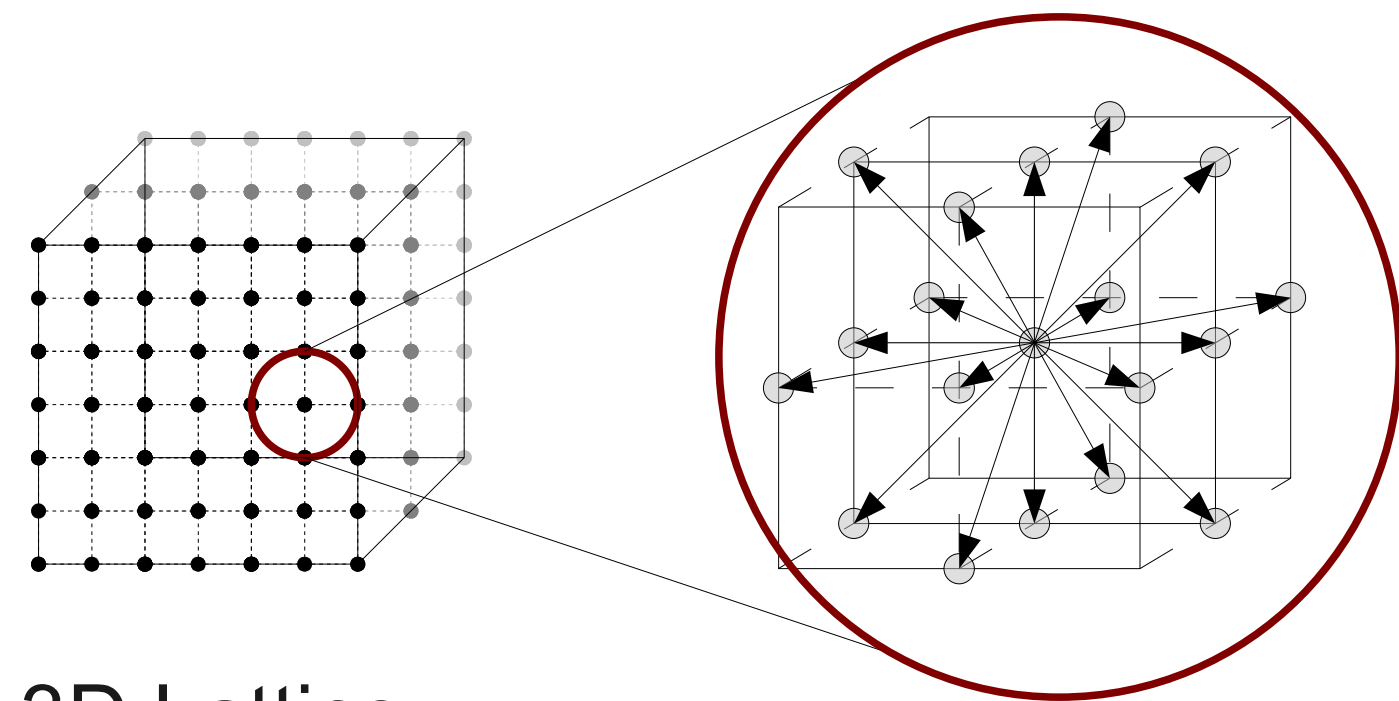


1 Introduction



3D Lattice

A Lattice node and its neighborhood

LB methods Algorithm

```
"Initialise the state of the lattice";
i := 0;
do i < iterationsCount →
    "Lattice nodes exchange state informations
    with their neighbors";
    "Lattice nodes update their state";
    i := i + 1
od
```

3 Configuration

Generic LB Parameters

```
<LBConfiguration>
  <Lattice size="(22,22,22)" />
  <Solid file="MU22.mat"
    type="ascii"
    class="D3SolidBitmap" />
</LBConfiguration>
```

LB Operations Description

```
<ProcessingChains>
  <ProcessingChain id="MyChain">
    <!-- Some operators -->
    <Operator class="BorderSender"
      parameters="" />
    ...
    <!-- Some loggers -->
    <Logger
      id="slice0"
      rate="10"
      loggerClass="D3SliceLogger"
      handlerClass="SliceLogHandler"
      loggerParameters="YZ 10"
      handlerParameters="BMPDisplay" />
    ...
  </ProcessingChain>
</ProcessingChains>
```

Grid-Related Parameters

```
<LoadBalancing
  uselt="true"
  threadsPerCpu="1" />
<Benchmark iterations="30"
  size="(30,30,30)" />
</LoadBalancing>
```

```
<FaultTolerance
  backupRate="10"
  neighborsCount="2"
  centralized="false"
  compressFiles="true"
  chunkSize="2097152" />
</LaBoGridMiddleware>
```

Job description

```
<LaBoGridJob>
  <LBTask
    startingIteration="0"
    iterationsCount="100"
    processingChain="MyChain"
    inputFolder=""
    outputFolder="out0"
    downloadFluid="true"
    finalCleanup="true"
    latticeClass="D3Q19FloatFluid" />
</LaBoGridJob>
```

2 Architecture

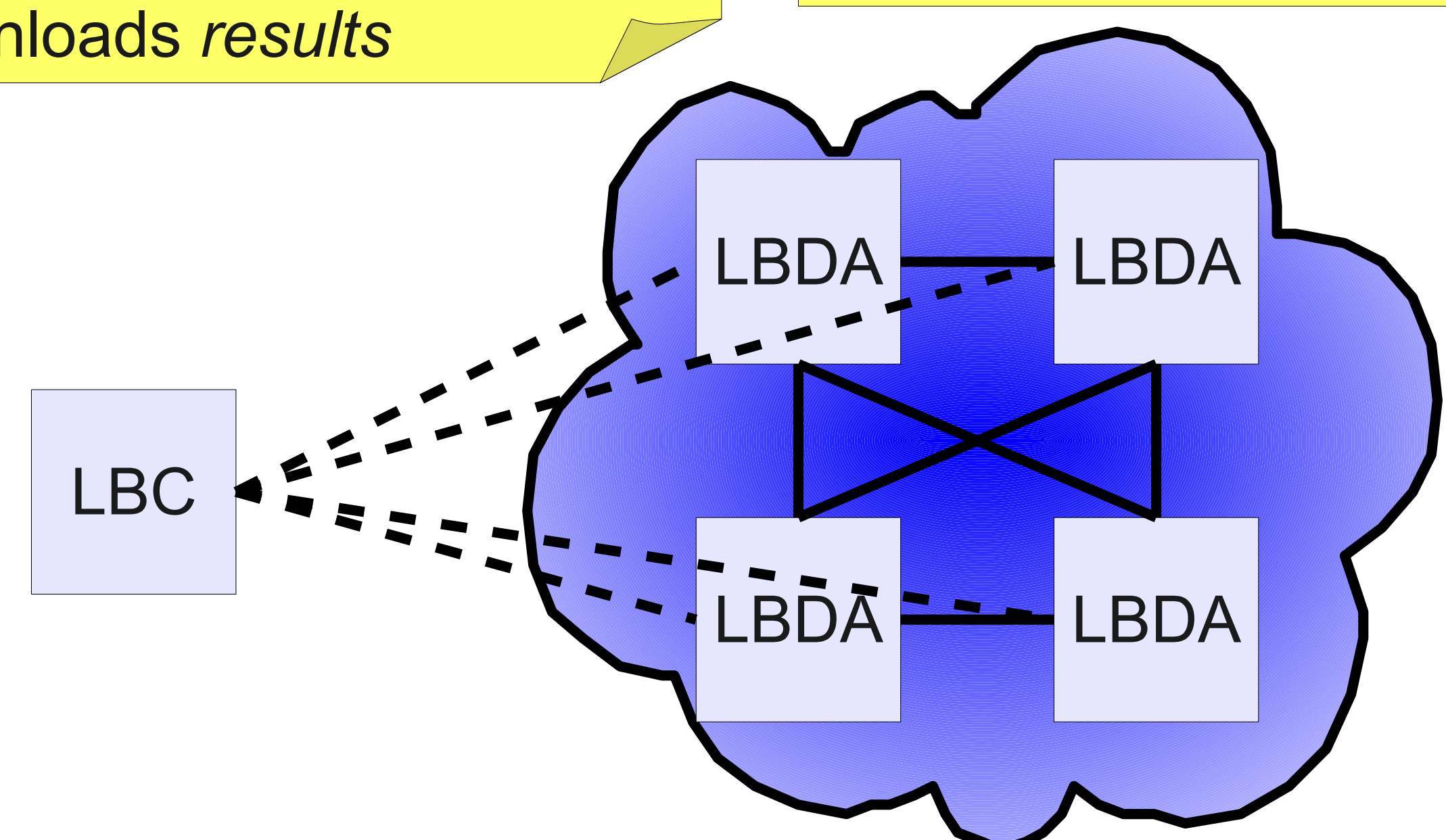
2.1 LaBoGrid

LBController (LBC)

- Configures LBDAs on new/lost resources (load-balancing)
- Uploads *initial* data
- Downloads *results*

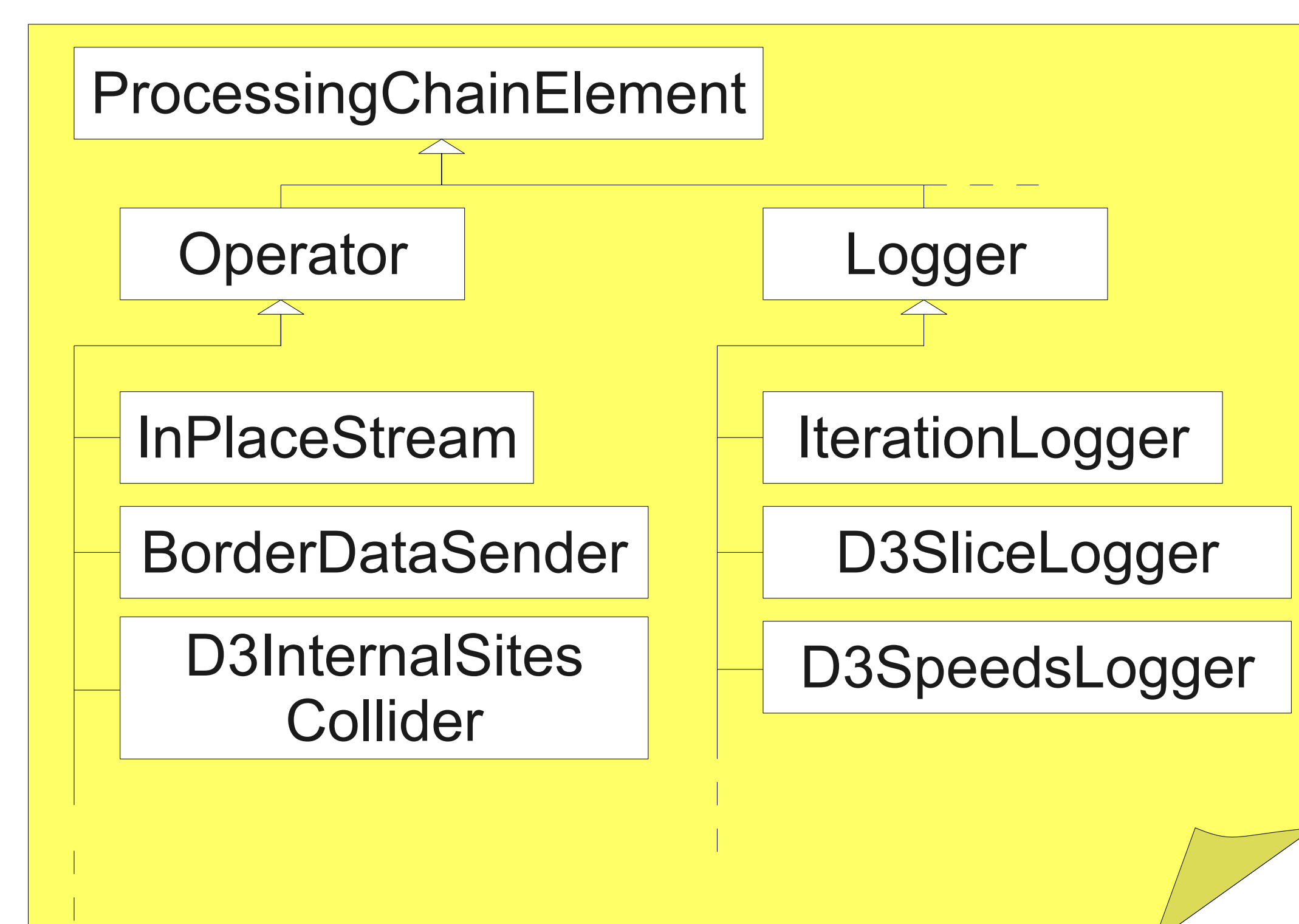
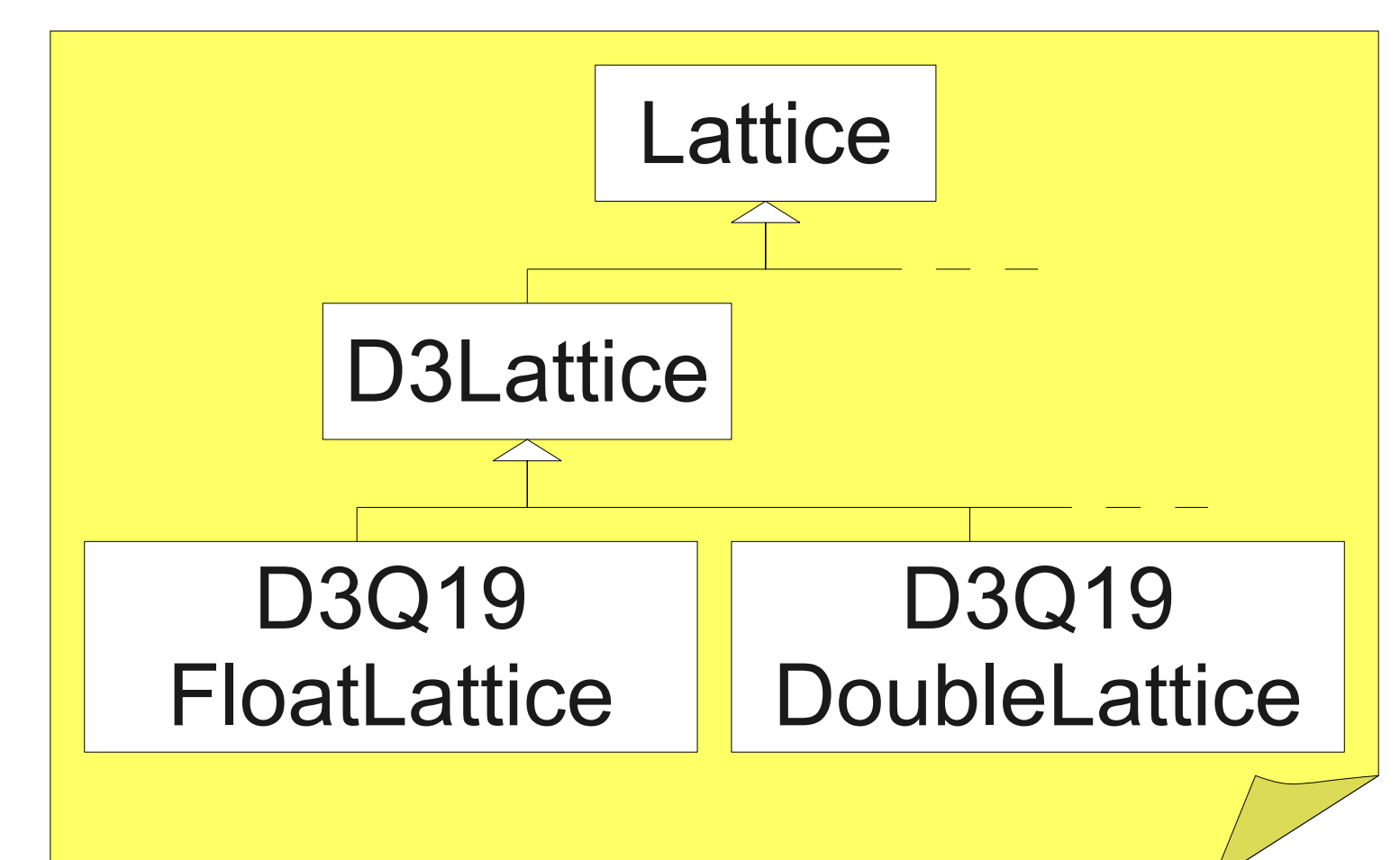
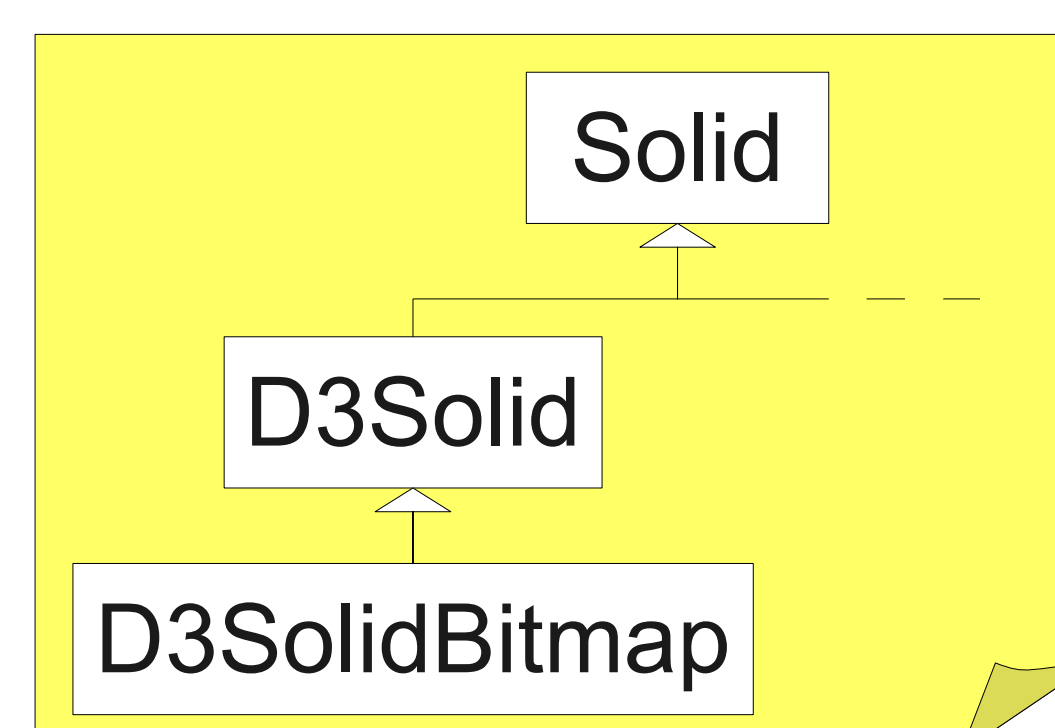
LBDistributedAgents (LBDAs)

- Execute LB code
- Exchange their *state* (fault-tolerance)



Grid or Cluster or Computer

2.2 LB Classes



4 Illustration

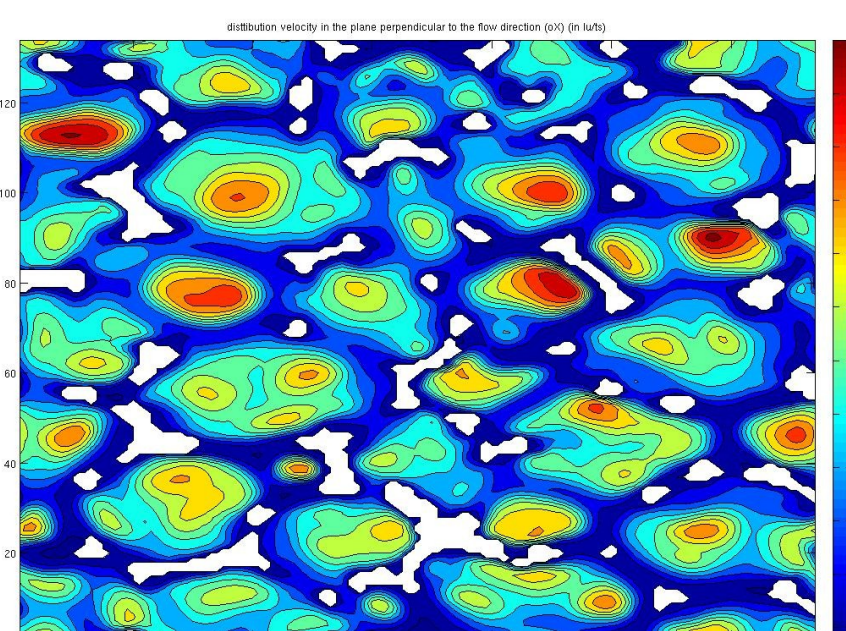
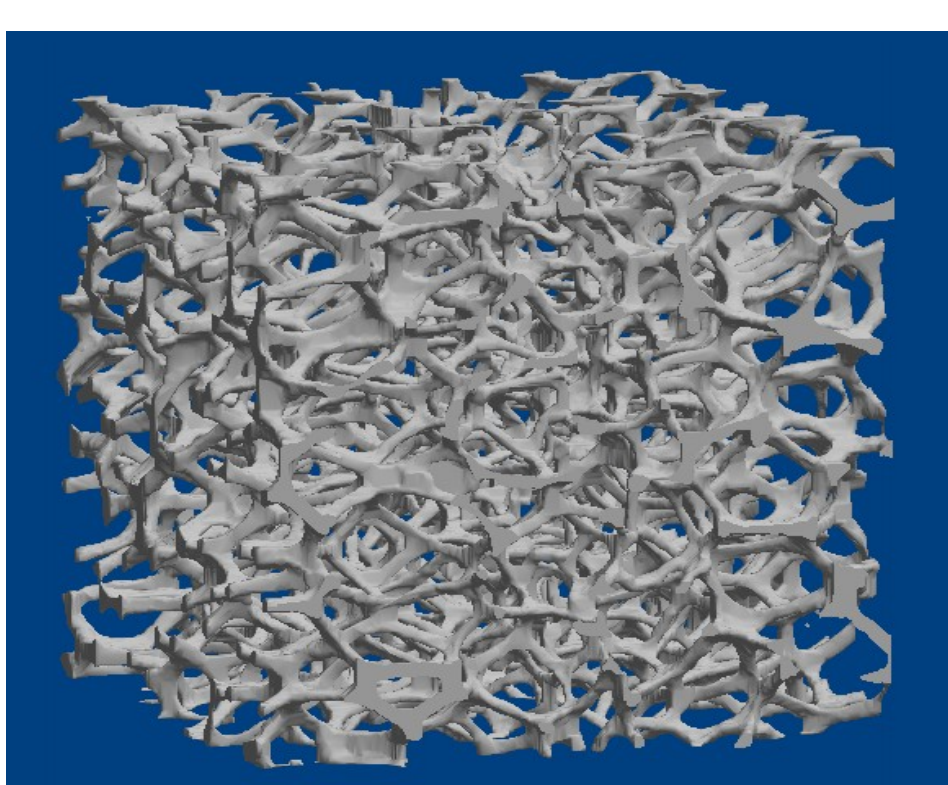
Input:

- Configuration file
- Solid

Output

- LBDA State files

NB: A LaBoGrid tool can convert the state files to ASCII files containing the macro variables (speed, density...)



References

See

<http://www.montefiore.ulg.ac.be/~dethier/>