

UNIVERSITY OF
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The Memento Protocol

COMP3220 Web Infrastructure

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The Memento protocol

HTTP can say when a representation was last modified

HTTP (as-is) can't say what past representations were like

Some use cases require us to be able to see past representations

- Web archives
- Versioning

Memento is an HTTP-based protocol that enables us to select and retrieve specific past representations, using content negotiation over datetimes

Memento resource types

Original resource

- A resource that exists (or used to exist), and for which access to one of its prior states may be required

A teal-colored icon with a wavy bottom edge, containing the text "URI-R" in white.

Memento resource

- A resource that encapsulates a prior state of an original resource. A *memento* for an *original resource* as it existed at time *t* is a resource that encapsulates the state (i.e. has the same representation as) the *original resource* had at time *t*

A teal-colored icon with a wavy bottom edge, containing the text "URI-M" in white.

TimeGate resource

- A resource that is capable of datetime negotiation to support access to *mementos* of an *original resource*

A teal-colored icon with a wavy bottom edge, containing the text "URI-G" in white.

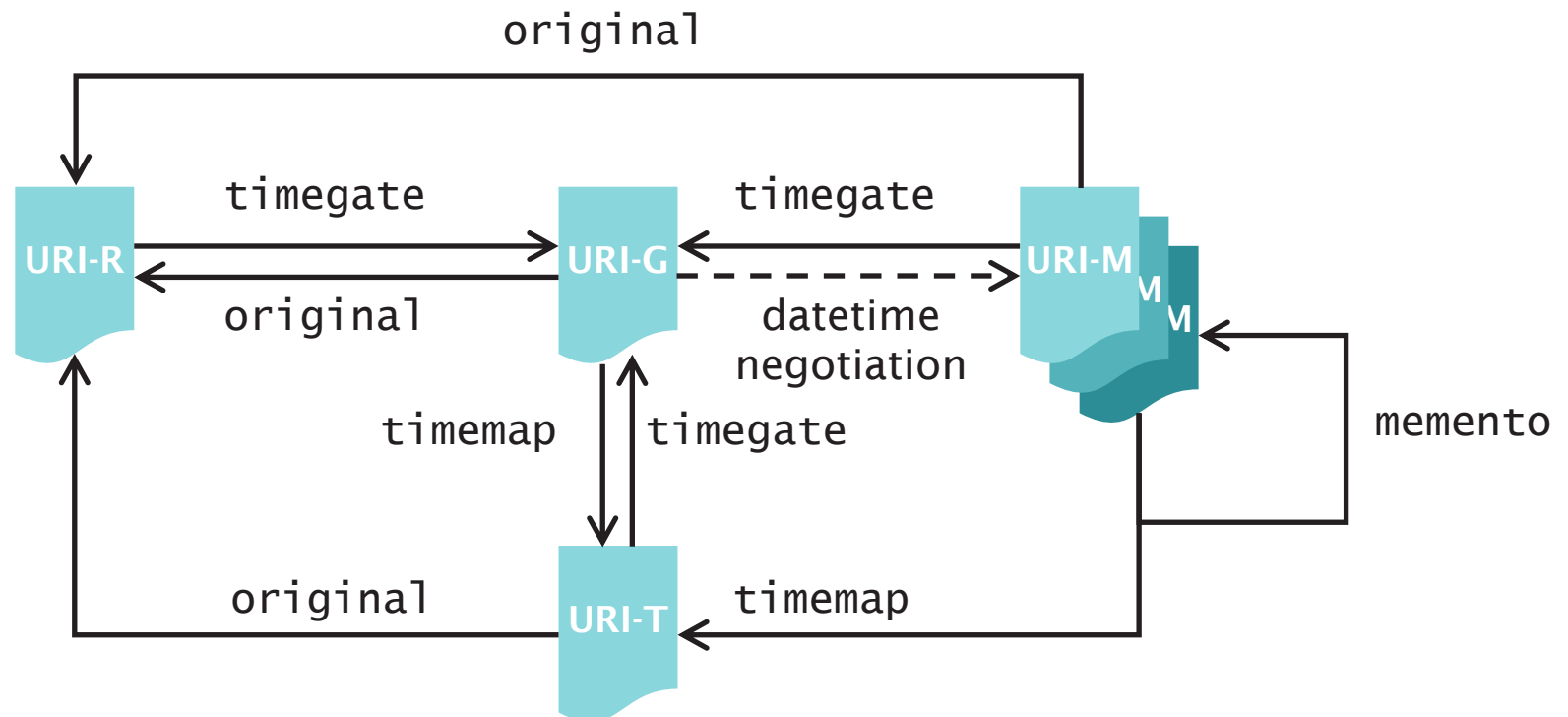
TimeMap resource

- A resource from which a list of URIs of *mementos* of an *original resource* is available

A teal-colored icon with a wavy bottom edge, containing the text "URI-T" in white.

Memento links

Relationships between the different resources are indicated using typed links



Memento headers

Memento-DateTime:

- Used by an origin server to indicate that a resource is a past state (a memento) of an original resource dating from the given datetime
- Constitutes a promise that the state (i.e. representation) of the memento will no longer change

Accept-DateTime:

- Used by a user agent on a TimeGate resource to indicate that it wishes to access a past state of the original resource for that TimeGate

Link:

- Used to encode links to other Memento resources

Vary:

- Used with the value `accept-datetime` to indicate that a resource is subject to content negotiation by datetime

Example

Original resource

`http://example.org/`

TimeGate resource

`http://arc.example/tg/http://example.org/`

TimeMap resource

`http://arc.example/tm/http://example.org/`

Memento resources

`http://arc.example/20190603230534/http://example.org/`

`http://arc.example/20190812110555/http://example.org/`

`http://arc.example/20201024154919/http://example.org/`

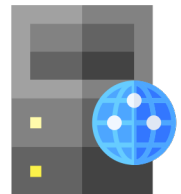
Locating the TimeGate



```
GET / HTTP/1.1  
Host: example.org
```

```
HTTP/1.1 200 OK  
Link: <http://arc.example/tg/http://example.org/> ;  
      rel="timegate"
```

```
...
```



link to timegate

Negotiating a Memento



```
GET /tg/http://example.org/ HTTP/1.1
Host: arc.example
```

```
Accept-DateTime: Mon, 22 Jun 2020 10:00:00 GMT
```

requested
datetime

```
HTTP/1.1 302 Found
Vary: accept-datetime
```

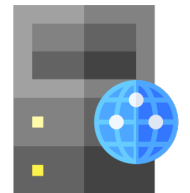
redirection
to memento

```
Location: http://arc.example/20190812110555/http://example.org/
```

```
Link: <http://example.org/>;
      rel="original",
```

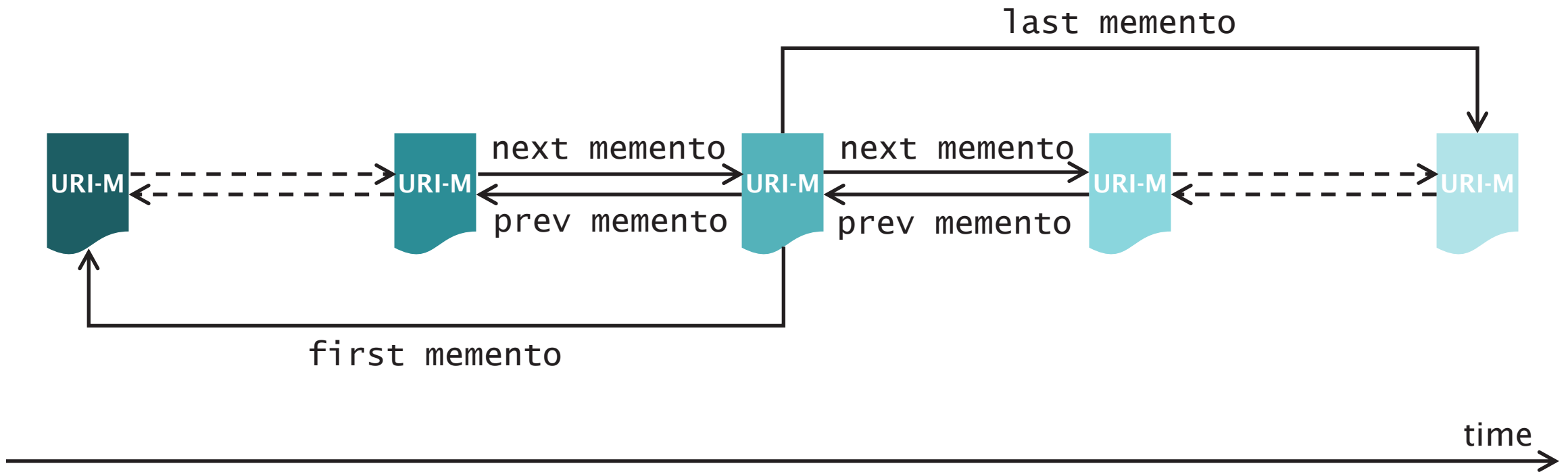
link to
original
resource

```
<http://arc.example/tm/http://example.org/> ;
  rel="timemap";
  type="application/link-format" ;
  from="Mon, 03 Jun 2019 23:05:34 GMT";
  until="Sat, 24 Oct 2020 15:49:19 GMT",
```



link to
timemap

Inter-Memento links



Retrieving a Memento



```
GET /20190812110555/http://example.org/ HTTP/1.1
Host: arc.example
Accept-DateTime: Mon, 22 Jun 2020 10:00:00 GMT
```

```
HTTP/1.1 200 OK
```

```
Memento-DateTime: Mon, 12 Aug 2019 11:05:55 GMT
```

datetime of
memento

link to
original

```
Link: <http://example.org/>;
      rel="original",
```

link to
timegate

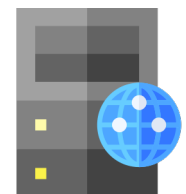
```
<http://arc.example/timegate/http://example.org/> ;
      rel="timegate" ,
```

```
<http://arc.example/tm/http://a.example.org/> ;
      rel="timemap";
      type="application/link-format" ,
```

link to
timemap

other
mementos

```
<http://arc.example/20190603230534/http://example.org/> ;
      rel="first prev memento" ,
<http://arc.example/20201024154919/http://example.org/> ;
      rel="last next memento"
```



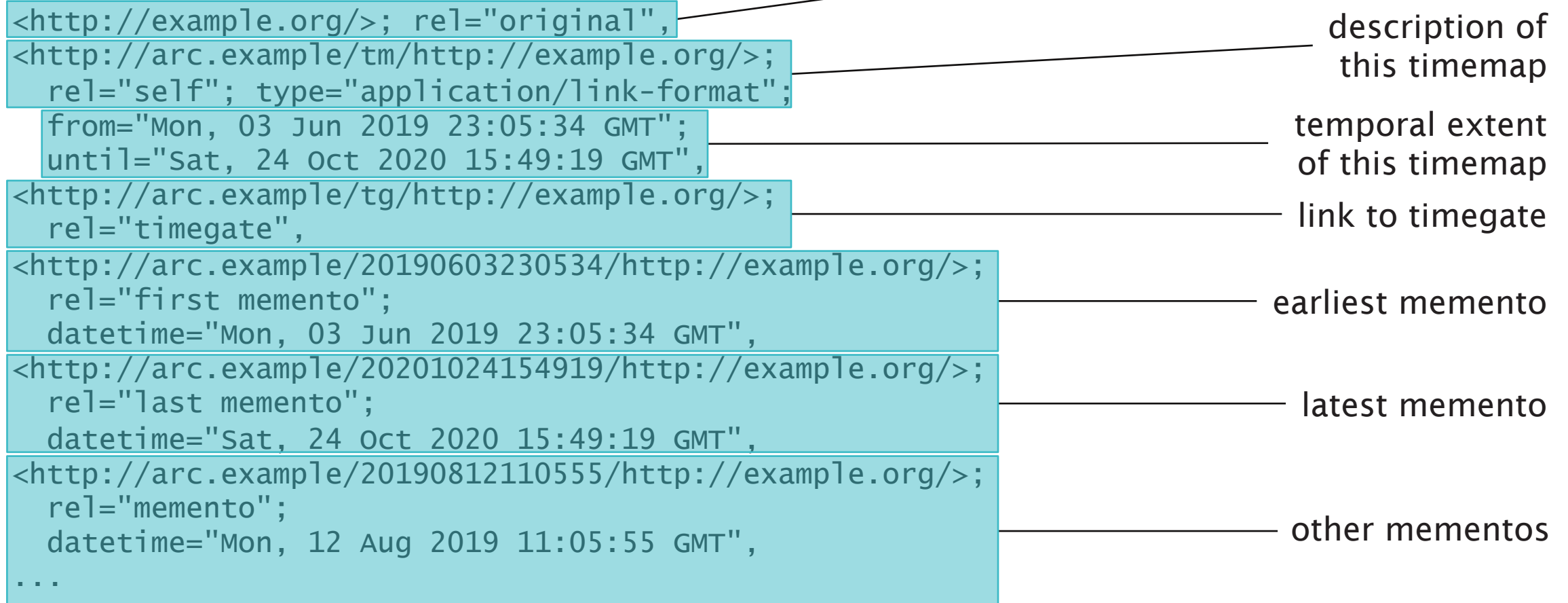
Memento TimeMap

A TimeMap for an original resource contains links to all of the mementos that are available for that original resource

May be expressed in different media types (so subject to content negotiation)

- `text/html` (i.e. a conventional web page)
- `application/link-format`
- `application/rdf+xml`, `text/n3`, `application/n-triples`, etc?

application/link-format



Further reading

Van de Sompel, H. et al (2013) *HTTP Framework for Time-Based Access to Resource States – Memento*. RFC7089.

<https://tools.ietf.org/html/rfc7089>

The Memento Project

<http://mementoweb.org/about/>

Nottingham, M. (2017) *Web Linking*. RFC8288.

<https://tools.ietf.org/html/rfc8288>

Shelby, Z. (2012) *Constrained RESTful Environments (CoRE) Link Format*. RFC6690.

<https://tools.ietf.org/html/rfc6690>

IANA Link Relation Types

<https://www.iana.org/assignments/link-relations/link-relations.xhtml>

Next Lecture: RESTful Web Services