Design Goals

For users

- Easy to switch to a new EOS model
- Easy to switch to another **Flash Calculation** algorithm
- Easy to add a new IMPES/IMPEC method

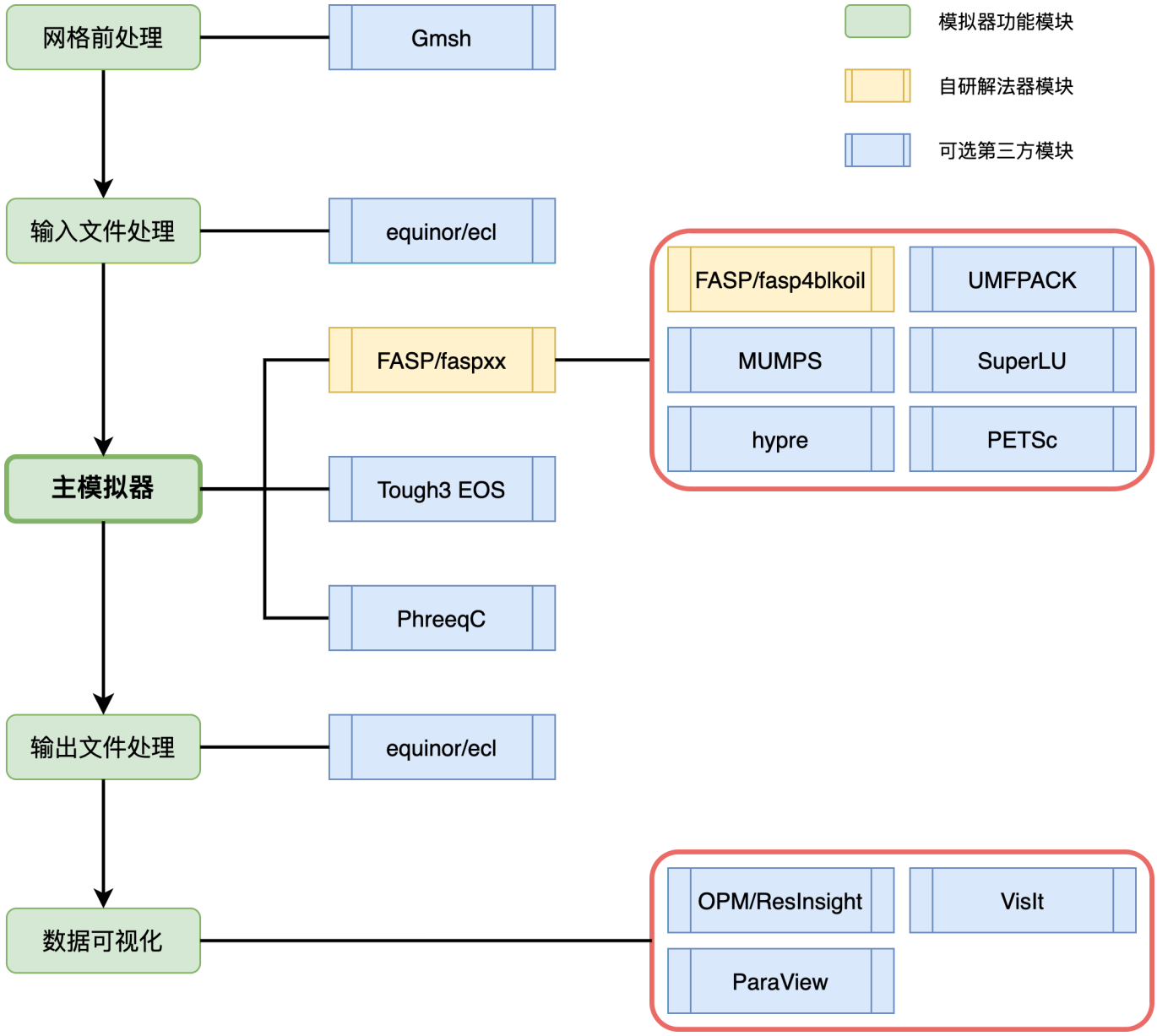
For developers

- Easy to change to a different grid structure
- Easy to add a new spatial discretization
- Easy to add a new temporal discretization

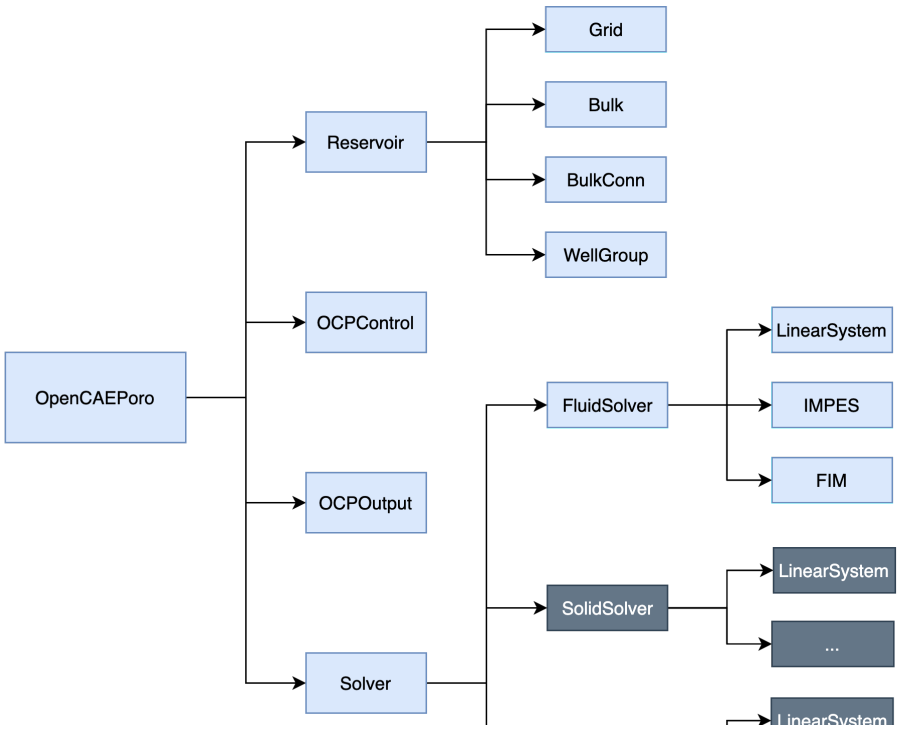
For optimzation

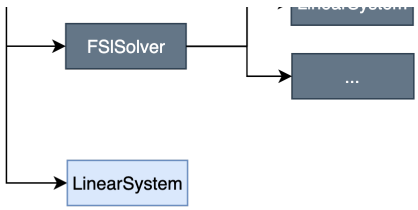
- Easy to add a new linear solution method
- Easy to parallelize linear solvers
- Easy to optimize code at certain steps

Linear solvers

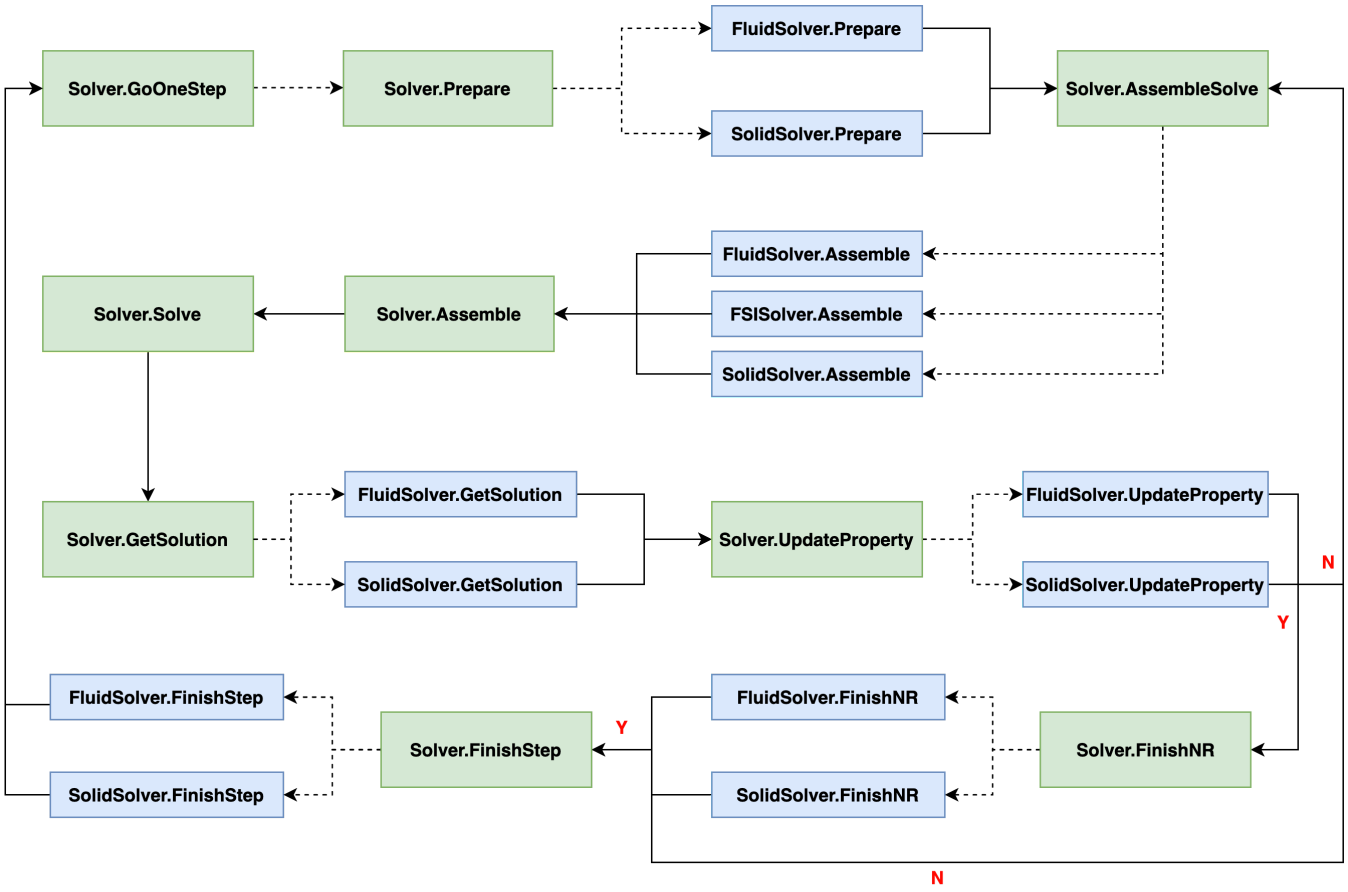

网格前处理
Gmsh
模拟器功能模块
自研解法器模块
可选第三方模块
输入文件处理
equinor/ecl
FASP/fasp4blkoil
UMFPACK
FASP/faspxx
MUMPS
SuperLU
hypre
PETSc
主模拟器
Tough3 EOS
PhreeqC
输出文件处理
equinor/ecl
OPM/ResInsight
VisIt
数据可视化
ParaView

Flow chart


Grid
Bulk
Reservoir
BulkConn
WellGroup
OCPControl
LinearSystem
OpenCAEPoro
FluidSolver
IMPES
FIM
OCPOutput
LinearSystem
SolidSolver
...
Solver
LinearSystem



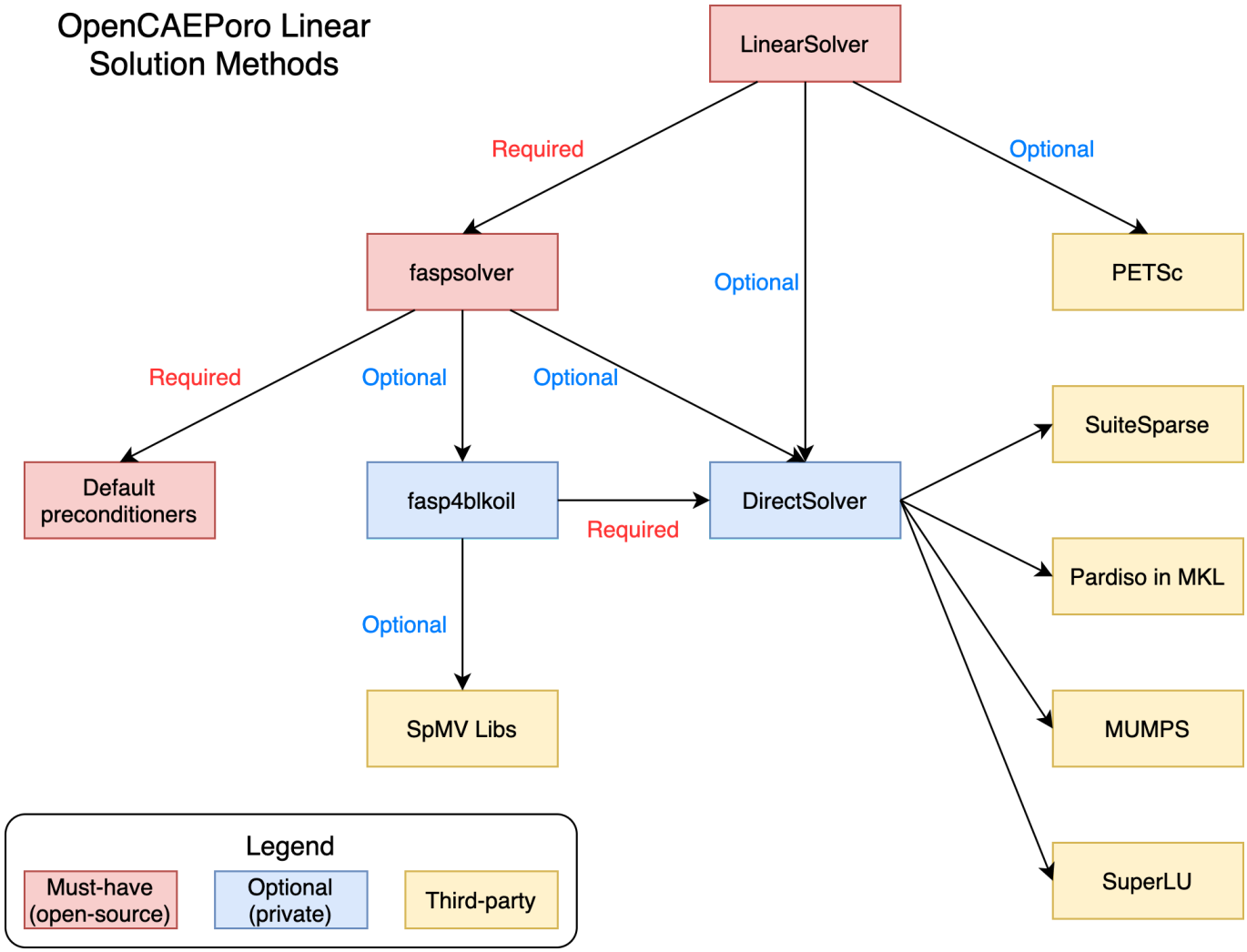
At each time step



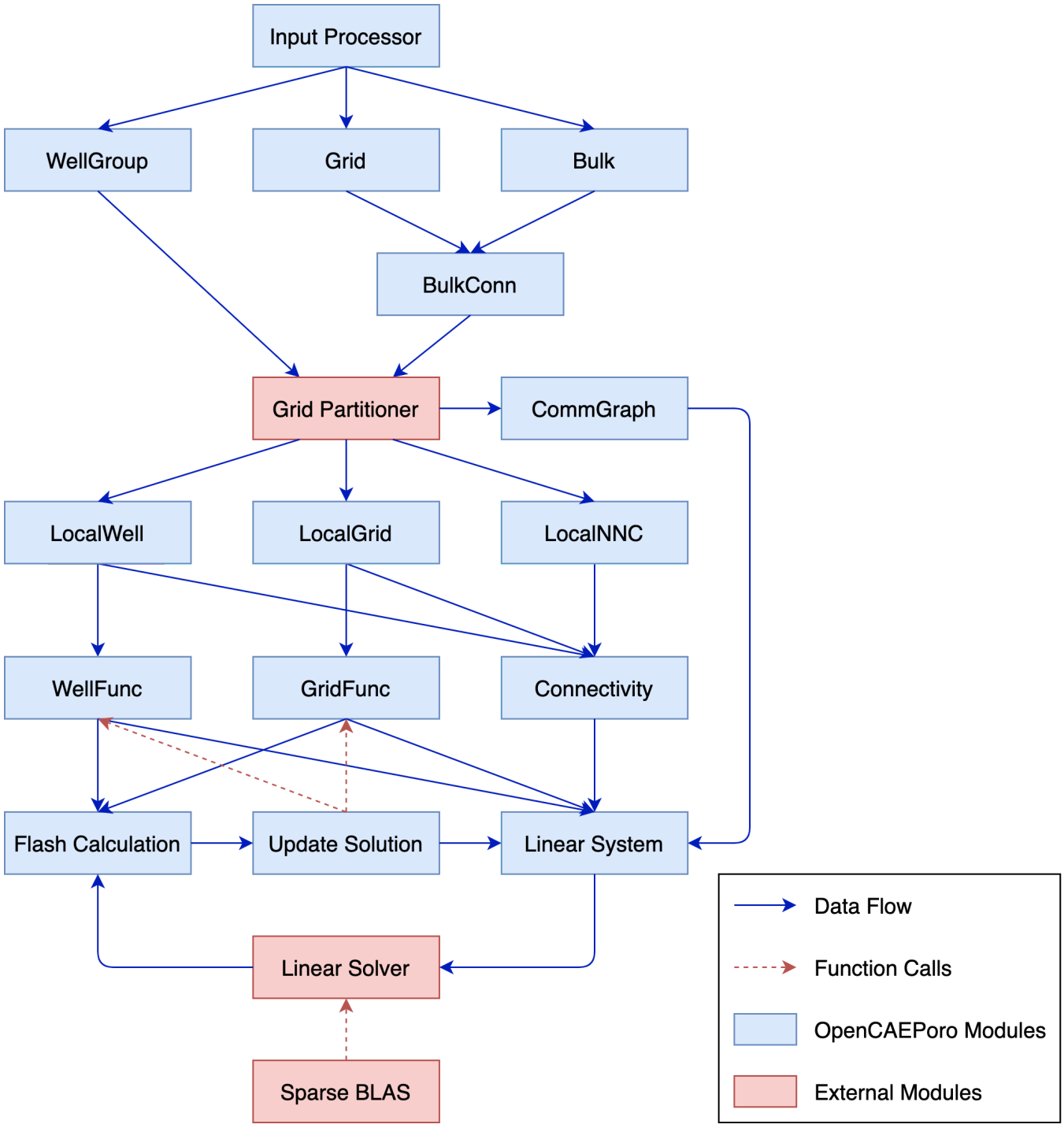
Notes:

(1) If the problem does not involve fluid-structure interaction, for example, only contains the fluid part, then Solver.AssembleSolve will only call the corresponding function in FLSolver (FSolver.AssembleSolve) to accelerate the simulation.

Linear solvers



Parallel module


Input Processor
WellGroup
Grid
Bulk
BulkConn
Grid Partitioner
CommGraph
LocalWell
LocalGrid
LocalNNC
WellFunc
GridFunc
Connectivity
Flash Calculation
Update Solution
Linear System
Linear Solver
Sparse BLAS
Data Flow
Function Calls
OpenCAEPoro Modules
External Modules