



OpenSees & DesignSafe: OpenSeesSP

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OpenSees applications on DesignSafe



NHERI: A NATURAL HAZARDS ENGINEERING RESEARCH INFRASTRUCTURE



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as well as data analysis and visualization tools including Jupyter, MATLAB, Paraview and VisIt.



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Browsing:

sal

File name

.ipynb_checkpoints

The **Open System for Earthquake Engineering Simulation** (OpenSees) is a software framework for simulating the static and seismic response of structural and geotechnical systems. It has advanced capabilities for modeling and analyzing the nonlinear response of systems using a wide range of material models, elements, and solution algorithms. One sequential (**OpenSees EXPRESS**) and two parallel interpreters (**OpenSeesSP** and **OpenSeesMP**) are available on DesignSafe. Please select the desired interpreter for more details.

Select a version of **OpenSees** from the dropdown:

- ✓ -- Please Select --
- OpenSees-EXPRESS
- OpenSeesMP (V 2.5)
- OpenSeesMP (V 3.0)
- OpenSeesSP (V 2.5)
- OpenSeesSP (V 3.0)

Jobs Status

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Select a version of **OpenSees** from the dropdown:

OpenSeesSP (V 3.0)

RUN OPENSEESSP (V 3.0) ver. 3.0.0.6709

OpenSeesSP is an OpenSees interpreter intended for high performance computers for performing finite element simulations of very large models on parallel machines. OpenSeesSP is easy to use even with limited knowledge about parallel computing. It only requires minimal changes to input scripts to make them consistent with the parallel process logic. OpenSeesSP runs on up to 12 KNL Nodes on Stampede2, with 64 cores per Node.

[OpenSeesSP \(V 3.0\) Documentation](#)

Inputs

Input Directory

Select

The directory containing your OpenSees input files as well as your OpenSees TCL script. You can drag the link for the directory from the Data Browser on the left, or click the 'Select Input' button and then select the directory. To try out sample data copy and paste 'agave://designsafe.storage.default/mock/examples/opensees/FreefieldAnalysisEffective' above.

TCL Script

The filename only of the OpenSees TCL script to execute. This file should reside in the Input Directory specified. To try this

Why OpenSeesSP?

OpenSeesSP (V 2.5)



OpenSeesSP (V 3.0)



OpenSeesSP is specifically developed for high performance computers (HPC).

Pros:

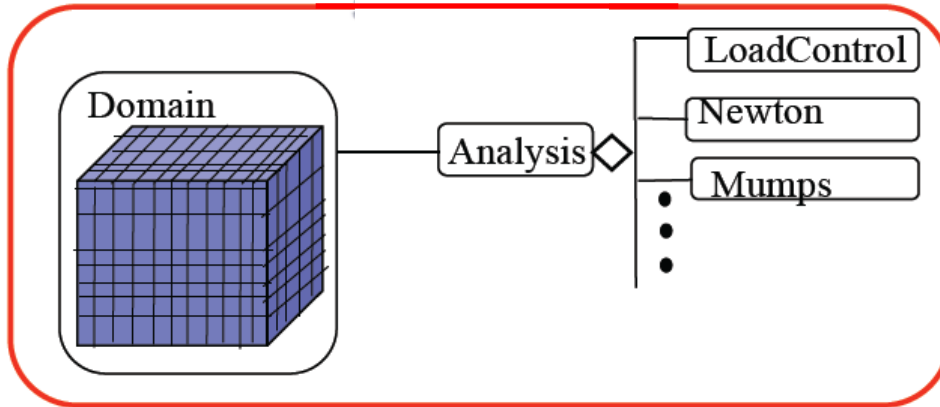
- Ideal for very large models;
- Minor changes to the script.

Cons:

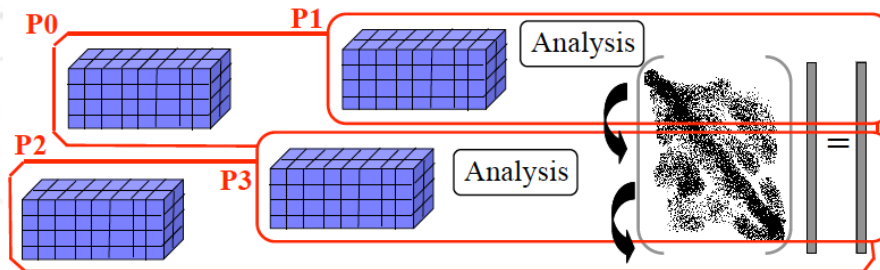
- It goes into the queue.

OpenSeesSP: The **S**ingle **P**arallel OpenSees Interpreter

P0



The main Processor (P0) interprets the script to build the model and to construct the analysis.



Other processors (P1, P2, P3) are running sub-domains of the model.

Graphics by McKenna

OpenSeesSP: How to modify the script

The *minimum changes* to the script include:

- Change the System of Equation and the Solver (**System Command**) to one of the following:
 - System Mumps;
 - System Diagonal.
- Change the Output Command for the Recorder substituting the *-file* flag with *-xml*:

```
recorder Element -file -xml Gstress.out -time -eleRange 1 $nElemT stress
```

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...Questions?

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