. DEFINITIONS, ACRONYMS AND ABBREVIATION

Glossary:

AG-IVE	Agent-based Intelligent Virtual Environment, now called ISS-Conductor
ALADIN	http://www.cnrm.meteo.fr/aladin/ - A collaborative project in meteorology
AT	Architecture Team
ATLAS	Automatically Tuned Linear Algebra Software (http://math-atlas.sourceforge.net)
Cactus	A component-oriented application development environment for scientific computing which employs a common interface to components written in multiple languages (http://www.cactuscode.org)
CAVE	Cave Automatic Virtual Environment
CERN	European Organisation for Nuclear Research (http://public.web.cern.ch/Public/)
CMS	Compact Muon Spectrometer
CrossGrid	The EU CrossGrid Project IST-2001-32243
DaveF	Dam-break model
DRIVE	The PC-based Distributed Real-time Interactive Virtual Environment
DTM	Digital Terrain Model
EDG	European Data Grid
ERM	*Task 1.2*
FESWMS	*http://water.usgs.gov/software/feswms.html* Finite-element surface-water modeling system
Globus	The Globus Project provides software tools that make it easier to build computational grids and grid-based applications. These tools are collectively called the Globus Toolkit. (http://www.globus.org)
GRIB	GRid in Binary
GSI	Grid Security Infrastructure
GUI	Graphical User Interface
GVK	Grid Visualisation Kernel
HSPF	*http://water.usgs.gov/software/hspf.html* Hydrological Simulation Program--Fortran
ISS-Conductor	Interactive Simulation System Conductor; an agent-based framework and architecture for ISS.
LBE	Lattice Boltzmann Equation
LCFG	A large scale UNIX configuration system. LCFG is a system for automatically installing and managing the configuration of large numbers of Unix systems. (http://www.lcfg.org)
LEP	Large Electron-Positron
LHC	The Large Hadron Collider
MCMC	Markov Chain Monte Carlo method
MPI	Message Passing Interface
MT	Magnetic Tape
OpenMP	The Application Program Interface that supports multi-platform shared-memory parallel programming in C/C++ and Fortran on all architectures (http://www.openmp.org/)
OpenDX	Open Visualization Data Explorer
OGSA	Open Grid Services Architecture
PAW	Physics Analysis Workstation
PROOF	Parallel ROOT Facility
PSE	Problem Solving Environment
PVM	Parallel Virtual Machine

TAT	Technical Architecture Team
UML	Unified Modeling Language
VO	Virtual Organisation
VR	Virtual Reality
VRVS	Virtual Rooms Videoconferencing System
VTK	Visualisation Toolkit (http://www.kitware.com)
WAM4	A sea wave modeling program http://www.iopan.gda.pl/oceanologia/41_2.html#A6
WSDL	Web Services Description Language
WMS	Water modeling system
XCAT	Common Component Architecture Implementation
XML	Extensible Markup Language

3. TASK 1.0: CO-ORDINATION AND MANAGEMENT

Task leader: Peter Sloot, UvA (CR5)

Deputy task leader: Alfons Hoekstra, UvA (CR5)

During the first reporting year (March 2002 – February 2003) the following tasks have been conducted:

3.1.1. Subtask 1.0.1 – General WP management (UvA, M 1 - 36).

1) A web-site (http://www.science.uva.nl/research/scs/projects/CrossGrid/) was developed for better co-ordination of activities of the Tasks 1.1-1.4 of the CrossGrid WP1. The web-site is regularly updated.
2) The kick-off meeting of WP1 was organised in Amsterdam, the Netherlands. The main goal of this meeting was to exchange ideas and existing solutions between Tasks 1.1-1.4 and to work out the strategy for further interaction with WP3-WP4. The summary of the WP1 kick-off meeting can be found on the CrossGrid WP1 web-site.
3) The second deliverable D1.0.2 "Semi-annual managerial progress report" of WP1 was been prepared and submitted.
4) Participation for review and improvement of the CrossGrid Quality Assurance Plan (Task 5.2.1).
5) The managerial staff of the WP1 participates regularly in the Steering Committee meetings organized via VRVS facility.
6) Preparation of the D1.0.3

There are no issues for this task.

3.1.2. Subtask 1.0.2 – Requirements Definition (UvA, II SAS, CSIC, ICM, M 1 - 3).

1) The representatives of all subtasks of WP1 participated in the first EU Conference on CrossGrid project (17-20 March 2002, Krakow, Poland). A series of WP1 meetings were conducted during the conference, including meetings with WP3 and WP4. The overview of these meetings can be also found on the CrossGrid WP1 web-site.
2) A working meeting WP1.2 (II SAS) with WP3.1 (PSNC) took place in Bratislava (10 April 2002). Issues concerning portal design and further cooperation were discussed.
3) Series of working meeting between the technical architecture team and the working team on WP1.1 were organized and held during the ICCS'02 Conference - International Conference on Computational Science - 20-24 April 2002 (Amsterdam, the Netherlands). The parallelisation of simulation algorithms in distributed Grid environment was discussed. A special discussion was devoted to the possible solution on improving the existing communication interface between the simulation and visualisation engines of the biomedical system of WP1.1.
4) Working meetings of representatives of WP1 with the architecture team 15-29 May 2002 (Krakow, Poland).
5) The first deliverable D1.0.1 of WP1 was prepared and sent to the technical architecture team at the beginning of May 2002. All tasks provided a response to questions from WP3, WP4 and TAT. The appropriate information has been included into the SRS document.

Task 1.0.2 was completed and closed with the issuance of D1.0.1.

3.1.3. Subtask 1.0.3 – Coherency (UvA, II SAS, CSIC, ICM, M 4 - 36).

1) The organization of the CrossGrid Working Meeting on 28-29 September 20002 (Univ. Linz, Austria) was done by Univ. Linz.
2) Technical meeting of WP1, WP2, WP3 with PSNC, Datamat and Cyfronet organized during the Global Grid Forum - 21-24 July 2002 (Edinburgh, Scotland, UK).
3) Participation in architecture team meetings in Vienna (October 25 – 26, 2002)
4) Meeting between UvA and ICM at Amsterdam (November 28, 2002)
5) Meetings between all WP 1 partners took place at various conferences and workshops.

This task is on schedule.

4. APPLICATION DEVELOPMENT ACTIVITIES ON WP1

4.1 TASK 1.1: INTERACTIVE SIMULATION AND VISUALISATION OF A BIOMEDICAL SYSTEM

Task leader: Dick van Albada, UvA (CR5)

During the period March 2002 – February 2003 the following application development activities have been conducted in the framework of Task1.1.

Jointly for all subtasks 1.1.1 – 1.1.4:

- The specifications for software, hardware, communication and user interfaces of a biomedical system were developed and included into the final version of SRS for Task 1.1. The SRS contains an extensive "use case" for the biomedical system. More condensed versions of the use case were later prepared on request.
- Regular consultations and meetings took place between the partners in this task. Face to face meetings took place on the following occasions:
  - At the WP1 kick-off meeting in Amsterdam (Feb. 10 – 12, 2002)
  - At the EU Conference on CrossGrid in Krakow (March 17 – 20, 2002)
  - At the ICCS'02 Conference in Amsterdam (April 20 – 24, 2002)
  - At the CrossGrid workshop in Linz and the following PVM/MPI conference (September 28 – October 2, 2002)
  - Visit of A. Wassermann from Linz to Amsterdam (March 25 – 28, 2002)
  - Visit of P.M.A. Sloot to Krakow (May 15 – 29, 2002)
  - Visits of K. Zajac to Amsterdam (June 24 – 28, November 25 – 29, 2002)

4.1.1. Subtask 1.1.1 - Simulation kernel (UvA, M 1-36).

1) Work on integrating existing routines for LB-simulation into one generic robust library was started and is nearly completed. New functionality is being added.

- The mechanism of LBE inter-process communication was improved.
- A new routine for the simulation of the blood flow in the abdominal aorta was added.
- A new geometry initialisation routine was developed.

The subtask is on schedule with respect to Annex 1 predictions.

4.1.2. Subtask 1.1.2 - VR environments (UvA, M 1-36).

1) A VtkCave library was developed and is now available as an alpha version for testing. This library is aimed to improve the interaction of a user with a virtual environment. The working prototype was completed in June 2002. Now visualisation routines implemented on VTK can be easily ported to the VR-projection modalities, such as CAVE and DRIVE developed by the UvA. The interaction with virtual objects is available via virtual menu, callback mechanisms and methods of direct manipulation supported by Vtk.
2) New routines for the visualisation of the simulation results of the systolic cycle have been developed.

3) A unified approach for the use of different modalities for the visualisation is being studied, from CAVE, through Wall and desktop systems to PDA. This involves both the study and follow-up of new developments in immersive environments, and the redesign of the user interface.
4) An analysis of the current version of the user interface of the biomedical system was carried out. The possible interaction aspects for applying the approach of interface adaptation have been selected, and the component design of a new version of user interface to the biomedical system is in progress now. A prototype of the user model of the system has been developed.

The subtask is on schedule with respect to Annex 1 predictions.

4.1.3. Subtask 1.1.3 - Grid Visualisation Kernel (Univ. Linz, M 1-36).

1) The specification of requirements on the GVK was prepared while working on SRS and D1.2.1 deliverable.
2) The GVK design was developed and was documented in a series of papers at international conferences.
3) Discussion and modifications of design according to the requirements of UvA.
4) Information gathering: Documentation, Publication, and Literature-Study
5) The implementation work on the GVK was started in April 2002 and is in progress now. This includes a grid management framework as the basis of GVK and interactive volume visualization using the marching cubes algorithm.
6) Implementation of a visualization system for landscape modelling in the scope of hydraulic simulation (WP 1.2). A first prototype is available and the basis for further discussions with the Slovak Academy of Sciences.
7) The installation and testing of the CAVE Virtual Reality software and OpenDX necessary for GVK was conducted. The VTK (Visualization Toolkit) has been installed and applied for small scale examples. VtkCave is being integrated into GVK.
8) Preparation and Local Organization of the CrossGrid Workshop 2002 during the EuroPVMMPI/DAPSYS 2002 Conference, Linz, Austria (28-29 September 2002).

The subtask is on schedule with respect to Annex 1 predictions.

4.1.4. Subtask 1.1.4 - Integration and deployment (UvA, Univ. Linz and Cyfronet, M 6-36).

The effort in this work package concentrated primarily on the application infrastructure for integrating the components of the biomedical application. Existing “software bus” architectures (Cactus and HLA) were reviewed. A choice was made for ISS-Conductor, an architecture and framework developed at the UvA and currently based on HLA. Eventually, the functionality currently provided by the Run-Time Infrastructure (RTI) of HLA will be provided through OGSA / webservices for better compatibility with Globus and greater independence of the proprietary RTI software.

Work performed by UvA in collaboration with Cyfronet:

1) An analysis of the Cactus problem-solving environment was carried out and experiments on its functionality were conducted. As Cactus was selected as a possible solution for the implementation of middleware between simulation and visualisation compounds of the biomedical system, the following aspects have been investigated:

- integrating the LB simulation code into Cactus;
- visualisation capabilities within Cactus;
- user interface capabilities within Cactus.

As a result of the analysis it has been found that Cactus does not satisfy the requirements of the integration of simulation and visualisation components of biomedical system.

2) A new version of network data transfer compound between simulation and visualisation engines of biomedical system has been deployed. It permits to collect simulation's results (pressure and velocity values) from an arbitrary number of nodes running parallel LBE through network connection. It also makes it possible to load geometry for simulating a flow from the visualisation side.
3) Work on upgrading the HLA-based ISS-Conductor (formerly called AG-IVE) version of the biomedical system to support OGSA has been started. This work is conducted in collaboration with the technical architecture team - TAT (see section 3.1.3).
4) A version of the biomedical system integrated using ISS-Conductor, but not yet incorporating all developments in the area of simulation and visualisation will constitute the M 12 software deliverable D1.1.2b for Task 1.1.
5) Tests have been conducted with the ISS-Conductor-based software on various distributed configurations, including the UvA testbed node DAS II.
6) Meetings with and input to Task 3.1 on the development of the portal.

Work performed by Univ. Linz:

1) Experiments with Globus IO concerning communication issues of large-scale data transfers required in GVK.
2) Globus Installation was carried out on a series of machines at the Univ. Linz. This includes the local supercomputer SGI Origin 3800, the clusters of the GUP Grid and Cluster Computing (G2C2) Lab, and a series of high-end workstations.

The subtask is on schedule with respect to Annex 1 predictions.

4.1.5. Subtask 1.1.5 - Dissemination (UvA and Univ. Linz, M 1 - 36).

Besides the papers published, accepted and submitted described in section 5 of this report, the following dissemination-related activities have taken place:

1) Univ. Linz: Local Organization of the 9th European PVM/MPI Users' Group Conference, including the Special Session on CrossGrid (29 September – 02 October 2002).
2) Work on IST02 slide show
3) Preparation of WP1.1 Brochure
4) Review of deliverables of other partners

The subtask is on schedule with respect to Annex 1 predictions.

4.2 TASK 1.2: FLOODING CRISIS TEAM SUPPORT

Task leader: Ladislav Hluchy, II SAS (AC6)

The list of activities conducted by Task1.2 during the period March 2002 - February 2003 (M1-M12):

4.2.1. Subtask 1.2.1 - Distributed data collection (II SAS, M1-36)

In this subtask the available and necessary sources of data will be further identified and techniques will be developed to allow a timely and distributed access to these necessarily distributed data.

- Preparing a subcontract with the Slovak Hydrometeorological Institute (SHMI) and participation in the collaboration meetings
- Specification of pilot site: Strecno-Nosice (models, data resources, storage)
- Data identification for pilot site (data resources, storage, models)
- Data identification and techniques for distributed access to data
- Data identification and preparation for hydrological and meteorological simulation
- Negotiations with SHMI staff about data upload
- Modifications of connection details to SHMI
- Metadata structure design

The subtask is on schedule with respect to Annex 1 predictions.

4.2.2. Subtask 1.2.2 - Distributed simulation and data analysis. (II SAS, M1-36)

In this subtask hydro meteorological and hydraulic models will be developed and implemented that can make use of the computational resources available through the grid, and that will be able to work with possibly incomplete data. The performance of these models will be an important issue.

- Analysis of simulation models (meteorological, hydrological and hydraulic)
- Design of cascade simulation architecture
- Preparing different scenarios for parallel hydraulic simulation (FESWMS)
- Preparation of input data for model DaveF (finite-volume model)
- Parallelisation of new hydraulic model DaveF (dam-break model)
- Cooperation with Univ. Linz (WP1.1) has been started with visualization issues of DTM for hydraulic simulation
- Analysis and experiments with visualisation system OpenDX - for hydraulic simulation results
- Analysis of hydrological simulation models (WMS, HSPF, ERM)
- Creating converter for input data for hydrological simulation models (ERM, HSPF)
- Porting of hydrological simulation model (ERM,HSPF) to Linux cluster, preparing their input data and models tuning

- Porting the ALADIN/Slovakia meteorological model to II SAS Linux cluster and its testing
- ALADIN model testing and work on scalability issues
- Visualization of ALADIN/Slovakia meteorological model outputs (GRIBEX, CHAGAL)

The subtask is on schedule with respect to Annex 1 predictions.

4.2.3. Subtask 1.2.3 Distributed access, support for the virtual organisation. (II SAS, M 1-36

In this subtask the problems related to the distributed and roaming access to the data and models will be addressed.

- Analysis of PSE for VO, data replica, storage element and Grid database support
- Design of PSE for VO, storage architecture and Grid database support and preparation for deployment in simulation cascade
- Design of collaboration place for VO, evaluation of existing solutions
- Study of authorization and data management Grid services for virtual organisation
- Review of existing Grid portal technology for virtual organisations

The subtask is on schedule with respect to Annex 1 predictions.

4.2.4. Subtask 1.2.4 - System integration, testing and demonstration (II SAS, M6-36)

In this subtask, the technologies developed in the preceding subtasks will be implemented on the testbed (Task 4.1). The performance of the integrated system will be tested and the results be coupled back to subtasks 1.2.1 to 1.2.3 and to the technology workpackages.

- Software/hardware requirement specifications and use cases
- Preparing use cases for first prototype
- Preparing scripts for running simulations on Grid
- Storage server software deployment and testing

The subtask is on schedule with respect to Annex 1 predictions.

4.2.5. Subtask 1.2.5 - Dissemination and industrial deployment (II SAS, M1-36)

Dissemination will be performed and industrial deployment promoted as described in the section on dissemination and exploitation.

- Preparing a presentation for the European Forum for IST in Budapest (dissemination)
- Preparing a presentation for the International Environmental Modelling and Software Society (Lugano, June 2002)
- Preparing documents: SRS and D1.2.1 deliverable (M3)
- Paper sent to ITEE'03 (June 24-27, 2003, Gdansk, Poland) Conference (waiting for review results)
- Presentation of "Flooding Crisis Team Support" (Task1.2) in IST conference Copenhagen, November 2002
- Paper sent to SCI'03 (July 27-30, 2003, Orlando, Florida, USA) Conference (waiting for review results)

4.3 TASK 1.3: DISTRIBUTED DATA ANALYSIS IN HIGH ENERGY PHYSICS

Task leader: Celso Martinez-Rivero, CSIC (CR15)

During the period March 2002-February 2003 the following application development activities have been conducted in the framework of WP1.3.

4.3.1. Subtask 1.3.1 - Interactive Distributed Data Access (CSIC M1-36)

A prototype data catalogue was implemented in XML with its corresponding schema containing a detailed description of each of the more than 1700 data files representing Monte Carlo events related to a particular High Energy Physics Analysis (LEP-Delphi four-jet channel). With the information contained in this data catalogue users will select the required data sets whose files will afterwards be obtained by means of the replica catalogue.

Work on the query mechanism to access the above data catalogue has been implemented (see contribution to the 1st European Across Grids Conference -Santiago de Compostela, February 2003-. The process is as following: the Interactive Service Database server acts as MPI master and sends to n slaves the url of the Data servers where the data is physically located as well as a query in XML format. Each slave contacts its Data server, sends the query, and waits the answer. We are working in two different Data servers: a PAW ntuple server and RDBMS.

The subtask is on schedule with respect to Annex 1 predictions.

4.3.2. Subtask 1.3.2 - Data Mining Techniques (CSIC M1-36)

In the framework of this subtask the works are concentrated on the training of an Artificial Neural Network in a distributed environment applied to a typical example in High Energy Physics interactive analysis. Preliminary tests in a wide area network studying the impact of latency time have been performed. The main focus during the second half of the year was to make this application grid-aware. As a first step it was compiled using as middleware the MPI implementation over Globus2.2 toolkit (MPICH-G2) and run on two different sites. Afterwards it run over five different sites (LIP, CYFRONET, IFIC, CESGA, FUW and ICM) using EDG testbed 1.2.2 with full success. Studies on latency with this new implementation will be the main study in the next future.

The subtask is on schedule with respect to Annex 1 predictions.

4.3.3. Subtask 1.3.3 - Integration and Deployment(FZK, CSIC M6-36)

Contacts with the four LHC Collaborations (ATLAS, CMS, ALICE and LHC-b) have been established.

4.3.4 Subtask 1.3.4 - Application to LHC Physics TDR and High Level Trigger (INP, INS, CSIC, UAB M1-36)

A work on physical aspects and architecture of HEP application conducted by CSIC:

The standard PAW file structure was transformed from RZ to a ROOT structure (using h2root binary). Once this transformation was completed, the Parallel ROOT Facility (PROOF) is in the process of implementation in the Santander Grid Cluster, where basic checks of the analysis will be repeated in order to crosscheck them with the standard results obtained in a single machine with the original PAW files.

The Cactus code has been checked with a simple executable and run in parallel using MPICH-1.2.4 inside Santander Cluster (60 nodes), showing -as claimed- the relatively easiness to perform a parallel job with this software.

A work on physical aspects and architecture of HEP application conducted by INS:

- Continuation of feasibility study of various physical aspects of the application.
- Study at CERN on understanding CMS simulation software needed for the application.
- Preparation of the document on the architecture of the application.
- Continuous work on the installation of CMS-specific software, needed by the application, using LCFG server

A work on physical aspects and architecture of HEP application conducted by UAB:

- Preparation of specification on HEP application.
- Evaluation of the WP3 proposals about support of interactive jobs over the Grid.
- Installation and testing of software components of the ATLAS project to be used by the HEP application.

A work on physical aspects and architecture of HEP application conducted by INP:

A system to evaluate the network performance, as part of the feasibility studies for locating the ATLAS third level trigger in remote locations has been prepared. Part of the processing power required to run the Event Filter can be provided in remote centres if a suitable network connection is available. The system is composed of two PC's equipped with GPS systems where measurements quantifying end-to-end latency, throughput, jitter and packet loss as well as running streaming tests were performed.

The subtask is on schedule with respect to Annex 1 predictions.

4.4 TASK 1.4: WEATHER FORECAST AND AIR POLLUTION MODELLING

Task leader: Bogumil Jakubiak, ICM (AC2)

During the period March 2002-February 2003 the following application development work was conducted in the framework of Task 1.4:

4.4.1 Subtask 1.4.1 Integration of distributed databases into GRID structure

The work done at CSIC (Spain) focused mainly on the paralellisation of self-organizing maps (unsupervised data mining). Different algorithms have been developed and a study of their efficiency for the GRID has been carried out. A hybrid algorithm has been implemented and SVG (an XML-based graphic format) has been used for graphic output of the algorithm.

Task is on schedule

4.4.2 Subtask 1.4.2 Migration of data mining algorithms to GRID

The work at ICM (Poland) concentrated mainly on development of the software for selection of requested information from a MT storage system with conversion from native Cray format to common GRIB format used by meteorologists.

Our data mining application is based on the Monte Carlo Markov Chain (MCMC) algorithms for parameter estimation and statistical models inference. Precipitation fields produced by NWP models are post-processed using a generalized extended Kalman filter as an approximate posterior mode estimator. We tested different statistical packages (commercial and academic) and found the public domain R package most suitable for our applications.

Some work has been conducted on the development of a GUI for the data-mining user based on Globus 2.0 tools.

Task is on schedule

4.4.3 Subtask 1.4.3 Integration of distributed atmospheric and wave models into GRID structure

Atmospheric model applications:

The vector version of the COAMPS (Coupled Ocean Atmosphere Mesoscale Prediction System) model developed by NRL was implemented at ICM on CRAY SV1 computer. The Globus 2.0 was developed and implemented to CRAY environment, what gave us chance to test the model using Globus tools.

A parallel version of the COAMPS atmospheric model code has been implemented on the Linux cluster. The code has been compiled using Portland Group Fortran.

The GUI for atmospheric model based on Java scripts is in a phase of testing.

Maritime applications:

A preliminary work on parallelisation of the code of the sea wave model WAM4 was carried out. The WAM and SWAN models were implemented to different subbasins of the Baltic Sea and use cases concerned maritime applications have been developed.

The task is on schedule

4.4.4 Subtask 1.4.4 Integration of parallel codes for air quality models into GRID strucutre

- Improving the sequential code, getting a more efficient version.
- Implementation of a MPI version of the application.
- Execution of the MPI version on a cluster and an AP3000 Fujitsu multi-computer.
- Implementation of an OpenMP version of the application on a shared memory multiprocessor.
- Execution of the OpenMP version on a SGI O2000 system.
- Study of some topics for the implementation on the Grid: experimental test of the MPI version using MPICH-G2 and Globus.
- Study of fault tolerant capabilities in the air pollution application: development of a fault-tolerant sequential version.

The task is on schedule

5. CONFERENCES AND PUBLICATIONS

5.1 PUBLICATIONS IN THE MEDIA/PRESS

"Österreich im Grid – Visualisierung von großen Datenmengen an der Universität Linz", Press Article, http://www.gup.uni-linz.ac.at/crossgrid/PRESSE/crossgrid.pdf (April 2002). [in German]

"Slovak Minister of Education Visited Slovak Academy of Sciences", **Spravy SAV**, May/2002 (the monthly news issued by the Slovak Academy of Sciences, it is written in Slovak). No.5/2002,Vol. 38, pp.3.

"Information Technologies", **Spravy SAV**, October-November/2002 (the monthly news issued by the Slovak Academy of Sciences, it is written in Slovak), No.10-11/2002,Vol. 38, pp.14-15.

"Presentación de Iniciativa e-Ciencia en Cantabria" October 2002.
C. Martínez-Rivero. Presentation of e-Science Initiative in front of national and local authorities as well as specialized media.(http://grid.ifca.unican.es/icec/e-ciencia-hep.ppt)

5.2 PAPERS AND CONFERENCES BY MONTH

April 2002

The International Conference on Computational Science 2002, Amsterdam, the Netherlands (April 2002)

Z. Zhao, R.G. Belleman, G.D. van Albada: AG-IVE: An Agent Based Solution to Constructing Interactive Simulation Systems, Proc. of the ICCS'02 Conference, p. 1, pp. 693-703.

R.G. Belleman, R. Shulakov: High Performance Distributed Simulation for Interactive Simulated Vascular Reconstruction, Proc. of the ICCS'02 Conference, p. 3, pp. 265-274.

Dieter Kranzlmüller, Nam Thoai, Jens Volkert, "Debugging Large-Scale Long-Running Parallel Programs", in: P.M.A. Sloot, C.J.K. Tan, J.J. Dongarra, A.G. Hoekstra (Eds.), "Computational Science - ICCS 2002", Proc. of the International Conference on Computational Science, Part II, Springer-Verlag, Lecture Notes in Computer Science, Vol. 2330, ISBN 3-540-43593-X, Amsterdam, The Netherlands, pp. 913-922 (April 2002).

International Parallel and Distributed Processing Symposium Conference/Workshop on Parallel and Distributed Computing in Image Processing, video Processing and Multimedia 2002, Ft. Lauderdale, Florida (April 2002)

Dieter Kranzlmüller, Gerhard Kurka, Paul Heinzlreiter, Jens Volkert, "Optimizations in the Grid Visualization Kernel", Proc. IPDPS 2002, 16th International Parallel & Distributed Processing Symposium, Workshop on Parallel and Distributed Computing in Image Processing, Video Processing, and Multimedia (PDIVM 2002)), IEEE Computer Society, ISBN 0-7695-1573-8, Fr. Lauderdale, Florida, abstract p. 129, full paper CD-ROM (April 2002).

5th International Conference on Information Systems Modelling ISM '02, Roznov pod Radhostem, Czech Republic (April 2002)

O. Habala, B. S'imo, J. Astalos', L. Hluchý : Virtuálna organizácia pre predpoved' povodní na báze technolo'gie Grid. (written in Slovak). Modelling and Simulation of Systems MOSIS'02, Roz'nov pod Radhos'te'm, April 2002, Vol.2, pp. 17-24, ISBN 80-85988-72-0.

XXVII General Assembly of the European Geophysical Society:

R. Cano, A.S. Cofiño, J.M. Gutiérrez, C. Sordo, 2002: Probabilistic Networks For Statistical Downscaling And Spatialisation of Meteorological Data. Geophysical Research Abstracts. Vol. 4, 194 (2002). (Nice, France, 21 - 26 April 2002)

May 2002

FP6-IST Workshop, Brussels, Belgium (May 2002)

L. Hluchy: Collaborative Problem Solving Environment for Flood Warning and Forecasting System. Major societal challenges, FP6-IST Workshop, Brussels, May 2002.

June 2002

6th International Conference on Applied Parallel Computing, PARA'02, Espoo, Finland (June 2002)

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