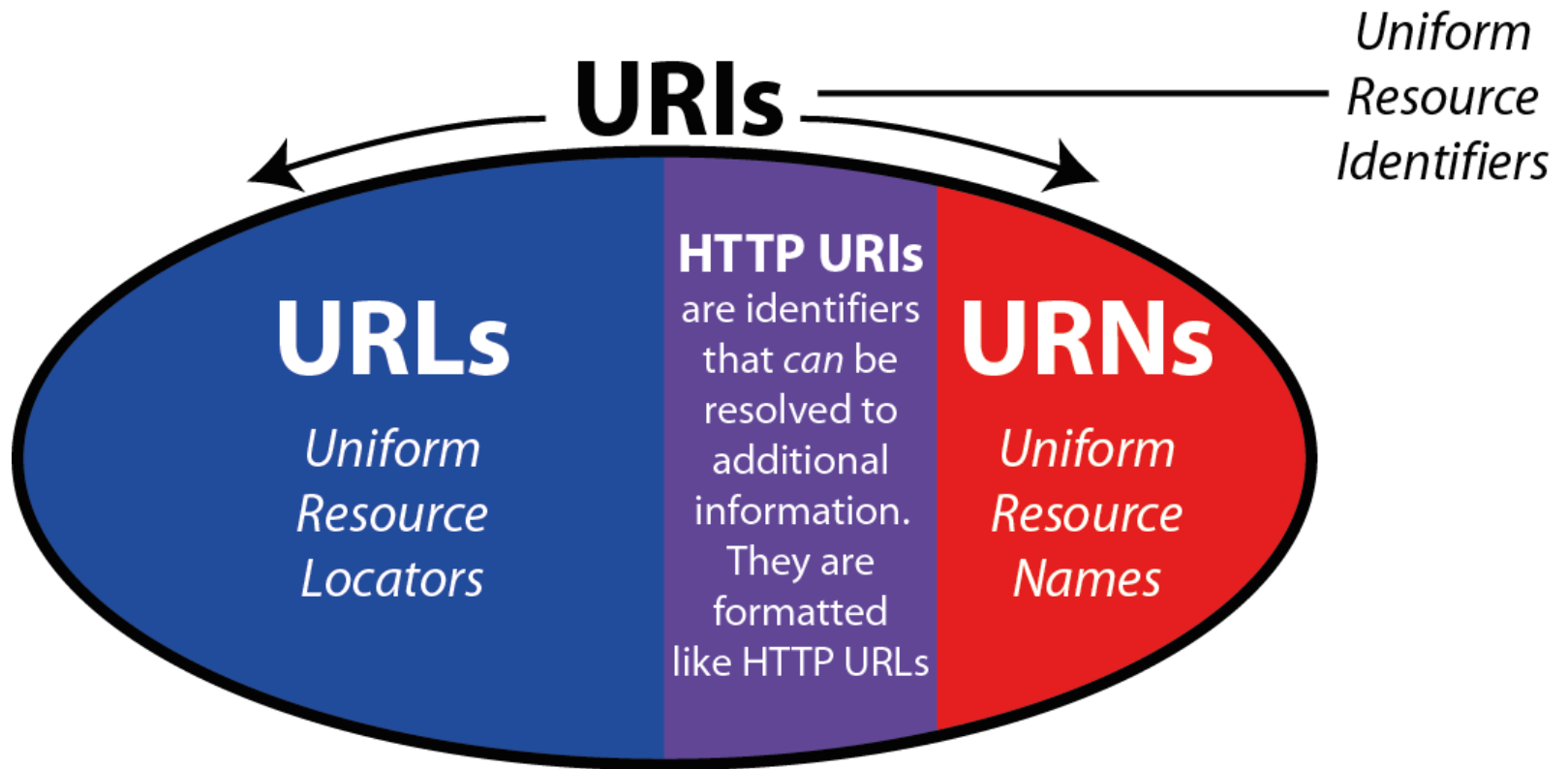


HTTP URI proposal
for use in GS1 Digital
(GTIN+ on the Web)
and with future 2-D barcodes

URLs vs URIs

Uniform Resource Identifiers (URIs) are the general term including:

- Uniform Resource Locators (URLs) – e.g. web addresses
- Uniform Resource Names (URNs) – e.g. pure identity EPCs



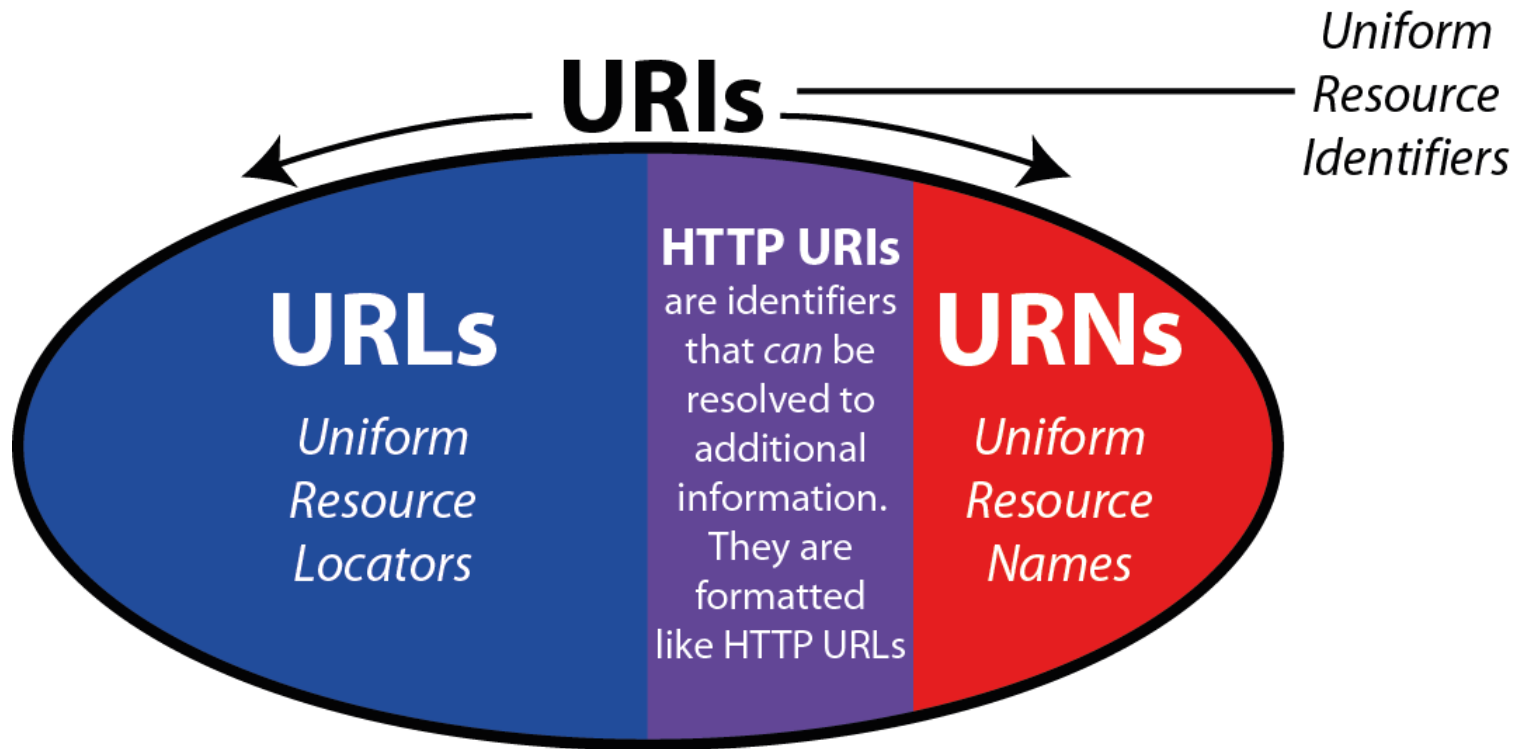
HTTP URIs

HTTP URIs can function **both** as names and as locators

They're globally unambiguous (point to just one resource)

They're also self-resolving on the web ('clickable') – unlike URNs

They're widely used for semantic web markup / linked data



Why use HTTP URIs?

Search engines are putting much more emphasis on **extracting meaning** from web pages.

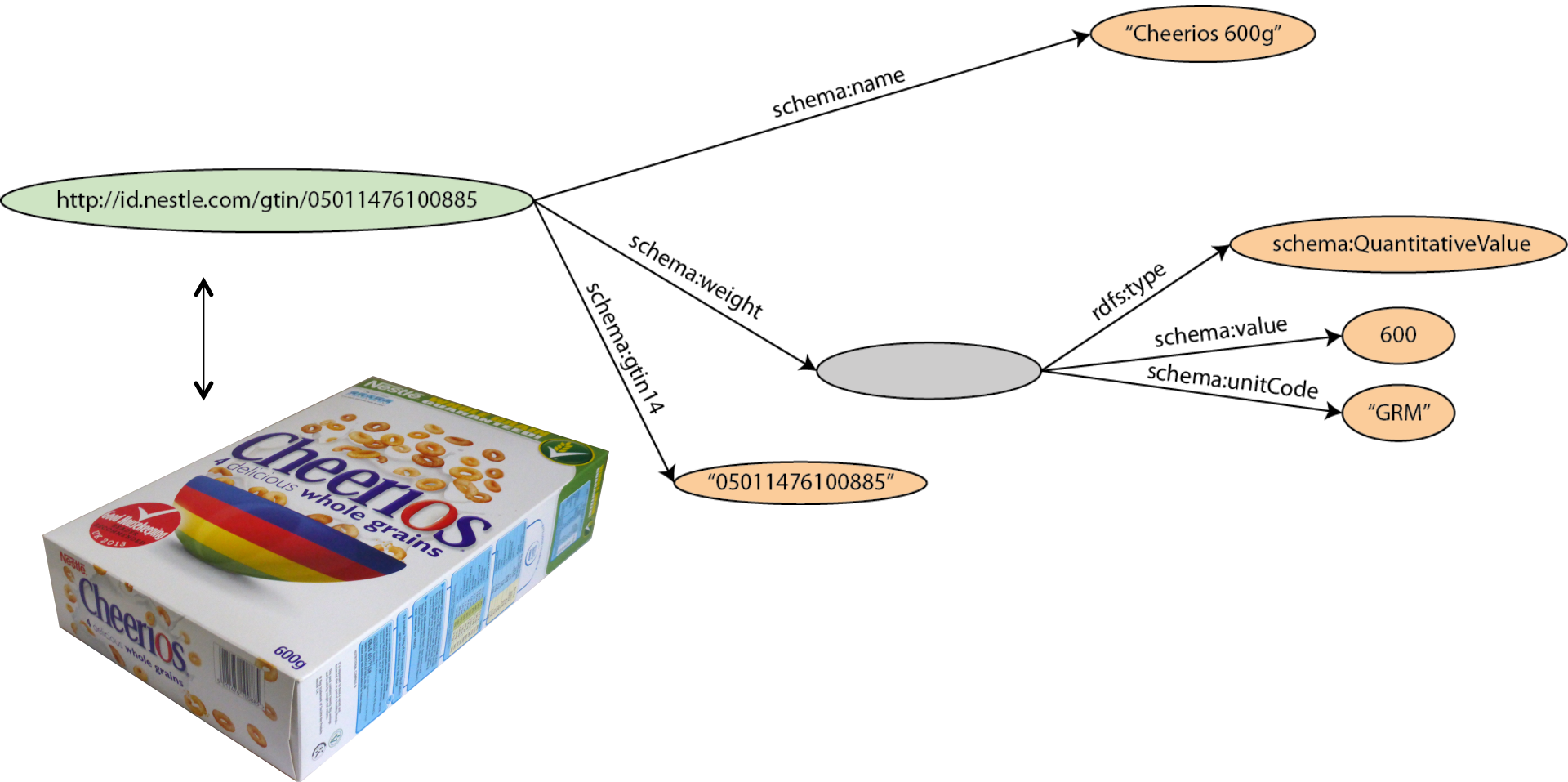
If you **put meaningful factual information in your web pages** about your products or your stores, you can **expect better search results**, e.g. Google Rich Snippets.

To make factual information in your web pages accessible to software and search engines, you **use semantic markup** such as RDFa, JSON-LD or Microdata. These let you write simple logical sentences about the properties of your products or stores.

The **subject** of each of these logical sentences (facts, RDF triples) should be an HTTP URI or it can be an un-named blank node.

If we use an HTTP URI for product identifiers, (in future 2-D barcodes), we can **directly retrieve factual information about products**

Using HTTP URIs to write facts



(N.B. Fictitious URI example above – not endorsed by Nestlé)

HTTP URIs & Semantic Web / Linked Data

Linked Data / Semantic Web technology uses HTTP URIs to identify anything (cities, people, places, properties, relationships, etc.)

e.g. <http://dbpedia.org/resource/London> identifies London

<http://sws.geonames.org/2643743/> identifies London

To obtain information about a resource, (e.g. London), you can make a web request for it (HTTP GET) – just using a web browser

Because your web browser cannot deliver London to you, the website is configured to suggest a redirect to an information representation of London. This is an **HTTP 303 ‘See Other’ redirect**.

<http://dbpedia.org/resource/London> redirects to <http://dbpedia.org/page/London>
<http://dbpedia.org/data/London>

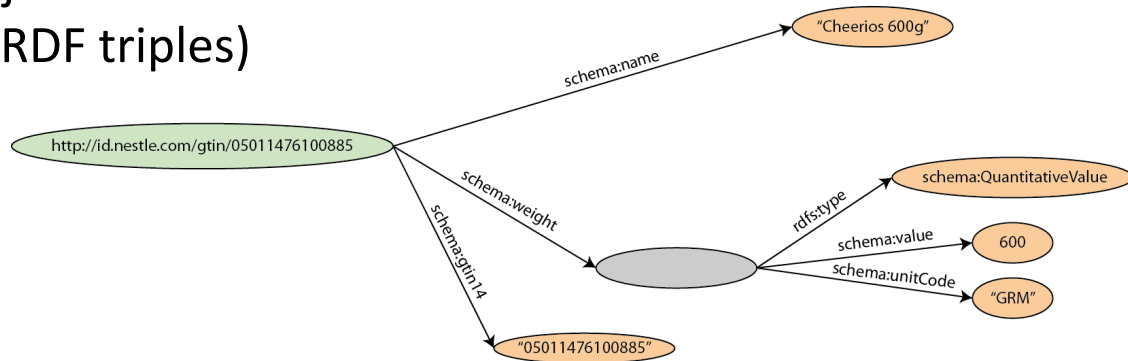
Human-readable or machine-readable data

When you make an HTTP GET request, you can **choose** whether you want to receive a human-readable web page or a machine-readable dataset. Both are accessed via the **same** HTTP URI

We use Content-Negotiation to select the *type* of data we want.

Web browsers will usually request a **text/html** representation for human-readable web pages.

Smartphone apps and search engines might request **text/turtle** or **application/ld+json** if they just want to retrieve the facts (simple logical sentences – RDF triples)



What does this mean for future 2-D barcodes?

Encoding a fixed URL to a web page about a product is a very limited (inflexible) way to web-enable the next generation of 2-D barcodes.

HTTP URIs open up many more possibilities for providing data about products **both as human-readable web pages and as machine-readable datasets** for search engines and smartphone apps

By encoding a short HTTP URI prefix in a 2-D barcode, we can build the full HTTP URI using the remaining identification keys and data elements.

Webserver configuration files take care of serving the information in the requested format - and can still redirect to / serve existing product web pages (as well)

What does this look like for future 2-D barcodes?

Suppose we use a GS1 QR code for a future 2-D barcode.

We might encode: (spaces included for ease of reading)

]Q3 XX http://id.nestle.com 01 05011476100885 21 ABC321

The diagram illustrates the components of the GS1 QR code data string:]Q3 XX http://id.nestle.com 01 05011476100885 21 ABC321. Brackets and labels identify each part: a blue bracket under]Q3 is labeled 'GS1 QR'; a yellow bracket under XX is labeled 'New GS1 AI for short HTTP URI prefix – not AI 8200'; a grey bracket under http://id.nestle.com is labeled 'HTTP URI prefix'; a red bracket under 05011476100885 is labeled 'Product GTIN'; and a green bracket under ABC321 is labeled 'Serial #'. A vertical line connects the 'New GS1 AI' label to the 'GS1 QR' label.

Software in the mobile device would restructure this as:

<http://id.nestle.com/gtin/05011476100885/ser/ABC321>

(N.B. Fictitious example above – not endorsed by Nestlé)

Web-enabling NGPI

An HTTP URI such as:

<http://id.nestle.com/gtin/05011476100885/ser/ABC321>

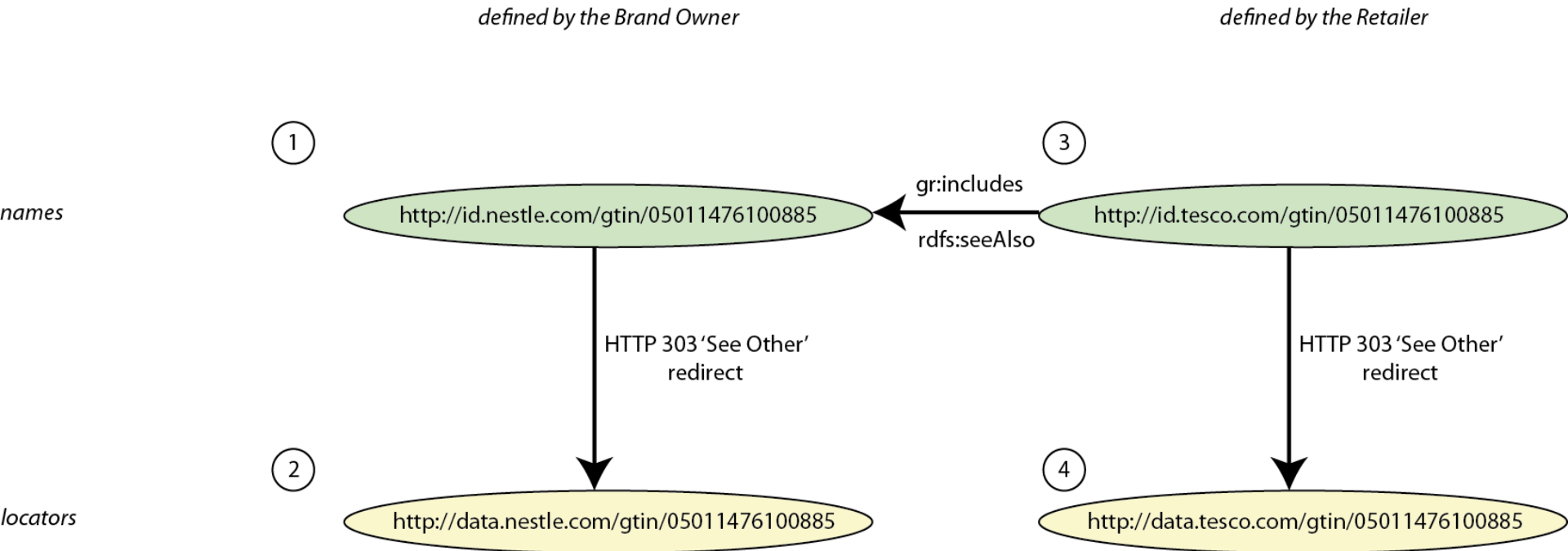
can be used by the brand owner as the subject of RDF triples (facts) about the product instance, such as date of manufacture.

Anyone can retrieve these facts – either as a web page or as machine-readable data (e.g. via smartphone apps / search engines) to find out more information about the product.

The webserver handling those URIs may redirect to the existing product web page for the product, but also to data pages, e.g.

<http://data.nestle.com/gtin/05011476100885/ser/ABC321>

HTTP URIs for brand owners and retailers



(N.B. Fictitious examples above – not endorsed by Nestlé or Tesco)

Advantages of this approach

An HTTP URI such as

<http://id.nestle.com/gtin/05011476100885/ser/ABC321> is...

- **Compact / efficient**
 - only encode a short HTTP URI prefix
(e.g. <http://id.nestle.com>) in the 2-D barcode
- **Stable**
 - doesn't break when the brand owner's marketing team change the structure of the website.
(All redirects / URI re-writing handled via webserver configuration files)
- **Modular**
 - easy to extract elements from HTTP URI and serve information at various levels of granularity
(GTIN, GTIN+Lot/Batch, GTIN+Serial)

Current status / Next steps

Two discussion documents have been written by GS1 staff (Henri Barthel, Robert Beideman) , Ken Traub, Mark Harrison (Auto-ID Labs, Cambridge), including members of the NGPI team (Scott Gray) and intended for discussions with the Open Mobile Alliance.

These documents are available from <http://www.gs1.org/digital>

Formal standardization of these HTTP URI structures will be done within the new GTIN+ on the Web work group and we will work closely with NGPI work group and OMA to avoid divergence or duplication of effort.

A new GS1 Application Identifier will be defined (indicated 'XX' in the previous examples). This serves a different purpose from AI 8200, which may fall into disuse over time. (It's not widely used at present)

Short human-readable labels for Serial, PVN, Lot/Batch and Expiry Date will be defined for use within the HTTP URI structure.