

Versioning for HTTP Resources

draft-toomim-httpbis-versions-00

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Review from IETF 118

Braid-HTTP: Four independent extensions to HTTP.
From *state transfer* to *state synchronization*.

1. Versioning ← Today!

2. Subscriptions

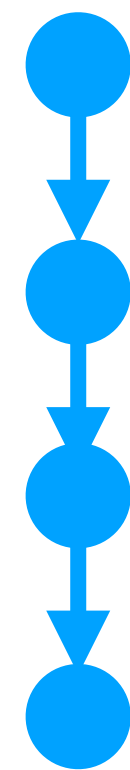
3. Patches

4. Merge-Types

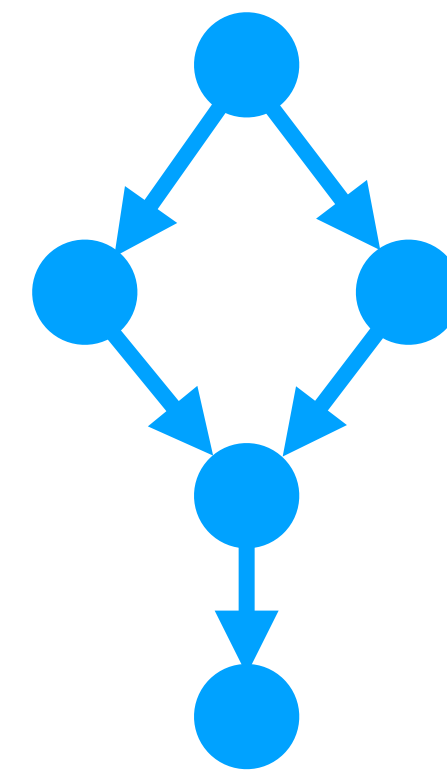
Versioning of HTTP Resources

not APIs!

HTTP resources change over time. Each change to a resource creates a new **version** of its state.



Version history
can be **linear**



Distributed system history
forms a **DAG**

Resource Versioning in HTTP today

1. Last-Modified

Last-Modified: **Sat, 6 Jul 2024 07:28:00 GMT**

2. ETag

ETag: **W/"2u34fa7yorz0"**

3. Additional URLs

e.g. in WebDAV, Memento, Link Relations

<https://unpkg.com/braid-text@0.0.18/index.js>

Limits of Today's Versioning

	Last-Modified	ETag	Additional URLs
Store & Access History			✓
Marks Time vs. Contents	✓		✓
Branching (Distributed) Time			~
Independent of URL Allocation	✓	✓	
Customizable Time Formats			~

Abilities of Generalized Versioning

- Incremental RSS Updates
- Git repo as website
- CDN with historical archive
- Apply PATCH at old versions
 - Rebase for other clients
- Send PUT/PATCH/POST edits while offline
- Collaborative Editing

Design Goals

- Version marks **point in time**
- Time can **branch** and **merge** (distributed)
- History of versions can be **stored** and **accessed**
- **Extensible** to new time **formats** (optimizable!)
- Additional URLs not required

Discussion: Is the WG interested in this problem?

Resource Versioning Proposal

- **Version:** and **Parents:** headers
 - Version = set of Version IDs
- **Version ID** = unique string identifying an edit
- **Version-Type:** defines format of string (optimizations!)
- Extend **GET/PUT/POST/PATCH** with version semantics

Version: and Parents: headers

```
PUT /foo
Version: "dkn7ov2vwg"
Parents: "ajtva12kid", "cmdpvkp112"

"Hello world!"
```

```
GET /foo
Version: "dkn7ov2vwg"
```

```
HEAD /foo
```

```
HTTP/1.1 200 OK
Version: "dkn7ov2vwg"
```



Varieties of GET

```
GET /foo
```

```
GET /foo  
Version: "dkn7ov2vwg"
```

```
GET /foo  
Parents: "ajtva12kid"
```

```
GET /foo  
Version: "dkn7ov2vwg"  
Parents: "ajtva12kid"
```

Varieties of PUT/POST/PATCH

```
PUT /foo
```

```
PUT /foo  
Version: "dkn7ov2vwg"
```

```
PUT /foo  
Parents: "ajtva12kid"
```

```
PUT /foo  
Version: "dkn7ov2vwg"  
Parents: "ajtva12kid"
```

Multiresponse & Current-Version

```
GET /foo  
Version: "3"  
Parents: "1a", "1b"
```



```
HTTP/1.1 104 Multiresponse  
Current-Version: "3"
```

```
HTTP/1.1 200 OK  
Version: "2"  
Parents: "1a", "1b"
```

```
"Hello!"
```

```
HTTP/1.1 200 OK  
Version: "3"  
Parents: "2"
```

```
"Hello World!"
```

Advanced features via **Version-Type**

```
Version-Type: vector-clock  
Version: "{mike: 5, seph: 10, greg: 3}"
```

```
Version-Type: rle  
Version: "mike-573"  
Parents: "mike-400"
```

Enables **1000x** history
compression!

```
Version-Type: git  
Version: "1d5f89f8843b33b91d62bf95877e46b23fd86741"  
Parents: "1cf6ab4ed836d4d7308ac93edbc6fd18a69ef88f"
```

Example: Resumeable Uploads

```
PUT /something
Current-Version: "900"
Version-Type: bytestream
Content-Length: 900

<binary data of length 900>
```

For a bytestream:
Version = length-of-stream!

```
HEAD /something
Parents: "0"
```

How much have you received?

```
200 OK
Parents: "0"
Version: "500"
```

I have up to 500!

Example: Git

```
GET /repo/readme.md
```



```
HTTP/1.1 200 OK
Content-Type: text/markdown
Version-Type: git
Version: "9531a9702af0d90dd489050ed8e25f87912a9252"
Parents: "3a4c361f8e0349fe4b25c1ff46ebec1cec66e60f"

...
```

Implemented in Production

dt.braid.org/todos.txt

https://dt.braid.org/todos.txt

This is live updating over Braid-HTTP!
These are what the messages look like.

YES! Nice. ^(-v-)^ =)

Braid Elements Console Sources Network Performance Memory

Display Raw Messages

Version	Range	Content
dgayb-3	text 90:91	= deleted
dgayb-5	text 90:90	= =-
lptfk-17	text 89:93	= deleted
dgayb-8	text 89:89	= ^)
dgayb-12	text 91:91	= (-v-
dgayb-13	text 96:96	= ^
lptfk-20	text 89:89	= =)
3i14s-2	text 100:100	= aa
3i14s-4	text 101:103	= deleted

Request **Response**

Content-Type: Text text/plain
Merge-Type: dt
Subscribe: true
Version:
Parents:

PeeryView

https://peeryview.org

Your view of Everything

About Users Search Post Mike

Data I Wish I Had When I Applied for a Ph.D. jeffhuang.com · 11/3/2021

Why Decentralized Science? nadia.xyz · 3/5/2022

Mockups for Adam Marblestone web.mit.edu · 5/6/2022

A Possible Fix for Scientific Publishing blog.peer-review.io · 8/1/2022

Seph's breakthrough CRDT news.ycombinator.com · 11/1/2021

Short-term roadmap for braiding github.com · 6/3/2022

invisible.college:3007

Not Secure | http://invisible.college:3007

gg wp: gg wp

Mike: goodgame wordpress

Mike: we like this

Mike: we like it we like it like this

Mike: we like we like

Mike: we like it more

ty: testing from hype

Mike: Send

Braid Elements Console Sources Network

Display Raw Messages

Version	Range	Content
default-1	json	=[{"from": "Mike", "body": "Hi"}, {"from": "James", "body": "Hello"}, {"from": "brynsk", "body": "hello"}, {"from": "Santi", "body": "hello"}, {"from": "Mike", "body": "Yeah!"}, {"from": "Mike", "body": "new message!"}, {"from": "Mike", "body": "sup"}, {"from": "tyler", "body": "sup"}, {"from": "tyler", "body": "hihi"}, {"from": "Mike", "body": "Hey guys!!!!!!!!!!"}, {"from": "Laura", "body": "hello hello"}, {"from": "Aral", "body": "Hello there :)"}, {"from": "Laura", "body": "There he is!"}, {"from": "Mehdi", "body": "Hello from Belgium!"}, {"from": "Dictyostelium discoideum", "body": "Check me ouuutt"}, {"from": "tyler", "body": "aaa"}, {"from": "tyler", "body": "ok"}, {"from": "tyler", "body": "dope"}, {"from": "tyler", "body": "testing"}, {"from": "Autobots", "body": "ee"}, {"from": "Default Name", "body": "e"}]

Request **Response**

Content-Type: Text application/javascript
Merge-Type:
Subscribe: true
Version:
Parents:

Generalized Versioning of HTTP Resources

Discussion:

- Q1: Interest in the problem?
- Q2: Is a solution feasible?
- Q3: Adopt?