Replica Optimisation
OptorSim vs. Optor

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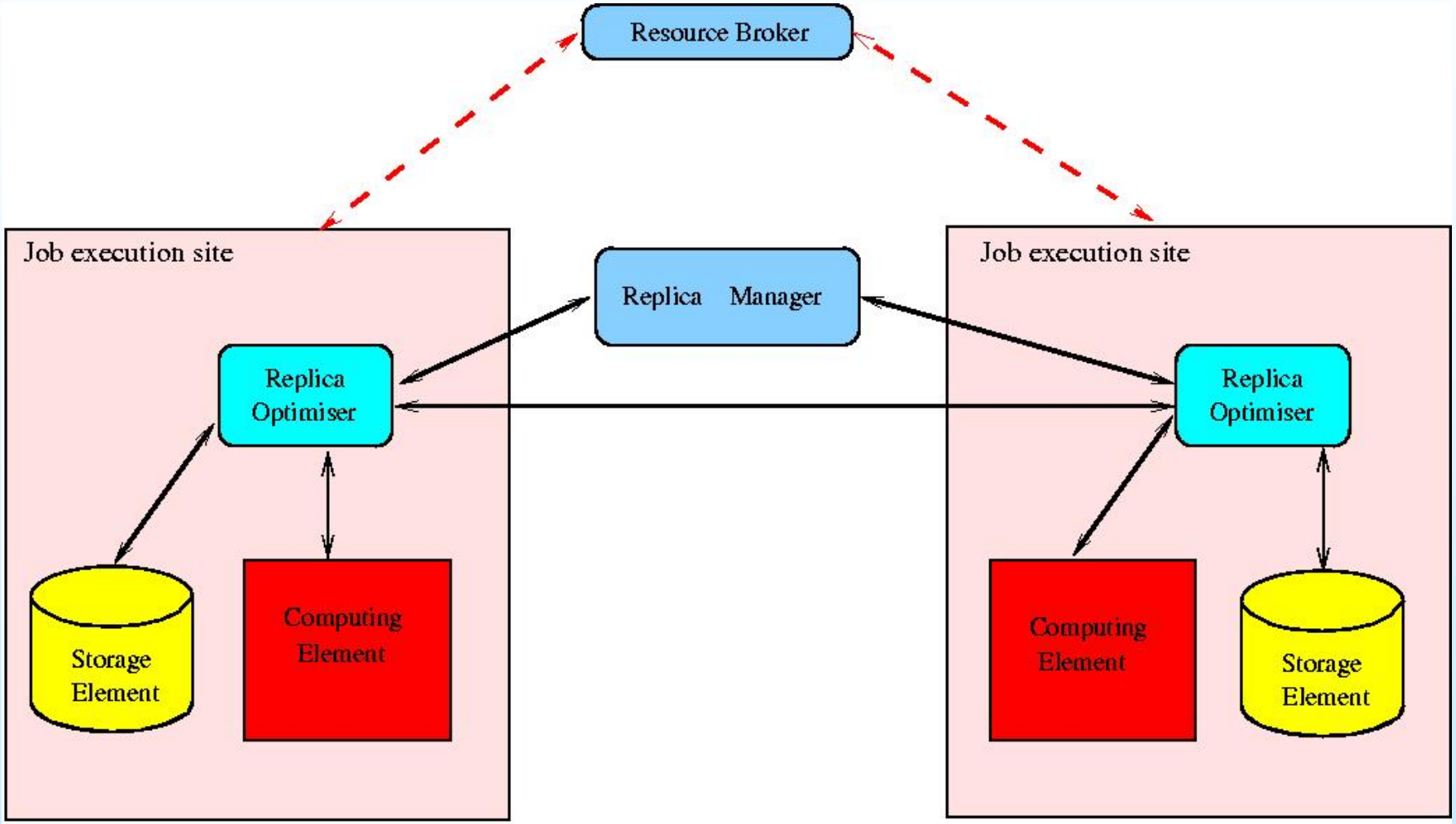
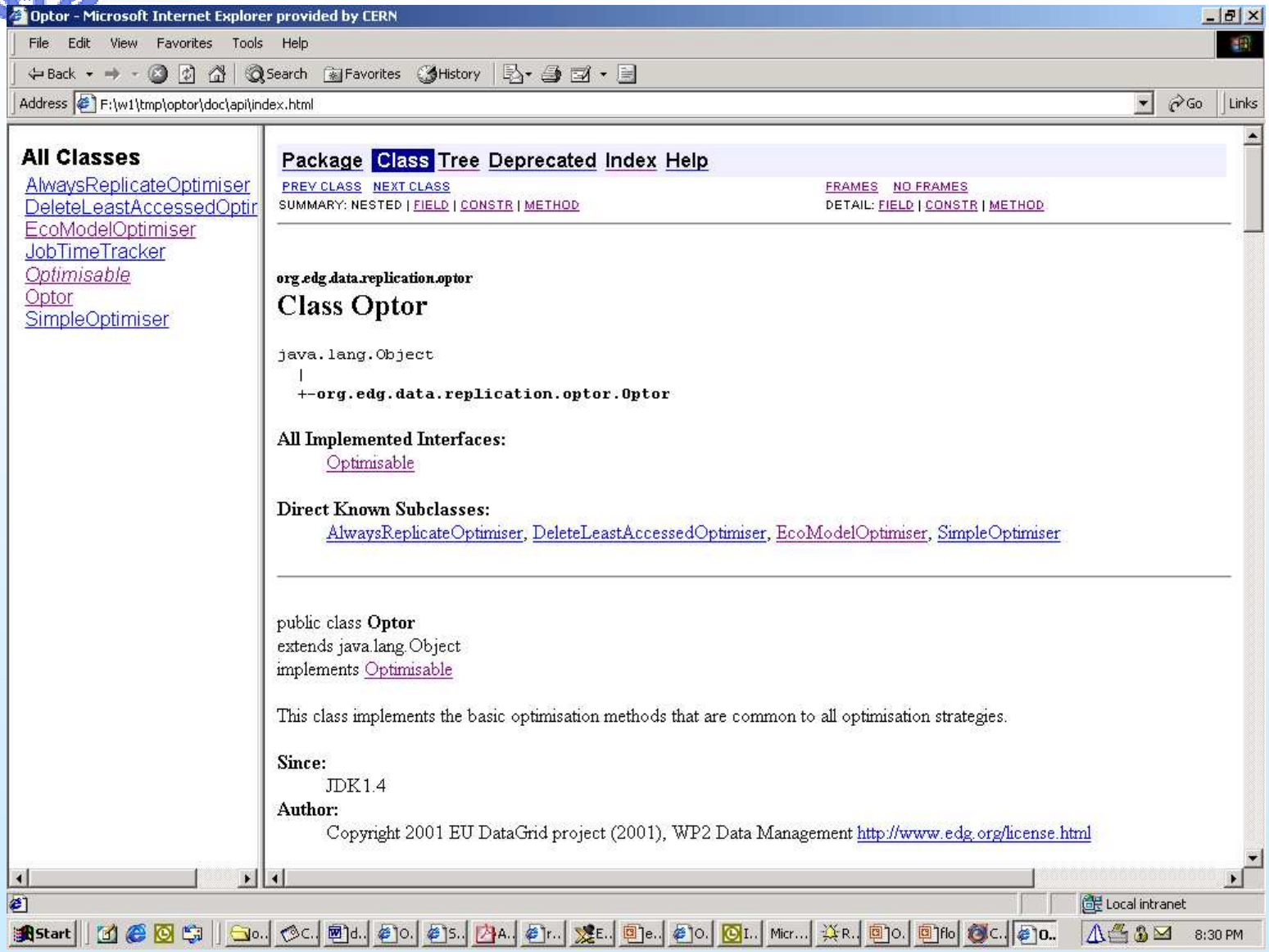
Optimisation of data access and replication based on an economic model

- View files as digital assets which can be bought and sold for profit
- Let nodes on the grid interact according to an economic model and thus optimise the system implicitly rather than explicitly

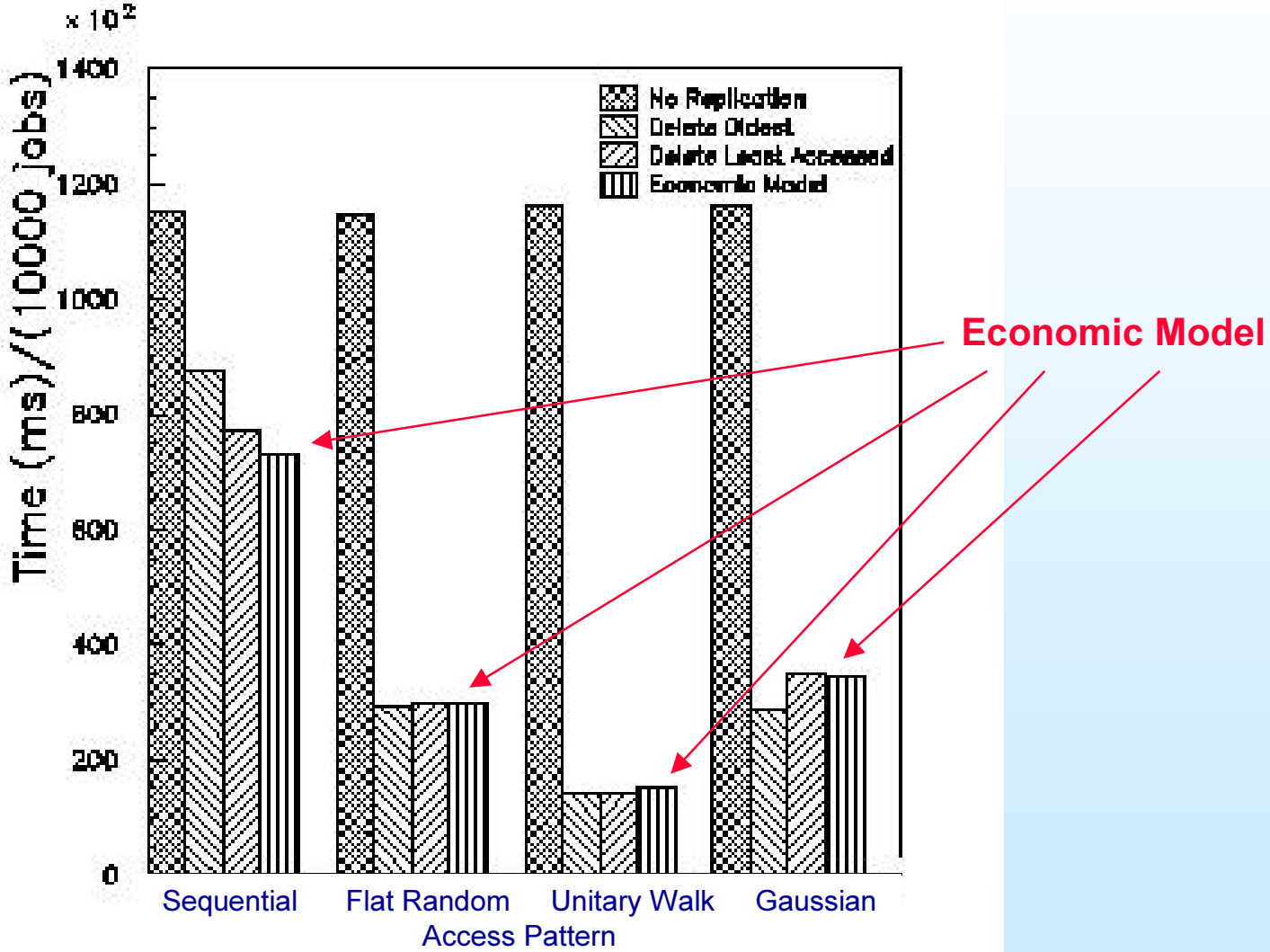
Simulation of Grid Architecture



Optimisation Algos in OptorSim

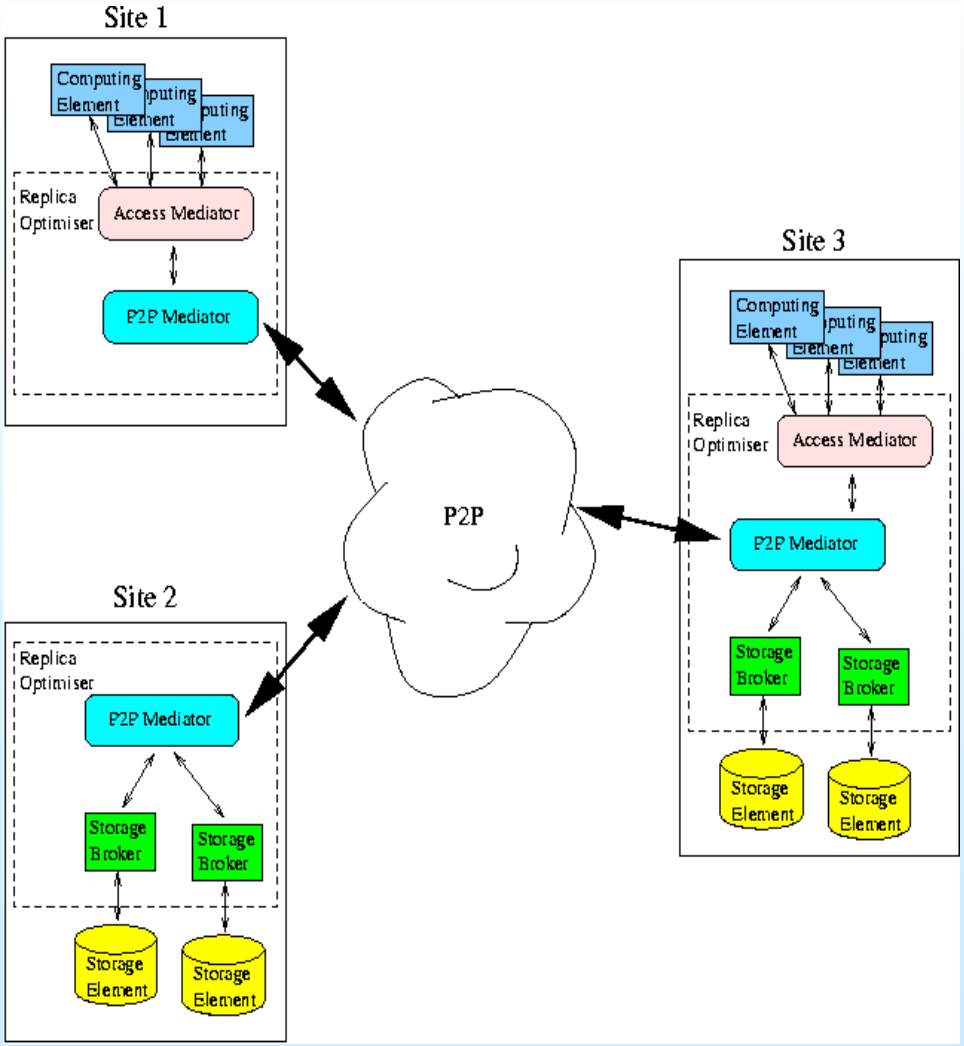


Results of OptorSim v0.4 (note: no Auctioning)

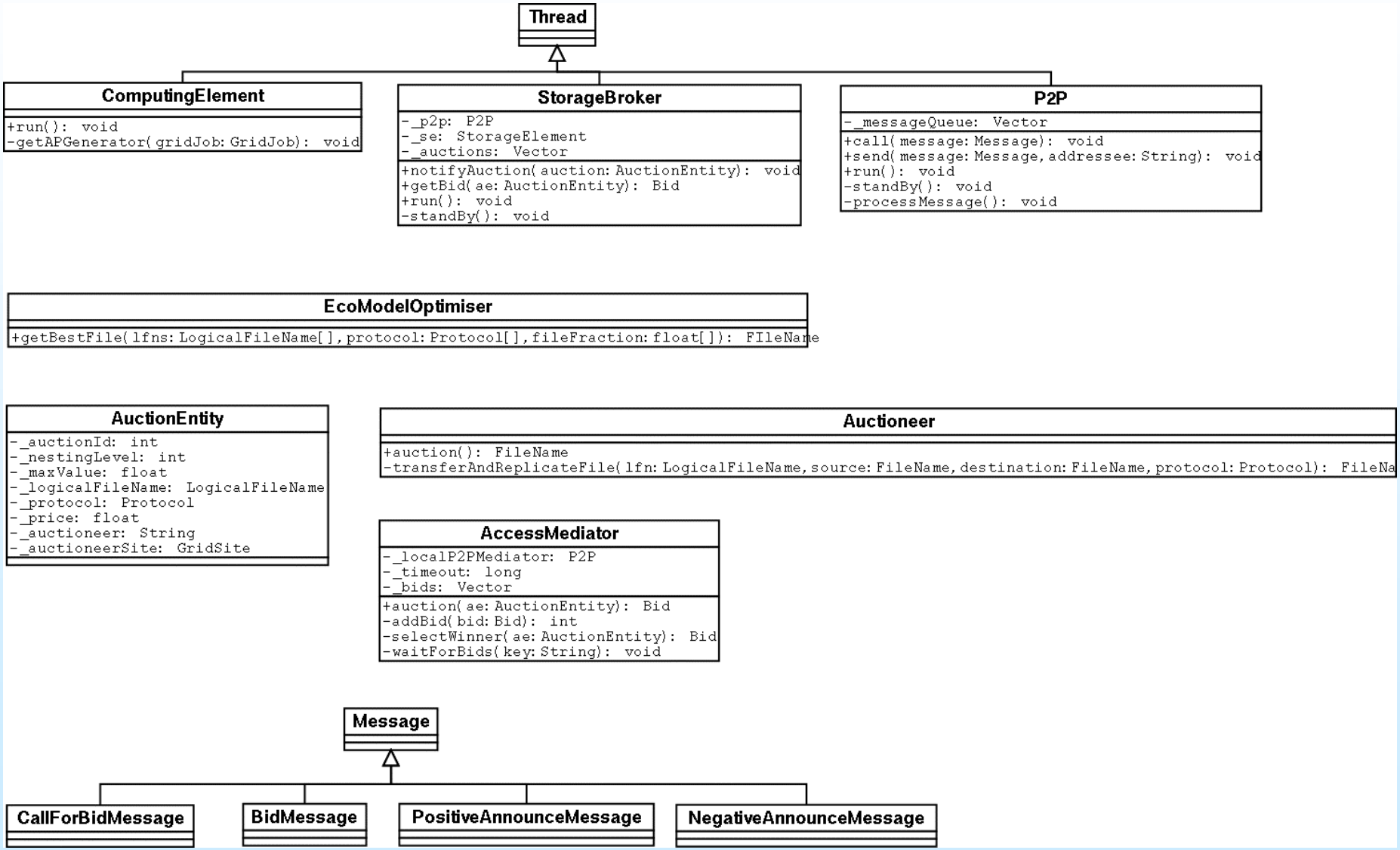


Architecture of Auction Mechanism for Replica Selection

- **Access Mediator (AM)** - contacts replica optimisers to locate the cheapest copies of files and makes them locally available
- **Storage Broker (SB)** - manages files stored in storage element, trying to maximise profit for the finite amount of storage space available
- **P2P Mediator (P2PM)** - establishes and maintains P2P communication between grid sites



OptorSim: Auction ClassDiagram



Usage of SE within OptorSim

Methods on SE:

- addFile()
- reserveSpace()
- addPreReservedFile()
- removeFile()

- pinFile() unpinFile()
- updateAccessHistory()

Optimisation methods for replica management:

- getLeastAccessedDeletableFile()
- getLeastValuableDeletableFile()
- getOldestDeletableFile()

Demo: Replica Selection with Optor based on Network Bandwith

```
ReptorServer rs = (ReptorServer) Naming.lookup(serverURL+"/ReptorServer");

// register first replica of lfn
rs.registerEntry(lfn[0], fn[0]);
…
// produce replicas of lfn
FileHandler fileHandler[] = new GridFTPFileHandler[5];
fileHandler[0] = new GridFTPFileHandler();
fileHandler[0].setSource(fn[0]);
fileHandler[0].setDestination(fn[1]);
rs.replicateFile(lfn[0], fn[0], fn[1], fileHandler[0]);
…
 // select best file
String destinationSE = "testbed008.cern.ch";
FileName[] bestFn =  rs.getBestFile(lfn, destinationSE, fileHandler, fileFraction);
```