Deployement and logic modularities should be distinct

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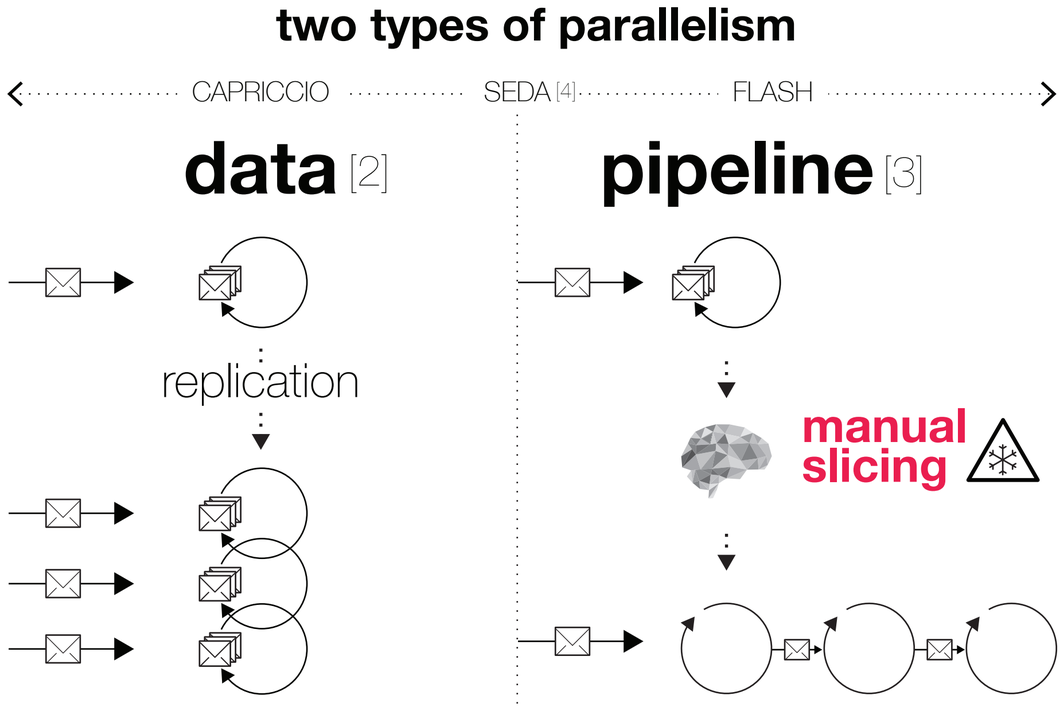
highly concurrent web applications need **parallelism**

two types of parallelism



problematic

Manual slicing freezes the **flexibility** of an application

because logic modularity **=** deployement modularity

proposition

We propose to automate the manual slicing process.

logic modularity **≠** deployement modularity.

two requirements

stack independence

&

memory independence

source[5]

```
var app = require('express')(),
    fs = require('fs'),
    count = 0;

app.get('/', function handler(req, res){
  fs.readFile(__filename, function reply(err, data){
    count += 1;
    var code = ('' + data)
                    .replace(/\n/g, '<br>')
                    .replace(/ /g, ' ');
    res.send(err
           || 'downloaded ' + count +
              ' times<br><br><code>' +
              code + '</code>');
  });
});

app.listen(8080);
console.log('>> listening 8080');
```

target[5]

```
flx source.js {}
>> handler-1000 [res]
  var app = require('express')(),
      fs = require('fs'),
      count = 0;
  app.get('/', >> handler-1000);
  app.listen(8080);
  console.log('>> listening 8080');
```

req, res

```
flx handler-1000 {fs}
-> reply-1001 [res]
  function handler(req, res) {
    fs.readFile(__filename, -> reply-1001);
  }
```

res, err, data

```
flx reply-1001 {count}
-> null
  function reply(err, data) {
    count += 1;
    var code = ('' + data)
                    .replace(/\n/g, '<br>')
                    .replace(/ /g, ' ');
    res.send(err
           || 'downloaded ' + count +
              ' times<br><br><code>' +
              code + '</code>');
  }
```

[1] A Adya, J Howell and M Theimer. “Cooperative Task Management Without Manual Stack Management.” In : USENIX Annual Technical Conference (2002).

[2] JR von Behren, J Condit and EA Brewer. “Why Events Are a Bad Idea (for High-Concurrency Servers).” In : HotOS (2003).

[3] J Ousterhout. “Why threads are a bad idea (for most purposes)”. Presentation given at the 1996 Usenix Annual Technical Conference (1996).

[4] M. Welsh, S. Gribble, E. Brewer, and D. Culler. A Design Framework for Highly Concurrent Systems. CS Technical Report UCB/CSD-00-1108, University of California, Berkeley, October 2000.

[5] flx-example: https://github.com/etnbrd/flx-example/tree/1.0. Accessed: 2014-08-22.

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