EPOS: Embedded Parallel Operating System

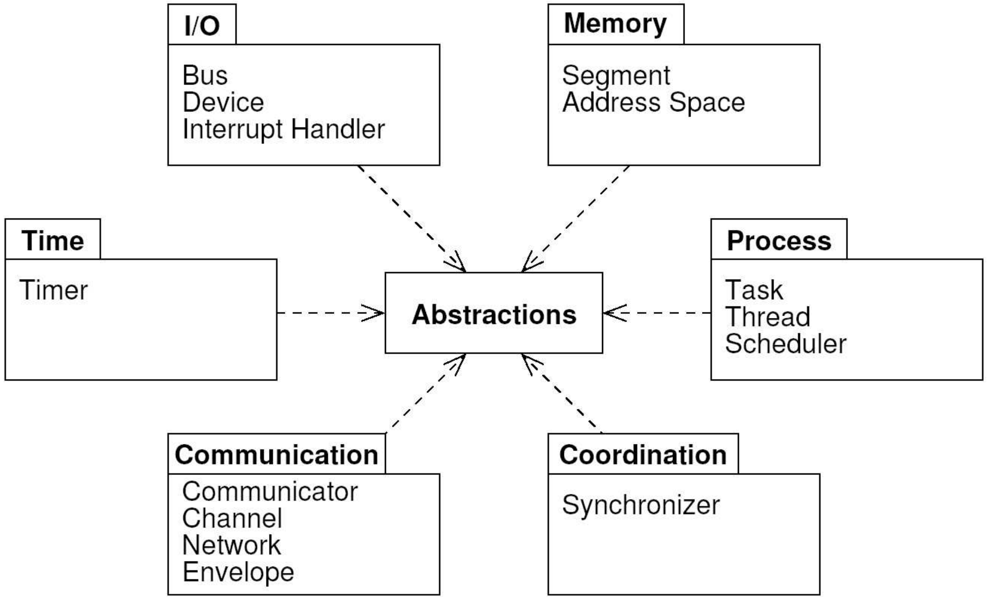
LISHA/UFSC

Prof. Dr. Antônio Augusto Fröhlich
guto@lisha.ufsc.br
http://www.lisha.ufsc.br/~guto

March 2004

EPOS

- Experimental application-oriented operating system
  - Abstractions, scenario aspects, framework, and tools
- High-performance dedicated computing



I/O
Bus
Device
Interrupt Handler

Memory
Segment
Address Space

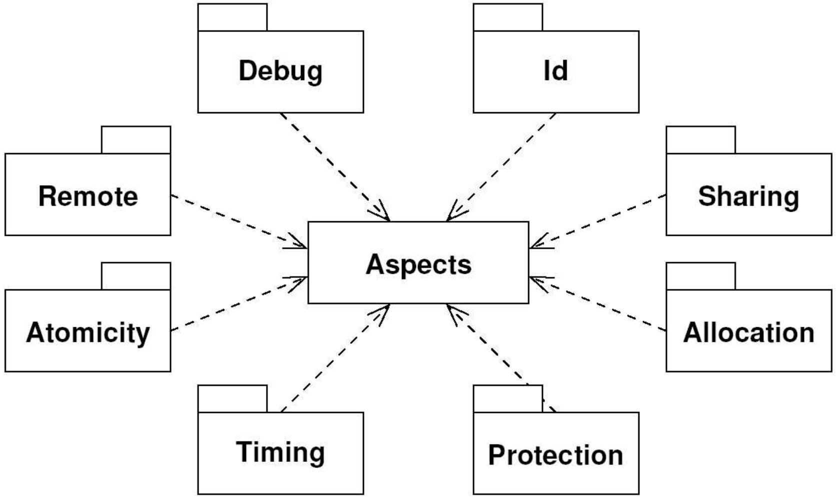
Time
Timer

Abstractions

Process
Task
Thread
Scheduler

Communication
Communicator
Channel
Network
Envelope

Coordination
Synchronizer



Debug

Id

Remote

Aspects

Sharing

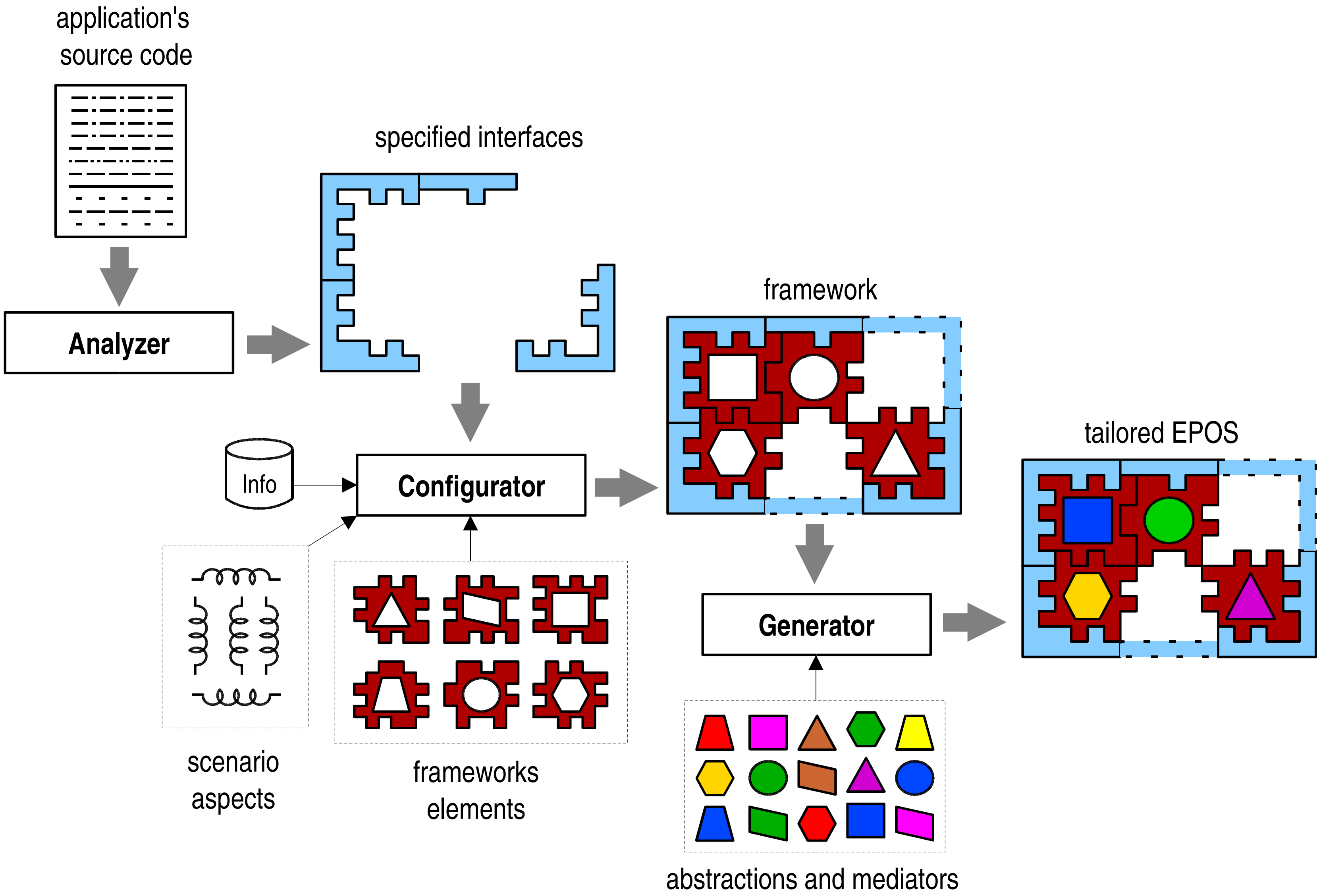
Atomicity

Allocation

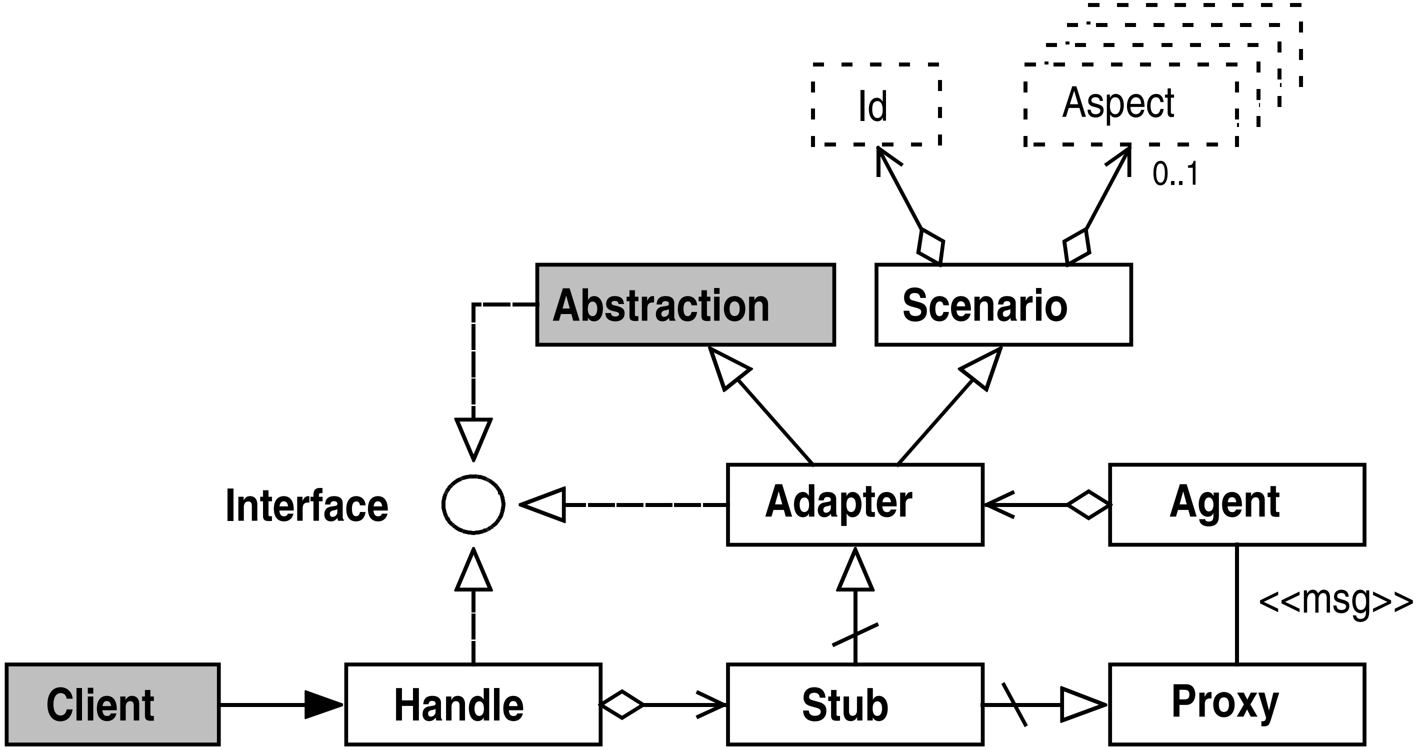
Timing

Protection

Tailoring EPOS



EPOS Framework Metaprogram



EPOS Sample Application: Dinning Philosophers

```
#include <iostream>
#include <synchronizer.h>
#include <thread.h>

using namespace System;
using namespace std;

Synchronizer fork[5];

int philosopher(int n)
{
  int first = (n < 4)? n : 0;
  int second = (n < 4)? n + 1 : 4;
  for(;;) {
    cout << "Philosopher " << n
         << " thinking ...\n";
    fork[first].lock();        // get first fork
    fork[second].lock();       // get second fork
    cout << "Philosopher " << n
         << " eating ...\n";
    fork[first].unlock();      // release first fork
    fork[second].unlock();      // release second fork
  }
}
```

```
int main()
{
  Thread* phil[5];
  for(int i = 0; i < 5; i++)
    phil[i] =
      new Thread(&philosopher, i);

  for(;;);
}
```

```
Synchronizer {
    constructor(void);
    lock(void);
    unlock(void);
}

Thread {
    constructor(int (*)(int),
  int);
}
```