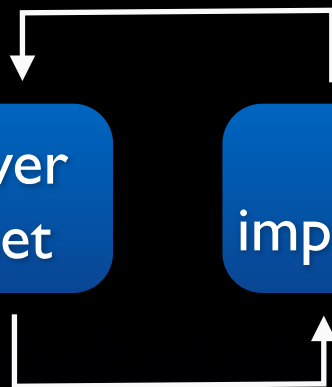


## HEP Data Analysis

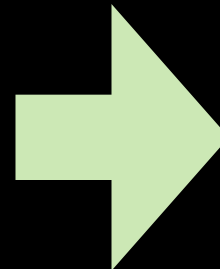
Implement  
algorithm



Run over  
data set



Make  
improvements



The Parallel ROOT Facility, PROOF, is an extension of ROOT enabling interactive analysis of large sets of ROOT files in parallel on clusters of computers or many-core machines.

PROOF is primarily meant as an alternative to batch systems for Central Analysis Facilities:

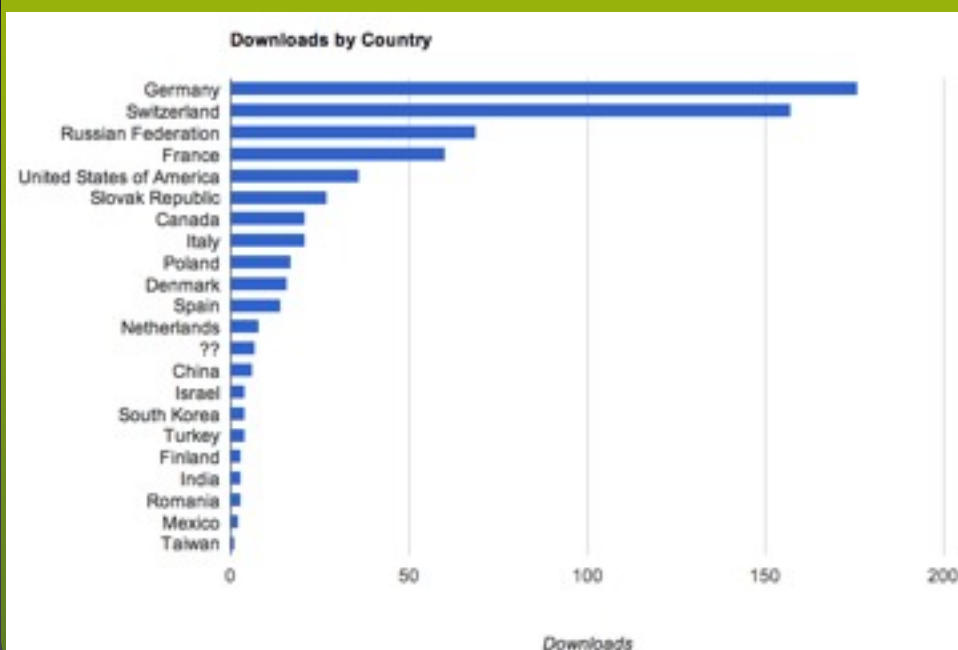
- One user can disturb other users.
- From time to time admin. interventions are needed.
- There is only one ROOT/xrootd version for PROOF services.
- There is a master node limitation.

“PROOF on Demand” (PoD) is a solution for private, dynamic PROOF clusters.

PROOF via PoD, User

- can entirely control his/her dynamic cluster,
- can setup and use it on demand on any RMS (SSH, LSF, PBS, GridEngine, Condor, gLite...),
- can dynamically change an amount of workers,
- can select a preferable master host,
- doesn't need admins to take an action,
- doesn't disturb other users,
- is free to choose a ROOT version for services.

PoD is also very popular outside of GSI:



- 700+ Downloads since June, 2010,
- used in 21 Countries,
- only in 2011 it has more than 170 downloads from unique IPs

Since end of 2009 GSI phased out a static PROOF cluster and use PROOF only via PoD. Mainly used by ALICE and FAIR at GSI.

Widely used outside of GSI, for example: it has been chosen by ATLAS as an official PROOF tool for T2-T3.

### **Native PROOF connections**

Whenever possible, PoD setups direct PROOF connections between nodes. It results in a full functional PROOF cluster. To use native connections an incoming traffic must be allowed on PoD workers for a defined port. Otherwise PoD uses packet-forwarding algorithms.

### **Multiuser/-core environment**

PoD implements automatic port mapping algorithms to properly handle cases when several users start PoD instances (servers/workers) on the same machine and when multiple PoD workers are started on the same node. Private PoD instances can't disturb each other.

### **Easy to use**

The process of installation is very simple and fully automated. PoD works out of the box.



### **Packet-forwarding**

When worker nodes are behind a firewall then PoD uses its packet-forwarding algorithms to maintain the PROOF traffic.

### **GUI & Command-line**

PoD provides a simple and intuitive graphics user interface in order to simplify access to its functionality. For user's convenience there is also a command line interface, it helps to manage a PoD cluster remotely or use it in a batch mode.

### **Different job managers**

PoD supports different job managers via a plug-in system. It is a very easy to extend system. PoD is currently shipped with SSH, gLite, LSF, PBSPro/Torque, and SGE/OGE plug-ins. In future versions more plug-ins will be implemented.