

University of Sarajevo, Faculty of Natural Sciences



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Infrastructure at the Laboratory for Optimization and Computing

- ◆ One HP rx2600 900MHz (donation of HP-UNESCO)
- ◆ Cluster with 8 Pentium and AMD processors
- ◆ 256 Kbs internet connection
- ◆ Soon will be extended with cluster of 8 dual core Pentium processors

Application areas

- ◆ Graph theory algorithms
- ◆ Difficult combinatorial real-life problems
 - Car sequencing problem (the best 6th result on the ROADEF Challenge 2005)
 - Frequency assignment problem (the best junior result on the ROADEF Challenge 2001)
 - Open-shop scheduling
- ◆ Financial mathematics
 - Optimal Asset Allocation for Defined Contribution Pension Plans (cluster and grid oriented application)
- ◆ Computational biology algorithms
 - Parametric alignment multiple sequences on the Grid

SEE-GRID related activities



SEE-GRID

South Eastern European GRid-enabled
elnfrastructure Development

- ◆ *Partner within the SEE-GRID 1 and 2 projects*
- ◆ *Run the grid site within the project:*
 - BA-04-PMFSA
- ◆ *Networking and collaborative liaisons with other research centers and projects in the region*
- ◆ Centre is one of the creators of the **National Grid Initiative in BiH**

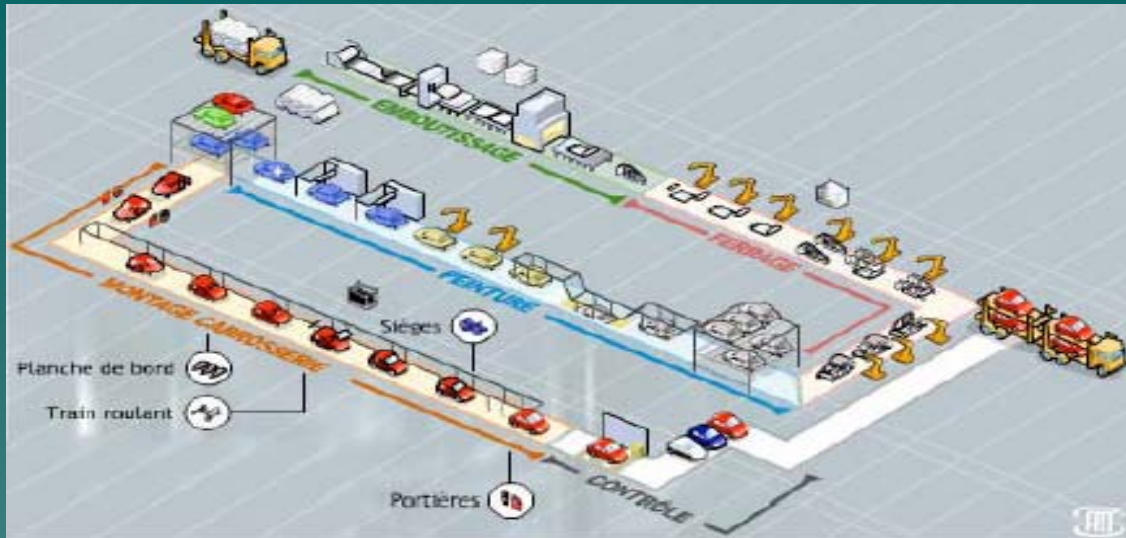
Activities and plans

- ◆ *Actively participate in training the talented youngsters for international Olympiad in informatics and involve them in grid related activities*
- ◆ *Establishment of a robust pilot infrastructure*
- ◆ *Networking with other research centers, building a strong human network (short stays, specialized training...)*
- ◆ *Provide the service for high performance computing methods for the researchers affiliated to the US*
- ◆ *Participation at the South Eastern European Grid Infrastructure development*

Collaborations

- ◆ Members of the laboratory developed the collaboration with :
 - Adbus Salam Center, Trieste, Italy;
 - CERN, Swiss;
 - City University of London, UK;
 - Johannes Kepler University Linz, Austria;
 - ILOG, France
 - Gelato federation members (Pontifical Catholic University of Rio Grande do Sul, University of Split, Croatia)

Car sequencing problem



- ◆ Proposed and sponsored by the automobile manufacturer **RENAULT**
- ◆ Problem is to schedule the sequence of vehicles that satisfies best the paint shop and the assembly line requirements
- ◆ 55 teams (France, Brasil, Chile, Italy, Germany, Canada,)
- ◆ Competitive results : our result is ranked 6th best result
- ◆ Methods : linear programming, tabu search, spelling the motifs in the string
- ◆ Results on Itanium based machine is better but out of competition within the Challenge

Optimal Assets Allocation for Defined Contribution Pension Plans

- ◆ Definition of the problem
 - To determine the optimal consumption and optimal allocation to risky assets at the beginning of each age year for known information and given assumption of the economy
- ◆ Scientific impact:
 - Part of the PhD research at CASS Business School, City University of London, UK
 - Could efficiently solve problems in financial mathematics that were impossible to solve previously
 - Also grid implementation
- ◆ Potential or existing user or beneficiary community and its size
 - Pension funds
 - Individual pensioners
 - Academia
 - Part of PhD study

Technicians and Interventions Scheduling for Telecommunications

- ◆ Proposed by the FRANCE telecom; subject of ROADEF Challenge 2007; <http://www.g-scop.inpg.fr/ChallengeROADEF2007>
- ◆ Constraint scheduling problem
- ◆ Set of technicians with appropriate skills (type and level). Some technicians are not available on given day
- ◆ Set of interventions with need for set of skills (type and level). Every intervention has its execution time. Graph of precedence's.
- ◆ Create the teams and schedule interventions minimizing given objective function
- ◆ MIP approach tested also on Itanium
- ◆ Invited to present the work at FRANCORO/ROADEF conference in February in Grenoble, FR