

# Liquefy the cloud



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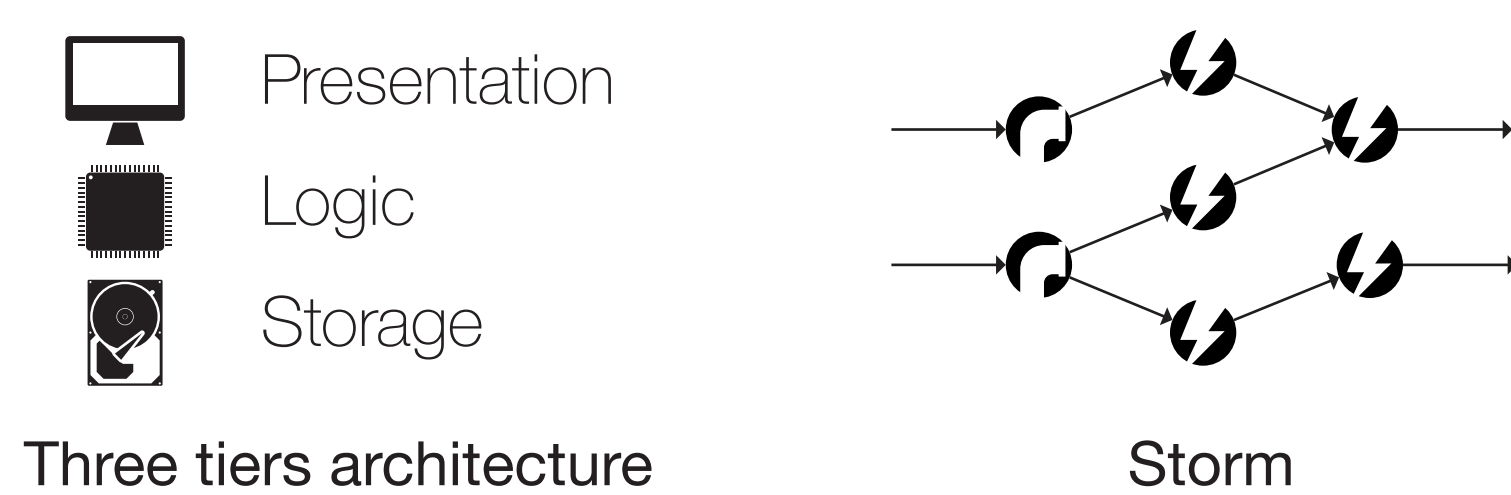
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## How to abstract web services' usage variation from developpement ?

A popular web service might grow from thousands to millions of users in a matters of days.

To react to such variation of usage, they have to be scalable.

The classical approaches - the **three tiers** architecture, frameworks like **storm** or **languages** like Erlang - allow developer to split web services into well defined parts in order to be scalable.



Instead we want to **automatically** split a web service into **stateless parts**, and make them communicate by **volatile data streams**.

The persistence is decoupled from the logic and managed into-the messaging system.

Statelessness and volatility assure the web service to be **frictionless\***, and the association with this fine decomposition, make it **scalable**.

**\*Frictionless** : independent from the hardware allowing it to be moved at runtime without relocation of ressources.

In a context of **data-stream oriented** web services written in **javascript**, we want

+ to create a **frictionless\*** execution model and

+ to **transpile** standard web services into this model

Example : a visit counter

// simple javascript

```
function store(userId, req, res, callback) {
  // Internal call : synchronous
  var result = localProcess(userId, req);

  // External Call : asynchronous
  callExternalDB(userId, result, function(result) {
    if (result.condition)
      return callback(result);
  });
}

// Entry point
app.get('/:id', function(req, res){
  return store(req.params.id, res, function(result) {
    res.send(result);
  });
});
```

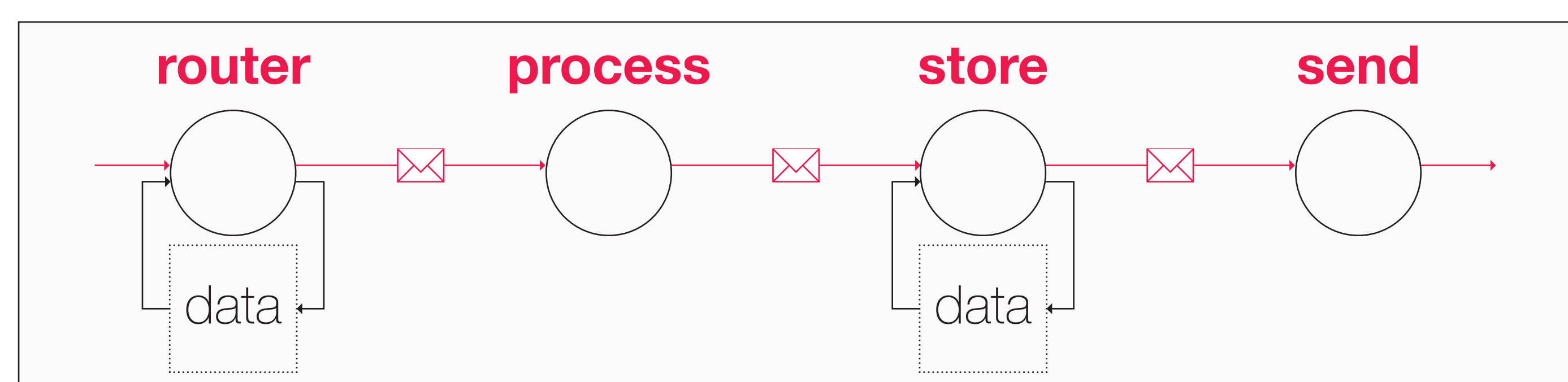
**Extraction**

// frictionless model

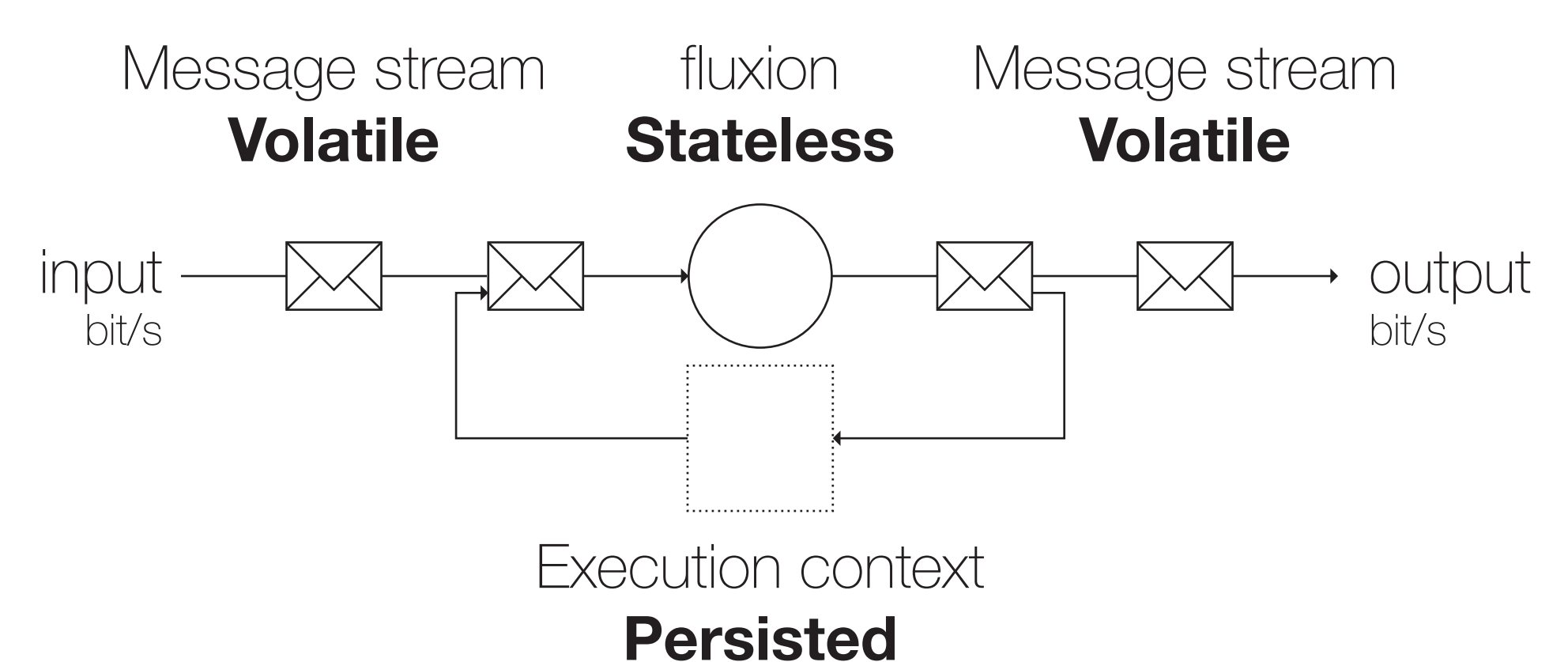
```
input >> router
router >> process | count
process >> store
store >> send | count
send >> output
```

**Execution**

// execution model



Execution model



Our **execution model** is composed of :

**Fluxion**, stateless parts, **listens** for, **modifies** and **sends** messages to other fluxions.

**Execution context** are persisted **memory states** needed by fluxions.

**Messaging system** keeps tracks of fluxions, and delivers volatile message streams.

+ Binds context execution and messages.

+ Moves fluxions and contexts to balance load.

Progression & Objectives

**We aim to transpile any javascript web service into one which can adapt dynamically to load.**

**Without the development constraints imposed by other approaches.**

**DONE** a javascript library to express and execute a fluxional program written in javascript.

**TODO** enhance this library with the automatic migration of fluxions, and create a langage with a compiler to javascript.