

On the Web Frontiers with Smalltalk

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```
  add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
  add: self infoLineElement. "brief info about document"  
  add: bucketElement. "infoLine needs buckets before"  
  add: self documentFooterElement.
```



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Why frontiers?



- Microsoft going to HTML5
 - For desktop apps it plans to replace .NET and WPF/Silverlight with trio HTML5, CSS and JavaScript
- Web OS-ses: Google ChromeOS, HP WebOS
- Will all the future applications be based on web technologies?
- How are we Smalltalkers prepared for this challenge?

```
  add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
  add: self infoLineElement. "brief info about document"  
  add: bucketElement. "infoLine needs buckets before"  
  add: self documentTextElement. "the main content of the document"
```



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Why? Many key events at once



- HTML5
- JavaScript
- Web browsers
- Event loop
- Realtime Web
- Mobile
- Cloud

```
self add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self documentActionsElement; add: self documentTitleElement
```



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Web Technology Trio



HTML5



CSS3



JavaScript

```
self add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self documentActionsElement; add: self documentTitleElement
```

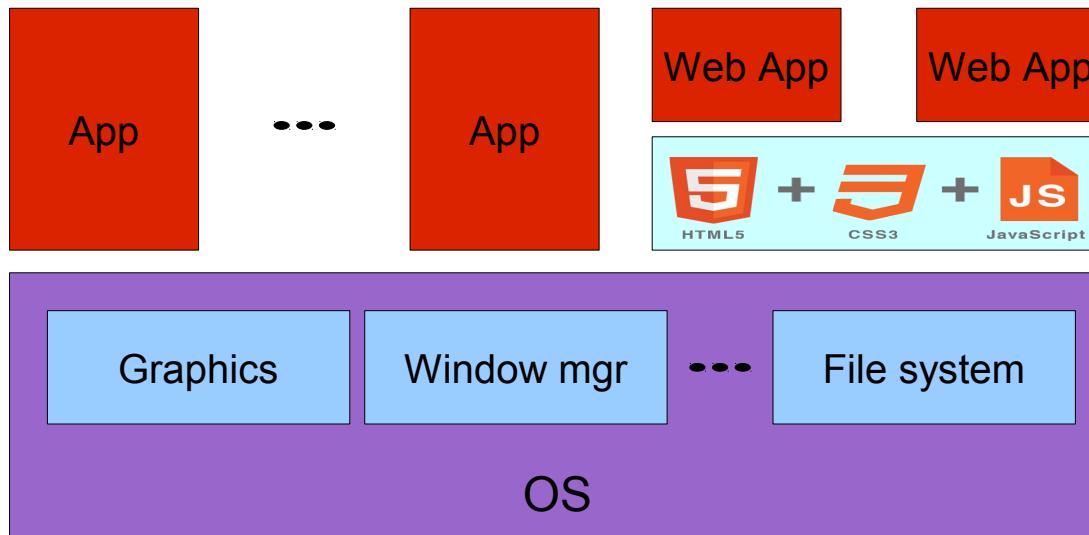


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Web integration into Operating System



Present: Web trio separated from OS

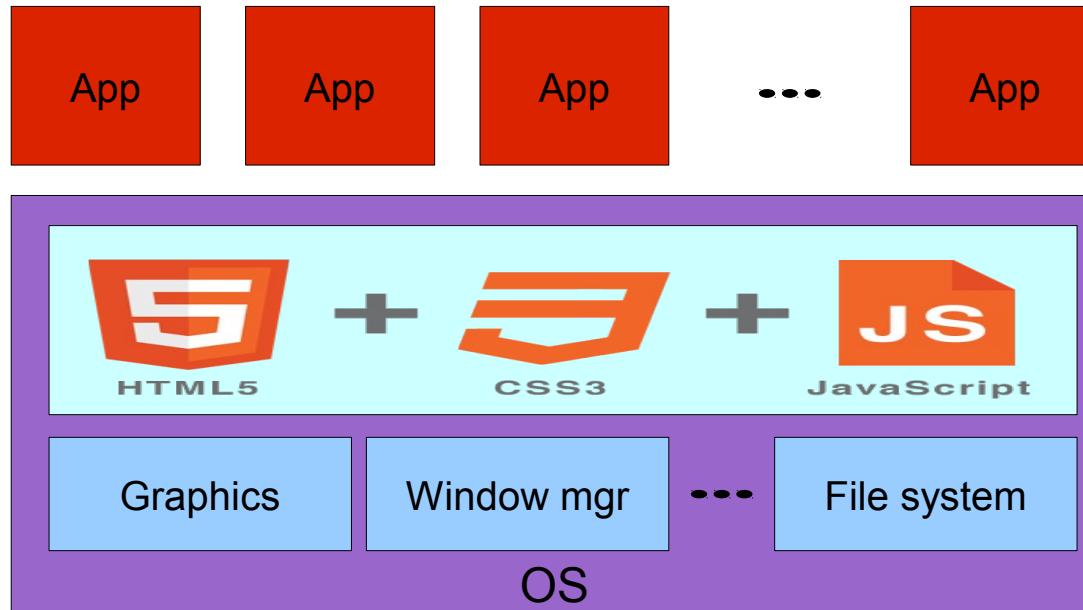
```
  add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
  add: self infoLineElement. "brief info about document"  
  add: bucketElement. "infoLine needs buckets before"  
  add: self documentTitleElement; add: self documentActionsElement.  
  add: self infoLineElement. "brief info about document"  
  add: self documentTitleElement; add: self documentActionsElement.  
  add: self infoLineElement. "brief info about document"
```



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Web integration into Operating System



Future: Web trio as part of OS

```
self add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self documentActionsElement; add: self documentTitleElement
```



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HTML5



<input checked="" type="checkbox"/> OFFLINE & STORAGE	<input checked="" type="checkbox"/> DEVICE ACCESS
<input checked="" type="checkbox"/> CONNECTIVITY / REALTIME	<input checked="" type="checkbox"/> PERFORMANCE & INTEGRATION
<input checked="" type="checkbox"/> MULTIMEDIA	<input checked="" type="checkbox"/> SEMANTICS
<input checked="" type="checkbox"/> GRAPHICS, 3D & EFFECTS	<input checked="" type="checkbox"/> CSS3 / STYLING



www.w3.org/html/logo/

```
self add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self documentElement. "detailed info, references..."
```



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Javascript



➤ Google V8

- Very performant JS VM (near Java speed)
- On server too!

➤ Client side „fat“ apps

```
  add: self documentTitleElement; add: self documentActionsElement.  
  bucketElement := self bucketsElement. "detailed info, references..."  
  add: self infoLineElement. "brief info about document"  
  add: bucketElement. "infoLine needs buckets before"  
  add: self documentFooterElement; add: self documentActionsElement.
```



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Web browsers



- Another browsers war?
 - **No!** Cooperation + healthy competition
- Competitive goal: being upfront in conformance with emerging HTML5 standards

```
self add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self documentActionsElement; add: self documentTitleElement
```



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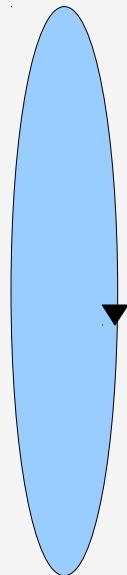
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Event loop in web browser



Web Browser



```
ajax = new XMLHttpRequest;  
ajax.onreadystatechange = function() { .. };  
ajax.open( 'get', '/ajax-example', true );
```

```
self add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self infoLineElement; add: self documentActionsElement.
```

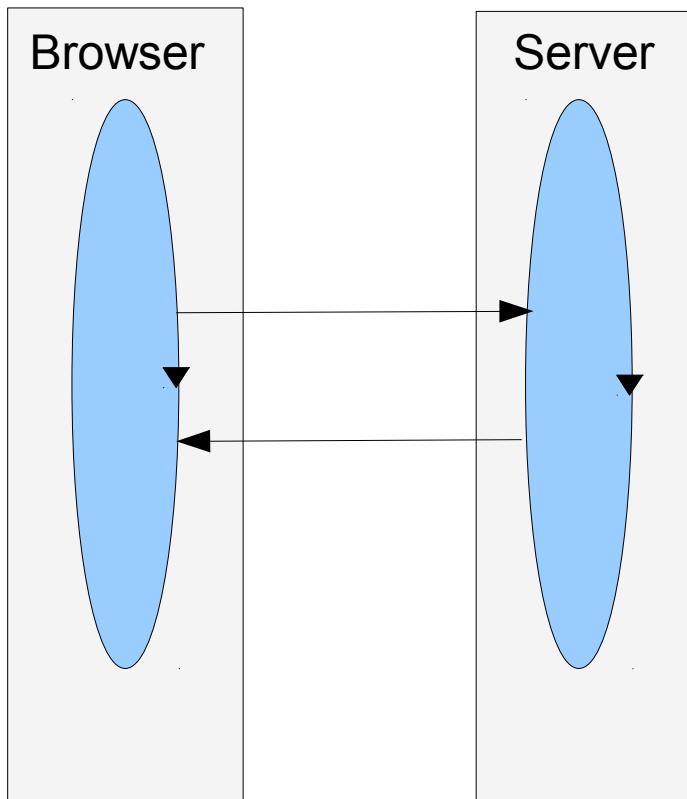


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Event Loop extended to Server



```
db.query('select...', function(result){...});
```

```
  add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
  add: self infoLineElement. "brief info about document"  
  add: bucketElement. "infoLine needs buckets before"  
  add: self documentContentElement. "detailed info, references..."
```



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Server framework based on Event Loop



nodeJS

```
    add: self documentTitleElement; add: self documentActionsElement.  
    bucketElement := self bucketsElement. "detailed info, references..."  
    add: self infoLineElement. "brief info about document"  
    add: bucketElement. "infoLine needs buckets before"  
    add: self documentActionsElement; add: self documentTitleElement
```



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Realtime web

[Timeline](#)[@Mentions](#)[Retweets](#) ▾[Searches](#) ▾[Lists](#) ▾

4 new tweets

```
  add: self documentTitleElement; add: self documentActionsElement.  
  bucketElement := self bucketsElement. "detailed info, references..."  
  add: self infoLineElement. "brief info about document"  
  add: bucketElement. "infoLine needs buckets before"  
  add: self documentActionsElement; add: self documentTitleElement
```

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Explaining Realtime Web in 100 words



The Real-Time Web is a paradigm based on **pushing information to users as soon as it's available** - instead of requiring that they or their software check a source periodically for updates.

It can be enabled in many different ways and can require a different technical architecture.

It's being implemented in **social networking, search, news** and elsewhere - making those experiences more **like Instant Messaging** and facilitating unpredictable innovations.

Early benefits include **increased user engagement ("flow")** and decreased server loads, but these are early days.

Real-time information delivery **will likely become ubiquitous, a requirement for almost any website or service.**

Source: ReadWriteWeb

```
  add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
  add: self infoLineElement. "brief info about document"  
  add: bucketElement. "infoLine needs buckets before"  
  add: self documentActionsElement; add: self documentTitleElement
```

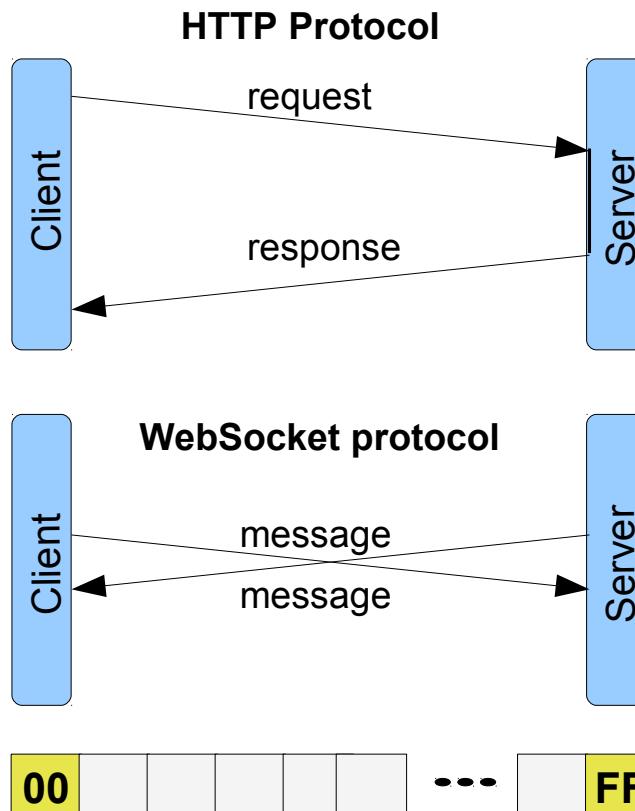


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WebSocket protocol



- Unidirectional
- Half-duplex

- Bidirectional
- Full-duplex

Two Versions:

1. **Hixie-76** (supported in Swazoo)
2. **HyBi-10**

```
add: self documentTitleElement; add: self documentActionsElement.  
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add: bucketElement. "infoLine needs buckets before"  
add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
add: self infoLineElement. "brief info about document"  
add: bucketElement. "infoLine needs buckets before"
```



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- Native vs. Web vs. Hybrid Apps
 - Hybrid = Web app packed as native one

```
    add: self documentTitleElement; add: self documentActionsElement.  
    bucketElement := self bucketsElement. "detailed info, references..."  
    add: self infoLineElement. "brief info about document"  
    add: bucketElement. "infoLine needs buckets before"  
    add: self documentContentElement. "detailed info, references..."
```



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Smalltalk is ideal for Web Apps



- We missed the GUI train
- Don't miss the Web too!
- Use Smalltalk spirit!
 - Elegance, Simplicity, Pure OO

```
  add: self documentTitleElement; add: self documentActionsElement.  
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  add: self documentContentElement.
```



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Smalltalk Web Frameworks



www.seaside.st



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www.aidaweb.si



www.iliadproject.org

Jtalk

www.jtalk-projekt.org

```
  add: self documentTitleElement; add: self documentActionsElement.  
  bucketElement := self bucketsElement. "detailed info, references..."  
  add: self infoLineElement. "brief info about document"  
  add: bucketElement. "infoLine needs buckets before"  
  add: self documentActionsElement; add: self documentTitleElement
```



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State in Smalltalk: HTML5



- New tags (<section>, <footer>, ...) mostly supported
- APIs like Geolocation, FileSystem, History, LocalStore, Offline, Drag&Drop, Canvas, ... ?

```
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self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self documentFooterElement
```



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State in Smalltalk: JavaScript



- J talk
- Orca
- J query and J S as Smalltalk in Seaside
- J S integrated in Aida and Iliad

```
  add: self documentTitleElement; add: self documentActionsElement.  
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  add: self documentContentElement.
```



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State in Smalltalk: **Realtime Web**



- In Smalltalk GUI since 80s, 90s
 - MVC, Dependency mechanism
 - In VisualWorks from Parcplace days
 - Observer pattern
- Immutability flag! (object change detection)

```
    add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
    add: self infoLineElement. "brief info about document"  
    add: bucketElement. "infoLine needs buckets before"  
    add: self documentContentElement. "detailed info, references..."
```



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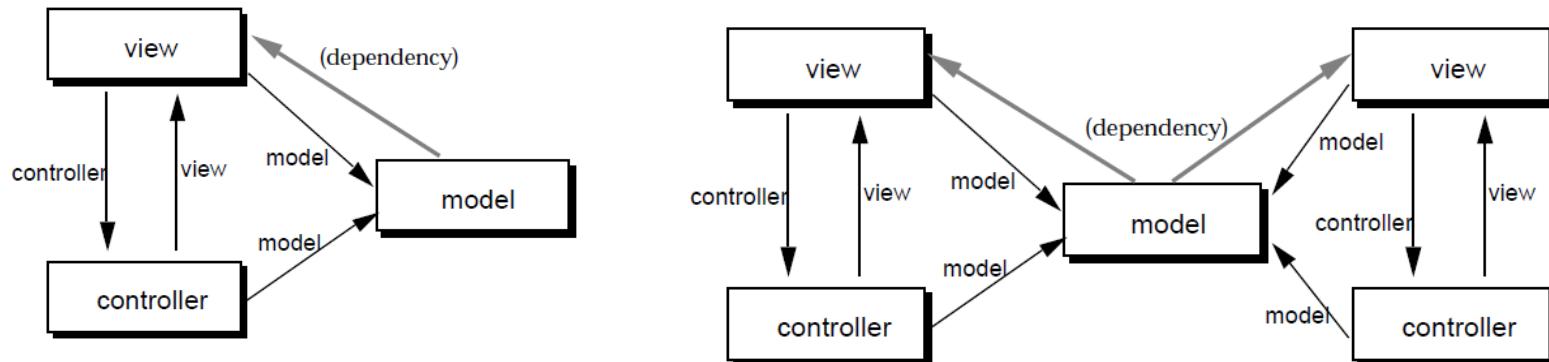
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State in Smalltalk: Realtime Web



In Smalltalk from 80's !



Source: Smalltalk, an Introduction to Smalltalk Development using VisualWorks, 1995

```
  e add: self documentTitleElement; add: self documentActionsElement.
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  e add: bucketElement. "infoLine needs buckets before"
```



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State in Smalltalk: **Realtime Web**



	Seaside	Aida	Iliad
Comet	Hidden IFRAME	Long Polling	Long Polling
WebSock et		Yes	

```
self add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self documentContentElement; add: self documentActionsElement.
```



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State in Smalltalk: Realtime Web



Smalltalk example: Chat

```
    add: self documentTitleElement; add: self documentActionsElement.  
    bucketElement := self bucketsElement. "detailed info, references..."  
    add: self infoLineElement. "brief info about document"  
    add: bucketElement. "infoLine needs buckets before"  
    add: self documentTextElement. "detailed info, references..."
```



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Example of realtime web

chatExample

| e lines |

e := WebElement newDiv.

e addTextH1: 'Multi-user Chat'.

lines := self linesElement.

e add: le; addBreak.

(e addInputFieldAspect: #line for: self) focus.

(e addButtonText: 'Send')

onSubmitDo:

[self observee addLine: self line.

self line: "].

self observee whenChangedDo: [lines update] on: self.

^e

```
    e add: self documentTitleElement; add: self documentActionsElement.
    bucketElement := self bucketsElement. "detailed info, references..."
    e add: self infoLineElement. "brief info about document"
    e add: bucketElement. "infoLine needs buckets before"
    e add: self documentContentElement. "the main content"
```



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Example of realtime web

chatExample

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^ add: self documentTitleElement; add: self documentActionsElement.  
^ add: self infoLineElement. "brief info about document"  
^ add: bucketElement. "infoLine needs buckets before"
```



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State in Smalltalk: Mobile



➤ Native Apps:

- Squeak VM on iOS, Android
- Squeak Apps in Apple App Store

➤ Web Apps:

- Aida: device detection, CSS adaptation,
„responsive“ web

➤ Hybrid apps ?

```
    add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
    add: self infoLineElement. "brief info about document"  
    add: bucketElement. "infoLine needs buckets before"  
    add: self documentTextElement. "detailed info, references..."
```



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State in Smalltalk: Cloud



- Vmware Cloud Foundy
 - Gemstone actively participating
- Cloudfork
 - Jan van de Sandt
- SmallHarbour
 - Romain Verducci, Laurent Laffont
- Google, Facebook, Twitter,..REST API support?

```
self add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
self add: self infoLineElement. "brief info about document"  
self add: bucketElement. "infoLine needs buckets before"  
self add: self documentTextElement. "detailed info, references..."
```



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Conclusion



- Very vibrant situation in Web technologies field
- A lot to do but our community is small
- As browser implementers: let we **cooperate** while we **compete**

Hegelian **Dialectic**: Thesis + Antithesis = Synthesis

```
    add: self documentTitleElement; add: self documentActionsElement.  
bucketElement := self bucketsElement. "detailed info, references..."  
    add: self infoLineElement. "brief info about document"  
    add: bucketElement. "infoLine needs buckets before"  
    add: self documentActionsElement; add: self documentTitleElement
```



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Thanks for your attention!



www.aidaweb.si

@aidaweb



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```
  e add: self documentTitleElement; add: self documentActionsElement.
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