



EtherCalc

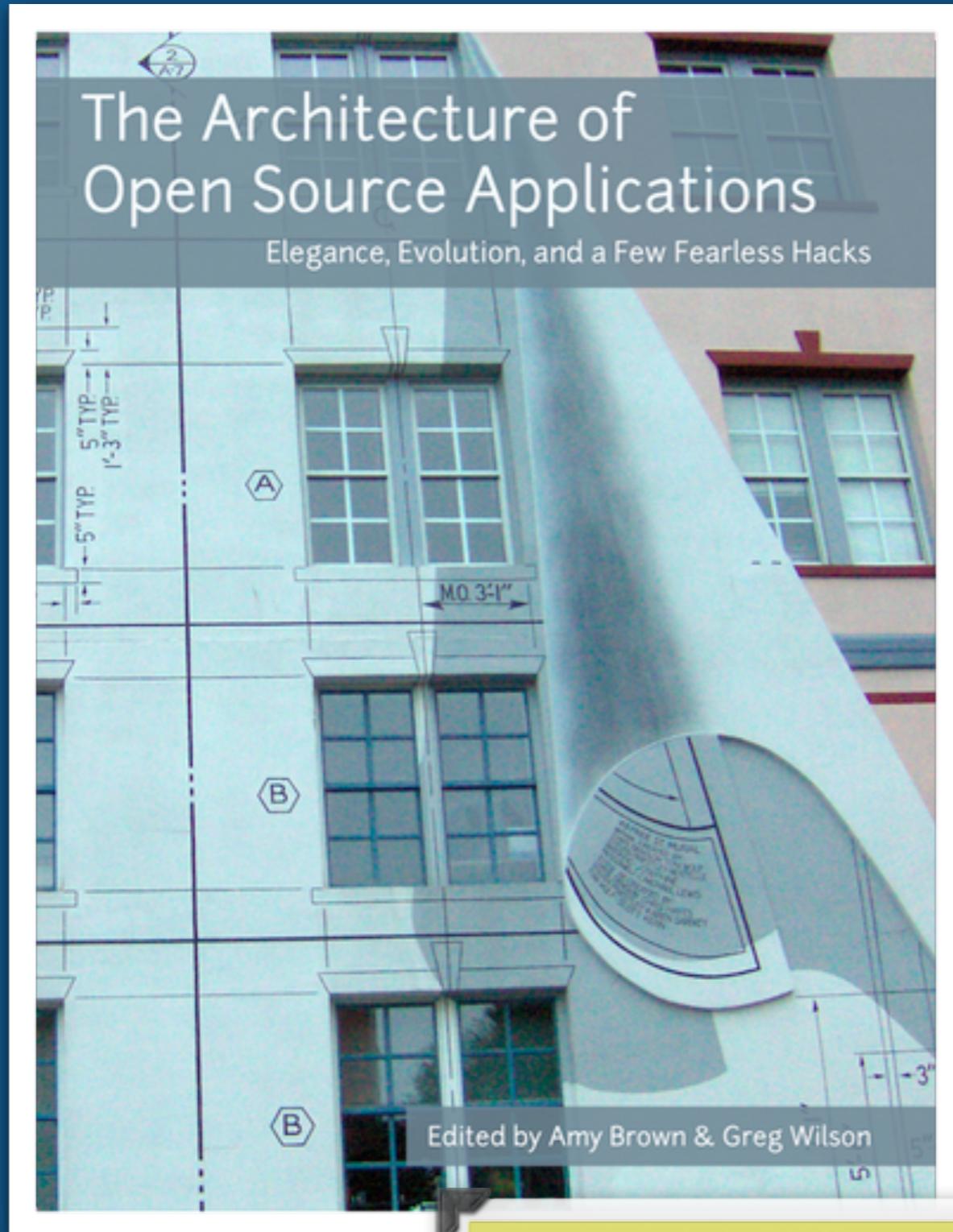
Multiplayer Spreadsheet

ethercalc.net

Installation

- ▶ `npm install -g ethercalc`
- ▶ `ethercalc`
Please connect to: `http://0:8000/`

`ethercalc.org`



aosabook.org

History

VisiCalc, 1979



Dan Bricklin

HOME BUDGET, 1979

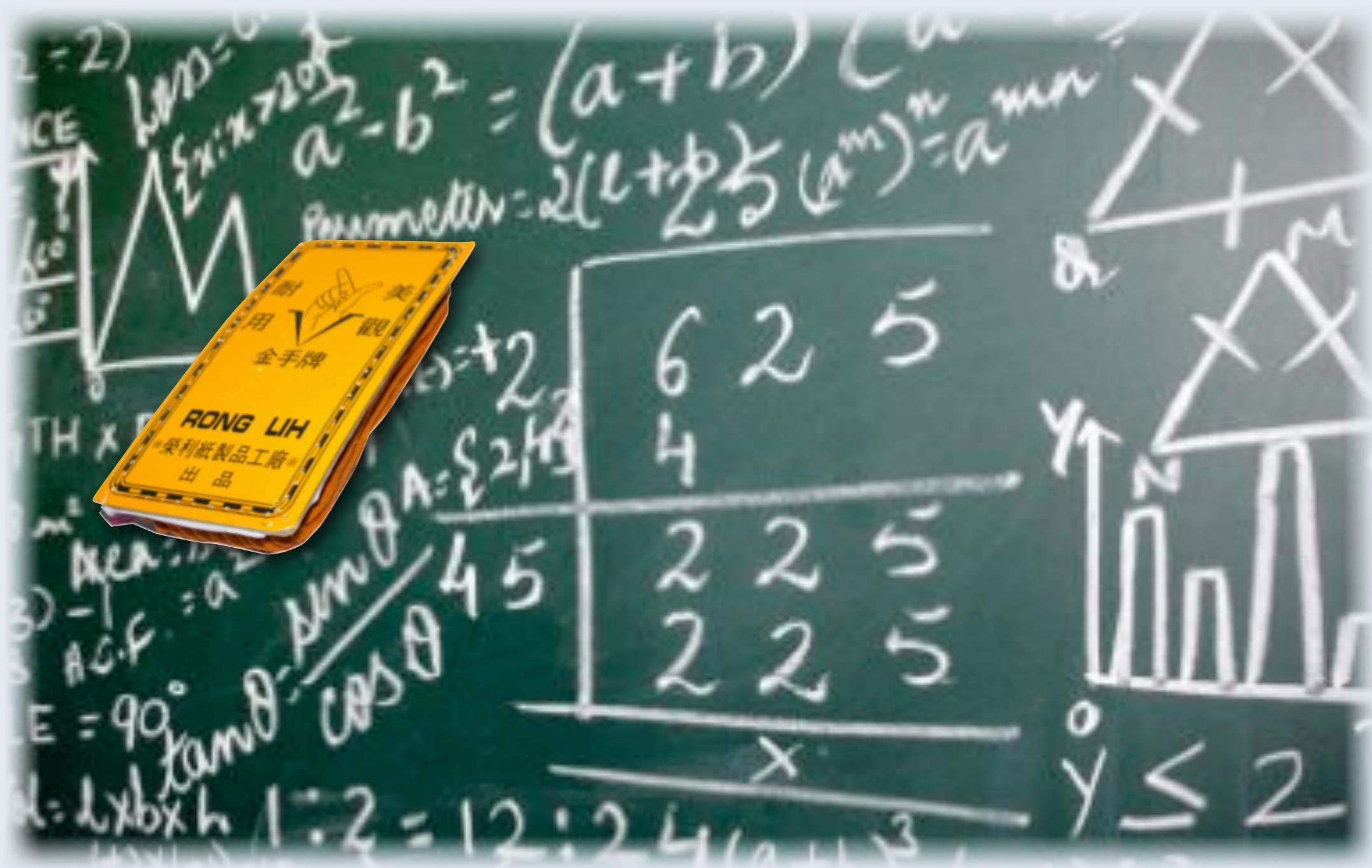
MONTH	NOV.	DEC.	TOTAL
SALARY	2500.00	2500.00	30000.00
OTHER			
INCOME	2500.00	2500.00	30000.00
FOOD	400.00	400.00	4800.00
RENT	350.00	350.00	4200.00
HEAT	110.00	120.00	575.00
REC.	100.00	100.00	1200.00
TAXES	1000.00	1000.00	12000.00
ENTERTAIN	100.00	100.00	1200.00
HISC	100.00	100.00	1200.00
CAR	300.00	300.00	3600.00
EXPENSES	2460.00	2470.00	28775.00
REMAINDER	40.00	30.00	1225.00
SAVINGS	30.00	30.00	300.00

Harvard, 1977

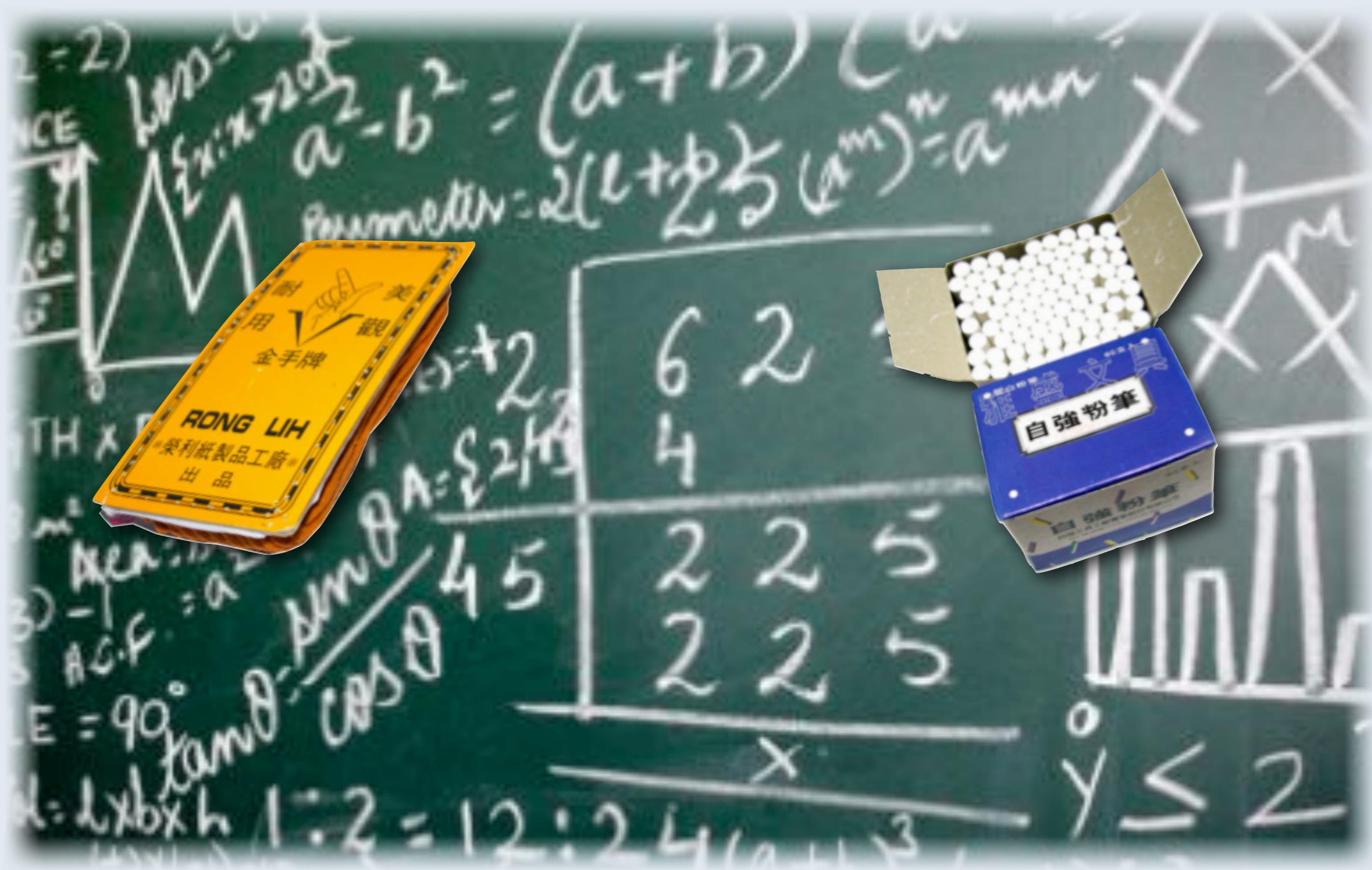
Harvard, 1977



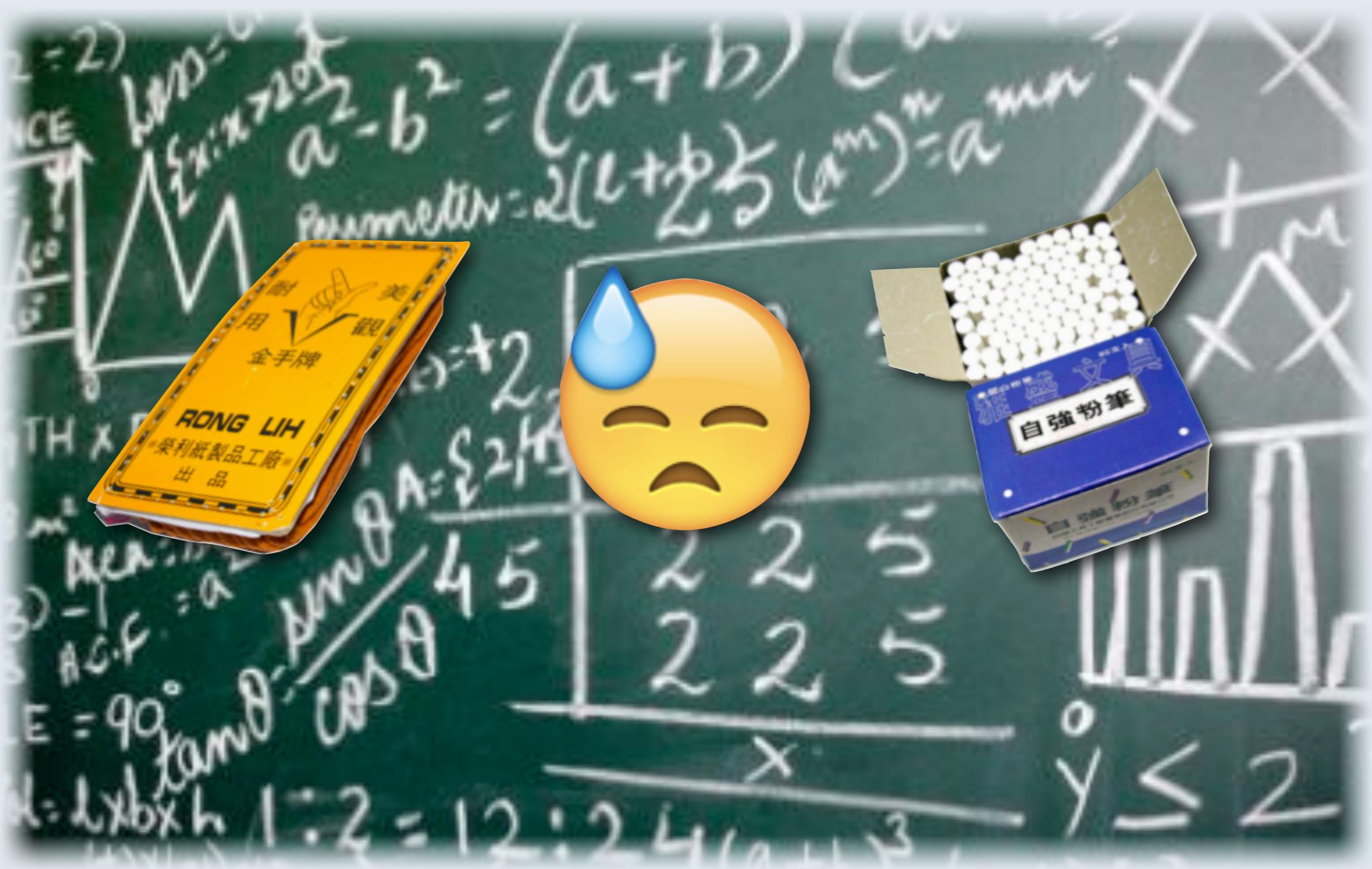
Harvard, 1977



Harvard, 1977



Harvard, 1977



Original Vision

Original Vision



Alto
Workstation

Original Vision



Calculator-
Mouse



Alto
Workstation

Original Vision



Calculator-
Mouse



Alto
Workstation



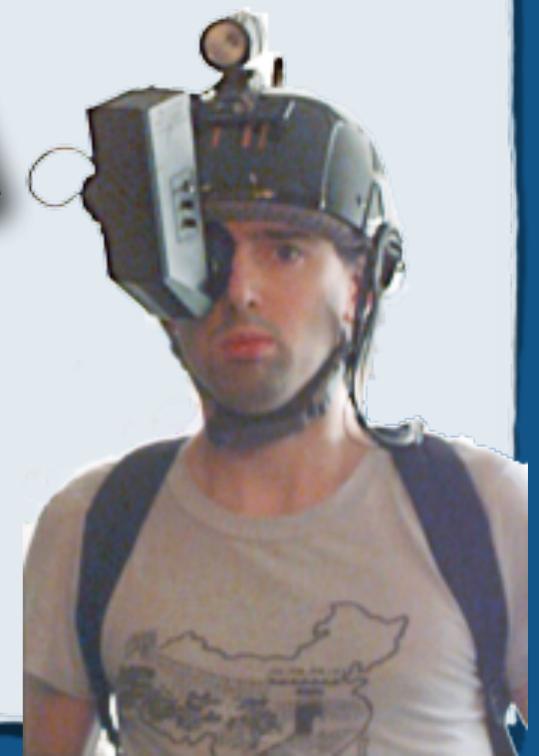
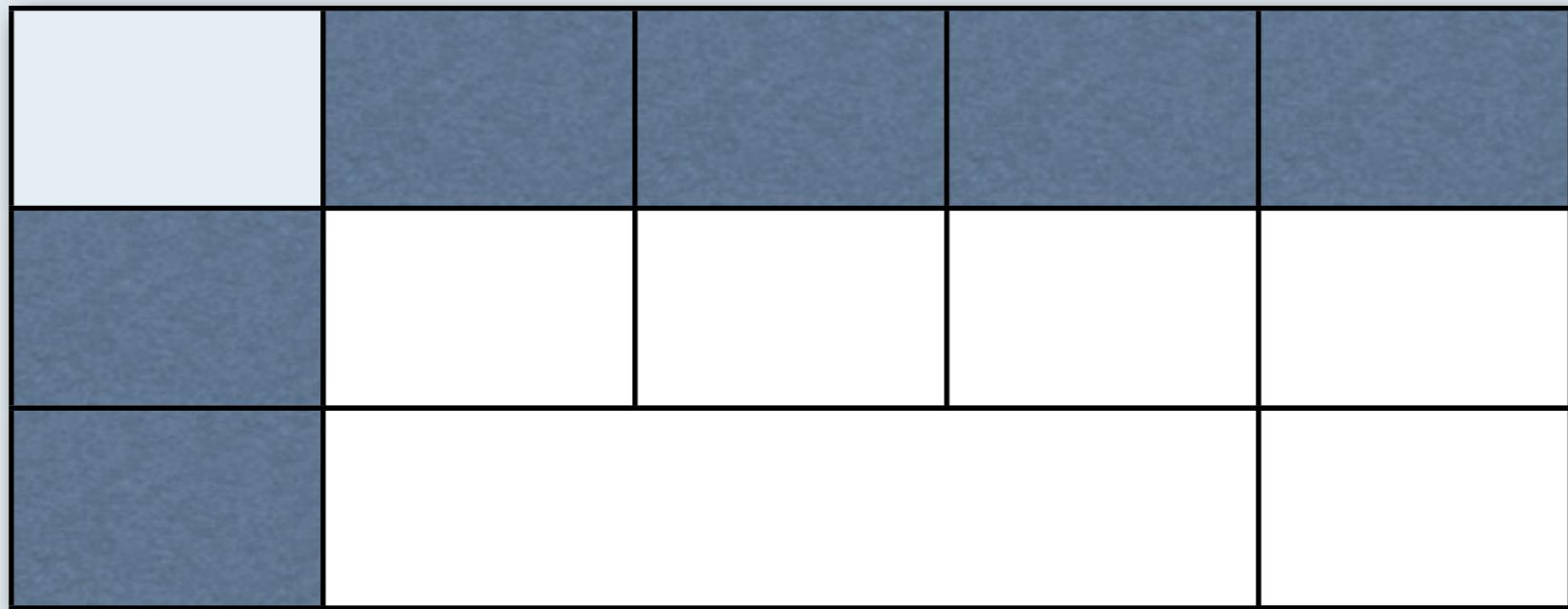
Head-mounted
Display



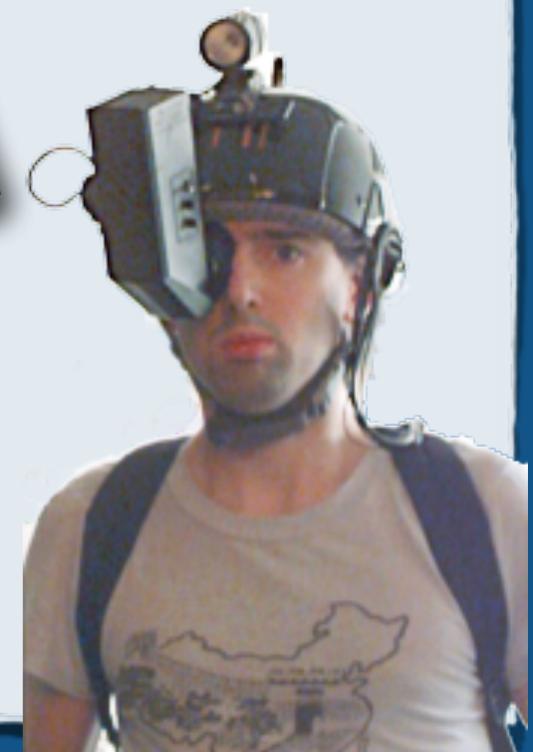
Calcu
Mou

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play

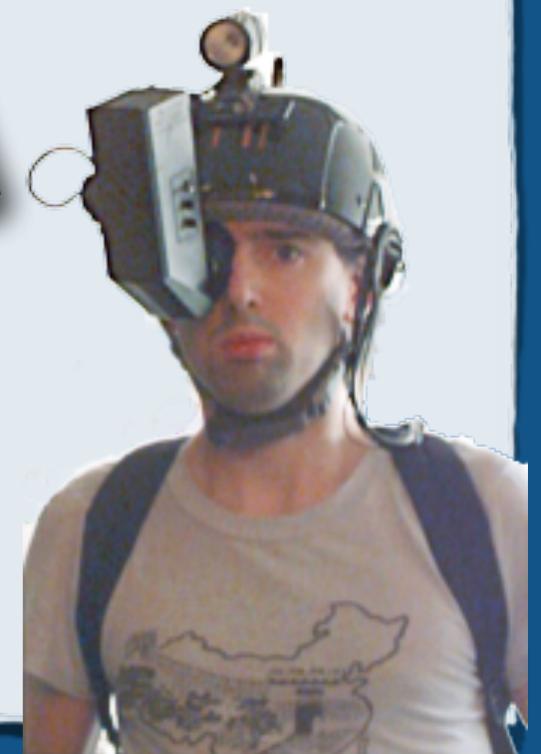




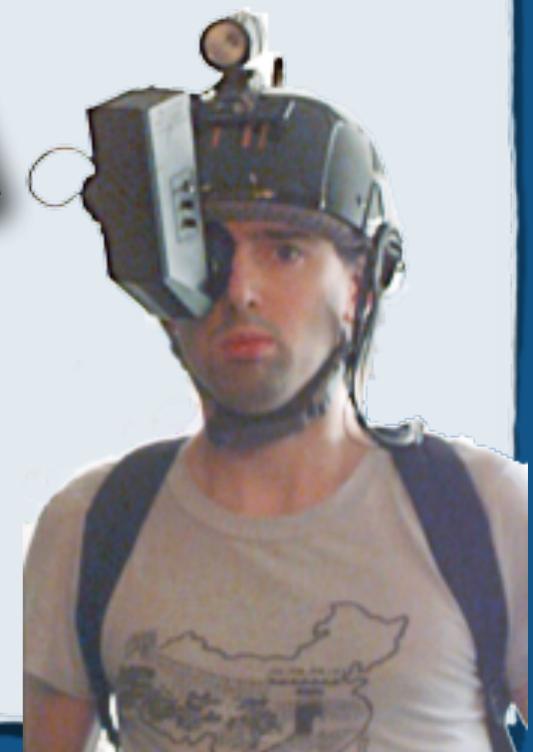
	=SUM()			0



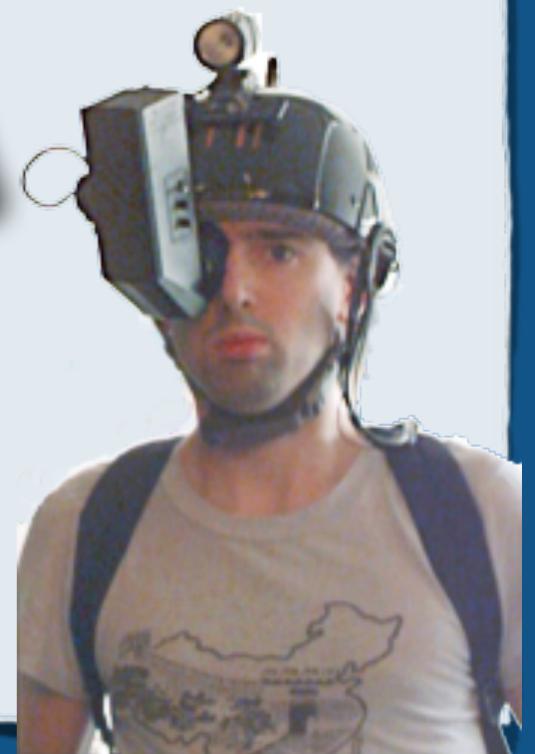
	10			
	⋮	=SUM()		10
	⋮			



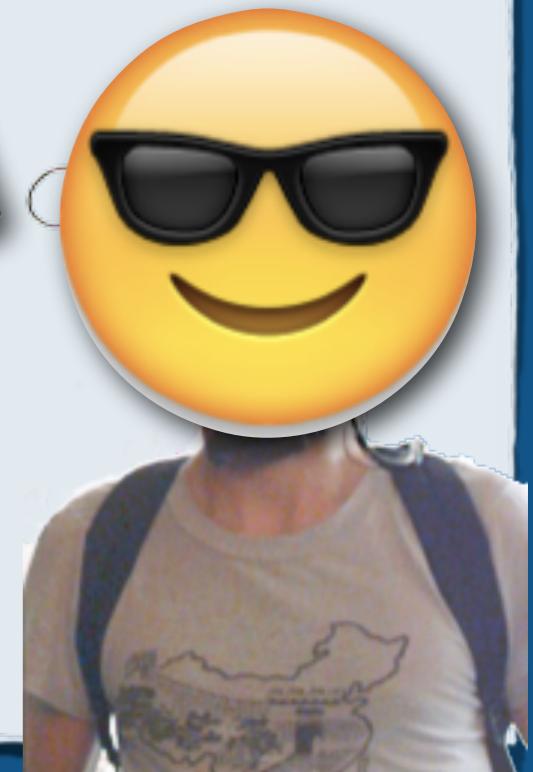
	10	20		
	⋮	⋮	=SUM(⋮)	30



	10	20	30	
	=SUM()			60



	10	20	30	
	=SUM()			60



1977 → 1978



1977 → 1978



1977 → 1978



+



Integer BASIC

1978 → 1979

1978 → 1979

	10	20	30	
	=SUM()	60

1978 → 1979

	A	B	C	D
1	10	20	30	
2	=SUM()	60

1978 → 1979

	A	B	C	D
1	10	20	30	
2	=SUM(A1,B1,C1)			60

1978 → 1979

	A	B	C	D
1	10	20	30	
2	=SUM(A1,B1,C1)			60



Bob & Dan

1978 → 1979

	A	B	C	D
1	10	20	30	
2	=SUM(A1,B1,C1)			60

- ▶ Dan prototypes in BASIC



Bob & Dan

1978 → 1979

	A	B	C	D
1	10	20	30	
2	=SUM(A1,B1,C1)			60

- ▶ Dan prototypes in BASIC
- ▶ Bob codes in 6502 ASM



Bob & Dan

1978 → 1979

	A	B	C	D
1	10	20	30	
2	=SUM(A1,B1,C1)			60

- ▶ Dan prototypes in BASIC
- ▶ Bob codes in 6502 ASM
- ▶ 700,000 copies in 6 years



Bob & Dan

1978 → 1979

	A	B	C	D
1	10	20	30	
2	=SUM(A1,B1,C1)			60

- ▶ Dan prototypes in BASIC
- ▶ Bob codes in 6502 ASM
- ▶ 700,000 copies in 6 years
- ▶ The first “Killer App”



Bob & Dan

1981

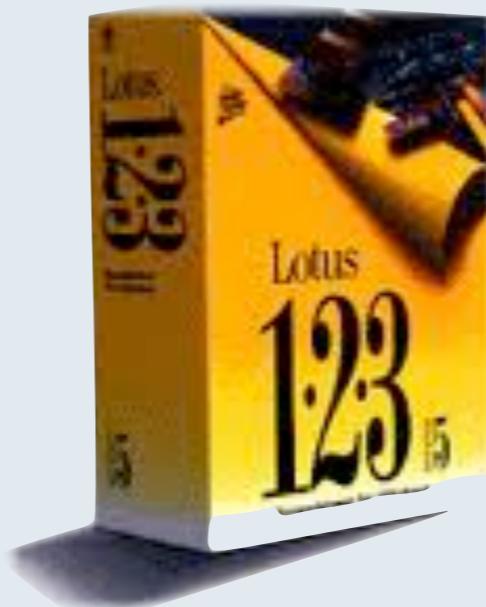








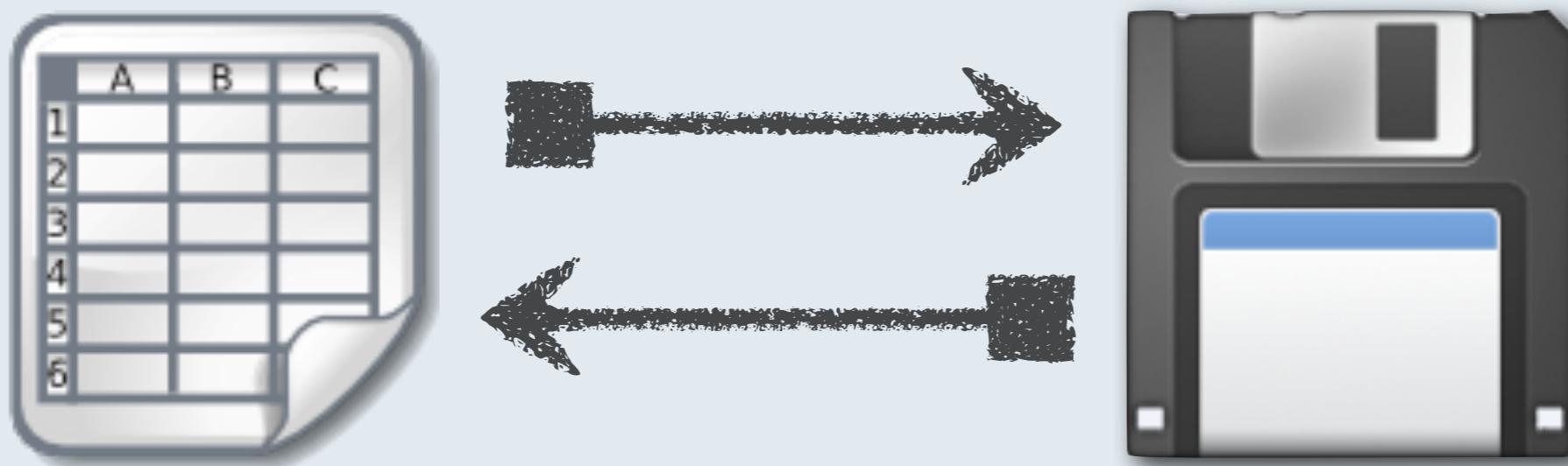




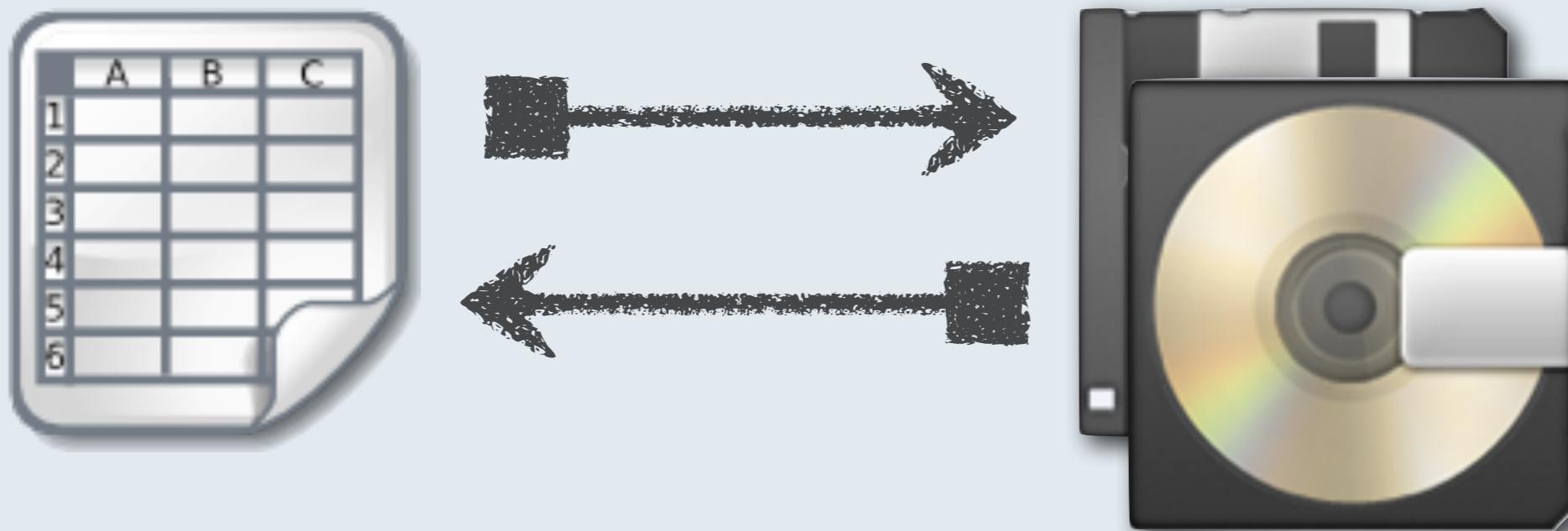
20 years passed



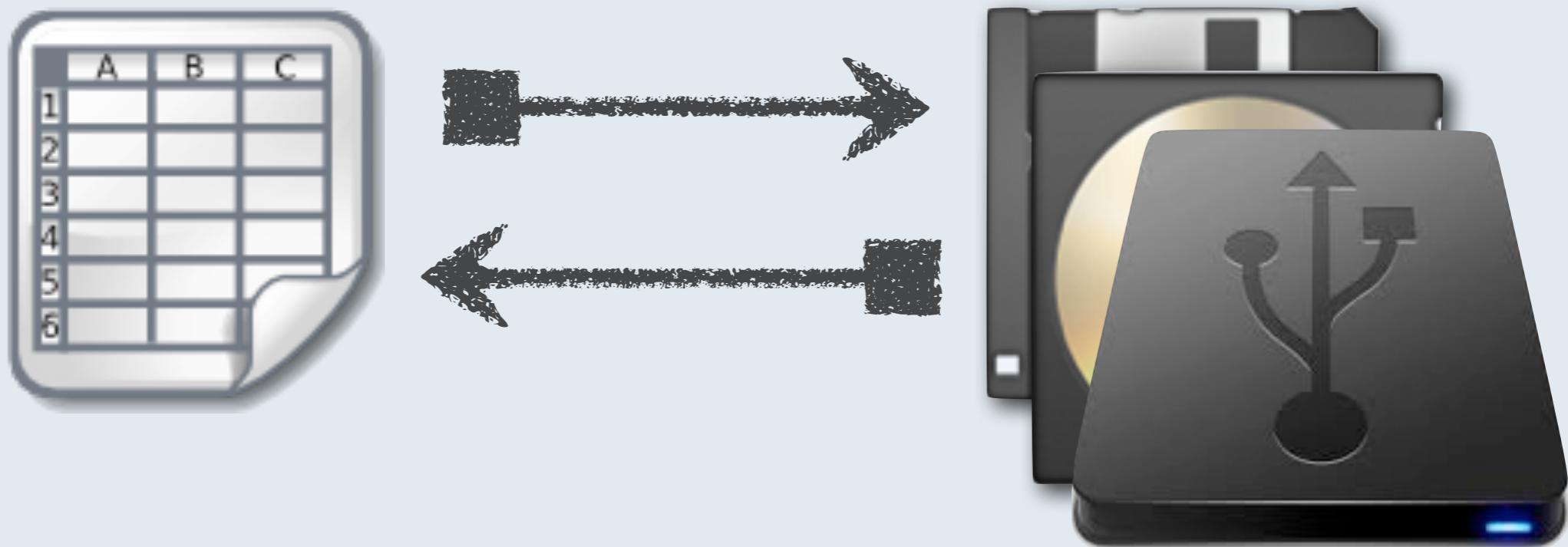
20 years passed



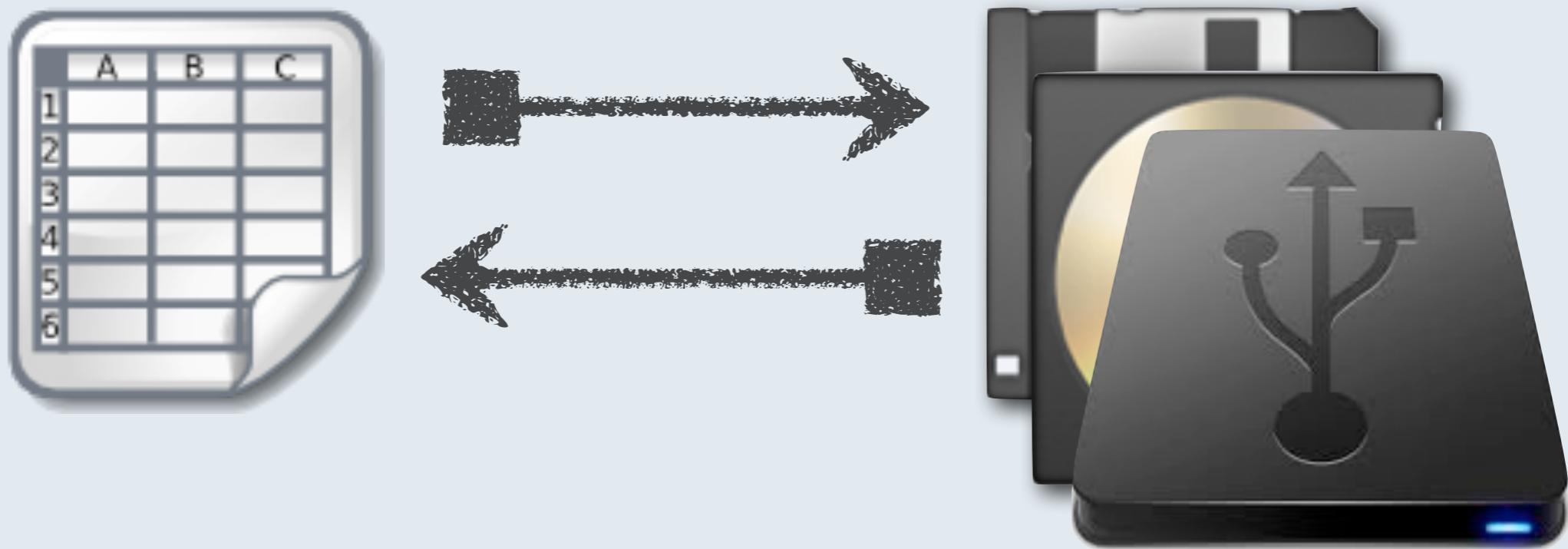
20 years passed



20 years passed



20 years passed

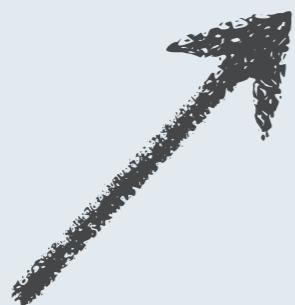


Nothing changed





“Can’t open”





“Can't open”



“MøjîbÃké”



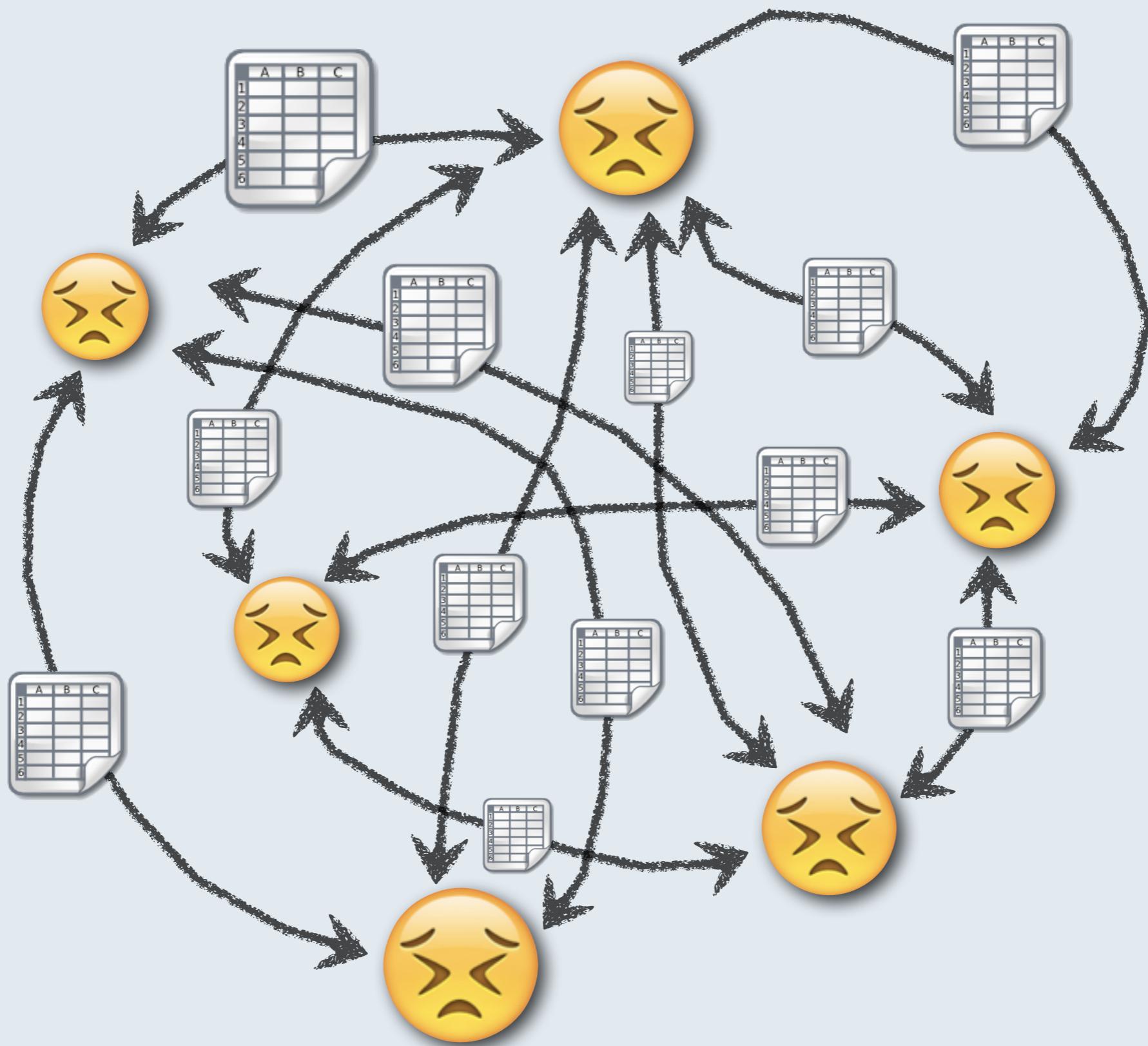
“Can't open”



“MøjîbÃké”



“Virus!”



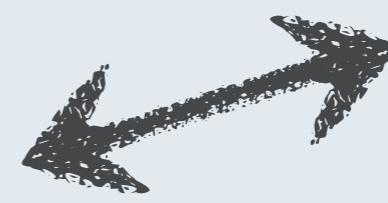
wikipedia, 2001



wikipedia, 2001



wikipedia, 2001



wikiCalc, 2005

Page

Edit

Format

Publish

Tools

Quit

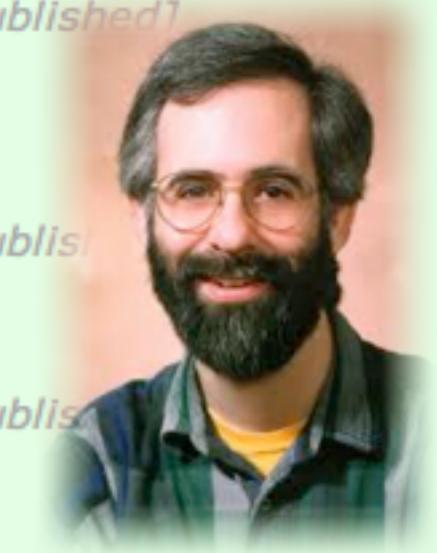
PAGE SELECTION

This is where you choose which page you want to edit. You can also change which site you are editing. Open a page for editing by pressing the appropriate Edit button. It will be copied from the server and you will be editing that copy. Modified pages may be published (which updates the copy on the server) and editing closed by pressing the appropriate Publish button.

Pages You Can Edit On Site: Site setup by Demonstration Setup (demosite)

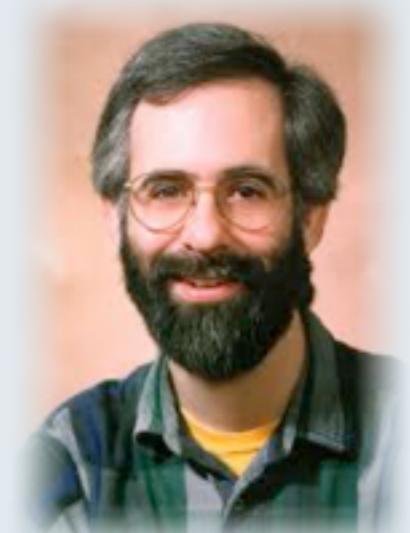
Your author name is: demoauthor

Edit Buttons View On Web Buttons Delete and Abandon Edit Buttons

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demopage1.html	wikiCalc Demonstration Page	Open for editing Not modified	[Not Published]
fll.html	bar	Open for editing Last modified: Apr 24, 2011 07:10:48	[Not Published]

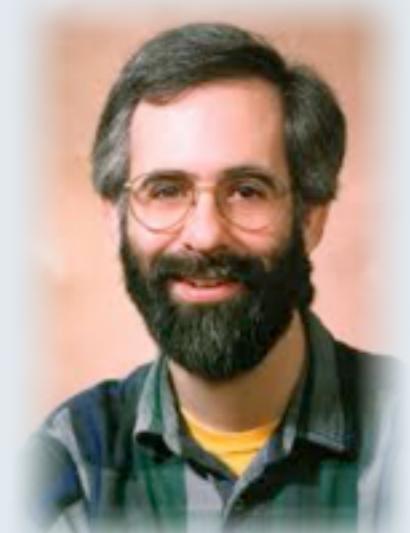
wikiCalc, 2005

- ✓ Plain text, HTML & Wiki syntax



wikiCalc, 2005

- ✓ Plain text, HTML & Wiki syntax
- ✓ References cells on other hosts



wikiCalc, 2005

- ✓ Plain text, HTML & Wiki syntax
- ✓ References cells on other hosts
- ✓ Keeps all operations for auditing



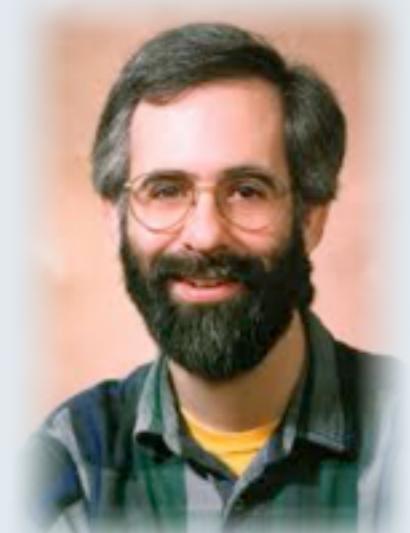
wikiCalc, 2005

- ✓ Plain text, HTML & Wiki syntax
- ✓ References cells on other hosts
- ✓ Keeps all operations for auditing
- ✓ Revert to any revision



wikiCalc, 2005

- ✓ Plain text, HTML & Wiki syntax
- ✓ References cells on other hosts
- ✓ Keeps all operations for auditing
- ✓ Revert to any revision
- ✓ Open Source! (GPLv2)



wikiCalc.pl

wikiCalc.pl

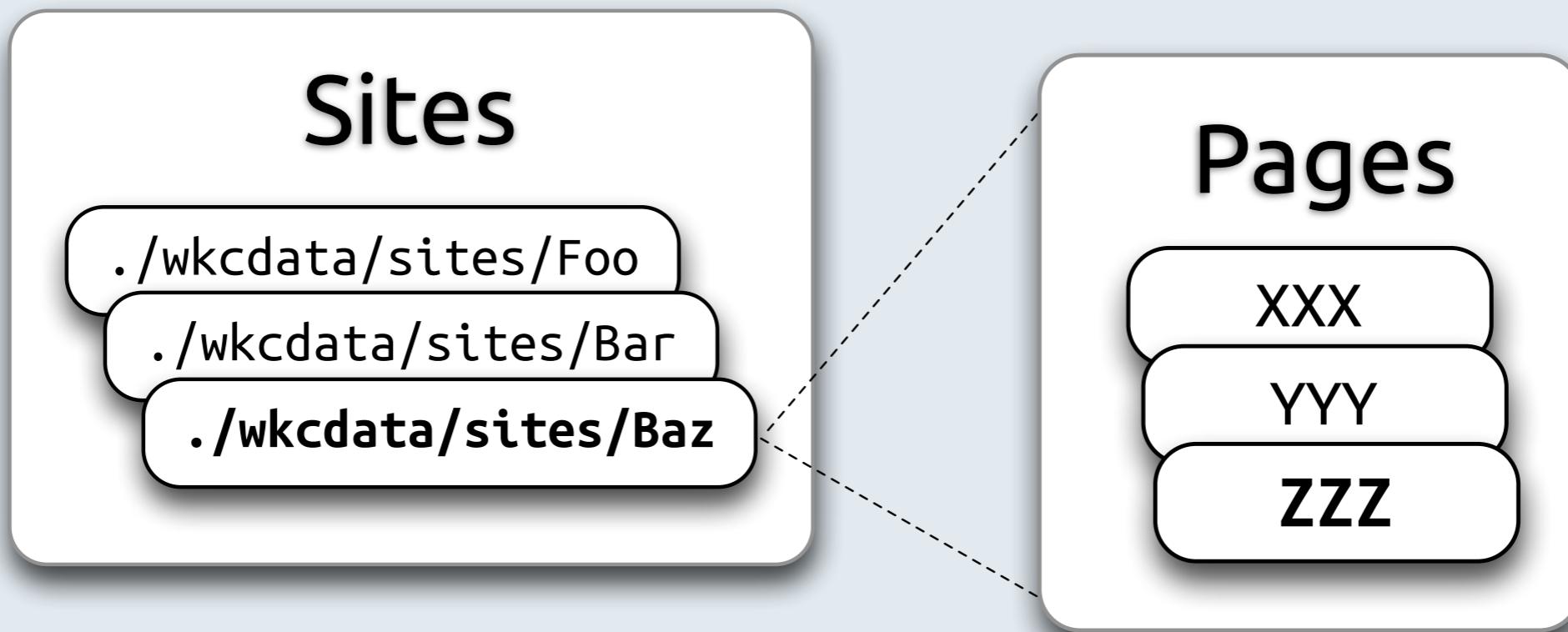
Sites

./wkcdatal/sites/Foo

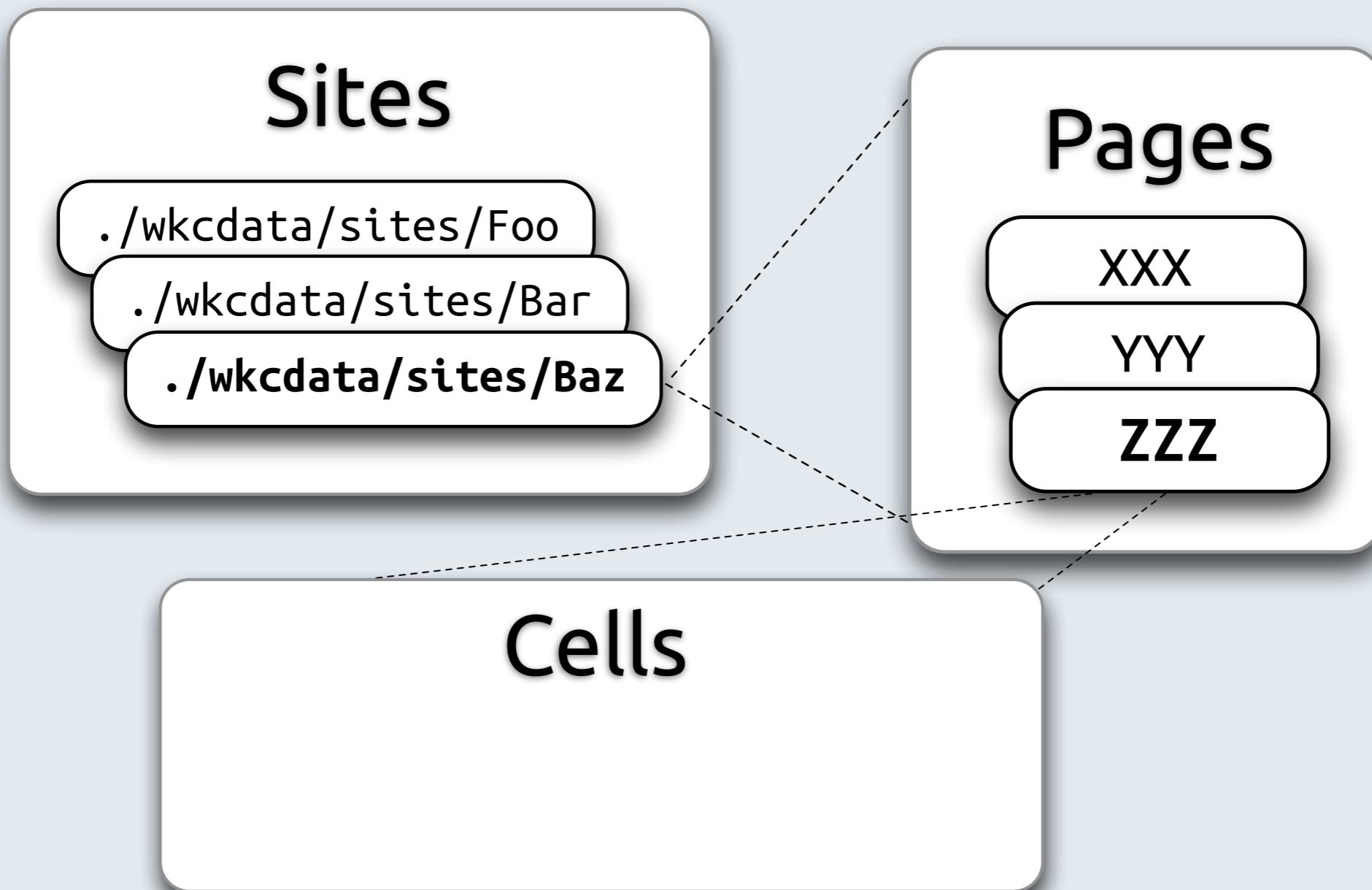
./wkcdatal/sites/Bar

./wkcdatal/sites/Baz

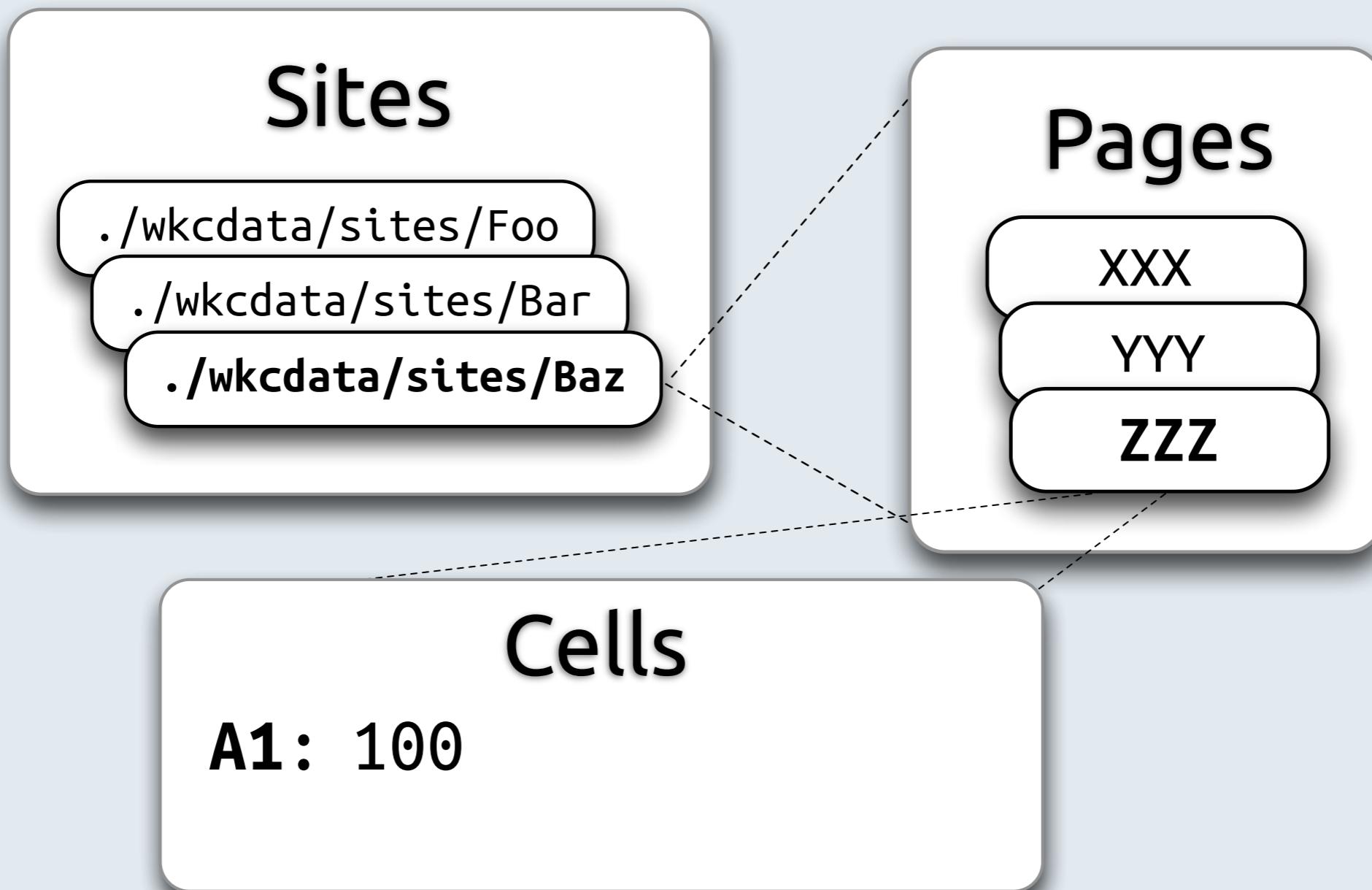
wikiCalc.pl



wikiCalc.pl



wikiCalc.pl



wikiCalc.pl

Sites

./wkcdatal/sites/Foo
./wkcdatal/sites/Bar
./wkcdatal/sites/Baz

Pages

XXX
YYY
ZZZ

Cells

A1: 100
A2: =A1*2

wikiCalc.pl

Sites

./wkcdatal/sites/Foo
./wkcdatal/sites/Bar
./wkcdatal/sites/Baz

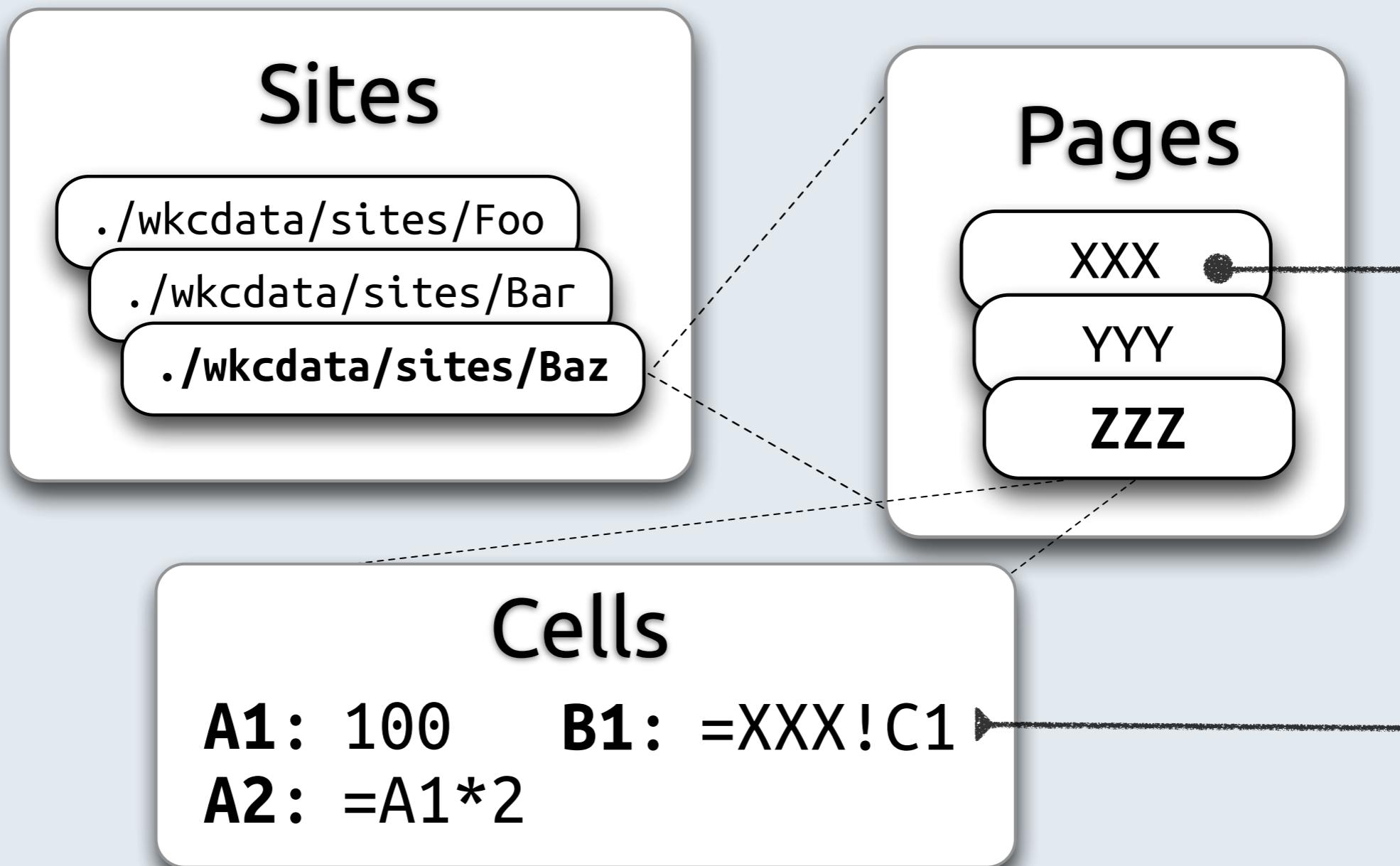
Pages

XXX
YYY
ZZZ

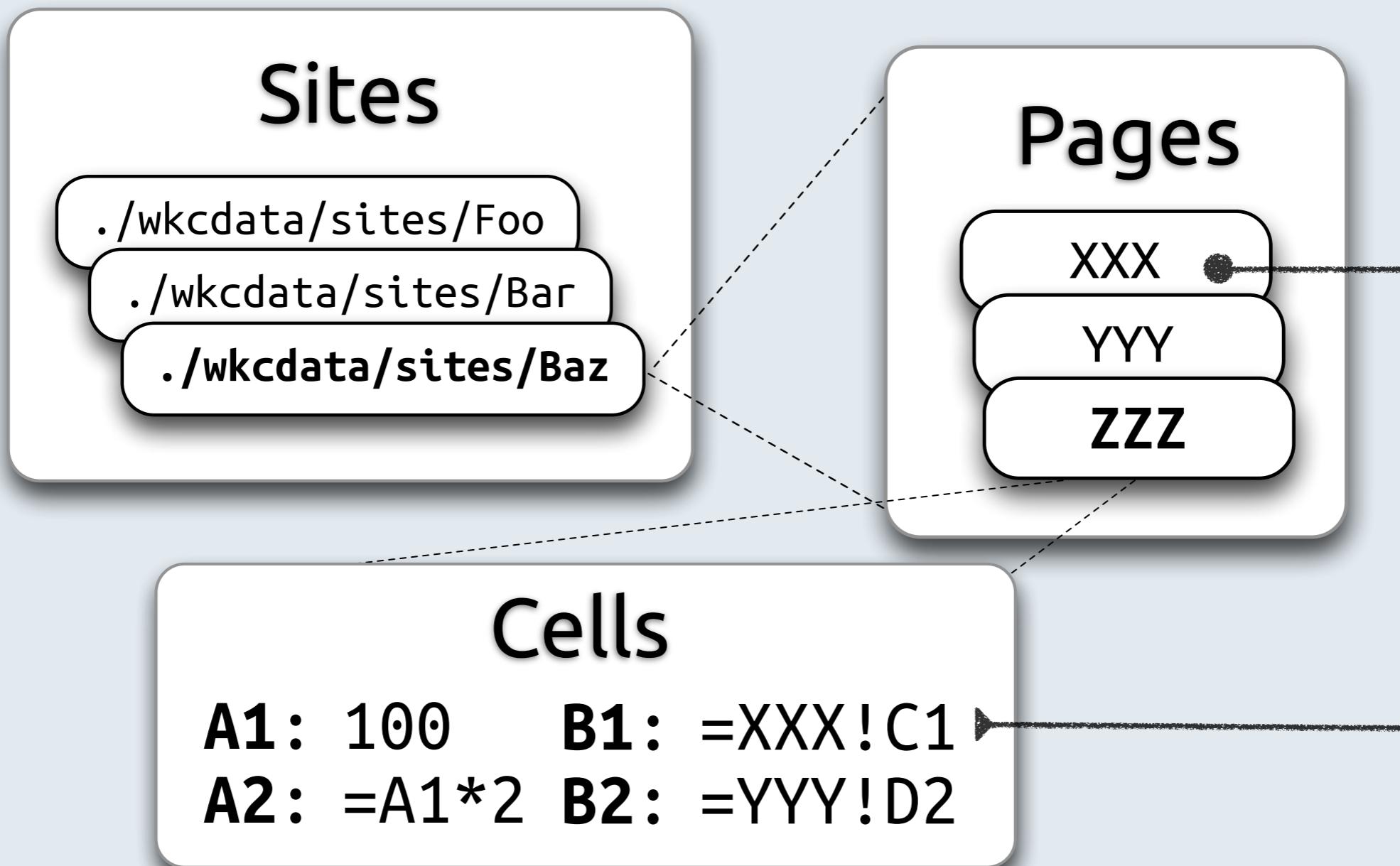
Cells

A1: 100 B1: =XXX!C1
A2: =A1*2

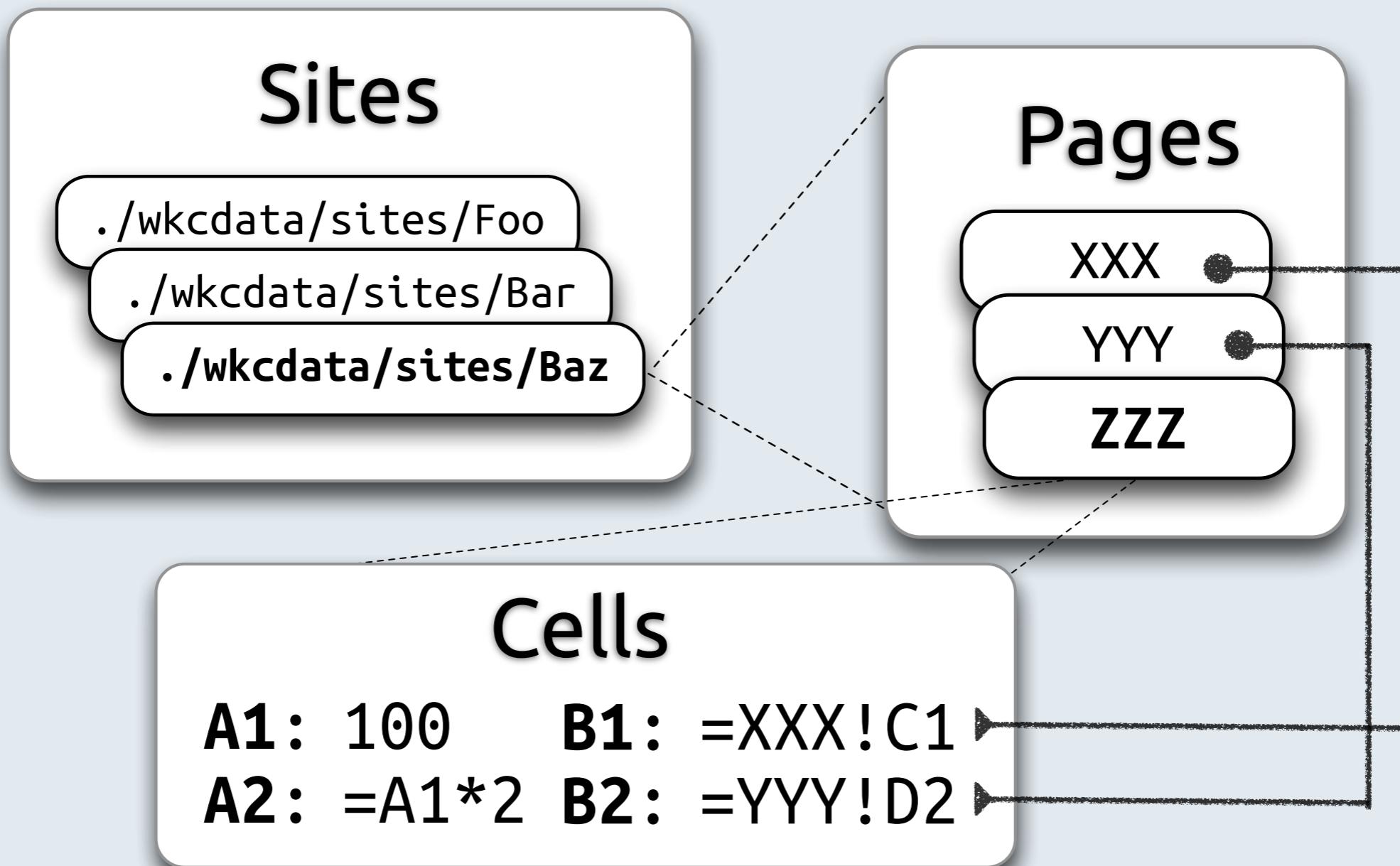
wikiCalc.pl



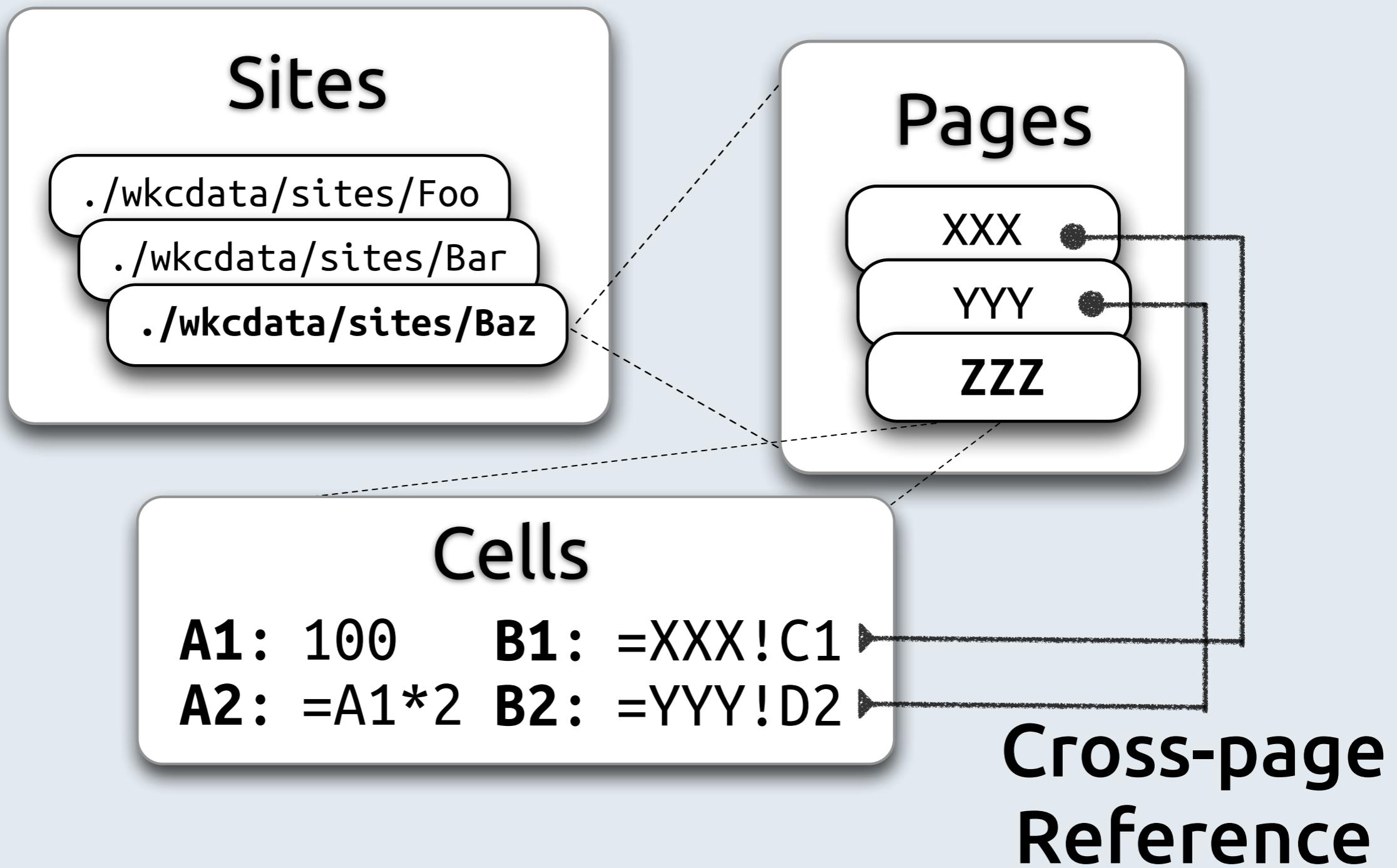
wikiCalc.pl



wikiCalc.pl



wikiCalc.pl

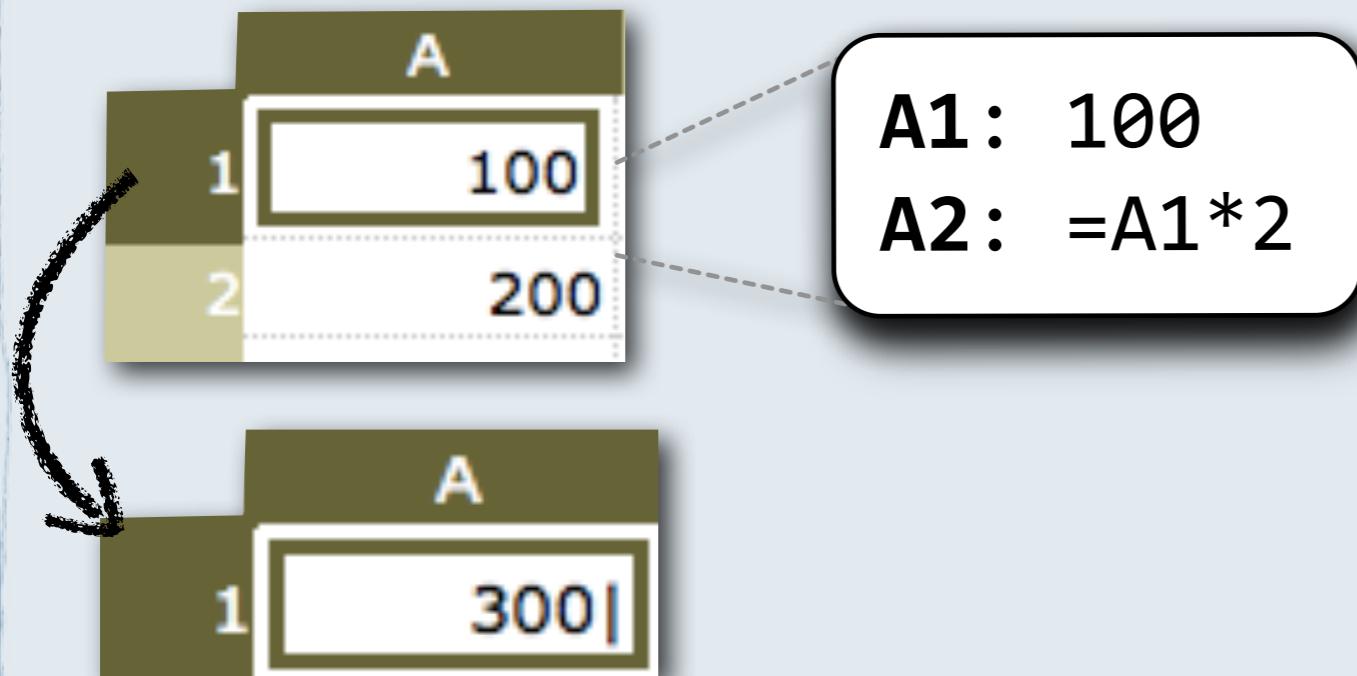


wikiCalc Edit Flow

wikiCalc Edit Flow



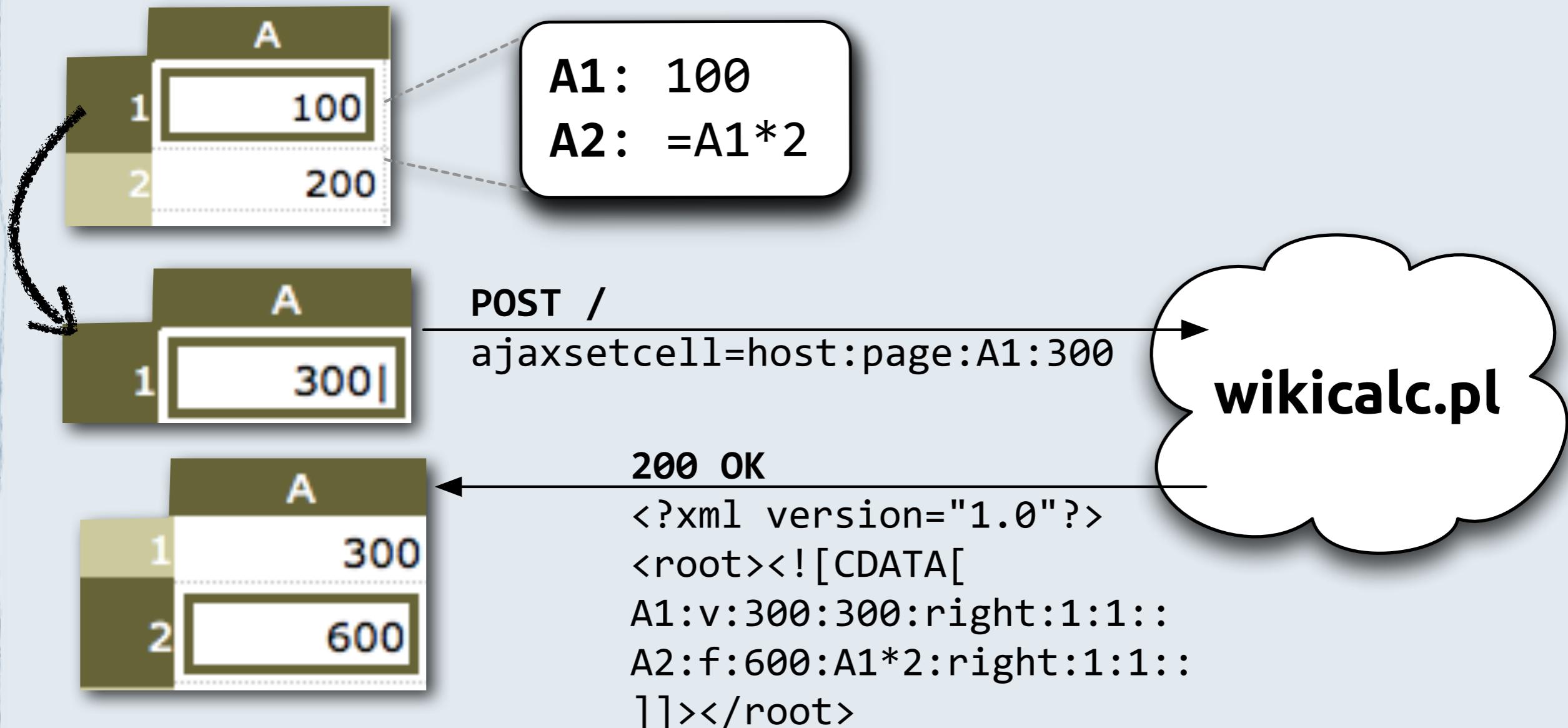
wikiCalc Edit Flow



wikiCalc Edit Flow



wikiCalc Edit Flow



“Loading...”

“Loading...”

	A	B	C	D
1	Loading...			
2				
3	Sample financial	Year	2006	2007
4	calculation in	Sales	Loading...	170.5
5	a table with	Cost	124.0	136.4
6	borders	Profit	31.0	34.1

“Loading...”

	A	B	C	D
1	Loading...			
2				
3	Sample financial calculation in a table with borders			
4				
5				
6				

	Year	2006	2007
Sales	Loading...	170.5	
Cost	124.0	136.4	
Profit	31.0	34.1	

“C100k” Problem

“Loading...”

	A	B	C	D
1	Loading...			
2				
3	Sample financial calculation in a table with borders			
4				
5				
6				

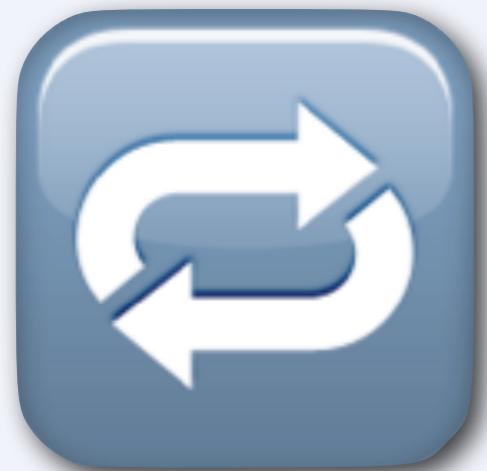
:(

	2006	2007
Cost	Loading...	170.5
Profit	124.0	136.4
	31.0	34.1

“C100k” Problem



Undo



Undo



Redo

SocialCalc, 2006



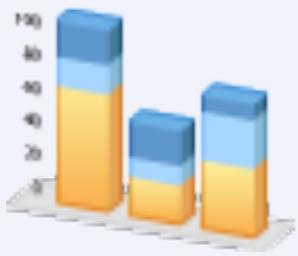
Dan Bricklin



Ross Mayfield



Design Goals



Design Goals

- ▶ Rewrite calc engine in JS



Design Goals

- ▶ Rewrite calc engine in JS
- ▶ Real-time responsive editor



Design Goals

- ▶ Rewrite calc engine in JS
- ▶ Real-time responsive editor
- ▶ Supports 100,000+ cells



Design Goals

- ▶ Rewrite calc engine in JS
- ▶ Real-time responsive editor
- ▶ Supports 100,000+ cells
- ▶ Works on all browsers (IE6+)



Design Goals

- ▶ Rewrite calc engine in JS
- ▶ Real-time responsive editor
- ▶ Supports 100,000+ cells
- ▶ Works on all browsers (IE6+)
- ▶ Client-side log & undo/redo



Architecture



Architecture

SocialCalc.js

HTTP Server



Architecture

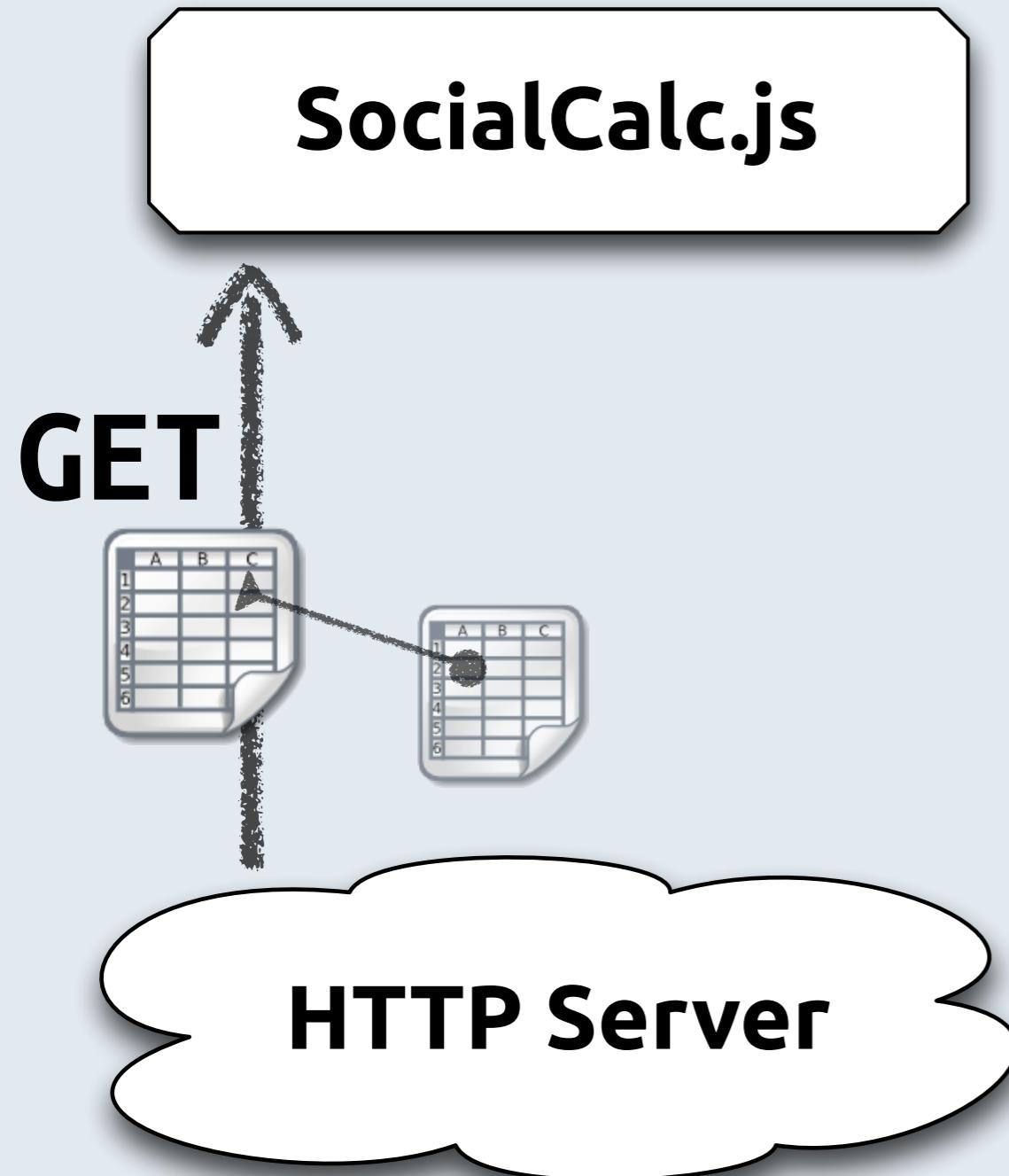
SocialCalc.js

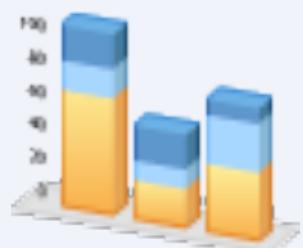


HTTP Server

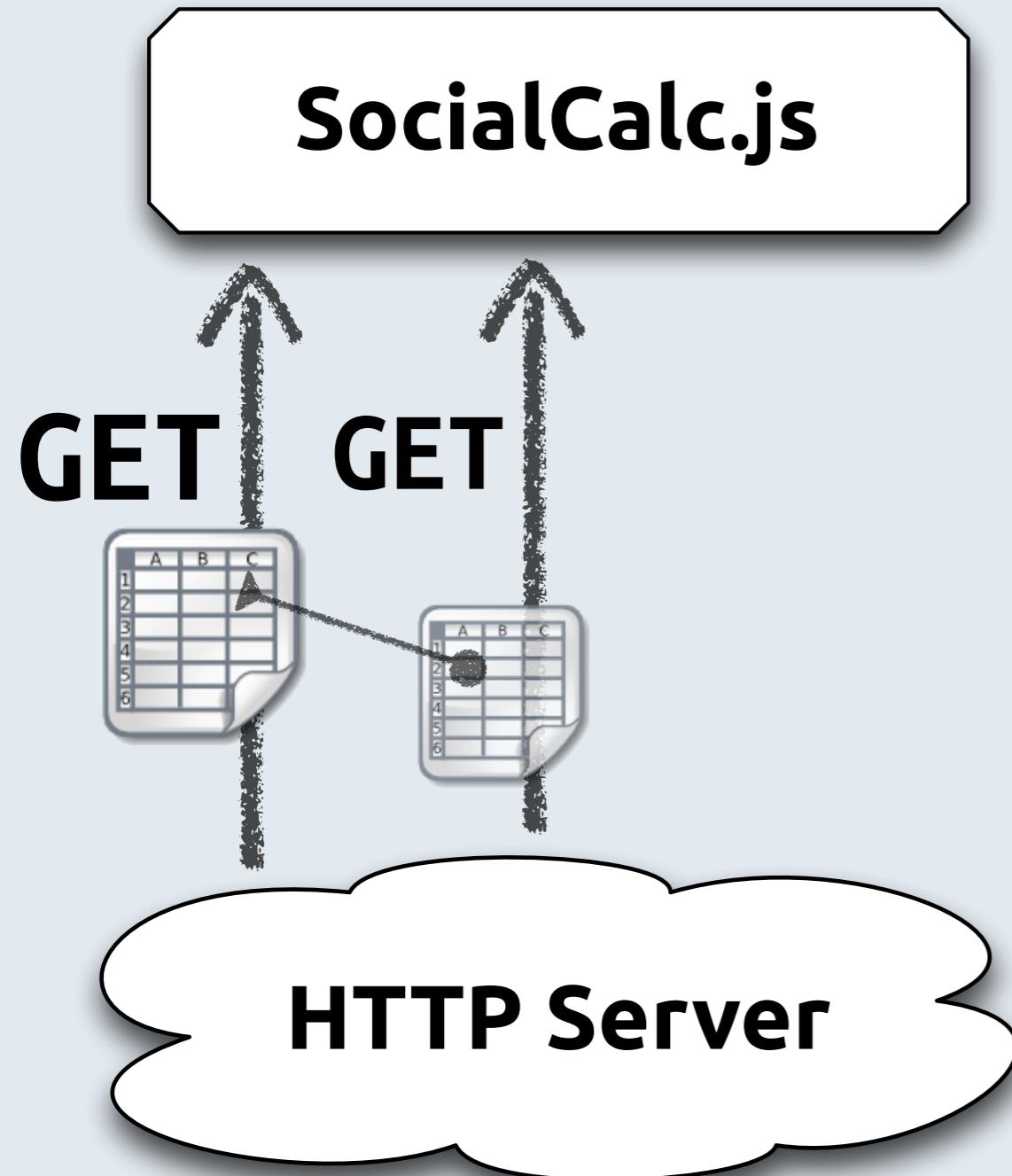


Architecture



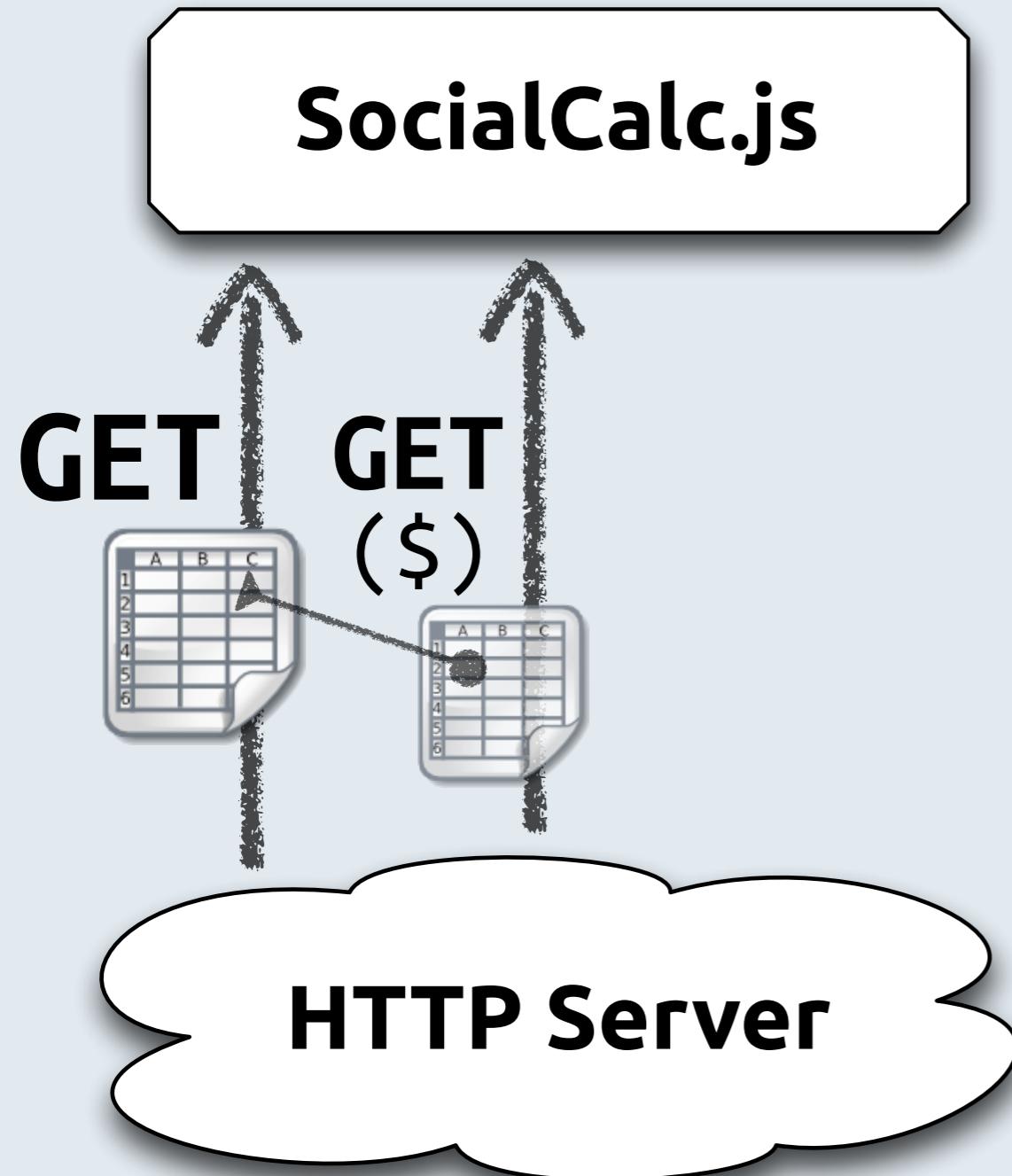


Architecture



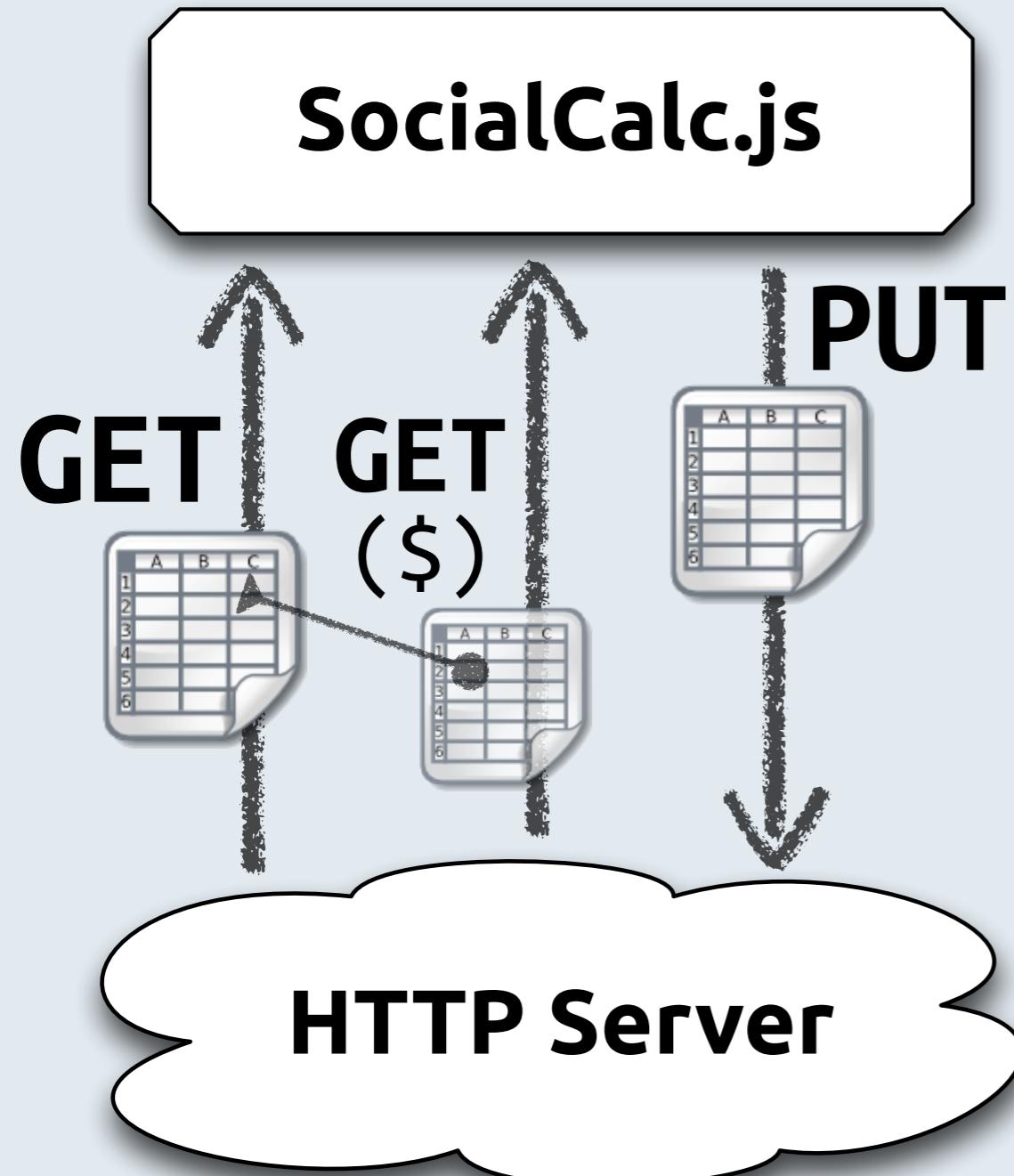


Architecture



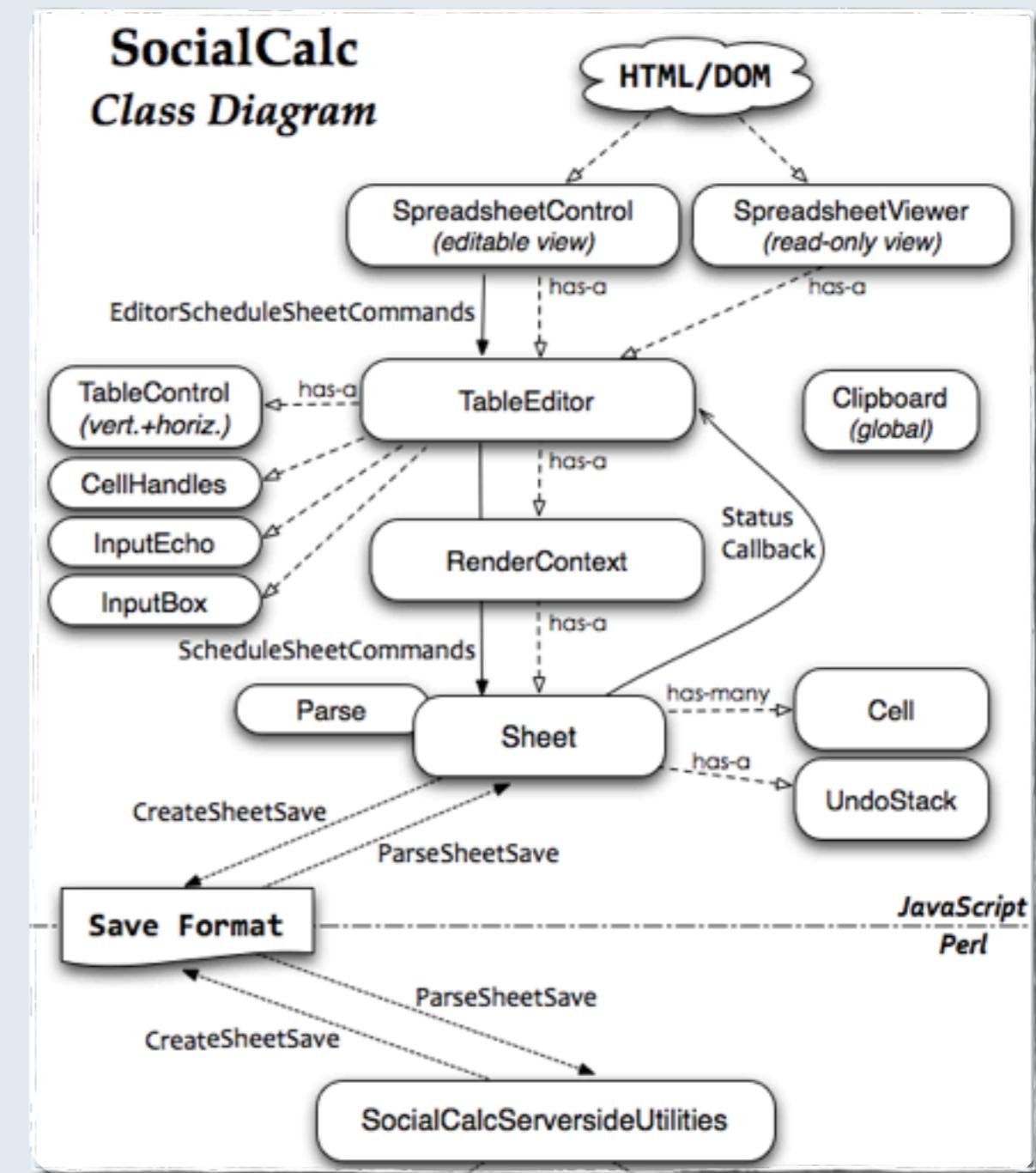
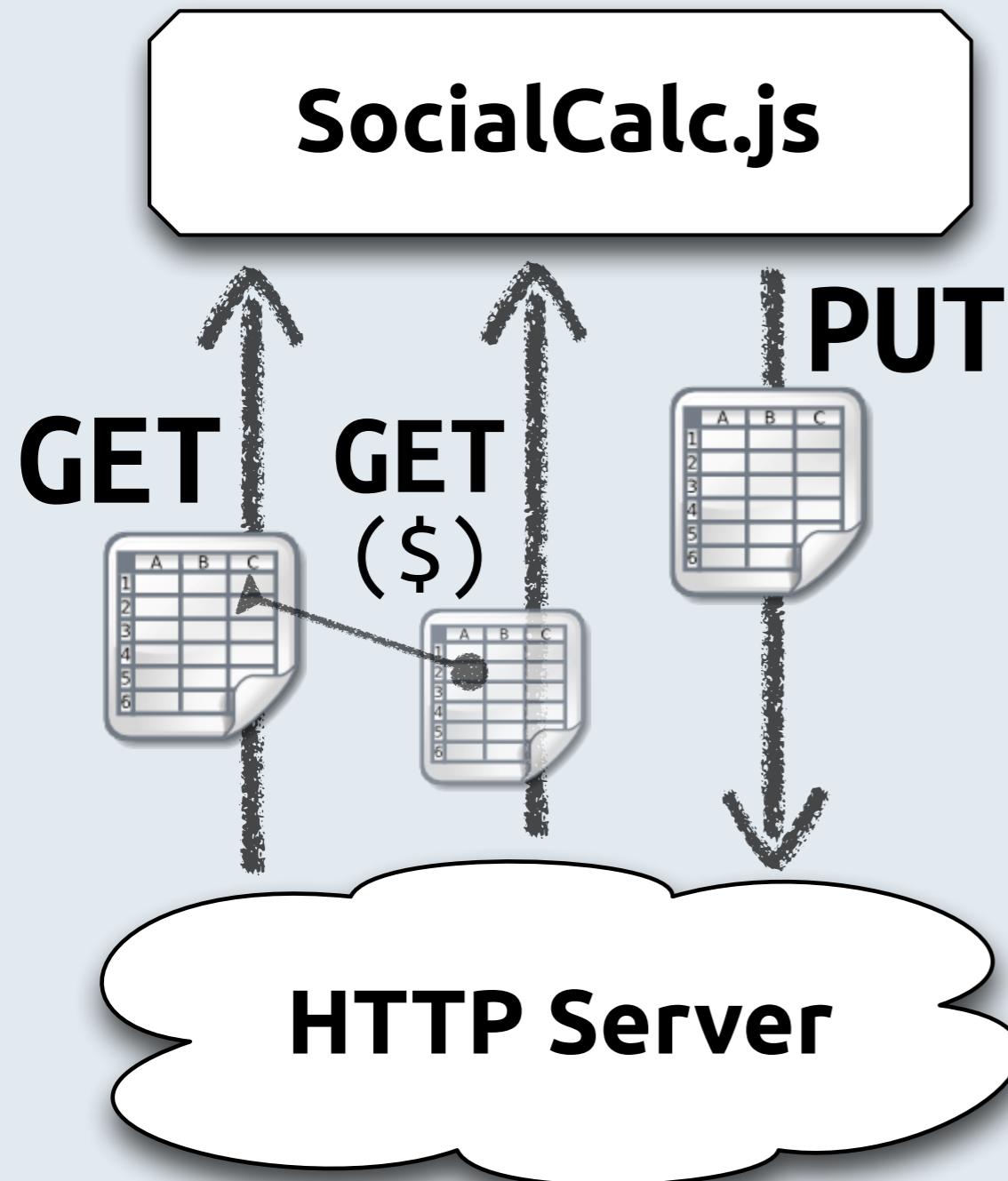


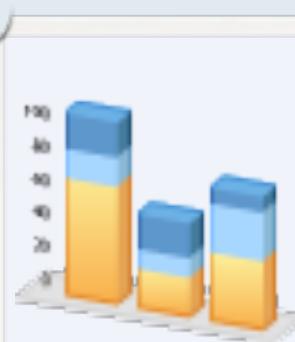
Architecture





Architecture





Command Pattern



Command Pattern

set A1 value n 42



Command Pattern

set A1 value n 42

set A2 formula A1*2



Command Pattern

set A1 value n 42

set A2 formula A1*2

merge A1:B2

cut A3

paste A4

sort A1:B9 A up B down

set sheet defaultcolor blue

...



Command Pattern

set A1 value n 42

set A2 formula A1*2

- ▶ **Async recalc loop**



Command Pattern

set A1 value n 42

set A2 formula A1*2

- ▶ **Async recalc loop**
- ▶ **Visible-only redraw**



Command Pattern

set A1 value n 42

set A2 formula A1*2

- ▶ **Async recalc loop**
- ▶ **Visible-only redraw**
- ▶ **Unlimited undo/redo**



Command Pattern

set A1 value n 42

set A2 formula A1*2

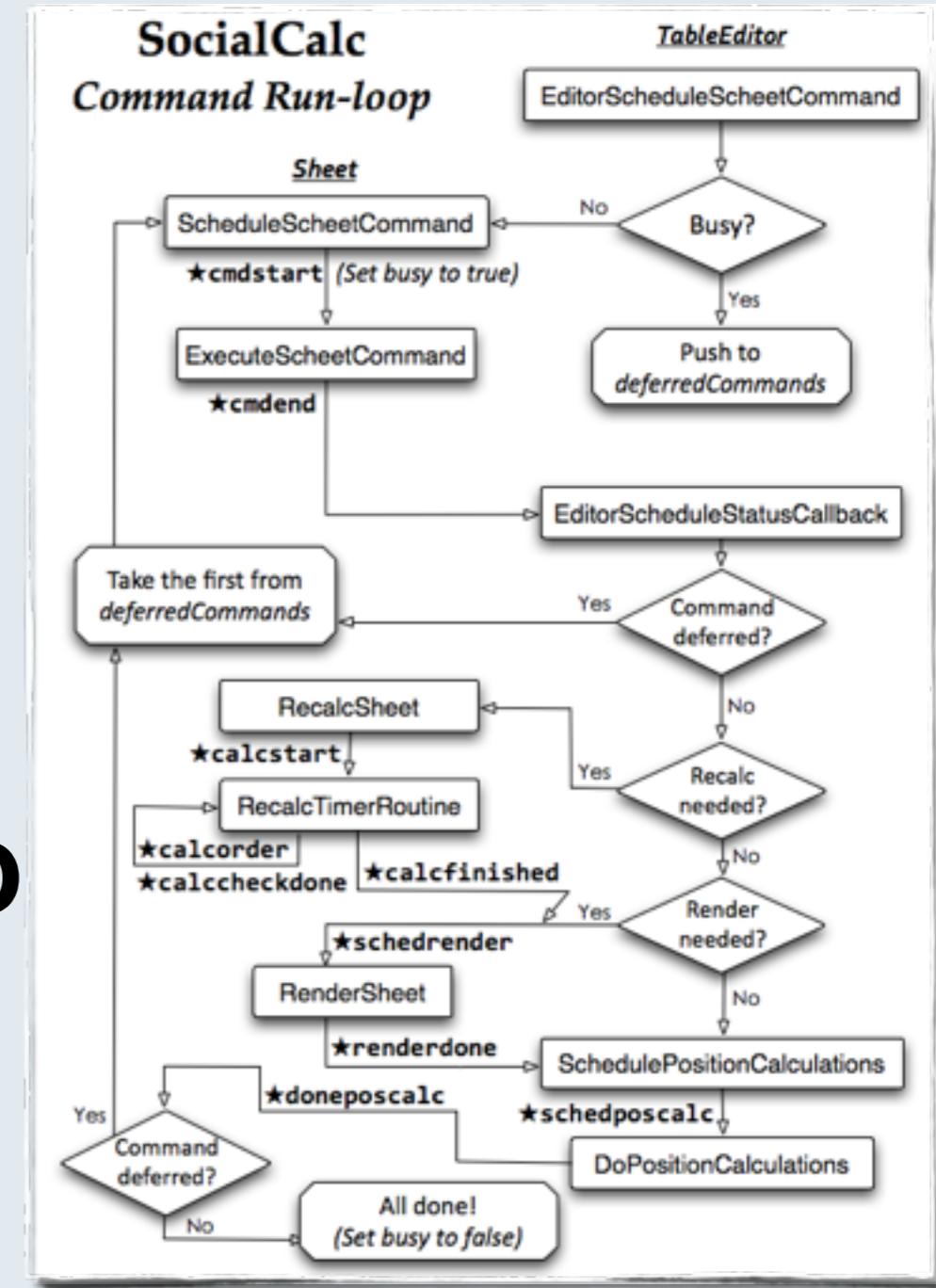
- ▶ **Async recalc loop**
- ▶ **Visible-only redraw**
- ▶ **Unlimited undo/redo**
- ▶ **UI stays responsive**



Command Pattern

set A1 value n 42
set A2 formula A1*2

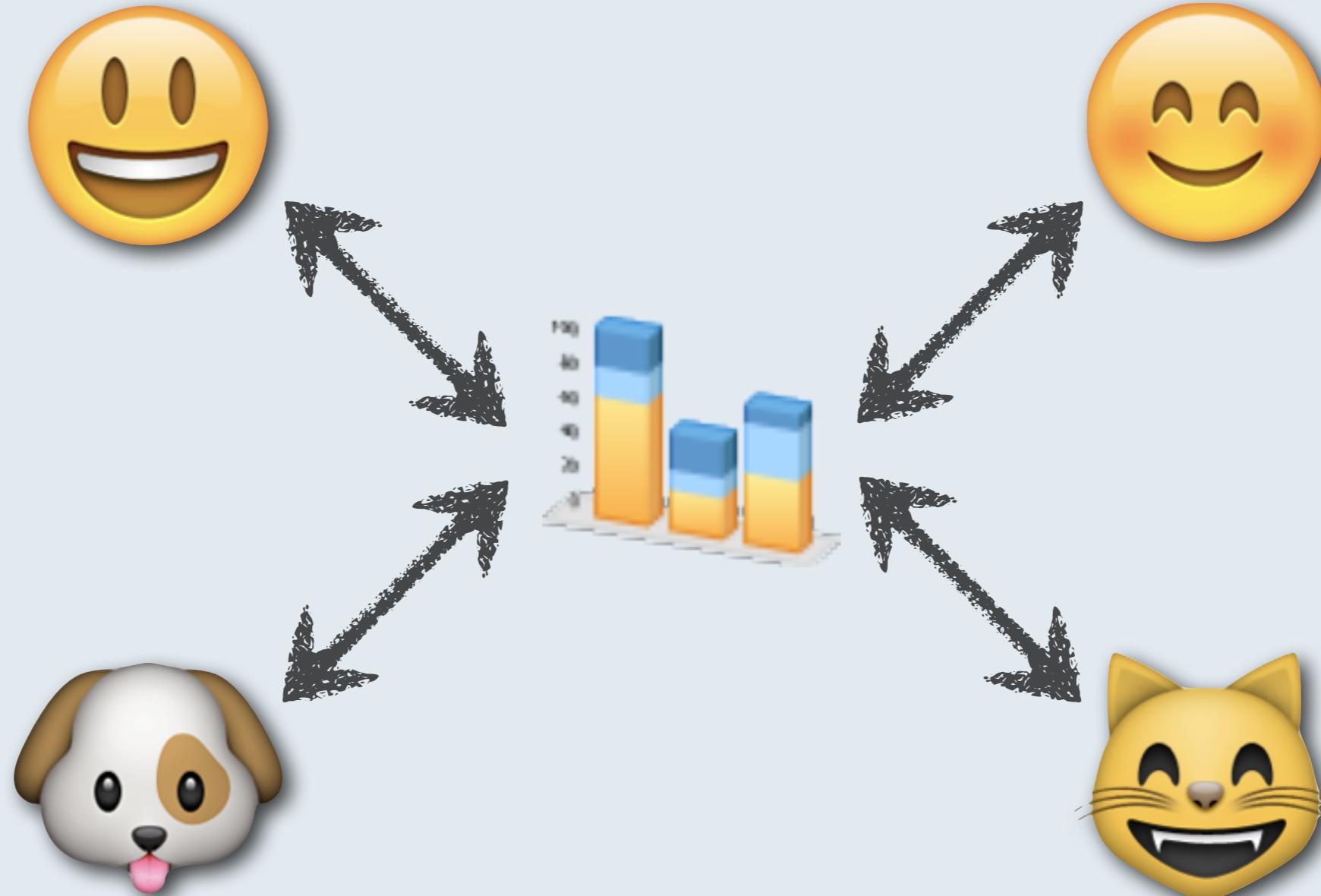
- ▶ Async recalc loop
- ▶ Visible-only redraw
- ▶ Unlimited undo/redo
- ▶ UI stays responsive



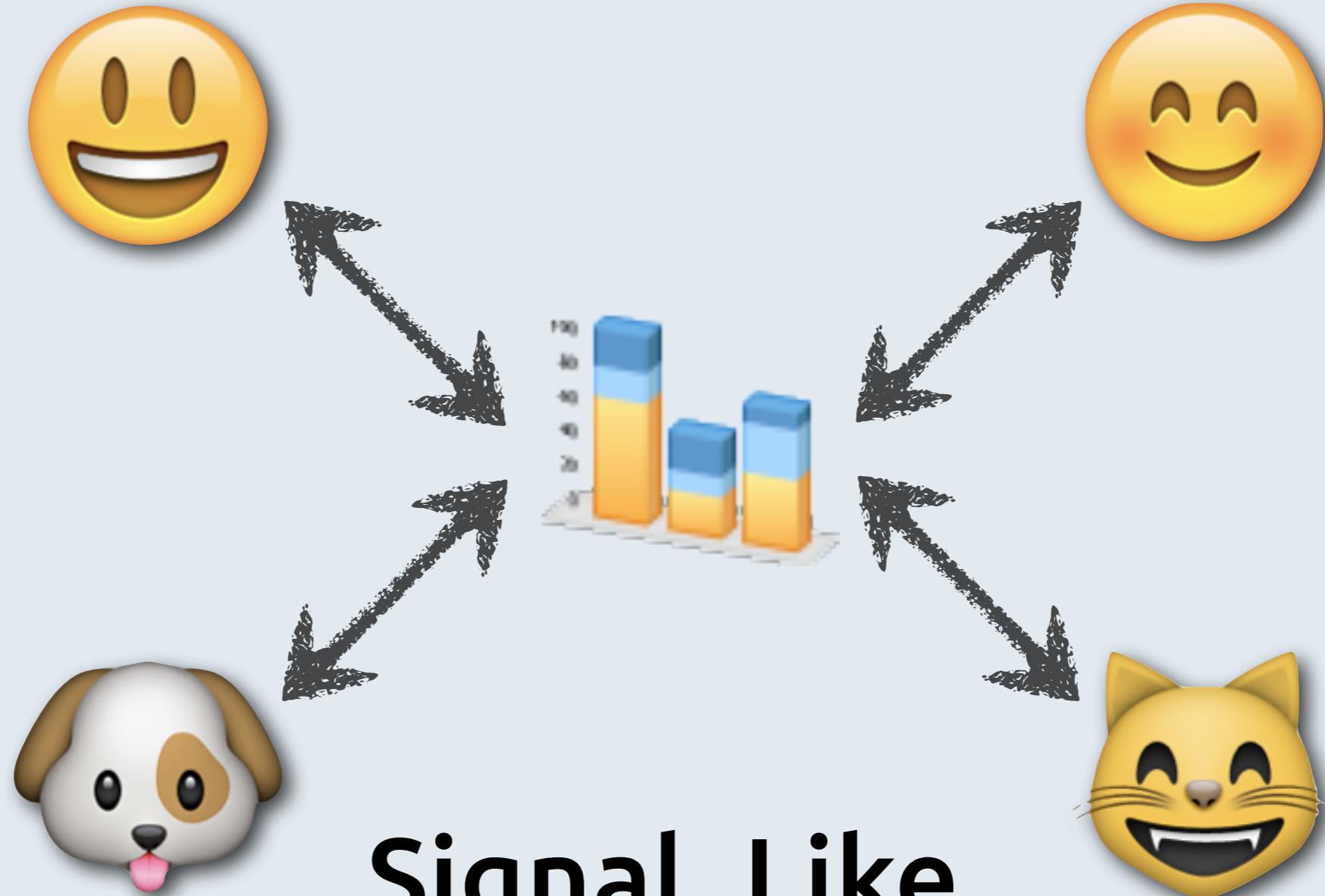
“Social”Calc



“Social” Calc

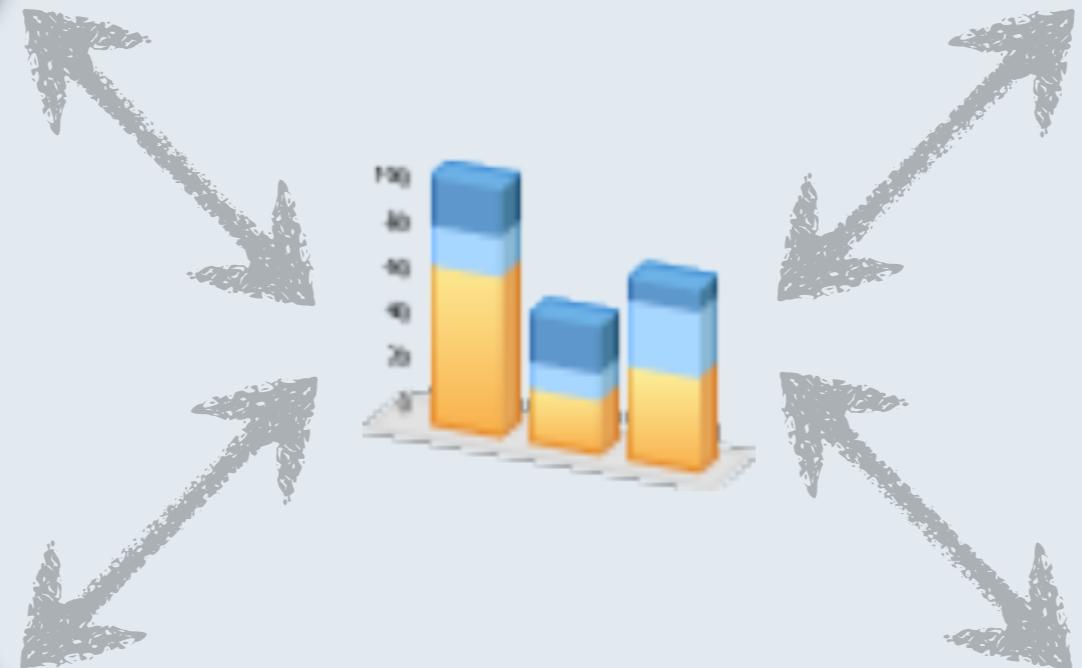
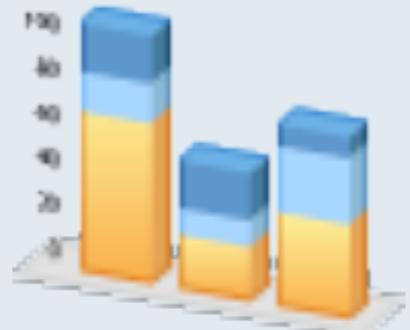
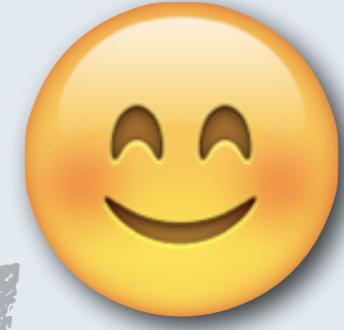


“Social” Calc

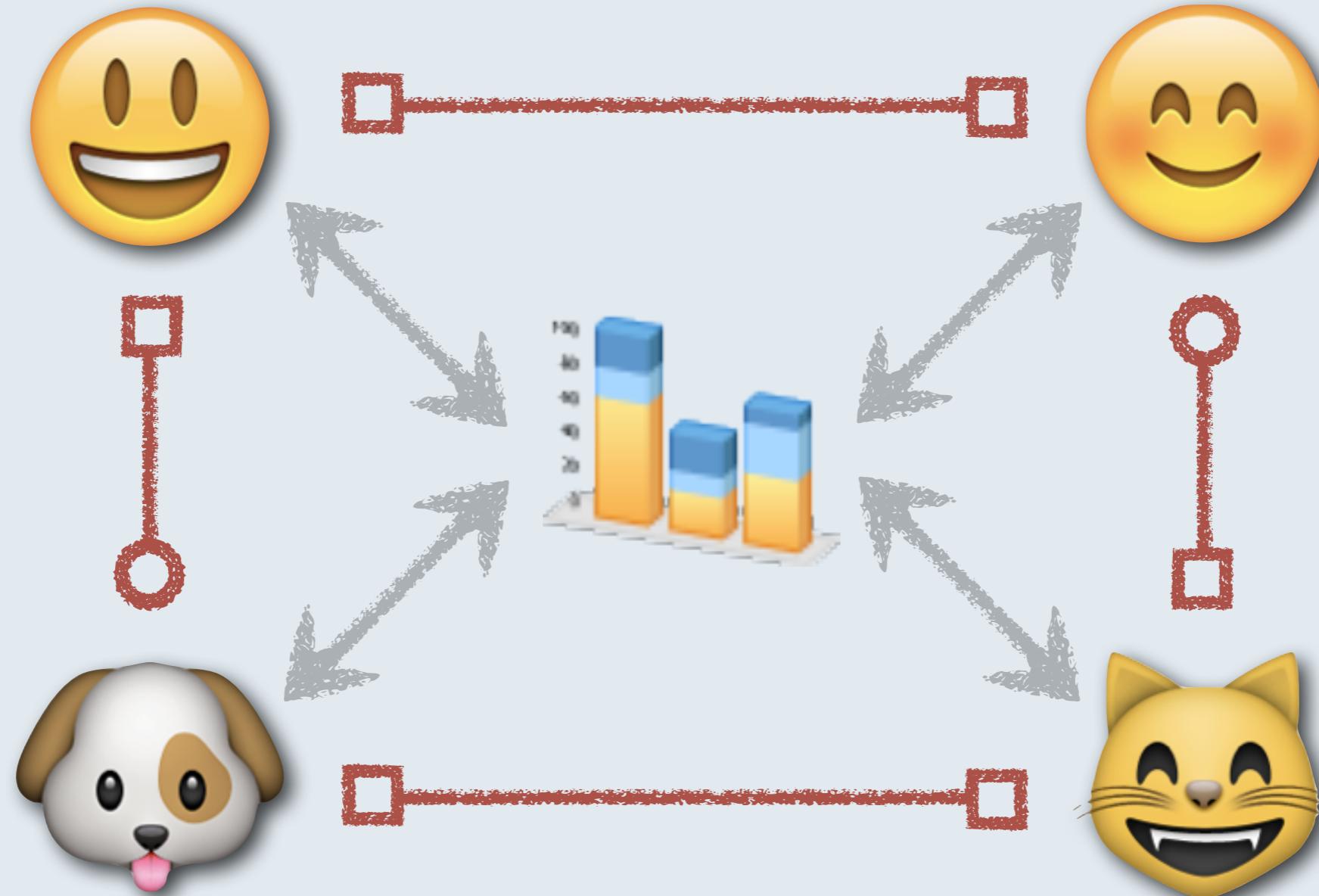


Signal, Like,
Tag, Share, Embed...

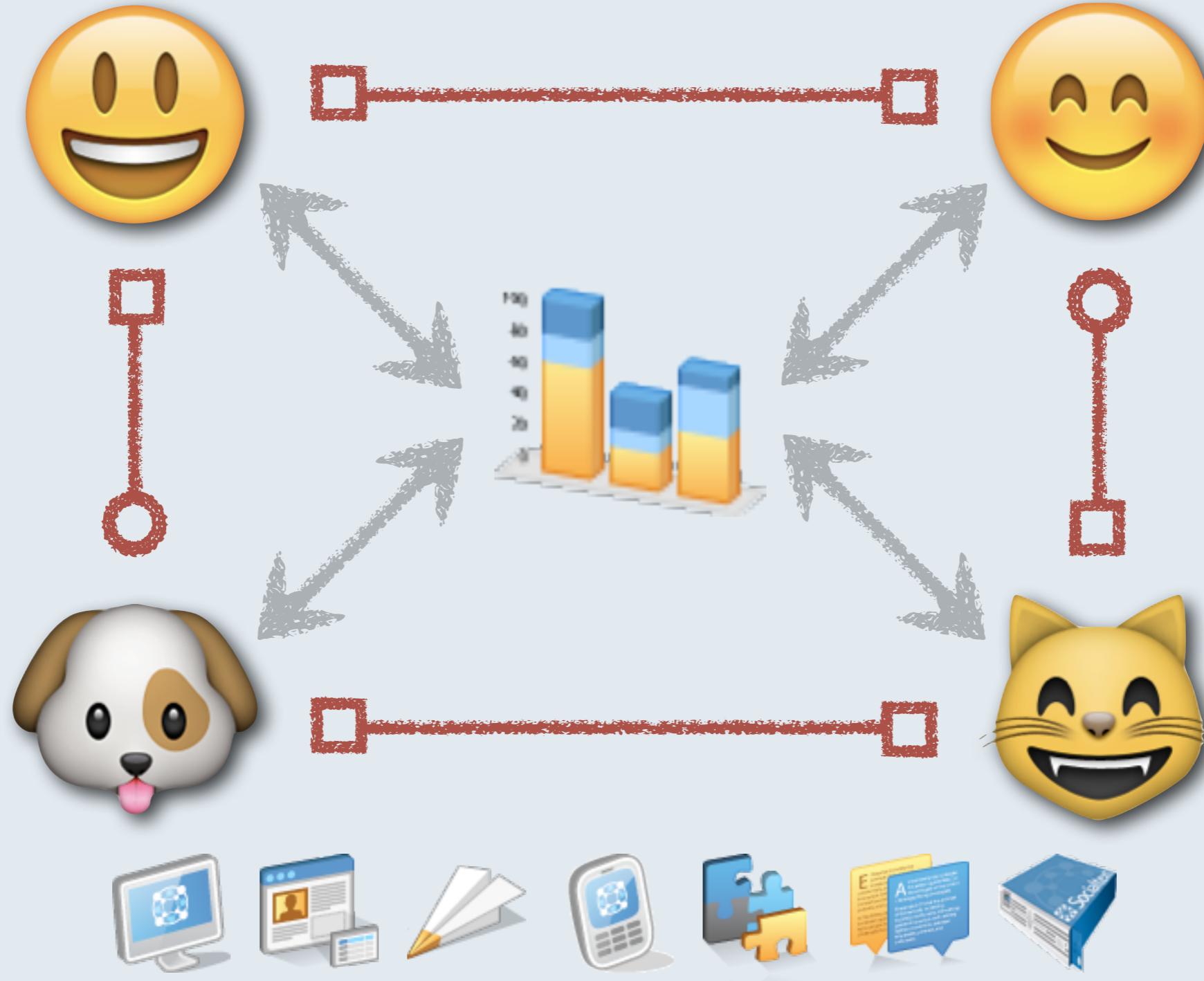
Objects ↔ Relations

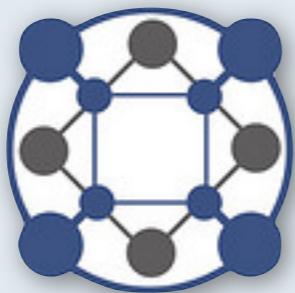


Objects ↔ Relations

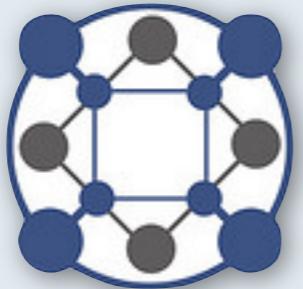


Objects ↔ Relations





Socialtext Open



Socialtext Open

Good first
Profits later

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a

BSD, MIT

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BSD, MIT

LGPL, MPL

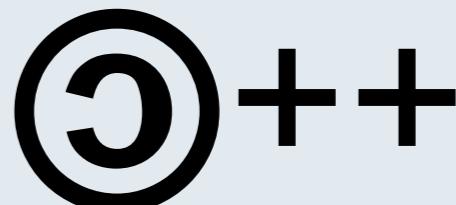
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BSD, MIT



LGPL, MPL



GPL

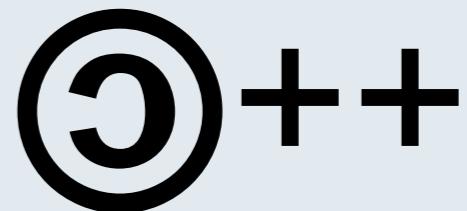
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LGPL, MPL



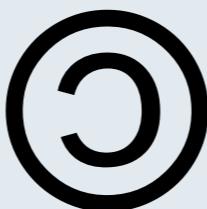
GPL

“ASP Loophole”

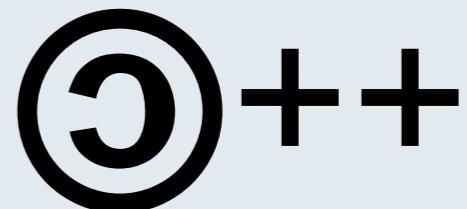
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“ASP Loophole”



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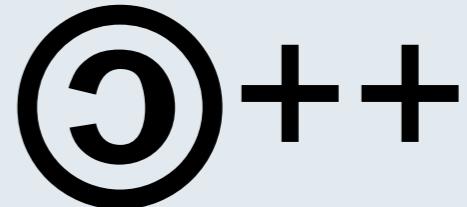
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GPL

“ASP loophole”



CPAL

Affero GPL

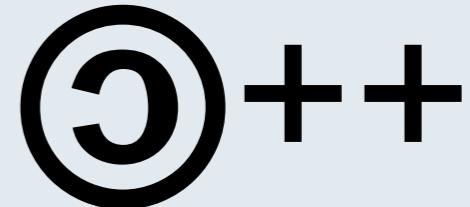
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©++

GPL

“ASP loophole”



CPAL



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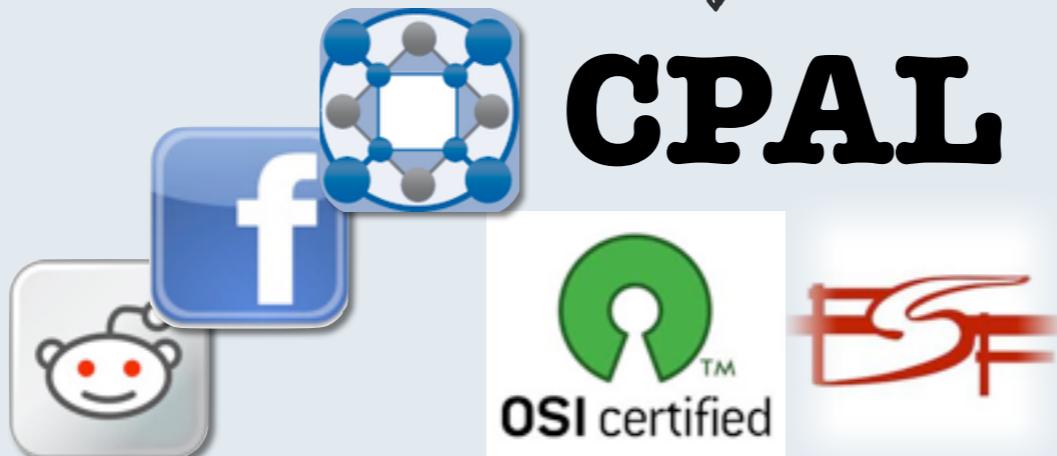
LGPL, MPL

©++

GPL

“ASP loophole”

CPAL



Affero GPL



Sheetnode, 2008



Karim Ratib



Sheetnode, 2008

Views + Fields + CCK



Karim Ratib

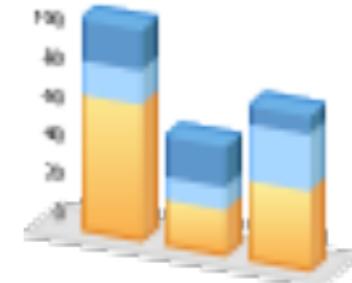


Sheetnode, 2008



Karim Ratib

Views + Fields + CCK



SocialCalc.js



Sheetnode, 2008



Karim Ratib

Views + Fields + CCK



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Sheetnode, 2008



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Sheetnode, 2008

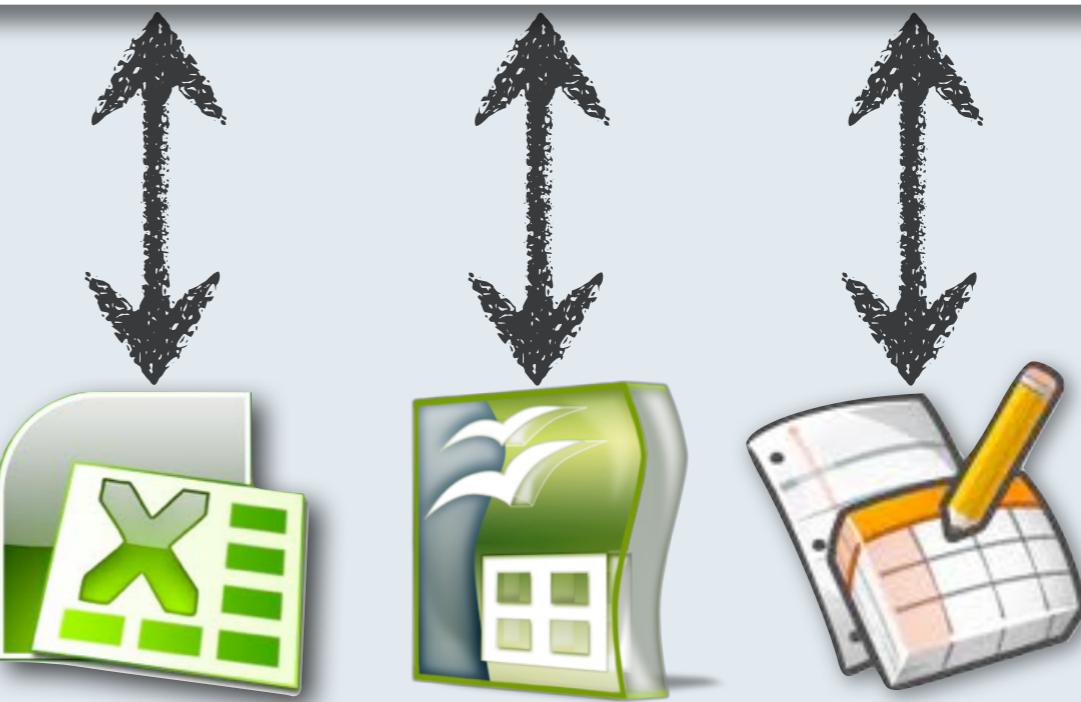


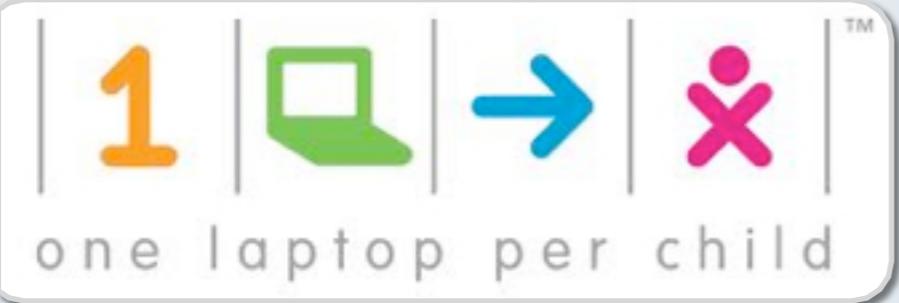
Karim Ratib

Views + Fields + CCK

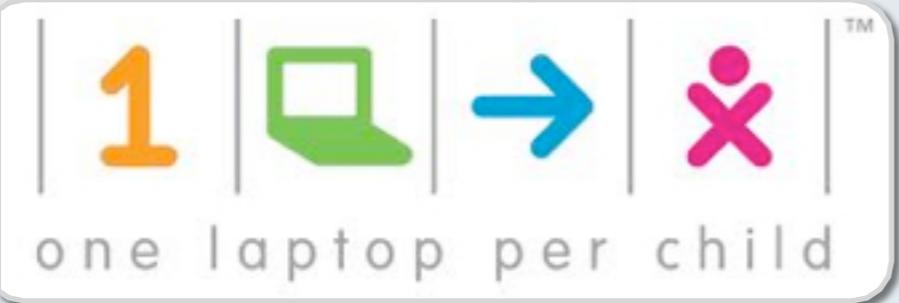


SocialCalc.js





OLPC, 2008

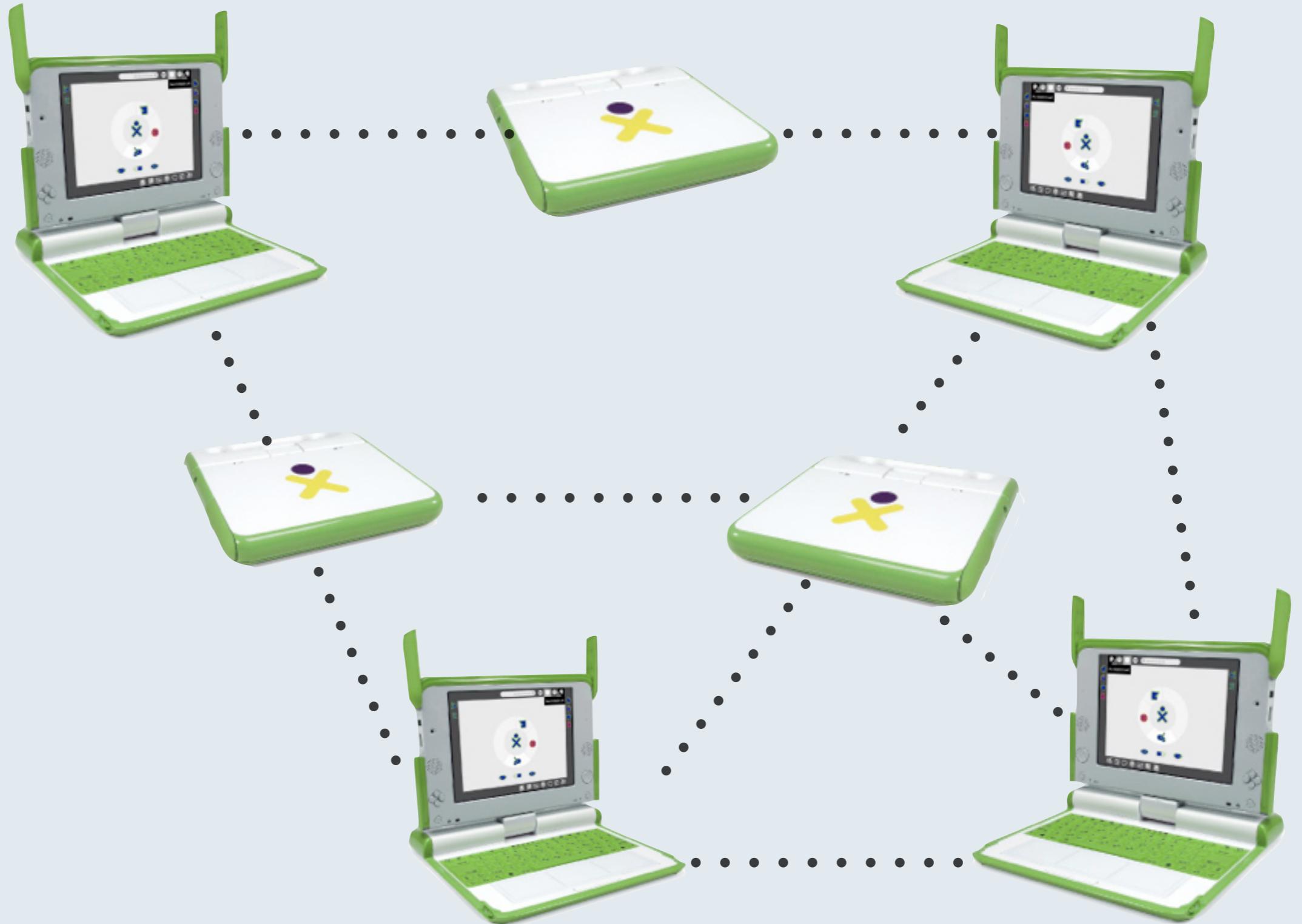


OLPC, 2008

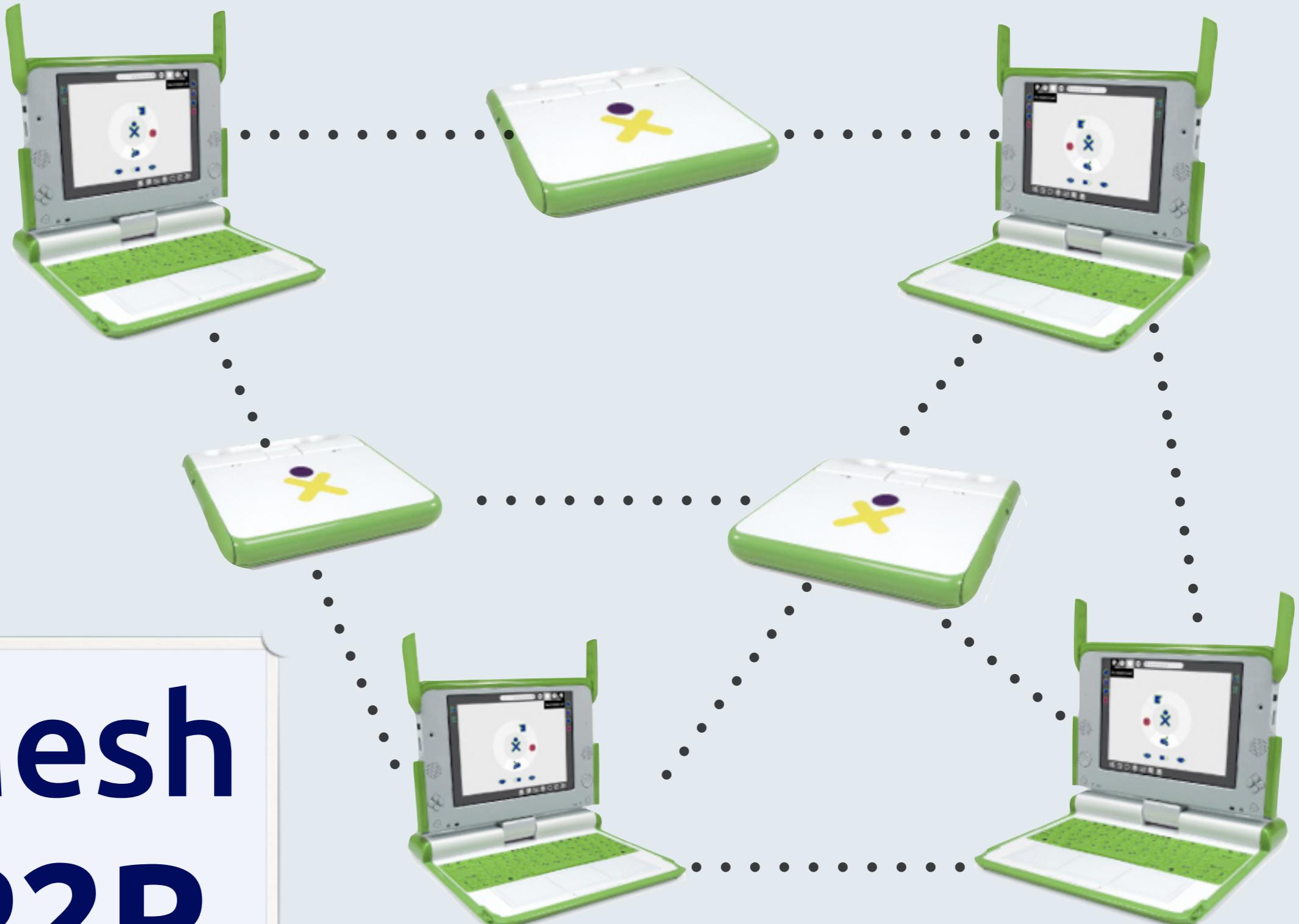


Luke Closs & Dan





Mesh P2P







**Manusheel
Gupta**



Dijit Singh



**Manusheel
Gupta**



Dijit Singh



SocialCalcActivity.py

Gecko/XPCOM

SocialCalc.js

XoCom.js

XoCom.py



**Manusheel
Gupta**



Dijit Singh



set A1 value n 42

SocialCalcActivity.py

Gecko/XPCOM

SocialCalc.js

XoCom.js

XoCom.py



**Manusheel
Gupta**



Dijit Singh



set A1 value n 42

SocialCalcActivity.py

Gecko/XPCOM

SocialCalc.js

XoCom.js

XoCom.py

D-Bus + Telepathy



**Manusheel
Gupta**



Dijit Singh



set A1 value n 42

SocialCalcActivity.py

Gecko/XPCOM

SocialCalc.js

XoCom.js

XoCom.py

+ Telepathy

**OLPC Mesh
Broadcast**



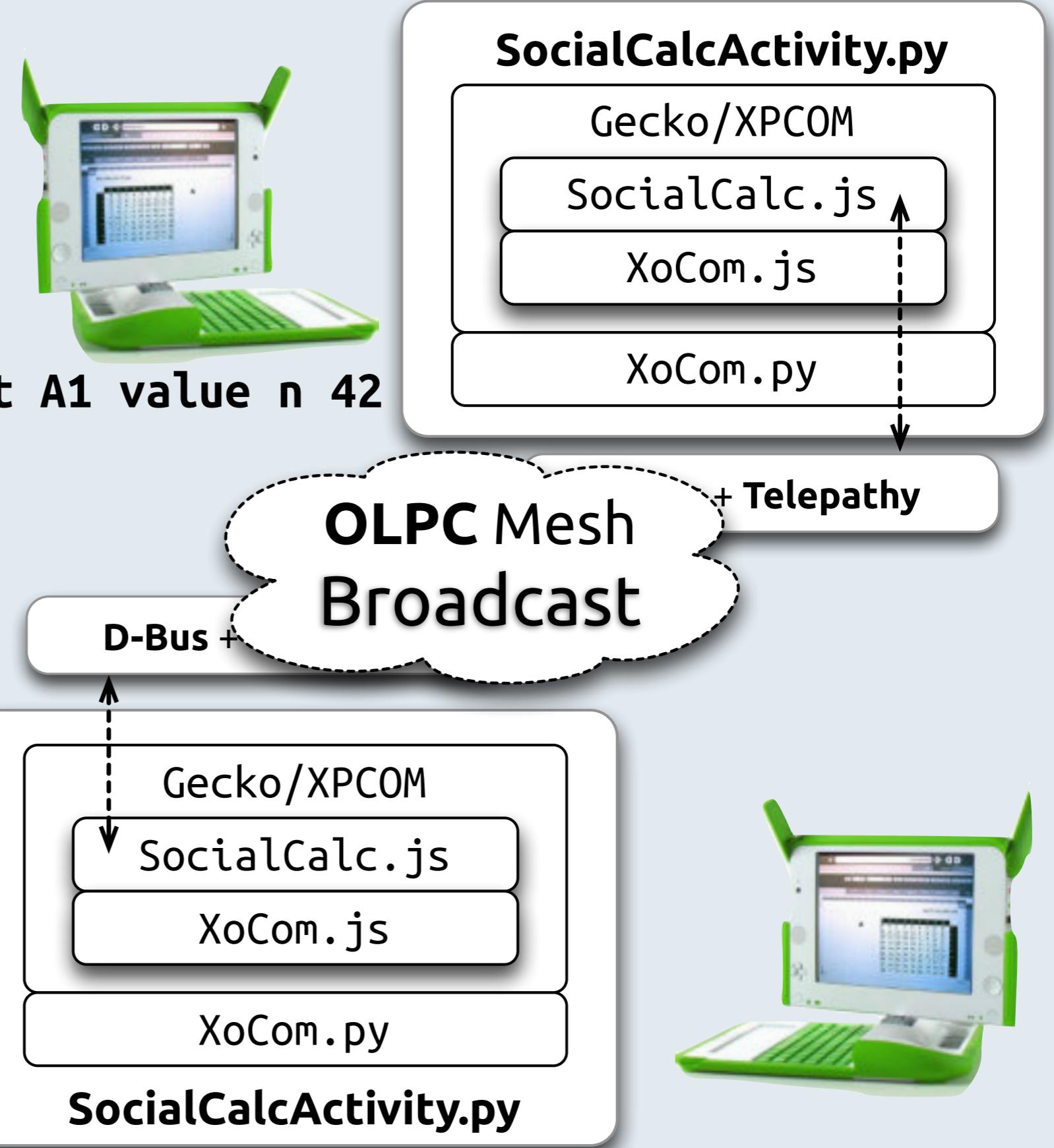


**Manusheel
Gupta**



Dijit Singh

set A1 value n 42





**Manusheel
Gupta**



Dijit Singh

set A1 value n 42



SocialCalcActivity.py

Gecko/XPCOM

SocialCalc.js

XoCom.js

XoCom.py

+ Telepathy

**OLPC Mesh
Broadcast**

D-Bus +

Gecko/XPCOM

SocialCalc.js

XoCom.js

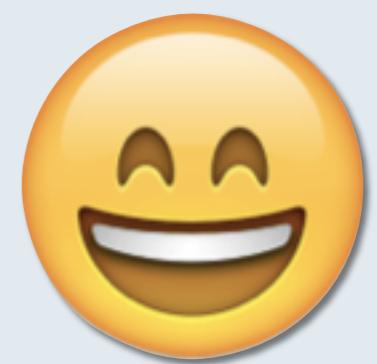
XoCom.py

SocialCalcActivity.py

set A1 value n 42

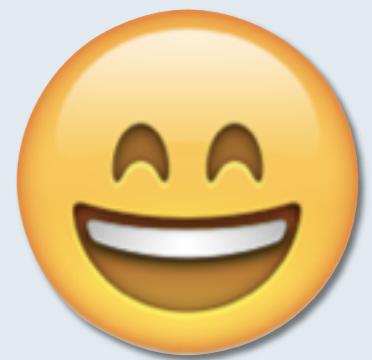


Great, but...



Great, but...

- ▶ Must start at same time



Great, but...

- ▶ Must start at same time
- ▶ Can't replay missed logs



Great, but...

- ▶ Must start at same time
- ▶ Can't replay missed logs
- ▶ Race condition on cells



Great, but...

- ▶ Must start at same time
- ▶ Can't replay missed logs
- ▶ Race condition on cells
- ▶ OLPC-specific transport!



YAPC::Tiny, 2009



Multiplayer
SocialCalc

二零零九 唐鳳
中英雙字有字版

EV/AnyEvent

Tatsumaki

EV/AnyEvent



@miyagawa

Tatsumaki

EV/AnyEvent

Web::Hippie



@miyagawa

@clkao

Tatsumaki

EV/AnyEvent



@miyagawa



@clkao

Web::Hippie

Feersum



@stash

WebSocket Channels

multiserver.pl

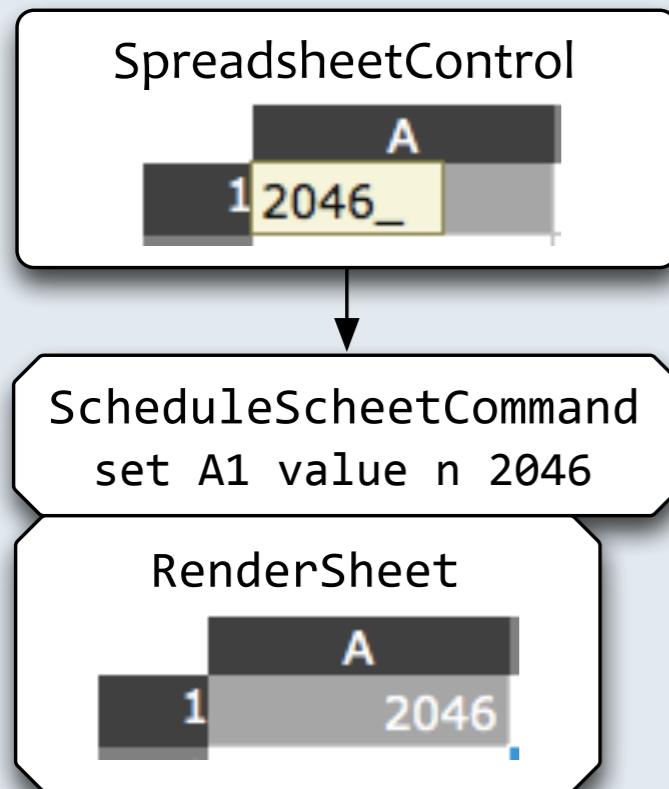
Web::Hippie

Plack

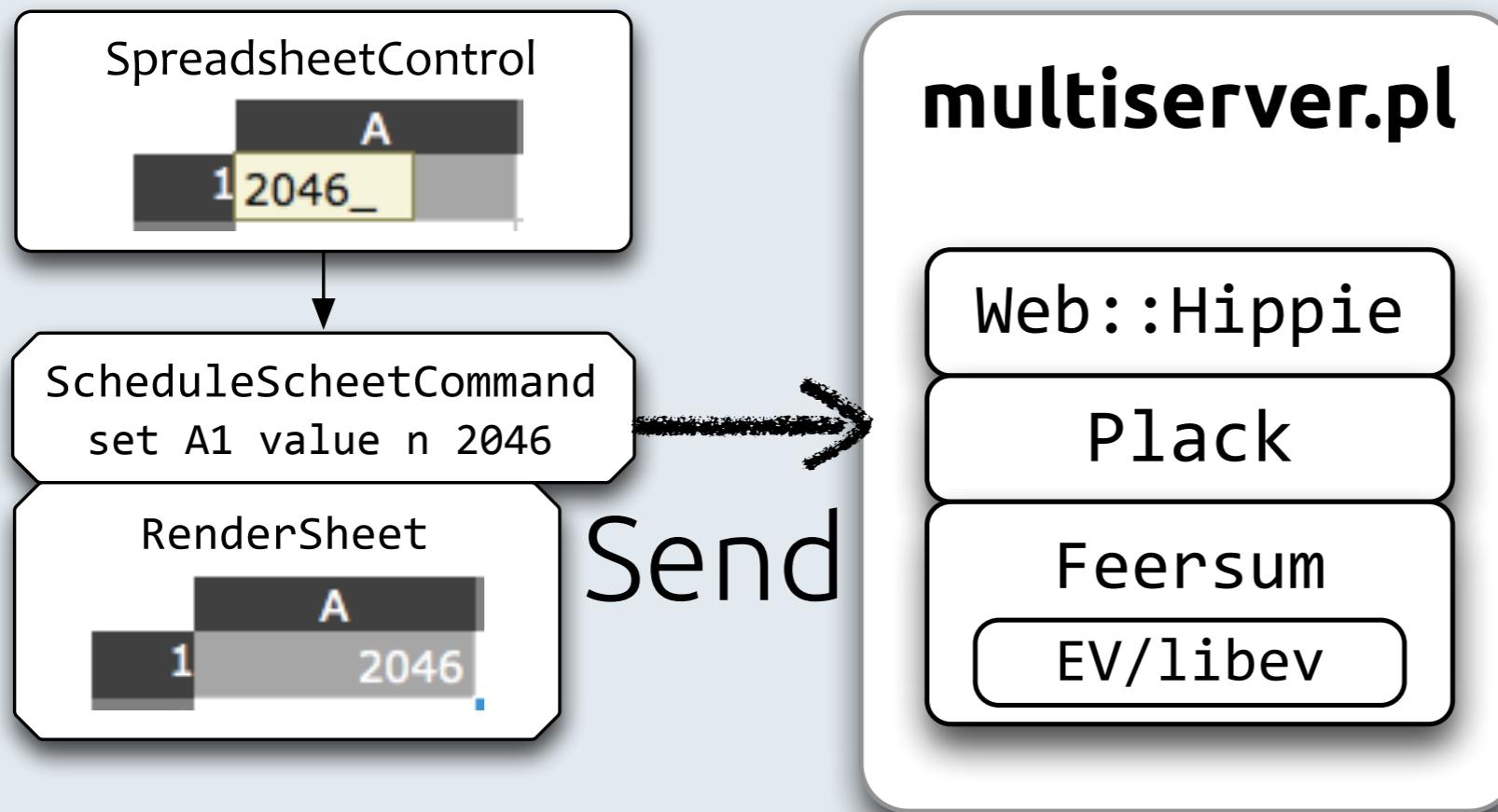
Feersum

EV/libev

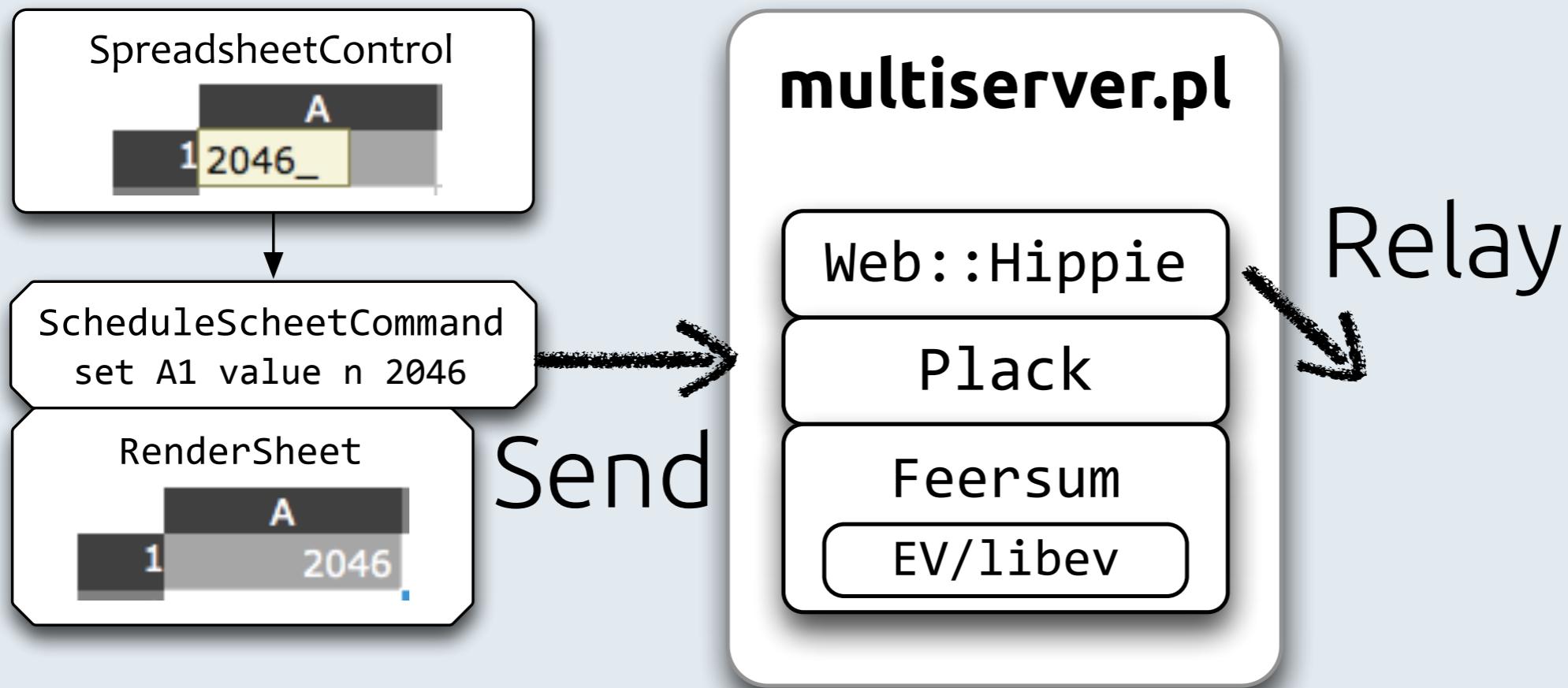
WebSocket Channels



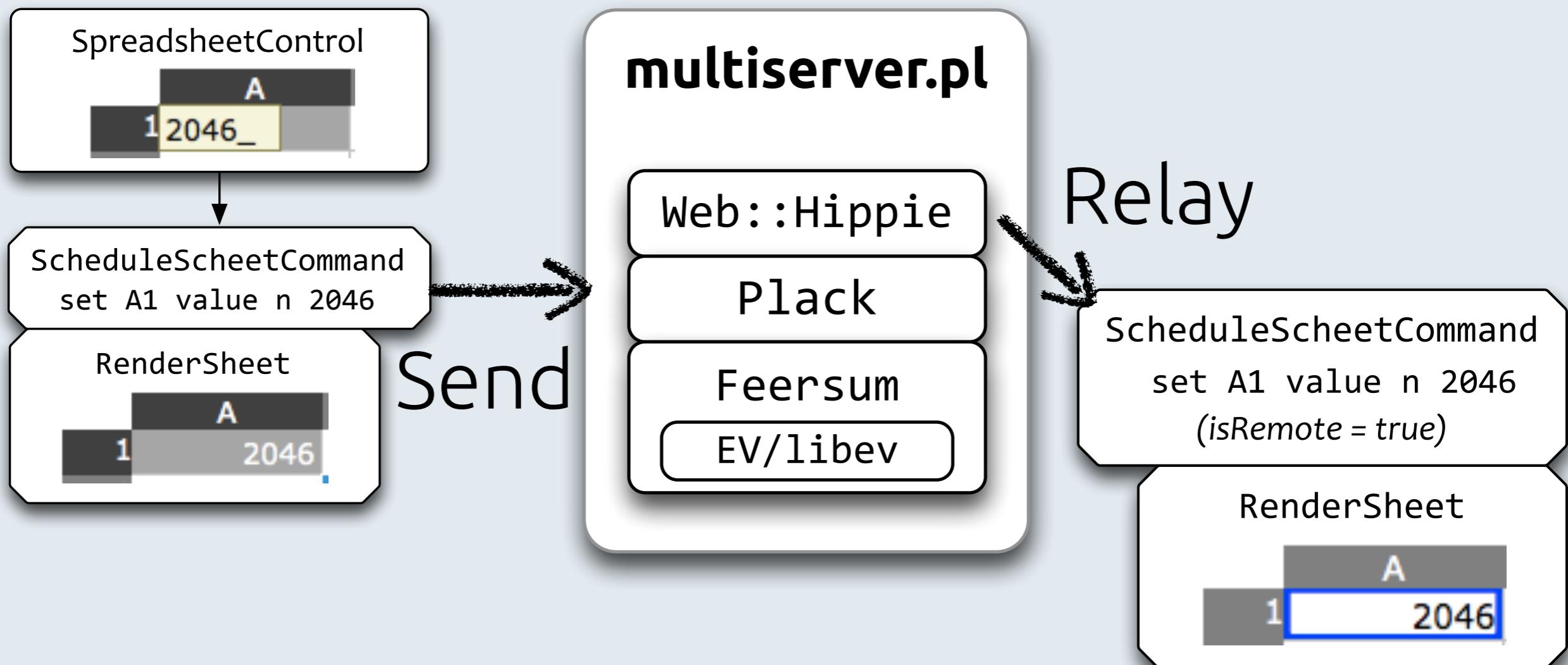
WebSocket Channels



WebSocket Channels



WebSocket Channels



New Features

New Features

- ✓ Logs retrieved on join

New Features

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- ✓ Reconnection recovery

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- ✓ Logs retrieved on join
- ✓ Reconnection recovery
- ✓ Peer cursors are visible
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Much better, but...



Much better, but...

- ▶ Which peer's log to take?



Much better, but...

- ▶ Which peer's log to take?
- ▶ What if everyone leaves?



Much better, but...

- ▶ Which peer's log to take?
- ▶ What if everyone leaves?
- ▶ Who would keep the logs?



Much better, but...

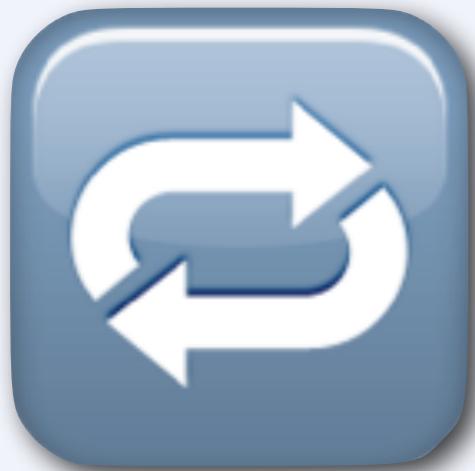
- ▶ Which peer's log to take?
- ▶ What if everyone leaves?
- ▶ Who would keep the logs?
- ▶ Replay 1,000+ commands?



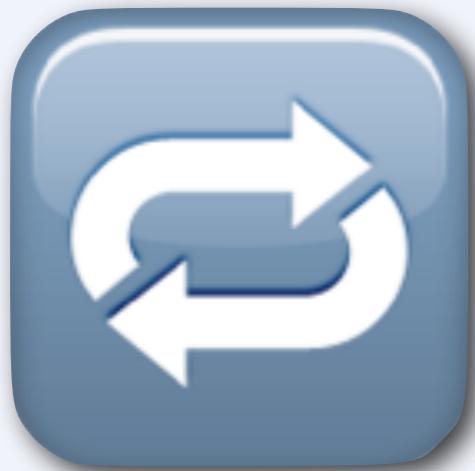
Much better, but...

- ▶ Which peer's log to take?
- ▶ What if everyone leaves?
- ▶ Who would keep the logs?
- ▶ Replay 1,000+ commands?





Undo



Undo

Redo??

YAPC::NA, 2006



YAPC::NA, 2006

“I think, but I cannot prove, that by the next year **JavaScript 2.0** will **bootstrap** itself, complete self hosting, **compile back** to JavaScript, and **replace Ruby** as the Next Big Thing in all environments.”



YAPC::NA, 2006



YAPC::NA, 2006

“JavaScript will become the common backend for all dynamic languages, and so you can write Perl to run in the browser, on the server, and inside databases, all with the same set of development tools.”



YAPC::NA, 2006



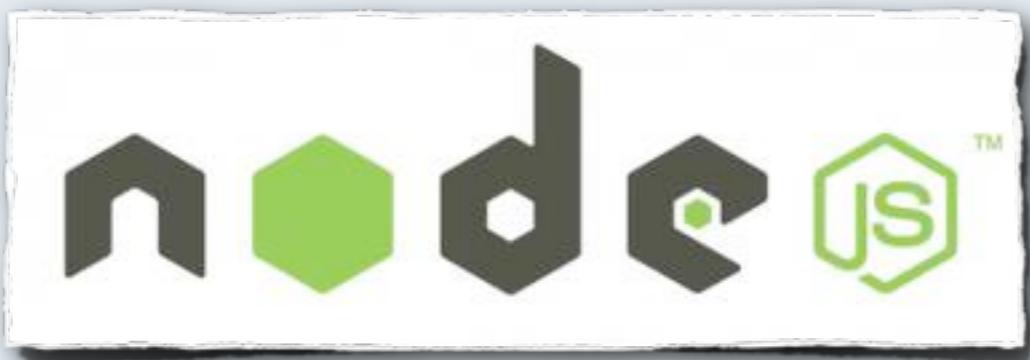
YAPC::NA, 2006

“Because, as we all know,
worse is better, so the **worst**
scripting language is doomed
to become the *best*.”



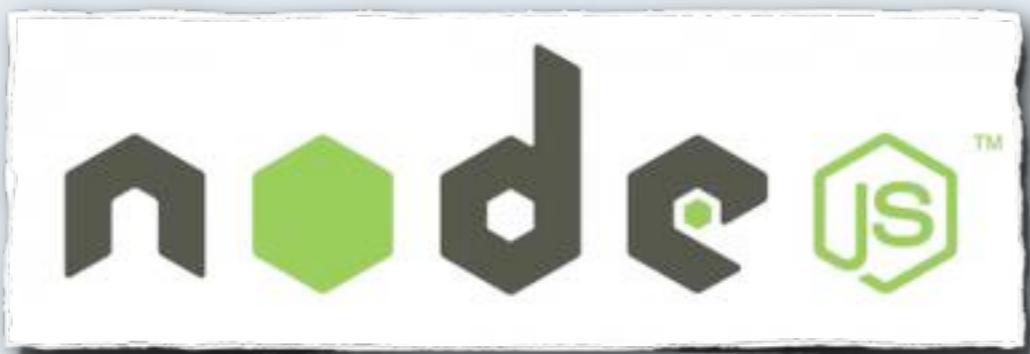
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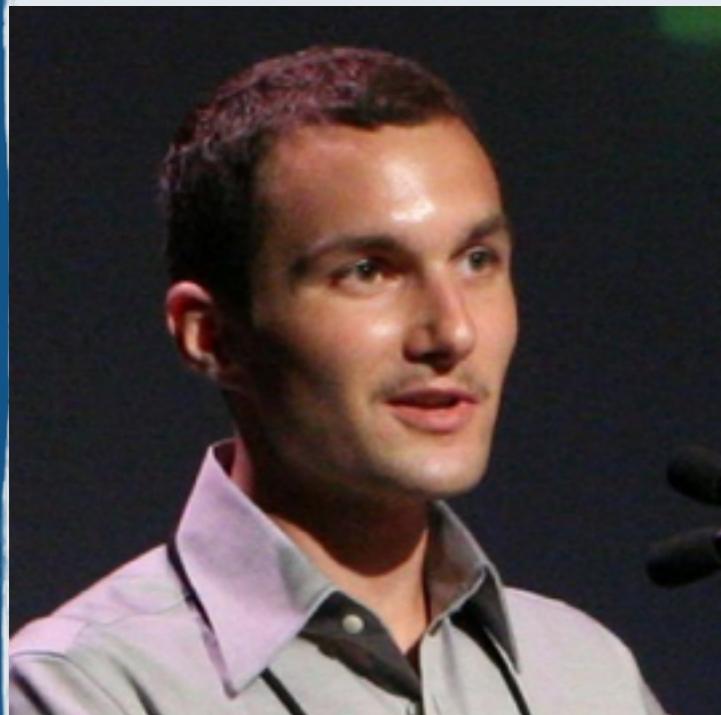


YAPC::NA, 2006

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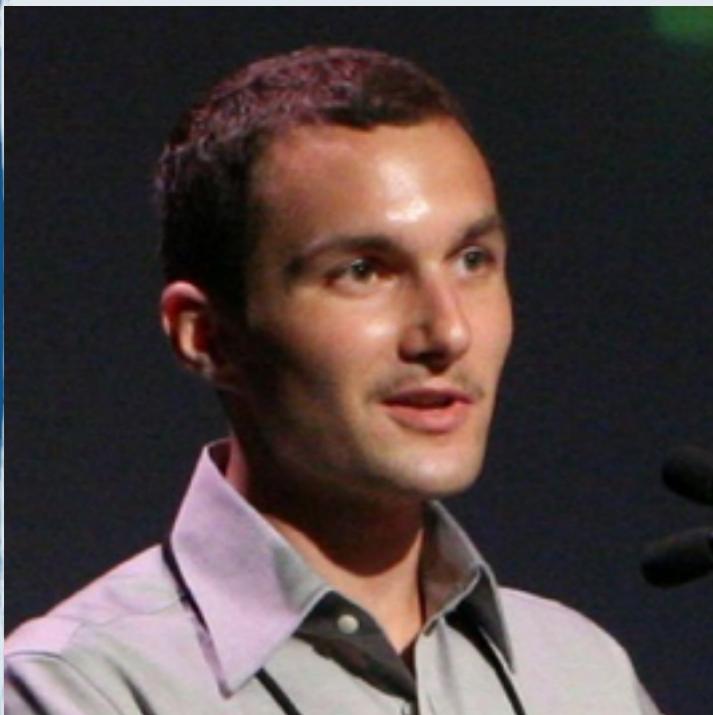
JS: Only The Good Parts



**Jeremy
Ashkenas**

JS: Only The Good Parts

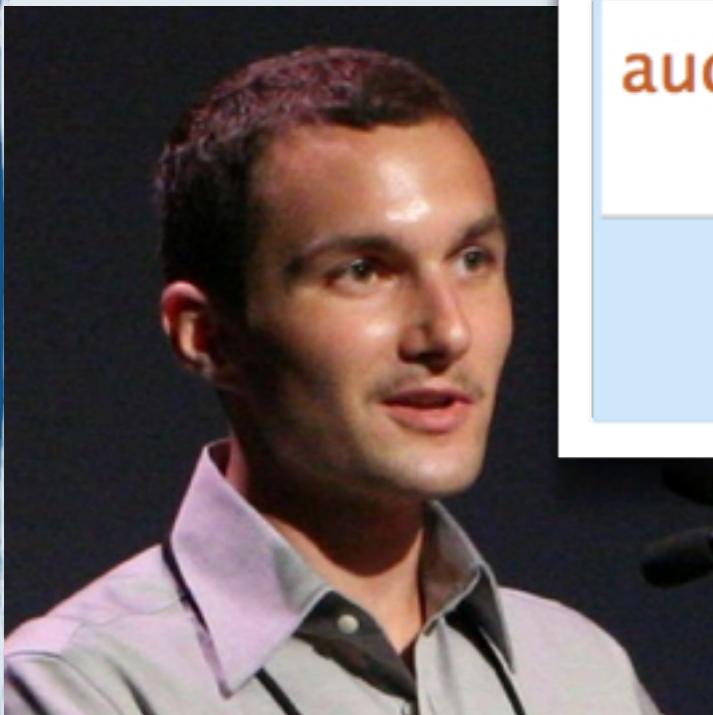
cs = (js) => js/2



**Jeremy
Ashkenas**

JS: Only The Good Parts

cs = (js) => js/2



audreyt 本周程式碼產量: 負一萬七千行。 😎

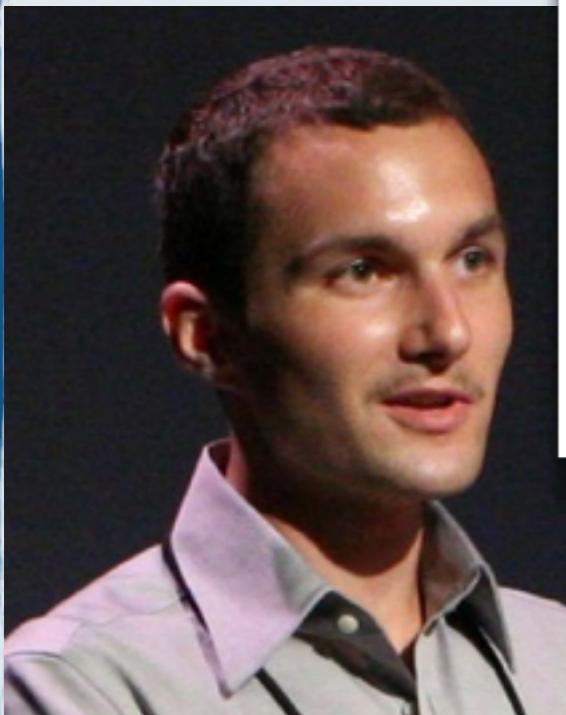
2011-9-8 - 16:51

亦未
可知

**Jeremy
Ashkenas**

JS: Only The Good Parts

cs = (js) => js/2

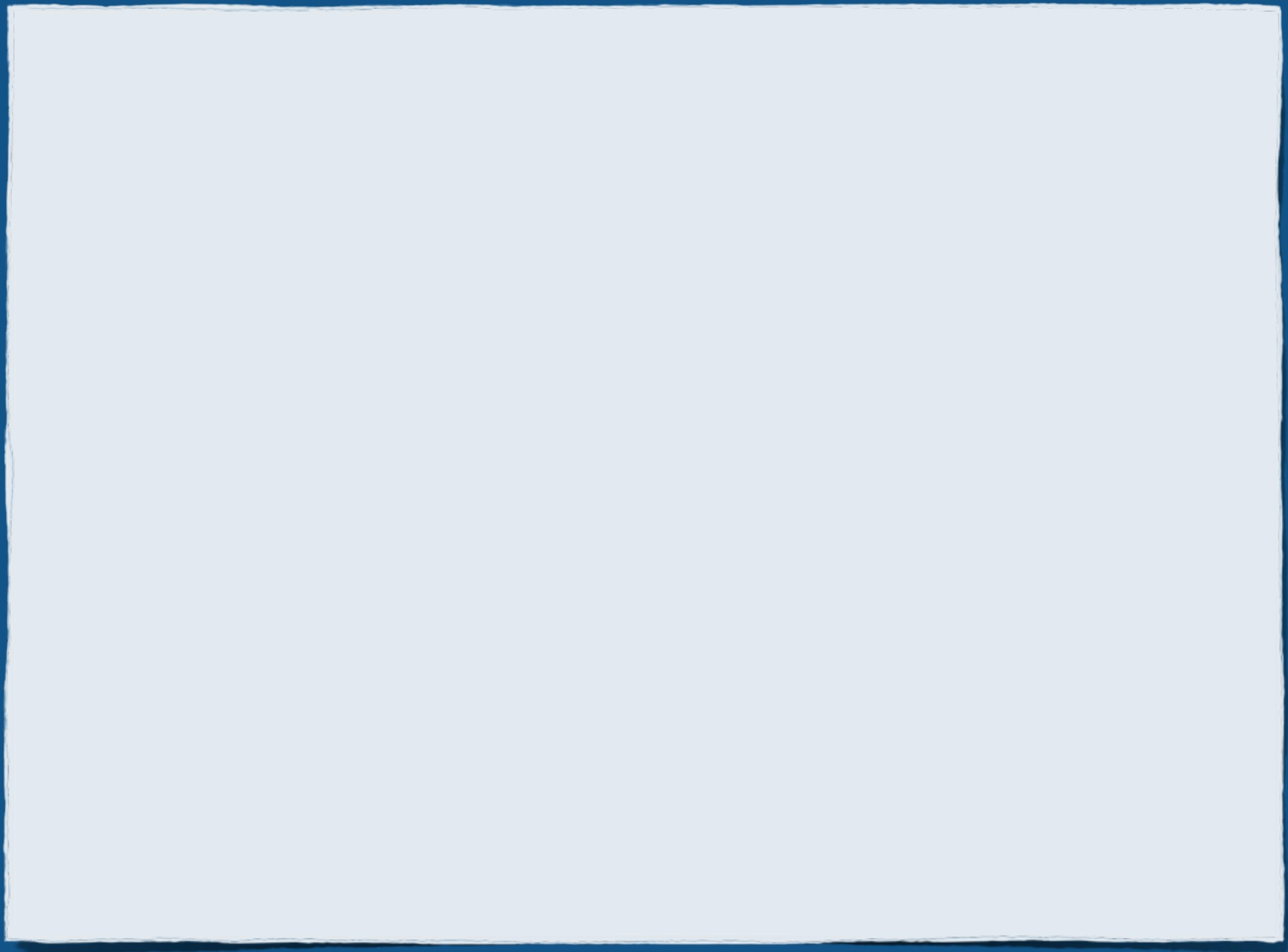


audreyt 本周程式碼產量: 負一萬七千行。 😎

2011-9-8 - 16:51

“Original **JavaScript**: 22k LOC.
Ported to **CoffeeScript**: 5k LOC.
{async, jsdom, zappa, optimist etc}++”

**Jeremy
Ashkenas**





```
{x,y} = @offset
```



```
{x,y} = @offset
```

```
var _ref = this.offset;
```



JavaScript



```
{x,y} = @offset
```

```
var _ref = this.offset;  
var x = _ref.x;
```



JavaScript



```
{x,y} = @offset
```

```
var _ref = this.offset;  
var x = _ref.x;  
var y = _ref.y;
```



JavaScript



```
{x,y} = @offset
```

```
var _ref = this.offset;  
var x = _ref.x;  
var y = _ref.y;
```



JavaScript

js2coffee.org





Wen-Tien Chang @ihower

4月12日

原來 JavaScript 也可以搞 Function Composition

seanhess.github.com/2012/02/20/fun... # 不過還是 Haskell 用起這招

最漂亮，一個 . 就是 compose 運算子 XD



Wen-Tien Chang @ihower

4月12日

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亦
未
可
知

唐鳳 @audreyt

@ihower (Function::° = (fun) -> (arg) => @ fun arg); (f = (x) -> x * 2); (g = (x) -> x * 3); h = f .° g; console.log h 10 # 60 #coffeescript



Wen-Tien Chang @ihower

原來 JavaScript 也可以搞 Function Composition

4月12日

Function::^o = (fun) ->



Wen-Tien Chang @ihower

4月12日

原來 JavaScript 也可以搞 Function Composition

Function::^o = (fun) ->
(arg) => @ fun arg



Wen-Tien Chang @ihower

4月12日

原來 JavaScript 也可以搞 Function Composition

Function::^o = (fun) ->
(arg) => @ fun arg

f = (x) => x * 2



Wen-Tien Chang @ihower

4月12日

原來 JavaScript 也可以搞 Function Composition

Function::^o = (fun) ->
(arg) => @ fun arg

f = (x) => x * 2

g = (x) => x * 3



Wen-Tien Chang @ihower

4月12日

原來 JavaScript 也可以搞 Function Composition

Function::^o = (fun) ->
(arg) => @ fun arg

f = (x) => x * 2

g = (x) => x * 3

h = f .^o g



Wen-Tien Chang @ihower

4月12日

原來 JavaScript 也可以搞 Function Composition

Function::^o = (fun) ->
(arg) => @ fun arg

f = (x) => x * 2

g = (x) => x * 3

h = f .^o g

h 100 # 600



Wen-Tien Chang @ihower

4月12日

原來 JavaScript 也可以搞 Function Composition

Function :: \circ = (fun) ->
(arg) => @ fun arg

f = (x) => x * 2

g = (x) => x * 3

h = f . \circ g

h 100 # 600



Zappa: Lazy Node.js

zappajs.org

Zappa: Lazy Node.js



Maurice
Machado

zappajs.org

Zappa: Lazy Node.js



Maurice
Machado

**“If you can describe it
in 495 characters,
why on earth should
it take 879?”**

zappajs.org

```
require('zappa') ->
  @view layout: ->
    html => body => @body

  @get '/': -> @render 'index'

  @view index: -> for name, value of {
    wiki: "Wiki to HTML"
    html: "HTML to Wiki"
  }
    form method: 'post', =>
      p => textarea {name}
      p => input {type: 'submit', value}
```

```
require('zappa') ->
  @view layout: ->
    html => body => @body

@get '/': -> @render 'index'

@view index: -> for name, value of {
  wiki: "Wiki to HTML"
  html: "HTML to Wiki"
}
  form method: 'post', =>
    p => textarea {name}
    p => input {type: 'submit', value}
```

Wiki to HTML

HTML to Wiki

```
@post '/': ->
  if @data.wiki?
    @send w2h @data.wiki
  else if @data.html?
    @send h2w @data.html
  else redirect '/'
```

```
form method: 'post', =>
  p => textarea {name}
  p => input {type: 'submit', value}
```

Wiki to HTML

HTML to Wiki

COSCUP, 2011



COSCUP, 2011

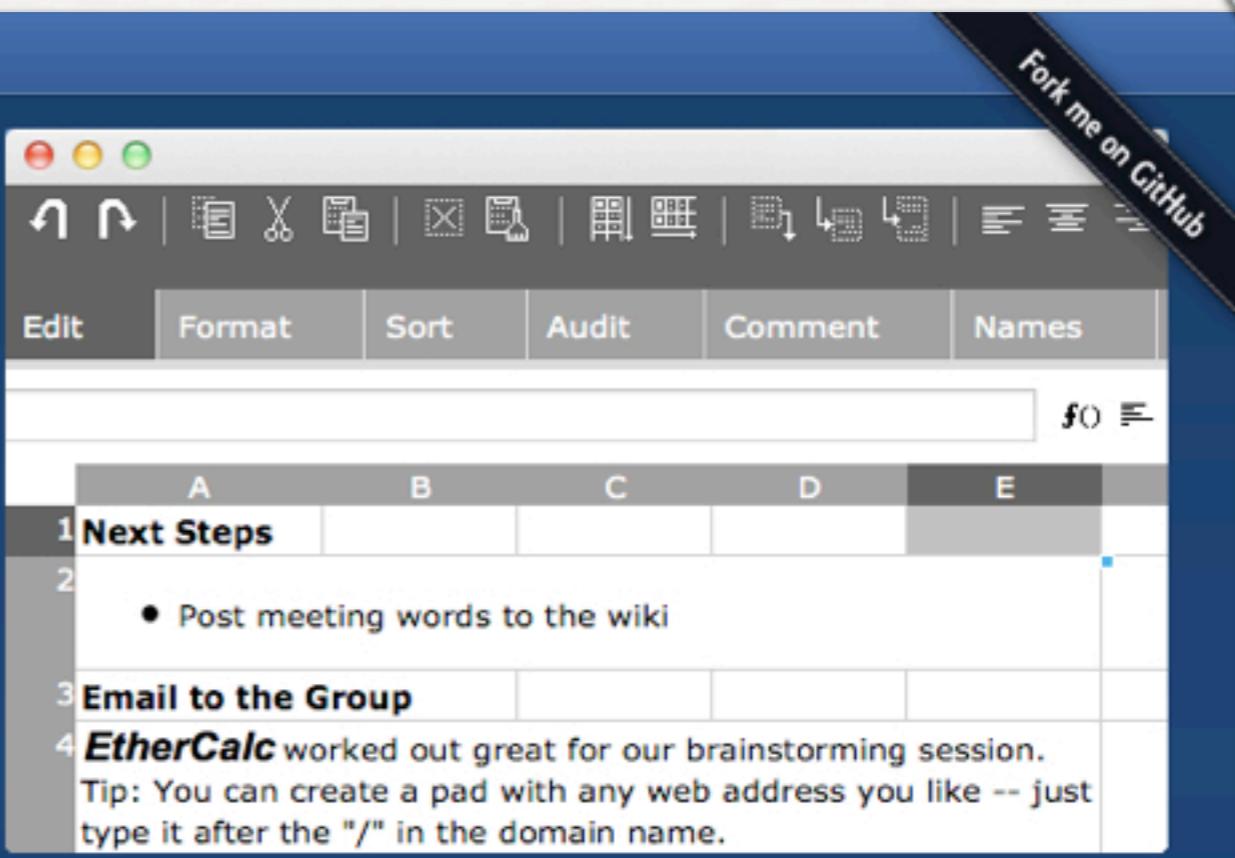


COSCUP, 2011



hack hack hack ...

COSCUP, 2011



The screenshot shows the EtherCalc interface. At the top, there's a toolbar with various icons. Below it is a menu bar with 'Edit', 'Format', 'Sort', 'Audit', 'Comment', and 'Names'. The main area is a grid with columns labeled A through E. Row 1 contains the text '1 Next Steps'. Row 2 contains a bulleted list: '• Post meeting words to the wiki'. Row 3 contains the text '3 Email to the Group'. Row 4 contains the text '4 EtherCalc worked out great for our brainstorming session.' followed by a tip: 'Tip: You can create a pad with any web address you like -- just type it after the "/" in the domain name.' In the top right corner of the interface, there's a diagonal banner with the text 'Fork me on GitHub'.

EtherCalc

EtherCalc is a web spreadsheet.

Your data is saved on the web, and people can edit the same document at the same time. Everybody's changes are instantly reflected on all screens.

Work together on inventories, survey forms, list management, brainstorming sessions and more!

Create Spreadsheet
No sign-up, start writing instantly

hack hack hack ...

EtherCalc Edit Flow

EtherCalc Edit Flow

main.coffee

sc.coffee

SocialCalc.js

db.coffee

redis.js

Socket.io

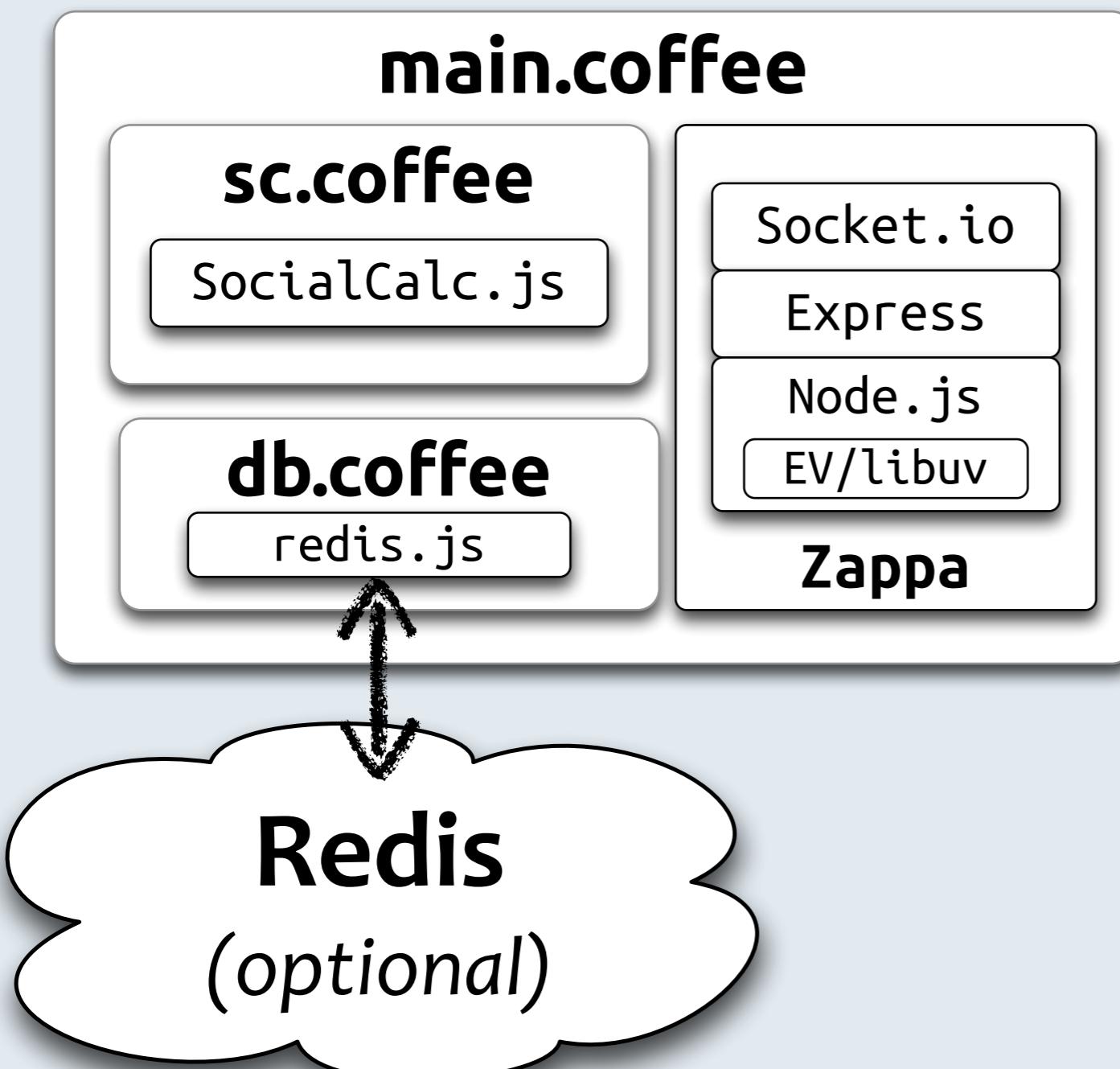
Express

Node.js

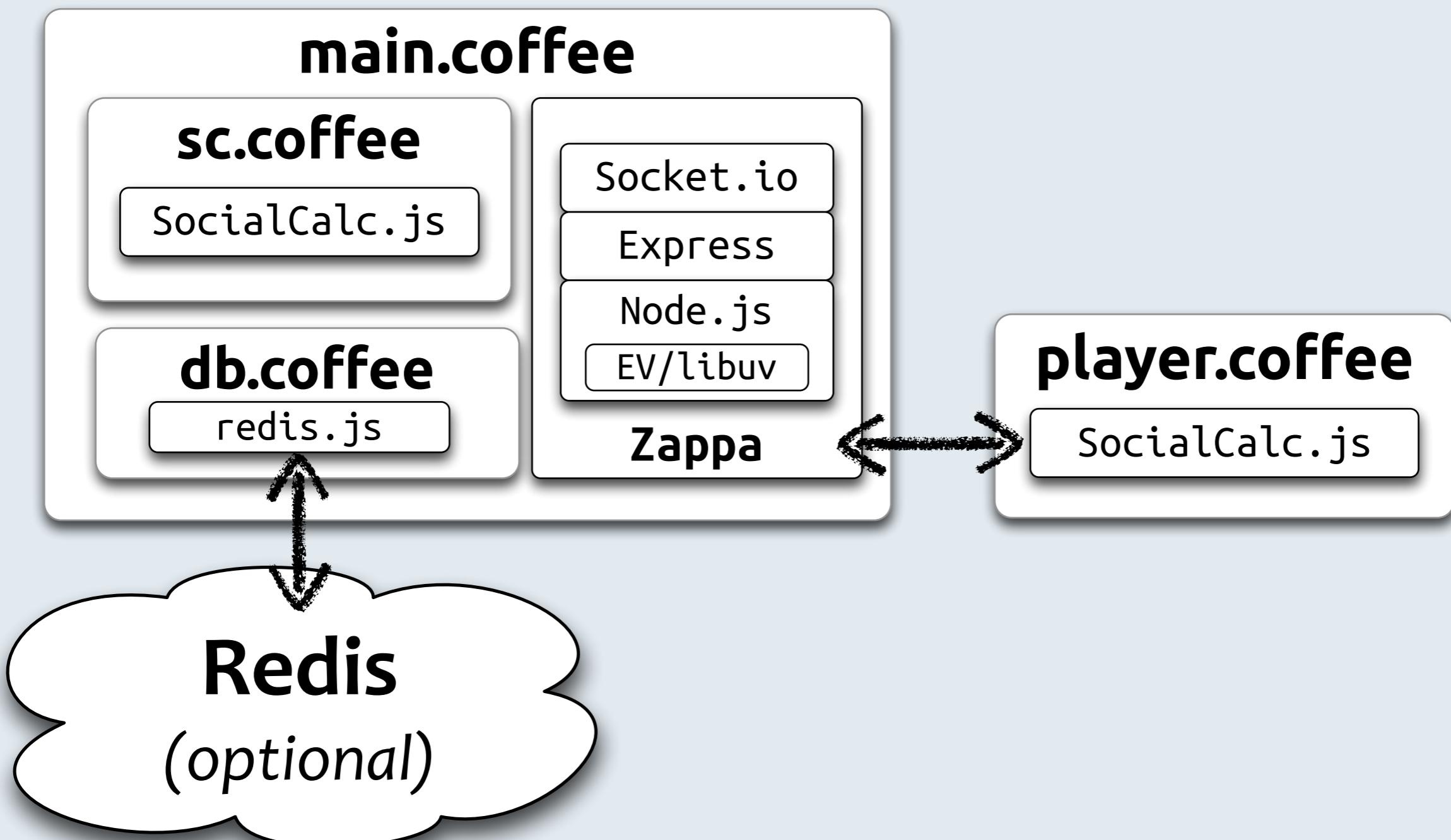
EV/libuv

Zappa

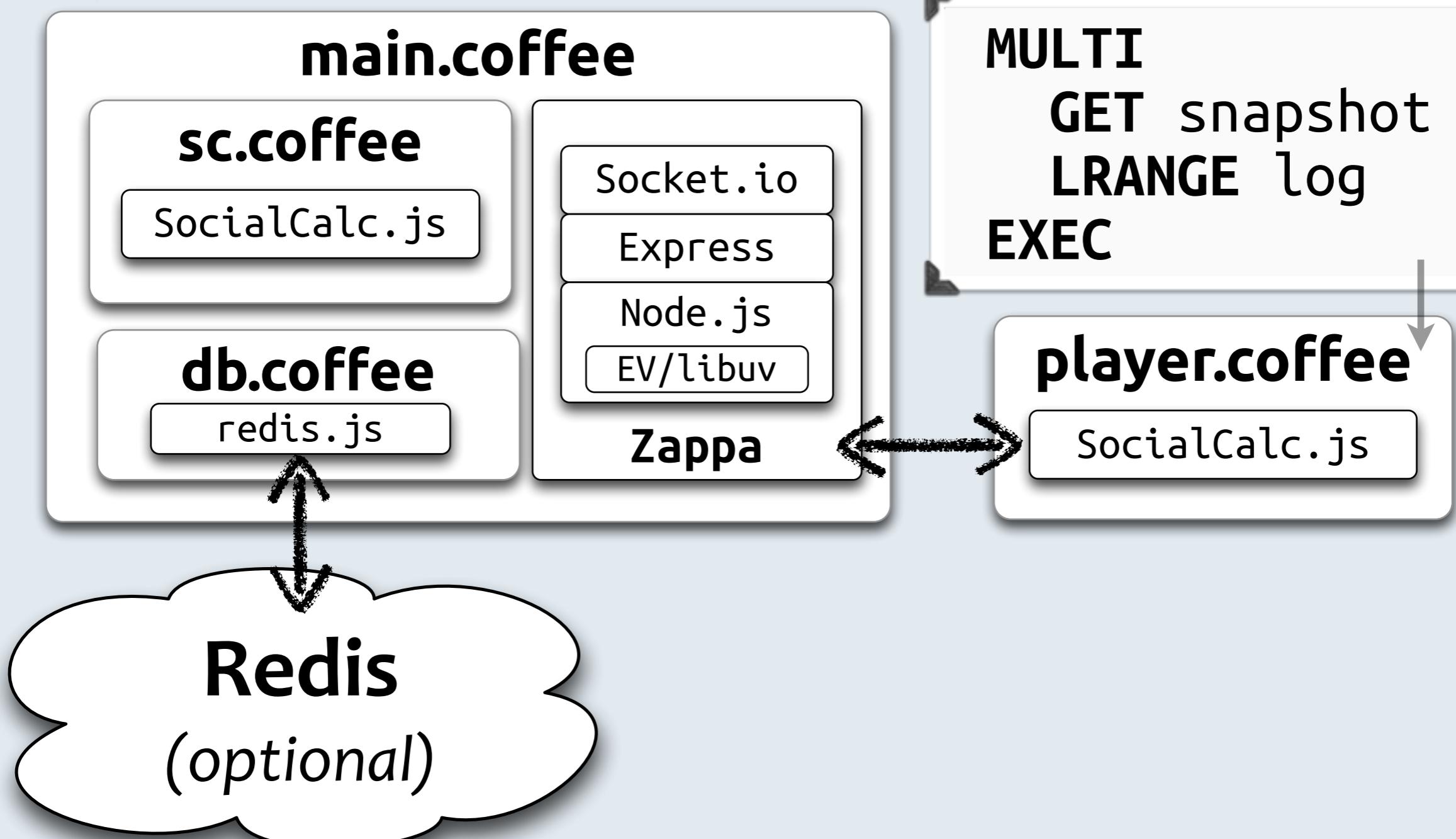
EtherCalc Edit Flow



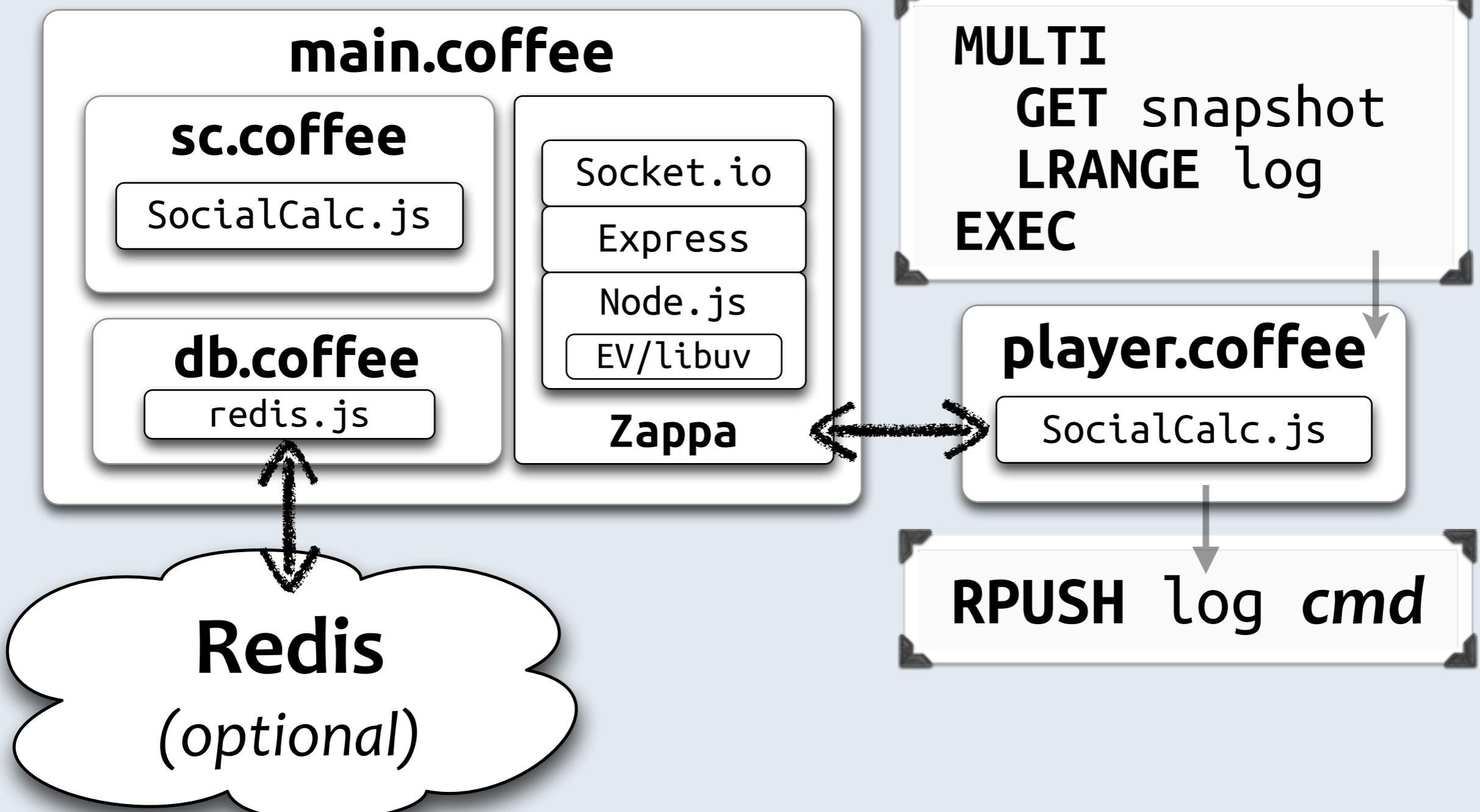
EtherCalc Edit Flow



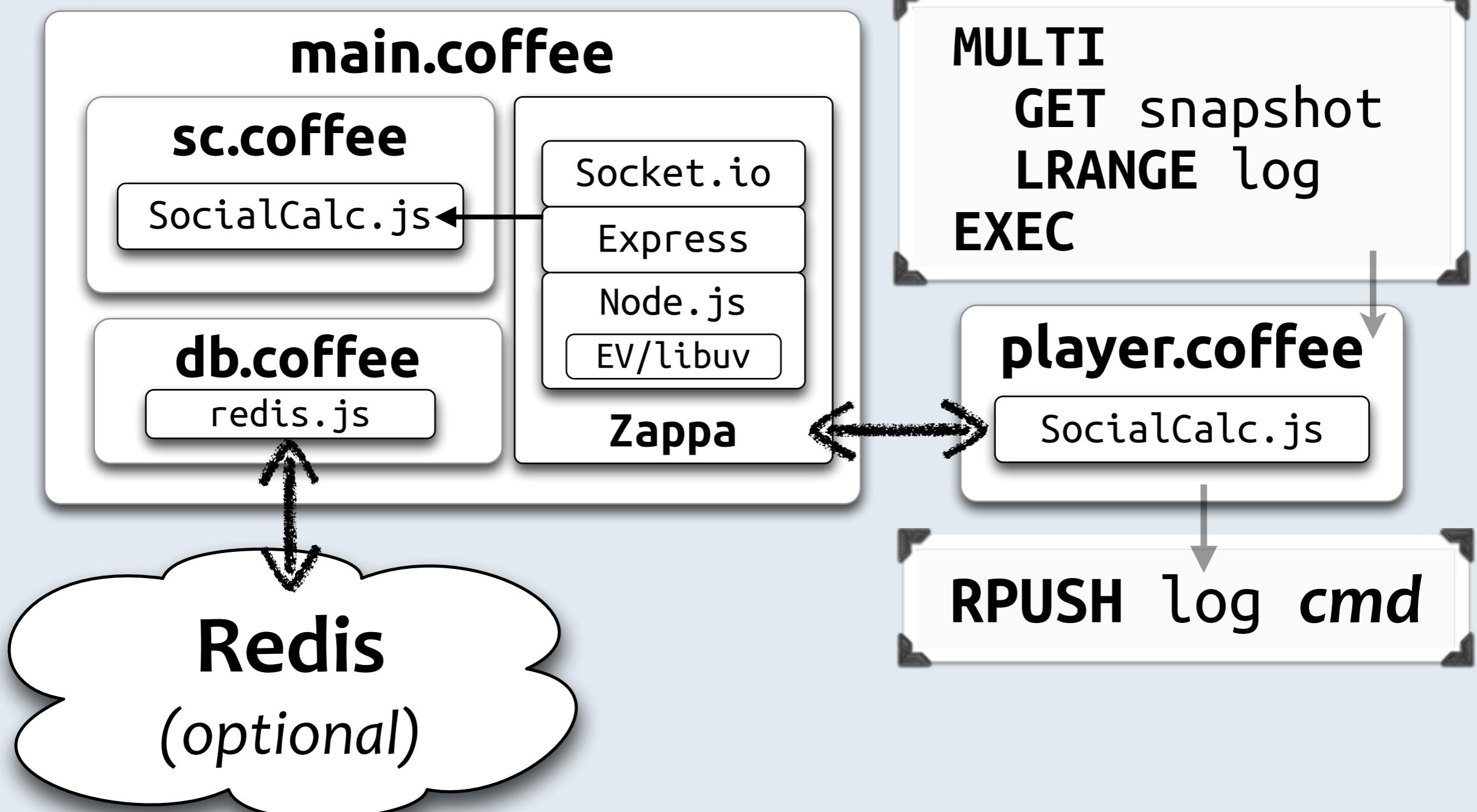
EtherCalc Edit Flow



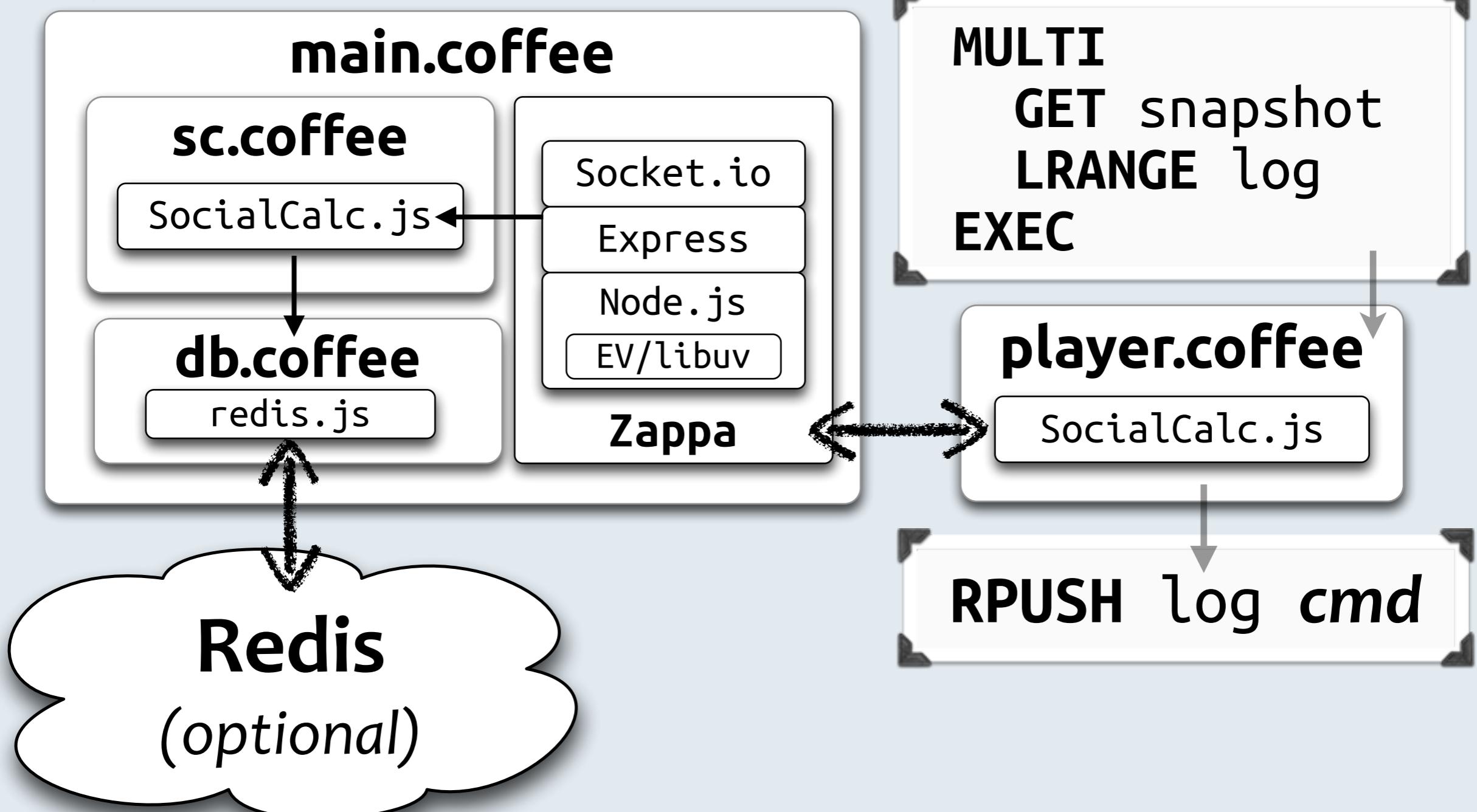
EtherCalc Edit Flow



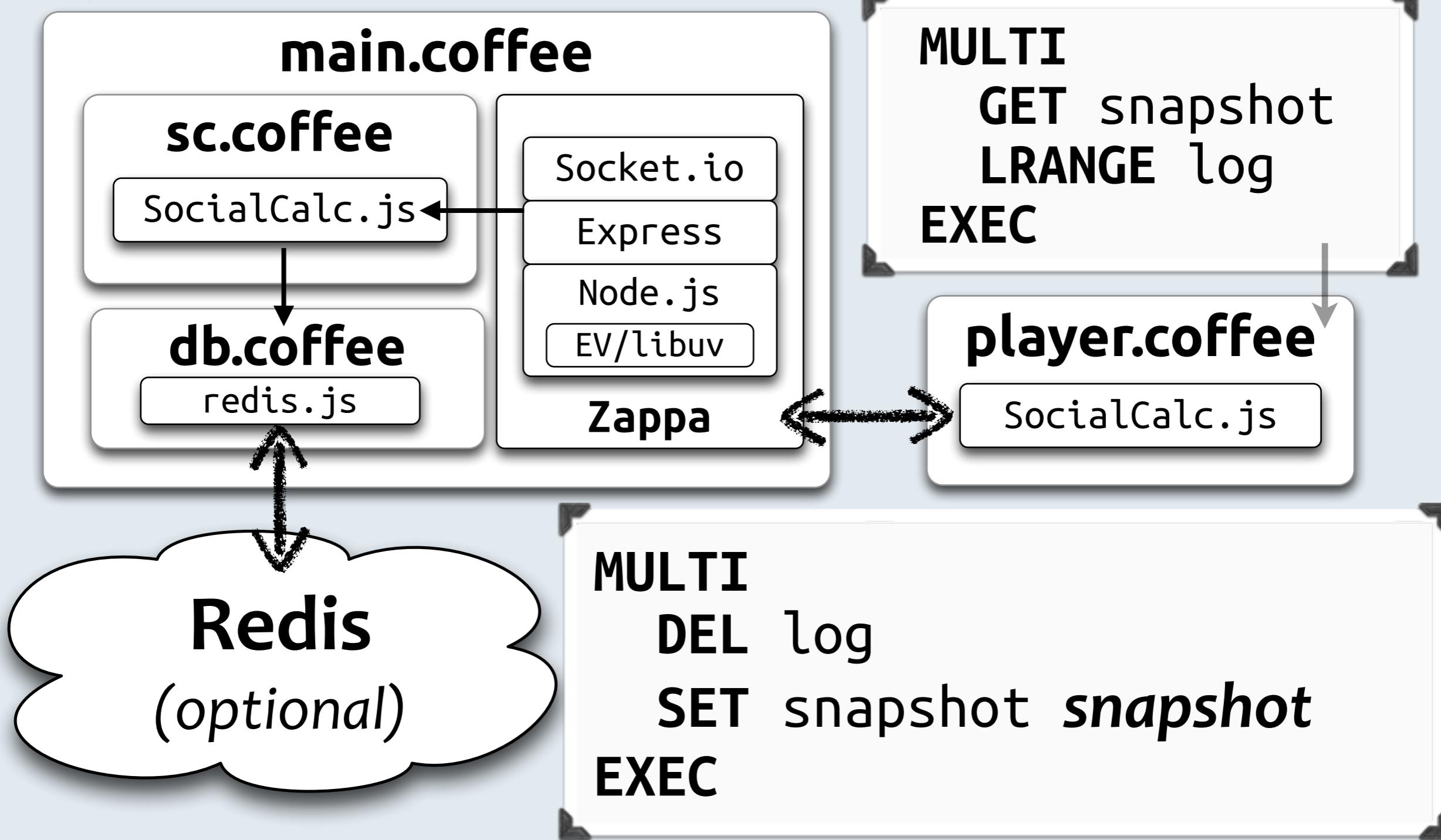
EtherCalc Edit Flow



EtherCalc Edit Flow



EtherCalc Edit Flow



Recalc Subscription

Recalc Subscription



Recalc Subscription



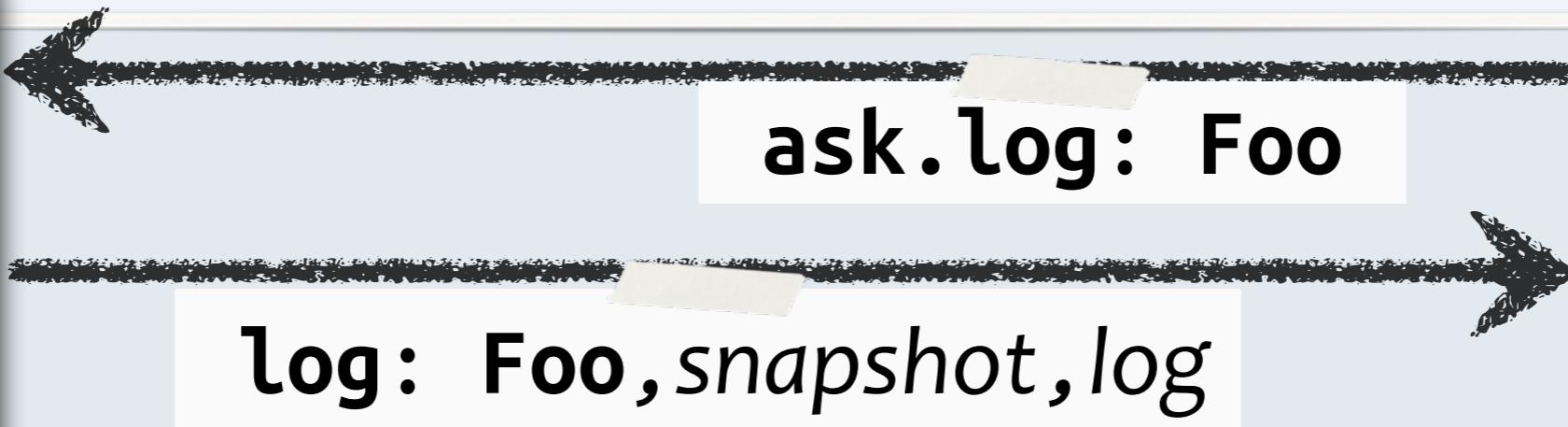
Recalc Subscription



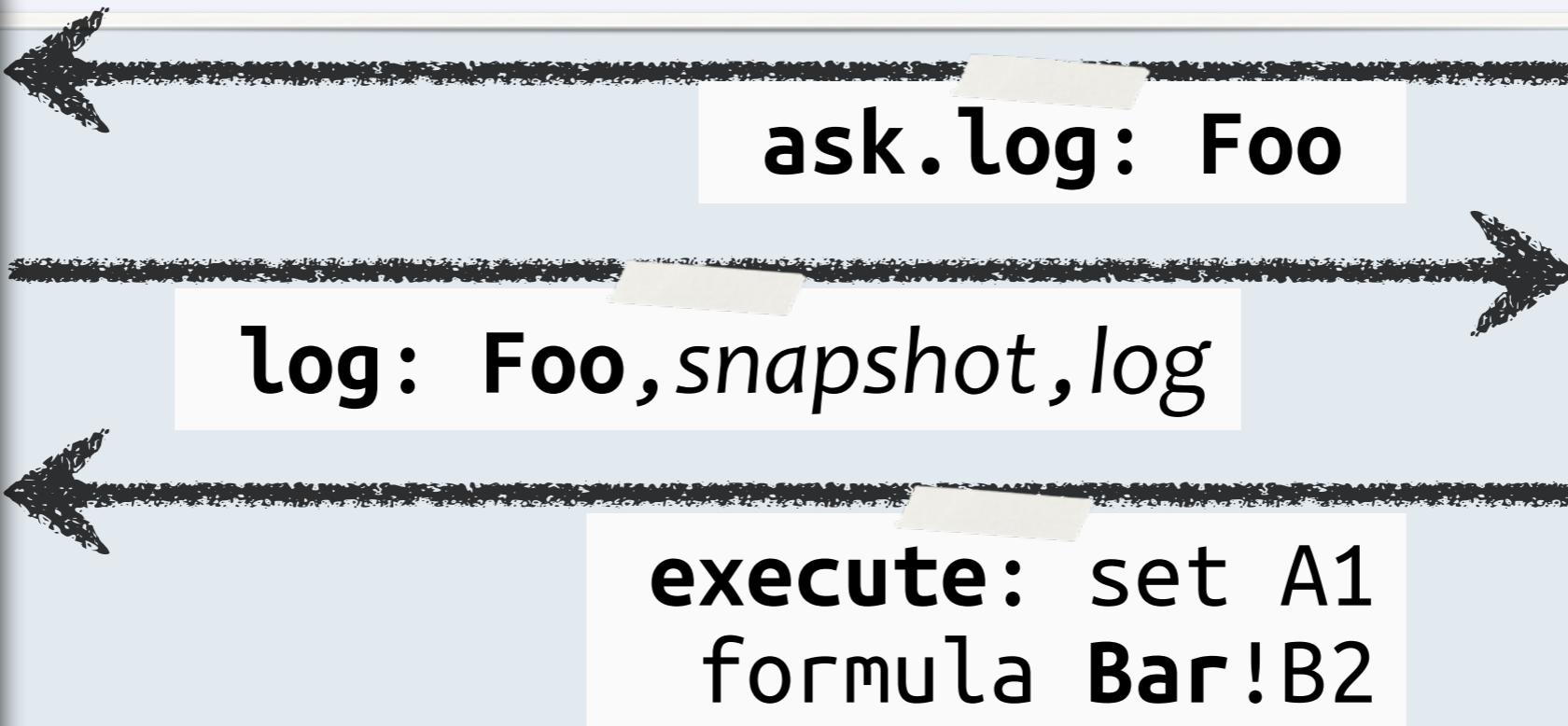
ask.log: Foo



Recalc Subscription



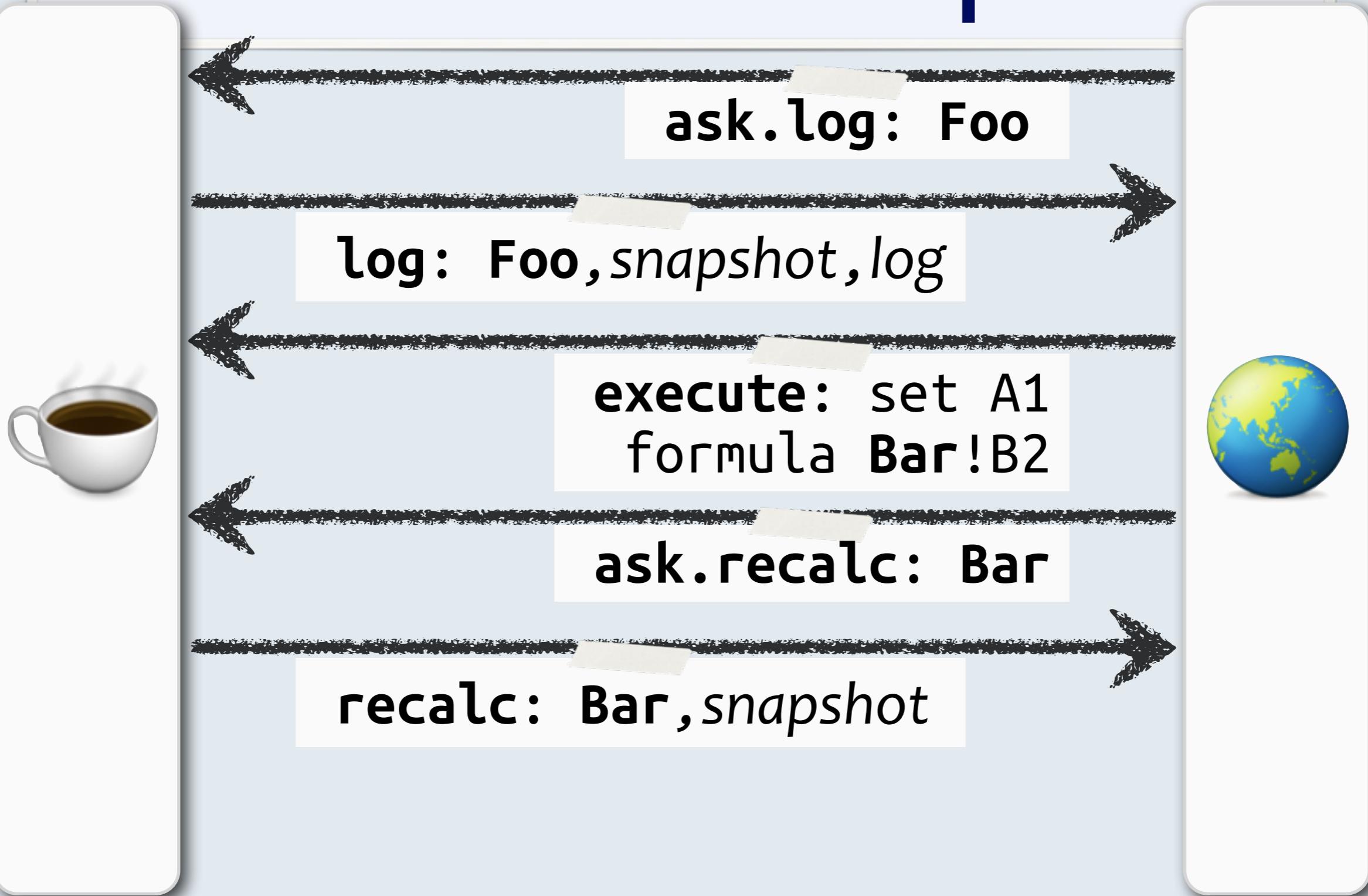
Recalc Subscription



Recalc Subscription



Recalc Subscription



Recalc Subscription



PaaS Deployment

PaaS Deployment



stackato.yml
app.js

PaaS Deployment



stackato.yml
app.js



dotcloud.yml
server.js

PaaS Deployment



`stackato.yml`
`app.js`



`dotcloud.yml`
`server.js`



`server.js`

REST Interface

REST Interface

GET */_/page*

PUT */_/page*

REST Interface

GET */_page*
PUT */_page*

POST */_page*
{command: [...]}

REST Interface

GET */_/page*

PUT */_/page*

POST */_/page*
{command: [...]}

GET */_/page/cells/A1*

PUT */_/page/cells/A1*

GET */_/page/names/range*

TODO, 2012



TODO, 2012

- ▶ Export/Import



TODO, 2012

- ▶ Export/Import
- ▶ Chat & Presence



TODO, 2012

- ▶ Export/Import
- ▶ Chat & Presence
- ▶ Socialtext Integration



TODO, 2012

- ▶ Export/Import
- ▶ Chat & Presence
- ▶ Socialtext Integration
- ▶ Drupal Integration

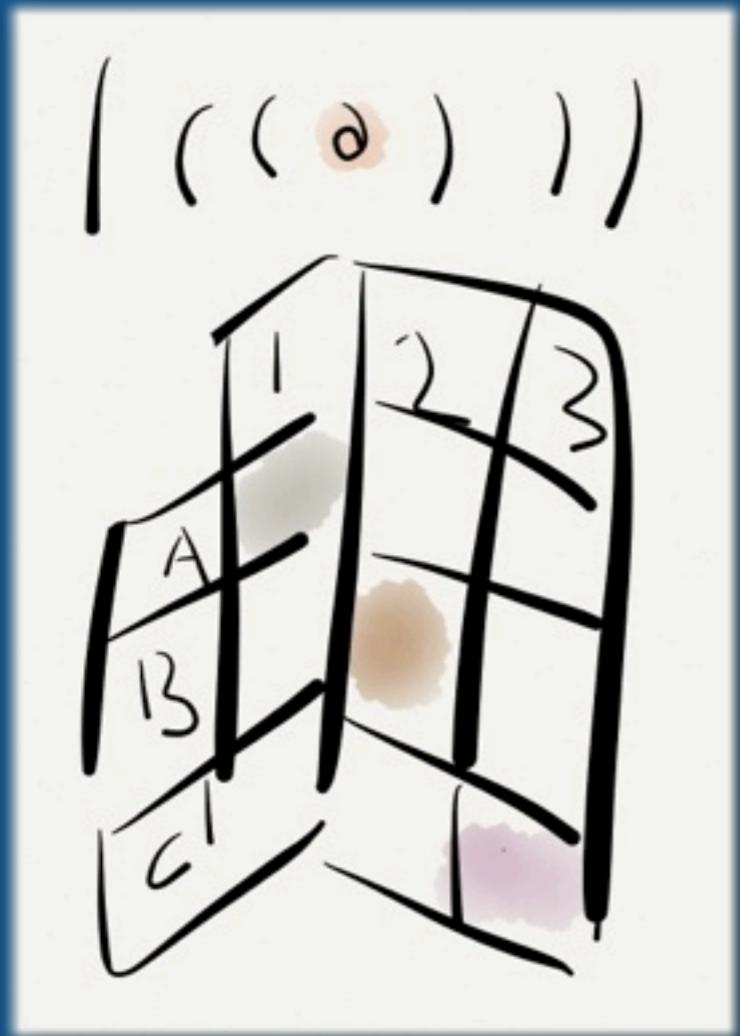


TODO, 2012

- ▶ Export/Import
- ▶ Chat & Presence
- ▶ Socialtext Integration
- ▶ Drupal Integration
- ▶ *Forks welcome!*



Thank you!

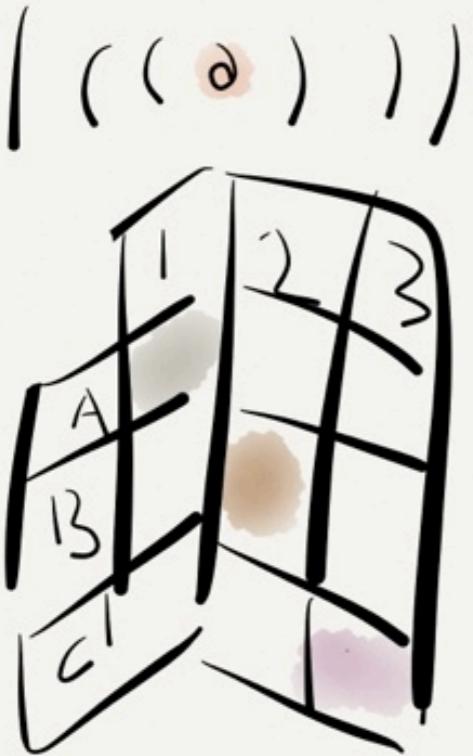


EtherCalc
Multiplayer
Spreadsheet

EtherCalc

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- Works under CC0 do **not** require attribution.

ethercalc.net



creativecommons