

# FOXGrid

## User's guide

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# 1 Introduction

FOXGrid is a modification of FOX software (Favre-Nicolin & Černý, 2002) with additional grid (distributed computing) features.

FOXGrid code works in following way: One instance of FOX is sending jobs to another FOX instances on the net or on the same multi-core PC. The problem is solved in parallel runs. This method can be used for full utilization on multi-core and hyper threading PC by running multiple clients on the same PC as well as using multiple PC on the net. This allows getting more computational power than with standard FOX without grid extension. The target is to get power to solve more complex structures or problems requiring “brute force” approach.

## 2 Using FOXGrid

### 2.1 Start FOXGrid

At first, you should launch FOXGrid executable file (file name must be Fox.exe under Windows systems). In the menu select "FOXGrid->Run Server". FOXGrid tab window should look like on Fig. 1.

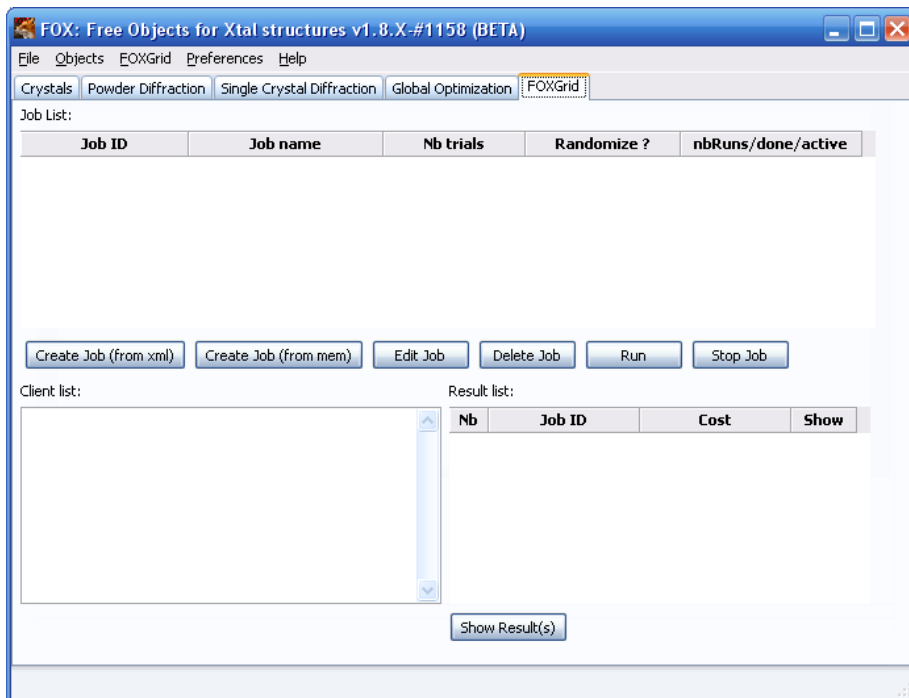


Fig 1. FOXGrid server GUI.

## 2.2 Create job (data file)

Job is a FOX \*.xml or \*.xml.gz data file with describe the required run and it contains all needed objects (e.g. Crystal, Powder Pattern and Monte-Carlo). It is possible to create this file in the FOX GUI by using standard FOX's menus (file->save as). The second way to create job file is using Create Job buttons in the FOXGrid server GUI. There are two methods - creating job from existing file or create job from program memory (it creates job from currently loaded data).

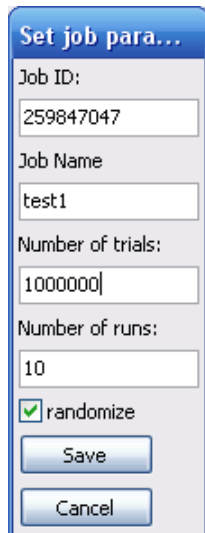


Fig. 2. Job settings

After pressing one of the "Create job" buttons you should fill up the job settings parameters.

- Job ID - read only - ID of the job.
- Job Name - name of the job
- Number of Trials (the same as "Number of trials per run").
- Number of runs (the same as "Number of runs to perform").
- Randomize - check it and client randomizes data before computing.

Modify or delete job by selecting appropriate line and by pressing one of the delete or edit button.

### Warnings:

Job \*.xml or \*.xml.gz file must be a complete FOX file with all needed data (including Monte-Carlo object).

Be careful when creating job from FOX memory (from loaded data) - data must be complete for running computation (including all needed data again).

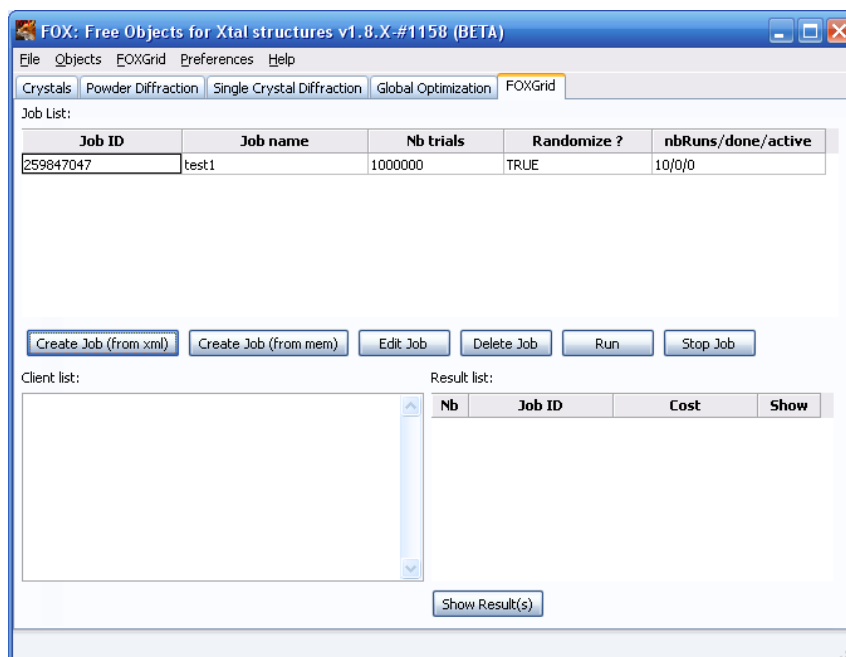


Fig. 3. FOXGrid server with one job.

## 2.3 Run computation

After loading job(s) - see **2.2 Create Job**, press "Run" button. Server will detect number of CPUs in the current PC and it will offer for run as many clients as is the number of CPUs detected. Press OK to run clients on the same PC as server. Press cancel to run and connect clients on another PC in the net, see **2.4 Run Client(s)**.

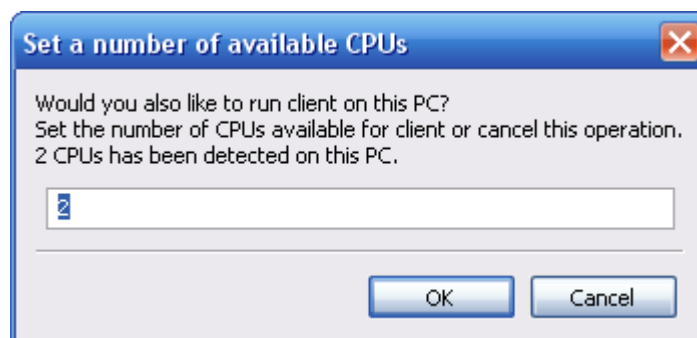


Fig. 4.

After pressing OK, server will launch and connect clients automatically to this FOXGrid server. Program creates "client" folder with many subfolders and files. The computation process will start in a few seconds.

## 2.4 Run and connect client(s)

Run FOXGrid executable file (file name must be Fox.exe under Windows systems). In the menu select "FOXGrid->Run Client". FOXGrid tab window should look like Fig. 5

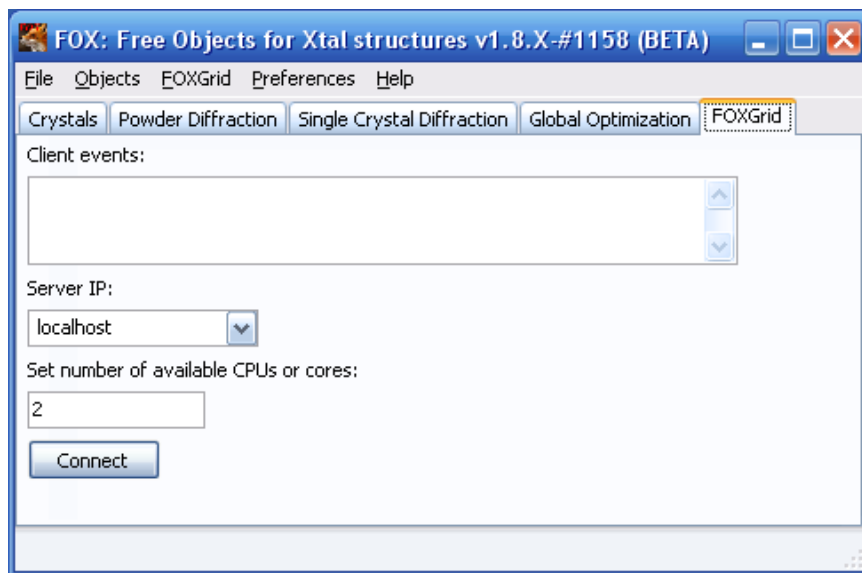


Fig. 5. FOXGrid client GUI.

Write the FOXGrid server's IP to the appropriate edit box and set the number of CPUs. Press connect. Client will try to connect to the server. If client connect to the server, server will send data to the client. The client will launch working threads for multiple FOX runs on actual PC (see Fig 6).

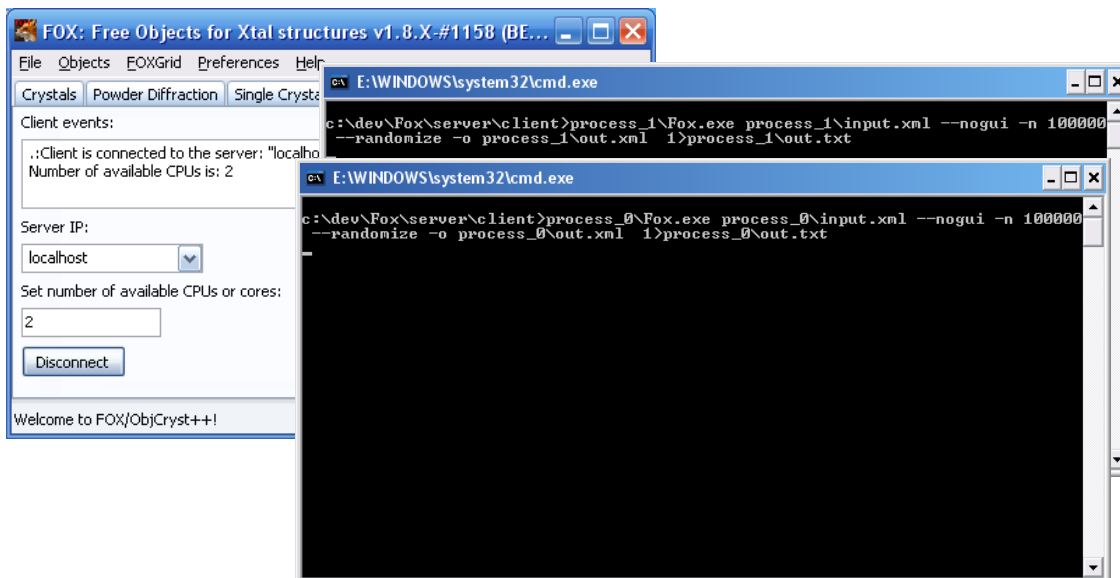


Fig. 6. Client with two working threads

If client can't connect the server you should press stop button to cancel connecting and write the correct IP.

If client is successfully connected it is possible to disconnect by pressing disconnect button - it automatically kills all computing threads and disconnects client from server.

### **3 References**

Favre-Nicolin V, Cerny R.: J.Appl. Cryst. 35, 734-743 (2002).