Siemens Power Technologies International

MPjobs - running PSSe in parallel

José Conto - ERCOT

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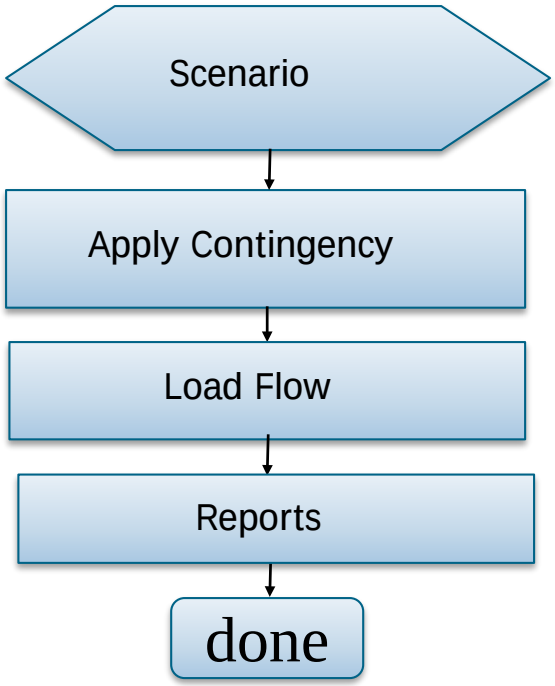
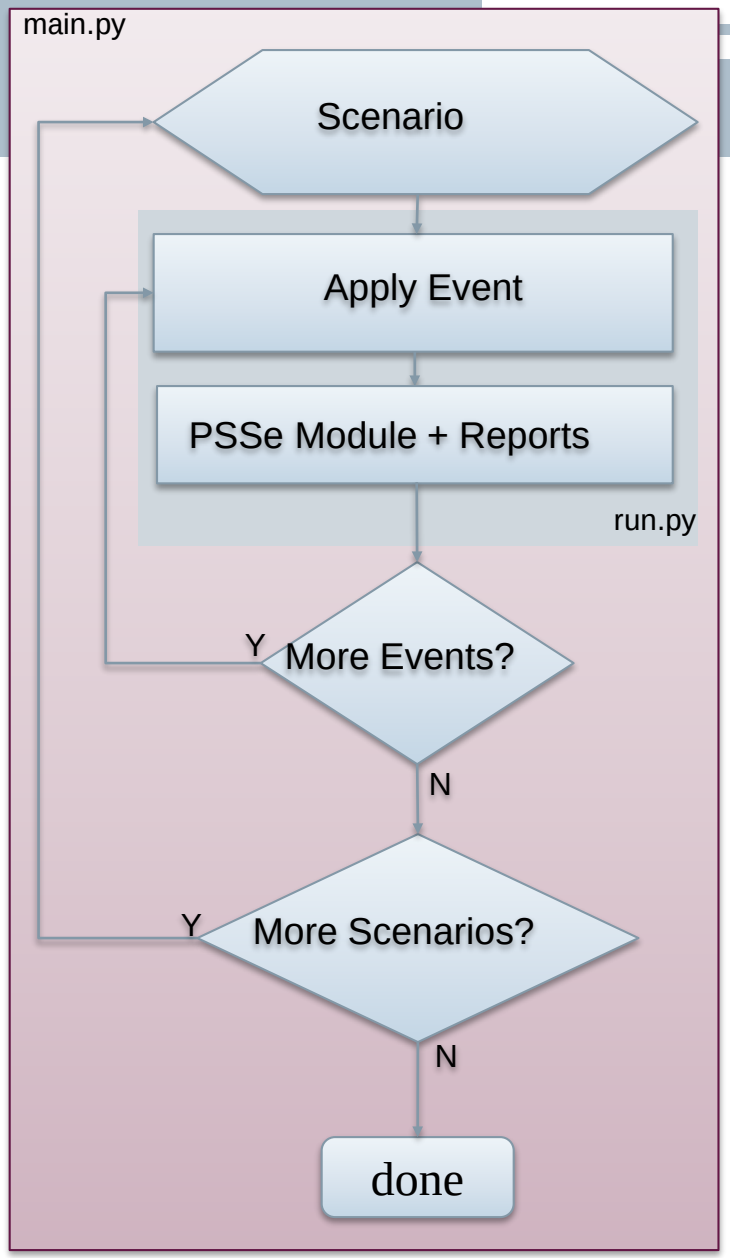
Processes in Series





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run.py – code to run a single dynamic simulation

```
// My = dictionary with study vars
sys.path.append(My['PSSEPATH'])
import psspy
psspy.psseinit(My['BUSDIM'])
…
psspy.progress_output(2,My['LOGFILE'],[0,0])

psspy.case(My['CNVFILE'])
psspy.rstr(My['SNAPFILE'])

psspy.runrspnsfile(My['CHANNELS'])
psspy.dynamics_solution_params([My['ITERATION'],_i,_i,_i,_i,_i,_i,_i],
      [My['ACCELERATIONF'],_f, My['STEP'],My['FREQFACTOR'] ,_f,_f, _f,_f],
My['OUTFILE'])
psspy.set_relang(1,My['GENRELANG'],str(My['GENIDRELANG']))
psspy.strt(0,My['OUTFILE'])
psspy.runrspnsfile(My['EVENTFILE'])
psspy.run(0,My['SIMTIME'],99,9,0)
```

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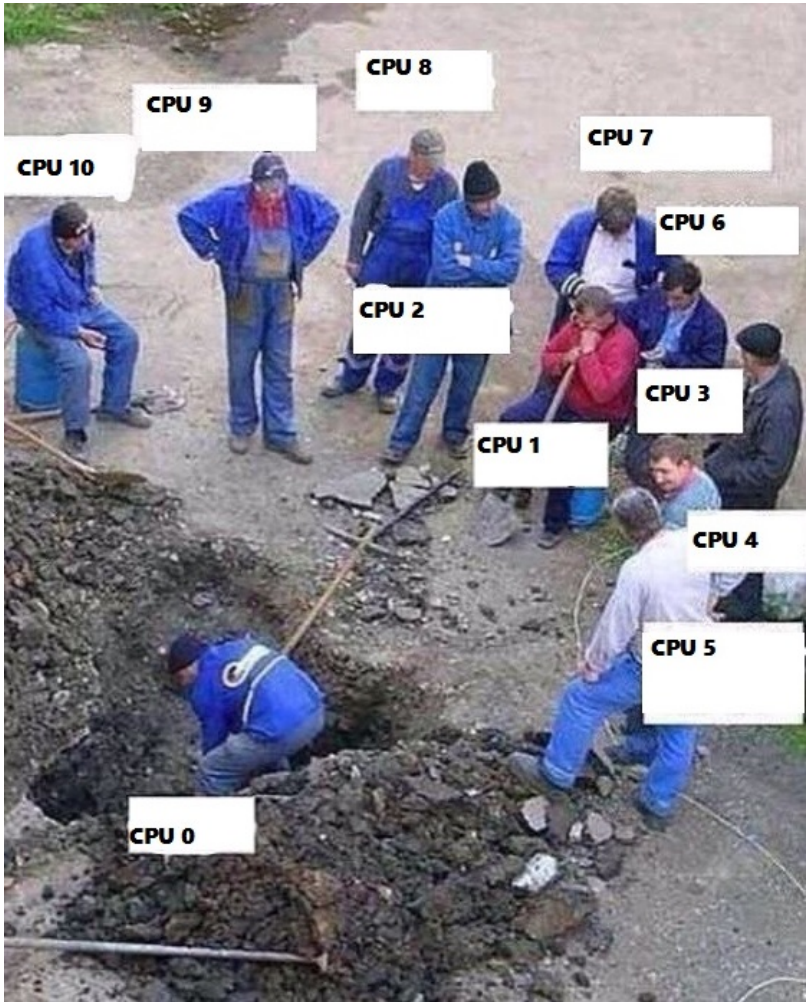
One CPU Environment



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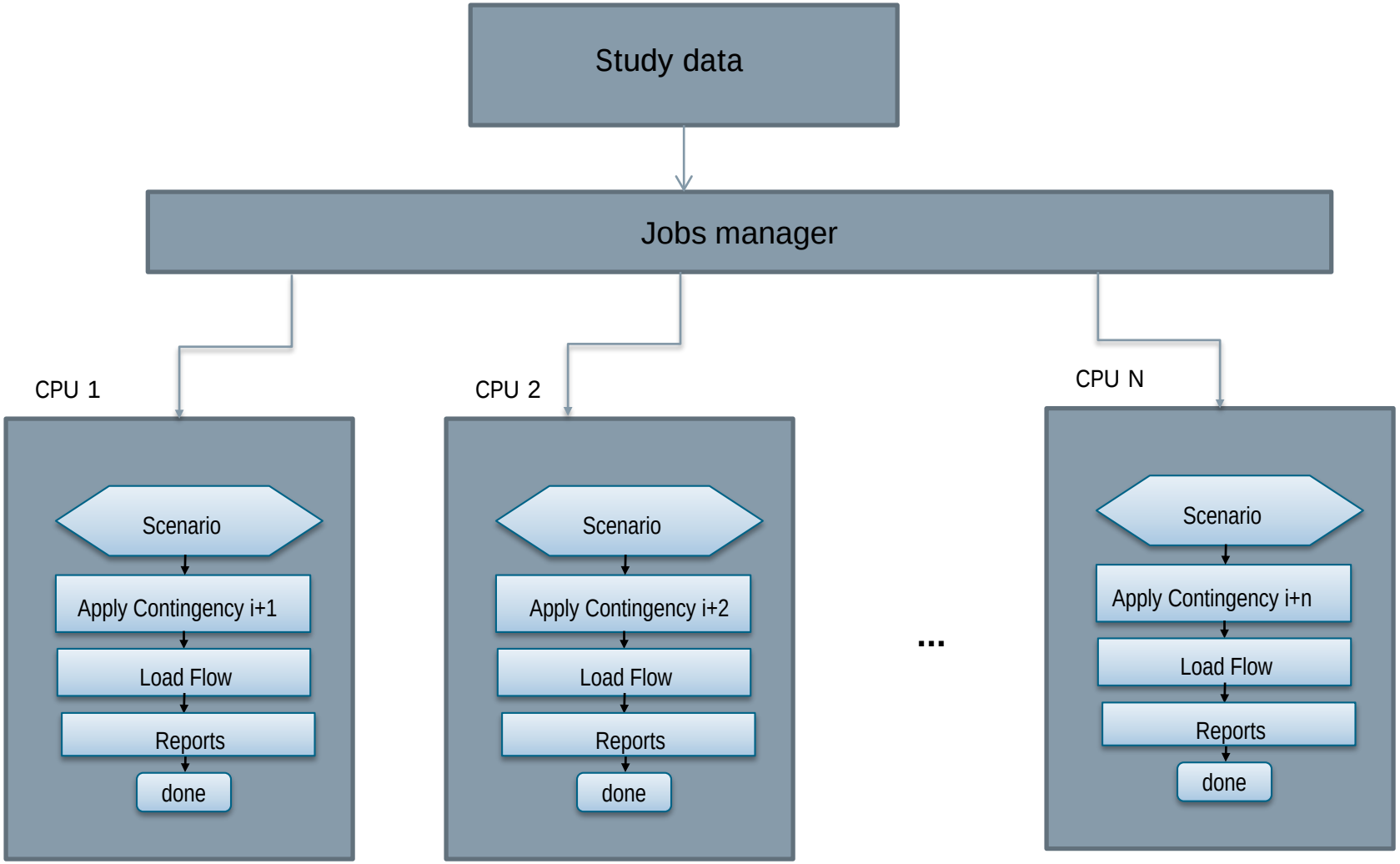
Processes in Parallel



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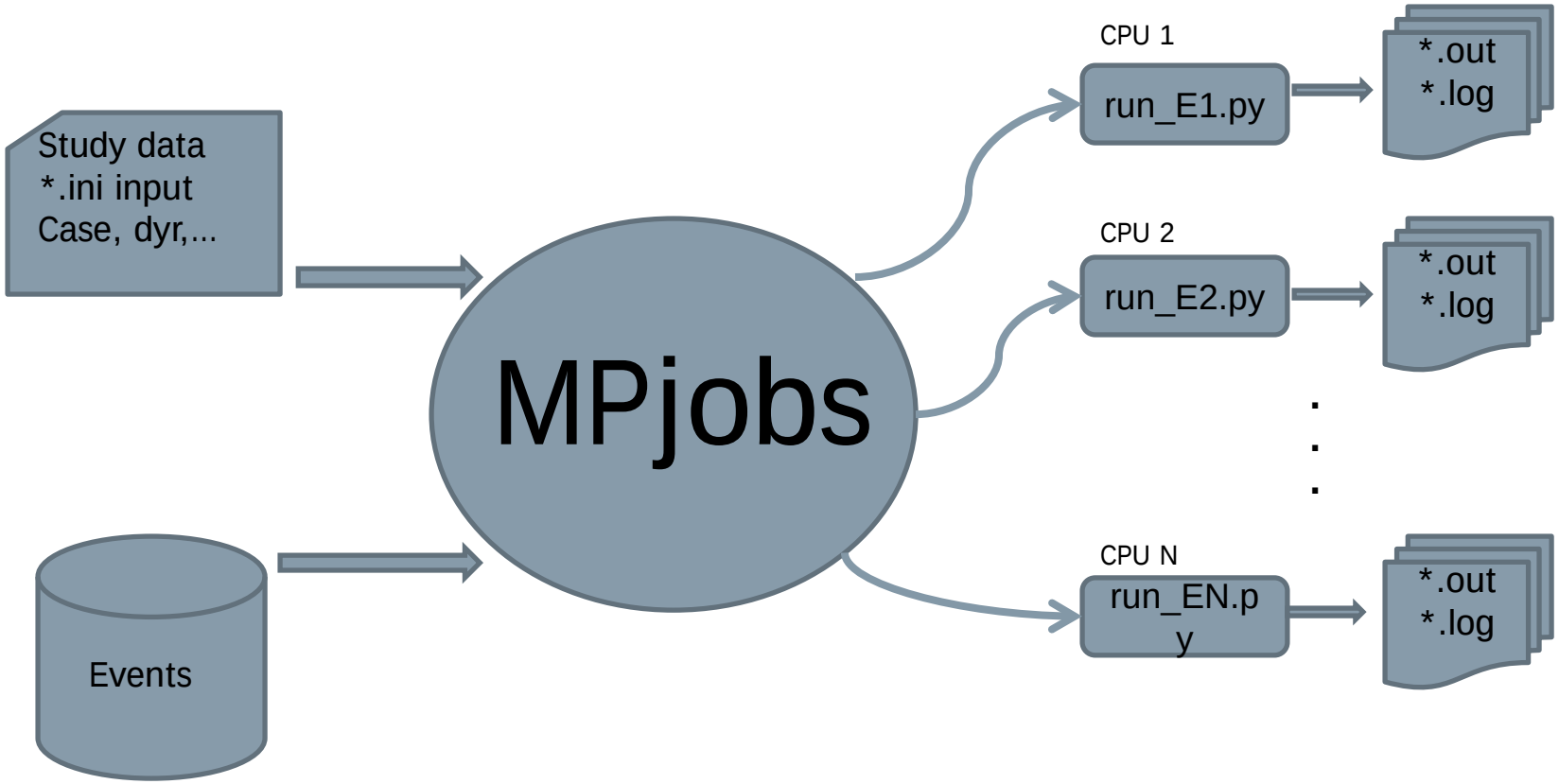
PSSe Dynamics in Parallel



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MPjobs code

```
import multiprocessing
import JCtools

def run_py(My):
    #call py code to exec a single process run
    execfile(My['SCRIPT'],globals(),locals())
    return

def main():
     My = JCtools.readIni(sys.argv[1])
     pool= multiprocessing.Pool()
     for xvar in open(My['XFILE']):
          My['XVAR'] = ...
          pool.apply_async(run_py, args = (My, ), )
          time.sleep(1)
     pool.close()
     pool.join()
```

```
/mpjobs.ini
case     = CASES\savnw_flat33
Script   = SCRIPTs\run_faults.py
Xfile    = events\P1.lst
Channels = scripts\channels.idv
Outspath = OUTs\
simtime = 10.0
PssePath   = ….
```

```
/P1.lst
SB1_b152.idv
SB1_b153.idv
SB2_b154.idv
…
```

```
/SB1_b152.idv
RUN
1.0,99,15,0
BAT_DIST_BUS_FAULT, 152, …
….
```

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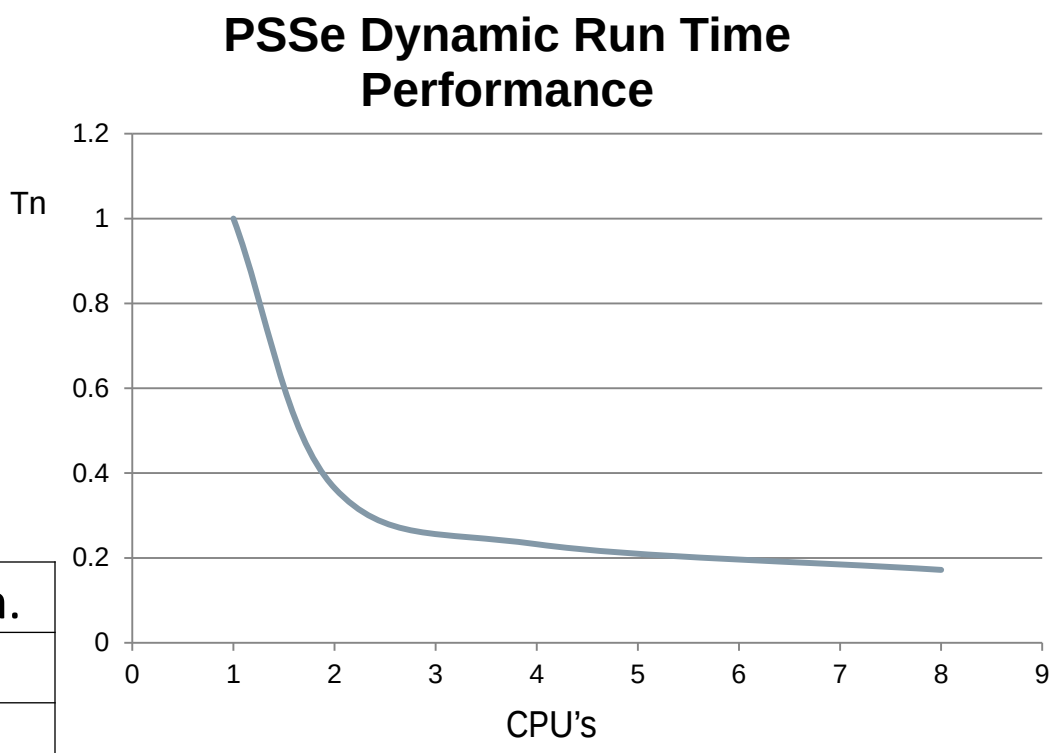
ERCOT test

PSSe v33,
ERCOT 5k bus system dynamic case,
16 normal clearing faults for 5 sec. simulation,
1/4 cycle step size,
busdim = 80k,
3249 channels

time sec	CPU	Time norm.
3386.13	1	1
1234.89	2	0.36
786.64	4	0.23
581.68	8	0.17



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1D->2D->3D runs

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MPjobs can process up to three loops of Z, Y, X vars:

- 1D runs: a single list of variables, in addition to other study data.
  (i.e.: In dynamics runs, a list of faults names = X vars)

- 2D runs: two independent lists of variables
  (i.e.: In dynamics runs, a list of faults names = X vars and
  a list of base case names = Y vars)

- 3D runs: three independent lists of variables
  (i.e.: In dynamics runs, a list of faults names = X vars,
  a list of base case names = Y vars, and
  a list of a study region load levels = Z vars)

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Thank you for your attention!

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