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Grid Network Services Use Cases: Status Update

GHPN Research Group

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Introduction

- Motivation: collect quantitative and qualitative requirements from users and applications for identification and definition of Grid Network Services

- Applications:
  - Visualization
  - Data management in High Energy Physics Experiments
  - Emergency Medical Technician with Integrated Wireless Sensors
  - Astrophysics (black hole simulation)
  - Grid Network Management

Areas and Usecases

1. *Path-oriented: connectivity offering advanced services with QoS*
   - Visualization sessions
   - High throughput file transport with a deadline
   - File replica management in HEP experiments
   - Emergency Medical Technician with integrated wireless sensors
   - (Secure processing)
2. *Knowledge-based: collection and use of information about network performance*
   - Service optimization
   - Administrative setup of schedules of measurements
   - Passively monitored data
   - (Astrophysics bkack hole simulation)

Path-oriented Use Cases

	Banwidth	Latency	Jitter	Packet Loss	Mcast	Reliability	Co-Allocation	Data security
Visuali-zation	. Compute/data intensive . distributed data-sets: TBy/PBy . Depending on image resolution: 68/680 Mb/s; 6.8/68 Gb/s	< 200 ms	< 15 ms (if lat= 10 ms)	Yes	Yes	Yes TCP/UDP with forward error correction	Computing/ Storage/ network	No
HEP file replica	Several PBy/year .Tier-0 to Tier-1 sites (raw data, 2 PBy) -re-processed data, from Tier-1 to other Tier-1 - Local copies	No(but dependenc y of TCP on RTT)	No	Yes	Yes	Yes	Computing/ Storage/ Bandwidth, loss	No
EMT	Small data-sets from wireless sensors to PDAs and vice-versa; network capacity used depends on sensor sampling rate	< 1 s	No	0 – 20%	No	Yes	Storage (disconnected operation); bw and latency	Yes
Secure processing	NA	NA	NA	NA	NA	NA	NA	Yes

Knowledge-based Use Cases

	Resources accessed	Other Grid Services	Performance issues	Security and Privacy
Service optimization	. Network performance metrics: history and latest results	. Information Service . File replica management service . Scheduling	Information Service response time	Protection of information base during insert/retrieve operations
Administrative set-up of schedules of measurement	. Applications performing measurements . monitoring nodes . network paths (in case of active measurements)	. Information Service . Service Optimization . Network reservation . Grid operations	NA	. Authentication/ authorization . Protection of data during insert operations
Passively Monitred Data	. Applications logging performance data . Log files	. Information Service . Service Optimization . Network reservation . Grid operations	NA	Privacy of data needs to be guaranteed
Astrophysics Black Hole Simulation	. Information about network and generally “resource” status	. Information Service . (Immediate) Resource Reservation: Compute, Storage and Network . Monitoring Service	. Near real-time status information	NA

Future work

- Revision of some use cases
- Addition of new use cases (input is welcome!)
- Use case analysis
  - input to the network services draft