Feedback on improving performance and scalability

using **multi core and distribution**

while preserving correctness

David SAUVAGE
AdaLabs innovate.all
Software architect

David DHÉNAUX
SMARTSIDE
Co-founder & CTO

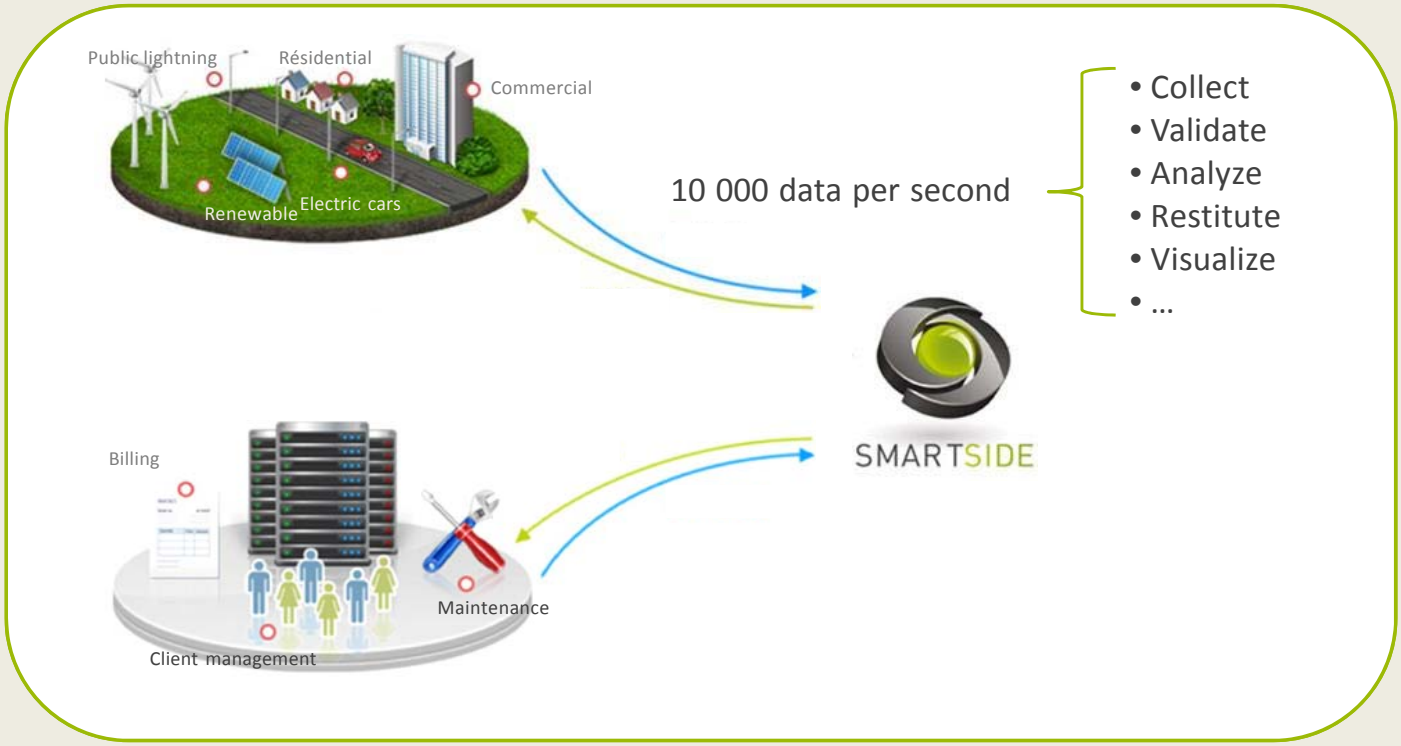
Ada Europe 2013 - Berlin

Who are we ?

David SAUVAGE
AdaLabs innovate.all
Software architect

David DHÉNAUX
SMARTSIDE
Smart Metering & Smart Grids Solutions
Co-founder & CTO

Smart Grid Systems need to manage huge amount of data



AdaLabs innovate.all | Introduction | FeedBack | Demo | Conclusion | SMARTSIDE

Smart Grid Systems need to manage huge amount of data

Ada 2012

DSA

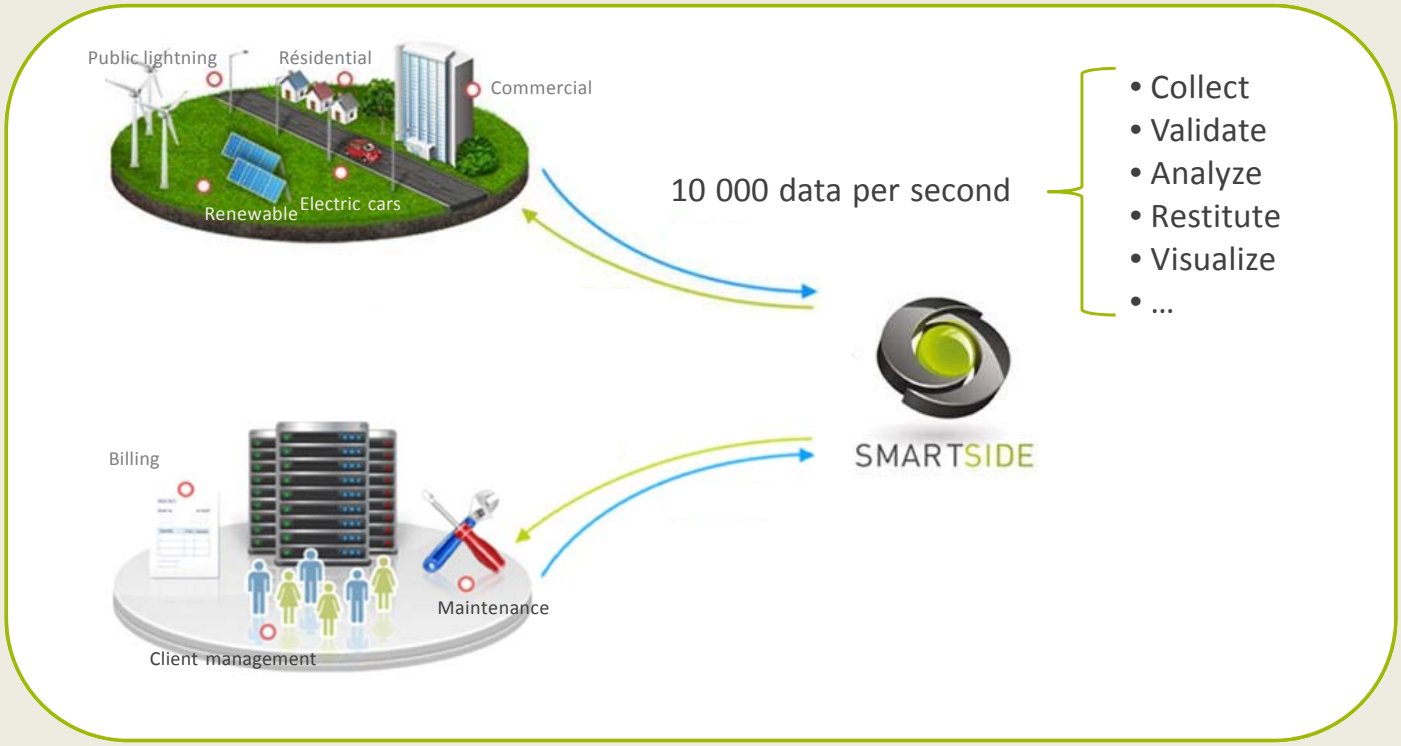
Critical system for utilities

MDMS needs **high reliability**…

…and **high performances**

Formal verification and proof secure our customers' business

Smart Grid Systems need to manage huge amount of data



Feedback

Ada provides an attractive semantic

but bad practices could lead to …

Code duplication

Tasking architecture rigidity

Test instabilities

Amazing concept

but could lead to …

Behavior hiding (network, asynchronous)

Heavy impact on legacy code

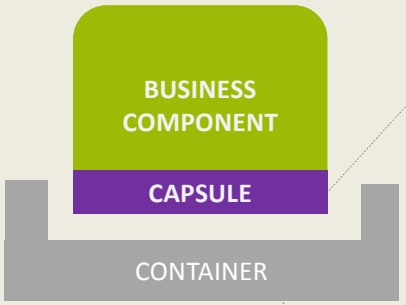
Our recommendations

Best practices

Add **Separation of Concerns** beetween
Business and Infrastructure Components

Manage **Tasking and Distribution** in the
Infrastructure Layer

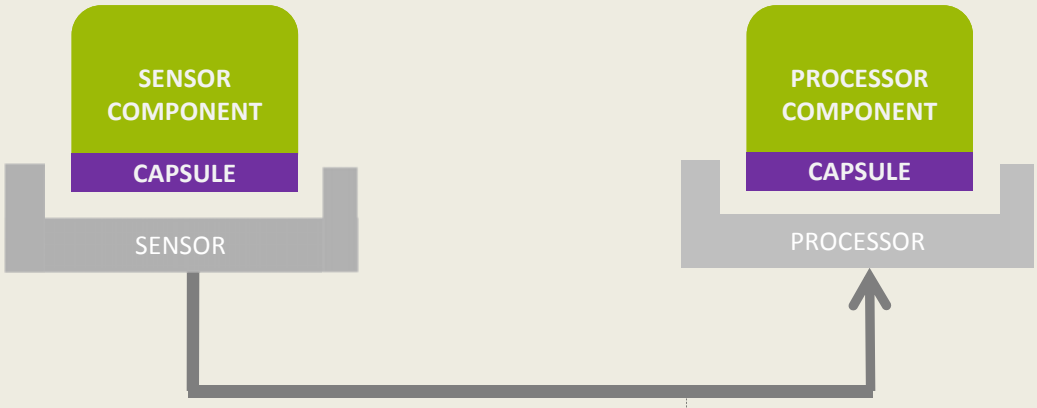
Business component encapsulation




```
1
2  type Capsule is new T_Capsule with null record;
3
4  overriding procedure Initialize (...)
5  -- ...
6
7  overriding procedure Process (...)
8  -- ...
9
```

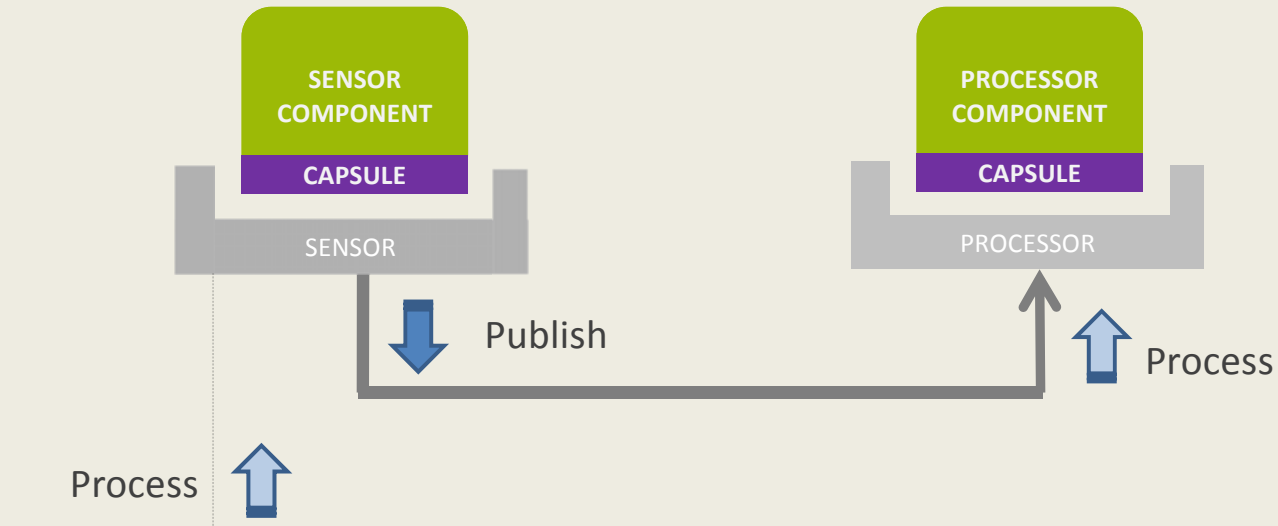
```
31
32 package Container is new Rachis.Components.Containers
33   (Label     => "Business_Component",
34    Id        => 2,
35    Policy    => By_Pipeline_FIFO_Two_Task_Policy,
36    T_Capsule => Capsule);
37
38 pragma Remote_Call_Interface (Container);
39
```

Component containers cabling



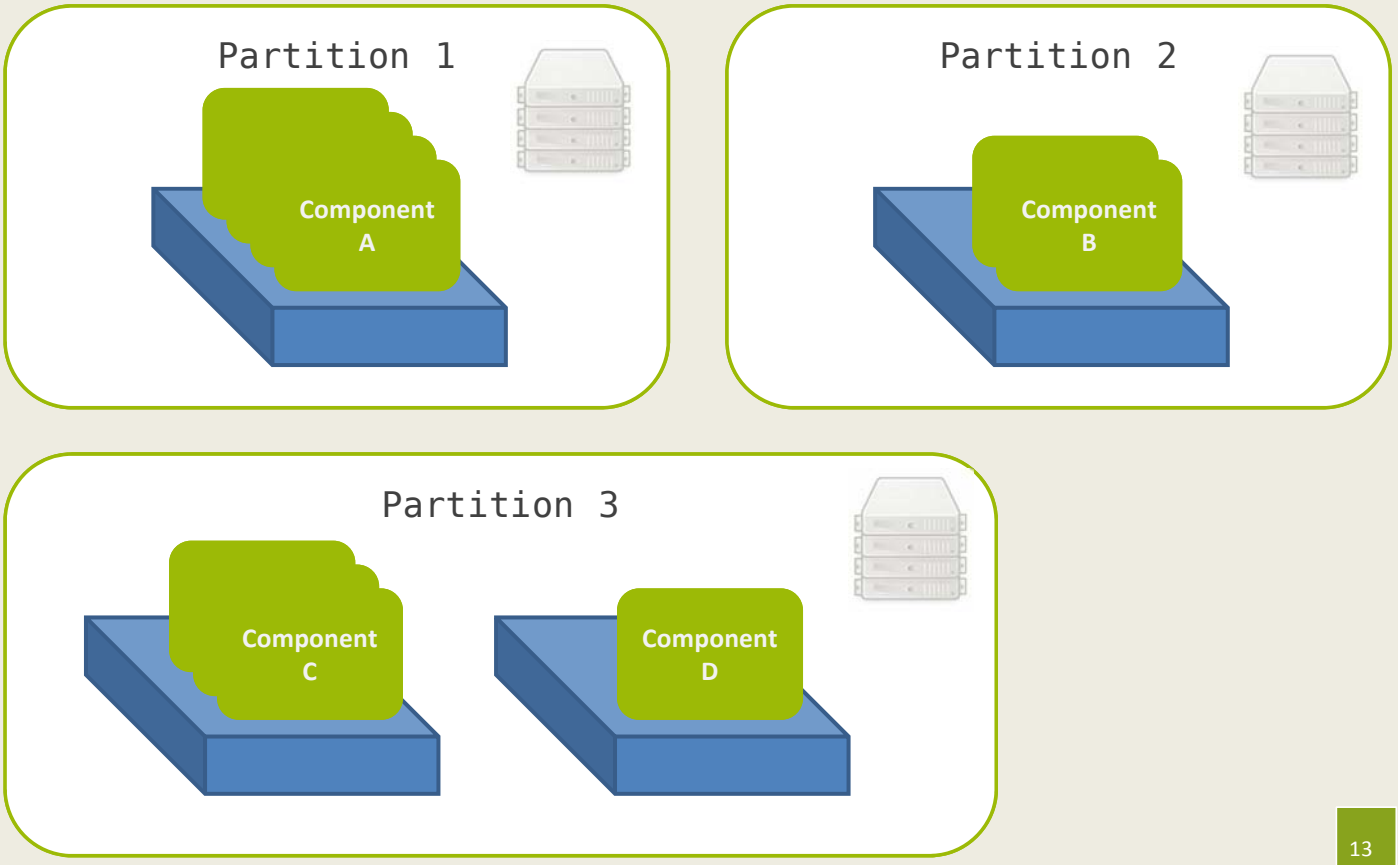

```
40
41 Sensor.Link_To (Processor.Reference);
42
```


Data processing flow

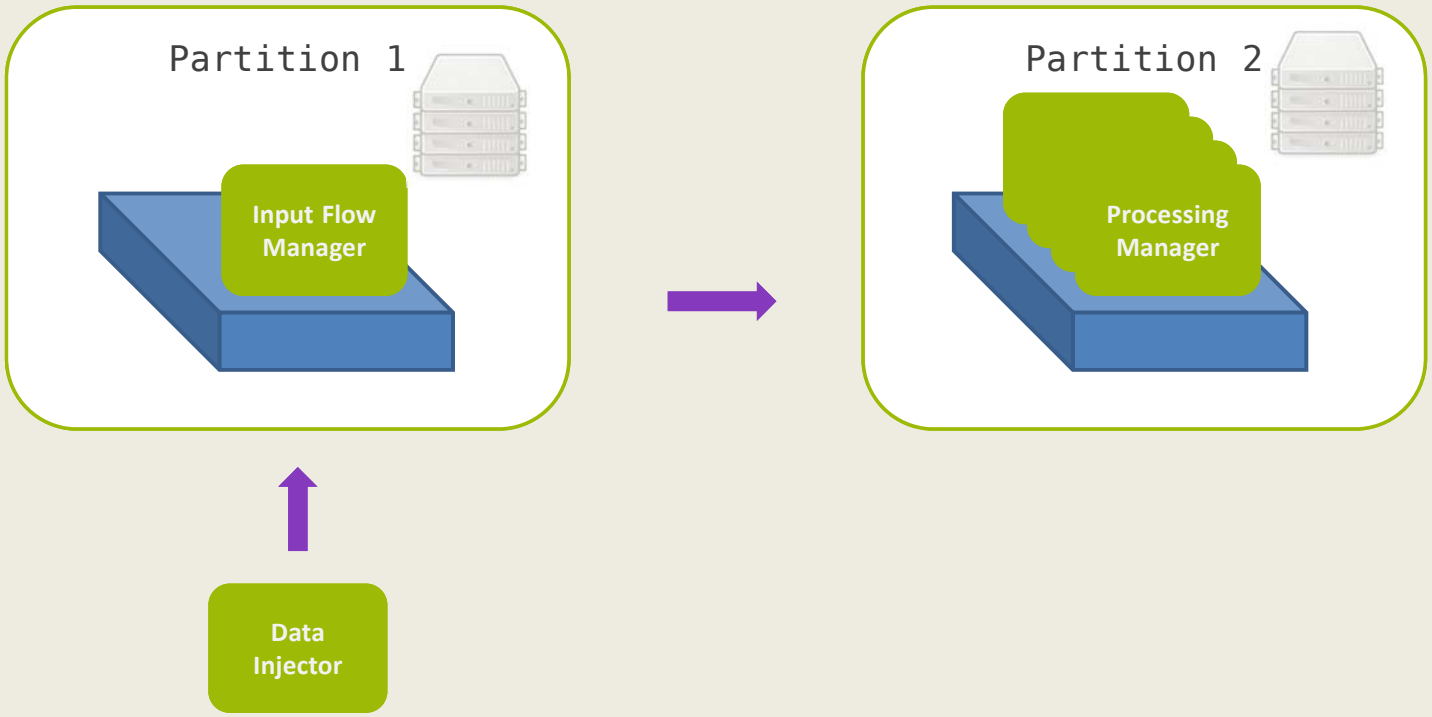



```
43
44 Element.Set_Pipeline_Id (Hash);
45 Sensor.Process (Element);
46
```

Deployment flexibility



Demonstration



What's next ?

- Make the framework formally proven
- Add more features (memory pools,…)
- Add dynamic behaviors

Thanks !