Academia-business collaboration in HPC: experience from Bulgaria

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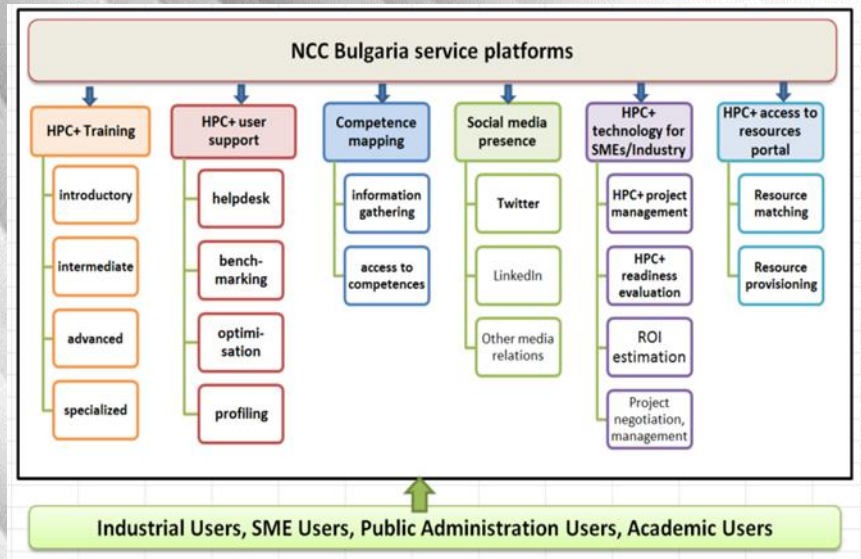
IICT-BAS

Institutional context

- Strong partnership in NCC Bulgaria
- Institute of Information and Communication Technologies – Bulgarian Academy of Sciences
- Sofia University
- University of National and World Economics
- Leaders of 2 Centers of Excellence and one Center of Competence, funded by European Structural Funds
- Leaders of Research Infrastructures, including two related to HPC and AI.
- Participating in various EDIH Consortia

Training and consulting services of Bulgarian NCC

- Trainings organized on wide range of topics, relevant to optimal use of HPC
- Consultations based on specific needs and application areas
- Proof of Concept



Context: HPC Hardware and Software

- HEMUS Supercomputer at IICT – still in top500 list.
- HPDA system at UNWE – good interconnection with IICT and TechPark
- Substantial Discoverer upgrade
- Rich software stack, licensed storage systems, lots of free/open source software installed

Outreach strategy

- General audience: from TV appearances to podcasts
- Important to work with industry leaders and big national players
- Participation in EDIH events
- Sector-relevant events

Trainings and industry participation

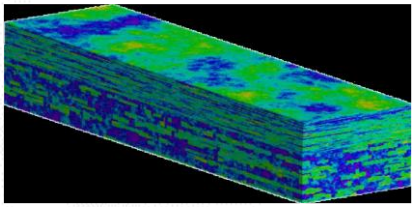
- Conclusion – rarely useful to organize event for just one SME
- Strategy - open events with participation from multiple SMES, but still focused
- Representatives from SMEs and industry participated in more than 30 training events (10 training events were specifically organized for end-users from SMEs)
- 9 training guides developed, published and distributed

Stages of interaction with industry

- Outreach/initial contact
- Training participation, discussions with people with technical or managerial role
- Consultations
- Proposal preparation help
- Deeper collaboration with funding from national, EU or internal (SME) sources, outside of EuroCC2
- Significant experience in doing all kinds of contracts, even public tenders participation

Example of scientific work with industrial impact

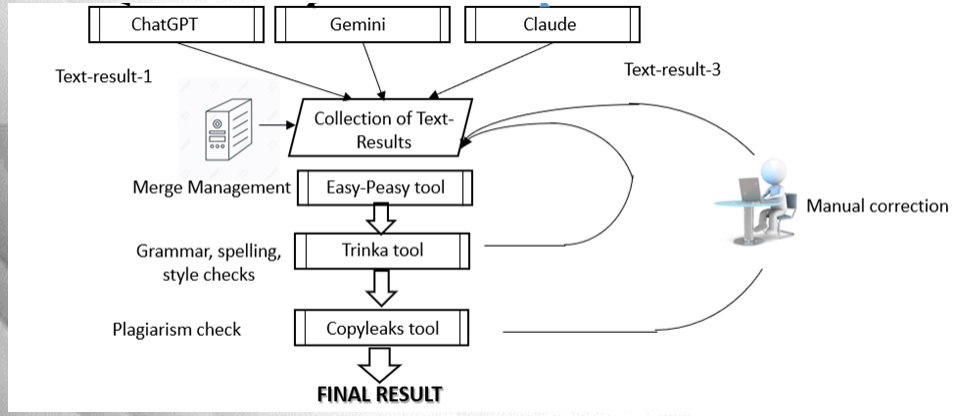
- More than 90% of the peak performance of systems come from the accelerators
- Using accelerators, it is possible to achieve better price/performance and energy efficiency
- Important for startups using AI/HPDA
- Understanding efficiency and scalability challenges is important for achieving academic results but also has industrial impact



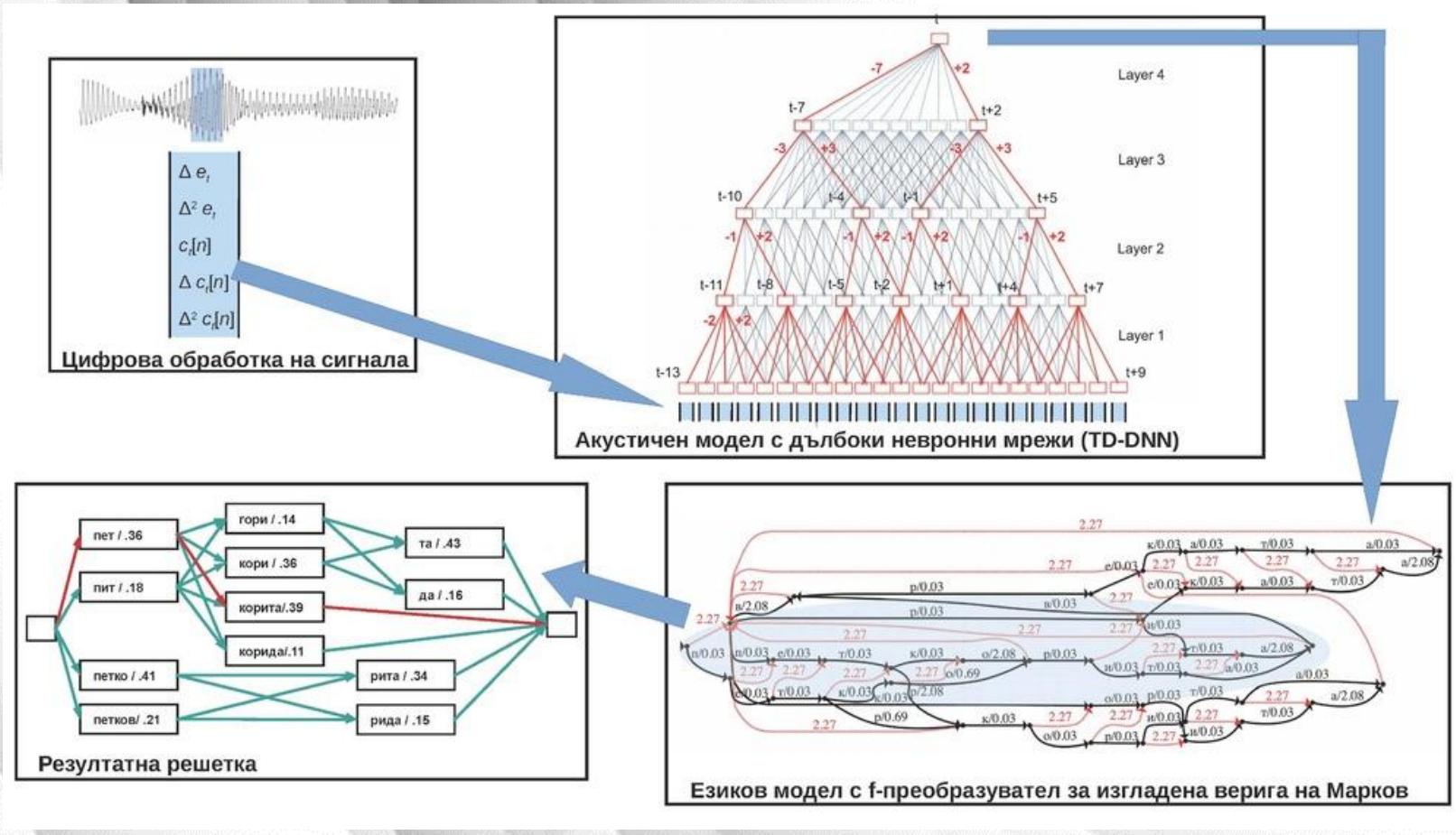
Number of processes	8	16	32
ALGORITHM 1	0.8494	0.7763	2.2047
ALGORITHM 2	0.6047	0.7149	0.9330
ALGORITHM 3	0.5619	0.3873	0.3994
MKL	0.7182	0.9029	0.9098

Success stories

- System based on parallel processing of High Performance Generative AI – in collaboration with industrial end-users
- Empowering Big Data insights and ensuring reliability in data ecosystems for parallel processing



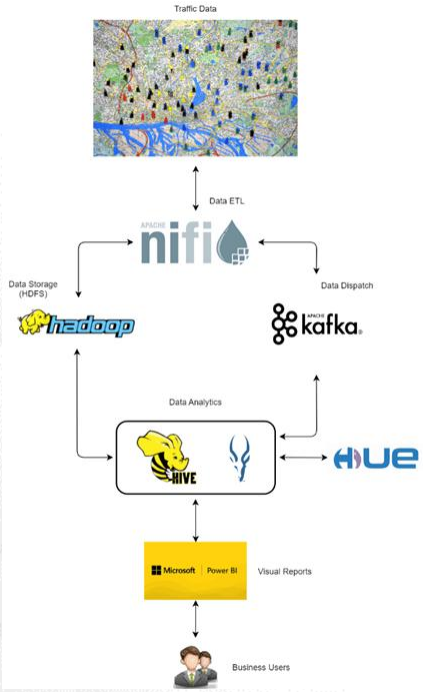
Natural Language Processing with applications in medicine



CFD modelling of ships

Some challenges and useful approaches

- Some industry players understand what they need, but don’t have the funding
- Others have too much funds and only consider actions with high business impact
- SMEs and startups are hesitant to invest themselves
- Pilot projects are useful, building trust, demonstrating technical knowledge is convincing
- Proposal preparation is difficult and not always successful, but provides useful experience – Fortissimo plus presented at 3 events, 2 proposals submitted
- Sectors that have been identified for deeper collaboration – electricity generation/trading, traffic simulation/management.



Thanks

This project has received funding from the European High-Performance Computing Joint Undertaking (JU) under grant agreement No 101101903. The JU receives support from the Digital Europe Programme and Germany, Bulgaria, Austria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Ireland, Italy, Lithuania, Latvia, Poland, Portugal, Romania, Slovenia, Spain, Sweden, France, Netherlands, Belgium, Luxembourg, Slovakia, Norway, Türkiye, Republic of North Macedonia, Iceland, Montenegro, Serbia