# PSR Cloud

PSR

Remote Execution of Computational Models

## What is PSR Cloud?

As the optimization models incorporate more details of the real world, they become more complex and higher computational power is needed to solve. A natural approach to keep the execution time under acceptable levels is to design distributed models, which take advantage of the use of multiple computers – and their various processors – performing parallel calculations. Among the computational models that use such strategy are SDDP, OPTGEN and NCP. A usual disadvantage of this approach is the relatively high cost with dedicated hardware, software and personnel to maintain the infrastructure available.

PSR Cloud is a platform conceived to manage the remote execution of simulation models in an environment of distributed processing (cloud computing), in such a way that the users do not need to have any specialized infrastructure for that purpose.

PSR Cloud:

- Avoids the investment in dedicated hardware, software and personnel;
- Executes simulations securely using large scale infrastructure on the cloud;
- Offers scalability: for each execution, the user defines how many processors will be used;
- Allows the execution of multiple cases simultaneously;
- Can be used for simulations when the local infrastructure is busy or unavailable.

## Main features

### Easy to setup, update and use

PSR Cloud Client is the application that manages the remote executions of the models. It can be installed in any standard PC with internet access. The updates of this application can be set to be automatically downloaded, like the Windows updates.

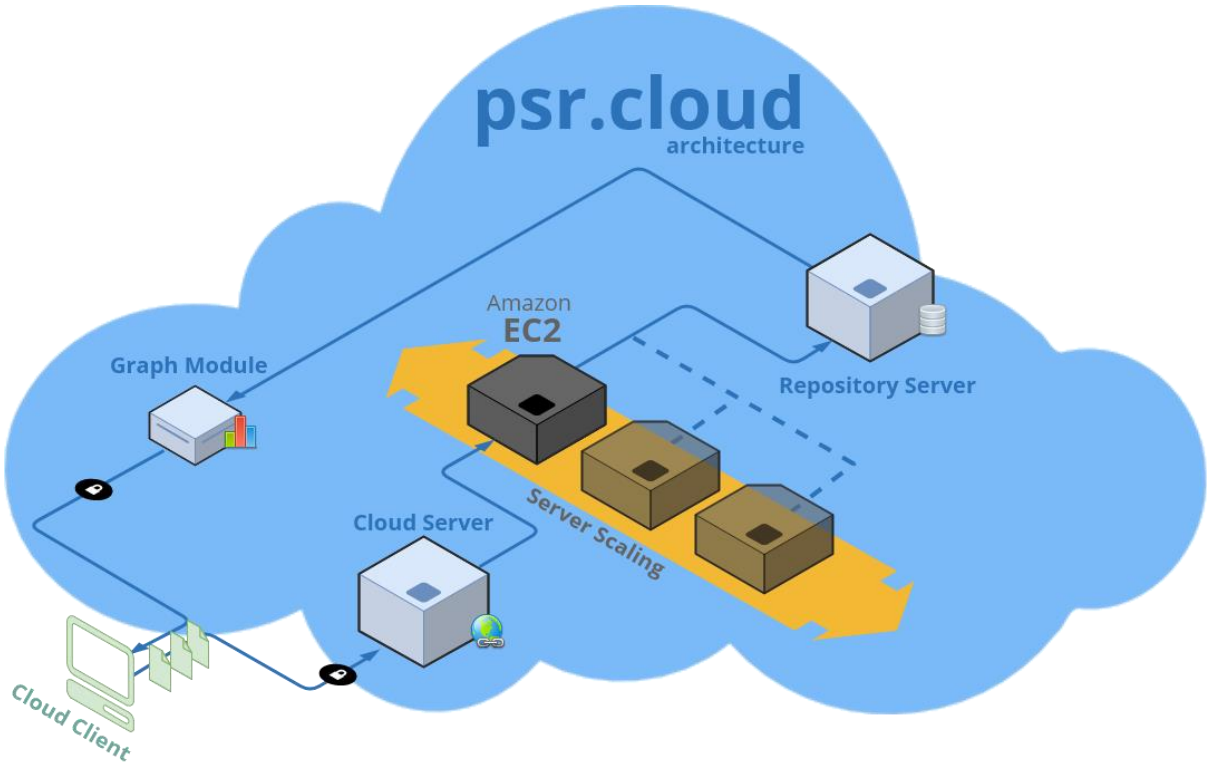
On the cloud, the PSR Cloud Server takes care of all execution process without demanding any user intervention: it uploads the local data, adds the processing servers, installs the models in the servers, initiates and monitors the execution, notifies the user by email once the processing is finished and keeps the results available to be downloaded to the user´s local PC.

PSR Cloud Client works as follows (see figure below):

1) The user informs the study input data folder and the desired number of processors;

2) When the user executes the case, the PSR Cloud Server verifies the permissions granted to the user and allocates the requested servers;

3) PSR Cloud Client sends to the allocated serves the models' input data. Once the execution is finished, the results can be transferred to the user´s local computer.




## High Performance

PSR Cloud currently has available an infrastructure of thousands of high performance remote processing servers, powered by 3.0 GHz Intel Xeon Scalable processors (which allows a single core to run up to 3.5 GHz using Intel Turbo Boost Technology) with support for the new Intel Advanced Vector Extension 512 (AVX-512) instruction set, having 36 vCPUs and 72 Gb of RAM and with up to 25 Gbps of network bandwidth using Elastic Network Adapter (ENA)-based Enhanced Networking. The configuration of PSR Cloud servers is upgraded over time as new technology becomes available.

## Confidentiality and security

All data communication (input and output files of the models) is carried out, using data cryptography, directly between the user's local computer and the remote servers allocated to the execution, without any interference or passing through PSR servers. There is no access to the user's data by third parties.

PSR Cloud uses the HTTP (Hyper Text Transfer Protocol) over SSL (Secure Sockets Layer) or HTTPS protocol, which is a secure way to transfer data over the internet, with the same level of protection applied for bank transactions.

### Low cost

PSR Cloud is a pay-per-run service whose cost for SDDP, OPTGEN and NCP executions is just US$0.10 per processor per hour using version 15 (or newer) of SDDP and US$0.50 per processor per hour using older versions of SDDP. PSR Cloud is billed proportionally per minute. This means that a run using version 15 of SDDP that takes 1 hour and 15 minutes (i.e., 75 minutes) with 36 processes will cost only (US$0.10/60)*(75)*36 = US$4.50.

The service is offered in a pre-pay scheme: the client purchases credits to be used in the executions, and the cost of each run is deducted from the current balance. The minimum amount of credits to be purchased is US$1,500 (net value; only Brazilian taxes included).

### Very high availability

PSR Cloud uses remote processing servers that have a minimum monthly availability of 99.95% of the time.

### Easy to control and monitor the executions

During the execution, the user can monitor – via the PSR Cloud Client graphical interface – the evolution of the processing phase by accessing the log produced by the model. At the end of the run, the user receives an email with its status, cost and remaining account balance. The user can also check the complete list of performed runs and their status and costs by accessing the administrative page of PSR Cloud on the web.

### Strategically compatible with local clusters

Even if a local infrastructure exists, for reliability purposes, PSR Cloud can act as an alternative processing environment.

### Extensible to other applications of interest

The platform can be personalized also to run similar user-specific applications[1].

### Multi-user flexibility

The client can create a corporate account and associate a group of users to it, who will share the PSR Cloud credits.

### Know more about PSR Cloud without commitment

Please contact us via the e-mail psrcloud@psr-inc.com and request a demo.

[1] Please contact PSR to assess the feasibility and cost for customizations.