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Keynote: From group collaboration to large scale social collaboration

François Charoy

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From group collaboration to large scale social collaboration

François Charoy - @charoy
Inria/University of Lorraine

EQUIPE PROJET

Coast

CENTRE Inria

Nancy Grand Est

Coast Team

Inria/LORIA research team (15/20 people)

University of Lorraine

Research topic :

Web Scale trustworthy collaborative systems

teams.inria.fr/coast

@InriaLORIACoast



Inria NANCY
Grand Est

Outline

Origin and (fly over) state of art of Computer Supported
Collaboration

Large scale collaboration (does it exist ?)

Perspectives and research issues



Dimensions of collaboration

Two or more people working together toward a shared goal

Communication

Coordination

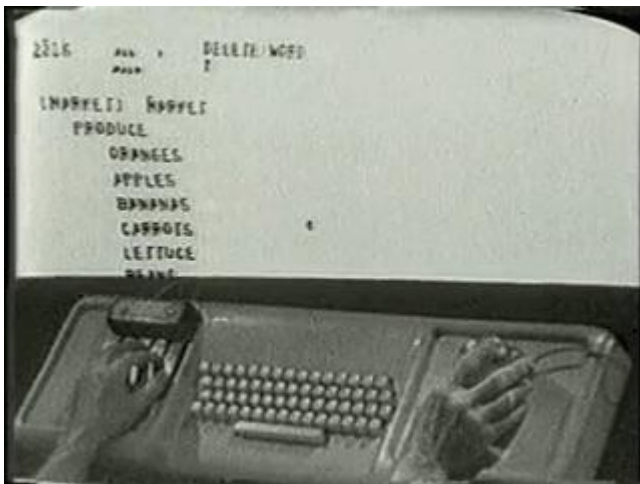
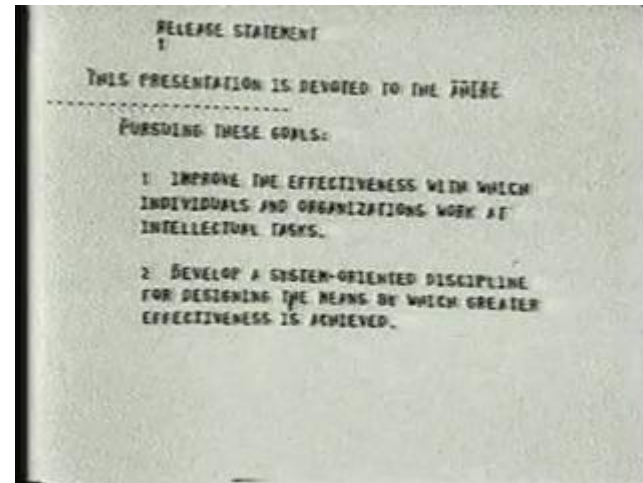
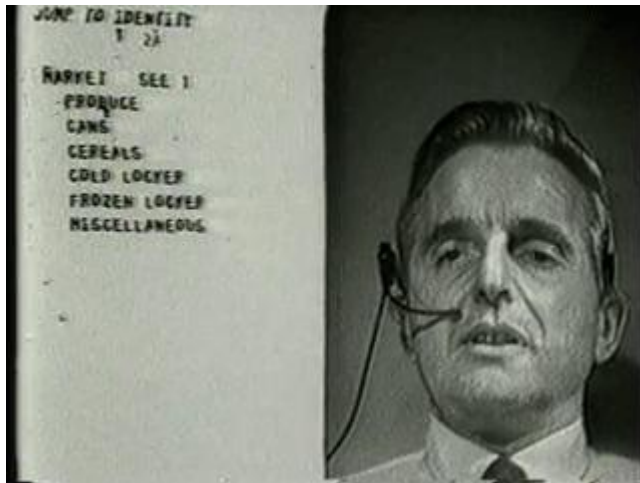
Sharing

Implicit vs Explicit Coordination

 **THE** 
PERSUADERS!



Mother of all demos – 12/9/1968 Doug Engelbart Augmentation Project



<http://theyear1968.tumblr.com/post/79620814201/on-december-9-1968-doug-engelbart-and-his-team>
<https://archive.org/details/doungengelbartarchives>

Clarence Ellis 5/1943 – 5/2014

- Pioneer in collaboration software and workflow systems

GROUPWARE
SOME ISSUES AND EXPERIENCES
C.A. Ellis, S.J. Gibbs, and G.L. Rein

Groupware reflects a change in emphasis from using the computer to solve problems to using the computer to facilitate human interaction. This article describes categories and examples of groupware and discusses some underlying research and development issues. GROVE, a novel group editor, is explained in some detail as a salient groupware example.

laboration of many specialists, including social scientists and computer scientists. CSCW looks at how

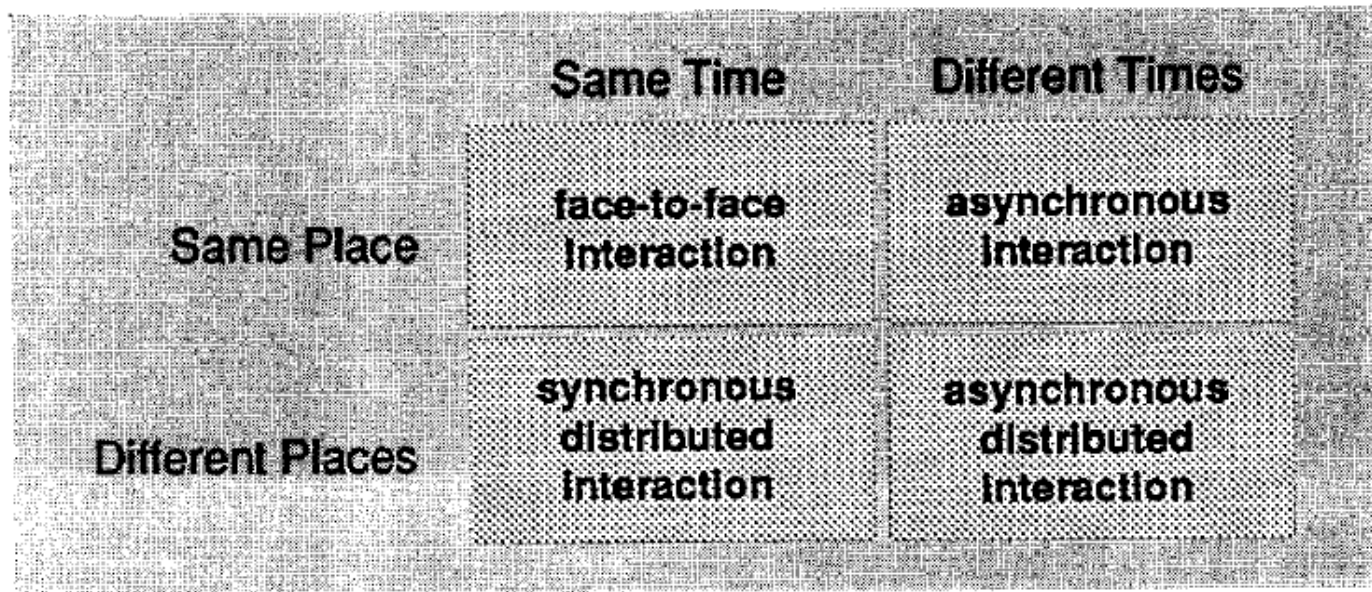
in this larger sense and delineates classes of design issues facing groupware developers. It is divided

**C.A. Ellis,
S.J. Gibbs, and
G.L. Rein**



COMMUNICATIONS OF THE ACM/January 1991/Vol.34, No.1

Taxonomy of Groupware



Office Automation (1979)

- SCOOP (Wharton and Sisman)
- OfficeTalk (Skip Ellis – Xerox Park)



File Index F1			
Memo		Dorothy Brown	
Blank Stock Index	ter	Larry Blue	
Dues		Edward Black	
Personal Letter		ACM	
		Joe Rainbow	

Out-basket			
Trace	Recipient	Subject	Sent
	John Green	Vacation Request	6/05/79

In-basket			
Trace	Sender	Subject	Received
	Dorothy Brown	Production Schedule	6/10/79
	John Green	Vacation Time	6/10/79
	Alice White	Budgets	6/11/79
	Edward Black	Salary Adjustment	6/11/79

Receive	Print	Copy	File	Send
---------	-------	------	------	------

International Widgets, Inc.
123 Color Way
Emerald City, CA 94304

TO: Oliver Rainbow DATE: 6/11/79

FROM: Edward Black

SUBJECT: Salary Adjustment

I have carefully reviewed your personnel folder and your progress

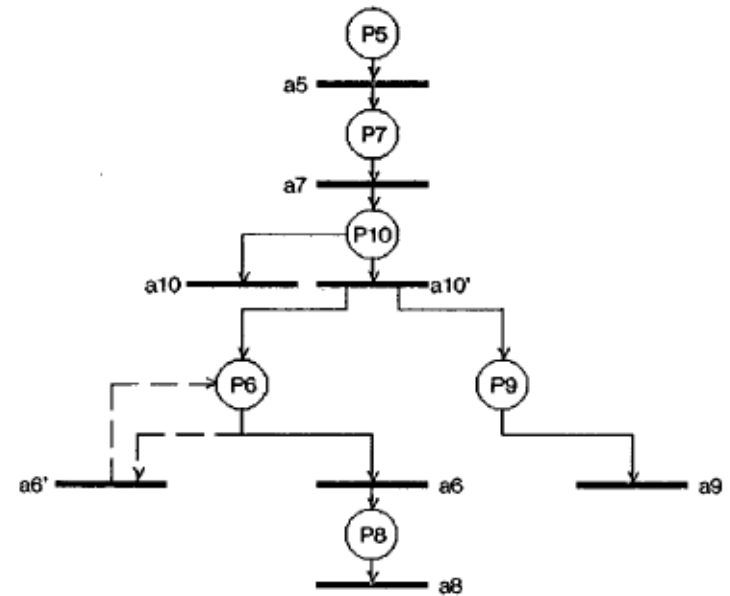
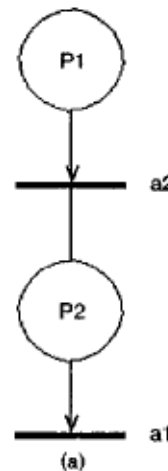


FIGURE 2. (a) Receptionist agent; (b) order administrator agent.

Challenges at the time

Office Information Systems and Computer Science

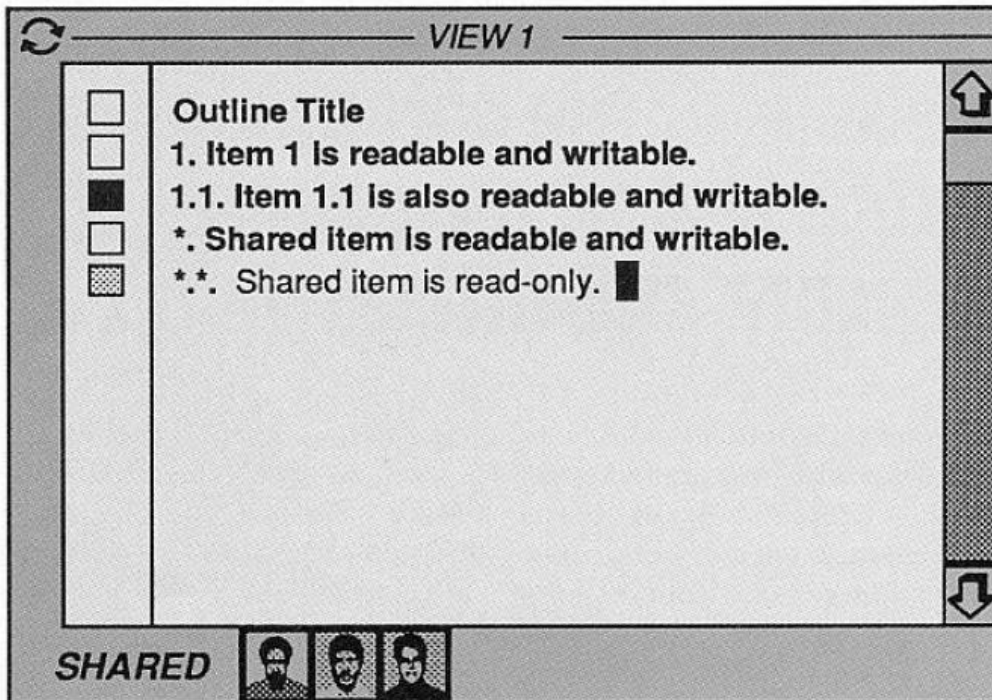
Clarence A. Ellis and Gary J. Nutt

- A programming language that can be **used by a Clerical worker**
- Software engineering – **modeling and validation**
- Operating Systems and database – distribution of data, **consistency and security**
- Measurement and Evaluation
- Communication - teleconferencing
- Other area – psychology, social implications

Collaborative Editor



- GROVE Group Editor



users ask “Isn’t it chaotic to all edit in the same document, even the same paragraph, at the same time?” and “Why would a group ever want to edit in the same line of text at the same time?” Indeed, this editor is at

Design issues (at the time)

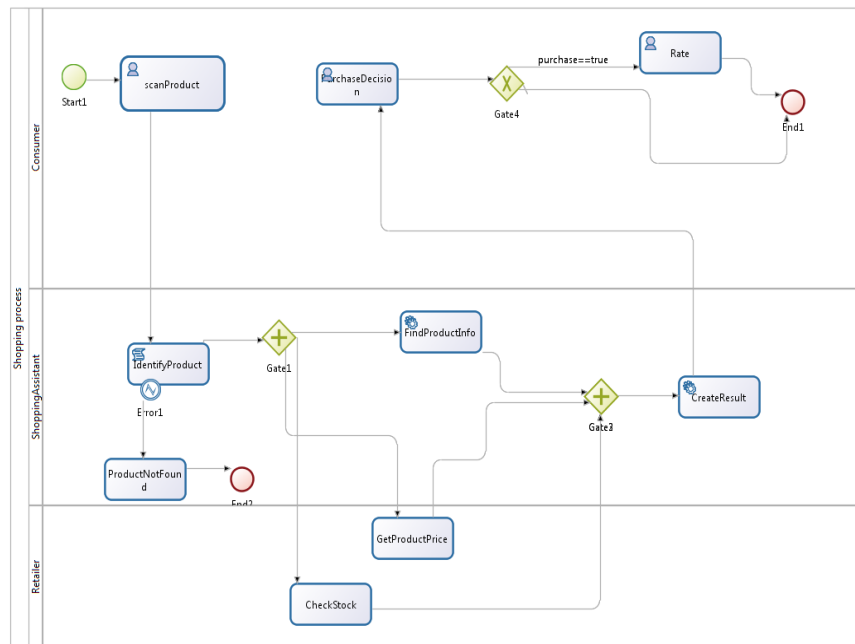
- WYSIWIS (What you see is what I see)
 - Relaxed vs strict
- Group Processes (Organising the collaboration)
- Concurrency Control (Optimist vs Pessimistic)
- Over issues



BPM systems



- Model and automate office processes
- Integrate Information Systems



Collaborative BPM

Social BPM

Support collaboration between people and organisations

More flexible/supports change

Allow more interactions between participant

Support for inter organisational process



BonitaBPM V6 (2015)



The screenshot displays the Bonita Studio interface for a process named "Buy a MINI (3.2)". The main workspace shows a BPMN diagram with the following elements:

- Start1**: A green circle representing the process start.
- Model choice**: A task icon (person) that leads to "Color selection".
- Color selection**: A task icon (person) that leads to "Accessories".
- Accessories**: A task icon (person) that leads to "Availability check".
- Availability check**: A task icon (gear) that leads to "Availability info".
- Availability info**: A task icon (person) that leads to a decision diamond.
- Decision Diamond**: A yellow diamond with an 'X' that branches based on "Mini available" and "Test drive".
- Mini available**: A path leading to "Payment options".
- Payment options**: A task icon (person) that leads to "Order".
- Order**: A task icon (gear) that leads to "Recap".
- Recap**: A task icon (person) that leads to "Order finished" (a red circle).
- Test drive**: A task icon (person) that leads to a decision diamond.
- Test Drive Decision**: A diamond that branches based on "Ready to order" and "Not ready to order".
- Ready to order**: A path leading to "Payment options".
- Not ready to order**: A path leading to "Order cancelled" (a red circle).
- Mini not available**: A path from the "Availability info" decision diamond back to "Model choice".

The bottom panel shows the configuration for "Buy a MINI":

- General**: Name: Buy a MINI (Buy_a_MINI), Edit...
- UserXP**: Version: 3.2
- Data**: Description: Design and order your car
- Actor Selectors**: (Empty)
- Connectors**: (Empty)
- BAM**: (Empty)
- Dependencies**: (Empty)

Inter organisational processes



The view-based approach to dynamic inter-organizational workflow cooperation

Issam Chebbi ^a, Schahram Dustdar ^{b,*}, Samir Tata ^a

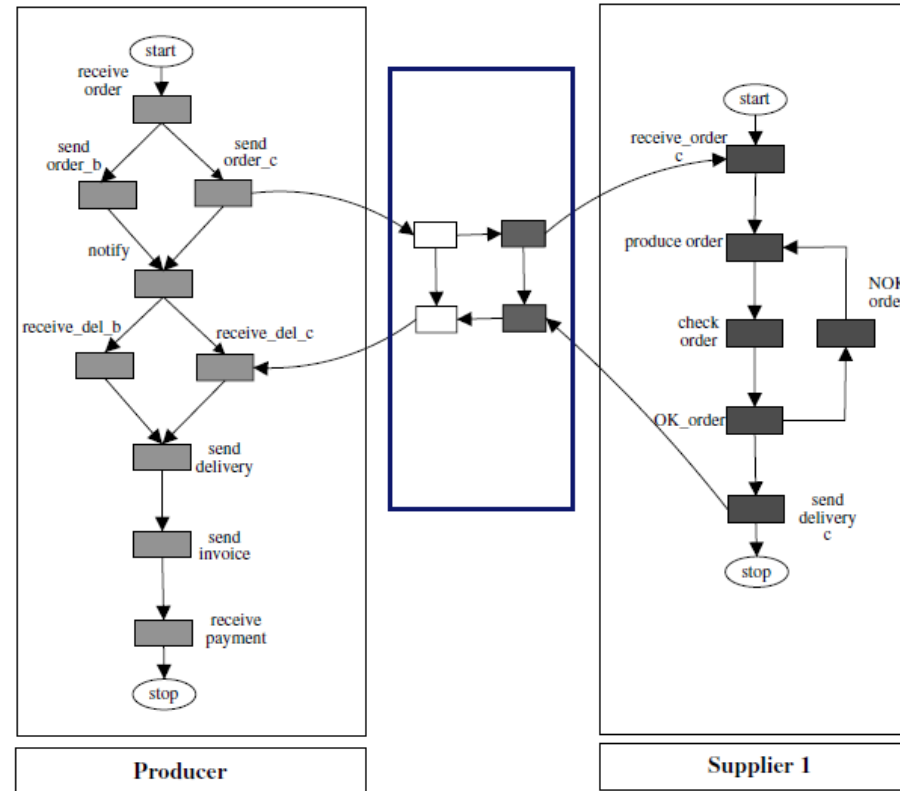


Fig. 4. Public vs. internal processes.

Coordination tool



The screenshot shows a Trello board for the 'AtomicOpenShift Roadmap'. The board is organized into columns representing different stages of completion: 'Epic Backlog', 'Done (3.2)', 'Done (3.1)', 'Done (3.0)', and 'Done (2.x)'. Each card in the 'Done' columns includes a title, a description, and a progress indicator (a green checkmark with a number). For example, in the 'Done (3.2)' column, the first card is 'Seamless Developer Experience on OpenShift (seamless-devexp)' with a progress of 6/6. The 'Epic Backlog' column contains cards like 'Integrated CI / CD Workflows to Enable DevOps (ci-cd-workflows)' and 'Mobile Services (mobile)'. On the right side, there is a 'Menu' panel showing a grid of member avatars and a list of recent activity, including moves of cards between columns and removal of future scenarios.

Trello used by OpenShift

Data sharing and collaborative editing

- Version and Distributed version control Systems
- Wiki
- Synchronous collaborative editors
- File Sharing

Version Control Systems and File sharing



- CVS, SVN, Git, ...



OneDrive
for Business



Google Drive for Work



amazon WorkDocs



Dropbox

Workspace Awareness



- What are the other doing

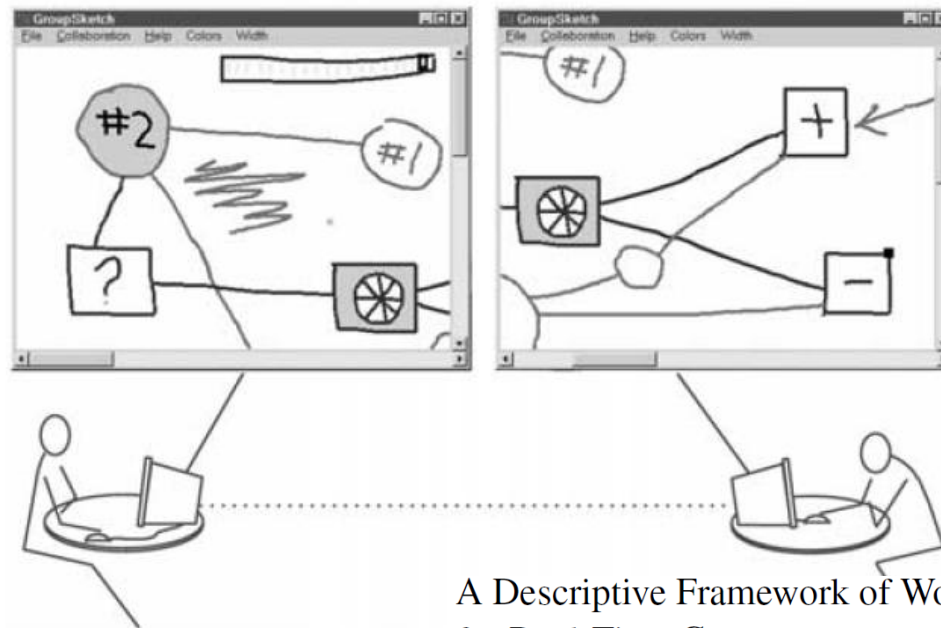


Figure 1. GroupSketchpad, a rel

A Descriptive Framework of Workspace Awareness
for Real-Time Groupware

CARL GUTWIN¹ & SAUL GREENBERG²

Example : the Radar view



- Where are the other – what are they doing

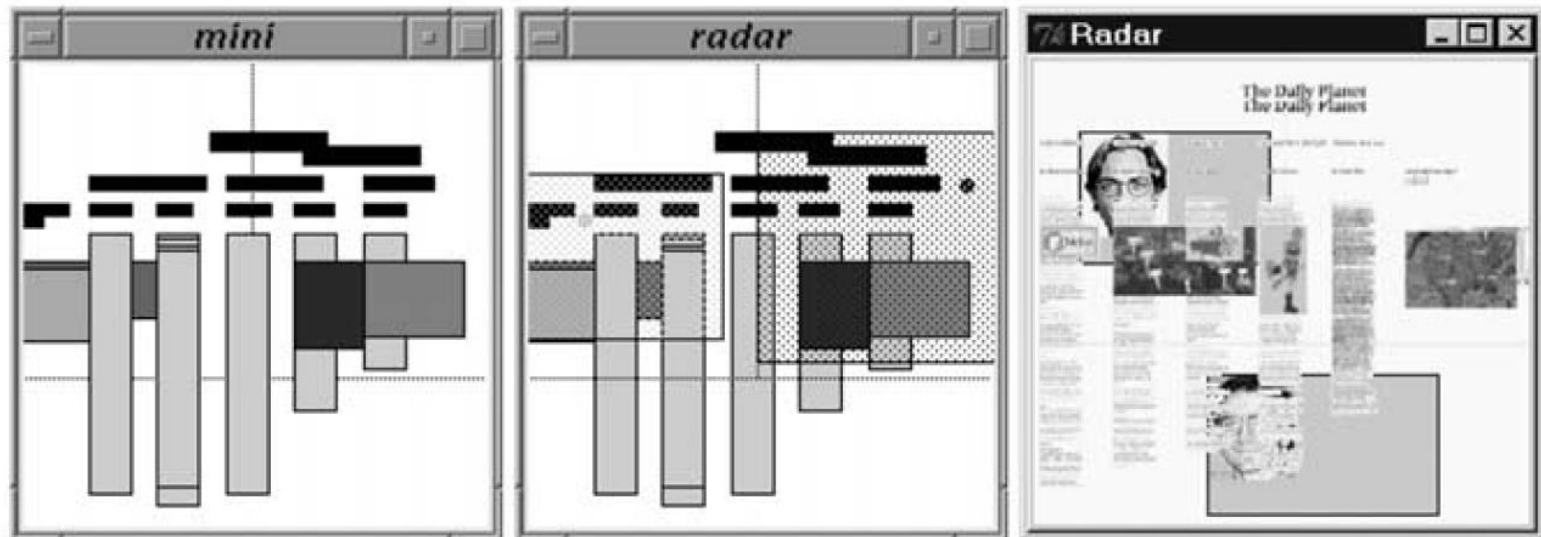


Figure 4. Three versions of the GroupKit radar view. Version 4a shows object movement only; 4b adds location information by showing each person's main view as a shaded rectangle; 4c adds photographs for participant identification.

Real time collaborative editing



Maintaining replicas in real time

Ensure eventual consistency

Take care of user intention

Google Doc/EtherPad

Writing workshop on Framapad

Hébergé par Bearstech Framapad (limites) Plein écran

poieo 4.8 Administration

01 26 2015 18 55:43

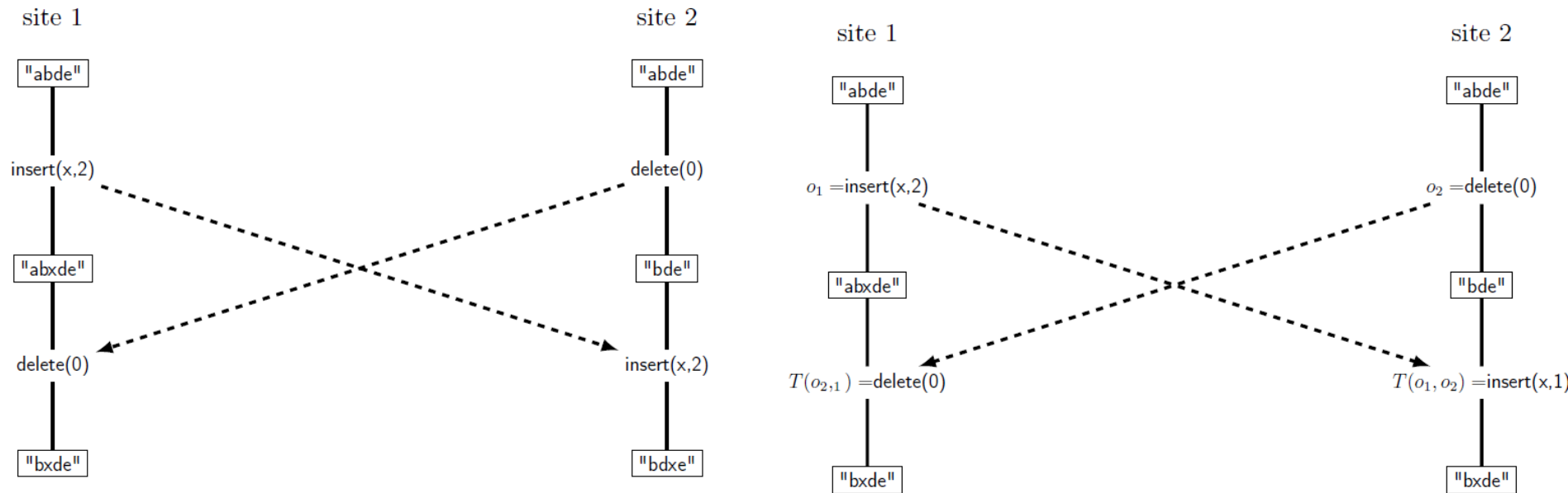
poieo 4.8 Version 646 Saved Jan 26, 2015

Où Est-ce que la Loire-Atlantique fait partie de la Bretagne ?
Au même endroit mais de l'autre côté de la route les premières lunettes 3D en carton vieux stylo cassé utilisée comme carabine
Panneau zone 30
Zone 70 (encore)
En arrivant au STOP, à ma droite le panneau de publicité « Auberge de La Coudre » avec le numéro
Je marche, c'est chiant, et je ne suis pas prête d'arriver ! 20 minutes à pied. Ou plus !
Il était une fois la pièce du puzzle qui réussit à réunir la France, petit pays d'Europe. Etrange paradoxe.
Un bar au coin de cette rue, un autre au bout de celle-ci. Une église au bout de cette rue, une autre au bout de celle-ci. Des touristes, des touristes, des touristes, brandissant leurs appareils photos.
J'habite dans une maison d'un quartier d'une petite ville, la ville est une cuvette. Ce pays de vaches !
J'habite une autre maison qui paraît très petite, une maison qui bouge toujours avec moi.
Tous voqués mais finissant comme des « moutons ».
Je suis un élément. Un élément d'une liste très organisée. Et puis si on cherche un peu, on tombe aussi sur des blogs de pâtisseries et de mode.
Une réussite sociale à première vue. Céline Dion.
Un numéro quelconque, numéro 4.
Et si on cherche un peu, il n'y a pas tant de personnes qui sont connues (Edgar Allan Poe, Quentin Tarantino, Roger Federer, Tim Burton).
Puis je descends par la cour du collège pour enfin arriver dans la cour du lycée. C'est alors que j'ai sombré.
Que l'oubli m'a englouti. Je me suis noyée. Je devais avoir 10 ans. Je devais avoir 10 ans. Je devais avoir 10 ans. c'était sans doute en 2006.
Je me souviens avoir eu mon premier ordinateur en CM1 ou en CM2, gros écran et centrale, ordinateur beige mais pas du moment où l'on a du le jeter sûrement pendant ma ferme.
Brusque changement de direction. D753 et tout d'un coup c'est beaucoup plus plat.
Peu important les noms, peu important les personnages, car elle est chacun d'eux.
Peu importe l'auteur, car seul importe son œuvre.
C'est quoi un rêve ?
Rêver c'est important plus important que d'attendre le métro.
Il y a Carnac en Bretagne, avec sa plage et sa nature. Il y a Nairobi au Kenya, avec ses parcs et ses grandes étendues solitaires. Il y a Bombay, en Inde, et sa culture magique. Il y a le Machu Picchu, et ses montagnes splendides. Il y a Palerme en Sicile, et son histoire passionnante.
Bonjour, dégustation de melon. Et pâtisseries. Choses qui ont une grâce raffinée. C'est comme les bigorneaux !!!
Sur place ou à emporter ?
C'est une affaire sérieuse, ça vous suit toute une vie. Mais quel rapport avec les questions précédentes ? Plein de mystères.
STOP !! N'importe quoi. Je vais pas manger ça. C'est pas la saison.

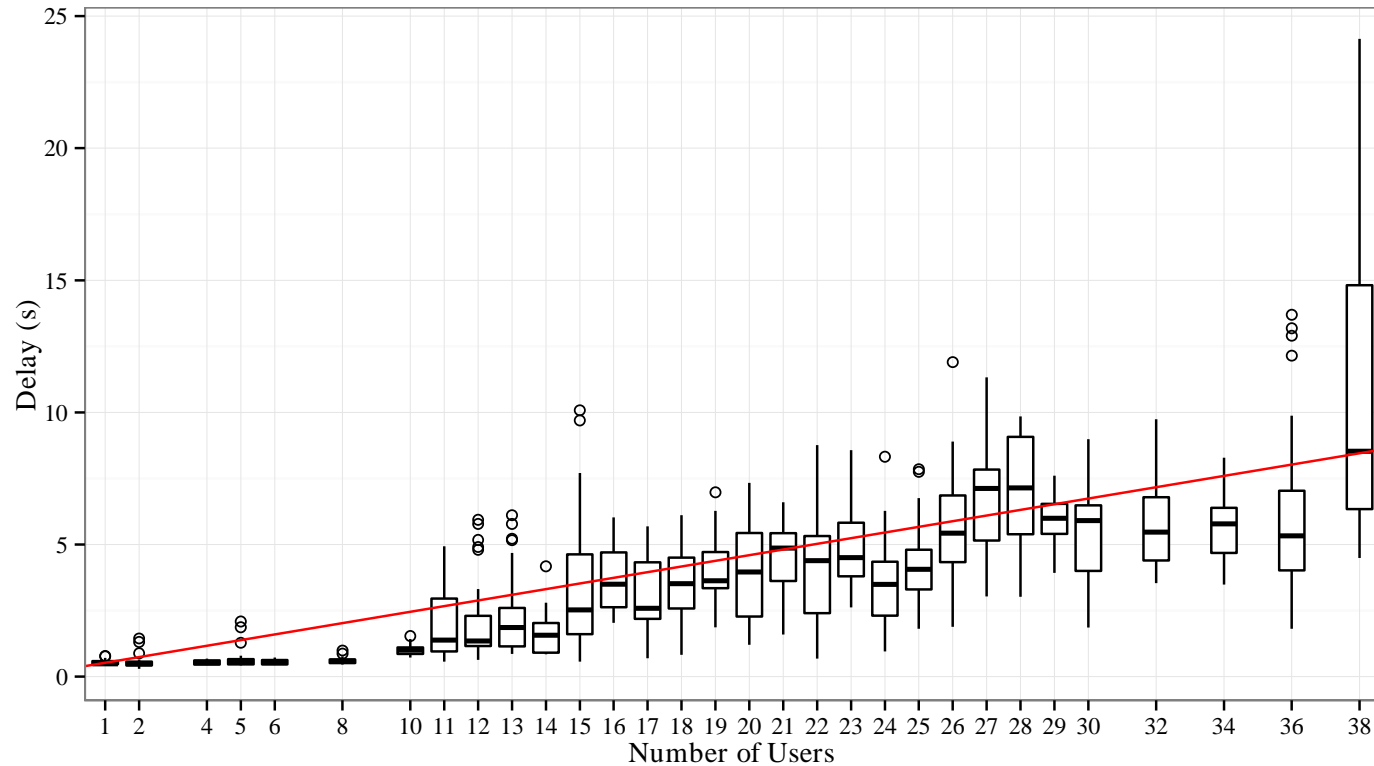
<https://vimeo.com/117890611>

Operational Transformation

Enforce eventual consistency



Delays in GoogleDocs



Typing speed:
2 chars/sec

Conflicts management



How to avoid them when the number of users grows

1 40 ans d'interaction homme-machine : points de repère et perspectives
2 Depuis qu'il existe les ordinateurs, la question de l'interface avec les utilisateurs s'est posée. En quarante ans, l'interaction homme-machine (IHM) a permis de rendre l'informatique accessible à un plus grand nombre, d'une façon que nul ne pouvait prédire. Que serait le visage de l'informatique aujourd'hui sans les interfaces graphiques ?
3



pouvais



interfasses

1 40 ans d'interaction homme-machine : points de repère et perspectives
2 Depuis qu'il existe les ordinateurs, la question de l'interface avec les utilisateurs s'est posée. En quarante ans, l'interaction homme-machine (IHM) a permis de rendre l'informatique accessible à un plus grand nombre, d'une façon que nul ne pouvait prédire. Que serait le visage de l'informatique aujourd'hui sans les interfaces graphiques ?



pouvaitt



interfacces

What about today's topic



About Large SCALE

- Hundreds or thousands of people
 - Crowds, communities, social networks
- Hundreds of organisations
- Thousands of services

Large scale collaborative editing

users ask “Isn’t it chaotic to all edit in the same document, even the same paragraph, at the same time?” and “Why would a group ever want to edit in the same line of text at the same time?” Indeed, this editor is at

Real Time Wikipedia

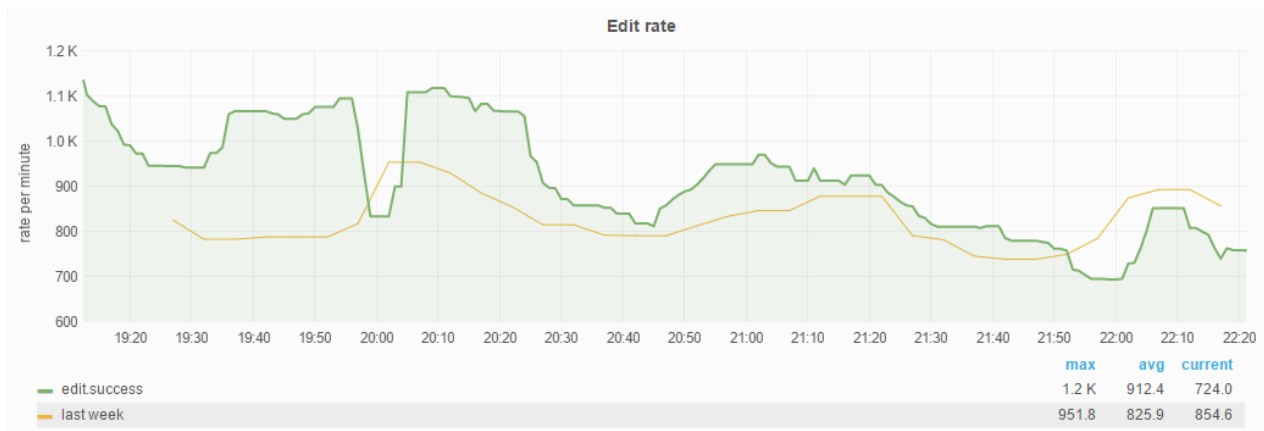


The image shows a screenshot of the Wikipedia revision history page for "Boston Marathon bombings". The page title is "Boston Marathon bombings: Revision history" and it includes a search bar and navigation options. The main content is a list of revisions, each with a timestamp, the user name, and a brief description of the change. The revisions are listed in descending order of time, starting from 10:11 on April 15, 2013, down to 10:27 on April 15, 2013. The list includes various users such as Jarnold, The ed17, Kristijn, Kennvido, The Rambling Man, and DragonHawk. The changes range from adding references and correcting typos to adding new content and fixing formatting. The page also includes a sidebar with navigation links and a footer with the Inria logo and event information.

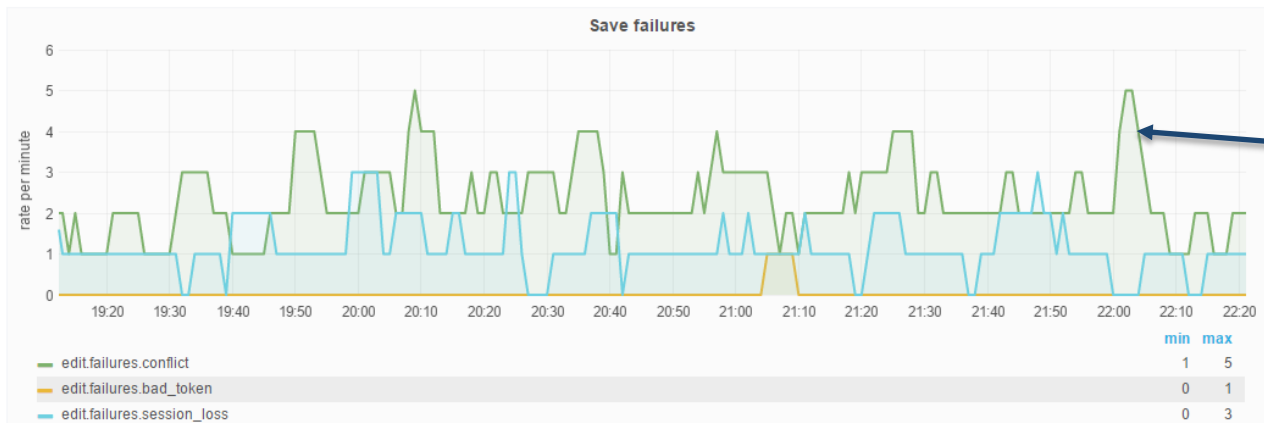
cur prev	19:49, 15 April 2013	The Rambling Man (talk contribs) .. (1,342 bytes) (-522) .. <i>(italics)</i> (undo)
cur prev	19:49, 15 April 2013	Kristijn (talk contribs) .. (1,864 bytes) (+28) .. (undo)
cur prev	19:48, 15 April 2013	Kennvido (talk contribs) .. (1,836 bytes) (+538) .. <i>(update)</i> (undo)
cur prev	19:48, 15 April 2013	The ed17 (talk contribs) .. (1,298 bytes) (-15) .. <i>(already referenced)</i> (undo)
cur prev	19:48, 15 April 2013	The Rambling Man (talk contribs) .. (1,313 bytes) (+4) .. <i>(italics)</i> (undo)
cur prev	19:48, 15 April 2013	80.90.195.239 (talk) .. (1,309 bytes) (+27) .. (undo)
cur prev	19:47, 15 April 2013	The Rambling Man (talk contribs) m .. (1,282 bytes) (-1) .. <i>(comma)</i> (undo)
cur prev	19:47, 15 April 2013	The Rambling Man (talk contribs) .. (1,283 bytes) (-255) .. <i>(reuse Script a</i>
cur prev	19:47, 15 April 2013	67.78.59.121 (talk) .. (1,538 bytes) (-1) .. (undo)
cur prev	19:46, 15 April 2013	The Rambling Man (talk contribs) .. (1,539 bytes) (+88) .. <i>(reuse)</i> (undo)
cur prev	19:46, 15 April 2013	Sethant (talk contribs) .. (1,451 bytes) (-5) .. <i>(correct to one hour after finish</i>
cur prev	19:46, 15 April 2013	80.90.195.239 (talk) .. (1,309 bytes) (+27) .. (undo)
cur prev	19:45, 15 April 2013	The Rambling Man (talk contribs) .. (1,482 bytes) (-77) .. <i>(no dead confirmed)</i> (undo)
cur prev	19:45, 15 April 2013	The Rambling Man (talk contribs) .. (1,539 bytes) (-23) .. <i>(stop forcing)</i> (undo)
cur prev	19:45, 15 April 2013	67.78.59.121 (talk) .. (1,516 bytes) (-35) .. (undo)
cur prev	19:44, 15 April 2013	Sethant (talk contribs) .. (1,551 bytes) (+276) .. <i>(add time)</i> (undo)
cur prev	19:43, 15 April 2013	The ed17 (talk contribs) .. (1,275 bytes) (-38) .. <i>(add)</i> (undo)
cur prev	19:43, 15 April 2013	Kennvido (talk contribs) .. (1,313 bytes) (+116) .. <i>(update)</i> (undo)
cur prev	19:43, 15 April 2013	The Rambling Man (talk contribs) .. (1,187 bytes) (+18) .. <i>(date)</i> (undo)
cur prev	19:42, 15 April 2013	DragonHawk (talk contribs) .. (1,169 bytes) (-77) .. <i>(listening right now and</i>
cur prev	19:41, 15 April 2013	The Rambling Man (talk contribs) .. (1,246 bytes) (+4) .. <i>(link)</i> (undo)
cur prev	19:41, 15 April 2013	The Rambling Man (talk contribs) .. (1,246 bytes) (+29) .. <i>(added Category:Boston M</i>



Wikipedia edit conflicts



900 edit/mn



5 failure conflict/mn

<https://grafana.wikimedia.org/dashboard/db/edit-count>

Centralized architecture ?

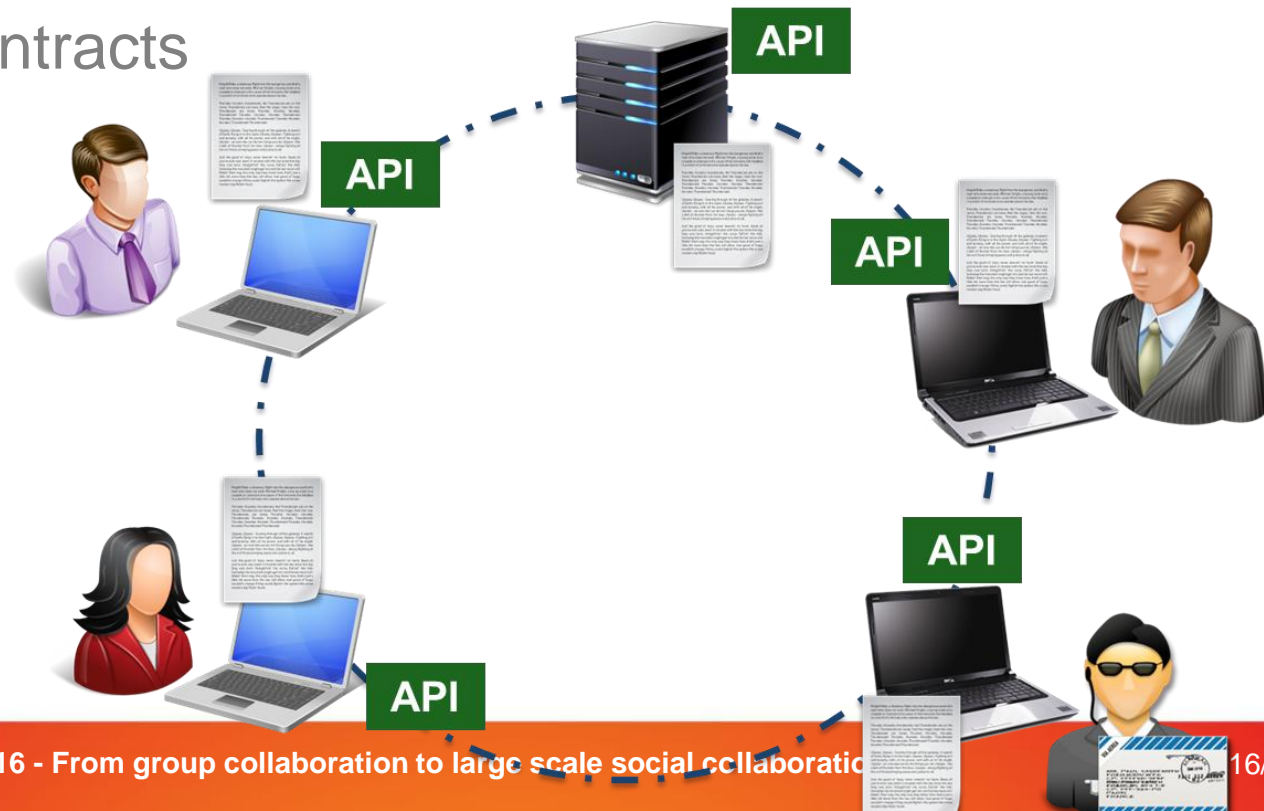


Abstract/Configurable p2p architecture



OpenPaas::NG

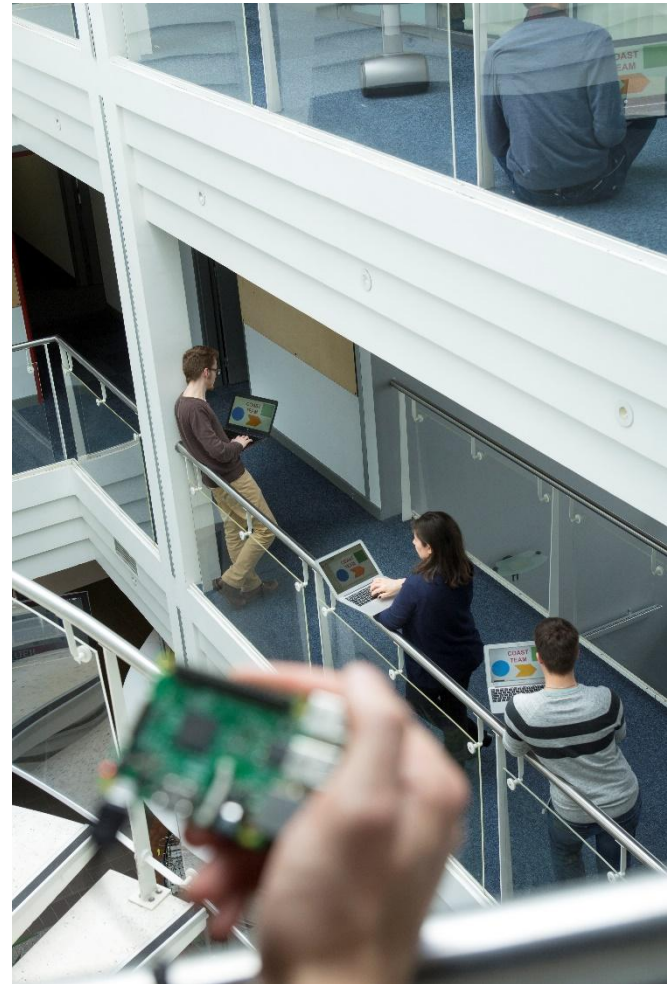
- Each partner decides of the control and of the contracts



MUTE v2 – No central server

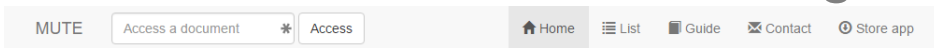


Photos Christian Morel



The Mute P2P editor

- Based on CRDT Algorithm (LogootSplit)



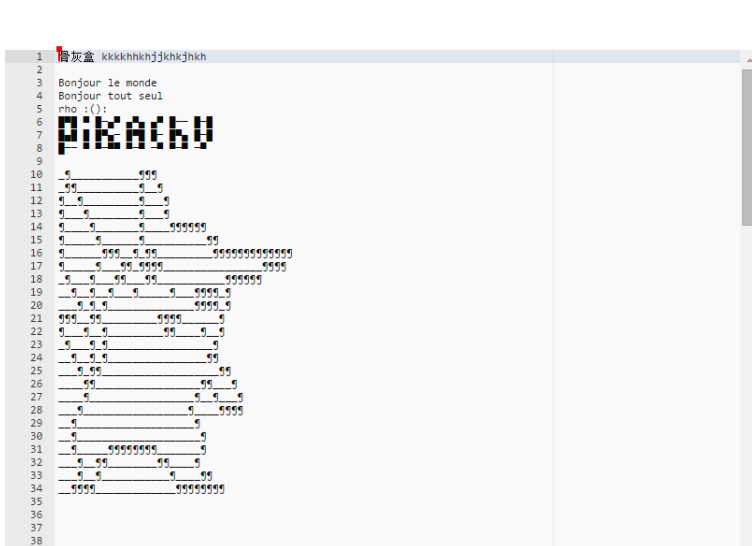
Try MUTE, the Multi-User Text Editor

Switch to history mode Switch to offline mode **Online!**



Try MUTE, the Multi-User Text Editor

Switch to history mode Switch to online mode **Offline!**



<http://mute-collabedition.rhcloud.com/doc/wetice2016>

Delays in MUTE

2 car./sec./utilisateurs
1 à 40 utilisateurs



Who is doing what ?



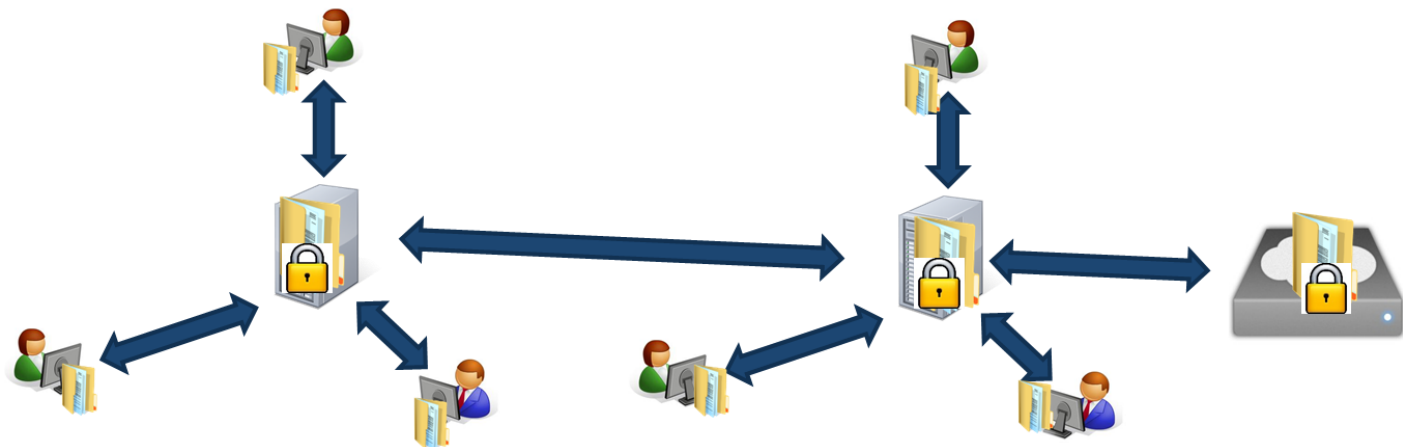
- Awareness at a large scale



A complex challenge : security and trust

- Who are the people I'm working with
- Collaboration data can be encrypted and not shared on the cloud (being investigated).
- Provides guarantees to the participants

Current Issue





Coordination at a large scale

Haiti Earthquake 2006

- 7.0 Magnitude earthquake – 3.5M people affected – 220.000 death (est.)
- **Hundreds** of responding organisations



Unexpected event at an unexpected scale

- First responder : people
- Overwhelming answer from the international community (hundreds of NGO's)
- First important use of social network
- volunteer based crisis mapping
- <http://www.digital-humanitarians.com/>

Hurricane Katrina 2005

- Category 5 Hurricane
- Caused breaches to flood protections structures
- 80% of the city of New Orleans Submerged (1500 deaths)



Coordination issues

- Very wide area affected
- Several political decisions level
- Coordination issues during the evacuation

The Danube floods

- 2002,2005,2006,...,2014
- Very common event – cross international borders
- Requires a dedicated organisation



Coordination at a large scale

- Combination of human and services activities
- Composition of hundred of services
- Duration, kind of contribution, governance
- Various domains : logistic, crisis management, software development,

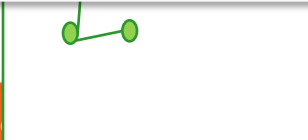
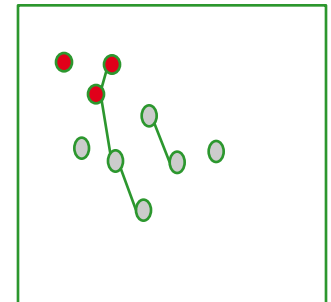
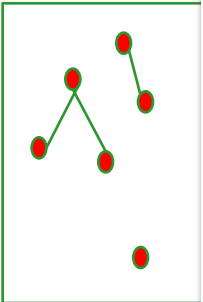
Inter organisational issues



“we are exchanging text information real-time through either cell or mobile units or satellite”

[..]

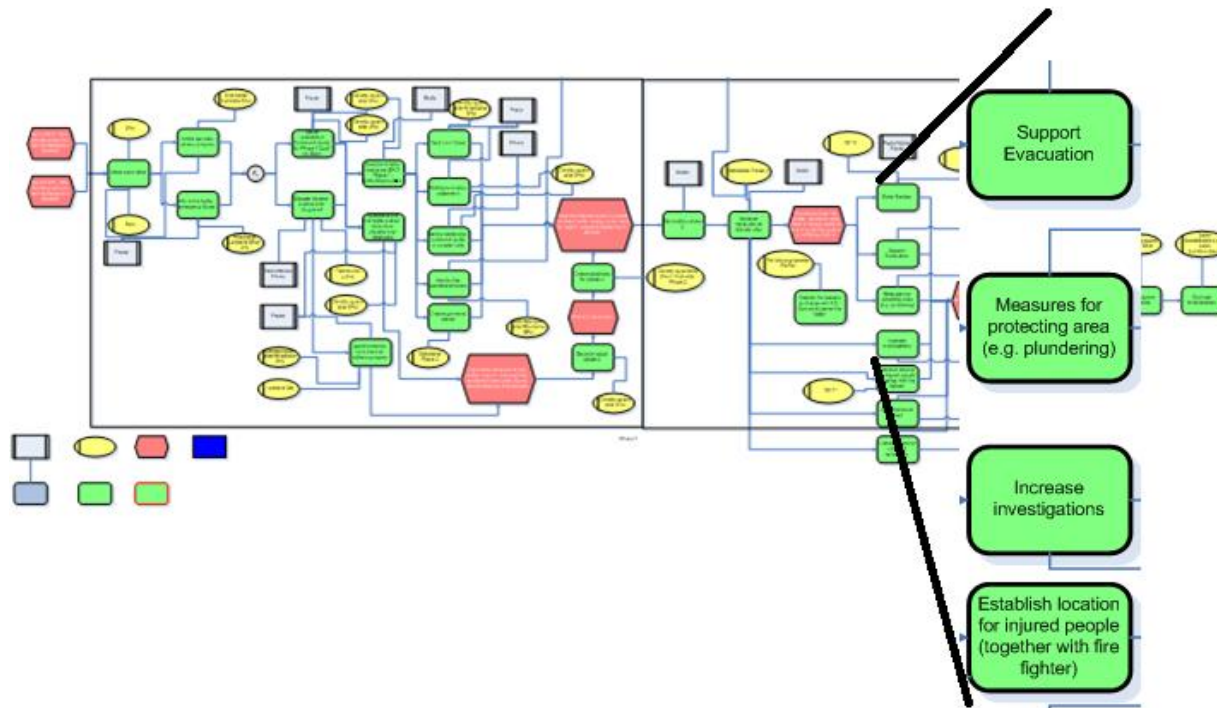
“obvious the more complex a situation gets, for instance where you may have many organizations working collectively in order to accomplish a goal, but at the same time working independently in terms of their own interests, where you get in those in situation like that, you know it get to the point, to be so complex that it would be overwhelming”



Complex BP Modeling



- Outcome of a workshop with Firefighters

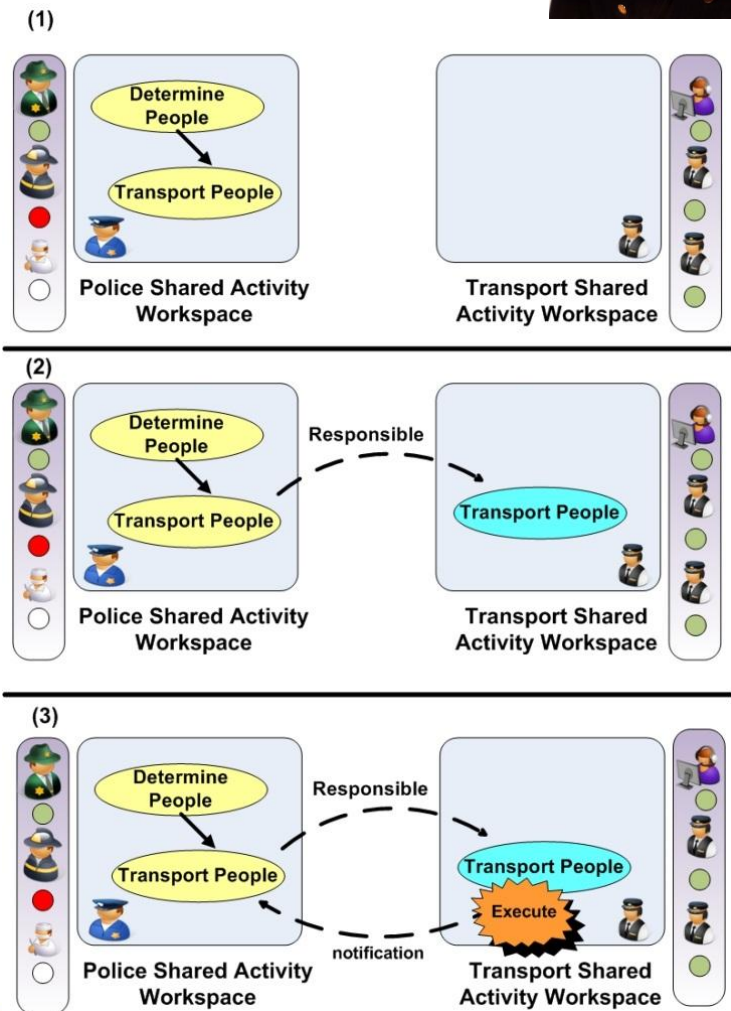


Coordination awareness



- Activity awareness ?
- Coordination **without a central authority**
- Distribution of control
- Privacy

Still an issue today



Crowdsourcing

Coordinating very large scale/long running simple activities

Combining human task and service in a process at a large
scale

Centralised process with very distributed unknown
performers

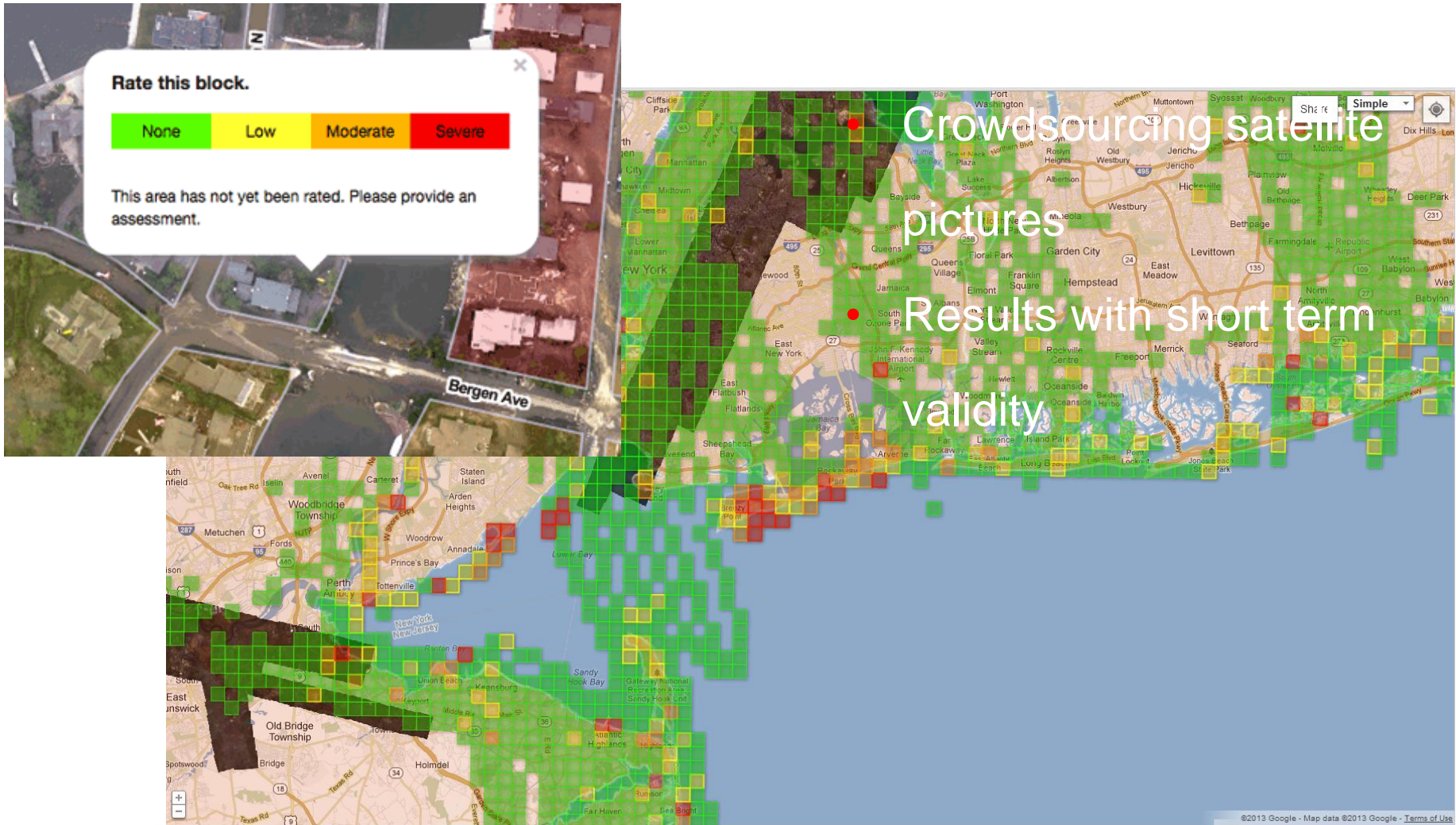
Haiti Crisis Mapping

4636 project volunteers translated 25,186 SMS messages and numerous e-mail, Web, and social media communications, resulting in 3,596 reports that were actionable and included enough relevant information to be mapped on Ushahidi.³¹



The Fletcher Crisis Mappers at work in Boston. Photo courtesy of Carol Waters.

Sandy Damage Assessment (2012)



Industrialisation of crowdsourcing



(a) Transcribe receipt

```

The Foodnan Cafe
250 Walnut Street
Englewood, NJ 07631
201-568-8056
08/07/2010 9:30AM CHECK NO:01001
TABLE:0 PERSONS:02
SERVER:BERT
Qty Price
1 Foodnan Burger/ 15.00
  Medium Rare/Onions/
  Lettuce/French Fries
1 Ginger Ale 1.50
1 Diet 7-Up 1.40
1 Cappucino 2.00
1 Chec Rasp. Truffles 1.50
1 Grilled Chicken/ 7.95
  Beefsteak Tomatoes/
  Bacon/French Bread
Subtotal >> 29.35
Tax >> 2.42
Pay this Amount >> 31.77
Use these two lines for advertisements,
special announcements, etc. . . . .
    
```

Company name

Address

Date

Total

(b) Check and improve

```

Happy Food Company
***** Customer Copy *****
1/2/2006 9:45:35 PM
Store Location
Store City :Store State:Store Zipcode
Store Country
TEL: (408) 476-8754

Employee : vincent
StoreID :store1
SystemID :POS 2
Pay By :CASH

# Desc Qty Price
2 DVD Spinal Tap 2 $64.00 Y
4 Internet Manager 2 $50.00 Y

***** INVOICE *****
447

Subtotal : $114.00
Tax : $9.41 ( 8.25% )
Total : $123.41

CASH payment : $30.00
Total Item Sold : 4

Change Due : $178.58
    
```

Company name

Address

Date

Total

(c) Classify receipt



Spending type

Transportation

Accommodation

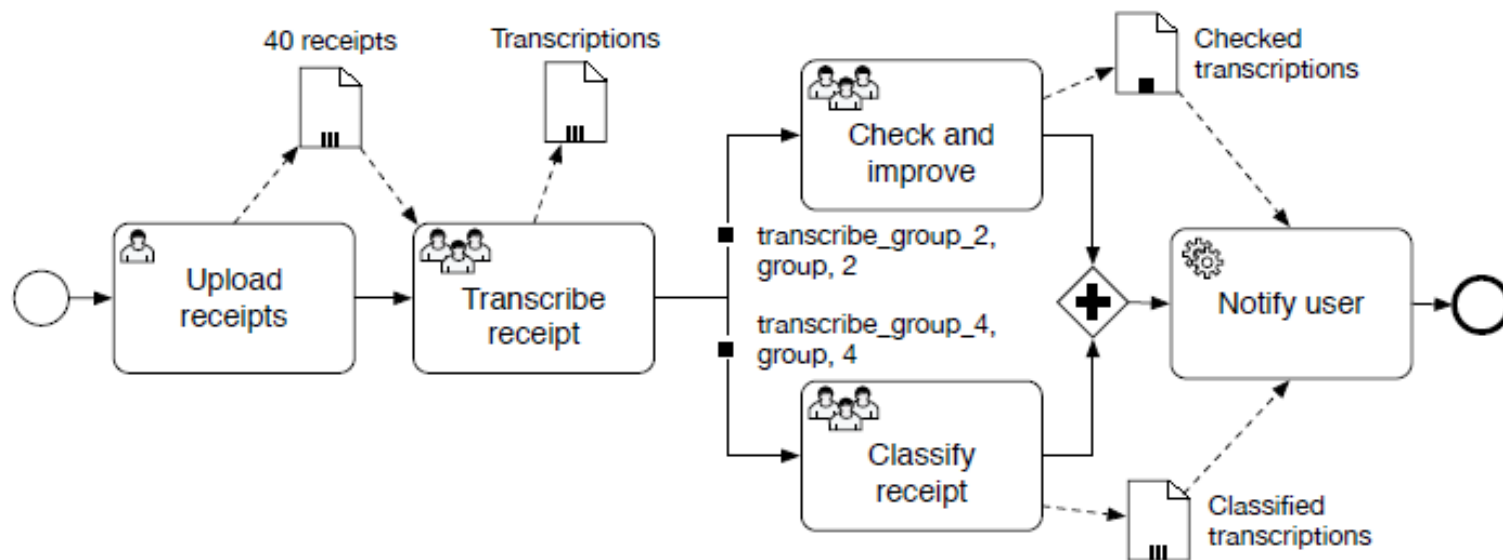
Meal

Other

BPMN Task Instance Streaming for Efficient Micro-Task Crowdsourcing Processes

Stefano Tranquillini¹, Florian Daniel^{1,2}, Pavel Kucherbaev¹, and Fabio Casati¹

BPM for crowdsourcing



Large scale real time coordination

Unsolicited individual data

Collaborative data

Twitter – 35000 geolocalised tweet/day



Flickr – 3000 geolocalised photos/day



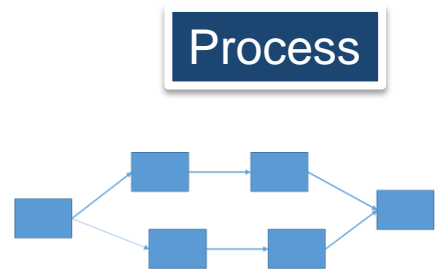
10 photos/s on Instagram during sandy



Wikipedia 1500 edit to the main page between the 28 and the 30th of October, not mentioning the talk or the area related pages



INPUTS

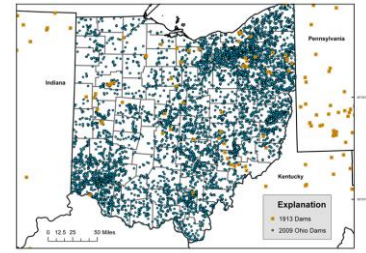
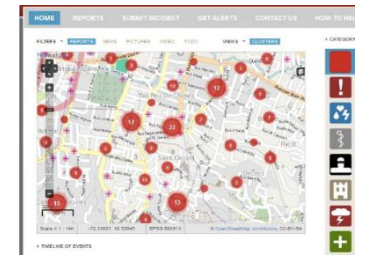
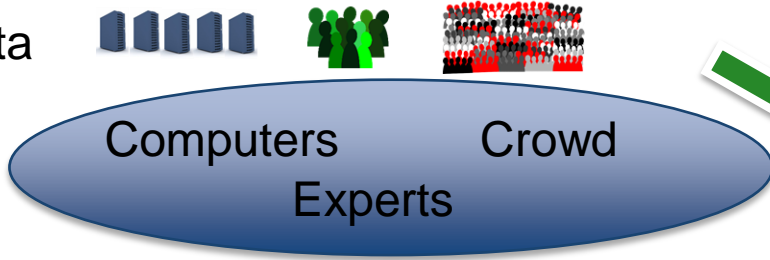


Citizen Sourcing Data

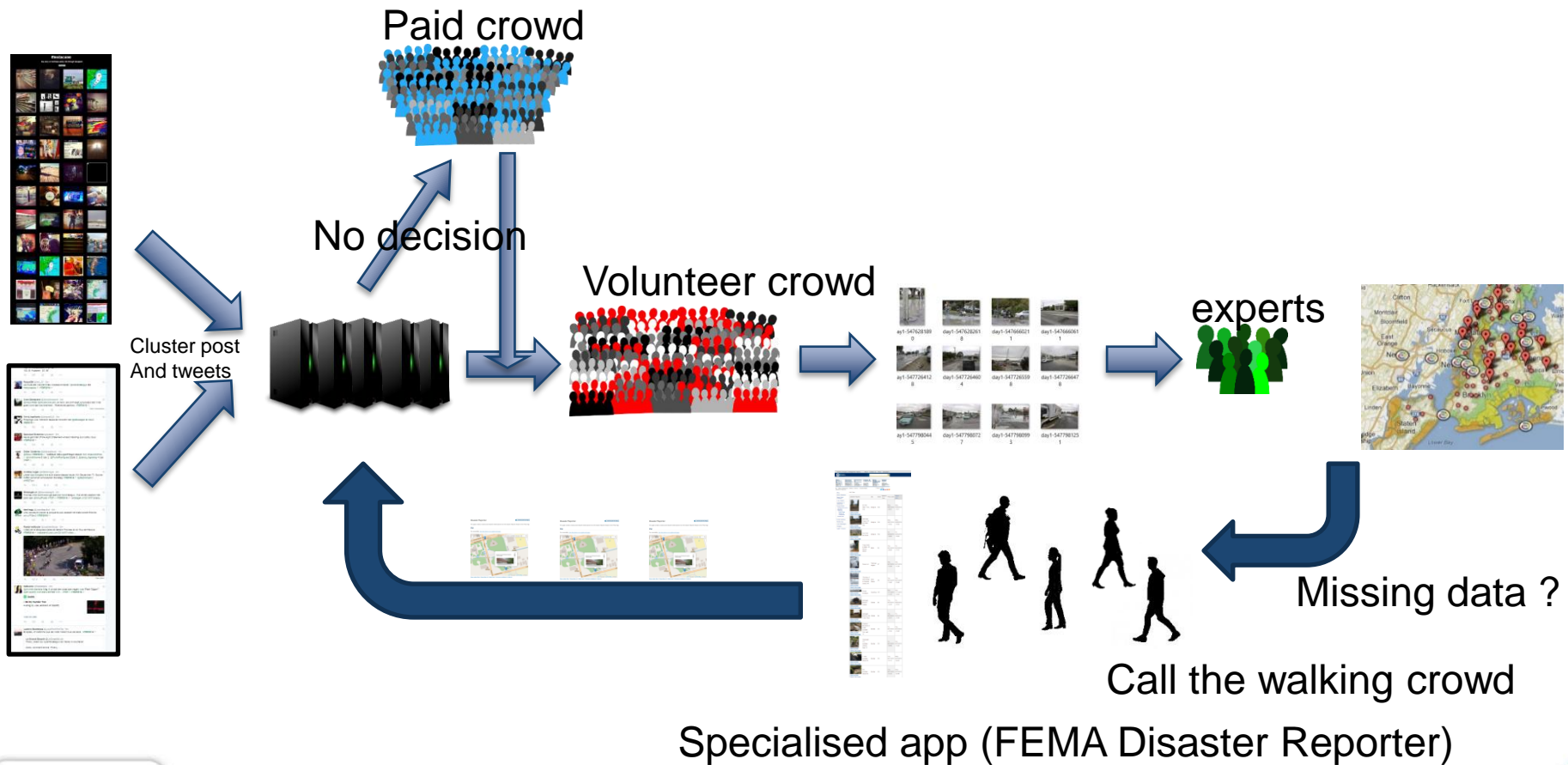


FEMA dedicated app

Dedicated app can receive notification and but used to ask for data



Human/Machine composition example



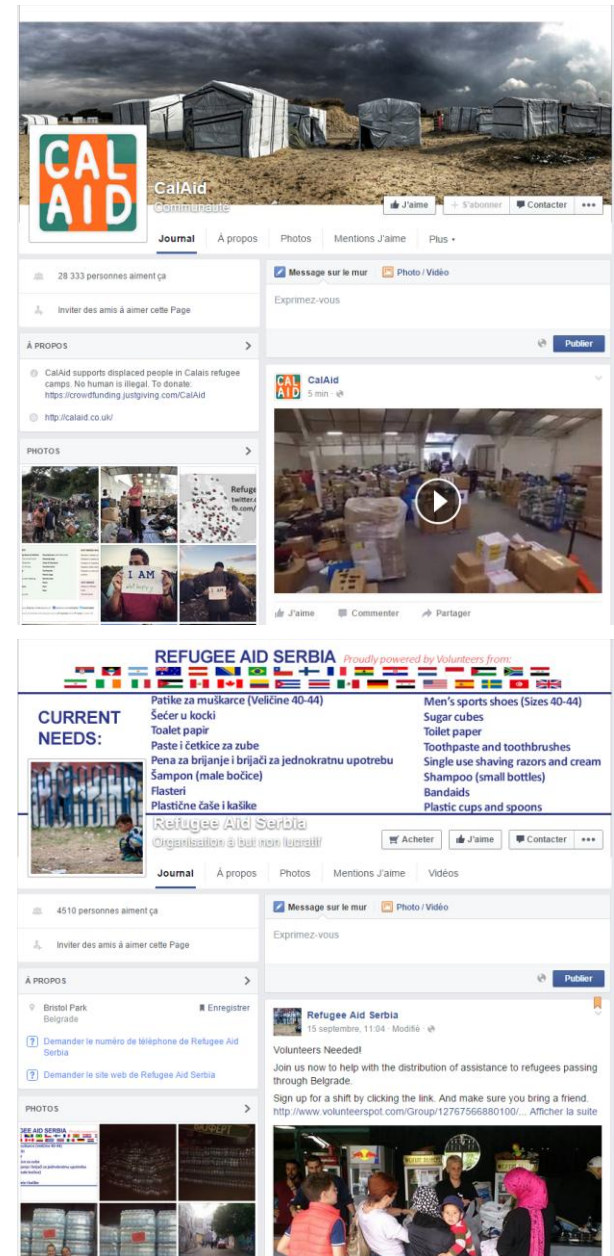
The Refugee crisis

- A very tricky kind of crisis
- Affect international relationships
- Difficult agreement on the response



Citizen coordination

- International scale
- Citizen create Facebook pages, maps, dedicated tools to coordinate
- But privacy, security, reliability, trust issues



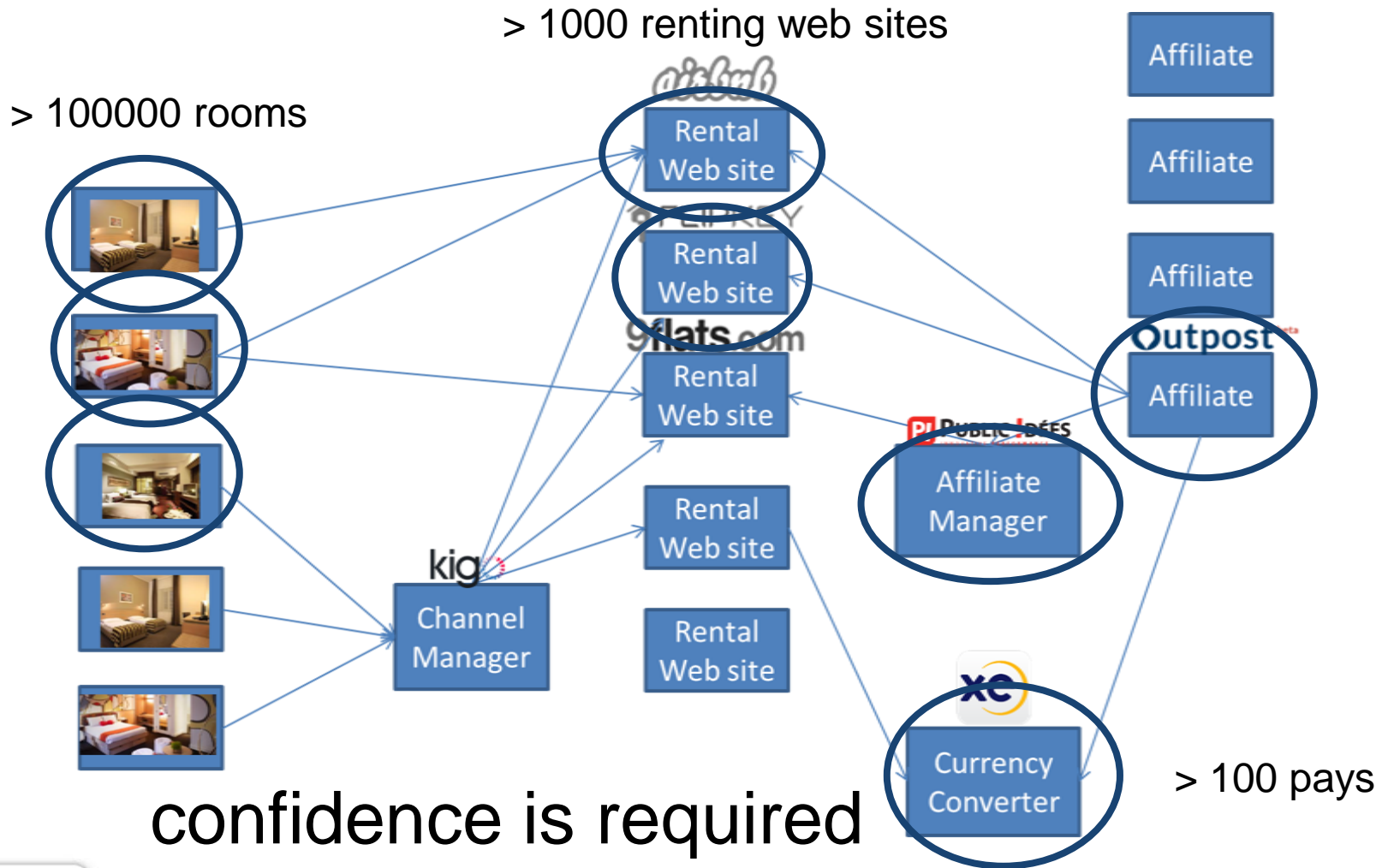
Internet wide service composition

The screenshot displays the Outpost website interface. At the top, navigation tabs include ACCOMMODATIONS, RIDESHARES, and EXPERIENCES. A currency selector is set to EUR. The main content area features a map of Florence on the left, showing a dense cluster of blue location pins. To the right, three accommodation listings are shown:

- Appartamento Oltrarno-Pitti: wifi internet**: Apartment, Entire Place, €436 for 4 nights, 2 sleeps, 1 bedroom, 1 bathroom, Centro storico.
- Lorenzo Studio**: House, Entire Place, €1728 per night, 2 sleeps, 3 bedrooms, 2 washrooms, Centro storico.
- Large double room with king-size bed, on the second floor**: Room - Apartment, Private Room, €149 per night, 2 sleeps, 1 bedroom, 1 bathroom, 1 bed, Centro storico.

Each listing includes a 'Book it' button and an 'Add +' button. A 'FLIP' button is visible on the second listing. A 'roomorama' logo is present on the third listing.

Behind the scene



Conclusion

- Large scale collaboration exists
- Large scale collaboration helps to solve large scale problems
- Only very solution based ad-hoc support

Large scale collaboration issues

- A programming language that can be used by a **Clerical worker**
- Software engineering – **modeling** and **validation**
- Operating Systems and database – **distribution of data, consistency and security**
- Measurement and Evaluation - **prediction**
- Security, **privacy and trust**
- WYSIWweS or What ou see is what we see
- **Community** Processes
- Concurrency Control
- Other area – psychology, social implications

QUESTIONS ?

Credits

- Some slides have been prepared by
 - Jorn Franke (Activity management)
 - Gérald Oster (P2P sharing)

Most of the work presented here are contribution made by members of the Coast team and the preceeding ones

<https://team.inria.fr/coast/>

Original photos are from Christian Morel (DR)