

The RMOST Online Steering Tool

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- Introduction
- Use cases
- Functionality of the tool
- Components of the tool and integration
- Future plans

- RMOST is a **R**esult **M**onitoring and **O**nline **S**teering **T**ool
 - Supports Athena jobs and visualization with ROOT
- Online steering is an established mechanism to accelerate computational research
- Connect to a job at runtime of the job
- Monitor intermediate results
- Modify job parameters

A Use Case (1)



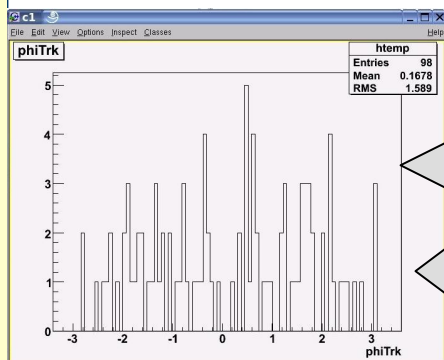
- Goal: Optimize an algorithm parameter (e.g. cut)
- Without steering tool:
 - Submit many jobs with different parameters consecutively
 - Wait until the jobs have finished
 - Check all results
 - Select the best parameter for the production job
- With online steering:
 - Submit one job
 - Connect to the job during runtime
 - Retrieve intermediate results
 - Optimize parameter and restart the job without resubmission

A Use Case (2)

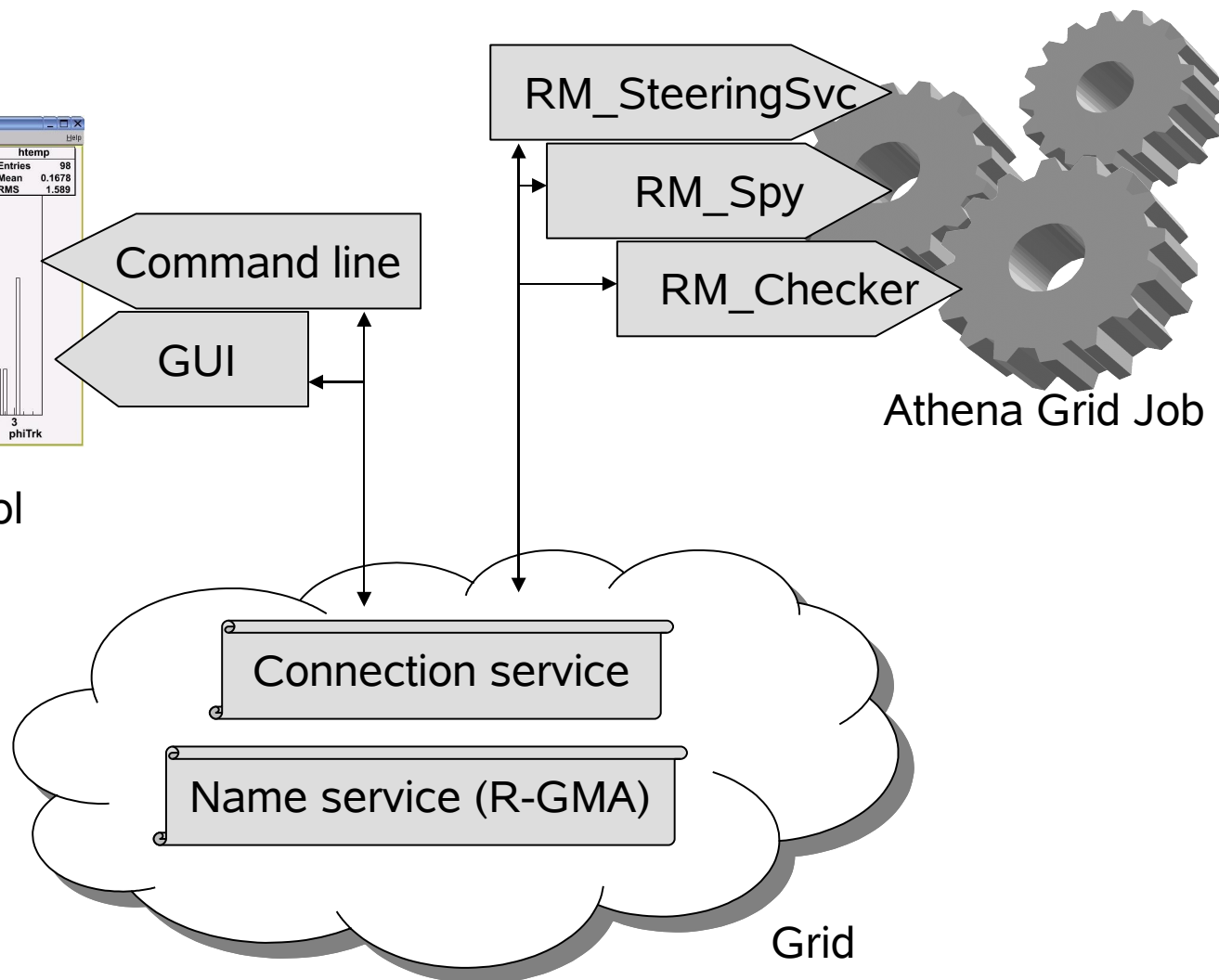
- Advantages:
 - Less jobs to manage
 - Earlier feedback on emerging results
 - Less computational resources needed
 - Only one input set must be moved => reduces network traffic

- Find the job options statement that causes the job to crash
- Study the emerging of results step by step
- Substitute an algorithm online
- Control the job execution

Components



Visualization tool
ROOT



- Steering of job execution
 - Suspend execution
 - Execute one single event and wait
 - Continue with execution
 - Terminate job
 - Restart job without resubmitting the job
- Download of intermediate results
- Replace the job options file
- Monitor the number of executed events
- Easy to apply: just edit the job options

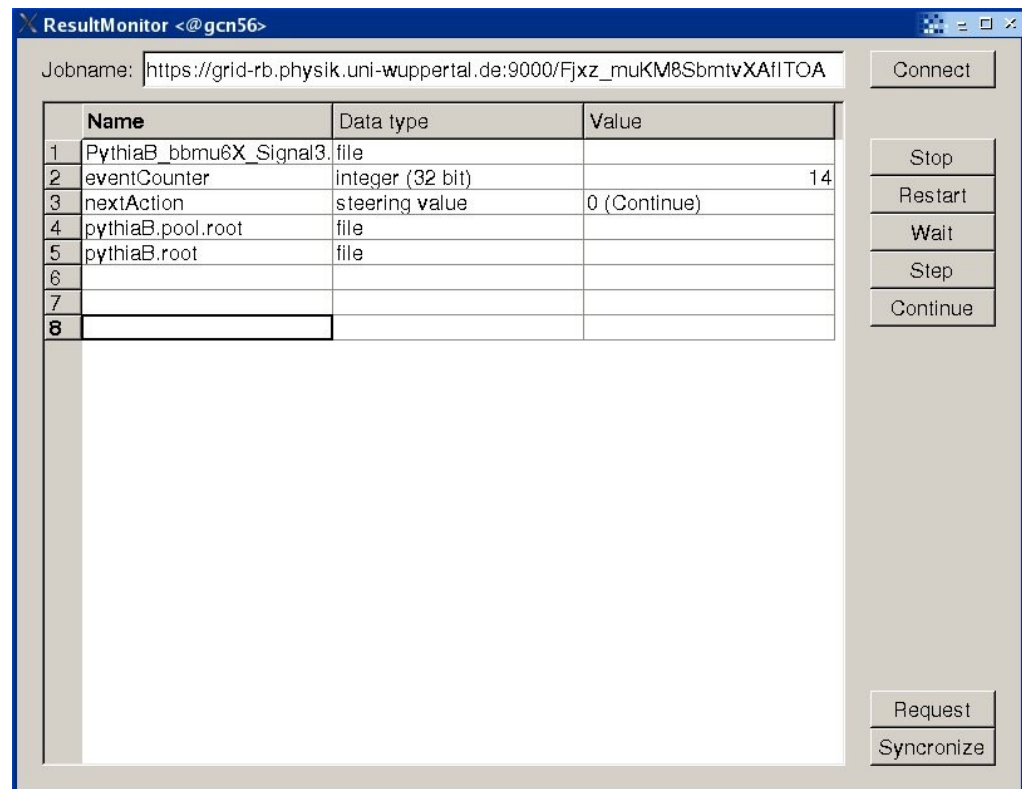
- With long algorithm lists => long response time of the steering
- RM_Checker accelerates the response time
- Used in combination with RM_Spy
- Instantiated in the job options
- Several instances can be used
- Overhead:
 - Depends on user interaction
 - Without user interaction on 2 GHz processor < 0.1 μ s per event

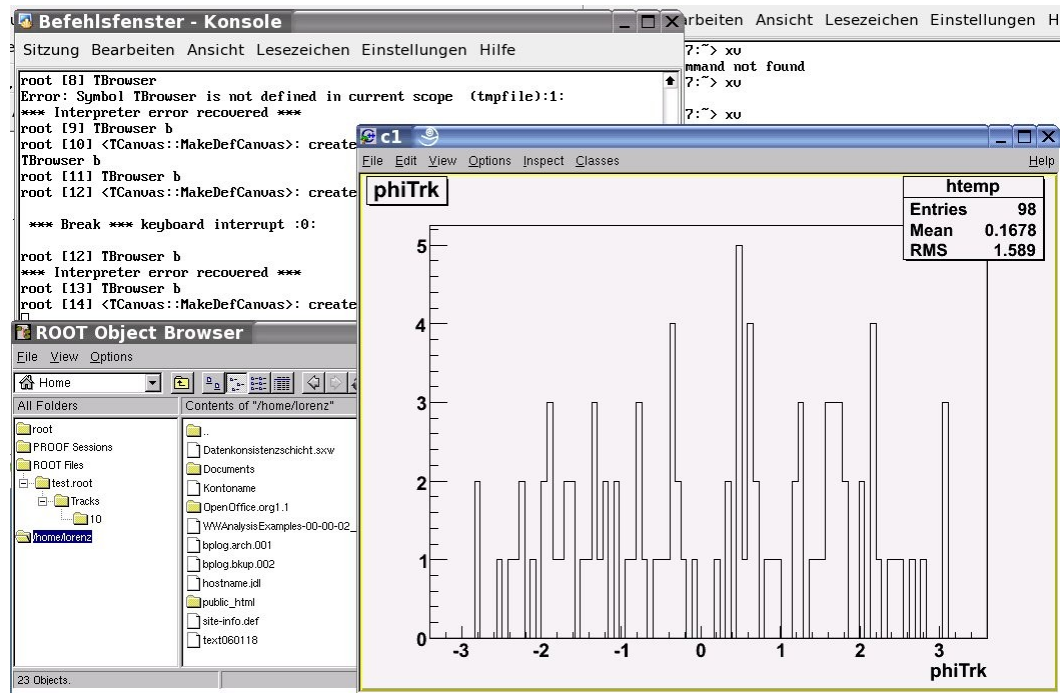
- Provides advanced functionality for expert users
 - Monitoring of data in memory
 - Steering of internal variables
 - Using user-defined data types
 - Preprocessing of data
 - Steering and monitoring of virtual data
- Registration of steerable/monitorable data
 - For non-standard data types, serialization methods must be provided
- Advanced functionality needs source code instrumentation
- Internally used by RM_Checker and RM_Spy

Graphical Data Browser



- Connect to job
- Show list of available data
- Monitor and steer data of basic data types
- Download and upload files
- Control the job execution





- Connect to job
- Get data from job
- Set data in job
- Allows monitoring and steering of data with user-defined types

- Necessary to establish a Grid connection
- Connection Service
 - Solves connectivity problems (firewalls, private IP networks)
 - Can be started by the user
 - Can be deployed as permanent service
- Name Service
 - Maps job id to network address
 - No own implementation
 - Uses R-GMA

- Milestones:
 - 05/2006: Specification of requirements
 - 10/2006: Design of system architecture
 - 04/2007: First prototype (Basic components)
- Status:
 - First prototype available:
 - <http://www.hep.physik.uni-siegen.de/hep/rmost>
 - The tutorial available on the website will be demonstrated

Improve Functionality:

- Automated error detection and report
- Online access of ROOT files instead of download
- Improve job handling

Issues to be discussed with developers:

- Integrate Grid connection components into gLite releases
- Integrate RMOST components into Athena and ROOT