



The Global Language of Business

# GS1 Digital Link: URI Syntax

enabling consistent representation of GS1 identification keys within web addresses to link to online information and services

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## Contributors (to be updated by Greg)

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.14	2020-10-30	Phil Archer	Slight modification to regex to support arbitrary paths before compressed string

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# 1 Introduction

*This section and its subsections are informative*

GS1 defines a wide range of identifiers that underpin the supply chain and retail industry across the world. This document assumes the reader is familiar with these and the concept of GS1 Application Identifiers. If not, please see information on [GS1 identification Keys] and the [GENSPECS] for further background.

This work has been motivated by a number of trends. For example: the desire among retailers to move to 2D barcodes that can carry more information than just the GTIN; the problems of multiple barcodes causing scanning errors through conflicts which suggests a need for a single but multipurpose barcode; the growing expectation among consumers that more information is available online about the products they're considering buying; the brand owner concept of the pack as a media channel linking to multimedia experiences, and more.

As a result of this standard, it is possible to represent GS1 identification keys consistently within Web addresses as well as within barcodes containing Web addresses, such that a single identification approach can support both product identification for supply chain applications *and* a link to online material for consumer and business partner interactions. It's this dual functionality and enormous flexibility that is currently not possible when, for example, Brand Owners embed an unstructured Web page address in a QR Code<sup>®1</sup>.

The scope of the work accommodates all Class 1 and Class 2 GS1 Keys and Key qualifiers (e.g., serial number, batch number, consumer product variant) and other relevant attributes as the same technologies are equally applicable to SSCCs, GLNs, GIAIs, GRAIs, GSRNs etc. While the syntax can support Class 2 Keys, it is up to the Class 2 Issuing Agencies to determine whether it's fit for their use. For Class 3 GS1 Keys, GS1 welcomes bilateral discussions with Issuing Agencies to see where alignment is possible.

This GS1 standard references a number of third-party standards from the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C).

## 1.1 How the GS1 Digital Link standard documents fit together

Rather than one very long document containing every detail, as of version 1.2, the GS1 Digital Link standard comprises 4 discrete documents:

### **URI syntax** (this document)

This document provides some of the background to the design of GS1 Digital Link, highlighting existing techniques and practices that underpin the World Wide Web, and applying those to the GS1 system. The normative portions set out the detailed syntax of Web addresses (HTTP URIs) that encode GS1 identifiers with exactly the same precision and expressivity as the AI-based element syntax used across the GS1 system, notably in the GS1 General Specifications. The GS1 Digital Link URI syntax distinguishes between primary keys, such as GTIN and GLN, key qualifiers, such as batch/lot and GLN extension, and attributes such as expiry date and ship to address. The GS1 Digital Link URI syntax is the foundation on which all other aspects of the standard are built.

### **Compression**

A GS1 Digital Link URI that contains a set of identifiers and attributes may exceed the capacity of some data carriers. This document defines a compression/decompression algorithm that minimises the length of those Web URIs while retaining two critical features: 1) that the compressed form is still a URL on the same domain as the uncompressed form, that is, there is no change in ownership of the URL; 2) that it can be decompressed and the GS1 keys extracted *without* an online lookup.

### **Resolution**

A GS1 Digital Link URI is a particular form of URL and *can* be used in exactly same same way as any other URL (this is an important design feature). However, it can also be the gateway to multiple sources of information, both human and machine-readable. This document defines how

<sup>1</sup> Unless otherwise specified, the term 'QR Code<sup>®</sup>' refers to the widely used [ISO/IEC 18004 QR Code<sup>®</sup>](#), excluding the GS1 QR Code that recognises the FNC1 character. 'QR Code' is a registered trademark of Denso Wave, a subsidiary of Denso Corporation. Both the [ISO/IEC 18004 QR Code<sup>®</sup>](#) and GS1 QR Code follow the encoding scheme described in ISO/IEC 18004 Information technology — Automatic identification and data capture techniques — QR Code bar code symbology specification, 3rd edition 2015-02-01.

the keys in a GS1 Digital Link URI can be 'resolved' to those information sources in such a way that information systems and apps can discover them automatically. Resolvers are what makes the standard operational for the GS1 community and the industries served.

### Semantics

Devices like scanners and point of sale terminals, PIM systems, product catalogues and more that are designed specifically to work with GS1 identifiers and data carriers, are all programmed to function within that particular framework. GS1 Digital Link puts things like GTINs, SSCCs and GRAIs onto the Web alongside countless other identifiers and ways of working. This document expresses the meaning behind the GS1 Digital Link standard in a way that the Web at large can understand and process. It makes use of, and extends, the GS1 Web Vocabulary.

## 1.2 Typographical conventions used in this document

This document includes a lot of examples of GS1 Digital Link URIs such as:

```
https://example.org/414/{gln}/254/{glnExtension}
```

```
https://example.org/01/{gtin}{?exp}
```

The use of the monospace font indicates that the text has meaning for computers. Further, these examples follow the convention used in [RFC 6570]. The places where the values of variables should be inserted are written in braces, so, for example, {gtin} means "insert gtin here". All other text in the URI is a literal string to be used as written. As explained in [RFC 2606] and [RFC 6761], the domains example.com, example.org and example.net are second-level domain names reserved by the Internet Assigned Numbers Authority (IANA) for use in documentation. These should be understood as a placeholder for any registered second-level domain name.

## 2 Conformance to GS1 Digital Link

*This section is normative*

The GS1 Digital Link standard comprises a number of discrete documents against which conformance can be asserted. The core of this standard, GS1 Digital Link URI syntax, is expressed using ABNF grammar [RFC 5234] in section 4 such that conformance can be determined with certainty.

There is no single conformance statement for the entirety of GS1 Digital Link. It is therefore inappropriate to make a formal claim of broad conformance without citing the specific standard with which conformance is claimed.

It is worth noting that a GS1 Digital Link URI, like any Web URI or URL, does not have any intrinsic meaning. It may be treated in exactly the same way as any URL. It is only if it is parsed by a GS1-aware system that GS1 application identifiers and their values can be extracted and processed. Examples of such systems include scanners that may treat a GS1 Digital Link URI as an alternative syntax to element strings, and conformant GS1 resolvers. Applications SHALL NOT assume that a URL that follows the syntax defined in this standard will point to a resolver. One way to test whether a Web URI does or does not point to a GS1 conformant resolver is to check for the presence of a Resolver Description File in the relevant Well-Known location /.well-known/gs1resolver [RFC 8615]. Details of the Resolver Description File are defined in GS1 DigitalLink: Resolution [DL-Resolution].



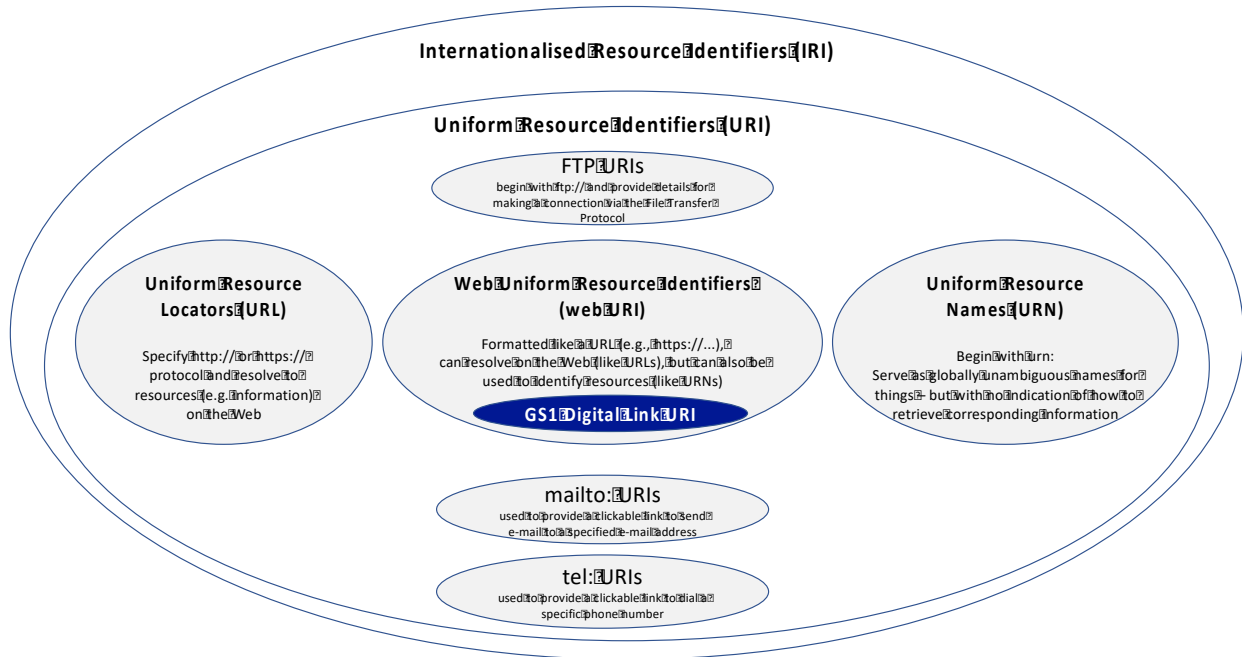
**NOTE:** This standard discusses complete URIs encoded in data carriers such as QR codes and NFC tags. The potential use of software to construct those URIs from components discovered through scans of, for example, UPC/EAN barcodes or GS1 DataMatrix symbols, is out of scope.

### 3 What is a URI?

*This section is informative*

This section provides some clarification about what a Uniform Resource Identifier (URI) is, how URIs relate to Uniform Resource Names (URNs) and Uniform Resource Locators (URLs), as well as providing an explanation of the main structural elements within a Web URI.

**Figure 3-1** URNs and URLs are also URIs



[Figure 3-1](#) shows a Venn diagram in which we see that Uniform Resource Identifier is the broad term that includes Uniform Resource Names (URNs) and Uniform Resource Locators (URLs) as well as URIs with various protocols including http or https, ftp, mailto, tel etc. This means that every URL and every URN is also a URI, since URI is the broader umbrella term. Furthermore, Internationalized Resource Identifiers (IRIs) are an even broader category that support characters from the Universal Character Set/Unicode, whereas URIs only support the ASCII character set. IRIs are defined in [IRIs]. GS1 Digital Link URIs are a subset of Web URIs that conform to this GS1 technical standard.

[Figure 3-2](#) shows another Venn diagram. This time, it shows two capabilities:

1. The capability to easily resolve to resources (e.g. information) on the Web.
2. The capability to provide a globally unambiguous name for anything, whether or not the thing exists only on the Web or in the real world.

The first capability is usually associated with URLs and Web addresses.

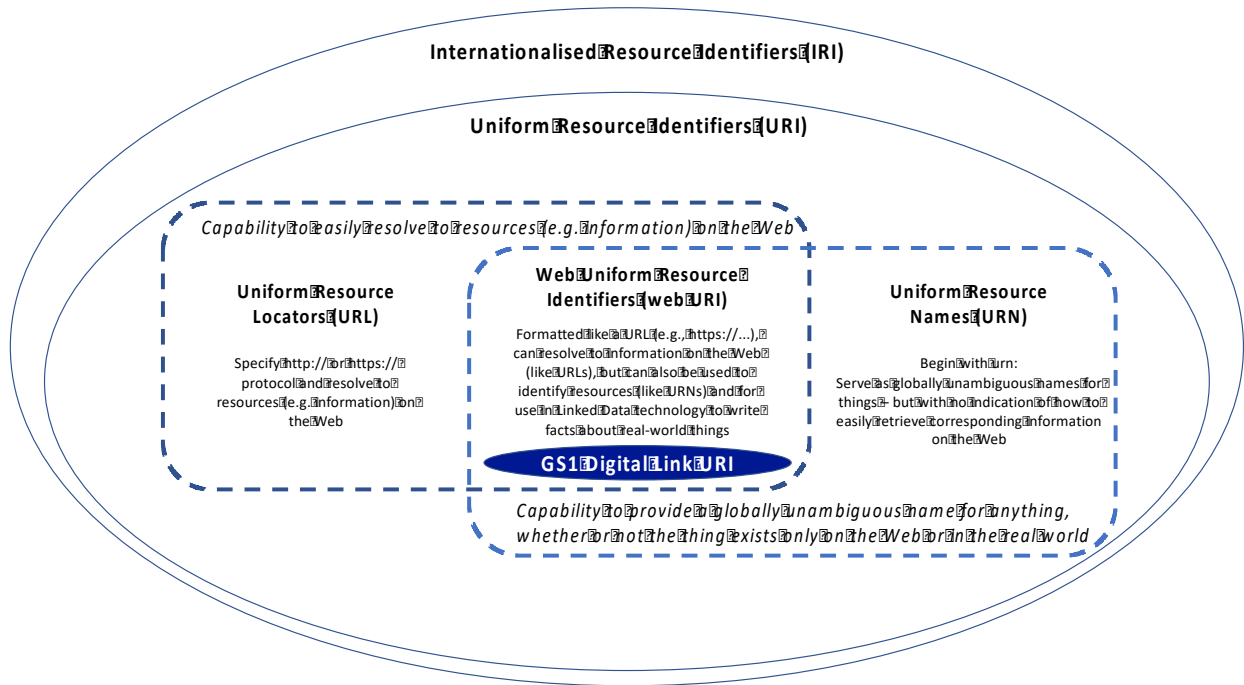
The second capability is usually associated with URNs.

Web URIs exist at the intersection of these two capabilities; in terms of their syntax, they look like URLs because they specify http or https as their protocol - and they can be configured to behave like URLs in terms of supporting Web requests via the http/https Web protocol. However, they are also a perfectly valid way of assigning a globally unambiguous name for anything, whether in the real world or online. Note that 'globally unambiguous' does not mean globally unique; two different things should have distinct URIs in any situation where we want to be able to distinguish between them. However, there may be many URIs that all refer to the same thing, even within the same URI namespace or domain name. It is also possible to use Linked Data [Linked Data] to make an



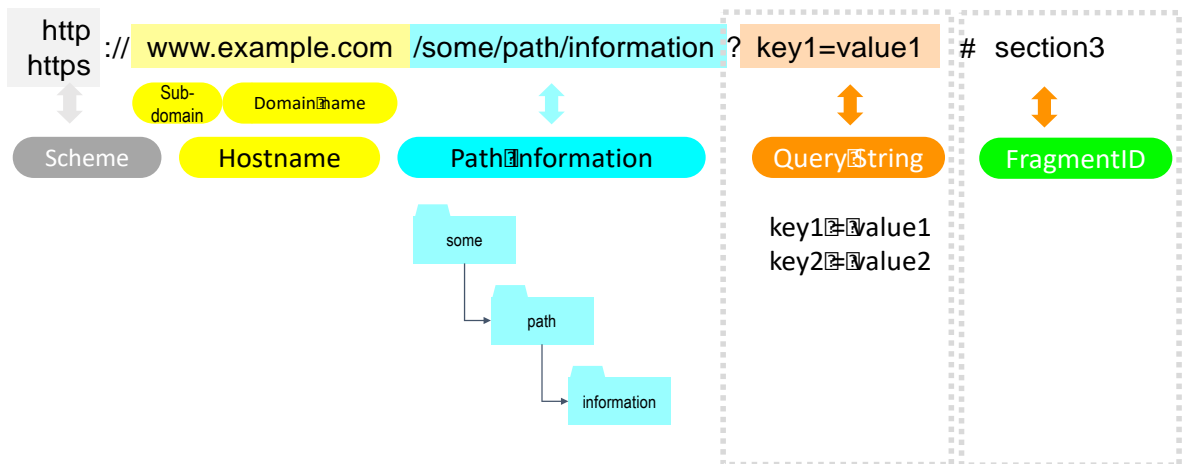
assertion between two URIs to formally express that they both refer to the same thing, even if the URIs are different strings.

**Figure 3-2** A Web URI can act both as a globally unambiguous name for something, as well as providing an easy way to retrieve Web resources (e.g. information) relating to the identified thing



[Figure 3-3](#) provides a brief overview of the internal structural elements of a Web URI:

**Figure 3-3** Internal structure of a Web URI



[Figure 3-3](#) shows the structural elements of a Web URI. The scheme indicates the protocol and (at the time of writing) is always `http://` or `https://` (use of HTTPS is more secure and is therefore recommended as best practice). The hostname is typically a registered Internet domain name or a subdomain of such a registered domain name. Following the domain name, the remainder of the Web URI is case sensitive. The URI path information consists of a number of strings separated by the forward slash character. Although this is just a string, it is often used by the Linked Data

community and in REST interfaces [REST] to represent a collection of resources organised in a conceptually hierarchical way, with the broadest (most general, least specific) category appearing towards the left of the URI path information and with the narrowest (most specific) category appearing towards the right of the URI path information.

This design pattern provides a hint to humans that related Web URIs may exist and can be formed by successively truncating the Web URI path information from right to left, removing each successive segment preceded by its forward slash ( "/" ) character. These related Web URIs may provide information about an object at a broader, more general, less specific granularity.

However, this is only a legible hint to humans. Computer software would typically treat the entire URI (at least up to the fragment identifier) as an opaque indivisible string and would not attempt such truncation. Instead, they will look for explicit links to related URIs, ideally expressed with semantic annotation, using Linked Data properties. These aspects – the machine-processable semantics or meaning of a GS1 Digital Link URI – are explored and defined in detail in GS1 Digital Link: Semantics [DL-Semantics]

The query string enables multiple key=value pairs to be sent to a Web resource. The URI query string appears after the URI path information and consists of everything between the "?" at the end of the path information and the end of the URI or the "#" symbol indicating the start of the fragment identifier. Within the URI query string, key=value pairs may be concatenated using & or ; as a delimiter.

The URI fragment identifier is optional and appears after the query string (if present) and preceded by the "#" character. The URI fragment identifier is typically used to provide a link to an internal subsection of an information resource. The Linked Data community do make use of URIs with fragment identifiers, although the fragment identifier is not useful for passing key=value pairs. Importantly, fragment identifiers are *not* sent to the server but are handled entirely within the client.

Web URIs provide essentially two options for expressing the values of GS1 Application Identifiers - either within the URI path information or within the URI query string. The URI path information is the most appropriate place for expressing a GS1 identification key and an ordered set of optional qualifiers that are used in conjunction with the GS1 identification key to form a compound key that is used to retrieve information about something at a finer level of granularity (e.g. traceability data about an SGTIN, batch/lot-level master data). The query string is appropriate for data attributes of the identified resource such as expiry date, weight etc., as well as being a natural extension point for any additional arbitrary key=value pairs that cannot be expressed using GS1 Application Identifiers (see section [4.10.1](#)); for example, the query string could include a key=value pair to indicate a specific stakeholder role or a specific action or activity or type of service to be accessed. It should be noted that no key=value pair should be repeated with the same key in the URI query string. If a key is repeated, the last defined value for that key takes precedence over any previously defined value.

### 3.1 The GS1 Digital Link URI

GS1 Digital Link provides a syntax for expressing GS1 identifier keys, key qualifiers and data attributes in a format that can be used on the Web in an intuitive manner (via a straightforward Web request) to enable consumers and others to directly access relevant information and services about products, assets, locations, etc. A GS1 Digital Link URI can be encoded natively in any data carrier that can support the encoding of a Web address (URL). This means that additional data carriers such as QR Codes®, digital watermarks, NFC tags and other technologies will also be able to include GS1 identification keys while continuing to provide links to relevant information. When the data carrier is created and such a URL is embedded within it, a scanning device can extract the entire URL, and no further processing by the scanning device, or software therein, is required to construct the URL that is used to access a server where relevant information is stored.

## 4 GS1 Digital Link URI Syntax

*This section and all its subsections are normative*

This section specifies the structure of GS1 Digital Link URIs using the Augmented Backus-Naur Form (ABNF) syntax as defined in [RFC 5234] and updated by [RFC 7405]. ABNF formally expresses how strings of characters (including URIs) are constructed by concatenating smaller components in a sequential order and is machine-processable.

Those smaller components may be defined in terms of further sub-components and/or in terms of sequences of character sets that are also defined by rules.

ABNF also supports repeating components and optional components. Optional components are enclosed within square brackets.

A sequential group of one or more components may be enclosed within round brackets.

Repeating components use the  $m*n(\text{component})$  notation to indicate that the component within the round brackets may appear at least  $m$  times and at most  $n$  times. Default values are  $m=0$ ,  $n=\text{infinity}$ . If either or  $m$  or  $n$  are omitted, their default values are assumed.

Everything following a semicolon on a line is considered to be an explanatory comment.


The notation  $n(\text{component})$  or  $n\text{component}$  where  $n$  is one or more digit characters is equivalent to  $n*n(\text{component})$ , indicating that the component must appear exactly  $n$  times.

A number of comments are provided to explain the meaning of rules.

ABNF is designed primarily to express formal syntax in standards documents. It may also be used to validate strings against that syntax, however, there are limitations. It has no negation option (string SHALL NOT contain "xyz") and it does not support non-greedy matching. For this reason, there are some features of the GS1 Digital Link URI syntax that cannot be tested using ABNF-based parsers. In particular, those with a custom path will fail ABNF-based validation.

### 4.1 Deprecation warning

The formal grammar below, developed initially for the first version of the GS1 Digital Link standard [DL1], supports 'convenience alphas' in place of commonly used application identifiers. For example, '01' can be replaced by 'gtin', '414' by 'gln' etc. These were introduced in an effort to make DL URIs more developer-friendly. Experience has shown that the opposite is true as it introduces complexity for implementations of the standard. Therefore please note that:

-  Convenience alphas will be removed from future version of the standard and hence are flagged as DEPRECATED here.

This is reflected as relevant in later sections of this document.

### 4.2 Character sets

Firstly, a number of character sets are defined for later re-use in subsequent ABNF rules.

DIGIT = "0" / "1" / "2" / "3" / "4" /  
"5" / "6" / "7" / "8" / "9"

BOOLEAN = "0" / "1"

UPPERALPHA = %x41-5A ; A-Z ( ASCII characters 65-90 decimal, 41-5A hex)

LOWERALPHA = %x61-7A ; a-z ( ASCII characters 97-122 decimal, 61-7A hex)

ALPHA = UPPERALPHA / LOWERALPHA ; A-Z or a-z

HEXDIG = DIGIT / "A" / "B" / "C" / "D" / "E" / "F"

DoubleQuote = '"' ; the double-quote character "

The following characters must be represented using percent-encoding (see section 2.1 of RFC 3986 [PercentEncoding]) when used as literal characters within URIs, since many of these have special meanings within Web URIs:

Octothorpe = "%x23" ; percent-encoding of the # character

ForwardSlash = "%x2F" ; percent-encoding of the / character

Percent = "%x25" ; percent-encoding of the % character

Ampersand = "%x26" ; percent-encoding of the & character

Plus = "%x2B" ; percent-encoding of the + character

Comma = "%x2C" ; percent-encoding of the , character

Exclamation = "%x21" ; percent-encoding of the ! character

LeftBracket = "%x28" ; percent-encoding of the ( character

RightBracket = "%x29" ; percent-encoding of the ) character

Asterisk = "%x2A" ; percent-encoding of the \* character

Apostrophe = "%x27" ; percent-encoding of the ' character

Colon = "%x3A" ; percent-encoding of the : character

Semicolon = "%x3B" ; percent-encoding of the ; character

LeftAngleBracket = "%x3C" ; percent-encoding of the < character

Equals = "%x3D" ; percent-encoding of the = character

RightAngleBracket = "%x3E" ; percent-encoding of the > character

QuestionMark = "%x3F" ; percent-encoding of the ? character

The following group of symbol characters is permitted within the 82-character subset of ISO/IEC 646, indicated in Figure 7.11-1 of the GS1 General Specifications [GENSPECS].

XSYMBOL = DoubleQuote / "-" / "." / "\_" / Exclamation / Percent / Ampersand / Plus / Comma / ForwardSlash / Asterisk / LeftBracket / RightBracket / Apostrophe / Semicolon / Colon / LeftAngleBracket / RightAngleBracket / Equals / QuestionMark

The following group of symbol characters is permitted within the 39-character subset of ISO/IEC 646, indicated in Figure 7.11-2 of the GS1 General Specifications [GENSPECS].

YSYMBOL = "-" / Octothorpe / ForwardSlash

The following character set corresponds to all permitted characters within the 82-character subset of ISO/IEC 646, indicated in Figure 7.11-1 of the GS1 General Specifications [GENSPECS].

XCHAR = DIGIT / UPPERALPHA / LOWERALPHA / XSYMBOL

The following character set corresponds to all permitted characters within the 39-character subset of ISO/IEC 646, indicated in Figure 7.11-2 of the GS1 General Specifications [GENSPECS]. It is currently only used within the value of the Components and Parts Identifier (CPID).

YCHAR = DIGIT / UPPERALPHA / YSYMBOL

### 4.3 Primary identification keys

The following rules indicate which GS1 Application Identifiers (AI) are considered as primary identification keys for GS1 Digital Link URI. Note that for each of these (and the rules in section 4.4), the numeric AI value may be used or alternatively, a corresponding lower-case short name may be used if it is more friendly to software developers. The numeric AI value may be more suitable for use when encoding a GS1 Digital Link URI within a 2D barcode, since this can be encoded more efficiently, resulting in a lower total module count and improved readability.

The %s prefix notation was introduced in [RFC 7405] and simply indicates that the following string value is case-sensitive. For example, in the rule below, `gtin-code` may be either "01" or "gtin" but not "GTIN" nor "Gtin". Note that the alphanumeric notation below will be deprecated and scheduled to be removed from future versions of the standard.

<code>gtin-code</code>	= "01" / %s"gtin"	; GTIN
<code>itip-code</code>	= "8006" / %s"itip"	; ITIP
<code>gmn-code</code>	= "8013" / %s"gmn"	; Global Model Number
<code>cpid-code</code>	= "8010" / %s"cpid"	; CPID
<code>gln-code</code>	= "414" / %s"gln"	; Physical Location GLN
<code>partyGln-code</code>	= "417" / %s"party"	; Party GLN
<code>gsrnp-code</code>	= "8017" / %s"gsrnp"	; GSRN of the Provider
<code>gsrn-code</code>	= "8018" / %s"gsrn"	; GSRN of the Recipient
<code>gcn-code</code>	= "255" / %s"gcn"	; GCN
<code>sscc-code</code>	= "00" / %s"sscc"	; SSCC
<code>gdti-code</code>	= "253" / %s"gdti"	; GDTI
<code>ginc-code</code>	= "401" / %s"ginc"	; GINC
<code>gsin-code</code>	= "402" / %s"gsin"	; GSIN
<code>grai-code</code>	= "8003" / %s"grai"	; GRAI
<code>giai-code</code>	= "8004" / %s"giai"	; GIAI

### 4.4 Key qualifiers


The following rules which GS1 Application Identifiers (AI) are considered as key qualifiers for a GS1 Digital Link URI.

<code>cpv-code</code>	= "22" / %s"cpv"	; Consumer Product Variant
<code>lot-code</code>	= "10" / %s"lot"	; Batch/Lot identifier
<code>ser-code</code>	= "21" / %s"ser"	; GTIN Serial Number
<code>cpsn-code</code>	= "8011" / %s"cpsn"	; CPID Serial Number
<code>glnx-code</code>	= "254" / %s"glnx"	; GLN extension
<code>refno-code</code>	= "8020" / %s"refno"	; Payment Reference Number
<code>srin-code</code>	= "8019" / %s"srin"	; Service Relation Instance Number

tpx-code = "235"; third-party controlled serialised extension to GTIN  
 uic-ext-code = "7040" ; GS1 UIC with Extension 1 and Importer Index

## 4.5 Primary key formats

The following rules express the format of the values of the primary GS1 identification keys.

 **Note:** the GS1 General Specifications [GENSPECS] define further restrictions on some of these values, particularly for those which include a GS1 Check Digit, Indicator Digit or Extension Digit. Please refer to the GS1 General Specifications [GENSPECS] for further details.

gtin-value	= 8DIGIT / 12DIGIT / 13DIGIT / 14DIGIT
itip-value	= 14DIGIT 2DIGIT 2DIGIT ; 14 digits then 2 digits then 2 digits
gmn-value	= 1*30XCHAR ; 1-30 characters from 82-chr subset
cpid-value	= 1*30YCHAR ; 1-30 characters from 39-chr subset
gln-value	= 13DIGIT ; exactly 13 digits
partyGln-value	= 13DIGIT ; exactly 13 digits
gsrnp-value	= 18DIGIT ; exactly 18 digits
gsrn-value	= 18DIGIT ; exactly 18 digits
gcn-value	= 13DIGIT 1*12DIGIT ; 13 digits then 1-12 digits
sscc-value	= 18DIGIT ; exactly 18 digits
gdti-value	= 13DIGIT 1*17XCHAR ; 13 digits then 1-17 characters ; from the 82-character subset
ginc-value	= 1*30XCHAR ; 1-30 characters from the 82-character subset
gsin-value	= 17DIGIT ; exactly 17 digits
grai-value	= 14DIGIT 1*16XCHAR ; 14 digits then 1-16 characters ; from the 82-character subset of ISO/IEC 646
giai-value	= 1*30XCHAR ; 1-30 characters from 82-chr subset

## 4.6 Key qualifier formats

The following rules express the format of the values of the key qualifiers of primary GS1 identification keys:

cpv-value	= 1*20XCHAR ; 1-20 characters from 82-chr subset
lot-value	= 1*20XCHAR ; 1-20 characters from 82-chr subset
ser-value	= 1*20XCHAR ; 1-20 characters from 82-chr subset
cpsn-value	= 1*12DIGIT ; 1-12 digits
glnx-value	= 1*20XCHAR ; 1-20 characters from 82-chr subset
refno-value	= 1*25XCHAR ; 1-25 characters from 82-chr subset

srin-value = 1\*10DIGIT ; 1-10 digits  
tpx-value = 1\*28XCHAR ; 1-28 characters from 82-chr subset  
uic-ext-value = 1DIGIT 3XCHAR  
; 1 digit then 3 characters from 82-chr subset

#### 4.7 Primary identifier and value concatenation

The following rules express how each primary identifier code and its value should be concatenated (for use within the URI path information) :

gtin-comp = "/" gtin-code "/" gtin-value  
itip-comp = "/" itip-code "/" itip-value  
gmn-comp = "/" gmn-code "/" gmn-value  
cpid-comp = "/" cpid-code "/" cpid-value  
gln-comp = "/" gln-code "/" gln-value  
partyGln-comp = "/" partyGln-code "/" partyGln-value  
gsrnp-comp = "/" gsrnp-code "/" gsrnp-value  
gsrn-comp = "/" gsrn-code "/" gsrn-value  
gcn-comp = "/" gcn-code "/" gcn-value  
sscc-comp = "/" sccc-code "/" sccc-value  
gdti-comp = "/" gdti-code "/" gdti-value  
ginc-comp = "/" ginc-code "/" ginc-value  
gsin-comp = "/" gsin-code "/" gsin-value  
grai-comp = "/" grai-code "/" grai-value  
giai-comp = "/" giai-code "/" giai-value

#### 4.8 Key qualifier concatenation

The following rules express how each key qualifier and its value should be concatenated (for use within the URI path information) :

cpv-comp = "/" cpv-code "/" cpv-value  
lot-comp = "/" lot-code "/" lot-value  
ser-comp = "/" ser-code "/" ser-value  
cpsn-comp = "/" cpsn-code "/" cpsn-value  
glnx-comp = "/" glnx-code "/" glnx-value  
refno-comp = "/" refno-code "/" refno-value  
srin-comp = "/" srin-code "/" srin-value  
tpx-comp = "/" tpx-code "/" tpx-value  
uic-ext-comp = "/" uic-ext-code "/" uic-ext-value

#### 4.9 Path element order

The following rules express how the URI path information should be structured for each primary GS1 identification key. Note that some primary identifiers such as SSCC do not have any associated key qualifier. Other primary identifiers such as GTIN may have multiple key qualifiers. The square bracket notation indicates that the enclosed key qualifier component may be omitted

but the sequence in which they appear is important and must be preserved. For example, the rule for `gtin-path` would permit any of these:

```
/01/9520123456788/22/2A/10/ABC123/21/12345XYZ
/01/9520123456788/10/ABC123/
/01/9520123456788/10/ABC123/21/12345XYZ
/01/9520123456788/21/12345XYZ
```

but does not permit strings such as:

```
/01/9520123456788/21/12345XYZ/10/ABC123
```

in which the sequential ordering of the key qualifier components is not preserved.

<code>gtin-path</code>	=	<code>gtin-comp</code>	[ <code>cpv-comp</code> ]	[ <code>lot-comp</code> ]	[ <code>ser-comp</code> ]
<code>itip-path</code>	=	<code>itip-comp</code>	[ <code>cpv-comp</code> ]	[ <code>lot-comp</code> ]	[ <code>ser-comp</code> ]
<code>gmn-path</code>	=	<code>gmn-comp</code>			
<code>cpid-path</code>	=	<code>cpid-comp</code>	[ <code>cpsn-comp</code> ]		
<code>gln-path</code>	=	<code>gln-comp</code>	[ <code>glnx-comp</code> ]		
<code>partyGln-path</code>	=	<code>partyGln-comp</code>			
<code>gsrnp-path</code>	=	<code>gsrnp-comp</code>	[ <code>srin-comp</code> ]		
<code>gsrn-path</code>	=	<code>gsrn-comp</code>	[ <code>srin-comp</code> ]		
<code>gcn-path</code>	=	<code>gcn-comp</code>			
<code>sscc-path</code>	=	<code>sscc-comp</code>			
<code>gdti-path</code>	=	<code>gdti-comp</code>			
<code>ginc-path</code>	=	<code>ginc-comp</code>			
<code>gsin-path</code>	=	<code>gsin-comp</code>			
<code>grai-path</code>	=	<code>grai-comp</code>			
<code>giai-path</code>	=	<code>giai-comp</code>			
<code>upui-path</code>	=	<code>gtin-comp</code>	<code>tpx-comp</code>		
<code>eoid-path</code>	=	<code>partyGln-comp</code>	<code>uic-ext-comp</code>		
<code>fid-path</code>	=	<code>gln-comp</code>	<code>uic-ext-comp</code>		
<code>mid-path</code>	=	<code>giai-comp</code>	<code>uic-ext-comp</code>		

The following rule simply states that any of the above is considered as a `gs1path` (which will be referenced in a later rule).

```
gs1path = gtin-path / itip-path / gmn-path / cpid-path / gln-path /
partyGln-path / gsrnp-path / gsrn-path / gcn-path / sscc-path
/ gdti-path / ginc-path / gsin-path / grai-path / giai-path /
upui-path / eoid-path / fid-path / mid-path
```

## 4.10 Data attributes

The following rules are concerned with GS1 Application Identifiers that are considered to be data attributes rather than primary identifier keys or key qualifiers. Data attributes and their values SHALL be expressed via the URI query string as `key=value` pairs. Where there is a choice, the numeric AI value is much preferred over the more human-friendly short name.

Note that 'data attributes' MAY include AIs that may also be used as primary keys. In any GS1 Digital Link URI there SHALL be exactly one primary key, as defined in section 4.3, followed by any key qualifiers relevant to that primary key as path elements. However, the GS1 General Specifications [GENSPECS] allow combinations of primary keys in a single data carrier. For example, it is possible to encode both a GTIN and a GIAI in a single element string within a data carrier (see the example in section 5.11). Where it is necessary to encode more than one primary key in a single GS1 Digital Link URI, one SHALL be used in the path and the remaining key(s) encoded in the query string as data attributes.

```
netWeightVMTICode = "3100" / "3101" / "3102" / "3103" / "3104" / "3105" /
"3200" / "3201" / "3202" / "3203" / "3204" / "3205" /
```



```

          "3560" / "3561" / "3562" / "3563" / "3564" / "3565" /
          "3570" / "3571" / "3572" / "3573" / "3574" / "3575"
netWeightVMTIValue      = 6DIGIT
netWeightVMTIParameter = netWeightVMTICode "=" netWeightVMTIValue

lengthVMTICode = "3110" / "3111" / "3112" / "3113" / "3114" / "3115" /
                 "3210" / "3211" / "3212" / "3213" / "3214" / "3215" /
                 "3220" / "3221" / "3222" / "3223" / "3224" / "3225" /
                 "3230" / "3231" / "3232" / "3233" / "3234" / "3235"
lengthVMTIValue      = 6DIGIT
lengthVMTIParameter = lengthVMTICode "=" lengthVMTIValue

widthVMTICode = "3120" / "3121" / "3122" / "3123" / "3124" / "3125" /
                "3240" / "3241" / "3242" / "3243" / "3244" / "3245" /
                "3250" / "3251" / "3252" / "3253" / "3254" / "3255" /
                "3260" / "3261" / "3262" / "3263" / "3264" / "3265"
widthVMTIValue      = 6DIGIT
widthVMTIParameter = widthVMTICode "=" widthVMTIValue

depthVMTICode = "3130" / "3131" / "3132" / "3133" / "3134" / "3135" /
                "3270" / "3271" / "3272" / "3273" / "3274" / "3275" /
                "3280" / "3281" / "3282" / "3283" / "3284" / "3285" /
                "3290" / "3291" / "3292" / "3293" / "3294" / "3295"
depthVMTIValue      = 6DIGIT
depthVMTIParameter = depthVMTICode "=" depthVMTIValue

areaVMTICode = "3140" / "3141" / "3142" / "3143" / "3144" / "3145" /
               "3500" / "3501" / "3502" / "3503" / "3504" / "3505" /
               "3510" / "3511" / "3512" / "3513" / "3514" / "3515" /
               "3520" / "3521" / "3522" / "3523" / "3524" / "3525"
areaVMTIValue      = 6DIGIT
areaVMTIParameter = areaVMTICode "=" areaVMTIValue

netVolumeVMTICode = "3150" / "3151" / "3152" / "3153" / "3154" / "3155" /
                    "3160" / "3161" / "3162" / "3163" / "3164" / "3165" /
                    "3600" / "3601" / "3602" / "3603" / "3604" / "3605" /
                    "3610" / "3611" / "3612" / "3613" / "3614" / "3615" /
                    "3640" / "3641" / "3642" / "3643" / "3644" / "3645" /
                    "3650" / "3651" / "3652" / "3653" / "3654" / "3655" /
                    "3660" / "3661" / "3662" / "3663" / "3664" / "3665"
netVolumeVMTIValue      = 6DIGIT
netVolumeVMTIParameter = netVolumeVMTICode "=" netVolumeVMTIValue

massPerUnitAreaVMTICode      = "3370" / "3371" / "3372" / "3373" / "3374" /
                               "3375"
massPerUnitAreaVMTIValue      = 6DIGIT
massPerUnitAreaVMTIParameter = massPerUnitAreaVMTICode "="
                               massPerUnitAreaVMTIValue

grossWeightCode = "3300" / "3301" / "3302" / "3303" / "3304" / "3305" /
                  "3400" / "3401" / "3402" / "3403" / "3404" / "3405"
grossWeightValue      = 6DIGIT
grossWeightParameter = grossWeightCode "=" grossWeightValue

logisticLengthCode = "3310" / "3311" / "3312" / "3313" / "3314" / "3315" /
                     "3410" / "3411" / "3412" / "3413" / "3414" / "3415" /
                     "3420" / "3421" / "3422" / "3423" / "3424" / "3425" /
                     "3430" / "3431" / "3432" / "3433" / "3434" / "3435"

```

```
logisticLengthValue      = 6DIGIT
logisticLengthParameter = logisticLengthCode "=" logisticLengthValue

logisticWidthCode = "3320" / "3321" / "3322" / "3323" / "3324" / "3325" /
                    "3440" / "3441" / "3442" / "3443" / "3444" / "3445" /
                    "3450" / "3451" / "3452" / "3453" / "3454" / "3455" /
                    "3460" / "3461" / "3462" / "3463" / "3464" / "3465"
logisticWidthValue      = 6DIGIT
logisticWidthParameter = logisticWidthCode "=" logisticWidthValue

logisticDepthCode = "3330" / "3331" / "3332" / "3333" / "3334" / "3335" /
                    "3470" / "3471" / "3472" / "3473" / "3474" / "3475" /
                    "3480" / "3481" / "3482" / "3483" / "3484" / "3485" /
                    "3490" / "3491" / "3492" / "3493" / "3494" / "3495"
logisticDepthValue     = 6DIGIT
logisticDepthParameter = logisticDepthCode "=" logisticDepthValue

logisticAreaCode = "3340" / "3341" / "3342" / "3343" / "3344" / "3345" /
                   "3530" / "3531" / "3532" / "3533" / "3534" / "3535" /
                   "3540" / "3541" / "3542" / "3543" / "3544" / "3545" /
                   "3550" / "3551" / "3552" / "3553" / "3554" / "3555"
logisticAreaValue     = 6DIGIT
logisticAreaParameter = logisticAreaCode "=" logisticAreaValue

logisticVolumeCode = "3350" / "3351" / "3352" / "3353" / "3354" / "3355" /
                     "3360" / "3361" / "3362" / "3363" / "3364" / "3365" /
                     "3620" / "3621" / "3622" / "3623" / "3624" / "3625" /
                     "3630" / "3631" / "3632" / "3633" / "3634" / "3635" /
                     "3670" / "3671" / "3672" / "3673" / "3674" / "3675" /
                     "3680" / "3681" / "3682" / "3683" / "3684" / "3685" /
                     "3690" / "3691" / "3692" / "3693" / "3694" / "3695"
logisticVolumeValue   = 6DIGIT
logisticVolumeParameter = logisticVolumeCode "=" logisticVolumeValue

processorCode = "7030" / "7031" / "7032" / "7033" / "7034" / "7035" /
               "7036" / "7037" / "7038" / "7039"
processorValue = 3DIGIT 1*27XCHAR
processorParameter = processorCode "=" processorValue

contentParameter      = "02=" 14DIGIT
prodDateParameter    = "11=" 6DIGIT
dueDateParameter     = "12=" 6DIGIT
packDateParameter    = "13=" 6DIGIT
bestBeforeDateParameter = "15=" 6DIGIT
sellByDateParameter  = "16=" 6DIGIT
firstFreezeDateParameter = "7006=" 6DIGIT
harvestDateParameter = "7007=" 6*12DIGIT
pricePerUnitParameter = "8005=" 6DIGIT
variantParameter     = "20=" 2DIGIT
varCountParameter    = "30=" 1*8DIGIT
```

countParameter	= "37=" 1*8DIGIT
mutualParameter	= "90=" 1*30DIGIT
additionalIdParameter	= "240=" 1*30DIGIT
custPartNoParameter	= "241=" 1*30DIGIT
mtoVariantParameter	= "242=" 6DIGIT
pcnParameter	= "243=" 1*20DIGIT
secondarySerialParameter	= "250=" 1*30DIGIT
refToSourceParameter	= "251=" 1*30DIGIT
amountCode	= "3900" / "3901" / "3902" / "3903" / "3904" / "3905"
amountValue	= 1*15DIGIT
amountParameter	= amountCode "=" amountValue
amountISOCCode	= "3910" / "3911" / "3912" / "3913" / "3914" / "3915"
amountISOValue	= 3DIGIT 1*15DIGIT
amountISOPParameter	= amountISOCCode "=" amountISOValue
priceCode	= "3920" / "3921" / "3922" / "3923" / "3924" / "3925"
priceValue	= 1*15DIGIT
priceParameter	= priceCode "=" priceValue
priceISOCCode	= "3930" / "3931" / "3932" / "3933" / "3934" / "3935"
priceISOValue	= 3DIGIT 1*15DIGIT
priceISOPParameter	= priceISOCCode "=" priceISOValue
percentOffCode	= "3940" / "3941" / "3942" / "3943" / "3944" / "3945"
percentOffValue	= 4DIGIT
percentOffParameter	= percentOffCode "=" percentOffValue
orderNumberParameter	= "400=" 1*30DIGIT
routeParameter	= "403=" 1*30DIGIT
shipToLocParameter	= "410=" 13DIGIT
billToParameter	= "411=" 13DIGIT
purchaseFromParameter	= "412=" 13DIGIT
shipForLocParameter	= "413=" 13DIGIT

locNoParameter	=	"414="	13DIGIT
payToParameter	=	"415="	13DIGIT
prodServLocParameter	=	"416="	13DIGIT
shipToPostParameter	=	"420="	1*20XCHAR
shipToPostISOPParameter	=	"421="	3DIGIT 1*9XCHAR
originParameter	=	"422="	3DIGIT
countryProcessParameter	=	"424="	3DIGIT
countryFullProcessParameter	=	"426="	3DIGIT
countryInitialProcessParameter	=	"423="	3DIGIT 1*12DIGIT
countryDisassemblyParameter	=	"425="	3DIGIT 1*12DIGIT
originSubdivisionParameter	=	"427="	1*3XCHAR
nhrnPZNParameter	=	"710="	1*20XCHAR
nhrnCIPPParameter	=	"711="	1*20XCHAR
nhrnCNParameter	=	"712="	1*20XCHAR
nhrnDRNParameter	=	"713="	1*20XCHAR
nhrnAIMParameter	=	"714="	1*20XCHAR
nsnParameter	=	"7001="	13DIGIT
meatCutParameter	=	"7002="	1*30XCHAR
activePotencyParameter	=	"7004="	1*4DIGIT
catchAreaParameter	=	"7005="	1*12XCHAR
aquaticSpeciesParameter	=	"7008="	1*3XCHAR
fishingGearTypeParameter	=	"7009="	1*10XCHAR
prodMethodParameter	=	"7010="	1*2XCHAR
refurbLotParameter	=	"7020="	1*20XCHAR
funcStatParameter	=	"7021="	1*20XCHAR
revStatParameter	=	"7022="	1*20XCHAR
giaiAssemblyParameter	=	"7023="	1*30XCHAR
certificationRefCode	=	"7230" / "7231" / "7232" / "7233" / "7234" / "7235" / "7236" / "7237" / "7238" / "7239"	
certificationRefValue	=	2*30XCHAR	

certificationRefParameter = certificationRefCode "=" certificationRefValue

dimensionsParameter = "8001=" 14DIGIT

cmtNoParameter = "8002=" 1\*20XCHAR

ibanParameter = "8007=" 1\*34XCHAR

prodTimeParameter = "8008=" 8DIGIT 1\*4DIGIT

opticalSensorParameter = "8009=" 1\*50XCHAR

versionParameter = "8012=" 4DIGIT 1\*20XCHAR

refNoParameter = "8020=" 1\*25XCHAR

itipContentParameter = "8026=" 14DIGIT 2DIGIT 2DIGIT

couponIDNAParameter = "8110=" 1\*70XCHAR

pointsParameter = "8111=" 4DIGIT

paperlessCouponIDNAParameter = "8112=" 1\*70XCHAR

shipToCompParameter = "4300=" 1\*35XCHAR

shipToNameParameter = "4301=" 1\*35XCHAR

shipToAdd1Parameter = "4302=" 1\*70XCHAR

shipToAdd2Parameter = "4303=" 1\*70XCHAR

shipToSubParameter = "4304=" 1\*70XCHAR

shipToLocalityParameter = "4305=" 1\*70XCHAR

shipToRegParameter = "4306=" 1\*70XCHAR

shipToCountryParameter = "4307=" 2XCHAR

shipToPhoneParameter = "4308=" 1\*30XCHAR

rtnToCompParameter = "4310=" 1\*35XCHAR

rtnToNameParameter = "4311=" 1\*35XCHAR

rtnToAdd1Parameter = "4312=" 1\*70XCHAR

rtnToAdd2Parameter = "4313=" 1\*70XCHAR

rtnToSubParameter = "4314=" 1\*70XCHAR

rtnToLocParameter = "4315=" 1\*70XCHAR

rtnToRegParameter = "4316=" 1\*70XCHAR

rtnToCountryParameter = "4317=" 2XCHAR

rtnToPostParameter = "4318=" 1\*20XCHAR

<code>rtnToPhoneParameter</code>	=	"4319="	1*30XCHAR
<code>srvDescriptionParameter</code>	=	"4320="	1*35XCHAR
<code>dangerousGoodsParameter</code>	=	"4321="	BOOLEAN
<code>authToLeaveParameter</code>	=	"4322="	BOOLEAN
<code>sigRequiredParameter</code>	=	"4323="	BOOLEAN
<code>notBeforeDelDateParameter</code>	=	"4324="	10DIGIT
<code>notAfterDelDateParameter</code>	=	"4325="	10DIGIT
<code>releaseDateParameter</code>	=	"4326="	6DIGIT
<code>gtinParameter</code>	=	"01="	gtin-value
<code>itipParameter</code>	=	"8006="	itip-value
<code>gmnParameter</code>	=	"8013="	gmn-value
<code>cpidParameter</code>	=	"8010="	cpid-value
<code>glnParameter</code>	=	"414="	gln-value
<code>partyGlnParameter</code>	=	"417="	partyGln-value
<code>gsrnpParameter</code>	=	"8017="	gsrnp-value
<code>gsrnParameter</code>	=	"8018="	gsrn-value
<code>gcnParameter</code>	=	"255="	gcn-value
<code>ssccParameter</code>	=	"00="	sscc-value
<code>gdtiParameter</code>	=	"253="	gdti-value
<code>gincParameter</code>	=	"401="	ginc-value
<code>gsinParameter</code>	=	"402="	gsin-value
<code>graiParameter</code>	=	"8003="	grai-value
<code>giaiParameter</code>	=	"8004="	giai-value
<code>internalCode</code>	=	"91" / "92" / "93" / "94" / "95" / "96" / "97" / "98" / "99"	
<code>internalValue</code>	=	1*90XCHAR	
<code>internalParameter</code>	=	internalCode "="	internalValue

Batch/Lot may also be used as a data attribute in conjunction with an SSCC [AI (00)] and a CONTENT [ AI (02) ] in order to indicate that the SSCC contains GTINs of a specific batch/lot. For this reason, `LotParameter` is defined for use within the URI query string.

`LotParameter` = lot-code "=" lot-value

Expiry Date [ AI (17) ] and Expiry Date/Time [ AI (7003) ] are data attributes. However, because of their importance in managing stock rotation and checking for expired products, the following rules also define a lower-case short name, `exp` and `expdt` that may be used in place of numeric AIs "17" and "7003" respectively.

```

expiryDateCode      = "17" / %s"exp"
expiryDateValue     = 6DIGIT
expiryDateParameter = expiryDateCode "=" expiryDateValue

expiryTimeCode      = "7003" / %s"expdt"
expiryTimeValue     = 10DIGIT
expiryTimeParameter = expiryTimeCode "=" expiryTimeValue
  
```

#### 4.10.1 Extension mechanism and reserved keywords

The URI query string is a natural extension point within the syntax that can accommodate additional key=value pairs to express data attribute parameters that cannot be expressed using GS1 Application Identifiers. Examples of such usage may be to express a specific role, action, activity or type of service to be accessed. The following `extensionParameter` is based on the ABNF rule for query appearing in [RFC 3986] and serves as the main extension point for the GS1 Digital Link URI syntax. It permits multiple arbitrary key=value pairs to be included within the query string of a GS1 Digital Link URI. Any key=value pairs used for extension data SHALL NOT be all-numeric to avoid conflict with existing and future keys used for GS1 Application Identifiers either in terms of semantics or syntax; and SHALL NOT use the values `lot`, `exp`, `expdt`; nor should they be used to express a value (such as a value for net weight) if that value can be expressed using GS1 Application Identifiers as data attributes. As detailed in GS1 Digital Link: Resolution [DL-Resolution], the keywords `linkType` and `context` are also reserved and SHALL NOT be used except as defined in those sections.

```

extensionParameter  = *( pchar / "/" / "?" )
                    ; any other query string parameter permitted by RFC 3986
                    ; including additional arbitrary key=value pairs except as
                    ; restricted in the above paragraph
  
```

#### 4.10.2 Constructing the query string

The following rule states that any of the above parameters for data attributes may appear as a query string parameter ( `queryStringParam` ), referenced later.

```

queryStringParam = netWeightVMTIPParameter / lengthVMTIPParameter /
                  widthVMTIPParameter / depthVMTIPParameter / areaVMTIPParameter /
                  netVolumeVMTIPParameter / massPerUnitAreaVMTIPParameter /
                  grossWeightParameter / logisticLengthParameter /
                  logisticWidthParameter / logisticDepthParameter /
                  logisticAreaParameter / logisticVolumeParameter /
                  processorParameter / LotParameter / expiryDateParameter /
                  expiryTimeParameter / contentParameter / prodDateParameter /
                  dueDateParameter / packDateParameter / bestBeforeDateParameter /
                  sellByDateParameter / firstFreezeDateParameter /
                  harvestDateParameter / pricePerUnitParameter / variantParameter /
                  varCountParameter / countParameter /
                  additionalIdParameter / custPartNoParameter /
                  mtoVariantParameter / pcnParameter / secondarySerialParameter /
                  refToSourceParameter / amountParameter / amountISOParameter /
                  priceParameter / priceISOParameter / percentOffParameter /
                  orderNumberParameter / routeParameter / shipToLocParameter /
                  billToParameter / purchaseFromParameter / shipForLocParameter /
                  locNoParameter / prodServLocParameter / shipToPostParameter /
                  shipToPostISOParameter / originParameter /
                  countryProcessParameter / countryFullProcessParameter /
                  countryInitialProcessParameter / countryDisassemblyParameter /
                  originSubdivisionParameter / nhrnPZNParameter / nhrnCIPParameter /
                  nhrnCNParameter / nhrnDRNParameter / nsnParameter /
                  meatCutParameter / activePotencyParameter / catchAreaParameter /
                  fishingGearTypeParameter / prodMethodParameter /
                  refurbLotParameter / funcStatParameter / revStatParameter /
                  giaaiAssemblyParameter / dimensionsParameter / cmtNoParameter /
                  ibanParameter / prodTimeParameter / versionParameter /
                  refNoParameter / couponIDNAParameter / pointsParameter /
  
```

```

itipContentParameter / certificationRefParameter /
aquaticSpeciesParameter / opticalSensorParameter /
paperlessCouponIDNAParameter /
internalParameter / mutualParameter / extensionParameter /

shipToCompParameter / shipToNameParameter /
shipToaAdd1Parameter / shipToaAdd2Parameter /
shipToSubParameter / shipToLocalityParameter /
shipToRegParameter / shipToCountryParameter /
shipToPhoneParameter / rtnToCompParameter /
rtnToNameParameter / rtnToAdd1Parameter /
rtnToAdd2Parameter / rtnToSubParameter /
rtnToLocParameter / rtnToRegParameter /
rtnToCountryParameter / rtnToPostParameter /
rtnToPhoneParameter / srvDescriptionParameter /
dangerousGoodsParameter / authToLeaveParameter /
sigRequiredParameter / notBeforeDelDateParameter /
notAfterDelDateParameter / releaseDateParameter /

gtinParameter / itipParameter / gmnParameter / cpidParameter /
glnParameter / partyGlnParameter / gsrnpParameter /
gsrnParameter / gcNParameter / sscCParameter / gdtiParameter /
gincParameter / gsinParameter / graiParameter / giaiParameter
  
```

#### 4.11 Constructing the GS1 Digital Link URI

The following rules are derived from rules appearing in [RFC 3986] and are used for defining the general structure of a Web URI. These are particularly relevant for GS1 Digital Link URIs that are not under the id.gs1.org domain.

```

scheme                = "http" / "https"

unreserved            = ALPHA / DIGIT / "-" / "." / "_" / "~"

reserved              = gen-delims / sub-delims

pct-encoded           = "%" HEXDIG HEXDIG

gen-delims            = ":" / "/" / "?" / "#" / "[" / "]" / "@"

sub-delims            = "!" / "$" / "&" / "'" / "(" / ")" / "*" /
                        "+" / "," / ";" / "="

pchar                 = unreserved / pct-encoded / sub-delims / ":" / "@"

segment               = *pchar

reg-name              = *( unreserved / pct-encoded / sub-delims )

dec-octet             = DIGIT                ; 0-9
                      / %x31-39 DIGIT        ; 10-99
                      / "1" 2DIGIT           ; 100-199
                      / "2" %x30-34 DIGIT    ; 200-249
                      / "25" %x30-35        ; 250-255

IPv4address           = dec-octet "." dec-octet "." dec-octet "." dec-octet

IPv6address           = 6( h16 ":" ) ls32
                      / "::" 5( h16 ":" ) ls32
                      / [ h16 ] "::" 4( h16 ":" ) ls32
  
```



```

/ [ *1( h16 ":" ) h16 ] ":" 3( h16 ":" ) ls32
/ [ *2( h16 ":" ) h16 ] ":" 2( h16 ":" ) ls32
/ [ *3( h16 ":" ) h16 ] ":" h16 ":" ls32
/ [ *4( h16 ":" ) h16 ] ":" ls32
/ [ *5( h16 ":" ) h16 ] ":" h16
/ [ *6( h16 ":" ) h16 ] ":"

ls32      = ( h16 ":" h16 ) / IPv4address
           ; least-significant 32 bits of address

h16       = 1*4HEXDIG
           ; 16 bits of address represented in hexadecimal

IP-literal = "[" ( IPv6address / IPvFuture ) "]"

IPvFuture = "v" 1*HEXDIG "." 1*( unreserved / sub-delims / ":" )

host       = IP-literal / IPv4address / reg-name

port       = *DIGIT

hostname   = host [ ":" port ]
  
```

Finally, the following four rules define the syntax of a reference GS1 Digital Link URI from the concatenation of previous defined components:

```

queryStringDelim = "&" / ";"

queryStringComp =
    "?" queryStringParam *( queryStringDelim queryStringParam)

uncompressedGS1webURIPattern = gslpath [queryStringComp]

referenceGS1webURI = "https://id.gs1.org" uncompressedGS1webURIPattern
  
```

The following rules define the syntax of a non-reference GS1 Digital Link URI from the concatenation of previous defined components. An example of usage of a non-reference GS1 Digital Link URI is when a company chooses to use their own registered Internet domain name to construct the Web URI but aligns with this specification for the format of the final part of the URI path information and query string. Note that zero or more path segments are permitted to appear after the hostname or domain name and before the start of the `gsluriPattern` defined in this specification.

```

optionalPathSegment = "/" segment

customURISTEM = scheme "://" hostname *optionalPathSegment

uncompressedCustomGS1webURI = customURISTEM uncompressedGS1webURIPattern
  
```

The formal ABNF syntax for the URI should be read in combination with the GS1 General Specifications [GENSPECS] to ensure appropriate usage of Application Identifiers that represent data attributes of identified things. In particular, section 4.14 of the GS1 General Specifications [GENSPECS] provides guidance about data relationships, including invalid pairs of element strings (see section 4.14.1) and mandatory associations of element strings (see section 4.14.2). In the GS1 General Specifications [GENSPECS], section 2 specifies which identifiers are used for an application, section 3 provides definitions for each Application Identifier, while section 4 explains the management rules for each GS1 identification key.

As previously mentioned, some GS1 primary identifier keys include GS1 check digits and some also include indicator digits or extension digits that are to be used for specific purposes. Section 7 of the GS1 General Specifications [GENSPECS] provides details of AIDC validation rules and section 7.2.7 explains the GS1 check digit calculation. Nothing in this GS1 specification changes the existing

validation rules that apply to the values of GS1 Application Identifiers; this document only specifies how valid GS1 AI values shall be expressed in the GS1 Digital Link structure.

Any URI that conforms to the formal syntax as defined above and that respects the relevant rules specified in the GS1 General Specifications as cited is:

1. a valid Web URI that can be dereferenced on the Web without further processing;
2. a valid expression of one or more GS1 application identifiers and their values, informationally equivalent to the same data expressed in GS1 AI syntax.

## 4.12 Canonical GS1 Digital Link URIs

The preceding rules provide the formal specification of GS1 Digital Link URIs in which the most commonly used identification keys.

A GS1 Digital Link URI can be constructed in any domain name, may contain additional key/value pairs in the query string and so on. This flexibility is a deliberate feature of the standard to support its use in as many scenarios as possible and to ensure brands can remain in control of the domains they use.

However, in some contexts (e.g., to support carriers that cannot embed a Web URI) it is necessary to identify a *single* preferred version of the GS1 Digital Link URI. This is defined in [RFC 6596] as the *canonical URI*. We define the canonical URI as follows:

- the scheme SHALL be HTTPS;
- the domain name SHALL be id.gs1.org;
- deprecated convenience string equivalents for AIs SHALL NOT be used;
- GTIN-8, GTIN-12 and GTIN-13 SHALL be padded to 14 digits
- the URI query string (if present) SHALL NOT contain any other key=value pairs except for keys that are GS1 application identifiers;
- key=value pairs, if present, should be sorted in lexical, not numeric, order of the key;
- for clarity, this means that the parameters defined in GS1 Digital Link: Resolution [DL-Resolution], namely `linkType` and `context`, and their values, are not included in the canonical GS1 Digital Link.

It follows that the canonical version of <https://example.com/01/9520123456788/22/2A> is `https://id.gs1.org/01/09520123456788/22/2A`

## 4.13 Preferred representation

The syntax defined for GS1 Digital Link URIs in general allows commonly used numeric AIs to be substituted for short strings that ease human comprehension. Note that this is not allowed for the canonical GS1 Digital Link URI structure defined immediately above in section 4.12. For example, `/01/` and `/gtin/` are synonymous, as are `/21/` and `/ser/` etc. These can be very useful when explaining the standard to a new audience. However, as noted in section 4.1, these 'convenience alphas' will be deprecated in the next iteration of this standard. Therefore, in any production setting or new implementation, only the numeric versions SHALL be used. There are three primary reasons for this:

1. In some data carriers, fewer bits or modules are needed to encode numbers than letters;
2. In all cases, the 'convenience alpha' short name is longer than the numeric version;
3. GS1 Digital Link is based on GS1 AI-based element strings which are all based on numeric AIs. Convenience alphas confuse this and add an extra burden to implementations.

## 5 Examples of GS1 Digital Link URIs

*This section is informative*

### 5.1 GTIN

`https://id.gs1.org/01/09520123456788`

is the canonical Digital Link URI for GTIN 9520123456788 equivalent to the following element string:

`(01)09520123456788`

The following are further valid GS1 non canonical Digital Link URIs for GTIN 9520123456788 using a custom domain name e.g. `example.com` instead of `id.gs1.org`

`https://brand.example.com/01/9520123456788`

`https://brand.example.com/some-extra/pathinfo/01/9520123456788`

If redirection information has been specified to GS1 by the corresponding licensee of that GTIN or the GS1 Company Prefix (for GTINs constructed from GS1 Company Prefixes), a GS1 Resolver that supports GS1 Digital Link URIs will be able to effectively redirect any requests for that GS1 Digital Link URI to a corresponding URL specified by the licensee.

### 5.2 GTIN + CPV

`https://id.gs1.org/01/09520123456788/22/2A`

Is the canonical GS1 Digital Link URIs for GTIN 9520123456788 combined with Consumer Product Variant '2A' and to the following element string:

`(01)09520123456788(22)2A`

The following are further valid non canonical GS1 Digital Link URIs for GTIN 9520123456788 combined with Consumer Product Variant '2A'.

`https://brand.example.com/01/9520123456788/22/2A`

`https://retailer.example.com/01/9520123456788/22/2A`

### 5.3 GTIN + Batch/Lot

`https://id.gs1.org/01/09520123456788/10/ABC123`

is the canonical GS1 Digital Link URIs for GTIN 9520123456788 combined with Batch/Lot 'ABC123' and equivalent to the following element string:

`(01)09520123456788(10)ABC123`

The following are further non canonical valid GS1 Digital Link URIs for GTIN 9520123456788 combined with Batch/Lot 'ABC123'

`https://brand.example.com/01/9520123456788/10/ABC123`

`https://retailer.example.com/01/9520123456788/10/ABC123`

## 5.4 GTIN + Serial Number (also known as SGTIN)

<https://id.gs1.org/01/09520123456788/21/12345>

is the canonical GS1 Digital Link URIs for GTIN 9520123456788 combined with Serial Number '12345' and equivalent to the following element string:

(01)09520123456788(21)12345

The following are further valid GS1 Digital Link URIs for GTIN 9520123456788 combined with Serial Number '12345'

<https://brand.example.com/01/9520123456788/21/12345>

<https://retailer.example.com/01/9520123456788/21/12345>

## 5.5 GTIN + Batch/Lot + Serial Number + Expiry Date

<https://id.gs1.org/01/09520123456788/10/ABC1/21/12345?17=180426>

is the canonical GS1 Digital Link URIs for GTIN 9520123456788 combined with Batch/Lot 'ABC1' and Serial Number '12345' and with an expiry date of 26th April 2018 equivalent to the following element strings:

(01)09520123456788(17)180426(10)ABC1(21)12345

The following is a also valid non canonical GS1 Digital Link URIs for GTIN 9520123456788 combined with Batch/Lot 'ABC1' and Serial Number '12345' and with an expiry date of 26th April 2018.

<https://example.com/01/9520123456788/10/ABC1/21/12345?17=180426>

## 5.6 GTIN + Net Weight

<https://id.gs1.org/01/09520123456788?3103=000195>

is the canonical GS1 Digital Link URIs for GTIN 9520123456788 combined with a net weight of 0.195 kg equivalent to the following element strings:

(01)09520123456788(3103)000195

The following is a further valid non canonical GS1 Digital Link URIs for GTIN 9520123456788 combined with a net weight of 0.195 kg :

<https://example.com/01/9520123456788?3103=000195>

## 5.7 GTIN + Net weight + Amount payable + Best before date

<https://example.com/01/9520123456788?3103=000195&3922=0299&17=201225>

This GS1 Digital Link URI includes three data attributes for the given GTIN, which can be in any order in the query string. The equivalent element string is

(01)09520123456788(3103)000195(3922)0299(17)201225

The following GS1 Digital Link URIs are also equivalent, but only the second is canonical as the data attributes have been arranged in the lexical order of the AIs.

<https://id.gs1.org/01/9520123456788?3103=000195&3922=0299&17=201225>

<https://id.gs1.org/01/9520123456788?17=201225&3103=000195&3922=0299>

## 5.8 SSCC

<https://id.gs1.org/00/952012345678912345>

is the canonical GS1 Digital Link URI for SSCC 952012345678912345 equivalent to the following element string:

(00) 952012345678912345

The following is a further valid non canonical GS1 Digital Link URIs for SSCC 952012345678912345 :

<https://example.com/00/952012345678912345>

## 5.9 SSCC with specified Content, Count and Batch/Lot

<https://id.gs1.org/00/952012345678912345?02=09520123456788&37=25&10=ABC12>

is the canonical GS1 Digital Link URIs for SSCC 952012345678912345 containing a count [ AI (37) ] of 25 instances of Content [ AI (02) ] 09520123456788 having Batch/Lot identifier [ AI (10) ] 'ABC123' equivalent to the following element strings:

(00) 952012345678912345 (02) 09520123456788 (37) 25 (10) ABC123

The following is a further non canonical valid GS1 Digital Link URI for SSCC 106141412345678908 containing a count [ AI (37) ] of 25 instances of Content [ AI (02) ] 09520123456788 having Batch/Lot identifier [ AI (10) ] 'ABC123':

<https://example.com/00/952012345678912345?02=09520123456788&37=25&10=ABC123>

## 5.10 Physical location represented by a GLN or GLN + GLN Extension

<https://id.gs1.org/414/9520123456788>

is the canonical GS1 Digital Link URI for GLN 9520123456788 equivalent to the following element string:

(414) 9520123456788

<https://id.gs1.org/414/9520123456788/254/32a%2Fb>

Is the canonical GS1 Digital Link URIs for GLN 9520123456788 combined with a GLN extension '32a/b'. Note that because the forward slash character has a special meaning within Web URIs, it is replaced with %2F, its percent encoding, when it is being used as a literal value, rather than as a URI path separator.

It is equivalent to the following element strings:

(414) 9520123456788 (254) 32a/b

The following is also a valid but non canonical GS1 Digital Link URIs for GLN 9520123456788 :

<https://example.com/414/9520123456788>

The following is a further valid non canonical GS1 Digital Link URIs for GLN 9520123456788 combined with a GLN extension '32a/b' :

<https://example.com/gln/9520123456788/254/32a%2Fb>

## 5.11 GIAI + GTIN

`https://example.com/8004/9520614141234567?01=9520123456788`

`https://example.com/01/9520123456788?8004=9520614141234567`

Both of these GS1 Digital Link URIs express the same combination of GS1 Application Identifiers. However, they are not equivalent. For the first example, in which the GIAI appears in the URI path information, the issuer of that GIAI asset identifier is the authority, whereas for the second example in which the GTIN is in the URI path information, the licensee of the GTIN (typically the brand owner or manufacturer) is the authority for that GS1 Digital Link URI.

Although both identify an item with GIAI 9520614141234567 that is an instance of GTIN 9520123456788, the choice of which identifier to place in the URI path information does matter for resolvers that have a policy of only permitting referral records specified by the respective licensee of the GS1 identification key appearing in the URI path information. It also makes a difference from a semantic perspective. The first example expresses that "this thing is an asset identified by this GIAI – and it is/was also a product identified by this GTIN." The second example expresses that this is a product and that it also carries this asset identifier. The second example is unlikely to be encoded by the manufacturer or brand owner in a data carrier except when an instance of a product is manufactured for a specific known customer / asset owner. Most mass-produced products are made to stock rather than made to order / bespoke. This is an example where there are two primary identifiers in a single GS1 Digital Link URI. The equivalent element string is

```
(01)09520123456788(8004)9520614141234567
```

Although there are no specific rules about which of the 'two primary keys' should go in the path and which in the query string, the order is likely to be determined by the context. In this example, the GIAI will be assigned by the owner of the item who purchased it from the manufacturer who assigned the GTIN. In this scenario, it is the owner who would create the GS1 Digital Link URI and therefore it is very likely to be the GIAI that goes in the path – the owner's primary – rather than the manufacturer. The presence of multiple primary keys has an effect on the semantics that can be inferred from the URI. See GS1 Digital Link: Semantics for more on this topic [DL-Semantics].

## 6 AIDC Issues

*This section is normative*

The use of GS1 Digital Link URIs in data carriers is governed by the GS1 General Specifications [GENSPECS]. That document defines the full GS1 system from the semantics of individual Application Identifiers and their permitted values, through to data carrier positioning and human readable information and much more besides.

The following subsections supplement the General Specifications as they pertain specifically to GS1 Digital Link.

### 6.1 Recognising a GS1 Digital Link URI

There is no special character that can be included in a data carrier to indicate that what follows is a GS1 Digital Link URI. This is because there is no special character in any data carrier to indicate that what follows is a URL – and GS1 DL URIs are URLs. This is a deliberate and important design feature: a general purpose scanning application, such as a consumer's mobile device, can scan a GS1 DL URI and treat it like any other URL.

Applications might, however, want to recognise a GS1 DL URI and, for example, make use of the GS1 identifiers or execute specific queries against a resolver. Therefore, some processing is necessary by the scanner to determine whether the string of characters is or is not conformant to this and other GS1 standards.

A scanner working within the GS1 system that recognises GS1 Digital Link SHALL only pass on the scanned string if it has determined that it is *plausibly* a conformant GS1 Digital Link URI. It is not required to ~~MAY NOT~~ carry out a full validation, which is left to the receiving application.

We offer a method based on a regular expression match for making this determination but any method is acceptable. It does not give an absolute assurance that the string *is* a conformant GS1 DL URI, rather it detects strings that are definitely not and plausibly are GS1 DL URIs. This is in

line with many scanning applications that will recognise the presence of indicator characters at the start of a barcode and act accordingly but will not process the scanned string further before passing it to a receiving application.

The following regular expression is built up from several components and is based on earlier work at W3C [Rabin].

The initial pattern matches the structure of a URL (http or https) including the little-used but possible inclusion of user-IDs and port numbers.

```
^https?:(\\\/((([^\/?#]*@)?([^\/?#:]*)?(:([^\/?#]*))?)?)?)?
```

Next we want to test for the presence of a path component containing a primary key (which may follow arbitrary other path segments). For now only, this can be either in its numeric form or its convenience string equivalent (see section 4.1). We further want to test that the path segment following the primary key:

- Is a string beginning with at least 4 digits (the value of every GS1 ID key begins with 4 digits).
- Is followed optionally zero or more repetitions of:
  - a literal forward slash;
  - one or more characters of which none are a literal forward slash;
  - another literal forward slash;
  - one or more characters of which none are a literal forward slash (this pattern matches a key qualifier and its value – see section 4.8).

Furthermore:

- A trailing forward slash is allowed at the end of the URI path info (strictly speaking forbidden by the ABNF grammar for DL but is tolerable)
- Anything following the path is within the structure of a URL with a query string and fragment identifier.

These rules are expressed in the following pattern

```
([^\?#]*) (\\\/(01|gtin|8006|itip|8013|gmn|8010|cpid|414|gln|417|party|8017|gsrnp|8018|gsrn|255|gcn|00|sscc|253|gdti|401|ginc|402|gsin|8003|grai|8004|giai)\\/) (\d{4}[^\\/]+) (\\\/[^\\/]+\\\/[^\\/]+)?(?:\?(\?([^\?\\n]*)))?(?:#([^\n]*))?
```

Looking to the future state where 'convenience alphas' are no longer permitted (section 4.1), this can be simplified to:

```
([^\?#]*) (\\\/(01|8006|8013|8010|414|417|8017|8018|255|00|253|401|402|8003|8004)\\/) (\d{4}[^\\/]+) (\\\/[^\\/]+\\\/[^\\/]+)?(?:\?(\?([^\?\\n]*)))?(?:#([^\n]*))?
```

A final complexity is that a GS1 DL URI may be compressed [DL-Compression]. The path of a compressed GS1 DL URI will:

- Contain at least 10 characters from the file-safe / URI-safe base 64 set (digits, upper and lower case Latin letters, underscore \_ and hyphen - ) as defined in RFC 4648.
- No other characters (including path separators, querystrings and fragments)
- Like the uncompressed form, there may be additional path elements *before* the path component containing the primary AI.

These features are tested by

```
\\\/[0-9A-Za-z_-]{10,}$
```

Therefore, the path of a GS1 DL URI will match either of the previous two patterns. Putting all these components together leads to this regular expression:

```
^https?:(\\\/((([^\/?#]*@)?([^\/?#:]*)?(:([^\/?#]*))?)?)?)?([^\?#]*)(((\\\/(01|gtin|8006|itip|8013|gmn|8010|cpid|414|gln|417|party|8017|gsrnp|8018|gsrn|255|gcn|00|sscc|253|gdti|401|ginc|402|gsin|8003|grai|8004|giai)\\/) (\d{4}[^\\/]+) (\\\/[^\\/]+\\\/[^\\/]+)?(?:\?(\?([^\?\\n]*)))?(?:#([^\n]*))?)|\\\/[0-9A-Za-z_-]{10,}$))
```

Without the convenience alphas, this becomes:

```
^https?:(\\\/(((^\/?#]*)@)?(^\/?#:]*) (: (^\/?#]*)?))?(^[?#]*) ((\\\/(01|8006|8013|8010|414|417|8017|8018|255|00|253|401|402|8003|8004)\\\/) (\d{4}[^\/]+) (\\\/[^\/]+\\\\/[^\/]+)?[/]?(\?([^\n]*)?#[^\n]*)?)| (\\\/[0-9A-Za-z_-]{10,}$)
```

For emphasis, a positive match against this pattern means that the input string is *plausibly* a GS1 Digital Link URI. It will be sufficient to determine, for example, whether or not to pass the string on to a receiving application that expects GS1 identifiers and understands the GS1 DL syntax. The only way to be sure that the URI is a fully conformant GS1 DL URI is to parse the string according to the rules set out in section 4 and related rules in the GS1 General Specifications [GENSPECS].

If the desire is to test specifically for an uncompressed GS1 DL URI then the final component may be omitted to give this regular expression

```
^https?:(\\\/\/(((^\/?#]*)@)?(^\/?#:]*) (: (^\/?#]*)?))?(^[?#]*)\\\/(01|gtin|8006|itip|8013|gmn|8010|cpid|414|gln|417|party|8017|gsrnp|8018|gsrn|255|gcn|00|sscc|253|gdti|401|ginc|402|gsin|8003|grai|8004|giai)\\\/) (\d{4}[^\/]+) (\\\/[^\/]+\\\\/[^\/]+)?[/]?(\?([^\n]*)?#[^\n]*)?)?
```

Or, without the convenience alphas:

```
^https?:(\\\/\/(((^\/?#]*)@)?(^\/?#:]*) (: (^\/?#]*)?))?(^[?#]*)\\\/(01|8006|8013|8010|414|417|8017|8018|255|00|253|401|402|8003|8004)\\\/) (\d{4}[^\/]+) (\\\/[^\/]+\\\\/[^\/]+)?[/]?(\?([^\n]*)?#[^\n]*)?)?
```

## 6.2 Human Readable Interpretation (HRI)

This standard defers entirely to the GS1 General Specifications for rules concerning human readable interpretation.

## 7 Glossary

The glossary lists the terms and definitions that are applied in this document. Please refer to the [www.gs1.org/glossary](http://www.gs1.org/glossary) for the online version.

Term	Definition
Attribute	An element string that provides additional information about an entity identified with a GS1 identification key, such as batch number associated with a Global Trade Item Number (GTIN).
Brand Owner	The organisation that owns the specifications of a trade item, regardless of where and by whom it is manufactured. The brand owner is normally responsible for the management of the Global Trade Item Number (GTIN).
Canonical GS1 Digital Link URI	The definitive GS1 Digital Link URI for a given resource. See section <a href="#">Canonical GS1 Digital Link URIs</a>
Consumer	Often considered as the "recipient" of the supply chain in the past, today's consumer is an active part of the supply chain and expects more data, with higher accuracy, and greater ease.
Consumer Product Variant (CPV)	An alphanumeric attribute of a GTIN assigned to a retail consumer trade item variant for its lifetime.
Data Field	A field that contains a GS1 identification key, an RCN, or attribute information
Data titles	Data titles are the abbreviated descriptions of element strings which are used to support manual interpretation of barcodes.
Dereferencing a URI	The use of an appropriate access mechanism (e.g. Web request) to perform an action on the URI's resource (e.g. to retrieve an information representation via HTTP GET or to send data to a resource via an HTTP POST operation). Dereferencing a URI is often considered synonymous with making a Web request or 'looking up' a URI on the Web.



Term	Definition
Domain name	<p>A domain name is an identification string that defines a realm of administrative autonomy, authority or control within the Internet. Domain names are formed by the rules and procedures of the Domain Name System (DNS). Any name registered in the DNS is a domain name. Domain names are used in various networking contexts and application-specific naming and addressing purposes.</p> <p>Domain names provide a abstraction layer that separates a registered name for an organisation or activity from the actual internet addresses (IP addresses) that provide its associated information services such as its Website, its e-mail server etc. The system that connects the domain names with the corresponding IP addresses is the Domain Name System (DNS).</p>
Element string	The combination of a GS1 Application Identifier and GS1 Application Identifier data field.
GS1 Application identifier	The field of two or more digits at the beginning of an element string that uniquely defines its format and meaning.
GS1 Application identifier data field	The data used in a business application defined by one GS1 Application Identifier.
GS1 Barcode	A data carrier which encodes GS1 Application Identifier element strings.
GS1 Barcode using GS1 Application Identifiers	All GS1 endorsed barcode symbologies that can encode more than a GTIN namely GS1-128, GS1 DataMatrix, GS1 DataBar and Composite and GS1 QR Code.
GS1 Identification key	A unique identifier for a class of objects (e.g. a trade item) or an instance of an object (e.g. a logistic unit).
GS1 key qualifier	A key qualifier is an additional attribute that is designated for use as part of a compound key (e.g., GTIN + serial number is a compound key, with the serial number being a key qualifier for the GTIN)
GS1 Digital Link URI	A Web URI conforming to the GS1 Digital Link URI syntax.
LGTIN (GTIN + Lot/Batch)	A compound key formed from the combination of GTIN [ AI (01) ] and Batch/Lot identifier [ AI (10) ]. LGTIN is defined as an EPC Class URN in the current GS1 Tag Data Standard (v1.11), sections 6.4.1 and 7.14, which describes the mapping between the EPC Class URN format for LGTIN and the corresponding element string.
Parsing	The process of analysing the structure of a sentence or URI structure in order to extract relevant information from it. Note that within the context of EPC URN structures, parsing refers to the ability to extract structural components within the EPC structure, e.g. for the purpose of matching against EPC URN patterns.
QR Code®	A two-dimensional matrix symbology consisting of square modules arranged in a square pattern. The symbology is characterised by a unique finder pattern located at three corners of the symbol. QR Code® symbols are read by two-dimensional imaging scanners or vision systems
Reference GS1 Digital Link URI	A GS1 Digital Link URI that uses the id.gs1.org domain
Resolver	The term 'resolver' is not unique to GS1. It is the name for any service that accepts an identifier as input and passes the request about the identified item to information about it. In the GS1 context, a resolver connects a GS1-identified item to one or more online resources that are directly related to it. The item may be identified at any level of granularity, and the resources may be either human or machine readable. Examples include product information pages, instruction manuals, patient leaflets and clinical data, product data, service APIs, marketing experiences and more. GS1 resolvers are defined in [DL-Resolution]
Retailer	An organisation engaged in the sale and distribution of products to consumers. Also includes online retailers / e-tailers
SGTIN (Serialised GTIN)	A compound key formed from the combination of a GTIN [AI (01) ] with Serial Number [ AI (21) ] which provides globally unique identification for every instance of a product. The term SGTIN appears in section 6.3.1 and 7.1 of the current GS1 Tag Data Standard, v1.11

Term	Definition
Subdomain	<p>A subdomain is a domain that is part of a main domain. Although example.com is a subdomain of the top-level domain (.com), we most often think of a subdomain as the part of the hostname that precedes the registered domain name. For example, the registered domain name gs1.org has one subdomain ('www') [ as in www.gs1.org ] that is used for its Website. It also has a subdomain ('id') [ as in id.gs1.org] that is used for Web-based data services for GS1.</p>
URI	<p>Uniform Resource Identifier. A string of characters used to identify a resource. The resource may be an information resource such as a Web page or a thing in the real world, such as a physical object, person or location. URIs refer to the superset of Uniform Resource Names (URNs), Uniform Resource Locators (URLs) and Web URIs (which can function both as globally unambiguous names, while also behaving like URLs by enabling intuitive retrieval of related information via the Web).</p>
URI fragment identifier	<p>The fragment identifier component of a URI allows indirect identification of a secondary resource by reference to a primary resource and additional identifying information. The identified secondary resource may be some portion or subset of the primary resource, some view on representations of the primary resource, or some other resource defined or described by those representations. A fragment identifier component is indicated by the presence of an octothorpe / hash / number sign ("#") character and terminated by the end of the URI.</p> <p>A typical use of a URI fragment identifier is to provide a direct link to a specific section within a very long Web document such as  <a href="https://www.w3.org/TR/dwbp/#DataIdentifiers">https://www.w3.org/TR/dwbp/#DataIdentifiers</a></p>
URI path information	<p>A path consists of a sequence of path segments separated by a slash ("/") character. A path is always defined for a URI, though the defined path may be empty (zero length). The path component contains data, usually organized in hierarchical form, that, along with data in the non-hierarchical query component, serves to identify a resource within the scope of the URI's scheme and naming authority (if any). The path is terminated by the first question mark ("?") or number sign ("#") character, or by the end of the URI.</p>
URI query string	<p>The query component contains non-hierarchical data that, along with data in the path component, serves to identify a resource within the scope of the URI's scheme and naming authority (if any). The query component is indicated by the first question mark ("?") character and terminated by a number sign ("#") character or by the end of the URI.</p>
URL	<p>Uniform Resource Locator (URL), a specific type of URI colloquially known as Web address.</p> <p>A URL is a URI starting with http or https .</p>

## 8 Changes since version 1.1

The single GS1 Digital Link standard version 1.1 has been split into four separate documents:

- GS1 Digital Link: URI syntax (this document)
- GS1 Digital Link: Resolution
- GS1 Digital Link: Compression and decompression
- GS1 Digital Link: Semantics

The canonical version of a GS1 Digital Link URI, section 4.12, is now defined as using HTTPS and the key=value pairs in the query string are now sorted in lexical order of the AIs.

AIs in the 410-416 range, except 414 and 417, have been removed from the list of primary keys (section 4.3).

The ABNF grammar has been updated to support new AIs in the range 4300-4326 introduced in the GS1 General Specifications as a result of GS1 Scan4Transport.

All primary keys can be included in the query string to accommodate situations where a single URI needs to carry more than one primary key (section 4.10).

Convenience alphas deprecation notice (4.1, 4.13)

New paragraph emphasising that GS1 DL URIs do not have to, and SHALL NOT be assumed to, point to a resolver (section 2).

Updated introduction.

Example GS1 identifiers changed to use the 952 prefix.

## 9 References

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[DL1]

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[DL 1.1]

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[DL-Compression]

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[DL-Resolution]

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[DL-Semantics]

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[GS1 Identification Keys]

<https://www.gs1.org/standards/id-keys>

[GS1Voc]

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[IRIs]

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[Linked Data]

Tim Berners-Lee 2006 <https://www.w3.org/DesignIssues/LinkedData>

## [LMS]

GS1 Lightweight Messaging Standard for Verification of Product Identifiers, Release 1.1. GS1 ratified standard July 2019  
[https://www.gs1.org/sites/default/files/docs/standards/gs1\\_lightweight\\_verification\\_messaging\\_standard\\_v1-1.pdf](https://www.gs1.org/sites/default/files/docs/standards/gs1_lightweight_verification_messaging_standard_v1-1.pdf)

## [Rabin]

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## [PercentEncoding]

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## [REST]

See [https://en.wikipedia.org/wiki/Representational\\_state\\_transfer](https://en.wikipedia.org/wiki/Representational_state_transfer)

## [RFC 2606]

Reserved Top Level Domain Names D Eastlake, A Panitz. IETF June 1999 <https://tools.ietf.org/html/rfc2606>

## [RFC 3986]

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