KIP Heidelberg

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Specification of POL and of the Reconfiguration-Framework

Communication Matrix:		Nick Meier
POL to VHDL	:	Frederik Grüll
POL to Java	:	Andreas Beyer

Using the conventional tools...

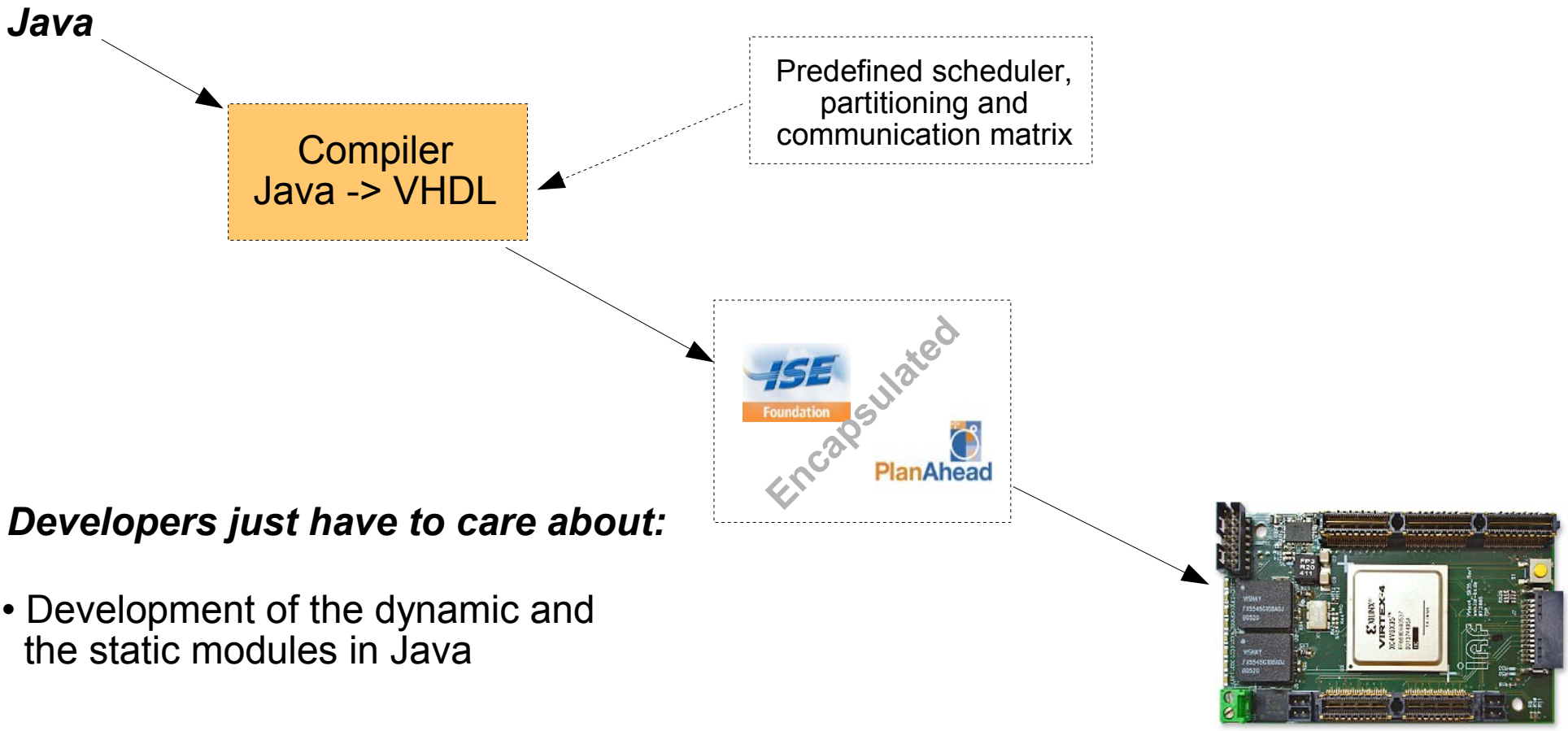
VHDL

Developers have to care about:

- Development of the dynamic and the static modules in VHDL
- Partitioning of the design in VHDL
- Implementation of the scheduler
- Logical implementation of the inter module communication (IMC)

- Partitioning of the Chip
- Physical implementation of the IMC

Using our DPR-Framework...

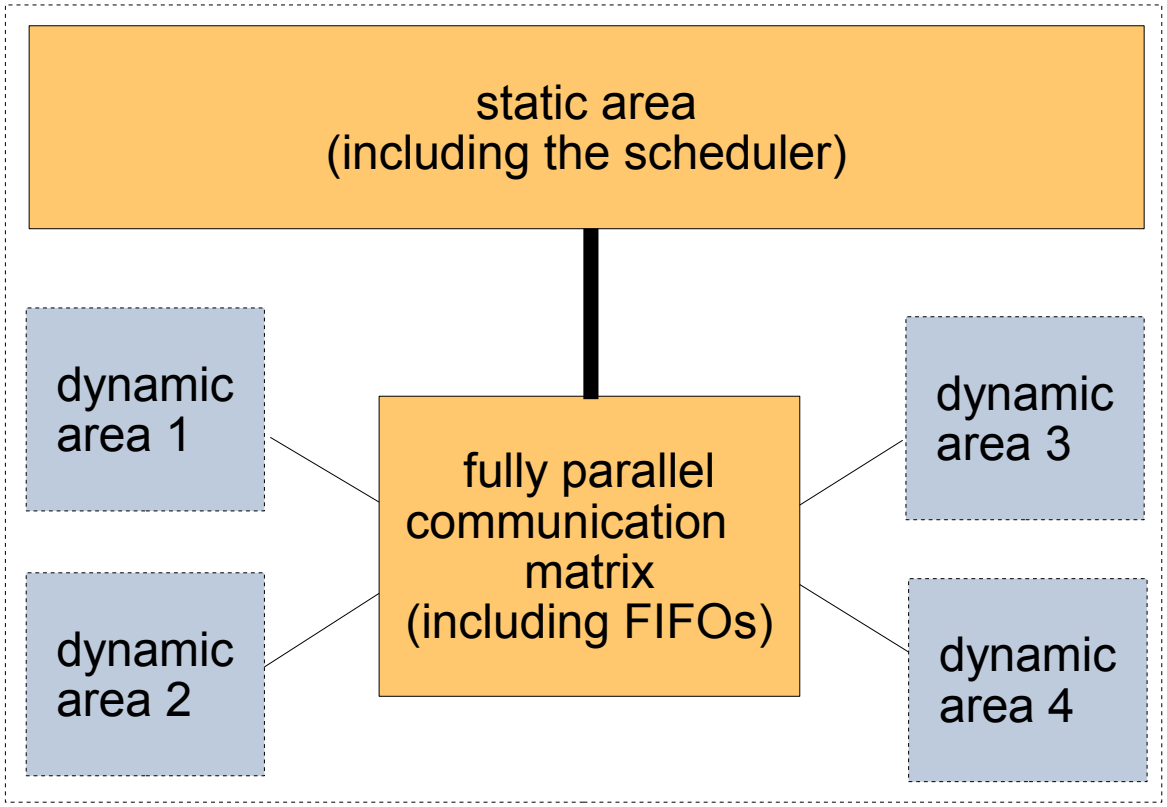


Developers just have to care about:

- Development of the dynamic and the static modules in Java

*The dynamically instantiation of a module is done with a simple **new***

A closer look to the Framework

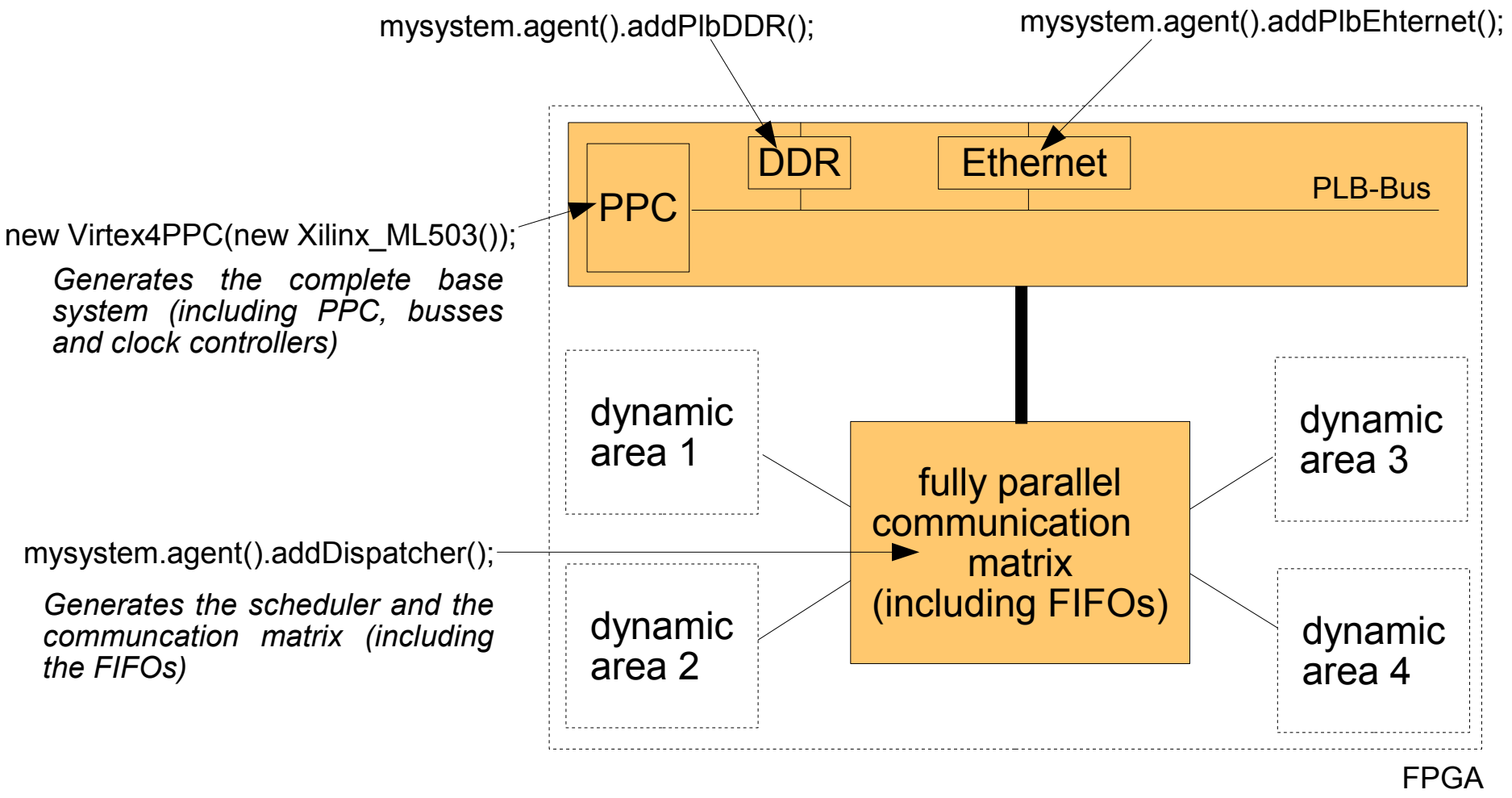


*Modules are loaded into the dynamic areas **on demand**. The communication matrix stores the data for every module in a FIFO. Since there is a farm of FIFOs the communication between several modules is fully parallel.*

Java-Description of the static part

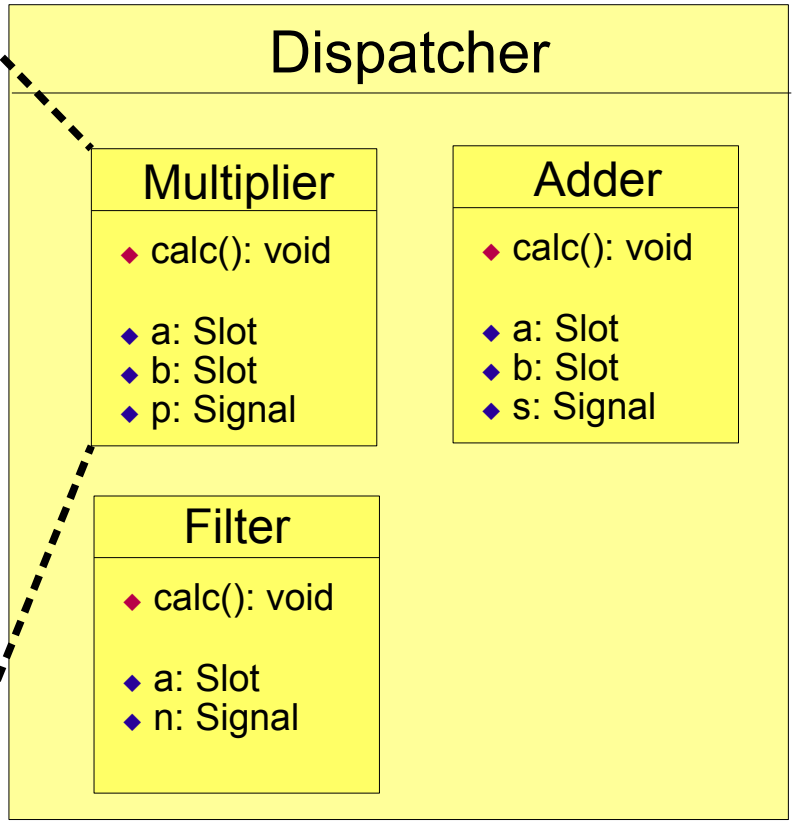
```
import system.*;
import system.architectures.*;
import system.basesystems.*;

public class MySystem {

  public static void  main (String[] args) throws SystemJavaException {

      Virtex4PPC mysystem = new Virtex4PPC(new Xilinx_ML503());

      mysystem.agent().addPlbEthernet();
      mysystem.agent().addPlbDDR();
      mysystem.agent().addDispatcher();

      new SystemJava().run(mysystem, args);

   }

}
```

Java-Description of the static part



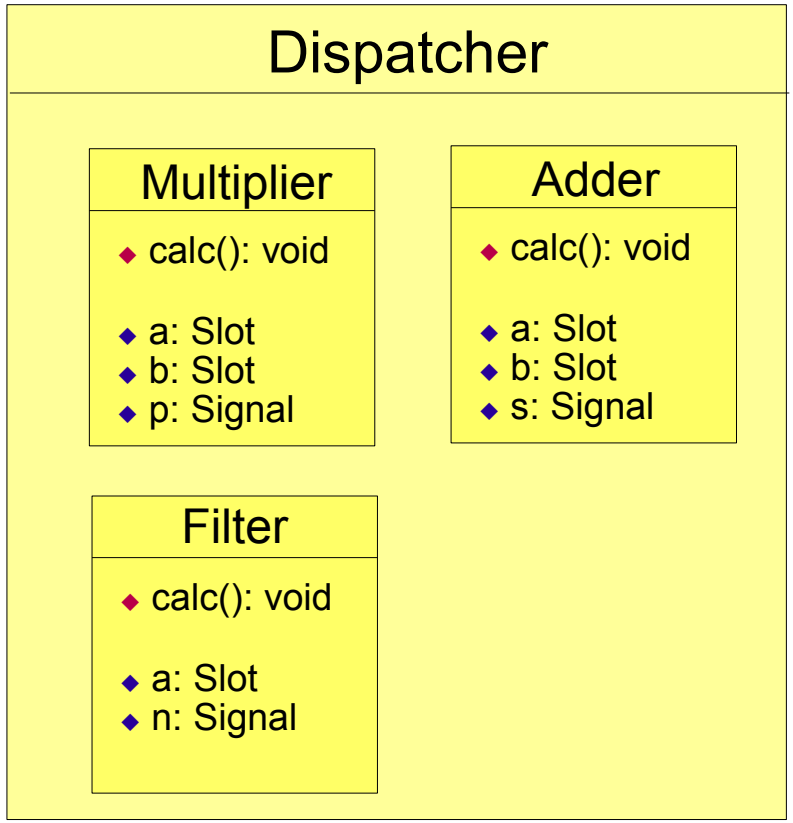
Java-Description of the dynamic part

```
class Multipier extends ParObj {
   Slot a,b;
   Signal p;

   int result;

   calc() {
      result = a.get() * b.get ();
      p.emit(result);
   }
}
```

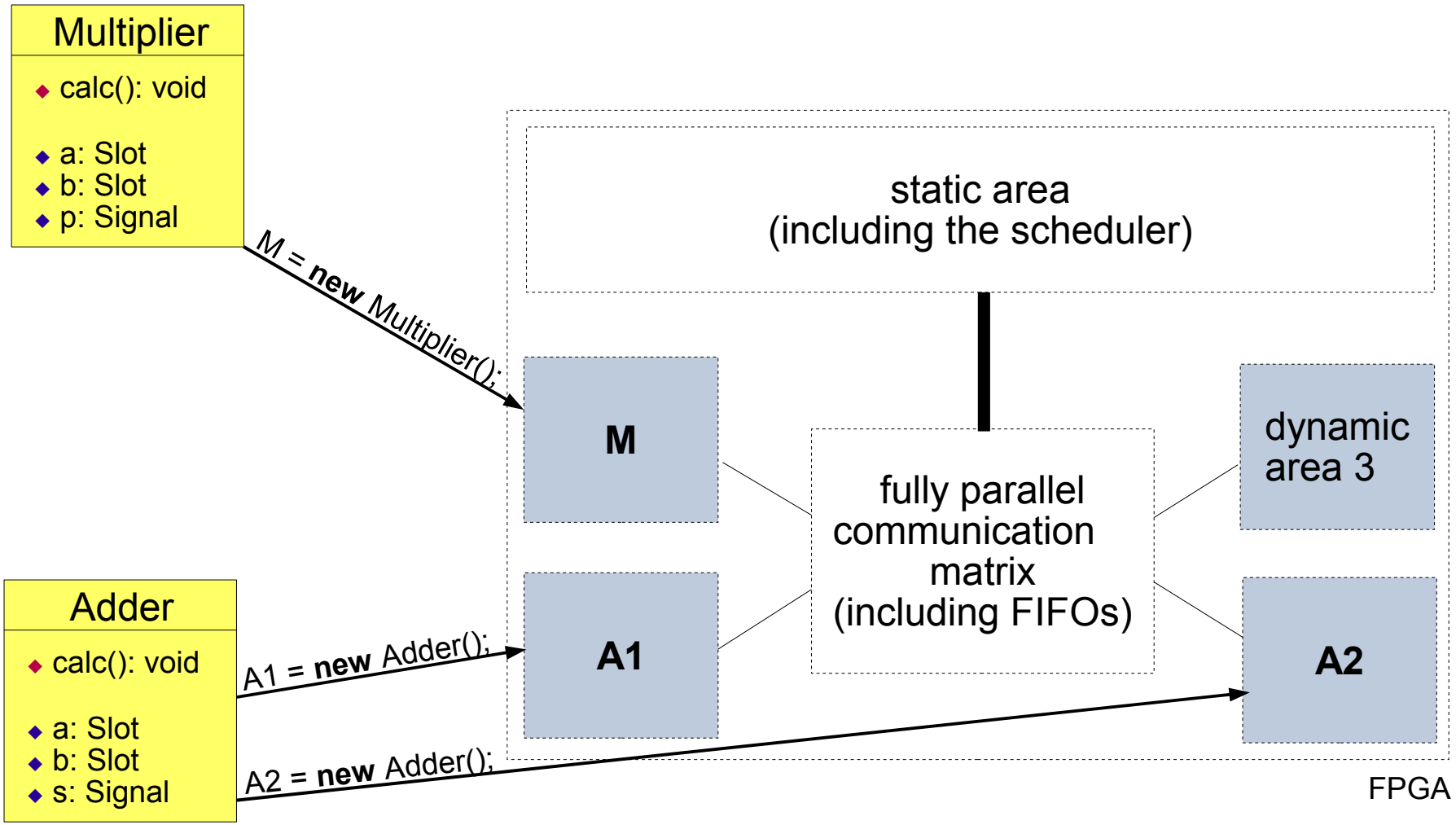


Java-Description of the dynamic part

```
class Dispatcher extends ParObj {

  ...

  Dispatcher () {
     M = new Multiplier();
     A1 = new Adder();
     A2 = new Adder();

     A1.s.connect(M.a);
     A2.s.connect(M.b);
   }

   calc() {
     ...
       if (stdin==”1”) F1 = new Filter();
     ...
   }
}
```



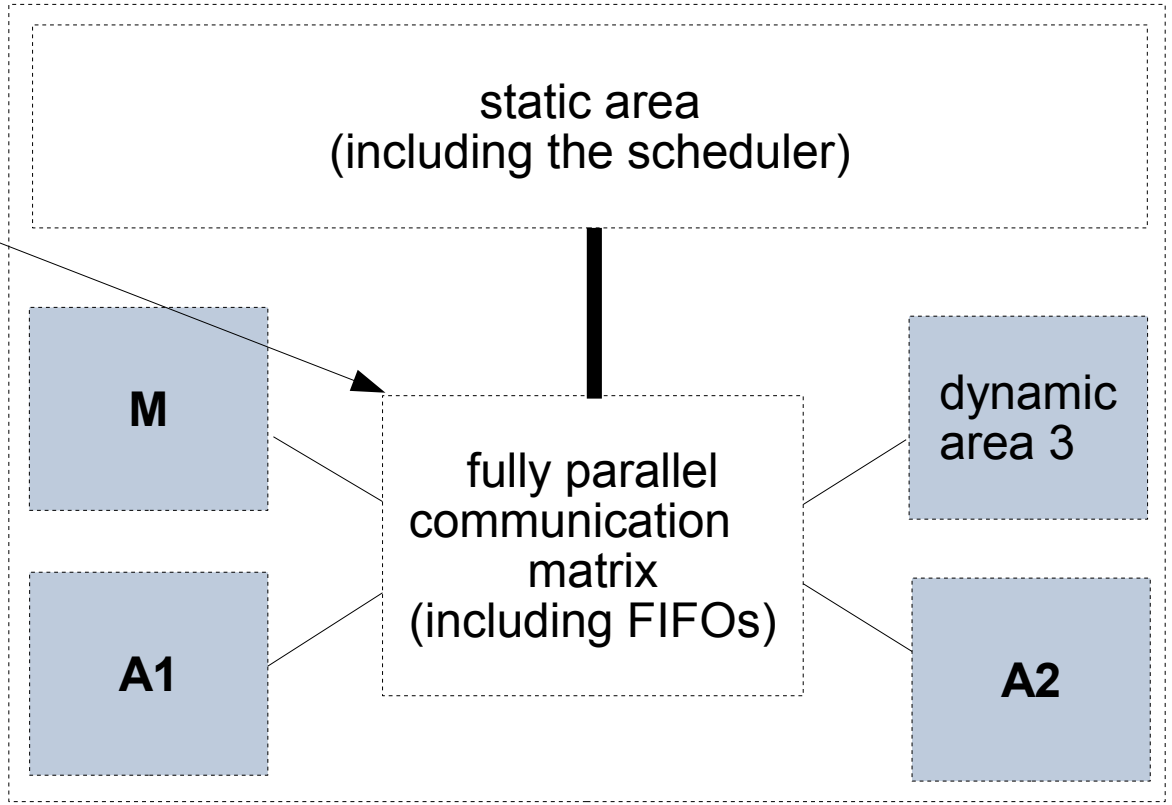
Java-Description of the dynamic part



Java-Description of the dynamic part

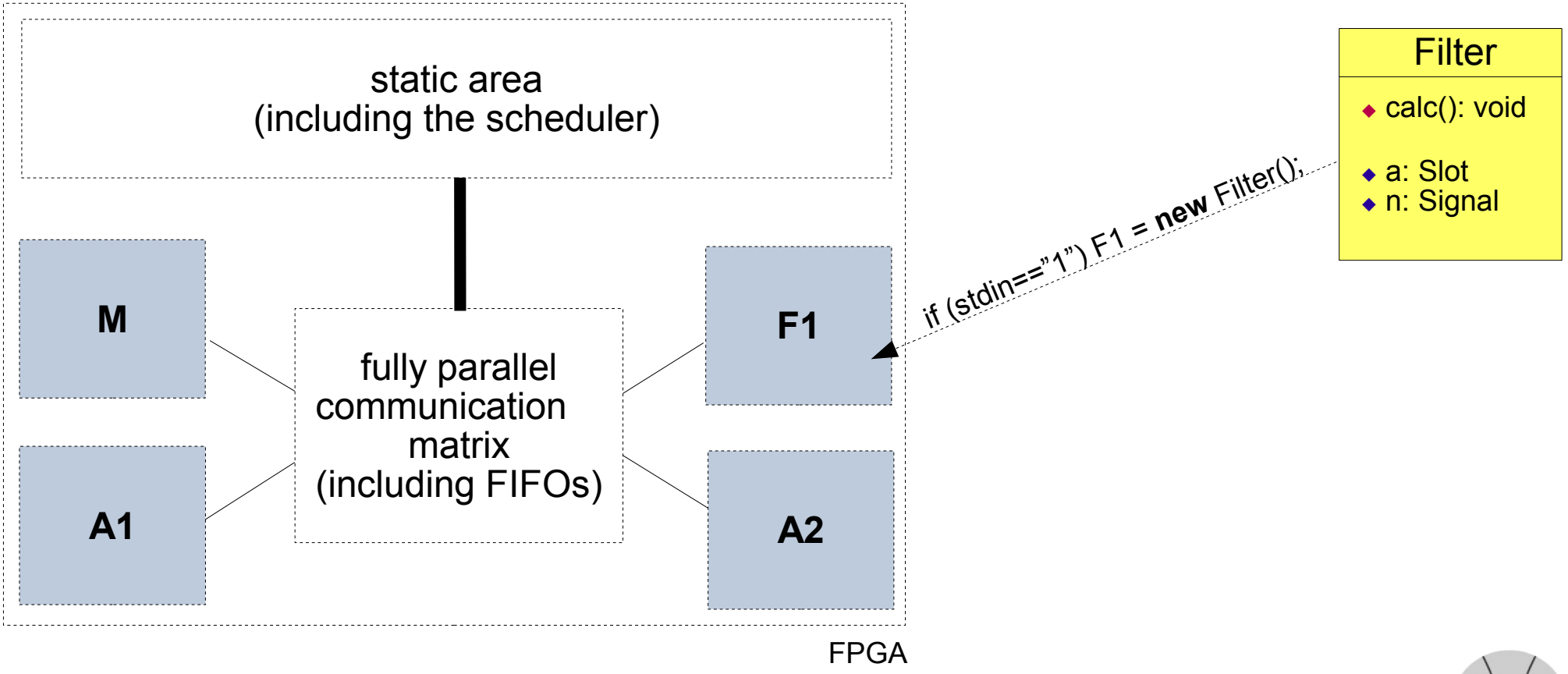
A1.s.connect(M.a);

*Tells **A1** via the communication matrix, that it shall send its calculations to **M**.*



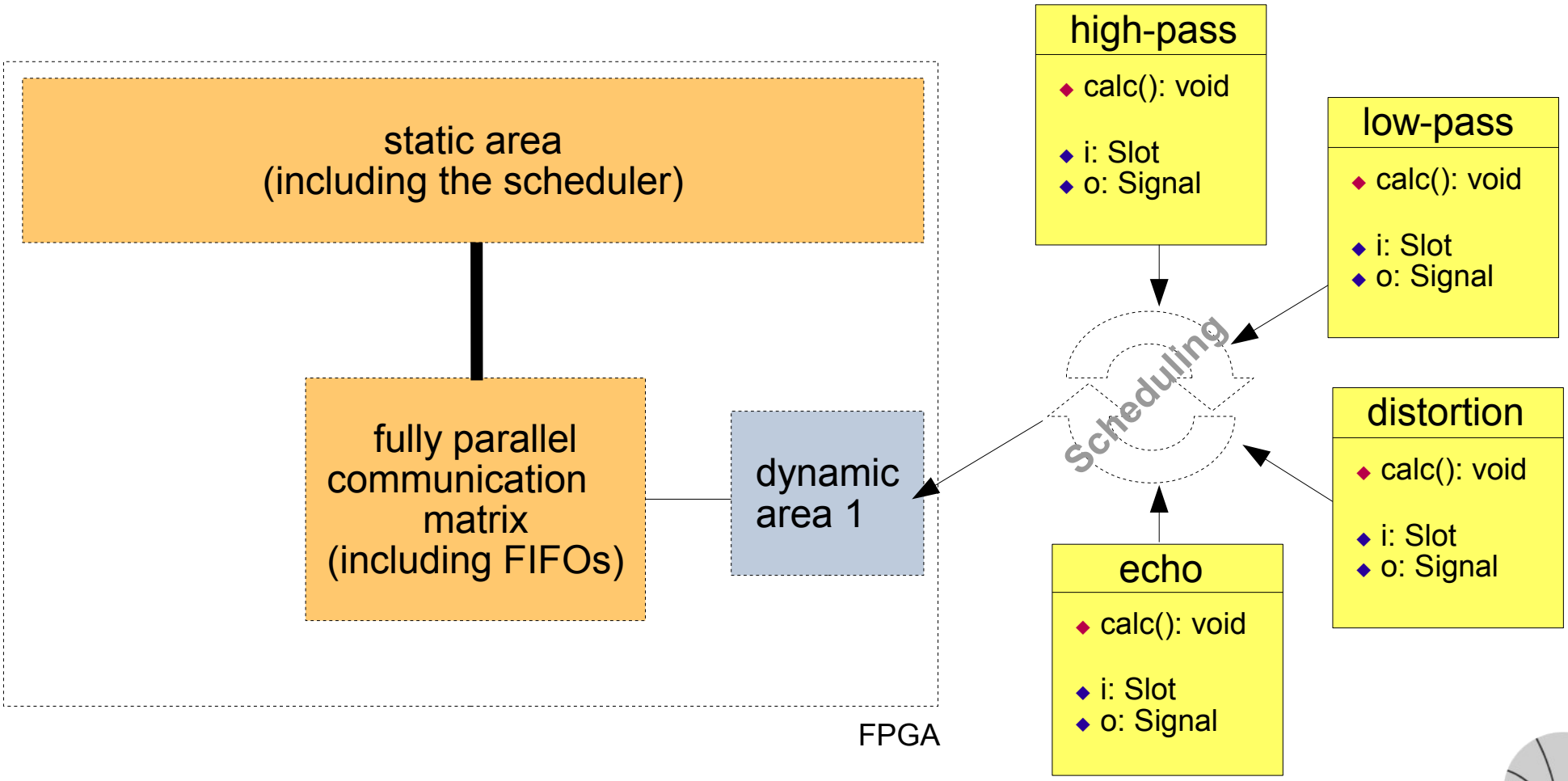
Java-Description of the dynamic part

*Objects can be added and removed at runtime with a simple **new** or **finish()**.*

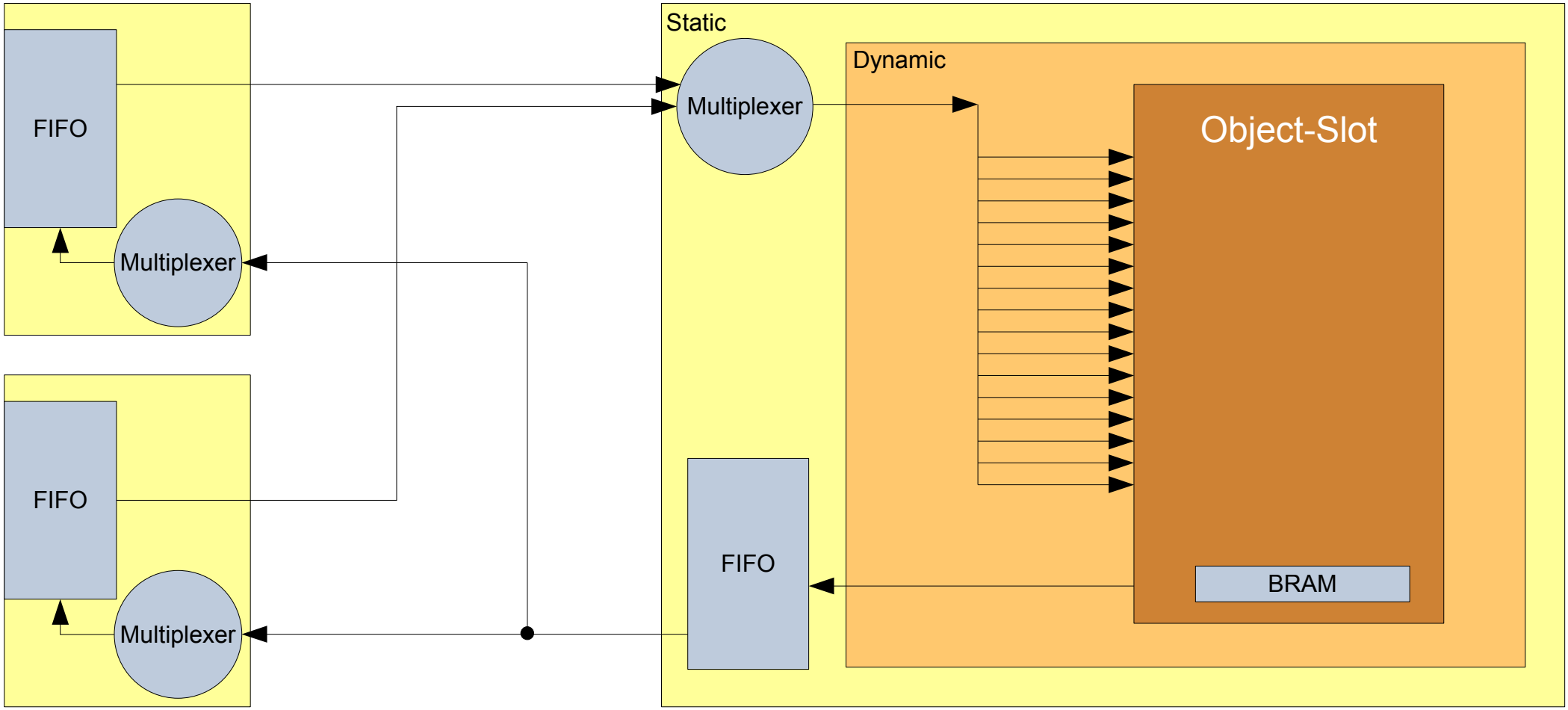


Java-Description of the dynamic part

If there are more instances than dynamic areas the system can schedule.
The figure illustrates our actual test setup.



The communication matrix



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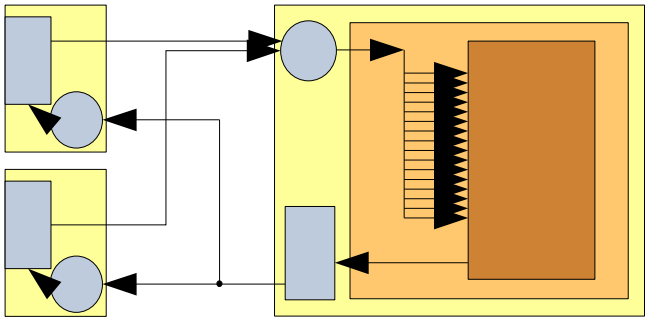

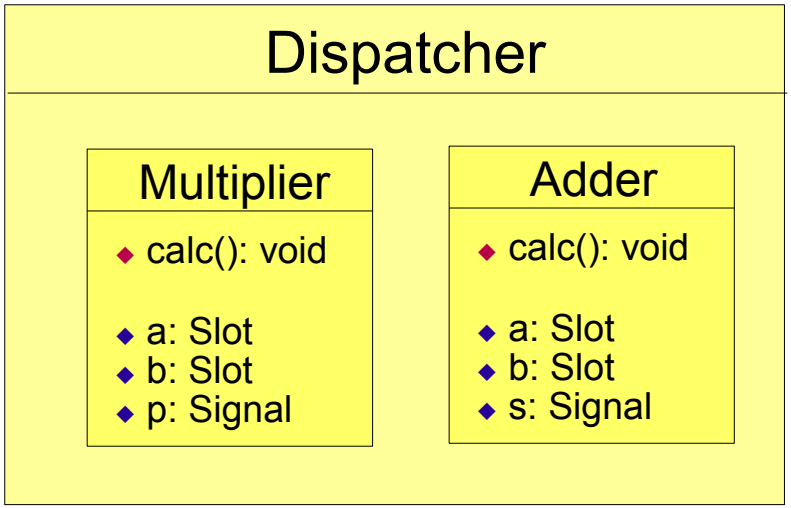

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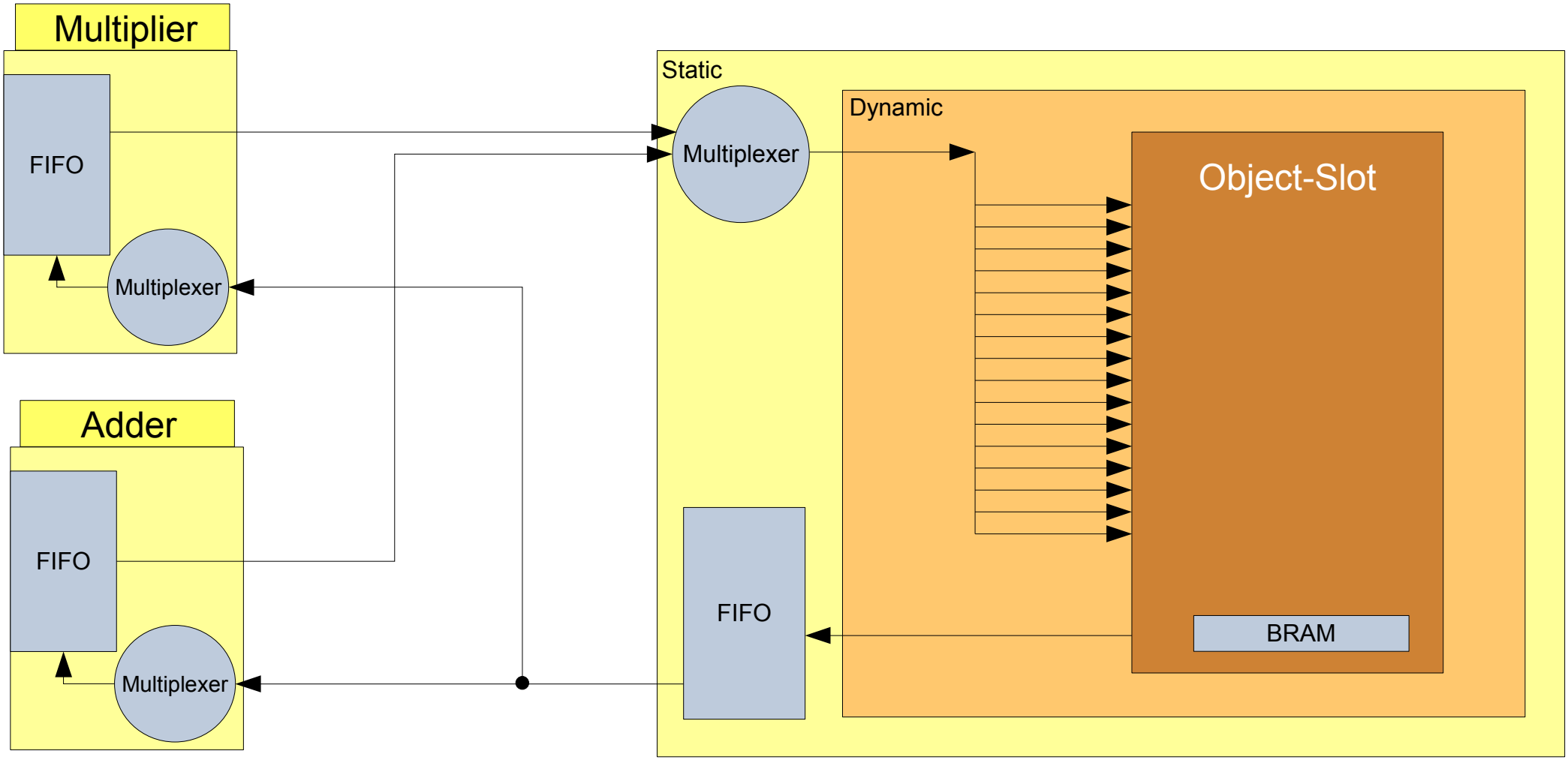

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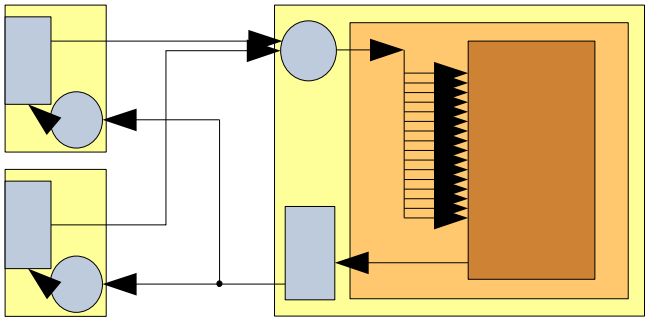

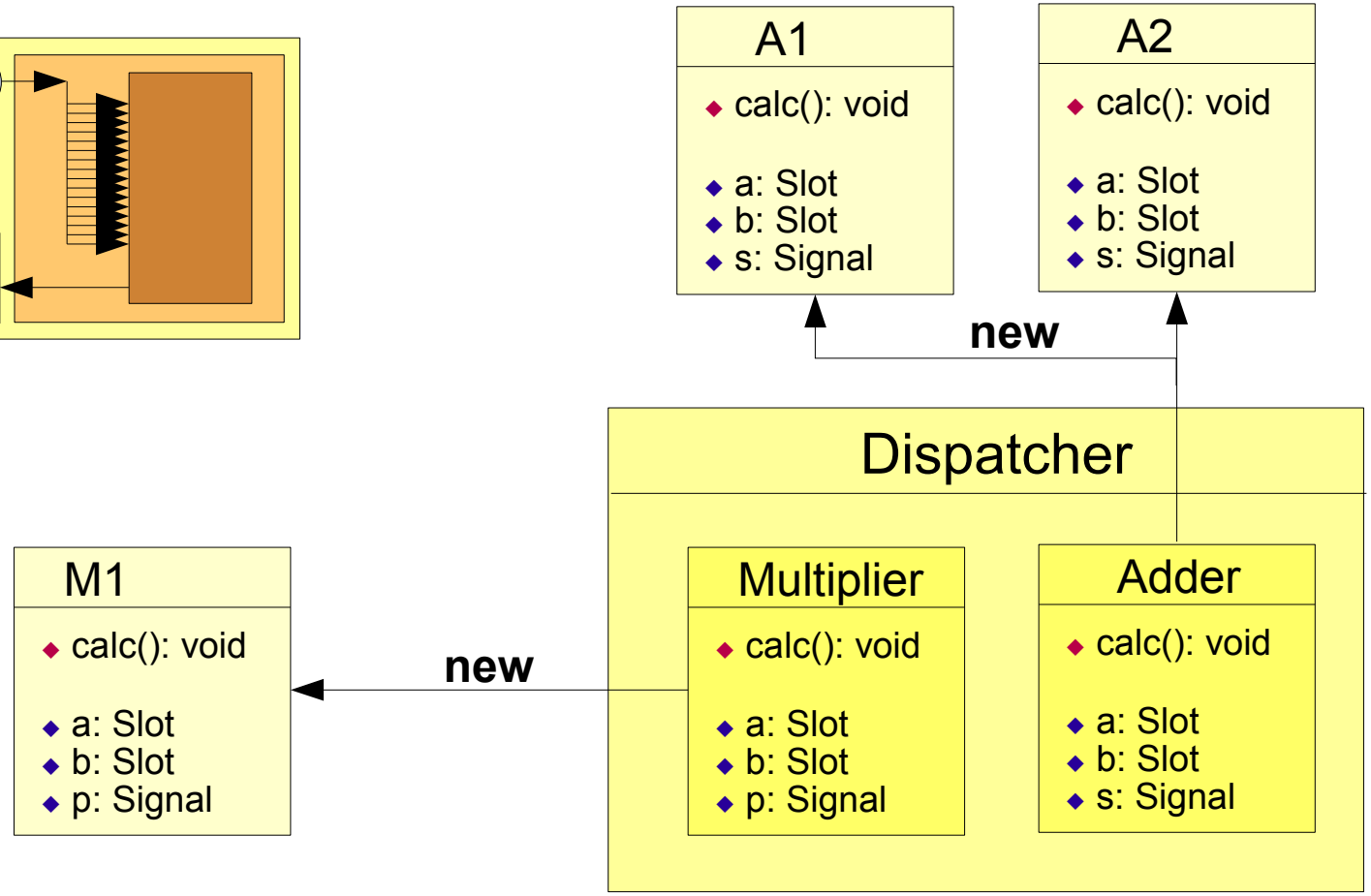

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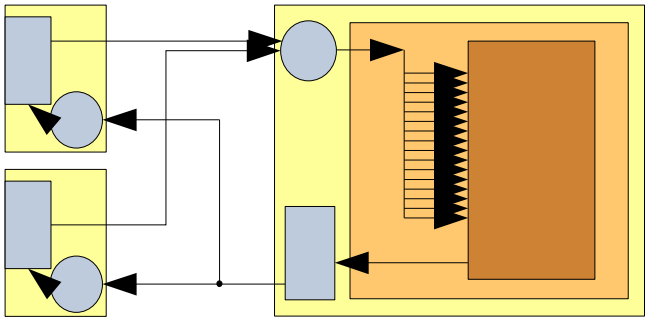
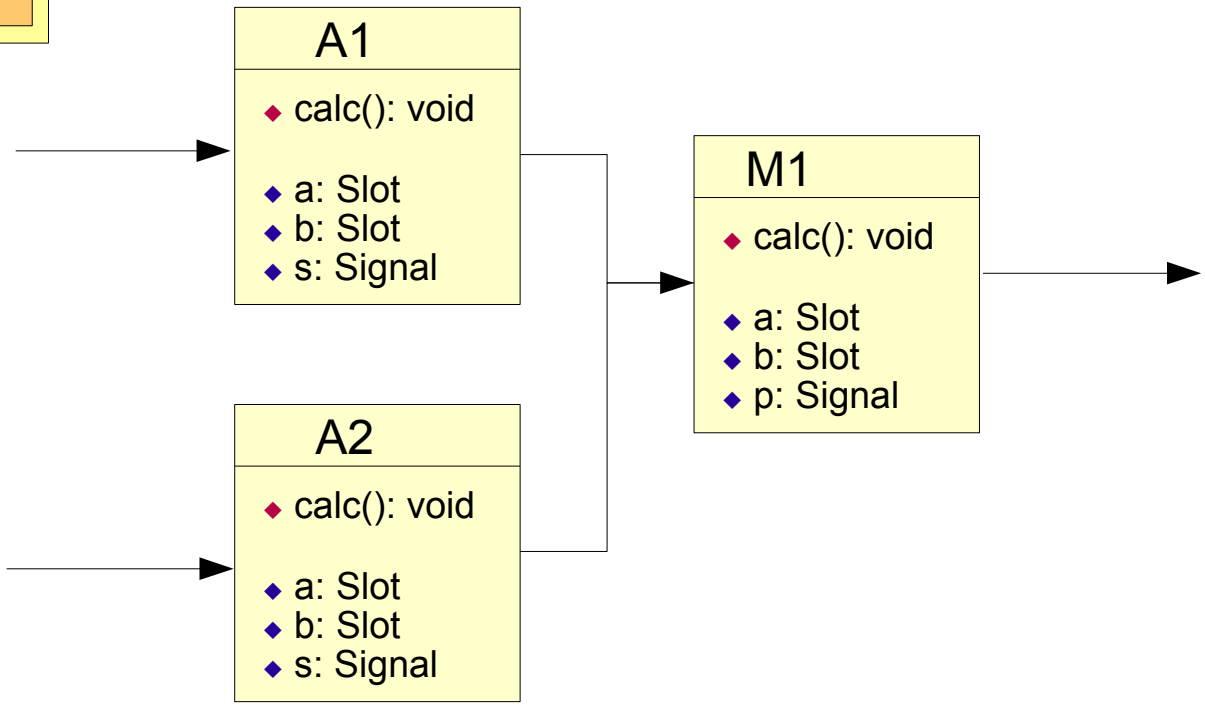


```
A1.s.connect(M.a);
A2.s.connect(M.b);
```



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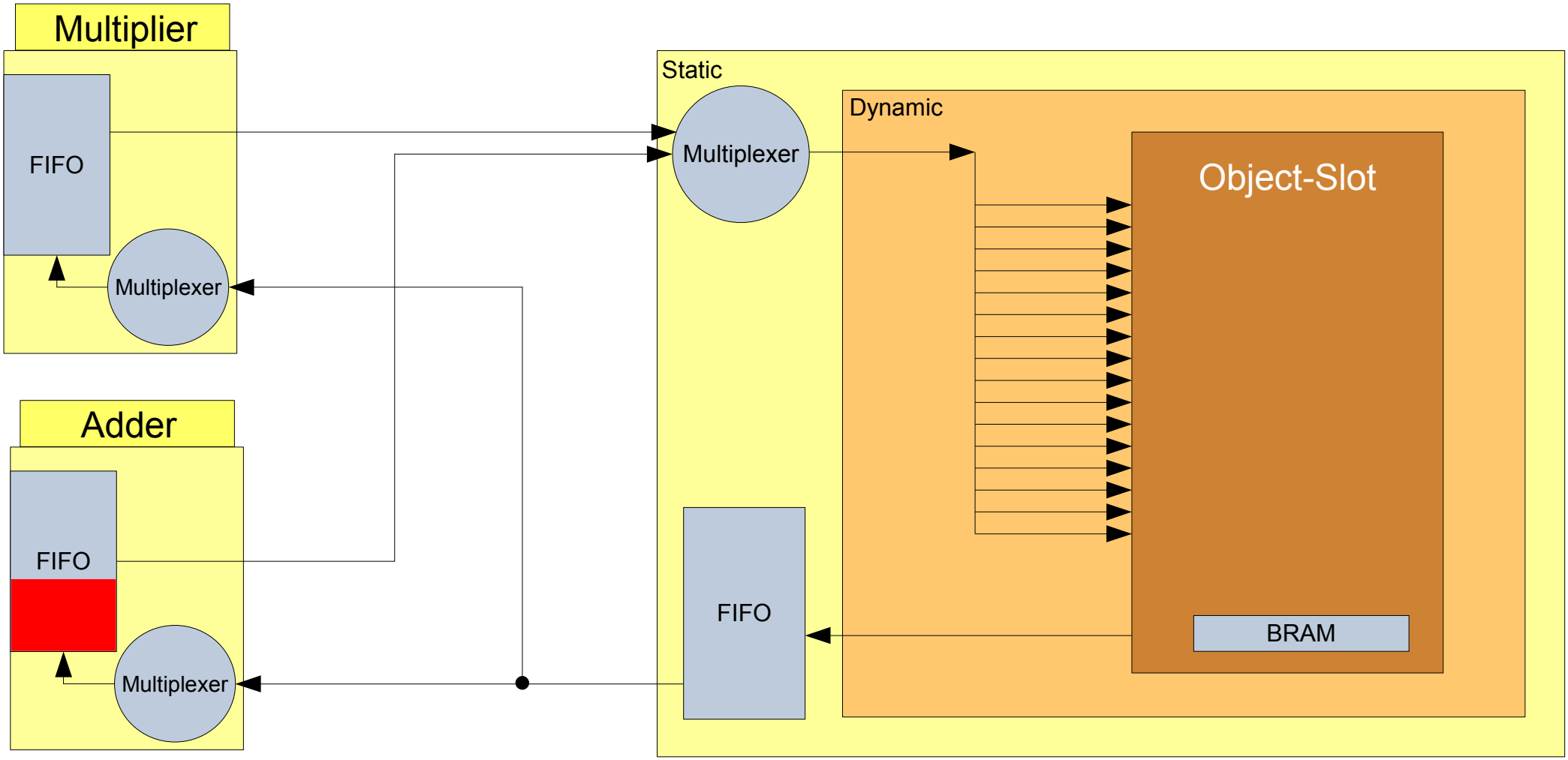

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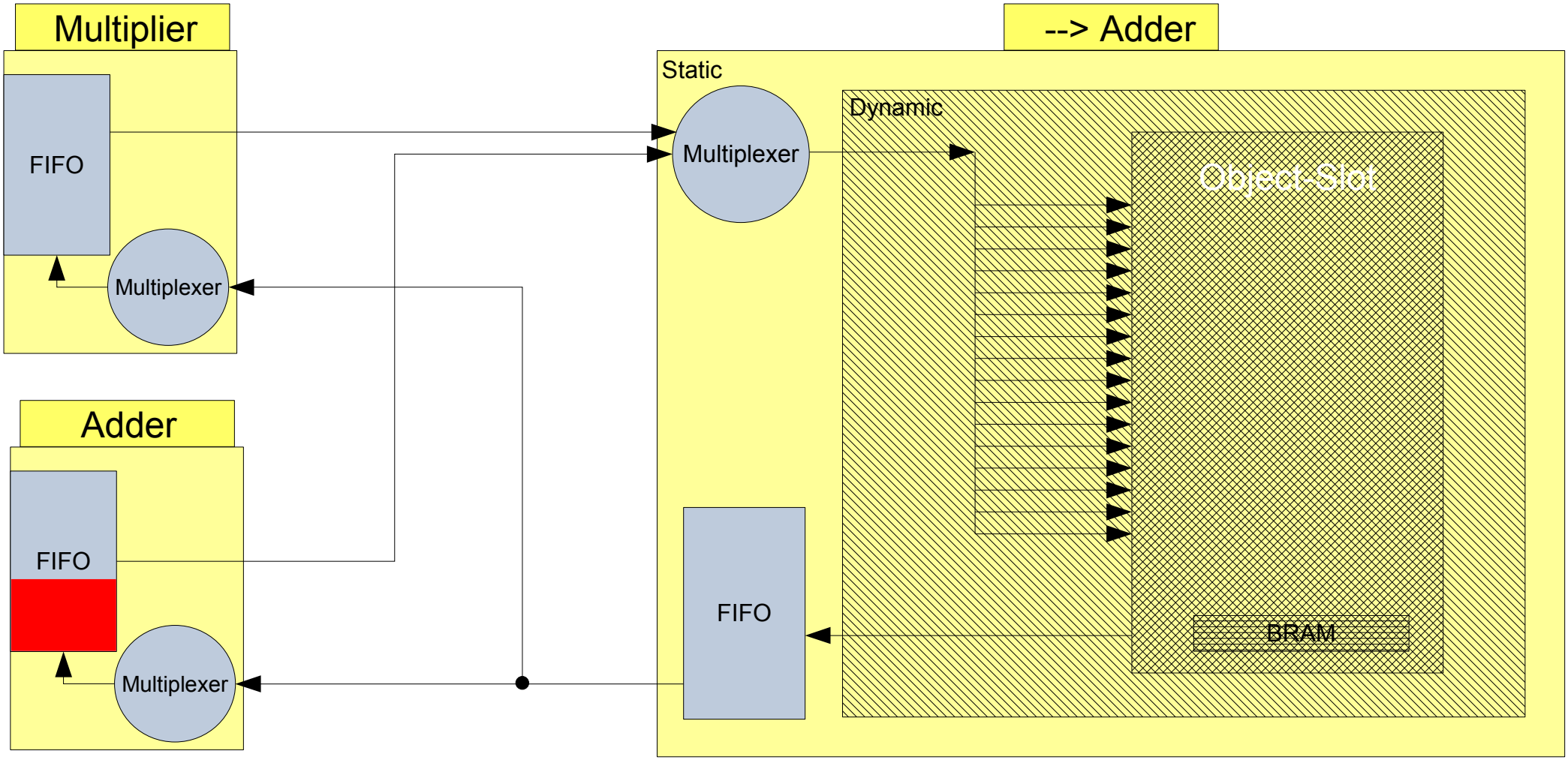

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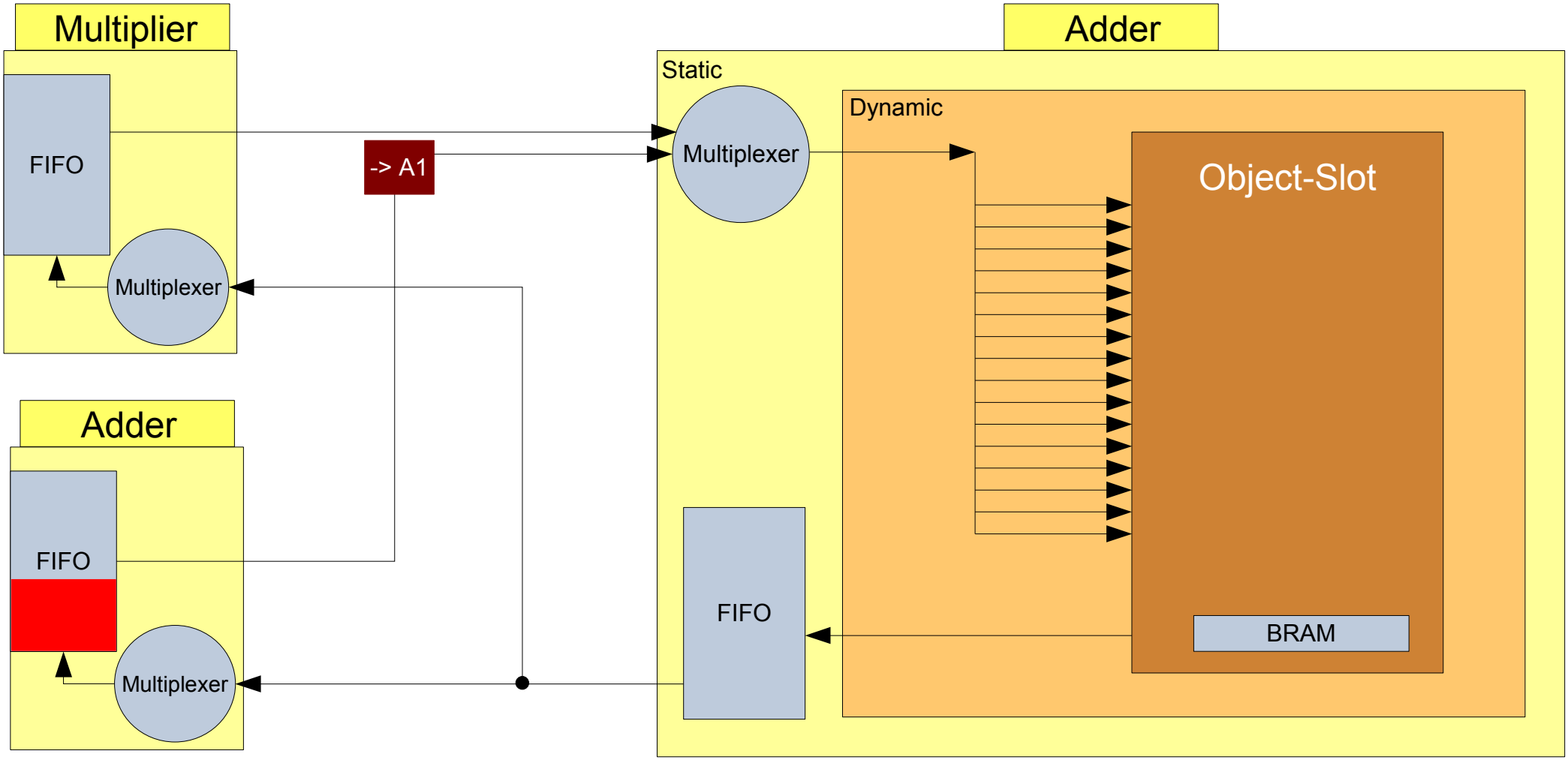

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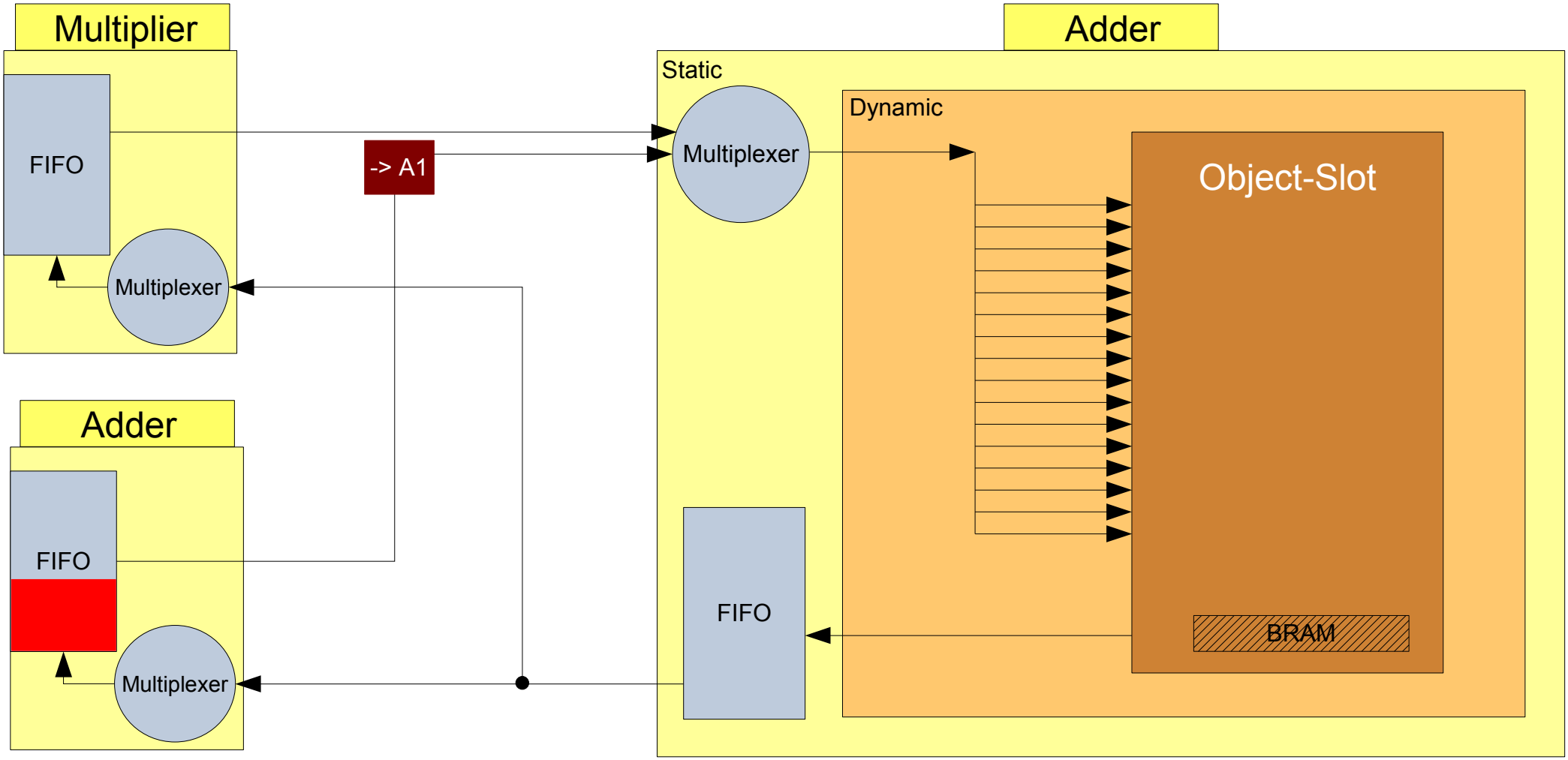

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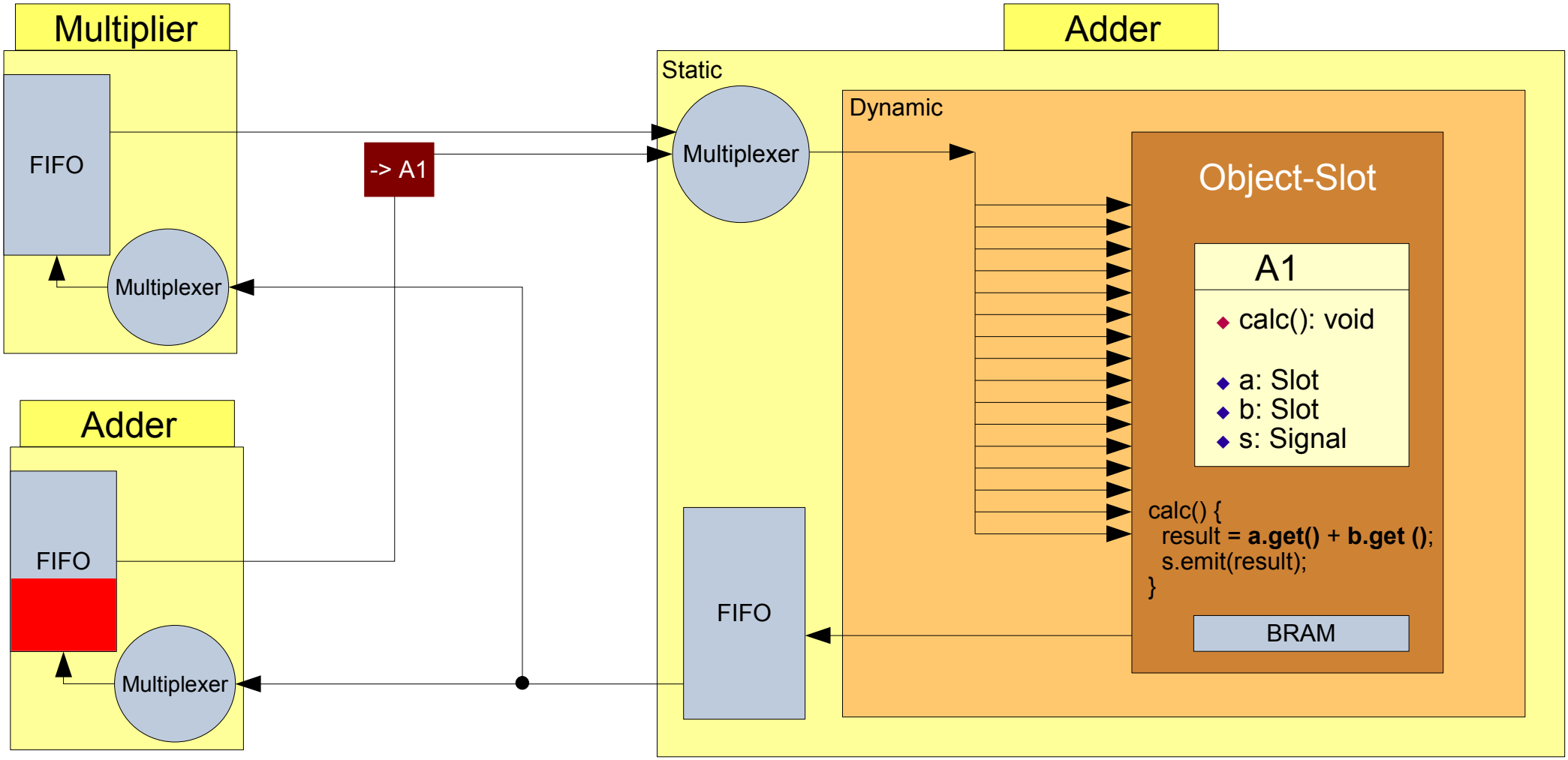

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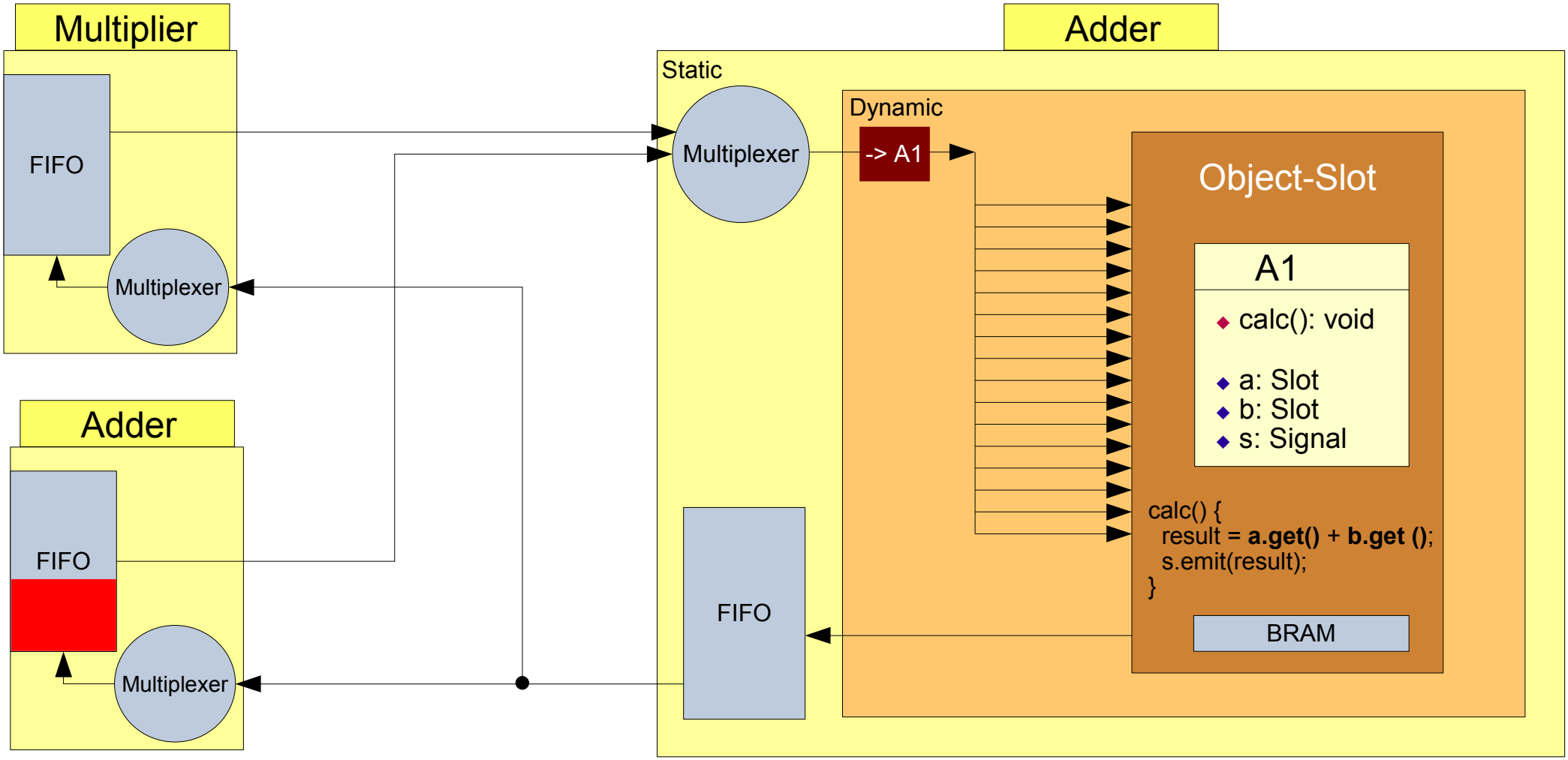

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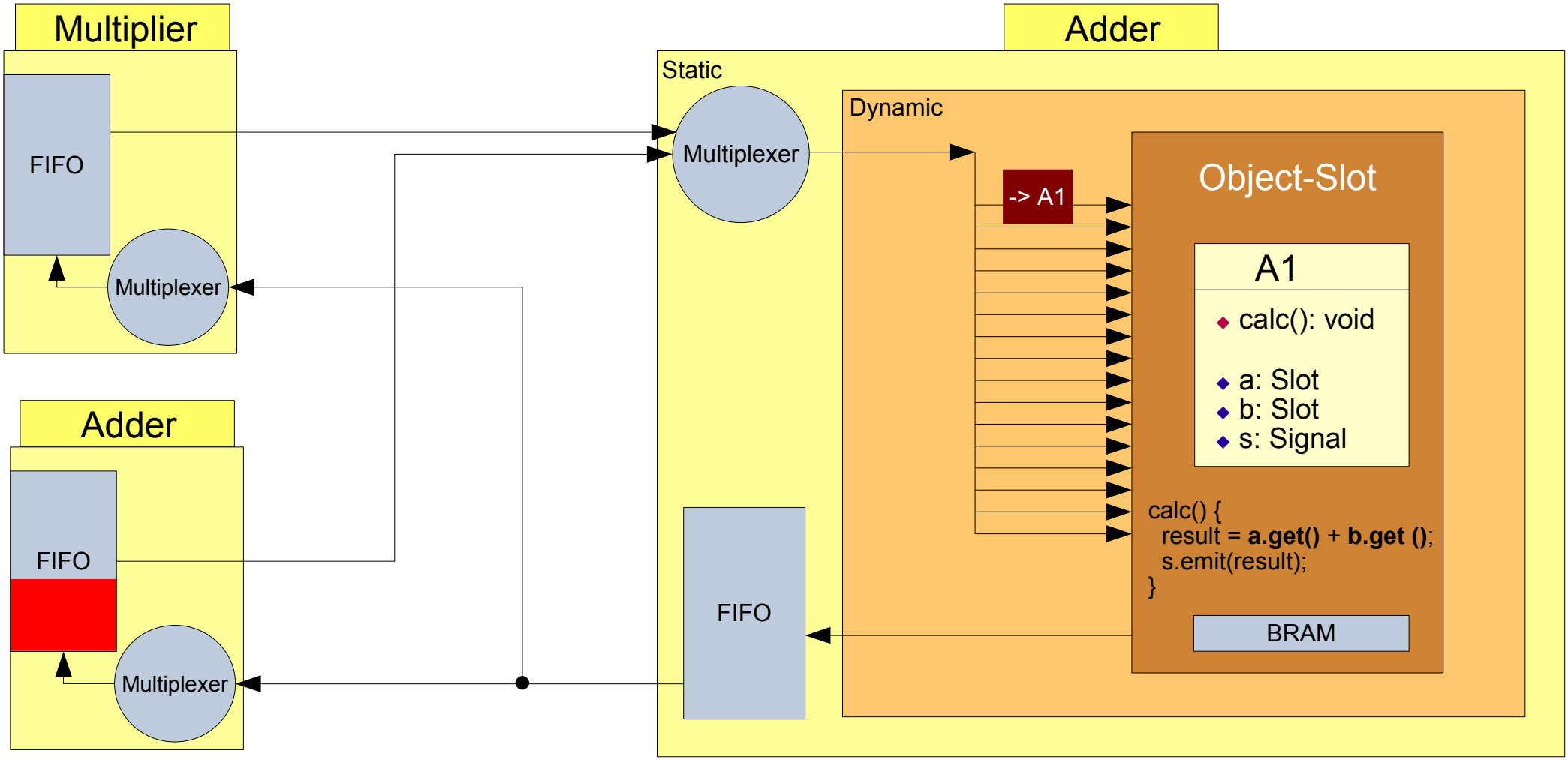

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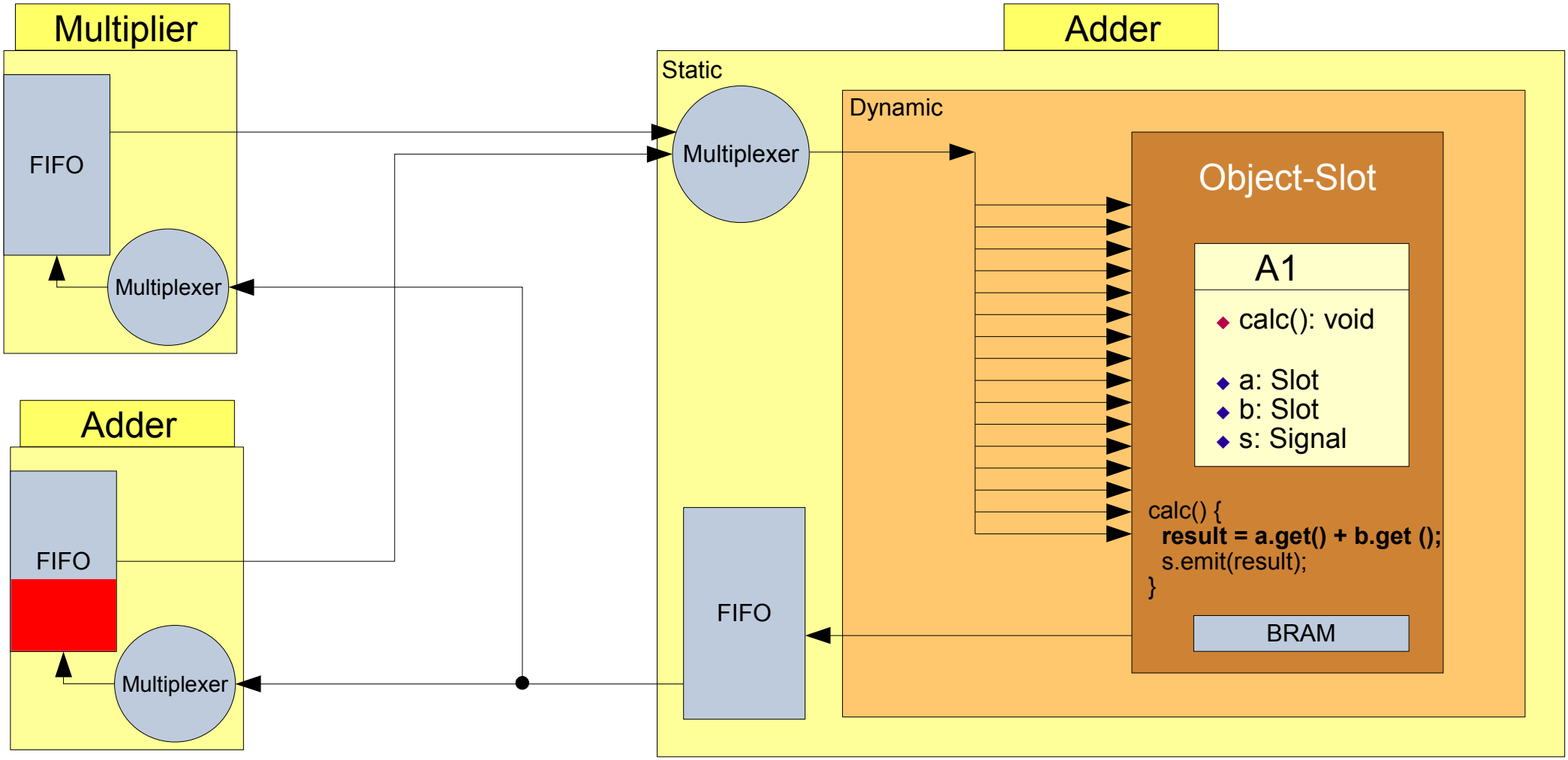

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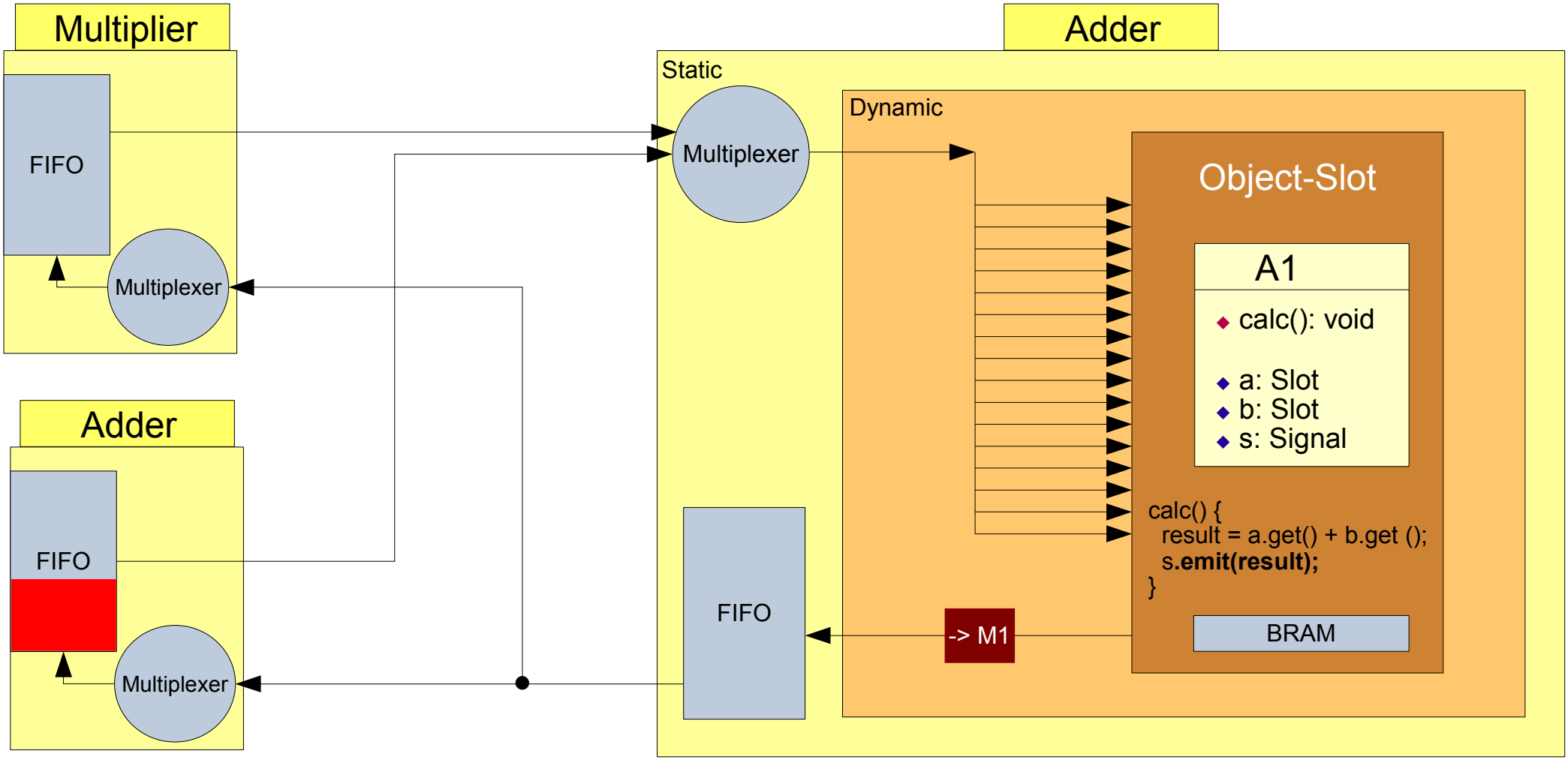

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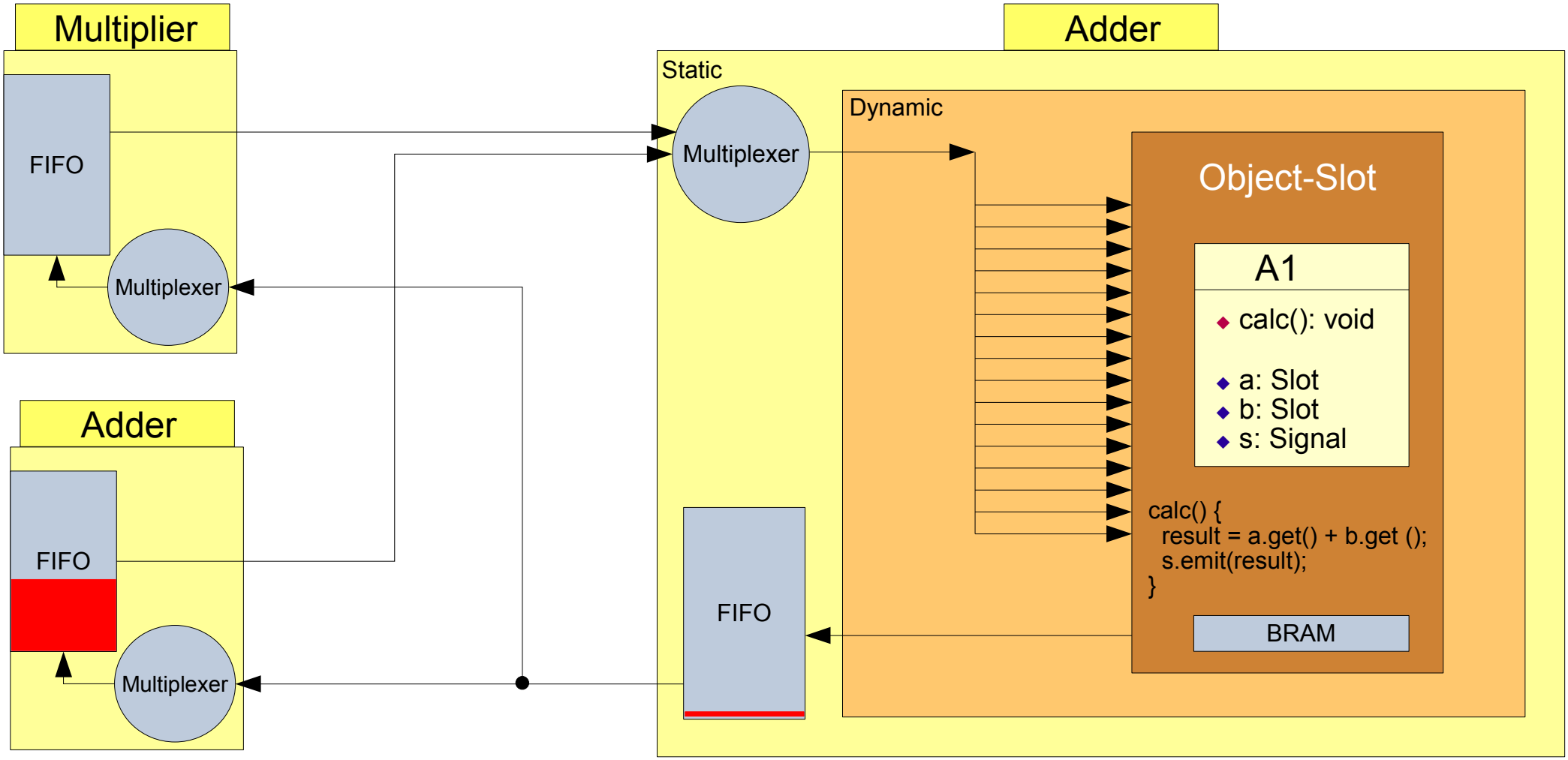

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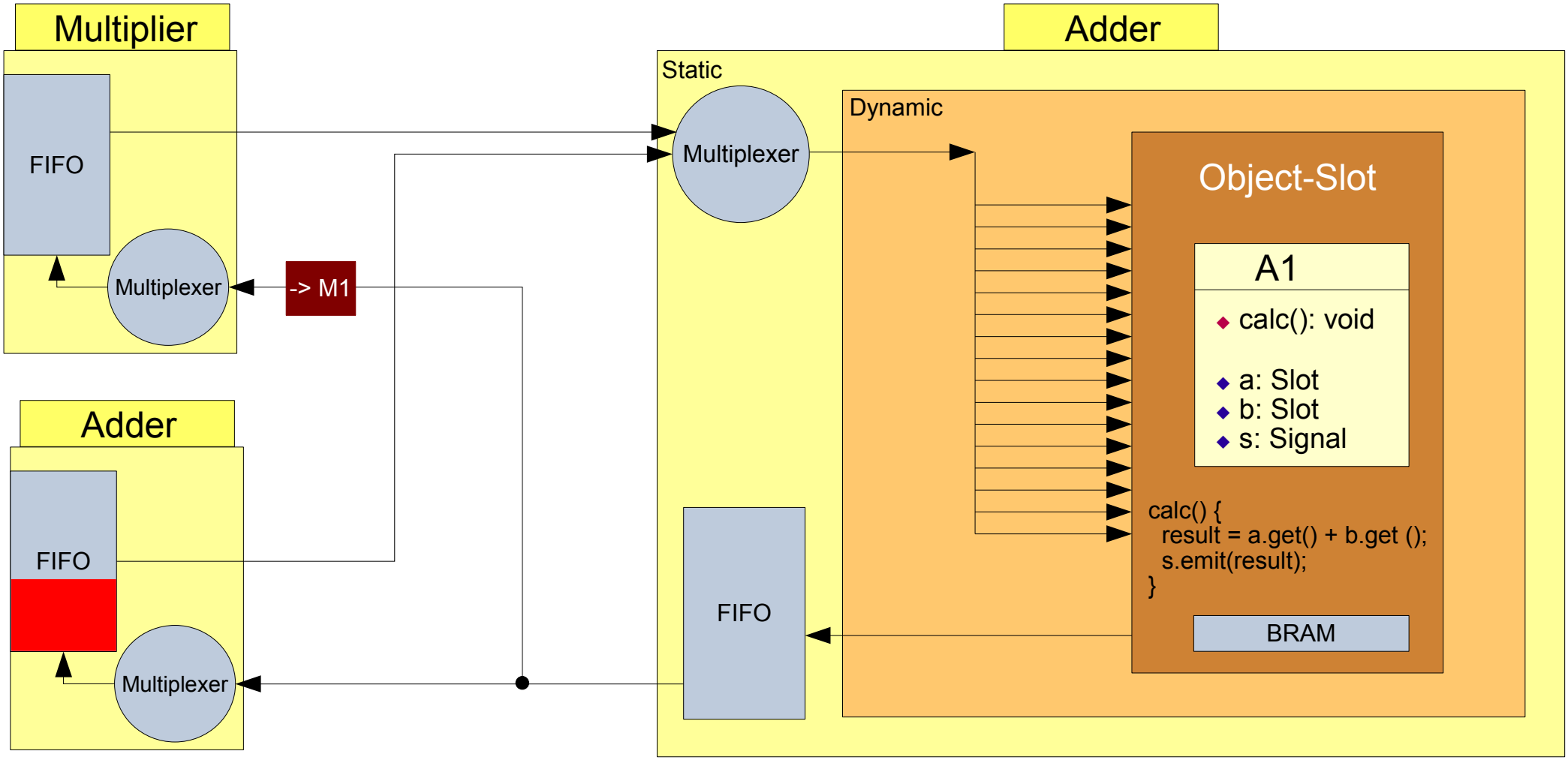

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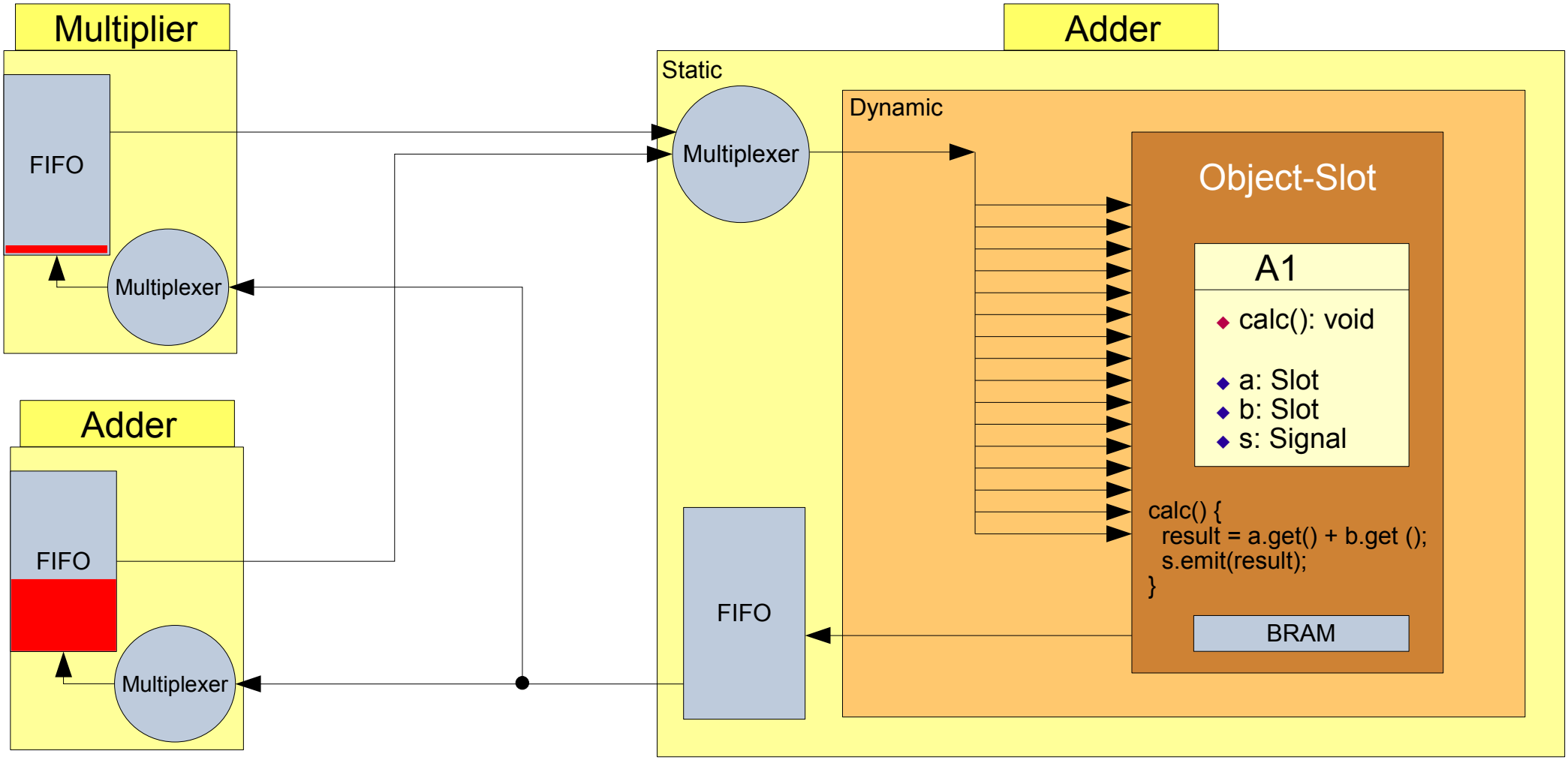

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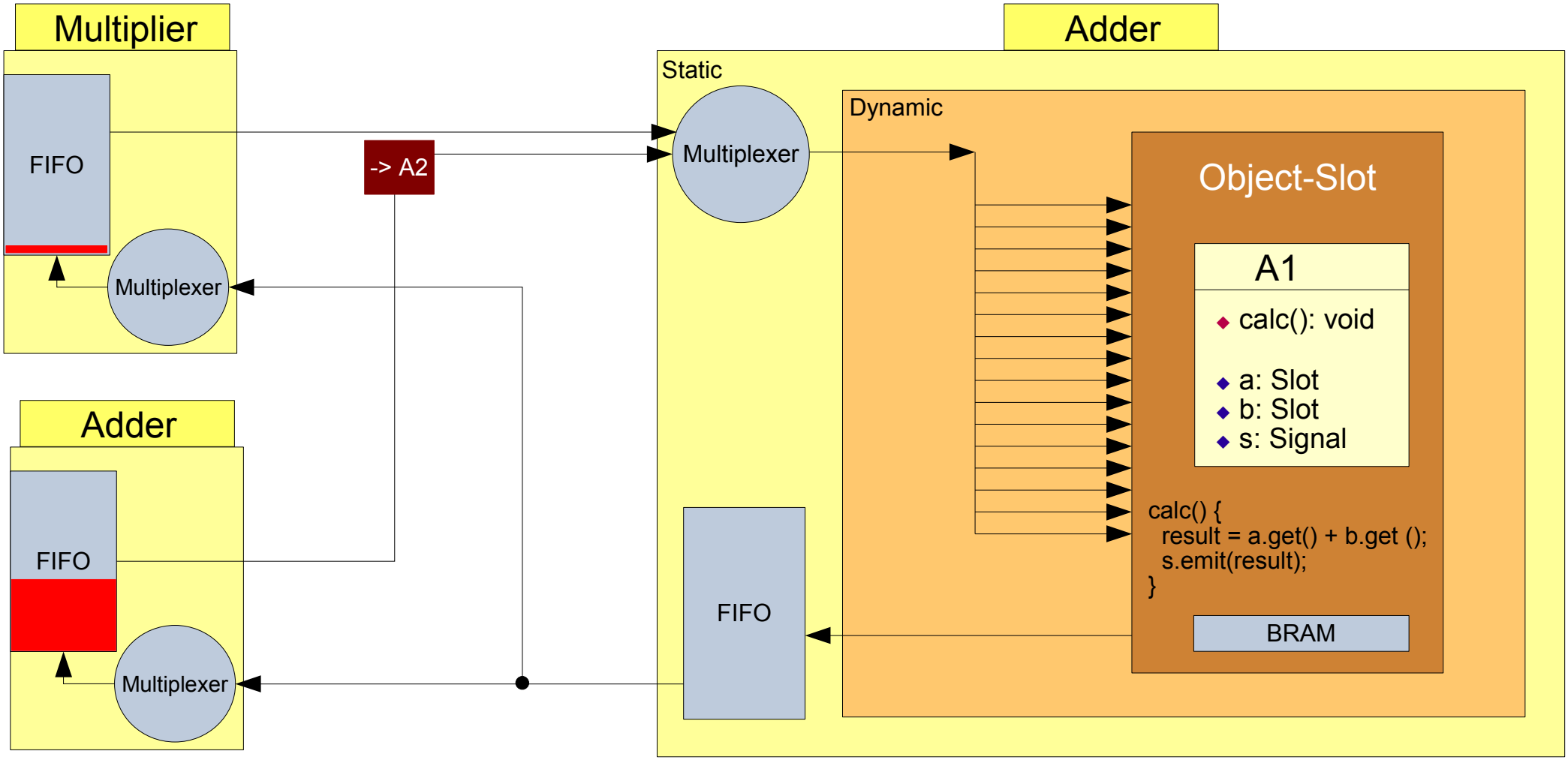

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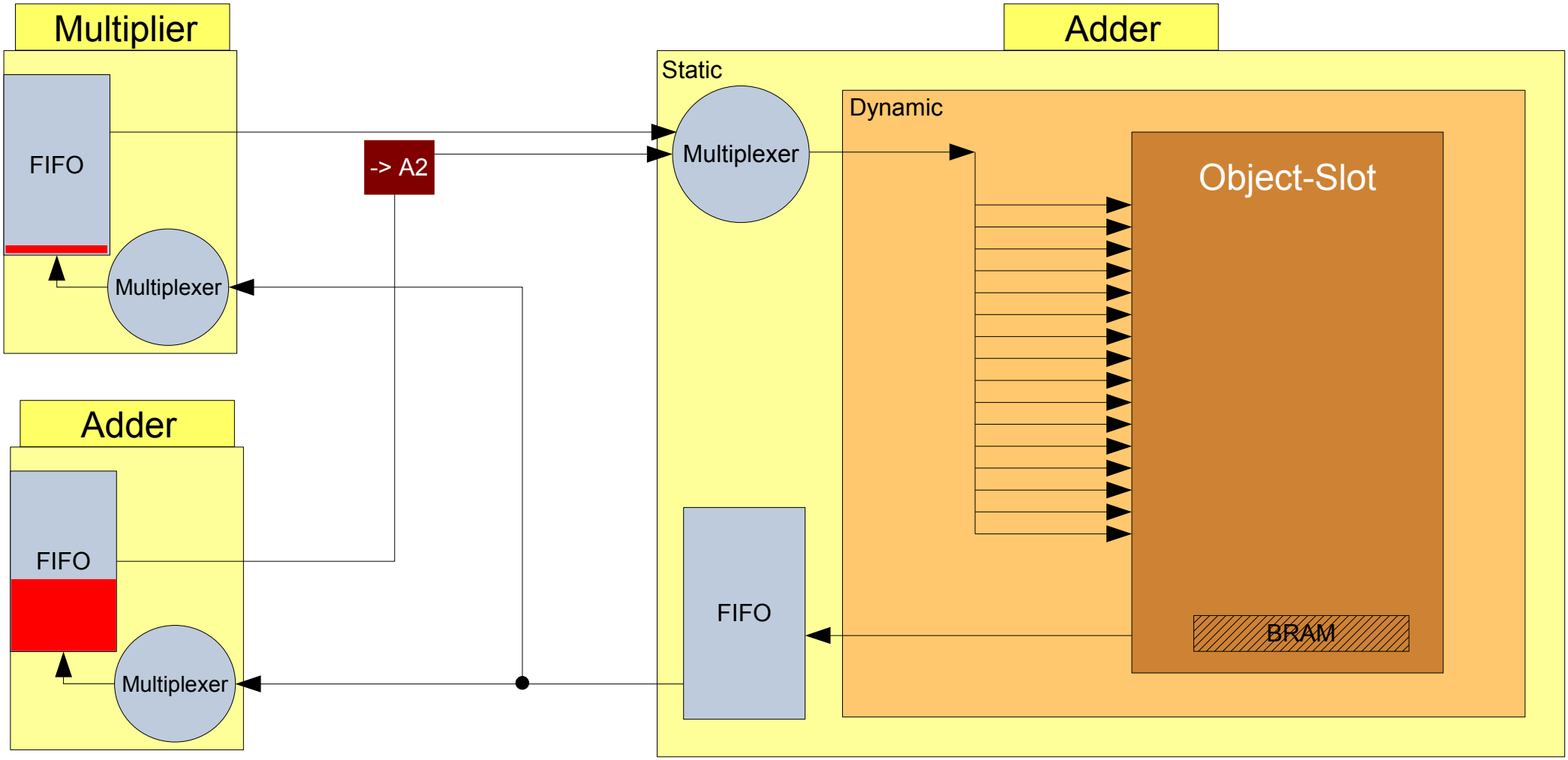

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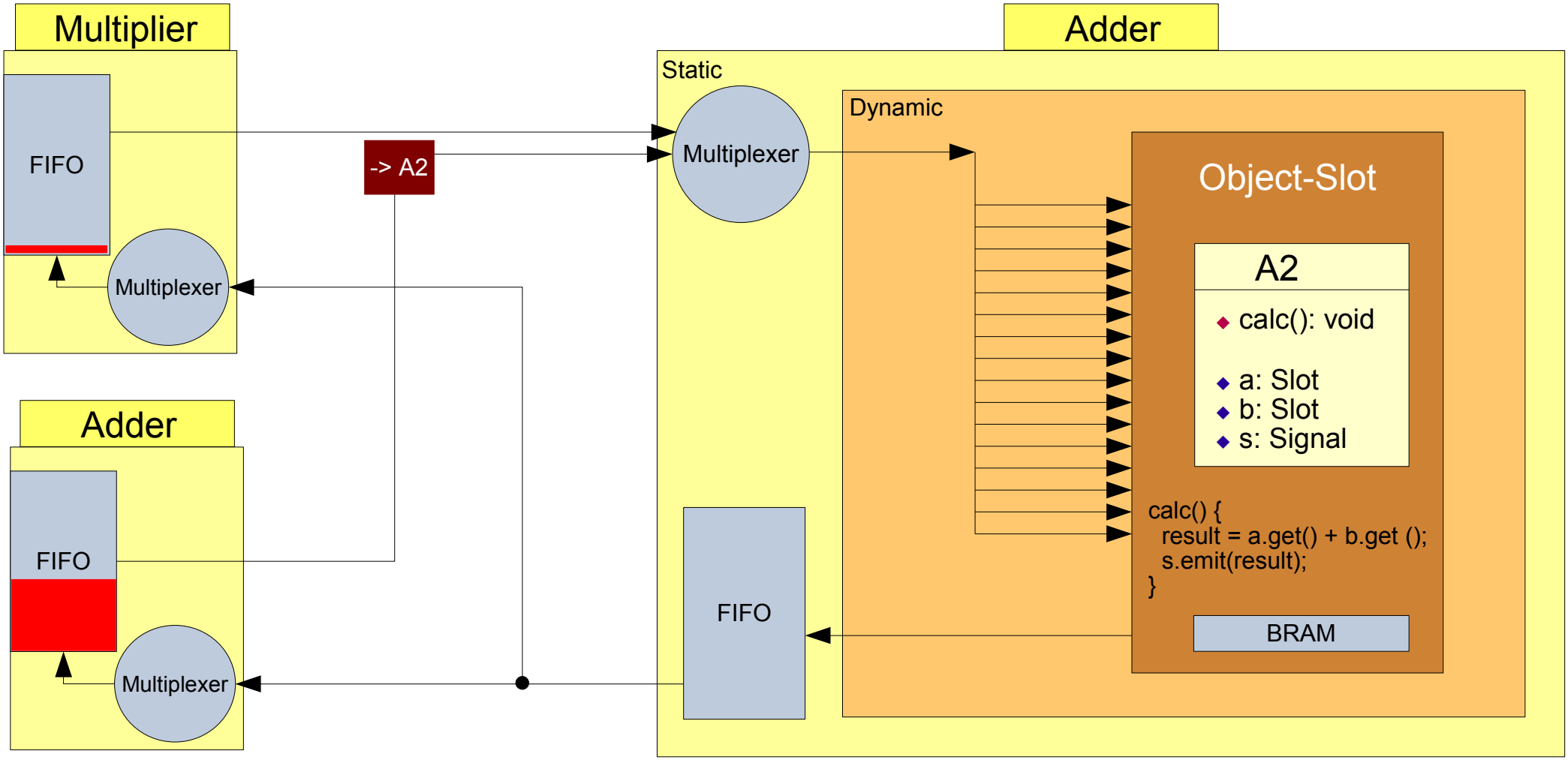

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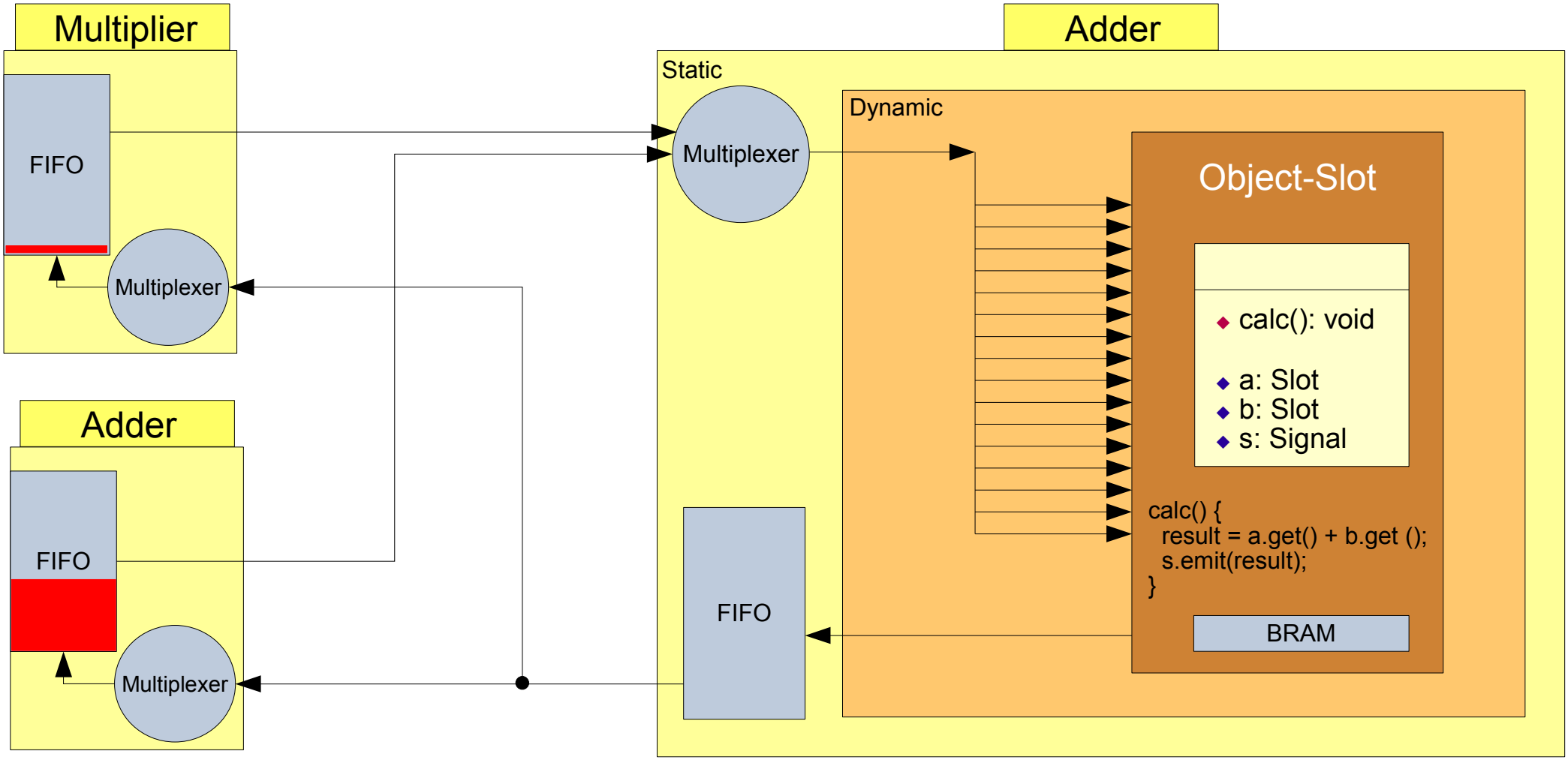

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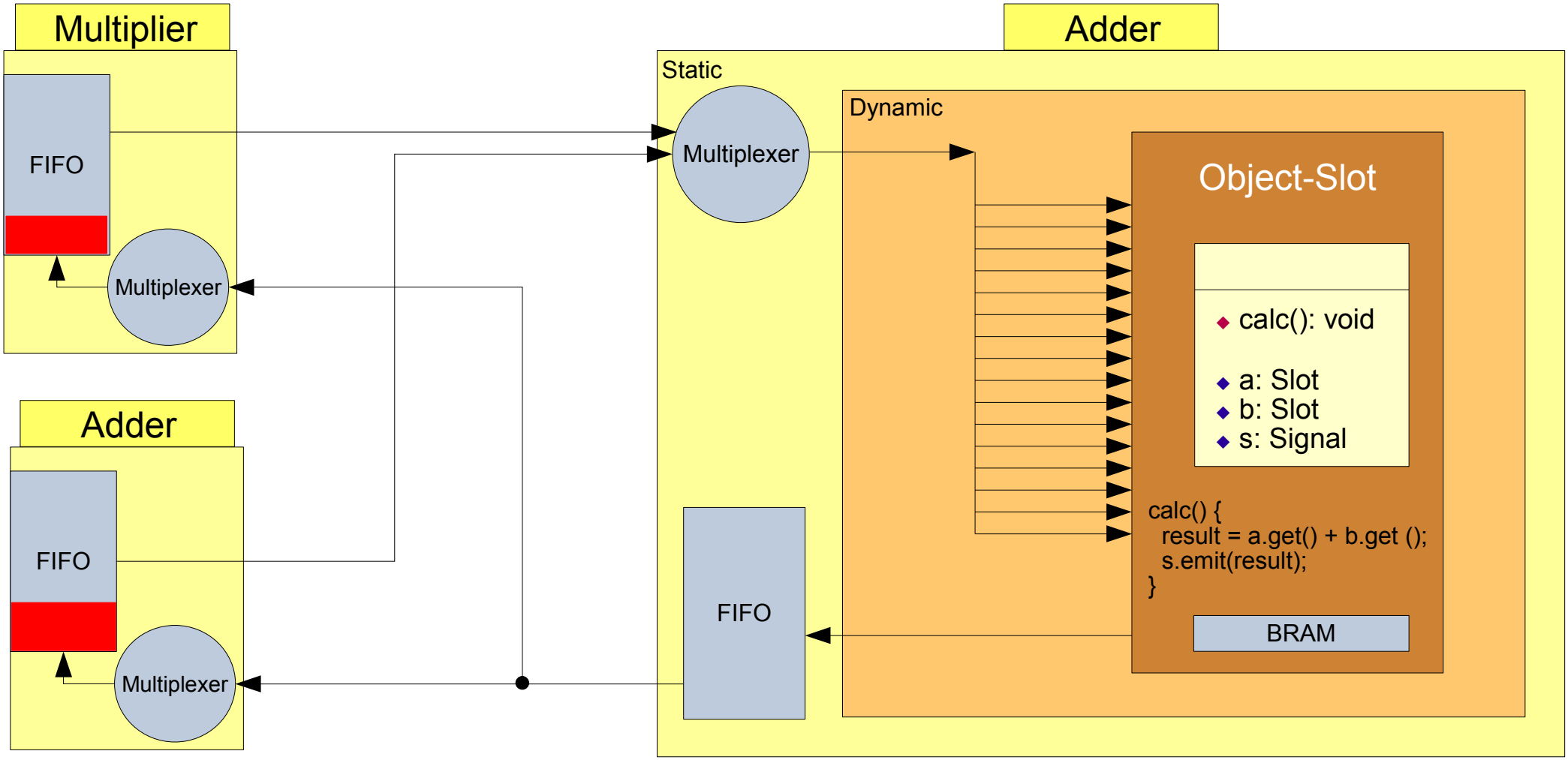

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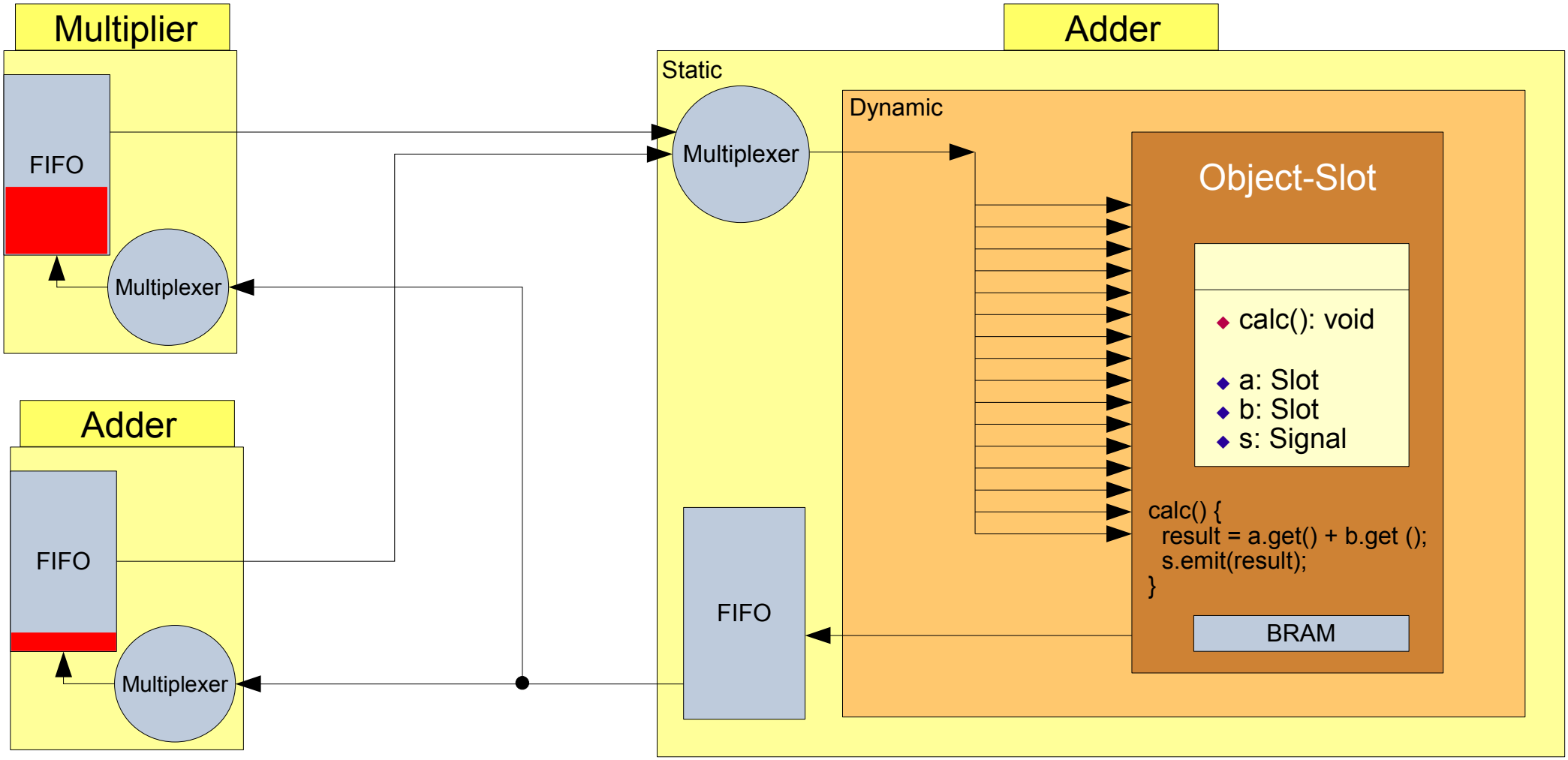

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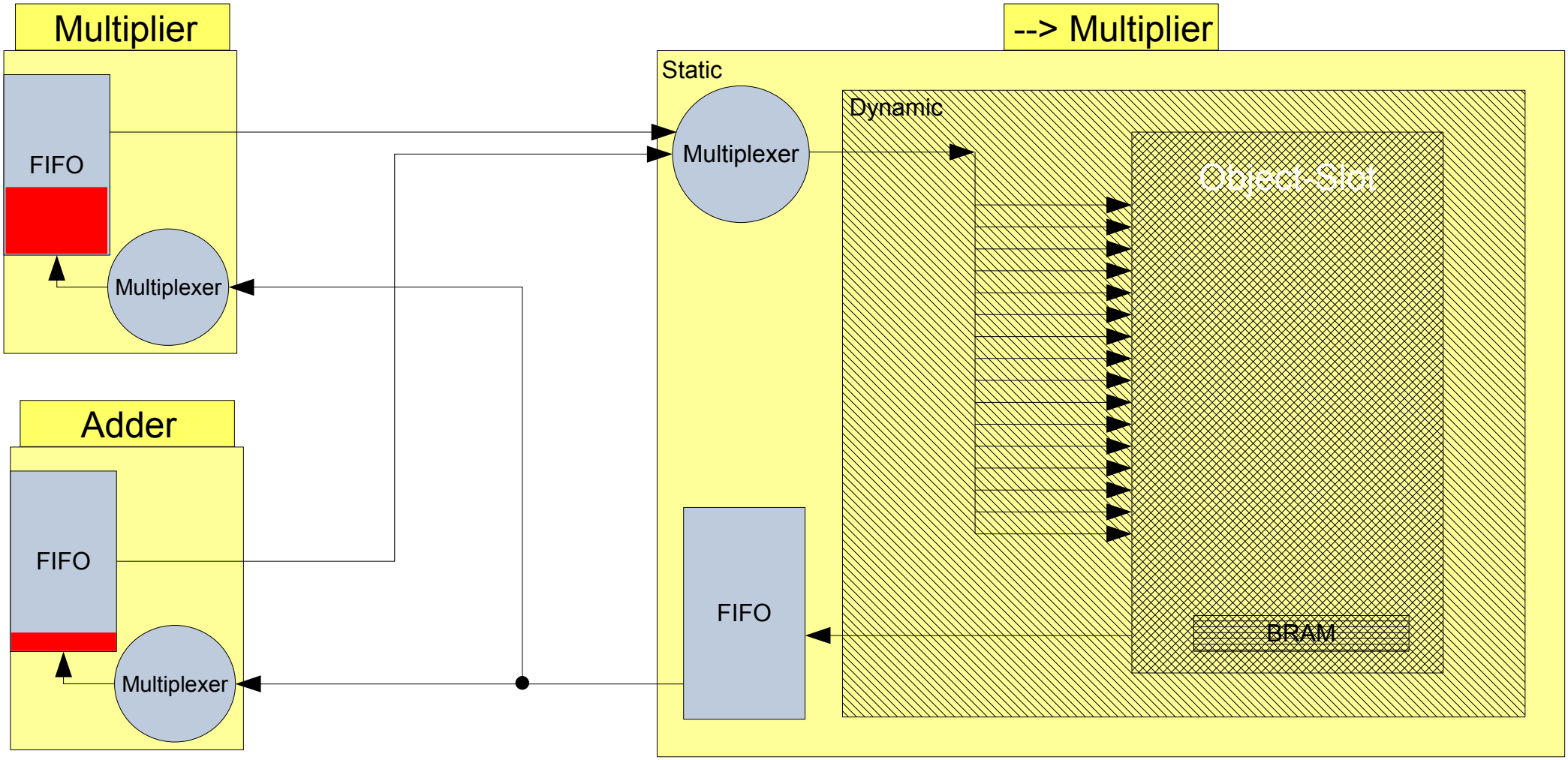

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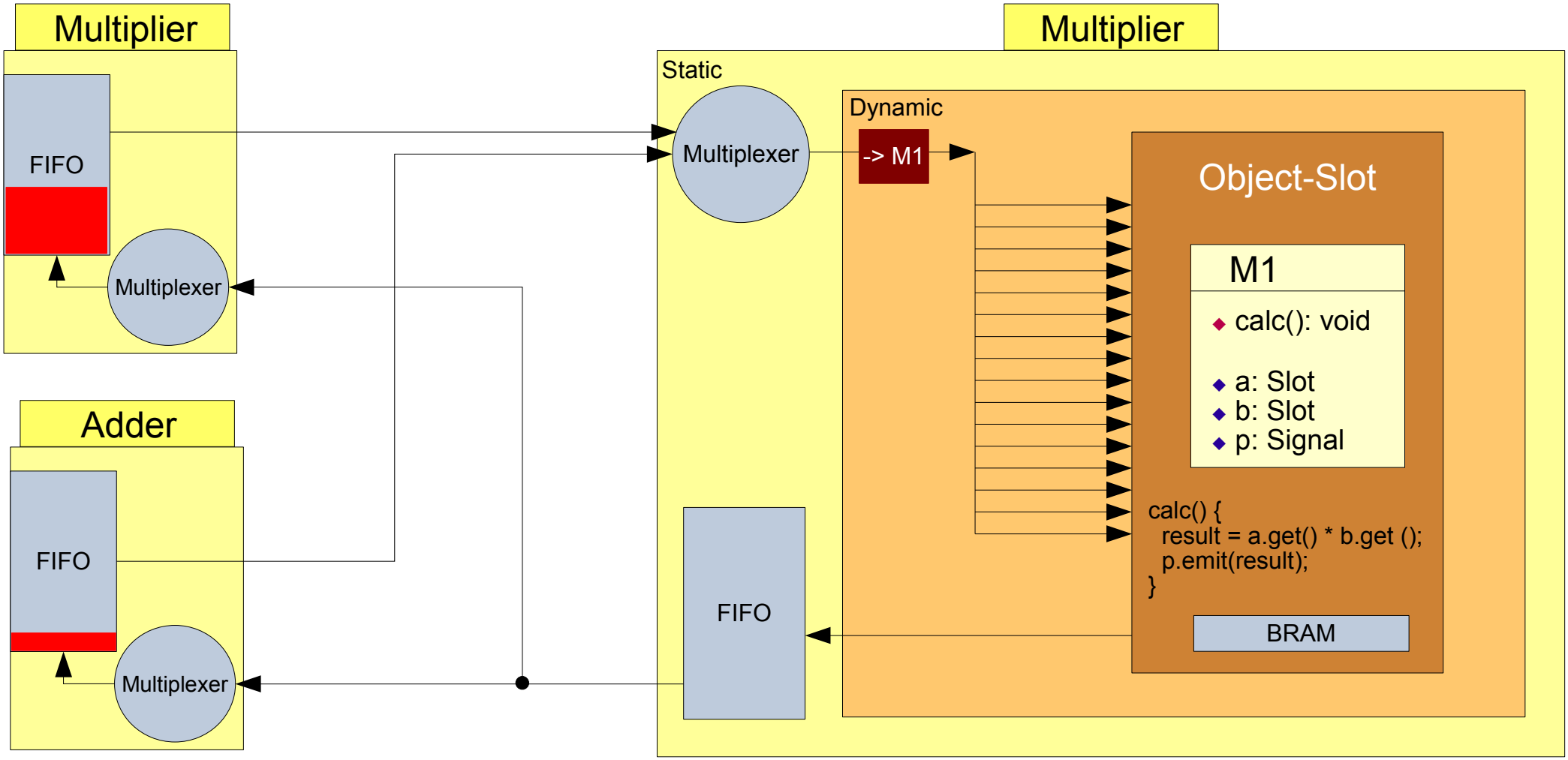

The POL commands

Slot *in*;	Deklariert den Eingang *in* einer Klasse
Signal *out*;	Deklariert den Ausgang *out* einer Klasse
***Sender.out*.connect(*Receiver.in*);**	Verbindet das Signal *out* des Objekts *Sender* mit dem Slot *in* des Objekts *Receiver*
***Sender.out*.disconnect(*Receiver.in*);**	Trennt das Signal *out* des Objekts *Sender* von dem Slot *in* des Objekts *Receiver*
***out*.emit(*value*);**	Sendet eine Nachricht mit Inhalt *value* an alle mit dem Signal *out* verbundenen Slots
***in*.get();**	Blockiert, bis eine Nachricht an Slot in anliegt und holt diese ab
***in*.get(*default*);**	Holt eine Nachricht von Slot in ab oder gibt *default* zurück, falls keine Nachricht anliegt