Transactional Archives: A Novel Web Preservation Paradigm

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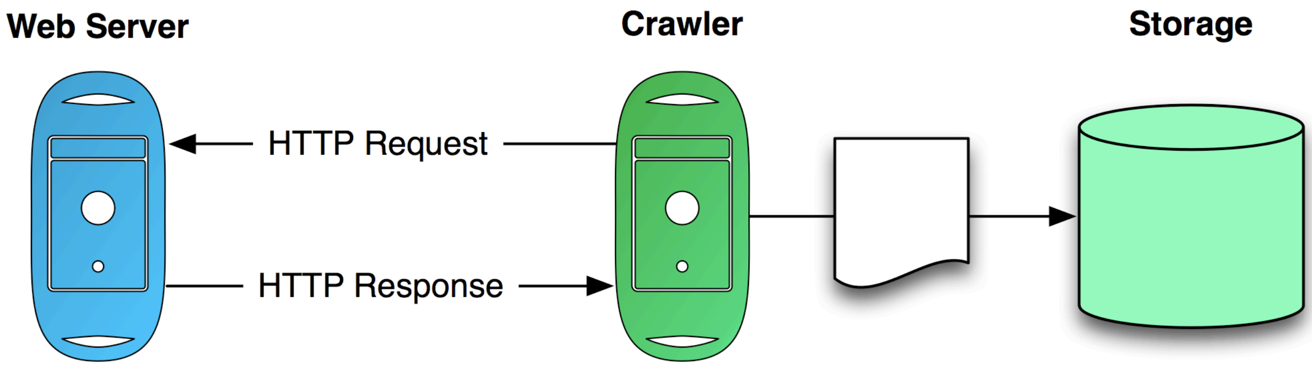
Memento: Transactional Archiving

- Transactional Archiving?
- Server Side Capture
  - Submission, Storage, Access
- Browser Side Capture
  - Submission, Storage, Access
- Memento

Transactional Archiving?

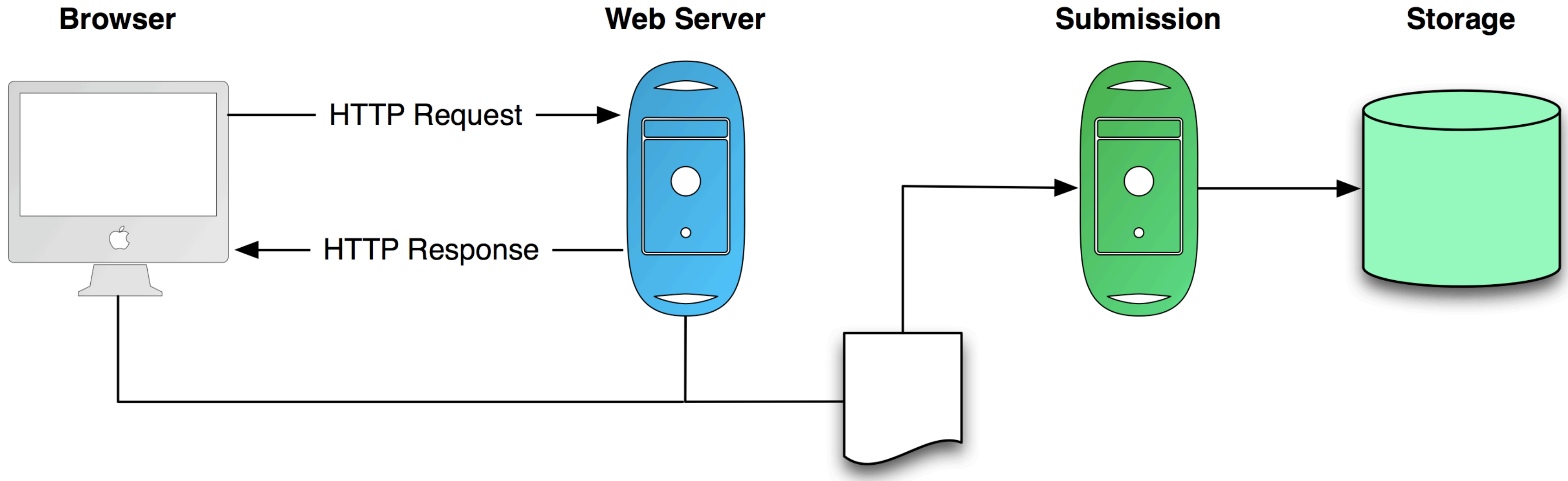
- Current web archives actively crawl the web



- For example, Heritrix from the Internet Archive and the many archives that use it

Transactional Archiving?

- Transactional archives passively accept submitted HTTP transactions between browser and server



- For example, TTApache, PageVault and Everlast.

Why Transactional Archiving?

- Issues with crawler based archiving:
    - Can be rejected (robots.txt, by user-agent, by host IP)
    - Can be deceived (cloaking: geo-location, by user-agent)
    - Can be trapped (infinite auto-generated pages)
    - Don't necessarily capture well used resources
    - Require constant and massive bandwidth

- None of these are true for Transactional Archiving …

… but, it has its own different set of challenges

Transactional Archiving?

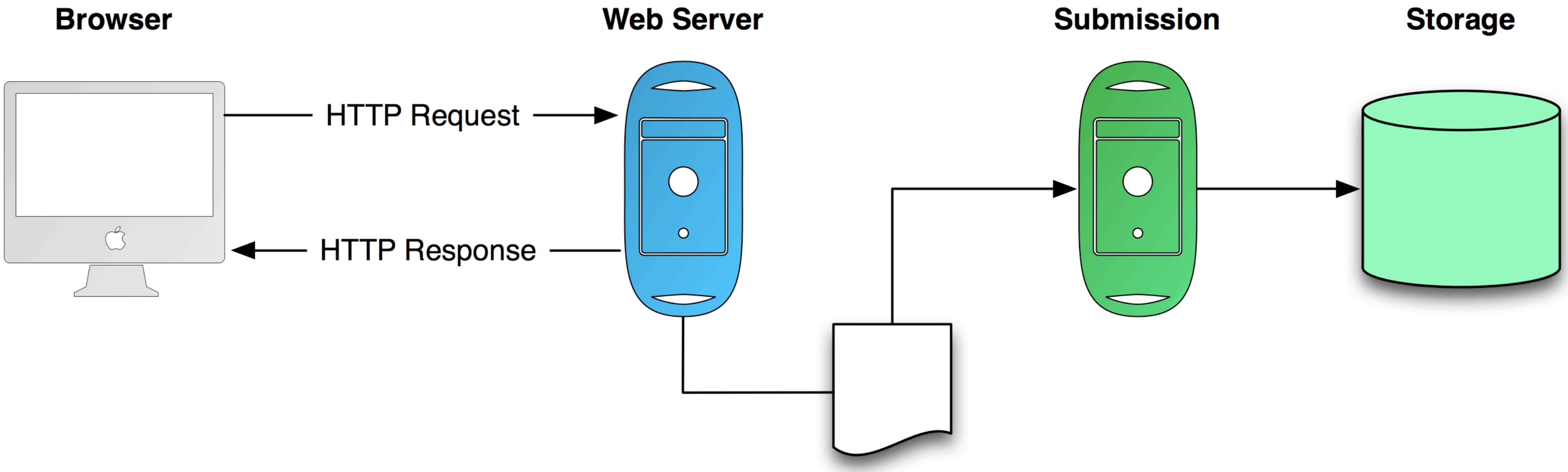
- Need to record transactions between browser and server
  - Server side: Servers to be archived must cooperate
  - Browser side: Many browers must cooperate

- Need to transfer data to archive: either batch mode or real-time
- Archive must trust submission to be authentic

- Deduplication challenges as can't control what will be submitted:
  - Aliases: Different URL, same response
  - Negotiation: Same URL, different response
  - Determine "significant" change in response
  - Other factors for what to archive/throw away?

Server Side Capture

- Approach:
  - Willing server records the request and response headers and response body just before returning to the browser
  - Server sends to an archive for storage



Server Side Capture/Submission

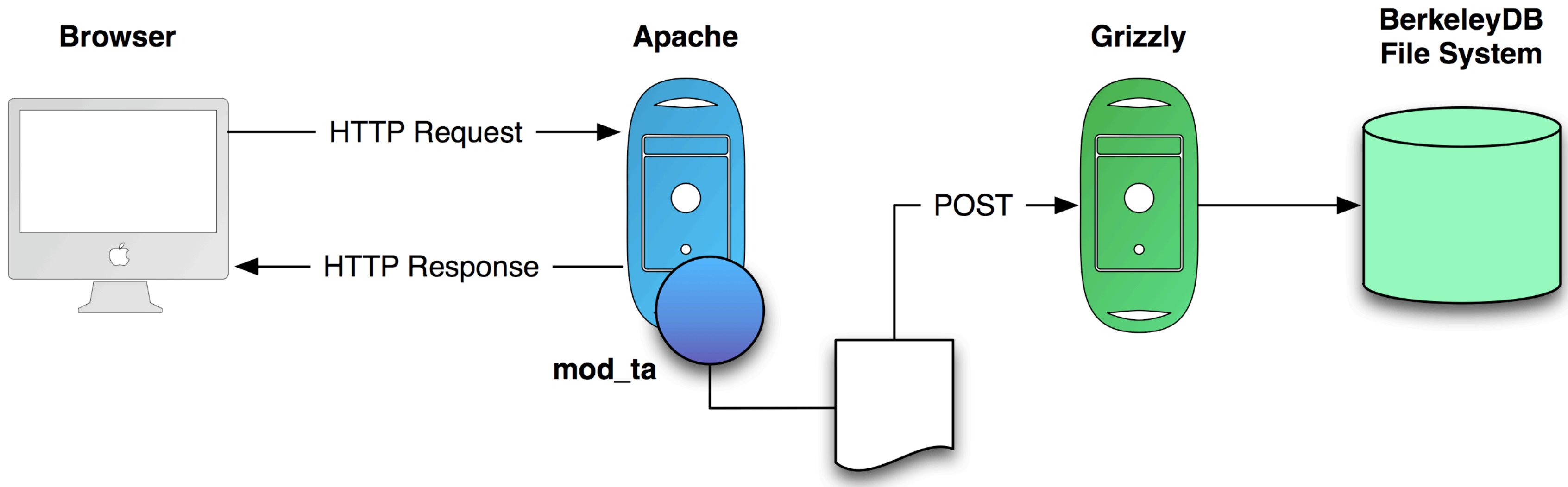
- Developer: Luda Balakireva

- Capture Implementation
  - Apache connection filter module implemented in C to trap URL, headers and response body
  - Module POSTs to a configurable URL in real time

- Submission Implementation
  - Java/Grizzly+Jersey for handling submission interface
    - Can also be deployed under tomcat or glassfish
  - BerkeleyDB f or storing metadata
  - Headers and response body data stored in file system

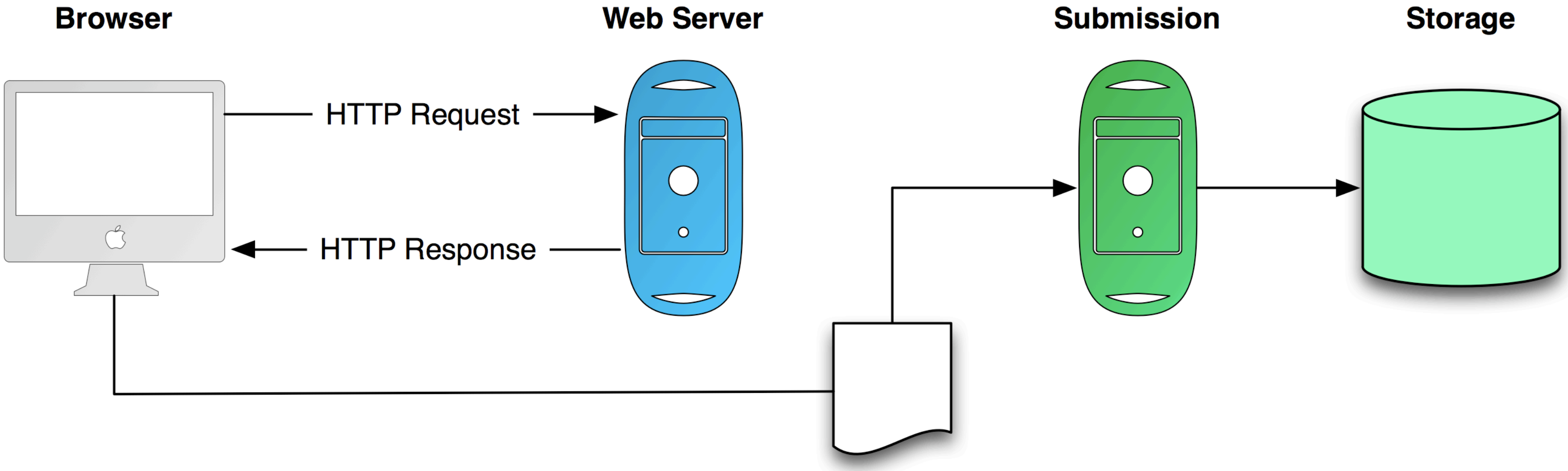
Server Side Capture

- Direct server to server upload, in real time:
  - Most configurations will have server/archive in close network proximity
  - Reduces wait time between observation and being discoverable in archive



Browser Side Capture

- Approach:
  - Willing browser records the request and response headers and response body after receiving from server
  - Browser sends to an archive for storage



Browser Side Capture/Submission

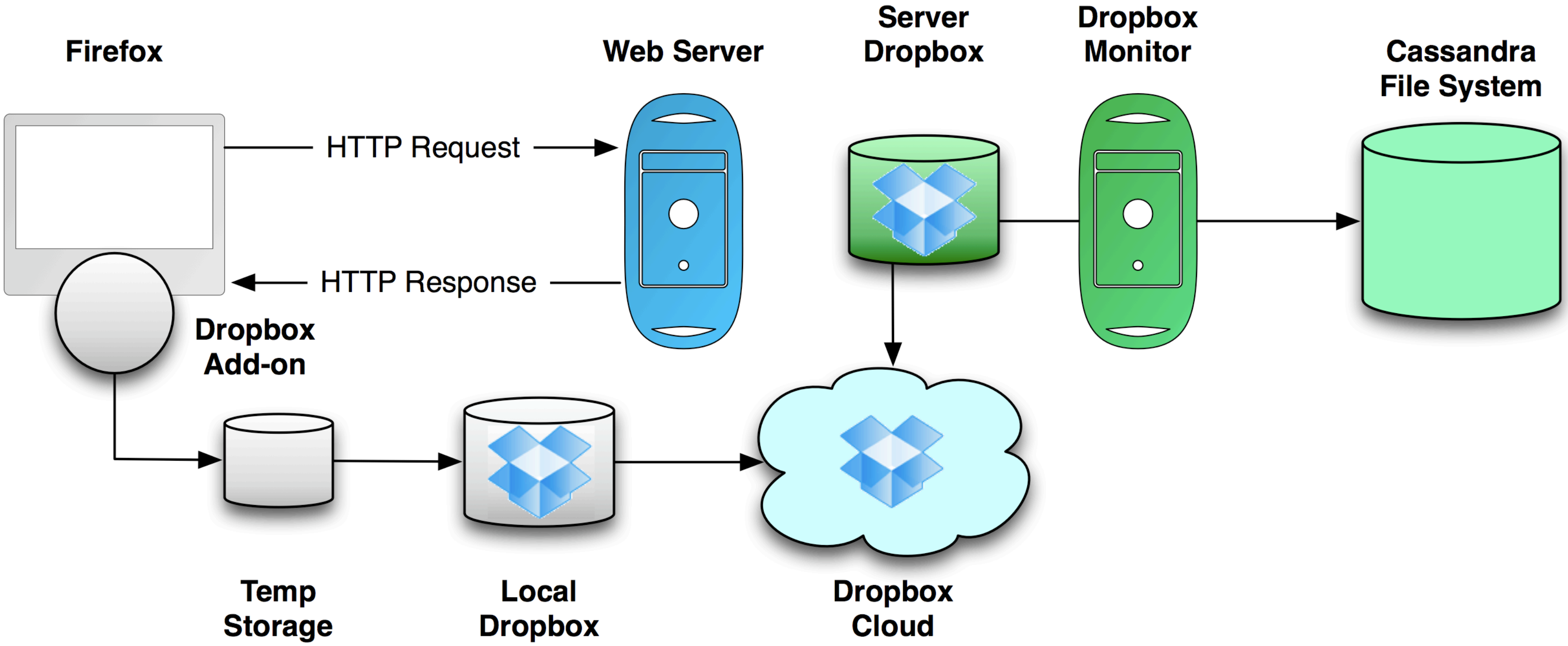
- Developer: Rob Sanderson

- Capture Implementation
  - Firefox add-on captures headers and body and writes to temporary storage on local disk
  - After configurable amount of data stored, module compresses and moves to a shared Dropbox folder for batch upload
  - (Limited) Ability to detect and ignore private data

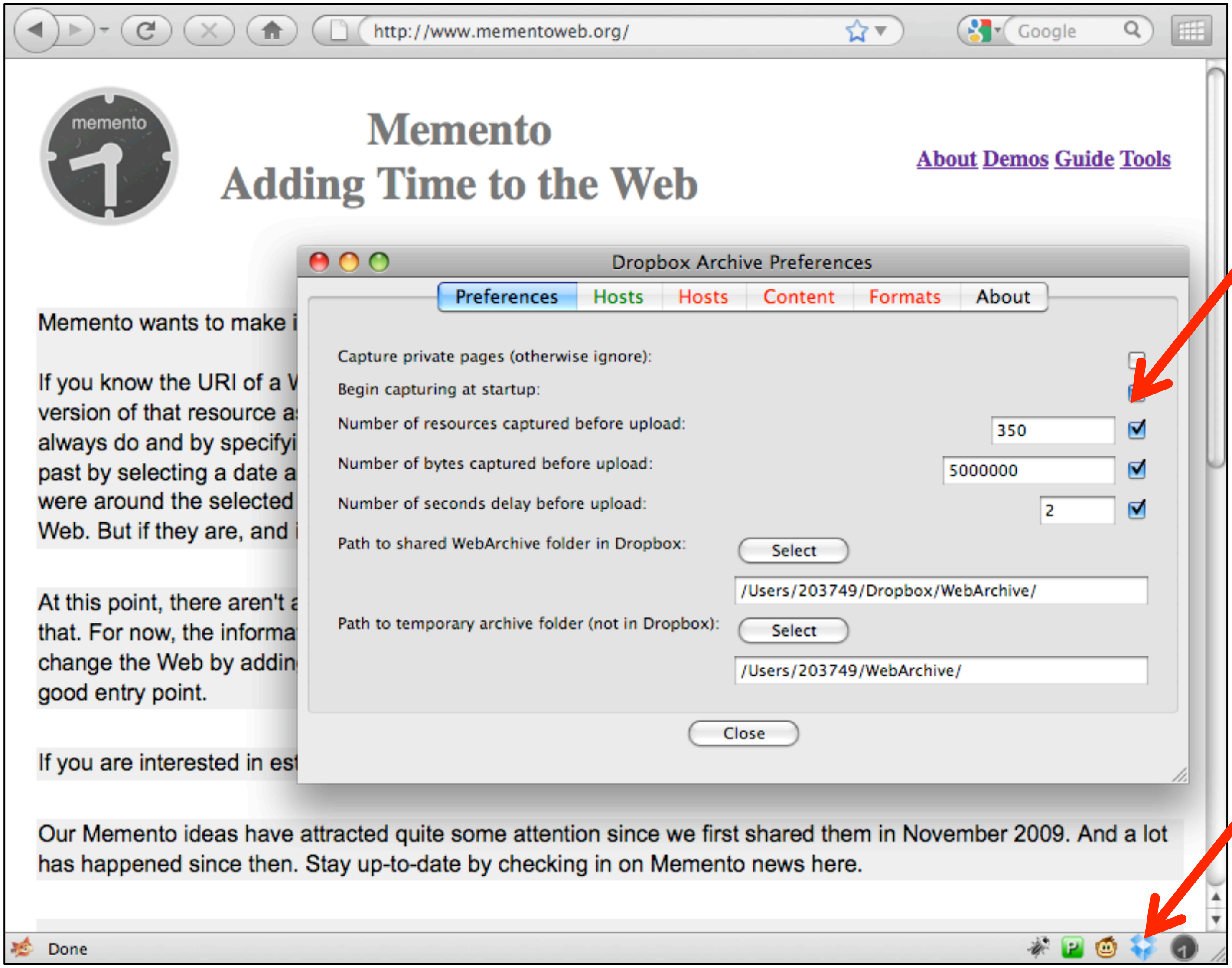
- Submission Implementation
  - Dropbox used as transfer, temporary storage mechanism
  - Python monitor system on top of Dropbox
  - Cassandra (NoSQL hash store) for storing metadata
  - Response body and headers stored in pair-tree file system

Browser Side Submission

- Reasons for Dropbox rather than direct upload:
  - Batch upload via existing infrastructure reduces bandwidth
  - Increases Firefox responsiveness
  - Batch processing can be scheduled as needed



Browser Side Capture/Submission



Memento
Adding Time to the Web

Memento wants to make i

If you know the URI of a W
version of that resource as
always do and by specifyi
past by selecting a date a
were around the selected
Web. But if they are, and i

At this point, there aren't a
that. For now, the informa
change the Web by addin
good entry point.

If you are interested in est

Our Memento ideas have attracted quite some attention since we first shared them in November 2009. And a lot has happened since then. Stay up-to-date by checking in on Memento news here.

Dropbox Archive Preferences

Capture private pages (otherwise ignore): ☐

Begin capturing at startup: ☑

Number of resources captured before upload: 350 ☑

Number of bytes captured before upload: 5000000 ☑

Number of seconds delay before upload: 2 ☑

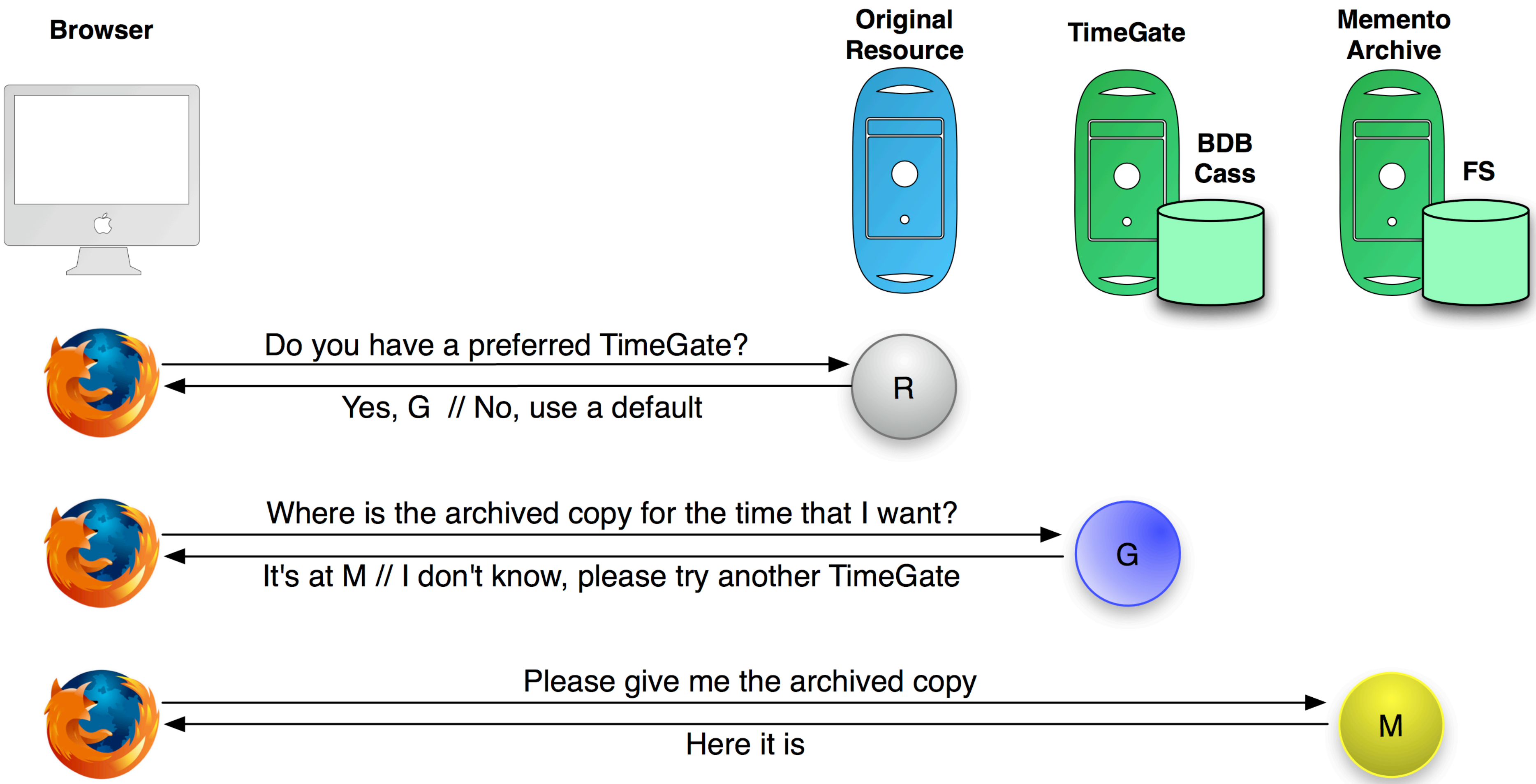
Path to shared WebArchive folder in Dropbox: Select /Users/203749/Dropbox/WebArchive/

Path to temporary archive folder (not in Dropbox): Select /Users/203749/WebArchive/

Upload Preferences

Public/Private Status Icon

Memento in One Slide



Do you have a preferred TimeGate?

Yes, G // No, use a default

Where is the archived copy for the time that I want?

It's at M // I don't know, please try another TimeGate

Please give me the archived copy

Here it is

Access via Memento

- Both archives provide Memento TimeGates for access

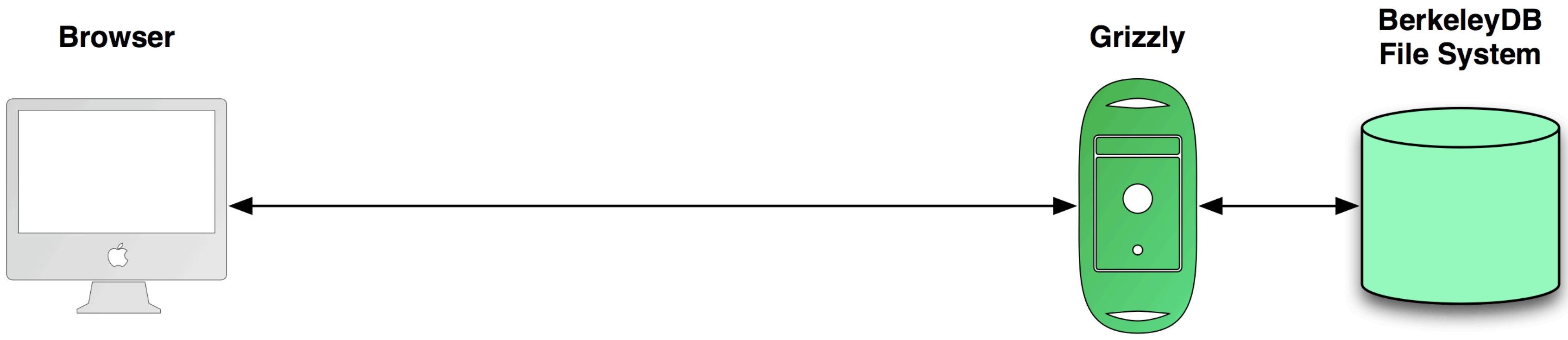
- TimeGates can be used with MementoFox:
  - Endorsed Firefox add-on: http://bit.ly/memfox
  - Must be configured with Dropbox archive TimeGate
  - Processes every HTTP request, not just HTML page

- Distributed access is intentional design feature
  - Possible to construct views from multiple archives: Server side will have most authentic copy, but may embed image from another server, only in Dropbox archive

Server Side Access

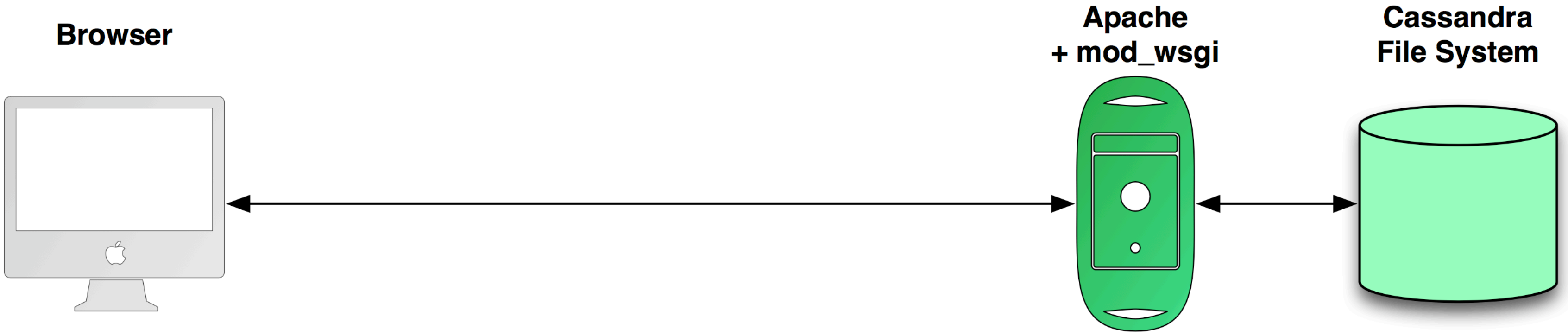
- Access to archive via Memento TimeGate
  - Implemented in Grizzly server using Jersey library
- Original Server uses HTTP Link header to point to archive

- Export functionality also available to WARC format to extract data in batch mode
  - By datetime of last update
  - By URL

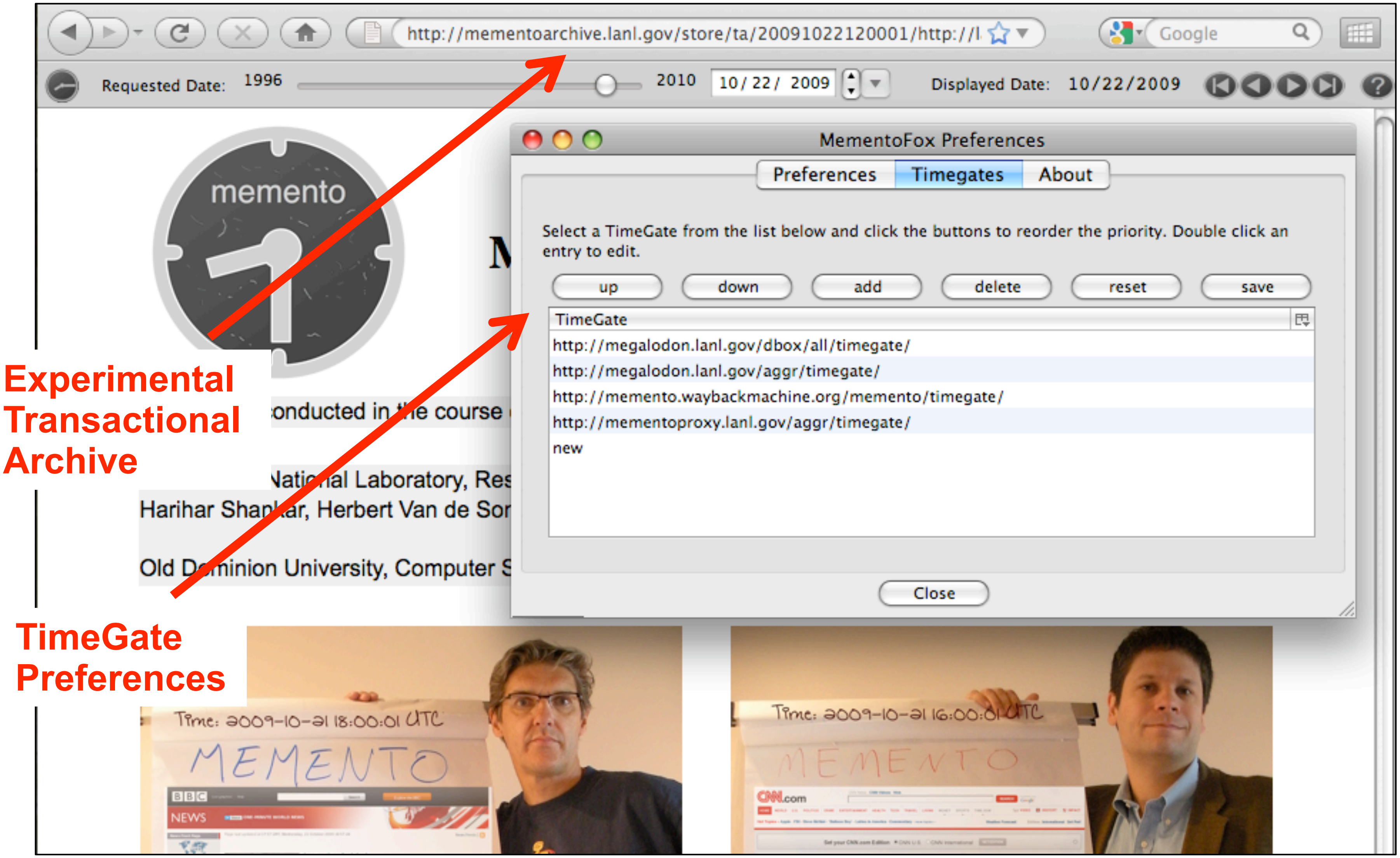


Browser Side Access

- Apache/Python Memento TimeGate for access
  - Archive provides combined, anonymous TimeGate
  - Also provides per-user TimeGates to see own archive
  - Per-User currently secure only through obscurity
  - Export functionality also yet to be implemented



Access via Memento



http://mementoarchive.lanl.gov/store/ta/20091022120001/http://l
Google
Requested Date: 1996
2010
10/ 22/ 2009
Displayed Date: 10/22/2009
memento
M
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National Laboratory, Res
Harihar Shankar, Herbert Van de Sor
Old Dominion University, Computer S
Time: 2009-10-21 18:00:01 UTC
MEMENTO
BBC
NEWS
Time: 2009-10-21 16:00:01 UTC
MEMENTO
CNN.com
MementoFox Preferences
Preferences
Timegates
About
up
down
add
delete
reset
save
Close

Select a TimeGate from the list below and click the buttons to reorder the priority. Double click an entry to edit.

TimeGate
http://megalodon.lanl.gov/dbox/all/timegate/
http://megalodon.lanl.gov/aggr/timegate/
http://memento.waybackmachine.org/memento/timegate/
http://mementoproxy.lanl.gov/aggr/timegate/
new

Experimental Transactional Archive

TimeGate Preferences

Community Involvement

- Try out MementoFox! Feedback is always welcome

- Internet Archive is about to release native Memento support for Wayback. Please update!

- Memento implementations exist for:
  - MediaWiki (available now)
  - WordPress (soon)
  - Drupal (soon)
- If you run one, install the Memento plugin
- If you run a different one, develop a Memento plugin for it?

- And most importantly, let us know! :)

Summary

- Implemented and tested two types of Transactional Archive:
  - Server Side
  - Browser Side
- Transactional Archives lack many of the challenges of Crawler based Archives

- Implemented Memento TimeGates for Transactional Archives:
  - Does not require rewriting URIs for self-contained-ness
  - Works well with automated, distributed access patterns

- Access via Browser add-on is fast and seamless
- Server and Browser archiving code will be released

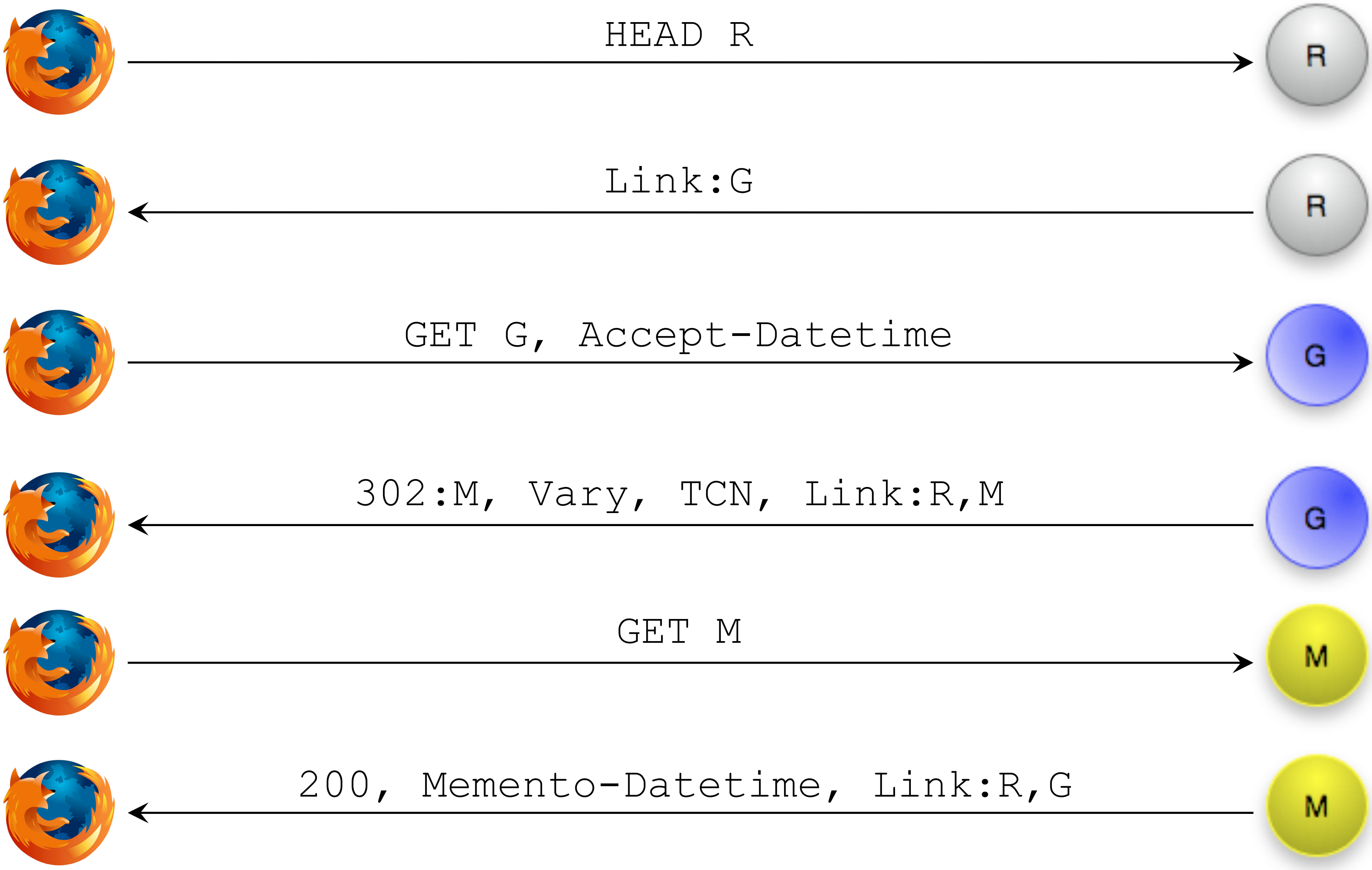
Memento wants to make Navigating the Web’s Past Easy

Learn: http://www.mementoweb.org/

Talk: http://groups.google.com/group/memento-dev

Use: http://bit.ly/memfox

Memento HTTP Flow



HEAD R

Link:G

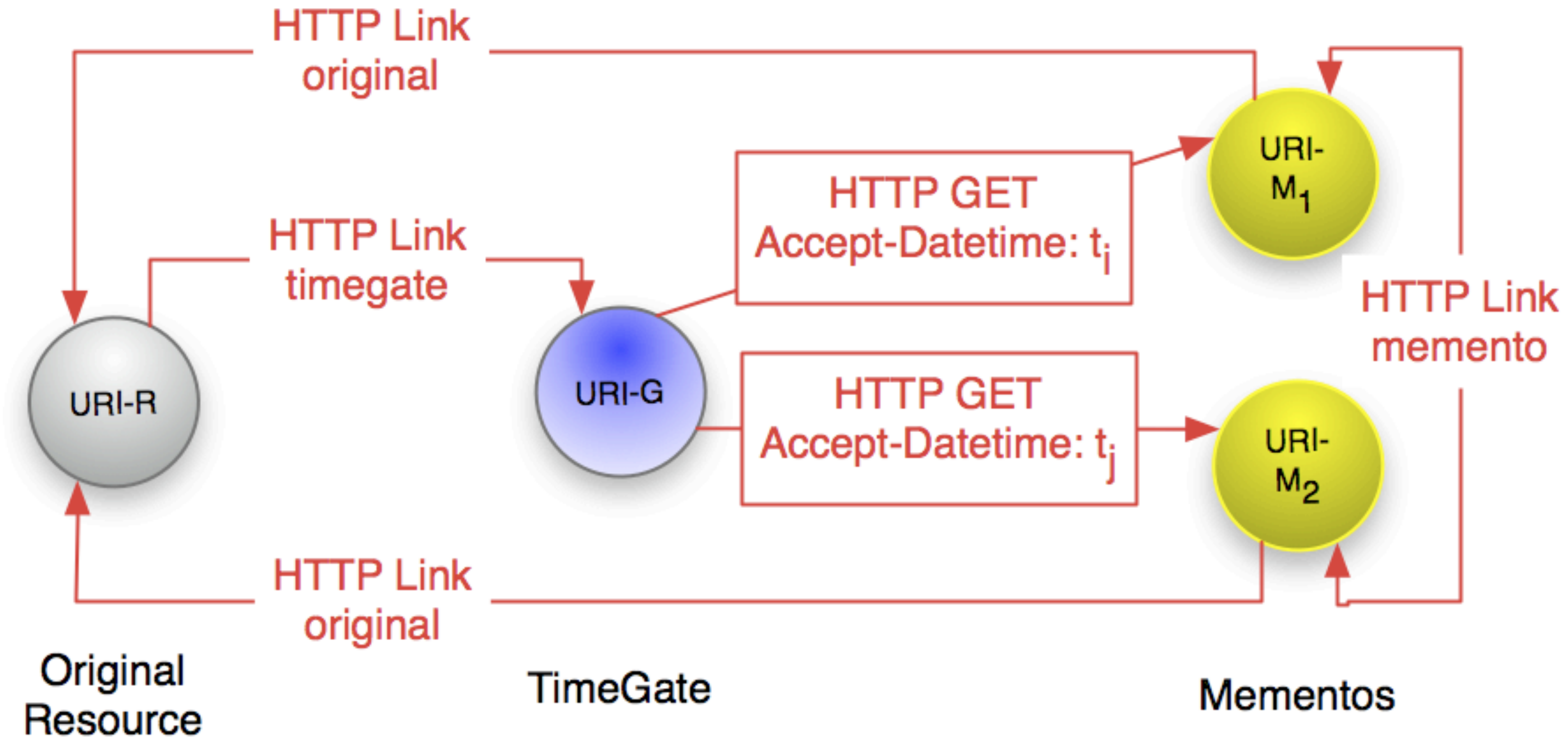
GET G, Accept-Datetime

302:M, Vary, TCN, Link:R,M

GET M

200, Memento-Datetime, Link:R,G

The Web with Time Dimension added by Memento


HTTP Link
original
HTTP GET
Accept-Datetime: t_i
URI-
M_1
HTTP Link
timegate
HTTP Link
memento
URI-R
URI-G
HTTP GET
Accept-Datetime: t_j
URI-
M_2
HTTP Link
original
Original
Resource
TimeGate
Mementos