

Grids and Clouds Activities in Vietnam

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Outline

- Grids activities until later 2009
- Grids activities in 2008-2010
- On-going grids and clouds activities at IFI
- Conclusion

HPC Centers and Grid groups

- 1995-2005: 4 HPC centers were setting up in Hanoi and HCM City
 - HCM UT (1995), Hanoi UT (2001), IOIT-VAST (2004) and Hanoi US (2005)
 - Problems
 - All are not Teraflops HPC centers
 - Using different infrastructure (material and software)
 - Not connect to other HPC centers
 - Private used, for academic research
 - Lack of large scale applications
 - Lack of the co-operation between HPCs and customers (companies, institutes, universities)
- 2003-2009: Grid research groups
 - HCM UT (2003), Hanoi UT (2004) and Hanoi US (2009)

PRAGMA, TEIN2/3, APAN and VinaREN

- Participating to PRAGMA
 - IOIT-VAST, HPCC-HUT and HCMC UT
 - PRAGMA workshop 17 held in Oct. 28-30, 2009 in Hanoi (host by IOIT)
- Participating to TEIN2/3 and APAN
 - Joint to TEIN2 in 2005
 - Joint to TEIN3 in 2008
 - Member of APAN since 2007
- VinaREN
 - Dedicated network for research and education (2005)
 - 155 Mbps with TEIN3
 - Supported by the MoST
 - In contruction...

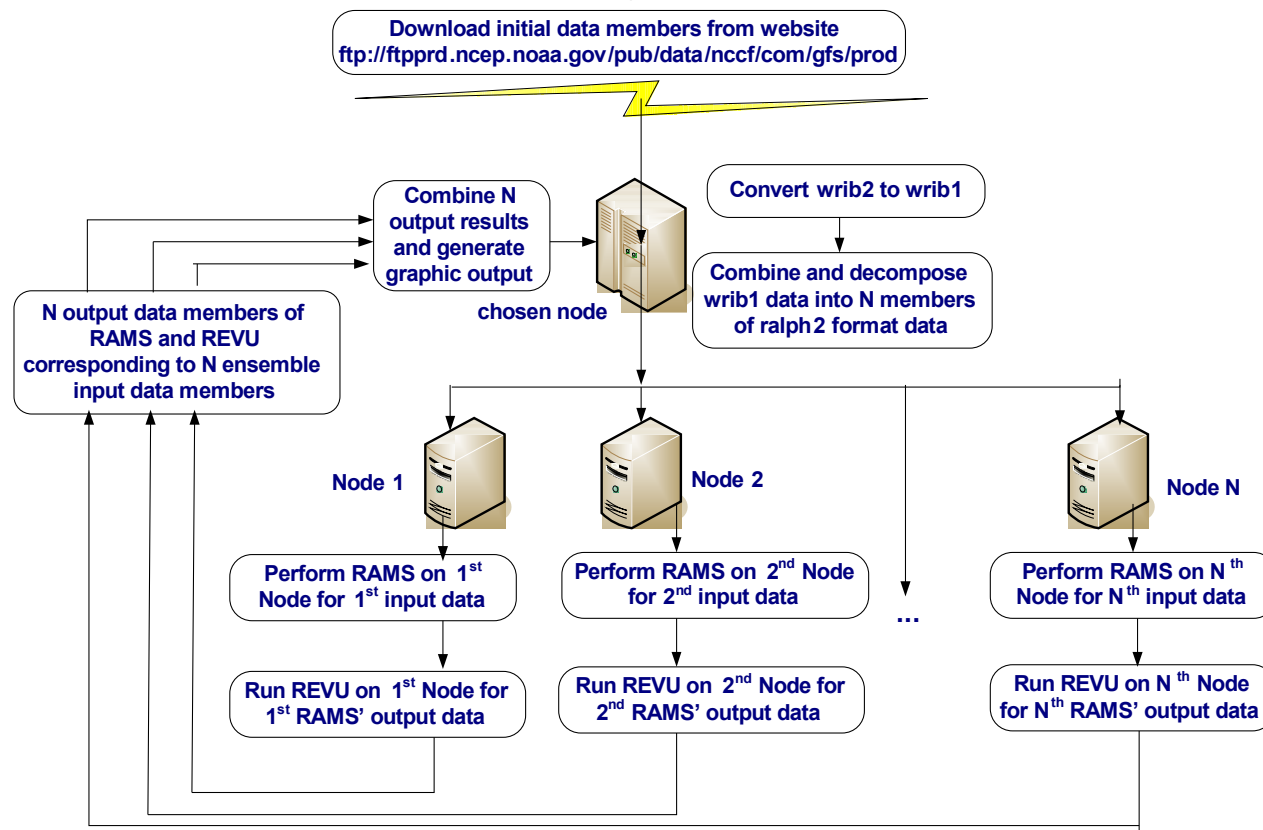


VinaGRID project

- Funded by the Ministry of Science and Technology (2008-2010)
 - Building a cyber-infrastructure to connect partners (IOIT-VAST, HPC-VNU, HPCC-HUT,...)
 - Deploying advanced grid technologies to improve the performance (resource monitoring and discovering, scheduling and brokering)
 - Experimenting some grid-based applications (Bioinformatics, Meteorology, Virtual Reality, Cryptography)
 - Connect to other grid systems in the region and the world
- Results (not very successful)
 - Almost research papers, not real applications
 - Lack of national coordination
 - Limited resources, low Internet bandwidth

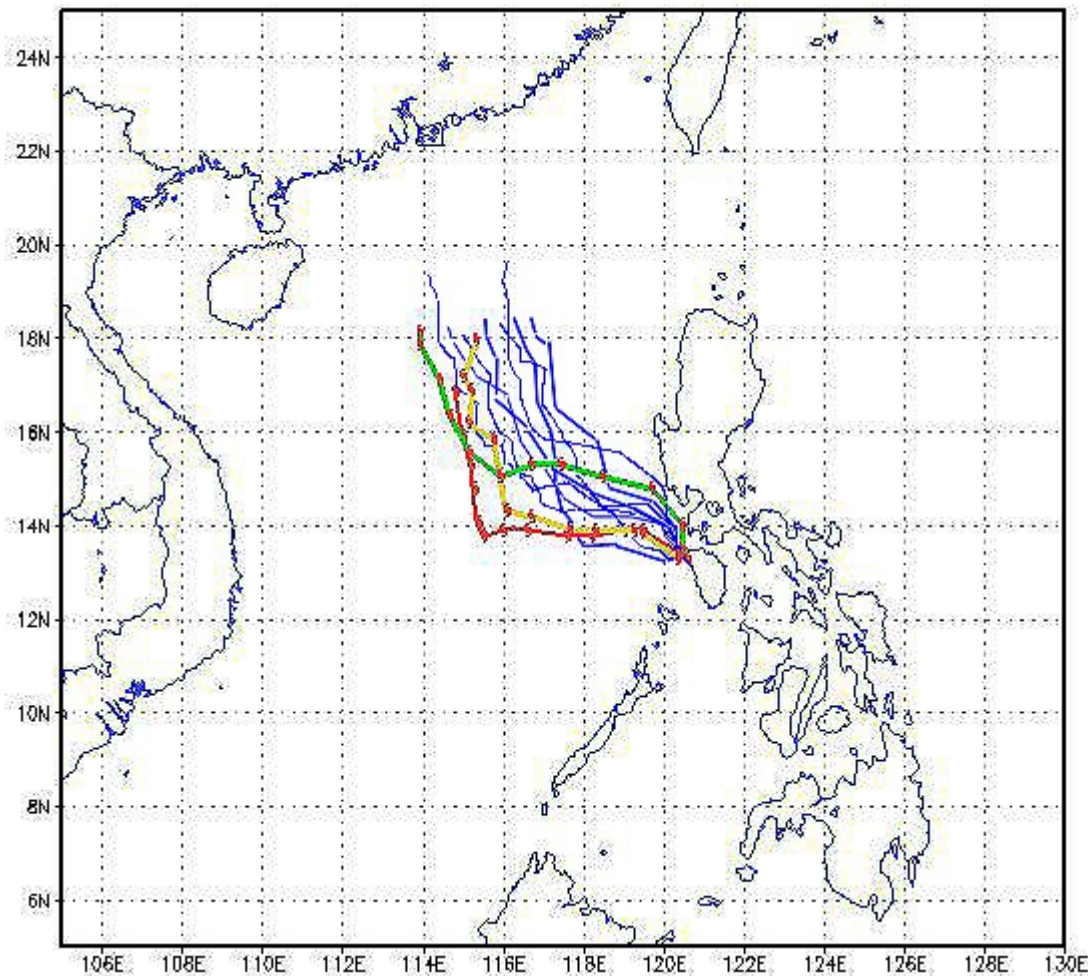
RAMS-Grid & MM5-Grid

- RAMS/MM5 combined with ensemble forecasting and grid computing to get faster result & improved accuracy



Test on Chanchu hurricane

May 13-16, 2006 data



- RAMS-Grid is more accurate than RAMS
- **Red line**: Real trajectory
- **Green line**: Predicted trajectory by RAMS.
- **Yellow line**: Predicted trajectory by RAMS-Grid.
- **Resources:**
 - Using 3 nodes of VNGrid of 100 GFlops.
 - Execution time ~ 7 hours.

Grid activities in 2008-2010

- EGEE grids are introduced to Vietnam by the CNRS (France)
 - First ACGRID (Advanced Computing and GRID technologies for research) school at IOIT (november 2007)
 - Two institutes participating to EUAsiaGrid project (IAMI and IFI)
 - PhD dissertation on “grid-based flu epidemic surveillance network”, collaboration between IFI, CNRS and HealthGrid France
 - 3 EGEE nodes setting up in Hanoi (IOIT, IFI and HUT) (end 2009) on VinaREN network
 - Second ACGRID school at IFI with the sponsors of the CNRS (september 2009)
 - EGEE grid community is established
 - International workshop on Grid computing applications in Vietnam at IFI (december 2010)

Executive summary of the last workshop

- Vietnamese citizens have growing concerns related to healthcare, climate change, natural disasters, industrial and environmental risks
- Distributed computing and storage infrastructures (grid and cloud) are an opportunity for Vietnamese scientists to play a leading role on these world-wide issues
 - Scientific impact
 - Human factor
 - Training
 - Key issues

Scientific impact

- One application already led and developed in Vietnam
 - g-INFO portal
- Several applications identified in earth and life sciences
 - Led by vietnamese scientists
 - With wide social impact for Vietnam and beyond Vietnam
- CNRS, IRD, and Asia Pacific Grid Initiatives collaborate on these applications and also commit to provide tools and support for modeling, simulation and data management
- Emerging cloud technology is an opportunity for Vietnam
- Issues
 - Funding for engineers and PhD students is needed
 - Running cost must be covered

- Strengths
 - Strong expertise in programming
 - Large number of young highly educated scientists
 - Already a core of Vietnamese grid experts
- Need for regular meetings among grid application developers and users
- Need to coordinate efforts at a national level and involve all the key players (VAST, universities)

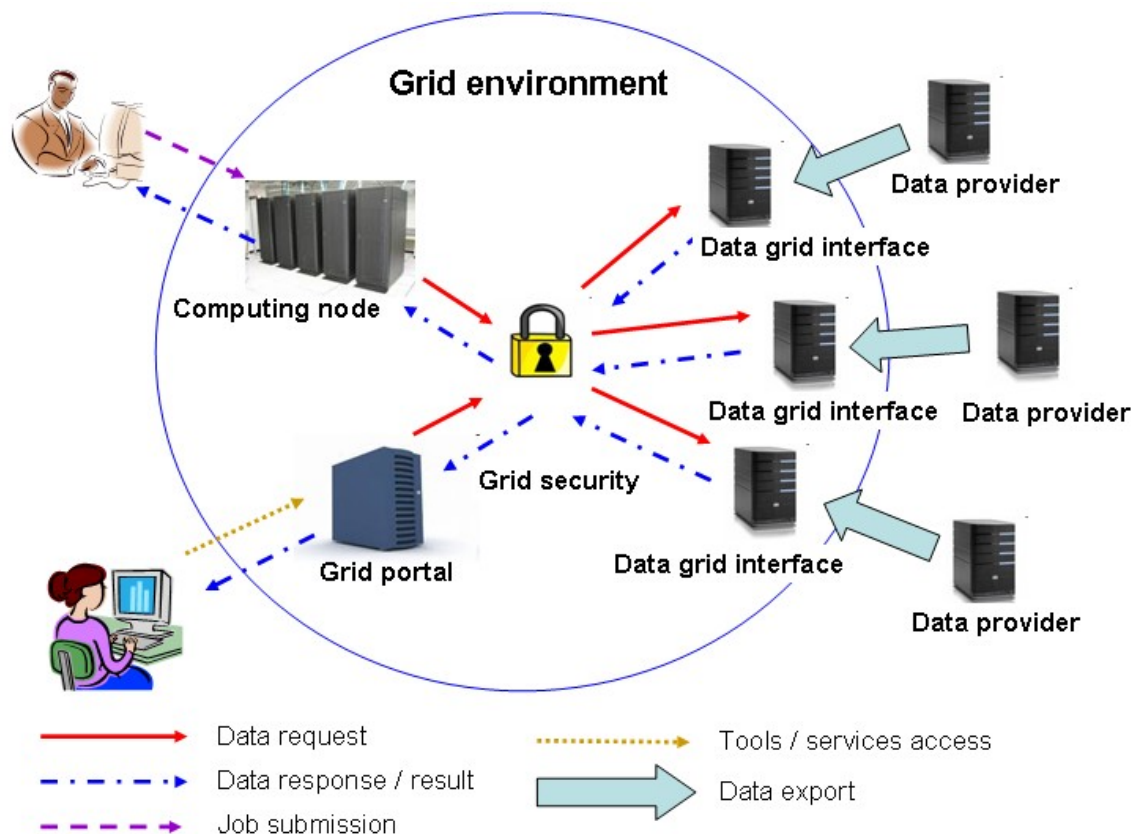
- 2 schools already organized in 2007 and 2009
 - Sufficient expertise in Vietnam for training in Vietnamese
 - Need to reach out to new users and communities
 - Need for tutorials focused on specific tools
 - Need for training on parallelization and distribution
 - Need for open days for non experts
- Issues
 - Today, trainees can't experience the grid because of network problems when they go home

Key issues

- No distributed computing without network: need to build on a robust, fast and reliable network connecting the grid nodes, clouds and clusters in Vietnam together and to the outside Research and Education world
 - VINAREN or commercial network for back-up
- Need for structuring a National Grid Initiative
 - Need to set up a committee with representatives from the different institutes (VAST, universities) and appoint a coordinator
- Need for sufficient funding for engineers and PhD students
 - Unless they quit for better paid jobs

On-going projects

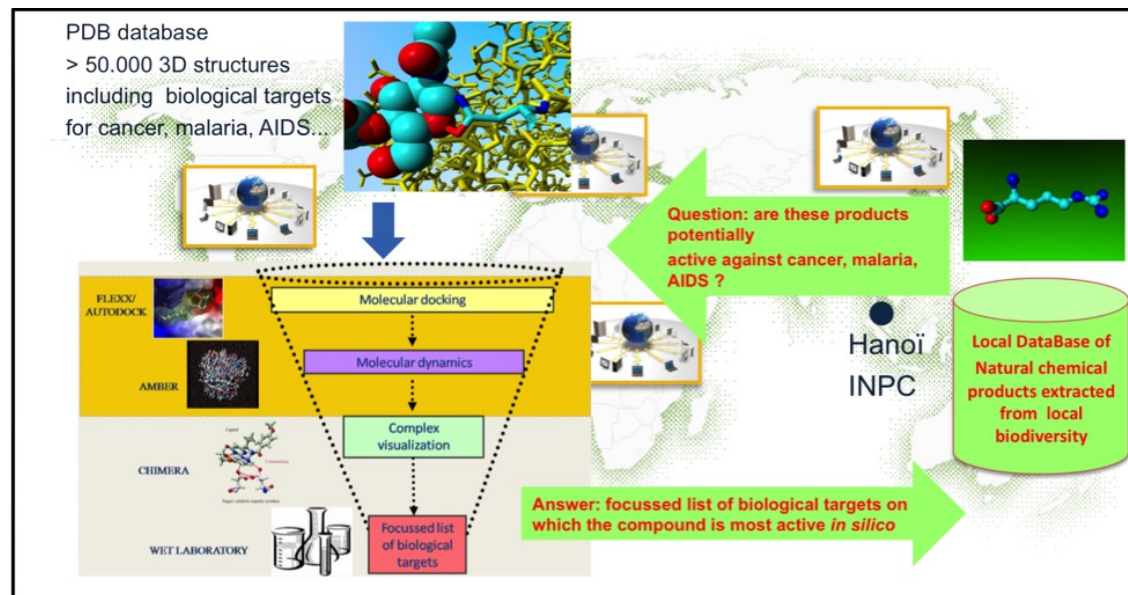
- g-INFO (grid-based International Network for Flu Observation), version 2
- Drug discovery on local biodiversity compounds
- Database of pre-calculated earthquake/tsunami scenarios for the Vietnam
- WN on-demand deployment with Virtualization and Cloud Technologies



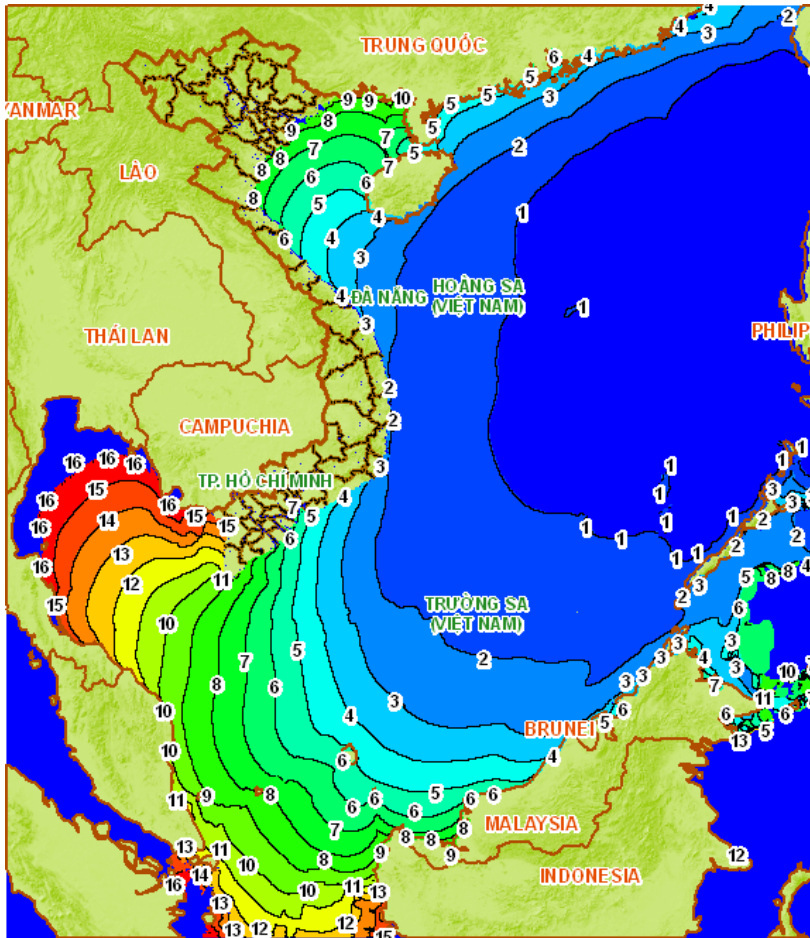
- Topic
 - Surveillance of emerging diseases
- Local partner
 - IFI, IOIT, IBT, HUT
- Remote partner
 - CNRS, HealthGrid
- Status
 - V1 running on biomed and EUAsia VO's
- Perspectives
 - workflow engine with multiple choice of components and DB

Drug discovery on local biodiversity compounds

- Local partners
 - INPC, IOIT, IFI, HCMUS
- Remote partners
 - CNRS, HealthGrid, IRD, ASGC, UPM
- Status
 - 45 compounds tested.
Compound DB ready
- Perspectives
 - Grid development & deployment (3 years)



Database of pre-calculated earthquake/tsunami scenarios



- Local partners
 - IGP, IOIT, IFI
- Remote partners
 - CNRS, IPGP, IRD, ASGC
- Status
 - 20 scenarios using ArcGIS software
- Perspectives
 - Portal with thousands of scenario to better define the risk from Tsunami
 - search and retrieve the proper scenario

On-demand WN deployment with Virtualization and Cloud Technologies

OpenNebula.org
The Open Source Toolkit for Cloud Computing

StratusLab

- Local partners
 - IFI, IOIT, HUT
- Remote partners
 - CNRS, IRD
- Status
 - Based on OpenNebula/Stratuslab technologies
- Perspectives
 - Tools for WN on-demand management and WN image configuration

Conclusion

- Grid applications just begin to develop in Vietnam
 - Thanks to the support of CNRS and EUAsiaGrid project partners
- Real needs identified, projects starting
- Difficulties
 - Lack of experiences
 - Very limited research funding
 - Very limited grids resources (cores, storage capacity)
 - Bandwidth limited and unstable Internet connexions
 - Lack of a NGI
- Community supports are always welcomed
- We hope able to contribute to the community on the next years.

Thank you !