

## Web of Browsers Context

- Web Browsers are most available execution platform in the world
- They execute complex applications connecting humans and web services
- **Browser-to-browser connections allow writing serverless applications !**



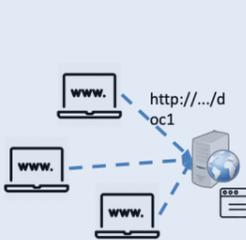
## Web of Browsers Objectives

- Propose a serverless web, massively decentralized and ephemeral
- A URI no more reference an HTML page
- **A URI references a network of browsers hosting one or several HTML pages...**

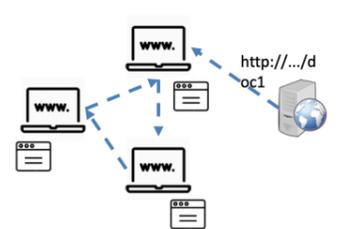


## Web Of Browsers: Concepts

Web

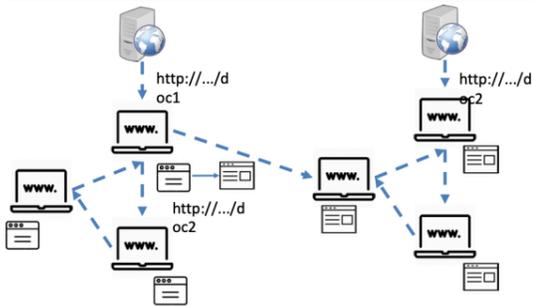


Web of Browsers



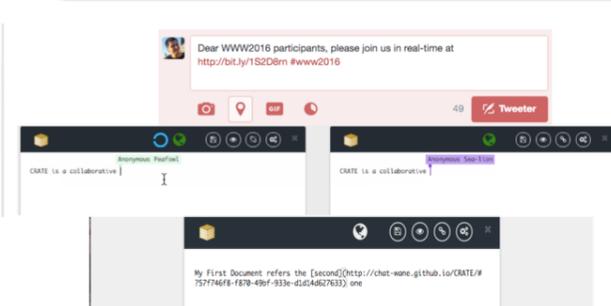
What we do, stays between us !

## WOB: Concepts



A graph of pages = A graph of networks

## WOB: URIs refers networks !



## Properties and Use-cases

Properties

- It forgets by default
- Privacy friendly
- Support real time and high latencies
- Scale

Use-case

- Moco: Massive online course
  - Example Coursera 2013
- TV Shows
- Big Event...

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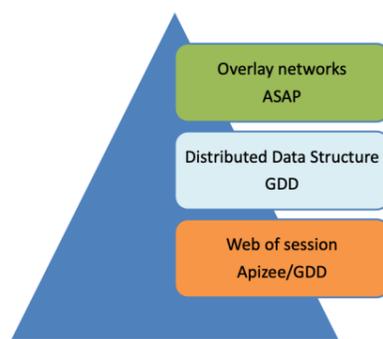
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## WOB Organization



## WOB Results : soocrate.github.io



## WOB Results : Scaling with causality

TABLE I: Space and time complexity of causal broadcast protocols.  $N$  is the number of processes.  $W$  is the number of received messages awaiting for delivery.  $P$  is the number of messages that are still unsafe to be purged.  $B$  is the size of a set of temporary buffers.

	dynamic	message overhead	local space consumption	delivery execution time
vector-based [7]	✓	$O(N)$	$O(N + W \cdot N)$	$O(W \cdot N)$
FIFO+forward [14]	✗	$O(1)$	$O(P + W)$	$O(1)$
<b>this paper</b>	✓	$O(1)$	$O(N + B + W)$	$O(1)$

## WOB Result: Forget the past...

	message overhead	delivery execution time	local space consumption	# control messages per added link
vector-based R-broadcast	$O(1)$	$O(1)$	$O(N)$	0
vector-based C-broadcast	$O(N)$	$O(W \cdot N)$	$O(N + W \cdot N)$	0
PC-broadcast	$O(1)$	$O(1)$	$O(N)$	3 to $2 \cdot  P ^2$
PRC-broadcast	$O(1)$	$O( Q_i )$	$O( Q_i  \cdot M)$	6 to $4 \cdot  P ^2$

Brice Nédelec, Pascal Mollé, Achour Mostéfaoui. Causal Broadcast: How to Forget?. The 22nd International Conference on Principles of Distributed Systems (OPODIS), Dec 2018, Hong Kong, China. fhal-01923830v2f

## Conclusions

- Web of browsers
  - A groundbreaking idea
  - Demonstrated feasibility and ease of use with [soocrate.github.io](https://soocrate.github.io)
  - Pushed the limits with new fundamental results on causality
- Industrial sustainability still an issue.

